

EMC filters

3-line filters
for converters and power electronics

Series/Type: B84143A*166
Date: May 2012

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Power line filters for 3-phase systems
Rated voltage V_R : 520/300 V AC
Rated current I_R : 10 A to 35 A
Construction

- 3-line filters
- Metal case

Features

- Excellent price/performance ratio
- Ultra-compact design
- Low weight
- Easy to install
- Optimized for short motor cables and operation under full load
- ENEC10, UL and cUL approval


Typical applications

- Frequency converters for motor drives, e.g.
 - elevators
 - pumps
 - HVAC systems (heating, ventilation and air conditioning)
- Power supplies

Terminals

- Tab connectors (10 A ... 20 A)
- Finger-safe terminal blocks (35 A)

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

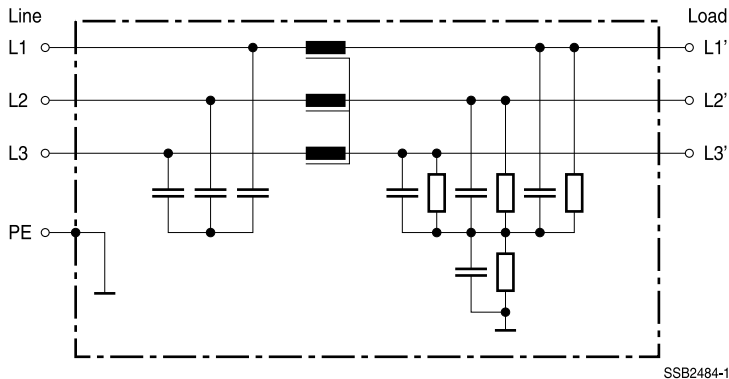


3-line filters

B84143A*166

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Typical circuit diagram



Technical data and measuring conditions

Rated voltage V_R	520/300 V AC (50/60 Hz)
Rated current I_R	Referred to 50 °C rated temperature ¹⁾
Test voltage V_{test}	2236 V DC, 2 s (line/line) 2720 V DC, 2 s (lines/case)
Overload capability (thermal)	1.5 · I_R for 3 min per hour or 2.5 · 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	IEC 60939, UL 1283, CSA C22.2 No.8

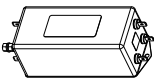
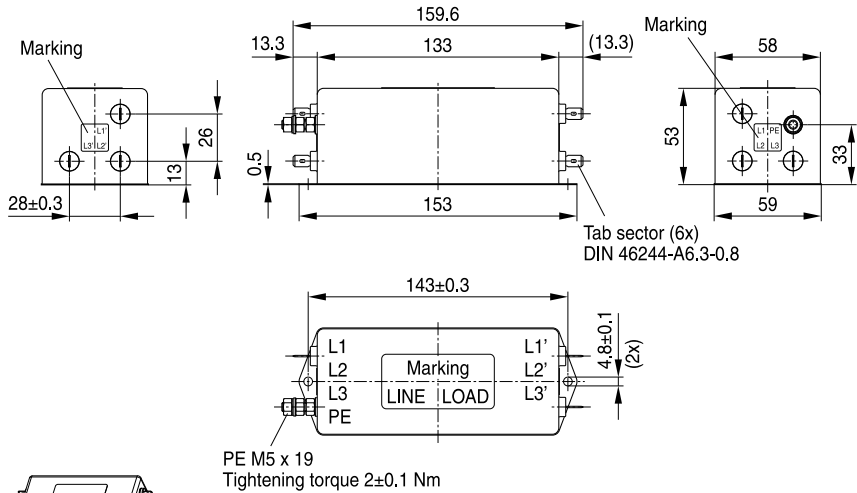
1) For use at higher ambient temperature as the rated temperature, see current derating in our data book.

Characteristics and ordering codes

I_R	Terminal cross section	$I_{LK}^{1)}$	R_{typ}	Approx. weight	Ordering code	Approvals		
A	mm ²	mA	mΩ	kg				
$V_R = 520/300$ V AC								
10	5	3.1	12.9	0.6	B84143A0010A166	×	×	×
20	5	3.1	4.9	0.75	B84143A0020A166	×	×	×
35	6	5.0	2.7	1.1	B84143A0035R166	×	×	×

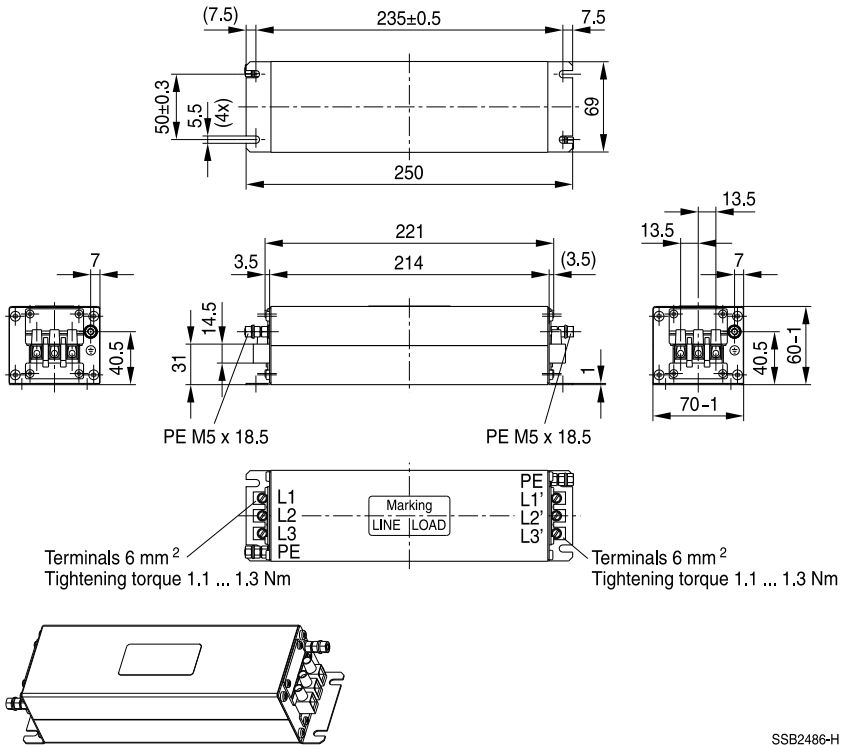
× = Approval granted

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

Dimensional drawings
B84143A0010A166, B84143A0020A166 (10 A, 20 A)


SSB2485-9

 General tolerances according to ISO 2768—C
 Dimensions in mm

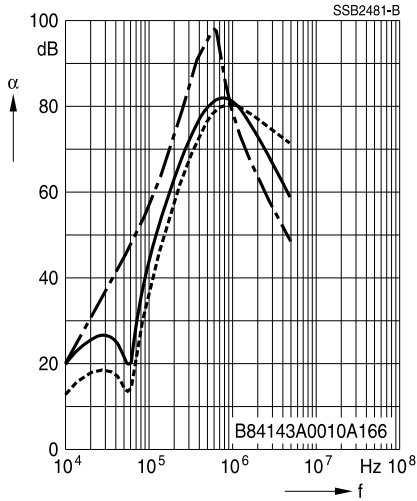
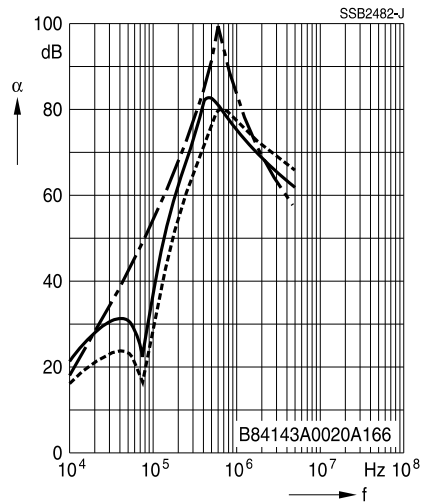
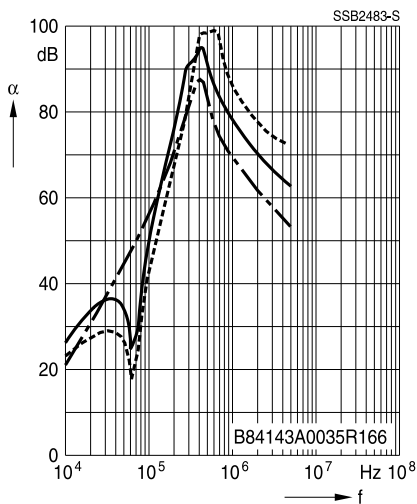
B84143A0035R166 (35 A)


SSB2486-H

 General tolerances according to ISO 2768-C
 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)

Filter for 10 A

Filter for 20 A

Filter for 35 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	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_{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_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)

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