

# Ultra Compact and Versatile Filtered Power Entry Module



- | Single stage filter
- | Ultra compact design
- | Rated currents up to 10 A
- | dual-fuse holder
- | Fuses Ø5x20mm
- | 2-pole rocker switch
- | Good attenuation performance
- | Faston or spring cage terminals



## Approvals



## RoHS

(CQC except HI-types); Patent US20110227692 / US8766761

## Performance indicators

Attenuation performance



Rated current [A]



The FN 9280 power entry module combines an IEC inlet, a mains filter and a dual fuse holder with a 2-pole rocker switch in an ultra compact housing.

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.

## Technical specifications

|  |   |
|--|---|
| <b>Mechanical life</b>                           | 50,000 cycles   |
| <b>High potential test voltage</b>               | P → PE 2000 VAC for 2 sec (standard types)<br>P → N 760 VAC for 2 sec<br>P → PE 2500 VAC for 2 sec (B types)      |
| <b>MTBF @ 40°C/230V (Mil-HB-217F)</b>            | > 1,000,000 hours   |
| <b>Temperature range (operation and storage)</b> | - 25 °C to +85 °C (25/85/21)  |
| <b>Design corresponding to</b>                   | UL 1283, CSA 22.2 No. 8 1986, EN60939, EN60950, EN60601-1, UL544, EN60320   |
| <b>Flammability corresponding to</b>             | UL 94 V-2 or better   |
| <b>Maximum continuous operating voltage</b>      | 250 VAC, 50/60 Hz   |
| <b>Rated currents</b>                            | 1 to 10 A* @ 40 °C max.   |
| <b>Operating frequency</b>                       | 50 to 400 Hz  |
| <b>Switch ratings</b>                            |   |
| <b>USA (UL) and Canada (C-UL)</b>                | 10 A, 125 VAC; 10 A, 250 VAC; 1/3HP   |
| <b>Europe (ENEC)</b>                             | 10 A (4 A), 250 VAC**   |
| <b>Electrical specifications</b>                 | Inrush current 82 A<br>6,000 on-off operations according to UL 1054<br>10,000 on-off operations according to ENEC |
| <b>Leakage current</b>                           | Standard: <500uA at 250 VAC/50 Hz<br>Medical: <5uA at 250 VAC/50 Hz   |
| <b>Protection category</b>                       | IP40 according to IEC 60529 (front side)  |
| <b>Fuse holder</b>                               | 2fuses (Ø5 x 20 mm) max. 250 V  |
| <b>Terminals</b>                                 | IP20 spring cage safe against finger touch  |
| <b>Spring cage wire range</b>                    | 0.2 – 1.5 mm <sup>2</sup> / 24 – 16 AWG single or flexible wire   |
| <b>Rocker switch</b>                             | 2-pole, dark not illuminated, Marking I - 0   |

\* 10 A version is 8 A UL approved

\*\* Value in () relates to the inductive current charge: cos γ = 0.65



## Features and benefits

- | Good 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 fuse holder
- | 2-pole rocker switch
- | Faston or spring cage terminals for more flexible assembly
- | Medical version (B Type) according IEC / EN60601-1
- | Spare fuse holder

## Typical applications

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

## Filter selection table

| Filter*        | Rated current | Leakage current** | Inductance      |     | Capacitance |     | Resistance | Output connections  |   | Weight |
|----------------|---------------|-------------------|-----------------|-----|-------------|-----|------------|---|---|--------|
|                | @ 40 °C       |                   | @ 250 V ~/50 Hz | L1  | L2          | Cx  |            | R   |   |        |
|                | [A]           | [uA]              | [mH]            |     | [nF]        |     | [kOhm]     |  |  | [g]    |
| FN9280-1-..    | 1             | 311               | 10.9            | 0   | 220         | 2.2 | 1000       | -06   | -100  | 101    |
| FN9280-2-..    | 2             | 311               | 4.4             | 0   | 220         | 2.2 | 1000       | -06   | -100  | 102    |
| FN9280-4-..    | 4             | 311               | 1.7             | 0   | 220         | 2.2 | 1000       | -06   | -100  | 105    |
| FN9280-6-..    | 6             | 311               | 0.78            | 0   | 220         | 2.2 | 1000       | -06   | -100  | 104    |
| FN9280-10-..   | 10            | 311               | 0.32            | 0   | 220         | 2.2 | 1000       | -06   | -100  | 106    |
| FN9280B-1-..   | 1             | 2                 | 10.9            | 0   | 220         | 0   | 1000       | -06   | -100  | 101    |
| FN9280B-2-..   | 2             | 2                 | 4.4             | 0   | 220         | 0   | 1000       | -06   | -100  | 102    |
| FN9280B-4-..   | 4             | 2                 | 1.7             | 0   | 220         | 0   | 1000       | -06   | -100  | 105    |
| FN9280B-6-..   | 6             | 2                 | 0.78            | 0   | 220         | 0   | 1000       | -06   | -100  | 104    |
| FN9280B-10-..  | 10            | 2                 | 0.32            | 0   | 220         | 0   | 1000       | -06   | -100  | 106    |
| FN9289-1-..    | 1             | 311               | 10.9            | 0   | 220         | 2.2 | 1000       | -06   | -100  | 101    |
| FN9289-2-..    | 2             | 311               | 4.4             | 0   | 220         | 2.2 | 1000       | -06   | -100  | 102    |
| FN9289-4-..    | 4             | 311               | 1.7             | 0   | 220         | 2.2 | 1000       | -06   | -100  | 105    |
| FN9289-6-..    | 6             | 311               | 0.78            | 0   | 220         | 2.2 | 1000       | -06   | -100  | 104    |
| FN9289-10-..   | 10            | 311               | 0.32            | 0   | 220         | 2.2 | 1000       | -06   | -100  | 106    |
| FN9289B-1-..   | 1             | 2                 | 10.9            | 0   | 220         | 0   | 1000       | -06   | -100  | 101    |
| FN9289B-2-..   | 2             | 2                 | 4.4             | 0   | 220         | 0   | 1000       | -06   | -100  | 102    |
| FN9289B-4-..   | 4             | 2                 | 1.7             | 0   | 220         | 0   | 1000       | -06   | -100  | 105    |
| FN9289B-6-..   | 6             | 2                 | 0.78            | 0   | 220         | 0   | 1000       | -06   | -100  | 104    |
| FN9289B-10-..  | 10            | 2                 | 0.32            | 0   | 220         | 0   | 1000       | -06   | -100  | 106    |
| FN9280E-1-..   | 1             | 311               | 10.9            | 0.4 | 220         | 2.2 | 1000       | -06   | -100  | 135    |
| FN9280E-2-..   | 2             | 311               | 4.4             | 0.4 | 220         | 2.2 | 1000       | -06   | -100  | 136    |
| FN9280E-4-..   | 4             | 311               | 1.66            | 0.4 | 220         | 2.2 | 1000       | -06   | -100  | 137    |
| FN9280E-6-..   | 6             | 311               | 0.78            | 0.4 | 220         | 2.2 | 1000       | -06   | -100  | 138    |
| FN9280E-10-..  | 10            | 311               | 0.32            | 0.4 | 220         | 2.2 | 1000       | -06   | -100  | 139    |
| FN9280BE-1-..  | 1             | 2                 | 10.9            | 0.4 | 220         | 0   | 1000       | -06   | -100  | 135    |
| FN9280BE-2-..  | 2             | 2                 | 4.4             | 0.4 | 220         | 0   | 1000       | -06   | -100  | 136    |
| FN9280BE-4-..  | 4             | 2                 | 1.66            | 0.4 | 220         | 0   | 1000       | -06   | -100  | 137    |
| FN9280BE-6-..  | 6             | 2                 | 0.78            | 0.4 | 220         | 0   | 1000       | -06   | -100  | 138    |
| FN9280BE-10-.. | 10            | 2                 | 0.32            | 0.4 | 220         | 0   | 1000       | -06   | -100  | 139    |
| FN9289E-1-..   | 1             | 311               | 10.9            | 0.4 | 220         | 2.2 | 1000       | -06   | -100  | 135    |
| FN9289E-2-..   | 2             | 311               | 4.4             | 0.4 | 220         | 2.2 | 1000       | -06   | -100  | 136    |
| FN9289E-4-..   | 4             | 311               | 1.66            | 0.4 | 220         | 2.2 | 1000       | -06   | -100  | 137    |
| FN9289E-6-..   | 6             | 311               | 0.78            | 0.4 | 220         | 2.2 | 1000       | -06   | -100  | 138    |
| FN9289E-10-..  | 10            | 311               | 0.32            | 0.4 | 220         | 2.2 | 1000       | -06   | -100  | 139    |
| FN9289BE-1-..  | 1             | 2                 | 10.9            | 0.4 | 220         | 0   | 1000       | -06   | -100  | 135    |
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| FN9289BE-4-..  | 4             | 2                 | 1.66            | 0.4 | 220         | 0   | 1000       | -06   | -100  | 137    |
| FN9289BE-6-..  | 6             | 2                 | 0.78            | 0.4 | 220         | 0   | 1000       | -06   | -100  | 138    |
| FN9289BE-10-.. | 10            | 2                 | 0.32            | 0.4 | 220         | 0   | 1000       | -06   | -100  | 139    |

\* 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 IEC 60939-1 Ed. 3 at 250 V AC.

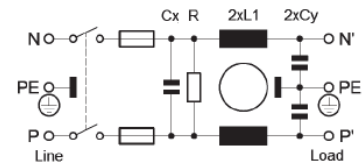
## Product selector

FN 92www-xx-yy-zz

|                 |   |
|-----------------|---|
| <b>Blank:</b>   | <b>Snap in range 1.0 to 2.5 mm</b>                                |
| Optional: 30:   | Snap in range >2.5 to 3.5 mm                                      |
| <b>06:</b>      | <b>Fast-On 6.3 x 0.8 mm (spade/soldering)</b>                     |
| <b>100:</b>     | <b>Spring cage</b>  |
| <b>1 to 10:</b> | <b>Rated current [A]</b>  |
| <b>Blank:</b>   | <b>Standard version</b>   |
| <b>B:</b>       | <b>Medical version (without Y2-capacitor)</b>                     |
| Optional: E:    | Earth line choke  |
| BE:             | Medical version (without YZ-capacitor) with earth line choke      |
| <b>0:</b>       | <b>Flange version vertical/horizontal/front/rear mounting set</b> |
| <b>9:</b>       | <b>Snap-in version, snapper on horizontal side (top / bottom)</b> |
| 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)          |
| <b>8:</b>       | <b>Single stage filter</b>  |
| <b>9:</b>       | <b>Dual stage filter</b>  |

## Typical electrical schematic

FN 9280 Standard types (B types without Cy)



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

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

Order Examples:

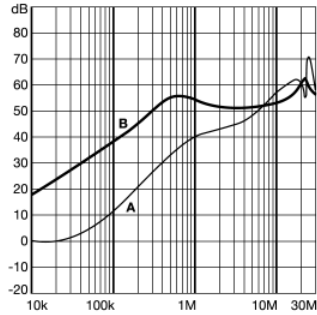
FN 9280B-6-100: Medical version of single stage, dual fuse EMC/EMI filter, flange set for vertical/horizontal/front/rear mounting, 6 A, spring cage terminals, from stock available.

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

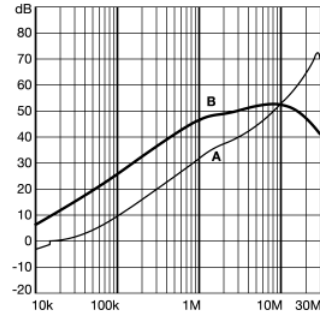
### Typical filter attenuation

**FN 9280 Series** | Per CISPR 17; A = 50 Ω/50 Ω sym; B = 50 Ω/50 Ω asym

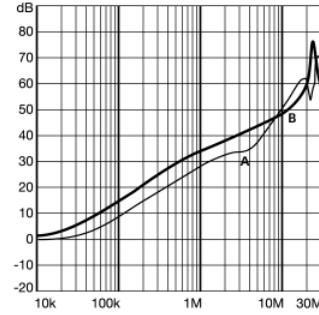
1 A types



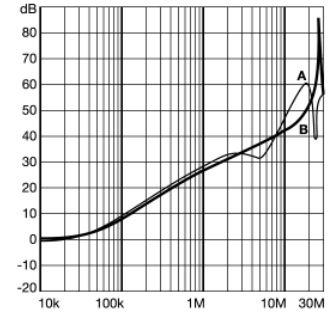
2 A types



4 – 6 A types

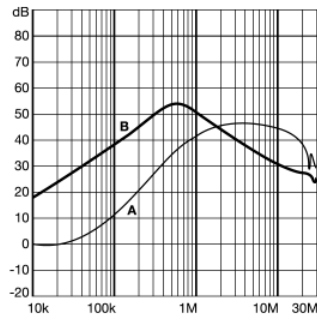


10 A types

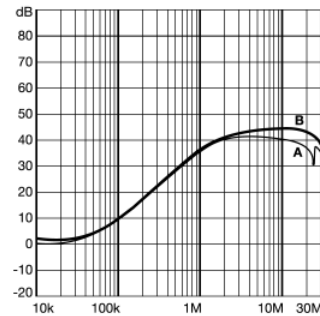


**FN 9280B Series** | Per CISPR 17; A = 50 Ω/50 Ω sym; B = 50 Ω/50 Ω asym

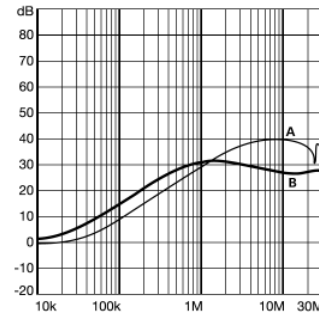
1 A types



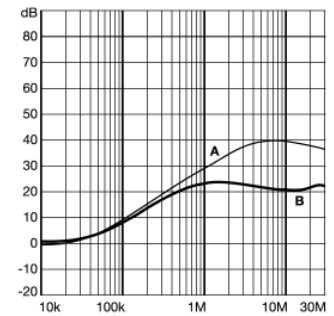
2 A types



4 – 6 A types

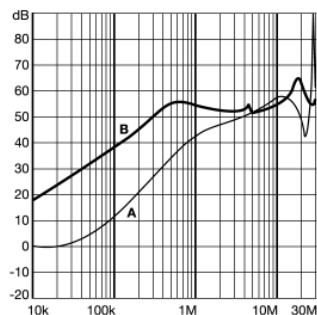


10 A types

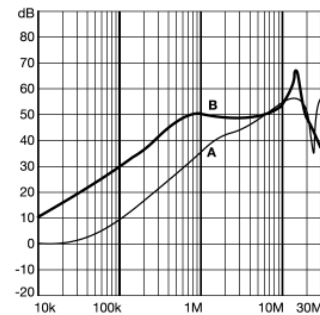


**FN 9280E Series** | Per CISPR 17; A = 50 Ω/50 Ω sym; B = 50 Ω/50 Ω asym

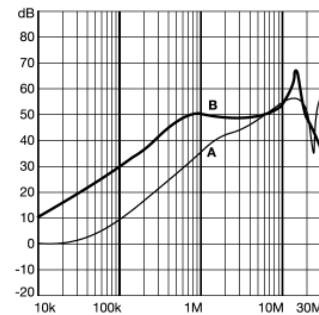
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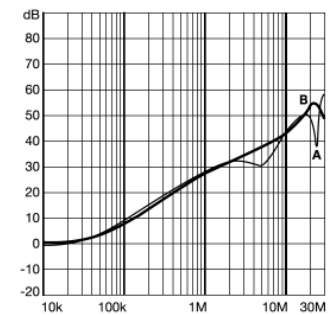
2 A types



4 – 6 A types

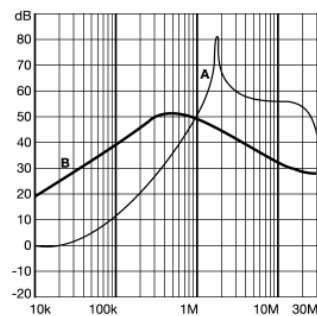


10 A types

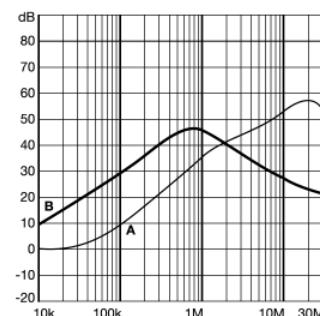


**FN 9280BE Series** | Per CISPR 17; A = 50 Ω/50 Ω sym; B = 50 Ω/50 Ω asym

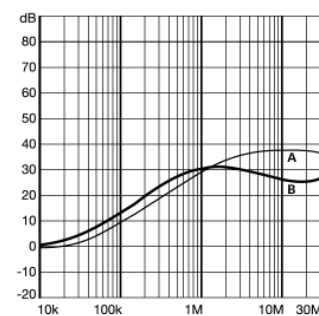
1 A types



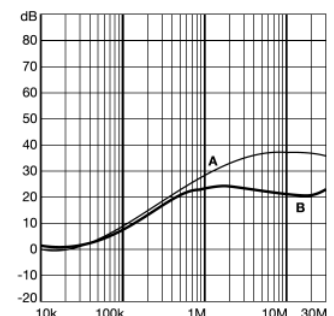
2 A types



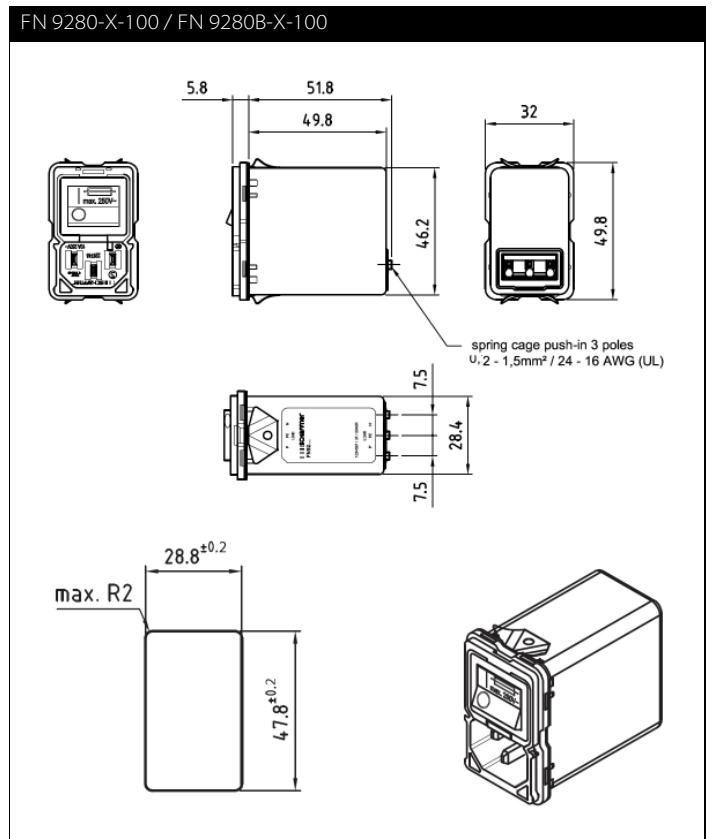
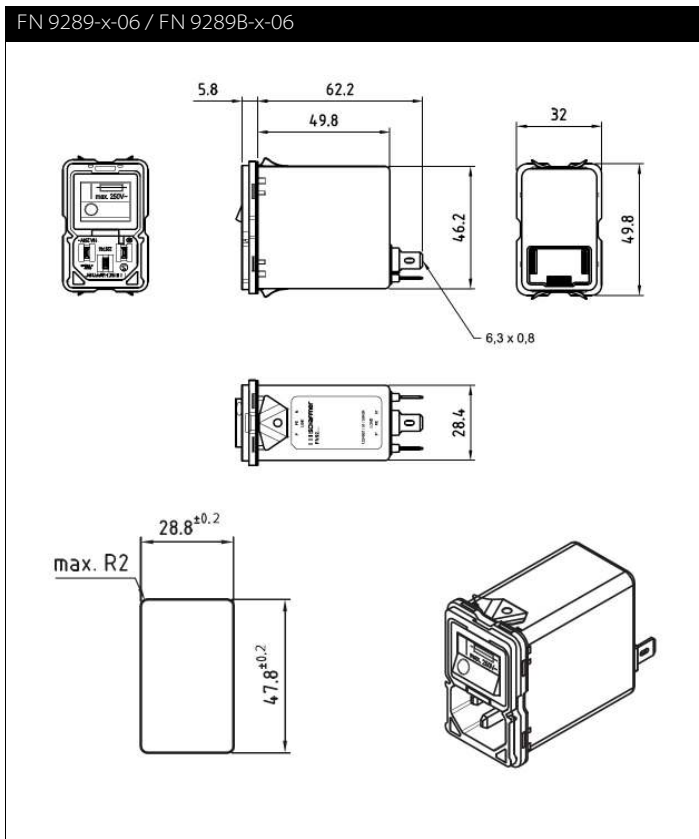
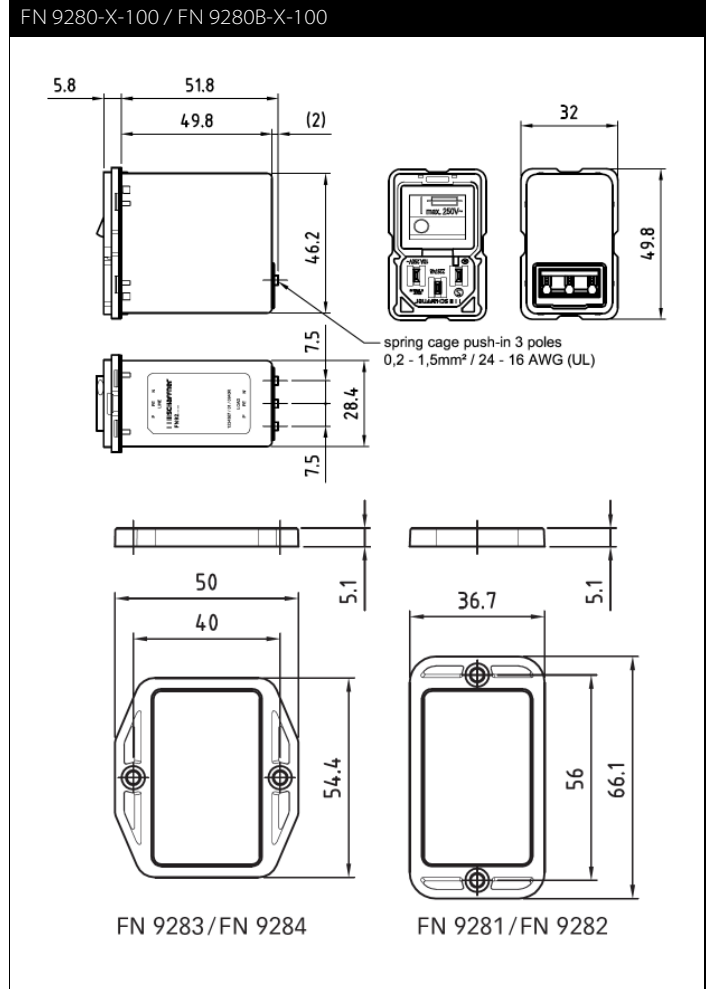
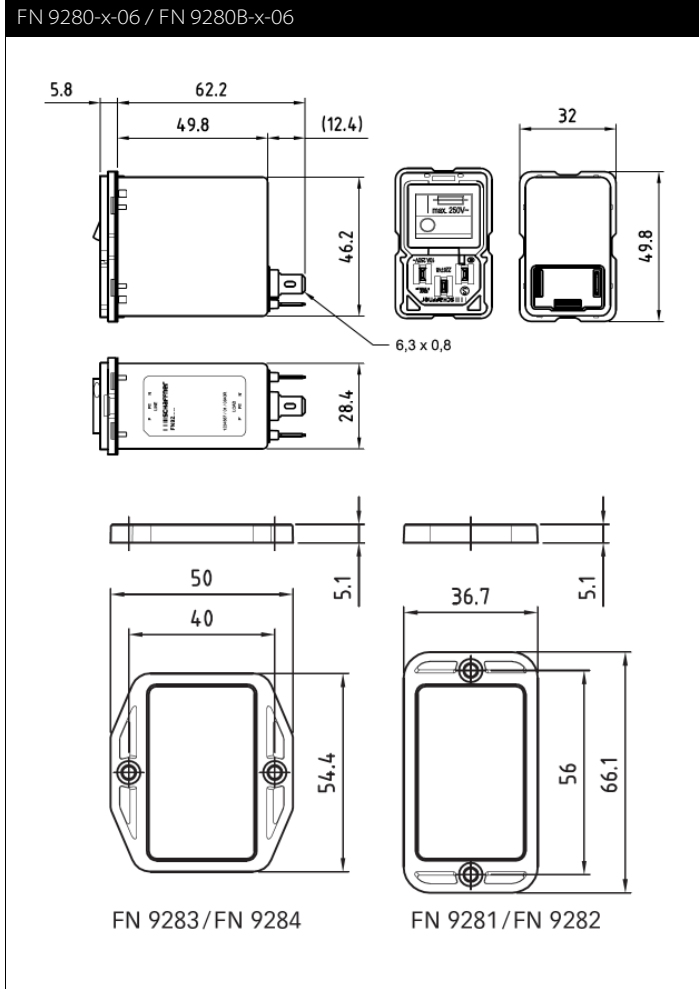
4 – 6 A types



10 A types



**Mechanical Data:**



Assembly Instructions

**REAR MOUNTING**

**FRONT MOUNTING**

vertical:

horizontal:

vertical:

horizontal:

FN9280xx  
FN9290xx  
FN9281xx  
FN9291xx

FN9280xx  
FN9290xx  
FN9283xx  
FN9293xx

FN9280xx  
FN9290xx  
FN9282xx  
FN9292xx

FN9280xx  
FN9290xx  
FN9284xx  
FN9294xx

panel

panel

panel

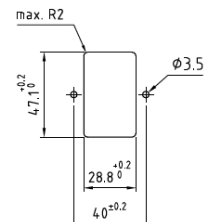
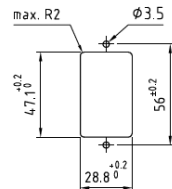
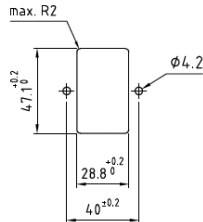
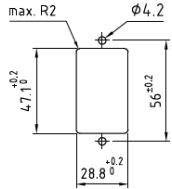
panel

Cutout:

Cutout:

Cutout:

Cutout:

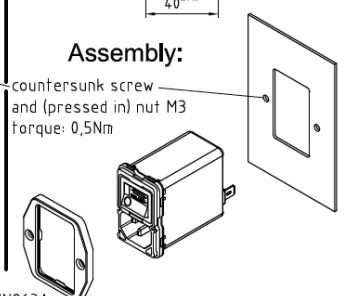
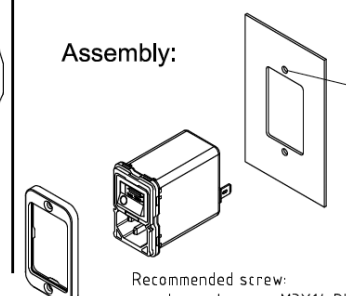
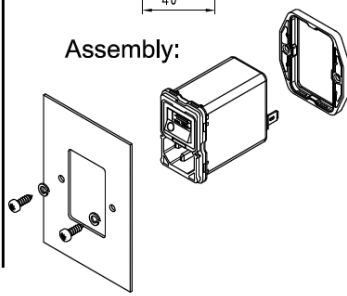
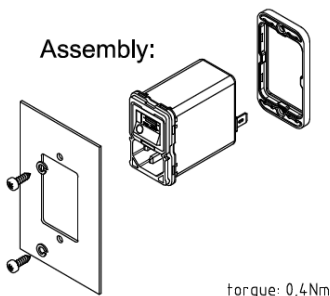


Assembly:

Assembly:

Assembly:

Assembly:



torque: 0,4Nm

Recommended screw:  
countersunk screw M3X14 DIN963A

countersunk screw  
and (pressed in) nut M3  
torque: 0,5Nm

**Terminal -100**

clamping range, solid wire / flex wire

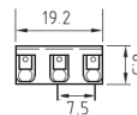
0,20 mm<sup>2</sup> – 1,5 mm<sup>2</sup>, AWG24 – AWG16

operating force of slider

max. 40 N

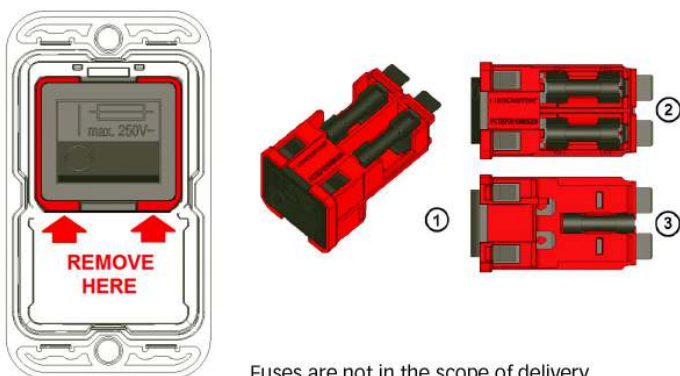
recommended stripped length

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](http://www.schaffner.com) to find more details on filter connectors.



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