



EMC filters

3-line filters
for converters and power electronics

Series/Type: B84143B/K*S080, S081

Date: November 2012

Power line filters for 3-phase systems
Rated voltage V_R : 520/300 V AC and 760/440 V AC
Rated current I_R : 180 A to 1600 A
Construction

- 3-line filter
- Metal case

Versions

- B84143B*S080 type for standard applications
- B84143B*S081 type for applications with higher voltages
- B84143K*S081 type without Y capacitors, very low leakage current

Features

- Optimized leakage current
- Easy to install
- Very compact design
- Optimized for operation under full load
- Low weight
- Design complies with IEC 60939
- UL and cUL approval


Typical applications

- Frequency converters for motor drives
- Photovoltaics
- Wind farms
- Power supplies

Terminals

- Busbars

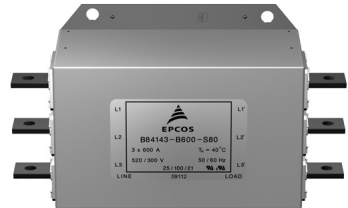
Marking

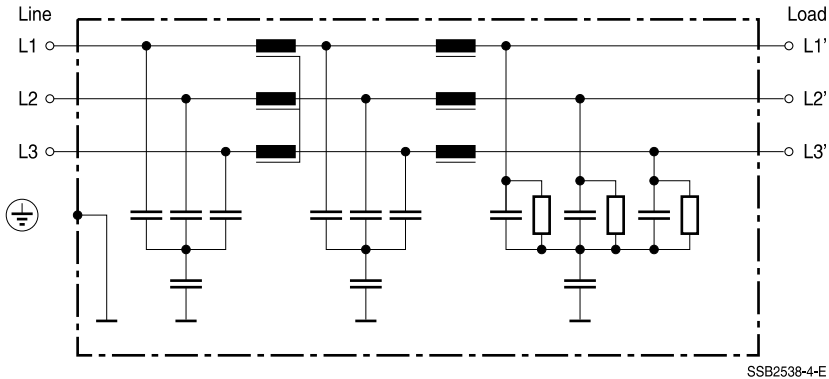
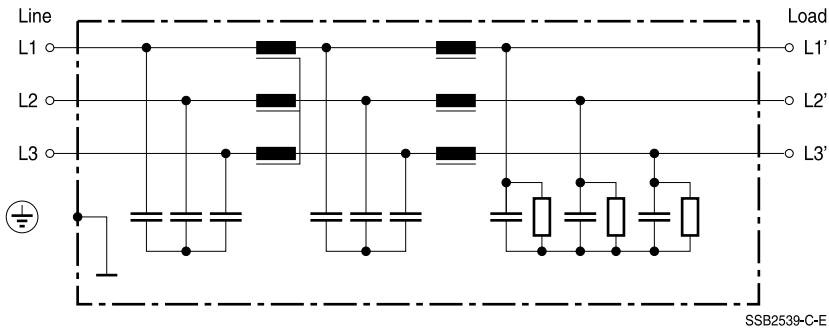
Marking on component:

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



Typical circuit diagrams
B84143B*S08*

B84143K*S081


Technical data and measuring conditions

Rated voltage V_R	Type B*S080: 520/300 V AC (50/60 Hz) Type S081: 760/440 V AC (50/60 Hz)
Rated voltage for IT mains supply	Type S081: 560/320 V AC (50/60 Hz) See also chapter "General technical information", section 7.
Rated current I_R	Referred to 40 °C rated temperature (250 A ... 1600 A) Referred to 60 °C rated temperature (180 A)
Rated peak withstand current I_{pk}	According IEC 60439-1:2011, chapter 3.8.10.2; limited by I^2t characteristics of fuse
Test voltage V_{test}	Type S080: 2240 V DC, 2 s (line/line) 2720 V DC, 2 s (lines/case)
	Type S081: 3270 V DC, 2 s (line/line) 2890 V DC, 2 s (lines/case)
Overload capability (thermal)	$1.5 \cdot I_R$ for 3 min per hour or $2.5 \cdot I_R$ for 30 s per hour
Climatic category (IEC 60068-1)	25/100/21 (–25 °C/+100 °C/21 days damp heat test)
Approvals	UL 1283; CSA C22.2 No.8 granted (Type S080: 500/290 V; Type S081: 600/350 V)

3-line filters

B84143B/K*S080, S081

for converters and power electronics

Characteristics and ordering codes

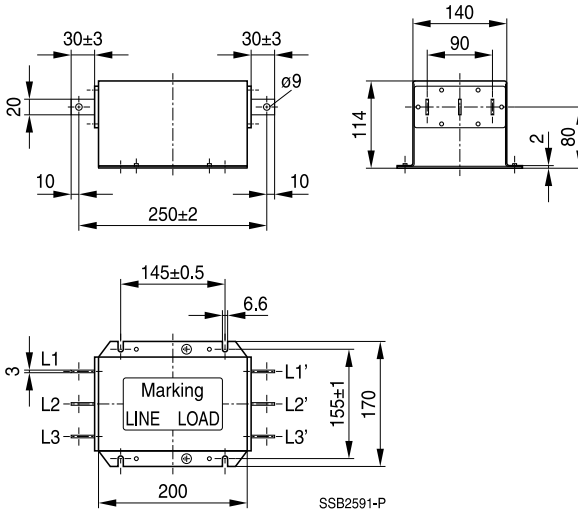
I_R A	I_{pk} kA	$I_{leak}^{1)}$ mA	R_{typ} mΩ	Approx. weight kg	Ordering code	Approvals  	
V _R = 520/300 V AC							
180	25	14	0.110	5.0	B84143B0180S080	×	×
250	25	14	0.110	5.0	B84143B0250S080	×	×
320	50	14	0.051	7.2	B84143B0320S080	×	×
400	50	14	0.048	7.5	B84143B0400S080	×	×
600	50	14	0.043	7.8	B84143B0600S080	×	×
1000	75	14	0.029	18.5	B84143B1000S080	×	×
1250	75	14	0.022	24.5	B84143B1250S080	×	×
1600	75	14	0.022	24.5	B84143B1600S080	×	×
V _R = 760/440 V AC							
180	25	20	0.110	5.0	B84143B0180S081	×	×
180	25	—	0.110	5.0	B84143K0180S081	×	×
250	25	20	0.110	5.0	B84143B0250S081	×	×
250	25	—	0.110	5.0	B84143K0250S081	×	×
320	50	20	0.051	7.2	B84143B0320S081	×	×
320	50	—	0.051	7.2	B84143K0320S081	×	×
400	50	20	0.048	7.5	B84143B0400S081	×	×
400	50	—	0.048	7.5	B84143K0400S081	×	×
600	50	20	0.043	7.8	B84143B0600S081	×	×
600	50	—	0.043	7.8	B84143K0600S081	×	×
1000	75	20	0.029	18.5	B84143B1000S081	×	×
1000	75	—	0.029	18.5	B84143K1000S081	×	×
1250	75	20	0.022	24.5	B84143B1250S081	×	×
1250	75	—	0.022	24.5	B84143K1250S081	×	×
1600	75	20	0.022	24.5	B84143B1600S081	×	×
1600	75	—	0.022	24.5	B84143K1600S081	×	×

× = Approval granted:

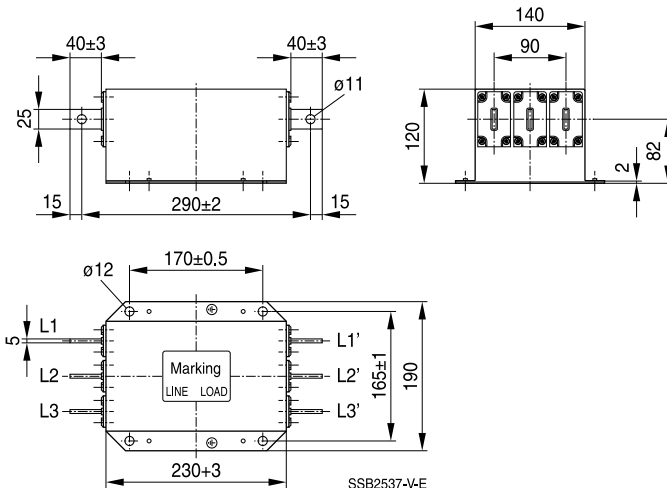
Type S080 for 500/290 V

Type S081 for 600/350 V

1) Calculation according IEC 60939-1 (04.2011), annex A, "Calculation of leakage current" at V_R , 50 Hz.

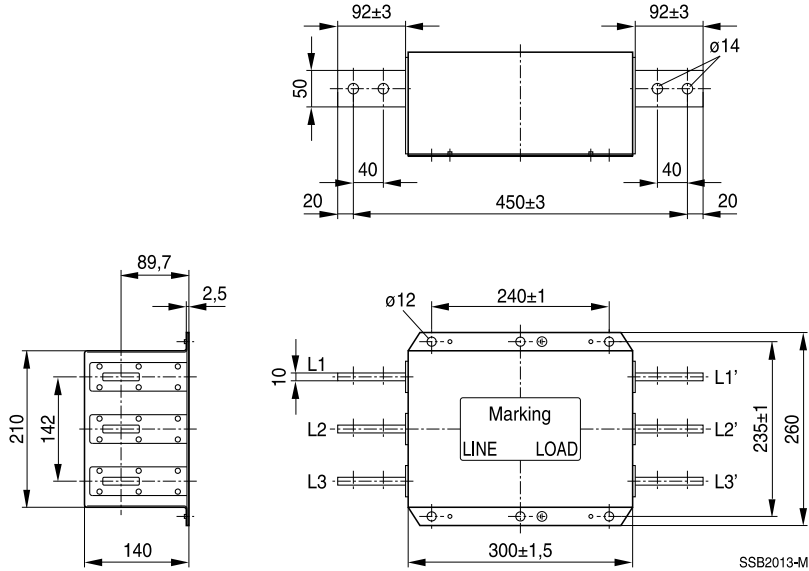
Dimensional drawings
B84143B/K0180S08*, B84143B/K0250S08* (180 A, 250 A)


General tolerances according to ISO 2768–cL
Dimensions in mm

B84143B/K0320S08*, B84143B/K0400S08* (320 A, 400 A)


General tolerances according to ISO 2768–cL
Dimensions in mm

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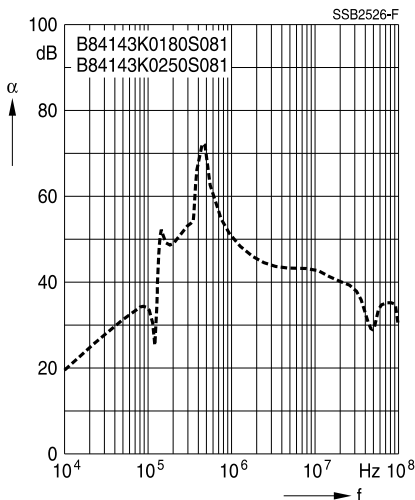
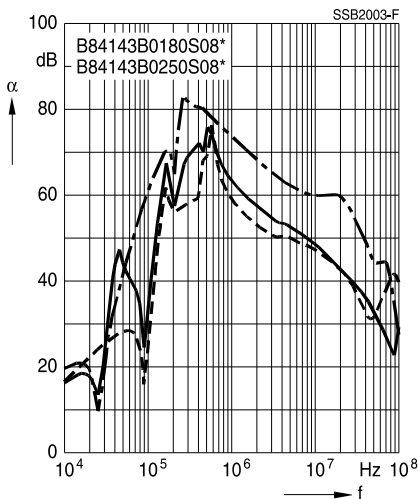
B84143B/K1250S08*, B84143B/K1600S08* (1250 A, 1600 A)


General tolerances according to ISO 2768–cL
Dimensions in mm

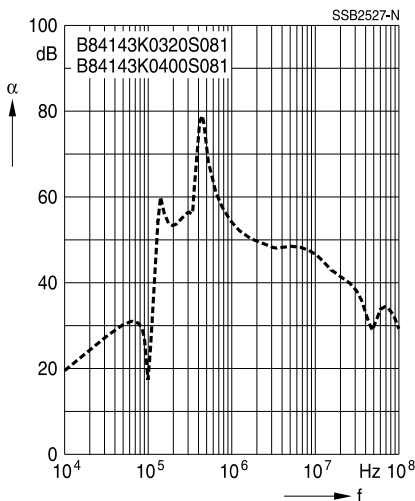
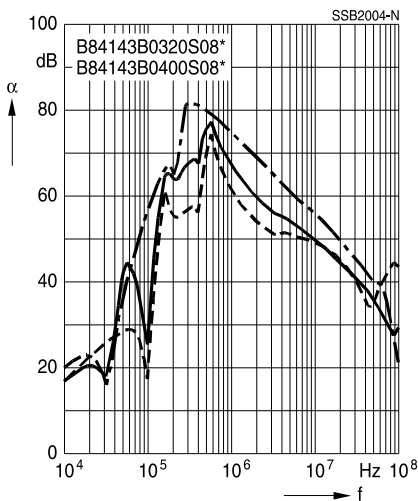
Insertion loss (typical values at $Z = 50 \Omega$)

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

Filters for 180 A and 250 A

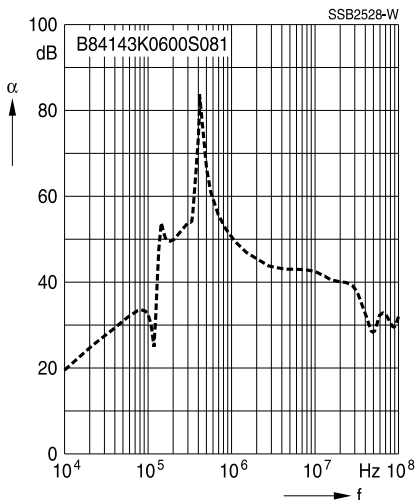
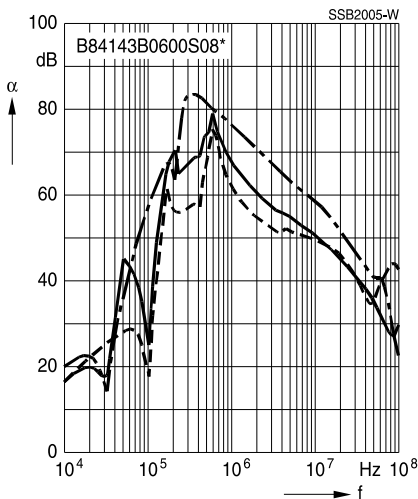
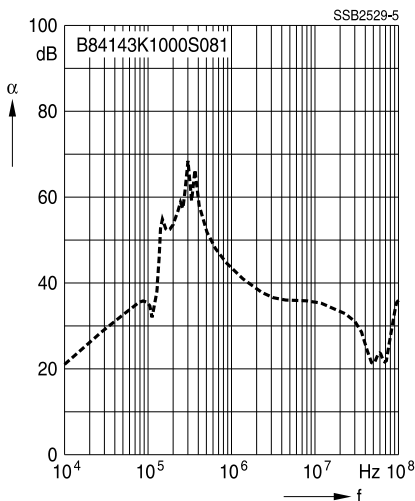
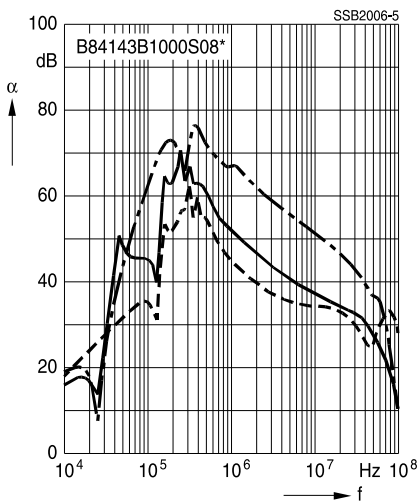


Filters for 320 A and 400 A



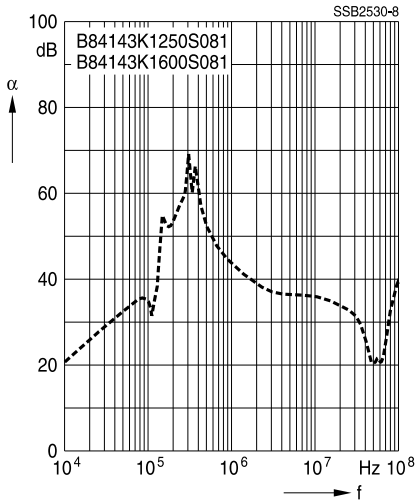
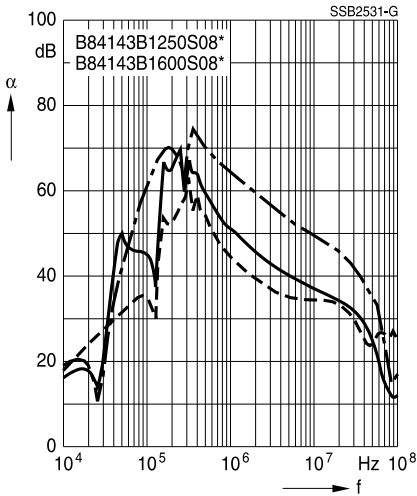
Insertion loss (typical values at $Z = 50 \Omega$)

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

Filters for 600 A

Filters for 1000 A


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

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

Filters for 1250 A and 1600 A


Cautions and warnings

- Please note the advices in our data book “EMC Filters” (latest edition); attention should be paid to the chapter “General safety notes”.
- 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. EMC 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 EMC 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 EMC 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).
- EMC filters must be protected in the application against impermissible exceeding of the rated currents by overcurrent protective.
- 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 $I_{LK}^{(1)} < 10$ mA the PE conductor must have a KU value²⁾ of 4.5; for leakage currents $I_{LK} \geq 10$ mA the PE conductor must have a KU value of 6.

1) I_{LK} = 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. A value of KU = 4.5 with respect to interruptions is attained: a) with a permanently connected protective earth circuit ≥ 1.5 mm² and b) with a protective earth circuit ≥ 2.5 mm² connected via shroud connectors (IEC 60309-2). KU = 6 with respect to interruptions is achieved for fixed-connection lines ≥ 10 mm² where the type of connection and line layout correspond to the requirements for PEN conductors as specified in relevant standards.

Symbols and terms

Symbol	English	German
α	Insertion loss	Einfügdungsdämpfung
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_{LK}	Filter leakage current	Filter-Ableitstrom
I_C	Current through capacitor	Strom durch Kondensator
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
I_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_{loss}	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
V_{eff}	RMS voltage	Effektivspannung
V_{LE}	Voltage line to earth; voltage line to ground	Spannung Phase zu Erdpotential
V_N	Nominal voltage	Netzspannung
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
Z	Impedance	Scheinwiderstand
$ Z $	Impedance, absolute value	Scheinwiderstand (Betragswert)

Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
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