

EMC filters

Series/Type: B84103

The following products presented in this data sheet are being withdrawn.

Ordering Code	Substitute Product		Deadline Last Orders	Last Shipments
B84103S0001A060	B84776A0006A000	2019-06-21	2019-09-30	2019-12-31
B84103S0001A030	B84776A0004A000	2019-06-21	2019-09-30	2019-12-31
B84103S0001A010	B84776A0001A000	2019-06-21	2019-09-30	2019-12-31

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IEC inlet filters

Power line filters for 1-phase systems

Rated voltage V_B: 250 V AC Rated current I_R: 1 A to 6 A

Construction

- 2-line filters with IEC connector, fuse holder and switch
- Appliance connector according to IEC 60320
- Fuse holder Ø 5 × 20 mm (delivery without fuse)
- 2-pole rocker switch



- Enhanced differential-mode insertion loss
- For installation in instrument housings
- UL and CSA approval **¬**





Typical applications

- Medium-performance switch-mode power supplies
- Industrial electronics
- Measuring instruments

Terminals

- Line side: Appliance connector C14 according to IEC 60320-1
- Load side: Tab connectors

Marking

Marking on component:

Manufacturer's logo, ordering code, rated voltage, rated current, rated temperature, climatic category, date code, approvals

Minimum data on packaging:

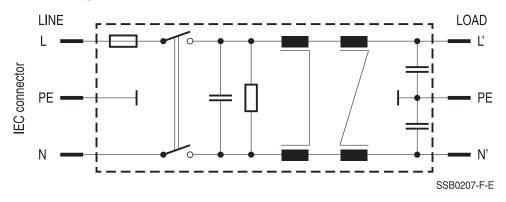
Manufacturer's logo, ordering code, quantity, date code





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Circuit diagram



Technical data and measuring conditions

Rated voltage V _R	250 V AC (50/60 Hz)	
Rated current I _R	Referred to 40 °C rated temperature	
Test voltage V _{test}	1414 V DC, 2 s (line/line)	
	2700 V DC, 2 s (lines/case)	
Leakage current I _{LK}	At V _R and 50 Hz	
Climatic category (IEC 60068-1)	25/085/21 (-25 °C/+85 °C/21 days damp heat test)	
Weight	Approx. 150 g	
Approvals	UL 1283, CSA C22.2 No.8	

Characteristics and ordering codes

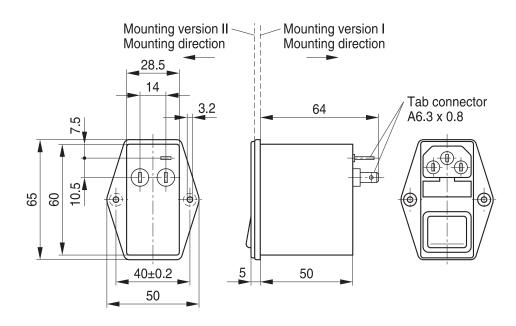
I _R	C _R	L _R	I _{LK} mA	Ordering code	App	٠ _
V_R	= 250 V AC					
1	$0.33 \mu F (X2) + 2 \times 10 nF (Y2)$	$2 \times 9 \text{ mH} + 2 \times 194 \mu\text{H}$	0.785	B84103S0001A010	×	×
3	$0.33 \mu\text{F} (\text{X2}) + 2 \times 10 \text{nF} (\text{Y2})$	$2 \times 1.5 \text{ mH} + 2 \times 17 \mu\text{H}$	0.785	B84103S0001A030	_	×
6	$0.33 \mu\text{F} (\text{X2}) + 2 \times 10 \text{nF} (\text{Y2})$	$2 \times 0.47 \text{ mH} + 2 \times 8 \mu \text{H}$	0.785	B84103S0001A060	—	×

 \times = Approval granted

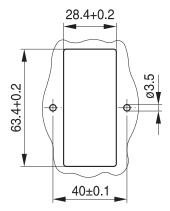


IEC inlet filters

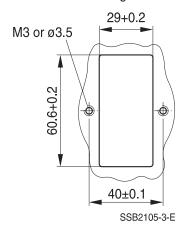
Dimensional drawings



Mounting holes for Mounting version II



Mounting holes for Mounting version I



General tolerances according to ISO 2768-cL Dimensions in mm

- All safety rules for working with electricity must be observed.
- Fuses may only be changed when they are not under voltage and by a qualified electrician or technician.
- The fuse holder must be closed before connecting the device to the mains.
- The person responsible for the system must select a suitable fuse (not included with the original product shipment), taking into account the specifications of both the filter and the systems.



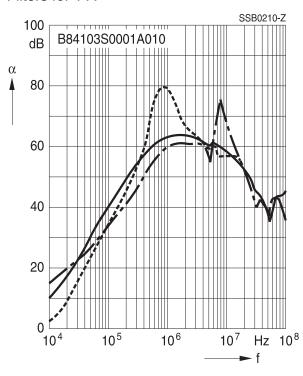
IEC inlet filters

Insertion loss (typical values at $Z = 50 \Omega$)

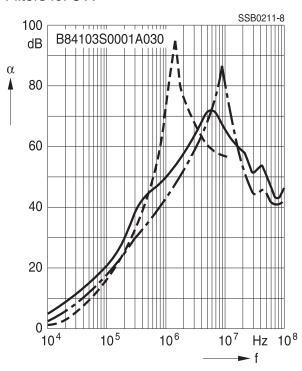
unsymmetrical, adjacent branches terminated common mode, all branches in parallel (asymmetrical)

---- differential mode (symmetrical)

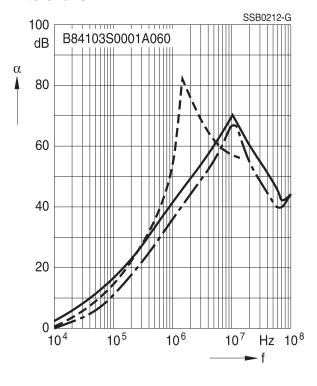
Filters for 1 A



Filters for 3 A



Filters for 6 A





IEC inlet filters

Cautions and warnings

Please read all safety and warning notes carefully before installing the filter and putting it into operation (see \triangle). The same applies to the warning signs on the filter. Please ensure that the signs are not removed nor their legibility impaired by external influences.

Death, serious bodily injury and substantial material damage to equipment may occur if the appropriate safety measures are not carried out or the warnings in the text are not observed.

Using according to the terms

The filters may be used only for their intended application within the specified values in low-voltage networks in compliance with the instructions given in the data sheets and the data book. The conditions at the place of application must comply with all specifications for the filter used.

Marning

- It shall be ensured that only qualified persons (electricity specialists) are engaged on work such as planning, assembly, installation, operation, repair and maintenance. They must be provided with the corresponding documentation.
- Danger of electric shock. Filters contain components that store an electric charge. Dangerous voltages can continue to exist at the filter terminals for longer than five minutes even after the power has been switched off.
- The protective earth connections shall be the first to be made when the filter is installed and the last to be disconnected. Depending on the magnitude of the leakage currents, the particular specifications for making the protective earth connection must be observed.
- Impermissible overloading of the filter or filter, such as with circuits able to cause resonances, impermissible voltages at higher frequencies etc. can lead to bodily injury and death as well as cause substantial material damages (e.g. destruction of the filter housing).
- Filters must be protected in the application against impermissible exceeding of the rated currents by overcurrent protective devices.
- In case of leakage currents >3.5 mA you shall mount the PE conductor stationary with the required cross section before beginning of operation and save it against disconnecting. For leakage currents $I_L^{1)} \le 10$ mA the PE conductor must have a KU value²⁾ of 4.5³⁾; for leakage currents $I_L > 10$ mA the PE conductor must have a KU value of $6^{4)}$.
- Output chokes and output filters must be protected in the application against impermissible exceeding of the component temperature.
- The converter output frequency must be within the specified range to avoid resonances and uncontrolled warming of the output chokes and output filters.
- Because the product can become very hot during operation, there is the risk of burns if touched. The product can remain hot for some time after the power is switched off!

¹⁾ I_L = leakage current let-go

²⁾ The KU value (symbol KU) is a classification parameter of safety-referred failure types designed to ensure protection against hazardous body currents and excessive heating.

³⁾ A value of KU = 4.5 with respect to interruptions is attained with: a) permanently connected protective earth connection ≥1.5 mm² and b) a protective earth connection ≥2.5 mm² via connectors for industrial equipment (IEC 60309-2)

⁴⁾ KU = 6 with respect to interruptions is achieved for fixed-connection lines ≥10 mm² where the type of connection and installation correspond to the requirements for PEN conductors as specified in relevant standards.



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The table below summarizes the safety instructions that must be observed without fail. A detailed description can be found in the relevant chapters of the databook.

Topic	Instructions	Reference chapter (data book), paragraph
Selecting a filter	When selecting a filter, it is mandatory to observe the rated data of the equipment (such as its rated input current, rated voltage, harmonic content etc.) as well as the derating instructions in Chapters 9 and 10.	Selection guide for converter filters
Rated voltage	When power distribution systems deviating from the symmetric TN-S system is to check the suitability of the filters and the allowed voltages including the fault cases.	Power distribution systems,
Protection from residual voltages Discharge resistors	Active parts must be discharged within 5 s to a voltage of less than 60 V (or 50 μ C). If this limit cannot be observed due to the operating mode, the hazardous point must be permanently marked in a clearly visible way.	
	Filters which are not permanently connected (e.g. when the test voltage is applied to the filter at the incoming goods inspection) must be discharged after the voltage has been switched off.	Safety regulations, 6.2
Installing and removing of filters Installation	When installing and removing our filters, a voltage-free state must be set up and secured with observance of the five safety rules described in EN 50110-1.	Safety regulations, 6.4
Use in IT systems	The special features of the IT system ("first fault case" and other fault cases) shall be observed.	Power distribution system (network types), 7.6
Safety notes on leakage currents	The filter leakage currents specified in the data book are intended for user information only. The maximum leakage current of the entire electrical equipment or appliance has to be limited for safety reasons. Please obtain the applicable limits for your application from the relevant regulations, provisions and standards.	8.4 Leakage current,
Voltage derating Hazards caused by	If the permissible limits for the higher-frequency voltages at the filter are exceeded, the filter may be	Voltage derating, 9.8
overloading the filters Current derating at elevated ambient temperatures	damaged or destroyed. Non-observance of the current derating may lead to overheating and consequently represents a fire hazard.	Current derating, 10.1



2-line filters	B84103
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Topic	Instructions	Reference chapter (data book),
		paragraph
Protective earth	For operating currents greater than 250 A, we	Mounting
connection at	recommend the PE connection to be set up between	instructions, point
operating currents	the feed (filter: line) and output (filter: load) not via the	2
>250 A	PE terminal bolt in the filter housing.	
Mounting position	Note the mounting position of the filters! It must	Mounting
	always be ensured that natural convection is not	instructions, point
	impaired.	13
Long motor cables	Long motor cables cause parasitic currents in the	Mounting
	installation. The cable lengths indicated for the output	instructions, point
	chokes and output filters serve for orientation. The	15
	user must check the technical parameters and	
	especially the choke temperatures for the respective	
	application.	

Display of ordering codes for EPCOS products

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IEC inlet filters

Symbols and terms

Symbol	English	German
α	Insertion loss	Einfügungsdämpfung
C_R	Rated capacitance	Bemessungskapazität
C_{X}	Capacitance X capacitor	Kapazität X-Kondensator
C_Y	Capacitance Y capacitor	Kapazität Y-Kondensator
ΔV	Voltage drop (input to output)	Spannungsabfall im Filter
dv/dt	Rate of voltage rise	Spannungsanstiegsgeschwindigkeit
f	Frequency	Frequenz
f_{M}	Converter output frequency	Motorfrequenz
f_P	Pulse frequency	Pulsfrequenz
f_R	Rated frequency	Bemessungsfrequenz
f_{res}	Resonant frequency	Resonanzfrequenz
I_{C}	Current through capacitor	Strom durch Kondensator
I_{LK}	Filter leakage current	Filter-Ableitstrom
I _{max}	Maximum current	Maximalstrom
I_N	Nominal current	Nennstrom
I_{op}	Operating current (design current)	Betriebsstrom
I_{pk}	Rated peak withstand current	Bemessungs-Stoßstromfestigkeit
l _q	Capacitive reactive current	Kapazitiver Blindstrom
I _R	Rated current	Bemessungsstrom
I_S	Interference current	Störstrom
L	Inductance	Induktivität
L_R	Rated inductance	Bemessungsinduktivität
L_{stray}	Stray inductance	Streuinduktivität
P_L	Power loss	Verlustleistung
R	Resistance	Widerstand
R_{is}	Insulation resistance	Isolationswiderstand
R_{typ}	DC resistance, typical value	Gleichstromwiderstand, Richtwert
T_A	Ambient temperature	Umgebungstemperatur
T_{max}	Upper category temperature	Obere Kategorietemperatur
T_{min}	Lower category temperature	Untere Kategorietemperatur
T_R	Rated temperature	Bemessungstemperatur
u_k	Refered voltage drop in %	Bezogener Spannungsabfall in %
$V_{\rm eff}$	RMS voltage	Effektivspannung
V_{K}	Voltage drop	Spannungsabfall
V_{LE}	Voltage line to earth; voltage line to ground	Spannung Phase zu Erdpotential
V_N	Nominal voltage	Nennspannung
V_R	Rated voltage	Bemessungsspannung
V_{peak}	Peak voltage	Spitzenspannung
V_{test}	Test voltage	Prüfspannung
V_X	Voltage over X capacitor	Spannung über X-Kondensator
V_Y	Voltage over Y capacitor	Spannung über Y-Kondensator
X_L	Inductive reactance	Induktiver Blindwiderstand
Z	Impedance	Scheinwidertand
IZI	Impedance, absolute value	Scheinwiderstand (Betragswert)



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Important notes

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Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: <u>org@eplast1.ru</u>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина,

дом 2, корпус 4, литера А.