

Ultra Compact and Versatile Filtered Power Entry Module

SCHAFNER
energy efficiency and reliability



Fuse holder included

- Single stage filter FN 9280
- Dual stage filter FN 9290
- Ultra compact design
- Rated currents up to 10A
- Dual fuse holder
- 2-pole rocker switch
- Good attenuation performance
- Faston or spring cage terminals

Technical specifications

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

* 10A version is 8A UL approved

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

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.

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

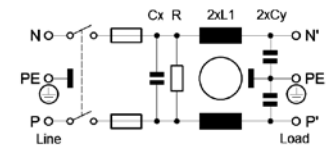
Approvals



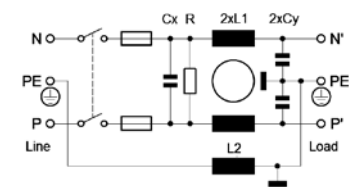
(CQC, approval pending)

Typical electrical schematic

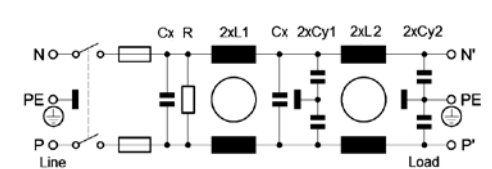
FN 9280 Standard types (B types without Cy)



FN 9280 E types (B types without Cy)



FN 9290 Standard types (B types without Cy)





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

FN 9280 Series

Filter selection table

| Filter* | Rated current @ 40°C | Leakage current** @ 250V ~/50Hz | Inductance | | Capacitance | | Resistance R | Output connections | | Weight [g] |
|-----------------|-------------------------|------------------------------------|------------|-----|-------------|-----|-----------------|---|---|---------------|
| | | | L1 | L2 | Cx | Cy | |  |  | |
| | [A] | [uA] | [mH] | | [nF] | | [kOhm] | | | |
| FN 9280-1-.. | 1 | 311 | 10.9 | 0 | 220 | 2.2 | 1000 | -06 | -100 | 101 |
| FN 9280-2-.. | 2 | 311 | 4.4 | 0 | 220 | 2.2 | 1000 | -06 | -100 | 102 |
| FN 9280-4-.. | 4 | 311 | 1.7 | 0 | 220 | 2.2 | 1000 | -06 | -100 | 105 |
| FN 9280-6-.. | 6 | 311 | 0.78 | 0 | 220 | 2.2 | 1000 | -06 | -100 | 104 |
| FN 9280-10-.. | 10 | 311 | 0.32 | 0 | 220 | 2.2 | 1000 | -06 | -100 | 106 |
| FN 9280B-1-.. | 1 | 2 | 10.9 | 0 | 220 | 0 | 1000 | -06 | -100 | 101 |
| FN 9280B-2-.. | 2 | 2 | 4.4 | 0 | 220 | 0 | 1000 | -06 | -100 | 102 |
| FN 9280B-4-.. | 4 | 2 | 1.7 | 0 | 220 | 0 | 1000 | -06 | -100 | 105 |
| FN 9280B-6-.. | 6 | 2 | 0.78 | 0 | 220 | 0 | 1000 | -06 | -100 | 104 |
| FN 9280B-10-.. | 10 | 2 | 0.32 | 0 | 220 | 0 | 1000 | -06 | -100 | 106 |
| FN 9289-1-.. | 1 | 311 | 10.9 | 0 | 220 | 2.2 | 1000 | -06 | -100 | 101 |
| FN 9289-2-.. | 2 | 311 | 4.4 | 0 | 220 | 2.2 | 1000 | -06 | -100 | 102 |
| FN 9289-4-.. | 4 | 311 | 1.7 | 0 | 220 | 2.2 | 1000 | -06 | -100 | 105 |
| FN 9289-6-.. | 6 | 311 | 0.78 | 0 | 220 | 2.2 | 1000 | -06 | -100 | 104 |
| FN 9289-10-.. | 10 | 311 | 0.32 | 0 | 220 | 2.2 | 1000 | -06 | -100 | 106 |
| FN 9289B-1-.. | 1 | 2 | 10.9 | 0 | 220 | 0 | 1000 | -06 | -100 | 101 |
| FN 9289B-2-.. | 2 | 2 | 4.4 | 0 | 220 | 0 | 1000 | -06 | -100 | 102 |
| FN 9289B-4-.. | 4 | 2 | 1.7 | 0 | 220 | 0 | 1000 | -06 | -100 | 105 |
| FN 9289B-6-.. | 6 | 2 | 0.78 | 0 | 220 | 0 | 1000 | -06 | -100 | 104 |
| FN 9289B-10-.. | 10 | 2 | 0.32 | 0 | 220 | 0 | 1000 | -06 | -100 | 106 |
| FN 9280E-1-.. | 1 | 311 | 10.9 | 0.4 | 220 | 2.2 | 1000 | -06 | -100 | 135 |
| FN 9280E-2-.. | 2 | 311 | 4.4 | 0.4 | 220 | 2.2 | 1000 | -06 | -100 | 136 |
| FN 9280E-4-.. | 4 | 311 | 1.66 | 0.4 | 220 | 2.2 | 1000 | -06 | -100 | 137 |
| FN 9280E-6-.. | 6 | 311 | 0.78 | 0.4 | 220 | 2.2 | 1000 | -06 | -100 | 138 |
| FN 9280E-10-.. | 10 | 311 | 0.32 | 0.4 | 220 | 2.2 | 1000 | -06 | -100 | 139 |
| FN 9280BE-1-.. | 1 | 2 | 10.9 | 0.4 | 220 | 0 | 1000 | -06 | -100 | 135 |
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| FN 9280BE-4-.. | 4 | 2 | 1.66 | 0.4 | 220 | 0 | 1000 | -06 | -100 | 137 |
| FN 9280BE-6-.. | 6 | 2 | 0.78 | 0.4 | 220 | 0 | 1000 | -06 | -100 | 138 |
| FN 9280BE-10-.. | 10 | 2 | 0.32 | 0.4 | 220 | 0 | 1000 | -06 | -100 | 139 |
| FN 9289E-1-.. | 1 | 311 | 10.9 | 0.4 | 220 | 2.2 | 1000 | -06 | -100 | 135 |
| FN 9289E-2-.. | 2 | 311 | 4.4 | 0.4 | 220 | 2.2 | 1000 | -06 | -100 | 136 |
| FN 9289E-4-.. | 4 | 311 | 1.66 | 0.4 | 220 | 2.2 | 1000 | -06 | -100 | 137 |
| FN 9289E-6-.. | 6 | 311 | 0.78 | 0.4 | 220 | 2.2 | 1000 | -06 | -100 | 138 |
| FN 9289E-10-.. | 10 | 311 | 0.32 | 0.4 | 220 | 2.2 | 1000 | -06 | -100 | 139 |
| FN 9289BE-1-.. | 1 | 2 | 10.9 | 0.4 | 220 | 0 | 1000 | -06 | -100 | 135 |
| FN 9289BE-2-.. | 2 | 2 | 4.4 | 0.4 | 220 | 0 | 1000 | -06 | -100 | 136 |
| FN 9289BE-4-.. | 4 | 2 | 1.66 | 0.4 | 220 | 0 | 1000 | -06 | -100 | 137 |
| FN 9289BE-6-.. | 6 | 2 | 0.78 | 0.4 | 220 | 0 | 1000 | -06 | -100 | 138 |
| FN 9289BE-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 250V AC.

FN 9290 Series

Filter selection table

| Filter* | Rated current | Leakage current** | Inductance | | Cx | Capacitance | | Resistance R | Output connections | | Weight |
|----------------|---------------|-------------------|------------|------|-----|-------------|------|--------------|--------------------|------|--------|
| | @ 40°C | @ 250V ~/50Hz | L1 | L2 | | Cy1 | Cy2 | | [kOhm] | | |
| | [A] | [uA] | [mH] | | | [nF] | | | | | |
| FN 9290-1-.. | 1 | 311 | 10.9 | 10.9 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 147 |
| FN 9290-2-.. | 2 | 311 | 4.4 | 4.4 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 148 |
| FN 9290-4-.. | 4 | 311 | 1.7 | 1.7 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 148 |
| FN 9290-6-.. | 6 | 311 | 0.78 | 0.78 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 153 |
| FN 9290-10-.. | 10 | 311 | 0.32 | 0.32 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 154 |
| FN 9290B-1-.. | 1 | 2 | 10.9 | 10.9 | 220 | 0 | 0 | 1000 | -06 | -100 | 147 |
| FN 9290B-2-.. | 2 | 2 | 4.4 | 4.4 | 220 | 0 | 0 | 1000 | -06 | -100 | 148 |
| FN 9290B-4-.. | 4 | 2 | 1.7 | 1.7 | 220 | 0 | 0 | 1000 | -06 | -100 | 148 |
| FN 9290B-6-.. | 6 | 2 | 0.78 | 0.78 | 220 | 0 | 0 | 1000 | -06 | -100 | 153 |
| FN 9290B-10-.. | 10 | 2 | 0.32 | 0.32 | 220 | 0 | 0 | 1000 | -06 | -100 | 154 |
| FN 9299-1-.. | 1 | 311 | 10.9 | 10.9 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 147 |
| FN 9299-2-.. | 2 | 311 | 4.4 | 4.4 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 148 |
| FN 9299-4-.. | 4 | 311 | 1.7 | 1.7 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 148 |
| FN 9299-6-.. | 6 | 311 | 0.78 | 0.78 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 153 |
| FN 9299-10-.. | 10 | 311 | 0.32 | 0.32 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 154 |
| FN 9299B-1-.. | 1 | 2 | 10.9 | 10.9 | 220 | 0 | 0 | 1000 | -06 | -100 | 147 |
| FN 9299B-2-.. | 2 | 2 | 4.4 | 4.4 | 220 | 0 | 0 | 1000 | -06 | -100 | 148 |
| FN 9299B-4-.. | 4 | 2 | 1.7 | 1.7 | 220 | 0 | 0 | 1000 | -06 | -100 | 148 |
| FN 9299B-6-.. | 6 | 2 | 0.78 | 0.78 | 220 | 0 | 0 | 1000 | -06 | -100 | 153 |
| FN 9299B-10-.. | 10 | 2 | 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 IEC 60939-1 Ed. 3 at 250V AC.

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: E: | Earth line choke |
| BE: | Medical version (without YZ-capacitor) with earth line choke |
| 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) |
| 8: | Single stage filter |
| 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 9280B/FN 9289/FN 9289B/FN 9290/FN 9290B/FN 9299/FN 9299B are stock types from our distribution partners.

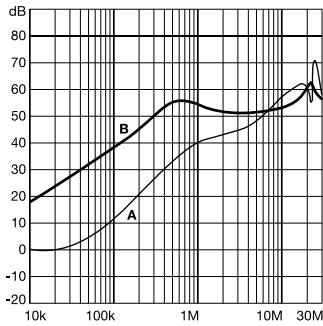
Order Examples:

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

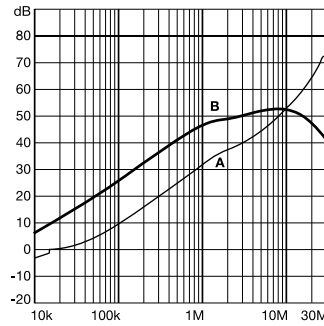
FN 9298-6-06-30: Dual stage, dual fuse EMC/EMI filter, snap-in version, snappers for snap-in panel thickness range >2.5 to 3.5 mm, snapper on vertical side, 6A, fast-on terminals, non-stock order type

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

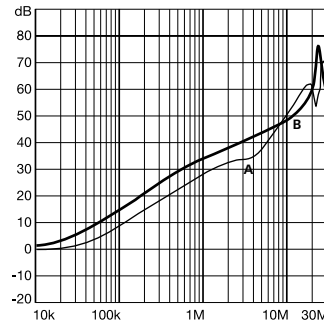
1A types



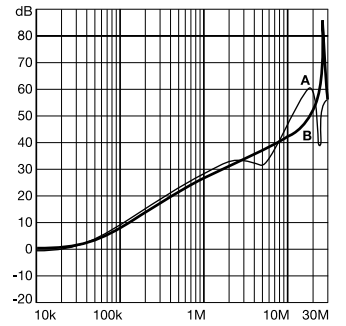
2A types



4-6A types

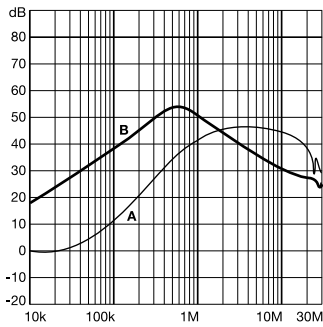


10A types

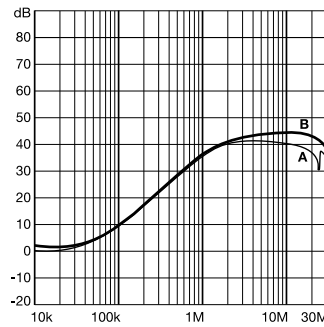


FN 9280B Series | Typical filter attenuation | Per CISPR 17; A = 50Ω/50Ω sym; B = 50Ω/50Ω asym

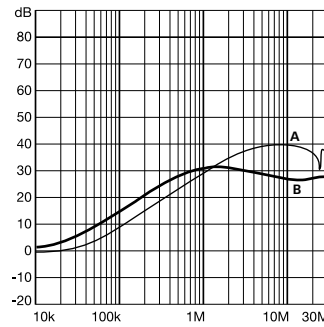
1A types



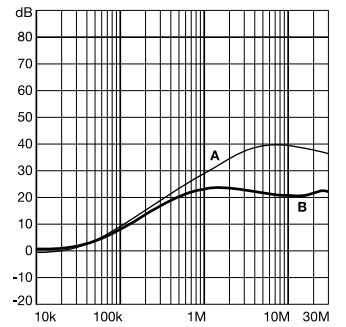
2A types



4-6A types

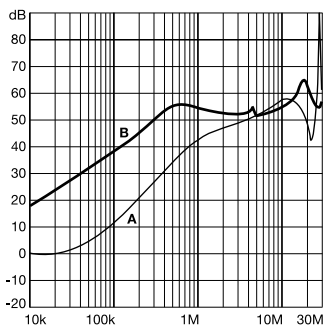


10A types

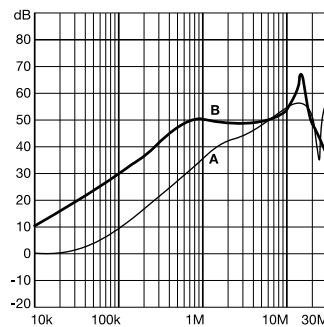


FN 9280E Series | Typical filter attenuation | Per CISPR 17; A = 50Ω/50Ω sym; B = 50Ω/50Ω asym

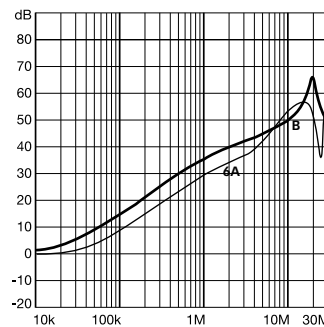
1A types



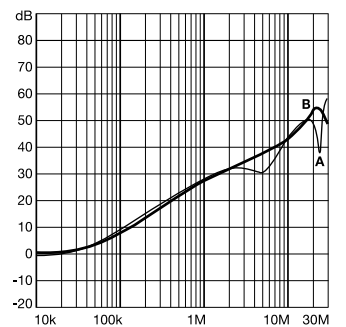
2A types



4-6A types

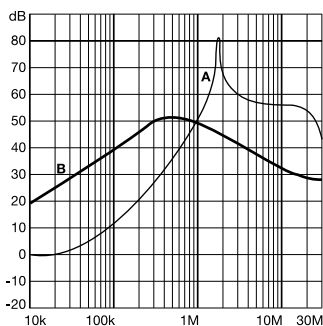


10A types

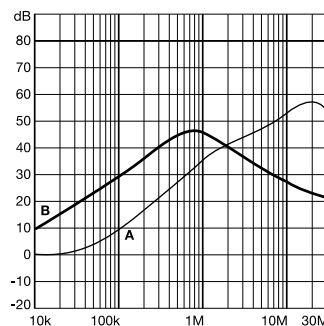


FN 9280BE Series | Typical filter attenuation | Per CISPR 17; A = 50Ω/50Ω sym; B = 50Ω/50Ω asym

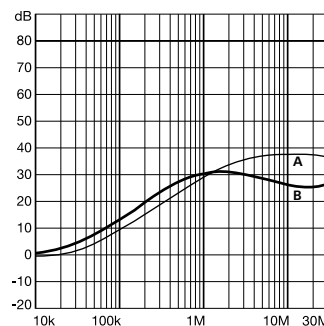
1A types



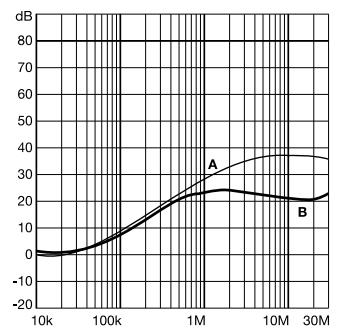
2A types



4-6A types

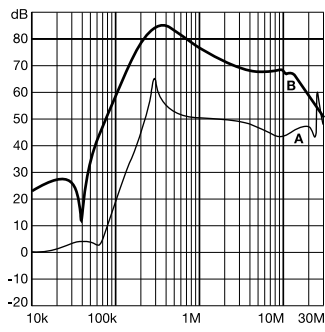


10A types

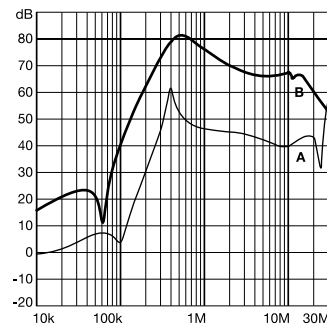


FN 9290 Series | Typical filter attenuation | Per CISPR 17; A = 50Ω/50Ω sym; B = 50Ω/50Ω asym

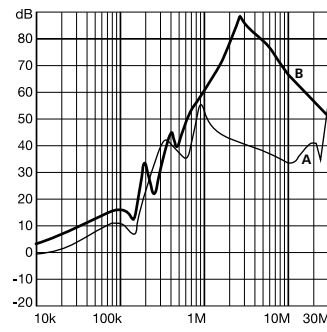
1A types



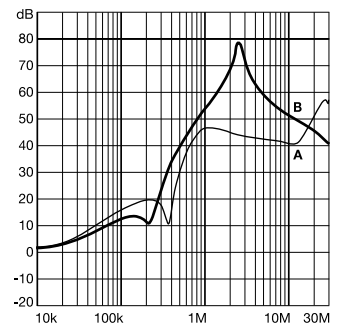
2A types



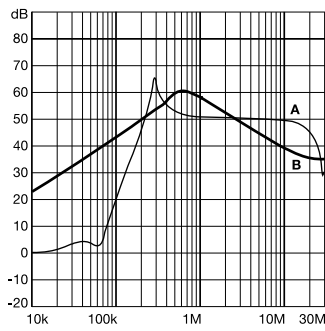
4-6A types



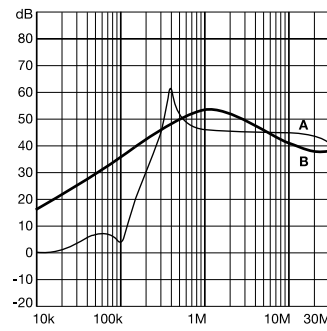
10A types


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

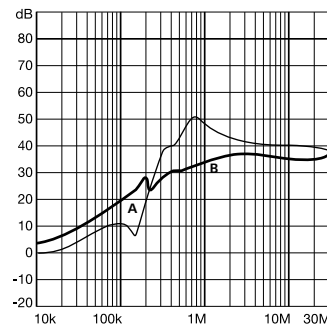
1A types



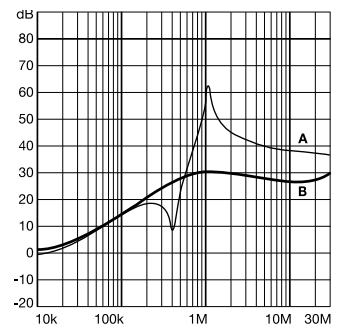
2A types



4-6A types

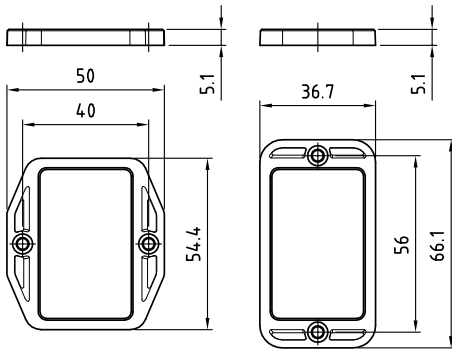
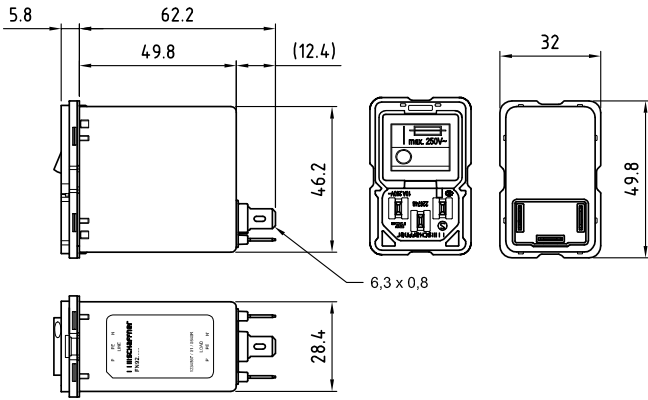


10A types



Mechanical Data:

FN 9280-x-06 / FN 9280B-x-06:

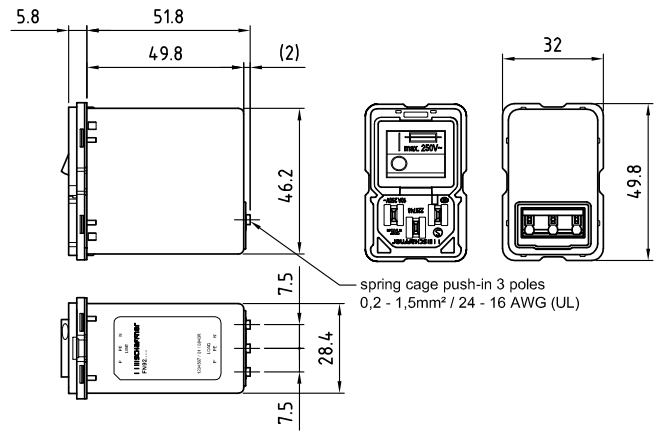


FN 9283 / FN 9284

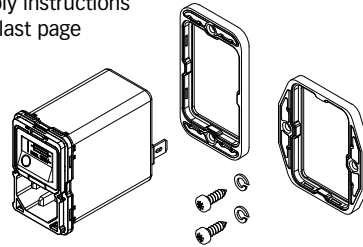
FN 9281 / FN 9282

FN 9280-X-100 / FN 9280B-X-100:

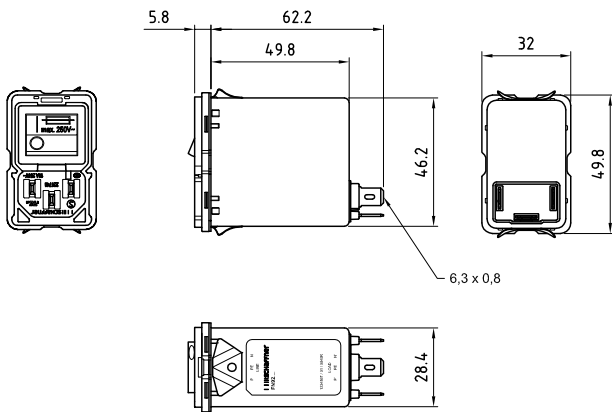
Dimensions (mm)



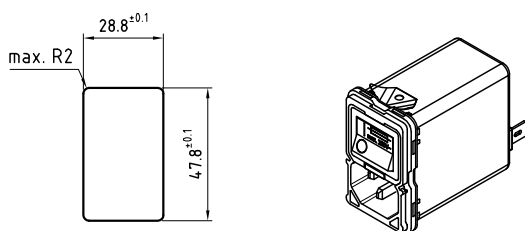
assembly instructions
 see on last page



FN 9289-x-06 / FN 9289B-x-06:

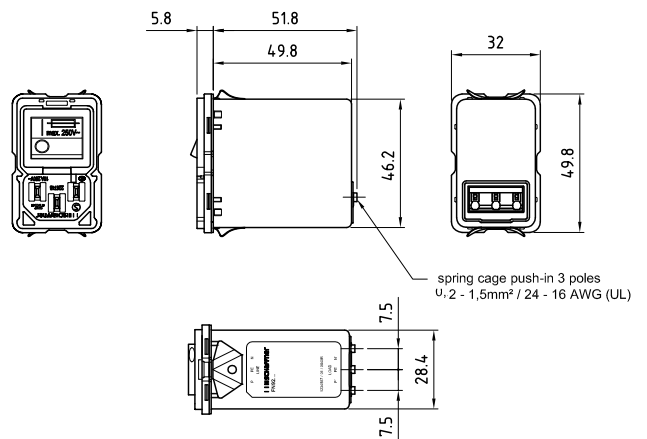


Panel cutout:

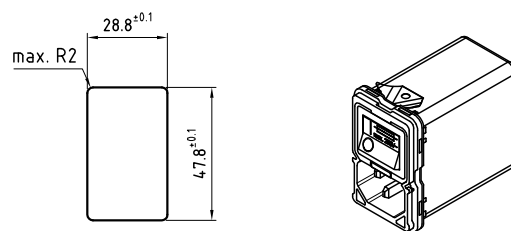


FN 9289-x-100 / FN 9289B-x-100:

Dimensions (mm)

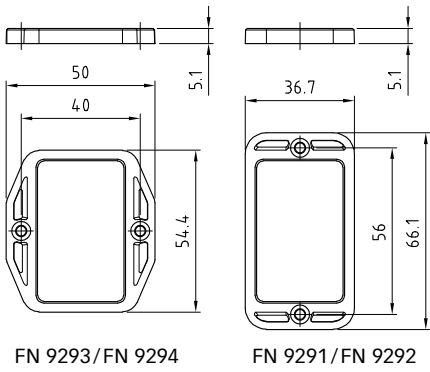
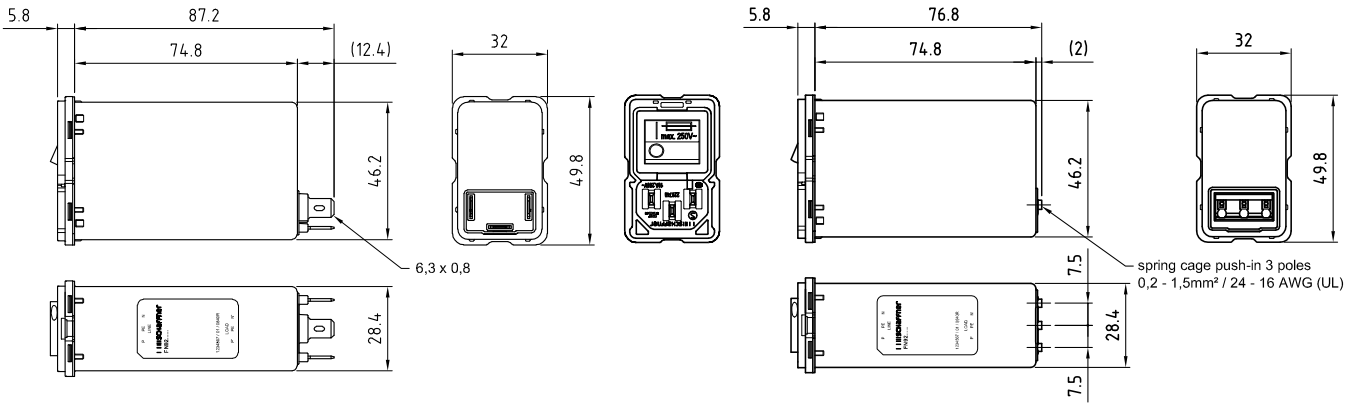


Panel cutout:

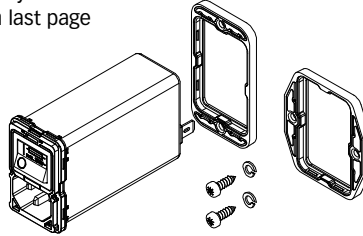


FN 9290-x-06 / FN 9290B-x-06 / FN 9280E-x-06 / FN 9280BE-x-06:

FN 9290-x-100 / FN 9290B-x-100 / FN 9280E-x-100 / FN 9280BE-x-100:



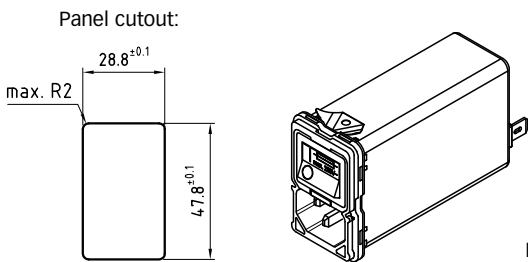
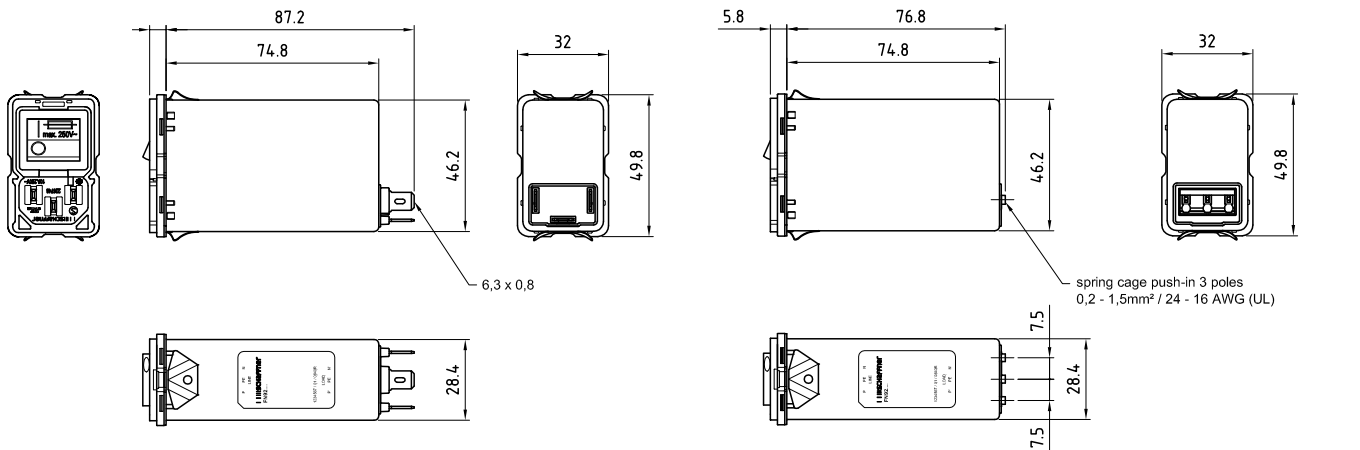
assembly instructions
see on last page



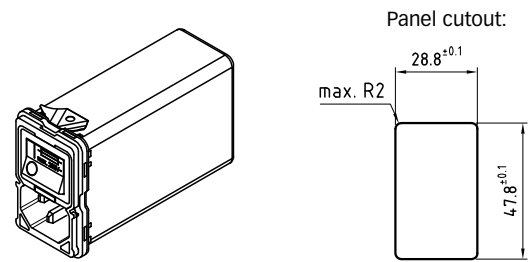
Dimensions (mm)

FN 9299-x-06 / FN 9299B-x-06 / FN 9289E-x-06 / FN 9289BE-x-06:

FN 9299-x-100 / FN 9299B-x-100 / FN 9289E-x-100 / FN 9289BE-x-100:

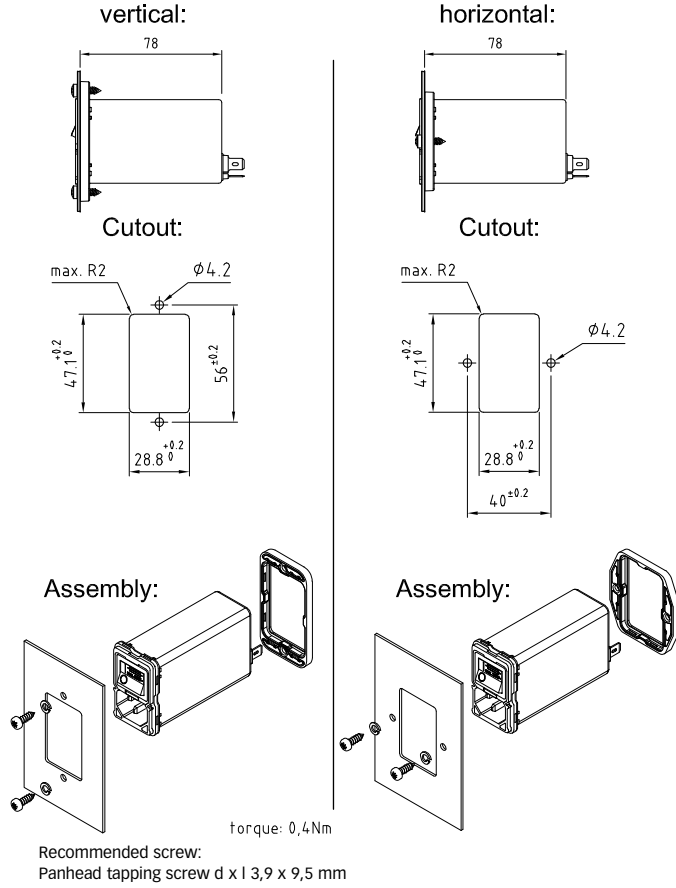


Dimensions (mm)

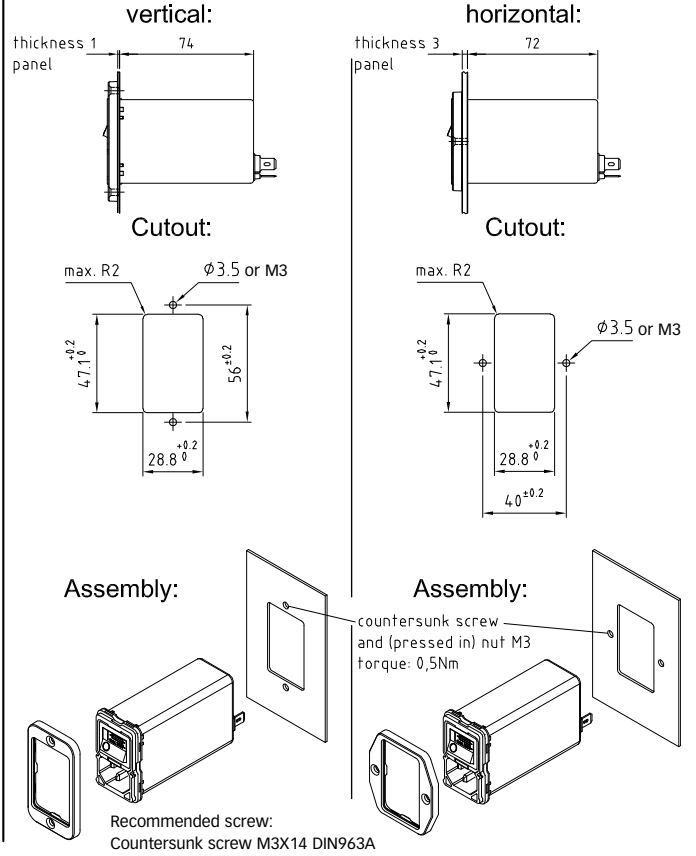


Assembly Instructions:

REAR MOUNTING

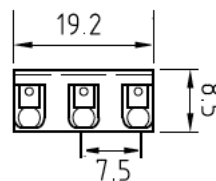


FRONT MOUNTING



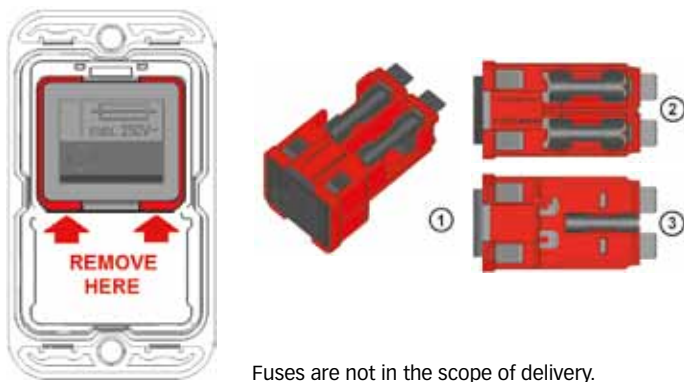
Terminal -100

| | |
|--------------------------------------|--|
| clamping range, solid wire/flex wire | 0,20 mm ² – 1,5 mm ² , AWG24 – AWG16 |
| operating force of slider | max. 40N |
| recommended stripped length | 8mm |



Push the knob above the terminal to insert the wire.

Removal of the combined switch / fuse holder unit



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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