Data Sheet 5120

Power Entry Modules with Line Filter

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1 General Description

General
Area of use: EMC sensitive equipment
Advantage: Full EMC screening from inlet to filter.

The inlet filter type 5120 is suitable for use in equipment according to IEC/UL 60950.

It consists of the following parts:

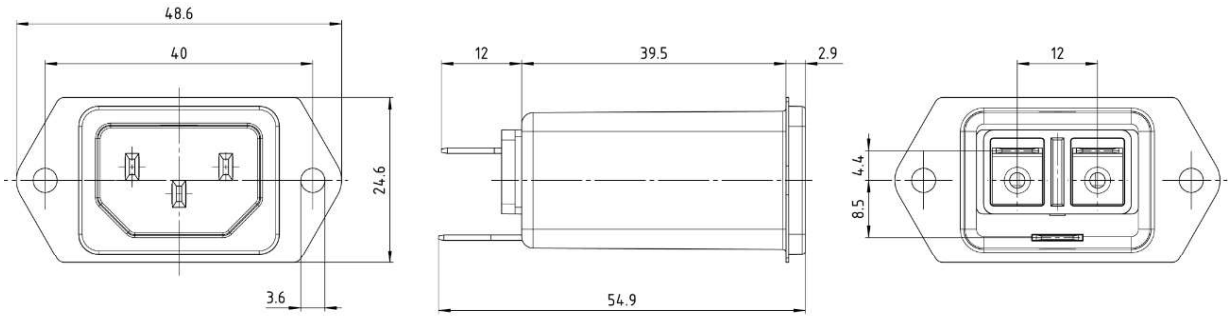
Appliance inlet
For a pin temperature of max. 70° C.
The appliance inlet is in general V-Lock compatible.
The appliance inlet meets the following standards:
- IEC / EN 60320-1
- UL 60320-1
- CSA 22.2 no. 60320-1
- GB/T 17465.1

Protection class I (L / N / PE) according to IEC 61140.
Protection class II (L / N) according to IEC 61140.

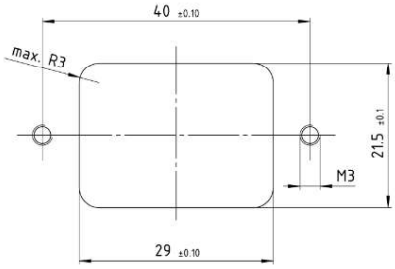
Mains-filter
1-stage mains-filter for standard or medical application.
The mains-filter meets the following standards:
- IEC / EN 60939
- UL 60939-3
- CSA 22.2 No.8
- GB/T 15287, GB/T 15288

2 Dimensions

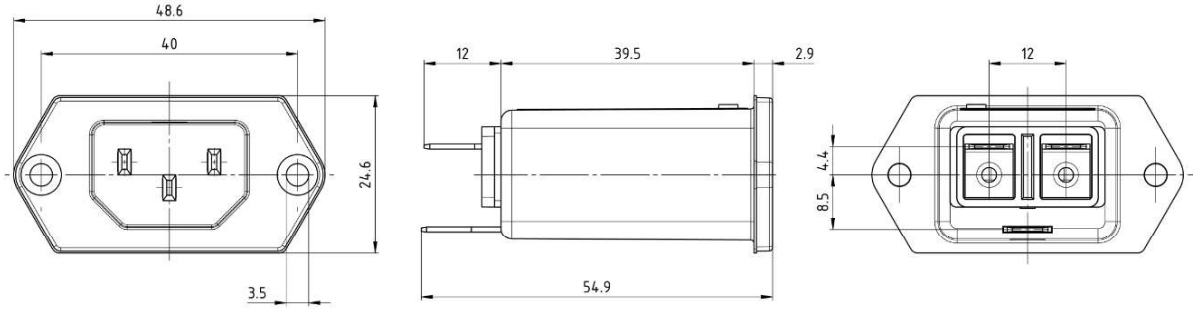
Screw-on version, protection class I, front side



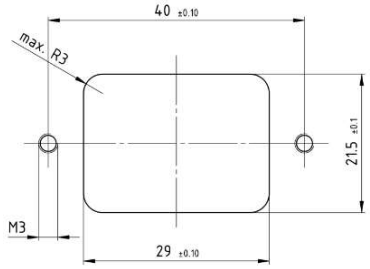
Panel cut-out



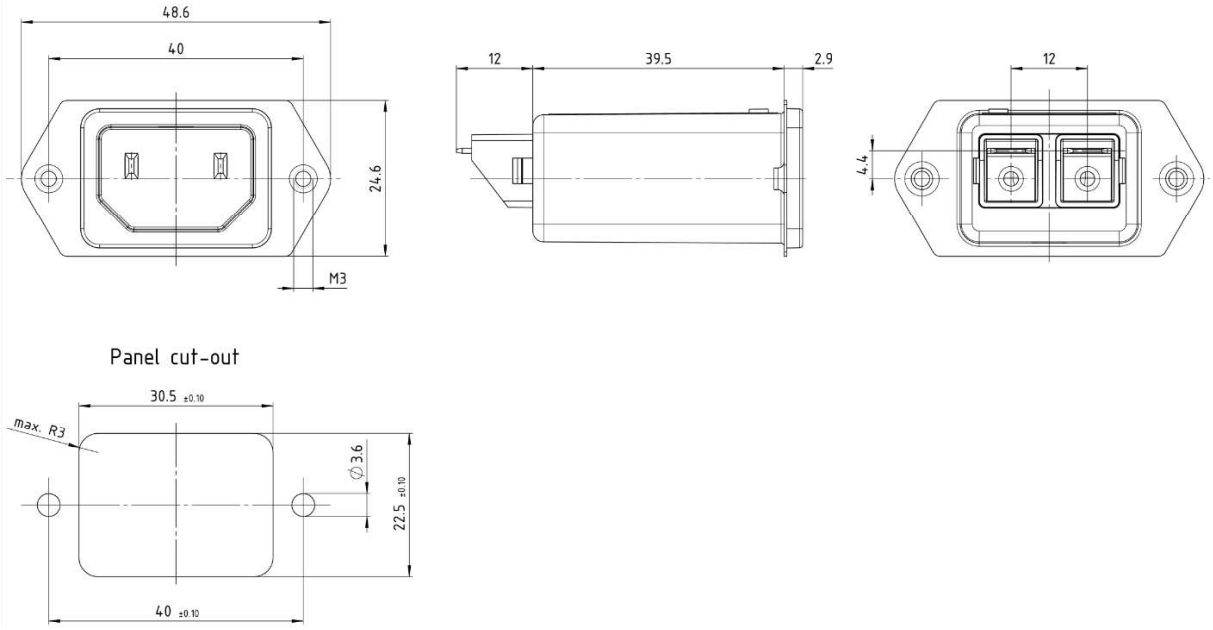
Screw-on version, protection class I, front side, plastic flange



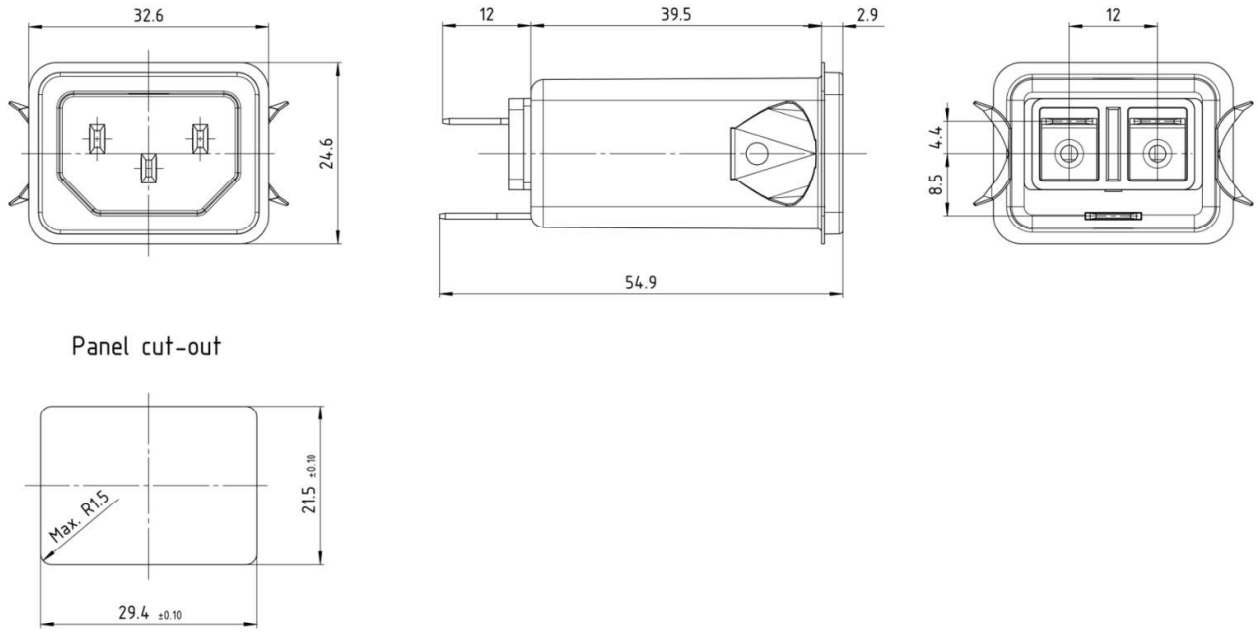
Panel cut-out



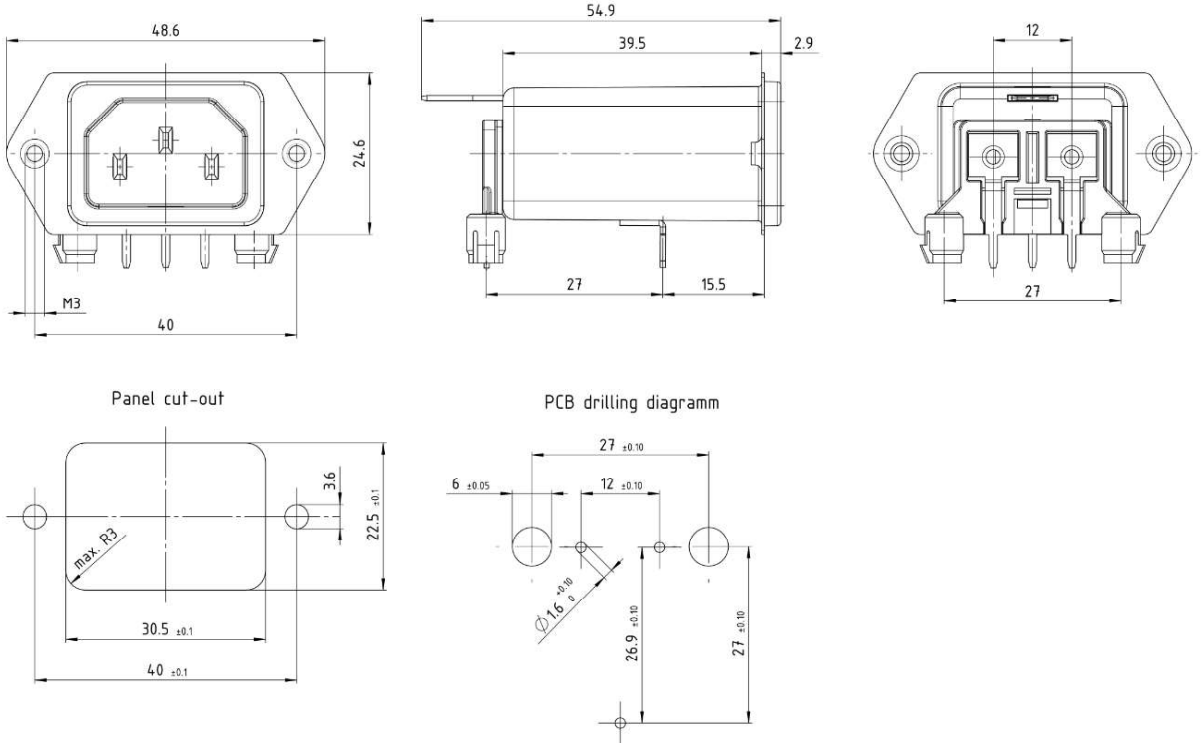
Screw-on version, protection class II, rear side



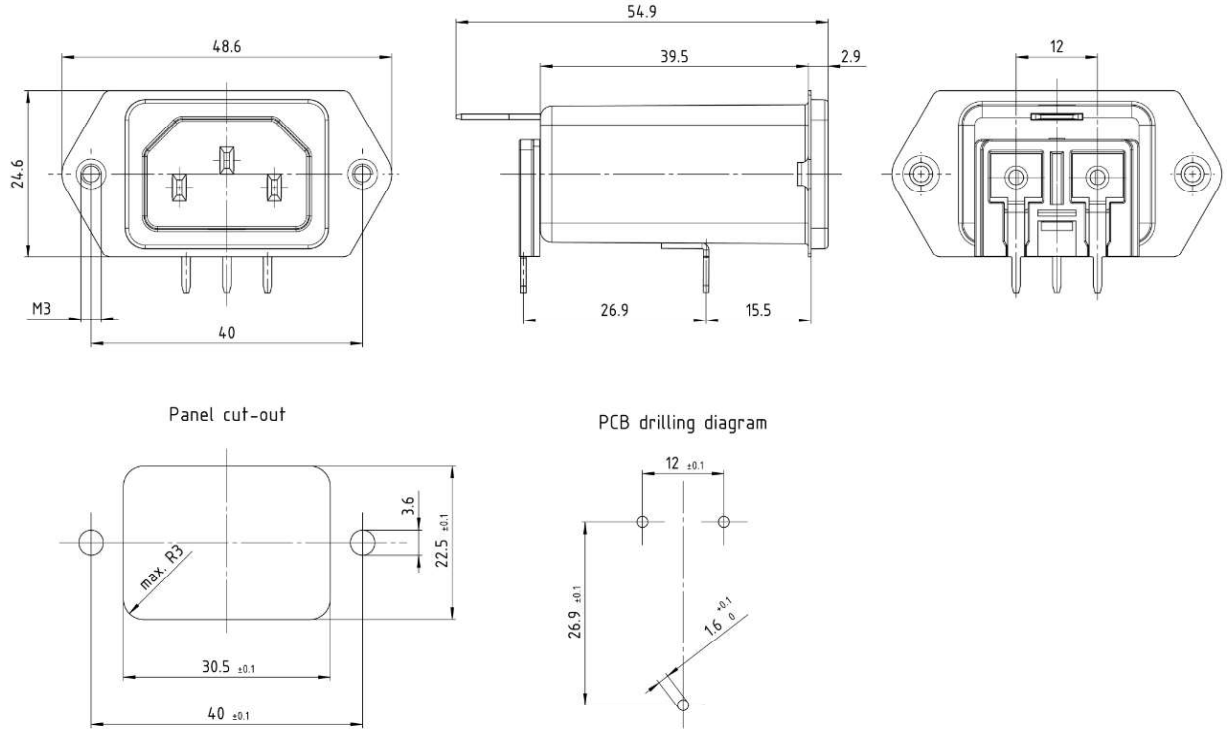
Snap-in version, protection class I, front side



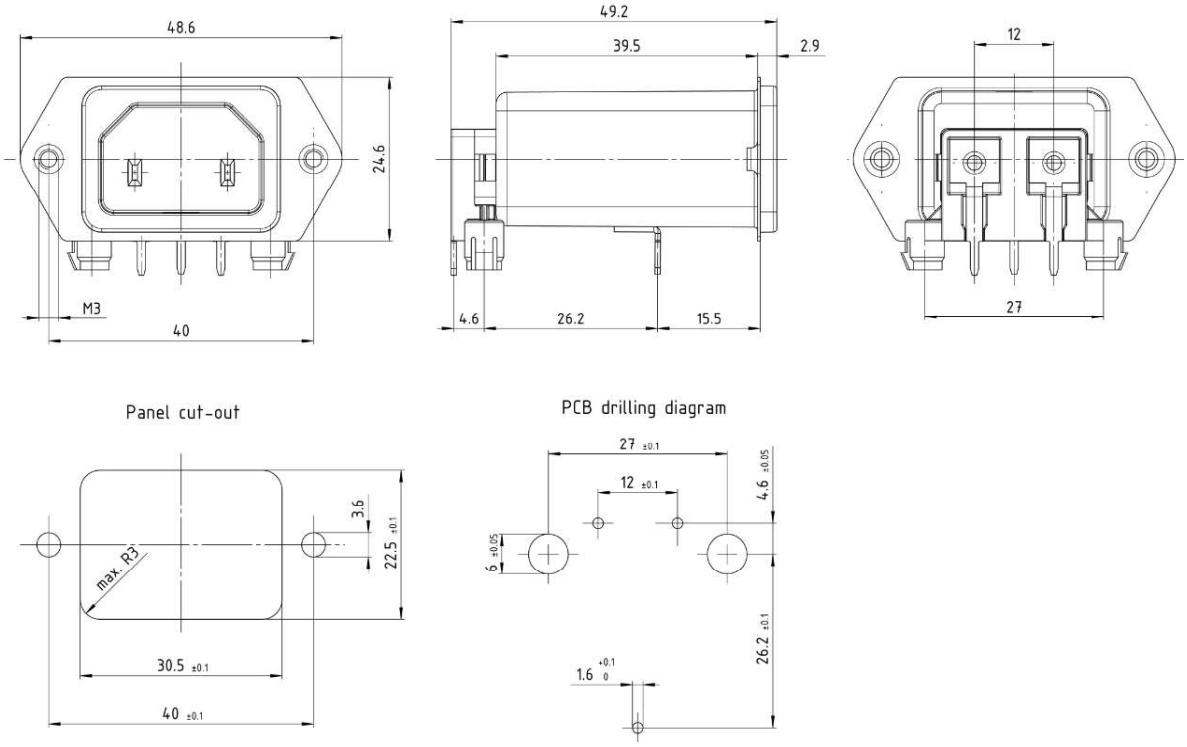
Snap PCB-Mounting Screw-on version, protection class I, rear side



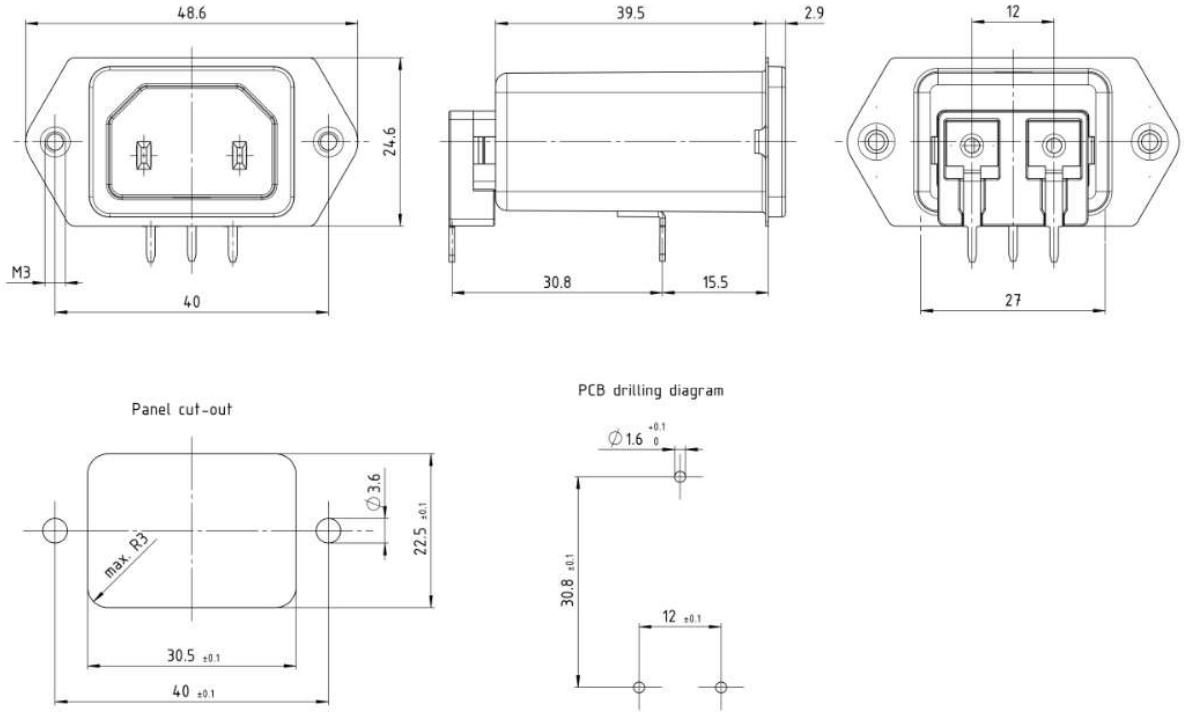
PCB-Mounting Screw-on version, protection class I, rear side



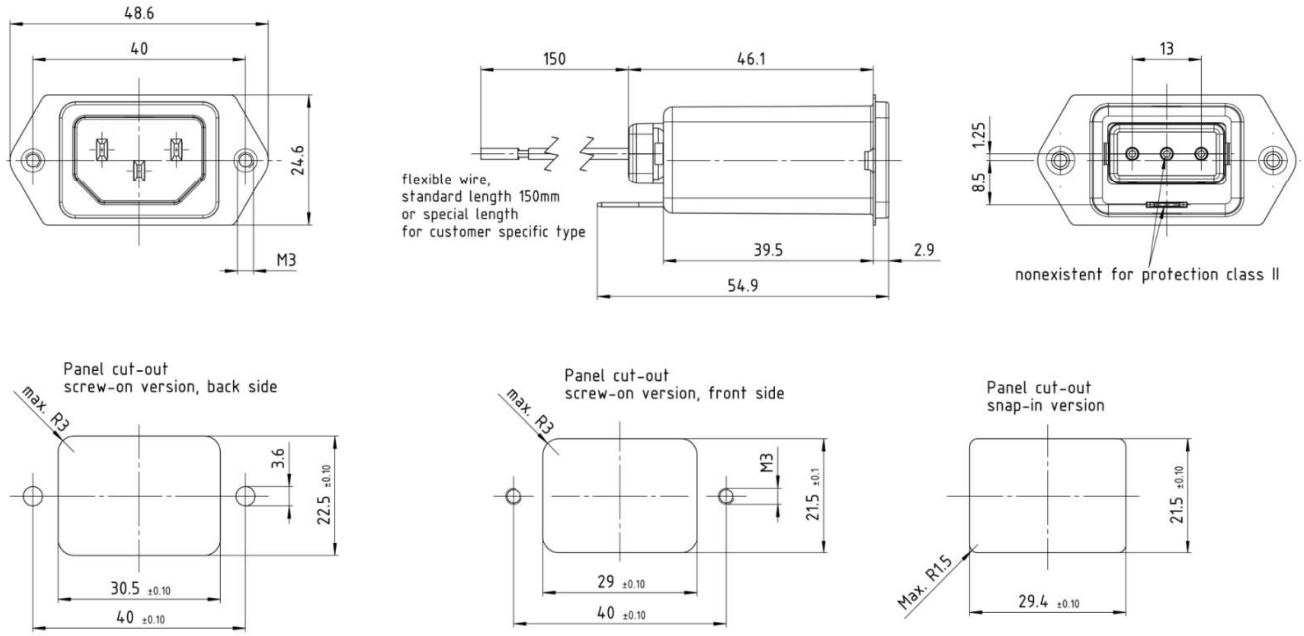
Snap PCB-Mounting, Screw-on version, Protection class II, rear side



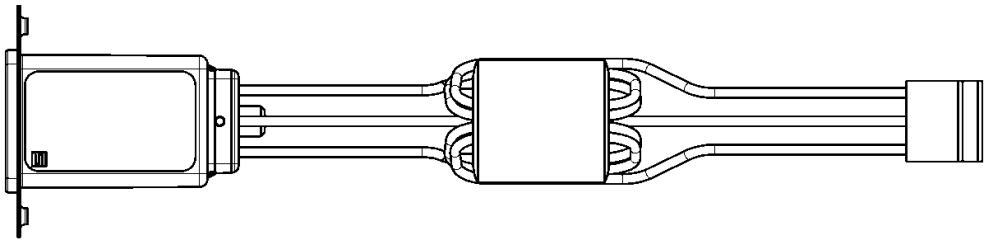
PCB-Mounting, Screw-on version, Protection class II, rear side



Screw-on version and Snap-in version, with flexible wire



Customer specific version with flexible wire, ferrit core and Molex connector



3 Electrical Data

3.1 General

Rated voltage Un	125 / 250 V AC 50 / 60 Hz	
Rated current In	1, 2, 4, 6, 10, 15A @ Ta 40° C	
	1, 2, 4, 6, 10A @ Ta 40° C	
Insulation resistance (500 V DC ; 1 min.)	> 3GΩ	between live parts of different potentials (without bleed resistor)
	> 3GΩ	between protective conductor PE and live parts
Dielectric strength (1 min.)	> 1.7 kV DC	between live parts of different potentials (without bleed resistor)
	> 2.7 kV DC	between live parts and protective conductor PE for PCI
	> 4.5 kV DC	between live parts and metal case for PCII
Test voltage (2sec.) Fabrication test	1075 V DC	between live parts of different potentials
	2250 V DC	between live parts and protective conductor PE for PCI
	4500 V DC	between live parts and metal case for PCII
Impulse withstand voltage Û 1.2/50	> 2.5 kV	between live parts of different potentials
	> 5 kV	between protective conductor PE and live parts
Overvoltage category	I - I I I	according to IEC 60664-1
Clearence and creepage Distances	> 3 mm	between live parts of different potentials
	> 4 mm	between protective conductor PE and live parts
Pollution degree	1 - 3	according to IEC 60664-1
Protection class (Protection against electric shock)	Suitable for appliances of protection class I and II, acc. to IEC 61140 respectively acc. to VDE 0106 / part 1	
Max. leakage current	mains-filter standard	max. 0.5 mA (250 V / 60 Hz)
	mains-filter medical M5	max. 5 µA (250 V / 60 Hz)
	mains-filter medical M80	max. 80 µA (250 V / 60 Hz)

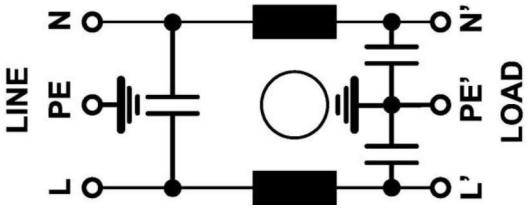
3.2 Appliance inlet

Dimensions acc. to IEC / EN 60320-1	C 14 for protection class I (L / N / PE)
	C 18 for protection class II (L / N)
Pin temperature	max. 70° C

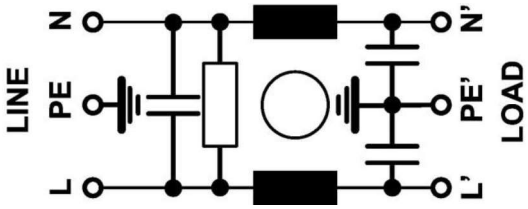
3.3 Diagrams

3.3.1 Standard-Mounting

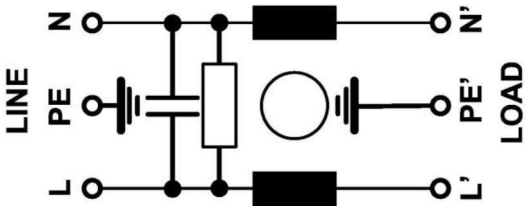
Filter standard



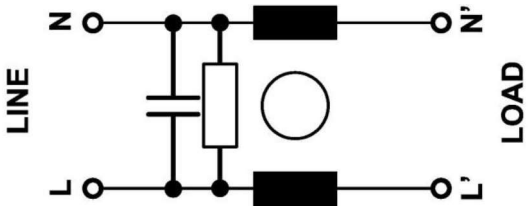
Filter standard with bleed resistor and Medical M80



Medical M5

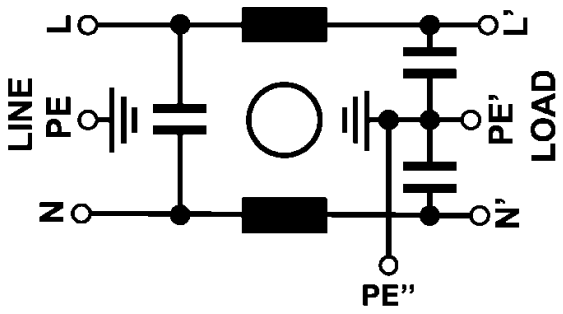


Medical M5, PC II

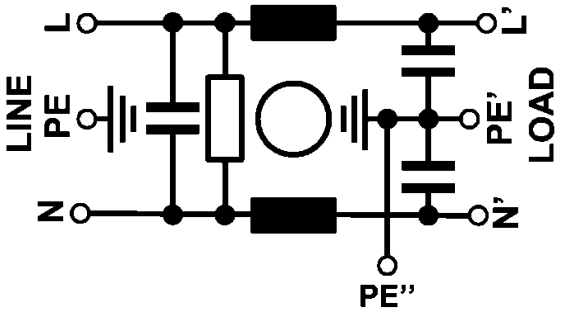


3.3.2 PCB-Mounting

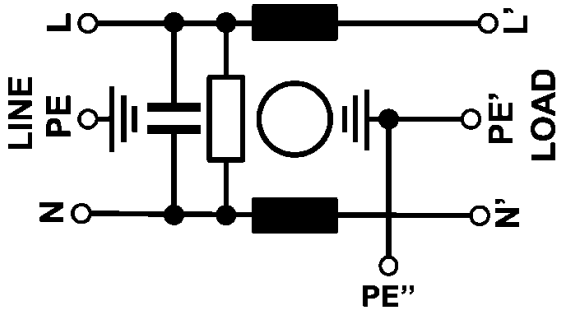
Filter standard



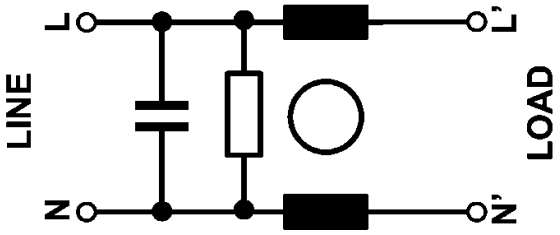
Filter standard with bleed resistor and Medical M80



Medical M5



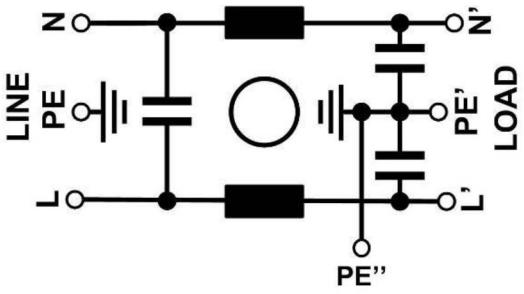
Medical M5, PC II



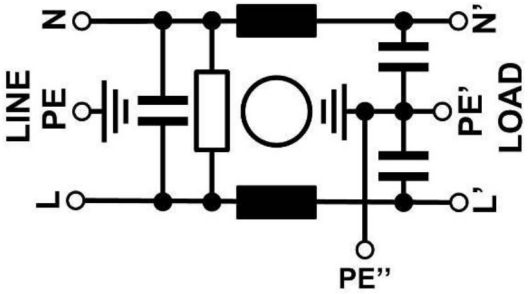
Standard Mounting, with flexible wire

Optional without PE''

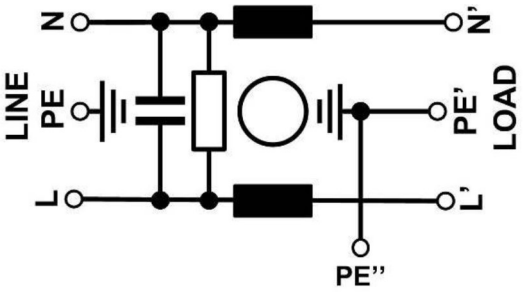
Filter standard



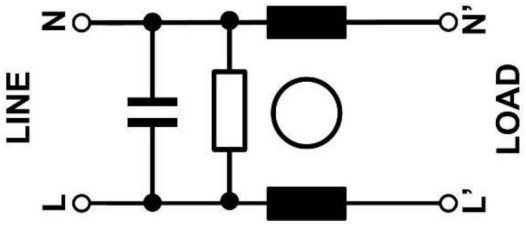
Filter standard with bleed resistor and Medical M80



Medical M5



Medical M5, PC II



3.4 Components data

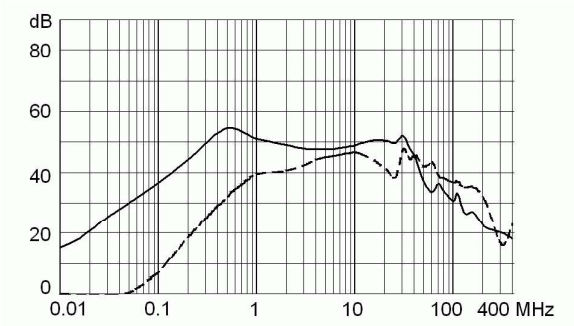
Rated current A	Filter type	Inductors L1 / L2 mH	max. Number of turns	Wire gauge Ø [mm]	Cx nF	Cy pF	R MΩ	DC-resistance @ 25°C [1] mΩ
1	standard	12	2 x 57	0.3	X2 100 X1 47	2 x Y2 2200 2 x Y1 2200	--	400
2		5.2	2 x 38	0.45				120
3		4.0	2 x 34	0.63				55
4		2.0	2 x 23	0.7				35
6		0.8	2 x 16	0.85				16
8		0.6	2 x 14	1.0				11
10		0.4	2 x 10	1.12				9
15		0.1	2 x 5	1.32				6
1	standard with bleed resistor	12	2 x 57	0.3	X2 100 X1 47	2 x Y2 2200 2 x Y1 2200	1	400
2		5.2	2 x 38	0.45				120
3		4.0	2 x 34	0.63				55
4		2.0	2 x 23	0.7				35
6		0.8	2 x 16	0.85				16
8		0.6	2 x 14	1.0				11
10		0.4	2 x 10	1.12				9
15		0.1	2 x 5	1.32				6
1	medical M5	12	2 x 57	0.3	X2 100 X1 47	--	1	400
2		5.2	2 x 38	0.45				120
3		4.0	2 x 34	0.63				55
4		2.0	2 x 23	0.7				35
6		0.8	2 x 16	0.85				16
8		0.6	2 x 14	1.0				11
10		0.4	2 x 10	1.12				9
15		0.1	2 x 5	1.32				6
1	medical M80	12	2 x 57	0.3	X2 100 X1 47	2 x Y2 470 2 x Y1 470	1	400
2		5.2	2 x 38	0.45				120
3		4.0	2 x 34	0.63				55
4		2.0	2 x 23	0.7				35
6		0.8	2 x 16	0.85				16
8		0.6	2 x 14	1.0				11
10		0.4	2 x 10	1.12				9
15		0.1	2 x 5	1.32				6

[1] DC-Resistance values are specified for the variant with Quick-Connect terminals or flexible wires with up to 50mm wire length.

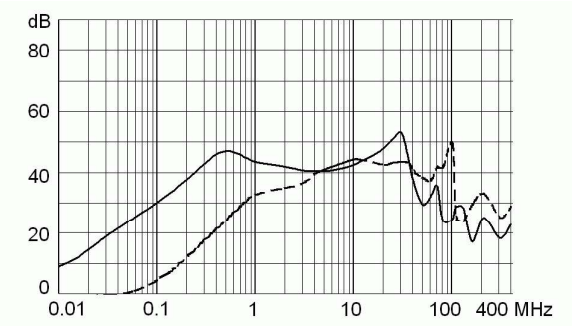
Conductor resistance for flexible wires: AWG16 14.6 mΩ/m; AWG18 23.3 mΩ/m

3.5 Attenuation loss

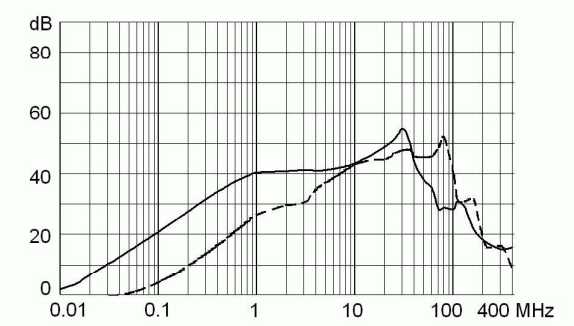
Filter standard



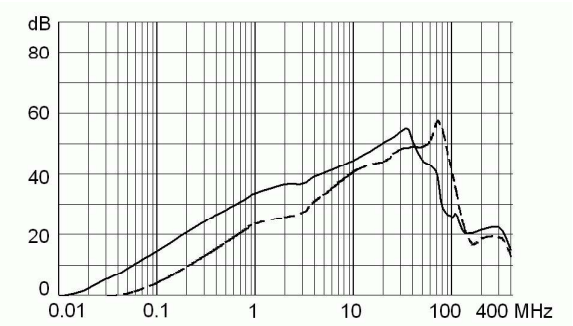
1 A standard



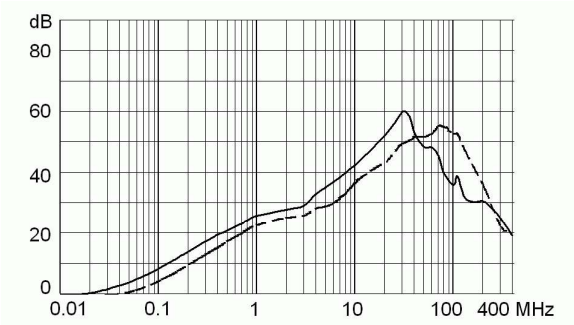
2 A standard



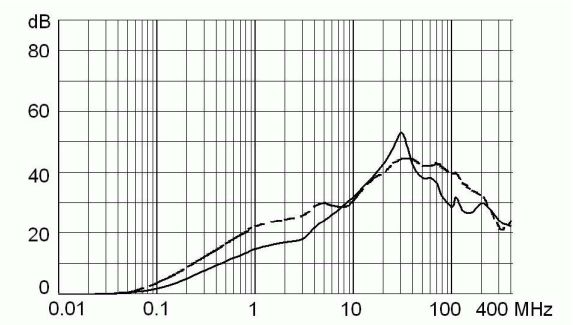
4 A standard



6 A standard



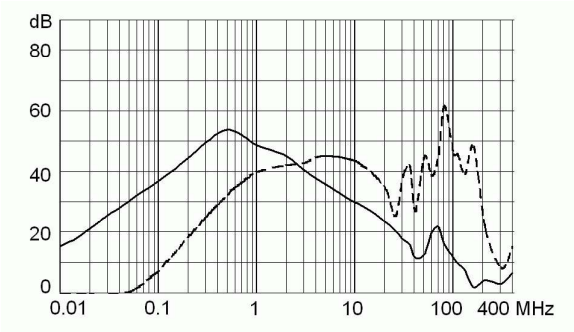
10 A standard



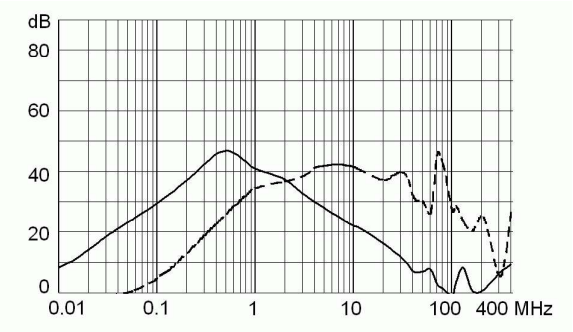
15 A standard

——— asymmetric measurement: L + N - PE, 50/50 Ohm according to CISPR17
– – – symmetric measurement: L - N, 50/50 Ohm according to CISPR17

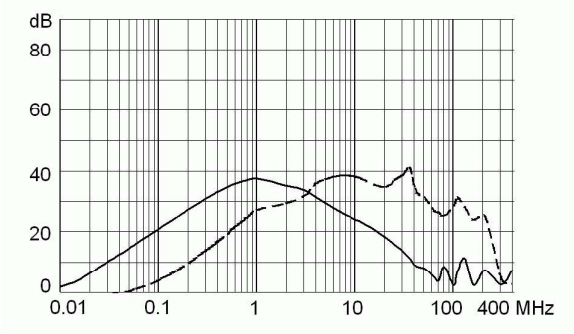
Filter medical M5



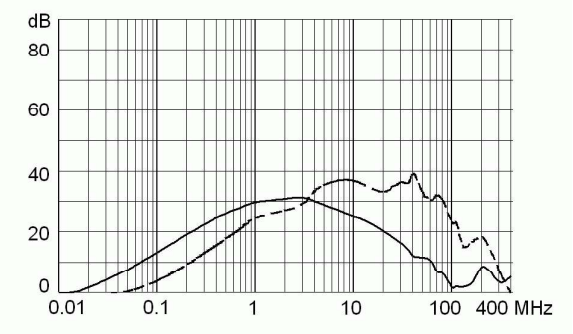
1 A medical M5



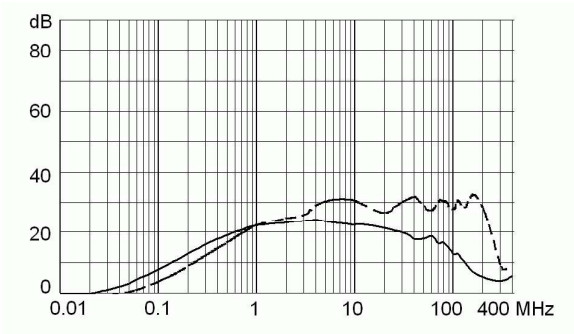
2 A medical M5



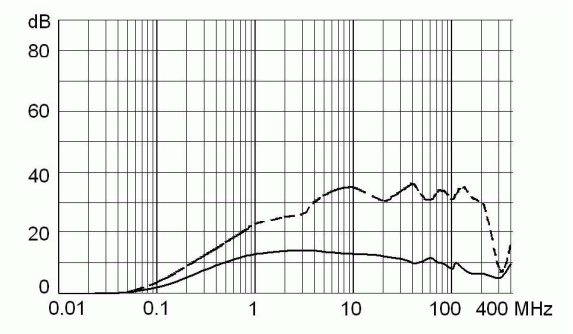
4 A medical M5



6 A medical M5



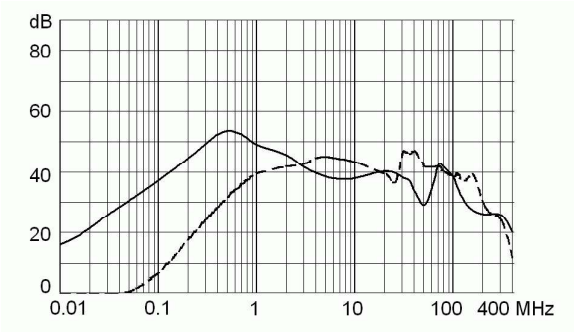
10 A medical M5



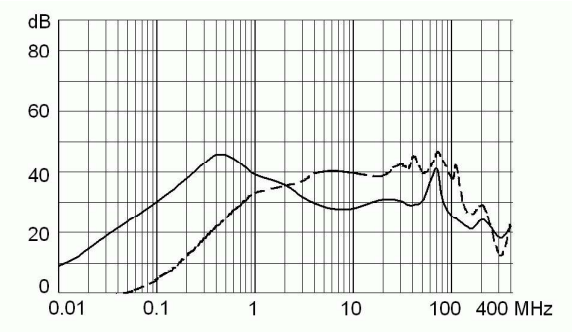
15 A medical M5

——— asymmetric measurement: L + N - PE, 50/50 Ohm according to CISPR17
– – – symmetric measurement: L - N, 50/50 Ohm according to CISPR17

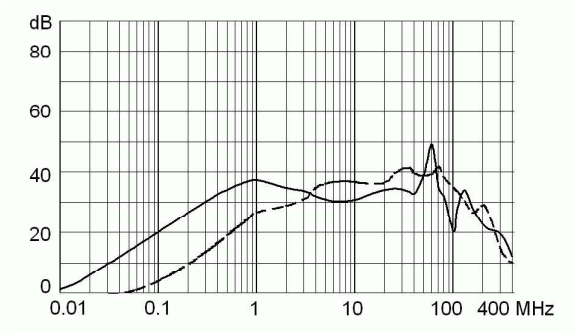
Filter medical M80



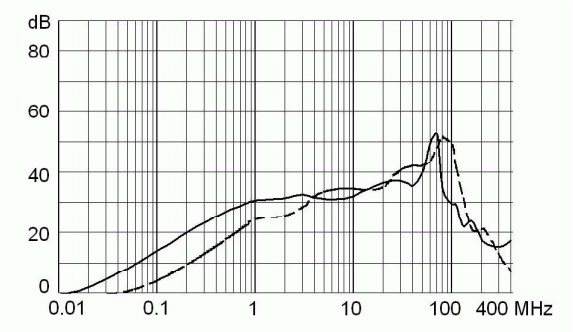
1 A medical M80



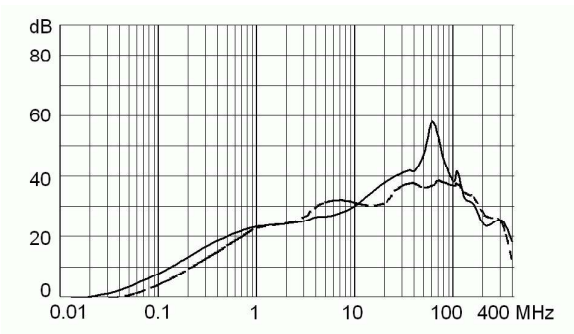
2 A medical M80



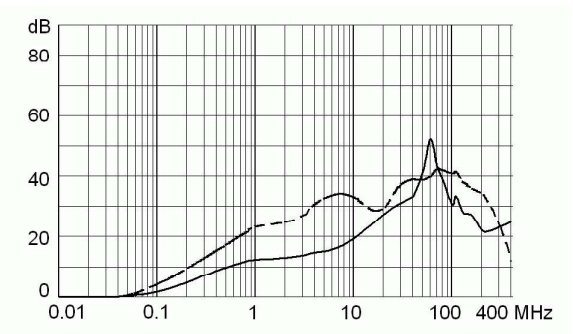
4 A medical M80



6 A medical M80



10 A medical M80



15 A medical M80

——— asymmetric measurement: L + N - PE, 50/50 Ohm according to CISPR17
– – – symmetric measurement: L - N, 50/50 Ohm according to CISPR17

4 Mechanical Data

4.1 Mounting

The Inlet filter 5120 is suitable for panel mounting from the front and back side or can be mounted on a printed circuit board from the panel inside of the housing.
Fixing takes place with two screws. On both version the filter housing is connected to the equipment housing, metal to metal.
The panel thickness for the snap-in versions is 0.8mm – 3mm.

Note: For connection of the earth (ground) line to the housing in accordance with regulations, either an additional connection is to be made or the screw fixing made with a spring element (IEC / EN 60950).

Connection takes place with quick-connect terminals 6.3x0.8 mm and Solder terminals.

Mounting from the panel inside of the housing with: - 2 holes for screws M3

The fixing on the PCB takes place with PC-board terminals 1.25x0.8mm or with PCB-board terminals with additional snap-in mounting.

4.2 Terminals

L / N and protective conductor PE
- Quick-connect terminals 6.3x0.8 mm, according to IEC 61210
  L / N Sn-plated
  PE Ni-plated
- Solder Terminals, Sn-plated
- PC-board terminals 1.25x0.8 mm
- Flexible wires

Flexible wires:
- Standard length 150mm
- with or without customer specific Connector
  - R/C ECBT2, RFWV2 or ZMVV2 and Canadian Certified
  - Rated 250Vac
  - Rated 15Amps minimum
  - Rated 105°C minimum

Solderability	
PC-board terminals	235° C / 2s acc. to IEC 60068-2-20, test Ta method 1
Quick-connect terminals and Solder terminals	350° C / 2 s acc. to IEC 60068-2-20, test Ta method 2
Resistance to soldering heat	
PC-board terminals	260°C / 5s acc. to IEC 60068-2-20, test Tb method 1A
Quick-connect terminals and Solder terminal	350° C / 10 s acc. to IEC 60068-2-20, test Tb method 2

4.3 Packing and weight

Original packing	10 pcs.
Net weight gr. per 1 piece	42 gr.

5 Materials

Thermoplastic	Socket / Cover filter case
Type	PA 66; Polyamide
Flame class UL94	V-0
Comparative tracking index CTI	600 V
EMC-shield	Steel, Sn-plated
Live parts	Copper alloy, protected against corrosion.
Snap-in spring element	Stainless spring steel
Heat shrink tube	PE-modified (Polyolefine)
Flexible wires	Copper-wire tin-plated, finely stranded UL AWM Style 3266 125°C 300V CSA AWM|A/B 125°C 300V FT Insulation: XLPE (Cross-linked Polyethylene insulated)

6 Environmental Condition

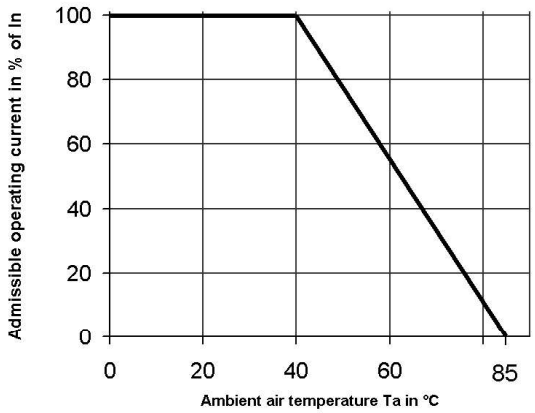
6.1 Temperatures

Operating temperature	- 25° C up to + 85° C see table 1 “derating curve”
Storage temperature	- 40° C up to + 85° C
Climatic category	25 / 085 / 21 according to IEC 60068-1

Derating curve

Mains-filter

Table 1 : correlation between max. operating current I and the ambient air temperature Ta (Appliance inlet : pin temperature max. 70° C)



To calculate the exact permissible current at ambient temperature use the following formula :

$$I = I_n \sqrt{\frac{T_{max} - T_a}{T_{max} - T_n}}$$

I	=	permissible current at operating temperature
In	=	Rated current
Tmax	=	maximal permissible temperature (85° C)
Ta	=	ambient temperature
Tn	=	temperature concerning In (40° C)

6.2 Vibration and shock resistance

Resistance to vibration according to IEC 60068-2-6

Test Fc ; Frequency range 10 - 500 Hz,
cross-over frequency 60 Hz
< 60 Hz constant amplitude of 0.75 mm
> 60 Hz constant acceleration of 10 g

6.3 Degree of protection

Degree of protection

IP40 according to IEC 60529
Front face of Inlet Filter.

7 Approvals

Country	Certification Body	Mark	File no.	Production site
Europe	VDE		40016382	SAGM, SSRO, SEC
U.S.A. / Canada	UL		E495089	Any authorized for PG06
China	CQC		CQC19001218810	SSRO
			CQC22001364058	SEC

8 Configuration Code

5120 - X X X X - X X X X 0 - XX

Customer specific type
00 = standard
01…ZZ according D10-026-749

Colour
0 = Black

Rated current
1 = 1A
2 = 2A
3 = 3A 2)
4 = 4A
5 = 6A
6 = 8A 2)
7 = 10A
8 = 15A (15A @ UL / 10A @ IEC/GB)

Terminal PE
0 = Without (PCII)
1 = Quick Connect 6.3x0.8
2 = Solder
3 = Flexible wire
4 = Flexible wire with additional QC 6.3x0.8mm terminal
5 = Flexible wire with additional solder terminal 2)
6 = PCB 2)
7 = PCB with additional Quick Connect 6.3x0.8 terminal
8 = PCB with additional solder terminal 2)

Terminal L/N
1 = Quick Connect 6.3x0.8
2 = Solder
3 = PCB
5 = Flexible wire

Resistor
0 = Without
1 = 1MΩ

Y-Capacitor
0 = Without (Medical M5 Filter)
1 = Y1, 2.2nF (Standard Filter) 10)
2 = Y2, 2.2nF (Standard Filter) 10)
3 = Y1, 470pF (Medical M80 Filter) 2) 10)
4 = Y2, 470pF (Medical M80 Filter) 10)

X-Capacitor
1 = X1, 47nF
2 = X2, 100nF

Mounting
0 = Screw, Font
1 = Screw, Rear
2 = Snap-in, 0.8-2.0 mm
3 = Snap-in, >2.0-3.0 mm
4 = Screw, Rear, Soldering on PCB
5 = Screw, Rear, Soldering and Snap-in on PCB
7 = Screw, Front, Plastic Flange

2) Only on request, no approvals available
10) Not for PC II variants