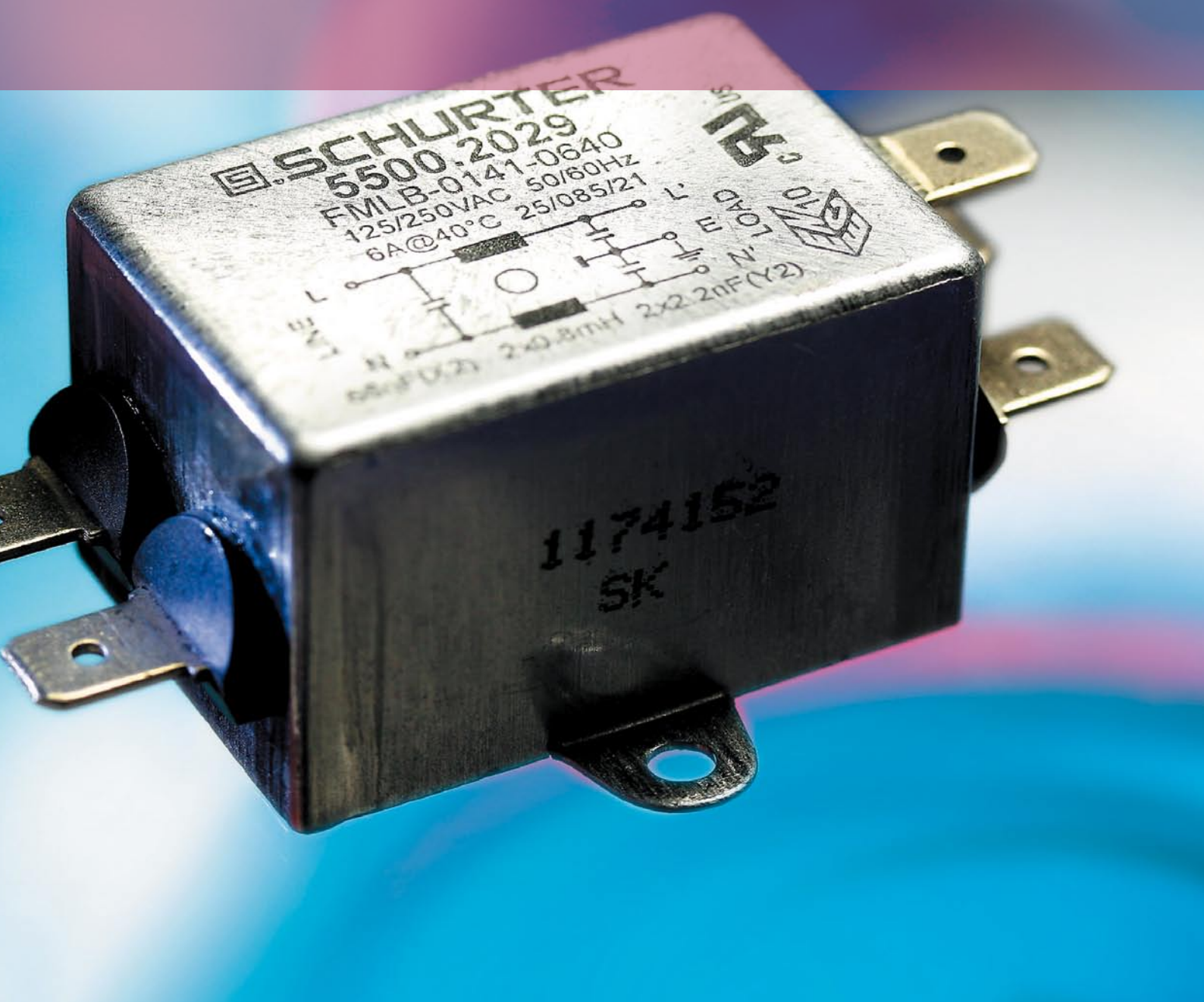
Product Group Catalog
EMC Products

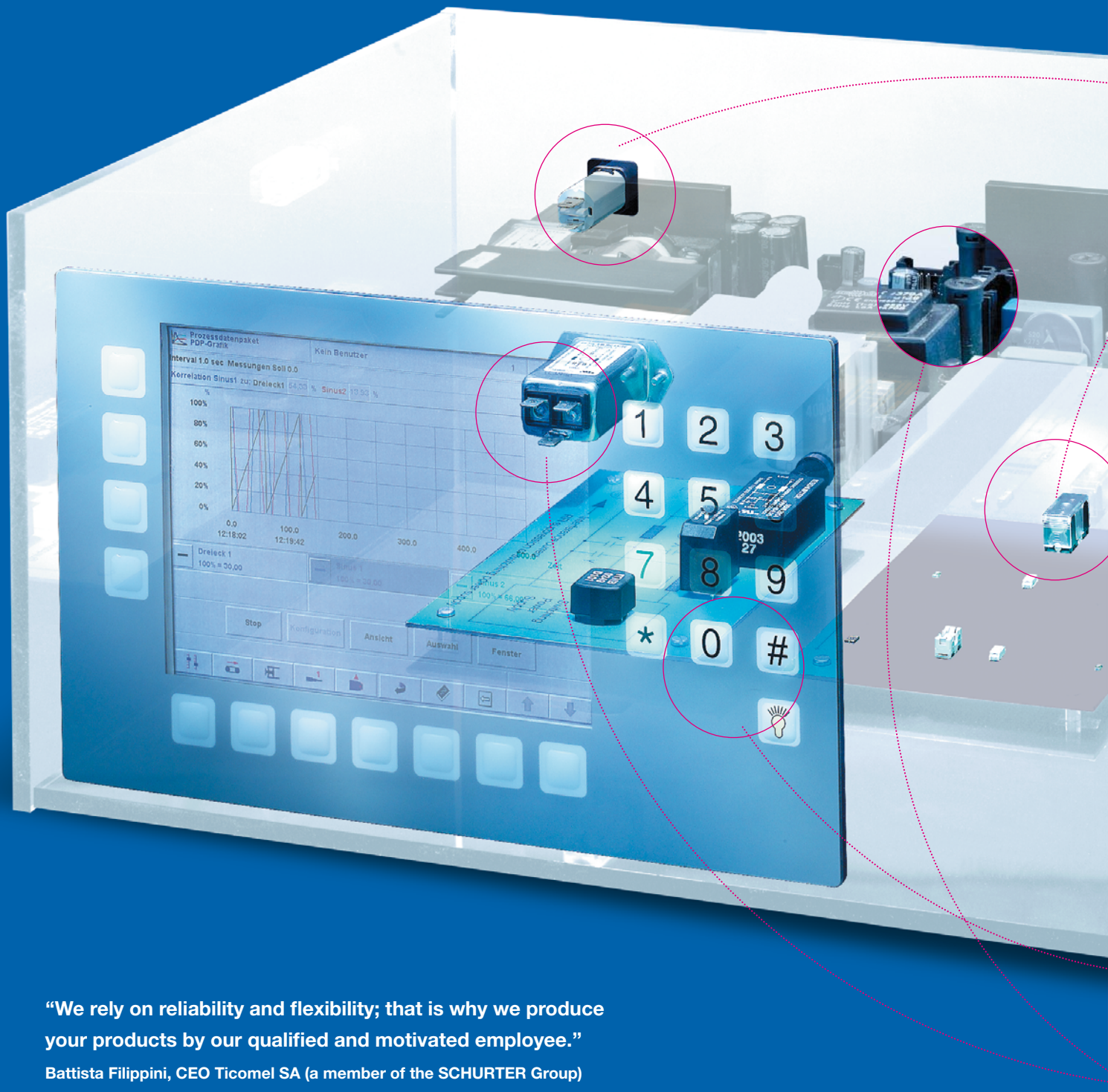
www.schurter.com/emc

SCHURTER
ELECTRONIC COMPONENTS

1-Phase Line Filters



summary

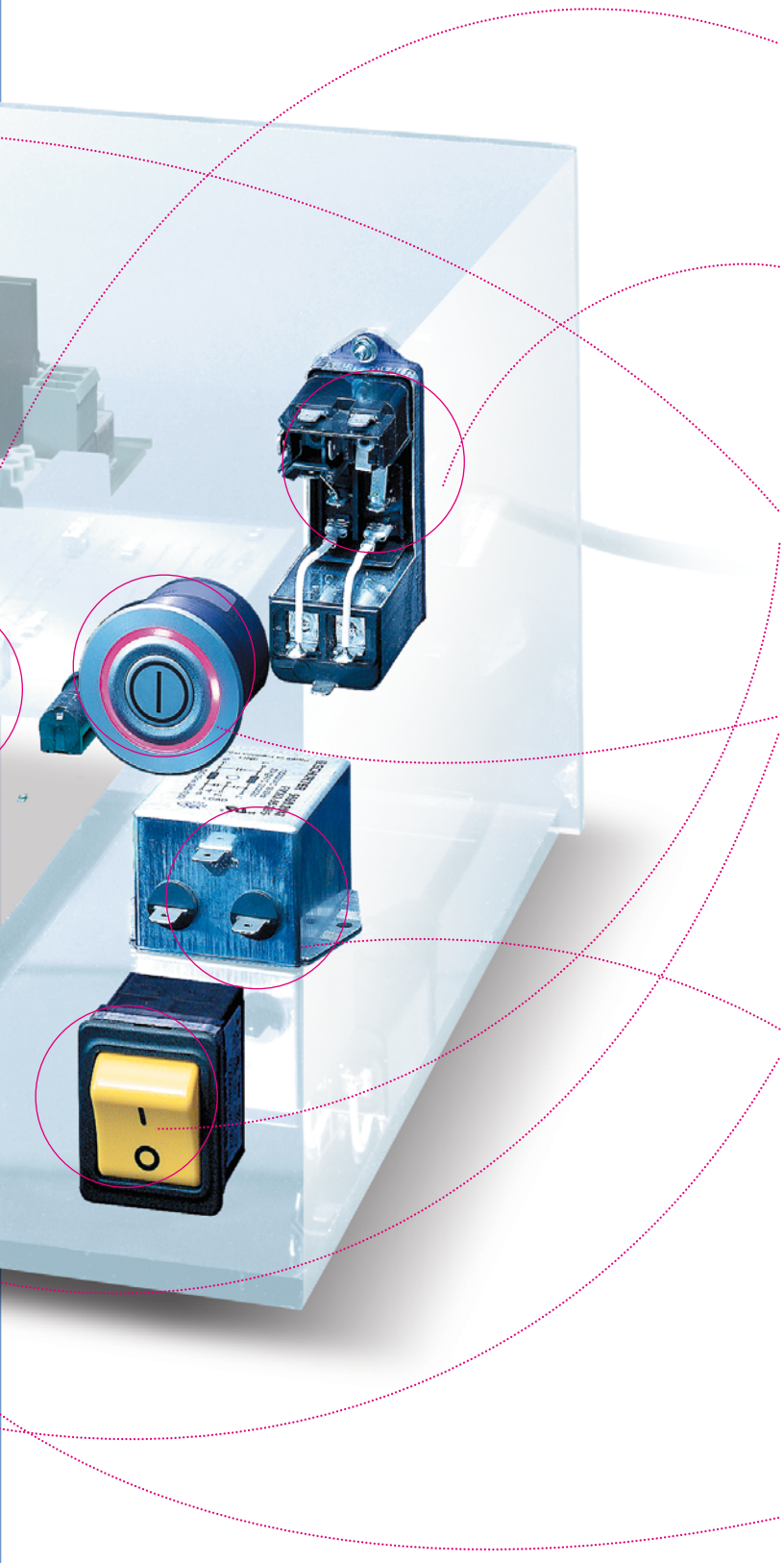


“We rely on reliability and flexibility; that is why we produce your products by our qualified and motivated employee.”

Battista Filippini, CEO Ticomel SA (a member of the SCHURTER Group)

> the Schurter Range at the Glance

SCHURTER is a progressive innovator and manufacturer of fuses, connectors, circuit breakers, input systems, EMC products and manufacturing services for the electronics industry. We focus on components that ensure safe supply of power and make the interface between human and machine easier.



fuses
non resettable fuses
telecom fuses
resettable fuses
fuseholders
fuseholders blocks & clips

connectors
power entry modules without line filter
power entry modules with line filter
appliance couplers
cord connectors (rewireable)
distribution units
cord sets

circuit breakers
thermal (t- and ta-line)
thermal-magnetic (tm- and as-line)
undervoltage protection
power entry modules with CBE

input systems
printmount switches
frontpanel switches
public transport switch
metal line switches
sensor switches
membrane keypads
sensor keypad
metal line keypads
touch panel / touch screen
housing systems and front panels

EMC products
power entry modules with line filter
1-phase line filters
3-phase line filters
chokes
pulse transformers
power stage driver modules

other products
voltage selector
test jacks & probes
indicators
data & signal, audio, dc/ din connectors

EMS
Electronic Manufacturing Services

	Description Approvals	Rated Current	Filter-Type	Attenuation Filter Stage	Application	Housing	Web Reference or Type
	MOUNTING PCB MOUNTED						
	1-phase filter for THT mounting	1 - 10A	Standard and Medical Version	-Standard	General purpose	Thermoplastic	5500 12
	1-phase filter for THT mounting in flat aluminum housing	2 - 16A	Standard and Medical Version	-Standard	General purpose	Aluminum	FMAB-72 22
	1-phase filter for THT mounting in flat housing	0.5 - 6,5A	Standard and Medical Version	-Standard	General purpose	Thermoplastic	FPP-02 19
	Cost optimized 1-phase filter for THT mounting	0.6 - 6A	Standard and Medical Version	-Standard	General purpose	Thermoplastic	FPP-01 15

This overview only shows a selection of the current product range of SCHURTER.
You will find additional information about the respective products on our website: www.schurter.com/pg06_1
For customer specific solutions, please contact us. www.schurter.com/contact
General Product Information see Industrial Mains Filters page 65

For a noise free and reliable DC power distribution

The filter series FMEB and FMEC have been specially developed for DC applications offering optimal EMC noise suppression for that range of power distribution.

The new DC-filter series FMEB and FMEC are designed for current rage up to 30 A. The single pole version FMEB is suitable for a maximum operating voltage of +80 VDC, the dual pole version FMEC +/- 80 VDC. There are numerous applications that need a noise free DC supply, which, however environmental conditions not always permit. Areas of application include IT- and telecom sector, electical and control cabinets as well as automation.

Systematical employment of SIX SIGMA

SCHURTER distinguishes itself by the highest quality standards in all processes. With the methodes of SIX SIGMA, we arise the customer benefit and strengthen our position in the market continuously.

	Description Approvals	Rated Current	Filter-Type	Attenuation Filter Stage	Application	Housing	Web Reference or Type
	MOUNTING SCREW-ON						
	1-stage filter for 1-phase systems	1 - 10A	Standard and Medical Version	-Standard	General purpose	Aluminum	FMW-41 41
	1-stage filter for 1-phase systems	10 - 20A	Standard and Industrial Version	-Standard	General purpose	Aluminum	FMW-55 46
	1-stage filter for 1-phase systems, broad band attenuation	12 - 30A	Industrial Version	-Excellent	High attenuation at high loads	Metal	FMAB 56
	2-stage filter for 1-phase systems	2 - 6A	Standard Version	-High	For high requirements	Aluminum	FMW-52 44
	2-stage filter for 1-phase systems, very broad band attenuation	8 - 25A	Standard and Industrial Version	-Excellent	High attenuation at high loads	Metal	FMBB 58

	Description Approvals	Rated Current	Filter-Type	Attenuation Filter Stage	Application	Housing	Web Reference or Type
	2-stage filter for 1-phase systems, very high symmetrical attenuation	1 - 16A	Standard and Industrial Version	-Medium	Especially against symmetrical interference	Aluminum	FSS 53
	3-stage filter for 1-phase systems, very high broad band attenuation	4 - 30A	Industrial Version	-Medium	High symmetrical and asymmetrical attenuation	Metal	FMW-150 48
	Cost optimized 1-stage filter for 1-phase systems	1 - 10A	Standard and Medical Version	-Standard	General purpose	Aluminum	FMLB-41 35
	Cost optimized 1-stage filter for 1-phase systems	6 - 20A	Standard and Medical Version	-Standard	General purpose	Aluminum	FMLB-09 32
	Cost optimized 1-stage filter for 1-phase systems	6 - 20A	Standard and Medical Version	-Standard	General purpose	Aluminum	FMLB-51 38

	Description Approvals	Rated Current	Filter-Type	Attenuation Filter Stage	Application	Housing	Web Reference or Type
	Cost optimized 2-stage filter for 1-phase systems, very high sym. and asym. attenuation	3 - 36A	Standard and Industrial Version	-High	Especially against asymmetrical interference	Alu. anodised / Stainless Steel	**FSW 50**
 new	1-stage filter for DC systems, dual pole, standard attenuation	5 - 30A	Industrial Version	-Standard	-	Alu. anodised	**FMEC 29**
 new	1-stage filter for DC systems, single pole, standard attenuation	5 - 30A	Industrial Version	-Standard	-	Alu. anodised	**FMEB 26**

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General Product Information see Industrial Mains Filters page 65

Screw Clamps for Simple Assembly

The block filters are offered in various configuration. To highlight are for example the several connection possibilities.

The connectors can be screw clamps, quick connect terminals or with stranded wires. The restrictions are given by the current ratings. The customer may configure the design on his purpose.

Intensive Customer Interaction

“So what made this thing happen was our good teamwork with their technical department and the close and continuous overall development cooperation with the customer.”

Raimund Hüglin / Martin Zarges

1-phase filter for THT mounting

Standard- or Medical-Filter

Shield

Description
- Component:
  PCB mounted
- 1 Function:
  Line filter in standard and medical version
- For PCB mounting

Approvals
- VDE License Number: 101307
- UL License Number: E72928
- CSA License Number: 97784

Characteristics
- Ultra-compact design
- Shield available separately (German silver)
- Qualified for use in equipment according IEC/EN 60950

References
General Product Information

Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

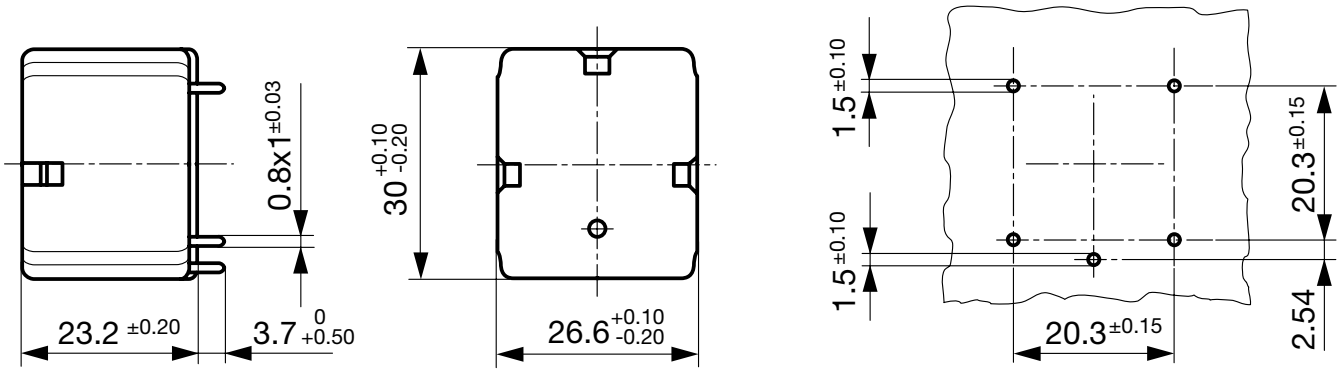
Technical Data

Ratings IEC	1 - 10 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	1 - 10 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	standard < 0.5 mA (250 V / 60 Hz) medical < 5 µA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 85 °C
Climatic Category	25/085/21 acc. to IEC 60068-1
Degree of Protection	from front side IP 40 acc. to IEC 60529
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	For PCB mounting
Material: Housing	Thermoplastic, UL 94V-0

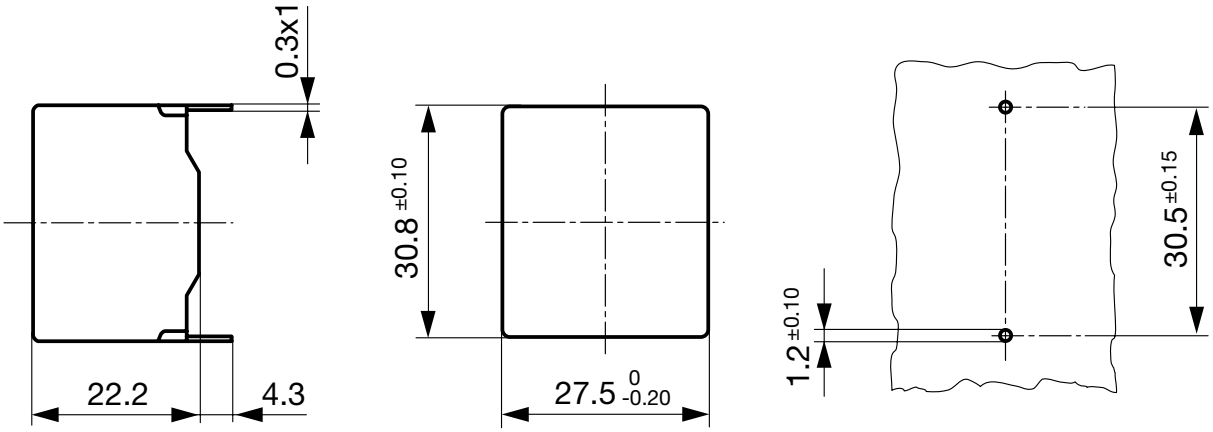
Line Filter	Standard and Medical Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 5'900'000 h acc. to MIL-HB-217 F

Dimensions
Line Filter

Length 30 mm



Shield

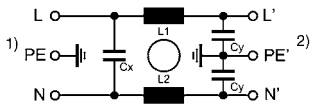


Technical Data of Filter-Components

Rated Current [A]	Filter-Type	Inductances L [mH]	Capacitance CX [nF]	Capacitance CY [nF]	R [MΩ]
1	Standard Version	2 x 11	47	2.2	-
2	Standard Version	2 x 4	47	2.2	-
4	Standard Version	2 x 1.6	47	2.2	-
6	Standard Version	2 x 0.7	47	2.2	-
10	Standard Version	2 x 0.3	47	2.2	-
1	Medical Version (M5)	2 x 11	47	-	1
2	Medical Version (M5)	2 x 4	47	-	1
4	Medical Version (M5)	2 x 1.6	47	-	1
6	Medical Version (M5)	2 x 0.7	47	-	1
8	Medical Version (M5)	2 x 0.5	47	-	1
10	Medical Version (M5)	2 x 0.3	47	-	1

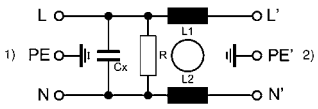
Diagrams

Standard version



1) Line
2) Load

Medical version



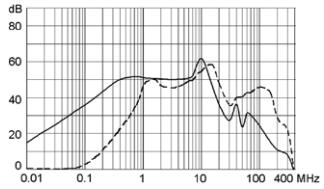
1) Line
2) Load

Attenuation Loss

- - - - differential mode _____ common mode

Standard version

1 A



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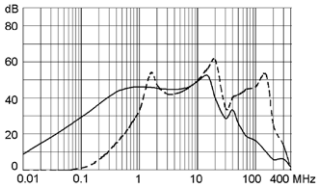

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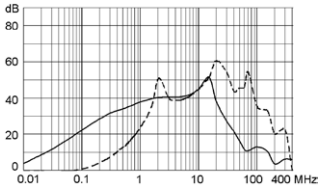

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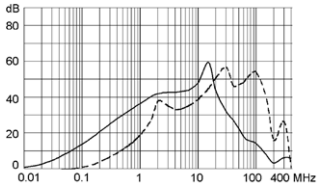

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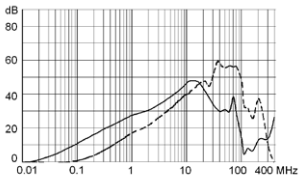

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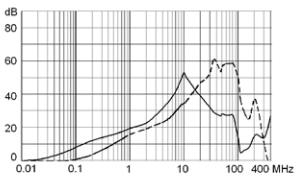
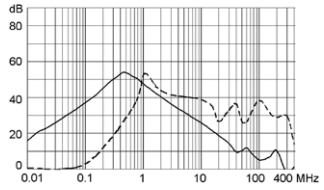


Medical version (M5)

1 A



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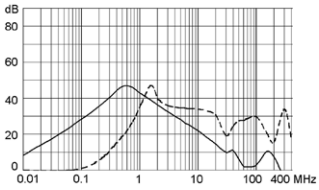

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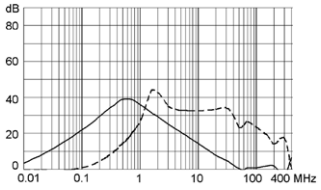

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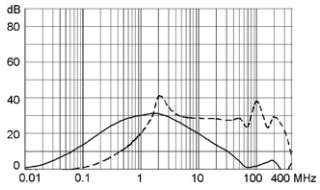

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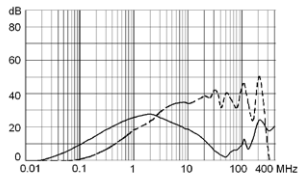

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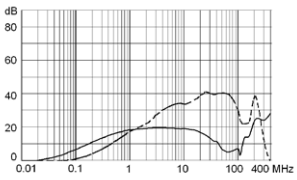


Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	EMC-Shielding	Weight [g]	Order Number
-	-	Shield	20	5500.0001
1	Standard Version	Without EMC-shield	35	5500.0155.1
2	Standard Version	Without EMC-shield	35	5500.0255.1
4	Standard Version	Without EMC-shield	35	5500.0455.1
6	Standard Version	Without EMC-shield	35	5500.0655.1
10	Standard Version	Without EMC-shield	35	5500.1055.1
1	Medical Version (M5)	Without EMC-shield	35	5500.0155.3
2	Medical Version (M5)	Without EMC-shield	35	5500.0255.3
4	Medical Version (M5)	Without EMC-shield	35	5500.0455.3
6	Medical Version (M5)	Without EMC-shield	35	5500.0655.3
8	Medical Version (M5)	Without EMC-shield	35	5500.0855.3
10	Medical Version (M5)	Without EMC-shield	35	5500.1055.3

Packaging unit 100 Pcs

Cost optimized 1-phase filter for THT mounting

Standard- or Medical-Filter

Description
- Chassis:
  PCB mounted, from top
- Line filter in standard and medical version, 1-stage, standard attenuation
- For PCB-mounting or quick connect terminals
- Excellent price/perfomance ratio

Approvals
- VDE License Number: 40004673
- UL License Number: E72928

Characteristics
- Cost-saving plastic housing
  Designed for standard applications
- Protection against interference voltage from the mains
  Possible interferences generated in the equipment are strongly attenuated
- For standard applications
- Qualified for use in equipment according IEC/EN 60950

Other versions on request
- Version with wire connection
- Medical version M80

References
General Product Information

Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

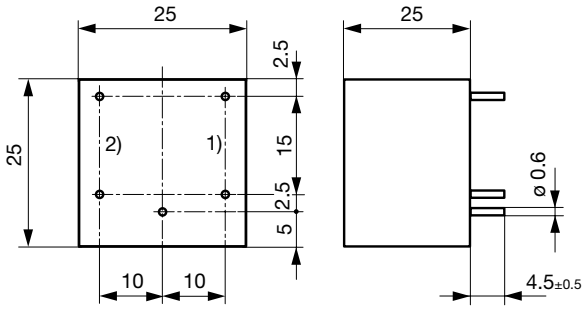
Technical Data

Ratings IEC	0.6 - 6 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	0.6 - 6 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	standard < 0.25 mA (250 V / 60 Hz) medical < 5 µA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 85 °C
Climatic Category	25/085/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	For PCB mounting , tin-plated
Material: Housing	Thermoplastic, black, UL 94V-0

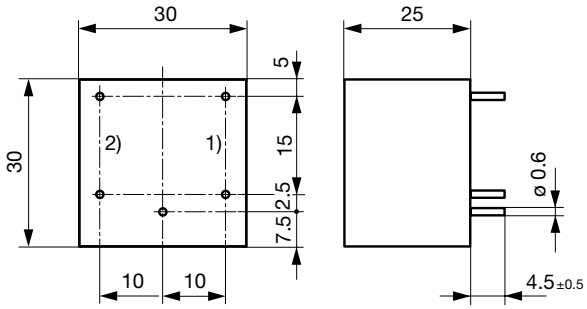
Line Filter	Standard and Medical Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

Dimensions

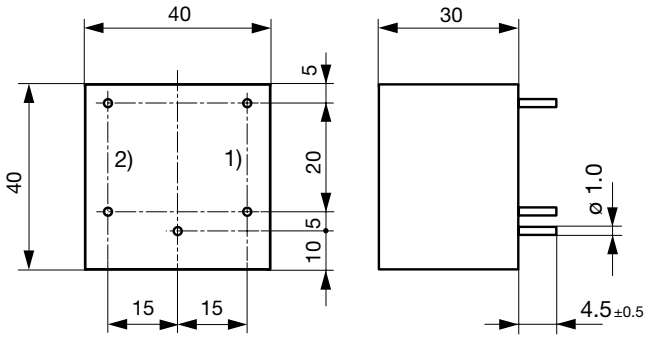
Case 13P



Case 18P



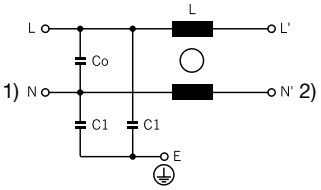
Case 24P



1) Line
2) Load

Diagrams

S1 standard version



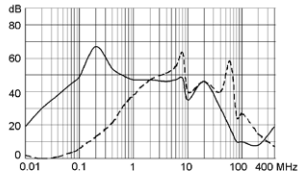
1) Line
2) Load

Attenuation Loss

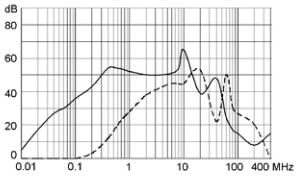
- - - - differential mode _____ common mode

Standard version

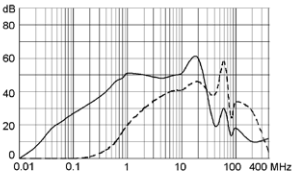
0.6 A (5500.2000)



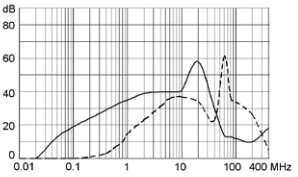
1 A (5500.2001)



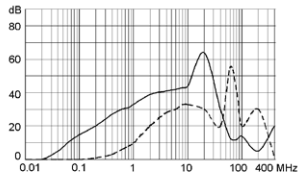
2 A (5500.2002)



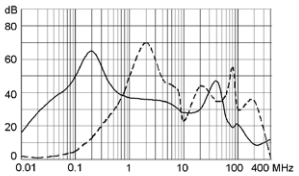
4 A (5500.2003)



6 A (5500.2004)



0.7 A (5500.2005)



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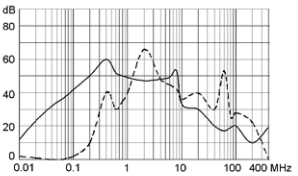

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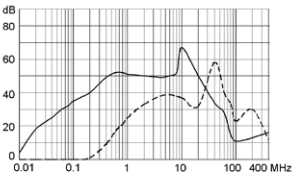
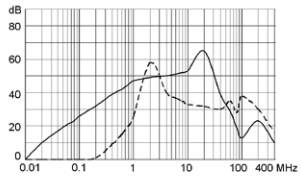


3 A (5500.2008)



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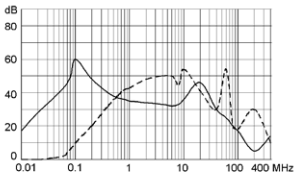
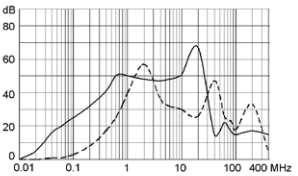
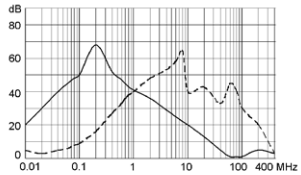


3 A (5500.2010)

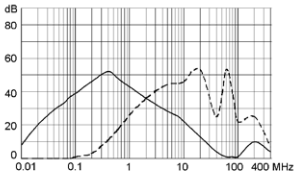


Medical version (M5)

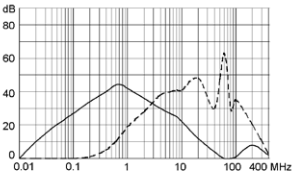
0.6 A (5500.2116)



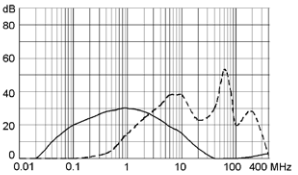
1 A (5500.2117)



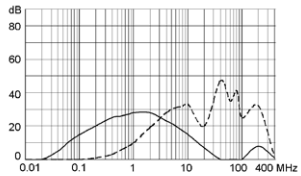
2 A (5500.2118)



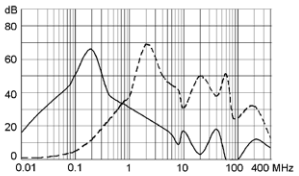
4 A (5500.2119)



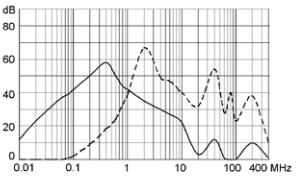
6 A (5500.2120)



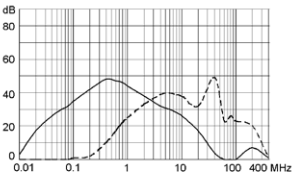
0.7 A (5500.2121)



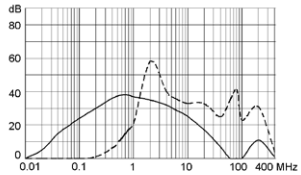
1 A (5500.2122)



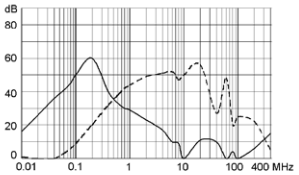
2 A (5500.2123)



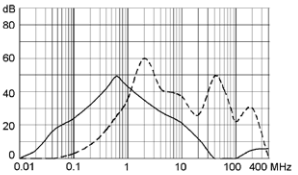
3 A (5500.2124)



1 A (5500.2125)



3 A (5500.2126)



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	L [mH]	Co / C2 (X2) [µF]	C1 (Y2) [nF]	Diagram	Weight [g]	Case	Order Number
0.6	Standard Version	2 x 40	0.015	2.2	S1	35	13P	5500.2000
1	Standard Version	2 x 10	0.015	2.2	S1	35	13P	5500.2001
2	Standard Version	2 x 4	0.015	2.2	S1	35	13P	5500.2002
4	Standard Version	2 x 1.5	0.015	2.2	S1	35	13P	5500.2003
6	Standard Version	2 x 0.8	0.015	2.2	S1	35	13P	5500.2004
0.7	Standard Version	2 x 40	0.015	2.2	S1	45	18P	5500.2005
1	Standard Version	2 x 20	0.022	2.2	S1	45	18P	5500.2006
2	Standard Version	2 x 6	0.022	2.2	S1	45	18P	5500.2007
3	Standard Version	2 x 3	0.022	2.2	S1	45	18P	5500.2008
1	Standard Version	2 x 30	0.047	2.2	S1	78	24P	5500.2009
3	Standard Version	2 x 4	0.047	2.2	S1	78	24P	5500.2010
0.6	Medical Version (M5)	2 x 40	0.015	-	S1	35	13P	5500.2116
1	Medical Version (M5)	2 x 10	0.015	-	S1	35	13P	5500.2117
2	Medical Version (M5)	2 x 4	0.015	-	S1	35	13P	5500.2118
4	Medical Version (M5)	2 x 1.5	0.015	-	S1	35	13P	5500.2119
6	Medical Version (M5)	2 x 0.8	0.015	-	S1	35	13P	5500.2120
0.7	Medical Version (M5)	2 x 40	0.015	-	S1	45	18P	5500.2121
1	Medical Version (M5)	2 x 20	0.022	-	S1	45	18P	5500.2122
2	Medical Version (M5)	2 x 6	0.022	-	S1	45	18P	5500.2123
3	Medical Version (M5)	2 x 3	0.022	-	S1	45	18P	5500.2124
1	Medical Version (M5)	2 x 30	0.047	-	S1	78	24P	5500.2125
3	Medical Version (M5)	2 x 4	0.047	-	S1	78	24P	5500.2126

Packaging unit 50 Pcs

1-phase filter for THT mounting in flat housing

Standard- or Medical-Filter

Description
- Chassis:
  PCB mounted, from top
- Line filter in standard and medical version, 1-stage, standard attenuation
- For PCB mounting
- Excellent price/perfomance ratio

Approvals
- VDE License Number: 40004673
- UL License Number: E72928

Characteristics
- Cost-saving plastic housing
  Designed for standard applications
- Protection against interference voltage from the mains
  Possible interferences generated in the equipment are strongly attenuated
- For standard applications
- Qualified for use in equipment according IEC/EN 60950

Other versions on request
- Version with wire connection
- Medical version M80

References
General Product Information

Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

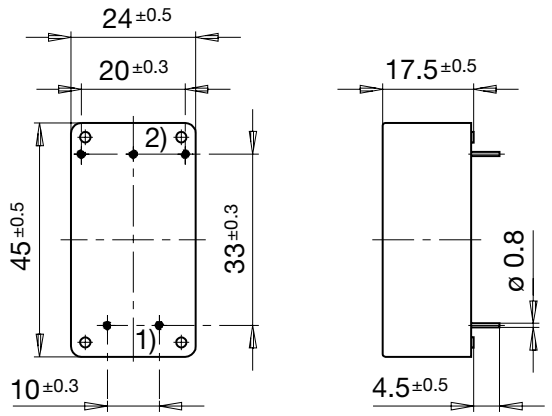
Technical Data

Ratings IEC	0.5 - 6,5 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	0.5 - 6,5 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	standard < 0.25 mA (250 V / 60 Hz) medical < 5 µA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 85 °C
Climatic Category	25/085/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	For PCB mounting , tin-plated
Material: Housing	Thermoplastic, black, UL 94V-0

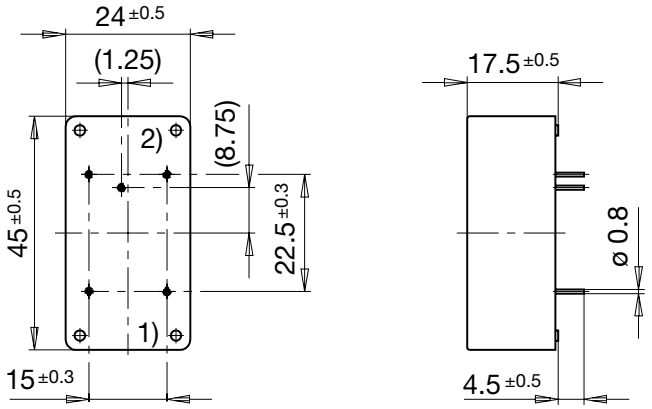
Line Filter	Standard and Medical Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

Dimensions

Case 27P



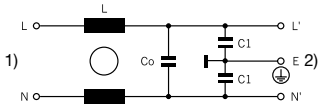
Case 27-1P



1) Line
2) Load

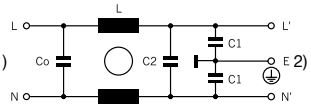
Diagrams

S2 standard version



1) Line
2) Load

S3 standard version



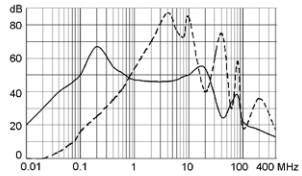
1) Line
2) Load

Attenuation Loss

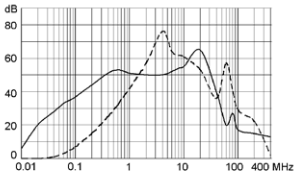
- - - - differential mode _____ common mode

Standard version

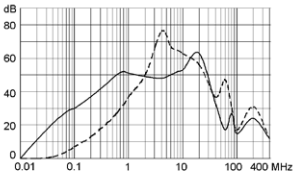
0.5 A (5500.2014)



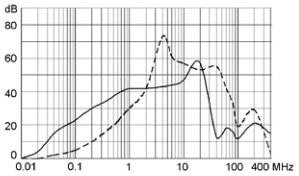
1 A (5500.2015)



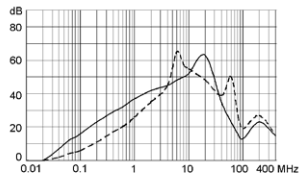
1.6 A (5500.2016)



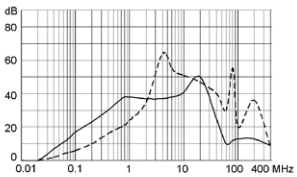
2.5 A (5500.2017)



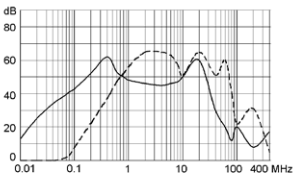
4 A (5500.2018)



6.5 A (5500.2019)

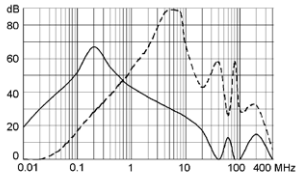


0.8 A (5500.2020)

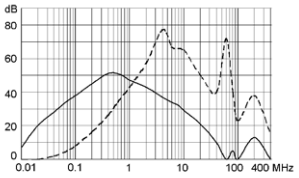


Medical version (M5)

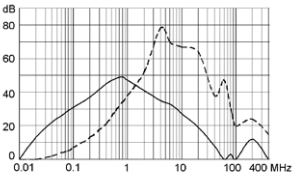
0.5 A (5500.2127)



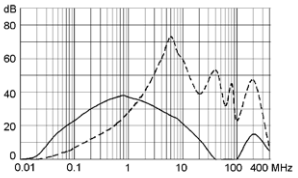
1 A (5500.2130)



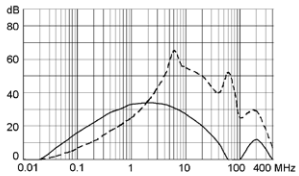
1.6 A (5500.2131)



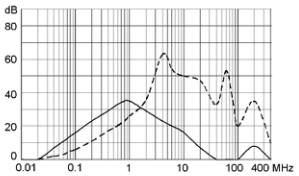
2.5 A (5500.2132)



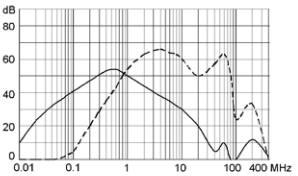
4 A (5500.2133)



6.5 A (5500.2128)



0.8 A (5500.2129)



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	L [mH]	Co / C2 (X2) [µF]	C1 (Y2) [nF]	Diagram	Weight [g]	Case	Order Number
0.8	Standard Version	2 x 20	0.068/0.015	2.2	S3	38	27-1P	5500.2020
0.5	Standard Version	2 x 40	0.1	2.2	S2	38	27P	5500.2014
1	Standard Version	2 x 10	0.1	2.2	S2	38	27P	5500.2015
1.6	Standard Version	2 x 6	0.1	2.2	S2	38	27P	5500.2016
2.5	Standard Version	2 x 2	0.1	2.2	S2	38	27P	5500.2017
4	Standard Version	2 x 1	0.1	2.2	S2	38	27P	5500.2018
6,5	Standard Version	2 x 1	0.1	2.2	S2	38	27P	5500.2019
0.8	Medical Version (M5)	2 x 20	0.068/0.015	-	S3	38	27-1P	5500.2129
0.5	Medical Version (M5)	2 x 40	0.1	-	S2	38	27P	5500.2127
1	Medical Version (M5)	2 x 10	0.1	-	S2	38	27P	5500.2130
1.6	Medical Version (M5)	2 x 6	0.1	-	S2	38	27P	5500.2131
2.5	Medical Version (M5)	2 x 2	0.1	-	S2	38	27P	5500.2132
4	Medical Version (M5)	2 x 1	0.1	-	S2	38	27P	5500.2133
6,5	Medical Version (M5)	2 x 1	0.1	-	S2	38	27P	5500.2128

Packaging unit 50 Pcs

1-phase filter for THT mounting in flat aluminum housing

Standard- or Medical-Filter

Description
- Chassis:
  PCB mounted, from top
- Line filter in standard and medical version, 1-stage, standard attenuation
- For PCB mounting

Approvals
- VDE License Number: 40004673
- UL License Number: E72928

Characteristics
- Aluminum case provides good shielding
  Designed for standard applications
- Protection against interference voltage from the mains
  Possible interferences generated in the equipment are strongly attenuated
- Universal line filter for standard applications
- Qualified for use in equipment according IEC/EN 60950

Other versions on request
- Medical version M80

References
General Product Information

Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

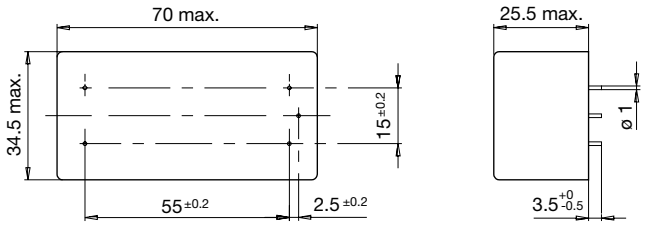
Technical Data

Ratings IEC	2 - 16 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	2 - 16 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	standard < 0.5 mA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	For PCB mounting , tin-plated
Material: Housing	Aluminum

Line Filter	Standard and Medical Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

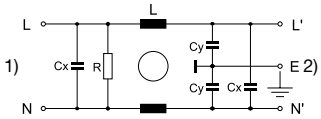
Dimensions

Case 72



Diagrams

Standard version



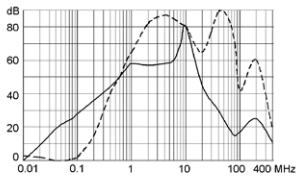
1) Line
2) Load

Attenuation Loss

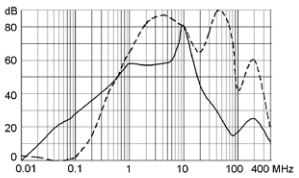
- - - - differential mode _____ common mode

Standard version

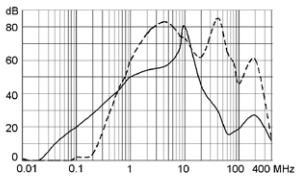
2 A



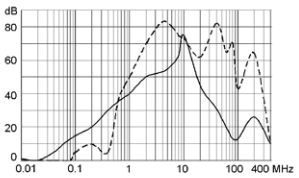
4 A



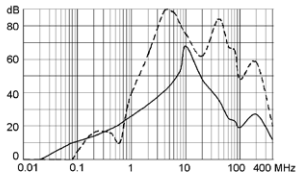
6 A



10 A

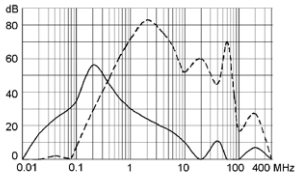


16 A

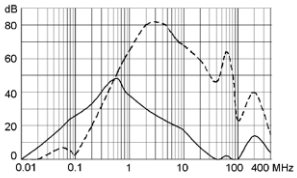


Medical version (M5)

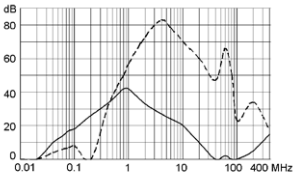
2 A



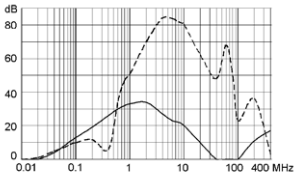
4 A



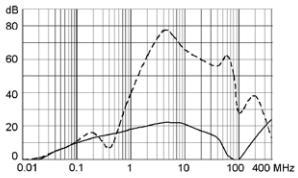
6 A



10 A



16 A



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	L [mH]	Cx (X2) [nF]	Cy (Y2) [nF]	R [MΩ]	Weight [g]	Case	Order Number
2	Standard Version	2 x 8	100	4.7	1	114	72	5500.2021
4	Standard Version	2 x 3.5	100	4.7	1	114	72	5500.2022
6	Standard Version	2 x 1.8	100	4.7	1	115	72	5500.2023
10	Standard Version	2 x 0.82	100	4.7	1	115	72	5500.2024
16	Standard Version	2 x 0.65	100	4.7	1	115	72	5500.2025
2	Medical Version (M5)	2 x 8	100	-	1	114	72	5500.2106
4	Medical Version (M5)	2 x 3.5	100	-	1	114	72	5500.2107
6	Medical Version (M5)	2 x 1.8	100	-	1	115	72	5500.2108
10	Medical Version (M5)	2 x 0.82	100	-	1	115	72	5500.2109
16	Medical Version (M5)	2 x 0.65	100	-	1	115	72	5500.2110

Packaging unit 10 Pcs

1-stage filter for DC systems, single pole, standard attenuation

new

Description
- Chassis:
  Screw-on, from top
- Line-filter in standard version, 1-stage, standard attenuation
- Effective against symmetrical and asymmetrical interferences in the frequency range from 100kHz up to 30MHz

Approvals
- VDE License Number: 40021953
- UL License Number: E72928

Characteristics
- Optimized for DC supplied applications
- Qualified for use in equipment according IEC/EN 60950

Other versions on request
- Other terminal combinations
- Version with wire connection

References
General Product Information

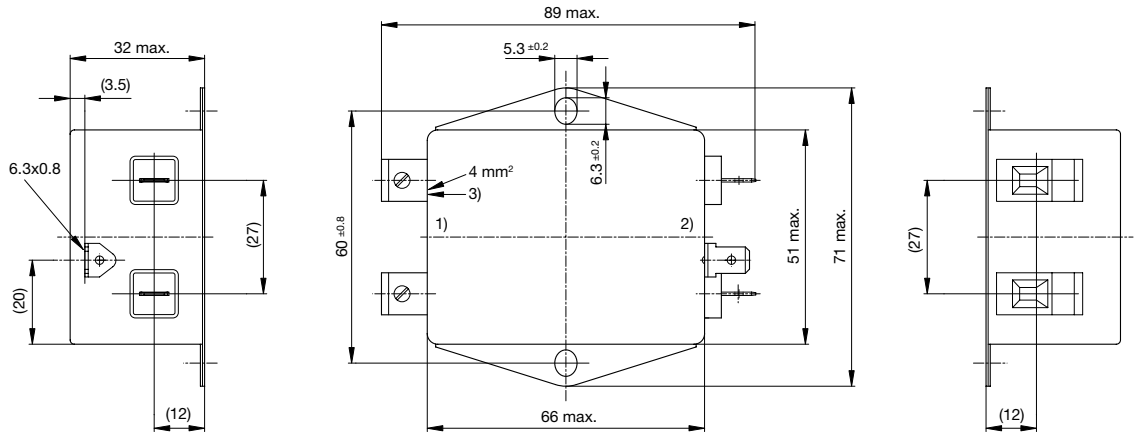
Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

Technical Data

Ratings IEC	5 - 30 A @ Ta 40 °C / 80 VDC
Ratings UL/CSA	5 - 30 A @ Ta 40 °C / 80 VDC
Dielectric Strength	> 1.7 kVDC between Vss-GND > 2.7 kVDC between Vss/GND-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Quick connect terminals 6.3 x 0.8 mm or screw terminals
Material: Housing	Alu. anodised, UL 94V-0

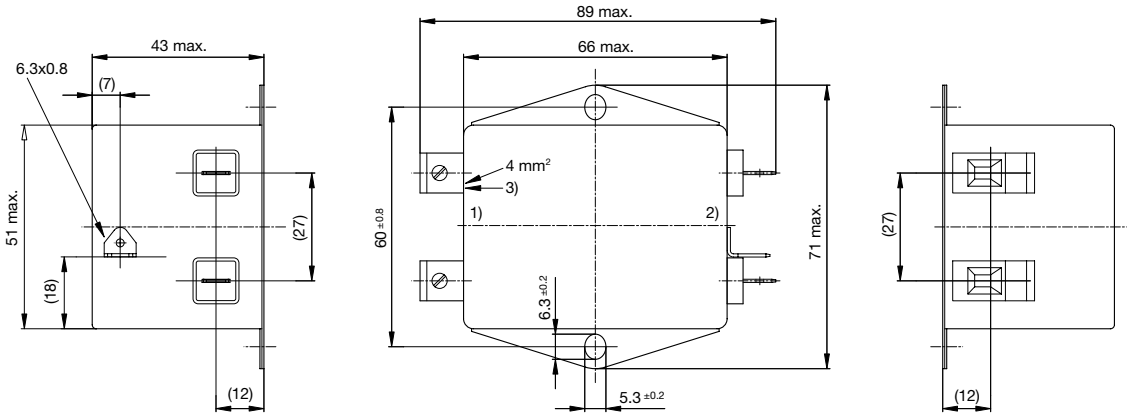
Line Filter	Industrial Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

Dimensions
Case 85-2



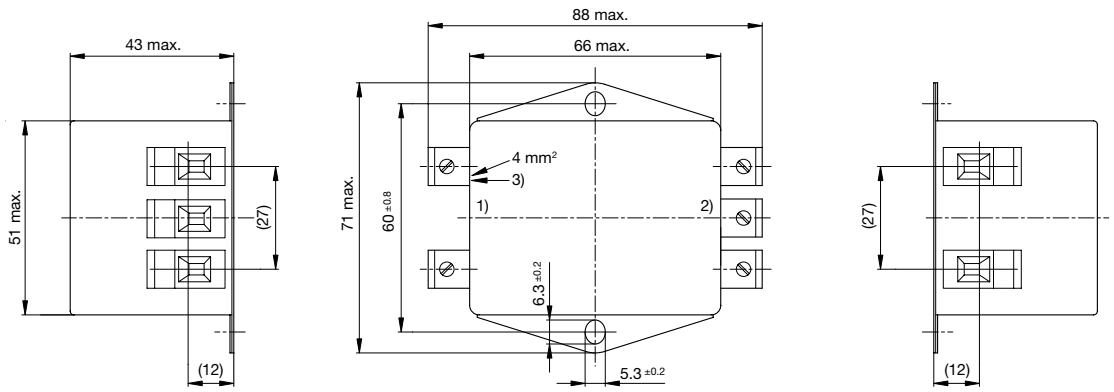
1) Line
2) Load
3) Tightening torque 0.6...0.8 Nm

Case 86-2



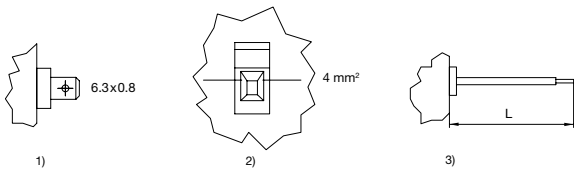
1) Line
2) Load
3) Tightening torque 0.6...0.8 Nm

Case 86-6



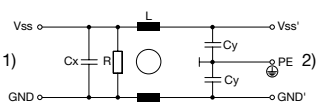
1) Line
2) Load
3) Tightening torque 0.6...0.8 Nm

Terminal options



1) Quick connect terminals 6.3x0.8 (only up to 24A)
2) Screw clamp 4mm²
3) Flexible wires

Diagrams



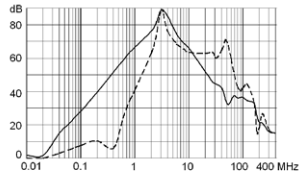
1) Line
2) Load

Attenuation Loss

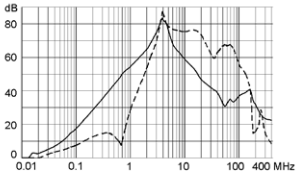
- - - - differential mode _____ common mode

Standard version

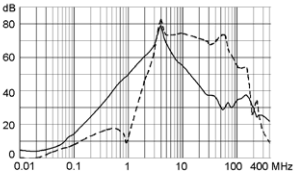
5 A



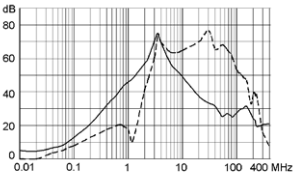
10 A



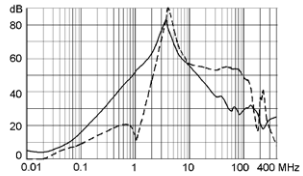
15 A



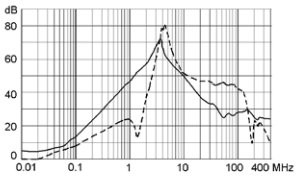
20 A



24 A



30 A



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	L [mH]	Cx (X2) [nF]	Cy (Y2) [nF]	R [MΩ]	Weight [g]	Case	Packaging unit	Order Number
5	2 x 0.75	100	100	1	175	85-2	10	5500.2223
10	2 x 0.2	100	100	1	175	85-2	10	5500.2224
15	2 x 0.1	100	100	1	175	85-2	10	5500.2225
20	2 x 0.07	100	100	1	175	85-2	10	5500.2226
24	2 x 0.14	100	100	1	255	86-2	10	5500.2227
30	2 x 0.08	100	100	1	265	86-6	10	5500.2228

1-stage filter for DC systems, dual pole, standard attenuation

new

Description
- Chassis:
  Screw-on, from top
- Line-filter in standard version, 1-stage, standard attenuation
- Effective against symmetrical and asymmetrical interferences in the frequency range from 100kHz up to 30MHz

Approvals
- VDE License Number: 40020247
- UL License Number: E72928

Characteristics
- Optimized for DC supplied applications
- Qualified for use in equipment according IEC/EN 60950

Other versions on request
- Other terminal combinations
- Version with wire connection

References
General Product Information

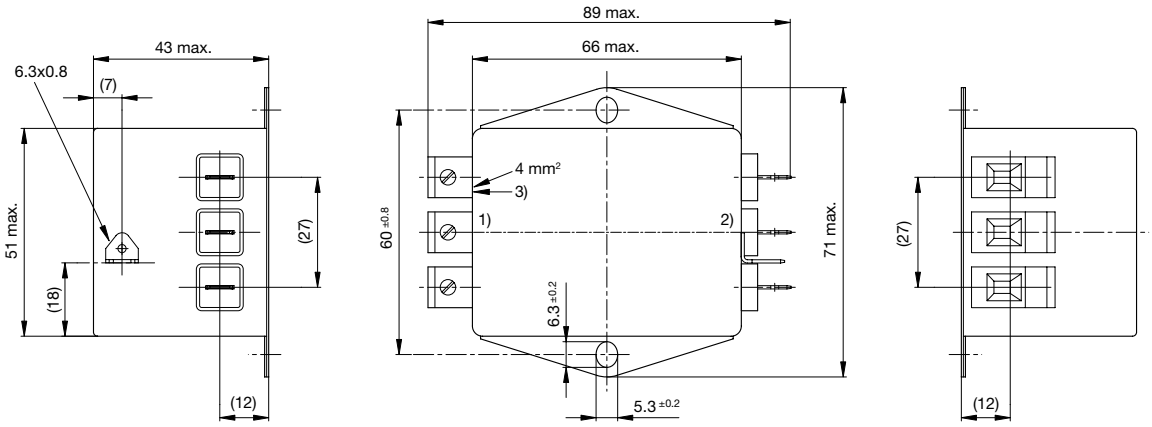
Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

Technical Data

Ratings IEC	5 - 30 A @ Ta 40 °C / ±80 VDC
Ratings UL/CSA	5 - 30 A @ Ta 40 °C / ±80 VDC
Dielectric Strength	> 1.7 kVDC between Vss-GND > 2.7 kVDC between Vss/GND-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Quick connect terminals 6.3 x 0.8 mm or screw terminals
Material: Housing	Alu. anodised, UL 94V-0

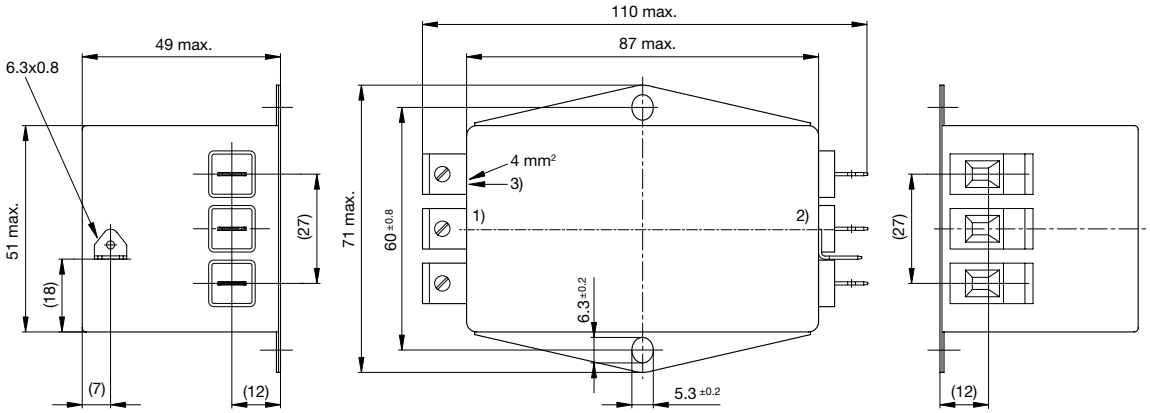
Line Filter	Industrial Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

Dimensions
Case 86-3



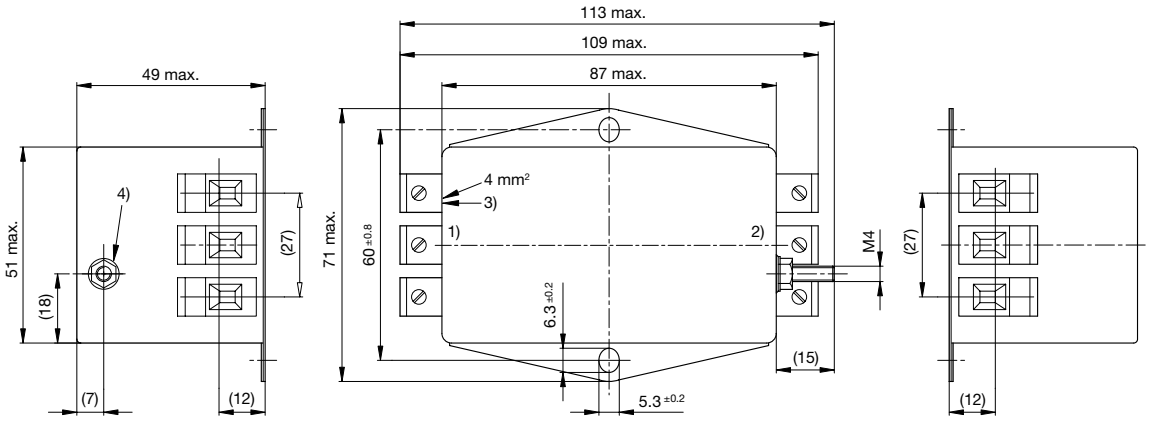
1) Line
2) Load
3) Tightening torque 0.6...0.8 Nm

Case 87-3



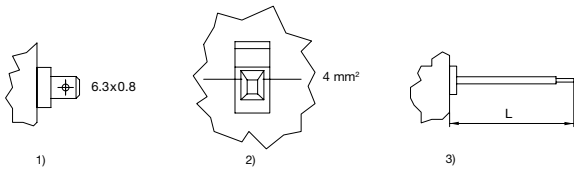
1) Line
2) Load
3) Tightening torque 0.6...0.8 Nm

Case 87-7



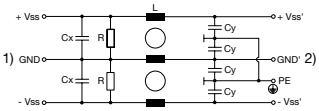
1) Line
2) Load
3) Tightening torque 0.6...0.8 Nm
4) Tightening torque 1.2...1.4 Nm

Terminal options



1) Quick connect terminals 6.3x0.8 (only up to 24A)
2) Screw clamp 4mm²
3) Flexible wires

Diagrams



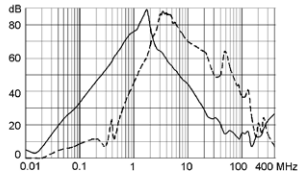
1) Line
2) Load

Attenuation Loss

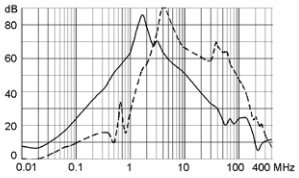
- - - - differential mode _____ common mode

Standard version

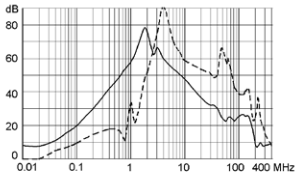
5 A



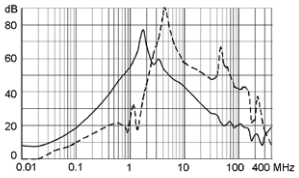
10 A



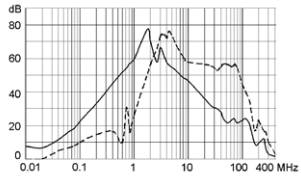
15 A



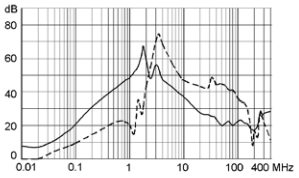
20 A



24 A



30 A



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	L [mH]	Cx (X2) [nF]	Cy (Y2) [nF]	R [MΩ]	Weight [g]	Case	Packaging unit	Order Number
5	3 x 0.75	100	100	1	245	86-3	10	5500.2229
10	3 x 0.2	100	100	1	245	86-3	10	5500.2230
15	3 x 0.1	100	100	1	250	86-3	10	5500.2231
20	3 x 0.07	100	100	1	260	86-3	10	5500.2232
24	3 x 0.14	100	100	1	400	87-3	4	5500.2233
30	3 x 0.08	100	100	1	425	87-7	4	5500.2234

Cost optimized 1-stage filter for 1-phase systems

Standard- or Medical-Filter

Description
- Chassis:
  Screw-on, from top
- Line filter in standard and medical version, 1-stage, standard attenuation
- Quick connect terminals 6.3 x 0.8 mm
- Especially effective against asymmetrical interferences in the frequency range from 10kHz up to 30MHz

Approvals
- VDE License Number: 40004673
- UL License Number: E72928

Characteristics
- Compact design
- High attenuation at maximum resp. asymmetric load independent from the line impedance
- Especially designed for industrial applications such as: Frequency Converters, Stepper Motor Drives, UPS-Systems, Inverters
- Qualified for use in equipment according IEC/EN 60950

Other versions on request
- Version with wire connection
- Medical version M80

References
General Product Information

Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

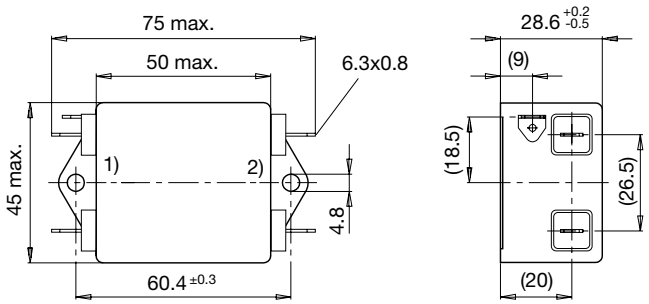
Technical Data

Ratings IEC	6 - 20 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	6 - 20 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	standard < 0.5 mA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Quick connect terminals 6.3 x 0.8 mm
Material: Housing	Aluminum

Line Filter	Standard and Medical Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

Dimensions

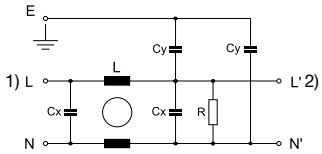
Case 73



1) Line
2) Load

Diagrams

Standard version



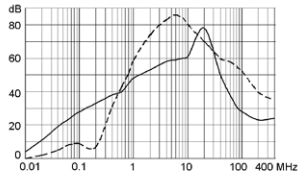
1) Line
2) Load

Attenuation Loss

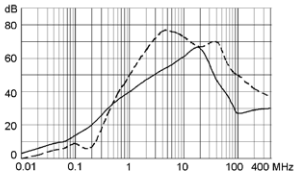
- - - - differential mode _____ common mode

Standard version

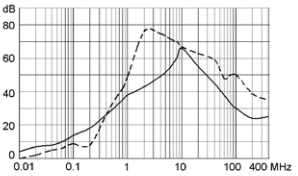
6 A



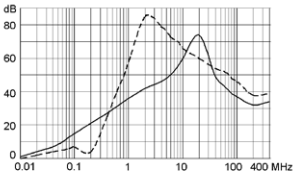
10 A



16 A

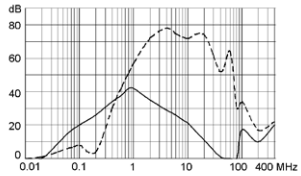


20 A

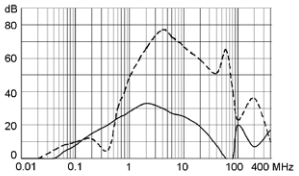


Medical version (M5)

6 A



10 A



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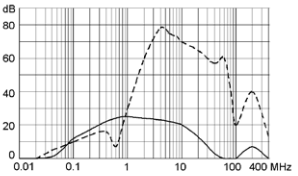
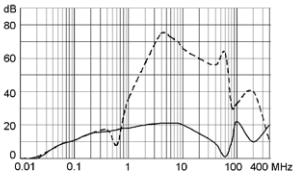


20 A



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	L [mH]	Cx (X2) [µF]	Cy (Y2) [nF]	Weight [g]	Case	R [MΩ]	Order Number
6	Standard Version	2 x 1.8	0.1	4.7	116	73	1	5500.2031
10	Standard Version	2 x 0.82	0.1	4.7	122	73	1	5500.2032
16	Standard Version	2 x 0.64	0.1	4.7	131	73	1	5500.2033
20	Standard Version	2 x 0.5	0.1	4.7	135	73	1	5500.2034
6	Medical Version (M5)	2 x 1.8	0.1	-	116	73	1	5500.2072
10	Medical Version (M5)	2 x 0.82	0.1	-	122	73	1	5500.2073
16	Medical Version (M5)	2 x 0.64	0.1	-	131	73	1	5500.2074
20	Medical Version (M5)	2 x 0.5	0.1	-	160	73	1	5500.2076

Packaging unit 10 Pcs

SCHURTER ELECTRONIC COMPONENTS

Cost optimized 1-stage filter for 1-phase systems

Standard- or Medical-Filter

Description

- Chassis:
  Screw-on, from top
- Line filter in standard and medical version, 1-stage, standard attenuation
- Quick connect terminals 6.3 x 0.8 mm

Approvals

- VDE License Number: 40004673
- UL License Number: E72928

Characteristics

- Designed for standard applications
- Protection against interference voltage from the mains
  Possible interferences generated in the equipment are strongly attenuated
- Qualified for use in equipment according IEC/EN 60950

Other versions on request

- Medical version M80
- Version with ZNR-varistor for overvoltage protection

References

General Product Information

Weblinks

Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

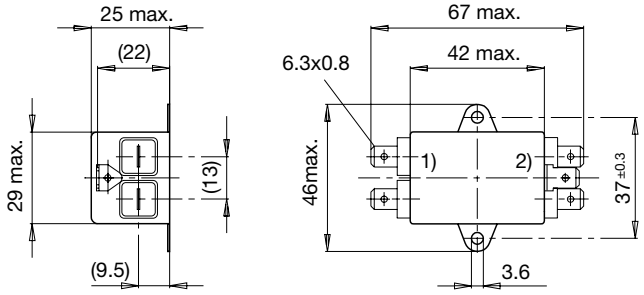
Technical Data

Ratings IEC	1 - 10 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	1 - 10 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	standard < 0.25 mA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Quick connect terminals 6.3 x 0.8 mm
Material: Housing	Aluminum

Line Filter	Standard and Medical Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

Dimensions

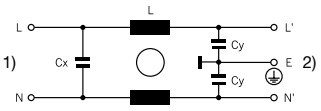
Case 41



1) Line
2) Load

Diagrams

Standard version



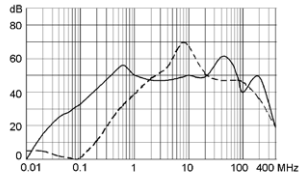
1) Line
2) Load

Attenuation Loss

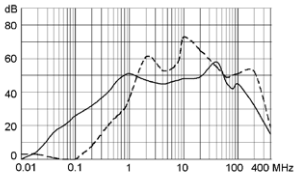
- - - - differential mode _____ common mode

Standard version

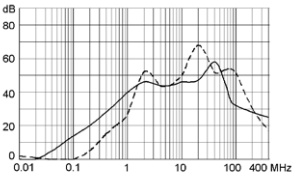
1 A



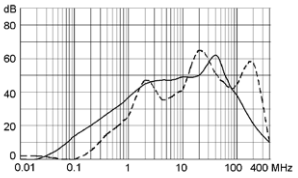
2 A



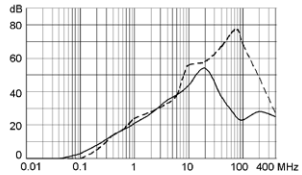
4 A



6 A

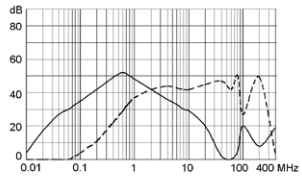


10 A

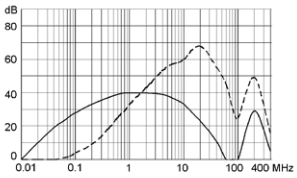


Medical version (M5)

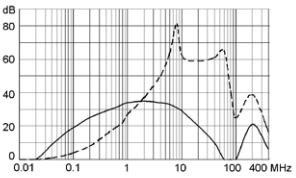
1 A



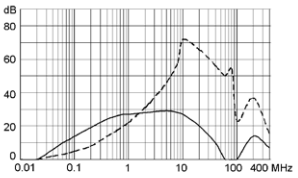
2 A



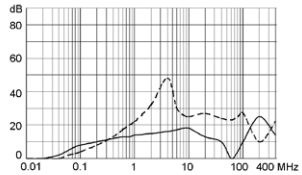
4 A



6 A



10 A



Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	Leakage Current [mA]	L [mH]	Cx (X2) [nF]	Cy (Y2) [nF]	Weight [g]	Case	Order Number
1	Standard Version	0.25	2 x 10	68	2.2	50	41	5500.2026
2	Standard Version	0.25	2 x 4	68	2.2	50	41	5500.2027
4	Standard Version	0.25	2 x 1.5	68	2.2	50	41	5500.2028
6	Standard Version	0.25	2 x 0.8	68	2.2	65	41	5500.2029
10	Standard Version	0.25	2 x 0.3	68	2.2	65	41	5500.2030
1	Medical Version (M5)	0.005	2 x 10	68	-	50	41	5500.2077
2	Medical Version (M5)	0.005	2 x 4	68	-	50	41	5500.2078
4	Medical Version (M5)	0.005	2 x 1.5	68	-	50	41	5500.2079
6	Medical Version (M5)	0.005	2 x 0.8	68	-	65	41	5500.2080
10	Medical Version (M5)	0.005	2 x 0.3	68	-	65	41	5500.2081

Packaging unit 25 Pcs

Cost optimized 1-stage filter for 1-phase systems

Standard- or Medical-Filter

Description
- Chassis:
  Screw-on, from top
- Line filter in standard and medical version, 1-stage, standard attenuation
- Quick connect terminals 6.3 x 0.8 mm
- Especially effective against symmetrical interferences in the frequency range from 10kHz up to 30MHz

Approvals
- VDE License Number: 40004673
- UL License Number: E72928

Characteristics
- Designed for universal industrial applications
- High attenuation at maximum resp. asymmetric load independent from the line impedance
  Protection against interference voltage from the mains
  Possible interferences generated in the equipment are strongly attenuated
- Especially designed for industrial applications such as: Frequency Converters, Stepper Motor Drives, UPS-Systems, Inverters
- Qualified for use in equipment according IEC/EN 60950

Other versions on request
- Version with wire connection

References
General Product Information

Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

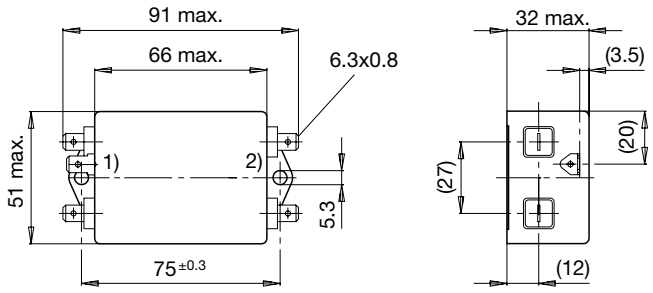
Technical Data

Ratings IEC	6 - 20 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	6 - 20 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	standard < 0.35 mA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Quick connect terminals 6.3 x 0.8 mm
Material: Housing	Aluminum

Line Filter	Standard and Medical Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

Dimensions

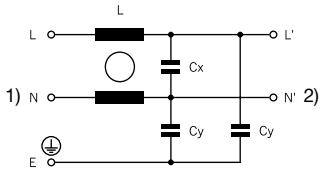
Case 49



1) Line
2) Load

Diagrams

Standard version



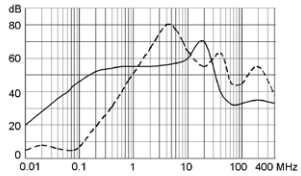
1) Line
2) Load

Attenuation Loss

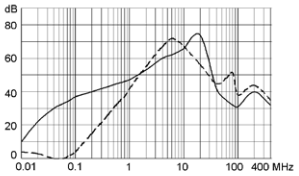
- - - - differential mode _____ common mode

Standard version

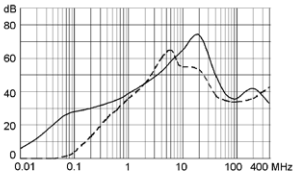
6 A



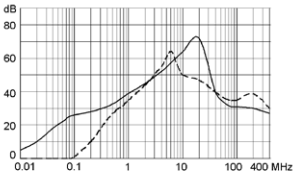
10 A



16 A

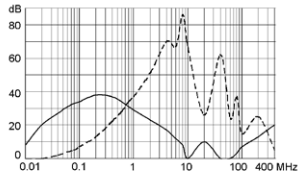


20 A

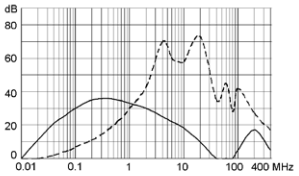


Medical version (M5)

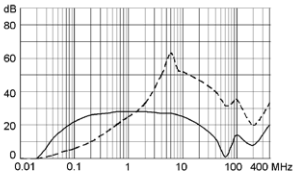
6 A



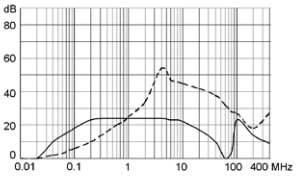
10 A



16 A



20 A



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	L [mH]	Cx (X2) [µF]	Cy (Y2) [nF]	Weight [g]	Case	Order Number
6	Standard Version	2 x 14	0.1	3.3	212	49	5500.2035
10	Standard Version	2 x 5	0.1	3.3	212	49	5500.2036
16	Standard Version	2 x 2	0.1	3.3	208	49	5500.2037
20	Standard Version	2 x 1.5	0.1	3.3	218	49	5500.2038
6	Medical Version (M5)	2 x 14	0.1	-	212	49	5500.2082
10	Medical Version (M5)	2 x 5	0.1	-	212	49	5500.2083
16	Medical Version (M5)	2 x 2	0.1	-	208	49	5500.2084
20	Medical Version (M5)	2 x 1.5	0.1	-	218	49	5500.2085

Packaging unit 10 Pcs

1-stage filter for 1-phase systems

Standard- or Medical-Filter

Description

- Chassis:
  Screw-on, from top
- Line filter in standard and medical version, 1-stage, standard attenuation
- Quick connect terminals 6.3 x 0.8 mm

Approvals

- VDE License Number: 40004673
- UL License Number: E72928

Characteristics

- Designed for standard applications
- Protection against interference voltage from the mains
  Possible interferences generated in the equipment are strongly attenuated
- Universal line filter for standard applications
- Qualified for use in equipment according IEC/EN 60950

Other versions on request

- Version with wire connection
- Medical version M80
- Version with ZNR-varistor for overvoltage protection

References

General Product Information

Weblinks

Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

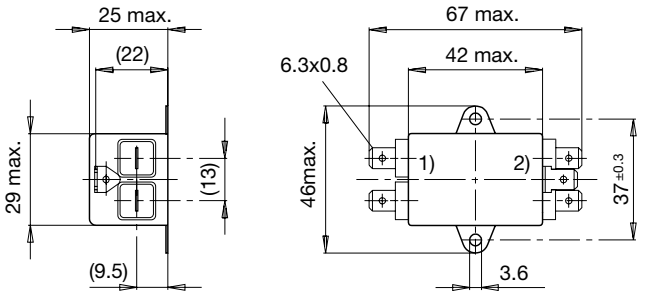
Technical Data

Ratings IEC	1 - 10 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	1 - 10 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	standard < 0.25 mA (250 V / 60 Hz) medical < 5 µA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Quick connect terminals 6.3 x 0.8 mm
Material: Housing	Aluminum

Line Filter	Standard and Medical Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

Dimensions

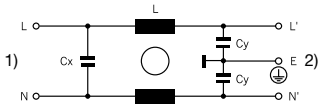
Case 41



1) Line
2) Load

Diagrams

Standard version



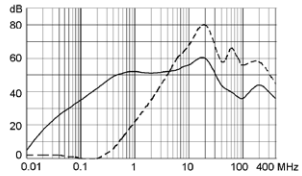
1) Line
2) Load

Attenuation Loss

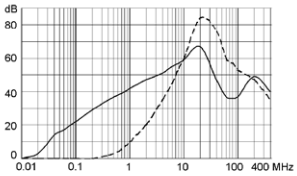
- - - - differential mode _____ common mode

Standard version

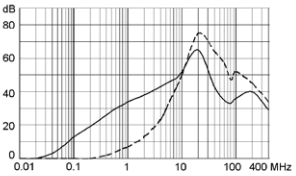
1 A



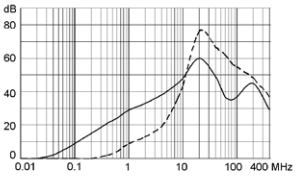
3 A



6 A

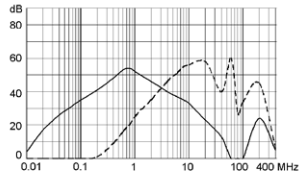


10 A

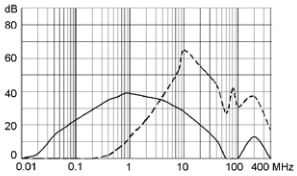


Medical version (M5)

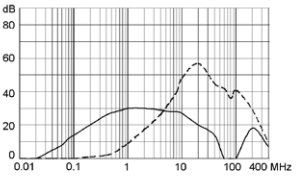
1 A



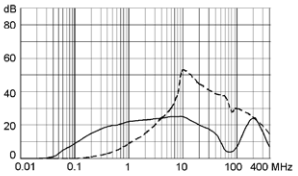
3 A



6 A



10 A



Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	Leakage Current [mA]	L [mH]	Cx (X2) [nF]	Cy (Y2) [nF]	Weight [g]	Case	Order Number
1	Standard Version	0.25	2 x 10	15	2.2	55	41	5500.2039
3	Standard Version	0.25	2 x 2	15	2.2	55	41	5500.2040
6	Standard Version	0.25	2 x 0.8	15	2.2	55	41	5500.2041
10	Standard Version	0.25	2 x 0.4	15	2.2	55	41	5500.2042
1	Medical Version (M5)	0.005	2 x 10	15	-	55	41	5500.2098
3	Medical Version (M5)	0.005	2 x 2	15	-	55	41	5500.2104
6	Medical Version (M5)	0.005	2 x 0.8	15	-	55	41	5500.2100
10	Medical Version (M5)	0.005	2 x 0.4	15	-	55	41	5500.2102

Packaging unit 25 Pcs

2-stage filter for 1-phase systems

Description
- Chassis:
  Screw-on, from top
- Line-filter in standard version, 2-stage, high attenuation
- Quick connect terminals 6.3 x 0.8 mm
- Very high symmetrical and asymmetrical attenuation loss in the frequency range from 10kHz up to 30MHz

Approvals
- VDE License Number: 40004673
- UL License Number: E72928

Characteristics
- Designed for increased requirements
- Protection against interference voltage from the mains
  Possible interferences generated in the equipment are strongly attenuated
  2-stage line filter with increased attenuation
- For standard and industrial applications
- Qualified for use in equipment according IEC/EN 60950

References
General Product Information

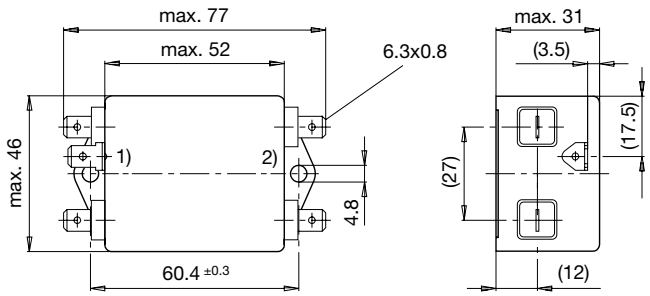
Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

Technical Data

Ratings IEC	2 - 6A @ Ta 40 °C / 250VAC; 50Hz
Ratings UL/CSA	2 - 6A @ Ta 40 °C / 125VAC; 60Hz
Leakage Current	standard < 0.5mA (250V / 60Hz)
Dielectric Strength	> 1.7kVDC between L-N > 2.7kVDC between L/N-PE Test voltage (2sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Quick connect terminals 6.3 x 0.8 mm
Material: Housing	Aluminum

Line Filter	Standard Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000h acc. to MIL-HB-217 F

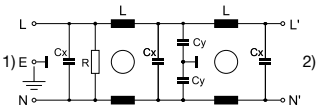
Dimensions
Case 09



1) Line
2) Load

Diagrams

Standard version



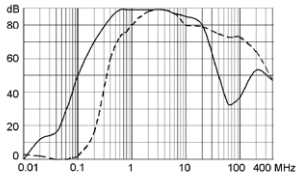
1) Line
2) Load

Attenuation Loss

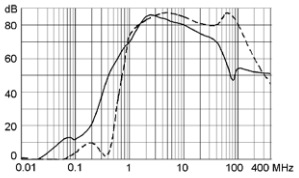
- - - - differential mode _____ common mode

Standard version

2 A



6 A



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	L [mH]	Cx (X2) [nF]	Cy (Y2) [nF]	R [MΩ]	Weight [g]	Case	Order Number
2	Standard Version	2 x 3	100	4.7	0.5	140	09	5500.2043
6	Standard Version	2 x 0.8	100	2.2	0.5	140	09	5500.2044

Packaging unit

10 Pcs

1-stage filter for 1-phase systems

Description
- Chassis:
  Screw-on, from top
- Line-filter in standard version, 1-stage, standard attenuation
- Quick connect terminals 6.3 x 0.8 mm
- Excellent price/perfomance ratio

Approvals
- VDE License Number: 40004673
- UL License Number: E72928

Characteristics
- Designed for high current applications
  Compact design
- Protection against interference voltage from the mains
  Possible interferences generated in the equipment are strongly attenuated
- For standard and industrial applications
- Qualified for use in equipment according IEC/EN 60950

References
General Product Information

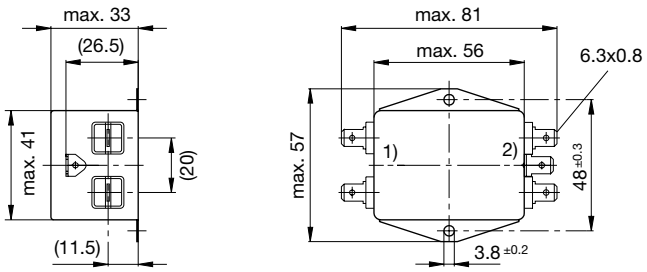
Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

Technical Data

Ratings IEC	10 - 20 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	10 - 20 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	industrial < 2.1 mA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Quick connect terminals 6.3 x 0.8 mm
Material: Housing	Aluminum

Line Filter	Standard and Industrial Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

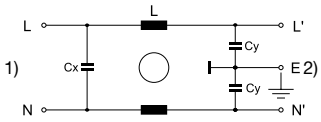
Dimensions
Case 10



1) Line
2) Load

Diagrams

Standard version



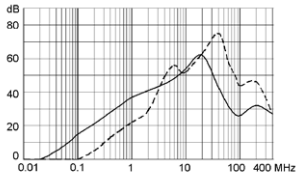
1) Line
2) Load

Attenuation Loss

- - - - differential mode _____ common mode

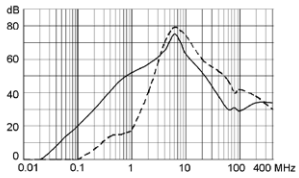
Standard version

10 A (5500.2045)

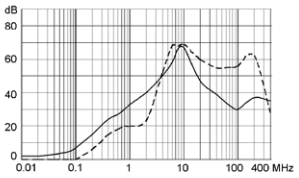


Industrial Version

10 A (5500.2046)



20 A (5500.2047)



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	Leakage Current [mA]	L [mH]	Cx (X2) [nF]	Cy (Y2) [nF]	Weight [g]	Case	Order Number
10	Standard Version	0.25	2 x 1	68	2.2	160	10	5500.2045
10	Industrial Version	2.1	2 x 1	68	22	140	10	5500.2046
20	Industrial Version	2.1	2 x 0.15	68	22	140	10	5500.2047

Packaging unit

10 Pcs

3-stage filter for 1-phase systems, very high broad band attenuation

Description
- Chassis:
  Screw-on, from top
- Line-filter in standard version, 3-stage, very high attenuation, broad-band
- Screw
- Very high symmetrical and asymmetrical attenuation loss in the frequency range from 10kHz up to 30MHz

Approvals
- VDE License Number: 40004673
- UL License Number: E72928

Characteristics
- Designed for highest demands
- High attenuation at maximum resp. asymmetric load independent from the line impedance
- For standard and industrial applications
- Qualified for use in equipment according IEC/EN 60950

References
General Product Information

Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

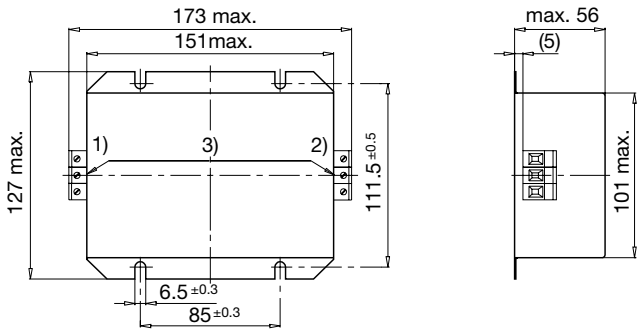
Technical Data

Ratings IEC	4 - 30 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	4 - 30 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	industrial < 1.5 mA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Screw
Material: Housing	Metal

Line Filter	Industrial Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

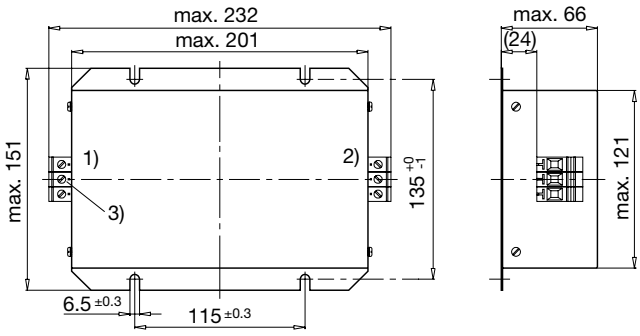
Dimensions

Case 43



1) Line
2) Load
3) I/O connections torque 0.6...0.8 Nm

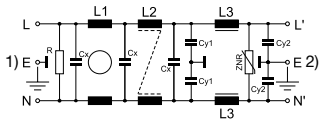
Case 22



1) Line
2) Load
3) I/O connections torque 1.5...1.8 Nm

Diagrams

Standard version



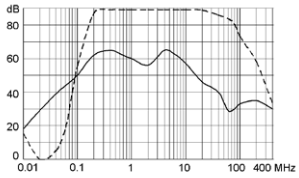
1) Line
2) Load

Attenuation Loss

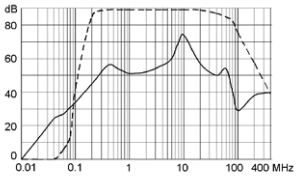
- - - - differential mode _____ common mode

Industrial Version

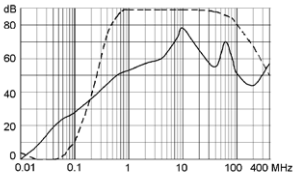
4 A



10 A



30 A



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	Leakage Current [mA]	L1 [mH]	L2 [µH]	L3 [µH]	Cx [nF]	Cy1 [nF]	Cy2 [nF]	R [MΩ]	Clamps [mm²]	Weight [kg]	Case	Order Number
4	Industrial Version	3.5	2 x 20	2 x 30	3	220	33	2.2	0.5	4	1.6	43	5500.2048
10	Industrial Version	1.5	2 x 5	2 x 30	3	220	15	-	0.5	4	1.8	43	5500.2049
30	Industrial Version	1.5	2 x 4	2 x17	3	220	15	-	0.5	6	3.2	22	5500.2050

Packaging unit

1 Pcs

Cost optimized 2-stage filter for 1-phase systems, very high sym. and asym. attenuation

Description
- Chassis:
  Screw-on, from top
- Line-filter in standard version, 2-stage, high attenuation
- Quick connect terminals 6.3 x 0.8 mm or screw terminals
- Especially effective against asymmetrical interferences in the frequency range from 10kHz up to 30MHz

Approvals
- VDE License Number: 40004673
- UL License Number: E72928

Characteristics
- Designed for increased requirements
- 2-stage line filter with increased attenuation
  Protection against interference voltage from the mains
- Especially designed for industrial applications such as: Frequency Converters, Stepper Motor Drives, UPS-Systems, Inverters
  Especially suitable for use in switching power supplies
- Qualified for use in equipment according IEC/EN 60950

References
General Product Information

Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

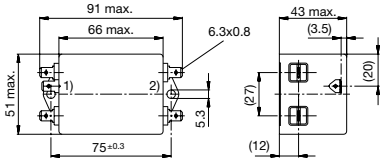
Technical Data

Ratings IEC	3 - 36 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	3 - 36 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	standard < 0.5 mA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Quick connect terminals 6.3 x 0.8 mm or screw terminals Current >24 A requires screw terminals
Material: Housing	Alu. anodised / Stainless Steel

Line Filter	Standard and Industrial Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

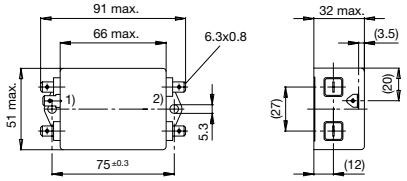
Dimensions

Case 48



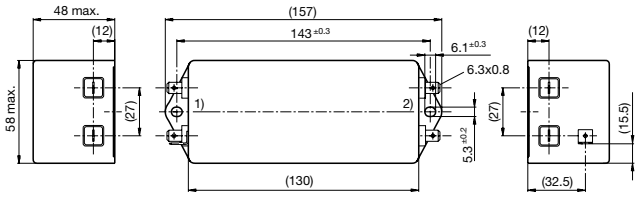
1) Line
2) Load

Case 49



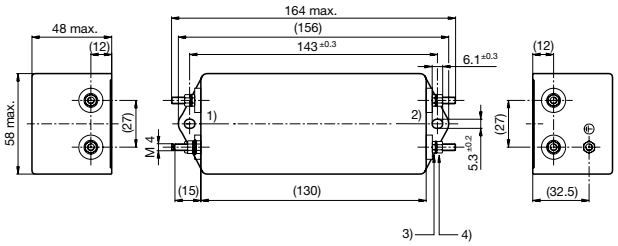
1) Line
2) Load

Case FF with quick connect terminals



1) Line
2) Load

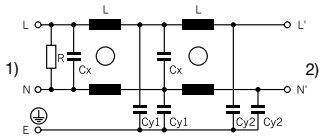
Case FF with screw terminals



1) Line
2) Load
3) Lock-nut do not unscrew
4) Nut torque 0.85...1 Nm, keep lock-nut fastened

Diagrams

Standard version



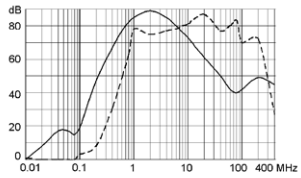
1) Line
2) Load

Attenuation Loss

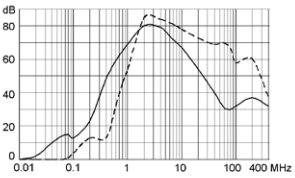
- - - - differential mode _____ common mode

Standard version

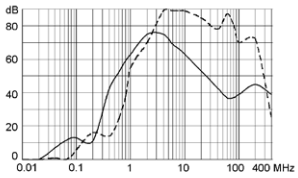
3 A (5500.2058)



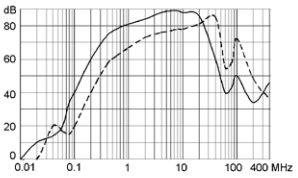
6 A (5500.2060)



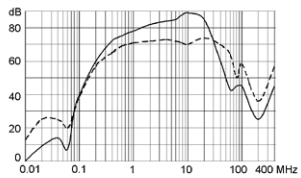
10 A (5500.2062)



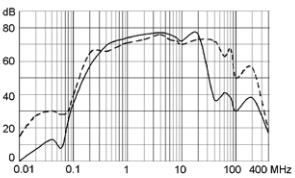
16 A



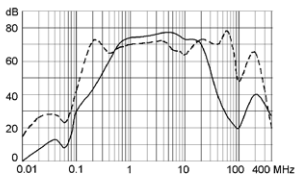
20 A



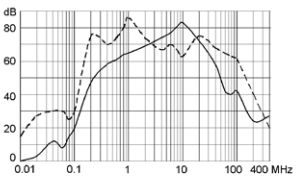
24 A



25 A

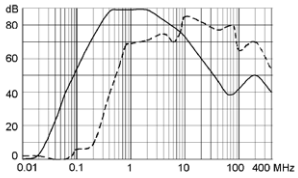


36 A

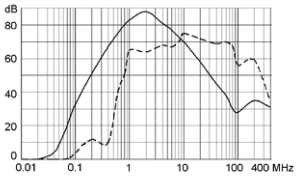


Industrial Version

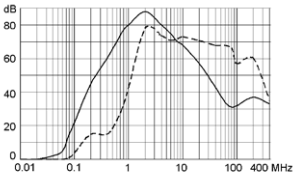
3 A (5500.2059)



6 A (5500.2061)



10 A (5500.2063)



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	Leakage Current [mA]	Terminal	L [mH]	Cx [µF]	Cy1 [nF]	Cy2 [nF]	R [MΩ]	Weight [g]	Case	Order Number
3	Standard Version	0.25	Quick connect terminals	2 x 2	100	1.5	1	1	157	49	5500.2058
6	Standard Version	0.25	Quick connect terminals	2 x 0.8	100	1.5	1	1	159	49	5500.2060
10	Standard Version	0.25	Quick connect terminals	2 x 0.4	100	1.5	1	1	159	49	5500.2062
3	Industrial Version	2.5	Quick connect terminals	2 x 2	100	22	1	1	157	49	5500.2059
6	Industrial Version	2.5	Quick connect terminals	2 x 0.8	100	22	1	1	159	49	5500.2061
10	Industrial Version	2.5	Quick connect terminals	2 x 0.4	100	22	1	1	159	49	5500.2063

Packaging unit 10 Pcs

2-stage filter for 1-phase systems, very high symmetrical attenuation

Description

- Chassis:
  Screw-on, from top
- Line-filter in standard version, 2-stage, very high attenuation, broad-band
- Quick connect terminals 6.3 x 0.8 mm or screw terminals
- Especially effective against symmetrical interferences in the frequency range from 10kHz up to 30MHz

Approvals

- VDE License Number: 40004673
- UL License Number: E72928

Characteristics

- Designed for increased requirements
- 2-stage line filter with increased attenuation
  Protection against interference voltage from the mains
  Possible interferences generated in the equipment are strongly attenuated
- Especially suitable for use in switching power supplies
  e.g. in electronic designs with high repetitive switching frequency
- Qualified for use in equipment according IEC/EN 60950

References

General Product Information

Weblinks

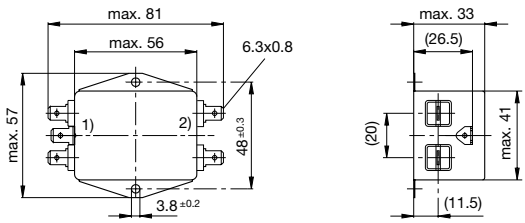
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

Technical Data

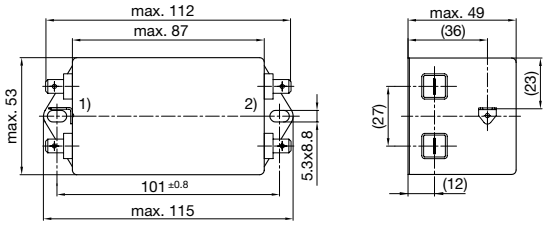
Ratings IEC	1 - 16 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	1 - 16 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	industrial < 1.4 mA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Quick connect terminals 6.3 x 0.8 mm or screw terminals
Material: Housing	Aluminum

Line Filter	Standard and Industrial Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

Dimensions

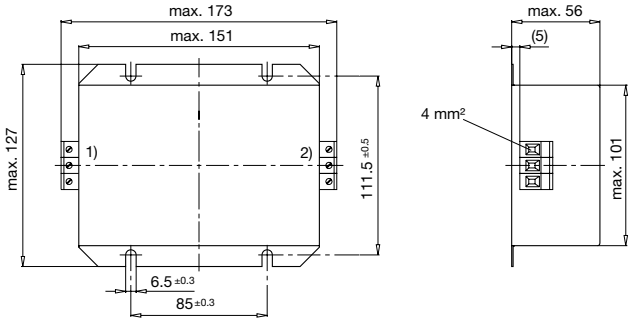


Case 19



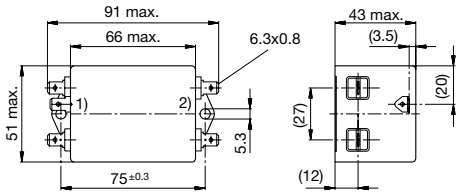
1) Line
2) Load

Case 27



1) Line
2) Load

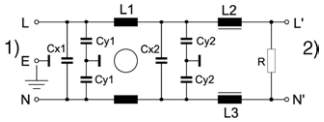
Case 48



1) Line
2) Load

Diagrams

Standard version



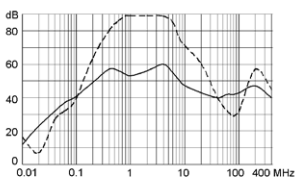
1) Line
2) Load

Attenuation Loss

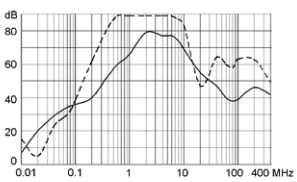
- - - - differential mode _____ common mode

Standard version

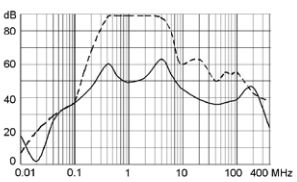
1 A



2 A

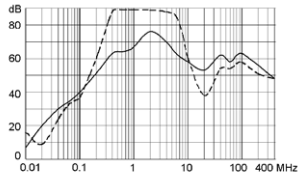


3 A

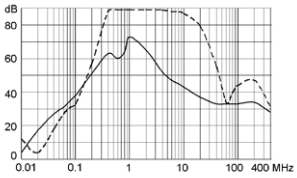


Industrial Version

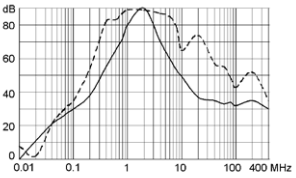
4 A



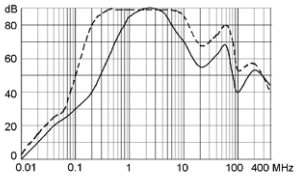
6 A



10 A



16 A



Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	Leakage Current [mA]	L1 [mH]	L2 [mH]	L3 [mH]	Cx1 [µF]	Cx2 [µF]	Cy1 [nF]	Cy2 [nF]	R [MΩ]	Weight [g]	Case	Order Number
1	Standard Version	0.25	2 x 15	1	-	0.1	0.47	1.5	1	1	121	10	5500.2051
2	Standard Version	0.25	2 x 10	0.4	0.4	0.1	0.47	1.5	1	1	121	10	5500.2052
3	Standard Version	0.25	2 x 12	1	-	0.1	0.68	1.5	1	1	275	48	5500.2053
4	Industrial Version	1.4	2 x 10	0.8	-	0.1	0.68	10	4.7	1	275	48	5500.2054
6	Industrial Version	1.4	2 x 6	0.5	-	0.1	0.68	10	4.7	1	284	48	5500.2055
10	Industrial Version	1.4	2 x 5	0.2	0.2	0.1	1	10	4.7	1	529	19	5500.2056
16	Industrial Version	1.4	2 x 4	0.2	0.2	0.47	2.2	10	4.7	1	2000	27	5500.2057

Packaging unit 10 Pcs

1-stage filter for 1-phase systems, broad band attenuation

Description
- Chassis:
  Screw-on, from top
- Line-filter in standard version, 1-stage, high attenuation
- Very high symmetrical and asymmetrical attenuation loss in the frequency range from 10kHz up to 30MHz

Approvals
- VDE License Number: 40004673
- UL License Number: E72928

Characteristics
- Designed for high current applications
- High attenuation at maximum resp. asymmetric load independent from the line impedance
- Especially designed for industrial applications such as: Frequency Converters, Stepper Motor Drives, UPS-Systems, Inverters
- Qualified for use in equipment according IEC/EN 60950

References
General Product Information

Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

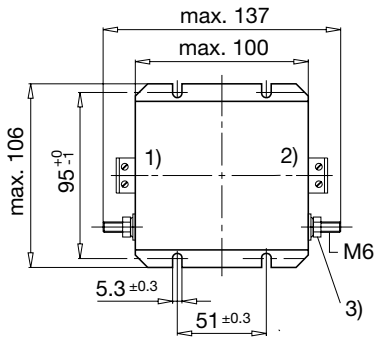
Technical Data

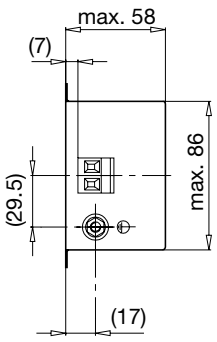
Ratings IEC	12 - 30 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	12 - 30 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	industrial < 5.2 mA (250 V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Screw
Material: Housing	Metal

Line Filter	Industrial Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

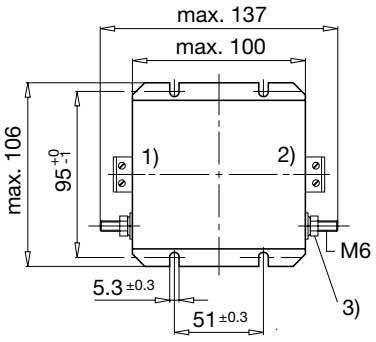
Dimensions

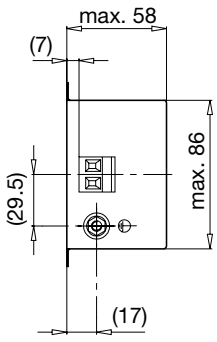
Case 24-2





Case 24-6

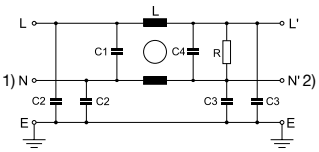




1) Line
2) Load
3) Nut torque 3...4 Nm

.

Diagrams



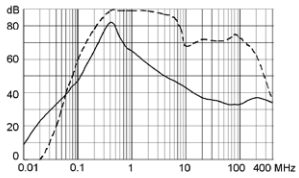
1) Line
2) Load

Attenuation Loss

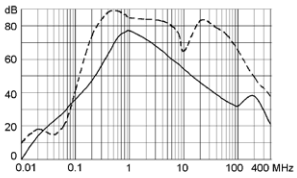
- - - - differential mode _____ common mode

Industrial Version

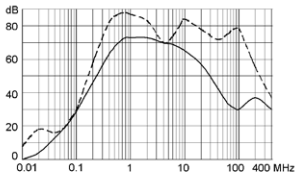
12 A



20 A



30 A



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	Leakage Current [mA]	L [mH]	C1 (X2)	C2 (Y2) [nF]	C3 (Y2)	C4 (X2)	R [MΩ]	Clamps [mm²]	Weight [g]	Case	Order Number
12	Industrial Version	5.2	2 x 10	2.2	10	47	1	1	4	927	24-2	5500.2064
20	Industrial Version	5.2	2 x 3.5	2.2	10	47	1	1	4	930	24-2	5500.2065
30	Industrial Version	5.6	2 x 1.5	2.2	15	47	1	1	6	970	YB2	5500.2066

Packaging unit

2 Pcs

2-stage filter for 1-phase systems, very broad band attenuation

Description
- Chassis:
  Screw-on, from top
- Line-filter in standard version, 2-stage, very high attenuation
- Very high symmetrical and asymmetrical attenuation loss in the frequency range from 10kHz up to 30MHz

Approvals
- VDE License Number: 40004673
- UL License Number: E72928

Characteristics
- Designed for high current applications
- Protection against interference voltage from the mains
  Possible interferences generated in the equipment are strongly attenuated
- Especially designed for industrial applications such as: Frequency Converters, Stepper Motor Drives, UPS-Systems, Inverters
- Qualified for use in equipment according IEC/EN 60950

Other versions on request
- Version with wire connection

References
General Product Information

Weblinks
Approvals, RoHS, CHINA-RoHS, e-Store, SCHURTER-Stock-Check, Distributor-Stock-Check

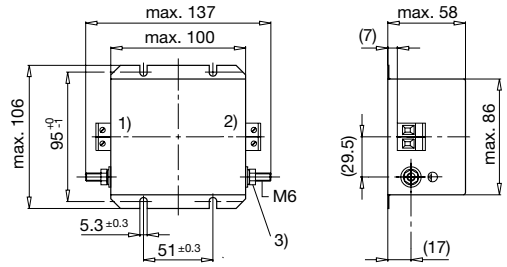
Technical Data

Ratings IEC	8 - 25 A @ Ta 40 °C / 250 VAC; 50 Hz
Ratings UL/CSA	8 - 25 A @ Ta 40 °C / 125 VAC; 60 Hz
Leakage Current	industrial < 3.5 mA (V / 60 Hz)
Dielectric Strength	> 1.7 kVDC between L-N > 2.7 kVDC between L/N-PE Test voltage (2 sec)
Allowable Operation Temp.	-25 °C to 100 °C
Climatic Category	25/100/21 acc. to IEC 60068-1
Protection Class	Suitable for appliances with protection class I acc. to IEC 61140
Terminal	Screw
Material: Housing	Metal

Line Filter	Standard and Industrial Version, IEC 60939, IEC 60601-1, UL 1283, UL 544, EN 133 200, CSA C22.2 no. 8 Technical details
MTBF	> 200'000 h acc. to MIL-HB-217 F

Dimensions

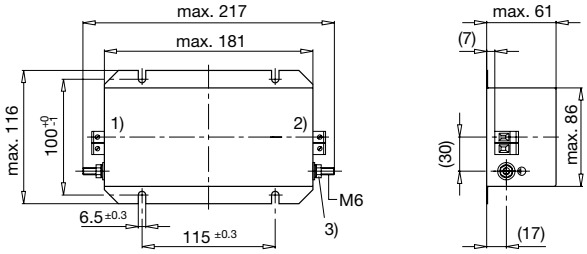
Case 24-2



1) Line
2) Load
3) Nut torque 3...4 Nm

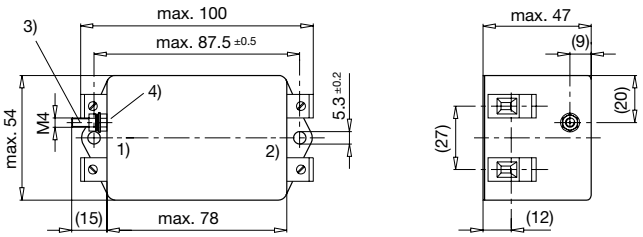
.

Case 31-2



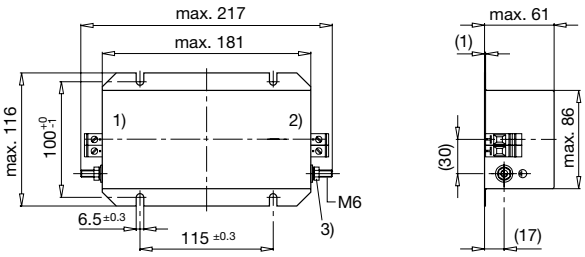
1) Line
2) Load
3) Nut torque 3...4 Nm

Case 16-2



1) Line
2) Load
3) Nut torque 3...4 Nm
4) Do not unscrew lock-nut

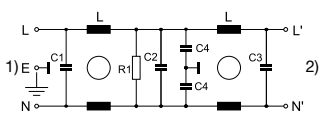
Case 31-6



1) Line
2) Load
3) Nut torque 3...4 Nm

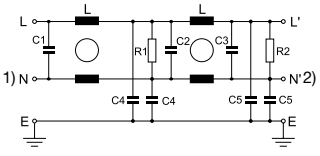
Diagrams

S1 standard version



1) Line
2) Load

S2 standard version



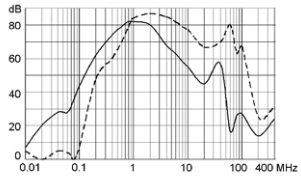
1) Line
2) Load

Attenuation Loss

- - - - differential mode _____ common mode

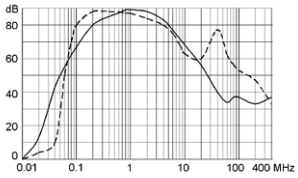
Standard version

8 A

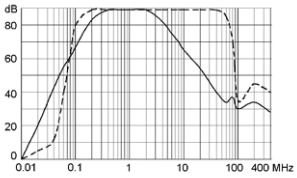


Industrial Version

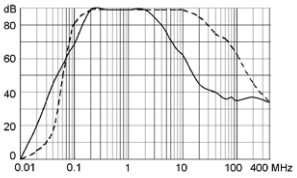
12 A



16 A



25 A



Variants

Distributor-Stock-Check | SCHURTER-Stock-Check | e-Store

Rated Current [A]	Filter-Type	Leakage Current [mA]	L [mH]	C1 (X2) [µF]	C2 (X2) [µF]	C3 (X2) [µF]	C4 (Y2) [nF]	C5 (Y2) [nF]	R1, R2 [MΩ]	Diagram	Clamps [mm²]	Weight [g]	Case	Order Number
8	Standard Version	0.25	2 x 7	0.1	0.15	0.47	2.2	-	1	S1	4	410	16-2	5500.2068
12	Industrial Version	3.5	2 x 5	2.2	2.2	2.2	33	2.2	0.5	S2	4	1000	24-2	5500.2069
16	Industrial Version	3.5	2 x 3.5	2.2	2.2	2.2	33	2.2	0.5	S2	4	2400	31-2	5500.2070
25	Industrial Version	3.5	2 x 3.5	2.2	2.2	2.2	33	2.2	0.5	S2	6	2500	31-6	5500.2071

Packaging unit 5 Pcs

general product-information

general product-information

Product standard equipment standard

The product standard only contains minimum requirements. Attention is drawn to the fact that appliance specifications might contain requirements additional to or deviating from those specified in the relevant product standards.

Comments on definitions used

Please be aware that the specifications nominal value used in the German part of the Schurter catalogue and the data sheets, is synonymous with rated value.
The difference between these two values is a pure matter of definition. In order to avoid any unnecessary complications we will continue to use the specifications nominal value.

CE marking CE acc. to EU-directives

CE marking is the only marking which indicates that a product conforms to the relevant EU-directive.
This means that the CE-mark is no quality or standard conformity mark but only an administration mark.
SCHURTER products are covered by the low voltage directives 72/23/EEC and 93/68/EEC. Those are valid for equipment and appliances with rated voltage values between AC 50 V to AC 1000 V as well as DC 75 V to DC 1500 V.
The CE marking of SCHURTER parts will be found on the label of the smallest packing unit. On request we will submitt a CE conformity statement for each component. CE conformity statements and approvals can also be retrieved from the internet under www.schurter.com.

Conformity to component standards, national approvals

National testing institutions are testing according to national and international standards or other generally recognized rules of technology. Their certification/approval-marks confirm the observance of the safety requirements which electric appliances must fulfil.

National approvals

(Recognition)	UL	Underwriters Laboratories (USA)
(Listing)	UL	Underwriters Laboratories (USA, Canada)
(Recognition)	UL	Underwriters Laboratories (USA, Canada)
(Listing)	UL	Underwriters Laboratories (USA, Canada)
	CSA	Canadian Standard Association, Component Acceptance Service
	CSA	Canadian Standard Association
	SEV	Schweizerischer Elektrotechnischer Verein
(Mark)	VDE	Verband Deutscher Elektrotechniker
(Certificate of conformity with factory surveillance)		
	BSI	British Standard Institute
	SEMKO	Svenska Elektriska Materielkontrollanstalten
	NEMKO	Norges Elektriske Materiellkontroll
	DEMKO	Danmarks Elektriske Materielkontrol
	FIMKO	Finnish Electrical Inspectorate
	ÖVE	Österreichischer Verband für Elektrotechnik
	KEMA	Keuring van Elektrotechnische Materialien
	IMQ	Instituto italiano del marchio di qualità
(Mark)	European Norms Electrical Certification	
	CCC	China Compulsory Certification

In addition to the combined UL/CSA approvals, most of the SCHURTER components are also approved by one of the European Certification Bodies like VDE (Germany), Electrosuisse (Switzerland) or SEMKO (Sweden). The safety testing of all these European Certification Bodies are based on the commen European Safety Standards. With the harmonisation effort in Europe, the different National European Certification Bodies have lost their importance and SCHURTER has decided to maintain only one European approval (e.g. VDE, SEV or SEMKO) in future. The others will not be renewed once they have expired.

Because UL and CSA are not members of the CENELEC, the standards of UL and CSA are not harmonised yet with the European Standards. However, UL and CSA are trying to harmonize their standards with each other. Where possible, SCHURTER will apply for the combined cULus or cURus approval.

Further to development in Asia, SCHURTER has obtained national approvals from China, Japan and Korea.

IP degrees of protection provided by enclosures (IP code)

Standards IEC 60529; EN 60529

Scope
These standards apply to the classification of degrees of protection provided by enclosures for electrical equipment with a rated voltage not exceeding 72.5 kV.

Object
The object of these standards is to give:

a) Definitions for degrees of protection provided by enclosures of electrical equipment as regards:
1. Protection of persons against access to hazardous parts inside the enclosure
2. Protection of the equipment inside the enclosure against ingress of solid foreign objects
3. Protection of the equipment inside the enclosure against harmful effects due to the ingress of water.

b) Designations for these degrees of protection.
c) Requirements for each designation.
d) Tests to be performed to verify that the enclosure meets the requirements of these standards.

Designations

The degree of protection provided by an enclosure is indicated by the IP Code.

Elements of the IP Code and their meanings

A brief description of the IP Code elements is given in the following table.

IP xy	Meaning for the protection of equipment	Meaning for the protection of persons
	Against ingress of solid foreign objectif	**Against access to hazardous parts with**
x = 0	(non-protected)	(non-protected)
x = 1	50 mm diameter	back of hand
x = 2	12.5 mm diameter	finger
x = 3	2.5 mm diameter	tool
x = 4	1.0 mm diameter	wire
x = 5	dust-protected	wire
x = 6	dust-tight	wire
	Against ingress of water with harmful effects	
y = 0	(non protected)	
y = 1	vertically dripping	
y = 2	dripping (15° tilted)	
y = 3	spraying	
y = 4	splashing	
y = 5	jetting	
y = 6	powerful jetting	
y = 7	temporary immersion	
y = 8	continuous immersion	

Protection against electric shock

1. Protection against direct and indirect contact General terms

The protection against electric shock on electric equipment as well as their components are divided into the following parts:

- Protection against direct contact with live parts concerns all measures for the protection of human beings and animals against hazards which result from direct contact with live parts of electric equipment and their components.
- Protection against indirect contact is the protection of human beings and animals against hazards which result from contact of live parts 1 of electric equipment as well as components thereof, which have become live due to an insulation failure.

[1)] Accessible, conductive part, which is not conductive normally but which may be conductive due to a failure.

2. Protection against direct contact with live parts e.g. of a fuseholder

The data sheets of the relevant components inform about the taken measures.

3. Protection against indirect contact

Measures for the protection against indirect contact on electrical equipment are defined according to IEC 61140 by the 4 protection classes 0, I, II, III. Each protection class includes two protection measures. Even if one of these measures should fail, no electric shocks will occur.

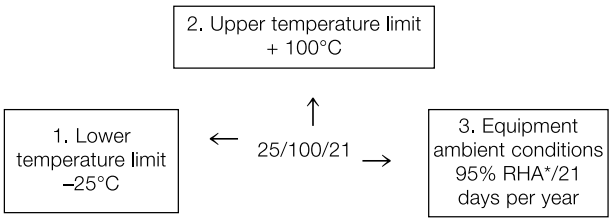
Protection class	Main protective measures
0	1. Basic insulation between live parts and accessible conductive parts. 2. Earth-free location, non-conducting environment.
I 	1. Basic insulation between live parts and accessible conductive parts. 2. Means are provided for the connection of accessible conductive parts of the equipment to the protective (earthing) conductor in the fixed wiring of the installation in such a way that accessible conductive parts cannot become live in the event of a failure of the basic insulation.
II 	1. Basic insulation between live parts and accessible conductive parts. 2. Additional insulation. Basic and supplementary insulation are summarised under the term "double insulation". Under certain circumstances also a "reinforced insulation» (single insulation system) may guarantee an equivalent protection against electric shock as a "double-insulation" does. No terminal for a protective conductor is allowable. A possibly existing protective conductor must not be connected and has to be insulated like any live part.
III 	1. Functional insulation. 2. Supply at safety extra-low voltage SELV (the circuit is isolated from the mains supply by such means as a safety isolating transformer). The protection against electric shock is in this case completely based on the supplying by SELV-circuits (U ≤ 42 V). Higher voltages are not generated in the equipment. No terminal for a protective conductor is allowable.

Application Classes (IEC 60068-1)

The aim of this standard is to create a basis for classification of telecommunication engineering electrical components according to application classes which correspond to their climatic and mechanical suitability.

general product-information

Example:



* relative humidity

MTBF

The high reliability of the filters can be excelled from MTBF (Meantime between failures). These values are according MIL-HB-217-F class G_B at an amient temperatur 40§C at rated voltage and current.

Industrial mains filters

Frequency range 0.01 MHz ... 1000 MHz

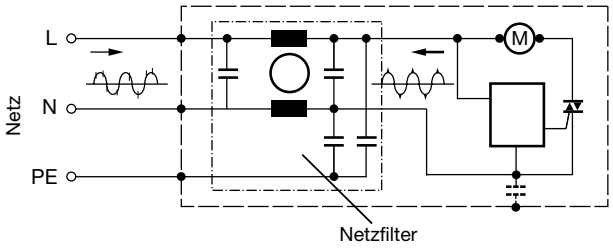
General Information

Electromagnetic Compatibility (EMC) is the capability of electrical equipment (installations, devices, assemblies) to operate effectively in its electromagnetic environment (Immunity), without in turn irresponsibly affecting this environment (Emission).

Mains filters of various types are used for the protection of electronic circuits, components and equipment against transients or similar interference, on the mains power supply. A suitable filter can be selected from the existing product range for each equipment type in accordance with electromagnetic conditions of its environment.

Mains interference can be classified into four categories:
A) Fluctuations in the industrial mains supply
(magnetic voltage stabilizer)
B) Harmonic wave interference in the frequency range 100 Hz ... 2 kHz
(filter type selective harmonic)
C) Transient interference signals in the frequency range up to
300 MHz (filter type low-pass)
D) Sinusoidal interference signals in the frequency range up to
1 GHz (filter type broad band, low-pass)

In practice, however, interference is mainly found in the last three categories B, C and D. Superimposed on the high-voltage mains supply, such interference can affect the performance of electronic circuits, or even cause them damage. An optimally-designed mains filter can perform a double function:



Function 1

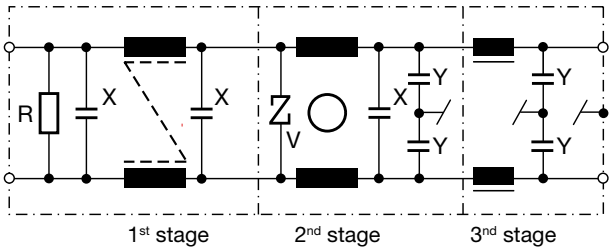
The filter protects an electronic control circuit from voltage spikes in the mains supply, which may be generated, for example, by electromechanical switches and relays.

Function 2

The same filter also acts simultaneously in the opposite direction. The HF interference generated in the unit by thyristor control is attenuated such that the boundary values Class B, (EN 55011/55022) are maintained.

Filters are usually made up of capacitors and inductance coils. Components such as leakage resistors, surge dissipators and VHF chokes can also be integrated into the filter. Broad band filters
which meet the highest requirements are often composed of 2 or 3 single stages put together to make one filter unit:

3-stage filter



1st stage

A differential mode acting filter with high energy absorption. Discharging resistors are normally used for Cx capacitors > 100 nF. The capacitors are tested and approved as so-called Class X noise suppression capacitors. The 1st stage serves as dI/dt limitation.

2nd stage

A common mode acting filter with a high, broad band attenuation ratio. A ZNR varistor surge serves as the overvoltage suppression component. The earthed capacitors are tested and approved as so-called Class Y noise suppression capacitors.

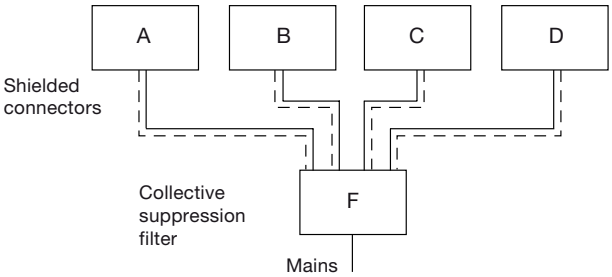
3rd stage

Common mode as well as differential mode acting filter in the HF range up to 300 MHz. Feedthrough capacitors make high attenuation values possible up to the gigahertz range. These capacitors are also Class Y type. SCHURTER uses only approved noise suppression capacitors according to EN 132400.

Filter Assemblies

Three types of mains noise suppression filter assemblies are used in practice:

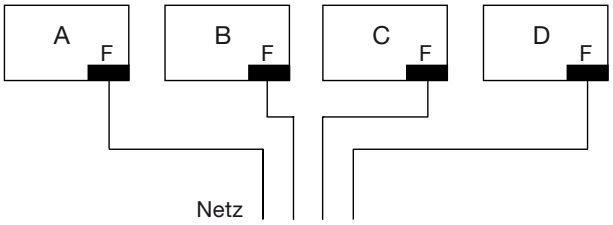
Collective Suppressor



The collective suppressor principle results in one filter per plant. This has to cope with the entire power input. In addition, all of the connecting cables have to be shielded. Furthermore interference generated by «A» device can reach other devices for instance «B» or «C» through the connecting cables. The following example promises to be a more economical solution. In many cases, the single suppressor principle is

the most economical solution.

Single Suppressors



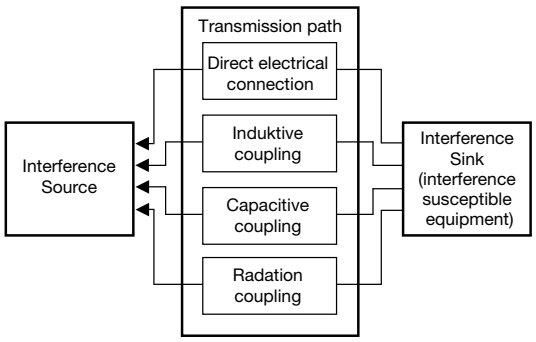
Combined Single and Collective Suppressor

From the technical point of view, only the combined application of both suppression techniques can result in a significant improvement.

Interference Propagation

In the field of interference and RF suppression, the most significant means of transmission is the direct electrical connection, i.e. the connecting wiring. The radiation coupling is also important from the electromagnetic compatibility (EMC) point of view; it cannot, however, be dealt with here.

Interference Propagation



Propagation and Coupling Paths

The capacitive and inductive coupling effects occur inside the case. These could be:
- Capacitive coupling through the coupling capacity of a mains transformer.
- Inductive coupling through control system wiring in parallel.

The introduction briefly mentioned the possibility of the mains filter operating with a double function. Depending on the main area of application, these filters are designated as either RF SUPPRESSION FILTERS or INTERFERENCE SUPPRESSION FILTERS.

The one filter may, therefore, appear under two references in the documentation. A filter is also classified by its mechanical design as well as its electrical data.

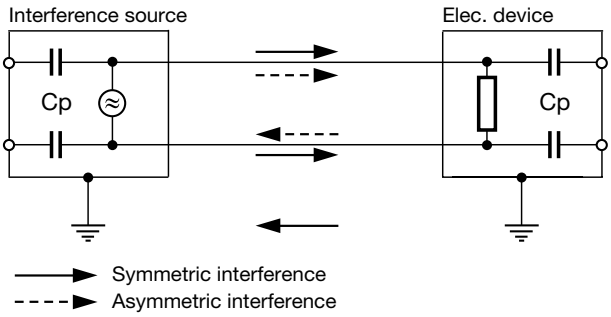
RF SUPPRESSION FILTERS impede the propagation of RF interference, generated by an electronic or electrical device into the mains. They also ensure an interference-free radio reception in the immediate vicinity.

INTERFERENCE SUPPRESSION FILTERS prevent mains interference from affecting electronic equipment. They enable an interference- free operation even in the case of a power supply badly affected by mains interference.

It is common to operate the mains filter in both directions in the one piece of equipment, allowing it to fulfil its double function as both interference and RF suppression filters as specified.

Common- and differential Mode Interference

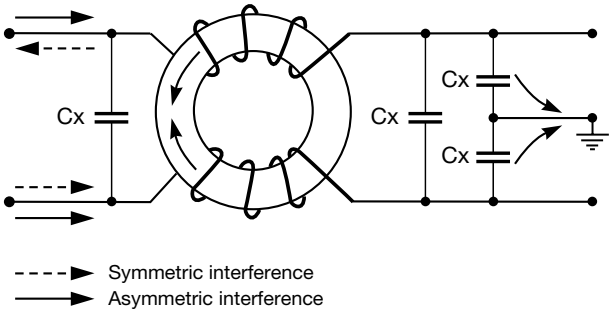
Filter engineering differentiates between common and differential mode interference originating from supply lines.



In the case of a non-earthed interference source, interference at first only propagates along the connecting lines. Like the mains AC current, the parasitic current flows to the user on one lead, and returns to the interference source on the other. Both these currents are in differential mode. This type of interference is therefore referred to as differential mode interference.

Due to the mechanical configuration and its parasitic capacitance, parasitic currents are also generated in the earthing circuit. This parasitic current flows on both connecting leads to the user and over an earthed lead back to the interference source. Both currents on the connecting lead are in common mode. This type of interference is therefore referred to as common mode interference.

Current Compensated Chokes in Interference Suppression Filters



The main type of choke used in suppression filter engineering is the current compensated choke. This mainly damps the common mode interference. The differential mode parasitic current, or rather the magnetic flux they produce in the core, is compensated by means of a special type of winding. The relatively small attenuation of the dif-

ferential mode parasitic currents can be balanced through the large, symmetrically connected capacitance C_x between the lines. Only the leakage inductance L_s of the choke is then of any importance.

$$L_{leakage} \approx \frac{L_{nominal}}{50} \text{ to } \frac{L_{nominal}}{100}$$

The high nominal inductance LN active for common mode parasitic currents allows the insertion of small, earthed capacitances CY in a filter circuit. These capacitances are regulated by international standards for leakage currents.

RF Suppression Capacitors:

General Information

All SCHURTER filters are fitted with Class X or Y RF suppression capacitors in accordance with international standards (IEC, EN). These are mainly self-healing metallized paper or polyester types, tested against the standards of major countries around the world and approved as noise suppression capacitors. Class X capacitors are capacitors with unlimited capacity for those applications in which a failure caused by a short circuit cannot result in a dangerous electrical shock. Class Y capacitors are capacitors intended for an operating voltage V_{eff} = 250 V with increased electrical and mechanical safety and limited capacitance.

General notes

a) Leakage current according to IEC 60335-1

The leakage current of a device is mainly determined by the capacity value of the Y-capacitor. According to international standards (IEC 60335-1) the following regulations with respect to leakage current can be assumed:

Type of appliance	Protection class	I_L max. (mA)	U(V)	f(Hz)
Portable appliances	I	0.75	250	50
Stationary motor appliances *	I	3.5	250	50
Stationary heating appliances	I	0.75/kW (max. 5.0)	250	50
Appliances	II	0.25	250	50
Appliances	I, OI, III	0.5	250	50

* Stationary appliances fixed or weighing in excess of 18 kg (without carrying handle).

For other applications:

Ref.	Laboratory	Medical	IT	Test equipment
UL	0.5 mA (UL 1262)	0.1 mA (UL 544)	3.5 mA (UL 1950)	5.0 mA (UL 1244)
IEC		0.1 mA (IEC 60601-1)	3.5 mA (IEC 60950)	3.5 mA (IEC 61010-1)

Filter classification

For easy reading of the catalogue data, SCHURTER uses the following simplified filter classification:

Differential Mode and Common Mode Attenuation

Attenuation value			
Standard	Medium	High	Excellent
20-50 dB	40-70 dB	60-80 dB	70-95 dB

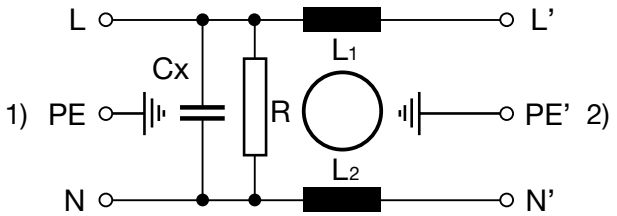
Leakage Current Classification

Operating leakage current			
Medical	Standard	Industrial	Other
<0.1 mA	<0.5 mA	<5 mA	>5 mA

Medical filter

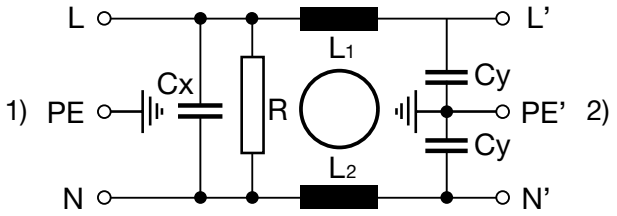
SCHURTER medical filters comply with UL544 and IEC 60601-1 standard specifications and are available in two versions, which differ in terms of their leakage current values.

Medical filter (M5)



1) Line
2) Load

Medical filter (M80)



1) Line
2) Load

Standard medical filters for direct person contact supplied by SCHURTER have a leakage current value of <5 µA (M5). This can only be achieved without C_y. Here, a common mode fault current against earth is not attenuated and the filter acts only on differential mode fault currents. In addition, an inlet in protection class II can be used here, as no earth connection exists. However, if an earth connection is desired, Type (M80) can be used for indirect person contact; this has a leakage current of <80 µA which is below the required limit value of 0.1 mA. Type (M80) is manufactured to special order.

Bleed resistor

Medical filters and filters with a X-capacitor >100 nF have a bleed resistor so that no inadmissible rest voltage occurs at the touchable pins of the inlet.

general product-information

EMC requirements in Europe

Household, Luminaries and Telecommunication Residential, commercial and light industrial	**Class Industrial** (ISM) Industrial, Scientific and Medical
Emission	**Emission**
IEC 61000-6-3 (EN 50081-1)	IEC 61000-6-4(EN 50081-2)
EN 55022 ITE Information technology equipment EN 55014 Household Applications and Tools	EN 55011 Harmonics (IEC 61000-3-2) Voltage fluctuation (IEC 61000-3-3)
Harmonic (IEC 61000-3-2) Voltage fluctuations (IEC 61000-3-3)	
Immunity	**Immunity**
IEC 61000-6-1 (EN 50082-1)	IEC 61000-6-2 (EN 50082-2)
IEC 61000-4-2 ESD IEC 61000-4-3 HF-Field IEC 61000-4-4 Burst IEC 61000-4-5 Surge	IEC 61000-4-2 ESD IEC 61000-4-3 Inducted HF-Field (enclosure) IEC 61000-4-6 Inducted HF-Field (lines) IEC 61000-4-4 Burst IEC 61000-4-5 Surge IEC 61000-4-8 NF Magnetic Field (only for magnetic devices)

Electrical Safety Regulations

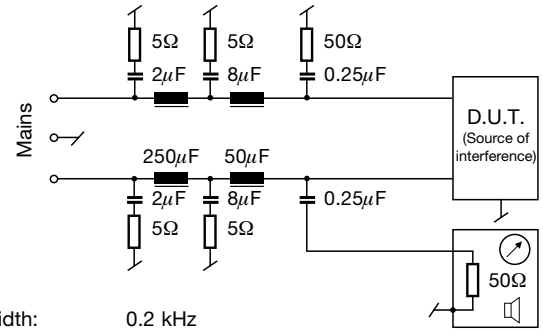
The most important safety standards for equipment/installations are listed in the following:

IEC 60950	Safety of Information Technology Equipment including Electrical Business Equipment
IEC 60335	Safety of Household and similar Electrical Appliances
IEC 61010-1	Safety requirements for Electronic Measuring Apparatus
IEC 60601	Safety requirements for Electro-medical Equipment
UL 1950	Safety requirements for Information Technology Equipment
UL 544	Electric Medical and Dental Equipment

Interference Emissions

There are basically 2 types of emitted disturbances: conducted and radiated. Line interferences are high frequency noise signals which are superimposed on the useful signals on input and output lines. Interference signals can be of common- or differential mode type. The significance of line interference is reduced dramatically above a frequency of 30 MHz. From here radiated interference increases greatly. On the following pages we will nevertheless deal with conducted interference only.

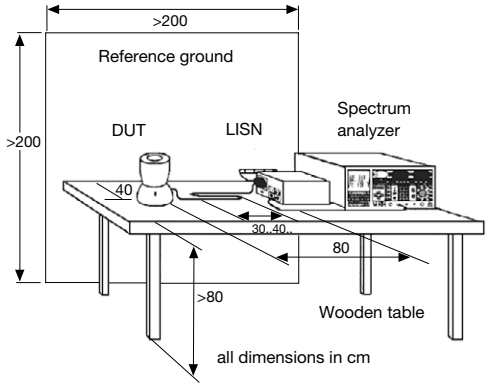
Measuring Technique CISPR 3



Bandwidth: 0.2 kHz
Impedance: 50 Ohm/1 MHz
Frequency range: 10 kHz–30 MHz

Test Receiver

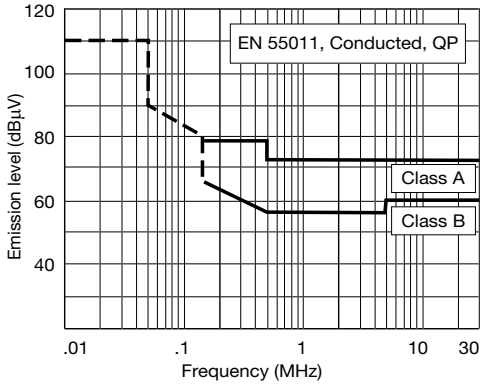
Radio Frequency Interference Boundary Values



RFI testing station

EN 55011: Boundary values and measuring systems for RF suppression for industrial, scientific and medical high frequency equipment (ISM), 1991 (see also CISPR 11 or VDE 0871)

Boundary values complying with EN 55011



Quasipeak (QP) and Average (AV) are two limits, neither of which must be exceeded and which are measured by two different test receivers. The test arrangement remains the same. These boundary values replace the boundary values given by the old standards for broadband and narrowband noise generators.

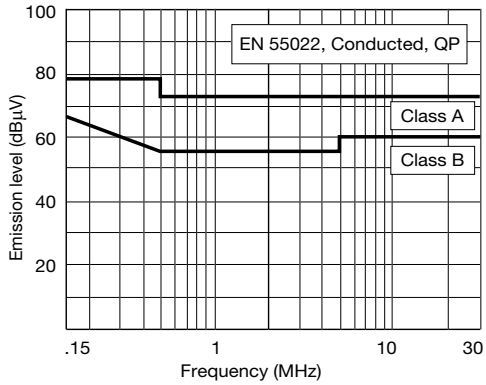
Boundary values are divided into Class A and B.

Into Class A fall those devices which should not be operated in residential buildings and should not be connected to power supplies which also supply these areas. Class A boundary values shall not be exceeded.

Into Class B fall devices for which above restrictions do not apply. Class B boundary values shall not be exceeded.

EN 55022: Boundary values and measuring systems for RF suppression for information technology installations (Telecommunications) 1987 (see also CISPR 22 or VDE 0878).

Boundary values complying with EN 55022



Into Class A fall all units which should be used in a commercial environment and should be used with a safety distance of 30 m to other units.
Into Class B fall all units which have no restrictions on their use.

EN 55013: Boundary value and measuring techniques for RF suppression characteristics of radio receivers and connected applications.

EN 55014: Boundary values and measuring systems for RF suppression for electrical household appliances, handheld electrical tools and similar electrical products, 1993 (see also CISPR 14).

EN 55015: Boundary values and measuring systems for RF suppression for fluorescent lamps and lighting, 1993 (see also CISPR 13).

Harmonics

(EN 61000-3-2, IEC 61000-3-2)
Current harmonics represent a distortion of the normal sine wave provided by the utility. When a product such as an SCR switched load or a switching power supply distorts the current, harmonics at multiples of the power line frequency are generated. Two significant consequences arise as a result of harmonic generation. First, because of finite impedances of power lines, voltage variations are generated that other equipment on the line must tolerate. Second, when generated in a three-phase system, harmonics may cause overheating of neutral lines.

Power line harmonics are generated when a load draws a non linear current from a sinusoidal voltage. The harmonic component is an element of a Fourier series which can be used to define any periodic waveshape. The harmonic order or number is the integral number defined by the ratio of the frequency of the harmonic to the fundamental frequency (e.g., 150 Hz is the third harmonic of 50 Hz; n = 150/50).

After multiple postponement finishes at 1.1. 2001 the transition-period for the EN 61000-3-2, frequently called "PFC-Norm". It applies to all electrical and electronic devices with input current up to max. 16 A per phase, which are designed to connect to the general lowvoltage mains. Limits are set only for 220/380 V, 230/400 V and 240/415 V at 50 Hz.

This standard distinguishes four classes of equipment.

Class	Equipment
A	Simmetric three phase equipment and all other equipment not in other classes
B	Portable tools
C	Lighting equipment
D	Equipment having special Waveshape (see EN 61000-3-2, paragraph 4 picture 1)

A harmonics test to conform to the standards must include an analysis of the incoming current up to the 40th harmonic (for f_N = 50 Hz, f_H = 2 kHz).
The IEC 61642 "Industrial a.c. networks affected by harmonics- Application of filters and shunt capacitors" give guidance for the use of passive a.c. harmonic filters and shunt capacitors for the limitation of harmonics and power factor correction intended to be used in industrial applications, at low and high voltages.

Voltage Fluctuations (Flicker)

(EN61000-3-3, IEC 61000-3-3, IEC 61000-3-5)
The appearance of flicker effects and voltage fluctuations on the mains supply is caused by varying loads connected to the mains. The most critical are the effects of voltage fluctuations on equipment such as lights and illumination. Here the light output and thereby the intensity is an exponential function of the supplied voltage. This fluctuation in light intensity is called flicker. Many people experience dizziness and headaches as a result.

There are various limit values depending on the type of voltage fluctuation (square, sinusoidal and mixed or erratic voltage fluctuation).

Flickers are measured by so-called flicker meters (arranged in compliance with EN 60808).

Immunity

ESD (Electrostatic Discharge)

(EN 61000-4-2, IEC 61000-4-2)
One of the main interference sources, along with switching through radio interference, is electrostatic discharge from people and equipment.

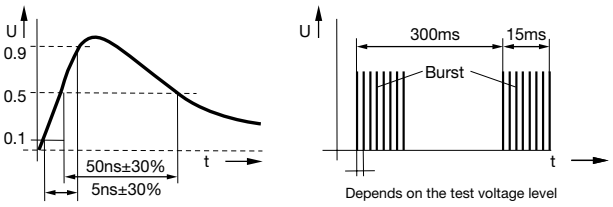
Burst

(EN 61000-4-4, IEC 61000-4-4)
One of the most common and most dangerous sources of interference are transient disturbances such as those originating from switching transients (interruption of inductive loads, relay contact bounce, etc.). The burst test measures the resistance of the device to repetitive fast transients.

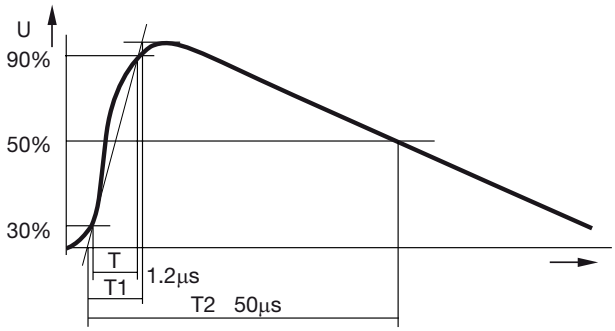
Surge

(EN 61000-4-5, IEC 61000-4-5)
This test procedure measures the behaviour of a device when subjected to high-energy pulses. Sources of such pulses are switching events due to lightning strikes, short-circuits, or switching cycles which vary in time and place. Surge test on SCHURTER filters are according to EN 133200.

Specification of the Burst test impulse



Surge voltage form in open circuit



Guideline for the selection of ESD test levels

Class	Relative ambient humidity as low as [%]	Antistatic material (floor)	Synthetic material (floor)	Level air discharge (kV)	Level contact discharge (kV)
Class 1	35	x		2.00	2.00
Class 2	10	x		4.00	4.00
Class 3	50		x	8.00	6.00
Class 4	10		x	15.00	8.00

Recommended test levels for Fast Transient/Burst (acc. IEC 61000-4-4)

Test levels	The installation is characterized by following attributes	Voltage peak: [kV]		Repetition rate [kHz]
		Power supply	Signal ports	
Level 1 Well-protected environment	Suppression of all EFT/B* in the switched power supply circuits Separation between power supply lines and control and measurement circuits Shielded power supply cables with the screens earthed at both ends	0.50	0.25	5.0
Level 2 Protected environment	Partial suppression of EFT/B* in the power supply and control circuits Separation of all the circuits from other circuits associated with environments of higher severity levels Physical separation of unshielded power supply and control cable from signal and communication cables	1.00	0.50	5.0
Level 3 Typical industrial environment	No suppression of EFT/B* in the power supply and control circuits Poor separation of the industrial circuits from other circuits Dedicated cables for power supply, control, signal and communication lines Poor separation between power supply, control, signal and communication cables	2.00	1.00	5.0
Level 4 Severe industrial environment	No Suppression of EFT/B* in the power supply and control and power circuits No separation between power supply, control, signal and communication cables Use of multicore cables in common for control and signal lines	4.00	2.00	2.5

*EFT/B: Electrical Fast Transient/Burst

Installation classification for Surge Immunity test (acc. IEC 61000-4-5)

Class	Environment definition	Voltage peak [kV]	
		L → N [2kV]	L/N → PE [12kHz]
Class 0 well-protected environment	- All cables with overvoltage protection - Well-designed earthing system - Surge voltage may not exceed 25 V	-	-
Class 1 Partly protected environment	- All cables with overvoltage protection, well interconnected earth line network - Power supply completely separated from the other equipment - Surge voltage may not exceed 500 V	-	0.50
Class 2	- Separate earth line to earthing system - The power supply is separated from other circuits - Non-protected circuits are in the installation, but well separated and in restricted numbers - Surge voltage may not exceed 1000 V	0.50	1.00
Class 3	- The installation is earthed to the common earthing system - Protected electronic equipment and less sensitive electric equipment on the same power supply network - Unsuppressed inductive loads are in the installation	1.00	2.00

Installation classification for Surge Immunity test (acc. IEC 61000-4-5)

Class 4	- The installation is connected to the earthing system for the power installation - Current in the kA range due to earth faults - The power supply network can be the same for both the electronic and the electrical equipment - Surge voltages may not exceed 2000 V	2.00	4.00
Class 5	- Electrical environment for electronic equipment connected to telecommunication cables - The interference voltages can be extremely high - All cables and lines are provided with overvoltage protection	dep. on the local power supply network	dep. on the local power supply network dep. on the local power supply network

General Technical Data - Filter parameters

Rated voltage UR (U_{max})

The rated voltage UR is the maximum RMS alternating line to line voltage (U_{max}) which may be applied continuosly to the terminals of the filter. The rated voltage is the nominal voltage including 10% tolerances.

Example:

Filter with U_R = 440 VAC is made for a power system with nominal voltage 400 VAC +10%.
For standard three phase filters the voltage between phase and earth is intended $U_R/\sqrt{3}$ (example 440/250 VAC).

Filters made for IT power systems withstand a voltage between phase and earth equal to U_R.

SCHURTER filters for IT systems have code endingwith "I": ex. FMAC-0932-2512I.

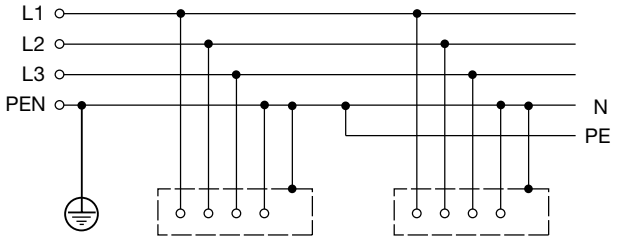
The line frequency f_N (50/60 Hz) may be exceeded under certain conditions. We recommend the users to consult in any case our technical department. DC power operation is possible in most cases.

Power distribution system

There are three main types of power distribution systems according to IEC 60950 (1.2.12): TN, TT, IT.

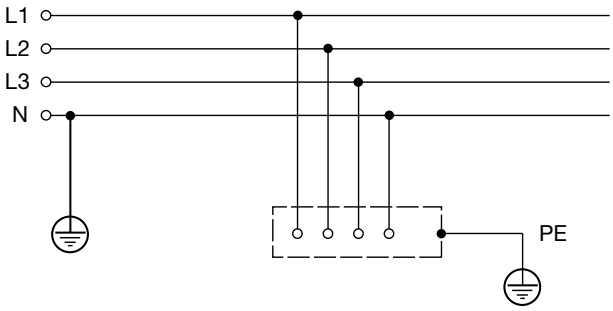
The TN POWER SYSTEM is a power distribution system having one point directly earthed, the exposed conductive parts of the installation being connected to that point by protective earth conductors. Three types of TN POWER SISTEMS are recognized according to the arrangement of neutral and protective earth conductors: TN-S, TN-C-S, TN-C.

Example of a TN-C-S system



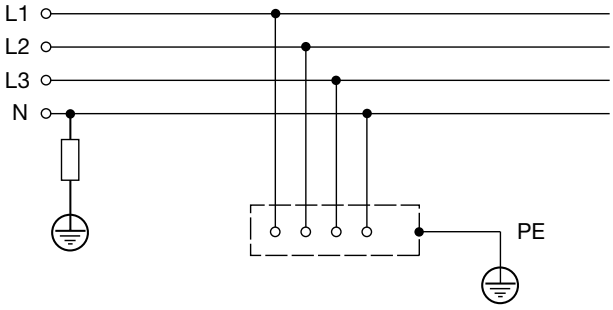
TN-C-S is in a system which neutral and protective functions are combined in a single conductors in a part of the system.

Example of a TT system



A TT POWER SYSTEM is a power distribution system having one point directly earthed, the exposed conductive parts of the installation being connected to earth electrodes electrically indipendent of the earth electrodes of the power system.

Example of a IT system



The IT POWER SYSTEM is a power distribution system having no direct connection to earth, the exposed conductive parts of the electrical installation being earthed. In this case the voltage between phase and earth can reach the line to line voltage.

Nominal Current I_N

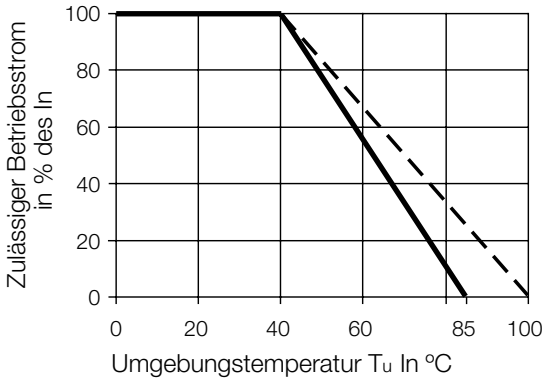
The technical data gives the max continuous supply current in function of the ambient temperature I_N/va. The SCHURTER range generally differentiates between two types of filters:

- High-current filter: va at I_N = 40°C
  va$_{max}$ = 100°C
- All other filters: va at I_N = 40°C
  va$_{max}$ = 85°C

The permissible working current at higher ambient temperatures can be read from the following graph.

Permissible Working Current as a Function of Ambient Temperature Up to the approved nominal ambient temperature a the filter can be operated continuously at its nominal current. Above this temperature the square of the nominal current drops off linearly and reaches its zero point at Tmax (85 or 100 °C).

Derating curve (approx.)



Formula:

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

I = admissible operating current at elevated ambient air temperature
I_n = rated current
T_{max} = max. allowable ambient air temperature Ta (85 °C)
T_a = ambient air temperature
T_n = allowable ambient air temperature at rated current (40 °C)

RF Suppression Capacitor Complying with IEC 60384-14

All SCHURTER filters are equipped with components which have been tested and approved as R_F suppression capacitors.
The most important test data for R_F suppression capacitors are:
Capacitance C_x, C_y ± 20% for fM = 1 kHz

Insulation resistance Ris between the capacitor terminals:
for C > 0.33 µF: R_{is} x C > 2000 s (time constant)
for C 0.33 µF: R_{is} > 6000 MOhm

Major voltage test and standards for C_X and C_Y capacitors

Country	Standard	C	Rigidity	Pulse Test 1.2/50 µs
Europe	EN 132400	X1	4.3 UR VAC	4.0 kV
	IEC 60384-14.2	X2	4.3 UR VAC	2.5 kV
		Y1	4.0 kVAC	8.0 kV
		Y2	2.5 kVAC	5.0 kV
	IEC 60950	X1	2700 V_{DC}, 60s	4.0 kV
	(Equipment Standard)	X2	2121 V_{DC}, 60s	2.5 kV
USA	UL 1414		2121 V_{DC}, 60s	50 Pulse, 10 kV, 1000 W
	UL 1283		2121 VDC, 60s 2545 VDC, 1s	-
Switzerland	SEV 1055	x	4.3 UR VAC	3.0 kV
		y	2(100 + 2 UR) min. 2250 VAC	5.0 kV

RF Suppression Chokes Conforming to IEC60938

All SCHURTER filters are fitted with chokes which satisfy the guidelines set down by international and national standards organizations.

The most important test data for RF suppression chokes are:

Maximum variation of inductance:	30% / +50% for compensated 15% / +15% for linear and storage
Test frequency	1MHz ± 20% at L 10 µH 100kHz ± 20% at 10 µH < L 1 mH 10kHz ± 20% at 1 mH < L 50 mH 50 to 120 Hz ± 20% at L > 50 mH
Test current:	0.1 mA
Test temperature:	25°C ± 3°C
Insulation resistance R_{is}:	6000 MOhm

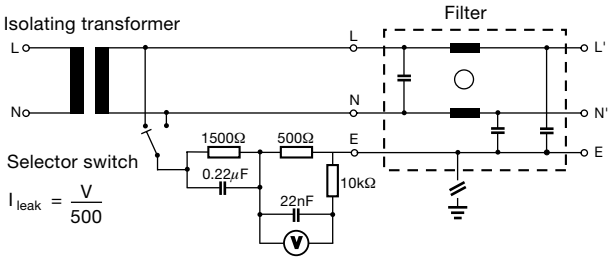
Test voltages

Chokes for	Between connections	Inner and outer insulation
AC	4.3 U_R VDC	2 U_R + 1500 VAC, but at least 2000 VAC
DC	3 U_R VDC	2 U_R + 1500 VDC

Leakage Current

(see also Chapter 1.6 RF Suppression Capacitors: General information)
1-Phase measuring Techniques
Measurement of the leakage current (simplified).
The leakage current is measured from every pole of the network:
- to all accessible metal parts
- to metal parts of protection class II equipment which is separated only by the base material from parts under voltage.

The test is made with AC at 250 V / 50 Hz.
Measurements are made in both switch positions (see diagram).



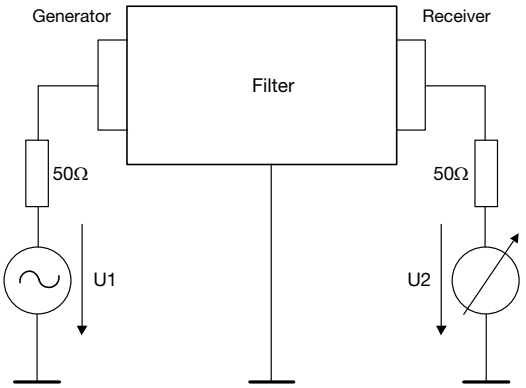
TT or TN Power System according to IEC 60950 - 5.2.3 - Annex D

Protection Class I:

Devices are fitted with a special grounding conductor to provide protection against electrical shocks (L,N,PE wire cable). SCHURTER filters correspond to Protection Class I.

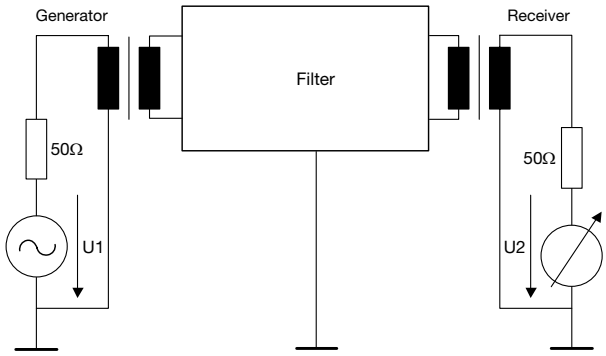
Insertion loss acc. CISPR 17 (common- and differential mode)

Asymmetrical measurement



In common mode measurements, the line and neutral conductors are measured with respect to earth.
Line (L) and neutral (N) are measured to earth (E).

Symmetrical measurement



In differential mode measurements, the insertion transmission loss is measured between line and neutral through a balancing transformer; the earth wire is not used.
4-pole network with integrated balancing transformer for the measurement of insertion transmission loss in the symmetric case.

Measurement Method

The insertion loss D is defined as that loss which results when a four-pole network is inserted into an existing layout, having a surge impedance Z, assuming that the LHS and the RHS terminal impedances of the four-pole network are equal in magnitude and real, the insertion transmission loss and the overall loss are the same.
The insertion transmission loss, in decibels, can be obtained as follows:

$$D_{dB} = \frac{20 \log (U_G)}{2\ U_2}$$

IEC 60939-2

Nominal voltage connections	Between	Inner and outer insulation	
		C*≤ 1 µF	C*> 1 µF
150 ≤ U_R ≤ 250 VAC	4.3 U_R VDC	1500 VAC or 2250 VDC	4.3 U_R VDC
250 ≤ U_R ≤ 500 VAC	4.3 U_R VDC	2 kVAC or 3 kVDC	4.3 U_R VDC
500 ≤ U_R ≤ 760 VAC	4.3 U_R VDC	3 kVAC or 4 kVDC	4.3 U_R VDC

*) C is the capacity measured between the connection block to which the high voltage is connected for test.

UL 1283 (Appliance filters)

Nominal voltage	Between connection	Between connection and case
UR ≤ 250 VAC	1250 VAC or 1768 VDC	1500 VAC or 2121 VDC

In compliance to the known standards of the IEC, EN, VDE and UL, the filters are tested as follows. In principle, these tests correspond to those of the RF suppression capacitors.

Test duration

- 2 sec for production test
- 60 sec for types test

The SCHURTER final production test has a duration of 2 sec. This test may not be repeated more than one time (i.e. incoming inspection at the customer). Any filter that has been under test for 60 sec can not be commercially used (reduced life cycle).

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