

# 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

- 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 and additional spare fuse holder
- 2-pole rocker switch
- Faston or spring cage terminals for more flexible assembly
- Medical version (B Type) according 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

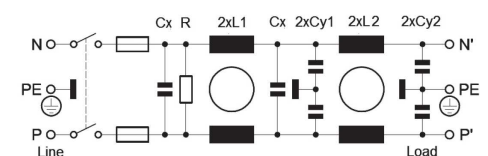
|                                                  |                                                                                                                   |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|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

\* 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<br>@ 40°C | Leakage current**<br>@ 250 VAC / 50 Hz<br>(@ 120 VAC / 60 Hz) | Inductance |      | Capacitance |      |        | Resistance<br>R | Output connections |      | Weight<br>[g] |
|-----------------|-------------------------|---------------------------------------------------------------|------------|------|-------------|------|--------|-----------------|--------------------|------|---------------|
|                 |                         |                                                               | L1         | L2   | Cx          | Cy1  | Cy2    |                 |                    |      |               |
|                 | [A]                     | [mA]                                                          | [mH]       | [nF] | [nF]        | [nF] | [kOhm] |                 |                    |      |               |
| 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 92WWW-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:

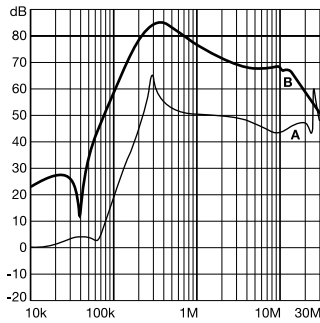
FN 9280 B-6-100: Medical version of single stage, dual fuse EMC/EMI filter, flange set for vertical/horizontal/front/rear mounting, 6 A, spring cage terminals, from stock available.

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

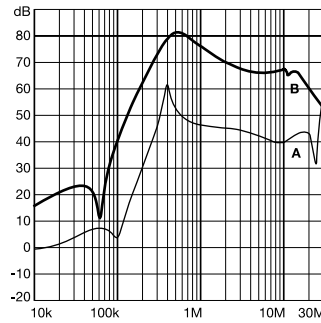
### Typical filter attenuation

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

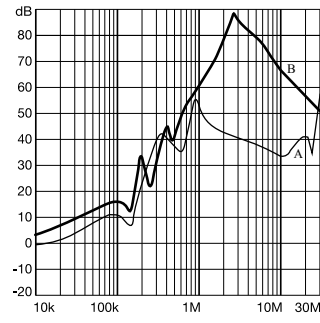
1 A types



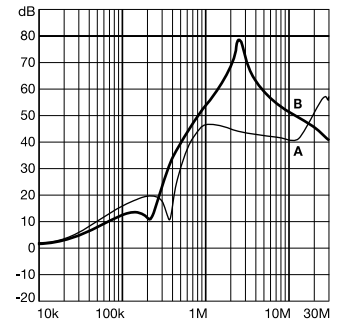
2 A types



4 – 6 A types

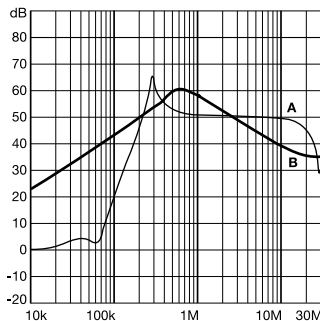


10 A types

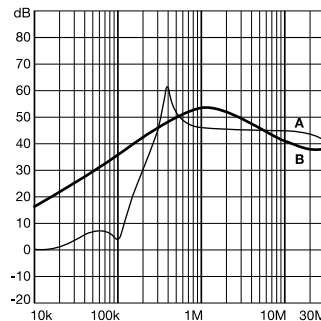


**FN 9290 B Series | Typical filter attenuation** | Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

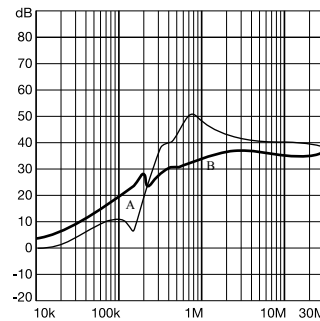
1 A types



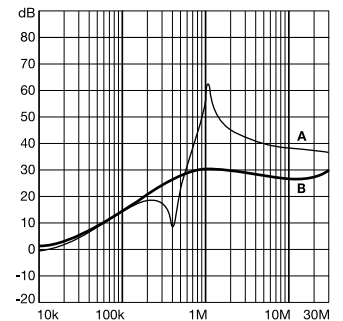
2 A types



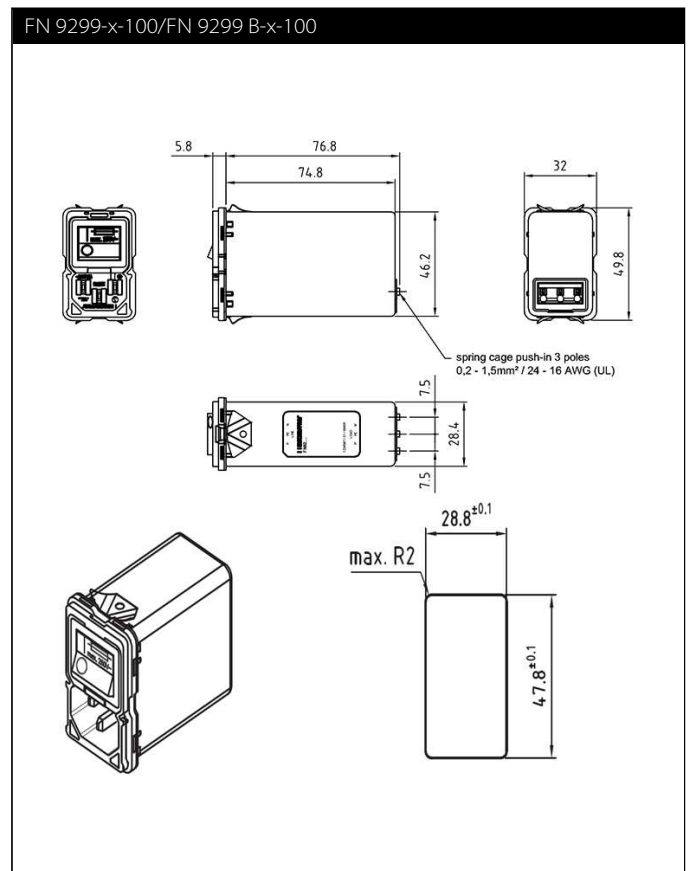
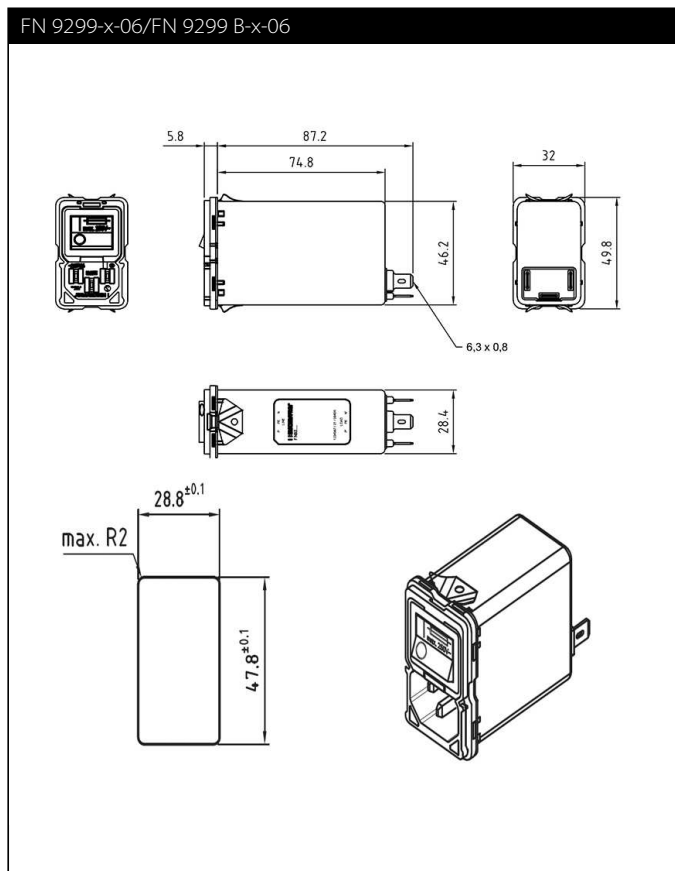
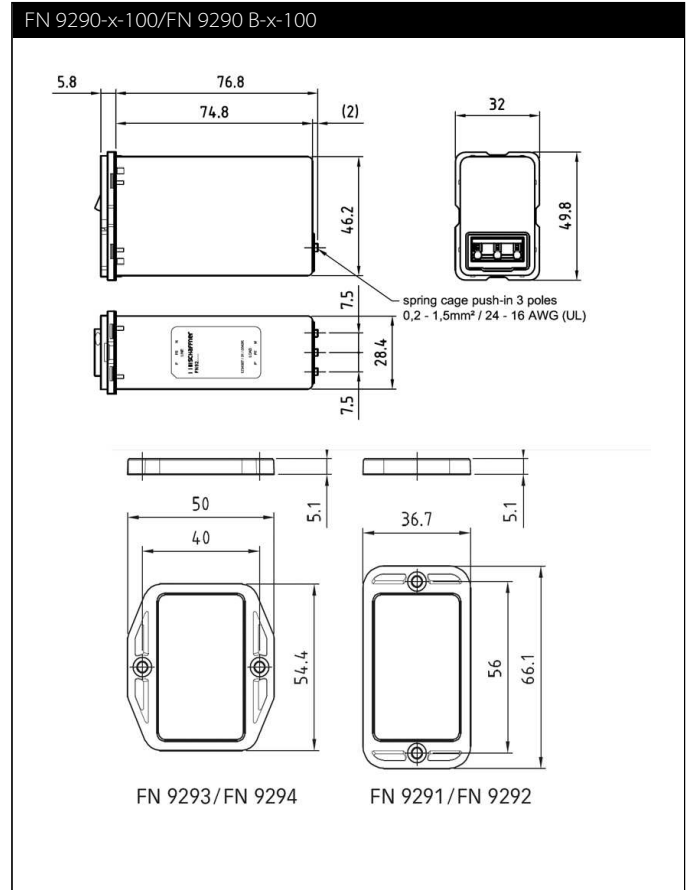
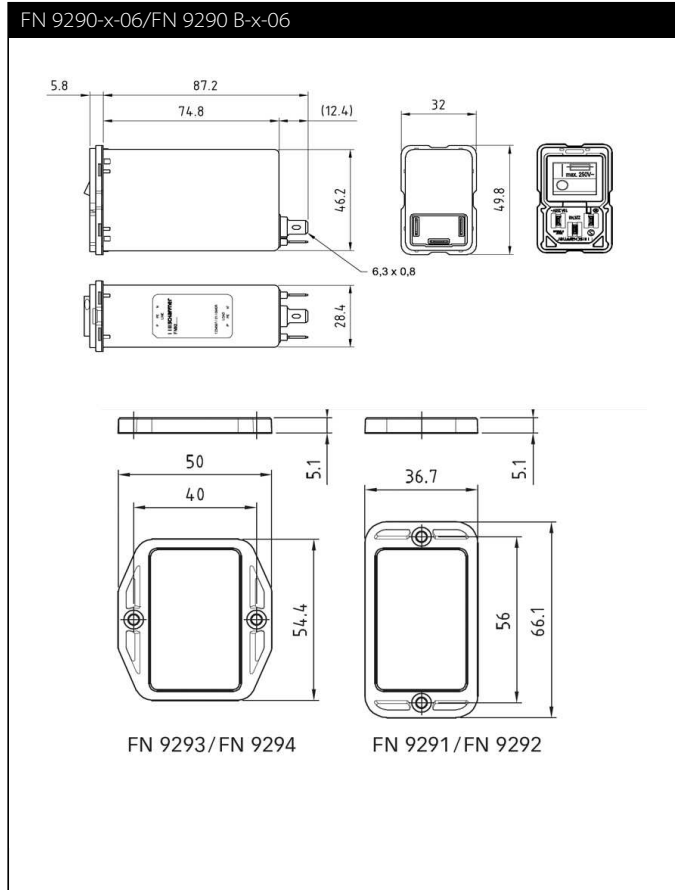
4 – 6 A types



10 A types



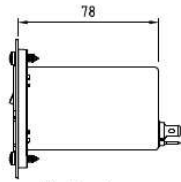
**Mechanical Data**



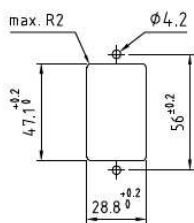
Assembly Instructions

REAR MOUNTING

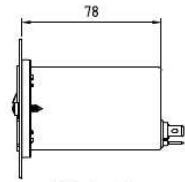
vertical:



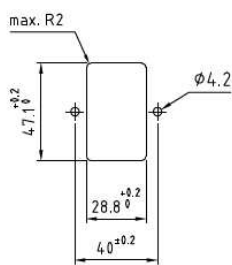
Cutout:



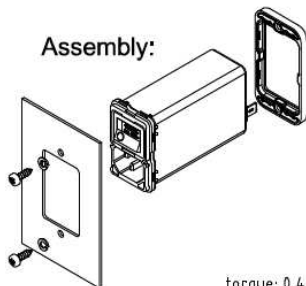
horizontal:



Cutout:



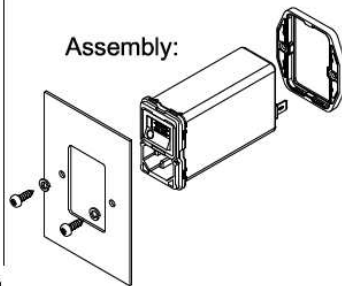
Assembly:



torque: 0,4Nm

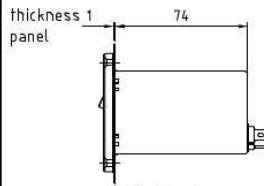
Recommended screw:  
Panhead tapping screw d x l 3,9 x 9,5 mm

Assembly:

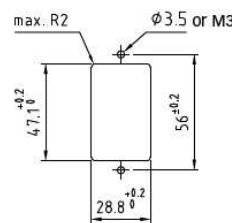


FRONT MOUNTING

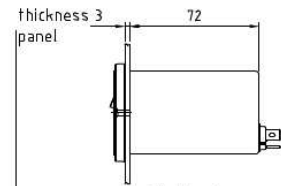
vertical:



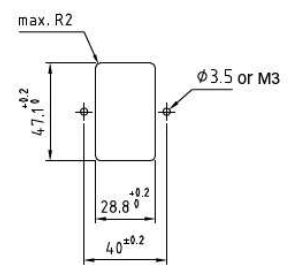
Cutout:



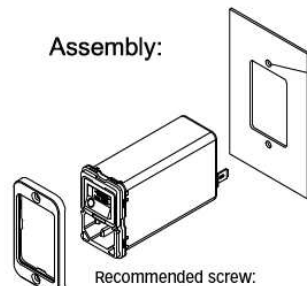
horizontal:



Cutout:

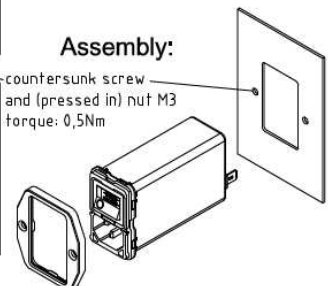


Assembly:



Recommended screw:  
Countersunk screw M3X14 DIN963A

Assembly:



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

Terminal -100

clamping range, solid wire / flex wire

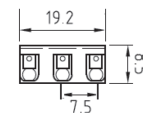
0,20 mm<sup>2</sup> -1,5 mm<sup>2</sup>, AWG24 -AWG16

operating force of slider

max. 40 N

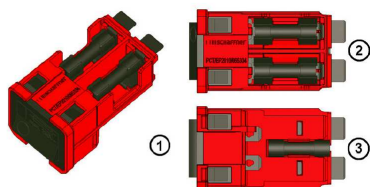
recommended stripped length

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.



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