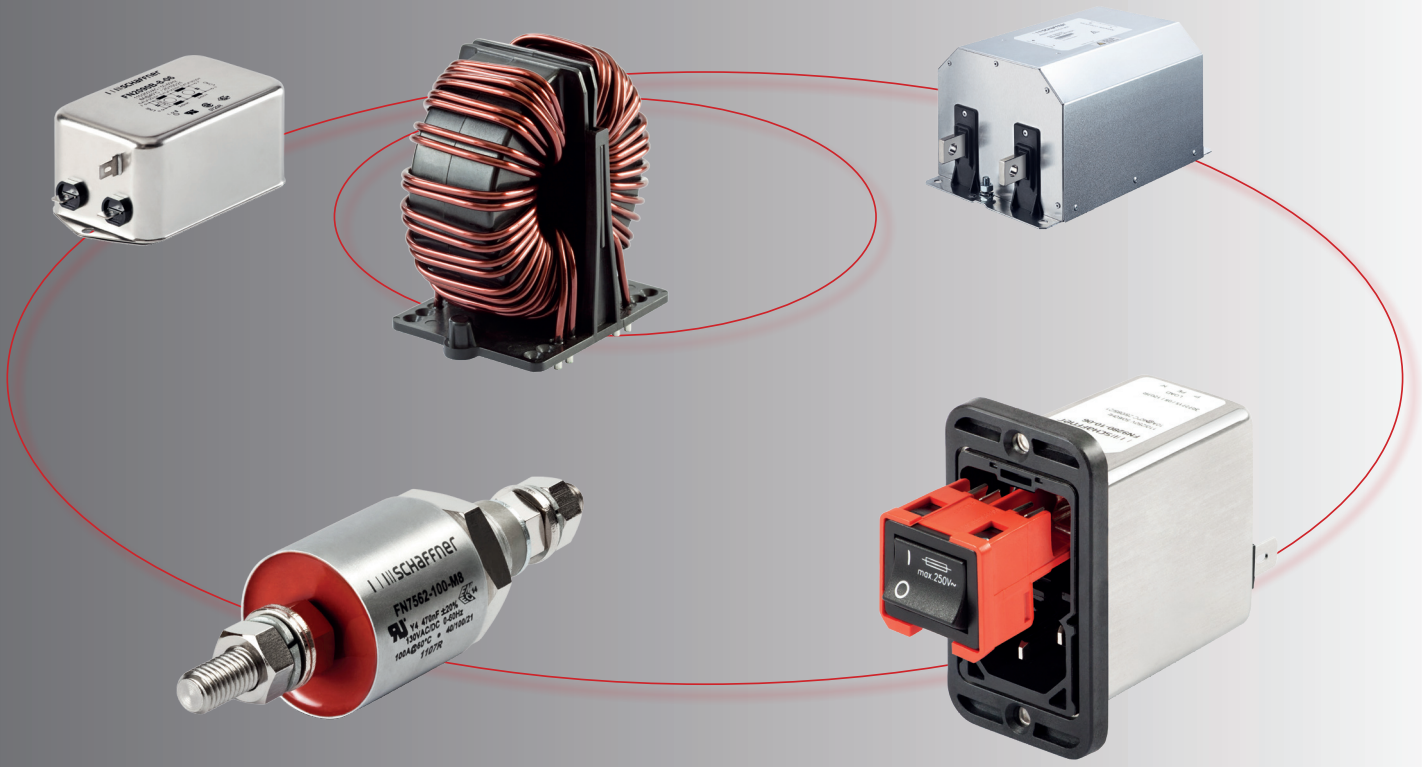
PRODUCT CATALOG
APRIL 2020

EMC/EMI Components
Solutions for 1-Phase AC and DC Power Systems



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Product Index

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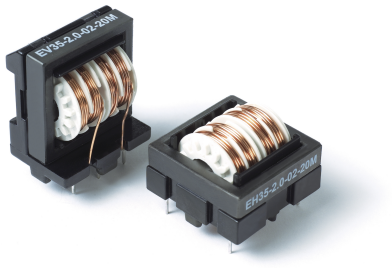
Common-mode Suppression Chokes



- Rated currents up to 5 A
- Broadband attenuation characteristics
- Low magnetic leakage flux
- UL rated materials
- RoHS compliant

Technical specifications

Maximum continuous operating voltage	250 VAC @ 50°C
Operating frequency	DC to 400 Hz
Rated currents	0.3 to 5 A
Overcurrent	1.5x Inominal for 1 minute, once per hour
winding-to-winding @ 25°C	3000 VAC, 60 sec, guaranteed 2000 V, 50 Hz, 2 sec, factory test
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Flammability corresponding to	UL 94 V-0
Measuring frequency	10 kHz; 5 mA <16 µH; 500 µA >16 µH <160 µH; 50 µA >160 µH >16 mH; 50 mV >16 mH <160 mH Inductance tolerance ±30%
Resistance	Tolerance max. ±15% @ 25°C; ≤20 mΩ, 1 A; >20 mΩ ≤200 mΩ, 100 mA; >200 mΩ ≤2 V, 10 mA
Electrical characteristics	@ 25°C ±2°C

Approvals

RoHS

Common-mode suppression chokes are mainly used to filter noise on AC power lines. Noise on commercial power lines could enter the equipment and disturb the proper function. Noise generated by the equipment for example from switch mode power supplies need to be filtered and the spread of such generated noise need to be suppressed. Common-mode suppression chokes together with line bypass capacitors building an AC EMI suppression filter device.

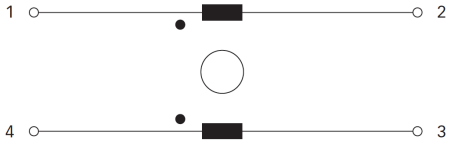
Features and benefits

- Rated currents up to 5 A
- Compact and light weight
- Low magnetic leakage flux
- Sectional winding
- Standard foot print
- Broad range of available inductances and current ratings
- Custom-specific versions
- Schaffner offers you also EMI measure- ment service to verify that your design will pass the required safety standards

Typical applications

- Input filters for switch mode power supplies
- Filters to reduce leaking noise
- TVs, VCRs, multimedia and audio equipment
- Office automation, communications and other electronic devices
- Electric ballast
- AC/AC converters

Typical electrical schematic



Choke selection table

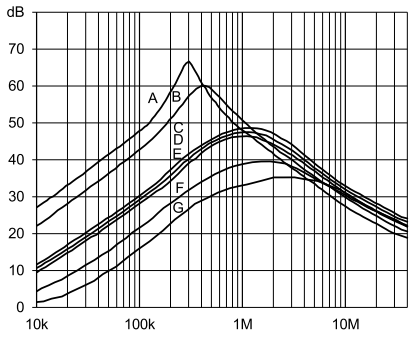
EH choke	EV choke	L nominal (±30%) [mH]	DC resistance R [mΩ]	Rated current I (50°C) [A]	Weight [g]
EH 20-0.3-02-33M	EV 20-0.3-02-33M	33	1780	0.3	10
EH 20-0.5-02-18M	EV 20-0.5-02-18M	18	725	0.5	10
EH 20-0.8-02-5M6	EV 20-0.8-02-5M6	5.6	245	0.8	10
EH 20-1.0-02-3M9	EV 20-1.0-02-3M9	3.9	168	1.0	10
EH 20-1.2-02-3M3	EV 20-1.2-02-3M3	3.3	127	1.2	10
EH 20-1.5-02-1M8	EV 20-1.5-02-1M8	1.8	72	1.5	10
EH 20-2.0-02-0M8	EV 20-2.0-02-0M8	0.82	38	2.0	10
EH 24-0.5-02-44M	EV 24-0.5-02-44M	44	1250	0.5	18
EH 24-0.8-02-18M	EV 24-0.8-02-18M	18	438	0.8	18
EH 24-1.0-02-10M	EV 24-1.0-02-10M	10	244	1.0	18
EH 24-1.5-02-4M5	EV 24-1.5-02-4M5	4.5	116	1.5	18
EH 24-2.0-02-2M5	EV 24-2.0-02-2M5	2.5	62	2.0	18
EH 24-3.0-02-1M2	EV 24-3.0-02-1M2	1.2	29	3.0	18
EH 24-4.0-02-0M5	EV 24-4.0-02-0M5	0.5	16	4.0	18
EH 28-1.0-02-75M-X		75	880	1.0	31
EH 28-1.0-02-36M	EV 28-1.0-02-36M	36	591	1.0	31
EH 28-1.5-02-27M-X	EV 28-1.5-02-27M-X	27	282	1.5	31
EH 28-1.5-02-20M	EV 28-1.5-02-20M	20	282	1.5	31
EH 28-2.0-02-15M-X		15	196	2.0	33
EH 28-2.0-02-11M	EV 28-2.0-02-11M	11	162	2.0	31
EH 28-3.0-02-9M0-X	EV 28-3.0-02-9M0-X	9	115	3.0	31
EH 28-3.0-02-5M0	EV 28-3.0-02-5M0	5	79	3.0	31
EH 28-4.0-02-3M5-X		3.5	52	4.0	31
EH 28-4.0-02-2M3	EV 28-4.0-02-2M3	2.3	40	4.0	31
EH 28-5.0-02-1M1	EV 28-5.0-02-1M1	1.1	27	5.0	31
EH 35-1.0-02-90M	EV 35-1.0-02-90M	90	628	1.0	70
EH 35-2.0-02-20M	EV 35-2.0-02-20M	20	150	2.0	70
EH 35-3.0-02-10M	EV 35-3.0-02-10M	10	72	3.0	70
EH 35-4.0-02-5M0	EV 35-4.0-02-5M0	5	53	4.0	70
EH 35-5.0-02-3M6	EV 35-5.0-02-3M6	3.6	33	5.0	70

All wires rated 130°C or higher.

Typical choke attenuation

Per CISPR 17; 50 Ω/50 Ω asym

EV/EH 20 types

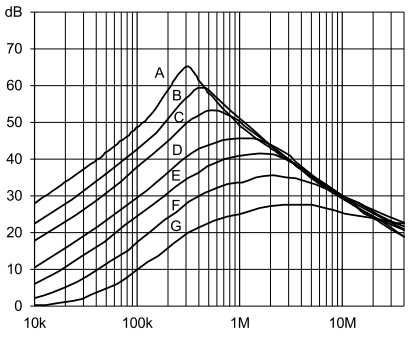


A = 33 mH; B = 18 mH; C = 5.6 mH

D = 3.9 mH; E = 3.3 mH; F = 1.8 mH

G = 0.8 mH

EV/EH 24 types

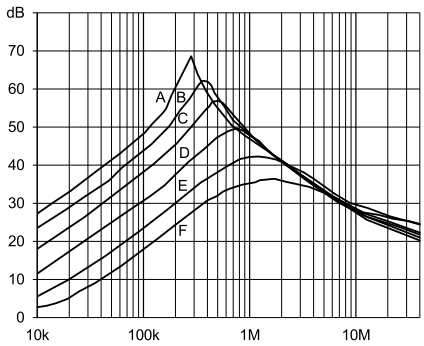


A = 44 mH; B = 18 mH; C = 10 mH

D = 5.5 mH; E = 2.5 mH; F = 1.2 mH

G = 0.5 mH

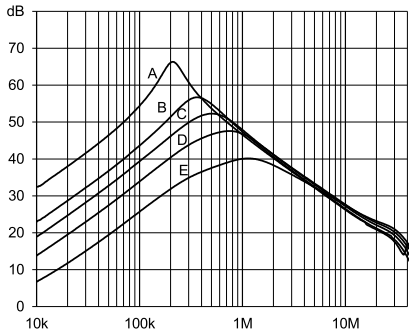
EV/EH 28 types



A = 36 mH; B = 20 mH; C = 11 mH

D = 5 mH; E = 2.3 mH; F = 1.1 mH

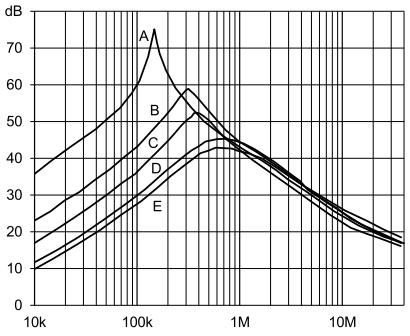
EV/EH 28 X types



A = 75 mH; B = 27 mH; C = 15 mH

D = 9 mH; E = 3.5 mH

EV/EH 35 types

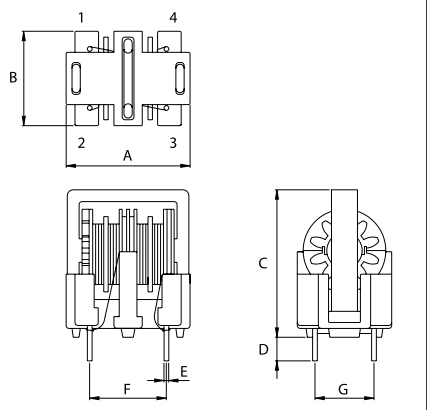


A = 90 mH; B = 20 mH; C = 10 mH

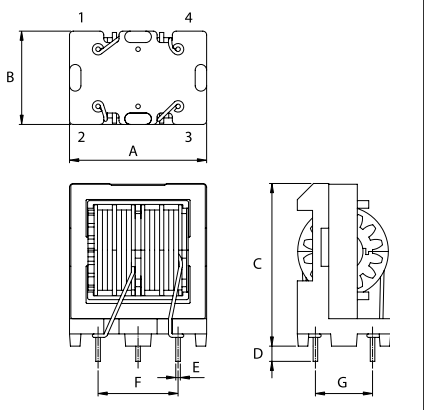
D = 5 mH; E = 3.6 mH

Mechanical data

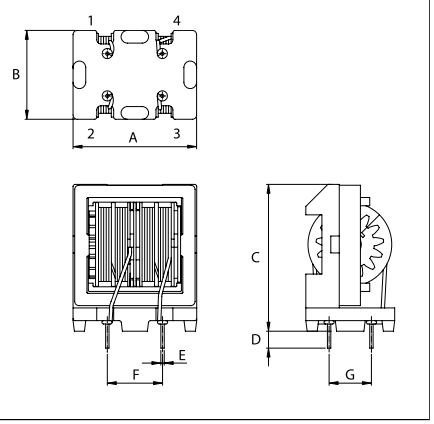
EV 20



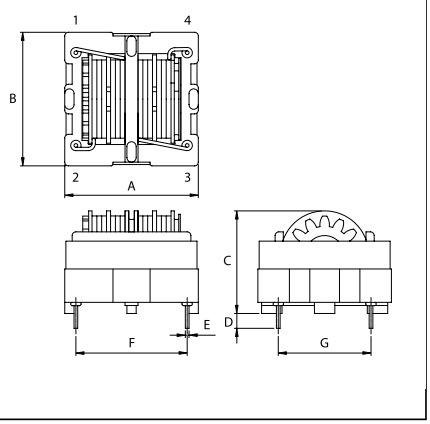
EV 35



EV 24 and 28



EH 20 to 35



Dimensions

	EV 20	EV 24	EV 28	EV 35	EH 20	EH 24	EH 28	EH35	Tolerances
A	21	24.6	29.2	36	21	24	28	36	±1
B	16	17.4	21	25.5	21	24	28	36	±1
C	25*	29.1	34.7	42.7	17.8	20	22.9	27.7	±1
D	4	4	4	4	4	4	4	4	±1
E	Ø0.8	Ø0.8	Ø0.8	Ø1.2	Ø0.8	Ø0.8	Ø0.8	Ø1.0	±0.1
F	13	13	13	21	13	21	24	30	±0.5
G	10	10	10	15	10	15	20	25	±0.5

All dimensions in mm; 1 inch = 25.4 mm
* Tolarance is +1/-2 mm

Please visit www.schaffner.com to find more details on filter connectors.

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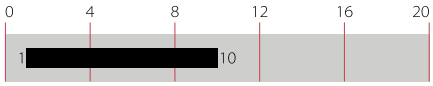
Compact filtered power entry module

- Complies with IEC/EN 60601-1
- Rated currents up to 10 A
- Single or dual-fuse holder
- Fuses Ø5 x 20 mm
- 2-pole rocker switch
- General purpose application
- Optional earth line choke (E type)
- Optional medical versions (B type)

Performance indicators

Attenuation performance

Rated current [A]



Approvals

(CQC except HI-types)

The FN 280 power entry module combines an IEC inlet, a mains filter with single or dual- fuse holder and a 2-pole rocker switch in a small form factor. Choosing FN 280 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on amperage ratings, fuse options, mounting possibilities and filters for medical applications are designed to offer you the desired solution.

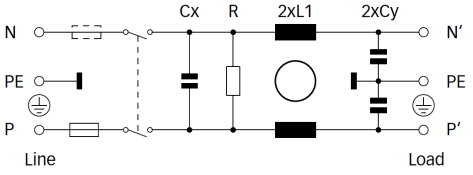
Features and benefits

- High conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear/front or snap-in mounting
- Single or dual-fuse holder
- 2-pole rocker switch
- Custom-specific versions are available on request

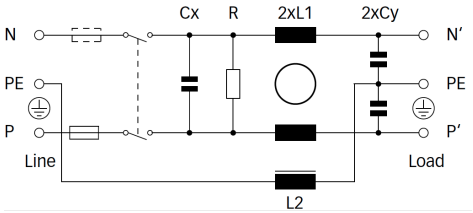
Typical applications

- Portable electrical and electronic equipment
- Consumer goods
- EDP and office equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Medical equipment

Typical electrical schematic



E types



Technical specifications

Maximum continuous operating voltage	250 V, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 10 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 760 VAC for 2 sec
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	1,500,000 hours
Fuse holder	1 or 2 fuses (Ø5 x 20 mm) (certified to IEC 60127-6)
Power acceptance @ amb. temperature	
Marking	max. 250 V ~ (text is print. below fuse symbol)
Rocker switch description	
Function	2-pole, dark not illuminated Marking I - 0
Electrical specifications	Inrush current 82 A 6,000 on-off operations according to UL 1054, TV5 10,000 on-off operations according to ENEC
Switch ratings	
USA (UL) and Canada (C-UL)	10 A, 125 VAC; 10 A, 250 VAC; 1/3 HP
Europe (ENEC)	10 A (4 A), 250 VAC*
Mechanical life	50,000 cycles

* Value in () relates to the inductive current charge: cosφ = 0.65

Filter selection table

	Rated current @ 40°C (25°C) [A]	Leakage current* @ 230 VAC/50 Hz [µA]	Inductance** L1 [mH]	Inductance** L2 [mH]	Capacitance** Cx [nF]	Capacitance** Cy [nF]	Resistance** R [kΩ]	Output connections	Fuses*** [Qty]	Weight [g]
FN 281-1-06	1 (1.2)	373	7.5		220	2.2	1000	-06	1	90
FN 281-2-06	2 (2.4)	373	2		220	2.2	1000	-06	1	90
FN 281-4-06	4 (4.8)	373	1		220	2.2	1000	-06	1	90
FN 281-6-06	6 (7.2)	373	0.45		220	2.2	1000	-06	1	90
FN 281-10-06	10 (11.6)	373	0.34		220	2.2	1000	-06	1	90
FN 282-1-06	1 (1.2)	373	7.5		220	2.2	1000	-06	2	90
FN 282-2-06	2 (2.4)	373	2		220	2.2	1000	-06	2	90
FN 282-4-06	4 (4.8)	373	1		220	2.2	1000	-06	2	90
FN 282-6-06	6 (7.2)	373	0.45		220	2.2	1000	-06	2	90
FN 282-10-06	10 (11.6)	373	0.34		220	2.2	1000	-06	2	90
FN 283-1-06	1 (1.2)	373	7.5		220	2.2	1000	-06	1	90
FN 283-2-06	2 (2.4)	373	2		220	2.2	1000	-06	1	90
FN 283-4-06	4 (4.8)	373	1		220	2.2	1000	-06	1	90
FN 283-6-06	6 (7.2)	373	0.45		220	2.2	1000	-06	1	90
FN 283-10-06	10 (11.6)	373	0.34		220	2.2	1000	-06	1	90
FN 284-1-06	1 (1.2)	373	7.5		220	2.2	1000	-06	2	90
FN 284-2-06	2 (2.4)	373	2		220	2.2	1000	-06	2	90
FN 284-4-06	4 (4.8)	373	1		220	2.2	1000	-06	2	90
FN 284-6-06	6 (7.2)	373	0.45		220	2.2	1000	-06	2	90
FN 284-10-06	10 (11.6)	373	0.34		220	2.2	1000	-06	2	90
FN 285-1-06	1 (1.2)	373	7.5		220	2.2	1000	-06	1	90
FN 285-2-06	2 (2.4)	373	2		220	2.2	1000	-06	1	90
FN 285-4-06	4 (4.8)	373	1		220	2.2	1000	-06	1	90
FN 285-6-06	6 (7.2)	373	0.45		220	2.2	1000	-06	1	90
FN 285-10-06	10 (11.6)	373	0.34		220	2.2	1000	-06	1	90
FN 286-1-06	1 (1.2)	373	7.5		220	2.2	1000	-06	2	90
FN 286-2-06	2 (2.4)	373	2		220	2.2	1000	-06	2	90
FN 286-4-06	4 (4.8)	373	1		220	2.2	1000	-06	2	90
FN 286-6-06	6 (7.2)	373	0.45		220	2.2	1000	-06	2	90
FN 286-10-06	10 (11.6)	373	0.34		220	2.2	1000	-06	2	90
FN 283 E-1-06	1 (1.2)	373	7.5	0.4	220	2.2	1000	-06	1	100
FN 283 E-2-06	2 (2.4)	373	2	0.4	220	2.2	1000	-06	1	100
FN 283 E-4-06	4 (4.8)	373	1	0.4	220	2.2	1000	-06	1	100
FN 283 E-6-06	6 (7.2)	373	0.45	0.4	220	2.2	1000	-06	1	100
FN 284 E-1-06	1 (1.2)	373	7.5	0.4	220	2.2	1000	-06	2	100
FN 284 E-2-06	2 (2.4)	373	2	0.4	220	2.2	1000	-06	2	100
FN 284 E-4-06	4 (4.8)	373	1	0.4	220	2.2	1000	-06	2	100
FN 284 E-6-06	6 (7.2)	373	0.45	0.4	220	2.2	1000	-06	2	100
FN 282 B-1-06	1 (1.2)	2	7.5		220		1000	-06	2	90
FN 282 B-2-06	2 (2.4)	2	2		220		1000	-06	2	90
FN 282 B-4-06	4 (4.8)	2	1		220		1000	-06	2	90
FN 282 B-6-06	6 (7.2)	2	0.45		220		1000	-06	2	90
FN 282 B-10-06	10 (11.6)	2	0.34		220		1000	-06	2	90

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%
*** Filters are delivered without fuse.

Filter	Rated current @ 40°C (25°C) [A]	Leakage current* @ 230 VAC/50 Hz [µA]	Inductance** L1 [mH]	Inductance** L2 [mH]	Capacitance** Cx [nF]	Capacitance** Cy [nF]	Resistance** R [kΩ]	Output connections	Fuses*** [Qty]	Weight [g]
FN 284 B-1-06	1 (1.2)	2	7.5		220		1000	-06	2	90
FN 284 B-2-06	2 (2.4)	2	2		220		1000	-06	2	90
FN 284 B-4-06	4 (4.8)	2	1		220		1000	-06	2	90
FN 284 B-6-06	6 (7.2)	2	0.45		220		1000	-06	2	90
FN 284 B-10-06	10 (11.6)	2	0.34		220		1000	-06	2	90
FN 286 B-1-06	1 (1.2)	2	7.5		220		1000	-06	2	90
FN 286 B-2-06	2 (2.4)	2	2		220		1000	-06	2	90
FN 286 B-4-06	4 (4.8)	2	1		220		1000	-06	2	90
FN 286 B-6-06	6 (7.2)	2	0.45		220		1000	-06	2	90
FN 286 B-10-06	10 (11.6)	2	0.34		220		1000	-06	2	90

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%
*** Filters are delivered without fuse.

Product selector

FN 28xx-yy-zz

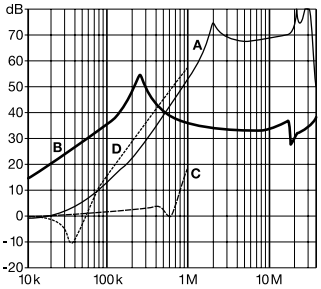
- 06: Faston 6.3 x 0.8mm (spade/soldering)
- 1 to 10: Rated current
- Blank: Standard version
- E: Optional earth line choke
- B: Medical version (with bleed resistor and without Y2-capacitor)
- 1: Flange mounting version top/bottom, single-fuse
- 2: Flange mounting version top/bottom, dual-fuse
- 3: Flange mounting version left/right, single-fuse
- 4: Flange mounting version left/right, dual-fuse
- 5: Snap-in version, single-fuse
- 6: Snap-in version, dual-fuse

For example: FN 281-6-06, FN 283 B-04-06, FN 283 E-1-06

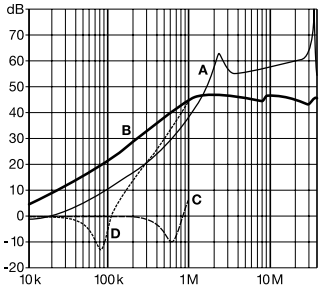
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

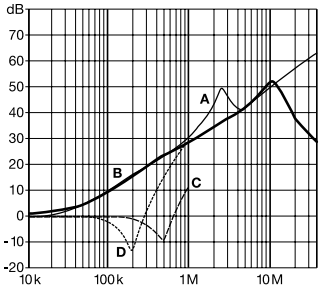
1 A types



2 to 6 A types

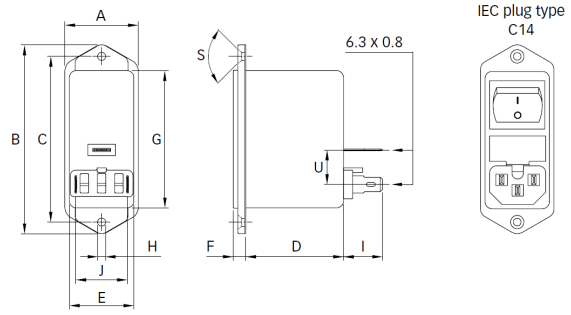


10 A types

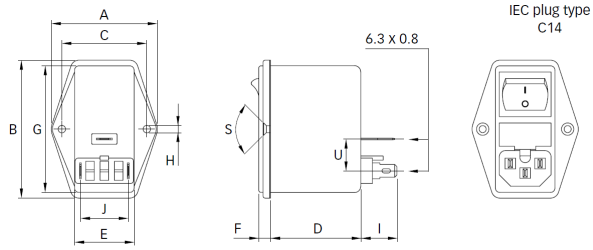


Mechanical data

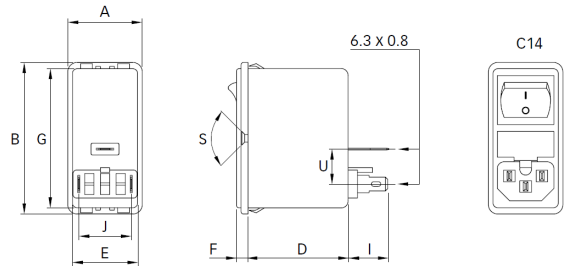
FN 281/FN 282



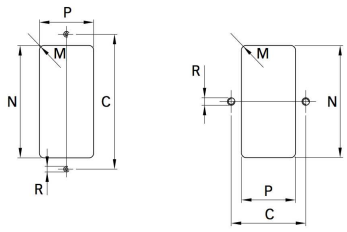
FN 283/FN 284



FN 285/FN 286



Panel cut out



Dimensions

	FN 281	FN 282	FN 283	FN 284	FN 285	FN 286	Tolerances
A	32	32	50	50	32	32	±0.3
B	82	82	65	65	65	65	±0.3
C	72	72	40	40			±0.1
D	43.1	43.1	43.1	43.1	43.6	43.6	±0.3
E	28.5	28.5	28.5	28.5	28.5	28.5	±0.25
F	5.5	5.5	5.5	5.5	5	5	±0.3
G	59.95 max.	59.95 max.	59.95 max.	59.95 max.	59.95 max.	59.95 max.	
H	Ø3.5	Ø3.5	Ø3.3	Ø3.3			
I	13.4	16.2	13.4	16.2	13.9	16.7	±0.3
J	22.5	22.5	22.5	22.5	22.5	22.5	
M	R ≤2.5	R ≤2.5	R ≤2.5	R ≤2.5	R ≤2.5	R ≤2.5	
N	60	60	60	60	61.5+0.2/-0*	61.5+0.2/-0*	+0.5/-0
P	29	29	29	29	29	29	+0.5/-0
R	M3	M3	M3	M3			
S	90°	90°	90°	90°			

* For a panel thickness between 0.8 and 3 mm

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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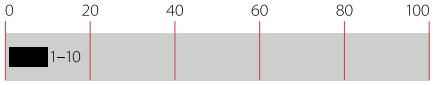
Performance EMI Filter

- Rated currents from 1 to 10 A
- Compact housing
- Optional overvoltage protection (Z type)

Performance indicators

Attenuation performance

Rated current [A]



Approvals

Features and benefits

- FN 332 filters are designed for easy and fast chassis mounting
- FN 332 filters are also available with integrated surge pulse protection to safeguard sensitive electrical equipment
- All FN 332 single-phase filters provide a good attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Chokes with high saturation resistance and high inductivity
- Surge pulse protection
- Custom-specific versions on request

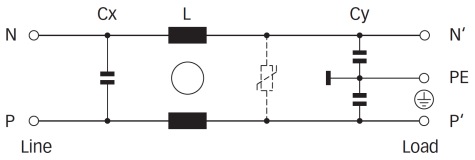
Typical applications

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Power supplies
- Office automation equipment
- Datacom equipment
- Industrial equipment auxiliary supply

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 10 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec P –> N 760 VAC for 2 sec P –> N 250 VAC for 2 sec (Z types)
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Flammability corresponding to	UL 94 V-2 or better
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Surge pulse protection (Z type)	2 kV, IEC 61000-4-5
MTBF @ 40°C/230 V (Mil-HB-217F)	710,000 hours

Typical electrical schematic



Filter selection table

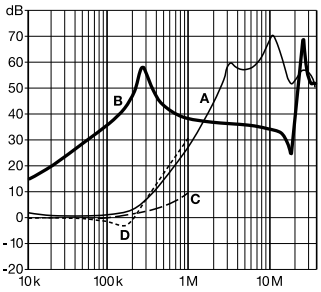
Filter	Rated current @ 40°C (25°C)	Leakage current* @ 230 VAC/50 Hz	Inductance L	Capacitance Cx	Capacitance Cy	Surge current	Energy absorption	Input/Output connections	Weight
	[A]	[µA]	[mH]	[nF]	[nF]	[A]	[J]		[g]
FN 332-1-05	1 (1.2)	340	10	15	2.2			-05	65
FN 332-3-05	3 (3.6)	340	2	15	2.2			-05	65
FN 332-6-05	6 (7.3)	340	0.8	15	2.2			-05	65
FN 332-10 A-05	10 (12)	340	0.5	15	2.2			-05	70
FN 332 Z-1-05	1 (1.2)	340	10	15	2.2	1200	26	-05	65
FN 332 Z-3-05	3 (3.6)	340	2	15	2.2	1200	26	-05	65
FN 332 Z-6-05	6 (7.3)	340	0.8	15	2.2	1200	26	-05	65
FN 332 Z-10-05	10 (12)	340	0.5	15	2.2	1200	26	-05	70

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

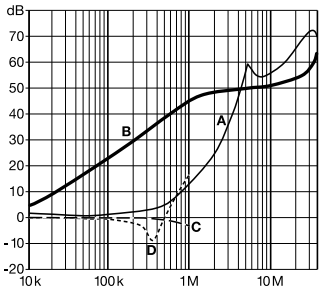
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

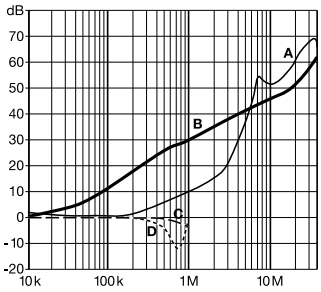
1 A types



3 and 6 A types

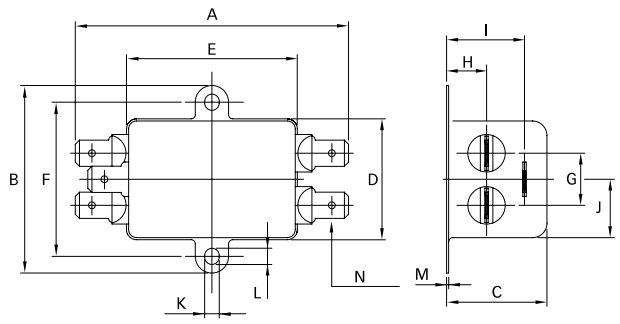


10 A types



Mechanical data

FN 332



Dimensions

	1 to 10 A types	Tolerances
A	65.6	±0.5
B	45	±0.5
C	24.8	±0.5
D	28	±0.5
E	40	±0.5
F	37	±0.4
G	12.5	±0.2
H	9.6	±0.2
I	18.7	±0.5
J	14	±0.5
K	3.5	
L	3.9	
M	0.5	
N	6.3 x 0.8	

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors

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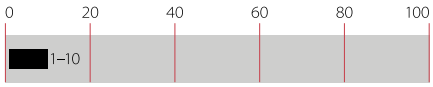
Performance EMI Filter

- Rated currents from 1 to 10 A
- Dual-stage filter
- Compact housing
- Integrated earth line choke

Performance indicators

Attenuation performance

Rated current [A]



Approvals

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 10 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec P –> N 760 VAC for 2 sec
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Flammability corresponding to	UL 94 V-2 or better
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
MTBF @ 40°C/230 V (Mil-HB-217F)	970,000 hours

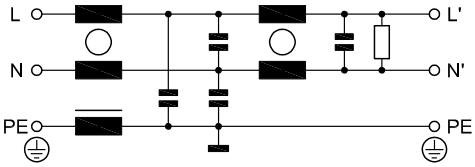
Features and benefits

- FN 343 filters are designed for easy and fast chassis mounting
- Increased attenuation performance based on dual-stage filter design and earth line choke
- All FN 343 single-phase filters provide an excellent attenuation performance, based on chokes with high saturation and excellent thermal behavior
- Faston connection
- Integrated earth line choke
- Compact design
- Custom-specific versions on request

Typical applications

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Power supplies
- Office automation equipment
- Datacom equipment
- Industrial equipment auxiliary supply

Typical electrical schematic



Filter selection table

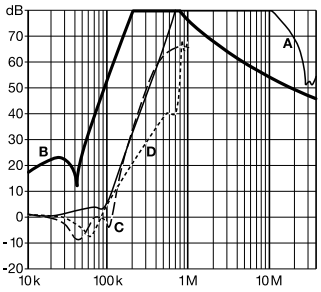
Filter	Rated current @ 40°C (25°C)	Leakage current* @ 230 VAC/50 Hz	Inductance			Capacitance		Resistance	Input/Output connections	Weight
			L	L1	L2	Cx	Cy	R		
	[A]	[µA]	[mH]	[mH]	[mH]	[nF]	[nF]	[MΩ]		[g]
FN 343-1-05	1 (1.15)	340	5.9	9.5	0.46	100	2.2	1	-05	160
FN 343-3-05	3 (3.4)	340	1.1	2	0.4	100	2.2	1	-05	160
FN 343-6-05	6 (6.9)	340	0.43	0.77	0.4	100	2.2	1	-05	160
FN 343-10-05	10 (11.5)	340	0.27	0.66	0.4	100	2.2	1	-05	160

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

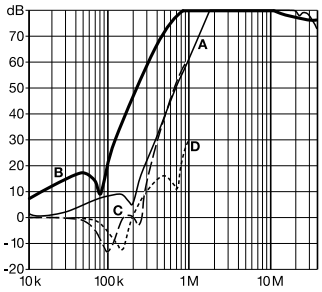
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

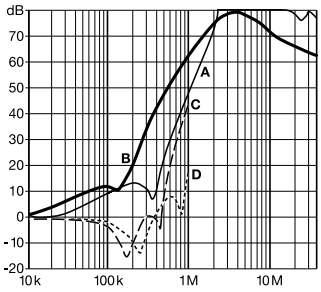
1 A types



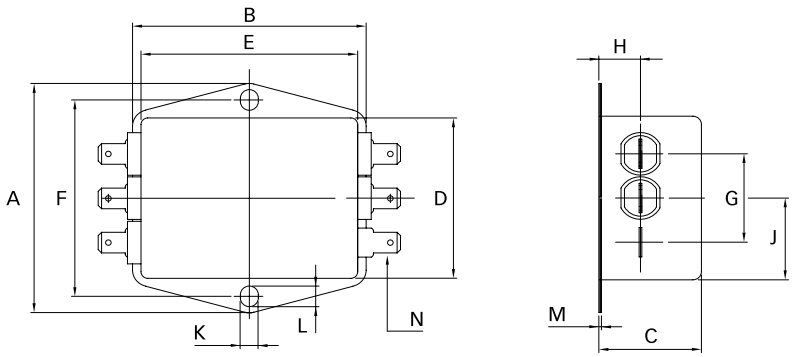
3 A types



6 and 10 A types



Mechanical data



Dimensions

	1 to 10 A	Tolerances
A	70	±0.5
B	69	±0.5
C	30.3	±1
D	50	±1
E	64.8	±1
F	60	±0.2
G	27	±0.5
H	12.3	±0.5
J	25	±0.5
K	5.3	
L	6.3	
M	0.7	
N	6.3 x 0.8	

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

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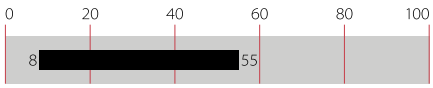
Compact EMC/RFI Filter for Motor Drives

- Compact filter solution for single-phase motor drive applications
- Industrial grade safety terminal blocks
- Designed to meet EN 55011/14/22
- Compliant with IEC 60950

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	1x 250 VAC
Operating frequency	DC to 400 Hz
Rated currents	8 to 55 A @ 40°C max.
High potential test voltage	P –> E 2000 VAC for 2 sec P –> N 1100 VDC for 2 sec
Protection category	IP 20
Overload capability	4x rated current at switch on, 1.5x rated current for 1 minute, once per hour
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Flammability corresponding to	UL 94 V-2 or better
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
MTBF @ 40°C/230 V (Mil-HB-217F)	420,000 hours

Approvals

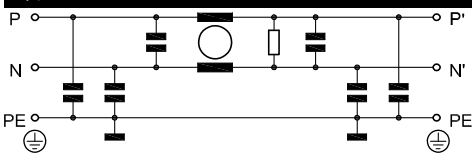
Features and benefits

- High component values optimized for common and differential-mode attenuation in the lower frequency range makes this filter ideal for a large variety of single-phase motor drive applications
- Supplied in a relatively small housing design with safety terminal blocks for fast and easy installation in primarily industrial environments
- FN 350 also meets IEC 60950 requirements, thus providing additional application flexibility

Typical applications

- Single-phase motor drives
- Automation equipment
- Power supplies, SMPS
- Office equipment
- Testing and measurements equipment

Typical electrical schematic



Filter selection table

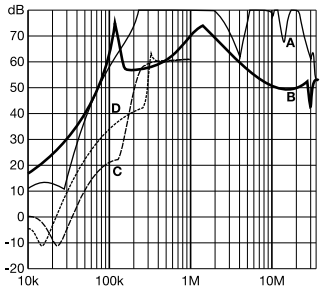
Filter	Rated current @ 40°C (25°C) [A]	Leakage current* @ 230 VAC/50 Hz [mA]	Power loss @ 25°C/50 Hz [W]	Input/Output connections		Weight [kg]
FN 350-8-29	8 (9.0)	4.9	5.2	-29		0.7
FN 350-12-29	12 (13.5)	4.9	5.7	-29		0.7
FN 350-20-29	20 (22.4)	4.9	6.1	-29		0.7
FN 350-30-33	30 (33.6)	5.4	6.1	-33		0.7
FN 350-55-..	55 (61.5)	11.0	9.9	-33	-24	1.2

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

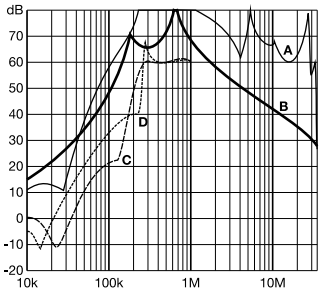
Typical filter attenuation

Per CISPR 17; A = 50 Ω/50 Ω sym; B = 50 Ω/50 Ω asym; C = 0.1 Ω/100 Ω sym; D = 100 Ω/0.1 Ω sym

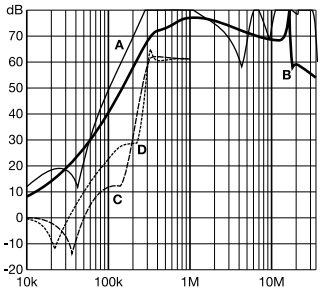
8 A types



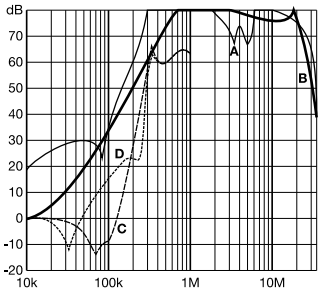
12 A types



20 and 30 A types

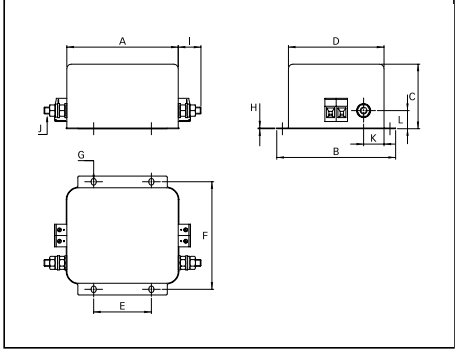


55 A types

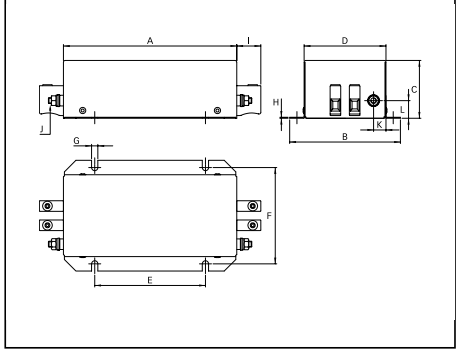


Mechanical data

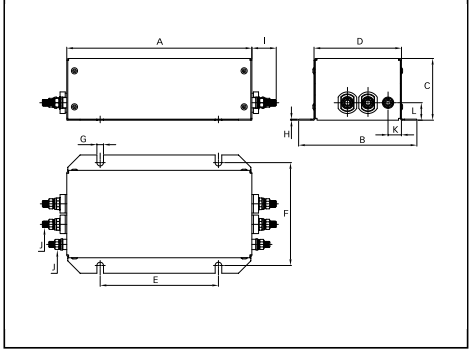
8 to 30 A types



55 A types (terminal -33)



55 A types (terminal -24)



Dimensions

	8 A	12 A	20 A	30 A	55 A (-33)	55 A (-24)
A	99.5	99.5	99.5	99.5	180	180
B	105	105	105	105	115	115
C	57	57	57	57.6	60	60
D	84.4	84.4	84.4	84.4	85	85
E	51	51	51	51	115	115
F	95	95	95	95	100	100
G	6 x 4.4	6 x 4.4	6 x 4.4	6 x 4.4	6.5	6.5
H	0.6	0.6	0.6	1.2	1	1
I	19.5	19.5	19.5	25	25	23.7
J	M6	M6	M6	M6	M6	M6
K	18	18	18	16	12.9	12.9
L	16	16	16	19	18.3	17

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Filter input/output connector cross sections

	-29	-33	-24 (M6)
Solid wire	6 mm^2	16 mm^2	
Flex wire	4 mm^2	10 mm^2	
AWG type wire	AWG 10	AWG 6	
Recommended torque	0.6-0.8 Nm	1.5-1.8 Nm	3.5-4.0 Nm

Please visit www.schaffner.com to find more details on filter connectors.

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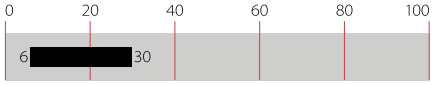
Multi-stage EMI Filter

- Rated currents from 6 to 30 A
- Surge pulse protection up to 2 kA
- Solder or screw connection

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	6 to 30 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec P –> N 350 VDC for 2 sec
Energy absorption	40J
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Flammability corresponding to	UL 94 V-2 or better
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
MTBF @ 40°C/230 V (Mil-HB-217F)	230,000 hours
Surge pulse protection	2 kV IEC 61000-4-5

Approvals

Features and benefits

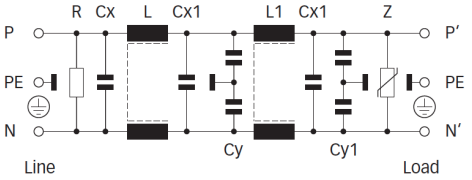
- FN 352 Z series is developed to meet high filter attenuation requirements by using multi-stage filter design
- Additional high surge pulse voltage protection up to 2 kA is integrated to protect sensitive equipment
- Choosing FN 352 Z product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances
- Standard filters are a practical solution helping you to pass EMI system approval in a short time
- Exceptional conducted attenuation performance, based on multi-stage design and chokes with high saturation resistance and excellent thermal behavior
- Various connection options
- Custom-specific versions on request

Typical applications

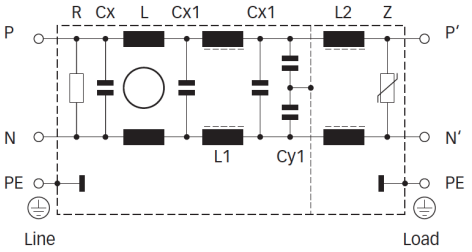
- Facility management
- Industrial
- Telecommunication
- Data processing
- Electrical and electronic equipment

Typical electrical schematic

6A types



10 to 30A types



Filter selection table

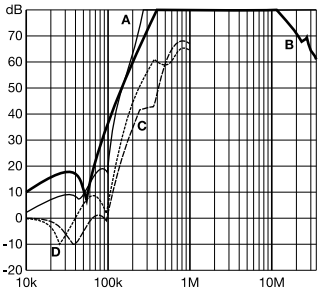
Filter	Rated current @ 40°C (25°C) [A]	Leakage current* @ 230 VAC/50 Hz [µA]	Inductance L [mH]	Inductance L1 [mH]	Inductance L2 [mH]	Capacitance Cx [nF]	Capacitance Cx1 [nF]	Capacitance Cy [nF]	Capacitance Cy1 [nF]	Resistance R [MΩ]	Energy absorption [J]	Input/Output connections		Weight [g]
FN 352 Z-6-06	6 (7.2)	420	3	3		470	220	3.3	1.5	0.47	40	-06		575
FN 352 Z-10-29	10 (12)	1300	5	0.06	0.003	220	220	15	15	0.47	40		-29	1320
FN 352 Z-20-29	20	1300	3.5	0.06	0.0035	220	220	15	15	0.47	40		-29	2950

* Maximum leakage under normal operating conditions.
Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

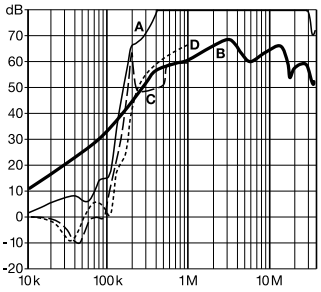
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

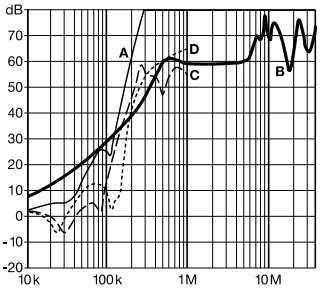
6 A types



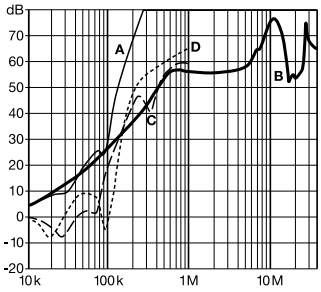
10 A types



20 A types

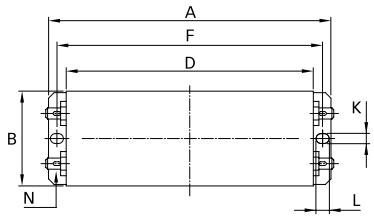


30 A types

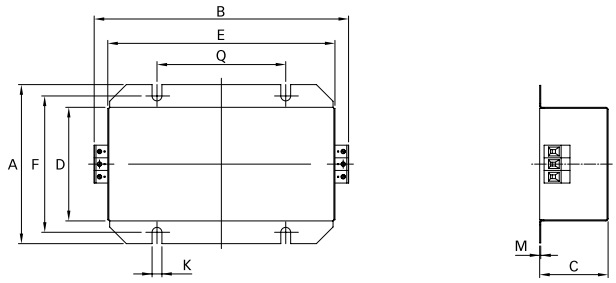


Mechanical data

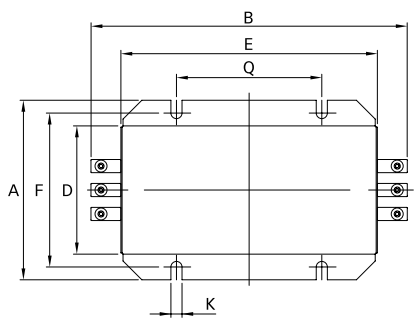
6 A types



10 and 20 A types



30 A types



Dimensions

	6 A	10 A	20 A	30 A	Tolerances
A	152	126	150	150	±0.5
B	51	172.3	221.8	250	±0.5
C	45	55.25	65	65	±0.5
D	133	100.5	119.5	119.5	±0.5
E		150.5	200	200	±0.5
F	143	112	135	135	±0.5
G	27				±0.5
H	9.5				±0.5
I	27				±0.5
J	12				±0.5
K	5.3	6.4	6.4	6.4	
L	7				
M	0.5				
N	6.3 x 0.8				
Q		85	115	115	±0.1

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Filter input/output connector cross sections

	-06 	-29 	-33 
Solid wire	n/a	6 mm^2	16 mm^2
Flex wire	n/a	4 mm^2	10 mm^2
AWG type wire	n/a	AWG 10	AWG 6
Recommended torque	n/a	0.6-0.8 Nm	1.5-1.8 Nm

Please visit www.schaffner.com to find more details on filter connectors.

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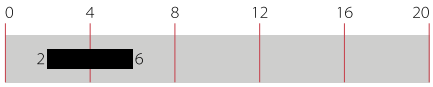
Versatile Filtered Power Entry Module

- Rated currents up to 6 A
- Single or dual-fuse holder
- Fuses Ø6.3 x 32 mm or Ø5 x 20 mm
- Voltage selector 100/120/230/240 V
- General purpose application
- Optional medical versions (B type)

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	250 V, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	2 to 6 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> N 760 VAC for 2 sec P –> PE 2500 VAC for 2 sec (B types)
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	550,000 hours
Voltage selector description	VOL-SE 4SP-4
Function	Series/parallel
Voltage marking	
1st	100
2nd	120
3rd	230
4th	240
Closed internal contact corresponding to	
1st	a, c, e
3st	a, d
4st	b, d
2st	b, c, e

* Other selected voltage marking on request.

Approvals

Features and benefits

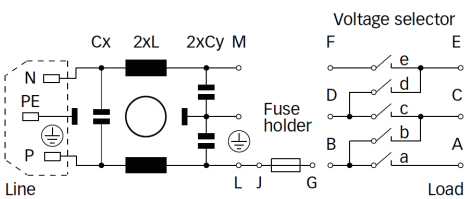
- Good conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear/front or snap-in mounting
- Single or dual-fuse holder
- USA Ø6.3 x 32 mm or EU Ø5 x 20 mm fuses
- Two attenuation performance ranges
- Voltage selector 100/120/230/240 V
- Custom-specific versions are available on request

Typical applications

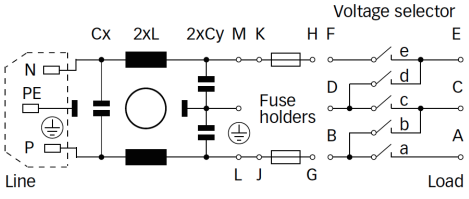
- Portable electrical and electronic equipment
- Consumer goods
- EDP and office equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Medical equipment

Typical electrical schematic

FN 370



FN 372 / FN 378 / FN 379



Filter selection table

Filter*	Rated current @ 40°C (25°C) [A]	Leakage current** @ 230 VAC/50 Hz [µA]	Inductance L [mH]	Capacitance Cx [nF]	Capacitance Cy [nF]	Resistance R [kΩ]	Output connections	Fuses*** [Qty]	Weight [g]
FN 370-2-2 z	2 (2.4)	373	0.70	47	2.2		13	1	55
FN 370-4-2 z	4 (4.8)	373	0.30	47	2.2		13	1	55
FN 370-6-2 z	6 (7.2)	373	0.18	47	2.2		13	1	55
FN 372-2-2 z	2 (2.4)	373	0.70	47	2.2		13	2	55
FN 372-4-2 z	4 (4.8)	373	0.30	47	2.2		13	2	55
FN 372-6-2 z	6 (7.2)	373	0.18	47	2.2		13	2	55
FN 378-2-2 z	2 (2.4)	373	0.70	47	2.2		13	2	60
FN 378-4-2 z	4 (4.8)	373	0.30	47	2.2		13	2	60
FN 378-6-2 z	6 (7.2)	373	0.18	47	2.2		13	2	60
FN 379-2-2 z	2 (2.4)	373	2.00	47	2.2		13	2	70
FN 379-4-2 z	4 (4.8)	373	0.80	47	2.2		13	2	70
FN 379-6-2 z	6 (7.2)	373	0.50	47	2.2		13	2	70
FN 379 B-2-2 z	2 (2.4)	2	2.00	47		1000	13	2	70
FN 379 B-4-2 z	4 (4.8)	2	0.80	47		1000	13	2	70
FN 379 B-6-2 z	6 (7.2)	2	0.50	47		1000	13	2	70

* Select the requested fuse holder for fuse EUR-1 or USA-1 (z).
** Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
*** Filters are delivered without fuse.

Product selector

FN 37xx-y-zz

- 1: Fuse Ø5 x 20mm (FUSE-H EUR-1)
- 2: Fuse Ø6.3 x 32mm (FUSE-H USA-1)

- 2: Voltage selector, series / parallel 100/120/230/240V

- 2 to 6: Rated current

- Blank: Standard version
- B: Medical version (with bleed resistor and without Y2-capacitor)

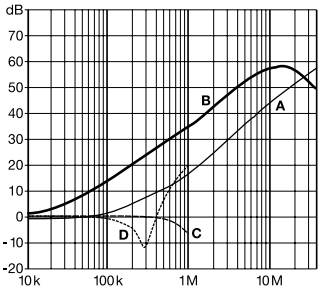
- 0: Snap-in version, single-fuse, standard performance
- 2: Snap-in version, dual-fuse, standard performance
- 8: Flange mounting version, dual-fuse, standard performance
- 9: Flange mounting version, dual-fuse, high performance

For example: FN 370-6-21, FN 378-4-22, FN 379 B-2-22

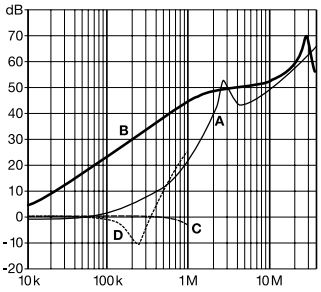
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

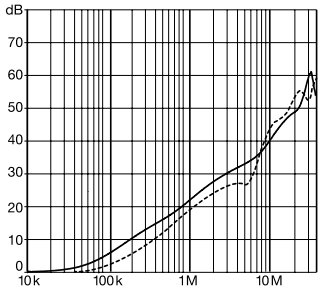
FN 370/FN 372/FN 378



FN 379

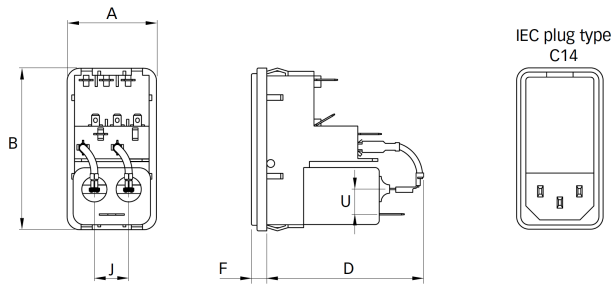


6A Types only

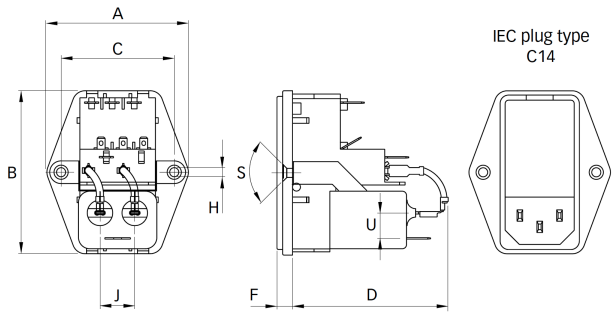


Mechanical data

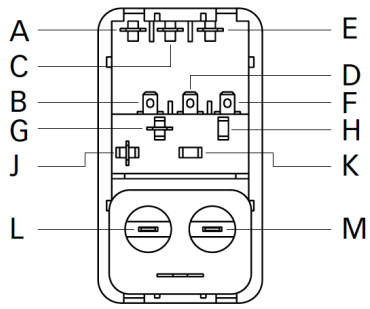
FN 370/FN 372



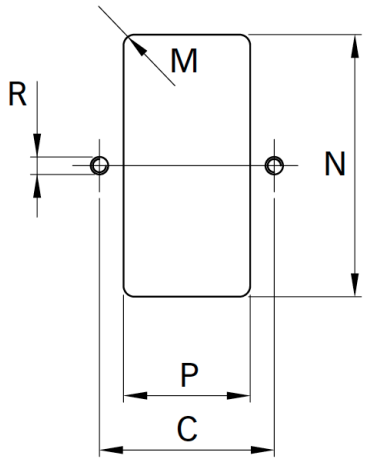
FN 378/FN 379



Connection designation



Panel cut out



Dimensions

	FN 370	FN 372	FN 378	FN 379	Tolerances
A	32	32	50	50	±0.3
B	58	58	58	58	±0.3
C			40	40	±0.1
D	54	54	54	64.5	
F	5.5	5.5	5.5	5.5	
H			Ø3.3	Ø3.3	
J	12.5	12.5	12.5	12.5	
M	R ≤2	R ≤2	R ≤2	R ≤2	±0.1
N	55.9*/56.2**	55.9*/56.2**	55.9*/56.2**	55.9*/56.2**	+0.2/-0
P	28.5	28.5	28.5	28.5	+0.2/-0
R			M3	M3	
S			90°	90°	
U	9	9	9	9	

* For a panel thickness between 0.8 and 3 mm
** For a back panel thickness between 2.1 and 3.2 mm

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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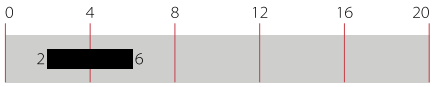
Versatile Filtered Power Entry Module

- Rated currents up to 6 A
- Single or dual-fuse holder
- Fuses Ø6.3 x 32 mm Ø5 x 20 mm
- 2-pole rocker switch
- General purpose application
- Optional medical versions (B type)

Performance indicators

Attenuation performance

Rated current [A]



Approvals

The FN 380 power entry module combines an IEC inlet, a mains filter with a single or dual fuse holder and a 2-pole rocker switch. Choosing FN 380 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on amperage ratings, fuse options, mounting possibilities and filters for medical applications are designed to offer you the desired solution.

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz 50 to 400 Hz
Rated currents	2 to 6 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 760 VAC for 2 sec
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	550,000 hours
Function	2-pole, dark not illuminated Marking I - 0
Electrical specifications	Inrush current 51 A 10,000 on-off operations according to ENEC 6,000 on-off operations according to UL 1054, TV 5
Mechanical life	50,000 cycles
Switch ratings	
Europe (ENEC)	6 A (4 A), 250 VAC*
USA (UL)	6 A, 125 VAC; 4 A, 250 VAC; 1/10 HP
Canada (CSA)	6 A, 125 VAC; 4 A, 250 VAC; 1/10 HP

* Value in () relates to the inductive current charge: cos φ=0.65

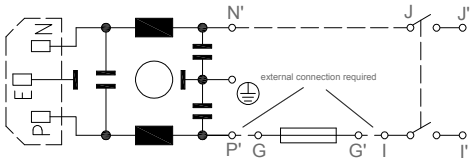
Features and benefits

- Good conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Front or snap-in mounting
- Single or dual-fuse holder
- USA Ø6.3 x 32 mm or EU Ø5 x 20 mm fuses
- 2-pole rocker switch

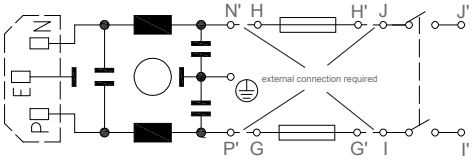
Typical applications

- Portable electrical and electronic equipment
- Consumer goods
- EDP and office equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Medical equipment

Typical electrical schematic (single fuse)



Typical electrical schematic (dual fuse)



Filter selection table

Filter*	Rated current @ 40°C (25°C) [A]	Leakage current** @ 230 VAC/50 Hz [µA]	Inductance*** L [mH]	Capacitance*** Cx [nF]	Capacitance*** Cy [nF]	Resistance*** R [kΩ]	Fuses**** [Qty]	Weight [g]
FN 380-2-2 z	2 (2.4)	373	0.70	47	2.2		1	55
FN 380-4-2 z	4 (4.8)	373	0.30	47	2.2		1	55
FN 380-6-2 z	6 (7.2)	373	0.18	47	2.2		1	55
FN 382-2-2 z	2 (2.4)	373	0.70	47	2.2		2	55
FN 382-4-2 z	4 (4.8)	373	0.30	47	2.2		2	55
FN 382-6-2 z	6 (7.2)	373	0.18	47	2.2		2	55
FN 388-2-2 z	2 (2.4)	373	0.70	47	2.2		2	60
FN 388-4-2 z	4 (4.8)	373	0.30	47	2.2		2	60
FN 388-6-2 z	6 (7.2)	373	0.18	47	2.2		2	60
FN 389-2-2 z	2 (2.4)	373	2.00	47	2.2		2	70
FN 389-4-2 z	4 (4.8)	373	0.80	47	2.2		2	70
FN 389-6-2 z	6 (7.2)	373	0.50	47	2.2		2	70
FN 382 B-2-2 z	2 (2.4)	2	0.70	47		1000	2	55
FN 382 B-4-2 z	4 (4.8)	2	0.30	47		1000	2	55
FN 382 B-6-2 z	6 (7.2)	2	0.18	47		1000	2	55
FN 385 B-2-2 z	2 (2.4)	2	2.00	47		1000	2	65
FN 385 B-4-2 z	4 (4.8)	2	0.80	47		1000	2	65
FN 385 B-6-2 z	6 (7.2)	2	0.50	47		1000	2	65
FN 389 B-2-2 z	2 (2.4)	2	2.00	47		1000	2	70
FN 389 B-4-2 z	4 (4.8)	2	0.80	47		1000	2	70
FN 389 B-6-2 z	6 (7.2)	2	0.50	47		1000	2	70

* Select the requested fuse holder for fuse EUR-1 or USA-1 (z).
** Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
*** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%
**** Filters are delivered without fuse.

Product selector

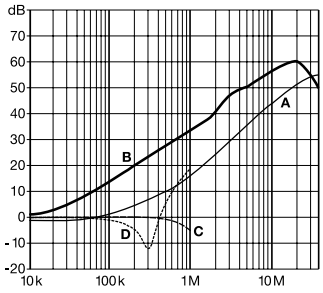
FN 38xx-y-zz

1:	Fuse Ø5 x 20mm (FUSE-H EUR-1)
2:	Fuse Ø6.3 x 32mm (FUSE-H USA-1)
2:	Rocker switch, 2-pole, dark not illuminated
2 to 6:	Rated current
Blank:	Standard version
B:	Medical version (with bleed resistor and without Y2-capacitor)
0:	Snap-in version, single-fuse, standard performance
2:	Snap-in version, dual-fuse, standard performance
5:	Snap-in version, dual-fuse, high performance
8:	Flange mounting version, dual-fuse, standard performance
9:	Flange mounting version, dual-fuse, high performance

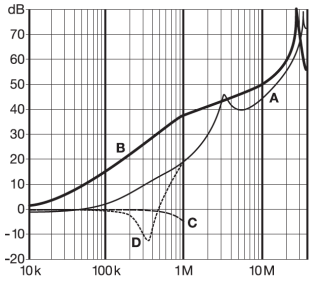
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

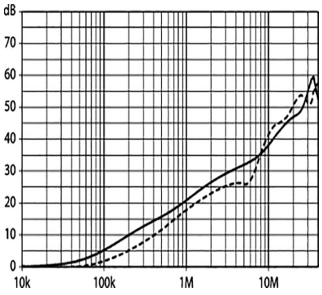
FN 380/FN 382/FN 388



FN 385/FN 389

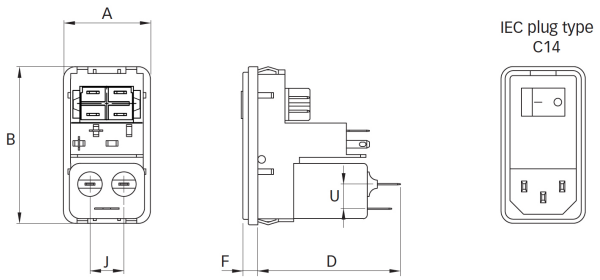


6A type only

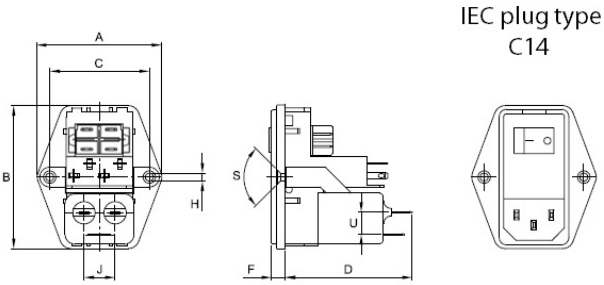


Mechanical data

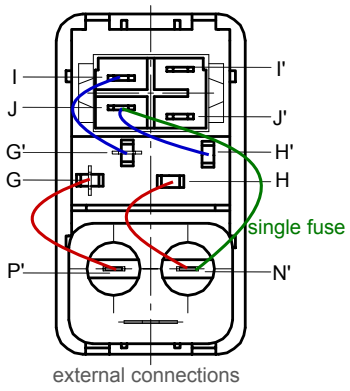
FN 380/FN 382/FN 385



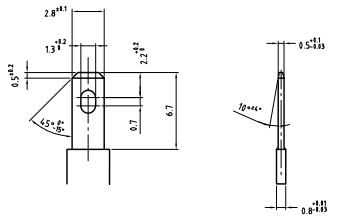
FN 388/FN 389



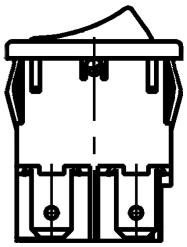
Connection designation



Output terminal (Filter and Fuse)

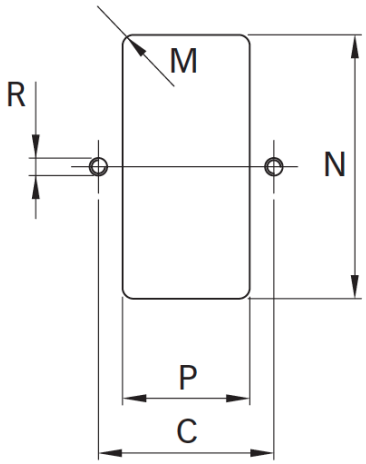


Output terminal (Switch)



Blade terminals of switch acc. DIN 46 244-A4.8-0.8 (do not connect by soldering)

Panel cut out



Dimensions

	FN 380	FN 382	FN 385	FN 388	FN 389	Tolerances
A	32	32	32	50	50	±0.3
B	58	58	58	58	58	±0.3
C				40	40	±0.1
D	51	51	61	51	61	
F	5.5	5.5	5.5	5.5	5.5	
H				Ø3.3	Ø3.3	
J	12.5	12.5	12.5	12.5	12.5	
M	R ≤2	R ≤2	R ≤2	R ≤2	R ≤2	±0.1
N	55.9*/56.2**	55.9*/56.2**	55.9*/56.2**	55.9*/56.2**	55.9*/56.2**	+0.2/-0
P	28.5	28.5	28.5	28.5	28.5	+0.2/-0
R				M3	M3	
S				90°	90°	
U	9	9	9	9	9	

* For a back panel thickness between 0.8 and 2.0 mm
** For a back panel thickness between 2.1 and 3.2 mm

All dimensions in mm; 1 inch=25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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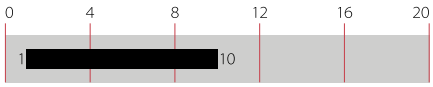
Versatile Filtered Power Entry Module

- Rated currents up to 10 A
- For one or two fuses
- Fuses Ø6.3 x 32 mm or Ø5 x 20 mm
- 2-pole rocker switch
- Voltage selector
- Optional earth line choke (E type)

Performance indicators

Attenuation performance

Rated current [A]



Approvals

The FN 390 power entry module combines an IEC inlet, mains filter with single or dual-fuse holder, voltage selector and 2-pole rocker switch. Choosing FN 390 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. Multiple options designed to offer you the desired solution.

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 10 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec P –> N 760 VAC for 2 sec
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	2,200,000 hours
Voltage selector description	
Function	Series/parallel
Voltage marking	
Series	110-120 V
Parallel	220-240 V
Rocker switch description	
Function	2-pole, dark not illuminated Marking I - 0
Electrical specifications	Inrush current 51 A 6,000 on-off operations according to UL 1054, TV 5 10,000 on-off operations according to ENEC
Mechanical life	50,000 cycles
Switch ratings	
USA (UL) and Canada (C-UL)	10 A, 125 VAC; 10 A, 250 VAC; 1/3 HP
Europe (ENEC)	10 A (4 A), 250 VAC*

* Value in () relates to the inductive current charge: cos φ=0.65

Features and benefits

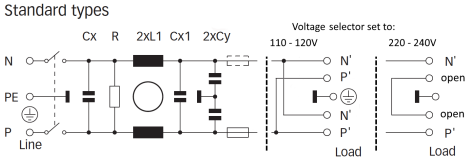
- High conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear or front mounting
- Single or dual-fuse holder
- USA Ø6.3 x 32 mm or EU Ø5 x 20 mm fuses
- 2-pole rocker switch
- Voltage selector 110-120 V/220-240 V
- Custom-specific versions are available on request

Typical applications

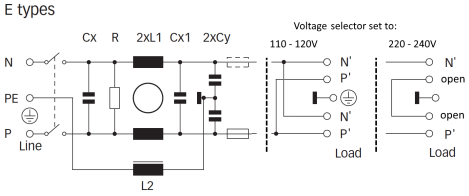
- Portable electrical and electronic equipment
- Consumer goods
- EDP and office equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment

Typical electrical schematic

Standard types



E types



Filter selection table

Filter	Rated current @ 40°C (25°C)	Leakage current* @ 230 VAC/50 Hz	Inductance		Capacitance			Resistance	Output connections	Fuses**	Weight
			L1	L2	Cx	Cx1	Cy	R			
	[A]	[µA]	[mH]	[mH]	[nF]	[nF]	[nF]	[kΩ]		[Qty]	[g]
FN 393-1-05-11	1 (1.2)	560	7.5		220		3.3	1000	05-11	1	200
FN 393-2.5-05-11	2.5 (3)	560	2		220		3.3	1000	05-11	1	200
FN 393-6-05-11	6 (7.2)	560	0.45		220		3.3	1000	05-11	1	200
FN 394-1-05-11	1 (1.2)	560	7.5		220		3.3	1000	05-11	2	200
FN 394-2.5-05-11	2.5 (3)	560	2		220		3.3	1000	05-11	2	200
FN 394-6-05-11	6 (7.2)	560	0.45		220		3.3	1000	05-11	2	200
FN 393 E-1-05-11	1 (1.2)	560	7.5	0.4	220		3.3	1000	05-11	1	205
FN 393 E-2.5-05-11	2.5 (3)	560	2	0.4	220		3.3	1000	05-11	1	205
FN 393 E-6-05-11	6 (7.2)	560	0.45	0.4	220		3.3	1000	05-11	1	205
FN 394 E-1-05-11	1 (1.2)	560	7.5	0.4	220		3.3	1000	05-11	2	205
FN 394 E-2.5-05-11	2.5 (3)	560	2	0.4	220		3.3	1000	05-11	2	205
FN 394 E-6-05-11	6 (7.2)	560	0.45	0.4	220		3.3	1000	05-11	2	205
FN 1393-1-05-11	1 (1.2)	797	16		220	100	4.7	470	05-11	1	210
FN 1393-2.5-05-11	2.5 (3)	797	8		220	100	4.7	470	05-11	1	210
FN 1393-6-05-11	6 (7.2)	797	2.5		220	100	4.7	470	05-11	1	210
FN 1393-10-05-11	10 (12)	797	0.6		220	100	4.7	470	05-11	1	210
FN 1394-1-05-11	1 (1.2)	797	16		220	100	4.7	470	05-11	2	210
FN 1394-2.5-05-11	2.5 (3)	797	8		220	100	4.7	470	05-11	2	210
FN 1394-6-05-11	6 (7.2)	797	2.5		220	100	4.7	470	05-11	2	210
FN 1394-10-05-11	10 (12)	797	0.6		220	100	4.7	470	05-11	2	210

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Filters are delivered without fuse.
Note: for medical versions please contact your local partner within Schaffner's global network.

Product selector

FN (1)39xx-y-zz

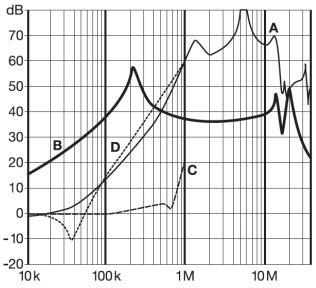
05-11:	Faston 6.3 x 0.8mm
1 to 10:	Rated current
Blank:	Standard version
E:	Optional earth line choke
3:	1 fuse (Ø5 x 20mm or Ø6.3 x 32mm)
4:	2 fuses (Ø5 x 20mm or Ø6.3 x 32mm)
Blank:	Standard version
1:	Additional Cx1 capacitor and higher inductivity

For example: FN 393-1-05-11, FN 394 E-2.5-05-11, FN 1394-10-05-11

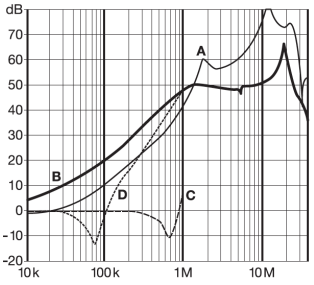
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

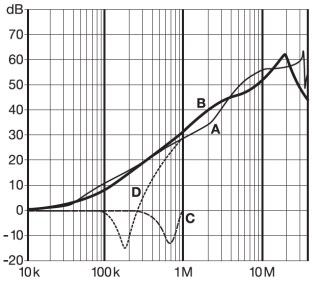
FN 39x: 1 A types



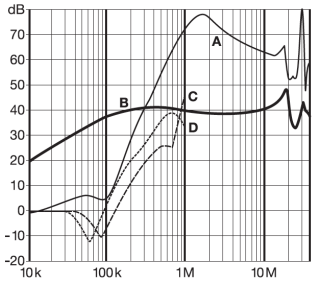
FN 39x: 2.5 A types



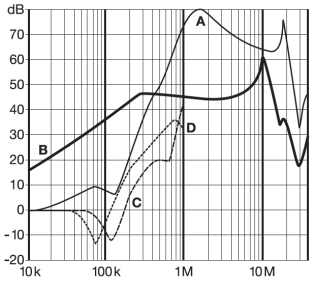
FN 39x: 6 A types



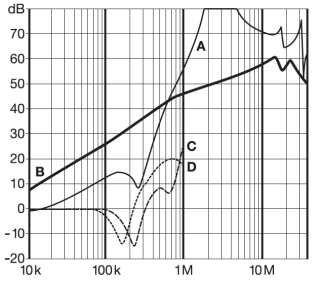
FN 139x: 1 A types



FN 139x: 2.5 A types

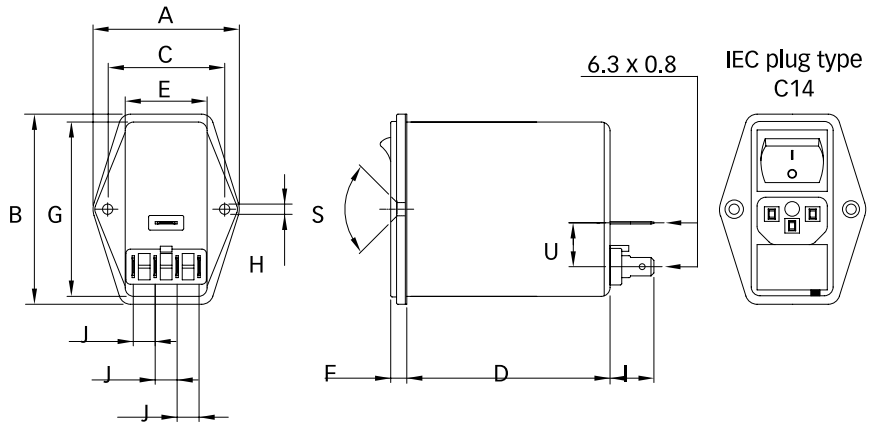


FN 139x: 6 and 10 A types

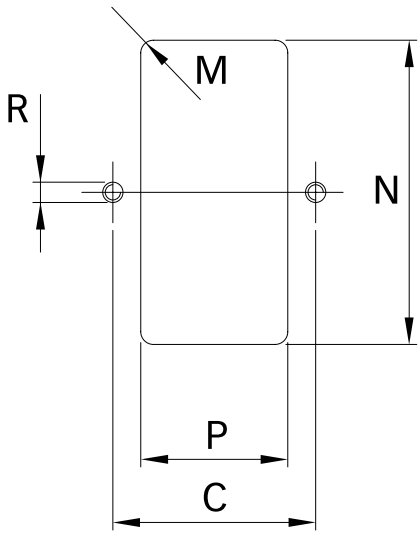


Mechanical data

1 to 10 A types



Panel cut out



Dimensions

	1 to 10 A	Tolerances
A	50	±0.3
B	65	±0.3
C	40	±0.1
D	70	±0.5
E	28.5	±0.3
F	5.5	±0.3
G	59.8	±0.2
H	Ø 3.3	
I	13.5	±0.5
J	7.5	
M	R ≤ 2.5	
N	60	+0.5/-0
P	29	+0.5/-0
R	M3	
S	90°	
U	15	±0.3

All dimensions in mm; 1 inch=25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connections.

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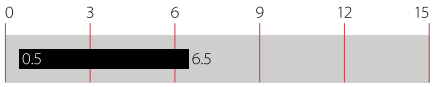
Low Cost PCB Filter

- Rated currents from 0.5 to 6.5 A
- Compact PCB-mountable design
- Very low profile
- Optional medical versions (B type)

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	0.5 to 6.5 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> N 760 VAC for 2 sec P –> PE 2500 VAC for 2 sec (B types)
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-0 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	1,900,000 hours

Approvals

The FN 402 PCB filter is a single-phase filter designed for easy and fast PCB-mounting. Choosing the FN 402 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptance. Standard PCB single-phase filters are a practical solution helping you to pass EMI system approval in a short time. A selection on amperage ratings and medical types are designed to offer you the desired standard product.

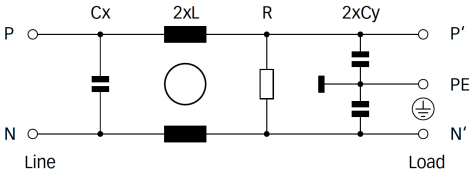
Features and benefits

- Good conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- PCB through hole mounting
- Low cost low profile
- Custom specific versions on request

Typical applications

- Electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Medical equipment

Typical electrical schematic



Filter selection table

Filter	Rated current @ 40°C (25°C)	Leakage current* @ 230 VAC/50 Hz	Inductance**	Capacitance**		Resistance**	Input/Output connections	Weight
			L	Cx	Cy	R	⊥	
	[A]	[µA]	[mH]	[nF]	[nF]	[kΩ]		[g]
FN 402-0.5-02	0.5 (0.6)	373	40	100	2.2	1000	-02	40
FN 402-1-02	1 (1.2)	373	10	100	2.2	1000	-02	40
FN 402-1.6-02	1.6 (1.9)	373	6	100	2.2	1000	-02	40
FN 402-2.5-02	2.5 (3)	373	2	100	2.2	1000	-02	40
FN 402-4-02	4 (4.7)	373	1	100	2.2	1000	-02	40
FN 402-6.5-02	6.5 (7.5)	373	1	100	2.2	1000	-02	40
FN 402 B-0.5-02	0.5 (0.6)	2	40	100		1000	-02	40
FN 402 B-1-02	1 (1.2)	2	10	100		1000	-02	40
FN 402 B-1.6-02	1.6 (1.9)	2	6	100		1000	-02	40
FN 402 B-2.5-02	2.5 (3)	2	2	100		1000	-02	40
FN 402 B-4-02	4 (4.7)	2	1	100		1000	-02	40
FN 402 B-6.5-02	6.5 (7.5)	2	1	100		1000	-02	40

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

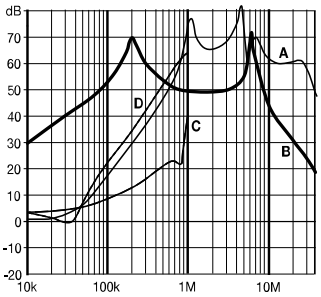
Product selector

FN 402x-yy-..

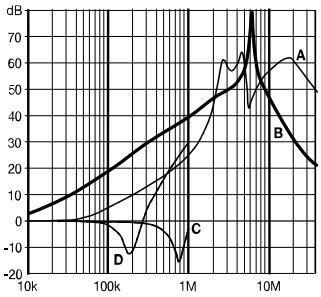
- 02: PCB through hole mounting
- 0.5 to 6.5: Rated current
- Blank: Standard version
- B: Medical version (without Y2-capacitor)

For example: FN 402-0.5-02, FN 402 B-6.5-02

0.5 to 1.6 A types

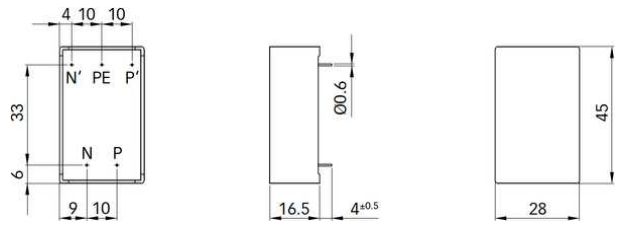


2.5 to 6.5 A types

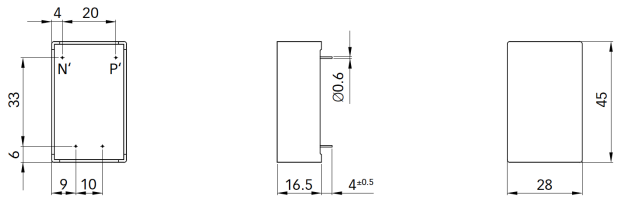


Mechanical data

FN 402



FN 402 B



All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

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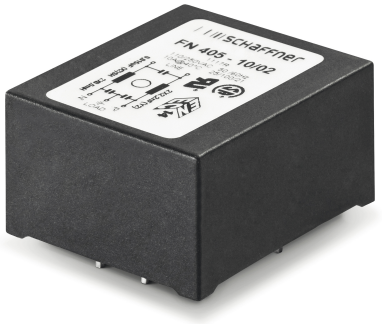
PCB-mounting filter

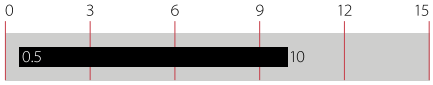


- Rated currents from 0.5 to 10 A
- Compact PCB-mountable design
- Low profile

Performance indicators

Attenuation performance

Rated current [A]



Approvals

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	0.5 to 10 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec P –> N 760 VAC for 2 sec
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-0
MTBF @ 40°C/230 V (Mil-HB-217F)	1,600,000 hours

The FN 405 PCB filter is a single-phase filter designed for easy and fast PCB-mounting. Choosing the FN 405 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptance. Standard PCB single-phase filters are a practical solution helping you to pass EMI system approval in a short time. A selection on amperage ratings are designed to offer you the desired standard product.

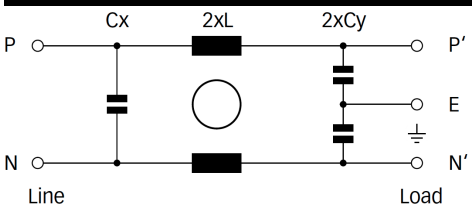
Features and benefits

- Good conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- PCB through hole mounting
- Low profile
- Custom specific versions on request

Typical applications

- Electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment

Typical electrical schematic



Filter selection table

Filter	Rated current @ 40°C (25°C)	Leakage current* @ 230 VAC/50 Hz	Inductance** L	Capacitance** Cx	Capacitance** Cy	Resistance R	Input/Output connections	Weight
	[A]	[µA]	[mH]	[nF]	[nF]		⊥	[g]
FN 405-0.5-02	0.5 (0.6)	373	24	15	2.2		-02	40
FN 405-1-02	1 (1.2)	373	10	15	2.2		-02	40
FN 405-3-02	3 (3.6)	373	2	15	2.2		-02	40
FN 405-6-02	6 (6.9)	373	0.8	15	2.2		-02	40
FN 405-10-02	10 (11.5)	373	0.5	15	2.2		-02	40

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

Product selector

FN 405-yy-..

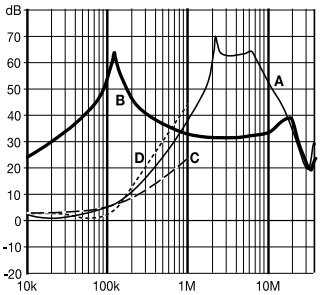
- 02: PCB through hole mounting
- 0.5 to 10: Rated current

For example: FN 405-0.5-02, FN 405-10-02

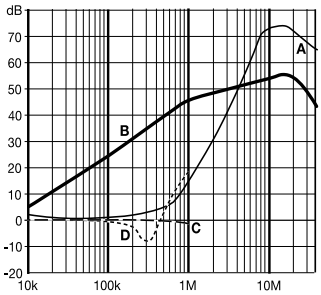
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

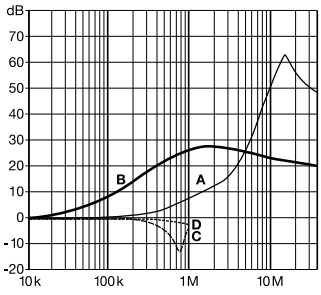
0.5 and 1 A types



3 and 6 A types

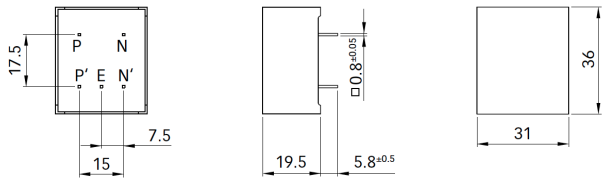


10 A types



Mechanical data

FN 405



All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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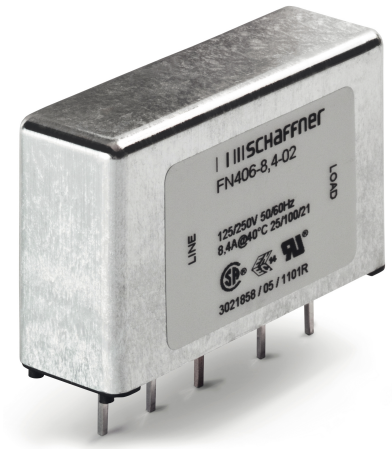
Ultra Compact EMC Filter

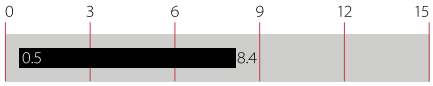


- Rated currents from 0.5 to 8.4 A
- Aluminium case
- Very compact PCB-mountable design
- Low profile
- Optional medical versions (B type)

Performance indicators

Attenuation performance

Rated current [A]



Approvals

The FN 406 PCB filter is a single-phase filter designed for easy, fast and compact PCB- mounting. Choosing the FN 406 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptance. Standard PCB single-phase filters are a practical solution helping you to pass EMI system approval in a short time. A selection on amperage ratings and medical types are designed to offer you the desired standard product.

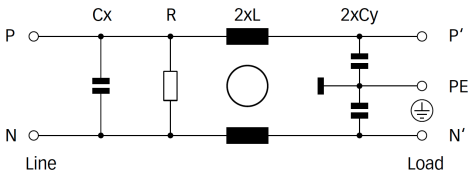
Features and benefits

- Good conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior.
- PCB through hole mounting.
- Low profile.
- Custom specific versions on request.

Typical applications

- Electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Medical equipment

Typical electrical schematic



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	0.5 to 8.4 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> N 760 VAC for 2 sec P –> PE 2500 VAC for 2 sec (B types)
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-0
MTBF @ 40°C/230 V (Mil-HB-217F)	1,900,000 hours

Filter selection table

Filter	Rated current @ 40 °C (25 °C)	Leakage current* @ 230 VAC/50 Hz	Inductance**	Capacitance**		Resistance**	Input/Output connections	Weight
			L	Cx	Cy	R	⊥	
	[A]	[µA]	[mH]	[nF]	[nF]	[kΩ]		[g]
FN 406-0.5-02	0.5 (0.6)	373	24	100	2.2	1000	-02	36
FN 406-1-02	1 (1.2)	373	12	100	2.2	1000	-02	36
FN 406-3-02	3 (3.6)	373	2.5	100	2.2	1000	-02	36
FN 406-6-02	6 (6.9)	373	0.78	100	2.2	1000	-02	36
FN 406-8.4-02	8.4 (9.6)	373	0.3	100	2.2	1000	-02	36
FN 406 B-0.5-02	0.5 (0.6)	2	24	100		1000	-02	36
FN 406 B-1-02	1 (1.2)	2	12	100		1000	-02	36
FN 406 B-3-02	3 (3.6)	2	2.5	100		1000	-02	36
FN 406 B-6-02	6 (6.9)	2	0.78	100		1000	-02	36
FN 406 B-8.4-02	8.4 (9.6)	2	0.3	100		1000	-02	36

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

Product selector

FN 406x-yy-..

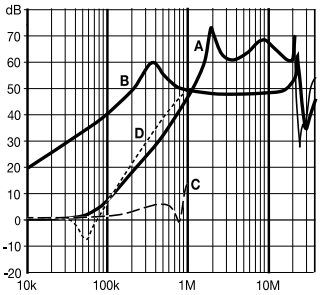
- 02: PCB through hole mounting
- 0.5 to 8.4: Rated current
- Blank: Standard version
- B: Medical version (without Y2-capacitor)

For example: FN 406-0.5-02, FN 406 B-8.4-02

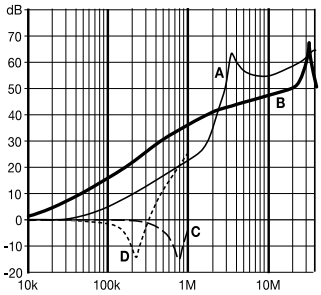
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

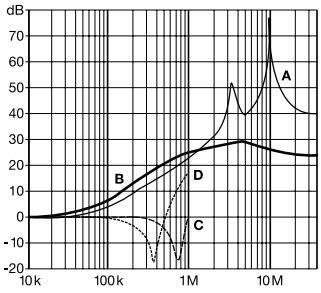
0.5 to 3 A types



6 A types

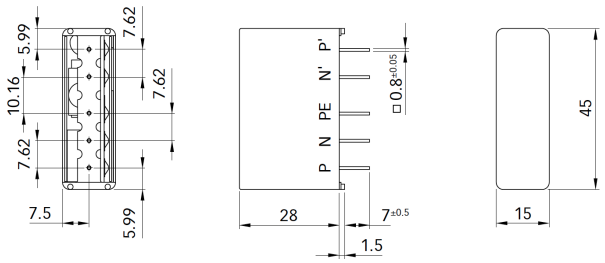


8.4 A types



Mechanical data

FN 406



All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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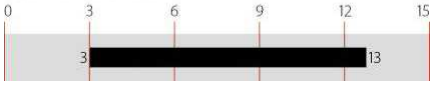
75 VDC Input PCB Filter

- Rated currents from 3 to 13 A, 75 VDC
- Very compact PCB-mounting design
- Exceptional attenuation performance
- High frequency noise compression

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	75 V
Rated currents	3 to 13 A
High potential test voltage	VI1/VI2 –> GND 1500 VDC for 2 sec VI1 –> VI2 100 VDC for 2 sec
Temperature range (operation and storage)	-40 °C to +100 °C (40/100/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-0
MTBF @ 40°C/230 V (Mil-HB-217F)	4,450,000 hours
Rated currents	3 to 13 A @50°C (480 V filters)

Approvals

RoHS

FN 409 PCB filters are designed to surpress common and differential-mode noise on DC voltage lines. The suppression performance is special designed to fulfill the requirements for high frequency switching DC/DC converter modules. FN 409 filters can also be used to filter the output current of switch-mode power supplies in applications with intelligent power distribution.

Features and benefits

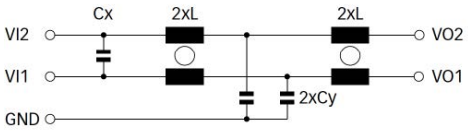
- High common and differential-mode noise suppression
- Rated currents up to 13 A at 75 VDC
- Small form factor
- Good thermal conductance

Typical applications

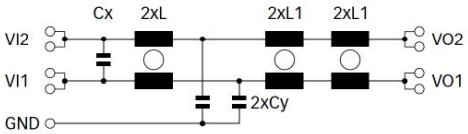
- Input or output filter for high frequency DC/DC converters
- DC output filter for switch-mode power supplies
- Computer and office automation equipment
- Telecom equipment
- Input/output filter within DC power distribution networks

Typical electrical schematic

3 and 6.5A types



13A types



Filter selection table

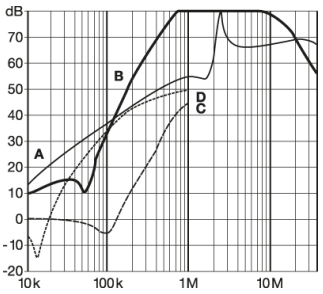
Filter	Rated current @ 50 °C (40 °C)	Inductance* L	Inductance* L1	Capacitance* Cx	Capacitance* Cy	DC Resistance* R @ 25 °C per path	Input/Output connections	Weight
	[A]	[mH]	[mH]	[nF]	[nF]	[mΩ]	⊥	[g]
FN 409-3-02	3 (3.2)	2.9		4700	4.7	86	-02	30
FN 409-6.5-02	6.5 (7)	0.5		4700	4.7	18	-02	30
FN 409-13-02	13 (14)	0.08	0.18	4700	4.7	7.8	-02	47

* Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

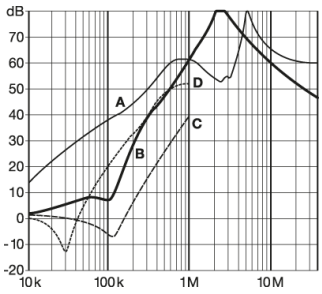
Typical filter attenuation

Per CISPR 17; A = 50 Ω/50 Ω sym; B = 50 Ω/50 Ω asym; C = 0.1 Ω/100 Ω sym; D = 100 Ω/0.1 Ω sym

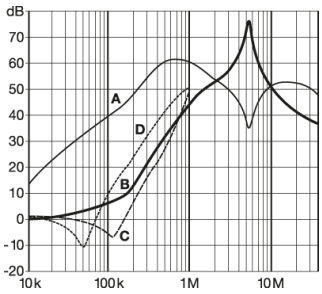
3 A types



6.5 A types

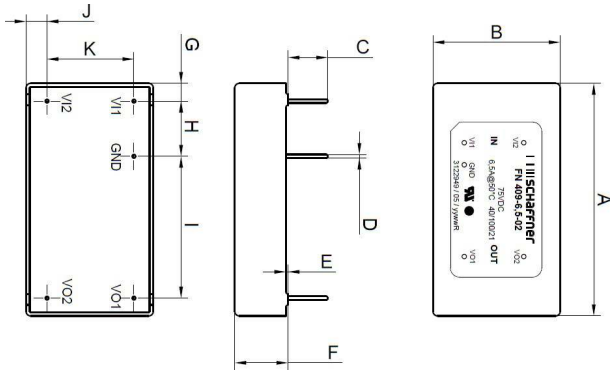


13 A types

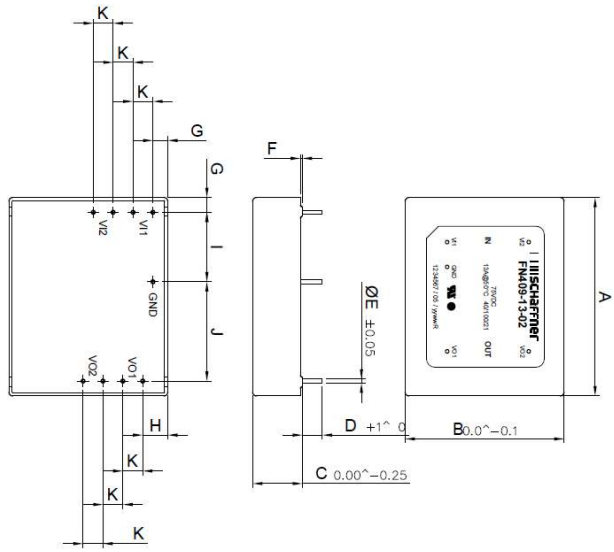


Mechanical data

3 and 6.5 A types



13 A types



All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m / EN 22768-m

Dimensions

	3 A	6.5 A	13 A
A	51	51	50.8
B	27.9	27.9	40.6
C	8.2	8.2	12.7
D	Ø0.8	Ø0.8	5.1
E	0.5	0.5	Ø1
F	11.7	11.7	0.5
G	3.9	3.9	3.8
H	12.1	12.1	6.4
I	31.1	31.1	17.8
J	4.6	4.6	25.4
K	19.05	19.05	5.08

Application

The filters are intended to be used in DC applications per EN/IEC 60950, where no transient on the DC bus occurs. To protect the filter against transient voltages a varistor (VDR, fig. 1) or a transient diode (fig. 2) must be placed at the input side of the filter module.

For protection against overcurrent place a fuse on each input lead (VI+, VI-). When AC voltage is superimposed on DC voltage, VP-P or VO-P, whichever is larger, should be maintained within the rated voltage range.

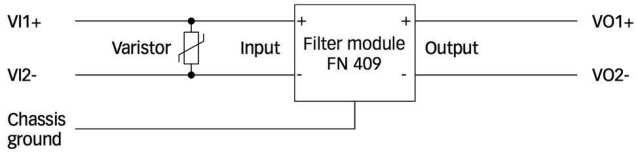


Figure 1: transient protection with a varistor

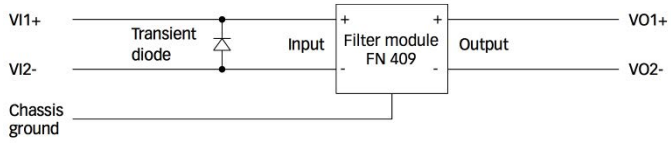
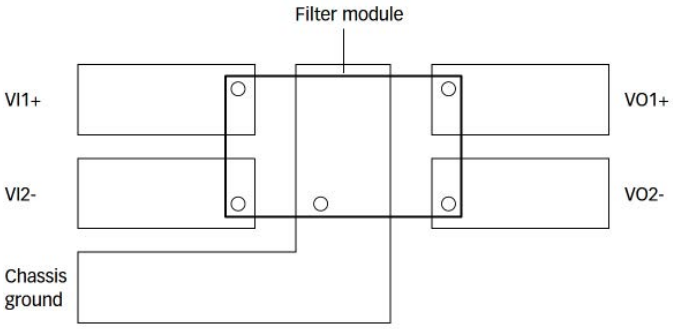


Figure 2: transient protection with a transient diode

Recommended layout



Note: avoid routing signal tracks or planes under the filter module

Please visit www.schaffner.com to find more details on filter connectors.

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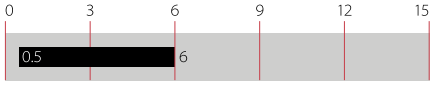
High Performance Two-stage PCB-mounting EMC Filter

- Rated currents from 0.5 to 6 A
- High attenuation two-stage design
- PCB-mountable design

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	0.5 to 6 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec P –> N 760 VAC for 2 sec
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	675,000 hours

Approvals

The FN 410 PCB filter is a single-phase, two-stage filter designed for easy and fast PCB-mounting. Choosing the FN 410 product line brings you the rapid availability of a standard high performance filter associated with the necessary safety acceptance. Standard PCB single-phase filters are a practical solution helping you to pass EMI system approval in a short time. A selection on amperage ratings are designed to offer you the desired standard product.

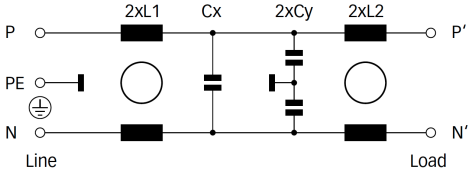
Features and benefits

- Very good conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Two-stage single-phase design
- PCB through hole mounting
- Custom specific versions on request

Typical applications

- Electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment

Typical electrical schematic



Filter selection table

Filter*	Rated current @ 40°C (25°C)	Leakage current* @ 230 VAC/50 Hz	Inductance**		Capacitance**		Resistance**	Input/Output connections	Weight
			L1	L2	Cx	Cy	R	⊥	
	[A]	[µA]	[mH]	[mH]	[nF]	[nF]	[kΩ]		[g]
FN 410-0.5-02	0.5 (0.6)	373	24	24	33	2.2		-02	85
FN 410-1-02	1 (1.2)	373	10	10	33	2.2		-02	85
FN 410-3-02	3 (3.6)	373	2	2	33	2.2		-02	85
FN 410-6-02	6 (6.9)	373	0.8	0.8	33	2.2		-02	85

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

Product selector

FN 410-yy-..

02: PCB through hole mounting

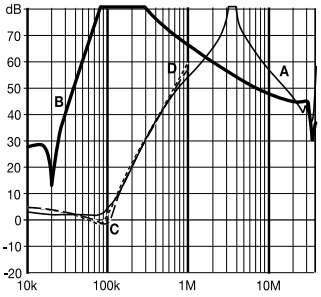
0.5 to 6: Rated current

For example: FN 410-0.5-02, FN 410-6-02

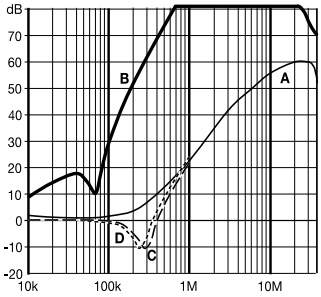
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

0.5 and 1 A types

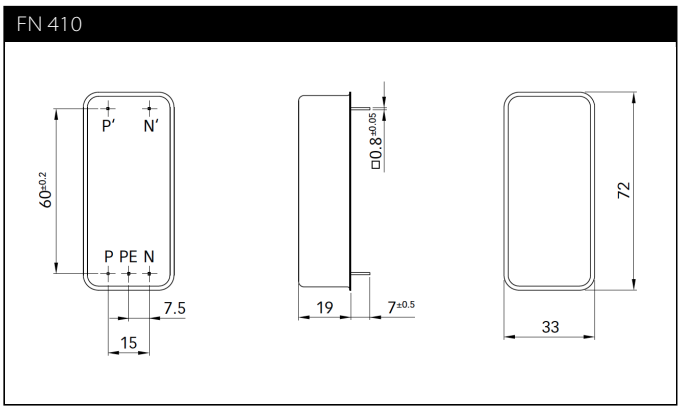


3 and 6 A types



Mechanical data

FN 410



All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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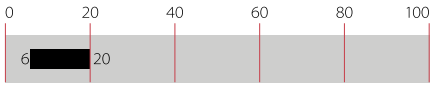
Three-stage EMC/EMI Filter

- Rated currents from 6 to 20 A
- IEC inlet for 6 and 10 A versions
- Up to 3 GHz attenuation
- High surge voltage protection

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	6 to 20 A @ 40°C max.
High potential test voltage	P –> PE 420 VAC for 2 sec P –> N 420 VAC for 2 sec
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Flammability corresponding to	UL 94 V-2 or better
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
MTBF @ 40°C/230 V (Mil-HB-217F)	450,000 hours

Approvals

RoHS CE

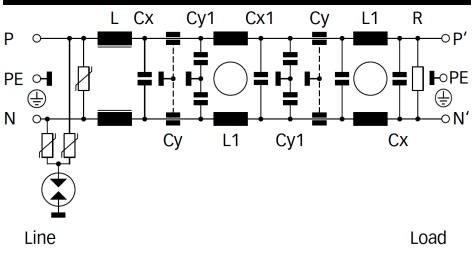
Features and benefits

- FN 700 Z series is designed to meet highest filter attenuation requirements over a wide range starting from a few kilohertz up to 3 GHz
- High surge voltage protection
- Choosing the FN 700 Z product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances
- Standard filters are a practical solution helping you to pass EMI system approval in a short time
- Exceptional conducted attenuation performance, based on three-stage design and chokes with high saturation resistance and excellent thermal behavior
- Integrated gas discharge tubes and suppressors
- IEC inlet version for 6 and 10 A types
- Custom-specific versions on request

Typical applications

- Facility management
- Information protection
- Telecommunication
- Data processing
- Medical equipment
- Electrical and electronic equipment

Typical electrical schematic



Filter selection table

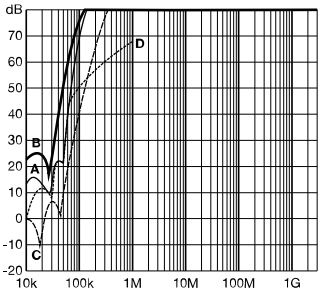
Filter*	Rated current @ 40°C (25°C) [A]	Leakage current* @ 230 VAC/50 Hz [µA]	Inductance L [µH]	Inductance L1 [mH]	Capacitance Cx [µF]	Capacitance Cx1 [µF]	Capacitance Cy [nF]	Capacitance Cy1 [nF]	Resistance R [MΩ]	Input connections		Output connections		Weight [kg]
FN 700 Z-6-06	6 (6.9)	440	50	17.1	1		2.5		0.33		IEC C14		-06	2
FN 700 Z-10-06	10 (11.6)	440	50	9.4	1		2.5		0.33		IEC C14		-06	2.3
FN 700 Z-20-03	20 (23)	2600	60	5.5	1	2.2	5	10	0.33	-03		-03		3.5

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

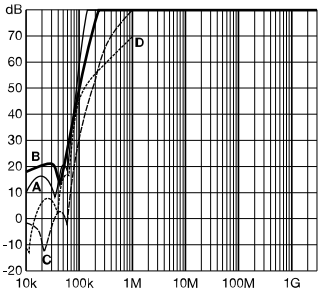
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

6 A types

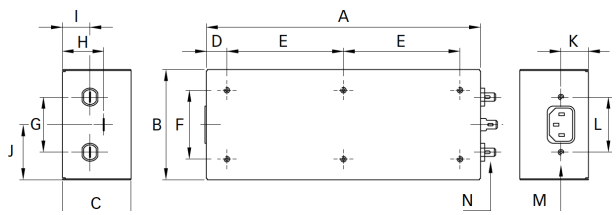


10 to 20 A types

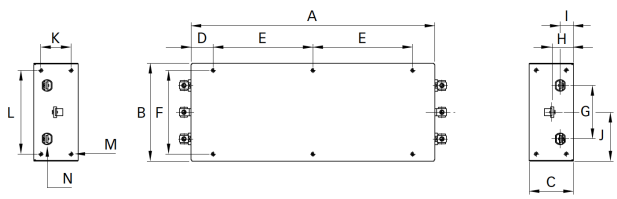


Mechanical data

6 and 10 A types



20 A types



Dimensions

	6 A	10 A	20 A	Tolerances
A	200	250	275	±0.3
B	80	80	110	±0.3
C	50	50	50	±0.2
D	15	25	25	±0.3
E	85	100	112.5	±0.2
F	50	50	94	±0.2
G	40	40	60	±0.3
H	30	30	25	±0.5
I	20	20	15	±0.3
J	40	40	55	±0.3
K	20	20	34	±0.3
L	40	40	94	±0.1
M	M4 x 6	M4 x 6	M4 x 6	
N	6.3 x 0.8	6.3 x 0.8	M4	

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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AC Feedthrough Capacitor

- IEC/EN 60384-14 approval
- Rated currents from 10 to 200 A
- 5 kV pulse test capability
- Class Y2 capacitor

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz (UL) 300 VAC, 50/60 Hz (ENEC) 1000 VDC max.
Rated currents	10 to 200 A @ 60°C max.
Capacitor class	Y2
High potential test voltage	3000 VDC for 2 sec
Insulation resistance (100VDC after 60 sec)	<0.33 µF, R >1500 MΩ >0.33 µF, τ >5000 s
Temperature range (operation and storage)	-40°C to +100°C (40/100/21)
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 60°C/300 V (Mil-HB-217F)	≥200 A: >850,000 hours <200 A: >1,600,000 hours
Operating frequency	DC to 60 Hz

Approvals

RoHS

Feedthrough capacitors offer a high insertion loss across a broad band of frequencies from a few tens of kHz up to the GHz region. The construction of feedthrough capacitors cause a better suppression performance over a much wider frequency range than a conventional two-wire capacitor of equivalent value. Different versions are available offering a wide selection on operating currents and performance levels. AC feedthrough capacitors are designed and approved for up to 300 VAC 50/60 Hz operation.

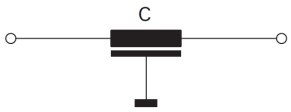
Features and benefits

- Very low internal series inductance
- Very high self-resonant frequency
- Self-healing dielectric
- High quality and reliability
- Through-bulkhead mounting
- Anti-twist protection
- Custom-specific or dual-versions on request

Typical applications

- Power line filter for 110/240 VAC power lines
- Increasing system and information security
- Power supplies
- Switching and cellular equipment
- Computer servers
- UPS power supplies
- Medical equipment
- Shielded rooms

Typical electrical schematic



Feedthrough selector table

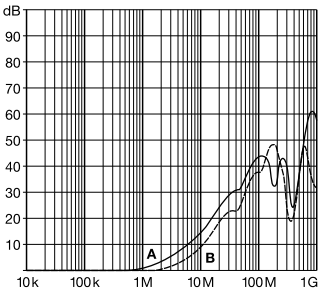
Feedthrough	Rated current @ 60°C [A]	Leakage current* @ 250 VAC/50 Hz [mA]	Capacitance** C [nF]	DC resistance*** R @ 25°C [mΩ]	Weight [g]
FN 7510-10-M3	10	0.21	2.2	0.8	15
FN 7511-10-M3	10	0.44	4.7	0.8	15
FN 7510-16-M4	16	0.44	4.7	0.5	28
FN 7511-16-M4	16	0.94	10	0.52	28
FN 7512-16-M4	16	4.4	47	0.62	33
FN 7513-16-M4	16	9.4	100	0.58	65
FN 7510-32-M4	32	0.44	4.7	0.52	28
FN 7511-32-M4	32	0.94	10	0.52	28
FN 7512-32-M4	32	3.1	33	0.62	34
FN 7514-32-M4	32	9.4	100	0.58	65
FN 7512-63-M6	63	9.4	100	0.3	70
FN 7510-100-M8	100	4.4	47	0.23	100
FN 7511-100-M8	100	9.4	100	0.23	100
FN 7511-200-M10	200	20.7	220	0.16	157

* Tolerance +20%
** Tolerance ±20%
*** Tolerance +15%

Typical filter attenuation

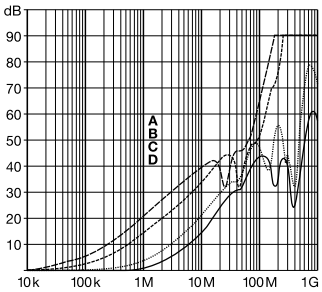
50 Ω system

10 A types



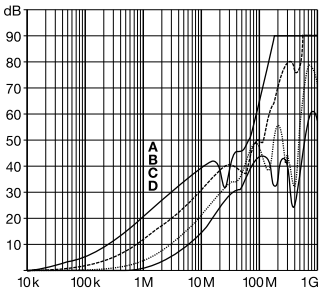
A = FN 7511-10-M3
B = FN 7510-10-M3

16 and 20 A types



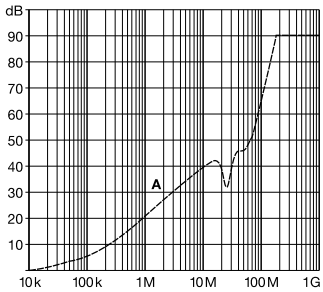
A = FN 7513-16-M4
B = FN 7512-16-M4
C = FN 7511-16-M4
D = FN 7510-16-M4
FN 7510-20-M4

32 A types



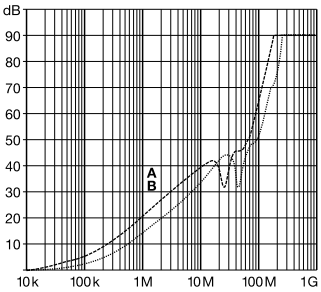
A = FN 7514-32-M4
B = FN 7512-32-M4
C = FN 7511-32-M4
D = FN 7510-32-M4

63 A types



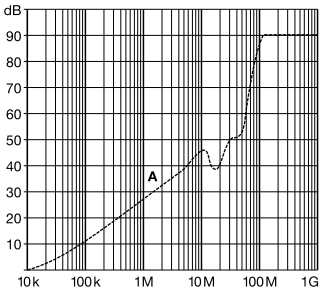
A = FN 7512-63-M6

100 A types



A = FN 7511-100-M8
B = FN 7510-100-M8

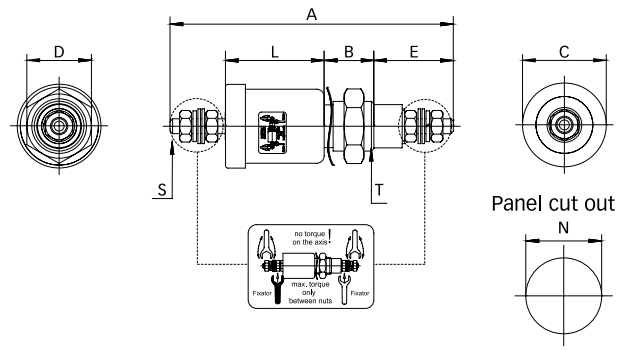
200 A types



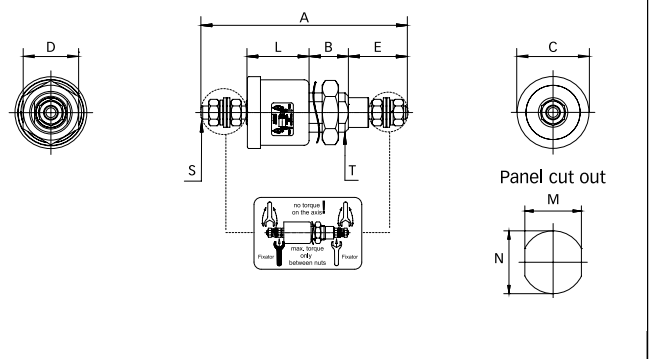
A = FN 7511-200-M10

Mechanical data

10 A types



16 to 200 A types



Dimensions

	A	B	C	D	E	L	M	N	S	T
FN 7510-10-M3	57	10	16.85 ±0.3	13	16 ±2.0	19.85 ±0.5		Ø10.3	M3	M10x1
FN 7511-10-M3	57	10	16.85 ±0.3	13	16 ±2.0	19.85 ±0.5		Ø10.3	M3	M10x1
FN 7510-16-M4	63	12	21.95 ±0.3	17	18 ±2.0	18.85 ±0.5	10.3	Ø12.3	M4	M12x1
FN 7511-16-M4	63	12	21.95 ±0.3	17	18 ±2.0	18.85 ±0.5	10.3	Ø12.3	M4	M12x1
FN 7512-16-M4	75	12	21.95 ±0.3	17	18 ±2.0	30.85 ±0.5	10.3	Ø12.3	M4	M12x1
FN 7513-16-M4	77	14	26.95 ±0.3	22	18 ±2.0	30.85 ±0.5	14.3	Ø16.3	M4	M16x1
FN 7510-32-M4	63	12	21.95 ±0.3	17	18 ±2.0	18.85 ±0.5	10.3	Ø12.3	M4	M12x1
FN 7511-32-M4	63	12	21.95 ±0.3	17	18 ±2.0	18.85 ±0.5	10.3	Ø12.3	M4	M12x1
FN 7512-32-M4	75	12	21.95 ±0.3	17	18 ±2.0	30.85 ±0.5	10.3	Ø12.3	M4	M12x1
FN 7514-32-M4	77	14	26.95 ±0.3	22	18 ±2.0	30.85 ±0.5	14.3	Ø16.3	M4	M16x1
FN 7512-63-M6	96	14	25	22	26 ±2.0	30	14.3	Ø16.3	M6	M16x1
FN 7510-100-M8	113	16	32	27	32 ±2.0	33	18.3	Ø20.3	M8	M20x1
FN 7511-100-M8	113	16	32	27	32 ±2.0	33	18.3	Ø20.3	M8	M20x1
FN 7511-200-M10	130	19	38	27	40 ±2.0	33	22.3	Ø24.3	M10	M24x1
Tolerances					±2		±0.2			

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Recommended torque

	M3	M4	M6	M8	M10	M10x1	M12x1	M16x1	M20x1	M24x1
Terminal thread	0.5 Nm	1.2 Nm	2.5 Nm	5 Nm	8 Nm					
Mounting thread						2 Nm	3 Nm	4 Nm	7 Nm	8 Nm

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DC Feedthrough Capacitor

- EN/IEC 60384-14 approval
- Rated currents from 10 to 200 A
- 2.5 kV pulse test capability
- Class Y4 capacitor

Technical specifications

Maximum continuous operating voltage	130 DC (UL, ENEC) 130 VAC, 50/60 Hz (UL, ENEC) 650 VDC max.
Rated currents	10 to 200 A @ 60°C max.
Capacitor class	Y4
High potential test voltage	1700 VDC for 2 sec
Insulation resistance (100VDC after 60 sec)	<0.33 µF, R >1500 MΩ >0.33 µF, τ >5000 s
Temperature range (operation and storage)	-40°C to +100°C (40/100/21)
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 60°C/130 V (Mil-HB-217F)	<200 A: >1,400,000 hours ≥200 A: >450,000 hours

Approvals

RoHS

Feedthrough filters offer a high insertion loss across a broad band of frequencies from a few tens of kHz up to the GHz region. In general, feedthrough filters offer a higher level of EMI suppression than feedthrough capacitors of the same current rating. This is particularly relevant to applications where source impedance is smaller than 50 Ω. Different versions are available offering a wide selection on operating currents and performance levels. DC feedthrough filters are designed and approved for 130 VDC/130 VAC 50/60 Hz operation.

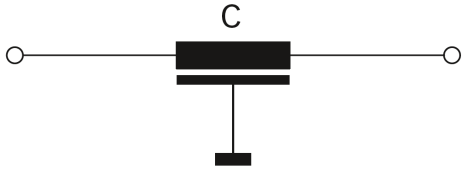
Features and benefits

- Very low internal series inductance
- Very high self-resonant frequency
- Self-healing dielectric
- High quality and reliability
- Through-bulkhead mounting
- Anti-twist protection
- Custom-specific or dual-versions on request

Typical applications

- Power line filter for 48 VDC battery power
- Increasing system and information security
- Telecom base stations
- Switching and cellular equipment
- Computer servers
- UPS power supplies
- Medical equipment

Typical electrical schematic



Feedthrough selector table

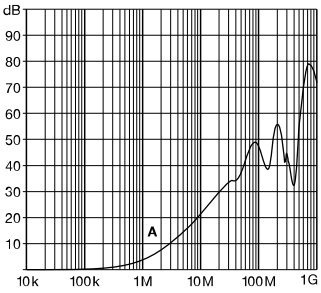
Feedthrough	Rated current @ 60°C	Leakage current* @ 130 VAC/50 Hz	Capacitance** C	DC resistance*** R @ 25°C	Weight
	[A]	[mA]	[nF]	[mΩ]	[g]
FN 7560-10-M3	10	0.49	10	0.8	15
FN 7562-16-M4	16	4.9	100	0.62	34
FN 7563-16-M4	16	23	470	0.63	78
FN 7562-32-M4	32	4.9	100	0.62	34
FN 7563-32-M4	32	23	470	0.63	79
FN 7560-63-M6	63	0.49	10	0.3	70
FN 7561-63-M6	63	2.3	47	0.3	70
FN 7562-63-M6	63	4.9	100	0.3	70
FN 7563-63-M6	63	23	470	0.43	103
FN 7560-100-M8	100	2.3	47	0.23	145
FN 7561-100-M8	100	4.9	100	0.23	145
FN 7562-100-M8	100	23	470	0.23	145
FN 7563-100-M8	100	49	1000	0.25	192
FN 7560-200-M10	200	4.9	100	0.16	160
FN 7561-200-M10	200	23	470	0.16	160
FN 7562-200-M10	200	49	1000	0.18	268
FN 7563-200-M10	200	230	4700	0.14	490

* Tolerance +20%
** Tolerance ±20%
*** Tolerance +15%

Typical filter attenuation

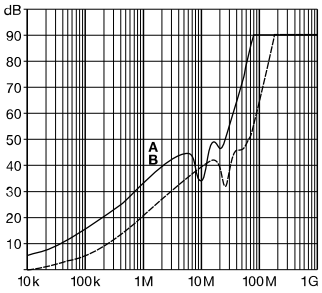
Full load, 50 Ω system

10 A types



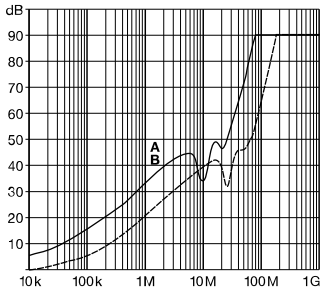
A = FN 7560-10-M3

16 A types



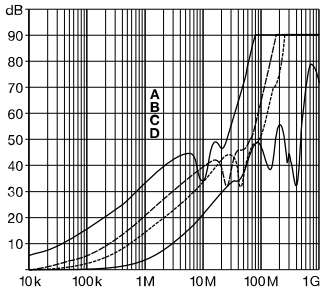
A = FN 7563-16-M4
B = FN 7562-16-M4

32 A types



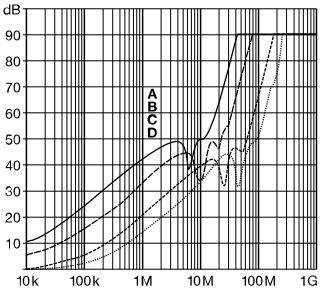
A = FN 7563-32-M4
B = FN 7562-32-M4

63 A types



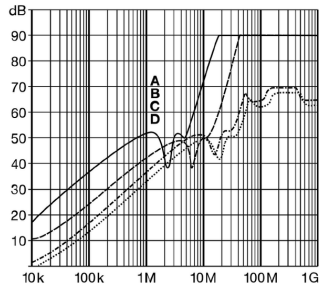
A = FN 7563-63-M6
B = FN 7562-63-M6
C = FN 7561-63-M6
D = FN 7560-63-M6

100 A types



A = FN 7563-100-M8
B = FN 7562-100-M8
C = FN 7561-100-M8
D = FN 7560-100-M8

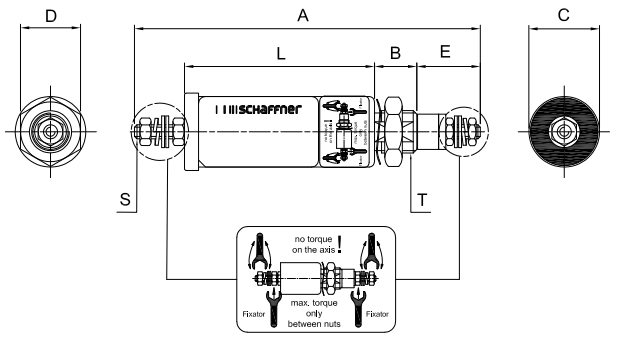
200 A types



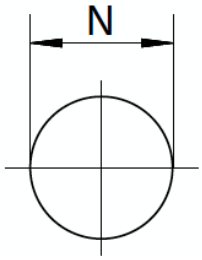
A = FN 7563-200-M10
B = FN 7562-200-M10
C = FN 7561-200-M10
D = FN 7560-200-M10

Mechanical data

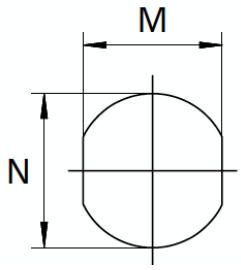
Mechanical drawing



Panel cut out 10 A types



Panel cut out other types



Dimensions

	A	B	C	D	E	L	M	N	S	T
FN 7560-10-M3	57	10	15	13	16	19		Ø10.3	M3	M10x1
FN 7562-16-M4	75	12	20	17	18	30	10.3	Ø12.3	M4	M12x1
FN 7563-16-M4	82	16	32	27	18	33	18.3	Ø20.3	M4	M20x1
FN 7562-32-M4	75	12	20	17	18	30	10.3	Ø12.3	M4	M12x1
FN 7563-32-M4	82	16	32	27	18	33	18.3	Ø20.3	M4	M20x1
FN 7560-63-M6	96	14	25	22	26	30	14.3	Ø16.3	M6	M16x1
FN 7561-63-M6	96	14	25	22	26	30	14.3	Ø16.3	M6	M16x1
FN 7562-63-M6	96	14	25	22	26	30	14.3	Ø16.3	M6	M16x1
FN 7563-63-M6	99	16	32	27	26	33	18.3	Ø20.3	M8	M20x1
FN 7560-100-M8	113	16	32	27	32	33	18.3	Ø20.3	M8	M20x1
FN 7561-100-M8	113	16	32	27	32	33	18.3	Ø20.3	M8	M20x1
FN 7562-100-M8	113	16	32	27	32	33	18.3	Ø20.3	M8	M20x1
FN 7563-100-M8	133	19	38	27	32	50	22.3	Ø24.3	M8	M24x1
FN 7560-200-M10	130	19	32	27	40	33	22.3	Ø24.3	M10	M24x1
FN 7561-200-M10	130	19	32	27	40	33	22.3	Ø24.3	M10	M24x1
FN 7562-200-M10	147	19	38	27	40	50	22.3	Ø24.3	M10	M24x1
FN 7563-200-M10	165	19	54	41	40	68	24.3	Ø27.3	M10	M27x1.5
Tolerances					±2		±0.2			

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Recommended torque

	M3	M4	M6	M8	M10	M10x1	M12x1	M16x1	M20x1	M24x1	M27x1.5
Terminal thread	0.5 Nm	1.2 Nm	2.5 Nm	5 Nm	8 Nm						
Mounting thread						2 Nm	3 Nm	4 Nm	7 Nm	8 Nm	12 Nm

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AC Feedthrough Filter

- IEC/EN 60939 approval
- Rated currents from 10 to 100 A
- 5 kV pulse test capability
- Class Y2 capacitor

Technical specifications

Maximum continuous operating voltage	300 VAC, 50/60 Hz (ENEC) 250 VAC, 50/60 Hz (UL) 1000 VDC max.
Rated currents	10 to 100 A @ 60°C max.
Capacitor class	Y2
High potential test voltage	3000 VDC for 2 sec
Insulation resistance (100VDC after 60 sec)	<0.33 µF, R >15,000 MΩ >0.33 µF, τ >5000 s
Temperature range (operation and storage)	-40°C to +100°C (40/100/21)
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 60°C/300 V (Mil-HB-217F)	<200 A: >675,000 hours ≥200 A: >494,000 hours
Operating frequency	DC to 60 Hz

Approvals

RoHS

Feedthrough filters offer a high insertion loss across a broad band of frequencies from a few tens of kHz up to the GHz region. In general, feedthrough filters offer a higher level of EMI suppression than feedthrough capacitors of the same current rating. This is particularly relevant to applications where source impedance is smaller than 50 Ω. Different versions are available offering a wide selection on operating currents and performance levels. AC feedthrough filters are designed and approved for up to 300 VAC 50/60 Hz operation.

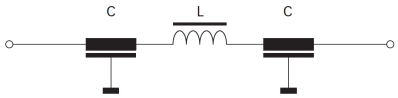
Features and benefits

- Very low internal series inductance
- Very high self-resonant frequency
- Self-healing dielectric
- High quality and reliability
- Through-bulkhead mounting
- Anti-twist protection
- Custom-specific or dual-versions on request

Typical applications

- Power line filter for 110/240 VAC power lines
- Increasing system and information security
- Power supplies
- Switching and cellular equipment
- Computer servers
- UPS power supplies
- Medical equipment
- Shielded rooms

Typical electrical schematic



Feedthrough selector table

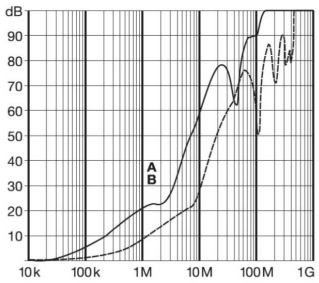
Feedthrough	Rated current @ 60°C [A]	Leakage current* @ 250 VAC/50 Hz [mA]	Capacitance** C [nF]	Inductance L @ 10 kHz [nH]	DC resistance*** R @ 25°C [mΩ]	Weight [g]
FN 7611-10-M3	10	1.89	10	70	1.2	55
FN 7612-10-M3	10	8.86	47	70	1.52	70
FN 7611-16-M4	16	4.15	22	70	0.65	80
FN 7612-16-M4	16	18.85	100	70	0.92	90
FN 7611-32-M4	32	4.15	22	70	0.65	80
FN 7612-32-M4	32	18.85	100	70	0.92	90
FN 7611-63-M6	63	28.3	150	186	0.47	250
FN 7612-63-M6	63	88.6	470	124	0.53	500
FN 7612-100-M8	100	188	1000	124	0.23	750

* Tolerance +20%
** Tolerance ±20%
*** Tolerance +15%

Typical filter attenuation

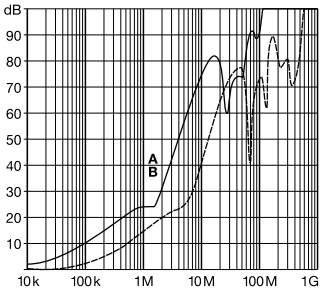
Full load, 50 Ω system

10 A types



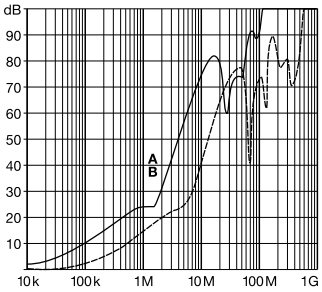
A = FN 7612-10-M3
B = FN 7611-10-M3

16 A types



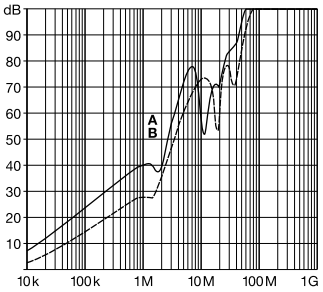
A = FN 7612-16-M4
B = FN 7611-16-M4

32 A types



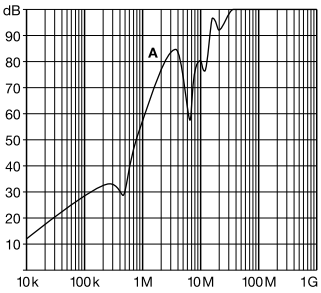
A = FN 7612-32-M4
B = FN 7611-32-M4

63 A types



A = FN 7612-63-M6
B = FN 7611-63-M6

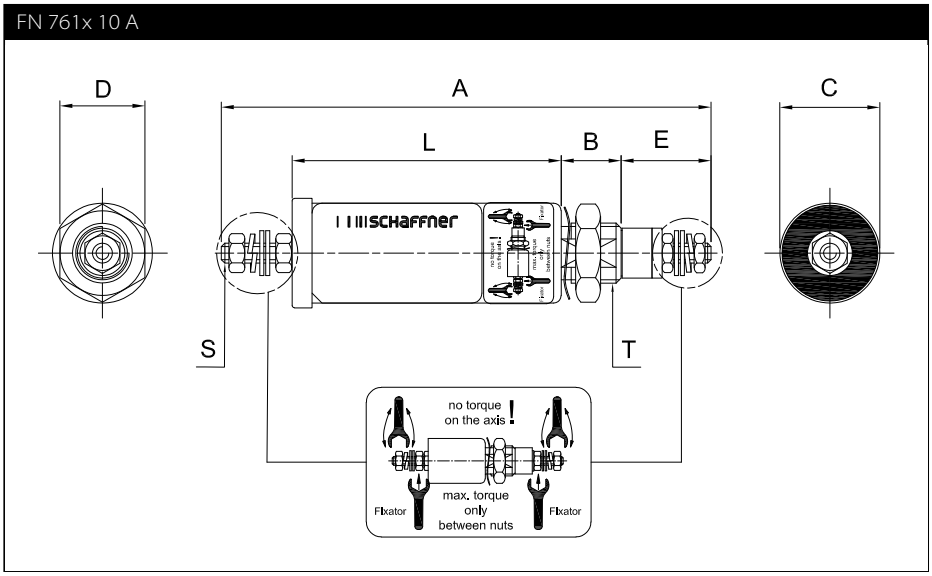
100 A types



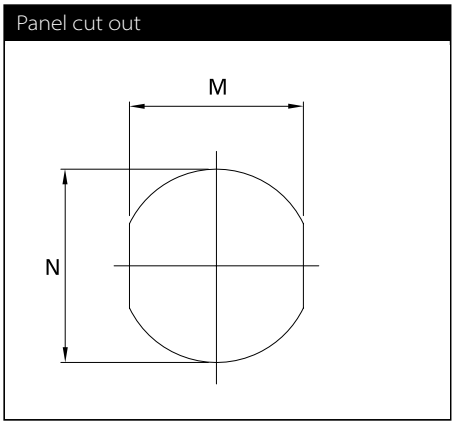
A = FN 7612-100-M8

Mechanical data

FN 761x 10 A



Panel cut out



Dimensions

	A	B	C	D	E	L	M	N	S	T
FN 7611-10-M3	107	12	20	17	16	66	10.3	Ø12.3	M3	M12x1
FN 7612-10-M3	140	12	20	17	16	99	10.3	Ø12.3	M3	M12x1
FN 7611-16-M4	116	14	25	22	18	69	14.3	Ø16.3	M4	M16x1
FN 7612-16-M4	148	14	25	22	18	101	14.3	Ø16.3	M4	M16x1
FN 7611-32-M4	116	14	25	22	18	69	14.3	Ø16.3	M4	M16x1
FN 7612-32-M4	148	14	25	22	18	101	14.3	Ø16.3	M4	M16x1
FN 7611-63-M6	173	16	32	27	26	105	18.3	Ø20.3	M6	M20x1
FN 7612-63-M6	189	19	54	41	26	118	24.3	Ø27.3	M6	M27x1.5
FN 7612-100-M8	227	19	54	41	32	144	24.3	Ø27.3	M8	M27x1.5
Tolerances					±2		±0.2			

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Recommended torque

	M3	M4	M6	M8	M12	M12x1	M16x1	M20x1	M27x1.5	M32x1.5
Terminal thread	0.5 Nm	1.2 Nm	2.5 Nm	5 Nm	11 Nm					
Mounting thread						3 Nm	4 Nm	7 Nm	12 Nm	14 Nm

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DC Feedthrough Filter

- IEC/EN 60939 approval
- Rated currents from 10 to 200 A
- 2.5 kV pulse test capability
- Class Y4 capacitor

Technical specifications

Maximum continuous operating voltage	130 VDC (UL, ENEC) 130 VAC, 50/60 Hz (UL, ENEC) 650 VDC max.
Rated currents	10 to 200 A @ 60°C max.
Capacitor class	Y4
High potential test voltage	1700 VDC for 2 sec
Insulation resistance (100VDC after 60 sec)	<0.33 µF, R >15,000 MΩ >0.33 µF, τ >5000 s
Temperature range (operation and storage)	-40°C to +100°C (40/100/21)
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 60°C/130 V (Mil-HB-217F)	<200 A: 680,000 hours ≥200 A: 356,000 hours

Approvals

RoHS

Feedthrough filters offer a high insertion loss across a broad band of frequencies from a few tens of kHz up to the GHz region. In general, feedthrough filters offer a higher level of EMI suppression than feedthrough capacitors of the same current rating. This is particularly relevant to applications where source impedance is smaller than 50 Ω. Different versions are available offering a wide selection on operating currents and performance levels. DC feedthrough filters are designed and approved for 130 VDC/130 VAC 50/60 Hz operation.

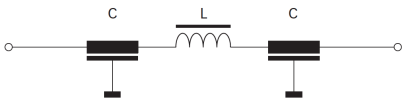
Features and benefits

- Very low internal series inductance
- Very high self-resonant frequency
- Self-healing dielectric
- High quality and reliability
- Through-bulkhead mounting
- Anti-twist protection
- Custom-specific or dual-versions on request

Typical applications

- Power line filter for 48 VDC battery power
- Increasing system and information security
- Telecom base stations
- Switching and cellular equipment
- Computer servers
- UPS power supplies
- Medical equipment

Typical electrical schematic



Feedthrough selector table

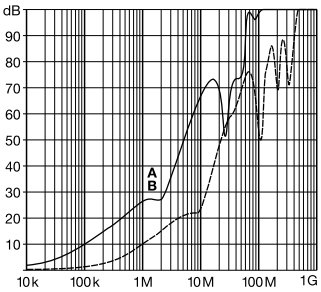
Feedthrough	Rated current @ 60°C [A]	Leakage current* @ 130 VAC/50 Hz [mA]	Capacitance** C [nF]	Inductance L @ 10 kHz [nH]	DC resistance*** R @ 25°C [mΩ]	Weight [g]
FN 7660-10-M3	10	0.98	10	58	1.06	48
FN 7661-10-M3	10	9.8	100	70	1.2	55
FN 7661-16-M4	16	9.8	100	70	0.7	58
FN 7660-32-M4	32	0.98	10	70	0.65	58
FN 7661-32-M4	32	9.8	100	70	0.7	58
FN 7660-63-M6	63	9.8	100	70	0.42	120
FN 7661-63-M6	63	46	470	186	0.47	250
FN 7660-100-M8	100	46	470	124	0.25	280
FN 7661-100-M8	100	98	1000	186	0.28	320
FN 7660-200-M10	200	46	470	124	0.24	410
FN 7661-200-M10	200	460.7	4700	124	0.24	655

* Tolerance +20%
** Tolerance ±20%
*** Tolerance +15%

Typical filter attenuation

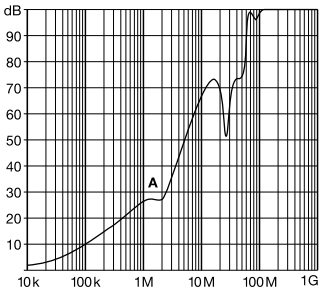
Full load, 50 Ω system

10 A types



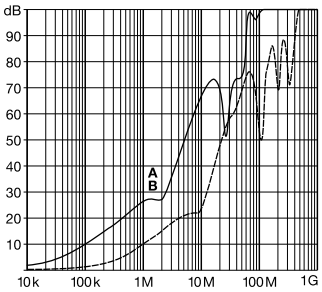
A = FN 7661-10-M3
B = FN 7660-10-M3

16 A types



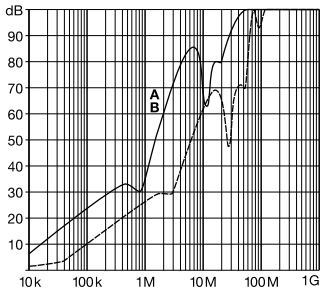
A = FN 7661-16-M4

32 A types



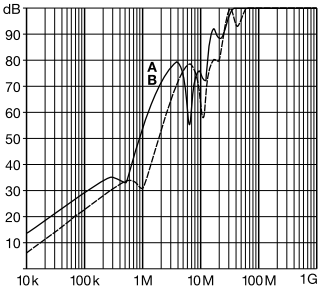
A = FN 7661-32-M4
B = FN 7660-32-M4

63 A types



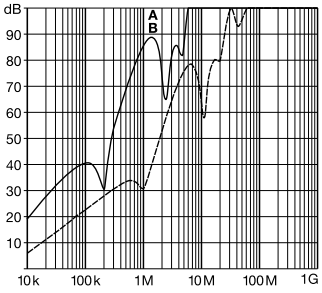
A = FN 7661-63-M6
B = FN 7660-63-M6

100 A types



A = FN 7661-100-M8
B = FN 7660-100-M8

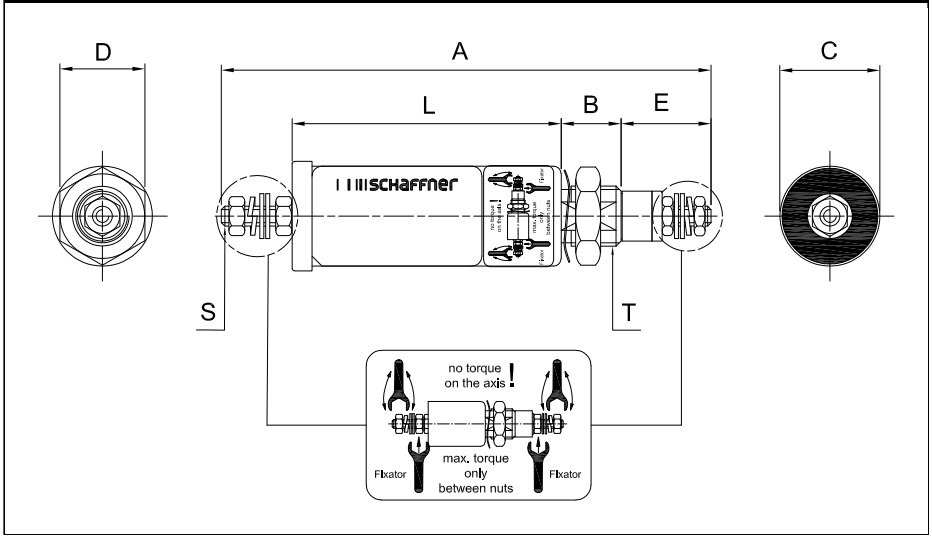
200 A types



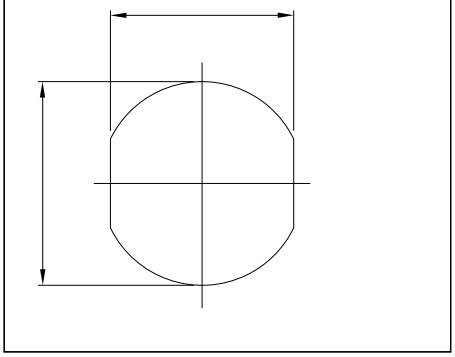
A = FN 7661-200-M10
B = FN 7660-200-M10

Mechanical data

FN 766x mechanical



Panel cut out



Dimensions

	A	B	C	D	E	L	M	N	S	T
FN 7660-10-M3	90	12	20	17	16	49	10.3	Ø12.3	M3	M12x1
FN 7661-10-M3	107	12	20	17	16	66	10.3	Ø12.3	M3	M12x1
FN 7661-16-M4	106	12	20	17	18	61	10.3	Ø12.3	M4	M12x1
FN 7660-32-M4	98	12	20	17	18	53	10.3	Ø12.3	M4	M12x1
FN 7661-32-M4	106	12	20	17	18	61	10.3	Ø12.3	M4	M12x1
FN 7660-63-M6	160	14	25	22	26	94	14.3	Ø16.3	M6	M16x1
FN 7661-63-M6	173	16	32	27	26	105	18.3	Ø20.3	M6	M20x1
FN 7660-100-M8	184	16	32	27	32	104	18.3	Ø20.3	M8	M20x1
FN 7661-100-M8	200	16	32	27	32	120	18.3	Ø20.3	M8	M20x1
FN 7660-200-M10	209	19	38	27	40	112	22.3	Ø24.3	M10	M24x1
FN 7661-200-M10	209	19	54	41	40	112	24.3	Ø27.3	M10	M27x1.5
Tolerances					±2		±0.2			

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Recommended torque

	M3	M4	M6	M8	M10	M12x1	M16x1	M20x1	M24x1	M27x1.5
Terminal thread	0.5 Nm	1.2 Nm	2.5 Nm	5 Nm	8 Nm					
Mounting thread						3 Nm	4 Nm	7 Nm	8 Nm	12 Nm

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General Purpose AC/DC EMI Filter

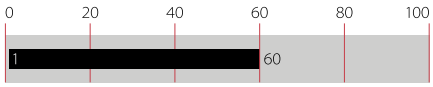
Images are for reference only. Please see product specifications

- Rated currents from 1 to 60 A
- General purpose filtering performance
- Optional medical versions (B type)
- Optional safety versions (A type)
- Optional enhanced performance versions
- Optional DC optimized versions

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Rated voltage*	250 VAC, 50/60 Hz; 250 VDC
Operating frequency	DC to 400 Hz
Rated currents	1 to 60 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec (equiv. cap <88 nF) P –> PE 2550 VDC for 2 sec (equiv. cap >88 nF) P –> PE 2500 VAC for 2 sec (B types) P –> N 1100 VDC for 2 sec
Temperature range (operation and storage)	-25 °C to +100 °C (25/100/21)**
Certified to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (applies to AC and DC applications)
Flammability corresponding to	Terminal plastic for -06/-08 version: UL 94 V-0 Laces for -07 version: UL 94 VW-1 Grommet for -07 version: UL 94 V-0
Overvoltage category	II acc. IEC 60664-1
Pollution degree	2 acc. IEC 60664-1
Altitude	2000m (above derating applies)**
MTBF @ 40°C/230 V (Mil-HB-217F)	1,250,000 hours 3,200,000 hours (B types)

* maximum RMS operating voltage at rated frequency or the maximum DC operating voltage

** for dedicated requests exceeding this specification (e.g. -40 °C or higher altitude) please contact your local Schaffner sales office

Approvals

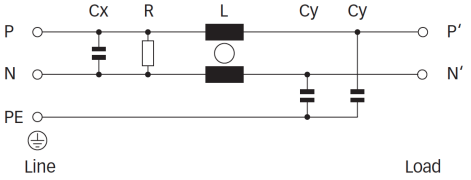
Features and benefits

- FN 2010 filters are designed for easy and fast chassis mounting
- FN 2010 B versions without capacitors to earth comply to 1MOP for ME (medical equipment) acc. IEC 60601-1
- FN 2010 A versions with low capacitance to earth for safety critical applications with necessity for low leakage currents
- FN 2010 filters are also available as enhanced performance and DC optimized versions. With higher attenuation in very compact housing (M, N1,N types)
- All filters provide a general purpose conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- FN 2010 filters can be used to cover a broad range of usage and they offer a good size/amperage ratio
- Various terminal options allow you to select the desired connection style

Typical applications

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Medical equipment
- Office automation equipment
- Datacom equipment

Typical electrical schematic



Filter selection table

Filter*	Rated current @ 40°C (25°C)	Leakage current** @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance***	Capacitance***		Resistance***	Input/Output connections			Weight
			L	Cx	Cy	R				
	[A]	[mA]	[mH]	[µF]	[nF]	[kΩ]				[g]
FN 2010-1-..	1 (1.15)	0.66 (0.38)	12	0.1	4.7	1000	-06	-07		65
FN 2010-3-..	3 (3.45)	0.66 (0.38)	2.5	0.1	4.7	1000	-06	-07		65
FN 2010-6-..	6 (6.9)	0.66 (0.38)	1	0.1	4.7	1000	-06	-07		65
FN 2010-10-..	10 (11.5)	0.66 (0.38)	0.8	0.1	4.7	1000	-06	-07		85
FN 2010-12-..	12 (13.8)	0.66 (0.38)	0.7	0.1	4.7	1000	-06	-07		85
FN 2010-16-..	16 (18.4)	0.66 (0.38)	0.7	0.1	4.7	1000	-06	-07	-08	140
FN 2010-20-..	20 (23)	0.66 (0.38)	0.6	0.1	4.7	1000	-06	-07	-08	210
FN 2010-30-08	30 (34.5)	0.79 (0.46)	0.7	0.47	10	1000			-08	470
FN 2010-60-24	60 (69)	0.79 (0.46)	1	1.5	10	330			-24	1100
FN 2010 A-1-..	1 (1.15)	0.07 (0.04)	12	0.1	0.47	1000	-06	-07		65
FN 2010 A-3-..	3 (3.45)	0.07 (0.04)	2.5	0.1	0.47	1000	-06	-07		65
FN 2010 A-6-..	6 (6.9)	0.07 (0.04)	1	0.1	0.47	1000	-06	-07		65
FN 2010 A-10-..	10 (11.5)	0.07 (0.04)	0.8	0.1	0.47	1000	-06	-07		85
FN 2010 A-12-..	12 (13.8)	0.07 (0.04)	0.7	0.1	0.47	1000	-06	-07		85
FN 2010 A-16-..	16 (18.4)	0.07 (0.04)	0.7	0.1	0.47	1000	-06	-07	-08	140
FN 2010 A-20-..	20 (23)	0.07 (0.04)	0.6	0.1	0.47	1000	-06	-07	-08	210
FN 2010 A-30-08	30 (34.5)	0.07 (0.04)	0.7	0.47	0.47	1000			-08	470
FN 2010 A-60-24	60 (69)	0.07 (0.04)	1	1.5	0.47	330			-24	1100
FN 2010 B-1-..	1 (1.15)	0.00	12	0.1		1000	-06	-07		65
FN 2010 B-3-..	3 (3.45)	0.00	2.5	0.1		1000	-06	-07		65
FN 2010 B-6-..	6 (6.9)	0.00	1	0.1		1000	-06	-07		65
FN 2010 B-10-..	10 (11.5)	0.00	0.8	0.1		1000	-06	-07		85
FN 2010 B-12-..	12 (13.8)	0.00	0.7	0.1		1000	-06	-07		85
FN 2010 B-16-..	16 (18.4)	0.00	0.7	0.1		1000	-06	-07	-08	140
FN 2010 B-20-..	20 (23)	0.00	0.6	0.1		1000	-06	-07	-08	210
FN 2010 B-30-08	30 (34.5)	0.00	0.7	0.47		1000			-08	470
FN 2010 B-60-24	60 (69)	0.00	1	1.5		330			-24	1100
Enhanced performance										
FN 2010 N1-1-06	1 (1.15)	5.34 (3.08)	12	0.1	68	1000	-06			70
FN 2010 N1-3-06	3 (3.45)	5.34 (3.08)	2.5	0.1	68	1000	-06			70
FN 2010 N1-6-06	6 (6.9)	5.34 (3.08)	1	0.1	68	1000	-06			70
FN 2010 N1-10-06	10 (11.5)	5.34 (3.08)	0.8	0.1	68	1000	-06			85
FN 2010 N1-12-06	12 (13.8)	3.69 (2.13)	0.7	0.1	47	1000	-06			85
FN 2010 M-16-06	16 (18.4)	3.69 (2.13)	0.7	0.1	47	1000	-06		-08	140
FN 2010 M-20-..	20 (23)	3.69 (2.13)	0.6	0.1	47	1000	-06		-08	220
FN 2010 N-30-08	30 (34.5)	7.85 (4.52)	0.7	0.47	100	1000			-08	400
FN 2010 N-60-24	60 (69)	7.85 (4.52)	1	1.5	100	330			-24	1120

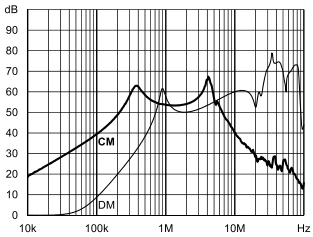
* To compile a complete part number, please replace the -.. with the required I/O connection style (e.g. FN 2010-30-08, FN 2010B-10-06). The different letters code the used Cy values in the filter type (A = 0.47nF; M = 47nF; N1 = 47nF; N = 100nF)

** Maximum leakage under usual AC operating conditions (acc. IEC 60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

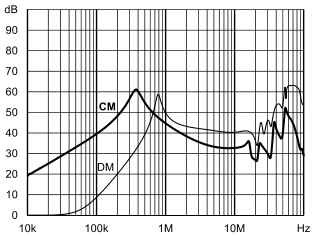
*** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

Typical filter attenuation

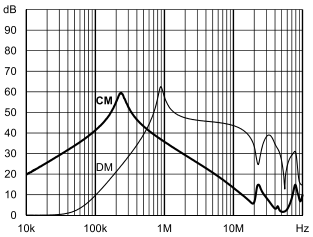
Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym



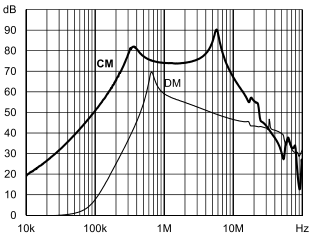
1 A: Standard type



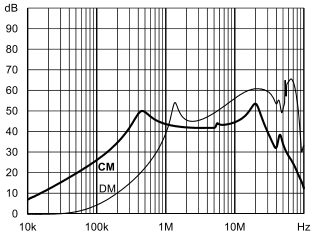
A type



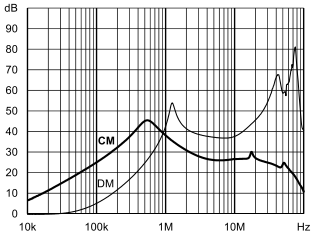
B type



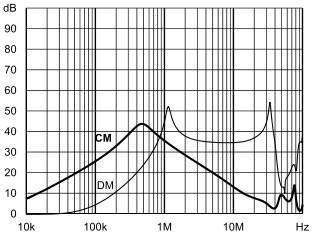
Enhanced performance



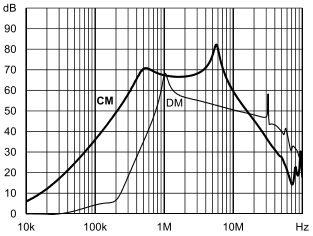
3 A: Standard type



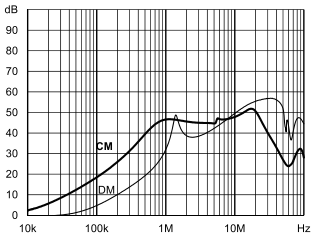
A type



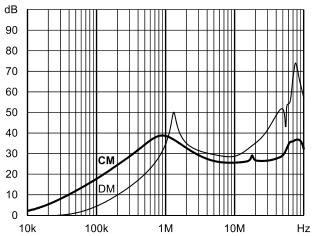
B type



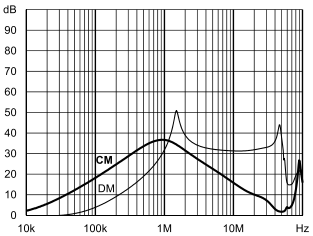
Enhanced performance



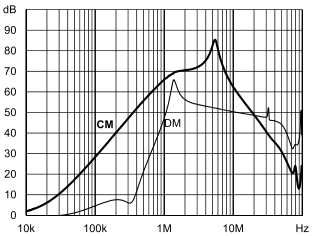
6 A: Standard type



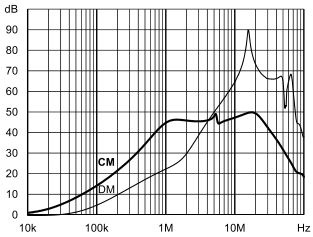
A type



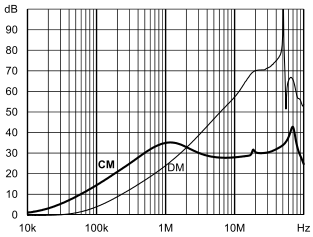
B type



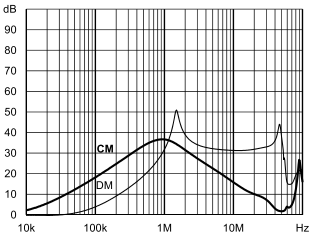
Enhanced performance



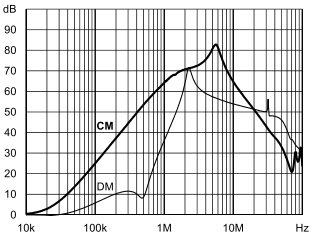
10 A: Standard type



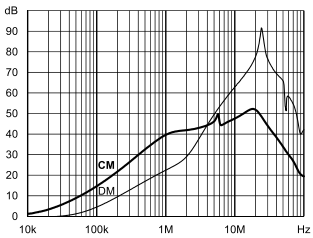
A type



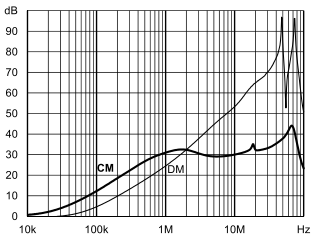
B type



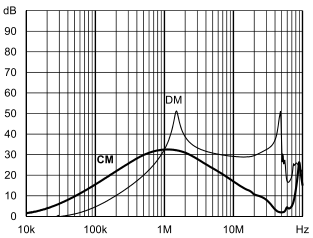
Enhanced performance



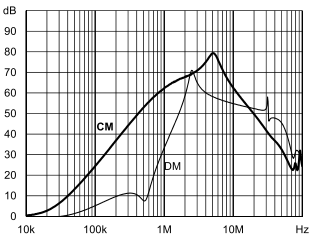
12 A: Standard type



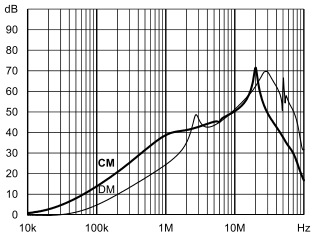
A type



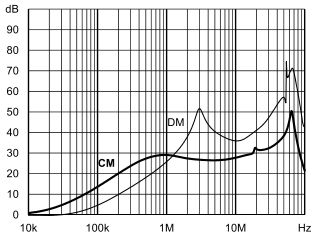
B type



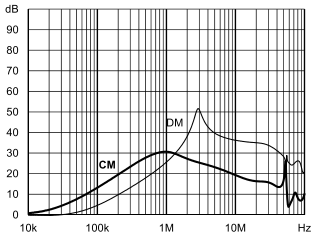
Enhanced performance



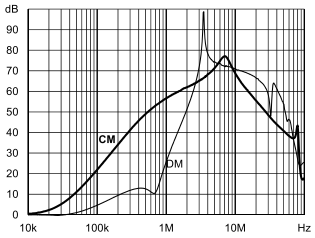
16 A: Standard type



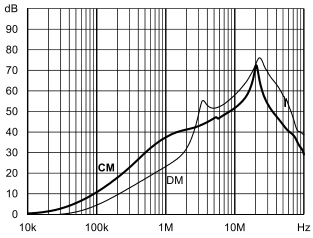
A type



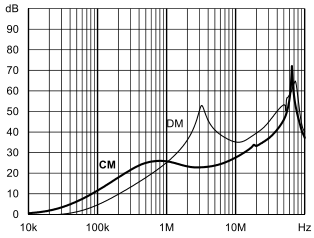
B type



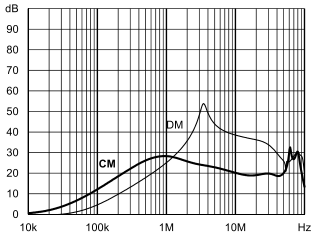
Enhanced performance



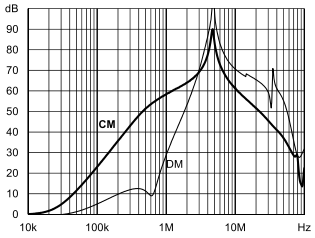
20 A: Standard type



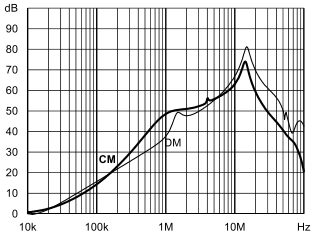
A type



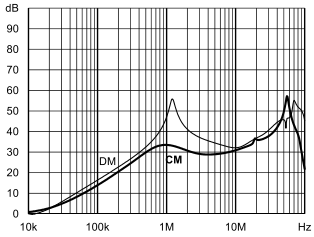
B type



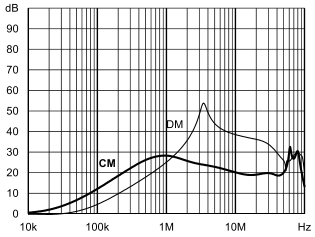
Enhanced performance



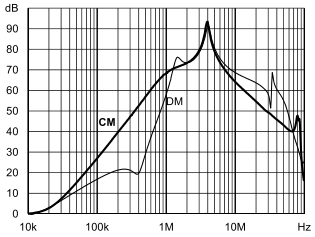
30 A: Standard type



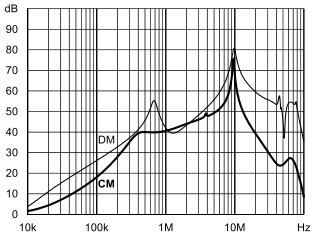
A type



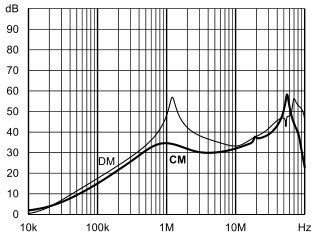
B type



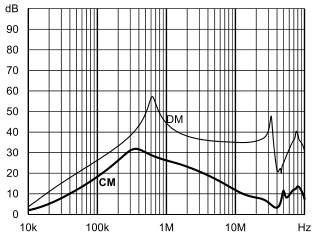
Enhanced performance



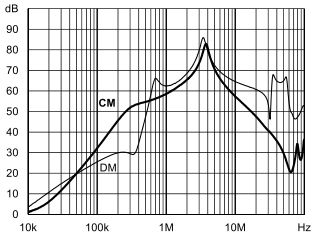
60 A: Standard type



A type



B type



Enhanced performance

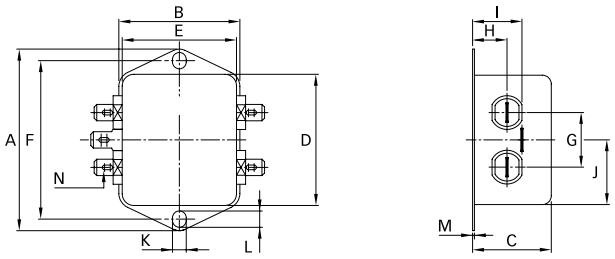
Product Selector

FN 2010-xy-xx-yy

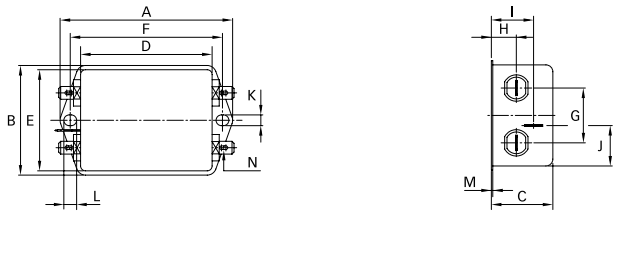
06	Faston 6.3 × 0.8 mm (spade/soldering)
07	Wire leads
08	Studs (M4 screws)
24	Studs (M6 screws)
1 to 60	Rated current
Blank	Standard version
Z	With surge protection
Blank	Standard version
A	Safety version
B	Medical version
N1/N/M	High performance version

Mechanical data

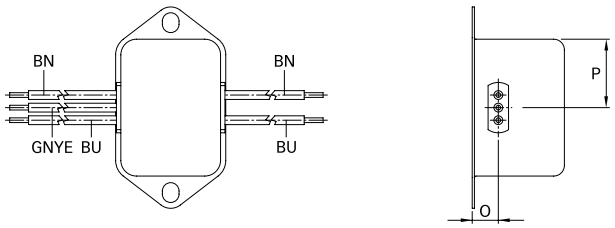
Connection style -06, 1 to 12 A types



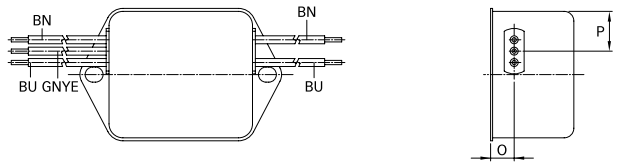
Connection style -06, 16 and 20 A types



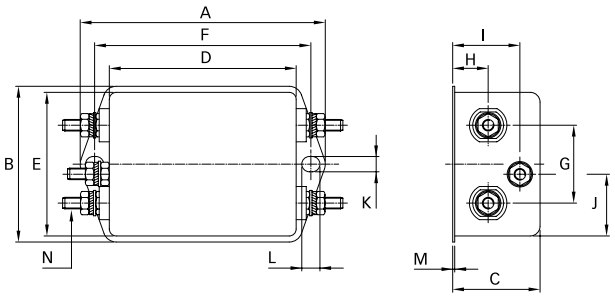
Connection style -07, 1 to 12 A types (same dimensions as style -06)



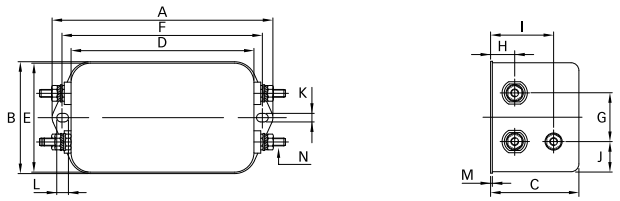
Connection style -07, 16 and 20 A types (same dimensions as style -06)



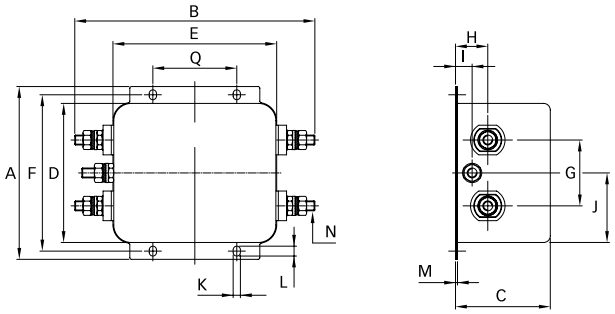
Connection style -08, 16 and 20 A types



Connection style -08, 30 A types



Connection style -24



Dimensions

	1 A	3 A	6 A	10 A	12 A	16 A	20 A	30 A	60 A	Tolerances
A	64	64	64	64	64	71	85	113.5 ±1	105 ±1	±0.5
B	35	35	35	35	35	46.6	54	57.5 ±1	145.9 ±1	±0.5
C	24.3	24.3	24.3	29.3	29.3	29.3	30.3	45.4 ±1	57.6 ±1	±0.5
D	43.5	43.5	43.5	43.5	43.5	50.5	64.8	94 ±1	84.5 ±1	±0.5
E	32.5	32.5	32.5	32.5	32.5	44.5	49.8	56	99.5	±0.5
F	54	54	54	54	54	61	75	103	95	±0.3
G	21	21	21	21	21	21	27	25	40	±0.2
H	9.3	9.3	9.3	9.3	9.3	10.8	12.3	12.4	19.6	±0.5
I	15.3	15.3	15.3	15.3	15.3	19.3	20.8	32.4	10.1	±0.5
J	21.8	21.8	21.8	21.8	21.8	20.1	19.9	15.5	42.25	±0.5
K	5.3	5.3	5.3	5.3	5.3	5.3	5.3	4.4	4.4	
L	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6	6	
M	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	1.2	±0.3
Connection style -06										
N	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8			
Connection style -07										
O	8.3	8.3	8.3	8.3	8.3	8.3	8.3			±0.5
P	21.8	21.8	21.8	21.8	21.8	14	14.9			±0.5
AWG type wire	AWG 20	AWG 20	AWG 18	AWG 18	AWG 16	AWG 16	AWG 14			
Wire length	140	140	140	140	140	140	140			+5
Connection style -08										
N						M4	M4	M4		
Recommended torque (Nm)						1.2 - 1.3	1.2 - 1.3	1.2 - 1.3		
Earth terminal						1.5 - 1.7	1.5 - 1.7	1.5 - 1.7		
Connection style -24										
N									M6	
Q									51	±0.2
Recommended torque (Nm)									3.5 - 4	
Earth Terminal									3.5 - 4	

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connections.

schaffner
shaping electrical power

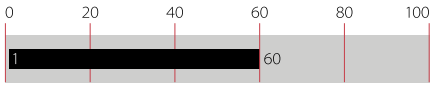
General Purpose AC/DC EMI Filter

- Rated currents from 1 to 60 A
- High differential-mode attenuation
- Optional medical version (B type)
- Optional safety version (A type)

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Rated voltage*	250 VAC, 50/60 Hz; 250 VDC
Operating frequency	DC to 400 Hz
Rated currents	1 to 60 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec P –> PE 2500 VAC for 2 sec (B types) P –> N 760 VAC for 2 sec (1 to 20 A types) P –> N 1100 VDC for 2 sec (30 and 60 A types)
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)**
Certified to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (applies to AC and DC applications)
Flammability corresponding to	Terminal plastic for -06/-08 version: UL 94 V-0 Laces for -07 version: UL 94 VW-1 Grommet for -07 version: UL 94 V-0
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Overvoltage category	II acc. IEC 60664-1
Pollution degree	2 acc. IEC 60664-1
Altitude	2000m (above derating applies)**
MTBF @ 40°C/230 V (Mil-HB-217F)	1,250,000 hours 1,750,000 hours (B types)

* maximum RMS operating voltage at rated frequency or the maximum DC operating voltage
** for dedicated requests exceeding this specification (e.g. -40 °C or higher altitude) please contact your local Schaffner Sales office

Approvals

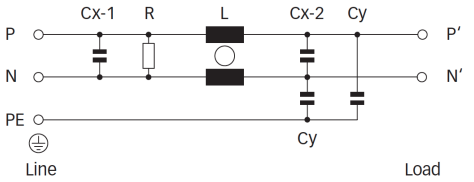
Features and benefits

- FN 2020 filters are designed for easy and fast chassis mounting
- FN 2020 B versions without capacitors to earth comply to 1MOP for ME (medical equipment) acc. IEC 60601-1
- FN 2020 A versions with low capacitance to earth for safety critical applications with necessity for low leakage currents
- All filters provide a general purpose conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- FN 2020 filters can be used to cover a broad range of usage and they offer a good size/amperage ratio
- FN 2020 filters are also available as two- stage filters (FN 2060, FN 2070 series) for more noisy environment
- Various terminal options allow you to select the desired connection style

Typical applications

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Medical equipment
- Office automation equipment
- Datacom equipment

Typical electrical schematic



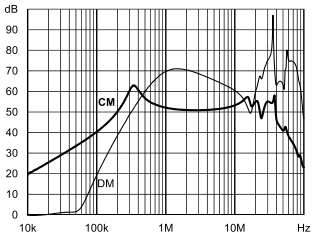
Filter selection table

Filter*	Rated current @ 40°C (25°C)	Leakage current** @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance***	Capacitance***		Resistance***	Input/Output connections			Weight
			L	Cx	Cy	R				
	[A]	[mA]	[mH]	[µF]	[nF]	[kΩ]				[g]
FN 2020-1-..	1 (1.15)	0.66 (0.38)	12	0.15	4.7	1000	-06	-07		80
FN 2020-3-..	3 (3.45)	0.66 (0.38)	2.5	0.15	4.7	1000	-06	-07		80
FN 2020-6-..	6 (6.9)	0.66 (0.38)	1	0.15	4.7	1000	-06	-07		80
FN 2020-10-..	10 (11.5)	0.66 (0.38)	0.8	0.15	4.7	1000	-06	-07		85
FN 2020-12-..	12 (13.8)	0.66 (0.38)	0.7	0.15	4.7	1000	-06	-07		85
FN 2020-16-..	16 (18.4)	0.66 (0.38)	0.65	0.15	4.7	1000	-06	-07	-08	140
FN 2020-20-..	20 (23)	0.66 (0.38)	0.6	0.15	4.7	1000	-06		-08	210
FN 2020-30-08	30 (34.5)	0.79 (0.45)	0.67	0.47	10	470			-08	470
FN 2020-60-24	60 (69)	0.79 (0.45)	1	1.5	10	220			-24	1100
FN 2020A-1-..	1 (1.15)	0.07 (0.04)	12	0.15	0.47	1000	-06	-07		80
FN 2020A-3-..	3 (3.45)	0.07 (0.04)	2.5	0.15	0.47	1000	-06	-07		80
FN 2020A-6-..	6 (6.9)	0.07 (0.04)	1	0.15	0.47	1000	-06	-07		80
FN 2020A-10-..	10 (11.5)	0.07 (0.04)	0.8	0.15	0.47	1000	-06	-07		85
FN 2020A-12-..	12 (13.8)	0.07 (0.04)	0.7	0.15	0.47	1000	-06	-07		85
FN 2020A-16-..	16 (18.4)	0.07 (0.04)	0.65	0.15	0.47	1000	-06	-07	-08	140
FN 2020A-20-..	20 (23)	0.07 (0.04)	0.6	0.15	0.47	1000	-06		-08	210
FN 2020A-30-08	30 (34.5)	0.07 (0.04)	0.67	0.47	0.47	470			-08	470
FN 2020A-60-24	60 (69)	0.07 (0.04)	1	1.5	0.47	220			-24	1100
FN 2020B-1-..	1 (1.15)	0.00	12	0.15		1000	-06	-07		80
FN 2020B-3-..	3 (3.45)	0.00	2.5	0.15		1000	-06	-07		80
FN 2020B-6-..	6 (6.9)	0.00	1	0.15		1000	-06	-07		80
FN 2020B-10-..	10 (11.5)	0.00	0.8	0.15		1000	-06	-07		85
FN 2020B-12-..	12 (13.8)	0.00	0.7	0.15		1000	-06	-07		85
FN 2020B-16-..	16 (18.4)	0.00	0.65	0.15		1000	-06	-07	-08	140
FN 2020B-20-..	20 (23)	0.00	0.6	0.15		1000	-06		-08	210
FN 2020B-30-08	30 (34.5)	0.00	0.67	0.47		470			-08	470
FN 2020B-60-24	60 (69)	0.00	1	1.5		220			-24	1100

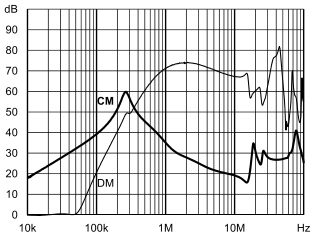
* To compile a complete part number, please replace the -.. with the required I/O connection style (e.g. FN 2020-30-08, FN 2020B-10-06).
** Maximum leakage under usual AC operating conditions (acc. IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
*** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

Typical filter attenuation

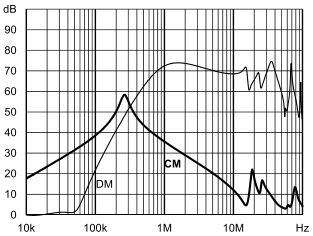
Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym



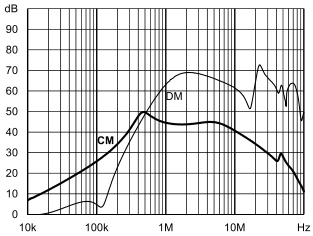
1 A: Standard type



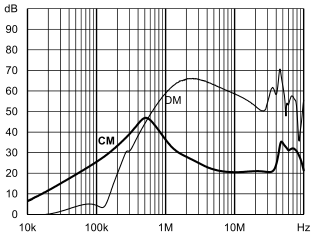
A type



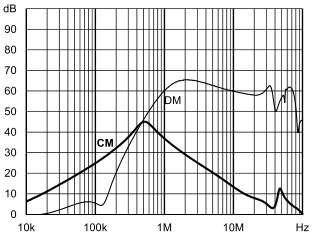
B type



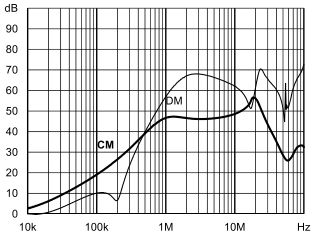
3 A: Standard type



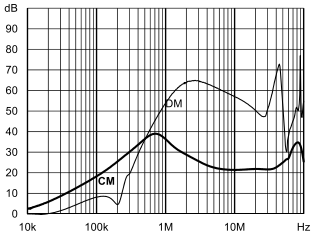
A type



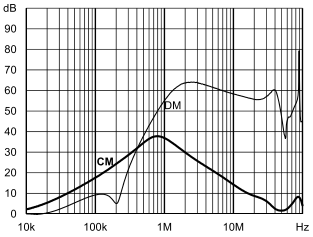
B types



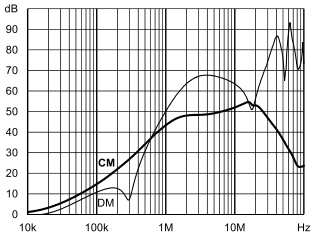
6 A: Standard type



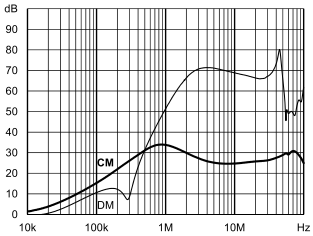
A type



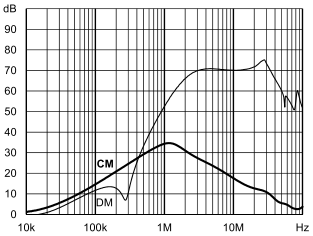
B types



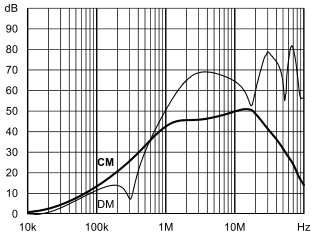
10 A: Standard type



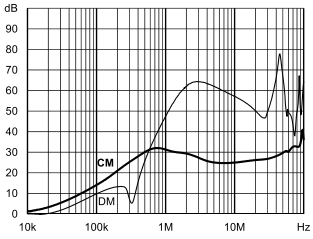
A type



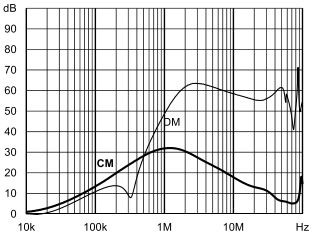
B types



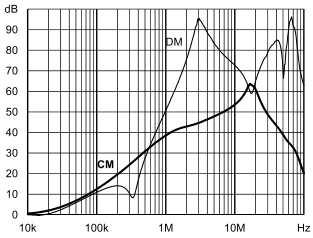
12 A: Standard type



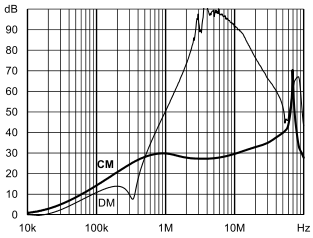
A type



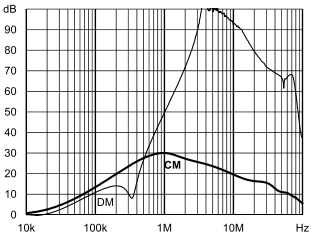
B types



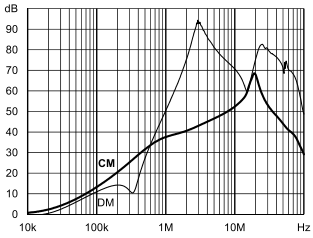
16 A: Standard type



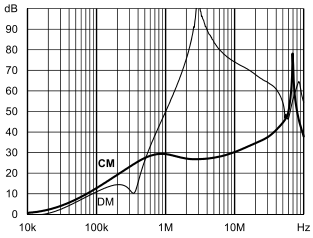
A type



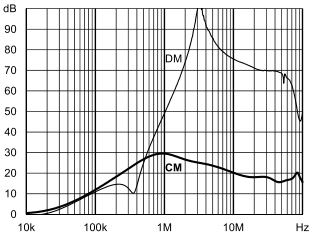
B types



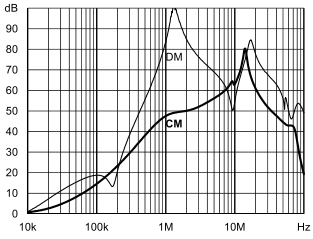
20 A: Standard type



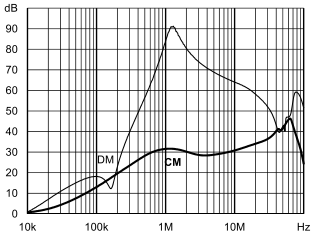
A type



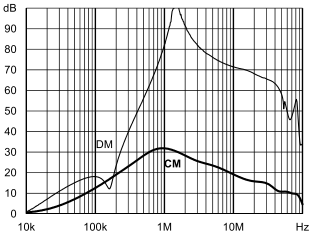
B types



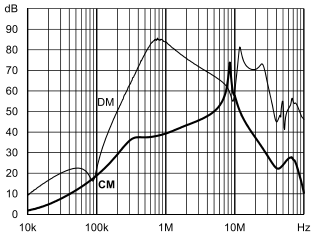
30 A: Standard type



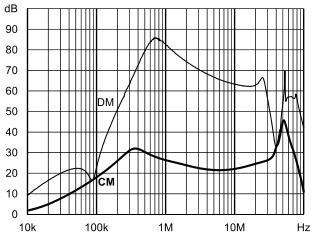
A type



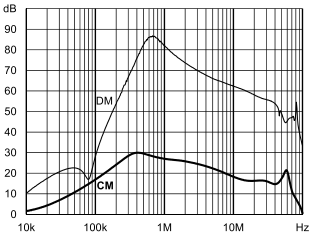
B types



60 A: Standard type



A type



B types

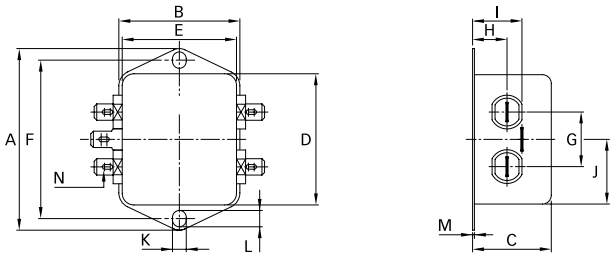
Product selector

FN 2020 x -xx-yy

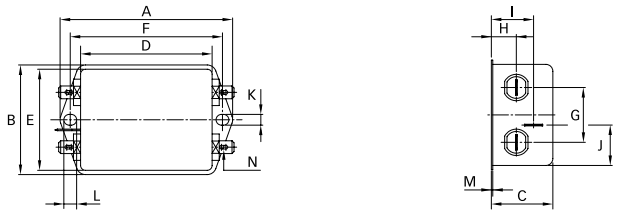
06	Faston 6.3 × 0.8 mm (spade/soldering)
07	Wire leads
08	Studs (M4 screws)
24	Studs (M6 screws)
1 to 60	Rated current
Blank	Standard version
A	Safety version
B	Medical version

Mechanical data

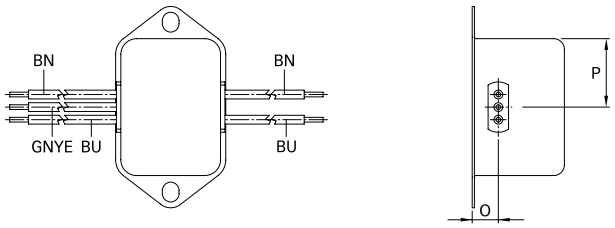
Connection style -06, 1 to12 A types



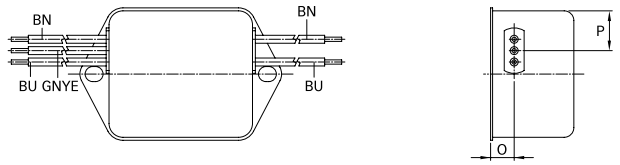
Connection style -06, 16 and 20 A types



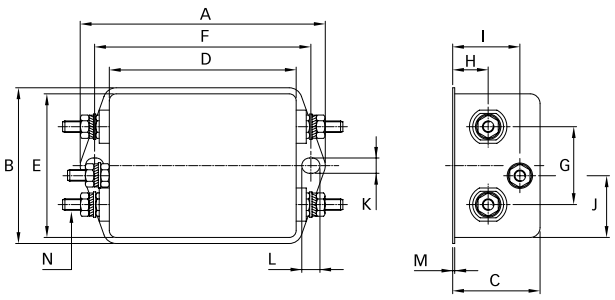
Connection style -07, 1 to 12 A types (same dimensions as style -06)



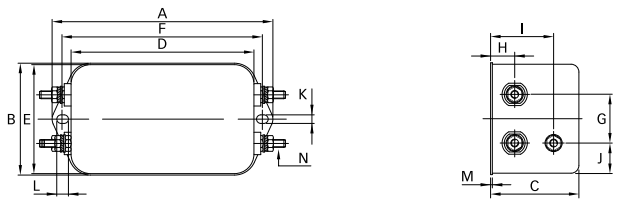
Connection style -07, 16 A types (same dimensions as style -06)



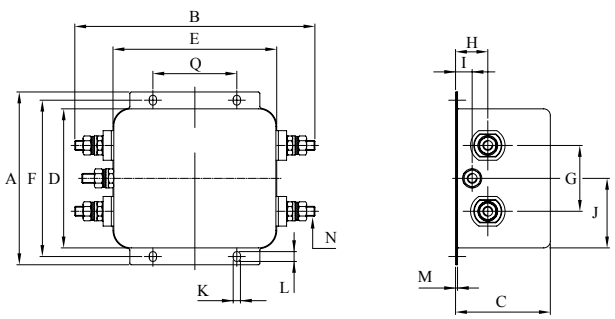
Connection style -08, 16 and 20 A types



Connection style -08, 30 A types



Connection style -24



Dimensions

	1 A	3 A	6 A	10 A	12 A	16 A	20 A	30 A	60 A	Tolerances
A	64	64	64	64	64	71	85	113.5 ±1	105 ±1	±0.5
B	35	35	35	35	35	46.6	54	57.5 ±1	145.9 ±1	±0.5
C	29.3	29.3	29.3	29.3	29.3	29.3	30.3	45.4 ±1	57.6 ±1	±0.5
D	43.5	43.5	43.5	43.5	43.5	50.5	64.8	94 ±1	84.5 ±1	±0.5
E	32.5	32.5	32.5	32.5	32.5	44.5	49.8	56	99.5	±0.5
F	54	54	54	54	54	61	75	103	95	±0.3
G	21	21	21	21	21	21	27	25	40	±0.2
H	9.3	9.3	9.3	9.3	9.3	10.8	12.3	12.4	19.6	±0.5
I	15.3	15.3	15.3	15.3	15.3	19.3	20.8	32.4	10.1	±0.5
J	21.8	21.8	21.8	21.8	21.8	20.1	19.9	15.5	42.25	±0.5
K	5.3	5.3	5.3	5.3	5.3	5.3	5.3	4.4	4.4	
L	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6	6	
M	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	1.2	±0.3
Connection style -06										
N	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8			
Connection style -07										
O	8.3	8.3	8.3	8.3	8.3	8.3				±0.5
P	21.8	21.8	21.8	21.8	21.8	14				±0.5
AWG type wire	AWG 20	AWG 20	AWG 18	AWG 18	AWG 16	AWG 16				
Wire length	140	140	140	140	140	140				+5
Connection style -08										
N						M4	M4	M4		
Recommended torque (Nm)						1.2 - 1.3	1.2 - 1.3	1.2 - 1.3		
Earth Terminal						1.5 - 1.7	1.5 - 1.7	1.5 - 1.7		
Connection style -24										
N									M6	
Q									51	±0.2
Recommended torque (Nm)									3.5 - 4	
Earth Terminal									3.5 - 4	

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connections.

schaffner
shaping electrical power

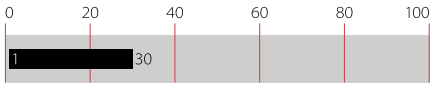
General Purpose AC/DC EMI Filter with High Attenuation Performance

- Rated currents from 1 to 30 A
- High performance filter attenuation
- High differential-mode attenuation
- Optional medical versions (B type)
- Optional safety versions (A type)
- Optional enhanced performance versions
- Optional overvoltage protection (Z type)

Performance indicators

Attenuation performance

Rated current [A]



Approvals

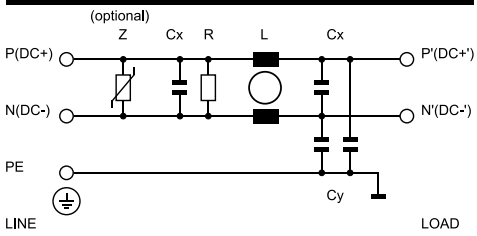
Features and benefits

- FN 2030 filters are designed for easy and fast chassis mounting
- FN 2030 B versions without capacitors to earth comply to 1MOP for ME (medical equipment) acc. IEC 60601-1
- FN 2030 A versions with low capacitance to earth for safety critical applications with a requirement for low leakage currents
- FN 2030 filters offer an optimized filter range for high performance AC and DC applications , in same compact size (M, N1 types)
- All filters provide an exceptional conducted attenuation performance, based on chokes with high permeable core material and excellent thermal behavior
- The higher inductivity versus amperage offers increased attenuation performance with same form factor compared to FN 2010 and FN 2020 filter series
- All FN 2030 filters can be delivered with optional surge pulse protection (Z type).
- Various terminal options allow you to select the desired connection style

Typical application

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Medical equipment
- Electronic data processing equipment
- Office automation and datacom equipment
- Various noisy applications requiring high filter performance

Typical electrical schematic



Technical specifications

Rated voltage*	250 VAC, 50/60 Hz; 250 VDC
Operating frequency	DC to 400 Hz
Rated currents	1 to 30 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec (equiv. cap <88 nF) P –> PE 2550 VDC for 2 sec (equiv. cap >88 nF) P –> PE 2500 VAC for 2 sec (B types) P –> N 1100 VDC for 2 sec
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)**
Certified to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (applies to AC and DC applications)
Flammability corresponding to	Terminal plastic for -06/-08 version: UL 94 V-0 Laces for -07 version: UL 94 VW-1 Grommet for -07 version: UL 94 V-0
Overvoltage category	II acc. IEC 60664-1
Pollution degree	2 acc. IEC 60664-1
Altitude	2000m (above derating applies)**
MTBF @ 40°C/230 V (Mil-HB-217F)	2,200,000 hours (1 to 10 A types) 1,200,000 hours (12 to 30 A types)
Surge pulse protection (Z type)	Helps compliance to IEC61000-4-5 (Differential Mode only)

* maximum RMS operating voltage at rated frequency or the maximum DC operating voltage
** for dedicated requests exceeding this specification (e.g. -40 °C or higher altitude) please contact your local Schaffner Sales office

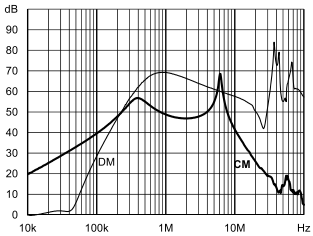
Filter selection table

Filter*	Rated current @ 40°C (25°C)	Leakage current** @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance***	Capacitance***		Resistance***	Input/Output connections			Weight
			L	Cx	Cy	R				
	[A]	[mA]	[mH]	[µF]	[nF]	[kΩ]				[g]
FN 2030-1-..	1 (1.1)	0.31 (0.18)	20	0.22	2.2	1000	-06	-07		58
FN 2030-3-..	3 (3.4)	0.47 (0.27)	14	0.33	3.3	1000	-06	-07		87
FN 2030-4-..	4 (4.5)	0.47 (0.27)	14	0.33	3.3	1000	-06	-07		92
FN 2030-6-..	6 (6.7)	0.66 (0.38)	8	0.47	4.7	680	-06	-07		100
FN 2030-8-..	8 (8.9)	0.66 (0.38)	8	0.47	4.7	680	-06	-07		170
FN 2030-10-..	10 (11.2)	0.66 (0.38)	8	0.47	4.7	680	-06	-07		196
FN 2030-12-..	12 (13.4)	0.79 (0.45)	4	1.0	10	330	-06	-07		185
FN 2030-16-..	16 (17.9)	0.79 (0.45)	4	1.0	10	330	-06	-07	-08	225
FN 2030-20-..	20 (22.4)	0.79 (0.45)	4	1.0	10	330	-06		-08	285
FN 2030-30-08	30 (33.5)	0.79 (0.45)	2	1.0	10	330			-08	326
FN 2030 A-1-..	1 (1.1)	0.07 (0.04)	20	0.22	0.47	1000	-06	-07		58
FN 2030 A-3-..	3 (3.4)	0.07 (0.04)	14	0.33	0.47	1000	-06	-07		87
FN 2030 A-4-..	4 (4.5)	0.07 (0.04)	14	0.33	0.47	1000	-06	-07		92
FN 2030 A-6-..	6 (6.7)	0.07 (0.04)	8	0.47	0.47	680	-06	-07		100
FN 2030 A-8-..	8 (8.9)	0.07 (0.04)	8	0.47	0.47	680	-06	-07		170
FN 2030 A-10-..	10 (11.2)	0.07 (0.04)	8	0.47	0.47	680	-06	-07		196
FN 2030 A-12-..	12 (13.4)	0.07 (0.04)	4	1.0	0.47	330	-06	-07		185
FN 2030 A-16-..	16 (17.9)	0.07 (0.04)	4	1.0	0.47	330	-06	-07	-08	225
FN 2030 A-20-..	20 (22.4)	0.07 (0.04)	4	1.0	0.47	330	-06		-08	285
FN 2030 A-30-08	30 (33.5)	0.07 (0.04)	2	1.0	0.47	330			-08	326
FN 2030 B-1-..	1 (1.1)	0.00	20	0.22		1000	-06	-07		58
FN 2030 B-3-..	3 (3.4)	0.00	14	0.33		1000	-06	-07		87
FN 2030 B-4-..	4 (4.5)	0.00	14	0.33		1000	-06	-07		92
FN 2030 B-6-..	6 (6.7)	0.00	8	0.47		680	-06	-07		100
FN 2030 B-8-..	8 (8.9)	0.00	8	0.47		680	-06	-07		170
FN 2030 B-10-..	10 (11.2)	0.00	8.45	0.47		680	-06	-07		196
FN 2030 B-12-..	12 (13.4)	0.00	4	1.0		330	-06	-07		185
FN 2030 B-16-..	16 (17.9)	0.00	4	1.0		330	-06	-07	-08	225
FN 2030 B-20-..	20 (22.4)	0.00	4	1.0		330	-06		-08	285
FN 2030 B-30-08	30 (33.5)	0.00	2	1.0		330			-08	326
Enhanced performance										
FN 2030 N1-1-06	1 (1.1)	5.34 (3.08)	20	0.22	68	1000	-06			65
FN 2030 M-3-06	3 (3.4)	3.69 (2.28)	14	0.33	47	1000	-06			110
FN 2030 M-4-06	4 (4.5)	3.69 (2.28)	14	0.33	47	1000	-06			110
FN 2030 M-6-06	6 (6.7)	3.69 (2.28)	8	0.47	47	680	-06			120
FN 2030 N1-8-06	8 (8.9)	5.34 (3.08)	8	0.47	68	3680	-06			200
FN 2030 N1-10-06	10 (11.2)	5.34 (3.08)	8	0.47	68	680	-06			200
FN 2030 N1-12-06	12 (13.4)	5.34 (3.08)	4	1.0	68	330	-06			210
FN 2030 M-16-06	16 (17.9)	3.69 (2.28)	4	1.0	47	330	-06		-08	265
FN 2030 M-20-..	20 (22.4)	3.69 (2.28)	4	1.0	47	330	-06		-08	326
FN 2030 M-30-08	30 (33.5)	3.69 (2.28)	2	1.0	47	330			-08	346

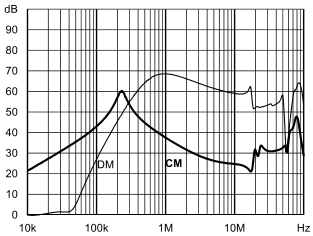
* To compile a complete part number, please replace the -.. with the required I/O connection style. For surge pulse protection, please add Z (e.g. FN 2030Z-10-06, FN 2030BZ-20-08).
** Maximum leakage under usual AC operating conditions (acc. IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
*** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

Typical filter attenuation

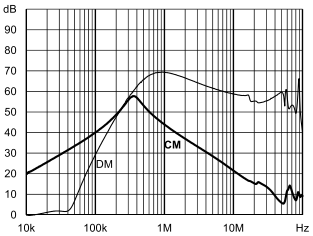
Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym



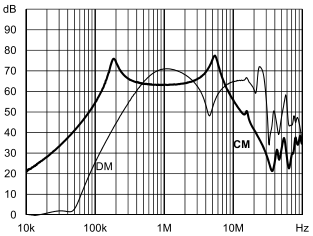
1 A: Standard type



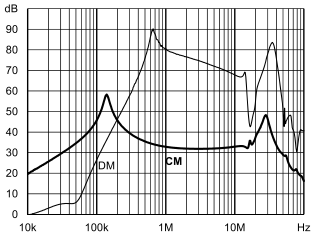
A type



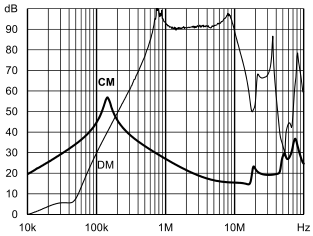
B type



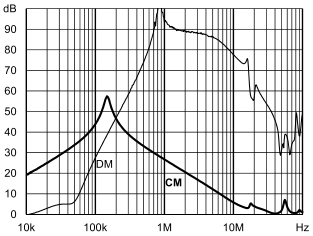
Enhanced performance



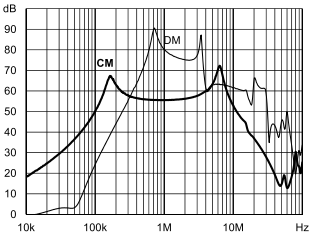
3 A: Standard type



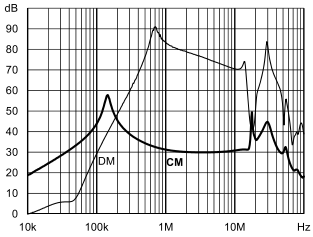
A type



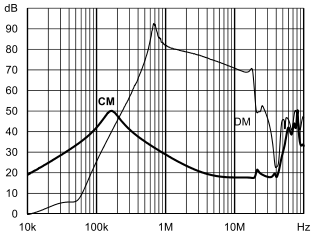
B type



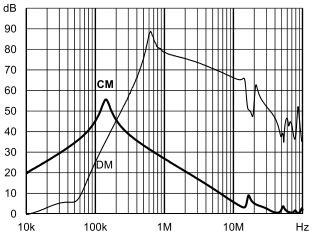
Enhanced performance



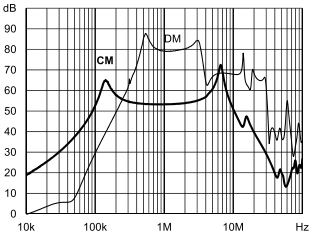
4 A: Standard type



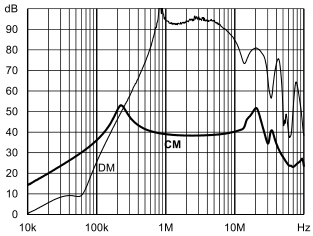
A type



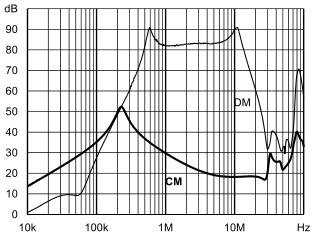
B type



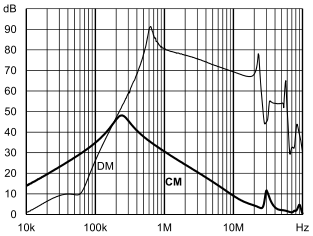
Enhanced performance



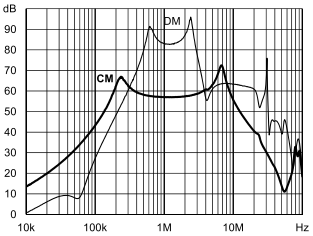
6 A: Standard type



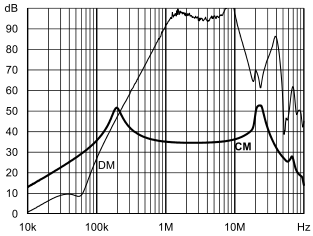
A type



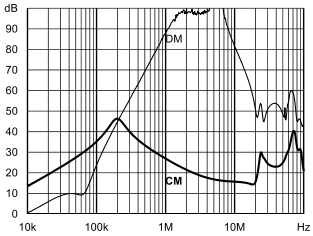
B type



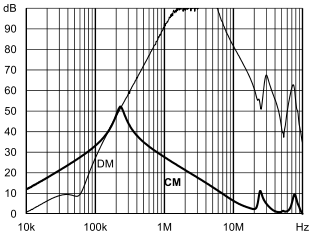
Enhanced performance



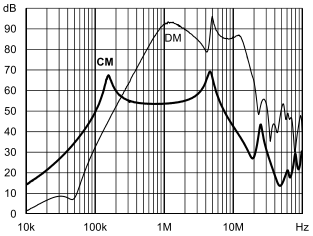
8 A: Standard type



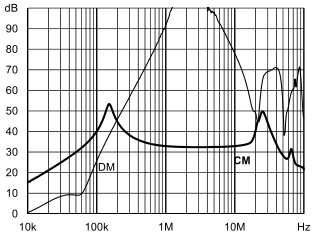
A type



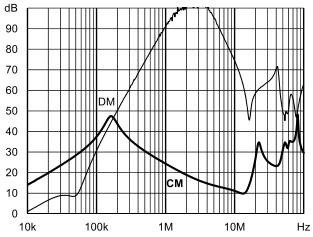
B type



Enhanced performance



10 A: Standard type



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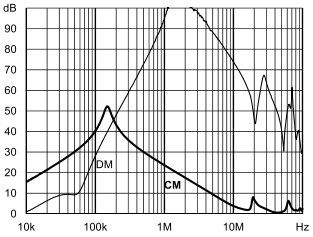
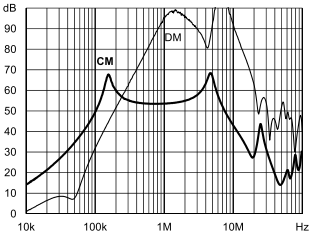
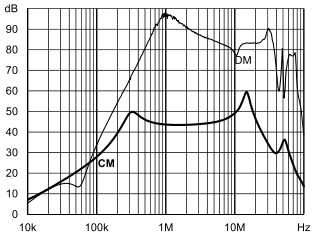


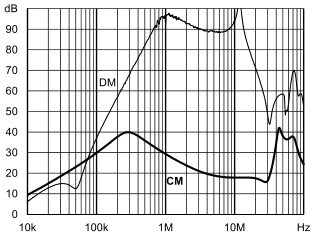
B type



Enhanced performance



12 A: Standard type



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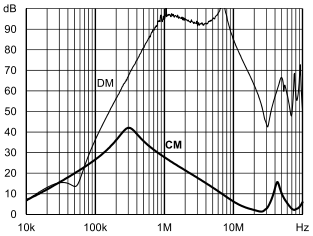
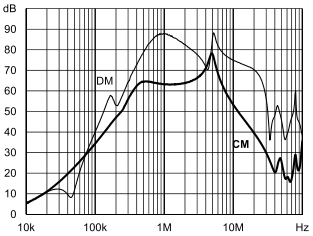
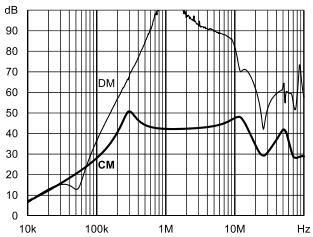


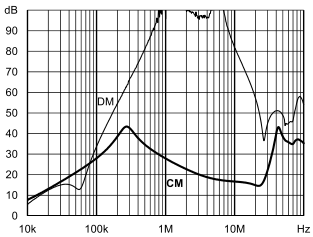
B type



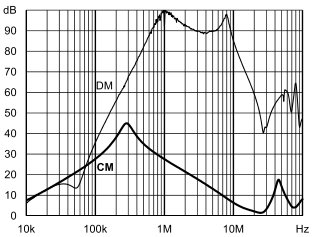
Enhanced performance



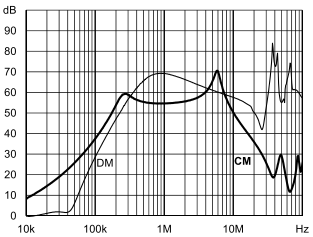
16 A: Standard type



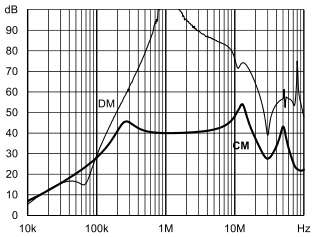
A type



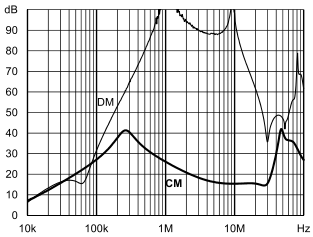
B type



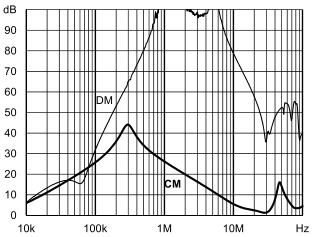
Enhanced performance



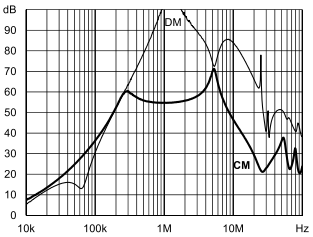
20 A: Standard type



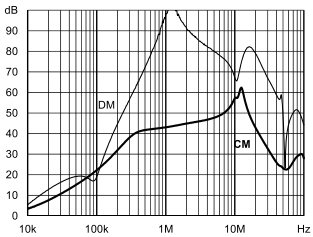
A type



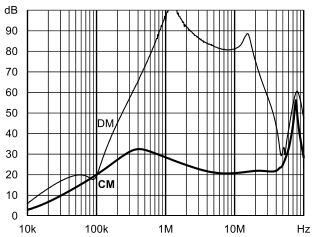
B type



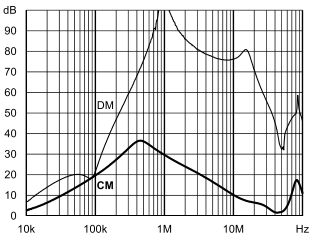
Enhanced performance



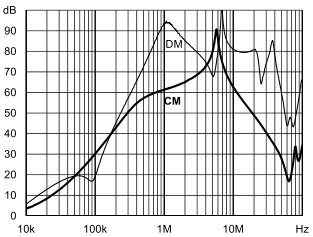
30 A: Standard type



A type



B type



Enhanced performance

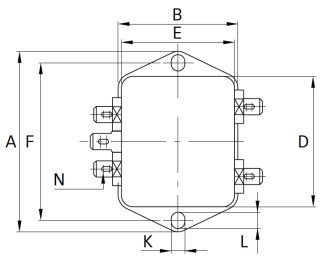
Product selector

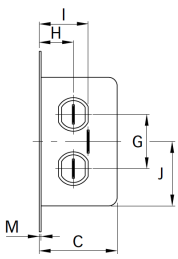
FN 2030 xy-xx-yy

xy	06	Faston 6.3 × 0.8 mm (spade/soldering)
	07	Wire leads
	08	Studs (M4 screws)
xx	1 to 60	Rated current
yy	Blank	Standard version
	Z	With surge protection
	Blank	Standard version
	A	Safety version
	B	Medical version
	N1/M	High performance version

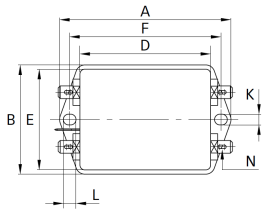
Mechanical data

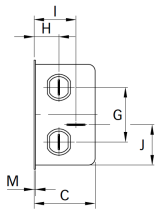
Connection style -06, 1 A types



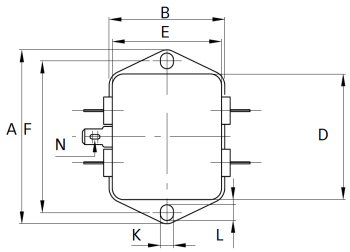


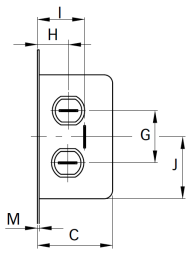
Connection style -06, 8 to 20 A types



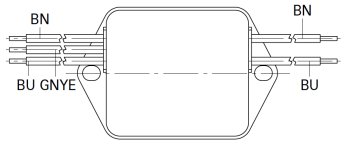


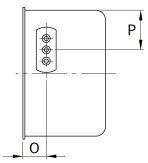
Connection style -06, 3 to 6 A types



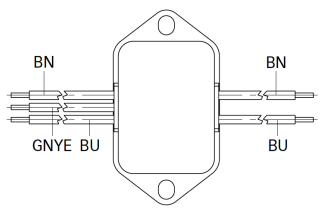


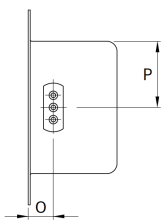
Connection style -07, 8 to 16 A types (same dimensions as style -06)



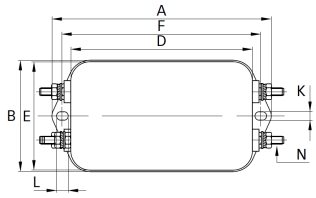


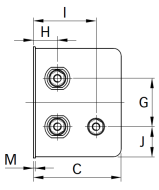
Connection style -07, 1 to 6 A types (same dimensions as style -06)





Connection style -08, 16 to 30 A types





Dimensions

	1 A	3 A	4 A	6 A	8 A	10 A	12 A	16 A	20 A	30 A	Tolerances
A	64	71	71	71	85	85	85	85	85	85	±0.5
B	35	46.6	46.6	46.6	54	54	54	54	54	54	±0.5
C	24.3	22.3	22.3	22.3	30.3	30.3	30.3	40.3	40.3	40.3	±0.5
D	43.5	50.5	50.5	50.5	64.8	64.8	64.8	64.8	64.8	64.8	±0.5
E	32.5	44.5	44.5	44.5	49.8	49.8	49.8	49.8	49.8	49.8	±0.5
F	54	61	61	61	75	75	75	75	75	75	±0.3
G	21	21	21	21	27	27	27	27	27	27	±0.2
H	9.3	10.8	10.8	10.8	12.3	12.3	12.3	12.3	12.3	12.3	±0.5
I	15.3	16.8	16.8	16.8	20.8	20.8	20.8	29.8	29.8	29.8	±0.5
J	21.8	25.25	25.25	25.25	19.9	19.9	19.9	11.4	11.4	11.4	±0.5
K	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	
L	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	
M	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
Connection style -06											
N	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8		
Connection style -07											
O	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3			±0.5
P	21.8	14	14	14	14.9	14.9	14.9	14.9			±0.5
AWG type wire	AWG 20	AWG 20	AWG 20	AWG 18	AWG 18	AWG 18	AWG 16	AWG 16			
Wire length	140	140	140	140	140	140	140	140			+5
Connection style -08											
N								M4	M4	M4	
Recommended torque (Nm)								1.2 - 1.3	1.2 - 1.3	1.2 - 1.3	
Earth terminal								1.5 - 1.7	1.5 - 1.7	1.5 - 1.7	

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

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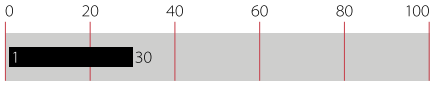
Multi-stage General Purpose AC/DC EMI Filter

- Rated currents from 1 to 30 A
- High differential and common-mode attenuation
- Optional medical versions (B type)
- Optional safety versions (A type)

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Rated voltage*	250 VAC, 50/60 Hz; 250 VDC
Operating frequency	DC to 400 Hz
Rated currents	1 to 30 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec P –> PE 2500 VAC for 2 sec (B types) P –> N 1100 VDC for 2 sec
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)**
Certified to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (applies to AC and DC applications)
Flammability corresponding to	Terminal plastic for -06/-08 version: UL 94 V-0 Laces for -07 version: UL 94 VW-1 Grommet for -07 version: UL 94 V-0
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Overvoltage category	II acc. IEC 60664-1
Pollution degree	2 acc. IEC 60664-1
Altitude	2000m (above derating applies)**
MTBF @ 40°C/230 V (Mil-HB-217F)	1,650,000 hours (B types) 950,000 hours

* maximum RMS operating voltage at rated frequency or the maximum DC operating voltage
** for dedicated requests exceeding this specification (e.g. -40 °C or higher altitude) please contact your local Schaffner Sales office

Approvals

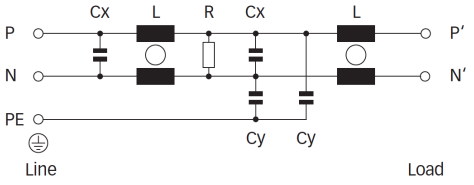
Features and benefits

- FN 2060 two-stage filters are designed for easy and fast chassis mounting
- FN 2060 B versions without capacitors to earth comply to 1MOP for ME (medical equipment) acc. IEC 60601-1
- FN 2060 A version with low capacitance to earth for safety critical applications with necessity for low leakage currents
- All filters provide a high conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- FN 2060 two-stage filters are designed for noisy applications requiering good differential and common-mode attenuation
- FN 2060 filters are also available as single-stage filters (FN 2010 series)
- Various terminal options allow you to select the desired connection style

Typical applications

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Building automation
- Industrial applications
- Machinery
- Medical equipment
- Electronic data processing equipment
- Office automation and datacom equipment
- Various noisy applications requiering good filter performance

Typical electrical schematic



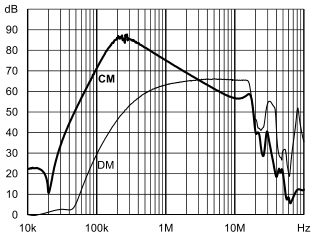
Filter selection table

Filter*	Rated current @ 40°C (25°C)	Leakage current** @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance***	Capacitance***		Resistance***	Input/Output connections			Weight
			L	Cx	Cy	R				
	[A]	[mA]	[mH]	[µF]	[nF]	[kΩ]				[g]
FN 2060-1-..	1 (1.2)	0.66 (0.38)	12	0.22	4.7	1000	-06	-07		120
FN 2060-3-..	3 (3.5)	0.66 (0.38)	2.5	0.22	4.7	1000	-06	-07		120
FN 2060-6-..	6 (6.9)	0.66 (0.38)	0.97	0.22	4.7	1000	-06	-07		120
FN 2060-10-..	10 (11.5)	0.66 (0.38)	0.8	0.47	4.7	470	-06	-07	-08	190
FN 2060-12-..	12 (13.8)	0.66 (0.38)	0.58	0.47	4.7	470	-06	-07	-08	190
FN 2060-16-..	16 (18.4)	0.66 (0.38)	0.65	0.33	4.7	1000	-06	-07	-08	260
FN 2060-20-..	20 (23)	0.66 (0.38)	0.6	1	4.7	220	-06		-08	480
FN 2060-30-08	30 (34.5)	0.79 (0.45)	0.6	1	10	220			-08	950
FN 2060A-1-..	1 (1.2)	0.07 (0.04)	12	0.22	0.47	1000	-06	-07		120
FN 2060A-3-..	3 (3.5)	0.07 (0.04)	2.5	0.22	0.47	1000	-06	-07		120
FN 2060A-6-..	6 (6.9)	0.07 (0.04)	0.97	0.22	0.47	1000	-06	-07		120
FN 2060A-10-..	10 (11.5)	0.07 (0.04)	0.8	0.47	0.47	470	-06	-07	-08	190
FN 2060A-12-..	12 (13.8)	0.07 (0.04)	0.58	0.47	0.47	470	-06	-07	-08	190
FN 2060A-16-..	16 (18.4)	0.07 (0.04)	0.65	0.33	0.47	1000	-06	-07	-08	260
FN 2060A-20-..	20 (23)	0.07 (0.04)	0.6	1	0.47	220	-06		-08	480
FN 2060A-30-08	30 (34.5)	0.07 (0.04)	0.6	1	0.47	220			-08	950
FN 2060B-1-..	1 (1.2)	0.00	12	0.22		1000	-06	-07		120
FN 2060B-3-..	3 (3.5)	0.00	2.5	0.22		1000	-06	-07		120
FN 2060B-6-..	6 (6.9)	0.00	0.97	0.22		1000	-06	-07		120
FN 2060B-10-..	10 (11.5)	0.00	0.8	0.47		470	-06	-07	-08	190
FN 2060B-12-..	12 (13.8)	0.00	0.58	0.47		470	-06	-07	-08	190
FN 2060B-16-..	16 (18.4)	0.00	0.65	0.33		1000	-06	-07	-08	260
FN 2060B-20-..	20 (23)	0.00	0.6	1		220	-06		-08	480
FN 2060B-30-08	30 (34.5)	0.00	0.6	1		220			-08	950

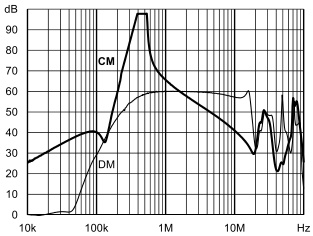
* To compile a complete part number, please replace the -.. with the required I/O connection style (e.g. FN 2070-25-08, FN 2070B-10-06).
** Maximum leakage under usual AC operating conditions (acc. IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
*** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

Typical filter attenuation

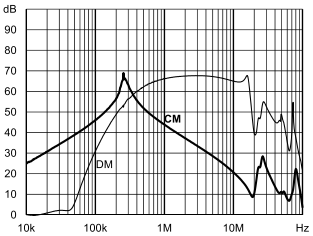
dPer CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym



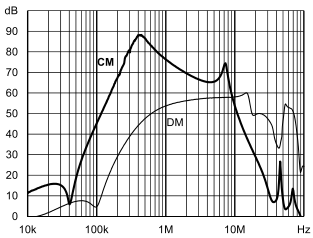
1 A: Standard type



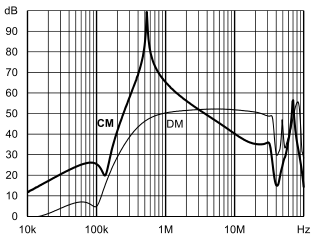
A type



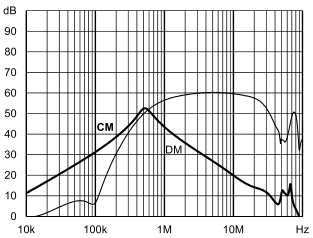
B type



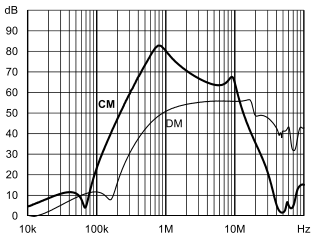
3 A: Standard type



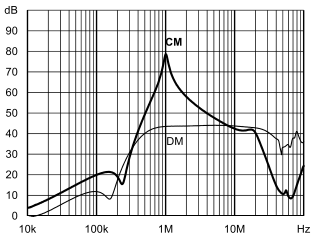
A type



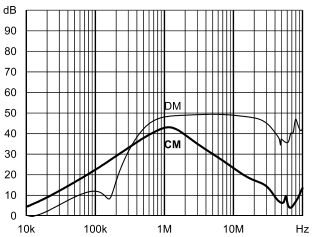
B type



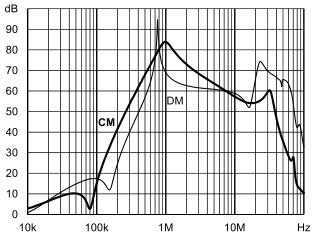
6 A: Standard type



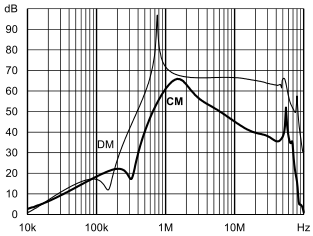
A type



B type



10 A: Standard type



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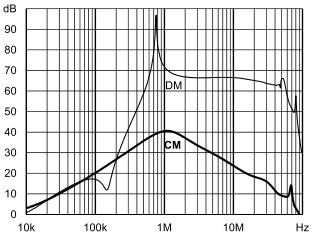
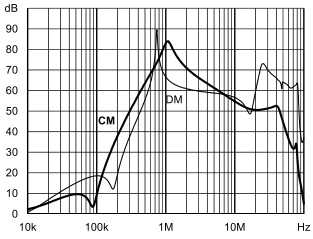
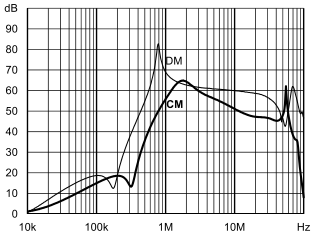


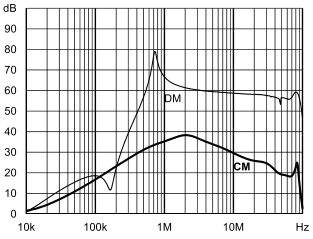
B type



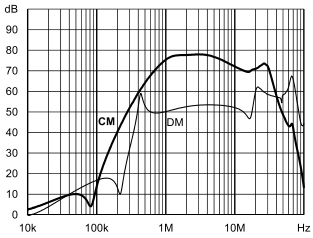
12 A: Standard type



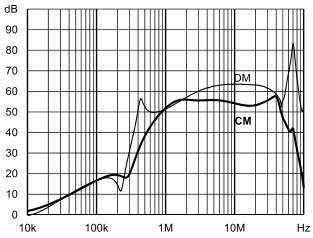
A type



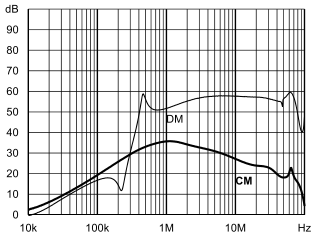
B type



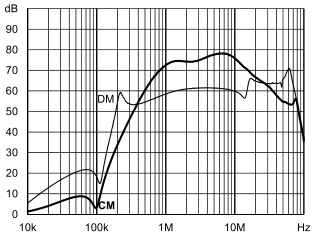
16 A: Standard type



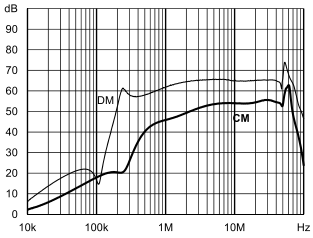
A type



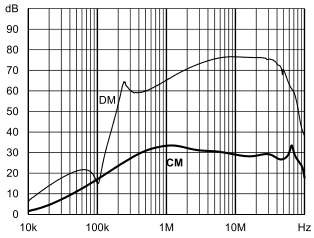
B type



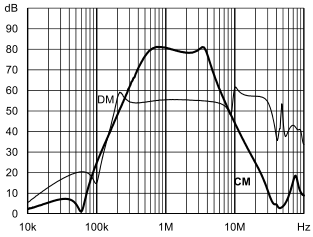
20 A: Standard type



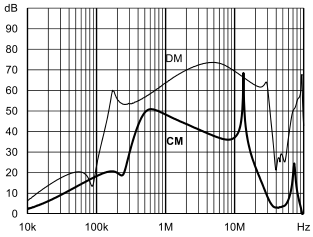
A type



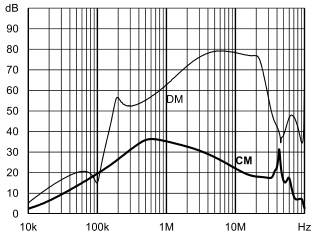
B type



30 A: Standard type



A type



B type

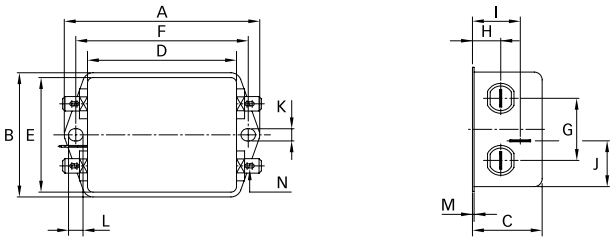
Product selector

FN 2060 x -xx-yy

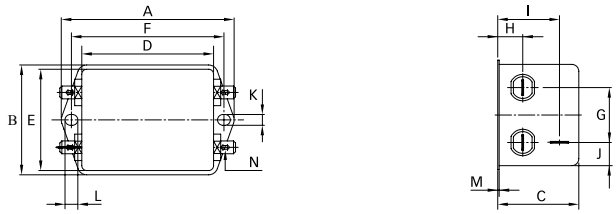
-xx-	06	Faston 6.3 × 0.8 mm (spade/soldering)
	07	Wire leads
	08	Studs (M4 screws)
-yy	1 to 30	Rated current
x	Blank	Standard version
	A	Safety version
	B	Medical version

Mechanical data

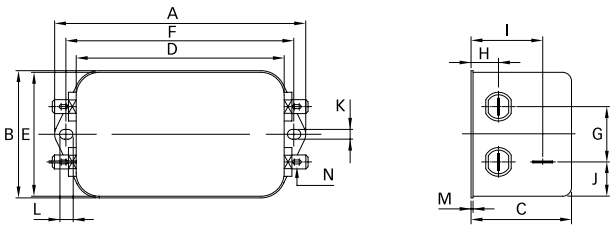
Connection style -06, 1 to 12 A types



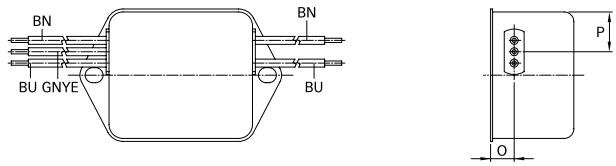
Connection style -06, 16 A types



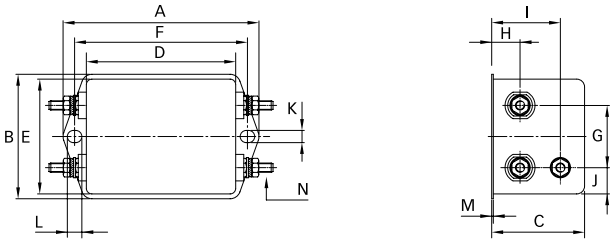
Connection style -06, 20 A types



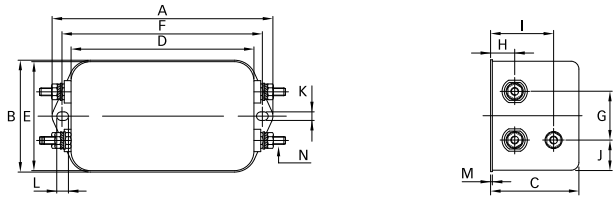
Connection style -07, 1 to 16 A types (same dimensions as style -06)



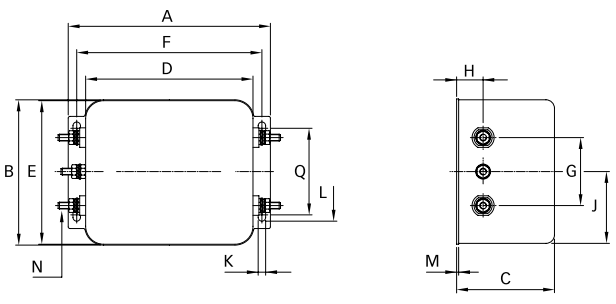
Connection style -08, 10 to 16 A types



Connection style -08, 20 A types



Connection style -08, 30 A types



	1 A	3 A	6 A	10 A	12 A	16 A	20 A	30 A	Tolerances
A	71	71	71	85	85	85	113.5 ±1	119 ±1	±0.5
B	46.6	46.6	46.6	54	54	54	57.5 ±1	85.5 ±1	±0.5
C	29.3	29.3	29.3	30.3	30.3	40.3	45.4 ±1	57.6 ±1	±0.5
D	50.5	50.5	50.5	64.8	64.8	64.8	94 ±1	98.5 ±1	±0.5
E	44.5	44.5	44.5	49.8	49.8	49.8	56	84.5	±0.5
F	61	61	61	75	75	75	103	109	±0.3
G	21	21	21	27	27	27	25	40	±0.2
H	10.8	10.8	10.8	12.3	12.3	12.3	12.4	15.6	±0.5
I	19.3	19.3	19.3	20.8	20.8	29.8	32.4		±0.5
J	20.1	20.1	20.1	19.9	19.9	11.4	15.5	42.25	±0.5
K	5.3	5.3	5.3	5.3	5.3	5.3	4.4	4.4	
L	6.3	6.3	6.3	6.3	6.3	6.3	6	7.4	
M	0.7	0.7	0.7	0.7	0.7	0.7	1	1.2	±0.3
Connection style -06									
N	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	
Connection style -07									
O	8.3	8.3	8.3	8.3	8.3	8.3			±0.5
P	14	14	14	14.9	14.9	14.9			
AWG type wire	AWG 20	AWG 20	AWG 18	AWG 18	AWG 16	AWG 16			
Wire length	140	140	140	140	140	140			+5
Connection style -08									
N				M4	M4	M4	M4	M4	
Q								51	±0.2
Recommended torque (Nm)				1.2 - 1.3	1.2 - 1.3	1.2 - 1.3	1.2 - 1.3	1.2 - 1.3	
Earth terminal				1.5 - 1.7	1.5 - 1.7	1.5 - 1.7	1.5 - 1.7		

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connections.

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Multi-stage Performance AC/DC EMI Filter

- Rated currents from 1 to 36 A
- High differential and common-mode attenuation
- High frequency attenuation
- Optional medical versions (B type)
- Optional safety versions (A type)

Technical specifications

Rated voltage*	250 VAC, 50/60 Hz; 250 VDC
Operating frequency	DC to 400 Hz
Rated currents	1 to 36 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec P –> PE 2500 VAC for 2 sec (B types) P –> N 1100 VDC for 2 sec
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)**
Certified to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (applies to AC and DC applications)
Flammability corresponding to	Terminal plastic for -06/-08 version: UL 94 V-0 Laces for -07 version: UL 94 VW-1 Grommet for -07 version: UL 94V-0
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Overvoltage category	II acc. IEC 60664-1
Pollution degree	2 acc. IEC 60664-1
Altitude	2000m (above derating applies)**
MTBF @ 40°C/230 V (Mil-HB-217F)	1,550,000 hours 1,600,000 hours (B types)

* maximum RMS operating voltage at rated frequency or the maximum DC operating voltage
** for dedicated requests exceeding this specification (e.g. -40 °C or higher altitude) please contact your local Schaffner Sales office

Approvals

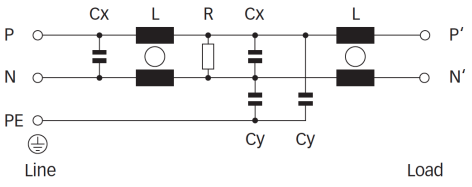
Features and benefits

- FN 2070 two-stage filters are designed for easy and fast chassis mounting
- FN 2070 B versions without capacitors to earth comply to 1MOP for ME (medical equipment) acc. IEC 60601-1
- Fn 2070 A version with low capacitance to earth for safety critical applications with necessity for low leakage currents
- All filters provide a high conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- FN 2070 two-stage filters are designed for high frequency attenuation
- FN 2070 filters are also available as single- stage filters (FN 2030 series)
- FN 2070 filters are also available with differential mode choke (FN 2080 series)
- Various terminal options allow you to select the desired connection style

Typical applications

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Building automation
- Industrial applications
- Machinery
- Medical equipment
- Electronic data processing equipment
- Office automation and datacom equipment
- Various noisy applications requiering good filter performance
- Single Phase Motor Drives

Typical electrical schematic



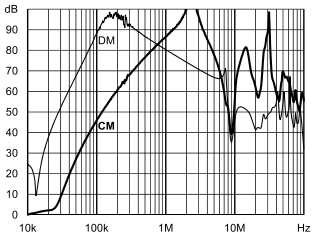
Filter selection table

Filter*	Rated current @ 40°C (25°C)	Leakage current** @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance***	Capacitance***		Resistance***	Input/Output connections			Weight
			L	Cx	Cy	R				
	[A]	[mA]	[mH]	[µF]	[nF]	[kΩ]				[g]
FN 2070-1-..	1 (1.2)	0.66 (0.38)	22	0.33	4.7	1000	-06	-07		190
FN 2070-3-..	3 (3.5)	0.66 (0.38)	9.8	0.47	4.7	470	-06	-07		250
FN 2070-6-..	6 (6.9)	0.66 (0.38)	7.8	1	4.7	220	-06	-07		450
FN 2070-10-..	10 (11.5)	0.66 (0.38)	4.5	1	4.7	220	-06	-07	-08	670
FN 2070-12-..	12 (13.8)	0.66 (0.38)	3.25	1	4.7	220	-06	-07	-08	670
FN 2070-16-..	16 (18.4)	0.66 (0.38)	2.8	1	4.7	220	-06	-07	-08	1000
FN 2070-25-08	25 (28.8)	0.66 (0.38)	2	2.2	4.7	220			-08	760
FN 2070-36-08	36 (41.4)	0.66 (0.38)	1.23	2.2	4.7	220			-08	790
FN 2070 A-1-..	1 (1.2)	0.07 (0.04)	22	0.33	0.47	1000	-06	-07		190
FN 2070 A-3-..	3 (3.5)	0.07 (0.04)	9.8	0.47	0.47	470	-06	-07		250
FN 2070 A-6-..	6 (6.9)	0.07 (0.04)	7.8	1	0.47	220	-06	-07		450
FN 2070 A-10-..	10 (11.5)	0.07 (0.04)	4.5	1	0.47	220	-06	-07	-08	670
FN 2070 A-12-..	12 (13.8)	0.07 (0.04)	3.25	1	0.47	220	-06	-07	-08	670
FN 2070 A-16-..	16 (18.4)	0.07 (0.04)	2.8	1	0.47	220	-06	-07	-08	1000
FN 2070 A-25-08	25 (28.8)	0.07 (0.04)	2	2.2	0.47	220			-08	760
FN 2070 A-36-08	36 (41.4)	0.07 (0.04)	1.23	2.2	0.47	220			-08	790
FN 2070 B-1-..	1 (1.2)	0.00	22	0.33		1000	-06	-07		190
FN 2070 B-3-..	3 (3.5)	0.00	9.8	0.47		470	-06	-07		250
FN 2070 B-6-..	6 (6.9)	0.00	7.8	1		220	-06	-07		450
FN 2070 B-10-..	10 (11.5)	0.00	4.5	1		220	-06	-07	-08	670
FN 2070 B-12-..	12 (13.8)	0.00	3.25	1		220	-06	-07	-08	670
FN 2070 B-16-..	16 (18.4)	0.00	2.8	1		220	-06	-07	-08	1000
FN 2070 B-25-08	25 (28.8)	0.00	2	2.2		220			-08	760
FN 2070 B-36-08	36 (41.4)	0.00	1.23	2.2		220			-08	790
Enhanced performance										
FN 2070 M-1-06	1 (1.2)	3.69 (2.13)	22	0.33	47	1000	-06			170
FN 2070 M-3-06	3 (3.5)	3.69 (2.13)	9.8	0.47	47	470	-06			250
FN 2070 M-6-06	6 (6.9)	3.69 (2.13)	7.8	1	47	220	-06			450
FN 2070 M-10-06	10 (11.5)	3.69 (2.13)	4.5	1	47	220	-06		-08	670
FN 2070 M-12-06	12 (13.8)	3.69 (2.13)	3.25	1	47	220	-06		-08	670
FN 2070 M-16-..	16 (18.4)	3.69 (2.13)	2.8	1	47	220	-06		-08	1000
FN 2070 M-25-08	25 (28.8)	3.69 (2.13)	2	2.2	47	220			-08	750
FN 2070 L-36-08	36 (41.4)	2.59 (1.49)	1.23	2.2	33	220			-08	790

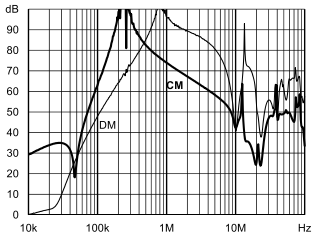
* To compile a complete part number, please replace the -.. with the required I/O connection style (e.g. FN 2070-25-08, FN 2070B-10-06).
** Maximum leakage under usual AC operating conditions (acc. IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
*** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym



1 A: Standard type



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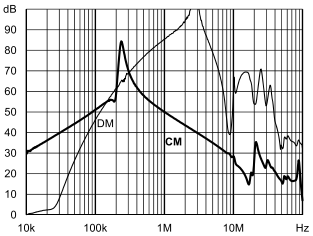
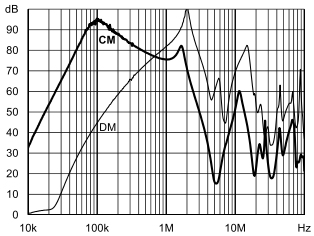
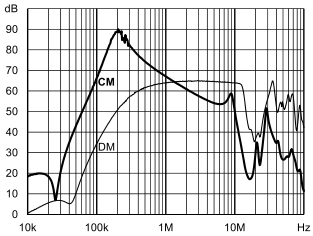


B type



Enhanced performance



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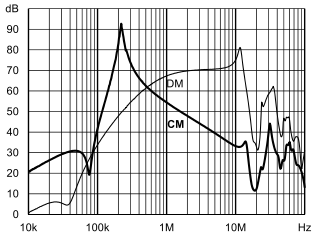

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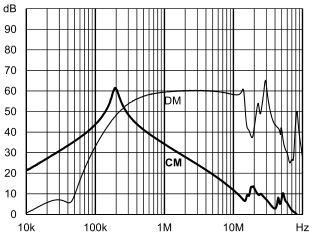

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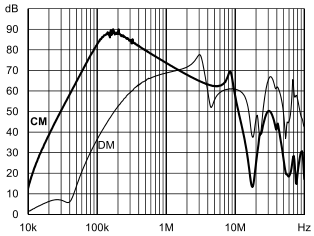
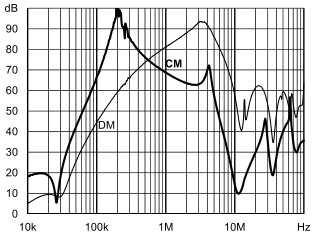


Enhanced performance



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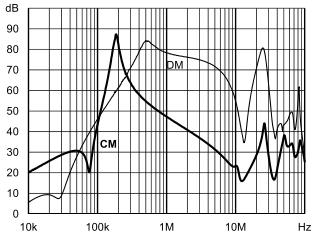

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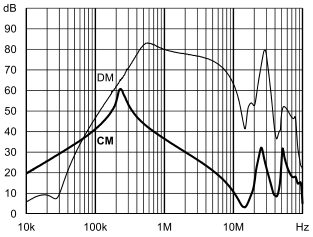

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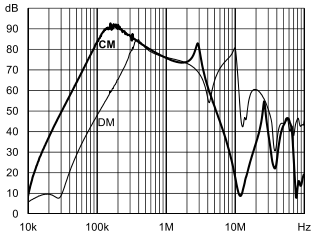
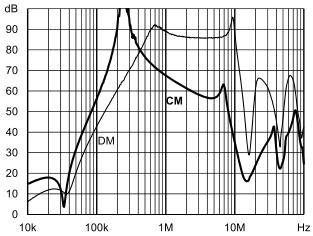


Enhanced performance



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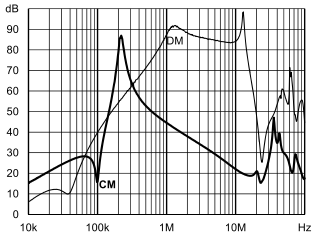

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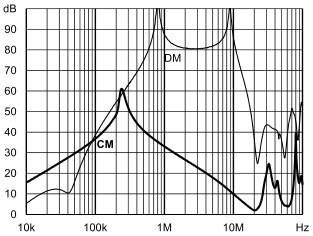

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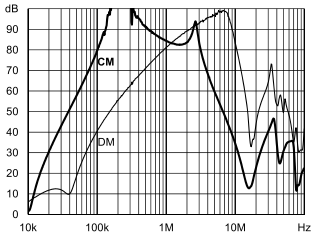
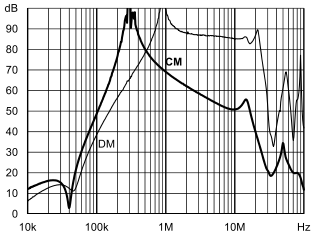
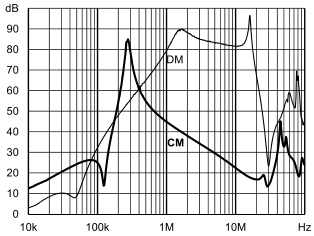


Enhanced performance



12 A: Standard type



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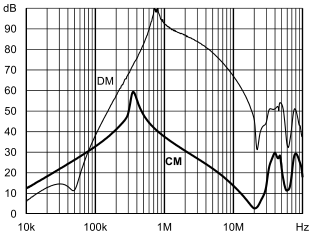

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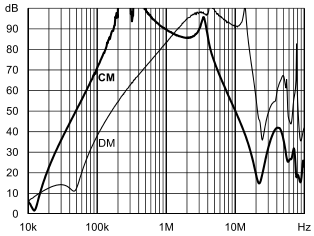
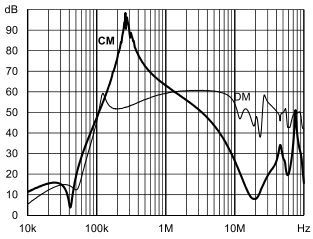
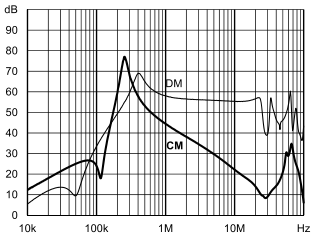


Enhanced performance



16 A: Standard type



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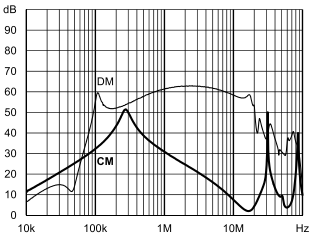

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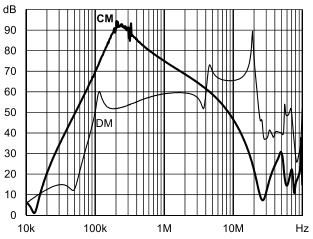
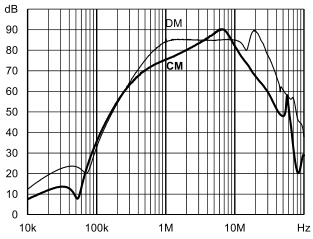


Enhanced performance



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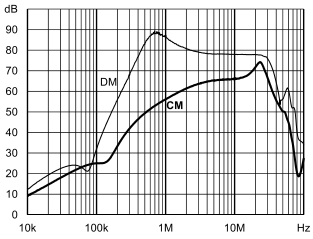

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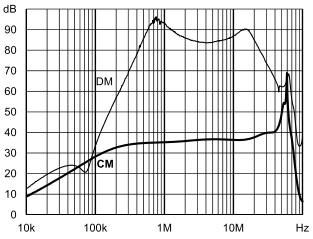

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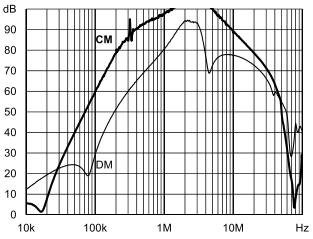
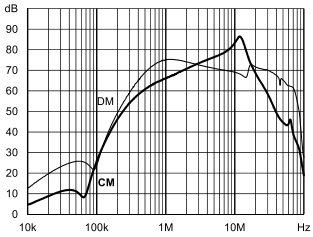
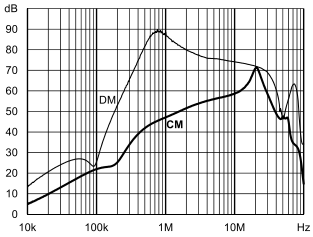


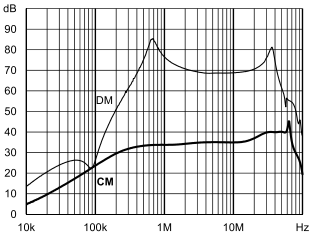
Enhanced performance



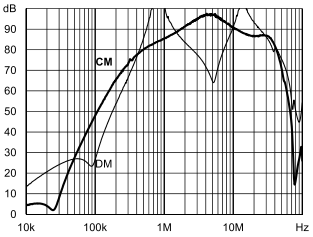
36 A: Standard type



A type



B type



Enhanced performance

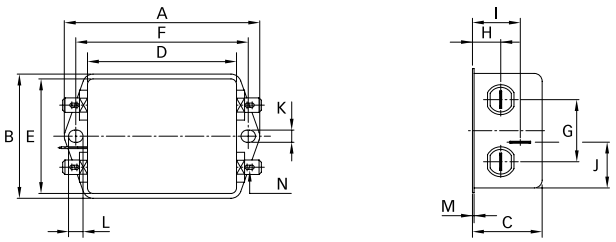
Product selector

FN 2070 x -xx-yy

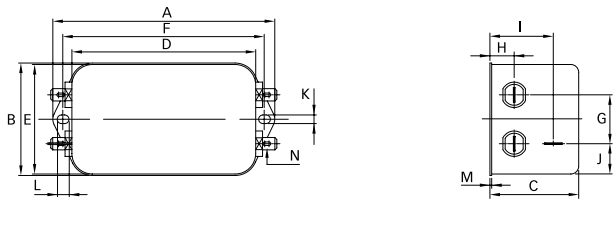
06	Faston 6.3 × 0.8 mm (spade/soldering)
07	Wire leads
08	Studs (M4 screws)
1 to 36	Rated current
Blank	Standard version
A	Safety version
B	Medical version
L/M	High performance version

Mechanical data

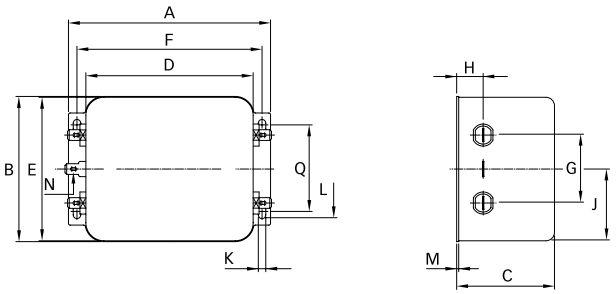
Connection style -06, 1 and 3 A types



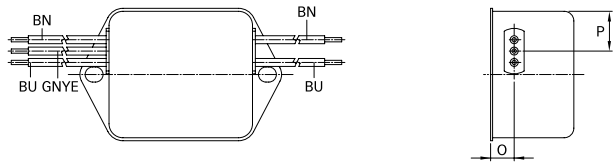
Connection style -06, 6 to 12 A types



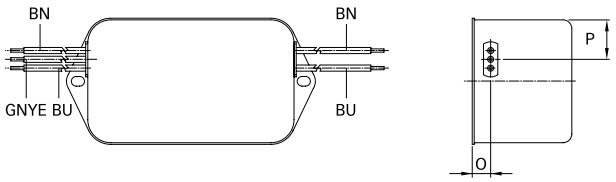
Connection style -06, 16 A types



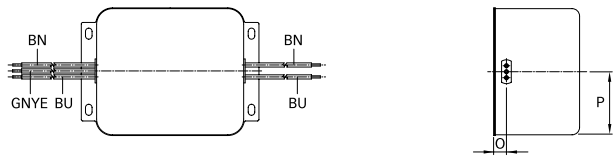
Connection style -07, 1 and 3 A types (same dimensions as style -06)



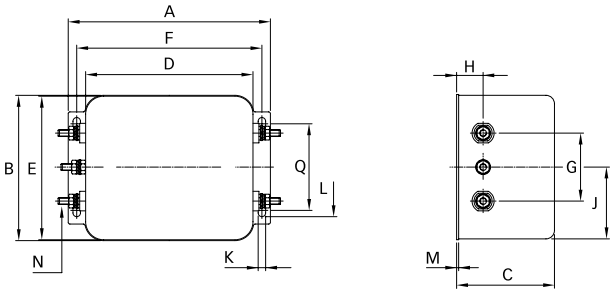
Connection style -07, 6 to 12 A types (same dimensions as style -06)



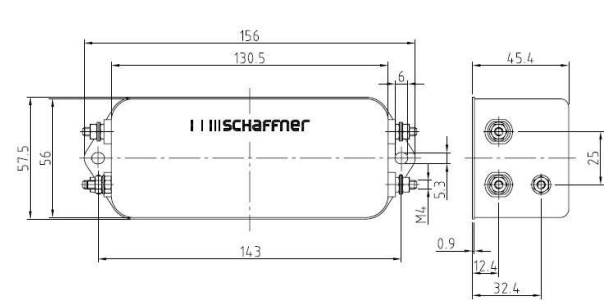
Connection style -07, 16 A types (same dimensions as style -06)



Connection style -08, 10 to 16 A types



Connection style -08, 25 and 36 A types



Dimensions

	1 A	3 A	6 A	10 A	12 A	16 A	25 A	36 A	Tolerances
A	85 ±0.5	85 ±0.5	113.5	156	156	119	156	156	±1
B	54 ±0.5	54 ±0.5	57.5	57.5	57.5	85.5	57.5	57.5	±1
C	30.3 ±0.5	40.3 ±0.5	45.4	45.4	45.4	57.6	45.4	45.4	±1
D	64.8 ±0.5	64.8 ±0.5	94	130.5	130.5	98.5	130.5	130.5	±1
E	49.8	49.8	56	56	56	84.5	56	56	±0.5
F	75	75	103	143	143	109	143	143	±0.3
G	27	27	25	25	25	40	25	25	±0.2
H	12.3	12.3	12.4	12.4	12.4	15.6	12.4	12.4	±0.5
I	20.8	29.8	32.4	32.5	32.5		32.5	32.5	±0.5
J	19.9	11.4	15.5	15.5	15.5	42.25	15.5	15.5	±0.5
K	5.3	5.3	4.4	5.3	5.3	4.4	5.3	5.3	
L	6.3	6.3	6	6	6	7.4	6	6	
M	0.7	0.7	1	1	1	1.2	1	1	±0.3
Connection style -06									
N	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8			
Connection style -07									
O	8.3	8.3	8.4	8.4	8.4	8.6			±0.5
P	14.9	14.9	18	18	18	42.25			±0.5
AWG type wire	AWG 20	AWG 20	AWG 18	AWG 18	AWG 16	AWG 16			
Wire length	140	140	140	140	140	140			+5
Connection style -08									
N				M4	M4	M4	M4	M4	
Q						51			±0.2
Recommended torque (Nm)				1.2 - 1.3	1.2 - 1.3	1.2 - 1.3	1.2 - 1.3	1.2 - 1.3	
Earth terminal				1.5 - 1.7	1.5 - 1.7	1.5 - 1.7	1.5 - 1.7	1.5 - 1.7	

All dimensions in mm; 1 inch = 25.4 mm

Please visit www.schaffner.com to find more details on filter connectors.

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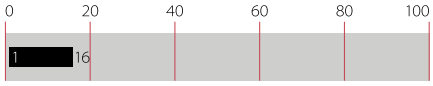
Multi-stage High Performance AC/DC EMI Filter

- Rated currents from 1 to 16 A
- High differential and common-mode attenuation
- Good low frequency attenuation
- Optional medical versions (B type)
- Optional safety versions (A type)

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Rated voltage*	250 VAC, 50/60 Hz; 250 VDC
Operating frequency	DC to 400 Hz
Rated currents	1 to 16 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec P –> PE 2500 VAC for 2 sec (B types) P –> N 1100 VDC for 2 sec
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)**
Certified to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (applies to AC and DC applications)
Flammability corresponding to	Terminal plastic for -06/-08 version: UL 94 V-0 Laces for -07 version: UL 94 VW-1 Grommet for -07 version: UL 94 V-0
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Overvoltage category	II acc. IEC 60664-1
Pollution degree	2 acc. IEC 60664-1
Altitude	2000m (above derating applies)**
MTBF @ 40°C/230 V (Mil-HB-217F)	1,650,000 hours 1,700,000 hours (B types)

* maximum RMS operating voltage at rated frequency or the maximum DC operating voltage
** for dedicated requests exceeding this specification (e.g. -40 °C or higher altitude) please contact your local Schaffner Sales office

Approvals

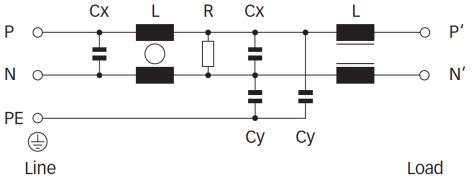
Features and benefits

- FN 2080 two-stage filters are designed for easy and fast chassis mounting
- FN 2080 B versions without capacitors to earth comply to 1MOP for ME (medical equipment) acc. IEC 60601-1
- FN 2808 A version with low capacitance to earth for safety critical applications with necessity for low leakage currents
- All filters provide a high conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- FN 2080 two-stage filters are designed with good low frequency attenuation
- FN 2080 filters are also available as single- stage filters
- FN 2080 filters are also available with two common mode choke configuration (FN 2070 series)
- Various terminal options allow you to select the desired connection style

Typical applications

- Electrical and electronic equipment
- Lighting applications (due to high differential mode inductance)
- Consumer goods
- Household equipment
- Building automation
- Industrial applications
- Machinery
- Medical equipment
- Electronic data processing equipment
- Office automation and datacom equipment
- Various noisy applications requiering good filter performance

Typical electrical schematic



Filter selection table

Filter*	Rated current @ 40°C (25°C)	Leakage current** @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance***		Capacitance***		Resistance***	Input/Output connections			Weight
			L	L1	Cx	Cy	R				
	[A]	[mA]	[mH]	[µH]	[µF]	[nF]	[kΩ]				[g]
FN 2080-1-..	1 (1.2)	0.66 (0.38)	22	490	0.33	4.7	1000	-06	-07		200
FN 2080-3-..	3 (3.5)	0.66 (0.38)	9.8	160	0.47	4.7	470	-06	-07		270
FN 2080-6-..	6 (6.9)	0.66 (0.38)	7.8	110	1	4.7	220	-06	-07		470
FN 2080-10-..	10 (11.5)	0.66 (0.38)	4.5	60	1	4.7	220	-06	-07	-08	750
FN 2080-12-..	12 (13.8)	0.66 (0.38)	3.25	50	1	4.7	220	-06	-07	-08	750
FN 2080-16-..	16 (18.4)	0.66 (0.38)	2.8	43	1	4.7	220	-06	-07	-08	1020
FN 2080A-1-..	1 (1.2)	0.07 (0.04)	22	490	0.33	0.47	1000	-06	-07		200
FN 2080A-3-..	3 (3.5)	0.07 (0.04)	9.8	160	0.47	0.47	470	-06	-07		270
FN 2080A-6-..	6 (6.9)	0.07 (0.04)	7.8	110	1	0.47	220	-06	-07		470
FN 2080A-10-..	10 (11.5)	0.07 (0.04)	4.5	60	1	0.47	220	-06	-07	-08	750
FN 2080A-12-..	12 (13.8)	0.07 (0.04)	3.25	50	1	0.47	220	-06	-07	-08	750
FN 2080A-16-..	16 (18.4)	0.07 (0.04)	2.8	43	1	0.47	220	-06	-07	-08	1020
FN 2080B-1-..	1 (1.2)	0.00	22	490	0.33		1000	-06	-07		200
FN 2080B-3-..	3 (3.5)	0.00	9.8	160	0.47		470	-06	-07		270
FN 2080B-6-..	6 (6.9)	0.00	7.8	110	1		220	-06	-07		470
FN 2080B-10-..	10 (11.5)	0.00	4.5	60	1		220	-06	-07	-08	750
FN 2080B-12-..	12 (13.8)	0.00	3.25	50	1		220	-06	-07	-08	750
FN 2080B-16-..	16 (18.4)	0.00	2.8	43	1		220	-06	-07	-08	1020

* To compile a complete part number, please replace the -.. with the required I/O connection style (e.g. FN 2080-16-08, FN 2080B-10-06).
** Maximum leakage under usual AC operating conditions (acc. IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
*** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

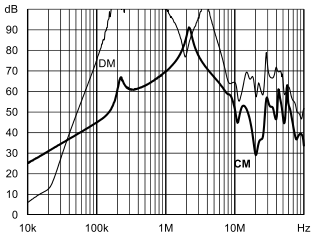
Product selector

FN 2080 x -xx-yy

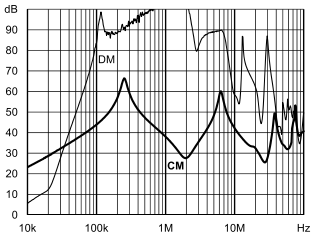
06	Faston 6.3 × 0.8 mm (spade/soldering)
07	Wire leads
08	Studs (M4 screws)
1 to 16	Rated current
Blank	Standard version
A	Safety version
B	Medical version

Typical filter attenuation

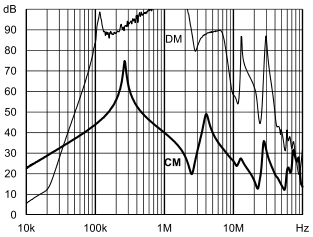
Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym



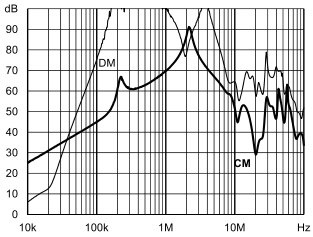
1 A: Standard type



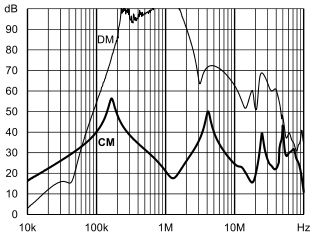
A type



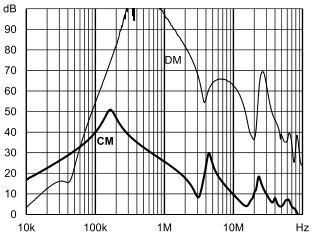
B type



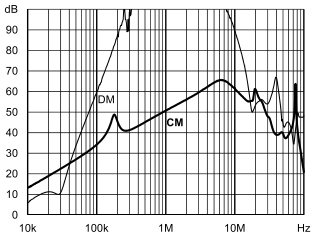
3 A: Standard type



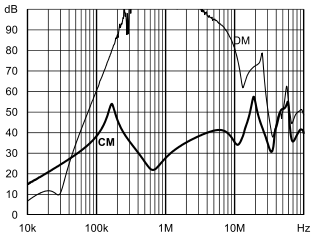
A type



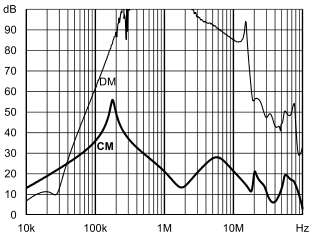
B type



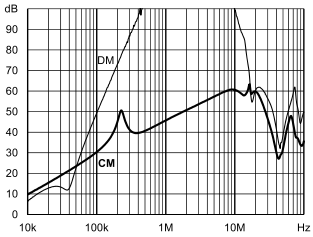
6 A: Standard type



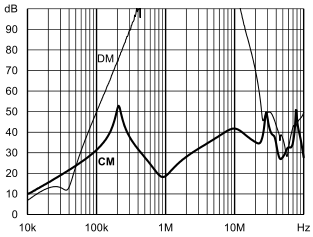
A type



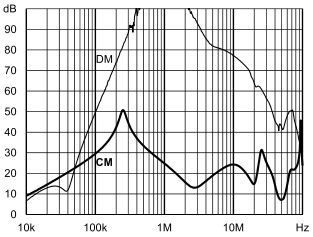
B type



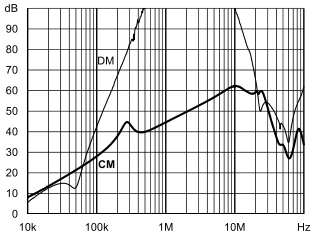
10 A: Standard type



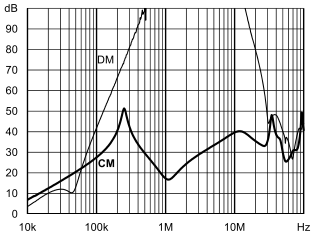
A type



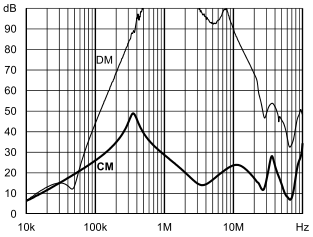
B type



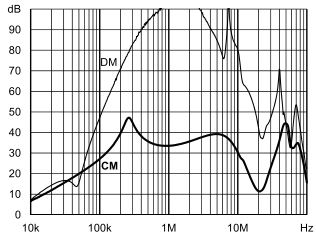
12 A: Standard type



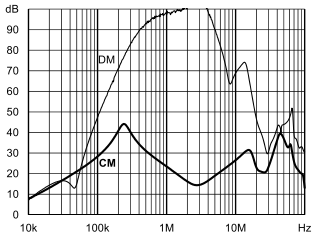
A type



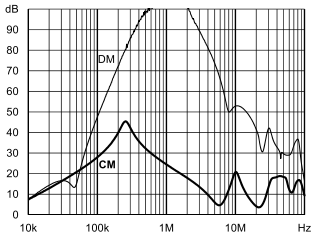
B type



16 A: Standard type



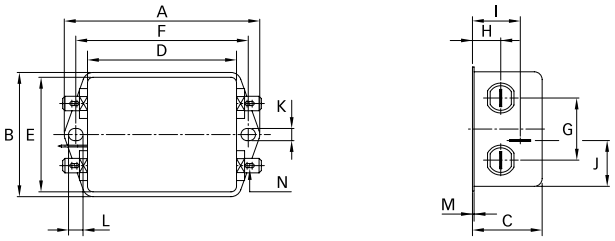
A type



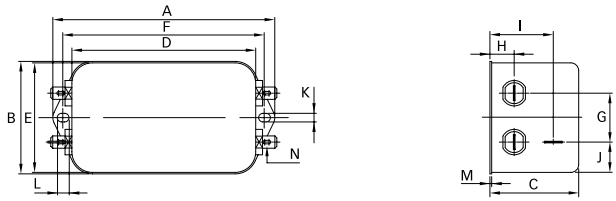
B type

Mechanical data

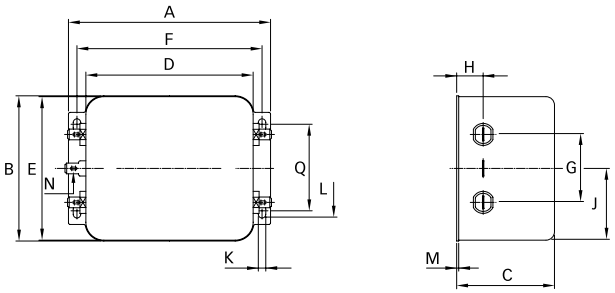
Connection style -06, 1 and 3 A types



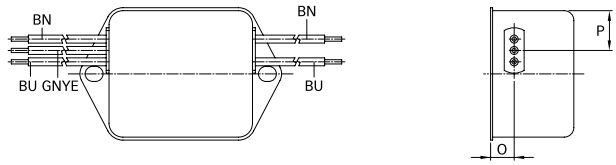
Connection style -06, 6 to 12 A types



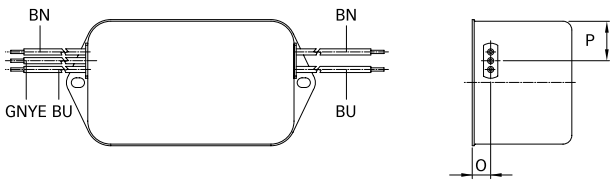
Connection style -06, 16 A types



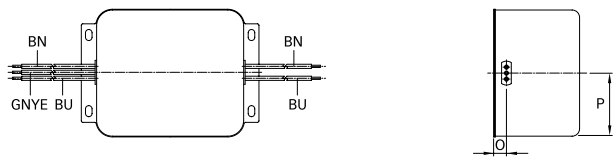
Connection style -07, 1 and 3 A types (same dimensions as style -06)



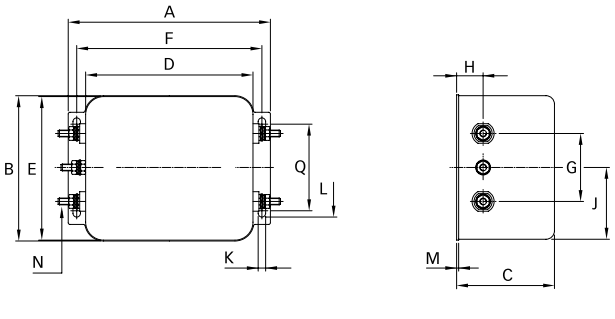
Connection style -07, 6 to 12 A types (same dimensions as style -06)



Connection style -07, 16 A types (same dimensions as style -06)



Connection style -08, 10 to 16 A types (same dimensions as style -06)



Dimensions

	1 A	3 A	6 A	10 A	12 A	16 A	Tolerances
A	85	85	113.5 ±1	156 ±1	156 ±1	119 ±1	±0.5
B	54	54	57.5 ±1	57.5 ±1	57.5 ±1	85.5 ±1	±0.5
C	30.3	40.3	45.4 ±1	45.4 ±1	45.4 ±1	57.6 ±1	±0.5
D	64.8	64.8	94 ±1	130.5 ±1	130.5 ±1	98.5 ±1	±0.5
E	49.8	49.8	56	56	56	84.5	±0.5
F	75	75	103	143	143	109	±0.3
G	27	27	25	25	25	40	±0.2
H	12.3	12.3	12.4	12.4	12.4	15.6	±0.5
I	20.8	29.8	32.4	32.5	32.5		±0.5
J	19.9	11.4	15.5	15.5	15.5	42.25	±0.5
K	5.3	5.3	4.4	5.3	5.3	4.4	
L	6.3	6.3	6	6	6	7.4	
M	0.7	0.7	1	1	1	1.2	± 0.3
Connection style -06							
N	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	
Connection style -07							
O	8.3	8.3	8.4	8.4	8.4	8.6	±0.5
P	14.9	14.9	18	18	18	42.25	±0.5
AWG type wire	AWG 20	AWG 20	AWG 18	AWG 18	AWG 16	AWG 16	
Wire length	140	140	140	140	140	140	+5
Connection style -08							
N				M4	M4	M4	
Q						51	±0.2
Recommended torque (Nm)				1.2 - 1.3	1.2 - 1.3	1.2 - 1.3	
Earth terminal				1.5 - 1.7	1.5 - 1.7	1.5 - 1.7	

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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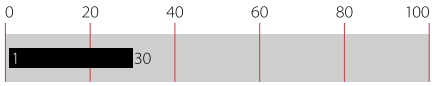
Multi-stage AC/DC EMI Filter with Excellent Attenuation Performance

- Rated currents from 1 to 30 A
- Two-stage filter
- Very high differential and common-mode attenuation
- Optional medical versions (B type)
- Optional safety versions (A type)
- Optional enhanced performance versions
- Optional overvoltage protection (Z type)

Performance indicators

Attenuation performance

Rated current [A]



Approvals

Features and benefits

- FN 2090 two-stage filters are designed for easy and fast chassis mounting.
- FN 2090 B versions without capacitors to earth comply to 1MOP for ME (medical equipment) acc. IEC 60601-1
- FN 2090 A versions with low capacitance to earth for safety critical applications with a requirement for low leakage currents.
- FN 2090 filters offers an optimized filter range for enhanced performance AC and DC applications , in same compact size (KK, LL, NN types)
- All filters provide an exceptional conducted attenuation performance, based on chokes with high permeable core material and excellent thermal behaviour.
- FN 2090 two-stage filters are designed for noisy applications requiring excellent filter performance.
- The higher inductivity versus amperage offers increased attenuation performance with the same form factor compared to FN 2060 and FN 2080 filter series.
- All FN 2090 filters can be delivered with optional surge pulse protection (Z type).
- FN 2090 filters are also available as singlestage filters (FN 2030 series).
- Various terminal options allow you to select the desired connection style.

Technical specifications

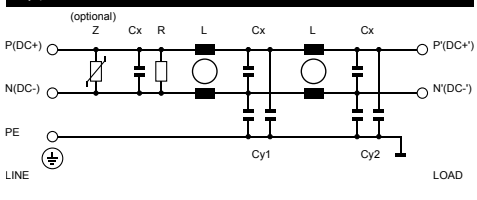
Rated voltage*	250 VAC, 50/60 Hz; 250 VDC
Operating frequency	DC to 400 Hz
Rated currents	1 to 30 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec (equiv. cap <88 nF) P –> PE 2550 VDC for 2 sec (equiv. cap >88 nF) P –> PE 2500 VAC for 2 sec (B types) P –> N 1100 VDC for 2 sec
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)**
Certified to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (applies to AC and DC applications)
Flammability corresponding to	Terminal plastic for -06/-08 version: UL 94 V-0 Laces for -07 version: UL 94 VW-1 Grommet for -07 version: UL 94 V-0
Surge pulse protection (Z type)	Helps compliance to IEC61000-4-5 (Differential Mode only)
Overvoltage category	II acc. IEC 60664-1
Pollution degree	2 acc. IEC 60664-1
Altitude	2000m (above derating applies)**
MTBF @ 40°C/230 V (Mil-HB-217F)	1,300,000 hours (1 to 10 A types) 1,100,000 hours (12 A types) 517,000 hours (16 and 30 A types)

* maximum RMS operating voltage at rated frequency or the maximum DC operating voltage
** for dedicated requests exceeding this specification (e.g. -40 °C or higher altitude) please contact your local Schaffner Sales office

Typical applications

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Building automation
- Industrial applications
- Machinery
- Medical equipment
- Electronic data processing equipment
- Office automation and datacom equipment
- Various noisy applications requiring high filter performance

Typical electrical schematic



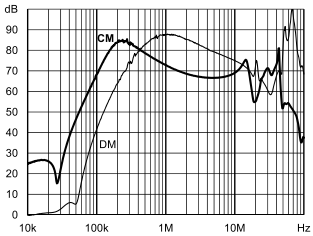
Filter selection table

Filter*	Rated current @ 40°C (25°C) [A]	Leakage current** @ 250V AC/50 Hz (@ 120V AC/60 Hz) [mA]	Inductance*** L [mH]	Capacitance*** Cx [µF]	Cy1 [nF]	Cy2 [nF]	Resistance*** R [kΩ]	Input/Output connections			Weight [g]
FN 2090-1-..	1 (1.1)	0.45 (0.26)	20	0.22	2.2	1.0	680	-06	-07		73
FN 2090-3-..	3 (3.4)	0.45 (0.26)	14	0.33	2.2	1.0	470	-06	-07		158
FN 2090-4-..	4 (4.5)	0.45 (0.26)	14	0.33	2.2	1.0	470	-06	-07		176
FN 2090-6-..	6 (6.7)	0.61 (0.35)	8	0.47	3.3	1.0	330	-06	-07	-08	191
FN 2090-8-..	8 (8.9)	0.61 (0.35)	8	0.47	3.3	1.0	330	-06	-07		330
FN 2090-10-..	10 (11.2)	0.61 (0.35)	8	0.47	3.3	1.0	330	-06	-07	-08	369
FN 2090-12-..	12 (13.4)	0.93 (0.54)	4	1	10	1.0	220	-06	-07	-08	391
FN 2090-16-..	16 (17.9)	0.93 (0.54)	4	1	10	1.0	220	-06	-07	n.a.	425
FN 2090-20-..	20 (22.4)	0.93 (0.54)	2.7	1	10	1.0	220	-06		-08	530
FN 2090-30-08	30 (33.5)	0.93 (0.54)	1.5	1	10	1.0	220			-08	548
FN 2090 A-1-..	1 (1.1)	0.13 (0.07)	20	0.22	0.47	0.47	680	-06	-07		73
FN 2090 A-3-..	3 (3.4)	0.13 (0.07)	14	0.33	0.47	0.47	470	-06	-07		158
FN 2090 A-4-..	4 (4.5)	0.13 (0.07)	14	0.33	0.47	0.47	470	-06	-07		176
FN 2090 A-6-..	6 (6.7)	0.13 (0.07)	8	0.47	0.47	0.47	330	-06	-07	-08	191
FN 2090 A-8-..	8 (8.9)	0.13 (0.07)	8	0.47	0.47	0.47	330	-06	-07		330
FN 2090 A-10-..	10 (11.2)	0.13 (0.07)	8	0.47	0.47	0.47	330	-06	-07	-08	369
FN 2090 A-12-..	12 (13.4)	0.13 (0.07)	4	1	0.47	0.47	220	-06	-07	-08	391
FN 2090 A-16-..	16 (17.9)	0.13 (0.07)	4	1	0.47	0.47	220	-06	-07	n.a.	425
FN 2090 A-20-..	20 (22.4)	0.13 (0.07)	2.7	1	0.47	0.47	220	-06		-08	530
FN 2090 A-30-08	30 (33.5)	0.13 (0.07)	1.5	1	10	10	220			-08	548
FN 2090 B-1-..	1 (1.1)	0.00	20	0.22			680	-06	-07		73
FN 2090 B-3-..	3 (3.4)	0.00	14	0.33			470	-06	-07		158
FN 2090 B-4-..	4 (4.5)	0.00	14	0.33			470	-06	-07		176
FN 2090 B-6-..	6 (6.7)	0.00	8	0.47			330	-06	-07	-08	191
FN 2090 B-8-..	8 (8.9)	0.00	8	0.47			330	-06	-07		330
FN 2090 B-10-..	10 (11.2)	0.00	8	0.47			330	-06	-07	-08	369
FN 2090 B-12-..	12 (13.4)	0.00	4	1			220	-06	-07	-08	391
FN 2090 B-16-..	16 (17.9)	0.00	4	1			220	-06	-07	n.a.	425
FN 2090 B-20-..	20 (22.4)	0.00	2.7	1			220	-06		-08	530
FN 2090 B-30-08	30 (33.5)	0.00	1.5	1			220			-08	548
Enhanced performance											
FN 2090 KK-1-06	1 (1.15)	3.46 (1.99)	20	0.22	22	22	680	-06			95
FN 2090 NN-3-06	3 (3.4)	15.71 (9.05)	14	0.33	100	100	470	-06			200
FN 2090 NN-4-06	4 (4.5)	15.71 (9.05)	14	0.33	100	100	470	-06			210
FN 2090 NN-6-06	6 (6.7)	15.71 (9.05)	8	0.47	100	100	330	-06			220
FN 2090 NN-8-06	8 (8.9)	15.71 (9.05)	8	0.47	100	100	330	-06			340
FN 2090 LL-10-06	10 (11.2)	5.18 (2.98)	8	0.47	33	33	330	-06		-08	470
FN 2090 LL-12-06	12 (13.4)	5.18 (2.98)	4	1	33	33	220	-06		-08	500
FN 2090 LL-16-06	16 (17.9)	5.18 (2.98)	4	1	33	33	220	-06		n.a.	530
FN 2090 LL-20-..	20 (23)	5.18 (2.98)	2.7	1	33	33	220	-06		-08	580
FN 2090 LL-30-08	30 (33.5)	5.18 (2.98)	1.5	1	33	33	220			-08	600

** To compile a complete part number, please replace the -.. with the required I/O connection style.
For surge pulse protection, please add Z (e.g. FN 2090Z-10-06, FN 2090BZ-20-08). The different letters code the used Cy values in the filter type (A = 0.47nF; K = 22nF; L = 33nF; N = 100nF; as the FN 2090 is a dual stage filter each letter stands for one stage of Cy)
** Maximum leakage under usual AC operating conditions (acc. IEC 60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level. Leakage current for DC application is 0 mA
*** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym



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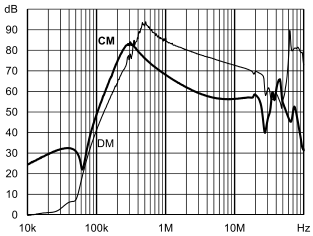
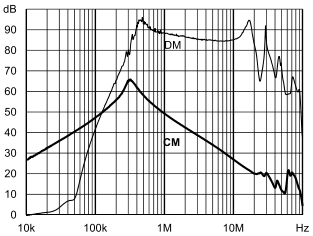


A type



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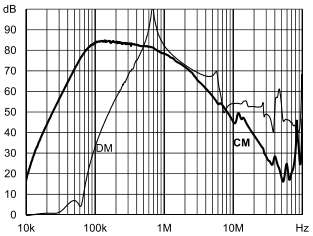
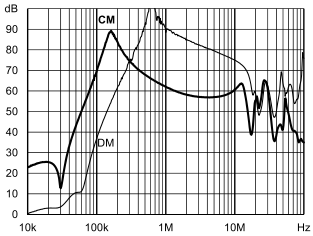
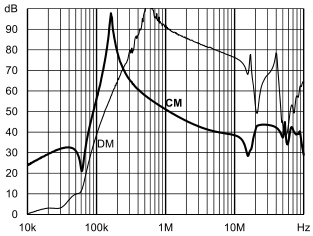


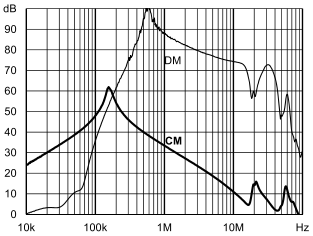
Enhanced performance



3 A: Standard type



A type



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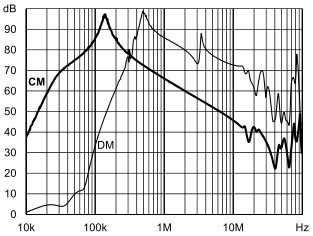
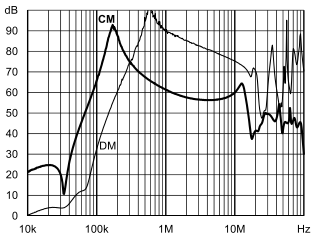
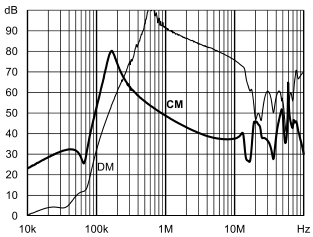


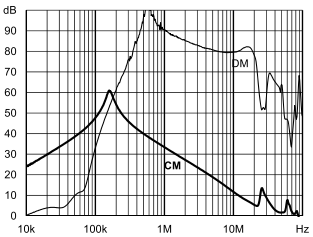
Enhanced performance



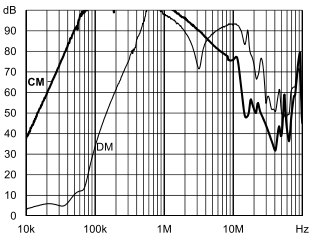
4 A: Standard type



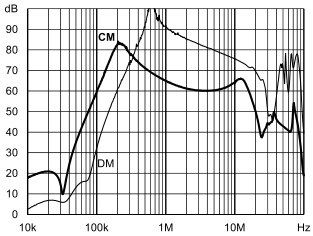
A type



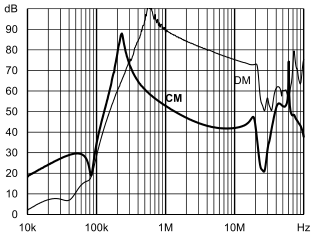
B type



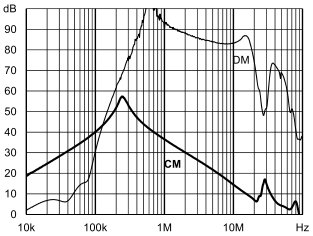
Enhanced performance



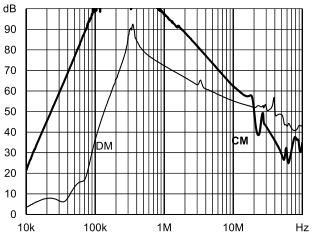
6 A: Standard type



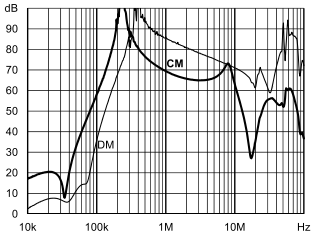
A type



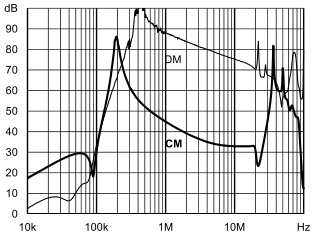
B type



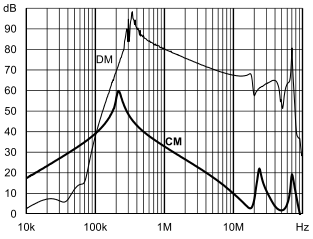
Enhanced performance



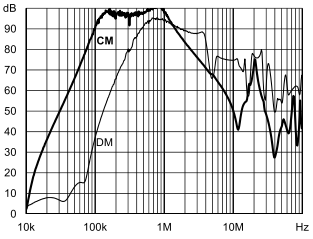
8 A: Standard type



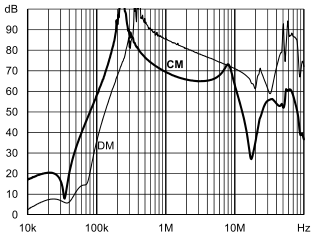
A type



B type



Enhanced performance



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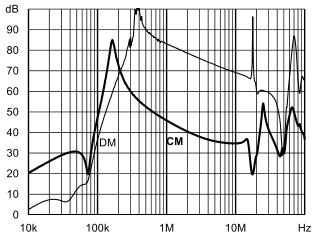

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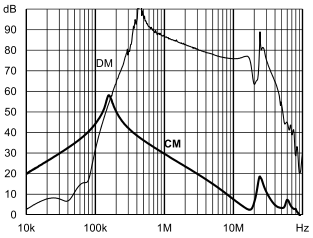
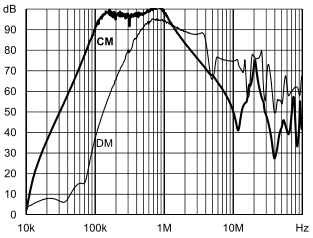
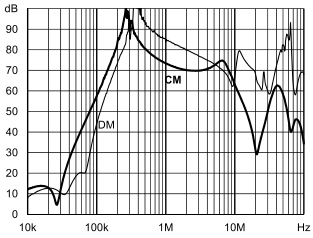


B type



Enhanced performance



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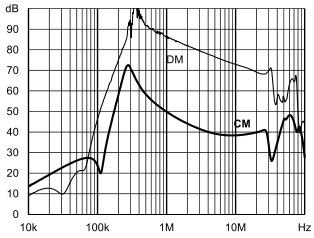

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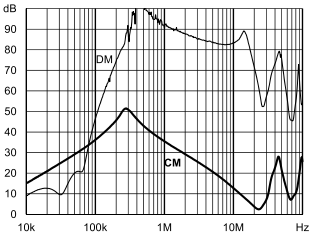

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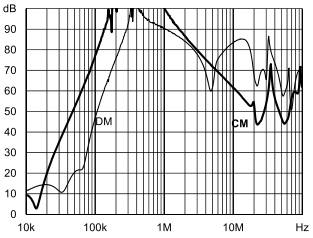
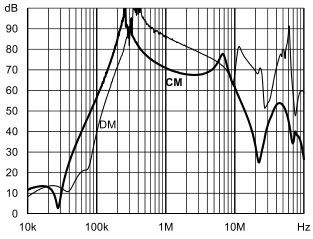
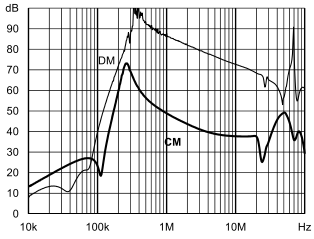


Enhanced performance



16 A: Standard type



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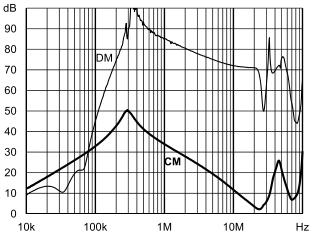

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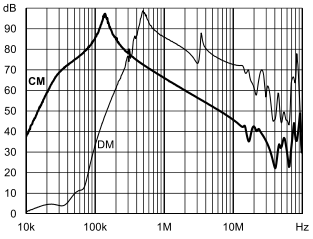
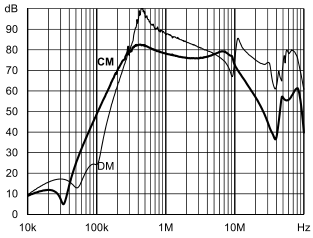


Enhanced performance



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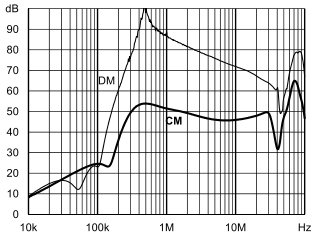

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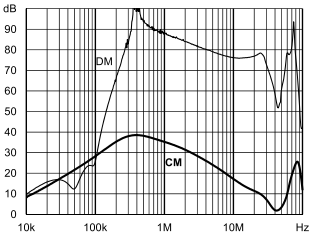

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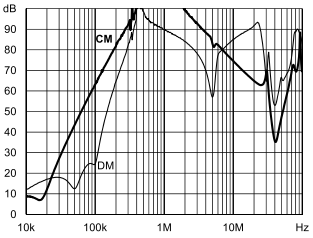
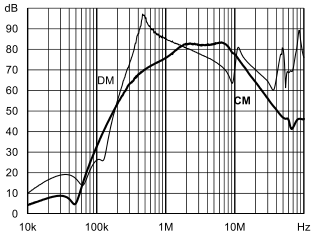
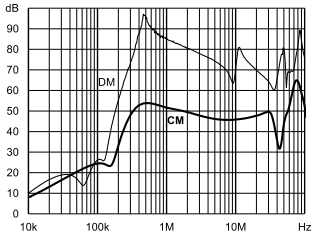


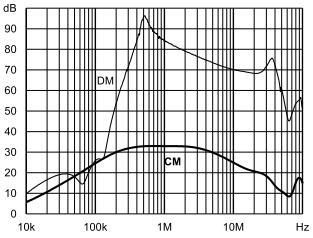
Enhanced performance



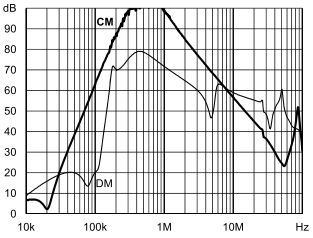
30 A: Standard type



A type



B type



Enhanced performance

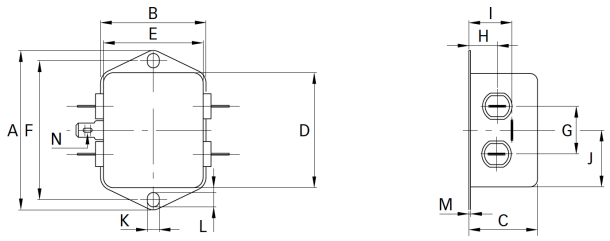
Product selector

FN 2090 xy-xx-yy

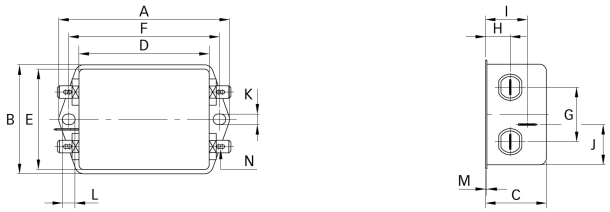
xx	06	Faston 6.3 × 0.8 mm (spade/soldering)
	07	Wire leads
	08	Studs (M4 screws)
yy	1 to 30	Rated current
	Blank	Standard version
	Z	With surge protection
	Blank	Standard version
	A	Safety version
	B	Medical version
	KK/LL/NN	High performance version

Mechanical data

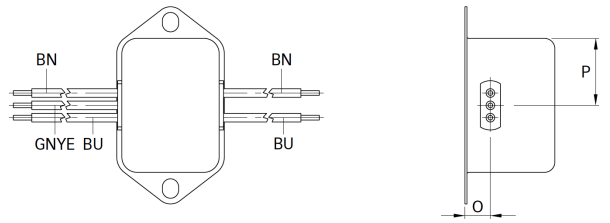
Connection style -06, 1 A types



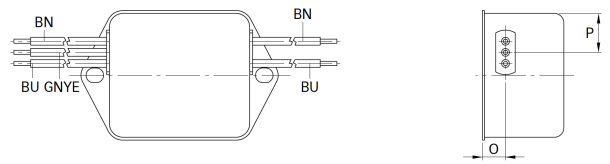
Connection style -06, 3 to 20 A types



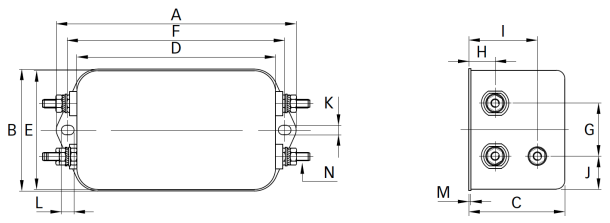
Connection style -07, 1 A types (same dimensions as style -06)



Connection style -07, 3 to 20 A types (same dimensions as style -06)



Connection style -08, 10 to 30 A types



Dimensions

	1 A	3 A	4 A	6 A	8 A	10 A	12 A	16 A	20 A	30 A	Tolerances
A	71	85	85	85	113.5 ±1	113.5 ±1	113.5 ±1	113.5 ±1	113.5 ±1	113.5 ±1	±0.5
B	46.6	54	54	54	57.5 ±1	57.5 ±1	57.5 ±1	57.5 ±1	57.5 ±1	57.5 ±1	±0.5
C	22.3	30.3	30.3	30.3	45.4 ±1	45.4 ±1	45.4 ±1	45.4 ±1	45.4 ±1	45.4 ±1	±0.5
D	50.5	64.8	64.8	64.8	94 ±1	94 ±1	94 ±1	94 ±1	94 ±1	94 ±1	±0.5
E	44.5	49.8	49.8	49.8	56	56	56	56	56	56	±0.5
F	61	75	75	75	103	103	103	103	103	103	±0.3
G	21	27	27	27	25	25	25	25	25	25	±0.2
H	10.8	12.3	12.3	12.3	12.4	12.4	12.4	12.4	12.4	12.4	±0.5
I	16.8	20.8	20.8	20.8	32.4	32.4	32.4	32.4	32.4	32.4	±0.5
J	25.25	19.9	19.9	19.9	15.5	15.5	15.5	15.5	15.5	15.5	±0.5
K	5.3	5.3	5.3	5.3	4.4	4.4	4.4	4.4	4.4	4.4	
L	6.3	6.3	6.3	6.3	6	6	6	6	6	6	
M	0.7	0.7	0.7	0.7	1	1	1	1	1	1	±0.3
Connection style -06											
N	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	6.3 x 0.8	
Connection style -07											
O	8.3	8.3	8.3	8.3	8.4	8.4	8.4	8.4			±0.5
P	14	14.9	14.9	14.9	18	18	18	18			±0.5
AWG type wire	AWG 20	AWG 20	AWG 20	AWG 18	AWG 18	AWG 18	AWG 16	AWG 16			
Wire length	140	140	140	140	140	140	140	140			+5
Connection style -08											
N						M4	M4	M4	M4	M4	
Recommended torque (Nm)						1.2 - 1.3	1.2 - 1.3	1.2 - 1.3	1.2 - 1.3	1.2 - 1.3	
Earth terminal						1.5 - 1.7	1.5 - 1.7	1.5 - 1.7	1.5 - 1.7	1.5 - 1.7	

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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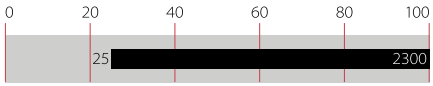
EMC/EMI Filter for PV Inverters

- Reduces conducted emissions towards the solar panel
- Reduces the probability of EMI radiation off the solar panel
- Helps to prevent pre-mature panel aging because of HF leakage currents
- Helps to meet international EMC regulations for the entire PV system
- Most compact standard solution in the industry, optionally available without capacitors to ground (B types)
- New: up to 2300 A

Performance indicators

Attenuation performance

Rated current [A]



Approvals

(600 VDC) (850 VDC)

FN 2200 are the most compact dedicated DC filters for PV inverters in the industry and therefore support the integration in the ever shrinking frame sizes of today's power electronics. All FN 2200 come in unsymmetrical housings, which help to prevent inverse installation and wrong electrical connection. Along with grid-side installed Schaffner AC EMC/EMI filters, FN 2200 are key to meet the stringent international standards for electromagnetic compatibility (EMC) like EN 61000-6-3 and -6-4 and help to ensure a reli- able and fault-free operation of the entire PV system. FN 2200 are designed for very low power loss, to support overall PV system efficiency.

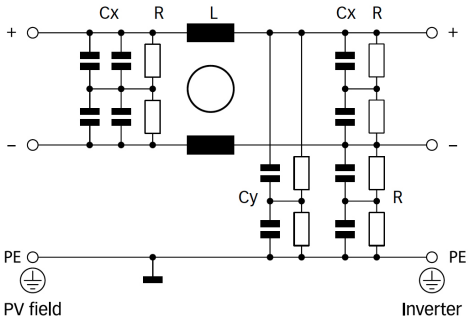
Features and benefits

FN 2200 range of standard EMC/EMI filters is based on Schaffner's years of experience in custom filter design for the global photovoltaic (PV) inverter industry. Installed between the PV inverter and the solar panel, FN 2200 DC filters help to control conducted emissions on the panel side of the system and therefore significantly reduce the potential for high-frequency (HF) interference radiation off the panel. The filter also protects the solar panel from HF stray and leakage currents which can cause pre-mature aging in the PV modules.

Typical applications

FN 2200 are primarily designed for PV inverters. However, they can potentially also be used in other DC applications within published specifications, like UPS, DC motor drives, or DC quick chargers.

Typical electrical schematic



Technical specifications

Maximum continuous operating voltage	Max. 1200 VDC
Operating frequency	DC
Rated currents	25 to 2300 A @ 55°C
High potential test voltage	P –> E 3600 VDC for 2 sec P –> P 3000 VDC for 2 sec
Protection category	IP 20 (25 to 150 A types); IP 00 (250 to 2300 A types)
Overload capability	4x rated current at switch on, 1.5x rated current for 1 minute, once per hour
Temperature range (operation and storage)	-40°C to +100°C (40/100/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 55°C/1200 V (Mil-HB-217F)	min. 223,000 hours

Filter selection table

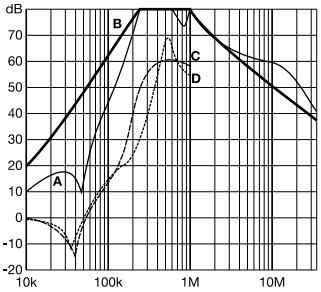
Filter	Rated current @ 55°C (40°C) [A]	Typical inverter AC power rating* [kW]	Filter efficiency @ 25°C/DC [%]	Power loss @ 25°C/DC [W]	Input/Output connections		Weight [kg]
FN 2200-25-33	25 (28)	10	> 99.9	8	-33		0.9
FN 2200-50-34	50 (57)	20	> 99.9	17	-34		1.6
FN 2200-75-34	75 (86)	30	> 99.9	18	-34		1.7
FN 2200-100-35	100 (115)	40	> 99.9	22	-35		2.7
FN 2200-150-40	150 (173)	60	> 99.9	31	-40		4.9
FN 2200-250-99	250 (288)	100	> 99.9	10		-99	5.0
FN 2200-400-99	400 (460)	150	> 99.9	16		-99	6.1
FN 2200-600-99	600 (690)	250	> 99.9	29		-99	6.5
FN 2200-800-99	800 (920)	350	> 99.9	26		-99	9.3
FN 2200-1000-99	1000 (1150)	400	> 99.9	40		-99	9.4
FN 2200-1500-99	1500 (1600)	500	> 99.9	45		-99	14.6
FN 2200-2300-99	2300 (2500)	800/1000	> 99.9	84		-99	25.0
FN 2200B-25-33	25 (28)	10	> 99.9	8	-33		0.9
FN 2200B-50-34	50 (57)	20	> 99.9	17	-34		1.6
FN 2200B-75-34	75 (86)	30	> 99.9	18	-34		1.7
FN 2200B-100-35	100 (115)	40	> 99.9	22	-35		2.7
FN 2200B-150-40	150 (173)	60	> 99.9	31	-40		4.9
FN 2200B-250-99	250 (288)	100	> 99.9	10		-99	5.0
FN 2200B-400-99	400 (460)	150	> 99.9	16		-99	6.1
FN 2200B-600-99	600 (690)	250	> 99.9	29		-99	6.5
FN 2200B-800-99	800 (920)	350	> 99.9	26		-99	9.3
FN 2200B-1000-99	1000 (1150)	400	> 99.9	40		-99	9.4
FN 2200B-1500-99	1500 (1600)	500	> 99.9	45		-99	14.6
FN 2200B-2300-99	2300 (2500)	800/1000	> 99.9	84		-99	25.0

* Based on rated DC current of typical 3-phase PV inverters with 900 VDC input. Note: depending upon manufacturer and model, DC currents for a given PV inverter power can differ significantly. Filters with higher current ratings for large central inverters up to the MW range are available upon request.

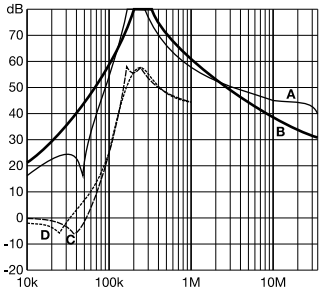
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

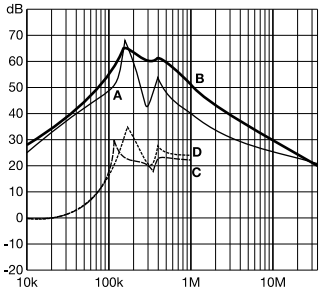
25 to 75 A types



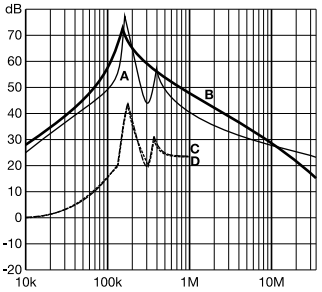
100 to 150 A types



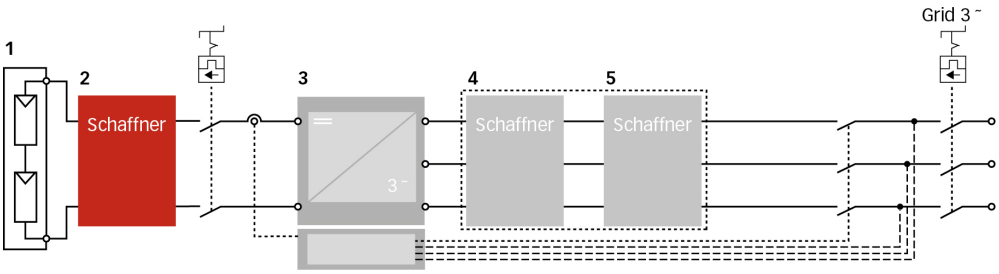
250 A types



400 to 2300 A types



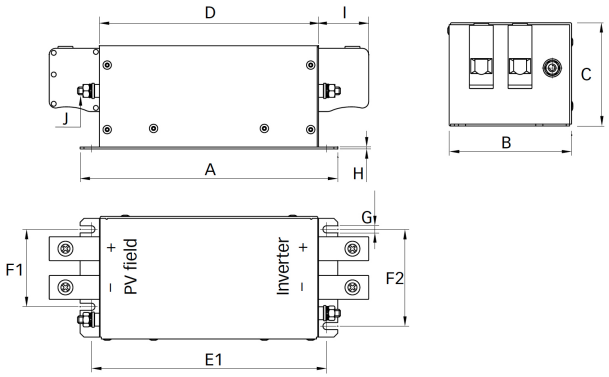
Typical block schematic



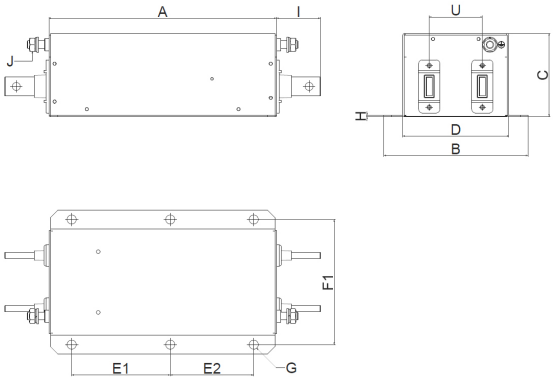
1 PV modules
2 Schaffner FN 2200
3 Central Inverter
4 Schaffner magnetic components
5 Schaffner AC EMC/EMI filter

Mechanical data

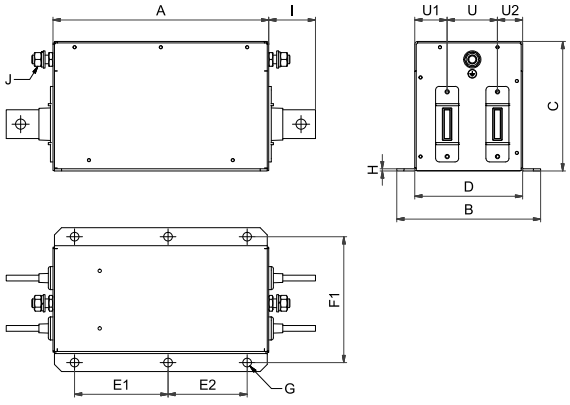
25 to 150 A types



250 to 600 A types



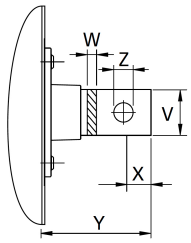
800 to 2300 A types



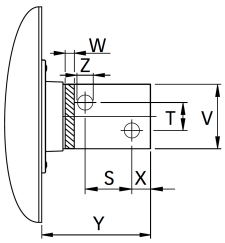
Note: all FN 2200 provide unsymmetrical mounting hole patterns to prevent inverse filter installation in the field. (Dimensions E1 E2 and F1/F2)

Busbar connections

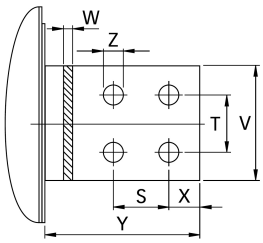
250 to 1000 A types



1500 A types



2300 A types



Dimensions

	25 A	50 A	75 A	100 A	150 A	250 A	400 A	600 A	800 A	1000 A	1500 A	2300 A
A	170	200	200	220	250	300	300	300	300	300	300	400
B	80	95	95	125	140	180	190	190	200	200	200	250
C	65	80	80	95	115	110	110	110	140	140	150	180
D	140	170	170	190	220	130	140	140	150	150	150	195
E1	152.5	182.5	182.5	202.5	232.5	130	130	130	130	130	130	190
E2						110	110	110	110	110	110	150
F1	45	60	60	80	100	155	165	165	175	175	175	225
F2	60	75	75	100	120							
G	5.5	5.5	5.5	5.5	5.5	Ø 12	Ø 12	Ø 12	Ø 12	Ø 12	Ø 12	Ø 12
H	1	1.5	1.5	1.5	2	2	2	2	3	3	3	3
I	25	39	39	45	51	58	58	58	65	65	110	100
J	M5	M6	M6	M8	M10	M10	M10	M10	M12	M12	M12	M16
S											43	35
T											26	35
U						70	70	70	70	70	70	100
U1									45	45	55	61
U2									35	35	25	34
V						20	25	25	40	40	60	70
W						5	6	8	8	8	10	15
X						15	15	15	20	20	17	20
Y						58	58	58	65	65	110	100
Z						Ø 9	Ø 10.5	Ø 10.5	Ø 14	Ø 14	Ø 14	Ø 14

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Filter input/output connector cross sections

	-33	-34	-35	-40
Solid wire	16 mm^2	35 mm^2	50 mm^2	95 mm^2
Flex wire	10 mm^2	25 mm^2	50 mm^2	95 mm^2
AWG type wire	AWG 6	AWG 2	AWG 1/0	AWG 4/0
Recommended torque	1.5-1.8 NM	4.0-4.5 NM	7-8 NM	17-20 NM

Please visit www.schaffner.com to find more details on filter connectors.

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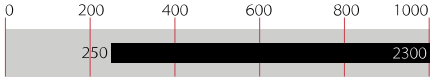
Compact high current DC EMC/EMI filter

- Reduces conducted emissions towards the solar panel
- Reduces the probability of EMI radiation off the solar panel
- Helps to prevent premature panel aging
- Helps to meet international EMC regulations
- Most compact standard solution in the industry
- FN 2210 HV without Cy capacitors to ground

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	1'500 VDC
Operating frequency	DC
Rated currents	250 to 2300 A @ 50°C
High potential test voltage	P -> E 6'800 VDC for 2 sec P -> P 3'850 VDC for 2 sec
Protection category	IP 00
Overload capability	4x rated current at switch on, max. 8 sec 1.5x rated current for 1 minute, once per hour -40°C
Temperature range (operation and storage)	to +100°C
Climatic category	40/100/21 acc. to IEC 60068-1
Terminals/Housing	Ni plated cu bars/Metal
Flammability corresponding to	UL 94V-0
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939, EN 60721-3, EN 62109

Approvals

RoHS c UL us CE

The FN 2211 HV/FN 2210 HV series are the most compact dedicated high current DC filters for PV inverters in the industry and therefore are an optimum fit with most modern PV inverter generation. In addition the filters can be configured in a very flexible way to fulfil customized application requirements.

All FN 2211 HV/FN 2210 HV come in unsymmetrical housings, which help to prevent inverse installation and wrong electrical connection. Along with grid-side installed Schaffner AC EMC/EMI filters FN 3311 HV/FN 3310 HV, the DC filters FN 2211 HV/FN 2210 HV are key to meet the stringent international standards for electromagnetic compatibility and help to ensure a reliable and fault-free operation of the entire PV system.

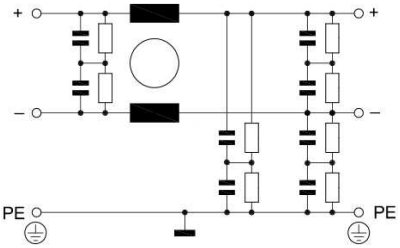
Features and benefits

Installed between the PV inverter and the solar panel, the FN 2211 HV and FN 2210 HV DC filters are used to influence positively the conducted emissions on the panel side of the system. Therefore the DC filters significantly reduce the potential for highfrequency (HF) interference radiation of the panel. The filter also helps to prevent premature panel aging because of HF stray and leakage currents.

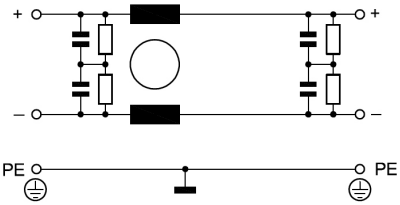
Typical applications

The FN 2211 HV/FN 2210 HV series are primarily designed for PV inverter applications between 250 and 2'300 A. However, they can potentially also be applied in other DC applications within published specifications, like UPS, DC motor drives, energy/ battery storage systems, or DC charger installations.

Typical electrical schematic FN 2211 HV



Typical electrical schematic FN 2210 HV



Filter selection table

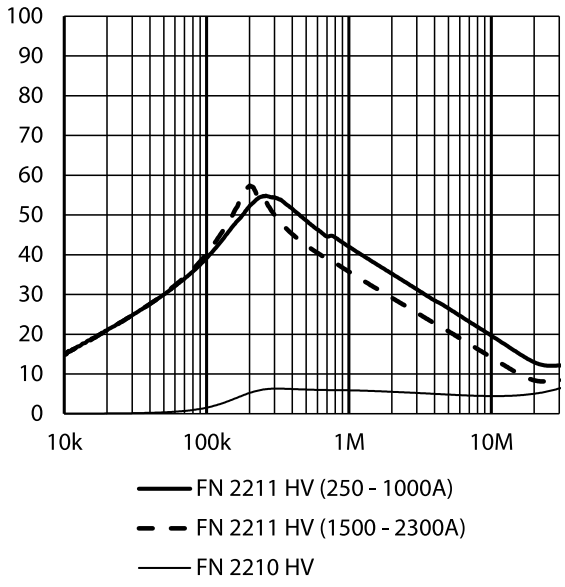
Filters *	Rated current @ 50°C [A]	Power losss @ 25°C/DC [W]	Weight [kg]
FN 2211 HV with Cy caps			
FN 2211HV-250-99-C27-R99	250	9	3.3
FN 2211 HV-400-99-C27-R99	400	14	4.2
FN 2211 HV-600-99-C27-R99	600	15	4.8
FN 2211 HV-1000-99-C27-R99	1000	31	7.1
FN 2211 HV-1500-99-C27-R99	1500	41	12.4
FN 2211 HV-2300-99-C27-R99	2300	64	18.3
FN 2210 HVwithout Cy caps			
FN 2210 HV-250-99-R9	250	9	2.
FN 2210 HV-400-99-R9	400	14	3.3
FN 2210 HV-600-99-R9	600	15	4.0
FN 2210 HV-1000-99-R9	1000	31	6.4
FN 2210 HV-1500-99-R9	1500	41	11.2
FN 2210 HV-2300-99-R9	2300	64	17.6

* Filters with reduced Cy capacitance to ground for high asymmetrical currents and higher voltages available upon request.

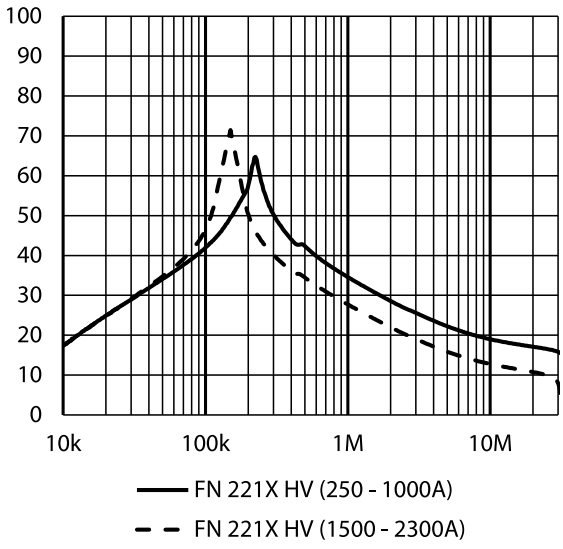
Typical filter attenuation FN 221x HV-xxx-99-C27-R99

Per CISPR 17

50 / 50 Ω asym

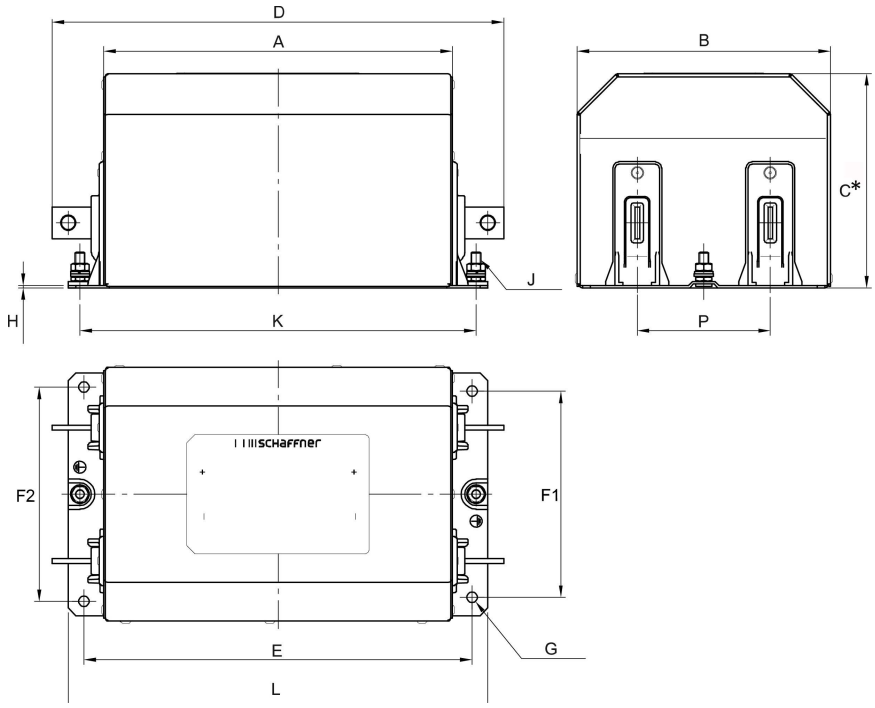


50 / 50 Ω sym



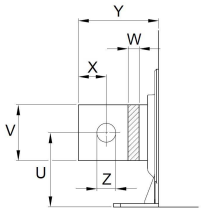
Mechanical data

250 to 2'300 A types

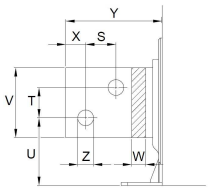


Busbar connections

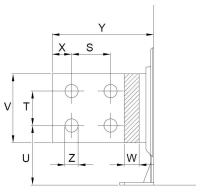
250 to 1'000 A types



1'500 A types



2'300 A types



Note: all FN 2211 and FN 2210 provide unsymmetrical mounting hole patterns to prevent inverse filter installation in the field.

Dimensions

	FN 2211 HV 250 A	FN 2210 HV* 250 A	FN 2211 HV 400 A	FN 2210 HV* 400 A	FN 2211 HV 600 A	FN 2210 HV* 600 A	FN 2211 HV 1'000 A	FN 2210 HV* 1'000 A	FN 2211 HV 1'500 A	FN 2210 HV* 1'500 A	FN 2211 HV 2'300 A	FN 2210 HV* 2'300 A
A	220	205	235	215	240	225	265	265	275	275	305	305
B	160	145	175	160	175	170	180	180	215	215	230	230
C*	140	105	150	110	150	110	165	110	200	150	210	165
D	285	270	310	290	315	300	380	380	440	440	495	495
E	245	227	260	240	265	250	300	300	315	315	345	345
F1	130	120	140	125	140	135	140	140	175	175	180	180
F2	135	125	145	130	145	140	145	145	180	180	185	185
G	Ø 7	Ø 7	Ø 9	Ø 9	Ø 9	Ø 9	Ø 11	Ø 11	Ø 11	Ø 11	Ø 11	Ø 11
H	1.5	1.5	2	2	2	2	2.5	2.5	2.5	2.5	2.5	2.5
J	M6	M6	M8	M8	M8	M8	M8	M8	M10	M10	M10	M10
K	250 (+/- 1)	230 (+/- 1)	265 (+/- 1)	245 (+/- 1)	270 (+/- 1)	255 (+/- 1)	310 (+/- 1)	310 (+/- 1)	321 (+/- 1)	321 (+/- 1)	351 (+/- 1)	351 (+/- 1)
L	265	245	285	265	290	275	330	330	345	345	375	375
P	84 (+/- 0.5)	74 (+/- 0.5)	86 (+/- 0.5)	71 (+/- 0.5)	84 (+/- 0.5)	79 (+/- 0.5)	86 (+/- 0.5)	86 (+/- 0.5)	86 (+/- 0.5)	86 (+/- 0.5)	93 (+/- 0.5)	93 (+/- 0.5)
S									26	26	40	40
T									26	26	35	35
U	41	41	46	46	49.5	49.5	53	53	58	58	60.5	60.5
V	20	20	25	25	25	25	40	40	60	60	70	70
W	3	3	4	4	8	8	8	8	10	10	15	15
X	10	10	12.5	12.5	12.5	12.5	20	20	17	17	20	20
Y	32.5	32.5	37.5	37.5	37.5	37.5	57.5	57.5	82.5	82.5	82.5	95
Z	Ø 9	Ø 9	Ø 11	Ø 11	Ø 11	Ø 11	Ø 13.5	Ø 13.5	Ø 13.5	Ø 13.5	Ø 13.5	Ø 13.5

* Filters with flat top (Dimension C)
All dimensions in mm; 1 inch=25.4mm
Tolerances according: ISO 2768-m / EN 22768-m, if not stated otherwise

Please see the brochure "Basics in EMC and Power Quality" on our website www.schaffner.com/downloads to find more details on filter connectors.

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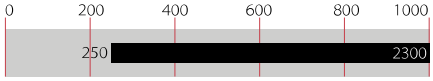
Compact high current DC EMC/EMI filter

- Reduces conducted emissions towards the solar panel
- Reduces the probability of EMI radiation off the solar panel
- Helps to prevent premature panel aging
- Helps to meet international EMC regulations
- Most compact standard solution in the industry
- FN 2210 without Cy capacitors to ground

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	1000 VDC
Rated currents	250 to 2300 A @ 50°C
High potential test voltage	P -> E 4800 VDC for 2 sec P -> P 3600 VDC for 2 sec
Protection category	IP 00
Overload capability	4x rated current at switch on, max. 8 sec 1.5x rated current for 1 minute, once per hour
Temperature range (operation and storage)	-40°C to +100°C
Climatic category	40/100/21 acc. to IEC 60068-1
Terminals/Housing	Ni plated cu bars/Metal
Flammability corresponding to	UL 94V-0
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939, EN 60721-3, EN 62109

Approvals

RoHS c UL us CE

The FN 2211/FN 2210 series are the most compact dedicated high current DC filters for PV inverters in the industry and therefore are an optimum fit with most modern PV inverter generation. In addition the filters can be configured in a very flexible way to fulfil customized application requirements.

All FN 2211/FN 2210 come in unsymmetrical housings, which help to prevent inverse installation and wrong electrical connection. Along with grid-side installed Schaffner AC EMC/EMI filters FN 3311/FN 3310, the DC filters FN 2211/FN 2210 are key to meet the stringent international standards for electromagnetic compatibility and help to ensure a reliable and fault-free operation of the entire PV system.

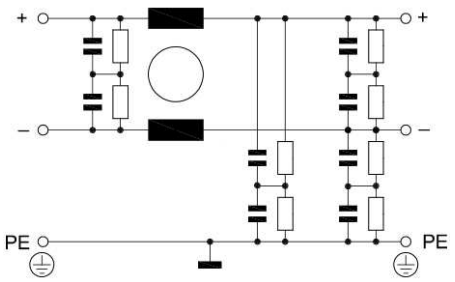
Features and benefits

Installed between the PV inverter and the solar panel, the FN 2211 and FN 2210 DC filters are used to influence positively the conducted emissions on the panel side of the system. Therefore the DC filters significantly reduce the potential for highfrequency (HF) interference radiation of the panel. The filter also helps to prevent premature panel aging because of HF stray and leakage currents.

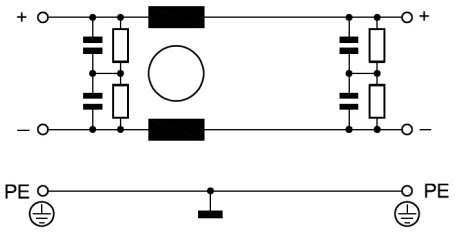
Typical applications

The FN 2211/FN 2210 series are primarily designed for PV inverter applications between 250 and 2'300 A. However, they can potentially also be applied in other DC applications within published specifications, like UPS, DC motor drives, energy/battery storage systems, or DC charger installations.

Typical electrical schematic FN 2211



Typical electrical schematic FN 2210



Filter selection table

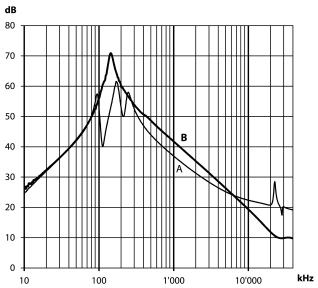
Filters *	Rated current @ 50°C [A]	Power losss @ 25°C/DC [W]	Weight [kg]
FN 2211 with Cy caps			
FN 2211-250-99-C30-R55	250	15	3.0
FN 2211-400-99-C30-R55	400	24	4.0
FN 2211-600-99-C30-R55	600	25	4.6
FN 2211-1000-99-C30-R55	1000	55	6.8
FN 2211-1500-99-C30-R55	1500	84	11.5
FN 2211-2300-99-C30-R55	2300	116	17.5
FN 2210 without Cy caps			
FN 2210-250-99-R5	250	15	2.4
FN 2210-400-99-R5	400	24	3.1
FN 2210-600-99-R5	600	25	3.8
FN 2210-1000-99-R5	1000	55	6.2
FN 2210-1500-99-R5	1500	84	11.3
FN 2210-2300-99-R5	2300	116	17.5

* Filters with reduced Cy capacitance to ground for high asymmetrical currents and higher voltages available upon request.

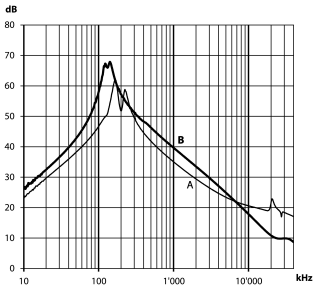
Typical filter attenuation FN 2211-xxx-99-C30-R55

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

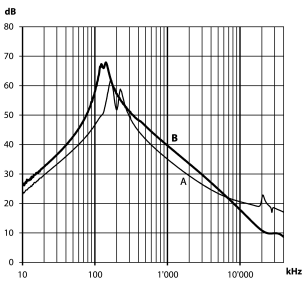
250/400/600 A types



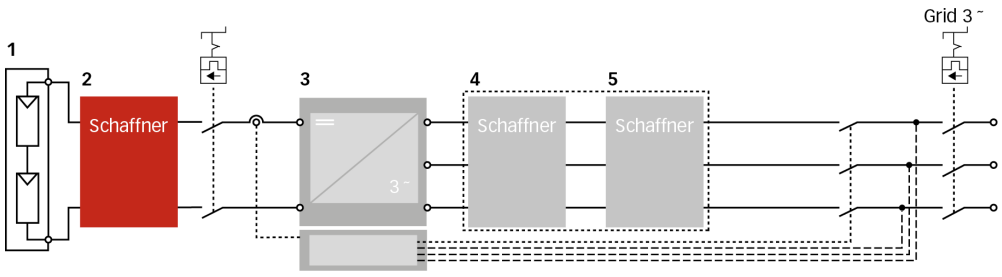
1000 A types



1'500/2'300 A types



Typical block schematic

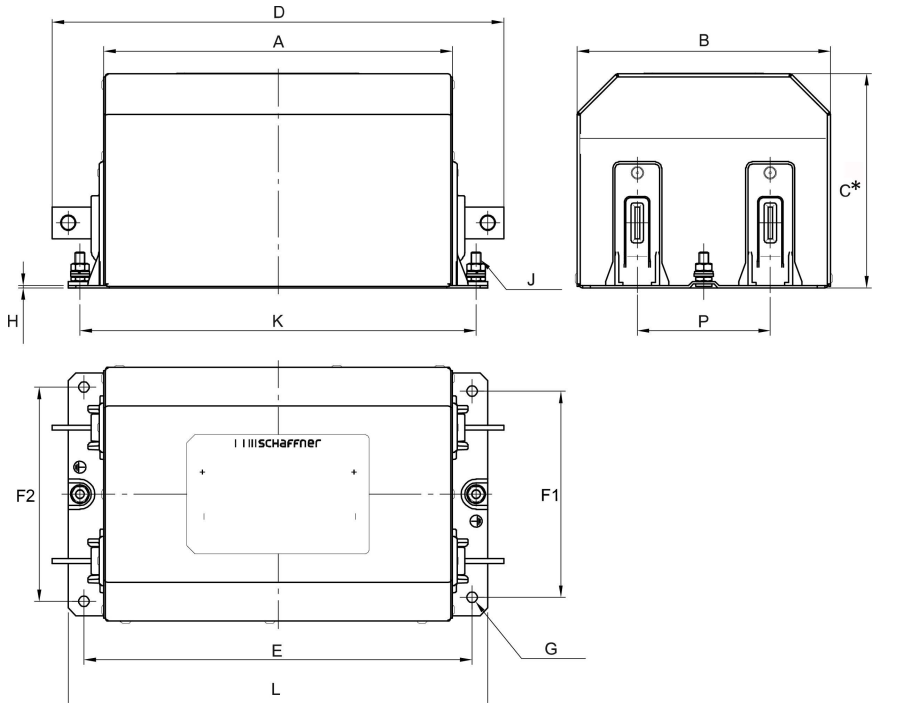


1 PV modules
2 Schaffner DC filter FN 22xx
3 Central Inverter
4 Schaffner magnetic components
5 Schaffner AC EMC/EMI filter FN 3xxx

Important note: depending on the grounding scheme of the solar power system, including the solar panel and the grid side transformer, the appropriate DC- and AC EMC/EMI filter version need to be selected. For support, please contact your local Schaffner sales office or partner.

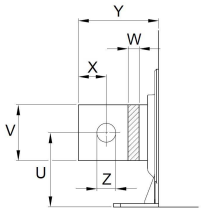
Mechanical data

250 to 2'300 A types

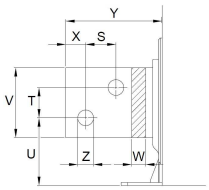


Busbar connections

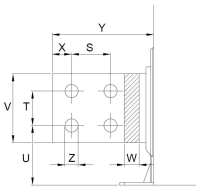
250 to 1'000 A types



1'500 A types



2'300 A types



Note: all FN 2211 and FN 2210 provide unsymmetrical mounting hole patterns to prevent inverse filter installation in the field.

Dimensions

	FN 2211 250 A	FN 2210* 250 A	FN 2211 400 A	FN 2210* 400 A	FN 2211 600 A	FN 2210* 600 A	FN 2211 1'000 A	FN 2210* 1'000 A	FN 2211 1'500 A	FN 2210* 1'500 A	FN 2211 2'300 A	FN 2210* 2'300 A
A	220	205	235	215	240	225	265	265	275	275	305	305
B	160	145	175	160	175	170	180	180	215	215	230	230
C*	135	95	150	100	150	100	160	110	200	150	210	165
D	285	270	310	290	315	300	380	380	440	440	495	495
E	245	227	260	240	265	250	300	300	315	315	345	345
F1	130	120	140	125	140	135	140	140	175	175	180	180
F2	135	125	145	130	145	140	145	145	180	180	185	185
G	Ø 7	Ø 7	Ø 9	Ø 9	Ø 9	Ø 9	Ø 11	Ø 11	Ø 11	Ø 11	Ø 11	Ø 11
H	1.5	1.5	2	2	2	2	2.5	2.5	2.5	2.5	2.5	2.5
J	M6	M6	M8	M8	M8	M8	M8	M8	M10	M10	M10	M10
K	250 (+/- 1)	230 (+/- 1)	265 (+/- 1)	245 (+/- 1)	270 (+/- 1)	255 (+/- 1)	310 (+/- 1)	310 (+/- 1)	321 (+/- 1)	321 (+/- 1)	351 (+/- 1)	351 (+/- 1)
L	265	245	285	265	290	275	330	330	345	345	375	375
P	84 (+/- 0.5)	74 (+/- 0.5)	86 (+/- 0.5)	71 (+/- 0.5)	84 (+/- 0.5)	79 (+/- 0.5)	86 (+/- 0.5)	86 (+/- 0.5)	86 (+/- 0.5)	86 (+/- 0.5)	93 (+/- 0.5)	93 (+/- 0.5)
S									26	26	40	40
T									26	26	35	35
U	41	41	46	46	49.5	49.5	53	53	58	58	60.5	60.5
V	20	20	25	25	25	25	40	40	60	60	70	70
W	3	3	4	4	8	8	8	8	10	10	15	15
X	10	10	12.5	12.5	12.5	12.5	20	20	17	17	20	20
Y	32.5	32.5	37.5	37.5	37.5	37.5	57.5	57.5	82.5	82.5	82.5	95
Z	Ø 9	Ø 9	Ø 11	Ø 11	Ø 11	Ø 11	Ø 13.5	Ø 13.5	Ø 13.5	Ø 13.5	Ø 13.5	Ø 13.5

* FN 2210 with flat top (Dimension C)
All dimensions in mm; 1 inch=25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m, if not stated otherwise

Please see the brochure "Basics in EMC and Power Quality" on our website www.schaffner.com/downloads to find more details on filter connectors.

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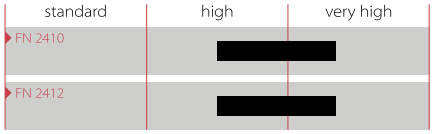
EMC/RFI Filters for Industrial Electronics

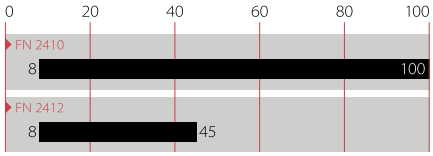
- Excellent filter performance for applications with high interference levels
- Filters for two-phase supply up to 2x 520 VAC (P-P) available
- Fast and comfortable snap-in installation on popular TS 35 DIN-rails up to 45 A
- Industrial grade terminal blocks for unsurpassed electrical safety

Performance indicators

Attenuation performance



Rated current [A]



Approvals

RoHS

Features and benefits

- FN 2410 filters up to 100 A are designed for traditional chassis mounting
- For extra fast installation, FN 2412 filters up to 45 A can comfortably be snapped-in on popular TS 35 DIN-rails which are common in most electrical cabinets
- Both FN 2410 and FN 2412 are also avail- able as „H versions". These are ideally suitable for an operation on two phases in a three-phase power network, handling voltages up to 520 VAC
- All filters provide an exceptional conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior. Thus, all filters retain the expected filter performance even in very noisy applications and under full load conditions
- Touch-safe industrial grade terminal blocks provide maximum electrical safety and protect humans from undeliberate contact with life conductors. They help to fulfill the most demanding installation standards

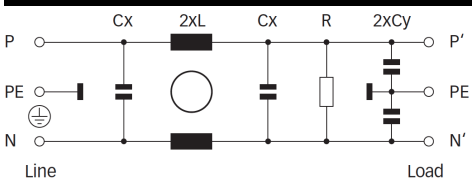
Technical specifications

Maximum continuous operating voltage	1x 250 VAC (FN 2410/FN 2412) 2x 520/300 VAC (FN 2410 H/FN 2412 H)
Operating frequency	DC to 400 Hz
Rated currents	8 to 100 A @ 50°C (FN 2410) 8 to 45 A @ 50°C (FN 2412)
High potential test voltage	P –> E 2000 VAC for 2 sec P –> N 1100 VDC for 2 sec P –> E 2700 VDC for 2 sec (H types) P –> P 2250 VDC for 2 sec (H types)
Protection category	IP 20
Overload capability	4x rated current at switch on, 1.5x rated current for 1 minute, once per hour
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Flammability corresponding to	UL 94 V-2 or better
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
MTBF @ 50°C/250 V (Mil-HB-217F)	1,200,000 hours 250,000 hours (H types)

Typical applications

- Small to medium-sized machines and industrial equipment
- High-end single-phase power supplies
- Single-phase variable speed motor drives, inverters and converters
- DIN-rail filter versions are ideal for panel building and electrical cabinets
- Various noisy applications with higher power single-phase or two-phase supply

Typical electrical schematic



Filter selection table

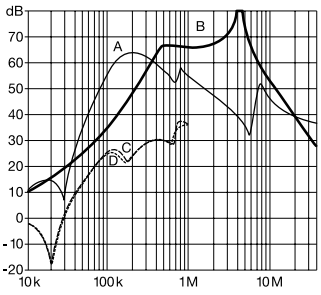
Filter	Rated current @ 50°C (40°C) [A]	Leakage current* @ 250 VAC /50 Hz (@ 120 VAC /60 Hz) [mA]	Power loss @ 25°C/50 Hz [W]	Input/Output connections	Weight [kg]
FN 2410-8-44	8 (8.8)	2.60 (1.49)	2.6	-44	0.4
FN 2410-16-44	16 (17.5)	2.60 (1.49)	3.5	-44	0.5
FN 2410-25-33	25 (27.4)	2.60 (1.49)	5.5	-33	0.6
FN 2410-32-33	32 (35.0)	2.60 (1.49)	5.6	-33	0.7
FN 2410-45-33	45 (49.3)	2.60 (1.49)	7.4	-33	0.7
FN 2410-60-34	60 (65.7)	2.60 (1.49)	5.5	-34	1.8
FN 2410-80-34	80 (87.6)	2.60 (1.49)	9.9	-34	1.8
FN 2410-100-34	100 (109.5)	2.60 (1.49)	15.4	-34	1.8
FN 2410 H-8-44	8 (8.8)	2.60 (1.49)	2.6	-44	0.5
FN 2410 H-16-44	16 (17.5)	2.60 (1.49)	3.5	-44	0.6
FN 2410 H-25-33	25 (27.4)	2.60 (1.49)	5.5	-33	0.7
FN 2410 H-32-33	32 (35.0)	2.60 (1.49)	5.6	-33	0.8
FN 2410 H-60-34	60 (65.7)	2.60 (1.49)	5.5	-34	1.9
FN 2410 H-80-34	80 (87.6)	2.60 (1.49)	9.9	-34	1.9
FN 2410 H-100-34	100 (109.5)	2.60 (1.49)	15.4	-34	1.9
FN 2412-8-44	8 (8.8)	2.60 (1.49)	2.6	-44	0.4
FN 2412-16-44	16 (17.5)	2.60 (1.49)	3.5	-44	0.6
FN 2412-25-33	25 (27.4)	2.60 (1.49)	5.5	-33	0.7
FN 2412-32-33	32 (35.0)	2.60 (1.49)	5.6	-33	0.8
FN 2412-45-33	45 (49.3)	2.60 (1.49)	7.4	-33	0.8
FN 2412 H-8-44	8 (8.8)	2.60 (1.49)	2.6	-44	0.5
FN 2412 H-16-44	16 (17.5)	2.60 (1.49)	3.5	-44	0.7
FN 2412 H-25-33	25 (27.4)	2.60 (1.49)	5.5	-33	0.8
FN 2412 H-32-33	32 (35.0)	2.60 (1.49)	5.6	-33	0.9

* Maximum leakage under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

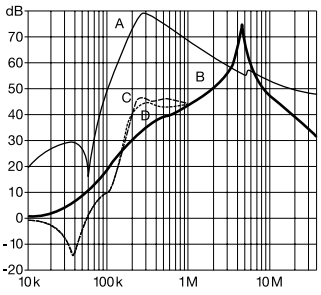
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

8 to 45 A types

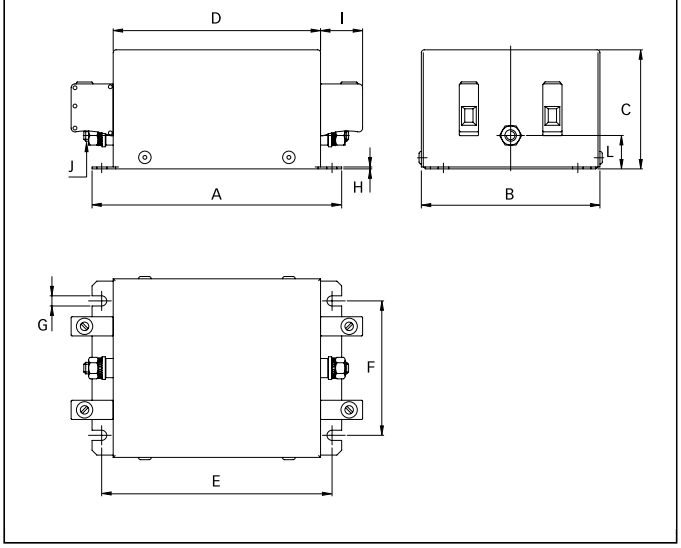


60 to 100 A types

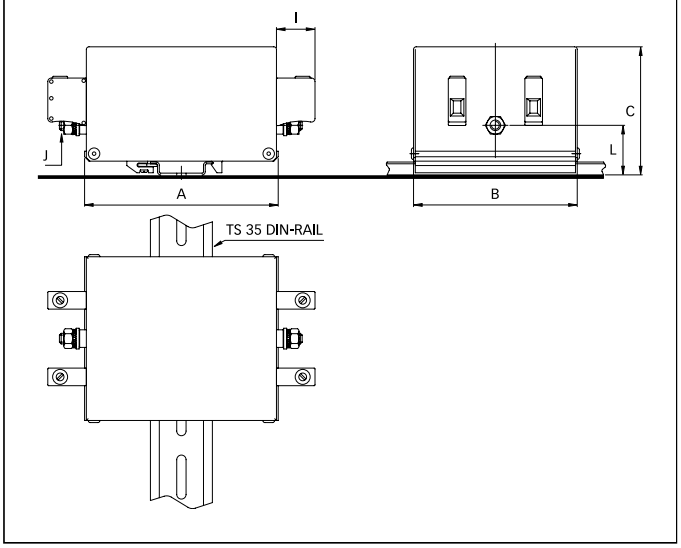


Mechanical data

FN 2410 (H)



FN 2412 (H)



Dimensions

	FN 2410								FN 2412				
	8 A	**16 A**	**25 A**	**32 A**	**45 A**	**60 A**	**80 A**	**100 A**	**8 A**	**16 A**	**25 A**	**32 A**	**45 A**
A	130	130	130	130	130	165	165	165	110	110	110	110	110
B	93	93	93	93	93	115	115	115	93	93	93	93	93
C	62	62	76	76	76	100	100	100	73	73	87	87	87
D	108	108	108	108	108	140	140	140					
E	120	120	120	120	120	155	155	155					
F	70	70	70	70	70	90	90	90					
G	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3					
H	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.2					
I	22	22	25	25	25	39	39	39	22	22	25	25	25
J	M6	M6	M6	M6	M6	M8	M8	M8	M6	M6	M6	M6	M6
Rec. torque (Nm)	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	8.0 - 9.0	8.0 - 9.0	8.0 - 9.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0	3.5 - 4.0
L	17.5	17.5	31.5	31.5	31.5	39.2	39.2	39.2	28.5	28.5	42.5	42.5	42.5

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Filter input/output connector cross sections

	-33	**-34**	**-44**
Solid wire	16 mm^2	35 mm^2	10 mm^2
Flex wire	10 mm^2	25 mm^2	6 mm^2
AWG type wire	AWG 6	AWG 2	AWG 8
Recommended torque	1.5-1.8 Nm	4.0-4.5 Nm	1.5-1.8 Nm

Please visit www.schaffner.com to find more details on filter connectors.

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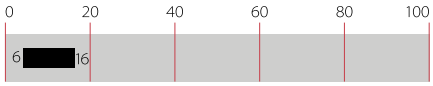
Single-phase EMC Filter for Control Equipment

- Filter for the control line of complex equipment and machinery
- To ensure interference-free operation of control equipment (PLC, Motion-, Robot Control etc.)
- To improve operational reliability and system stability
- Compact EMC filter design with minimum space requirement

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	250 VAC
Operating frequency	DC to 400 Hz
Rated currents	6 to 16 A @ 50°C
High potential test voltage	P/N –> E 2250VDC for 2 sec P –> N 1100VDC for 2 sec
Protection category	IP 20
Overload capability	4x rated current at switch on, 1.5x rated current for 1 minute, once per hour
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Flammability corresponding to	UL 94 V-2 or better
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
MTBF @ 50°C/250 V (Mil-HB-217F)	1,300,000 hours

Approvals

RoHS

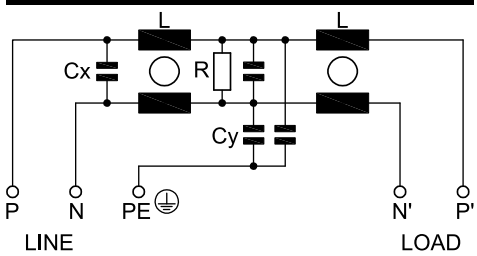
Features and benefits

- An additional filter for the supply cables of controls of rather large and complex systems, to ensure a reliable operation of the control unit.
- To achieve significant system stability improvement by reducing the risk of internal interference propagation and coupling.
- FN 2415 B version without leakage current (0 mA)
- FN 2415 L version with reduced leakage current of 3.5 mA.
- Simple and time-saving installation with good accessibility for automatic and hand tools
- Solid, touch-safe terminal blocks offering sufficient contacting cross section according to the EN 60204-1 installation standard
- By providing a very decent attenuation performance, FN 2415 contributes significantly to the achievement of electromagnetic compliance, e.g. EN50370-1 standards for machine tools.

Typical applications

Ideal for industrial equipment, machinery and diverse process automation systems, which involve any kind of control units (NC, CNC, Motion- and Robot Controls).
Large and complex machine tools with multiple driving axes and very long motor cables can be subjected to major reliability problems, provoked and by internal coupling of interferences from the drive system to the control wires.
This can cause drop outs and interrupts of the control unit and consequently lead to unnecessary downtimes of the entire machine. FN 2415 can also be used for most diverse single-phase applications, e.g. motor drives and power supplies.

Typical electrical schematic



Filter selection table

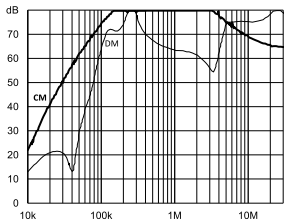
Filter	Rated current @40°C (25°C)	Leakage current* 250VAC/50Hz (120VAC/60Hz)	Power loss	Inductance** L	Capacitance** Cx	Capacitance** Cy	Resistance** R	Input/Output	Weight
	[A]	[mA]	[W]	[mH]***	[µF]	[nF]	[kΩ]		[kg]
FN 2415-6-29	6 (6.6)	7.85 (4.52)	2.2	8	3.3	100	220	-29	0.4
FN 2415-10-29	10 (11)	7.85 (4.52)	2.4	4.2	3.3	100	220	-29	0.4
FN 2415-16-29	16 (17.5)	7.85 (4.52)	4.3	3	3.3	100	220	-29	0.4
FN 2415B-6-29	6 (6.6)	0.00 (0.00)	2.2	8	3.3		220	-29	0.4
FN 2415B-10-29	10 (11)	0.00 (0.00)	2.4	4.2	3.3		220	-29	0.4
FN 2415B-16-29	16 (17.5)	0.00 (0.00)	4.3	3	3.3		220	-29	0.4
FN 2415L-6-29	6 (6.6)	2.59 (1.49)	2.2	8	3.3	33	220	-29	0.4
FN 2415L-10-29	10 (11)	2.59 (1.49)	2.4	4.2	3.3	33	220	-29	0.4
FN 2415L-16-29	16 (17.5)	2.59 (1.49)	4.3	3	3.3	33	220	-29	0.4

* Maximum leakage under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%
*** Value of both inductors in the same

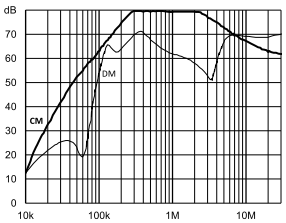
Typical filter attenuation

Per CISPR 17; DM (differential mode) =50 Ω/50 Ω sym; CM (common mode)=50 Ω/50 Ω asym

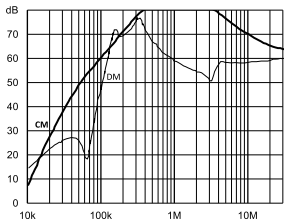
6 A type



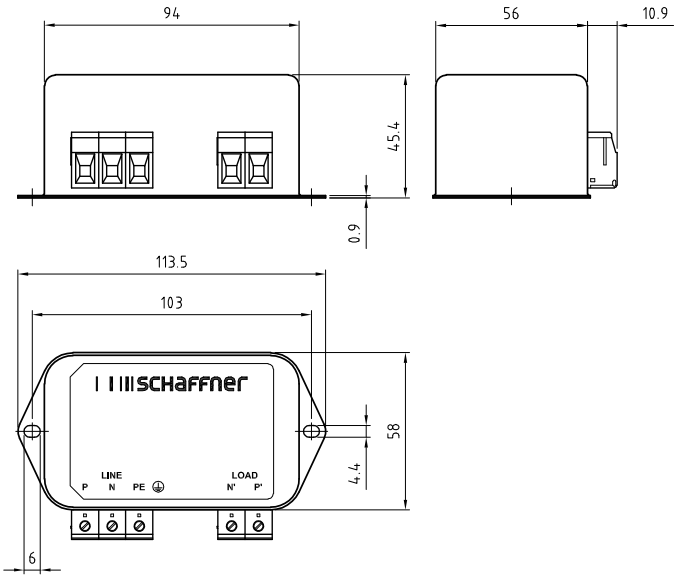
10 A type



16 A type



Mechanical Data



All dimensions in mm; 1 inch = 25.4 mm ; Tolerances according: ISO 2768-m/EN 22768-m

Filter input/output connector cross sections

	-29
Solid wire	6 mm^2
Flex wire	4 mm^2
AWG type wire	AWG 10
Recommended torque	0.6-0.8 Nm

Please visit www.schaffner.com to find more details on filter connectors.

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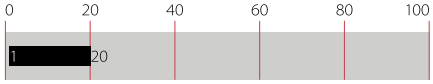
Safe and ergonomic EMC/EMI filter with very low leakage current

- Light weight plastic enclosure design
- Very low filter leakage current
- Hinged safety covers
- Embedded filter terminals
- Different performance levels
- Environmental friendly design without potting compound

Performance indicators

Attenuation performance

Rated current [A]



Approvals

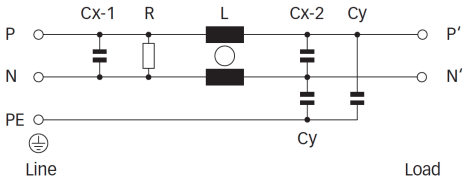
Features and benefits

- A plastic housing and a metal ground plate are cleverly combined to get the lowest possible product weight without compromising EMC behaviour
- The embedded terminals from Schaffner guarantee user-friendly handling and reliable, long-lasting electrical connection
- Captive hinged protective covers contribute to overall safety by offering protection against unintended contact with life conductors. They are included in the standard scope of delivery without any extra cost
- Very low leakage current values make the filters suitable for grids with very tough requirements or sensitive GFCIs, and for applications which set value on safety and reliability
- FN 2450 feature an ecologically conscious construction without the use of potting compound or banned substances (RoHS). Used raw materials can be easily separated at the end of the product life time for proper and environmentally safe disposal

Typical applications

- Electrical and electronic equipment
- Test and measurement devices
- Medical devices n Industrial automation
- Small machines
- Office automation equipment

Typical electrical schematic

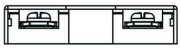


Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Rated currents	6 to 20 A @ 55°C
Operating frequency	DC to 400 Hz
High potential test voltage	P/N -> E 2500 VAC for 60 sec * P -> N 1100 VDC for 2 sec
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Flammability corresponding to	UL 94 V-0 (safety covers UL 94V-1)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939, EN 60601-1
MTBF @ 40°C/230 V (Mil-HB-217F)	>180,000 hours

* Type testing only

Filter selection table

Filter*	Rated current @ 55°C (40°C) [A]	Leakage current** @ 250 VAC /50 Hz (@ 120 VAC /60 Hz) [mA]	Inductance L [mH]	Capacitance Cx [uF]	Capacitance Cy [nF]	Resistance R [MΩ]	Input/Output connections  -61	Weight [g]
FN 2450 G-6-61	6 (6.8)	0.66 (0.38)	10.5	0.47	4.7	1	-61	210
FN 2450 G-10-61	10 (11.4)	0.66 (0.38)	4.9	0.47	4.7	1	-61	210
FN 2450 G-16-61	16 (18.2)	0.66 (0.38)	1.84	0.47	4.7	1	-61	210
FN 2450 G-20-61	20 (22.8)	0.66 (0.38)	0.94	0.47	4.7	1	-61	210
FN 2450 F-6-61	6 (6.8)	0.47 (0.27)	10.5	0.47	3.3	1	-61	210
FN 2450 F-10-61	10 (11.4)	0.47 (0.27)	4.9	0.47	3.3	1	-61	210
FN 2450 F-16-61	16 (18.2)	0.47 (0.27)	1.84	0.47	3.3	1	-61	210
FN 2450 F-20-61	20 (22.8)	0.47 (0.27)	0.94	0.47	3.3	1	-61	210
FN 2450 B-6-61	6 (6.8)	0.00	10.5	0.47		1	-61	210
FN 2450 B-10-61	10 (11.4)	0.00	4.9	0.47		1	-61	210
FN 2450 B-16-61	16 (18.2)	0.00	1.84	0.47		1	-61	210
FN 2450 B-20-61	20 (22.8)	0.00	0.94	0.47		1	-61	210

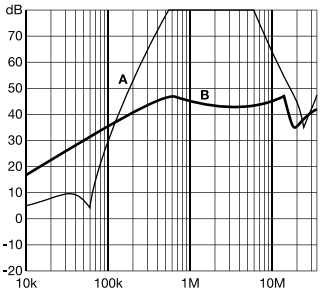
* The letter following FN2450 represents the value of the Y-capacitor and is directly related to the performance and leakage current of the filter. Other Y-capacitor values are available upon request.

** Maximum leakage current under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

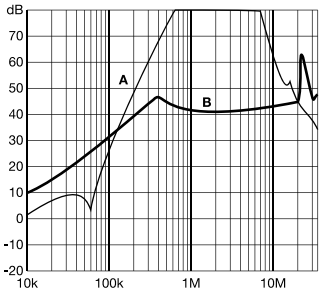
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

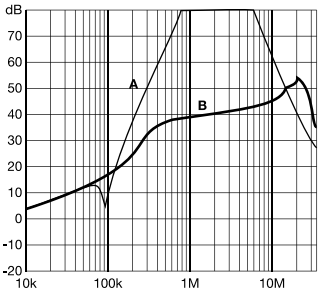
6 A types



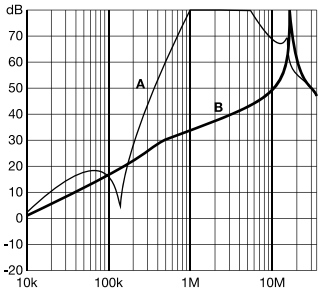
10 A types



16 A types



20 A types



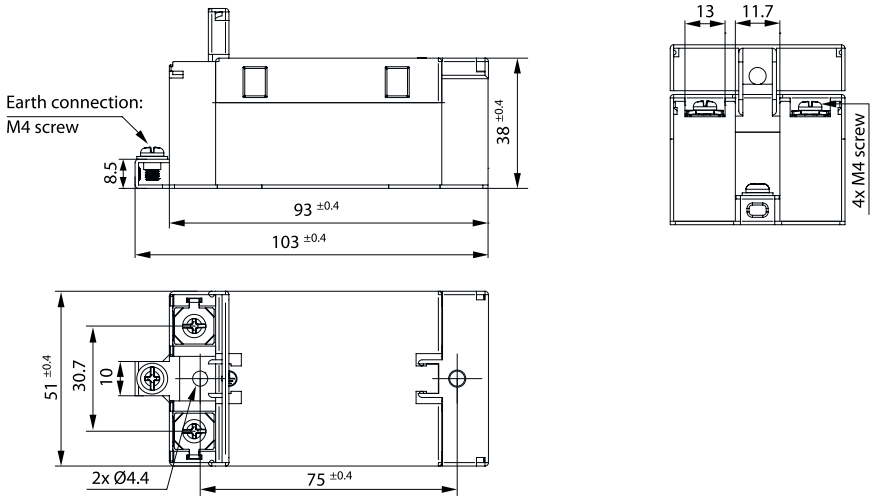
Installation

FN 2450 are delivered with closed plastic covers and fastened terminals. To install the filter please proceed as follows:

- Mount the filter on a metal surface with two appropriate bolts
- First connect the green/yellow wire to the earth stud of the filter
- Gently lift the two hinged plastic covers. n Untighten the terminals with an appropriately sized screw driver
- Connect phase and neutral wires with cable lugs by pushing down and tightening the bolts
- Please note the torque recommendation on the next page
- Push the safety covers back into their locked position to finish the filter installaton

Mechanical data

FN 2450



Filter input/output connector cross sections

	-61 (6 A)	-61 (10 A)	-61 (16 A)	-61 (20 A)
Flex wire	1.3 - 2.5 mm^2	1.3 - 2.5 mm^2	4 - 6 mm^2	4 - 6mm^2
AWG type wire	AWG 13 - AWG 16	AWG 13 - AWG 16	AWG 12 - AWG 10	AWG 12 - AWG 10
Ring/fork lug (W/d)*	max. 11 mm/min. Ø 4.3 mm	max. 11 mm/min. Ø 4.3 mm	max. 11 mm/min. Ø 4.3 mm	max. 11mm/min. Ø4.3mm
Recommended torque	0.8-1 Nm	0.8-1 Nm	0.8-1 Nm	0.8 - 1Nm

* Schaffner recommends the use of insulated and UL-recognized ring lugs or fork lugs of the appropriate size.

Please visit www.schaffner.com to find more details on filter connectors.

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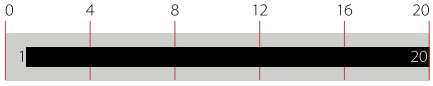
General Performance IEC Inlet Filter

- Rated currents up to 20 A
- Excellent performance/size ratio
- Optional medical versions (B type) according to IEC/EN 60601-1
- Snap-in versions (S and S1 type)
- Hot inlet versions (HI type)
- Optional overvoltage protection (Z type)

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 20 A @ 50°C
Approvals by rated current	1 to 10 A (ENEC, CQC) 16 A (ENEC, CQC) for 16 and 20 A types 1 to 20 A (UL, CSA)
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> N 250 VAC for 2 sec (all Z types) P –> N 1000 VAC for 2 sec (1 to 10 A types, not Z types) P –> PE 2500 VAC for 2 sec (B types) P –> N 1100 VDC for 2 sec (16 and 20 A types, not Z types)
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (X to XX A, not Z types)
Flammability corresponding to	UL 94 V-2 or better
Surge pulse protection (Z type)	Helps compliance to IEC61000-4-5 (Differential Mode only)
MTBF @ 40°C/230 V (Mil-HB-217F)	≤15 A: 3,040,000 hours ≥16 A: 2,256,000 hours

Approvals

(CQC except HI-types)

The FN 9222 IEC inlet filter combines an IEC inlet and mains filter with excellent filter attenuation in a small form factor. Choosing the FN 9222 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on amperage ratings, output connections, mounting possibilities and filters for medical applications are designed to offer you the desired solution.

Features and benefits

- Exceptional conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear/front or snap-in mounting
- Wide mounting flanges available
- FN 9222 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- 12 and 15 A types with hot inlet available
- Optional surge pulse protection
- Different output connections offering maximum flexibility for assembly
- Custom-specific versions are available on request

Typical applications

- Portable electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Medical equipment
- Rack mounting equipment

Filter selection table

Filter	Rated current @ 50°C (25°C)	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance	Capacitance		Resistance	Output connections		Weight
			L	Cx	Cy	R			
	[A]	[mA]	[mH]	[µF]	[nF]	[kΩ]			[g]
FN 9222 x-1-..	1 (1.2)	0.31 (0.18)	12	0.1	2.2		-06	-07	40
FN 9222 x-3-..	3 (3.5)	0.31 (0.18)	2.5	0.1	2.2		-06	-07	40
FN 9222 x-6-..	6 (7.2)	0.31 (0.18)	0.78	0.1	2.2		-06	-07	40
FN 9222 x-8-..	8 (10.6)	0.31 (0.18)	0.5	0.1	2.2		-06	-07	40
FN 9222 x-10-..	10 (11.6)	0.31 (0.18)	0.225	0.1	2.2		-06	-07	40
FN 9222 x-12-..	12 (12)	0.31 (0.18)	0.11	0.1	2.2		-06	-07	40
FN 9222 x-15-..	15 (15)	0.31 (0.18)	0.075	0.1	2.2		-06	-07	40
FN 9222 x-12-..HI	12 (12)	0.31 (0.18)	0.11	0.1	2.2		-06	-07	40
FN 9222 x-15-..HI	15 (15)	0.31 (0.18)	0.075	0.1	2.2		-06	-07	40
FN 9222 xR-1-..	1 (1.2)	0.31 (0.18)	12	0.1	2.2	1000	-06	-07	40
FN 9222 xR-3-..	3 (3.5)	0.31 (0.18)	2.5	0.1	2.2	1000	-06	-07	40
FN 9222 xR-6-..	6 (7.2)	0.31 (0.18)	0.78	0.1	2.2	1000	-06	-07	40
FN 9222 xR-8-..	8 (10.6)	0.31 (0.18)	0.5	0.1	2.2	1000	-06	-07	40
FN 9222 xR-10-..	10 (11.6)	0.31 (0.18)	0.225	0.1	2.2	1000	-06	-07	40
FN 9222 xR-12-..	12 (12)	0.31 (0.18)	0.11	0.1	2.2	1000	-06	-07	40
FN 9222 xR-15-..	15 (15)	0.31 (0.18)	0.075	0.1	2.2	1000	-06	-07	40
FN 9222 R-16-06	16 (18.5)	0.31 (0.18)	0.54	0.33	2.2	1000	-06		100
FN 9222 R-20-06	20 (23)	0.31 (0.18)	0.4	0.33	2.2	1000	-06		100
FN 9222 xR-12-..HI	12 (12)	0.31 (0.18)	0.11	0.1	2.2	1000	-06	-07	40
FN 9222 xR-15-..HI	15 (15)	0.31 (0.18)	0.075	0.1	2.2	1000	-06	-07	40
FN 9222 xB-1-..	1 (1.2)	0.00	12	0.1		1000	-06	-07	40
FN 9222 xB-3-..	3 (3.5)	0.00	2.5	0.1		1000	-06	-07	40
FN 9222 xB-6-..	6 (7.2)	0.00	0.78	0.1		1000	-06	-07	40
FN 9222 xB-8-..	8 (10.6)	0.00	0.5	0.1		1000	-06	-07	40
FN 9222 xB-10-..	10 (11.6)	0.00	0.225	0.1		1000	-06	-07	40
FN 9222 xB-12-..	12 (12)	0.00	0.11	0.1		1000	-06	-07	40
FN 9222 xB-15-..	15 (15)	0.00	0.075	0.1		1000	-06	-07	40
FN 9222 RB-16-06	16 (18.5)	0.00	0.54	0.33		1000	-06		100
FN 9222 RB-20-06	20 (23)	0.00	0.4	0.33		1000	-06		100
FN 9222 xB-12-..HI	12 (12)	0.00	0.11	0.1		1000	-06	-07	40
FN 9222 xB-15-..HI	15 (15)	0.00	0.075	0.1		1000	-06	-07	40
FN 9222 UZ-1-06	1 (1.2)	0.31 (0.18)	12	0.1	2.2		-06		43
FN 9222 UZ-3-06	3 (3.5)	0.31 (0.18)	2.5	0.1	2.2		-06		43
FN 9222 UZ-6-06	6 (7.2)	0.31 (0.18)	0.78	0.1	2.2		-06		43
FN 9222 UZ-8-06	8 (10.6)	0.31 (0.18)	0.5	0.1	2.2		-06		43
FN 9222 UZ-10-06	10 (11.6)	0.31 (0.18)	0.225	0.1	2.2		-06		43
FN 9222 UZ-12-06	12 (12)	0.31 (0.18)	0.11	0.1	2.2		-06		43
FN 9222 UZ-15-06	15 (15)	0.31 (0.18)	0.075	0.1	2.2		-06		43

* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

Product selector

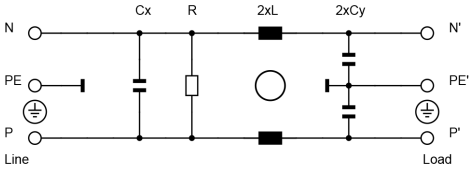
FN 9222xx-yy-..HI-zz

		Snap-in range for S version only
	Blank:	Snap-in range 0.7 to 1.5mm
	20:	Snap-in range 1.5 to 2.2mm
	Blank:	Standard IEC inlet type C14 (1 to 15A types), C20 (16 and 20A types)
	HI:	Hot IEC inlet type C16 (12 and 15A types only)
	06:	Faston 6.3 x 0.8mm (spade/soldering)
	07:	Wire leads
	1 to 20:	Rated current
	Blank:	Standard version
	R:	Bleed resistor
	B:	Medical version (with bleed resistor and without Y2-capacitor)
	Z:	Optional surge pulse protection with additional varistor (MOV)
		(Z types have longer housings, only available for FN 9222UZ-yy-06)
⬭	Blank:	Standard housing with mounting flanges
⬭	U:	Housing with wider mounting flanges
☐	S:	Snap-in version, snapper on vertical side (1 to 15A types only)
☐	S1:	Snap-in version, snapper on horizontal side (1 to 15A types only)

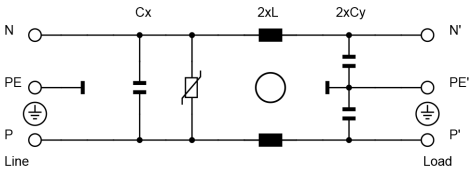
For example: FN 9222 E-15-06, FN 9222 ES1B-10-06-20, FN 9222 ER-12-06HI, FN 9222 EUB-8-06-20

Typical electrical schematic

Standard, R and B types



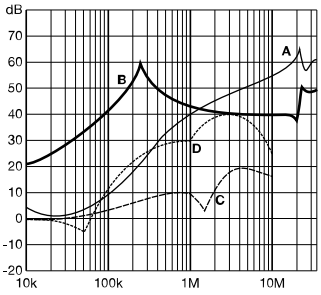
Z types



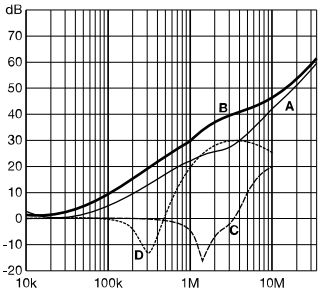
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

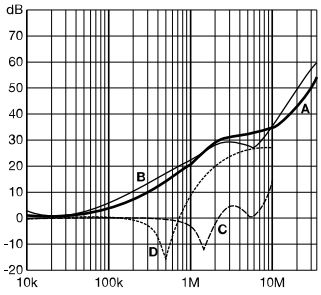
1 and 3 A types



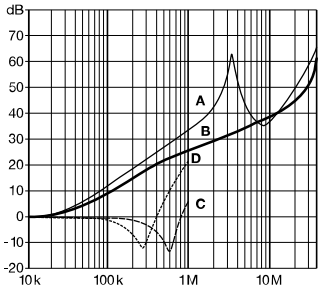
6 to 10 A types



12 and 15 A types

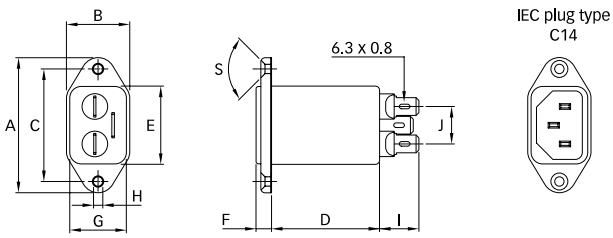


16 and 20 A types

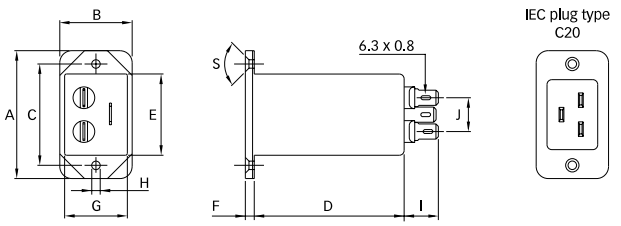


Mechanical data

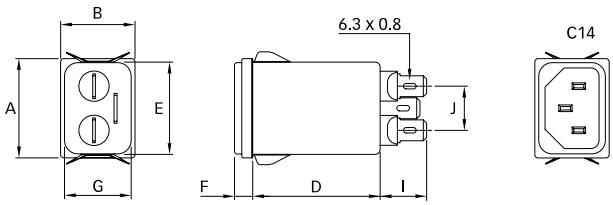
FN 9222 1 to 15 A types



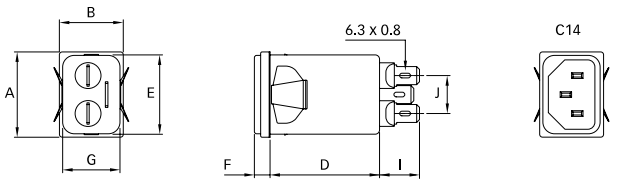
FN 9222, 16 and 20 A types



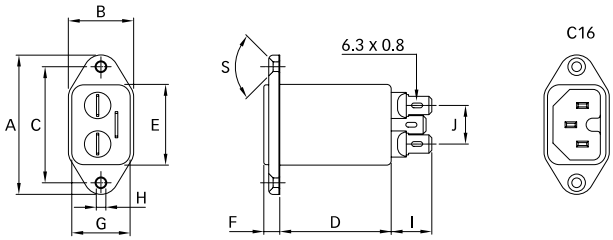
FN 9222 S



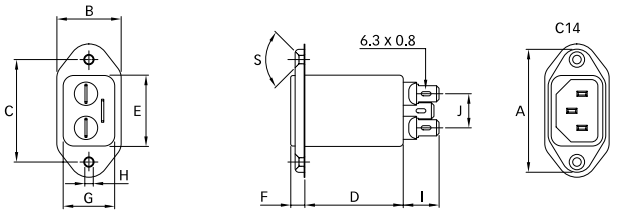
FN 9222 S1



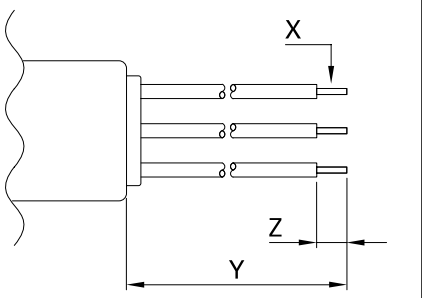
FN 9222-HI



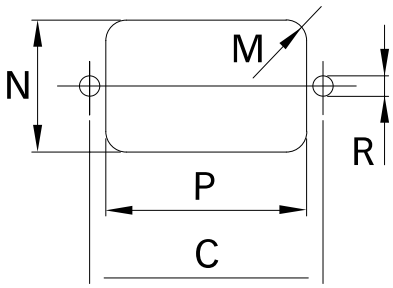
FN 9222 U



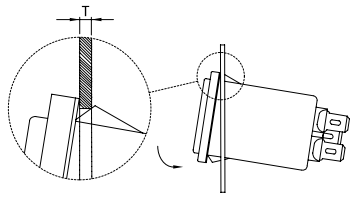
-07 connection style



Panel cut out



Installation



Dimensions

	FN 9222 1 to 8 A	10 to 15 A	16 and 20 A	FN 9222 U	FN 9222 UZ	FN 9222 S 1 to 8 A	10 to 15 A	FN 9222 S1 1 to 8 A	10 to 15 A	FN 9222-HI 12 and 15 A	Tol.
A	48	48	53	51.85	51.85	29.9	29.9	29.9	29.9	48	
B	22.4	22.4	30	25	25	22.4	22.4	22.4	22.4	22.4	
C	40	40	42	40	40					40	±0.2
D	38.25	38.25	62	38.25	46.7	38.25	38.25	38.25	38.25	38.25	
E	27.8	27.8	34.5	27.7	27.7	27.8	27.8	27.8	27.8	27.8	+0.6/-0
F	5.7	5.7	3.8	5.7	5.7	5.7	5.7	5.7	5.7	5.7	
G	20.1	20.1	26.5	20.1	20.1	20.1	20.1	20.1	20.1	20.1	+0.6/-0
H	Ø3.3	Ø3.3	Ø3.5	Ø3.3	Ø3.3					Ø3.3	
I	14	14	14	14	14	14	14	14	14	14	
J	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	
M	R 3	R ≤3	R ≤1.5	R ≤3	R ≤3	R ≤1.5	R ≤ 1.5	R ≤1.5	R ≤1.5	R ≤3	
N	21.5	21.5	27	21.5	21.5	20.8	20.8	21.9	21.9	21.5	
P	28.5	28.5	34.7	28.5	28.5	29.4	29.4	28.5	28.5	28.5	
R*	M3	M3	M3	M3	M3					M3	
S	90°	90°	90°	90°	90°					90°	
T**						0.7-1.5	0.7-1.5	0.7-1.5	0.7-1.5		
T**						1.5-2.2	1.5-2.2	1.5-2.2	1.5-2.2		
X	AWG 18	AWG 16				AWG 18	AWG 16	AWG 18	AWG 16	AWG 16	
Y	160	160				160	160	160	160	160	
Z	6	6				6	6	6	6	6	

* Recommended torque for M3 (90° countersunk flat head) is 0.5 Nm

** For selecting the panel thickness, please refer to the filter selector table.

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

Accessories for IEC Inlet Filters and Power Entry Modules

The accessories displayed are a selection of available accessories for IEC Inlet filters and IEC Power entry modules. As they are displayed in a general way there might be variants of the filters where the accessories are not available.
For further information please ask your local Schaffner Sales Partner and visit our homepage https://www.schaffner.com/.

Power Cord with Locking System for Inlet Filters IL 13, IL 13 P, IL 19

Link to Datasheet: Datasheet IEC C13/ C19 locking cable

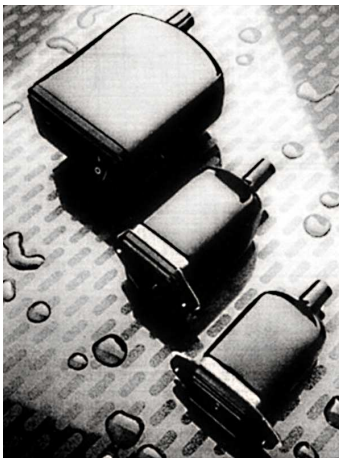
The locking system has a tensile force of typical 200N.
It is recommended to use it with flange mount filters.
Lock Power Cords with IEC Inlets and Filters"
Schaffner power cords with IEC lock guard against
accidental disconnection of all electrical appliances
with an IEC inlet. No exchange or modification of the
IEC inlet or IEC inlet filter system is needed. Easy
retrofit for all electronic equipments and devices.

IEC C13 Rewireable Connector for individual Power Cord with Locking System

Link to Datasheet: Datasheet IEC C13 rewireable

The locking system has a tensile force of typical 300N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters" Schaffner power connector with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

IB - Insulating Boots



There is a full range of insulating boots available from Schaffner that provide a physical cover for the exposed terminals on the back of IEC Inlet Filters.
These boots fit the simplest non-fused and unswitched style up to the fully fused and switched IEC filtered inlet. The boots are made from a durable black PVC material that conforms to UL94-V0 flammability requirements. The boots slip easily over the back of the filter and reduce the risk of electrical shock to maintenance personnel whilst protecting the filter from environmental hazard such as the ingress of dust and moisture.

schaffner
shaping electrical power

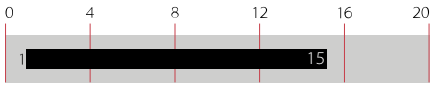
General Performance EMC/EMI Filter with Earth Line Choke

- Rated currents up to 15 A
- Excellent performance/size ratio
- Integrated earth line choke
- Complies with IEC/EN 60601-1
- Snap-in versions (S and S1 type)
- Optional wide mounting flanges

Performance indicators

Attenuation performance

Rated current [A]



Approvals

RoHS

(CQC except HI-types)

The FN 9222 E IEC inlet filter combines an IEC inlet and mains filter with excellent filter attenuation in a small form factor and integrated earth line choke. Choosing the FN 9222 E product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on amperage ratings, output connections, mounting possibilities and filters for medical applications are designed to offer you the desired solution.

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz dc to 400 Hz
Rated currents	1 to 15 A @ 50°C max.
Approvals by rated current	1 to 10 A (ENEC, CQC) 1 to 15 A (UL, CSA)
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 1000 VAC for 2 sec
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	1,610,000 hours

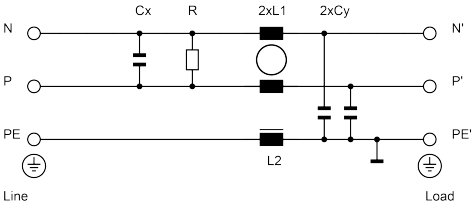
Features and benefits

- Exceptional conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear/front or snap-in mounting
- FN 9222 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- Wide mounting flanges available
- Different output connections offering maximum flexibility for assembly
- Without earth line choke see FN 9222 data sheet
- Custom-specific versions are available on request

Typical electrical schematic

- Portable electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Medical equipment
- Rack mounting equipment

Typical electrical schematic



Filter selection table

Filter	Rated current @ 50°C (5 °C)	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance		Capacitance		Resistance	Output connections	Weight
			L1	L2	Cx	Cy	R		
	[A]	[mA]	[mH]	[mH]	[µF]	[nF]	[kΩ]		[g]
FN 9222 Ex-1-06	1 (1.2)	0.31 (0.18)	12	0.4	0.1	2.2		-06	46
FN 9222 Ex-3-06	3 (3.5)	0.31 (0.18)	2.5	0.4	0.1	2.2		-06	46
FN 9222 Ex-6-06	6 (7.2)	0.31 (0.18)	0.78	0.4	0.1	2.2		-06	46
FN 9222 Ex-8-06	8 (10.6)	0.31 (0.18)	0.5	0.4	0.1	2.2		-06	46
FN 9222 Ex-10-06	10 (11.6)	0.31 (0.18)	0.225	0.1	0.1	2.2		-06	46
FN 9222 Ex-12-06	12 (12)	0.31 (0.18)	0.11	0.1	0.1	2.2		-06	46
FN 9222 Ex-15-06	15 (15)	0.31 (0.18)	0.075	0.1	0.1	2.2		-06	46
FN 9222 Ex-12-06HI	12 (12)	0.31 (0.18)	0.11	0.1	0.1	2.2		-06	46
FN 9222 Ex-15-06HI	15 (15)	0.31 (0.18)	0.075	0.1	0.1	2.2		-06	46
FN 9222 ExR-1-06	1 (1.2)	0.31 (0.18)	12	0.4	0.1	2.2	1000	-06	46
FN 9222 ExR-3-06	3 (3.5)	0.31 (0.18)	2.5	0.4	0.1	2.2	1000	-06	46
FN 9222 ExR-6-06	6 (7.2)	0.31 (0.18)	0.78	0.4	0.1	2.2	1000	-06	46
FN 9222 ExR-8-06	8 (10.6)	0.31 (0.18)	0.5	0.4	0.1	2.2	1000	-06	46
FN 9222 ExR-10-06	10 (11.6)	0.31 (0.18)	0.225	0.1	0.1	2.2	1000	-06	46
FN 9222 ExR-12-06	12 (12)	0.31 (0.18)	0.11	0.1	0.1	2.2	1000	-06	46
FN 9222 ExR-15-06	15 (15)	0.31 (0.18)	0.075	0.1	0.1	2.2	1000	-06	46
FN 9222 ExR-12-06HI	12 (12)	0.31 (0.18)	0.11	0.1	0.1	2.2	1000	-06	46
FN 9222 ExR-15-06HI	15 (15)	0.31 (0.18)	0.075	0.1	0.1	2.2	1000	-06	46
FN 9222 ExB-1-06	1 (1.2)	0.00	12	0.4	0.1		1000	-06	46
FN 9222 ExB-3-06	3 (3.5)	0.00	2.5	0.4	0.1		1000	-06	46
FN 9222 ExB-6-06	6 (7.2)	0.00	0.78	0.4	0.1		1000	-06	46
FN 9222 ExB-8-06	8 (10.6)	0.00	0.5	0.4	0.1		1000	-06	46
FN 9222 ExB-10-06	10 (11.6)	0.00	0.225	0.1	0.1		1000	-06	46
FN 9222 ExB-12-06	12 (12)	0.00	0.11	0.1	0.1		1000	-06	46
FN 9222 ExB-15-06	15 (15)	0.00	0.075	0.1	0.1		1000	-06	46
FN 9222 ExB-12-06HI	12 (12)	0.00	0.11	0.1	0.1		1000	-06	46
FN 9222 ExB-15-06HI	15 (15)	0.00	0.075	0.1	0.1		1000	-06	46

* Leakage current under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

Product selector

FN 9222Exx-yy-..HI-zz

Snap-in range for S version only
- Blank: Snap-in range 0.7 to 1.5mm
- 20: Snap-in range 1.5 to 2.2mm

- Blank: Standard IEC inlet type C14
- HI: Hot IEC inlet type C16 (12 and 15A types only)

- 06: Faston 6.3 x 0.8mm (spade/soldering)

- 1 to 15: Rated current

- Blank: Standard version
- R: Bleed resistor
- B: Medical version (with bleed resistor and without Y2-capacitor)

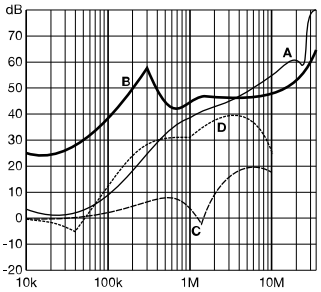
- Blank: Standard housing with mounting flanges
- U: Housing with wider mounting flanges
- S: Snap-in version, snapper on vertical side
- S1: Snap-in version, snapper on horizontal side

For example: FN 9222 E-15-06, FN 9222 ES1B-10-06-20, FN 9222 EUB-8-06-20

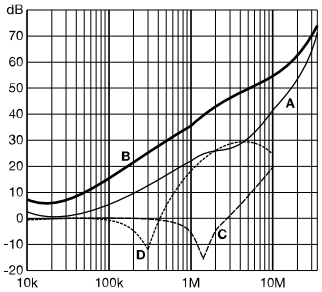
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

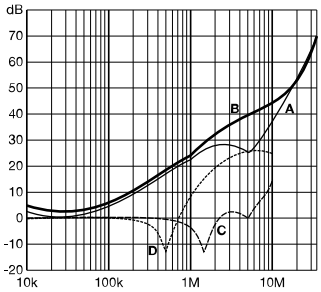
1 and 3 A types



6 to 10 A types

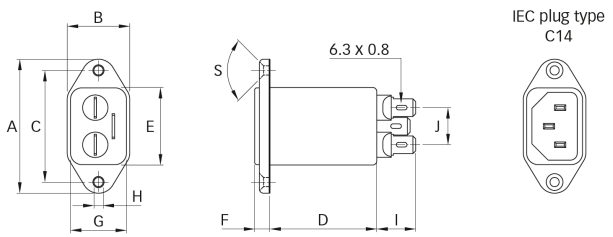


12 and 15 A types

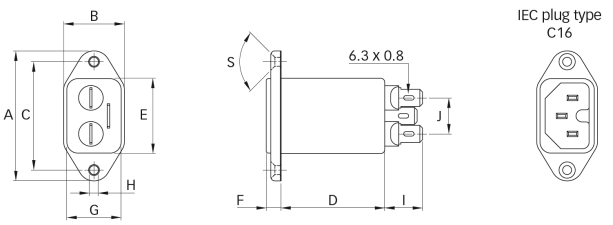


Mechanical data

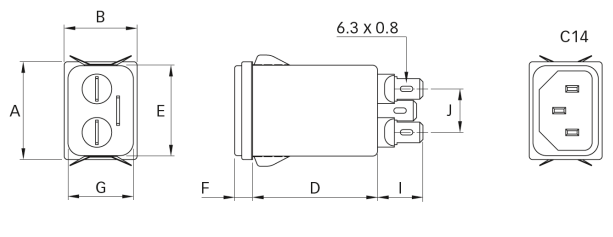
FN 9222 E



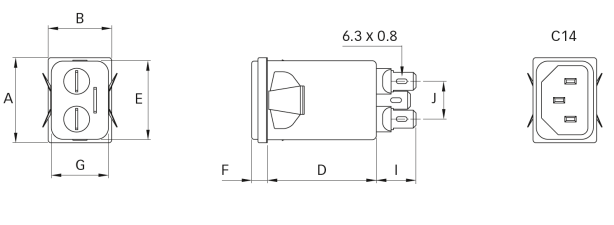
FN 9222 E-HI



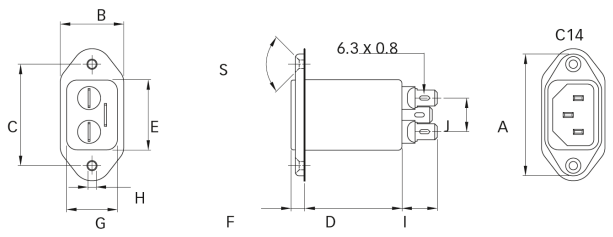
FN 9222 ES



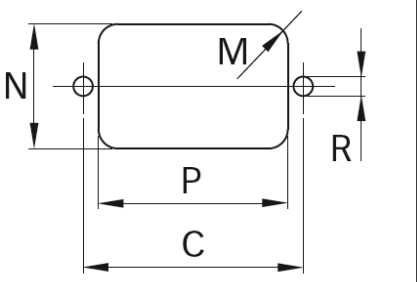
FN 9222 ES1



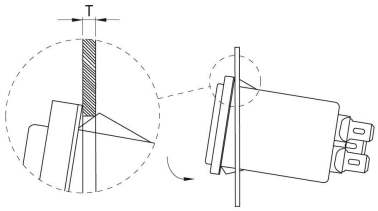
FN 9222 EU



Panel cut out



Installation



Dimensions

	FN 9222 E	FN 9222 EU	FN 9222 ES	FN 9222 ES1	FN 9222 E-HI	Tol.
A	48	48	29.9	29.9	48	
B	22.4	25	22.4	22.4	22.4	
C	40	40			40	±0.2
D	46.8	46.7	46.8	46.8	46.8	
E	27.8	27.7	27.8	27.8	27.8	+0.6/-0
F	5.7	5.7	5.7	5.7	5.7	
G	20.1	20.1	20.1	20.1	20.1	+0.6/-0
H	Ø3.3	Ø3.3			Ø3.3	
I	14	14	14	14	14	
J	13.3	13.3	13.3	13.3	13.3	
M	R ≤3	R ≤3	R ≤1.5	R ≤1.5	R ≤3	
N	21.5	21.5	20.8	21.9	21.5	
P	28.5	28.5	29.4	28.5	28.5	
R*	M3	M3			M3	
S	90°	90°			90°	
T**			0.7 - 1.5	0.7 - 1.5		
T**			1.5 - 2.2	1.5 - 2.2		

* Recommended torque for M3 (90° countersunk flat head) is 0.5 Nm

** For selecting the panel thickness, please refer to the filter selector table.

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

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Power Cord with Locking System for Inlet Filters IL 13, IL 13 P, IL 19

Link to Datasheet: Datasheet IEC C13/ C19 locking cable

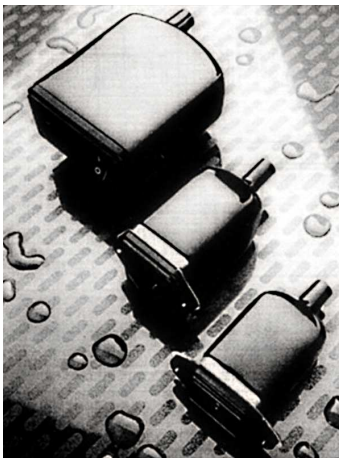
The locking system has a tensile force of typical 200N.
It is recommended to use it with flange mount filters.
Lock Power Cords with IEC Inlets and Filters"
Schaffner power cords with IEC lock guard against
accidental disconnection of all electrical appliances
with an IEC inlet. No exchange or modification of the
IEC inlet or IEC inlet filter system is needed. Easy
retrofit for all electronic equipments and devices.

IEC C13 Rewireable Connector for individual Power Cord with Locking System

Link to Datasheet: Datasheet IEC C13 rewireable

The locking system has a tensile force of typical 300N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters" Schaffner power connector with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

IB - Insulating Boots



There is a full range of insulating boots available from Schaffner that provide a physical cover for the exposed terminals on the back of IEC Inlet Filters.
These boots fit the simplest non-fused and unswitched style up to the fully fused and switched IEC filtered inlet. The boots are made from a durable black PVC material that conforms to UL94-V0 flammability requirements. The boots slip easily over the back of the filter and reduce the risk of electrical shock to maintenance personnel whilst protecting the filter from environmental hazard such as the ingress of dust and moisture.

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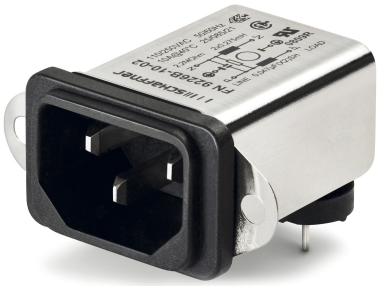
HF Performance EMC/EMI Filter

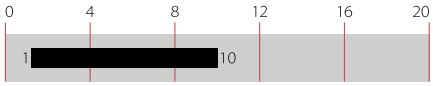


- Rated currents up to 10 A
- Faston connection
- Optional PCB through hole connection
- Good HF coupling to the equipment housing
- Optional medical versions (B type)

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 10 A @ 50°C max.
Approvals by rated current	1 to 10 A (ENEC, UL, CSA)
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> N 760 VAC for 2 sec P –> PE 2500 VAC for 2 sec (B types)
Protection category	IP 40 according IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	800,000 hours

Approvals

The FN 9226 IEC inlet filter combines an IEC inlet and mains filter with excellent filter attenuation in a small form factor. The FN 9226 is designed for printed circuit board mounting with good HF coupling to the equipment housing. Choosing the FN 9226 power entry module brings you the rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on current ratings, output connections and low leakage versions for medical applications helps you to select the desired solution for your application.

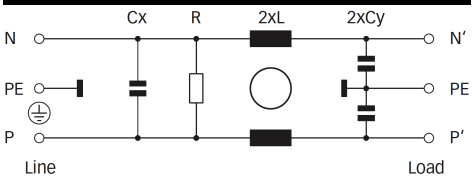
Features and benefits

- High conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear flange mounting
- FN 9226 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- Faston connection or PCB through hole pins
- Good HF coupling
- Rated currents up to 10 A
- Custom-specific versions are available on request

Typical applications

- Portable electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Consumer goods
- Test and measurement equipment
- EDP and office equipment
- Medical equipment
- Rack mounting equipment

Typical electrical schematic



Filter selection table

Filter	Rated current @ 50°C (25°C)	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance	Capacitance		Resistance	Output connections		Weight
			L	Cx	Cy	R			
	[A]	[mA]	[mH]	[nF]	[nF]	[kΩ]	⊥		[g]
FN 9226-1-..	1 (1.2)	0.31 (0.18)	4.65	47.0	2.2		-02	-06	40
FN 9226-3-..	3 (3.5)	0.31 (0.18)	1.24	47.0	2.2		-02	-06	40
FN 9226-6-..	6 (7.2)	0.31 (0.18)	0.52	47.0	2.2		-02	-06	40
FN 9226-10-..	10 (11.6)	0.31 (0.18)	0.27	47.0	2.2		-02	-06	40
FN 9226 B-1-..	1 (1.2)	0.00	4.65	47.0		2200	-02	-06	40
FN 9226 B-3-..	3 (3.5)	0.00	1.24	47.0		2200	-02	-06	40
FN 9226 B-6-..	6 (7.2)	0.00	0.52	47.0		2200	-02	-06	40
FN 9226 B-10-..	10 (11.6)	0.00	0.27	47.0		2200	-02	-06	40

* Maximum leakage under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

Product selector

FN 9226x-yy-..

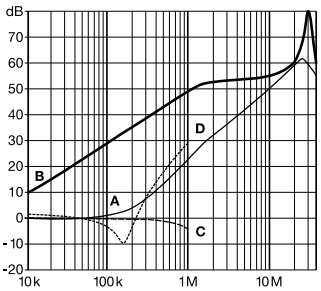
02:	PCB through hole mounting
06:	Faston 6.3 x 0.8mm (spade/soldering)
1 to 10:	Rated current
Blank:	Standard version
B:	Medical version (with bleed resistor and without Y2-capacitor)

For example: FN 9226-6-02, FN 9226 B-10-06

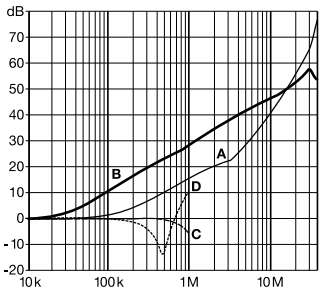
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

1 and 3 A types

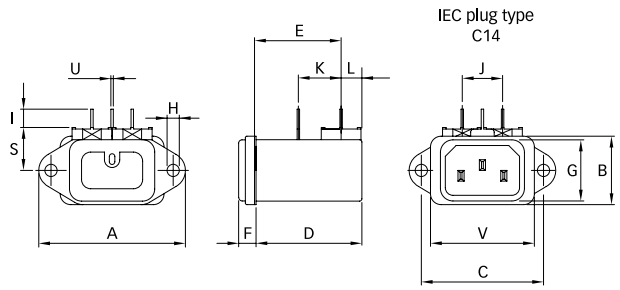


6 to 10 A types

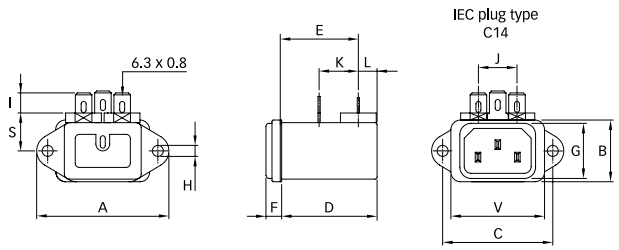


Mechanical data

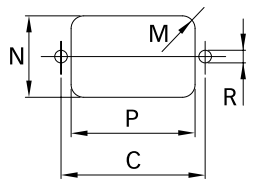
Connection style -02



Connection style -06



Panel cut out



	FN 9226 Connection style -02	FN 9226 Connections style -06	Tolerances
A	48	48	±0.5
B	22.4	22.4	±0.3
C	40	40	±0.2
D	35.15	35.15	±0.3
E	28.35	28.35	±0.3
F	5.7	5.7	±0.3
G	20	20	±0.3
H	Ø4	Ø4	
I	6	7.3	
J	13.2	13.2	+0.6/-0
K	14	14.25	±0.5
L	6.8	6.8	±0.3
M	R ≤3.5	R ≤3.5	
N	22.6	22.6	+0.2/-0
P	34.4	34.4	+0.2/-0
R	Ø3.5	Ø3.5	
S	14	14	
U	0.8		±0.1
V	34	34	±0.3

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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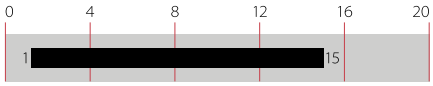
High Performance EMC/EMI Filter

- Rated currents up to 15 A
- Excellent attenuation performance
- Complies with IEC/EN 60601-1
- Snap-in versions (S and S1 type)
- Hot inlet versions (HI type)

Performance indicators

Attenuation performance

Rated current [A]



Approvals

(CQC except HI-types)

The FN 9233 IEC inlet filter combines an excellent IEC inlet and mains filter with excellent filter attenuation in a small form factor. Choosing the FN 9233 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on amperage ratings, output connections, mounting possibilities and filters for medical applications are designed to offer you the desired solution. For types with additional earth line choke please consult the FN 9233 E data sheet.

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 15 A @ 50°C
Approvals by rated current	1 to 10 A (ENEC, CQC) 1 to 15 A (UL, CSA)
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 1000 VAC for 2 sec
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	2,540,000 hours

Features and benefits

- Exceptional conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear/front or snap-in mounting
- Optional earth line choke see FN 9233 E data sheet
- FN 9233 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- Wide mounting flanges available
- Different output connections offering maximum flexibility for assembly
- Custom-specific versions are available on request

Typical applications

- Portable electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Medical equipment
- Rack mounting equipment

Filter selection table

Filter	Rated current @ 50°C (25°C)	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance	Capacitance			Resistance	Output connections	Weight
			L	Cx1	Cx2	Cy	Cy		
	[A]	[mA]	[mH]	[µF]	[µF]	[nF]	[kΩ]		[g]
FN 9233 x-1-06	1 (1.2)	0.31 (0.18)	22.5	0.1		2.2		-06	37
FN 9233 x-3-06	3 (3.5)	0.31 (0.18)	4.6	0.1		2.2		-06	37
FN 9233 x-6-06	6 (7.2)	0.31 (0.18)	1.6	0.1		2.2		-06	37
FN 9233 x-8-06	8 (10.6)	0.31 (0.18)	0.9	0.1		2.2		-06	37
FN 9233 x-10-06	10 (11.6)	0.31 (0.18)	0.45	0.1		2.2		-06	37
FN 9233 x-12-06	12 (12)	0.31 (0.18)	0.27	0.1		2.2		-06	37
FN 9233 x-15-06	15 (15)	0.31 (0.18)	0.2	0.1		2.2		-06	37
FN 9233 x-12-06HI	12 (12)	0.31 (0.18)	0.27	0.1		2.2		-06	37
FN 9233 x-15-06HI	15 (15)	0.31 (0.18)	0.2	0.1		2.2		-06	37
FN 9233 xR-1-06	1 (1.2)	0.31 (0.18)	22.5	0.1		2.2	1000	-06	37
FN 9233 xR-3-06	3 (3.5)	0.31 (0.18)	4.6	0.1		2.2	1000	-06	37
FN 9233 xR-6-06	6 (7.2)	0.31 (0.18)	1.6	0.1		2.2	1000	-06	37
FN 9233 xR-8-06	8 (10.6)	0.31 (0.18)	0.9	0.1		2.2	1000	-06	37
FN 9233 xR-10-06	10 (11.6)	0.31 (0.18)	0.45	0.1		2.2	1000	-06	37
FN 9233 xR-12-06	12 (12)	0.31 (0.18)	0.27	0.1		2.2	1000	-06	37
FN 9233 xR-15-06	15 (15)	0.31 (0.18)	0.2	0.1		2.2	1000	-06	37
FN 9233 xR-12-06HI	12 (12)	0.31 (0.18)	0.27	0.1		2.2	1000	-06	37
FN 9233 xR-15-06HI	15 (15)	0.31 (0.18)	0.2	0.1		2.2	1000	-06	37
FN 9233 xB-1-06	1 (1.2)	0.00	22.5	0.1			1000	-06	37
FN 9233 xB-3-06	3 (3.5)	0.00	4.6	0.1			1000	-06	37
FN 9233 xB-6-06	6 (7.2)	0.00	1.6	0.1			1000	-06	37
FN 9233 xB-8-06	8 (10.6)	0.00	0.9	0.1			1000	-06	37
FN 9233 xB-10-06	10 (11.6)	0.00	0.45	0.1			1000	-06	37
FN 9233 xB-12-06	12 (12)	0.00	0.27	0.1			1000	-06	37
FN 9233 xB-15-06	15 (15)	0.00	0.2	0.1			1000	-06	37
FN 9233 xB-12-06HI	12 (12)	0.00	0.27	0.1			1000	-06	37
FN 9233 xB-15-06HI	15 (15)	0.00	0.2	0.1			1000	-06	37
FN 9233 UF2-1-06	1 (1.2)	0.47 (0.27)	22.5	0.047	0.047	3.3		-06	46
FN 9233 UF2-3-06	3 (3.5)	0.47 (0.27)	4.6	0.047	0.047	3.3		-06	46
FN 9233 UF2-6-06	6 (7.2)	0.47 (0.27)	1.6	0.047	0.047	3.3		-06	46
FN 9233 UF2-8-06	8 (10.6)	0.47 (0.27)	0.9	0.047	0.047	3.3		-06	46
FN 9233 UF2-10-06	10 (11.6)	0.47 (0.27)	0.45	0.047	0.047	3.3		-06	46
FN 9233 UF2-12-06	12 (12)	0.47 (0.27)	0.27	0.047	0.047	3.3		-06	46
FN 9233 UF2-15-06	15 (15)	0.47 (0.27)	0.2	0.047	0.047	3.3		-06	46

* Maximum leakage under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

Product selector

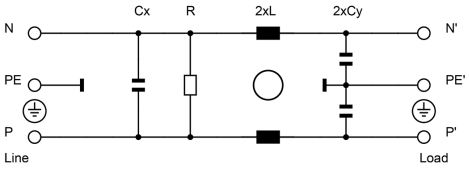
FN 9233xx-yy-..Hl-zz

		Snap-in range for S version only
	Blank:	Snap-in range 0.7 to 1.5mm
	20:	Snap-in range 1.5 to 2.2mm
	Blank:	Standard IEC inlet type C14
	Hl:	Hot IEC inlet type C16 (12 and 15A types only)
	06:	Faston 6.3 x 0.8mm (spade/soldering)
	1 to 15:	Rated current
	Blank:	Standard version
	R:	Bleed resistor
	B:	Medical version (with bleed resistor and without Y2-capacitor)
	F2:	2 X-capacitors and higher Y-capacitor value
⬡	Blank:	Standard housing with mounting flanges
⬡	U:	Housing with wider mounting flanges
□	S:	Snap-in version, snapper on vertical side
□	S1:	Snap-in version, snapper on horizontal side

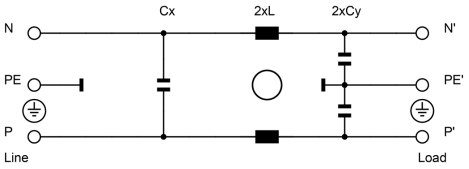
For example: FN 9233-15-06, FN 9233 S1B-10-06-20, FN 9233 R-12-06Hl

Typical electrical schematic

Standard, R and B types



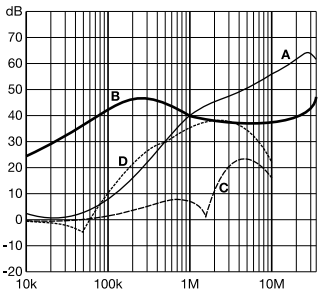
F2 types



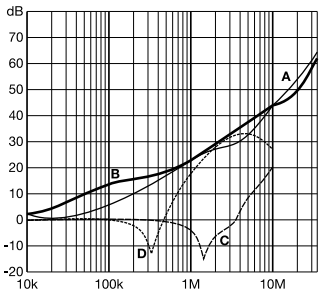
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

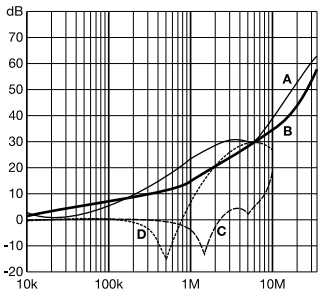
FN 9233: 1 and 3 A types



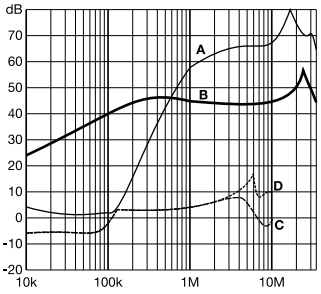
FN 9233: 6 to 10 A types



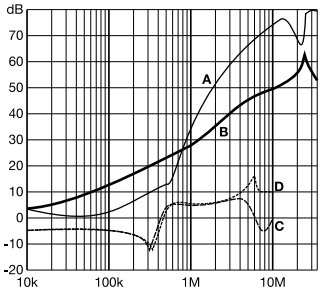
FN 9233: 12 and 15 A types



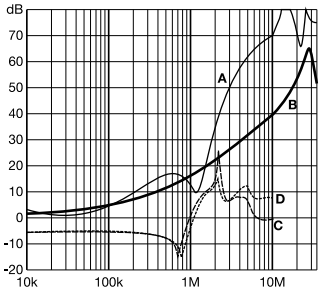
FN 9233 UF2: 1 and 3 A types



FN 9233 UF2: 6 to 10 A types

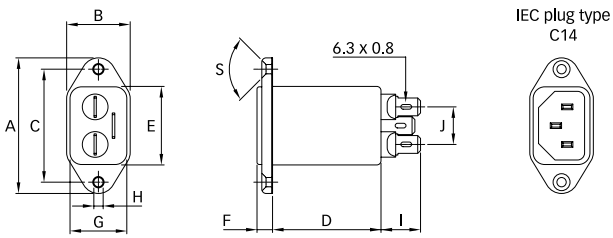


FN 9233 UF2: 12 and 15 A types

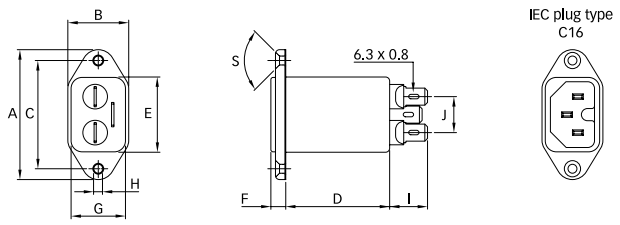


Mechanical data

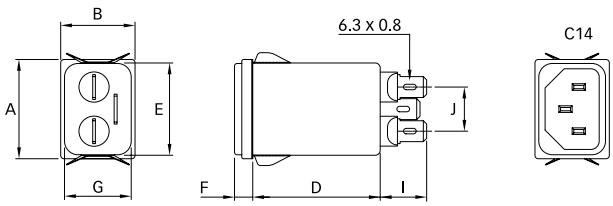
FN 9233



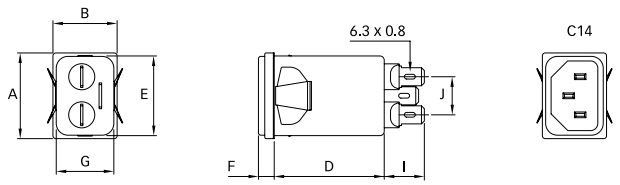
FN 9233-HI



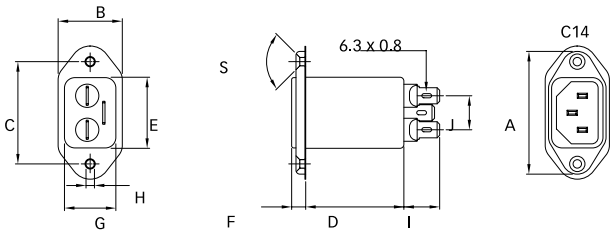
FN 9233 S



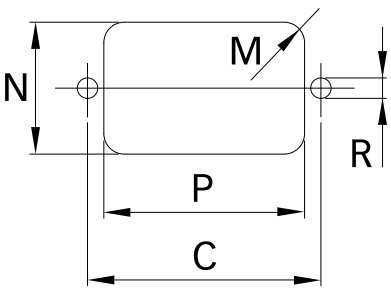
FN 9233vS1



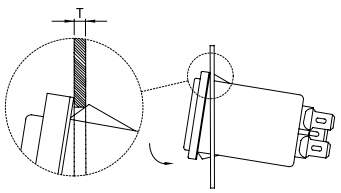
FN 9233 U



Panel cut out



Installation



Dimensions

	FN 9233	FN 9233 U	FN 9233 UF2	FN 9233 S	FN 9233 S1	FN 9233-HI	Tol.
A	48	48	48	29.9	29.9	48	
B	22.4	25	25	22.4	22.4	22.4	
C	40	40	40			40	±0.2
D	38.25	38.25	46.7	38.25	38.25	38.25	
E	27.8	27.7	27.7	27.8	27.8	27.8	+0.6/-0
F	5.7	5.7	5.7	5.7	5.7	5.7	
G	20.1	20.1	20.1	20.1	20.1	20.1	+0.6/-0
H	Ø3.3	Ø3.3	Ø3.3			Ø 3.3	
I	14	14	14	14	14	14	
J	13.3	13.3	13.3	13.3	13.3	13.3	
M	R ≤3	R ≤3	R ≤3	R ≤1.5	R ≤1.5	R ≤3	
N	21.5	21.5	21.5	20.8	21.9	21.5	
P	28.5	28.5	28.5	29.4	28.5	28.5	
R*	M3	M3	M3			M3	
S	90°	90°	90°			90°	
T**				0.7 - 1.5	0.7 - 1.5		
T**				1.5 - 2.2	1.5 - 2.2		

* Recommended torque for M3 (90° countersunk flat head) is 0.5 Nm

** For selecting the panel thickness, please refer to the filter selector table.

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on connectors.

Accessories for IEC Inlet Filters and Power Entry Modules

The accessories displayed are a selection of available accessories for IEC Inlet filters and IEC Power entry modules. As they are displayed in a general way there might be variants of the filters where the accessories are not available.
For further information please ask your local Schaffner Sales Partner and visit our homepage https://www.schaffner.com/.

Power Cord with Locking System for Inlet Filters IL 13, IL 13 P, IL 19

Link to Datasheet: Datasheet IEC C13/ C19 locking cable

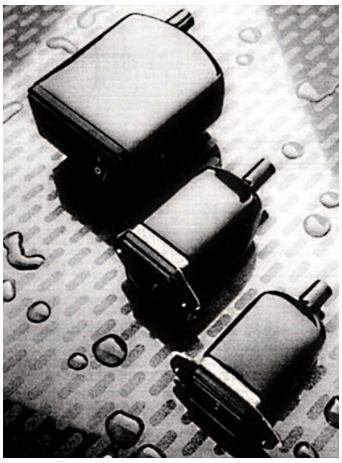
The locking system has a tensile force of typical 200N.
It is recommended to use it with flange mount filters.
Lock Power Cords with IEC Inlets and Filters"
Schaffner power cords with IEC lock guard against
accidental disconnection of all electrical appliances
with an IEC inlet. No exchange or modification of the
IEC inlet or IEC inlet filter system is needed. Easy
retrofit for all electronic equipments and devices.

IEC C13 Rewireable Connector for individual Power Cord with Locking System

Link to Datasheet: Datasheet IEC C13 rewireable

The locking system has a tensile force of typical 300N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters" Schaffner power connector with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

IB - Insulating Boots



There is a full range of insulating boots available from Schaffner that provide a physical cover for the exposed terminals on the back of IEC Inlet Filters.
These boots fit the simplest non-fused and unswitched style up to the fully fused and switched IEC filtered inlet. The boots are made from a durable black PVC material that conforms to UL94-V0 flammability requirements. The boots slip easily over the back of the filter and reduce the risk of electrical shock to maintenance personnel whilst protecting the filter from environmental hazard such as the ingress of dust and moisture.

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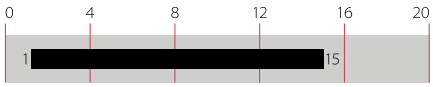
High Performance EMC/EMI Filter with Earth Line Choke

- Rated currents up to 15 A
- Excellent attenuation performance
- Integrated earth line choke
- Complies with IEC/EN 60601-1
- Snap-in versions (S and S1 type)
- Hot inlet versions (HI type)

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 15 A @ 50°C
Approvals by rated current	1 to 10 A (ENEC, CQC) 1 to 15 A (UL, CSA)
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 1000 VAC for 2 sec
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	1,710,000 hours

Approvals

(CQC except HI-types)

The FN 9233 E IEC inlet filter combines an IEC inlet and mains filter with excellent filter attenuation in a small form factor. The FN 9233 E high performance power entry module offers additional EMI suppression on the earth line. Choosing the FN 9233 E product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on amperage ratings, output connections, mounting possibilities and filters for medical applications are designed to offer you the desired solution. For types without additional earth line choke please consult the FN 9233 data sheet.

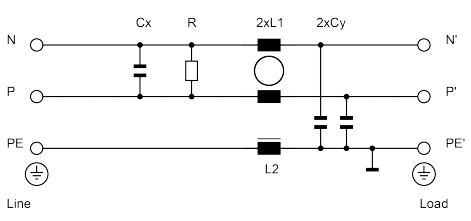
Features and benefits

- Exceptional conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear/front or snap-in mounting
- Without earth line choke see FN 9233 data sheet
- Optional medical versions (B type) comply with the requirements of IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- Wide mounting flanges available
- Different output connections offering maximum flexibility for assembly
- Custom-specific versions are available on request

Typical applications

- Portable electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Medical equipment
- Rack mounting equipment

Typical electrical schematic



Filter selection table

Filter	Rated current @ 50°C(25 °C)	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance		Capacitance		Resistance	Output connections	Weight
			L1	L2	Cx	Cy	R		
	[A]	[mA]	[mH]	[mH]	[µF]	[nF]	[kΩ]		[g]
FN 9233 Ex-1-06	1 (1.2)	0.31 (0.18)	22.5	0.4	0.1	2.2		-06	46
FN 9233 Ex-3-06	3 (3.5)	0.31 (0.18)	4.6	0.4	0.1	2.2		-06	46
FN 9233 Ex-6-06	6 (7.2)	0.31 (0.18)	1.6	0.4	0.1	2.2		-06	46
FN 9233 Ex-8-06	8 (10.6)	0.31 (0.18)	0.9	0.4	0.1	2.2		-06	46
FN 9233 Ex-10-06	10 (11.6)	0.31 (0.18)	0.45	0.4	0.1	2.2		-06	46
FN 9233 Ex-12-06	12 (12)	0.31 (0.18)	0.27	0.1	0.1	2.2		-06	46
FN 9233 Ex-15-06	15 (15)	0.31 (0.18)	0.2	0.1	0.1	2.2		-06	46
FN 9233 Ex-12-06HI	12 (12)	0.31 (0.18)	0.27	0.1	0.1	2.2		-06	46
FN 9233 Ex-15-06HI	15 (15)	0.31 (0.18)	0.2	0.1	0.1	2.2		-06	46
FN 9233 ExR-1-06	1 (1.2)	0.31 (0.18)	22.5	0.4	0.1	2.2	1000	-06	46
FN 9233 ExR-3-06	3 (3.5)	0.31 (0.18)	4.6	0.4	0.1	2.2	1000	-06	46
FN 9233 ExR-6-06	6 (7.2)	0.31 (0.18)	1.6	0.4	0.1	2.2	1000	-06	46
FN 9233 ExR-8-06	8 (10.6)	0.31 (0.18)	0.9	0.4	0.1	2.2	1000	-06	46
FN 9233 ExR-10-06	10 (11.6)	0.31 (0.18)	0.45	0.4	0.1	2.2	1000	-06	46
FN 9233 ExR-12-06	12 (12)	0.31 (0.18)	0.27	0.1	0.1	2.2	1000	-06	46
FN 9233 ExR-15-06	15 (15)	0.31 (0.18)	0.2	0.1	0.1	2.2	1000	-06	46
FN 9233 ExR-12-06HI	12 (12)	0.31 (0.18)	0.27	0.1	0.1	2.2	1000	-06	46
FN 9233 ExR-15-06HI	15 (15)	0.31 (0.18)	0.2	0.1	0.1	2.2	1000	-06	46
FN 9233 ExB-1-06	1 (1.2)	0.00	22.5	0.4	0.1		1000	-06	46
FN 9233 ExB-3-06	3 (3.5)	0.00	4.6	0.4	0.1		1000	-06	46
FN 9233 ExB-6-06	6 (7.2)	0.00	1.6	0.4	0.1		1000	-06	46
FN 9233 ExB-8-06	8 (10.6)	0.00	0.9	0.4	0.1		1000	-06	46
FN 9233 ExB-10-06	10 (11.6)	0.00	0.45	0.4	0.1		1000	-06	46
FN 9233 ExB-12-06	12 (12)	0.00	0.27	0.1	0.1		1000	-06	46
FN 9233 ExB-15-06	15 (15)	0.00	0.2	0.1	0.1		1000	-06	46
FN 9233 ExB-12-06HI	12 (12)	0.00	0.27	0.1	0.1		1000	-06	46
FN 9233 ExB-15-06HI	15 (15)	0.00	0.2	0.1	0.1		1000	-06	46

* Maximum leakage under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

Product selector

FN 9233Exx-yy-..HI-zz

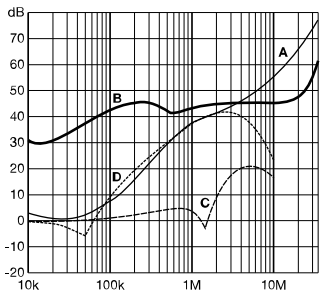
		Snap-in range for S version only
	Blank:	Snap-in range 0.7 to 1.5mm
	20:	Snap-in range 1.5 to 2.2mm
	Blank:	Standard IEC inlet type C14
	HI:	Hot IEC inlet type C16 (12 and 15A types only)
	06:	Faston 6.3 x 0.8mm (spade/soldering)
	1 to 15:	Rated current
	Blank:	Standard version
	R:	Bleed resistor
	B:	Medical version (with bleed resistor and without Y2-capacitor)
	Blank:	Standard housing with mounting flanges
	U:	Housing with wider mounting flanges
	S:	Snap-in version, snapper on vertical side
	S1:	Snap-in version, snapper on horizontal side

For example: FN 9233 E-15-06, FN 9233 ES1B-10-06-20, FN 9233 ER-12-06HI, FN 9233 EUB-8-06-20

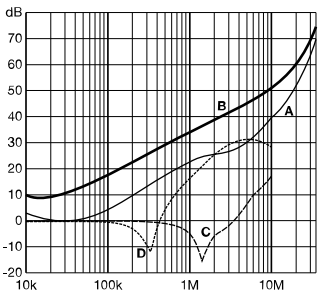
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

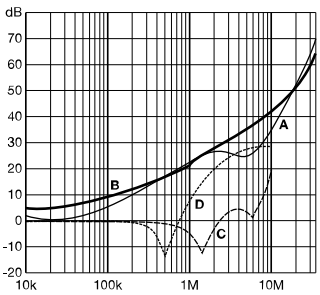
1 and 3 A types



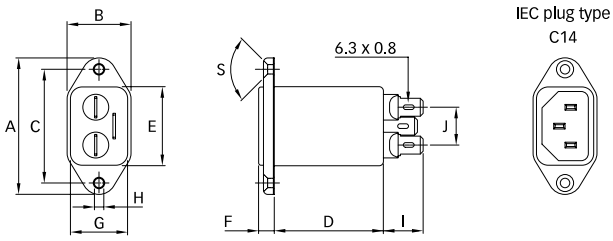
6 to 10 A types



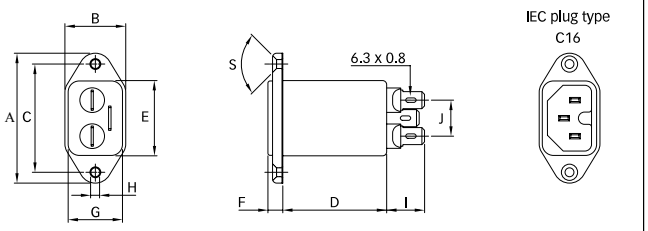
12 and 15 A types



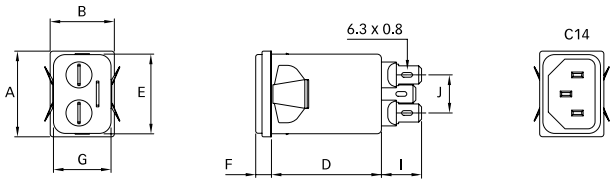
FN 9233 E



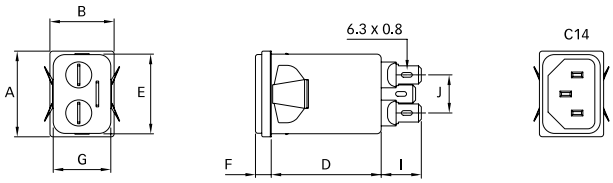
FN 9233 E-HI



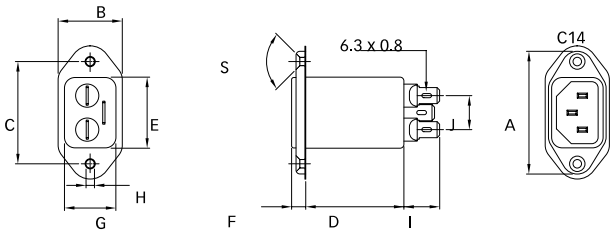
FN 9233 ES



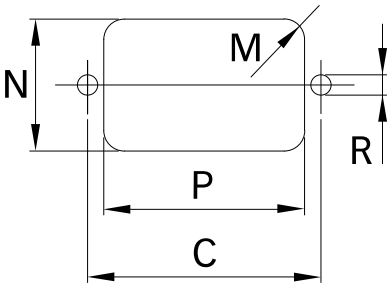
FN 9233 ES1



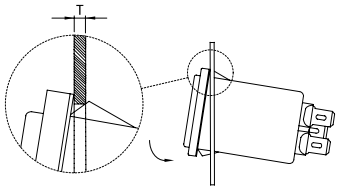
FN 9233 EU



Panel cut out



Installation



Dimensions

	FN 9233 E	FN 9233 EU	FN 9233 ES	FN 9233 ES1	FN 9233 E-HI	Tol.
A	48	48	29.9	29.9	48	
B	22.4	25	22.4	22.4	22.4	
C	40	40			40	0.2
D	46.8	46.7	46.8	46.8	46.8	
E	27.8	27.7	27.8	27.8	27.8	+0.6/-0
F	5.7	5.7	5.7	5.7	5.7	
G	20.1	20.1	20.1	20.1	20.1	+0.6/-0
H	Ø3.3	Ø3.3			Ø3.3	
I	14	14	14	14	14	
J	13.3	13.3	13.3	13.3	13.3	
M	R ≤3	R ≤3	R ≤1.5	R ≤1.5	R ≤3	
N	21.5	21.5	20.8	21.9	21.5	
P	28.5	28.5	29.4	28.5	28.5	
R*	M3	M3			M3	
S	90°	90°			90°	
T**			0.7 - 1.5	0.7 - 1.5		
T**			1.5 - 2.2	1.5 - 2.2		

* Recommended torque for M3 (90° countersunk flat head) is 0.5 Nm

** For selecting the panel thickness, please refer to the filter selector table.

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on connectors.

Accessories for IEC Inlet Filters and Power Entry Modules

The accessories displayed are a selection of available accessories for IEC Inlet filters and IEC Power entry modules. As they are displayed in a general way there might be variants of the filters where the accessories are not available.
For further information please ask your local Schaffner Sales Partner and visit our homepage https://www.schaffner.com/.

Power Cord with Locking System for Inlet Filters IL 13, IL 13 P, IL 19

Link to Datasheet: Datasheet IEC C13/ C19 locking cable

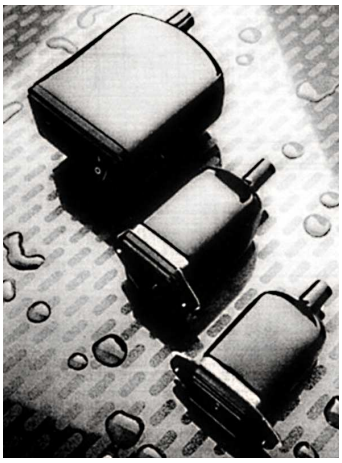
The locking system has a tensile force of typical 200N.
It is recommended to use it with flange mount filters.
Lock Power Cords with IEC Inlets and Filters"
Schaffner power cords with IEC lock guard against
accidental disconnection of all electrical appliances
with an IEC inlet. No exchange or modification of the
IEC inlet or IEC inlet filter system is needed. Easy
retrofit for all electronic equipments and devices.

IEC C13 Rewireable Connector for individual Power Cord with Locking System

Link to Datasheet: Datasheet IEC C13 rewireable

The locking system has a tensile force of typical 300N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters" Schaffner power connector with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

IB - Insulating Boots



There is a full range of insulating boots available from Schaffner that provide a physical cover for the exposed terminals on the back of IEC Inlet Filters.
These boots fit the simplest non-fused and unswitched style up to the fully fused and switched IEC filtered inlet. The boots are made from a durable black PVC material that conforms to UL94-V0 flammability requirements. The boots slip easily over the back of the filter and reduce the risk of electrical shock to maintenance personnel whilst protecting the filter from environmental hazard such as the ingress of dust and moisture.

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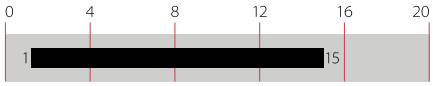
Excellent Performance EMC/EMI Filter

- Superior attenuation performance
- Optional earth line choke
- Complies with IEC/EN 60601-1
- Snap-in versions (S and S1 type)
- Hot inlet versions (HI type)

Performance indicators

Attenuation performance

Rated current [A]



Approvals

(CQC except HI-types)

The FN 9244 IEC inlet filter combines an IEC inlet and mains filter with superior filter attenuation in a small form factor. Choosing the FN 9244 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on amperage ratings, output connections, mounting possibilities and filters for medical applications are designed to offer you the desired solution.

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 15 A @ 50°C max.
Approvals by rated current	1 to 10 A (ENEC, CQC) 1 to 15 A (UL, CSA)
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 1000 VAC for 2 sec
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	≤8 A: 2,035,000 hours ≤15 A: 1,035,000 hours

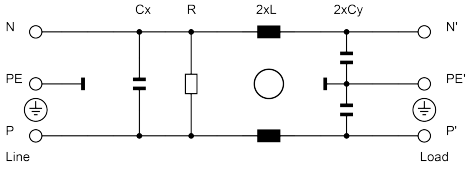
Features and benefits

- Exceptional conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear/front or snap-in mounting
- Standard or wide mounting flange
- FN 9244 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- Optional earth line choke see FN 9244 E data sheet
- Custom-specific versions are available on request

Typical applications

- Portable electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Medical devices (MDD)
- In-vitro diagnostic medical devices (IVDD)
- Rack mounting equipment

Typical electrical schematic



Filter selection table

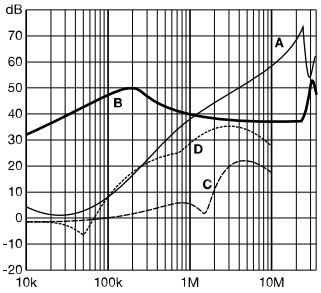
Filter	Rated current @ 50°C (25°C)	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance	Capacitance		Resistance	Output connections	Weight
			L	Cx	Cy	R		
	[A]	[mA]	[mH]	[µF]	[nF]	[kΩ]		[g]
FN 9244 x-1-06	1 (1.2)	0.31 (0.18)	59.53	0.1	2.2		-06	38
FN 9244 x-3-06	3 (3.5)	0.31 (0.18)	13.45	0.1	2.2		-06	38
FN 9244 x-6-06	6 (7.2)	0.31 (0.18)	4.1	0.1	2.2		-06	38
FN 9244 x-8-06	8 (10.6)	0.31 (0.18)	2.3	0.1	2.2		-06	38
FN 9244 x-10-06	10 (11.6)	0.31 (0.18)	1.02	0.1	2.2		-06	38
FN 9244 x-12-06	12 (12)	0.31 (0.18)	0.58	0.1	2.2		-06	38
FN 9244 x-15-06	15 (15)	0.31 (0.18)	0.4	0.1	2.2		-06	38
FN 9244 x-12-06HI	12 (12)	0.31 (0.18)	0.58	0.1	2.2		-06	38
FN 9244 x-15-06HI	15 (15)	0.31 (0.18)	0.4	0.1	2.2		-06	38
FN 9244 xR-1-06	1 (1.2)	0.31 (0.18)	59.53	0.1	2.2	1000	-06	38
FN 9244 xR-3-06	3 (3.5)	0.31 (0.18)	13.45	0.1	2.2	1000	-06	38
FN 9244 xR-6-06	6 (7.2)	0.31 (0.18)	4.1	0.1	2.2	1000	-06	38
FN 9244 xR-8-06	8 (10.6)	0.31 (0.18)	2.3	0.1	2.2	1000	-06	38
FN 9244 xR-10-06	10 (11.6)	0.31 (0.18)	1.02	0.1	2.2	1000	-06	38
FN 9244 xR-12-06	12 (12)	0.31 (0.18)	0.58	0.1	2.2	1000	-06	38
FN 9244 xR-15-06	15 (15)	0.31 (0.18)	0.4	0.1	2.2	1000	-06	38
FN 9244 xR-12-06HI	12 (12)	0.31 (0.18)	0.58	0.1	2.2	1000	-06	38
FN 9244 xR-15-06HI	15 (15)	0.31 (0.18)	0.4	0.1	2.2	1000	-06	38
FN 9244 xB-1-06	1 (1.2)	0.00	59.53	0.1		1000	-06	38
FN 9244 xB-3-06	3 (3.5)	0.00	13.45	0.1		1000	-06	38
FN 9244 xB-6-06	6 (7.2)	0.00	4.1	0.1		1000	-06	38
FN 9244 xB-8-06	8 (10.6)	0.00	2.3	0.1		1000	-06	38
FN 9244 xB-10-06	10 (11.6)	0.00	1.02	0.1		1000	-06	38
FN 9244 xB-12-06	12 (12)	0.00	0.58	0.1		1000	-06	38
FN 9244 xB-15-06	15 (15)	0.00	0.4	0.1		1000	-06	38
FN 9244 xB-12-06HI	12 (12)	0.00	0.58	0.1		1000	-06	38
FN 9244 xB-15-06HI	15 (15)	0.00	0.4	0.1		1000	-06	38

* Maximum leakage under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

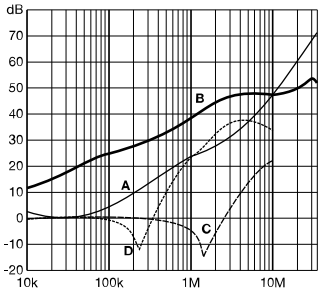
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

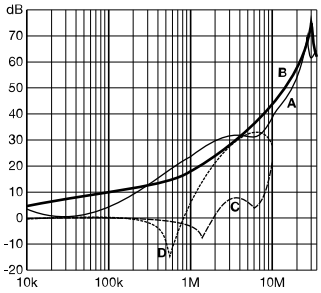
1 and 3 A types



6 to 10 A types



12 and 15 A types



Product selector

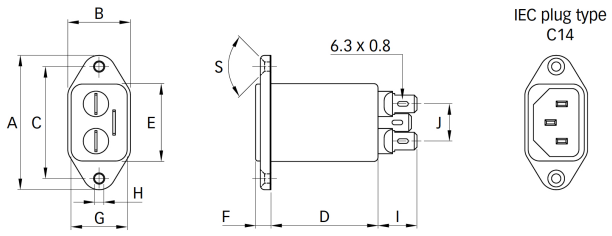
FN 9244xx-yy-..HI-zz

		Snap-in range for S version only
	Blank:	Snap-in range 0.7 to 1.5mm
	20:	Snap-in range 1.5 to 2.2mm
	Blank:	Standard IEC inlet type C14
	HI:	Hot IEC inlet type C16 (12 and 15A types only)
	06:	Faston 6.3 x 0.8mm (spade/soldering)
	1 to 15:	Rated current
	Blank:	Standard version
	R:	Bleed resistor
	B:	Medical version (with bleed resistor and without Y2-capacitor)
⬡	Blank:	Standard housing with mounting flanges
⬡	U:	Housing with wider mounting flanges
□	S:	Snap-in version, snapper on vertical side
□	S1:	Snap-in version, snapper on horizontal side

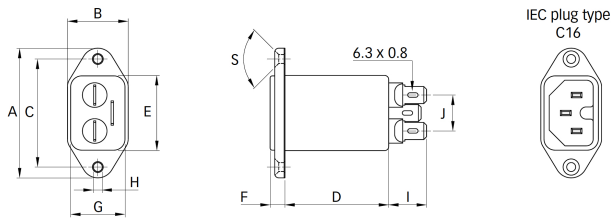
For example: FN 9244 B-15-06, FN 9244 S1B-10-06-20, FN 9244 R-12-06HI, FN 9244 UB-8-06

Mechanical data

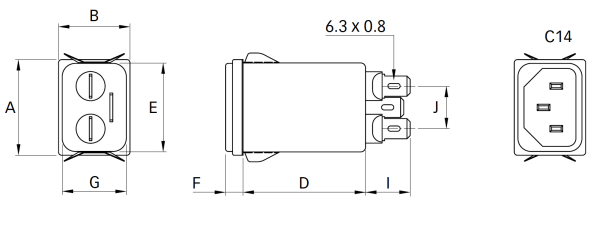
FN 9244



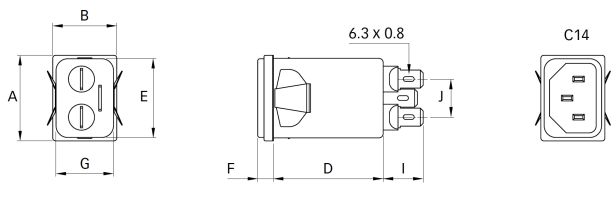
FN 9244-HI



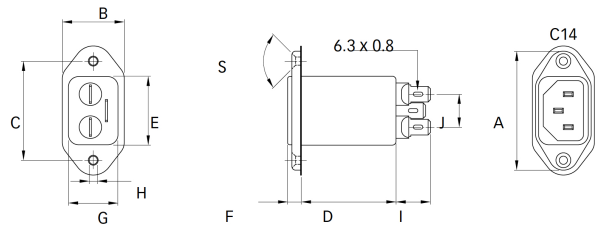
FN 9244 S



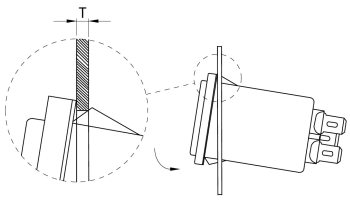
FN 9244 S1



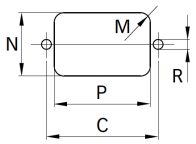
FN 9244 U



Installation



Panel cut out



Dimensions

	FN 9244	FN 9244 U	FN 92244 S	FN 92244 S1	FN 9244-HI	Tol.
A	48	48	29.9	29.9	48	
B	22.4	25	22.4	22.4	22.4	
C	40	40			40	±0.2
D	38.25	38.25	38.25	38.25	38.25	
E	27.8	27.7	27.8	27.8	27.8	+0.6/-0
F	5.7	5.7	5.7	5.7	5.7	
G	20.1	20.1	20.1	20.1	20.1	+0.6/-0
H	Ø3.3	Ø3.3			Ø3.3	
I	14	14	14	14	14	
J	13.3	13.3	13.3	13.3	13.3	
M	R ≤3	R ≤3	R ≤1.5	R ≤1.5	R ≤3	
N	21.5	21.5	20.8	21.9	21.5	
P	28.5	28.5	29.4	28.5	28.5	
R*	M3	M3			M3	
S	90°	90°			90°	
T**			0.7-1.5	0.7-1.5		
T**			1.5-2.2	1.5-2.2		

* Recommended torque for M3 (90° countersunk flat head) is 0.5 Nm

** For selecting the panel thickness, please refer to the filter selector table.

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on connectors.

Accessories for IEC Inlet Filters and Power Entry Modules

The accessories displayed are a selection of available accessories for IEC Inlet filters and IEC Power entry modules. As they are displayed in a general way there might be variants of the filters where the accessories are not available.
For further information please ask your local Schaffner Sales Partner and visit our homepage https://www.schaffner.com/.

Power Cord with Locking System for Inlet Filters IL 13, IL 13 P, IL 19

Link to Datasheet: Datasheet IEC C13/ C19 locking cable

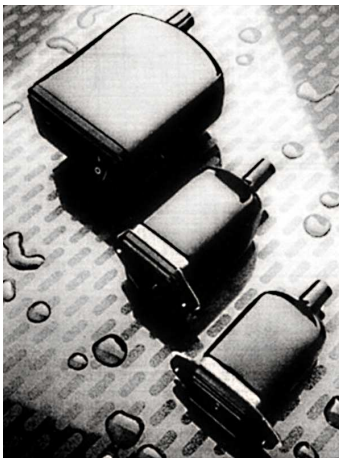
The locking system has a tensile force of typical 200N.
It is recommended to use it with flange mount filters.
Lock Power Cords with IEC Inlets and Filters"
Schaffner power cords with IEC lock guard against
accidental disconnection of all electrical appliances
with an IEC inlet. No exchange or modification of the
IEC inlet or IEC inlet filter system is needed. Easy
retrofit for all electronic equipments and devices.

IEC C13 Rewireable Connector for individual Power Cord with Locking System

Link to Datasheet: Datasheet IEC C13 rewireable

The locking system has a tensile force of typical 300N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters" Schaffner power connector with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

IB - Insulating Boots



There is a full range of insulating boots available from Schaffner that provide a physical cover for the exposed terminals on the back of IEC Inlet Filters.
These boots fit the simplest non-fused and unswitched style up to the fully fused and switched IEC filtered inlet. The boots are made from a durable black PVC material that conforms to UL94-V0 flammability requirements. The boots slip easily over the back of the filter and reduce the risk of electrical shock to maintenance personnel whilst protecting the filter from environmental hazard such as the ingress of dust and moisture.

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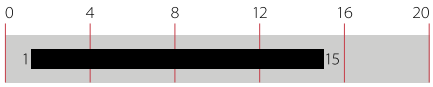
Excellent Performance EMC/EMI Filter with Earth Line Choke

- Rated currents up to 15 A
- Superior attenuation performance
- Integrated earth line choke
- Complies with IEC/EN 60601-1
- Snap-in versions (S and S1 type)
- Hot inlet versions (HI type)

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 15 A @ 50°C
Approvals by rated current	1 to 10 A (ENEC, CQC) 1 to 15 A (UL, CSA)
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 1000 VAC for 2 sec
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	2,230,000 hours

Approvals

(CQC except HI-types)

The FN 9244 E IEC inlet filter combines an IEC inlet and mains filter with superior filter attenuation in a small form factor. The FN 9244 E high performance power entry module offers additional EMI suppression on the earth line. Choosing the FN 9244 E product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on amperage ratings, output connections, mounting possibilities and filters for medical applications are designed to offer you the desired solution. For types without additional earth line choke please consult the FN 9244 data sheet.

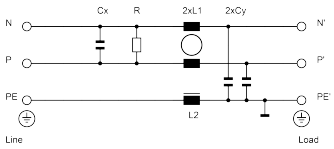
Features and benefits

- Superior conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear/front or snap-in mounting
- Without earth line choke see FN 9244 data sheet
- FN 9244 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- Wide mounting flanges available
- Custom-specific versions are available on request

Typical applications

- Electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Medical devices (MDD)
- In-vitro diagnostic medical devices (IVDD)
- Rack mounting equipment

Typical electrical schematic



Filter selection table

Filter	Rated current @ 50°C (25°C) [A]	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz) [mA]	Inductance L1 [mH]	Inductance L2 [mH]	Capacitance Cx [µF]	Capacitance Cy [nF]	Resistance R [kΩ]	Output connections	Weight [g]
FN 9244 Ex-1-06	1 (1.2)	0.31 (0.18)	59.53	0.4	0.1	2.2		-06	46
FN 9244 Ex-3-06	3 (3.5)	0.31 (0.18)	13.45	0.4	0.1	2.2		-06	46
FN 9244 Ex-6-06	6 (7.2)	0.31 (0.18)	4.1	0.4	0.1	2.2		-06	46
FN 9244 Ex-8-06	8 (10.6)	0.31 (0.18)	2.3	0.4	0.1	2.2		-06	46
FN 9244 Ex-10-06	10 (11.6)	0.31 (0.18)	1.02	0.4	0.1	2.2		-06	46
FN 9244 Ex-12-06	12 (12)	0.31 (0.18)	0.58	0.1	0.1	2.2		-06	46
FN 9244 Ex-15-06	15 (15)	0.31 (0.18)	0.4	0.1	0.1	2.2		-06	46
FN 9244 Ex-12-06HI	12 (12)	0.31 (0.18)	0.58	0.1	0.1	2.2		-06	46
FN 9244 Ex-15-06HI	15 (15)	0.31 (0.18)	0.4	0.1	0.1	2.2		-06	46
FN 9244 ExR-1-06	1 (1.2)	0.31 (0.18)	59.53	0.4	0.1	2.2	1000	-06	46
FN 9244 ExR-3-06	3 (3.5)	0.31 (0.18)	13.45	0.4	0.1	2.2	1000	-06	46
FN 9244 ExR-6-06	6 (7.2)	0.31 (0.18)	4.1	0.4	0.1	2.2	1000	-06	46
FN 9244 ExR-8-06	8 (10.6)	0.31 (0.18)	2.3	0.4	0.1	2.2	1000	-06	46
FN 9244 ExR-10-06	10 (11.6)	0.31 (0.18)	1.02	0.4	0.1	2.2	1000	-06	46
FN 9244 ExR-12-06	12 (12)	0.31 (0.18)	0.58	0.1	0.1	2.2	1000	-06	46
FN 9244 ExR-15-06	15 (15)	0.31 (0.18)	0.4	0.1	0.1	2.2	1000	-06	46
FN 9244 ExR-12-06HI	12 (12)	0.31 (0.18)	0.58	0.1	0.1	2.2	1000	-06	46
FN 9244 ExR-15-06HI	15 (15)	0.31 (0.18)	0.4	0.1	0.1	2.2	1000	-06	46
FN 9244 ExB-1-06	1 (1.2)	0.00	59.53	0.4	0.1		1000	-06	46
FN 9244 ExB-3-06	3 (3.5)	0.00	13.45	0.4	0.1		1000	-06	46
FN 9244 ExB-6-06	6 (7.2)	0.00	4.1	0.4	0.1		1000	-06	46
FN 9244 ExB-8-06	8 (10.6)	0.00	2.3	0.4	0.1		1000	-06	46
FN 9244 ExB-10-06	10 (11.6)	0.00	1.02	0.4	0.1		1000	-06	46
FN 9244 ExB-12-06	12 (12)	0.00	0.58	0.1	0.1		1000	-06	46
FN 9244 ExB-15-06	15 (15)	0.00	0.4	0.1	0.1		1000	-06	46
FN 9244 ExB-12-06HI	12 (12)	0.00	0.58	0.1	0.1		1000	-06	46
FN 9244 ExB-15-06HI	15 (15)	0.00	0.4	0.1	0.1		1000	-06	46

* Maximum leakage under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

Product selector

FN 9244Exx-yy-..HI-zz

Snap-in range for S version only
- Blank: Snap-in range 0.7 to 1.5mm
- 20: Snap-in range 1.5 to 2.2mm

- Blank: Standard IEC inlet type C14
- HI: Hot IEC inlet type C16 (12 and 15A types only)

- 06: Faston 6.3 x 0.8mm (spade/soldering)

- 1 to 15: Rated current

- Blank: Standard version
- R: Bleed resistor
- B: Medical version (with bleed resistor and without Y2-capacitor)

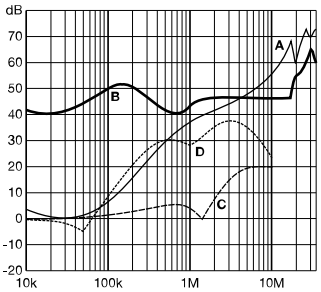
- Blank: Standard housing with mounting flanges
- U: Housing with wider mounting flanges
- S: Snap-in version, snapper on vertical side
- S1: Snap-in version, snapper on horizontal side

For example: FN 9244 E-15-06, FN 9244 ES1B-10-06-20, FN 9244 ER-12-06HI, FN 9244 EUB-8-06

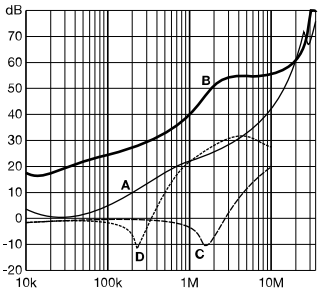
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

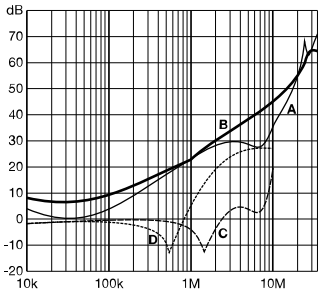
1 and 3 A types



6 to 10 A types

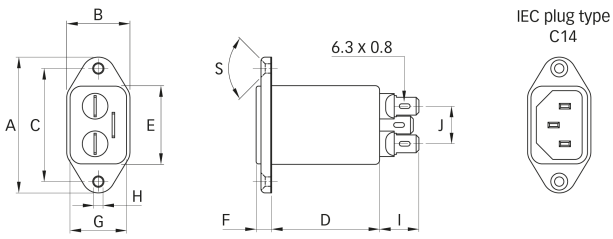


12 and 15 A types

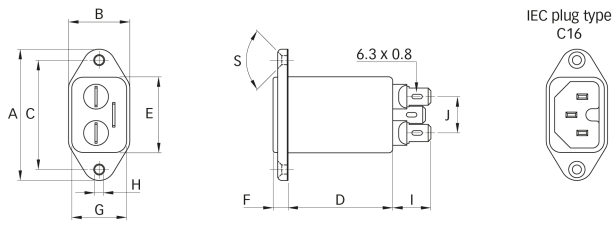


Mechanical data

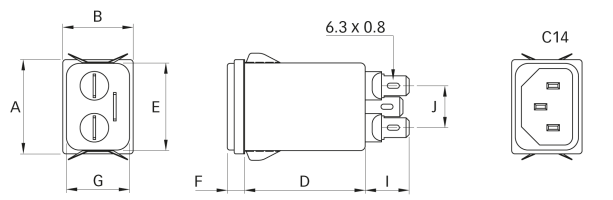
FN 9244 E



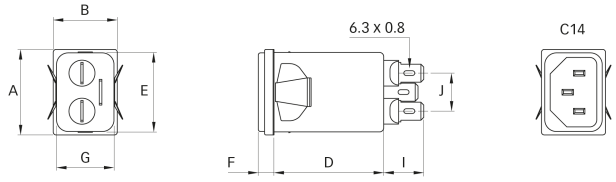
FN 9244 E-HI



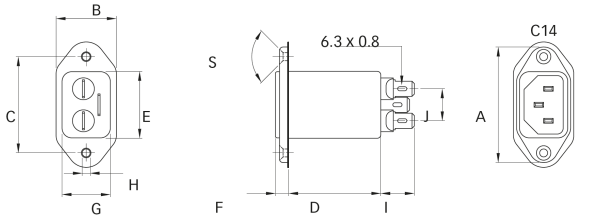
FN 9244 ES



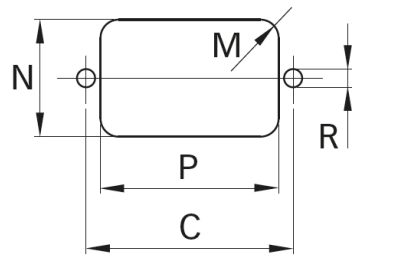
FN 9244 ES1



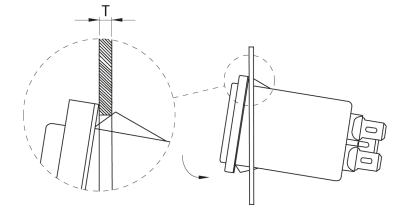
FN 9244EU



Panel cut out



Installation



Dimensions

	FN 9244 E	FN 9244 EU	FN 9244 ES	FN 9244 ES1	FN 9244 E-HI	Tol.
A	48	48	29.9	29.9	48	
B	22.4	25	22.4	22.4	22.4	
C	40	40			40	±0.2
D	46.8	46.7	46.8	46.8	46.8	
E	27.8	27.7	27.8	27.8	27.8	+0.6/-0
F	5.7	5.7	5.7	5.7	5.7	
G	20.1	20.1	20.1	20.1	20.1	+0.6/-0
H	Ø3.3	Ø3.3			Ø3.3	
I	14	14	14	14	14	
J	13.3	13.3	13.3	13.3	13.3	
M	R ≤3	R ≤3	R ≤1.5	R ≤1.5	R ≤3	
N	21.5	21.5	20.8	21.9	21.5	
P	28.5	28.5	29.4	28.5	28.5	
R*	M3	M3			M3	
S	90°	90°			90°	
T**			0.7 - 1.5	0.7 - 1.5		
T**			1.5 - 2.2	1.5 - 2.2		

* Recommended torque for M3 (90° countersunk flat head) is 0.5 Nm

** For selecting the panel thickness, please refer to the filter selector table.

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

Accessories for IEC Inlet Filters and Power Entry Modules

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For further information please ask your local Schaffner Sales Partner and visit our homepage https://www.schaffner.com/.

Power Cord with Locking System for Inlet Filters IL 13, IL 13 P, IL 19

Link to Datasheet: Datasheet IEC C13/ C19 locking cable

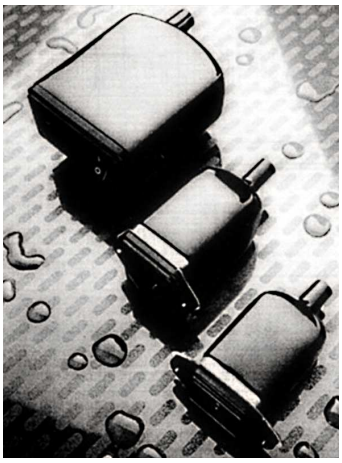
The locking system has a tensile force of typical 200N.
It is recommended to use it with flange mount filters.
Lock Power Cords with IEC Inlets and Filters"
Schaffner power cords with IEC lock guard against
accidental disconnection of all electrical appliances
with an IEC inlet. No exchange or modification of the
IEC inlet or IEC inlet filter system is needed. Easy
retrofit for all electronic equipments and devices.

IEC C13 Rewireable Connector for individual Power Cord with Locking System

Link to Datasheet: Datasheet IEC C13 rewireable

The locking system has a tensile force of typical 300N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters" Schaffner power connector with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

IB - Insulating Boots



There is a full range of insulating boots available from Schaffner that provide a physical cover for the exposed terminals on the back of IEC Inlet Filters.
These boots fit the simplest non-fused and unswitched style up to the fully fused and switched IEC filtered inlet. The boots are made from a durable black PVC material that conforms to UL94-V0 flammability requirements. The boots slip easily over the back of the filter and reduce the risk of electrical shock to maintenance personnel whilst protecting the filter from environmental hazard such as the ingress of dust and moisture.

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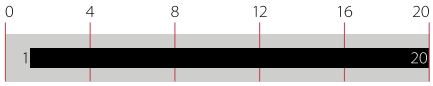
High Performance IEC Inlet Filter

- Rated currents up to 20 A
- Optional medical versions (B type)
- Rear mounting
- Excellant attenuation in the lower
- frequency range

Performance indicators

Attenuation performance

Rated current [A]



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 20 A @ 50°C
Approvals by rated current	1 to 10 A (Semko) 16 A (Semko) for 16 and 20 A types 1 to 20 A (UL, CSA)
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 1100 VAC for 2 sec (1 to 10 A types) P –> N 1100 VDC for 2 sec (16 and 20 A types)
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	1,600,000 hours

Approvals

RoHS

EN 133200
IEC 60939

The FN 9246 IEC inlet filter combines an IEC inlet and mains filter with excellent filter attenuation in a small form factor. Choosing the FN 9246 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on current ratings and low leakage versions for medical applications are designed to offer you the desired solution.

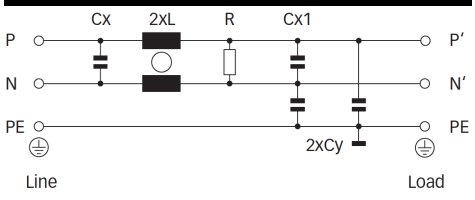
Features and benefits

- Excellent conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear mounting
- FN 9246 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- Rated currents up to 20 A
- Custom-specific versions are available on request

Typical applications

- Electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment
- Building automation
- Medical equipment
- Lighting application

Typical electrical schematic



Filter selection table

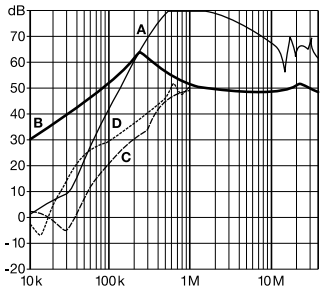
Filter	Rated current @ 40°C (25°C)	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance	Capacitance		Resistance	Output connections	Weight
			L	Cx	Cy	R		
	[A]	[mA]	[mH]	[µF]	[nF]	[kΩ]		[g]
FN 9246-1-06	1 (1.2)	0.31 (0.18)	50	1.22	2.2	470	-06	140
FN 9246-3-06	3 (3.5)	0.31 (0.18)	14	1.22	2.2	470	-06	140
FN 9246-6-06	6 (7.2)	0.31 (0.18)	7	1.22	2.2	470	-06	140
FN 9246-10-06	10 (12)	0.31 (0.18)	3	1.22	2.2	470	-06	140
FN 9246-12-06	12 (14)	0.31 (0.18)	1.85	1.22	2.2	470	-06	140
FN 9246-15-06	15 (18)	0.31 (0.18)	0.89	1.22	2.2	470	-06	140
FN 9246-16-06	16 (18.5)	0.66 (0.38)	2.5	1.22	4.7	470	-06	275
FN 9246-20-06	20 (23)	0.66 (0.38)	1.5	1.22	4.7	470	-06	275
FN 9246 B-1-06	1 (1.2)	0.00	50	1.22		470	-06	140
FN 9246 B-3-06	3 (3.5)	0.00	14	1.22		470	-06	140
FN 9246 B-6-06	6 (7.2)	0.00	7	1.22		470	-06	140
FN 9246 B-10-06	10 (11.6)	0.00	3	1.22		470	-06	140
FN 9246 B-12-06	12 (14)	0.00	1.85	1.22		470	-06	140
FN 9246 B-15-06	15 (18)	0.00	0.89	1.22		470	-06	140
FN 9246 B-16-06	16 (18.5)	0.00	2.5	1.22		470	-06	275
FN 9246 B-20-06	20 (23)	0.00	1.5	1.22		470	-06	275

* Maximum leakage under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

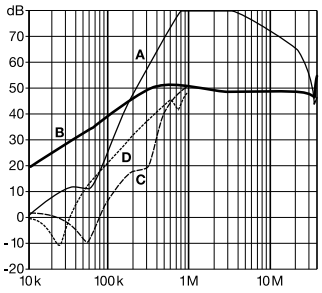
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

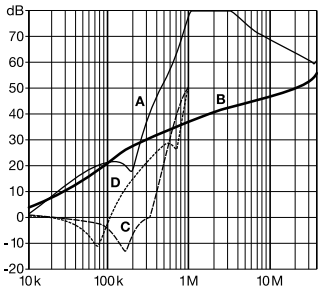
1 A types



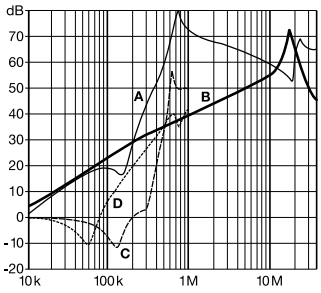
3 to 10 A types



12 and 15 A types



16 and 20 A types



Product selector

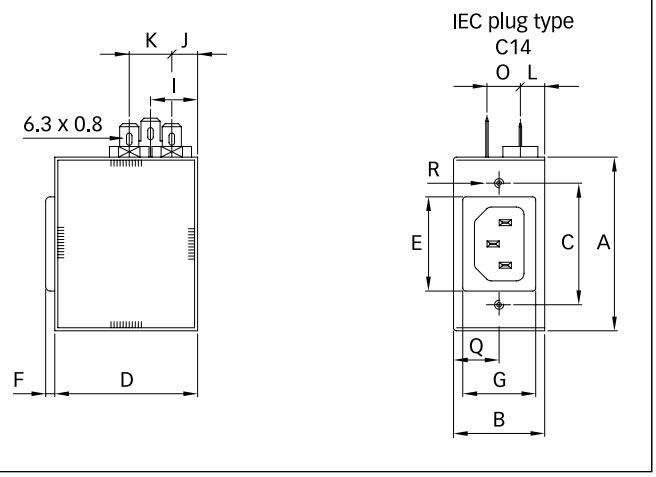
FN 9246x-yy-..

- 06: Faston 6.3 x 0.8mm (spade/soldering)
- 1 to 20: Rated current
  Standard IEC inlet type C14 (1 to 15A types), C20 (16 and 20A types)
- Blank: Standard version
- B: Medical version (with bleed resistor and without Y2-capacitor)

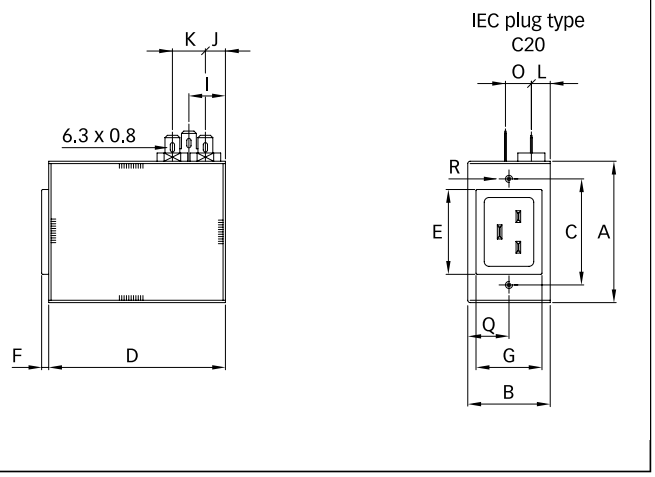
For example: FN 9246-6-06, FN 9246 B-10-06

Mechanical data

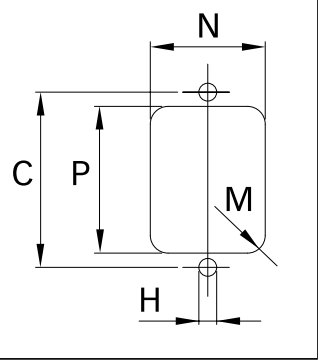
1 to 15 A types



16 and 20 A types



Panel cut out



	1 A	3 A	6 A	10 A	12 A	15 A	16 A	20 A
A	57.15	57.15	57.15	57.15	57.15	57.15	60	60
B	30	30	30	30	30	30	35	35
C	40	40	40	40	40	40	45	45
D	47	47	47	47	47	47	75	75
E	31	31	31	31	31	31	36	36
F	3	3	3	3	3	3	3	3
G	24	24	24	24	24	24	28	28
H	Ø3.5	Ø3.5	Ø3.5	Ø3.5	Ø3.5	Ø3.5	Ø3.5	Ø3.5
I	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5
J	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
K	14	14	14	14	14	14	14	14
L	8	8	8	8	8	8	8	8
M	R ≤1.5	R ≤1.5	R ≤1.5	R ≤1.5	R ≤1.5	R ≤1.5	R ≤1.5	R ≤1.5
N	25	25	25	25	25	25	29	29
O	11	11	11	11	11	11	11	11
P	32	32	32	32	32	32	37	37
Q	15	15	15	15	15	15	17.5	17.5
R				M3 x 10 max.				

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

schaffner
shaping electrical power

High performance dual-stage IEC C14 and C20 inlet filter

- Rated currents up to 20 A
- Excellent performance/size ratio
- IEC C14 or C20 inlet acc. IEC 60320-1
- Medical versions (B type) acc. to IEC/EN 60601-1
- Snap-in and rear mount versions (S and M type)
- Earth line choke version (Refer to FN9255 E)

Performance indicators

Attenuation performance

Rated current [A]

Approvals

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Rated currents	2 to 20 A @ 40°C max.
Operating frequency	DC to 400 Hz
Approvals by rated current	ENEC and CQC: IEC C14 Inlet - 2 to 10 A ENEC and CQC: IEC C20 Inlet - 16 A UL: IEC C14 Inlet - 2 to 15A UL: IEC C20 Inlet - 16 to 20A
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> N 760 VAC for 2 sec P –> PE 2500 VAC for 2 sec (B types)
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 60939-3, CSA Std C22.2 No. 8, IEC/EN 60939-3, GB/T 15287, GB/T 15288
Flammability according to	UL 94 V-0
MTBF @ Rated amb. Temp./Voltage (Mil-HB-217F)	> 1,000,000 hours

The FN9255 IEC inlet filter incorporates a dual stage filter into an IEC inlet that offers excellent filter attenuation in a compact housing. Using an IEC inlet, at the point of entry offers an optimized position and practical solution for integrating an EMC filter into any system. A wide selection of current ratings, output connections and mounting possibilities are available. The filter family also offers options that comply to medical application requirements and the entire family complies to all necessary safety approvals.

{GPvar:L}

Features and benefits

- Exceptional attenuation performance from 150kHz to 300MHz due to dual-stage design
- High saturation resistance and excellent thermal behavior
- Rear and Front flange or snap-in mounting options
- FN 9255 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- Optional earth line choke see FN 9255 E versions
- All versions according IEC/EN 62368-1

Typical applications

- Medical devices (MDD)
- In-vitro diagnostic medical devices (IVDD)
- Computing & accessories
- LCD and OLED Displays
- Test and measurement equipment
- Household and similar products as per IEC/EN55014
- Portable electrical and electronic equipment
- Small to medium-sized machines
- Single-phase power supplies, switch-mode power supplies (SMPS)

For electrical schematic refer to page 3

Filter selection table

Filter	Rated current @ 40°C	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance		Capacitance			Resistor	Input connections	Output connections		Weight
			L1	L2	Cx	Cy1	Cy2	R			**	
	[A]	[mA]	[mH]	[µH]	[µF]	[nF]	[nF]	[kΩ]				[g]
FN 9255 x-2- ..	2	0.45 (0.26)	4.8	18	0.1	2.2	1	-	C14	-06	-07	52
FN 9255 x-4-..	4	0.45 (0.26)	2.1	18	0.1	2.2	1	-	C14	-06	-07	52
FN 9255 x-6-..	6	0.45 (0.26)	0.9	18	0.1	2.2	1	-	C14	-06	-07	52
FN 9255 x-10-..	10	0.45 (0.26)	0.2	18	0.1	2.2	1	-	C14	-06	-07	54
FN 9255 x-15-..	15	0.45 (0.26)	0.13	8	0.1	2.2	1	-	C14	-06	-07	54
FN 9255 x-16-..	16	0.45 (0.26)	0.3	0.7	0.1	2.2	1	-	C20	-06	-07	130
FN 9255 x-20-..	20	0.45 (0.26)	0.3	0.7	0.1	2.2	1	-	C20	-06	-07	130
FN 9255 xB-2-..	2	-	4.8	18	0.1	-		1000	C14	-06	-07	52
FN 9255 xB-4-..	4	-	2.1	18	0.1	-		1000	C14	-06	-07	52
FN 9255 xB-6-..	6	-	0.9	18	0.1	-		1000	C14	-06	-07	52
FN 9255 xB-10-..	10	-	0.2	18	0.1	-		1000	C14	-06	-07	54
FN 9255 xB-15-..	15	-	0.13	8	0.1	-		1000	C14	-06	-07	54
FN 9255 xB-16-..	16	-	0.3	0.7	0.1	-		1000	C20	-06	-07	130
FN 9255 xB-20-..	20	-	0.3	0.7	0.1	-		1000	C20	-06	-07	130

Test conditions: 25°C±2°C; Measuring frequency for Inductance: 1 kHz; 50 mV;
Tolerances: Inductance: +50%, -30%; Capacitance: ±25%; Resistor: ±15%; For mechanical tolerances refer to mechanical data section.
* Maximum leakage under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Standard length is 100 mm

Product selector

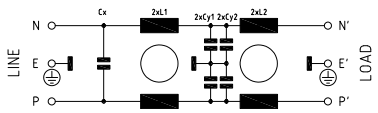
FN 9255 wx -yy-..-(zz)

- Snap-in range for S version only
  - Blank: Snap-in range 0.7 to 1.5 mm
  - 20: Snap-in range 1.5 to 2.2 mm
- 06: Faston 6.3 x 0.8 mm (spade/soldering)
- 07: Wire leads
- 2 to 20: Rated current
- Blank: Standard version
- B: Without Y-capacitors, with discharge resistors (Medical Version)
- Blank: Standard housing with mounting flanges (front mount)
- M: Standard housing with mounting flanges (rear mount)
- S: Snap-in version, snapper on vertical side

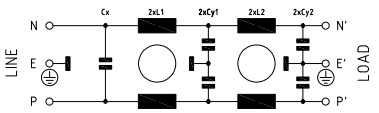
For example: FN 9255 MB-15-06 - FN 9255 dual stage IEC inlet with rear mount flanges, medical version, 15A rated current and fast-on terminals

Detailed electrical schematic

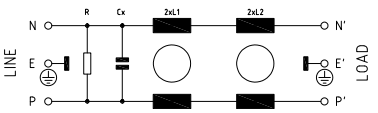
Schematic standard version (2 to 15A)



Schematic standard version (16 to 20A)



Schematic B version (2 to 20A)



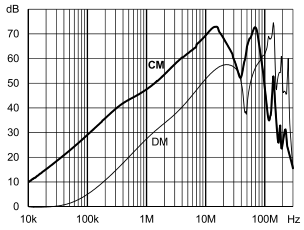
Typical filter attenuation

Per CISPR 17

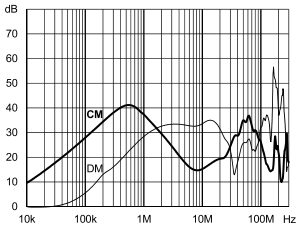
symmetrical 50 Ω/50 Ω - Differential Mode (DM)

asymmetrical 50 Ω/50 Ω - Common Mode (CM)

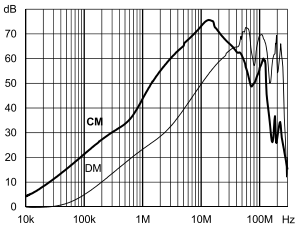
2 A (Standard Type)



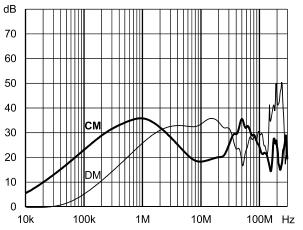
2 A (B Type)



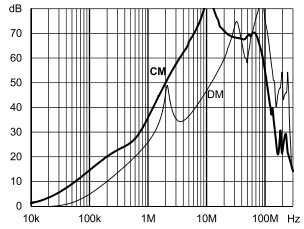
4 A (Standard Type)



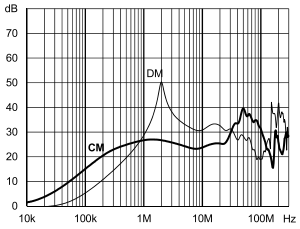
4 A (B Type)



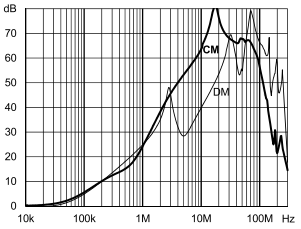
6 A (Standard Type)



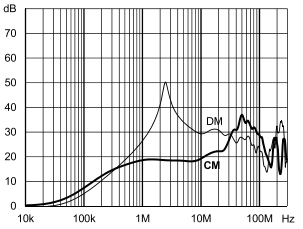
6 A (B Type)



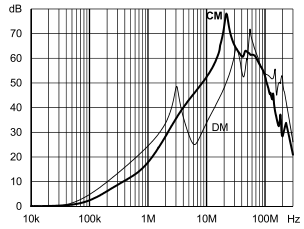
10 A (Standard Type)



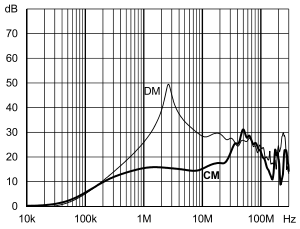
10 A (B Type)



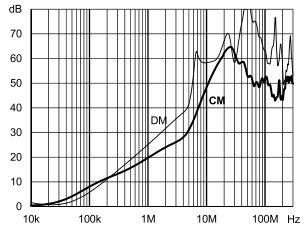
15 A (Standard Type)



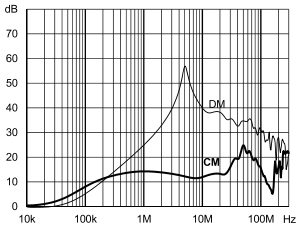
15 A (B Type)



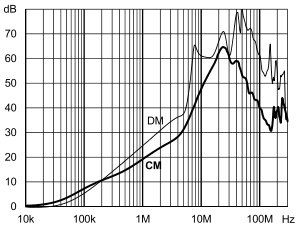
16 A (Standard Type)



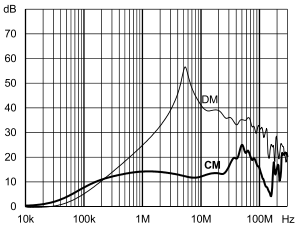
16 A (B Type)



20 A (Standard Type)

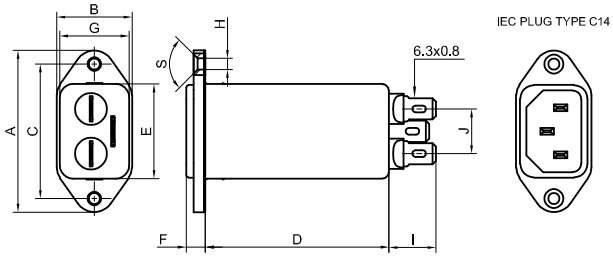


20 A (B Type)

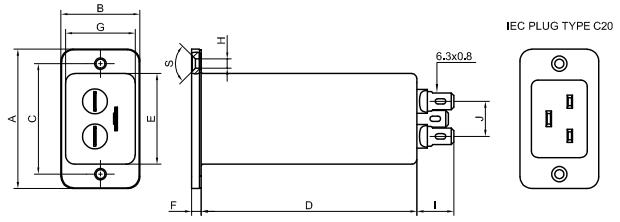


Mechanical data

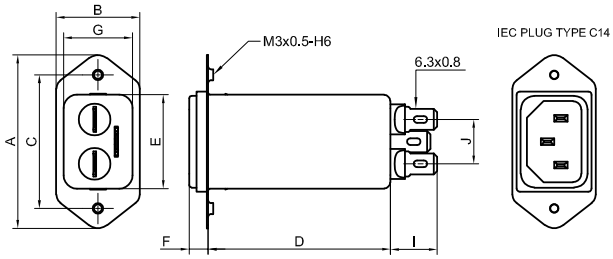
FN 9255 - 2 to 15 A



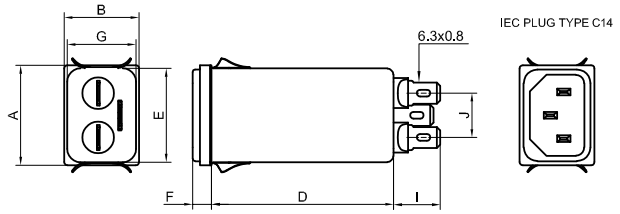
FN 9255 - 16 to 20 A



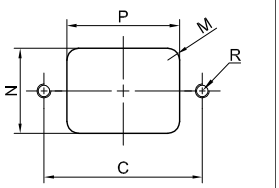
FN 9255 M - 2 to 15 A



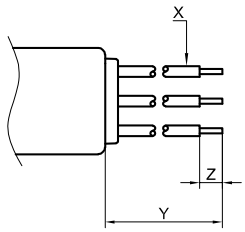
FN 9255 S - 2 to 15 A



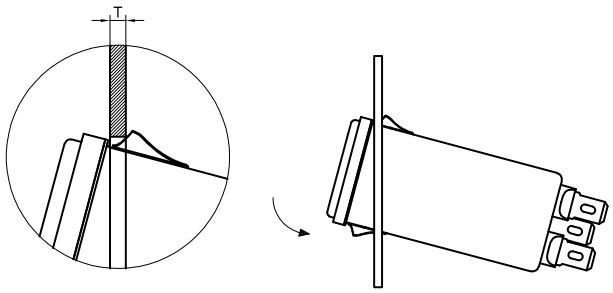
Panel cut out



-07 connection style



Installation



Dimensions

	FN 9255		FN 9255 M	FN 9255 S
	2 to 15A	16 to 20A		
A	48	53	51.85	29.9
B	22.4	30	25	22.4
C	40±0.2	42±0.2	40±0.2	-
D	-06: 54.5, -07: 52.5	82	-06: 54.5, -07: 52.5	-06: 54.5, -07: 52.5
E	28.1±0.3	34.6±0.3	28.1±0.3	28.1±0.3
F	5.8±0.2	3.9±0.2	5.8±0.2	5.8±0.2
G	20.6±0.3	26.7±0.3	20.6±0.3	20.6±0.3
H	Ø3.3	Ø3.5	M3	M3
I	14±0.5	14±0.5	14±0.5	14±0.5
J	13.3	13.3	13.3	13.3
M	R ≤ 3	R ≤ 3	R ≤ 1	R ≤ 1
N	21.5 +0.5/-0	27.1 +0.2/-0	22.9 +0.2/-0	21.0 +0.1/-0
P	28.5 +0.5/-0	34.9 +0.2/-0	30.4 +0.2/-0	29.5 +0.1/-0
R*	M3	M3	Ø3.4	Ø3.4
S	90°	90°		
T				1.5 - 2.2
X	AWG 18 (>6A: AWG 16)	AWG 14	AWG 18 (>6A: AWG 16)	AWG 18 (>6A: AWG 16)
Y	100±5	100±5	100±5	100±5
Z	6	6	6	6

* Recommended torque for M3 (90° countersunk flat head) is 0.5 Nm

All dimensions in mm; 1 inch = 25.4 mm
For values without dedicated tolerances ISO 2768-m/EN 22768-m applies.

Please visit www.schaffner.com to find more details on connectors.

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High Performance dual-stage IEC C14 inlet filter with earth line choke

- Rated currents up to 15 A
- Excellent performance/size ratio
- Earth line choke Version
- IEC C14 inlet acc. IEC 60320-1
- Medical versions (B type) acc. to IEC/EN 60601-1
- Snap-in and rear mount versions (S and M type)

Performance indicators

Attenuation performance

Rated current [A]

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Rated currents	2 to 15 A @ 40°C max.
Operating frequency	DC to 400 Hz
Approvals by rated current	ENEC and CQC: 2 to 10 A UL: 2 to 15A
High potential test voltage	P –> PE 2500 VAC for 2 sec P –> N 760 VAC for 2 sec
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 60939-3, CSA Std C22.2 No. 8, IEC/EN 60939-3, GB/T 15287, GB/T 15288
Flammability according to	UL 94 V-0
MTBF @ Rated amb. Temp./Voltage (Mil-HB-217F)	> 1,000,000 hours

Approvals

The FN9255 E IEC inlet filter incorporates a dual stage filter with Earth line choke into an IEC inlet that offers excellent filter attenuation in a compact housing. Using an IEC inlet, at the point of entry offers an optimized position and practical solution for integrating an EMC filter into any system. A wide selection of current ratings, output connections and mounting possibilities are available. The E Version of this family complies to medical application and safety requirements, with enhanced performance without added leakage current.

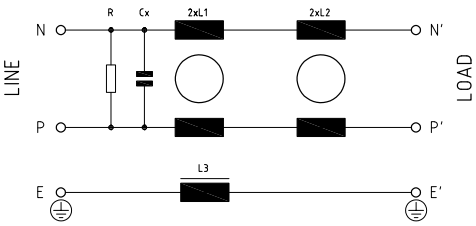
Features and benefits

- Exceptional attenuation performance from 150kHz to 300MHz due to dual-stage design
- High saturation resistance and excellent thermal behavior
- FN 9255 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- Suitable for IEC/EN 55014 tests up to 300MHz
- Rear and Front flange or snap-in mounting options
- Earth line choke Version, for standard version see FN 9255
- All versions according IEC/EN 62368-1

Typical applications

- Medical devices (MDD)
- Household and similar products as per IEC/EN 55014
- Test and measurement equipment
- In-vitro diagnostic medical devices (IVDD)
- Portable electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies (SMPS)

Typical electrical schematic



Filter selection table

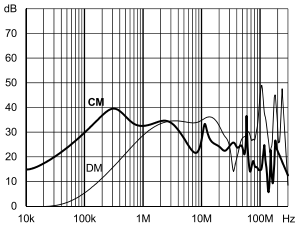
Filter	Rated current @ 40°C	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance L1	Inductance L2	Inductance L3	Capacitance Cx	Resistance R	Output connections	**	
	[A]	[mA]	[mH]	[µH]	[mH]	[µF]	[kΩ]			[g]
FN 9255 ExB-2-06	2	-	4.8	18	0.4	0.1	1000	-06	-07	66
FN 9255 ExB-4-06	4	-	2.1	18	0.4	0.1	1000	-06	-07	66
FN 9255 ExB-6-06	6	-	0.9	18	0.4	0.1	1000	-06	-07	66
FN 9255 ExB-10-06	10	-	0.2	18	0.4	0.1	1000	-06	-07	68
FN 9255 ExB-15-06	15	-	0.13	8	0.1	0.1	1000	-06	-07	68

Test conditions: 25°C±2°C; Measuring frequency for Inductance: 1 kHz; 50 mV;
Tolerances: Inductance: +50%, -30%; Capacitance: ±25%; Resistor: ±15%; For mechanical tolerances refer to mechanical data section.
* Maximum leakage under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Standard length is 100 mm

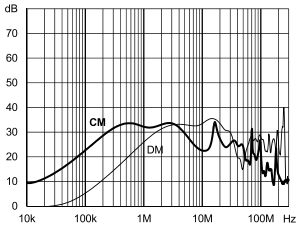
Typical filter attenuation

Per CISPR 17; symmetrical 50 Ω/50 Ω - Differential Mode (DM); asymmetrical 50 Ω/50 Ω - Common Mode (CM)

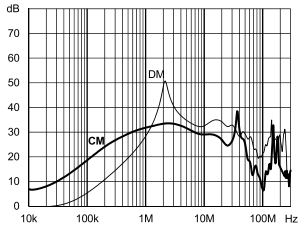
2 A type



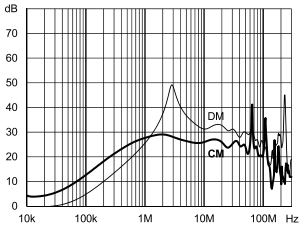
4 A type



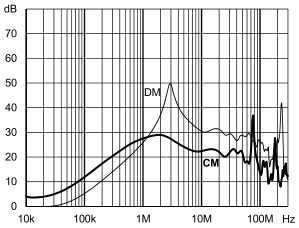
6 A type



10 A type



15 A type



Product selector

FN 9255 E x B -yy-.. -(zz)

- Snap-in range for S version only
  - Blank: Snap-in range 0.7 to 1.5 mm
  - 20: Snap-in range 1.5 to 2.2 mm
- 06: Faston 6.3 x 0.8 mm (spade/soldering)
- 07: Wire leads
- 2 to 15: Rated current
- Blank: Standard housing with mounting flanges (front mount)
- M: Standard housing with mounting flanges (rear mount)
- S: Snap-in version, snapper on vertical side

For example:

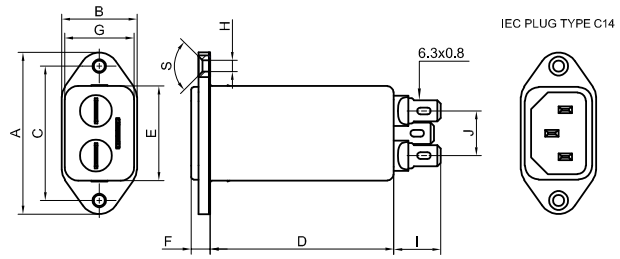
FN 9255 EB-15-06, 15A Version with fast-on terminals

FN 9255 ESB-10-06, 10A Version with fast-on terminals, snap-in version

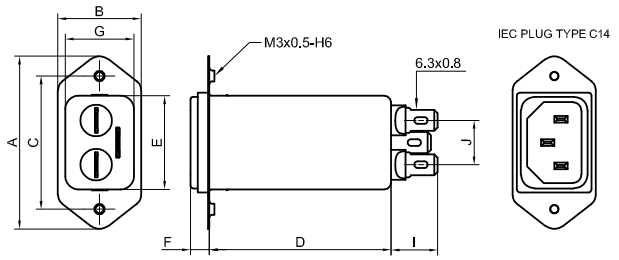
FN 9255 EMB-2-07, 2A Version with wire leads, rear mount version

Mechanical data

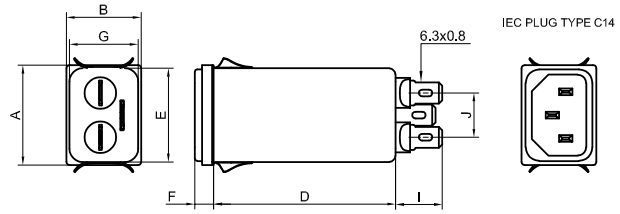
FN 9255 E - 2 to 15 A



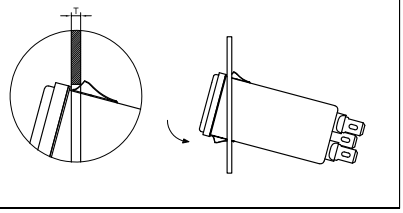
FN 9255 EM - 2 to 15 A



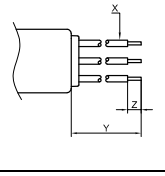
FN 9255 ES - 2 to 15 A



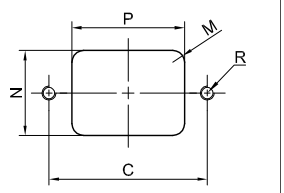
Installation



-07 connection



Panel cut out



Dimensions

	FN 9255 EB	FN9255 EMB	FN9255 ESB
A	48	51.85	29.9
B	22.4	25	22.4
C	40 ±0.2	40 ±0.2	
D	76.2	76.2	76.2
E	28.1 ±0.3	28.1 ±0.3	28.1 ±0.3
F	5.8 ±0.2	5.8 ±0.2	5.8 ±0.2
G	20.6 ±0.3	20.6 ±0.3	20.6 ±0.3
H	Ø3.3	M3	
I	14	14	14
J	13.3	13.3	13.3
M	R ≤ 3	R ≤ 1	R ≤ 1.5
N	21.5 +0.5/-0	22.9 +0.2/-0	21.5 +0.5/-0
P	28.5 +0.5/-0	30.4 +0.2/-0	29.4
R*	M3	Ø3.4	
S / T	S: 90°		T: 0.7 to 1.5
X / Y	AWG 18 / 100 mm (>6A: AWG 16)	AWG 18 / 100 mm (>6A: AWG 16)	AWG 18 / 100 mm (>6A: AWG 16)
Z	6	6	

* Recommended torque for M3 (90° countersunk flat head) is 0.5 Nm

All dimensions in mm; 1 inch = 25.4 mm
For values without dedicated tolerances ISO 2768-m/EN 22768-m applies.

Please visit www.schaffner.com to find more details on connectors.

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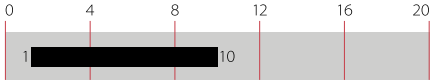
General Purpose Power Entry Module with Fuses

- Rated currents up to 10 A
- Integrated single/dual fuse holder
- Optional reduced leakage current versions (A/B type)
- Complies with IEC/EN 60601-1
- Snap-in versions (S type)
- Good attenuation performance

Performance indicators

Attenuation performance

Rated current [A]



Approvals

The FN 9260 power entry module combines an IEC inlet, mains filter with excellent filter attenuation and fuses in a small form factor. Choosing FN 9260 product line brings you rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on amperage ratings, output connections, mounting possibilities and filters for medical applications are designed to offer you the desired solution.

Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 10 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 760 VAC for 2 sec (standard types) P –> N 1700 VDC for 2 sec (B types)
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 60939-3, CSA Std C22.2 No. 8, IEC/EN 60939-3, GB/T15287, GB/T15288
Flammability corresponding to	Inlet plastic: UL 94 V-0 Fuseholder plastic: UL 94 V-0
MTBF @ 40°C/230 V (Mil-HB-217F)	2,200,000 hours
Fuse holder	1 or 2 fuses (Ø5 x 20 mm) (certified to IEC 60127-6)
Power acceptance @ amb. temperature	
Operating voltage	250 VAC, 50/60 Hz

Features and Benefits

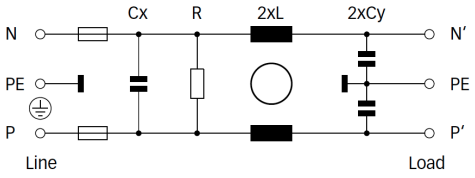
- Exceptional conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- FN 9260 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- Versions up to 10 A are available with fuse holder for one or two fuses
- Custom-specific versions are available on request

Typical applications

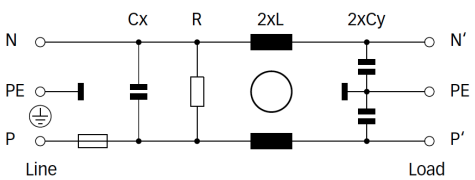
- Portable electrical and electronic equipment
- Medical equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment

Typical electrical schematic

FN 9260 (B types without Y-capacitors)



FN 261



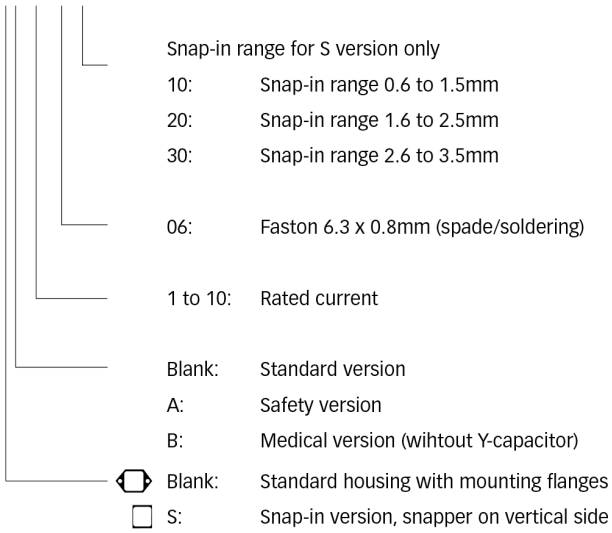
Filter selection table

Filter	Rated current @ 40°C (25°C)	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance**	Capacitance**		Resistance**	Input/Output connections	Fuses***	Weight
			L	Cx	Cy	R			
	[A]	[mA]	[mH]	[µF]	[nF]	[kΩ]		[Qty]	[g]
FN 9260 x-1-06-y	1 (1.2)	0.31 (0.18)	5.3	0.1	2.2	1000	-06	2	55
FN 9260 x-2-06-y	2 (2.3)	0.31 (0.18)	2.7	0.1	2.2	1000	-06	2	55
FN 9260 x-4-06-y	4 (4.6)	0.31 (0.18)	1.0	0.1	2.2	1000	-06	2	55
FN 9260 x-6-06-y	6 (6.9)	0.31 (0.18)	0.3	0.1	2.2	1000	-06	2	55
FN 9260 x-10-06-y	10 (11.5)	0.31 (0.18)	0.2	0.1	2.2	1000	-06	2	55
FN 9260 xA1-1-06-y	1 (1.2)	0.03 (0.02)	5.3	0.1	0.22	1000	-06	2	55
FN 9260 xA-2-06-y	2 (2.3)	0.07 (0.04)	2.7	0.1	0.47	1000	-06	2	55
FN 9260 xA-4-06-y	4 (4.6)	0.07 (0.04)	1.0	0.1	0.47	1000	-06	2	55
FN 9260 xA-6-06-y	6 (6.9)	0.07 (0.04)	0.3	0.1	0.47	1000	-06	2	55
FN9260 xA-10-06-y	10 (11.5)	0.07 (0.04)	0.2	0.1	0.47	1000	-06	2	55
FN 9260 xB-1-06-y	1 (1.2)	0.00	5.3	0.1		1000	-06	2	55
FN 9260 xB-2-06-y	2 (2.3)	0.00	2.7	0.1		1000	-06	2	55
FN 9260 xB-4-06-y	4 (4.6)	0.00	1.0	0.1		1000	-06	2	55
FN 9260 xB-6-06-y	6 (6.9)	0.00	0.3	0.1		1000	-06	2	55
FN9260 xB-10-06-y	10 (11.5)	0.00	0.2	0.1		1000	-06	2	55
FN 261 x-1-06-y	1 (1.2)	0.31 (0.18)	5.3	0.1	2.2	1000	-06	1	55
FN 261 x-2-06-y	2 (2.3)	0.31 (0.18)	2.7	0.1	2.2	1000	-06	1	55
FN 261 x-4-06-y	4 (4.6)	0.31 (0.18)	1.0	0.1	2.2	1000	-06	1	55
FN 261 x-6-06-y	6 (6.9)	0.31 (0.18)	0.3	0.1	2.2	1000	-06	1	55
FN 261 x-10-06-y	10 (11.5)	0.31 (0.18)	0.2	0.1	2.2	1000	-06	1	55

* Leakage current under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%
*** Fuses are not included in the filter and need to be selected according to application

Product selector

FN 9260xx-yy-yy-y

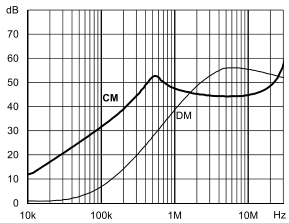


For example: FN 9260-1-06-10, FN 9260 SB-10-06-20, FN 261 S-6-06-30

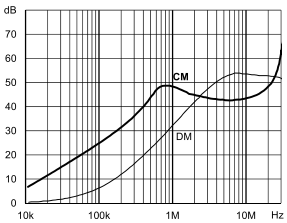
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

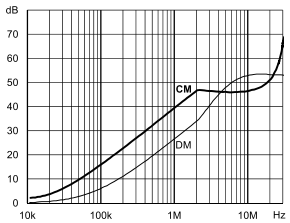
FN 261/ FN 9260: 1 A type



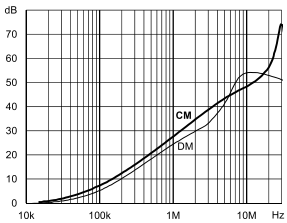
FN 261/ FN 9260: 2 A type



FN 261/ FN 9260: 4 A type

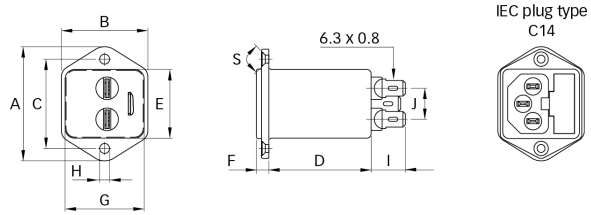


FN 261/ FN 9260: 6 and 10 A types

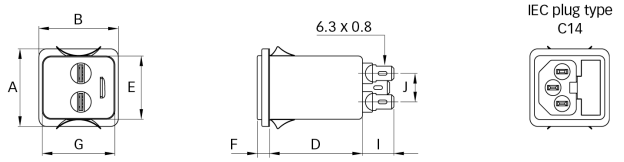


Mechanical data

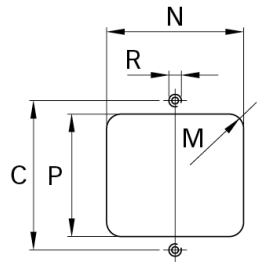
FN 9260/FN 261



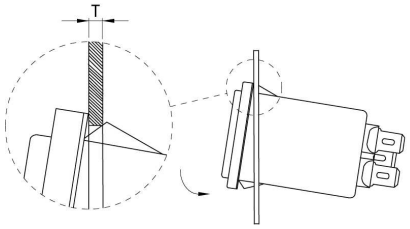
FN 9260 S/FN 261 S



Panel cut out



Installation



Dimensions

	FN 261 FN 9260	FN 261 S FN 9260 S	Tolerances
A	46	34	±0.3
B	35	35	±0.3
C	36		±0.3
D	41	41	±0.3
E	27.8	27.8	+0.3/-0
F	5.5	5.5	±0.3
G	32	32	+0.3/-0
H	Ø3.2		±0.1
I	14	14	±0.5
J	12.5	12.5	±0.3
M	R ≤3.5	R ≤3.5	
N	33	33	+0.3/-0
P	29	29.5	±0.3
R*	M3		
S	90°		
T**		0.6-1.5	
T**		1.6-2.5	
T**		2.6-3.5	

* Recommended torque for M3 (90° countersunk flat head) is 0.5 Nm

** For selecting the panel thickness, please refer to the filter selector table.

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connections.

Appropriated products

Accessories for IEC Inlet Filters and Power Entry Modules

The accessories displayed are a selection of available accessories for IEC Inlet filters and IEC Power entry modules. As they are displayed in a general way there might be variants of the filters where the accessories are not available.
For further information please ask your local Schaffner Sales Partner and visit our homepage https://www.schaffner.com/.

Power Cord with Locking System for Inlet Filters IL 13, IL 13 P, IL 19

Link to Datasheet: Datasheet IEC C13/ C19 locking cable

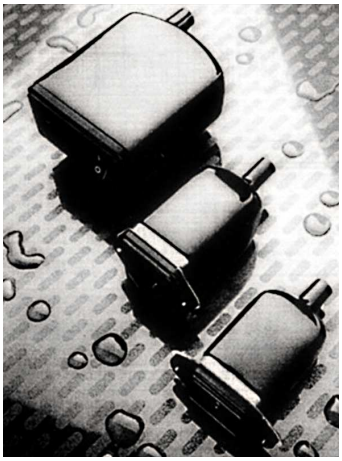
The locking system has a tensile force of typical 200N.
It is recommended to use it with flange mount filters.
Lock Power Cords with IEC Inlets and Filters"
Schaffner power cords with IEC lock guard against
accidental disconnection of all electrical appliances
with an IEC inlet. No exchange or modification of the
IEC inlet or IEC inlet filter system is needed. Easy
retrofit for all electronic equipments and devices.

IEC C13 Rewireable Connector for individual Power Cord with Locking System

Link to Datasheet: Datasheet IEC C13 rewireable

The locking system has a tensile force of typical 300N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters" Schaffner power connector with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

IB - Insulating Boots



There is a full range of insulating boots available from Schaffner that provide a physical cover for the exposed terminals on the back of IEC Inlet Filters.
These boots fit the simplest non-fused and unswitched style up to the fully fused and switched IEC filtered inlet.
The boots are made from a durable black PVC material that conforms to UL94-V0 flammability requirements.
The boots slip easily over the back of the filter and reduce the risk of electrical shock to maintenance personnel whilst protecting the filter from environmental hazard such as the ingress of dust and moisture.

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High Performance Power Entry Module with Fuses

- Rated currents up to 10 A
- Integrated dual fuse holder
- Optional reduced leakage current versions (A/B type)
- Complies with IEC/EN 60601-1
- Snap-in versions (S type)
- High attenuation performance

Performance indicators

Attenuation performance

Rated current [A]

Technical specifications

Operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 10 A @ 40°C max.
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 760 VAC for 2 sec
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21)
Design corresponding to	UL 60939-3, CSA Std C22.2 No. 8, IEC/EN 60939-3, GB/T 15287, GB/T 15288
Flammability corresponding to	Inlet plastic: UL 94 V-0 Fuseholder plastic: UL 94 V-0
MTBF @ Rated amb. Temp./Voltage (Mil-HB-217F)	2,100,000 hours
Fuse holder	2 fuses (Ø5 x 20 mm) (certified to IEC 60127-6)
Power acceptance @ amb. temperature	

Approvals

The FN 9262 power entry module combines an IEC inlet, mains filter with very high filter attenuation based on nano crystalline material selection and fuses in a small form factor. Choosing FN 9262 product line brings you rapid availability of a standard filter associated with the necessary safety acceptances. Standard IEC connector filters are a practical solution helping you to pass EMI system approval in a short time. A wide selection on amperage ratings, mounting possibilities and filters for medical applications (acc. to IEC 60601-1 with low leakage current and high performance) are designed to offer you the desired solution.

Features and Benefits

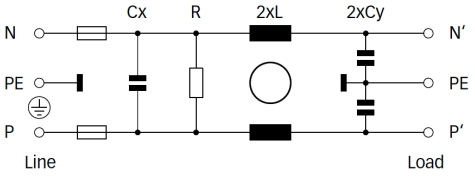
- Exceptional conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- FN 9262 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- Versions up to 10 A are available with fuse holder for two fuses
- Custom-specific versions are available on request

Typical applications

- Medical electrical devices (MD) and In-Vitro Diagnostic (IVD) medical devices
- Portable electrical and electronic equipment
- Small to medium-sized machines and household equipment
- Single-phase power supplies, switch-mode power supplies
- Test and measurement equipment

Typical electrical schematic

FN 9262 (B types without Y-capacitors)



Filter selection table

	Rated current @ 40°C	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance** L	Capacitance** Cx	Capacitance** Cy	Resistor** R	Input/Output connections	Fuses***	Weight
	[A]	[mA]	[mH]	[µF]	[nF]	[kΩ]		[Qty]	[g]
FN 9262-1-06	1	0.31 (0.18)	40	0.22	2.2	1000	-06	2	55
FN 9262-2-06	2	0.31 (0.18)	20	0.22	2.2	1000	-06	2	55
FN 9262-4-06	4	0.31 (0.18)	7	0.22	2.2	1000	-06	2	55
FN 9262-6-06	6	0.31 (0.18)	3	0.22	2.2	1000	-06	2	55
FN 9262-10-06	10	0.31 (0.18)	1.15	0.22	2.2	1000	-06	2	55
FN 9262A-1-06	1	0.07 (0.04)	40	0.22	0.47	1000	-06	2	55
FN 9262A-2-06	2	0.07 (0.04)	20	0.22	0.47	1000	-06	2	55
FN 9262A-4-06	4	0.07 (0.04)	7	0.22	0.47	1000	-06	2	55
FN 9262A-6-06	6	0.07 (0.04)	3	0.22	0.47	1000	-06	2	55
FN 9262A-10-06	10	0.07 (0.04)	1.15	0.22	0.47	1000	-06	2	55
FN 9262B-1-06	1	0.00	40	0.22		1000	-06	2	55
FN 9262B-2-06	2	0.00	20	0.22		1000	-06	2	55
FN 9262B-4-06	4	0.00	7	0.22		1000	-06	2	55
FN 9262B-6-06	6	0.00	3	0.22		1000	-06	2	55
FN9262B-10-06	10	0.00	1.15	0.22		1000	-06	2	55

* Leakage current under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%
*** Fuses are not included in the filter and need to be selected according to application

Product selector

FN 9262xx-yy-yy-y

Snap-in range for S version only
- Blank: Snap-in range 0.6 to 1.5mm
- 20: Snap-in range 1.6 to 2.5mm
- 30: Snap-in range 2.6 to 3.5mm

06: Faston 6.3 x 0.8mm (spade/soldering)

1 to 10: Rated current

- Blank: Standard version
- A: Safety version
- B: Medical version (wihtout Y-capacitor)

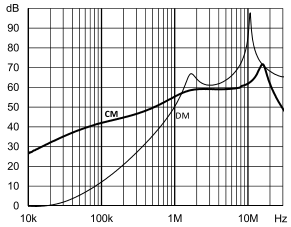
- Blank: Standard housing with mounting flanges
- S: Snap-in version, snapper on vertical side

For example: FN 9262-1-06, FN 9262 SB-10-06

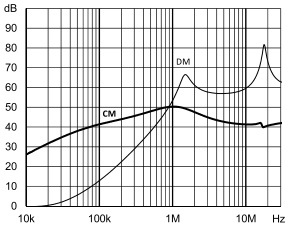
Typical filter attenuation

Per CISPR 17; DM (differential mode)=50 Ω/50 Ω sym; CM (common mode)=50 Ω/50 Ω asym

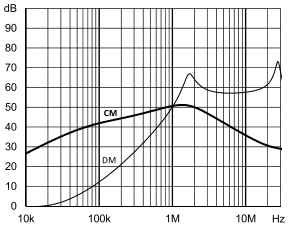
FN 9262 Standard Type 1 A



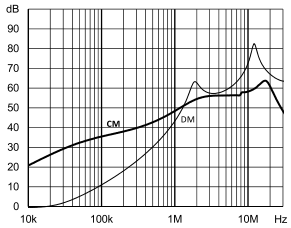
FN 9262 A Type 1 A



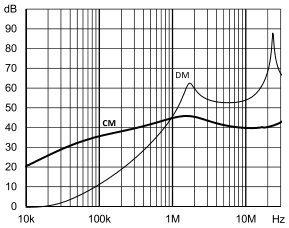
FN 9262 B Type 1 A



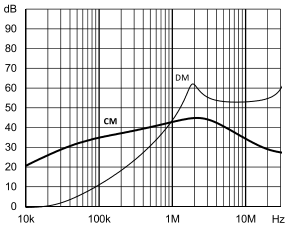
FN 9262 Standard Type 2 A



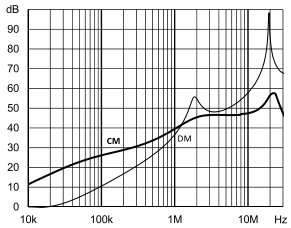
FN 9262 A Type 2 A



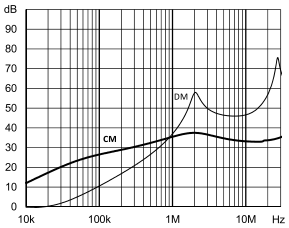
FN 9262 B Type 2 A



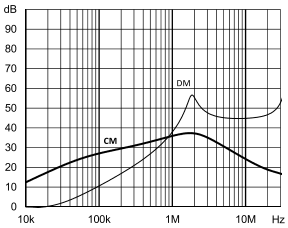
FN 9262 Standard Type 4 A



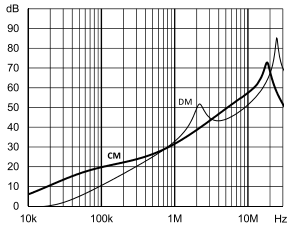
FN 9262 A Type 4 A



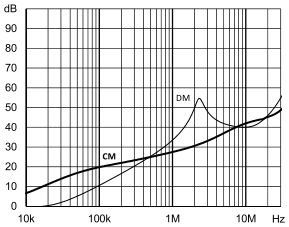
FN 9262 B Type 4 A



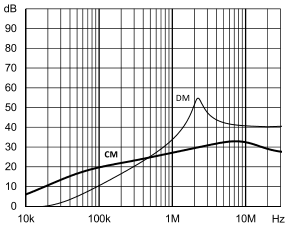
FN 9262 Standard Type 6 A



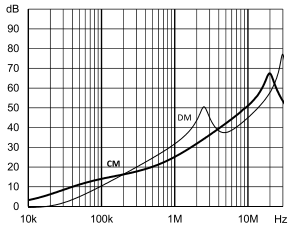
FN 9262 A Type 6 A



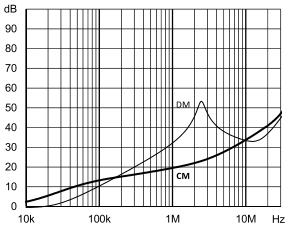
FN 9262 B Type 6 A



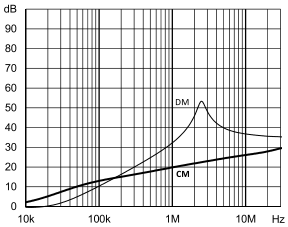
FN 9262 Standard Type 10 A



FN 9262 A Type 10 A

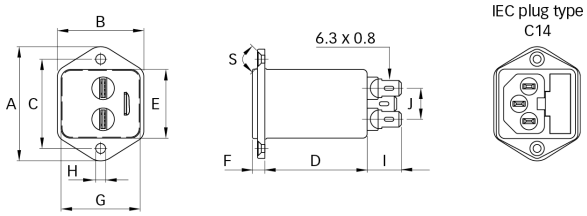


FN 9262 B Type 10 A

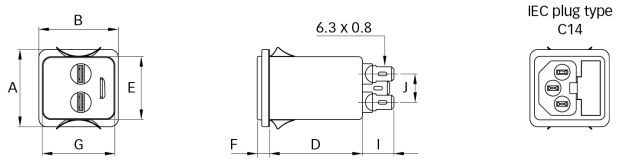


Mechanical data

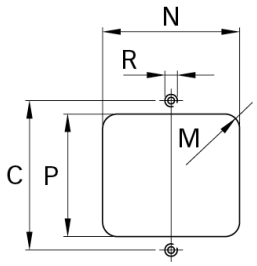
FN 9262



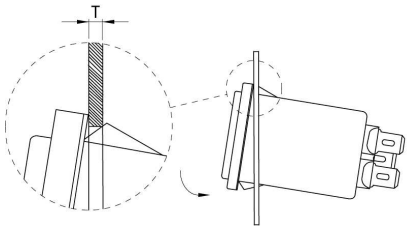
FN 9262 S



Panel cut out



Installation



Dimensions

	FN 9262	FN 9262 S	Tolerances
A	46	34	±0.3
B	35	35	±0.3
C	36		±0.3
D	41	41	±0.3
E	27.8	27.8	+0.3/-0
F	5.5	5.5	±0.3
G	32	32	+0.3/-0
H	Ø3.2		±0.1
I	14	14	±0.5
J	12.5	12.5	±0.3
M	R ≤3.5	R ≤3.5	
N	33 +0.3/-0	33 +0.2/-0	
P	29 ±0.3	29.5 ±0.2	
R*	M3		
S	90°		
T**		0.6-1.5	
T**		1.6-2.5	
T**		2.6-3.5	

* Recommended torque for M3 (90° countersunk flat head) is 0.5 Nm

** For selecting the panel thickness, please refer to the filter selector table.

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connections.

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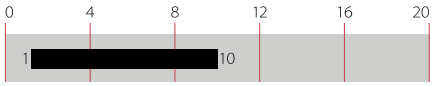
General Purpose Power Entry Module with Switch

- Rated currents up to 10 A
- High quality 2-pole rocker switch
- Optional reduced leakage current versions (A/B type)
- Complies with IEC/EN 60601-1
- Snap-in versions (S type)
- Good attenuation performance

Performance indicators

Attenuation performance

Rated current [A]



Approvals

Features and benefits

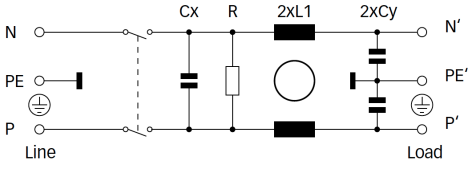
- Excellent conducted attenuation performance, based on chokes with high saturation resistance and good thermal behavior
- High quality 2-pole rocker switch for all-pole disconnection
- Faston terminals for easy assembly
- FN 9264 B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1 for creepage and clearance, leakage current and high potential testing
- As flange mount and snap-in types available

Typical applications

- Portable electrical and electronic equipment
- EDP and office equipment
- Single-phase power supplies
- Switch-mode power supplies
- Test and measurement equipment
- Medical electrical devices (MD) and In-Vitro Diagnostic (IVD) medical devices

Typical electrical schematic

FN 9264 (B types without Y-capacitors)



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Operating frequency	DC to 400 Hz
Rated currents	1 to 10 A @ 40°C max.
High potential test voltage for capacitors	P –> PE 2000 VAC for 2 sec (Standard) P –> PE 2500 VAC for 2 sec (B-types) P –> N 760 VAC for 2 sec
Protection category	IP 40 according to IEC 60529
Temperature range (operation and storage)	-25°C to +85°C (25/85/21) -25°C to +85°C (25/85/21)
Design corresponding to	UL 60939-3, CSA Std C22.2 No. 8, IEC/EN 60939-3, GB/T15287, GB/T15288
Flammability corresponding to	UL 94 V-2 or better
MTBF @ 40°C/230 V (Mil-HB-217F)	≥ 616,000 hours
Rocker switch description	
Function	2-pole, dark not illuminated Marking I – 0
Electrical specifications	Inrush current 100 A 50,000 on-off operations for 10 A according to EN 610581-1
Switch ratings	
Europe (ENEC)	10 A (4 A), 250 VAC* 5E4 16 A (4 A), 250 VAC* 1E4
USA (UL)	20 A, 125 VAC 1 HP; 250 VAC 2 HP;

* Value in () relates to the inductive current charge: cosφ = 0.65

Filter selection table

Filter	Rated current @ 40°C (25°C)	Leakage current* @ 250 VAC/50 Hz (@120 VAC/60Hz)	Inductance**	Capacitance**		Resistance**	Output connections	Weight
			L	Cx	Cy	R		
	[A]	[mA]	[mH]	[µF]	[nF]	[kΩ]		[g]
FN 9264xx-1-06-y	1 (1.2)	0.31 (0.18)	5.15	0.1	2.2	1000	-06	55
FN 9264xx-2-06-y	2 (2.3)	0.31 (0.18)	2.7	0.1	2.2	1000	-06	55
FN 9264xx-3-06-y	3 (3.6)	0.31 (0.18)	2		2.2	1000	-06	55
FN 9264xx-4-06-y	4 (4.6)	0.31 (0.18)	1	0.1	2.2	1000	-06	55
FN 9264xx-6-06-y	6 (6.9)	0.31 (0.18)	0.3	0.1	2.2	1000	-06	55
FN 9264xx-10-06-y	10 (11.5)	0.31 (0.18)	0.21	0.1	2.2	1000	-06	55

* Leakage current under normal operating conditions (acc. to IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.
** Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

Product selector

FN 9264xx-yy-yy-y

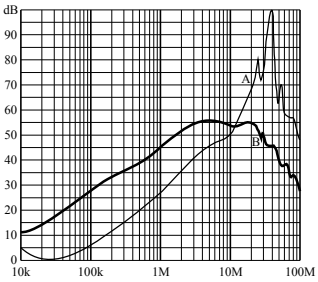
- Snap-in range for S version only
  - Blank: Snap-in panel thickness range 1.0 to 2.5 mm
  - 30: Snap-in panel thickness range >2.5 to 3.5 mm
- 06: Faston 6.3 x 0.8mm (spade/soldering)
- 1 to 10: Rated current
- Blank: Standard version
- B: Medical version (without Y2-capacitor, leakage current max 2µA*)
- Blank: Standard housing with mounting flanges
- S: Snap-in version, snappper on vertical side

For example: FN 9264-1-06, FN 9264 B-6-06, FN 9264 SB-4-06-30

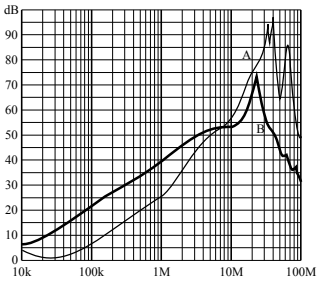
Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

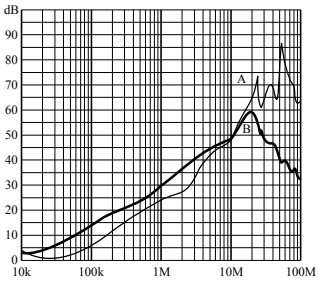
1 A Standard types



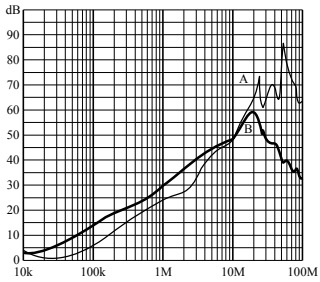
2 A Standard types



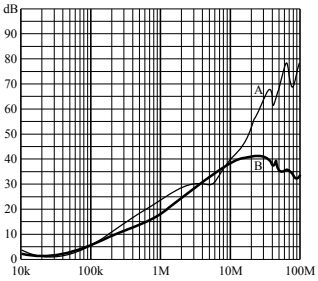
3 A Standard types



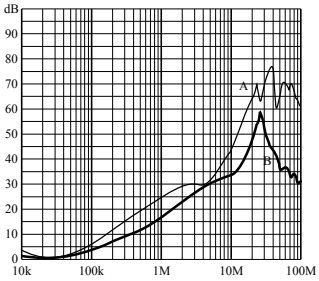
4 A types



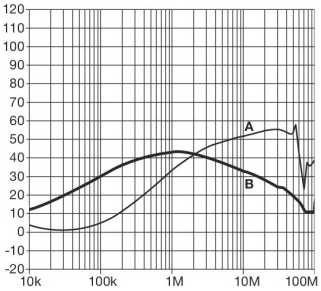
6 A Standard types



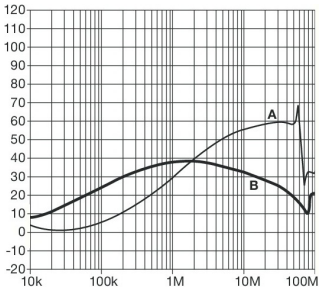
10 A Standard types



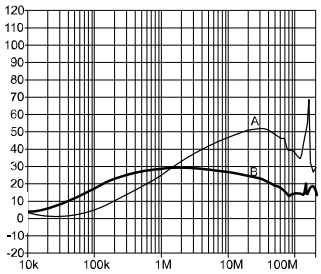
1 A B-types



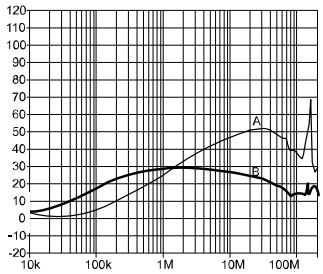
2 A B-types



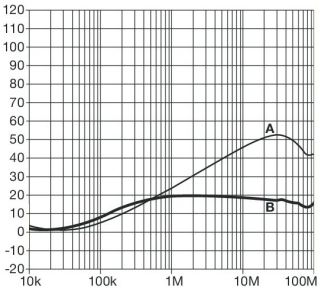
3 A B-types



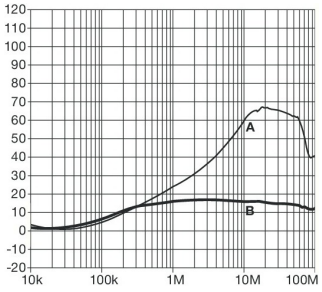
4 B types



6 A B-types

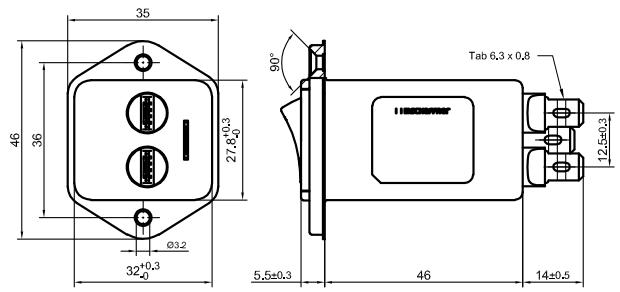


10 A B-types

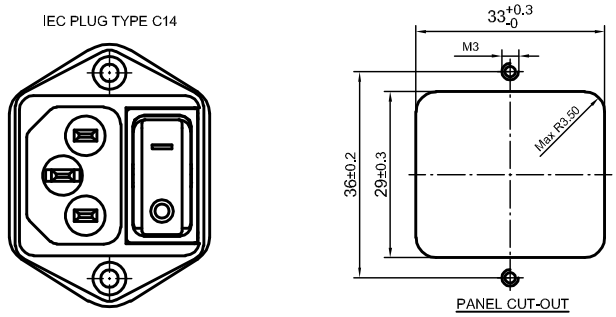


Mechanical data

FN 9264

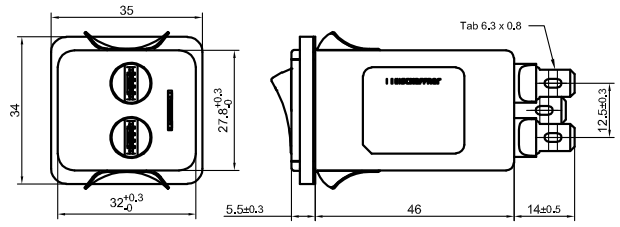


Panel cut out*

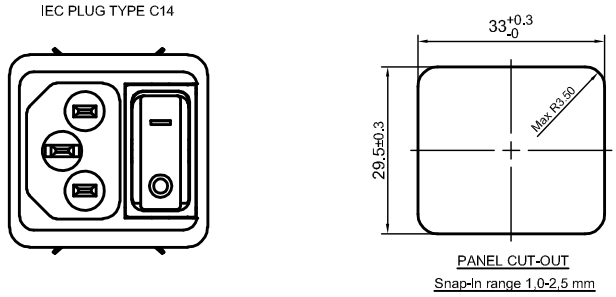


* Recommended torque for M3 (90° countersunk flat head) is 0.5 Nm

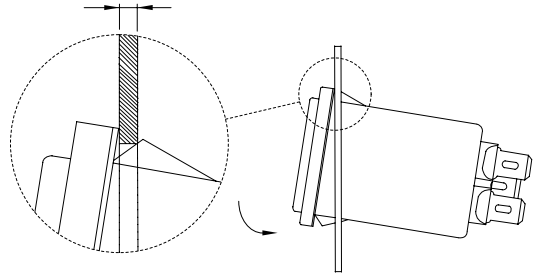
FN 9264 S



Panel cut out



Installation



Accessories for IEC Inlet Filters and Power Entry Modules

The accessories displayed are a selection of available accessories for IEC Inlet filters and IEC Power entry modules. As they are displayed in a general way there might be variants of the filters where the accessories are not available.
For further information please ask your local Schaffner Sales Partner and visit our homepage https://www.schaffner.com/.

Power Cord with Locking System for Inlet Filters IL 13, IL 13 P, IL 19

Link to Datasheet: Datasheet IEC C13/ C19 locking cable

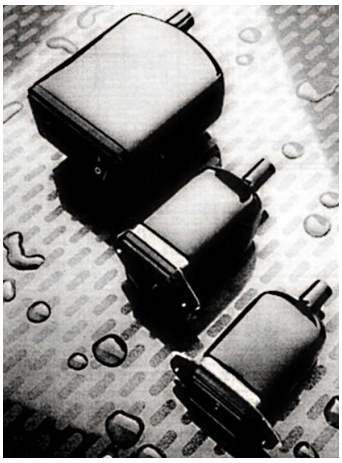
The locking system has a tensile force of typical 200N.
It is recommended to use it with flange mount filters.
Lock Power Cords with IEC Inlets and Filters"
Schaffner power cords with IEC lock guard against
accidental disconnection of all electrical appliances
with an IEC inlet. No exchange or modification of the
IEC inlet or IEC inlet filter system is needed. Easy
retrofit for all electronic equipments and devices.

IEC C13 Rewireable Connector for individual Power Cord with Locking System

Link to Datasheet: Datasheet IEC C13 rewireable

The locking system has a tensile force of typical 300N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters" Schaffner power connector with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

IB - Insulating Boots



There is a full range of insulating boots available from Schaffner that provide a physical cover for the exposed terminals on the back of IEC Inlet Filters.
These boots fit the simplest non-fused and unswitched style up to the fully fused and switched IEC filtered inlet. The boots are made from a durable black PVC material that conforms to UL94-V0 flammability requirements. The boots slip easily over the back of the filter and reduce the risk of electrical shock to maintenance personnel whilst protecting the filter from environmental hazard such as the ingress of dust and moisture.

schaffner
shaping electrical power

Ultra Compact and Versatile Filtered Power Entry Module

- Single stage filter
- Ultra compact design
- Rated currents up to 10 A
- dual-fuse holder
- Fuses Ø5x20 mm
- 2-pole rocker switch
- Good attenuation performance
- Faston or spring cage terminals

Check the video of our IEC Inlet Filters FN 9280 and FN 9290 on Youtube!

Performance indicators

Attenuation performance

Rated current [A]

Approvals

(CQC except HI-types; Patent US 20110227692/US 8766761; CN ZL201080069589.0)

Choosing FN 9280/90 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances and a high attenuation performance. For higher attenuation performance the FN 9290 family with a dual stage filter and identical panel cut-out can be used.

Standard IEC connector filters are a practical solution to pass EMI system approval in a short time. A wide selection of amperage ratings, mounting possibilities and also filters for medical applications are designed to offer you the best solution.

Features and benefits

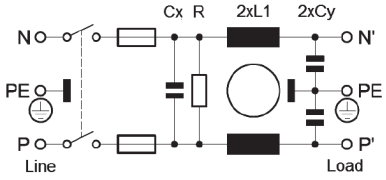
- Good conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Deep-drawn iron-sheet housing for best possible shielding against magnetic fields
- Rear/front flange mounting or snap-in versions
- Dual and additional spare fuse holder
- 2-pole rocker switch
- Faston or spring cage terminals
- FN 928X B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1
- All versions according IEC/EN 62368-1

Typical applications

- Portable electrical and electronic equipment
- Consumer goods
- EDP and office equipment
- Single-phase and switch-mode power supplies
- Test and measurement equipment
- Medical electrical devices (MD) and *In-Vitro*-Diagnostics (IVD) equipment
- Audio/Video, information and communication technologies

Typical electrical schematic

Standard types (see page 3 for all options):



Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Rated currents	1 to 10 A @ 40°C max.
Operating frequency	DC to 400 Hz
Leakage current	Standard: <500 uA at 250 VAC/50 Hz Medical: <5 uA at 250 VAC/50 Hz
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 760 VAC for 2 sec
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, EN 60939, EN 60950, EN 60601-1, UL 544, EN 60320
Flammability corresponding to	UL 94 V-2 or better
Temperature range (operation and storage)	– 25°C to +85°C (25/85/21)
Protection category	IP 40 according to IEC 60529 (front side)
Terminals	IP 20 spring cage safe against finger touch
Spring cage wire range	0.2 –1.5 mm2 / 24 –16 AWG single or flexible wire
MTBF @ 40°C/230 V (Mil-HB-217F)	>1,000,000 hours
Switch ratings	
Rocker switch	2-pole, dark not illuminated, Marking I - 0
USA (UL) and Canada (C-UL)	10 A, 125 VAC; 10 A, 250 VAC; 1/3 HP
Europe (ENEC)	10 A (4 A), 250 VAC**
Mechanical life	50,000 cycles
Electrical specifications	Inrush current 82 A 6,000 on-off operations according to UL 1054 10,000 on-off operations according to ENEC
Fuse holder	2 fuses (Ø5 x 20 mm) max. 250 V (certified to IEC 60127-6)
Power acceptance @ amb. temperature	

* 10 A version is 8 A UL and CSA approved
** Value in () relates to the inductive current charge: cos γ = 0.65

Filter selection table

Filter*	Rated current @ 40°C	Leakage current** @ 250 VAC /50 Hz (@ 120 VAC /60 Hz)	Inductance		Capacitance		Resistance	Output connections		Weight
			L1	L2	Cx	Cy	R			
	[A]	[mA]	[mH]	[mH]	[nF]	[nF]	[kOhm]			[g]
FN 9280-1-..	1	0.31 (0.18)	10.9	0	220	2.2	1000	-06	-100	101
FN 9280-2-..	2	0.31 (0.18)	4.4	0	220	2.2	1000	-06	-100	102
FN 9280-4-..	4	0.31 (0.18)	1.7	0	220	2.2	1000	-06	-100	105
FN 9280-6-..	6	0.31 (0.18)	0.78	0	220	2.2	1000	-06	-100	104
FN 9280-10-..	10	0.31 (0.18)	0.32	0	220	2.2	1000	-06	-100	106
FN 9280 B-1-..	1	0.00	10.9	0	220	0	1000	-06	-100	101
FN 9280 B-2-..	2	0.00	4.4	0	220	0	1000	-06	-100	102
FN 9280 B-4-..	4	0.00	1.7	0	220	0	1000	-06	-100	105
FN 9280 B-6-..	6	0.00	0.78	0	220	0	1000	-06	-100	104
FN 9280 B-10-..	10	0.00	0.32	0	220	0	1000	-06	-100	106
FN 9289-1-..	1	0.31 (0.18)	10.9	0	220	2.2	1000	-06	-100	101
FN 9289-2-..	2	0.31 (0.18)	4.4	0	220	2.2	1000	-06	-100	102
FN 9289-4-..	4	0.31 (0.18)	1.7	0	220	2.2	1000	-06	-100	105
FN 9289-6-..	6	0.31 (0.18)	0.78	0	220	2.2	1000	-06	-100	104
FN 9289-10-..	10	0.31 (0.18)	0.32	0	220	2.2	1000	-06	-100	106
FN 9289 B-1-..	1	0.00	10.9	0	220	0	1000	-06	-100	101
FN 9289 B-2-..	2	0.00	4.4	0	220	0	1000	-06	-100	102
FN 9289 B-4-..	4	0.00	1.7	0	220	0	1000	-06	-100	105
FN 9289 B-6-..	6	0.00	0.78	0	220	0	1000	-06	-100	104
FN 9289 B-10-..	10	0.00	0.32	0	220	0	1000	-06	-100	106
FN 9280 E-1-..	1	0.31 (0.18)	10.9	0.4	220	2.2	1000	-06	-100	135
FN 9280 E-2-..	2	0.31 (0.18)	4.4	0.4	220	2.2	1000	-06	-100	136
FN 9280 E-4-..	4	0.31 (0.18)	1.66	0.4	220	2.2	1000	-06	-100	137
FN 9280 E-6-..	6	0.31 (0.18)	0.78	0.4	220	2.2	1000	-06	-100	138
FN 9280 E-10-..	10	0.31 (0.18)	0.32	0.4	220	2.2	1000	-06	-100	139
FN 9280 EB-1-..	1	0.00	10.9	0.4	220	0	1000	-06	-100	135
FN 9280 EB-2-..	2	0.00	4.4	0.4	220	0	1000	-06	-100	136
FN 9280 EB-4-..	4	0.00	1.66	0.4	220	0	1000	-06	-100	137
FN 9280 EB-6-..	6	0.00	0.78	0.4	220	0	1000	-06	-100	138
FN 9280 EB-10-..	10	0.00	0.32	0.4	220	0	1000	-06	-100	139
FN 9289 E-1-..	1	0.31 (0.18)	10.9	0.4	220	2.2	1000	-06	-100	135
FN 9289 E-2-..	2	0.31 (0.18)	4.4	0.4	220	2.2	1000	-06	-100	136
FN 9289 E-4-..	4	0.31 (0.18)	1.66	0.4	220	2.2	1000	-06	-100	137
FN 9289 E-6-..	6	0.31 (0.18)	0.78	0.4	220	2.2	1000	-06	-100	138
FN 9289 E-10-..	10	0.31 (0.18)	0.32	0.4	220	2.2	1000	-06	-100	139
FN 9289 EB-1-..	1	0.00	10.9	0.4	220	0	1000	-06	-100	135
FN 9289 EB-2-..	2	0.00	4.4	0.4	220	0	1000	-06	-100	136
FN 9289 EB-4-..	4	0.00	1.66	0.4	220	0	1000	-06	-100	137
FN 9289 EB-6-..	6	0.00	0.78	0.4	220	0	1000	-06	-100	138
FN 9289 EB-10-..	10	0.00	0.32	0.4	220	0	1000	-06	-100	139

* To compile a complete part number, please replace the -.. with the required output connection style (e.g. FN 9289-1-06, FN 9282-4-100)
** Maximum leakage current under normal conditions (according to IEC60939-3)

Product selector

FN 92vww-xx-yy-zz

vv:	**Blank:**	**Snap in range 1.0 to 2.5 mm**
	Optional: 30:	Snap in range >2.5 to 3.5 mm
xx:	**06:**	**Fast-On 6.3 x 0.8 mm (spade/soldering)**
	100:	**Spring cage**
yy:	**1 to 10:**	**Rated current [A]**
zz:	**Blank:**	**Standard version**
	B:	**Medical version (without Y2-capacitor)**
	Optional: E:	Earth line choke
	EB:	Medical version (without YZ-capacitor) with earth line choke
ww:	**0:**	**Flange version vertical/horizontal/front/rear mounting set**
	9:	**Snap-in version, snapper on horizontal side (top / bottom)**
	Optional: 1:	Rear Flange mounting (top / bottom)
	2:	Front Flange mounting (top / bottom)
	3:	Rear Flange mounting (left / right)
	4:	Front Flange mounting (left / right)
	8:	Snap-in version, snapper on vertical side (left / right)
FN 92	**8:**	**Single stage filter**

All FN 9280/FN 9290 are equipped with a dual fuse holder with a spare fuse holder.

Note: All FN 9280/FN 9280 B/FN 9289/FN 9289 B/FN 9290/FN 9290 B/FN 9299/FN 9299 B are stock types from our distribution partners.

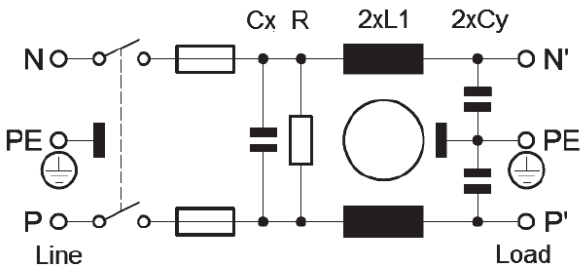
Order Examples:

FN 9280 B-6-100: Medical version of single stage, dual fuse EMC/EMI filter, flange set for vertical/horizontal/front/rear mounting, 6 A, spring cage terminals, from stock available.

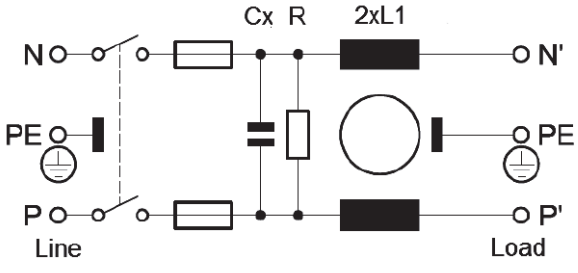
FN 9298-6-06-30: Dual stage, dual fuse EMC/EMI filter, snap-in version, snappers for snap-in panel thickness range >2.5 to 3.5 mm, snapper on vertical side, 6 A, fast-on terminals, non-stock order type

Accessories: The 4D flanges can be ordered separately. The order number is 427532. Please note that the minimum order quantity is one box of 50 pieces. One item includes both type of flanges (vertical and horizontal).

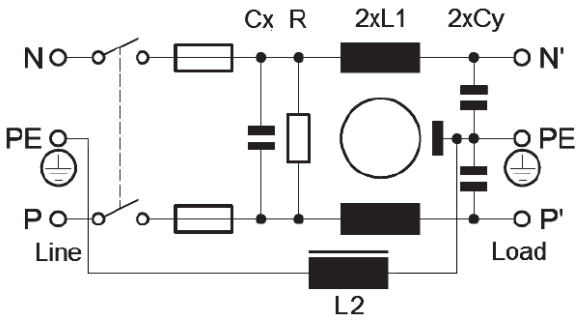
Standard type filters*



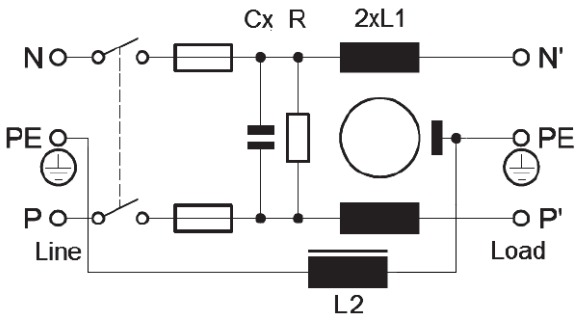
B-type filters* (without Cy)



E-type filters* (with earth line choke)



EB-type filters* (with earth line choke and without Cy)

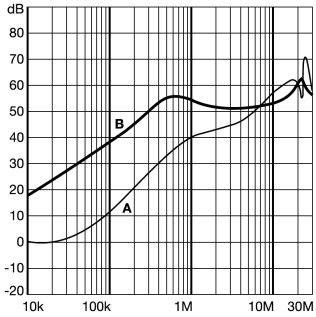


* Fuses are not included

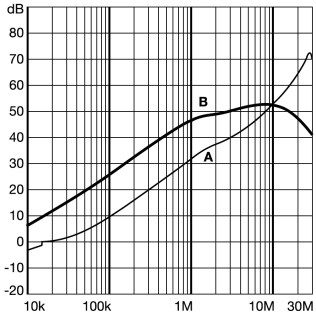
Typical filter attenuation

FN 9280 Series | Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

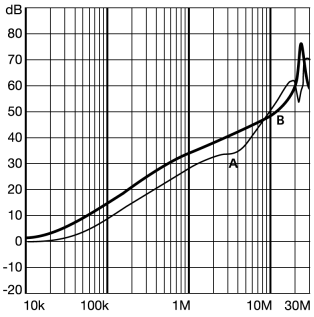
1 A types



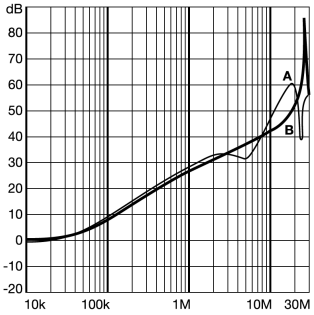
2 A types



4 – 6 A types

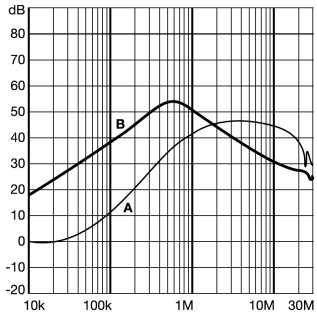


10 A types

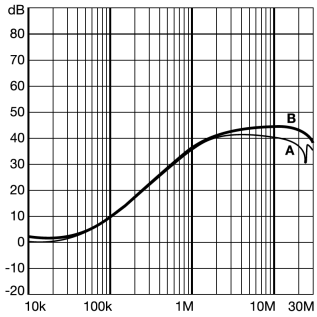


FN 9280 B Series | Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

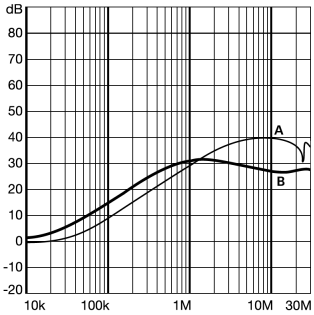
1 A types



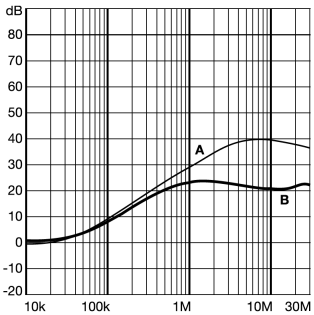
2 A types



4 – 6 A types

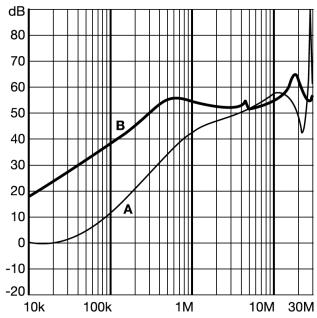


10 A types

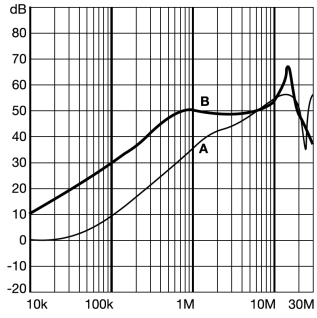


FN 9280 E Series | Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

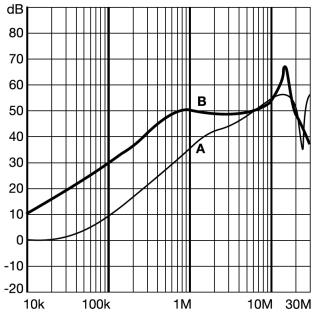
1 A types



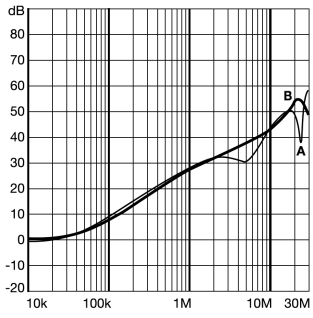
2 A types



4 – 6 A types

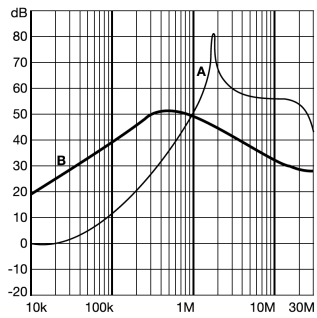


10 A types

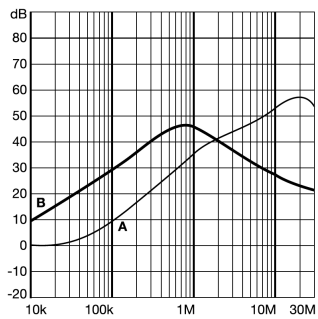


FN 9280 EB Series | Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

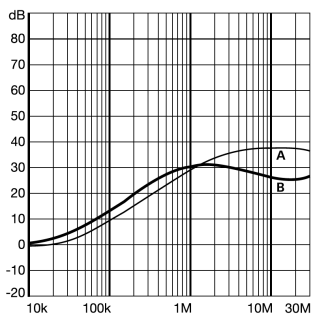
1 A types



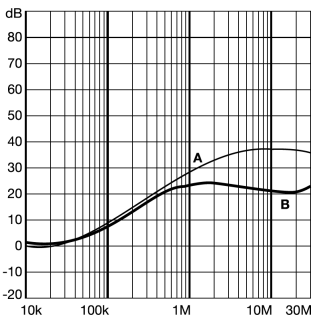
2 A types



4 – 6 A types

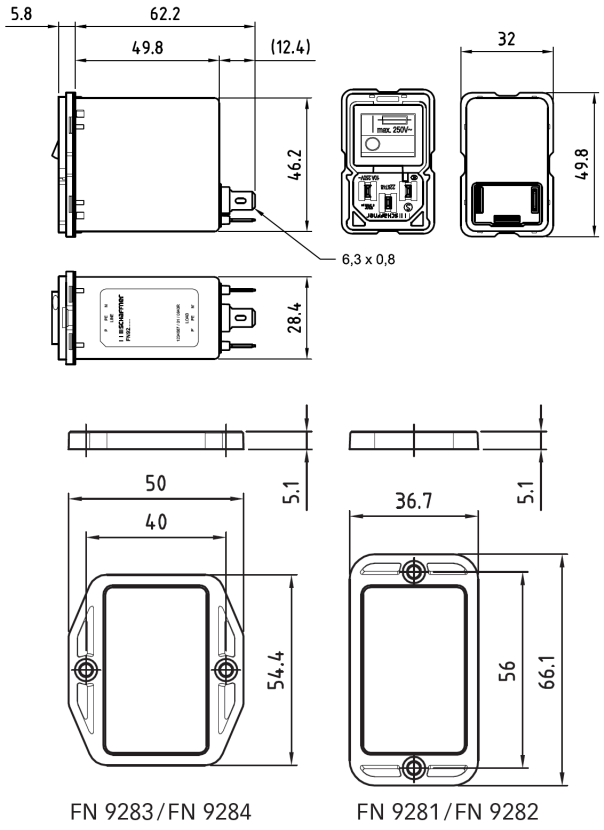


10 A types

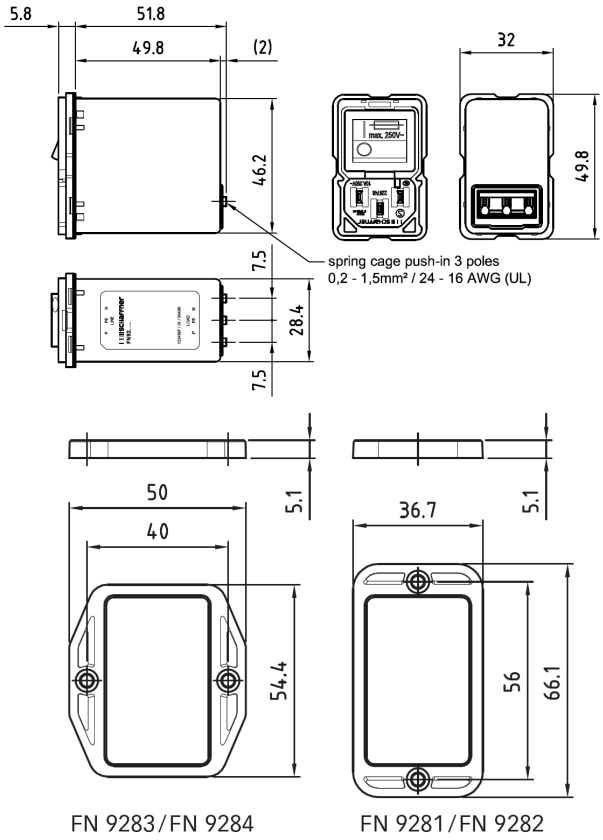


Mechanical Data

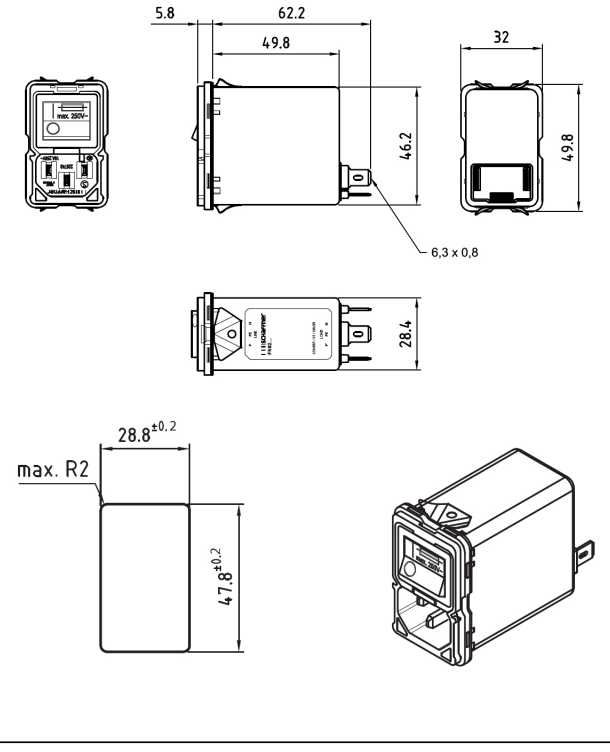
FN 9280-x-06/FN 9280 B-x-06



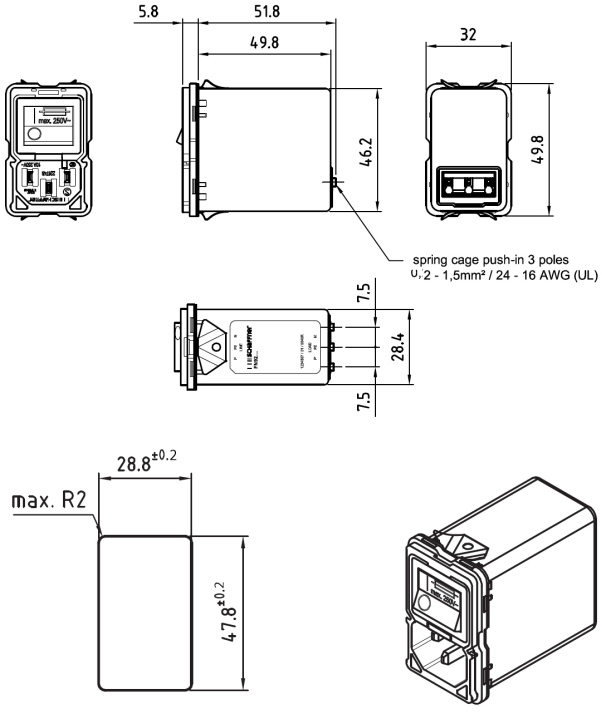
FN 9280-X-100/FN 9280 B-X-100



FN 9289-x-06/FN 9289 B-x-06

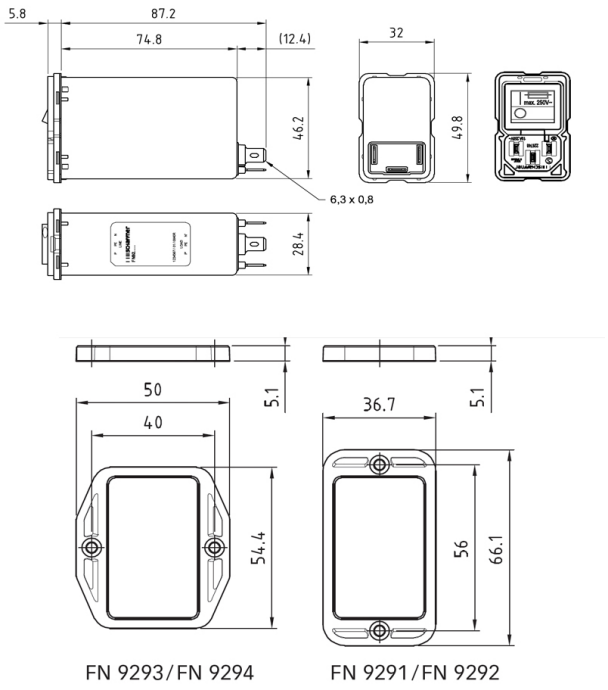


FN 9289-X-100/FN 9289 B-X-100

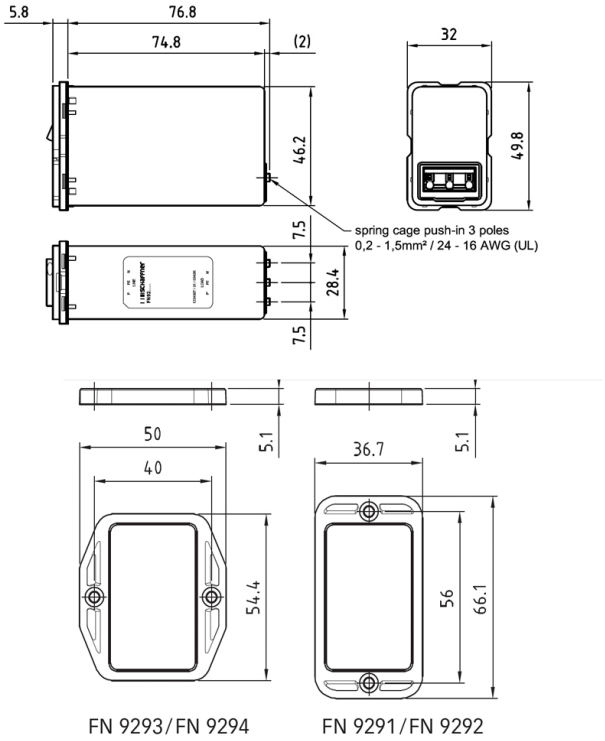


Mechanical Data

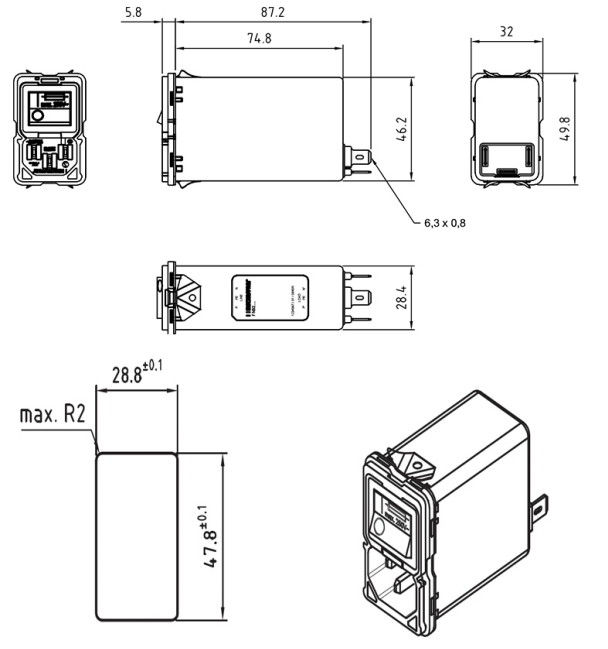
FN 9280 E-x-06/FN 9280 EB-x-06



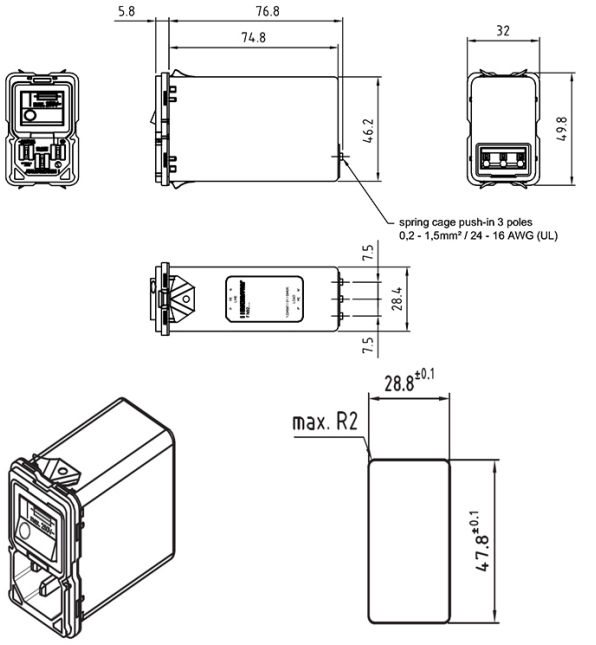
FN 9280 E-x-100/FN 9280 EB-x-100



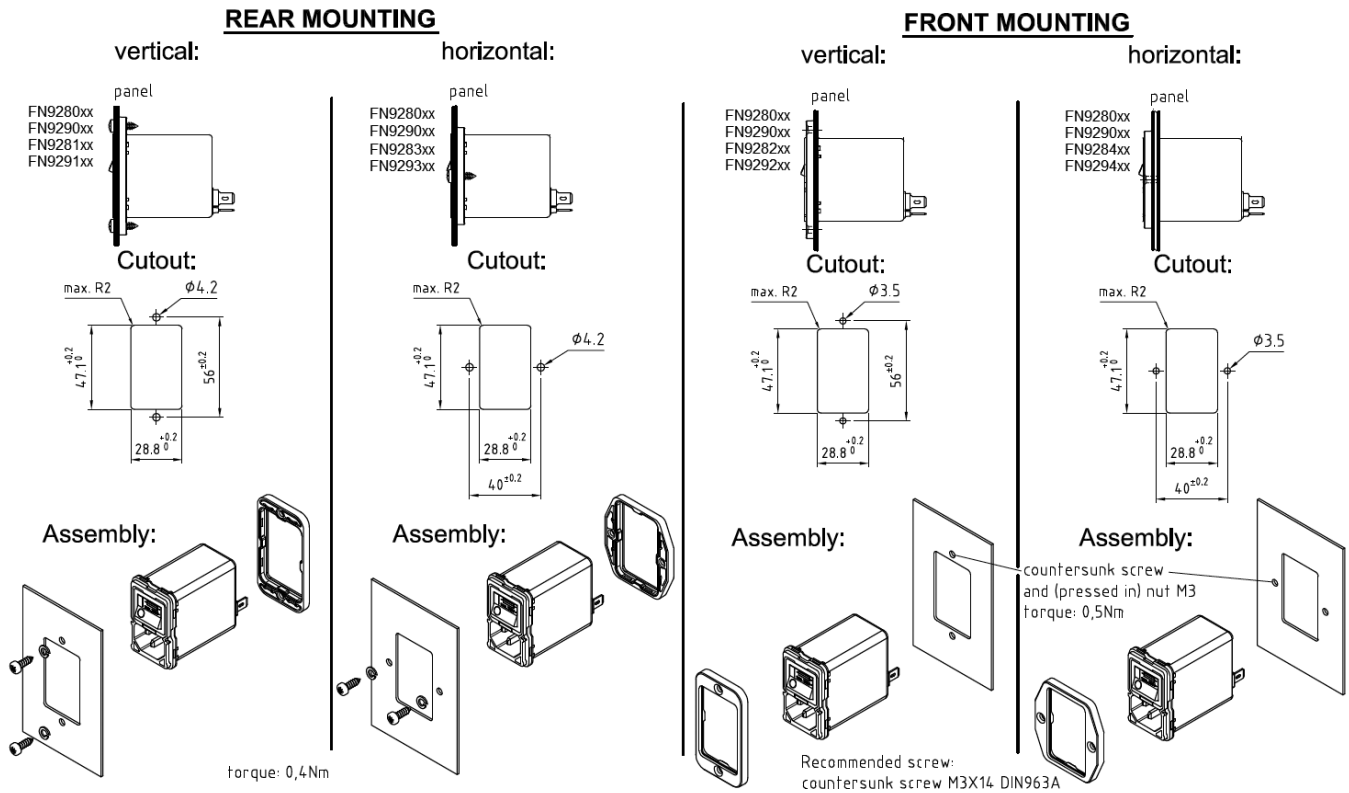
FN 9289 E-x-06/FN 9289 EB-x-06



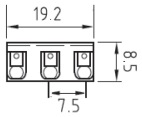
FN 9289E-x-100 / FN 9289EB-x-100



Assembly Instructions

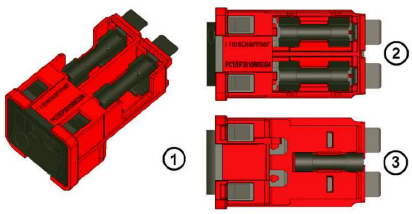


Terminal -100	
clamping range, solid wire / flex wire	0,20 mm² –1,5 mm², AWG24 –AWG16
operating force of slider	max. 40 N
recommended stripped length	8 mm



Push the knob above the terminal to insert the wire.

Removal of the combined switch / fuse holder unit



Fuses are not in the scope of delivery.

An additional fuse mark on the switch indicates the fuses holders behind the switch. The red frame shows the outline of the removable unit.

With a simple tool like a Swiss Army knife or a screwdriver No 1 or smaller the unit (1) can be removed from the filter. On the topside (2) behind the switch there are two fuse holders for each live connection. On the bottom side (3) is a clip to carry an additional spare fuse.

Please visit www.schaffner.com to find more details on filter connectors.

Accessories for IEC Inlet Filters and Power Entry Modules

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For further information please ask your local Schaffner Sales Partner and visit our homepage https://www.schaffner.com/.

Power Cord with Locking System for Inlet Filters IL 13, IL 13 P, IL 19

Link to Datasheet: Datasheet IEC C13/ C19 locking cable

The locking system has a tensile force of typical 200N.
It is recommended to use it with flange mount filters.
Lock Power Cords with IEC Inlets and Filters"
Schaffner power cords with IEC lock guard against
accidental disconnection of all electrical appliances
with an IEC inlet. No exchange or modification of the
IEC inlet or IEC inlet filter system is needed. Easy
retrofit for all electronic equipments and devices.

IEC C13 Rewireable Connector for individual Power Cord with Locking System

Link to Datasheet: Datasheet IEC C13 rewireable

The locking system has a tensile force of typical 300N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters" Schaffner power connector with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

schaffner
shaping electrical power

Ultra Compact and Versatile Filtered Power Entry Module

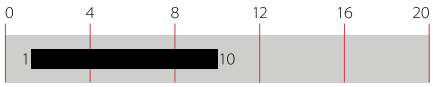
- Dual stage filter
- Ultra compact design
- Rated currents up to 10 A
- Dual fuse holder
- 2-pole rocker switch
- Good attenuation performance
- Faston or spring cage terminals

Check the video of our IEC Inlet Filters FN 9280 and FN 9290 on Youtube!

Performance indicators

Attenuation performance

Rated current [A]



Approvals

(CQC except HI-types; Patent US 20110227692/US 8766761; CN ZL201080069589.0)

Choosing FN 9280/90 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances and a high attenuation performance. For higher attenuation performance the FN 9290 family with a dual stage filter and identical panel cut-out can be used.

Standard IEC connector filters are a practical solution to pass EMI system approval in a short time. A wide selection of amperage ratings, mounting possibilities and also filters for medical applications are designed to offer you the best solution.

Features and benefits

- Best conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Deep-drawn iron-sheet housing for best possible shielding against magnetic fields
- Rear/front flange mounting or snap-in versions
- Dual and additional spare fuse holder
- 2-pole rocker switch
- Faston or spring cage terminals for more flexible assembly
- FN 929X B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1
- All versions according IEC/EN 62368-1

Typical applications

- Portable electrical and electronic equipment
- Consumer goods
- EDP and office equipment
- Single-phase and switch-mode power supplies
- Test and measurement equipment
- Medical electrical devices (MD) and *In-Vitro*-Diagnostics (IVD) equipment
- Audio/Video, information and communication technologies

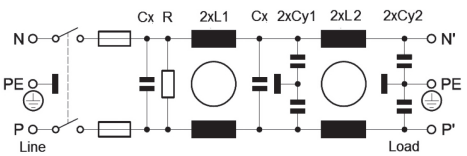
Technical specifications

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Rated currents	1 to 10 A @ 40°C max.
Operating frequency	DC to 400 Hz
Leakage current	Standard: <500 uA at 250 VAC/50 Hz Medical: <5 uA at 250 VAC/50 Hz
High potential test voltage	P –> PE 2000 VAC for 2 sec (standard types) P –> PE 2500 VAC for 2 sec (B types) P –> N 760 VAC for 2 sec
Design corresponding to	UL 1283, CSA 22.2 No. 8 1986, EN 60939, EN 60950, EN 60601-1, UL 544, EN 60320
Flammability corresponding to	UL 94 V-2 or better
Temperature range (operation and storage)	– 25°C to +85°C (25/85/21)
Protection category	IP 40 according to IEC 60529 (front side)
Terminals	IP 20 spring cage safe against finger touch
Spring cage wire range	0.2 –1.5 mm^2/24 –16 AWG single or flexible wire
MTBF @ 40°C/230 V (Mil-HB-217F)	> 1,000,000 hours
Switch ratings	
Rocker switch	2-pole, dark not illuminated, Marking I - 0
USA (UL) and Canada (C-UL)	10 A, 125 VAC; 10 A, 250 VAC; 1/3 HP
Europe (ENEC)	10 A (4 A), 250 VAC**
Mechanical life	50,000 cycles
Electrical specifications	Inrush current 82 A 6,000 on-off operations according to UL 1054 10,000 on-off operations according to ENEC
Fuse holder	2 fuses (Ø5 x 20 mm) max. 250 V (certified to IEC 60127-6)
Power acceptance @ amb. temperature	

* 10 A version is 8 A UL and CSA approved
** Value in () relates to the inductive current charge: cos γ = 0.65

Typical electrical schematic

FN 9290 Standard types (B types without Cy)



Filter selection table

Filter*	Rated current @ 40°C [A]	Leakage current** @ 250 VAC /50 Hz (@ 120 VAC /60 Hz) [mA]	Inductance L1 [mH]	Inductance L2 [mH]	Capacitance Cx [nF]	Capacitance Cy1 [nF]	Capacitance Cy2 [nF]	Resistance R [kOhm]	Output connections		Weight [g]
											
FN 9290-1-..	1	0.28 (0.16)	10.9	10.9	220	1.5	0.47	1000	-06	-100	147
FN 9290-2-..	2	0.28 (0.16)	4.4	4.4	220	1.5	0.47	1000	-06	-100	148
FN 9290-4-..	4	0.28 (0.16)	1.7	1.7	220	1.5	0.47	1000	-06	-100	148
FN 9290-6-..	6	0.28 (0.16)	0.78	0.78	220	1.5	0.47	1000	-06	-100	153
FN 9290-10-..	10	0.28 (0.16)	0.32	0.32	220	1.5	0.47	1000	-06	-100	154
FN 9290 B-1-..	1	0.00	10.9	10.9	220	0	0	1000	-06	-100	147
FN 9290 B-2-..	2	0.00	4.4	4.4	220	0	0	1000	-06	-100	148
FN 9290 B-4-..	4	0.00	1.7	1.7	220	0	0	1000	-06	-100	148
FN 9290 B-6-..	6	0.00	0.78	0.78	220	0	0	1000	-06	-100	153
FN 9290 B-10-..	10	0.00	0.32	0.32	220	0	0	1000	-06	-100	154
FN 9299-1-..	1	0.28 (0.16)	10.9	10.9	220	1.5	0.47	1000	-06	-100	147
FN 9299-2-..	2	0.28 (0.16)	4.4	4.4	220	1.5	0.47	1000	-06	-100	148
FN 9299-4-..	4	0.28 (0.16)	1.7	1.7	220	1.5	0.47	1000	-06	-100	148
FN 9299-6-..	6	0.28 (0.16)	0.78	0.78	220	1.5	0.47	1000	-06	-100	153
FN 9299-10-..	10	0.28 (0.16)	0.32	0.32	220	1.5	0.47	1000	-06	-100	154
FN 9299 B-1-..	1	0.00	10.9	10.9	220	0	0	1000	-06	-100	147
FN 9299 B-2-..	2	0.00	4.4	4.4	220	0	0	1000	-06	-100	148
FN 9299 B-4-..	4	0.00	1.7	1.7	220	0	0	1000	-06	-100	148
FN 9299 B-6-..	6	0.00	0.78	0.78	220	0	0	1000	-06	-100	153
FN 9299 B-10-..	10	0.00	0.32	0.32	220	0	0	1000	-06	-100	154

* To compile a complete part number, please replace the -.. with the required output connection style (e.g. FN 9289-1-06, FN 9282-4-100)
** Maximum leakage current under normal conditions (according to IEC60939-3)

Product selector:

FN 92vww-xx-yy-zz

Blank: **Snap in range 1.0 to 2.5 mm**
Optional: 30: Snap in range >2.5 to 3.5 mm

06: **Fast-On 6.3 x 0.8 mm (spade/soldering)**
100: **Spring cage**

1 to 10: **Rated current [A]**

Blank: **Standard version**
B: **Medical version (without Y2-capacitor)**
Optional: B: Medical version (without YZ-capacitor)

0: **Flange version vertical/horizontal/front/rear mounting set**
9: **Snap-in version, snapper on horizontal side (top / bottom)**
Optional: 1: Rear Flange mounting (top / bottom)
2: Front Flange mounting (top / bottom)
3: Rear Flange mounting (left / right)
4: Front Flange mounting (left / right)
8: Snap-in version, snapper on vertical side (left / right)

9: **Dual stage filter**

All FN 9280/FN 9290 are equipped with a dual fuse holder with a spare fuse holder.

Note: All FN 9280/FN 9280 B/FN 9289/FN 9289 B/FN 9290/FN 9290 B/FN 9299/FN 9299 B are stock types from our distribution partners.

Order Examples:

FN 9280 B-6-100: Medical version of single stage, dual fuse EMC/EMI filter, flange set for vertical/horizontal/front/rear mounting, 6 A, spring cage terminals, from stock available.

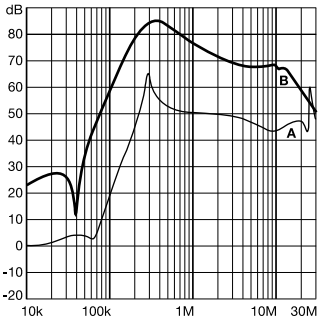
FN 9298-6-06-30: Dual stage, dual fuse EMC/EMI filter, snap-in version, snappers for snap-in panel thickness range >2.5 to 3.5 mm, snapper on vertical side, 6 A, fast-on terminals, non-stock order type

Accessories: The 4D flanges can be ordered separately. The order number is 427532. Please note that the minimum order quantity is one box of 50 pieces. One item includes both type of flanges (vertical and horizontal).

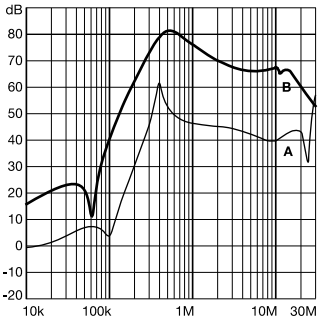
Typical filter attenuation

FN 9290 Series | Typical filter attenuation | Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

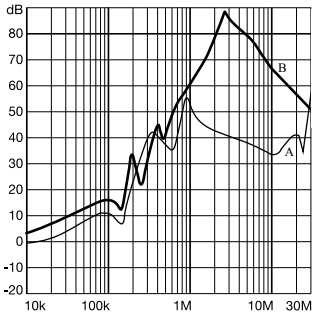
1 A types



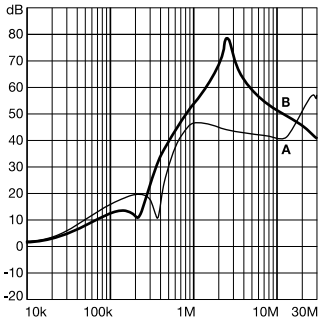
2 A types



4 – 6 A types

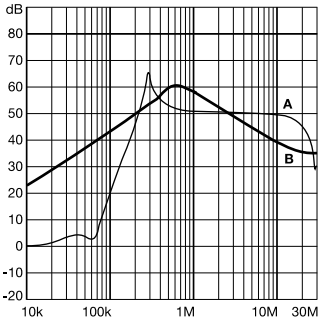


10 A types

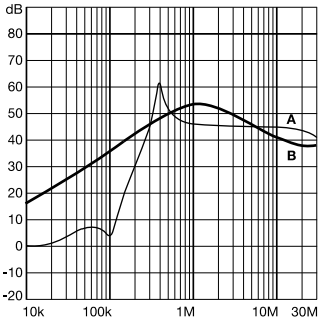


FN 9290 B Series | Typical filter attenuation | Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

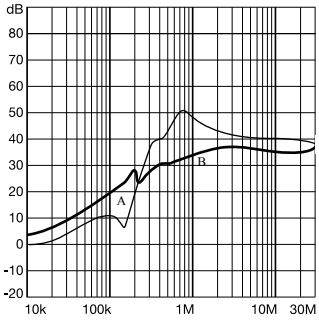
1 A types



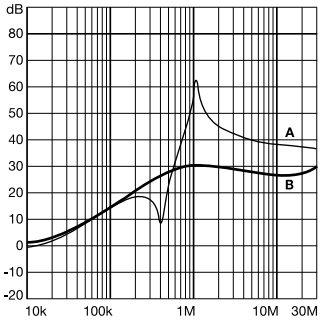
2 A types



4 – 6 A types

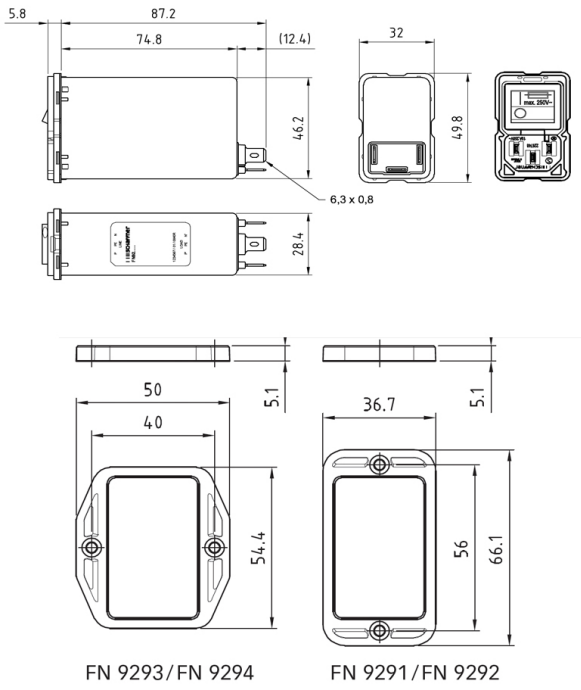


10 A types

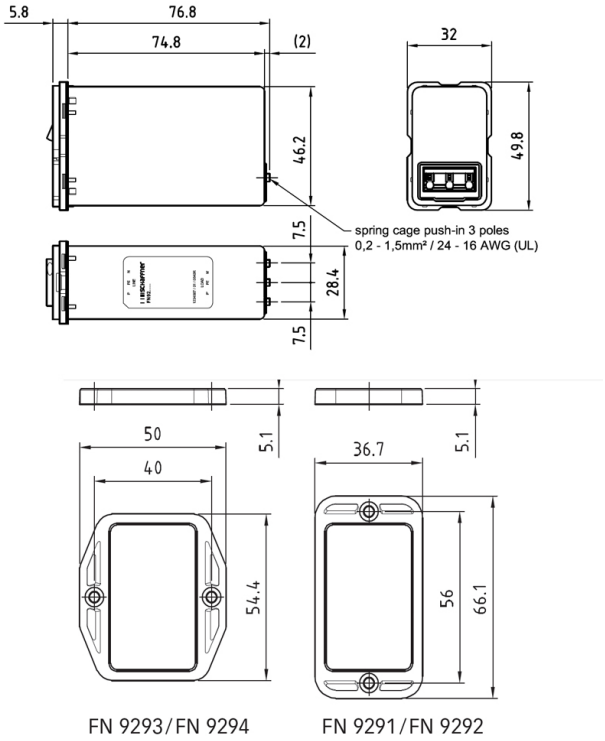


Mechanical Data

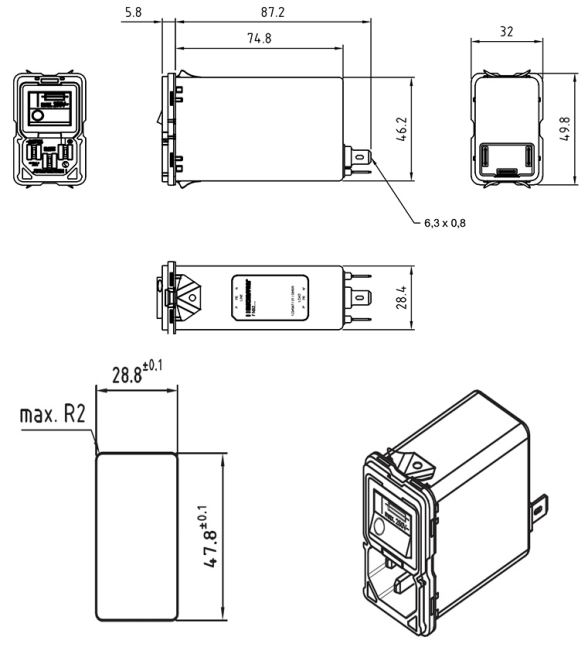
FN 9290-x-06/FN 9290 B-x-06



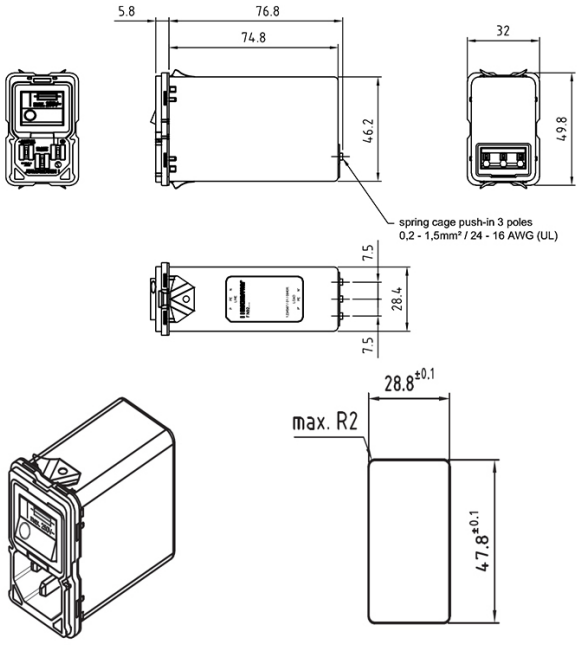
FN 9290-x-100/FN 9290 B-x-100



FN 9299-x-06/FN 9299 B-x-06



FN 9299-x-100/FN 9299 B-x-100



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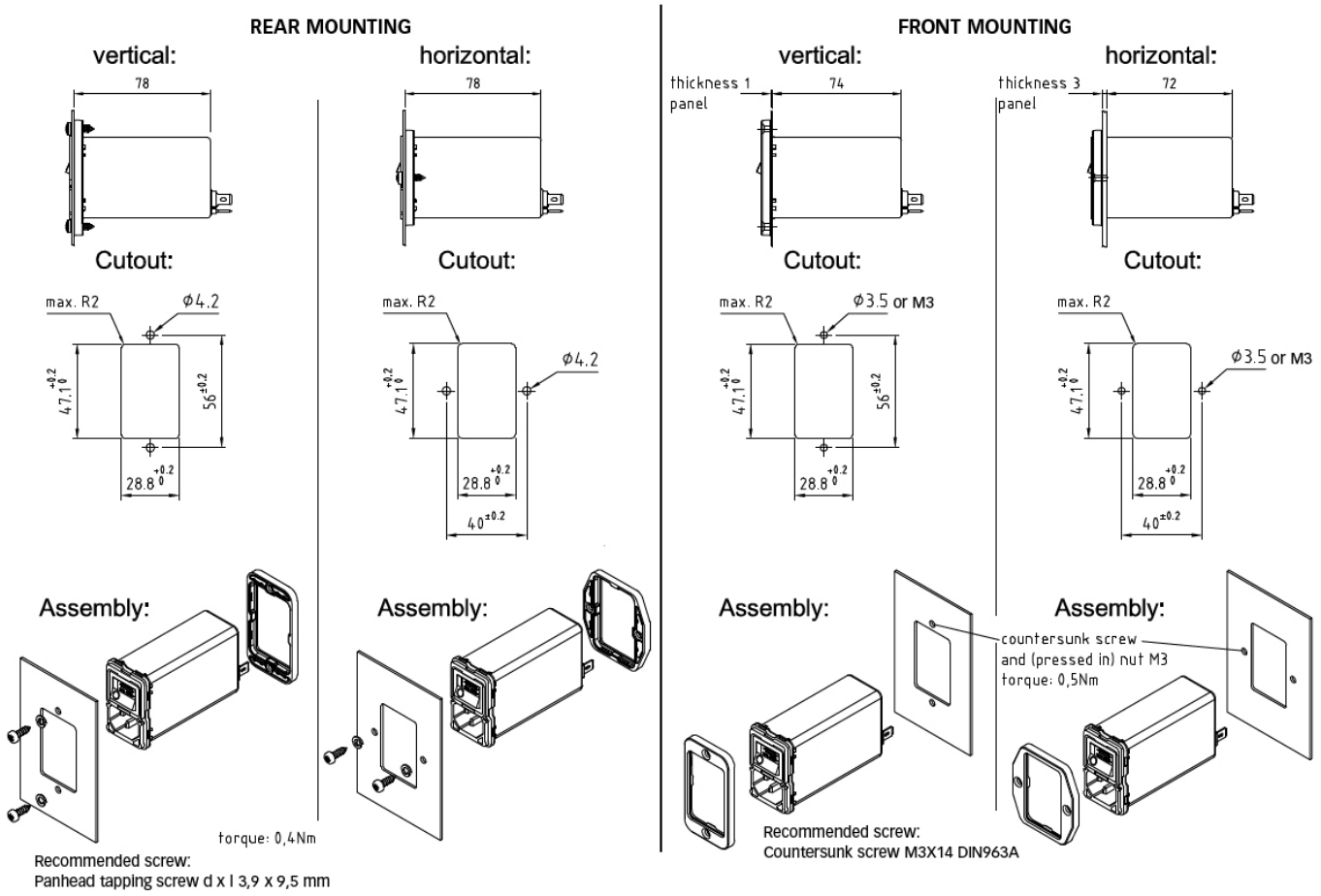

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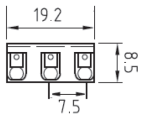

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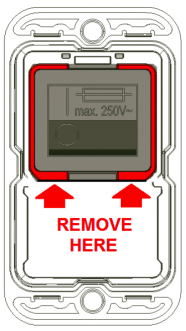

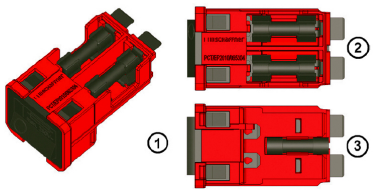

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accidental disconnection of all electrical appliances
with an IEC inlet. No exchange or modification of the
IEC inlet or IEC inlet filter system is needed. Easy
retrofit for all electronic equipments and devices.

IEC C13 Rewireable Connector for individual Power Cord with Locking System

Link to Datasheet: Datasheet IEC C13 rewireable

The locking system has a tensile force of typical 300N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters" Schaffner power connector with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

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Power Cord with Locking System for Inlet Filters IL 13, IL 13 P, IL 19

- Locking system for standardized IEC C14/C20 inlet filter
- No accidental disconnection
- Rated current up to 10 A (C13 plug), up to 15 A (C13P plug), and up to 20 A (C19 plug)
- Fits any Schaffner IEC C14/C20 inlet filter
- Retrofit for any IEC C14/C20 inlet
- Various power line plugs for international usage

Technical specifications IL 13/IL 13 P

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Rated currents	10 A for C13 plug, 15 A for C13P plug
High potential test voltage	P–> PE 2000 VAC (1 min 50 Hz) P –> N 2000 VAC (1 min 50 Hz)
Protection category	IP 20 according IEC 60529
Temperature range (operation and storage)	-25°C to +70°C
Connector (load side)	IEC C13 according to IEC/EN 60320-2-2 with IEC Lock UL 498, CSA C22.2 no. 42 (for cold conditions) pin temp. 70°C, up to 15 A, Protection Class I
Connector (line side) and cables	Please refer to table on page 2 and 3
Flammability corresponding to	Plugs: UL 94 V-2 or better; Cable: IEC 60332-1 Cat. F2

Technical specifications IL 19

Maximum continuous operating voltage	250 VAC, 50/60 Hz
Rated currents	16 A (IEC), 20 A (UL)
Operating frequency	50 to 400 Hz
High potential test voltage	P–> PE 2000 VAC (1 min 50 Hz) P –> N 2000 VAC (1 min 50 Hz)
Protection category	IP 20 according IEC 60529
Temperature range (operation and storage)	-25°C to +70°C
Connector (load side)	IEC C19 according to IEC/EN 60320-2-2 with IEC lock, UL 498, CSA C22.2 no. 42 (for cold conditions) pin temp. 70°C, up to 20 A, Protection Class I
Connector (line side) and cables	please refer to table on page 4
Flammability corresponding to	Plugs: UL 94 V-2 or better; Cable: IEC 60332-1 Cat. F2

Approvals

KEMA KEUR · VDE · CSA · RoHS

The locking system has a tensile force of typical 200N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters"

Schaffner power cords with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

Features and benefits

- Power cord with locking system for IEC inlets
- Protection class I (IL 13, IL 13 P)
- Suitable for use with any C14 IEC inlet (IL 13, IL 13 P) and C20 IEC inlet (IL 19)
- Fits the complete Schaffner IEC inlet filter program with C14 IEC inlet and C20 IEC inlet (IL 19)
- Max. pin temperature 70°C

Typical applications

- Data centers
- Industrial equipment
- Medical devices
- In-vitro diagnostic devices
- Broadcasting stations
- Mobile applications

Cable selection table IL 13

IL 13-C14-H05-3100-X*	IEC cable assembly with locking system for IEC C14 inlet, EU version
IL 13-C14-SVT-3100-X*	IEC cable assembly with locking system for IEC C14 inlet, US version
IL 13-CH1-H05-3100-X*	IEC cable assembly with locking system for IEC C14 inlet, CH version
IL 13-EU1-H05-3100-X*	IEC cable assembly with locking system for IEC C14 inlet, EU version
IL 13-JP1-HVCTF-3125-X*	IEC cable assembly with locking system for IEC C14 inlet, JP version
IL 13-SE-H05-3100-X*	IEC cable assembly with locking system for IEC C14 inlet, stripped ends
IL 13-UK1-H05-3100-X*	IEC cable assembly with locking system for IEC C14 inlet, UK version
IL 13-US1-SVT-3100-X*	IEC cable assembly with locking system for IEC C14 inlet, US version
IL 13-US2-SJT-3100-X*	IEC cable assembly with locking system for IEC C14 inlet, US version, hospital grade

To compile a complete part number, please replace the X* with the required length (please refer to table below for available length per cable type):
- X* options = 200, 300, 400, 500 or 1000 cm; 183, 275 or 366 cm (6, 9 or 12 feet)

Available combinations IL 13

To compile a complete part number exchange the letters (IL13-yyy-zzz-aaaa-bbb-c) with the data from the table below.

Load side IL13		**Line side plug**		**Cable type**		**Cable core**		**Rating**	**Cable length***		**Cable color**		**Cert.**
IL13		**yyy**		**zzz**		**aaaa**			**bbb**		**c**		
IL13	IEC C13 Female plug, straight, lock	IEC C14, male, straight Australian plug 3 pins SEV1011, straight CEE 7/VII, right angled or straight Italian Plug Israel Plug Korean Plug South African Plug Stripped Ends BS1363, right angled fused 5A BS1363, right angled fused 10A	C14 AU1 CH1 EU1 IT1 IL1 KC1 SA1 SE UK1 UK2	H05VV-F	H05	3x1.00mm²	3100	250VAC 10A	6 feet 200 cm 9 feet 300 cm 12 feet 400 cm 500 cm 1000 cm	183 200 275 300 366 400 500 1000	Black Blue Orange Red White	- B O R W	CB KC KEMA SAA
IL13	IEC C13 Female plug, straight, lock	IEC C14, male, straight Japanese plug JIS C8303 Stripped Ends	C14 JP1 SE	HVCTF	HVCTF	3x1.25mm² 3x2.00mm²	3125 3200	125VAC 12A 15A	100 cm 200 cm 300 cm 400 cm 500 cm	100 200 300 400 500	Black Blue Orange Red White	- B O R W	PSE
IL13	IEC C13 Female plug, straight, lock	IEC C14, male, straight Stripped Ends NEMA5-15, straight NEMA5-15, straight, hospital grade	C14 SE US1 US2	SJT SVT	SJT SVT	AWG 18 AWG 16 AWG 14	3100 3130 3160	125VAC 10A 13A 15A	6 feet 200 cm 9 feet 300 cm 12 feet 400 cm 500 cm 1000 cm	183 200 275 300 366 400 500 1000	Black Blue Orange Red White	- B O R W	UL cUL
IL13	IEC C13 Female plug, straight, lock	IEC C14, male, straight Chinese plug Stripped Ends	C14 CN1 SE	RVV	RVV	3x1.00mm²	3100	250VAC 10A	200 cm	200	Black Blue Orange Red White	- B O R W	CCC
IL13	IEC C13 Female plug, straight, lock	IEC C14, male, straigh Indian plug 3 Pin Stripped Ends	C14 IN1 SE	IS 694 1000V	IS694	3x1.00mm²	3100	250VAC 10A	200 cm	200	Black Blue Orange Red White	- B O R W	CB

*feet values are calculated to the matching length in cm

Cable selection table IL 13 P

IL 13 P-C14-H05-3100-X*	IEC cable assembly with locking system + for IEC C14 inlet, EU version
IL 13 P-CH1-H05-3100-X*	IEC cable assembly with locking system + for IEC C14 inlet, CH version
IL 13 P-EU1-H05-3100-X*	IEC cable assembly with locking system + for IEC C14 inlet, EU version
IL 13 P-JP1-HVCTF-3125-X*	IEC cable assembly with locking system + for IEC C14 inlet, JP version
IL 13 P-SE-H05-3100-X*	IEC cable assembly with locking system + for IEC C14 inlet, stripped ends
IL 13 P-UK1-H05-3100-X*	IEC cable assembly with locking system + for IEC C14 inlet, UK version
IL 13 P-US1-SJT-3160-X*	IEC cable assembly with locking system + for IEC C14 inlet, US version

To compile a complete part number, please replace the X* with the required length (please refer to table below for available length per cable type):
- X* options = 200, 300, 400, 500 or 1000 cm; 183, 275 or 366 cm (6, 9 or 12 feet)

Available combinations IL 13 P

To compile a complete part number exchange the letters (IL13P-yyy-zzz-aaaa-bbb-c) with the data from the table below.

Load side IL13P **IL13P**		**Line side plug** **yyy**		**Cable type** **zzz**		**Cable core** **aaaa**		**Rating**	**Cable length*** **bbb**		**Cable color** **c**		**Cert.**
IL13P	IEC C13 + Female plug, straight, lock	IEC C14, male, straight Australian plug 3 pins SEV1011, straight CEE 7/VII, right angled or straight Italian Plug Israel Plug Korean Plug South African Plug Stripped Ends BS1363, right angled fused 5A BS1363, right angled fused 10A	C14 AU1 CH1 EU1 IT1 IL1 KC1 SA1 SE UK1 UK2	H05VV-F	H05	3x1.00mm²	3100	250VAC 10A	6 feet 200 cm 9 feet 300 cm 12 feet 400 cm 500 cm 1000 cm	183 200 275 300 366 400 500 1000	Black Blue Orange Red White	- B O R W	CB KC KEMA SAA
IL13P	IEC C13 + Female plug, straight, lock	IEC C14, male, straight Japanese plug JIS C8303 Stripped Ends	C14 JP1 SE	HVCTF	HVCTF	3x1.25mm² 3x2.00mm²	3125 3200	125VAC 12A 15A	100 cm 200 cm 300 cm 400 cm 500 cm	100 200 300 400 500	Black Blue Orange Red White	- B O R W	PSE
IL13P	IEC C13 + Female plug, straight, lock	IEC C14, male, straight Stripped Ends NEMA5-15, straight NEMA5-15, straight, hospital grade	C14 SE US1 US2	SJT SVT	SJT SVT	AWG 18 AWG 16 AWG 14	3100 3130 3160	125VAC 10A 13A 15A	6 feet 200 cm 9 feet 300 cm 12 feet 400 cm 500 cm 1000 cm	183 200 275 300 366 400 500 1000	Black Blue Orange Red White	- B O R W	UL cUL
IL13P	IEC C13 + Female plug, straight, lock	IEC C14, male, straight Chinese plug Stripped Ends	C14 CN1 SE	RVV	RVV	3x1.00mm²	3100	250VAC 10A	200 cm	200	Black Blue Orange Red White	- B O R W	CCC
IL13P	IEC C13 + Female plug, straight, lock	IEC C14, male, straigh Indian plug 3 Pin Stripped Ends	C14 IN1 SE	IS 694 1000V	IS694	3x1.00mm²	3100	250VAC 10A	200 cm	200	Black Blue Orange Red White	- B O R W	CB

*feet values are calculated to the matching length in cm

Cable selection table IL 19

IL 19-C20-H05-3150-X*	IEC cable assembly with locking system for IEC C20 inlet, EU version
IL 19-C20-SJT-3160-X*	IEC cable assembly with locking system for IEC C20 inlet, US version
IL 19-EU1-H05-3150-X*	IEC cable assembly with locking system for IEC C20 inlet, EU version
IL 19-SE-H05-3150-X*	IEC cable assembly with locking system for IEC C20 inlet, stripped ends
IL 19-UK1-H05-3150-X*	IEC cable assembly with locking system for IEC C20 inlet, UK version
IL 19-US1-SJT-3160-X*	IEC cable assembly with locking system for IEC C20 inlet, US version

To compile a complete part number, please replace the X* with the required length (please refer to table below for available length per cable type):
- X* options = 200, 300, 400, 500 or 1000 cm; 183, 275 or 366 cm (6, 9 or 12 feet)

Available combinations IL 19

To compile a complete part number exchange the letters (IL19-yyy-zzz-aaaa-bbb-c) with the data from the table below.

Load side IL19		**Line side plug**		**Cable type**		**Cable core**		**Rating**	**Cable length***		**Cable color**		**Cert.**
IL19		**yyy**		**zzz**		**aaaa**			**bbb**		**c**		
IL19	IEC C19 Female plug, straight, lock	IEC C20, male, straight Australian plug 3 pins SEV1011, straight CEE 7/VII, right angled or straight Italian Plug South Africa plug Stripped Ends BS1363, right angled fused 10A BS1363, right angled fused 13A	C20 AU1 CH1 EU1 IT1 SA1 SE UK2 UK3	H05VV-F	H05	3x1.50mm²	3150	250VAC 16A	6 feet 200 cm 9 feet 300 cm 12 feet 400 cm 500 cm 1000 cm	183 200 275 300 366 400 500 1000	Black Blue Orange Red White	- B O R W	CB KEMA SAA
IL19	IEC C19 Female plug, straight, lock	IEC C20, male, straight Japanese plug JIS C8303 Stripped Ends	C20 JP1 SE	HVCTF	HVCTF	3x2.00mm²	3200	250VAC 20A	100 cm 200 cm 300 cm 400 cm 500 cm	100 200 300 400 500	Black Blue Orange Red White	- B O R W	PSE
IL19	IEC C19 Female plug, straight, lock	IEC C20, male, straight Stripped Ends NEMA5-15, straight Nema 5-20P	C20 SE US1 US4	SJT SVT	SJT SVT	AWG14 AWG12	3160 3205	125V 15A 20A	6 feet 200 cm 9 feet 300 cm 12 feet 400 cm 500 cm 1000 cm	183 200 275 300 366 400 500 1000	Black Blue Orange Red White	- B O R W	UL cUL
IL19	IEC C19 Female plug, straight, lock	Chinese plug	CN1	RVVF	RVVF	3x1.50mm²	3150	250V 16A	200 cm	200	black	-	CCC

*feet values are calculated to the matching length in cm

Mechanical data

IEC Lock C13

IEC Lock C13P

C14

IEC Lock C19

C20

Please visit www.schaffner.com to find more details on filter connectors.

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IL 13P IEC C13 Rewireable Angled Connectors with Locking System

Approvals

Ordercodes:
Up/down rewireable locking connector: 820893
left/right rewireable locking connector: 820982

Right (& Left)/ Down (& Up) Angled Rewirable IEC Lock+ Low Smoke Zero Halogen Appliance Outlet (Black)

Technical specifications

Rating	10A Max / 250V~ (Europe & Australia) 15A Max / 250V~ (USA) 125V~ / 250V~ (Japan)
Materials	Outer Body: Nylon (PA66) LSZH (RAL 9004 Signal Black) Housing Lid: Nylon (PA66) LSZH (RAL 9004 Signal Black) Chassis & Chassis Lid: Nylon (PA66) LSZH (RAL 9004 Signal Black) Cable Restraint: Nylon (PA66) Housing Screws & Cable Restraint Screws: Steel, Nickel Plated Lock Pivot Lever: Polycarbonate Terminal Block & Sliding Terminal: Brass Terminal Screws: Steel, Yellow Passivated Spring: Spring Steel Locking Blade: Spring Steel Zinc Plated Red Handle: Polycarbonate LSZH (RAL 3020 Traffic Light Red)
Terminal capacity	3 Core 1.5mm² Maximum, 2.5mmø Terminal Diameter
Torque value	Terminal Screws; 0.4Nm, Strain Relief Clamping Screws; 0.3 Nm
Dielectric strength	1.5 kV Max
Withdrawal force	>100N
Ambient operating temperature	25°C
Flammability rating	Equivalent to UL94V-0
Protection class	Suitable for appliances with protection Class I according to IEC EN 61140

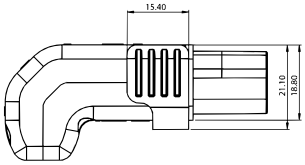
Description

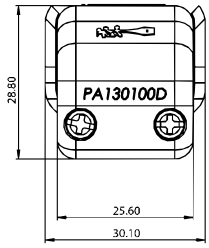
- Protects appliances that are vulnerable to vibration
- Connector cannot be accidentally pulled or vibrated out of the inlets
- Different angles for ease of access

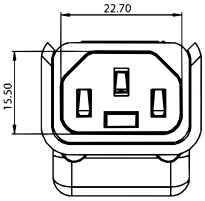
Features and benefits

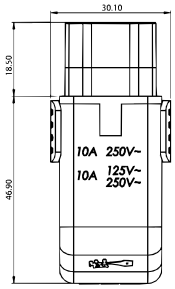
- Rewirable
- Housing can be 'flipped' to become a Left Angled Connector or Up Angled Connector
- Fits any standard C14 outlet
- Anti-Vibrate
- Integral plug retention feature
- Easy pull handle
- Slotted and Cross head housing screws
- Appliance inlet suitable for cold conditions

Down (& Up) Angled Rewirable IEC Lock+ Appliance Outlet (Black)

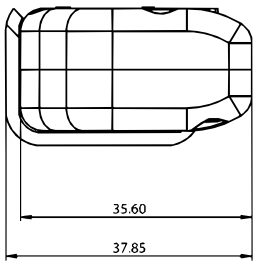


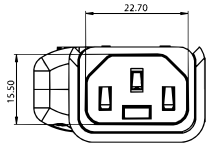


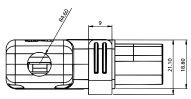


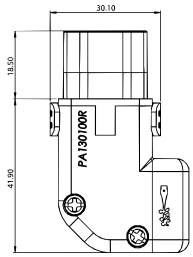


Right (& Left) Angled Rewirable IEC Lock+ Appliance Outlet









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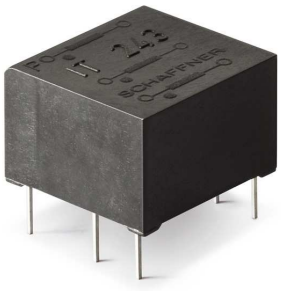
Pulse Transformer with Single Secondary Winding



- Galvanic separation of drive and power circuit
- Voltage resistance up to 8 kV
- Ignition current up to 3 A
- Turns ratio up to 3:1

Approvals

RoHS

IT pulse transformers are designed to offer you galvanic isolation for transformer coupled gate drives. The IT series provides negligible delays and the possibility of voltage scaling. They are available with single or double secondary winding for multiple gate drives. Choosing the IT product line brings you the rapid availability of a standard gate drive transformer. A wide selection on turns ratio, ignition current and voltages are designed to offer you the desired standard product.

Technical specifications

Nominal operating voltage	Up to 3000 V
Operating frequency	40 kHz max. 500 kHz max. for data transmission DC to 40000 Hz
Ignition currents	0.1 to 3 A @ 40°C
Rise time	0.3 to 2.3 µs
Test voltage	Up/50 Hz/2 s max. according to VDE 110b
Max. partial discharge voltage	1.5 x U^{nom}
Temperature range (operation and storage)	-25°C to +70°C (25/70/21)
Flammability corresponding to	UL 94 V-0 listed materials

Features and benefits

- Galvanic separation
- Voltage resistance up to 8 kV
- Allows high potential difference voltage scaling
- Optional grounded shields
- Vacuum potting
- Very low partial discharge effects
- PCB through hole mounting or faston types
- Custom-specific versions on request

Typical applications

- Gate drive circuit
- Power supplies
- Power converters
- Frequency converters
- Switching applications
- DC/DC converters
- Line coupling transformers in high-speed data transmission

Pulse transformer selection table

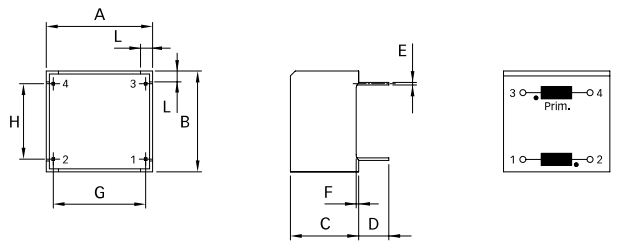
Pulse transformer	Turns ratio	Ignition current	Voltage		Voltage time area	Rise time	Inductance*		Resistance		Coupling capacitance	Input/ Output connections		Weight
		Iign	Unom	Up	V0t	tr	Lp	Lstr	Rp	Rs	Ck			
		[A]	[V]	[kV]	[Vµs]	[µs]	[mH]	[µH]	[Ω]	[Ω]	[pF]			[g]
IT 155	1:1	0.1	500	4	480	1	5	85	1.2	1.2	6	02		13
IT 245	1:1	0.1	750	4	500	1.2	8	100	1.48	1.48	10	02		6
IT 237	1:1	0.25	500	2.5	1100	1	25	35	1.9	2.2	50	02		14
IT 239	1:1	0.25	1000	6	300	2.3	3	80	0.9	0.9	5	02		13
IT 255	1:1	0.25	750	4	250	1.1	2.2	40	0.8	0.8	8	02		6
IT 258	1:1	1	750	3.2	250	0.25	2.5	3	0.62	0.75	80	02		6
IT 370	1:1	1	1000	5	4000	0.6	0.3	6	0.16	0.18	40	02		71
IT 364**	1:1	3	3000	8	5000	1.7	1.5	10	0.16	0.14	35		05	220
IT 246	2:1	0.1	750	4	200	0.4	7	35	2.1	1.1	7	02		6
IT 248	2:1	0.25	750	3.2	350	2.2	17	80	3.2	1.6	9	02		6
IT 260	3:1	0.1	500	3.2	200	0.3	12	30	2	0.8	8	02		6

* Tolerance: +50%; -30%
** Not suitable for PCB-mounting.

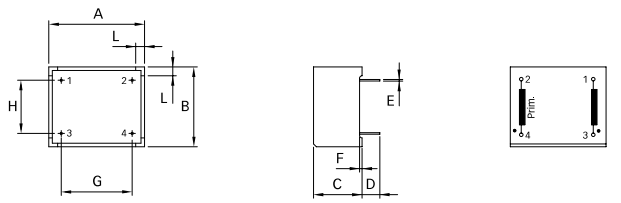
Explanations:
– tr rise time at given load resistor R and 70% of the output pulse height.
– Lp primary inductance measured at 1 kHz (secondary coile open).
– Lstr stray inductance measured at the secondary side, short circuit at the primary side. If there are several secondary coils only one at the time is connected (measuring frequency 10 kHz).
– The ignition current is a set peak value where the voltage drop over the coil resistance is still insignificant (mostly below 1 V).

Mechanical data

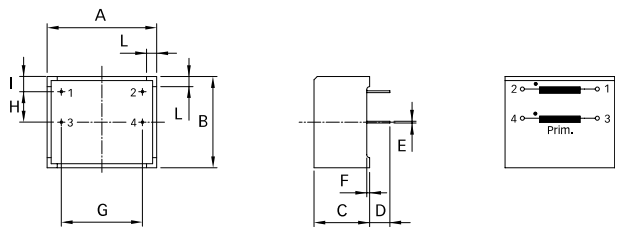
IT 245, IT 246, IT 248, IT 255, IT 258, IT 260



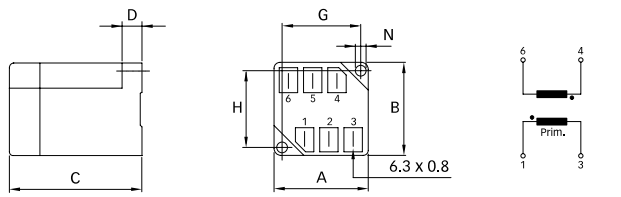
IT 239



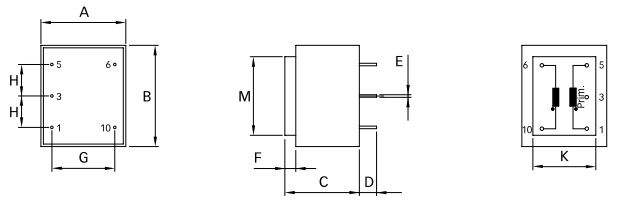
IT 155, IT 237



IT 364



IT 370



Dimensions

	IT 245	IT 246	IT 248	IT 255	IT 258	IT 260	IT 239	IT 155	IT 237	IT 364	IT 370	Tol.
A	17.6*	17.6*	17.6*	17.6*	17.6*	17.6*	27	27	27	50	27	±0.2
B	16.7*	16.7*	16.7*	16.7*	16.7*	16.7*	22.5	22.5	22.5	50	32.2	±0.2
C	11.3*	11.3*	11.3*	11.3*	11.3*	11.3*	13.7	13.7	13.7	60	23.7	±0.2
D	5	5	5	5	5	5	5	5	5	10*	5.5	+1/-0
E	0.42	0.42	0.42	0.42	0.42	0.42	0.45	0.45	0.45		Ø0.8	
F	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.7	0.7		3.5	
G	15.3	15.3	15.3	15.3	15.3	15.3	20	20	20	42	20	±0.2
H	12.5	12.5	12.5	12.5	12.5	12.5	15	7.5	7.5	42	10	±0.2
I								3.5	3.5			±0.2
L	2	2	2	2	2	2	2.5	2.5	2.5			
M											25	±0.2
N										Ø4.2		

* Tolerance is ±0.1

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on connectors.

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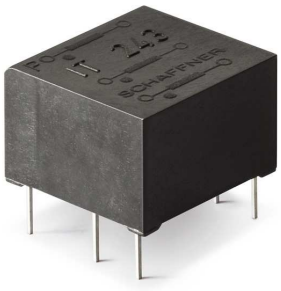
Pulse Transformer with Double Secondary Winding



- Galvanic separation of drive and power circuit
- Voltage resistance up to 4 kV
- Ignition current up to 1 A
- Turns ratio up to 3:1:1

Approvals

RoHS

Technical specifications

Nominal operating voltage	Up to 500 V
Operating frequency	40 kHz max. 500 kHz max. for data transmission DC to 40000 Hz
Ignition currents	0.025 to 1 A @ 40°C
Rise time	0.4 to 4 µs
Test voltage	Up/50 Hz/2 s max. according to VDE 110b
Max. partial discharge voltage	1.5 x U^{nom}
Temperature range (operation and storage)	-25°C to +70°C (25/70/21)
Flammability corresponding to	UL 94 V-0 listed materials

Features and benefits

- Galvanic separation with secondary winding
- Voltage resistance up to 4 kV
- Allows high potential difference voltage scaling
- Vacuum potting
- Very low partial discharge effects
- PCB through hole mounting
- Custom-specific versions on request

Typical applications

- Gate drive circuit
- Power supplies
- Power converters
- Frequency converters
- Switching applications
- DC/DC converters
- Line coupling transformers in high-speed data transmission

Pulse transformer selection table

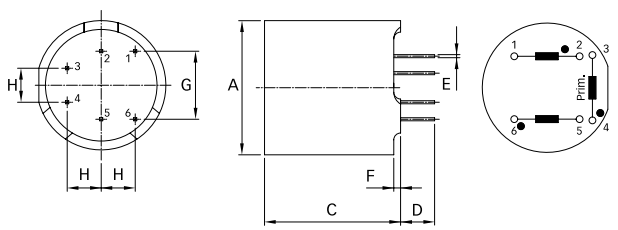
Pulse transformer	Turns ratio	Ignition current I_{ign} [A]	Voltage U_{nom} [V]	Voltage U_p [kV]	Voltage time area V_{0t} [Vµs]	Rise time t_r [µs]	Inductance * L_p [mH]	Inductance * L_{str} [µH]	Resistance R_p [Ω]	Resistance R_s [Ω]	Coupling capacitance C_k [pF]	Input/Output connections	Weight [g]
IT 143	1:1:1	0.025	500	4	800	0.6	15	200	3	3	10	02	14
IT 242	1:1:1	0.1	500	3.2	250	0.9	2.5	75	0.75	0.75	7	02	6
IT 243	1:1:1	0.1	500	3.2	250	1	2.5	85	0.8	0.8	7	02	6
IT 213	1:1:1	0.25	380	2.5	450	0.4	6.5	20	1.4	1.4	40	02	9
IT 233	1:1:1	0.25	500	4	300	1.3	3	45	0.8	0.8	7	02	13
IT 253	1:1:1	0.25	500	3.2	160	1.3	1.1	45	0.55	0.55	6	02	6
IT 312	1:1:1	0.25	380	2.5	1200	1	21	35	2.4	2.7	30	02	24
IT 313	1:1:1	1	380	2.5	450	0.6	3	6	0.33	0.4	27	02	24
IT 249	2:1:1	0.25	500	3.2	330	4	17	140	3.1	1.5	9	02	6
IT 244	3:1:1	0.1	500	3.2	200	0.7	15	70	2.8	0.9	9	02	6
IT 234	3:1:1	0.25	500	4	280	1	17	40	2	0.7	9	02	13
IT 314	3:1:1	1	380	2.5	500	1	35	20	1.6	0.7	30	02	25

* Tolerance: +50%; -30%

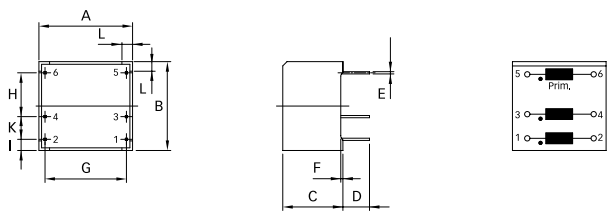
Explanations:
– t_r rise time at given load resistor R and 70% of the output pulse height.
– L_p primary inductance measured at 1 kHz (secondary coile open).
– L_{str} stray inductance measured at the secondary side, short circuit at the primary side. If there are several secondary coils only one at the time is connected (measuring frequency 10 kHz).
– The ignition current is a set peak value where the voltage drop over the coil resistance is still insignificant (mostly below 1 V).

Mechanical data

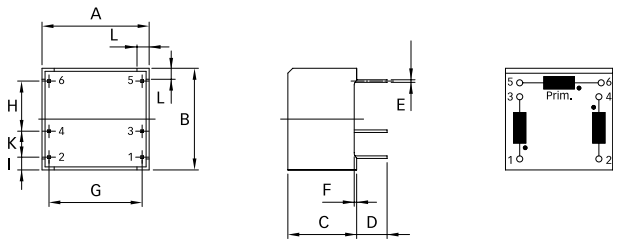
IT 213



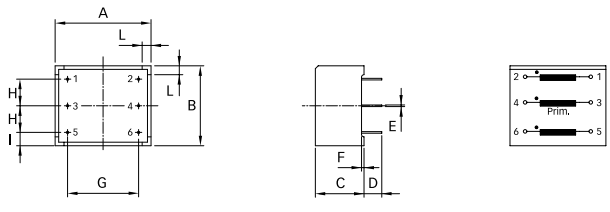
IT 243, IT 244, IT 249, IT 253



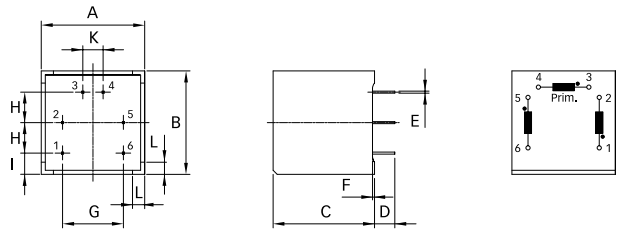
IT 242



IT 143, IT 154, IT 233, IT 234



IT 312, IT 313, IT 314



Dimensions

	IT 213	IT 243	IT 244	IT 249	IT 253	IT 242	IT 143	IT 154	IT 233	IT 234	IT 312	IT 313	IT 314	Tol.
A	Ø19	17.6	17.6	17.6	17.6	17.6	27*	27*	27*	27*	25.5*	25.5*	25.5*	±0.1
B		16.7	16.7	16.7	16.7	16.7	22.5*	22.5*	22.5*	22.5*	25.5*	25.5*	25.5*	±0.1
C	20	11.3	11.3	11.3	11.3	11.3	13.7	13.7	13.7	13.7	25*	25*	25*	±0.1
D	5	5	5	5	5	5	5	5	5	5	5	5	5	+1/-0
E	0.45	0.42	0.42	0.42	0.42	0.42	0.45	0.45	0.45	0.45	0.5	0.5	0.5	
F	1	0.4	0.4	0.4	0.4	0.4	0.7	0.7	0.7	0.7	0.5	0.5	0.5	
G	10	15.3	15.3	15.3	15.3	15.3	20	20	20	20	15	15	15	
H	5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	±0.2
I		2.1	2.1	2.1	2.1	2.1	3.75	3.75	3.75	3.75	5.25	5.25	5.25	±0.2
K		5	5	5	5	5					5	5	5	±0.2
L		2	2	2	2	2	2.5	2.5	2.5	2.5	3	3	3	

* Tolerance is ±0.2

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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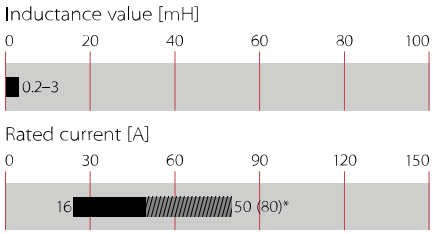
Current-compensated Chokes

- Rated currents from 16 to 50 A
- Up to 600 VAC or 1000 VDC
- 2- and 3-wire configurations
- Horizontal and vertical PCB mounting types
- Ruggedized saturation and thermal behavior
- Open construction for forced and convection cooling
- Straightforward pin-out for easy PCB design

Performance indicators



Technical specifications

Maximum continuous operating voltage	600 VAC/1000 VDC
Operating frequency	DC to 400 Hz
Rated currents	16 to 50 A @ 60°C max. convection cooling
High potential test voltage	
winding-to-winding	2500 VAC, 60 sec, guaranteed, 2 sec factory test
Temperature range (operation and storage)	-40°C to +125°C (40/125/21)
Flammability corresponding to	UL 94 V-0
Cooling	convection/forced cooling
MTBF @ 40°C/230 V (Mil-HB-217F)	>5,000,000 hours

Approvals

RoHS

RB common-mode chokes are mainly used to filter EMI noise on AC power lines up to 600 VAC but they are as well applicable in DC power lines of photovoltaic installations or similar applications up to 1000 VDC. EMI noise of electronic equipment can go to the power lines and disturb the proper function of other devices like TV sets or radios. Thus noise generated by the equipment from switched power electronics or by high slew rates of controllers needs to be filtered. RB common-mode chokes are used to suppress EMI noise in PCB integrated filter designs with line bypass capacitors or in combination with single phase filters for extra low leakage filter designs.

Features and benefits

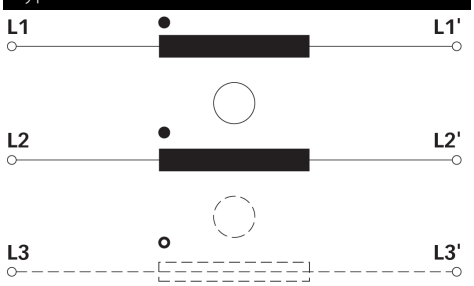
- Cost-effective PCB designs for up to 80 A with forced cooling *
- Compact size and light weight
- Low magnetic leakage flux
- Excellent winding insulation
- Standardized foot print
- Broad range of inductance ratings
- Custom-specific versions on request
- Evaluation Board and PCB footprints available

* See Application Note for forced cooling

Typical applications

- AC and DC filtering for midsize power range drives, photovoltaic inverters, fast chargers, charging stations, UPS and switch mode power supplies
- Filter with low leakage current noise or improved immunity against grid disturbances
- Electronic devices, automation
- Converters

Typical electrical schematic



RB Series

Selection table	convection cooling nominal current @ 60˚C [A]	*forced cooling 3 m/s nominal current @ 60˚C [A]	Inductance Ln @ 25˚C [mH/path]	Inductance Ls @ 25˚C [µH/path]	Resistance R @ 25˚C [mΩ/path]	**Choke [size]	Ø Pin D [mm]	Length Pin L [mm]	Weight [g]	Eval. Board No.
RB 6122-16-1M0	16	25	1.00	6.3	4.8	1	2.0 ±0.1	4.5 +0.5/-0	130	1
RB 6122-25-0M6	25	39	0.64	4.0	2.7	1	2.4 ±0.1	4.5 +0.5/-0	135	1
RB 6122-36-0M5	36	53	0.45	3.6	1.5	2	2.2 ±0.1	4.5 +0.5/-0	180	1
RB 6122-50-0M3	50	80	0.25	1.8	0.9	2	2.5 ±0.1	5.0 +0.5/-0	172	1
RB 6522-16-1M0	16	25	1.00	6.2	4.6	3	2.0 ±0.1	4.5 +0.5/-0	132	2
RB 6522-25-0M6	25	39	0.64	3.9	2.6	3	2.4 ±0.1	4.5 +0.5/-0	126	2
RB 6522-36-0M5	36	53	0.45	3.6	1.5	4	2.2 ±0.1	4.5 +0.5/-0	180	2
RB 6522-50-0M3	50	80	0.25	2.0	0.9	4	2.5 ±0.1	5.0 +0.5/-0	175	2
RB 8522-16-3M0	16	25	3.00	22.2	8.4	4	2.0 ±0.1	4.5 +0.5/-0	172	3
RB 8522-25-2M0	25	39	2.00	13.6	4.2	5	2.65 ±0.1	5.0 +0.5/-0	268	3
RB 8522-36-1M5	36	53	1.50	12.8	3.0	6	2.2 ±0.1	4.5 +0.5/-0	440	3
RB 8522-50-0M8	50	83	0.75	6.5	1.7	6	2.5 ±0.1	5.0 +0.5/-0	430	3
RB 6132-16-0M8	16	26.5	0.80	5.8	4.6	7	2.0 ±0.1	4.5 +0.5/-0	162	4
RB 6132-25-0M5	25	41	0.47	3.3	2.4	7	2.5 ±0.1	5.0 +0.5/-0	175	4
RB 6132-36-0M4	36	60	0.42	2.9	1.4	8	2.2 ±0.1	4.5 +0.5/-0	278	5
RB 6132-50-0M2	50	80	0.18	1.9	0.9	8	2.5 ±0.1	5.0 +0.5/-0	765	5
RB 6532-16-0M8	16	26.5	0.80	6.9	4.7	9	2.0 ±0.1	4.5 +0.5/-0	165	6
RB 6532-25-0M5	25	41	0.47	3.6	2.4	9	2.5 ±0.1	5.0 +0.5/-0	180	6
RB 6532-36-0M4	36	60	0.42	4.2	1.5	10	2.2 ±0.1	4.5 +0.5/-0	280	6
RB 6532-50-0M2	50	81	0.18	1.5	0.8	10	2.5 ±0.1	5.0 +0.5/-0	168	6
RB 8532-16-1M3	16	27	1.30	9.1	5.7	9	2.0 ±0.1	4.5 +0.5/-0	167	7
RB 8532-25-0M9	25	41	0.94	6.7	3.0	11	2.65 ±0.1	5.0 +0.5/-0	282	7
RB 8532-36-0M8	36	58	0.83	7.3	2.3	12	2.2 ±0.1	4.5 +0.5/-0	478	7
RB 8532-50-0M3	50	82	0.33	3.1	1.2	12	2.5 ±0.1	5.0 +0.5/-0	442	7

Test conditions:
Measuring frequency: 1 kHz; 500 µA >0.16 mH <1.6 mH; 50 µA >1.6 mH <160 mH
Inductance tolerance: +50%, –30%
Resistance tolerance: ±15% @ 25°C
Electrical characteristics @ 25°C: ±2°C

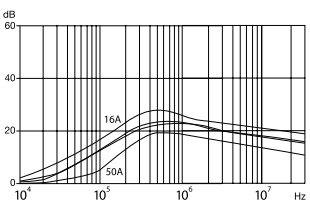
* typical current for forced cooling with 3 m/s. Due to the possible turbulences and degradation of the air stream within an equipment please consider thermal validation.

** Due to manufacturing processes and to cover current ampacity of chokes with high current rating, the number of parallel wires does vary between different sizes.

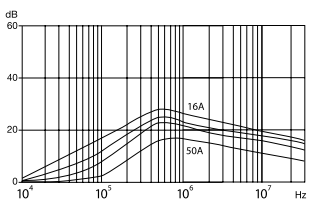
Typical choke attenuation/resonance frequency characteristics

Per CISPR 17; 50 Ω/50 Ω asym

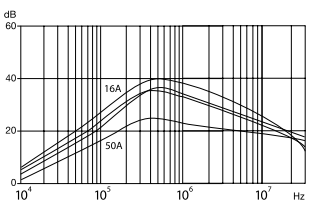
RB 6122, RB 6522



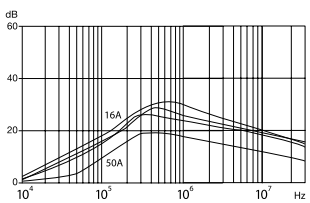
RB 6132, RB 6532



RB 8522



RB 8532



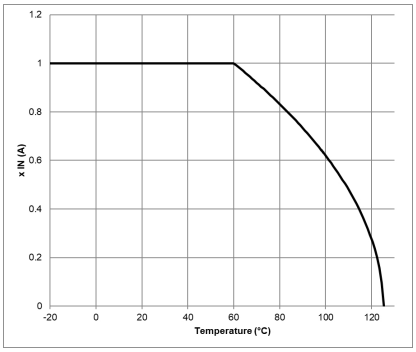
Product selector

RB xxxx-xx-xmx

- Inductance value (e.g. 9M6 = 9.6 mH)
- Nominal input current [A] (convection cooling)
- Terminal type (2 for PCB pin)
- 2 = 2-wire choke
- 3 = 3-wire choke
- 1 = Horizonzal
- 5 = Vertical
- 8 = high inductance series
- 6 = low inductance series
- Schaffner standard ring-core choke series RB

Thermal Derating

If higher ambient temperatures than the specified apply, the nominal current needs to be reduced according to the graph below.



Examples:

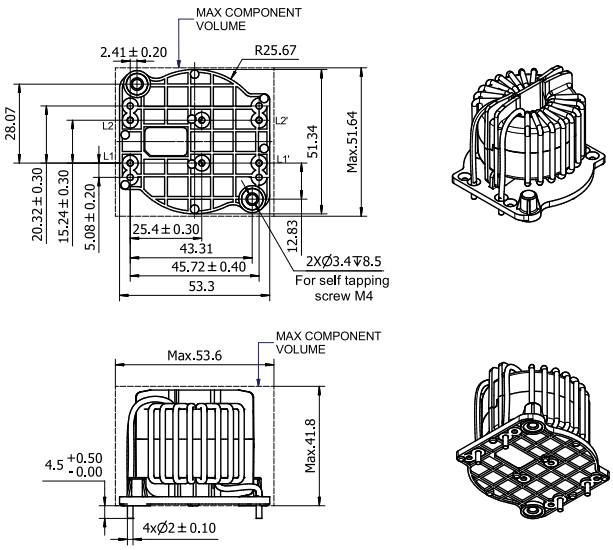
RB 8532-16-1M3: Vertical 3-wire high inductance choke with PCB pins, for 16 A, with 1.3 mH

RB 6122-50-0M3: Horizontal 2-wire low inductance choke with PCB pins, for 50 A, with 0.3 mH

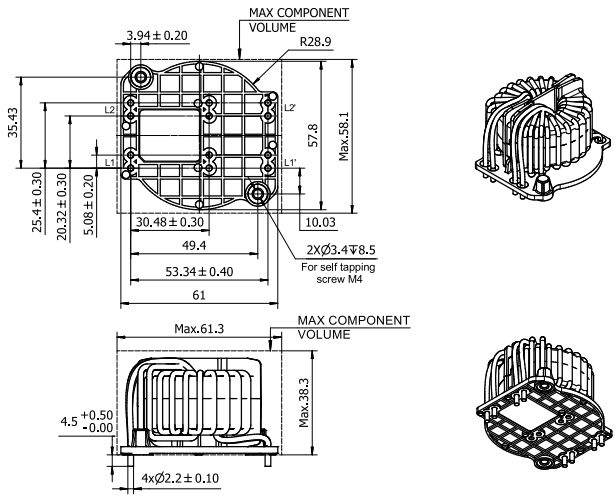
Mechanical data: 1-phase / DC chokes

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m
Windings of chokes are within max. component dimensions. Windings are illustrated simplified.

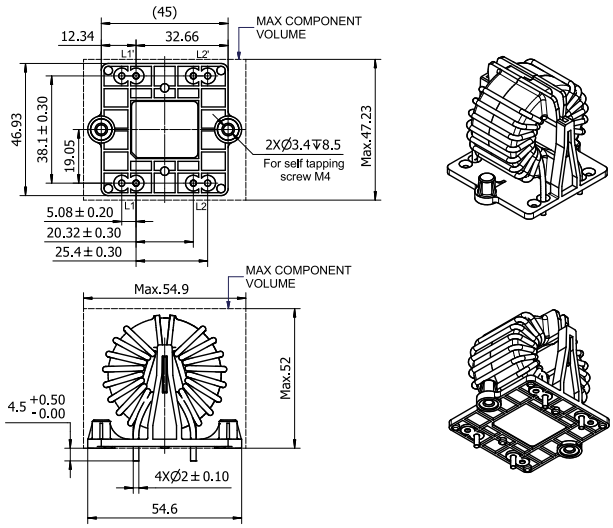
Size 1 (RB 6122)



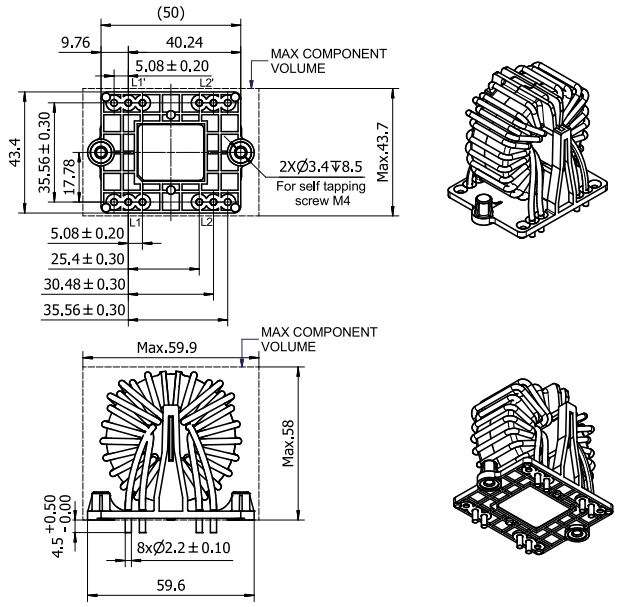
Size 2 (RB 6122)



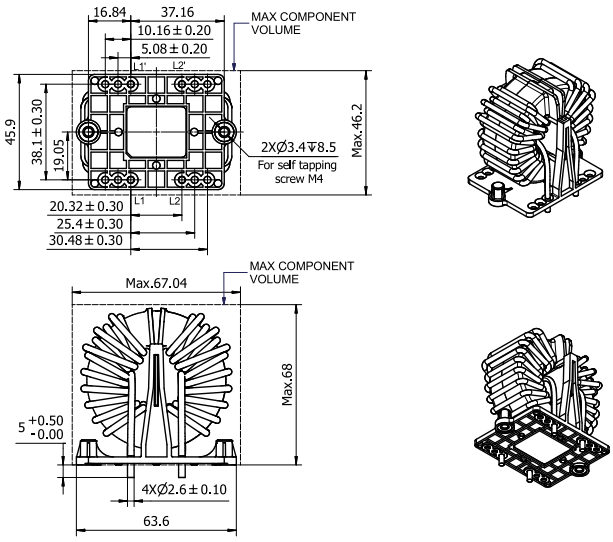
Size 3 (RB 6522)



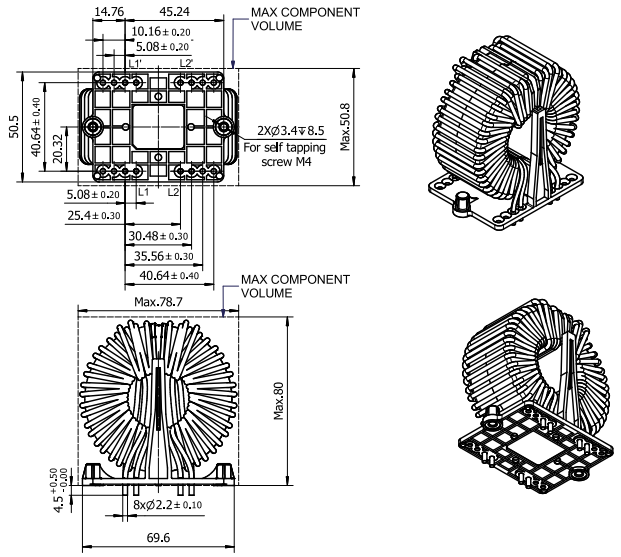
Size 4 (RB 6522/RB 8522)*



Size 5 (RB 8522)



Size 6 (RB 8522)*

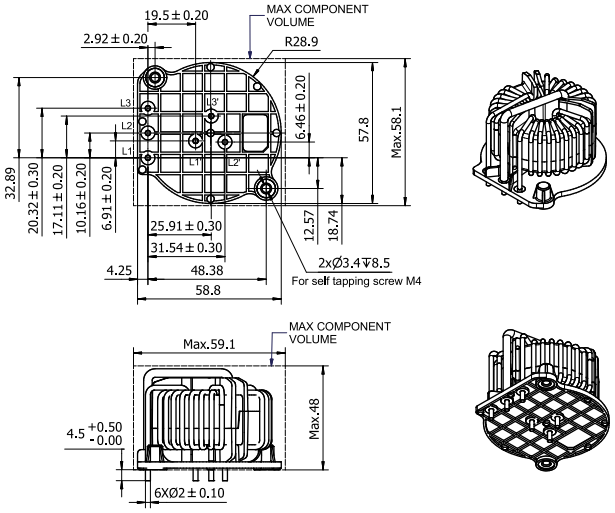


* These choke sizes do have two parallel wires. Due to manufacturing processes and to cover current ampacity of chokes with high current rating, the number of parallel wires does vary between different sizes.

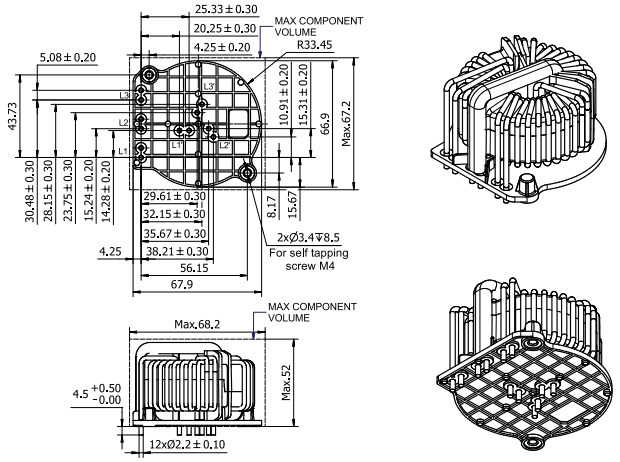
Mechanical data: 3-phase chokes

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m
Windings of chokes are within max. component dimensions. Windings are illustrated simplified.

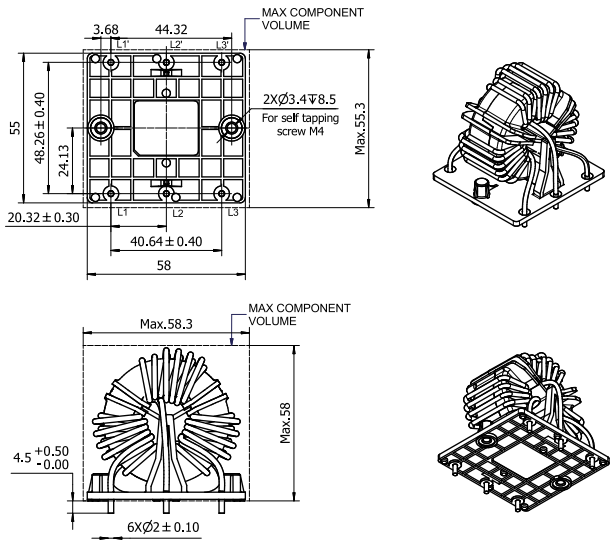
Size 7 (RB 6132)



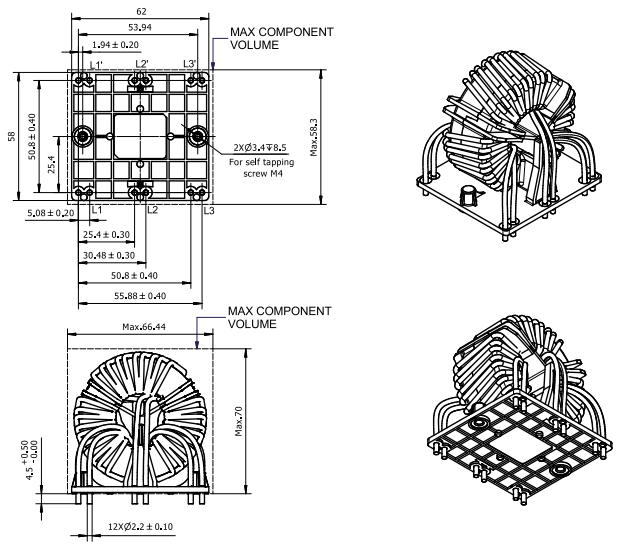
Size 8 (RB 6132)*



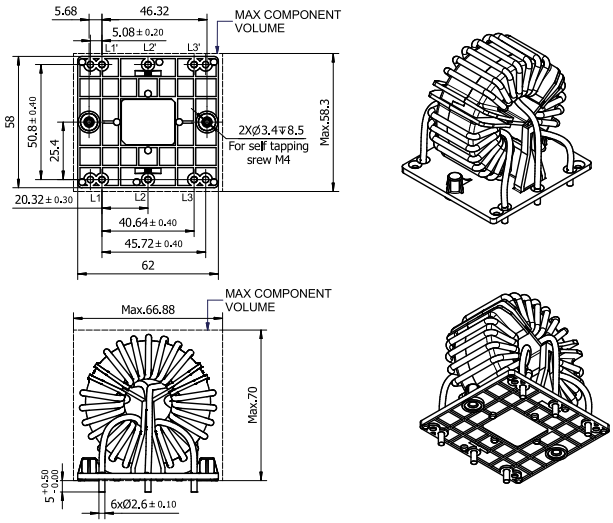
Size 9 (RB 6532/RB 8532)



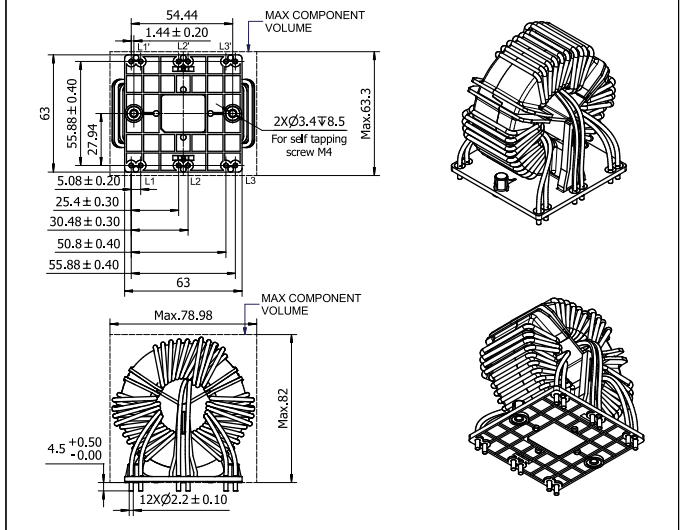
Size 10 (RB 6532)*



Size 11 (RB 8532)



Size 12 (RB 8532)*



* These choke sizes do have two parallel wires. Due to manufacturing processes and to cover current ampacity of chokes with high current rating, the number of parallel wires does vary between different sizes.

Available Supporting Material

Accessories

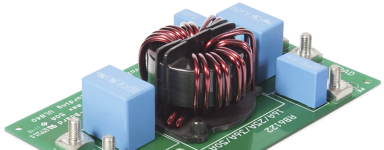
For all RB choke types an evaluationboard is available (not including capacitors and RB chokes)

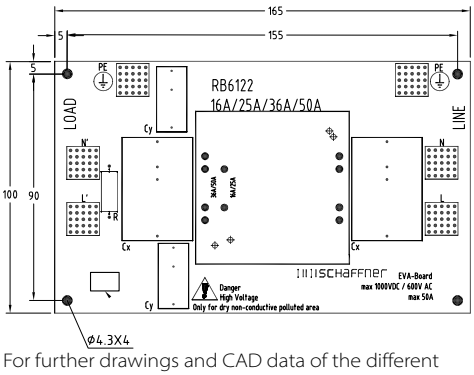
All boards feature voltage ratings according to the chokes usable on the board - up to 600VAC/1000VDC.

The capacitors used need to be selected according to application and safety level.
Recommended are Y1 and X1 capacitors with a voltage rating of at least 600VAC and 1000VDC.

The pitch for Y-capacitors (between phase and PE) is 15 or 22.5 mm. With a max outer dimnesion of 12 x 26 mm (w x l).
The pitch for X-capacitors (between phases) is 22.5, 27.5 or 37.5 mm. With a max outer dimnesion of 28 x 40 mm (w x l).
For discharge reason a resistor can be fitted in parallel to the X-capacitors.

All connections to the boards are done with M6 screw terminals (recommended torque is 2.5 Nm.





For further drawings and CAD data of the different boards please contact your local Schaffner subsidary.

Selection table RB Choke Type	Nom. Current of RB Choke	Eval. Board	Order Name	Order Code
[RB XXXX]	[Range A]	No		
RB 6122	16 - 50	1	EVA-BOARD FOR RB6122 SERIES	813249
RB 6522	16 - 50	2	EVA-BOARD FOR RB6522 SERIES	813252
RB 8522	16 - 50	3	EVA-BOARD FOR RB8522 SERIES	813254
RB 6132	16 - 25	4	EVA-BOARD FOR RB6132-16/25	813250
RB 6132	36 - 50	5	EVA-BOARD FOR RB6132-36/50	813251
RB 6532	16 - 50	6	EVA-BOARD FOR RB6532 SERIES	813253
RB 8532	16 - 50	7	EVA-BOARD FOR RB8532 SERIES	813255

Application Note

EMC/EMI Filter Design with RB Common Mode-Chokes

This application note addresses experienced engineers, who are familiar with the basics of EMC, and intends to provide additional information about RB choke series and Design support for PCB integrated EMC/EMI filters.

Link to PDF

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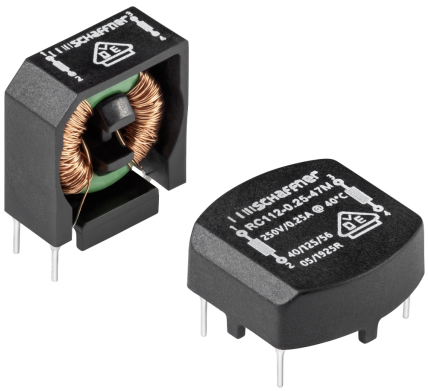
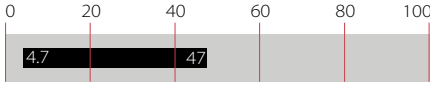
Current-compensated Chokes



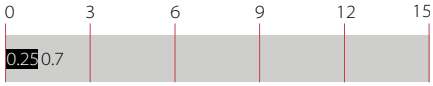
- Rated currents from 0.25 to 0.7 A
- DC to 400 Hz frequency
- 100 kHz to 3 MHz common-mode resonance frequency
- Dual-choke configurations
- Multiple PCB-mounting options

Performance indicators

Inductance value [mH]



Rated current [A]



Technical specifications

Rated operating voltage	250 VAC
Operating frequency	DC to 400 Hz
Rated currents	0.25 to 0.7 A @ rated ambient temperature
Rated inductance	4.7 to 47 mH
Stray inductance	Typically 1% of L_N
Inductance reduction (DC bias with IN)	Less than 10% (25°C)
High potential test voltage winding-to-winding @ 25°C	1500 VAC, 60 sec, guaranteed 1500 VAC, 2 sec, factory test
winding-to-housing @ 25°C	4000 VAC, 60 sec, guaranteed
Surge current @ 10 msec	20 x I_N @ 25°C
Temperature range (operation and storage)	-40°C to 125°C (40/125/56) acc. IEC 60068-1
Flammability corresponding to	UL 94V-0
Design corresponding to	IEC/EN 60938-2
MTBF @ Rated amb. Temp./Voltage (Mil-HB-217F)	> 5,000,000 hours

Approvals

RoHS

Features and benefits

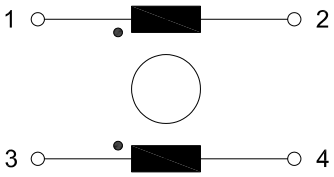
- High saturation resistance and excellent thermal behavior
- Through hole pin connections
- Dual-choke configuration
- Small compact design
- Multiple housing options
- Custom-specific versions are available on request
- Environmental friendly open design

RC chokes are attenuating common-mode or asymmetric (P/N –> E) interference signals, by being connected in series with the phase and neutral lines of an AC powerline input. Symmetrical components of the noise are also attenuated by the leakage inductance (stray inductance) of the windings. These chokes are typically used in conjunction with suppression capacitors.

Typical applications

- Switch-mode power applications
- DC/DC converters
- Suppressing common-mode interference levels
- EMI input filters
- For suppression-equipment with no earth connection, e.g. medical
- Phase-angle control circuits in combination with saturating chokes
- Consumer electronics, EDP, test equipment, electronic ballasts in lamps etc.

Typical electrical schematic



Choke selection table

Choke	Current (I_N) [A]	@ ambient temperature* [°C]	Inductance (L_N) [mH]	Stray Inductance (L_S) [mH]	Resistance (R_{DC}) [mOhm]	Pin 1-2** (Pin 3-4) [mm]	Pin 1-3 [mm]	Height [mm]	Weight (g)
RC 112-0.25-47M	0.25	40	47.0	0.6	2400	10	15	8	3
RC 112-0.3-30M	0.3	40	30.0	0.5	2200	10	15	8	3
RC 112-0.35-22M	0.35	40	22.0	0.4	1900	10	15	8	3
RC 112-0.4-15M	0.4	40	15.0	0.25	1350	10	15	8	3
RC 112-0.5-10M	0.5	40	10.0	0.17	1000	10	15	8	3
RC 112-0.6-6M8	0.6	40	6.8	0.12	630	10	15	8	3
RC 112-0.7-4M7	0.7	40	4.7	0.075	440	10	15	8	3
RC 212-0.25-47M	0.25	40	47.0	0.6	2400	5.08 (2.54)	12.7	17.6	3
RC 212-0.3-30M	0.3	40	30.0	0.5	2200	5.08 (2.54)	12.7	17.6	3
RC 212-0.35-22M	0.35	40	22.0	0.4	1900	5.08 (2.54)	12.7	17.6	3
RC 212-0.4-15M	0.4	40	15.0	0.25	1350	5.08 (2.54)	12.7	17.6	3
RC 212-0.5-10M	0.5	40	10.0	0.17	1000	5.08 (2.54)	12.7	17.6	3
RC 212-0.6-6M8	0.6	40	6.8	0.12	630	5.08 (2.54)	12.7	17.6	3
RC 212-0.7-4M7	0.7	40	4.7	0.075	440	5.08 (2.54)	12.7	17.6	3

Test conditions: Measuring frequency: 10 kHz; 50 mV; Inductance tolerance: +50%, -30%; Resistance tolerance: ±15% @ 25°C; Electrical characteristics @ 25°C: ±2°C

* rated ambient temperature according to approval. For other ambient temperature please make use of derating graph below

** Values in brackets show an optional pin out distance between pin 3 and 4, only availble for vertical version

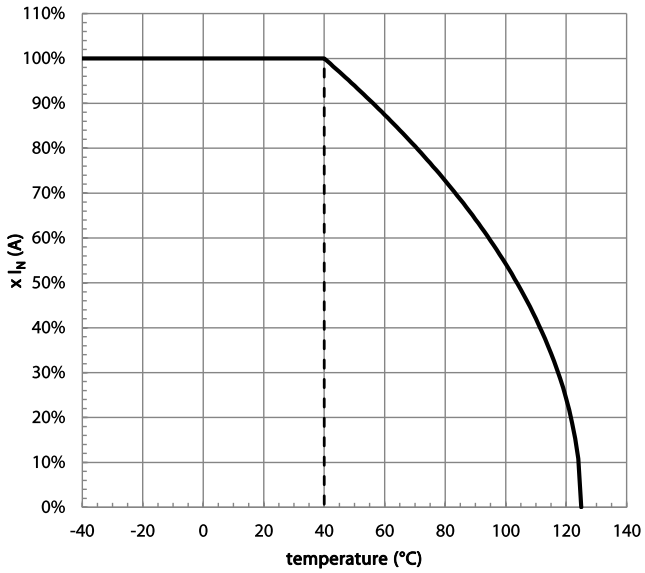
Product selector

RC XYY-II-LML

- Rated Inductivity L_N (mH)
- Rated Current I_N (A)
- Size 12
- Orientation (1 = horizontal; 2 = vertical)
- Familyname

Thermal Derating

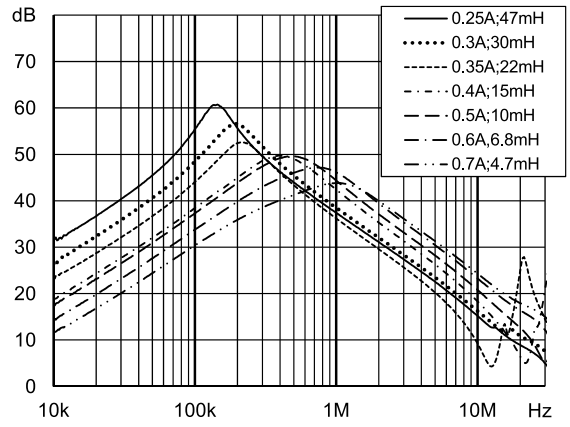
If higher ambient temperatures than the specified apply, the nominal current needs to be reduced according to the graph below.



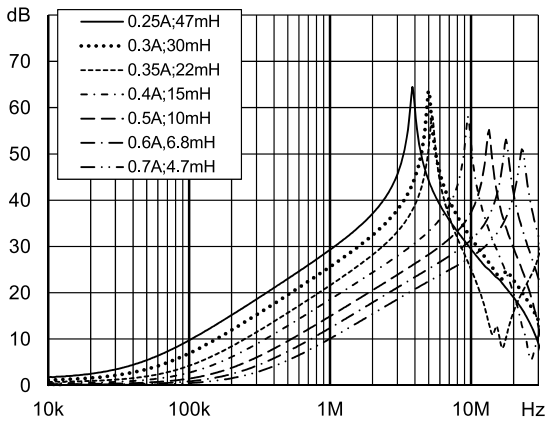
Typical attenuation/resonance frequency characteristics

Per CISPR 17; 50 Ω/50 Ω

RC 112, RC 212 common mode

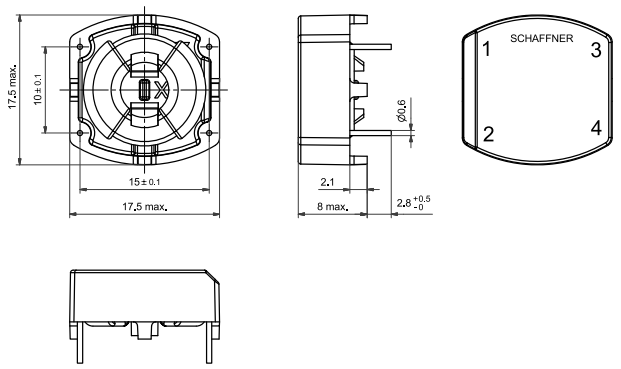


RC 112, RC 212 differential mode

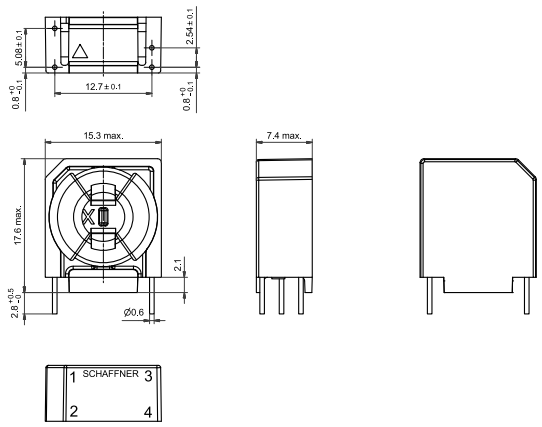


Mechanical data

RC 112



RC 212



For dimensions [mm] without tolerances: ISO 2768-m/ EN 22768-m applies

Pin material: Steel (base), Cu (under plating), Sn (final plating 6µm)

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Current-compensated Chokes

- Rated currents from 6 to 64 A
- Up to 600 VAC or 850 VDC
- DC to 400 Hz frequencies
- Dual, triple and quad-choke configurations

Technical specifications

Maximum continuous operating voltage	600 VAC/850 VDC @ 40°C
Operating frequency	DC to 400 Hz
Rated currents	6 to 64 A @ 40°C max.
High potential test voltage	
winding-to-winding	2500 V, 50 Hz, 2 sec, factory test 2500 VAC, 60 sec, guaranteed
winding-to-housing	4000 VAC, 60 sec, guaranteed
Surge current @ 10 msec	20 x I_N @ 25 °C
Temperature range (operation and storage)	-25°C to +110°C (25/110/21)
Flammability corresponding to	UL 94 V-0 (insulation tubes UL 94 V-2)
MTBF @ 40°C/230 V (Mil-HB-217F)	>5,000,000 hours

Approvals

RoHS

RD chokes are attenuating common-mode or asymmetric (P/N –> E) interference signals, by being connected in series with the phase and neutral lines of an AC powerline input. Symmetrical components of the noise are also attenuated by the leakage inductance of the windings. These chokes are typically used in conjunction with suppression capacitors.

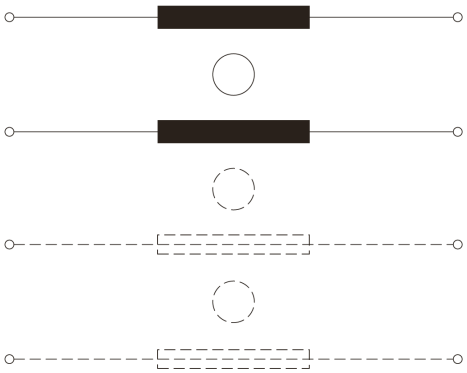
Features and benefits

- High saturation resistance and excellent thermal behavior
- Through hole or wire connections
- Dual, triple and quad-choke configuration
- Up to 64 A quad configuration
- Multiple housing options
- Custom-specific versions are available on request

Typical applications

- Phase-angle control circuits in combination with saturating chokes
- EMI input filters
- For suppressing equipment with no earth connection
- Suppressing high interference levels

Typical electrical schematic



Choke selection table

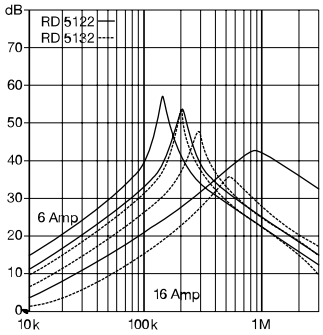
Choke	Nominal current @ 40°C [A]	Inductance L [mH/path]	Resistance R [mΩ/path]	Choke configuration [Qty]	Input/Output connections		Pin footprint connections [mm]	Weight [g]
RD 5122-6-9m6	6	9.6	52.55	2	-02		Ø1	160
RD 5122-10-6m0	10	6	24.25	2	-02		Ø1.3	160
RD 5122-16-2m0	16	2	9.5	2	-02		Ø1.6	160
RD 5132-6-5m0	6	5	38	3	-02		Ø1	160
RD 5132-10-3m0	10	3	17.6	3	-02		Ø1.3	160
RD 5132-16-1m0	16	1	6.9	3	-02		Ø1.6	160
RD 6127-6-15m0	6	15	66.65	2		-07	Ø1	235
RD 6127-10-9m0	10	9	25.9	2		-07	Ø1.5	235
RD 6127-16-3m0	16	3	10.9	2		-07	Ø1.8	235
RD 6137-6-7m5	6	7.5	49	3		-07	Ø1	235
RD 6137-10-4m5	10	4.5	18.35	3		-07	Ø1.5	235
RD 6137-16-1m5	16	1.5	8.3	3		-07	Ø1.8	235
RD 7127-6-25m0	6	25	84.2	2		-07	Ø1	320
RD 7127-10-14m0	10	14	33.5	2		-07	Ø1.4	350
RD 7127-16-5m7	16	5.7	14.1	2		-07	Ø1.8	370
RD 7127-25-2m8	25	2.8	6.4	2		-07	Ø2.4	400
RD 7127-36-1m0	36	1	3.3	2		-07	Ø2.7	380
RD 7137-6-12m0	6	12	60.6	3		-07	Ø1	340
RD 7137-10-6m6	10	6.6	21.9	3		-07	Ø1.5	380
RD 7137-16-2m8	16	2.8	10.7	3		-07	Ø1.8	380
RD 7137-25-1m3	25	1.3	4.45	3		-07	Ø2.5	440
RD 7137-36-0m5	36	0.5	2.75	3		-07	Ø2.7	400
RD 7147-6-6m0	6	6	45.1	4		-07	Ø1	320
RD 7147-10-3m5	10	3.5	19.1	4		-07	Ø1.4	370
RD 7147-16-1m5	16	1.5	8.5	4		-07	Ø1.8	390
RD 7147-25-0m7	25	0.7	3.65	4		-07	Ø2.4	430
RD 7147-36-0m2	36	0.2	2.3	4		-07	Ø2.5	400
RD 8127-16-12m0	16	12	20.05	2		-07	Ø2	590
RD 8127-25-5m0	25	5	8.45	2		-07	Ø2.4	630
RD 8127-36-3m0	36	3	4.55	2		-07	1.5 x 4.5	690
RD 8127-50-1m0	50	1	2.5	2		-07	1.7 x 5	640
RD 8127-64-0m8	64	0.8	1.6	2		-07	2.5 x 5	710
RD 8137-16-5m0	16	5	11.6	3		-07	Ø2	630
RD 8137-25-2m5	25	2.5	6.4	3		-07	Ø2.4	650
RD 8137-36-1m5	36	1.5	3.65	3		-07	1.5 x 4.5	720
RD 8137-50-0m6	50	0.6	2.15	3		-07	1.7 x 5	700
RD 8137-64-0m5	64	0.5	1.35	3		-07	2.5 x 5	780
RD 8147-16-3m0	16	3	9.25	4		-07	Ø2	650
RD 8147-25-1m3	25	1.3	5.05	4		-07	Ø2.4	650
RD 8147-36-0m8	36	0.8	3	4		-07	1.5 x 4.5	760
RD 8147-50-0m3	50	0.3	1.75	4		-07	1.7 x 5	740
RD 8147-64-0m2	64	0.2	1.1	4		-07	2.5 x 5	820

Test conditions:
Measuring frequency: 1 kHz; 500 µA >0.16 mH >1.6 mH; 50 µA >1.6 mH <160 mH
Inductance tolerance: +50%, -30%
Resistance tolerance: ±15% @ 25 °C
Electrical characteristics @ 25°C: ±2°C

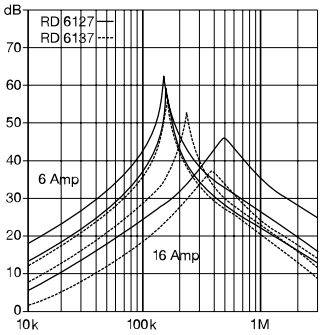
Typical choke attenuation/resonance frequency characteristics

Per CISPR 17; 50 Ω/50 Ω asym

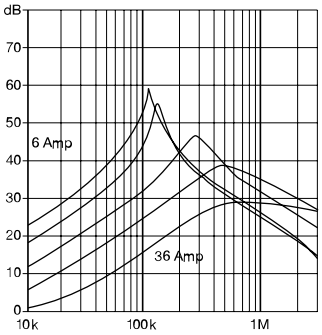
RD 51x2



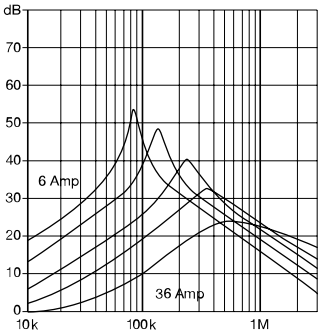
RD 61x7



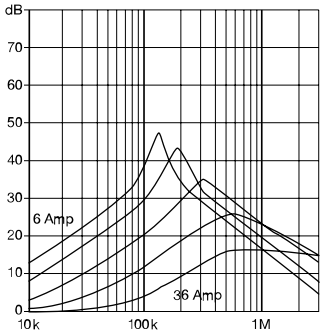
RD 7127



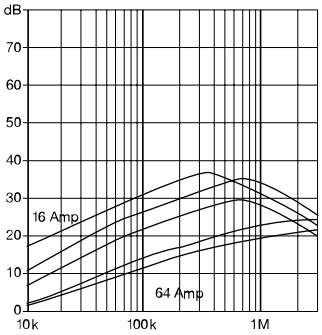
RD 7137



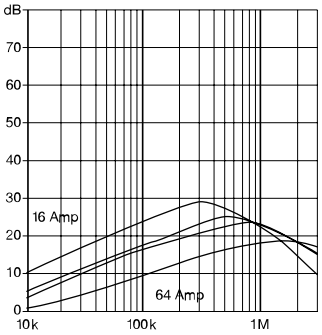
RD 7147



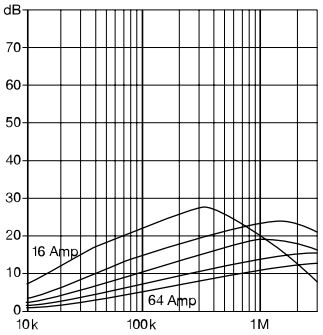
RD 8127



RD 8137



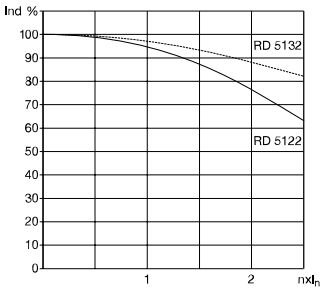
RD 8147



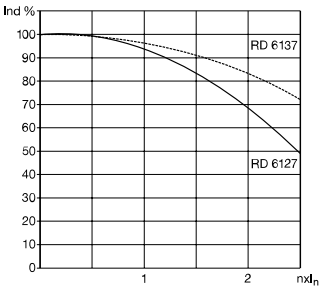
Typical saturation characteristics

Inductance (typical value in %) vs. nominal current (A DC)

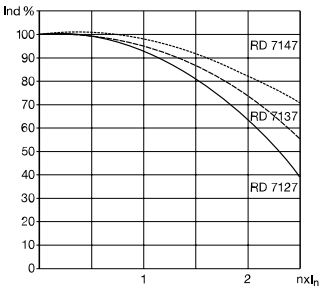
RD 51x2



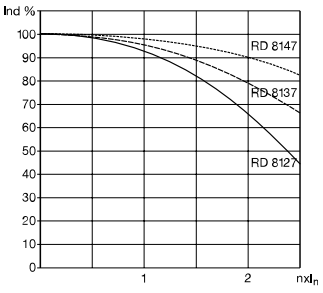
RD 61x7



RD 71x7

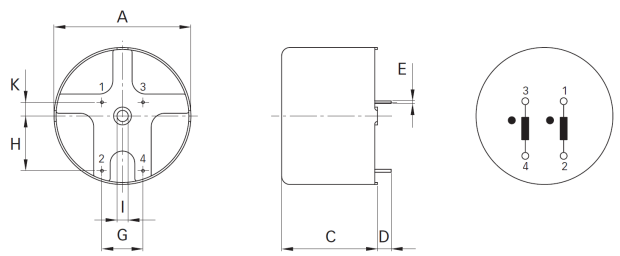


RD 81x7

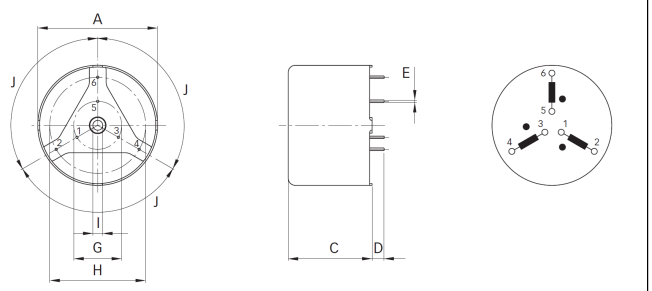


Mechanical data

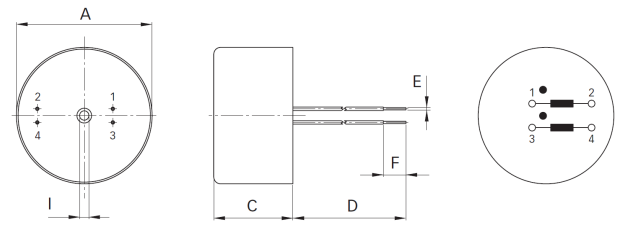
RD 5122



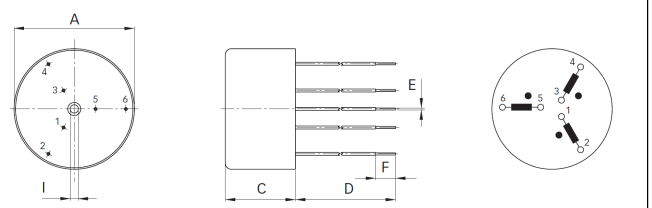
RD 5132



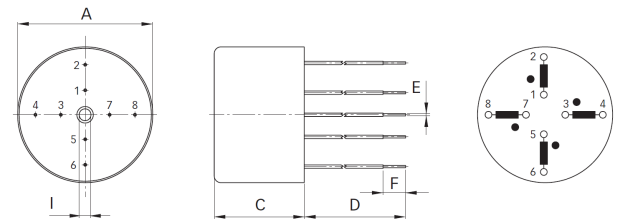
RD 6127, RD 7127, RD 8127



RD 6137, RD 7137, RD 8137



RD 7147, RD 8147



Dimensions

	RD 5122	RD 5132	RD 6127	RD 6137	RD 7127	RD 7137	RD 7147	RD 8127	RD 8137	RD 8147	Tolerances
A	50	50	60	60	70	70	70	80	80	80	±0.5
C	35	35	35	35	40	40	40	50	50	50	±0.5
D	5 ±0.5	5 ±0.5	150	150	150	150	150	200	200	200	+5/-0
E	see choke selection table										
F			10	10	10	10	10	20	20	20	±1
G	15	20									±0.3
H	20	40 ±0.4									±0.3
I	4.1 +3/-0	4.1 +3/-0	4.1 +3/-0	4.1 +3/-0	6.1	6.1	6.1	6.1	6.1	6.1	+6/-0
J		120°									
K	5										

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connectors.

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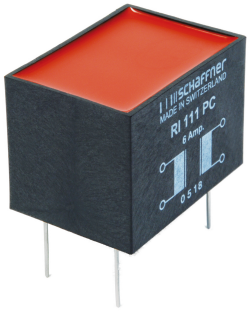
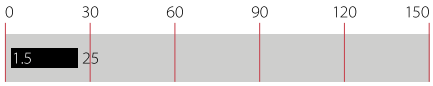
Saturating Chokes



- Rated currents from 1.5 to 25 A
- Up to 500 VAC operating voltage
- DC to 1 kHz frequency
- Single or dual-choke configurations

Performance indicators

Rated current [A]



Technical specifications

Maximum continuous operating voltage	500 VAC @ 40°C
Rated currents	1.5 to 25 A @ 40°C max.
High potential test voltage	
winding-to-winding @ 25°C	2500 VAC, 60 sec, guaranteed
and/or winding-to-inserts	2500 V, 50 Hz, 2 sec, factory test
Surge current @ 10 msec	20 x I_N @ 25°C
Temperature range (operation and storage)	-25°C to +110°C (25/110/21)
Flammability corresponding to	UL 94 V-0
MTBF @ 40°C/230 V (Mil-HB-217F)	>5,000,000 hours

Approvals

RoHS

RI saturating type chokes change impedance at the moment of switching, and can be used to attenuate differential-mode noise or symmetrical interference as generated in fast switching high current applications. These chokes are typically used in conjunction with suppression capacitors. For optimum attenuation chokes must be connected as close as possible to the semiconductor switching device.

Features and benefits

- Excellent thermal behavior
- Through hole or wire connections
- Single or dual-choke configurations
- Up to 25 A single configuration
- Custom-specific versions are available on request

Typical applications

- Suppressing high interference levels generated by fast switching circuits
- DC voltage smoothing
- EMC/EMI filters
- Phase angle control circuits
- Power supplies
- Chargers

Typical electrical schematic

Choke selection table

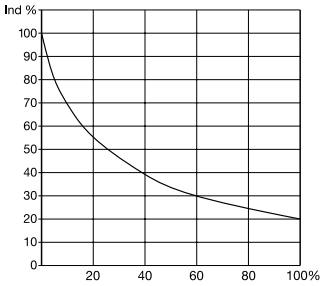
Choke	Nominal current @ 40°C [A]	Resistance R [mΩ/path]	Choke configuration [Qty]	Input/Output connections		Weight [g]
						
RI 111 PC	6	42	2	02		170
RI 401 PC	1.5	620	1	02		15
RI 403 PC	3	105	1	02		30
RI 406 PC	6	53	1	02		55
RI 410 PC	10	28	1	02		95
RI 415	15	8	1		07	205
RI 425	25	4	1		07	325

Test conditions:
Resistance tolerance: ±15% @ 25°C
Electrical characteristics @ 25°C: ±2°C

Typical saturation characteristics

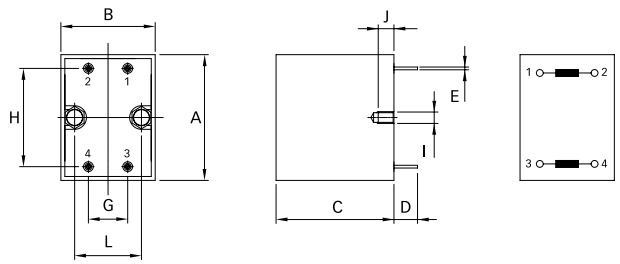
Inductance (typical value in %) vs. nominal current in %

RI series

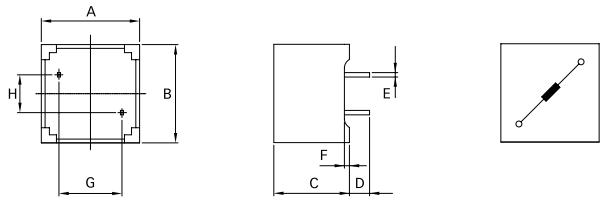


Mechanical data

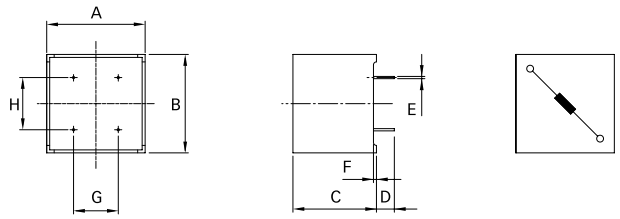
RI 111



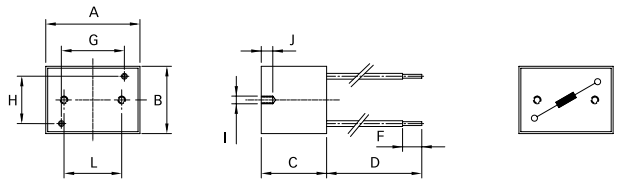
RI 401, RI 403, RI 406



RI 410



RI 415, RI 425



Dimensions

	RI 111	RI 401	RI 403	RI 406	RI 410	RI 415	RI 425	Tolerances
A	49	19.5	23.3	28.5	33	35	48	
B	35	19.5	23.3	28.5	33	49	48	
C	34	15	18	21.5	28	34	43	±0.3
D	15	4 ±0.5	6 ±0.5	4.5 ±0.5	6 ±0.5	200	200	
E	Ø1.15	0.6 x 0.88	Ø0.9	0.6 x 0.88	0.75 x 1.1			±0.1
F		1			1	10	10	
G	20	12.5	15	20	17.5	22	39	
H	40	7.5	10	10	15	36	35	
I	M4					M4	M4	
J	6					6	6	+0/-0.5
L	21					30	30	±0.25

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Please visit www.schaffner.com to find more details on filter connections.

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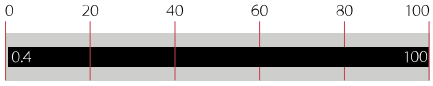
Current-compensated Chokes

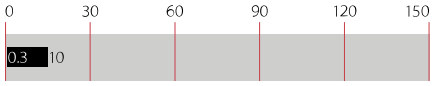
- Rated currents from 0.3 to 10 A
- DC to 400 Hz frequency
- 100 kHz to 3 MHz common-mode resonance frequency
- Dual-choke configurations
- Multiple PCB-mounting options

Performance indicators

Inductance value [mH]



Rated current [A]



Approvals

RoHS

Technical specifications

Operating voltage	300 VAC
Operating frequency	DC to 400 Hz
Rated currents	0.3 to 10 A @ rated ambient temperature
Rated inductance	0.4 to 100 mH
Stray inductance	Typically 1% of L_N
Inductance reduction (DC bias with IN)	Less than 10% (25°C)
High potential test voltage winding-to-winding @ 25°C	1500 VAC, 60 sec, guaranteed 1500 VAC, 2 sec, factory test
winding-to-housing @ 25°C	4000 VAC, 60 sec, guaranteed
MTBF @ 40°C/230 V (Mil-HB-217F)	>5,000,000 hours
Surge current @ 10 msec	20 x I_N @ 25°C
Temperature range (operation and storage)	-40°C to 100°C (40/100/56) acc. IEC 60068-1
Flammability corresponding to	Potting compound UL 94V-0 Housing UL 94V-0 Ringcore coating UL 94V-0
Design corresponding to	UL 1283, IEC/EN 60938-1

RN chokes are attenuating common-mode or asymmetric (P/N –> E) interference signals, by being connected in series with the phase and neutral lines of an AC powerline input. Symmetrical components of the noise are also attenuated by the leakage inductance (stray inductance) of the windings. These chokes are typically used in conjunction with suppression capacitors.

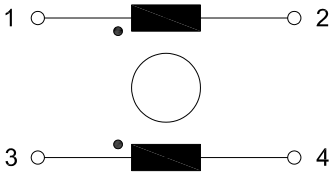
Features and benefits

- High saturation resistance and excellent thermal behavior
- Through hole pin connections
- Dual-choke configuration
- Small compact design
- Multiple housing options
- Custom-specific versions are available on request
- Higher temperature versions
- Fully potted design usable for ruggedized applications

Typical applications

- Switch-mode power applications
- Suppressing common-mode interference levels
- EMI input filters
- For suppression-equipment with no earth connection
- Phase-angle control circuits in combination with saturating chokes

Typical electrical schematic



Choke selection table

Choke	Current (I_N) [A]	@ ambient temperature [°C]	Inductance (L_N) [mH]	Resistance (R_{DC}) [mOhm]	A [mm]	B [mm]	H [mm]	Weight (g)	
RN 102-0.3-02-22M	0.3	40	22.0	1300	10.0	10.0	9.0	4	buy
RN 102-0.3-02-12M	0.3	40	12.0	1100	10.0	10.0	9.0	3	buy
RN 102-0.6-02-4M4	0.6	40	4.4	380	10.0	10.0	9.0	3	
RN 102-1-02-3M0	1.0	40	3.0	210	10.0	10.0	9.0	3	
RN 102-1.5-02-1M6	1.5	40	1.6	94	10.0	10.0	9.0	3	
RN 102-2-02-1M1	2.0	40	1.1	70	10.0	10.0	9.0	3	
RN 112-0.4-02-39M	0.4	40	39.0	1500	15.0	10.0	12.6	6	
RN 112-0.4-02-27M	0.4	40	27.0	1400	15.0	10.0	12.6	6	
RN 112-0.5-02-27M	0.5	40	27.0	1200	15.0	10.0	12.6	6	
RN 112-0.5-02-18M	0.5	40	18.0	1100	15.0	10.0	12.6	6	
RN 112-0.5-02-15M	0.5	40	15.0	700	15.0	10.0	12.6	6	
RN 112-0.6-02-15M	0.6	40	15.0	490	15.0	10.0	12.6	6	
RN 112-0.8-02-10M	0.8	40	10.0	380	15.0	10.0	12.6	6	
RN 112-1.2-02-6M8	1.2	40	6.8	250	15.0	10.0	12.6	6	
RN 112-1.5-02-3M3	1.5	40	3.3	102	15.0	10.0	12.6	6	
RN 112-2-02-1M8	2.0	40	1.8	74	15.0	10.0	12.6	6	
RN 112-2-02-1M0	2.0	40	1.0	70	15.0	10.0	12.6	6	
RN 112-2.6-02-0M4	2.6	40	0.4	40	15.0	10.0	12.6	6	
RN 112-3.6-02-0M4	3.6	40	0.4	27	15.0	10.0	12.6	6	
RN 112-4-02-0M7	4.0	40	0.7	24	15.0	10.0	12.6	6	
RN 114-0.3-02-47M	0.3	40	47.0	1700	20.1	12.5	13.2	10	
RN 114-0.5-02-39M	0.5	40	39.0	830	20.1	12.5	13.2	11	
RN 114-0.8-02-27M	0.8	40	27.0	500	20.1	12.5	13.2	11	
RN 114-1-02-15M	1.0	40	15.0	370	20.1	12.5	13.2	10	
RN 114-1.2-02-10M	1.2	40	10.0	195	20.1	12.5	13.2	10	
RN 114-1.5-02-6M8	1.5	40	6.8	123	20.1	12.5	13.2	11	
RN 114-2-02-4M2	2.0	40	4.2	100	20.1	12.5	13.2	11	
RN 114-2.5-02-3M3	2.5	40	3.3	72	20.1	12.5	13.2	11	
RN 114-3-02-2M0	3.0	40	2.0	52	20.1	12.5	13.2	10	
RN 114-4-02-1M5	4.0	40	1.5	34	20.1	12.5	13.2	11	
RN 116-0.5-02-47M	0.5	60	47.0	960	20.1	12.5	13.2	11	
RN 116-0.5-02-39M	0.5	60	39.0	920	20.1	12.5	13.2	11	
RN 116-0.5-02-27M	0.5	60	27.0	790	20.1	12.5	13.2	11	
RN 116-0.8-02-27M	0.8	60	27.0	370	20.1	12.5	13.2	13	
RN 116-1-02-15M	1.0	60	15.0	260	20.1	12.5	13.2	12	
RN 116-1-02-10M	1.0	60	10.0	210	20.1	12.5	13.2	11	
RN 116-1.3-02-6M8	1.3	60	6.8	140	20.1	12.5	13.2	12	
RN 116-1.5-02-10M	1.5	60	10.0	148	20.1	12.5	13.2	12	
RN 116-1.7-02-4M0	1.7	60	4.0	87	20.1	12.5	13.2	12	
RN 116-2-02-3M3	2.0	60	3.3	70	20.1	12.5	13.2	12	
RN 116-2-02-2M2	2.0	60	2.2	66	20.1	12.5	13.2	11	
RN 122-0.5-02-56M	0.5	40	56.0	1800	25.0	15.0	16.5	20	
RN 122-0.6-02-47M	0.6	40	47.0	1300	25.0	15.0	16.5	20	
RN 122-0.8-02-39M	0.8	40	39.0	1000	25.0	15.0	16.5	20	
RN 122-1-02-18M	1.0	40	18.0	630	25.0	15.0	16.5	19	
RN 122-1-02-10M	1.0	40	10.0	560	25.0	15.0	16.5	19	
RN 122-1.5-02-10M	1.5	40	10.0	250	25.0	15.0	16.5	20	
RN 122-2-02-6M8	2.0	40	6.8	156	25.0	15.0	16.5	20	
RN 122-2-02-5M0	2.0	40	5.0	140	25.0	15.0	16.5	21	
RN 122-2.5-02-5M6	2.5	40	5.6	110	25.0	15.0	16.5	20	
RN 122-3-02-4M5	3.0	40	4.5	80	25.0	15.0	16.5	21	
RN 122-4-02-3M3	4.0	40	3.3	46	25.0	15.0	16.5	22	
RN 122-4-02-1M8	4.0	40	1.8	42	25.0	15.0	16.5	22	

Choke	Current (I_N) [A]	@ ambient temperature [°C]	Inductance (L_N) [mH]	Resistance (R_{DC}) [mOhm]	A [mm]	B [mm]	H [mm]	Weight (g)
RN 142-0.5-02-82M	0.5	40	82.0	2700	30.0	20.0	19.7	36
RN 142-1-02-33M	1.0	40	33.0	810	30.0	20.0	19.7	37
RN 142-1.4-02-27M	1.4	40	27.0	500	30.0	20.0	19.7	40
RN 142-2-02-6M8	2.0	40	6.8	192	30.0	20.0	19.7	36
RN 142-4-02-3M3	4.0	40	3.3	67	30.0	20.0	19.7	38
RN 142-6-02-1M8	6.0	40	1.8	20	30.0	20.0	19.7	40
RN 143-0.5-02-100M	0.5	40	100.0	2900	30.0	20.0	19.7	36
RN 143-1-02-47M	1.0	40	47.0	890	30.0	20.0	19.7	38
RN 143-2-02-10M	2.0	40	10.0	240	30.0	20.0	19.7	42
RN 143-4-02-3M9	4.0	40	3.9	59	30.0	20.0	19.7	39
RN 143-6-02-1M8	6.0	40	1.8	20	30.0	20.0	19.7	42
RN 152-1-02-68M	1.0	40	68.0	1300	40.0	15.0	25.0	75
RN 152-2-02-18M	2.0	40	18.0	350	40.0	15.0	25.0	64
RN 152-4-02-6M8	4.0	40	6.8	87	40.0	15.0	25.0	74
RN 152-6-02-3M9	6.0	40	3.9	42	40.0	15.0	25.0	68
RN 152-8-02-2M7	8.0	40	2.7	22	40.0	15.0	25.0	73
RN 152-10-02-1M8	10.0	40	1.8	14	40.0	15.0	25.0	73
RN 202-0.3-02-22M	0.3	40	22.0	1300	5.1	15.2	13.5	4
RN 202-0.3-02-12M	0.3	40	12.0	1100	5.1	15.2	13.5	4
RN 202-0.6-02-4M4	0.6	40	4.4	380	5.1	15.2	13.5	4
RN 202-1-02-3M0	1.0	40	3.0	210	5.1	15.2	13.5	4
RN 202-1.5-02-1M6	1.5	40	1.6	94	5.1	15.2	13.5	4
RN 202-2-02-1M1	2.0	40	1.1	70	5.1	15.2	13.5	4
RN 204-0.3-02-22M	0.3	40	22.0	1300	7.6	10.0	14.3	3
RN 204-0.3-02-12M	0.3	40	12.0	960	7.6	10.0	14.3	3
RN 204-0.6-02-4M4	0.6	40	4.4	350	7.6	10.0	14.3	3
RN 204-1-02-3M0	1.0	40	3.0	192	7.6	10.0	14.3	3
RN 204-1.5-02-1M6	1.5	40	1.6	96	7.6	10.0	14.3	3
RN 204-2-02-1M1	2.0	40	1.1	57	7.6	10.0	14.3	3
RN 212-0.4-02-39M	0.4	40	39.0	1500	10.0	15.0	20.0	8
RN 212-0.4-02-27M	0.4	40	27.0	1400	10.0	15.0	20.0	8
RN 212-0.5-02-27M	0.5	40	27.0	1200	10.0	15.0	20.0	8
RN 212-0.5-02-18M	0.5	40	18.0	1100	10.0	15.0	20.0	8
RN 212-0.5-02-15M	0.5	40	15.0	700	10.0	15.0	20.0	8
RN 212-0.6-02-15M	0.6	40	15.0	490	10.0	15.0	20.0	8
RN 212-0.8-02-10M	0.8	40	10.0	380	10.0	15.0	20.0	8
RN 212-1.2-02-6M8	1.2	40	6.8	250	10.0	15.0	20.0	8
RN 212-1.5-02-3M3	1.5	40	3.3	102	10.0	15.0	20.0	8
RN 212-2-02-1M8	2.0	40	1.8	74	10.0	15.0	20.0	8
RN 212-2-02-1M0	2.0	40	1.0	70	10.0	15.0	20.0	8
RN 212-2.6-02-0M4	2.6	40	0.4	40	10.0	15.0	20.0	8
RN 212-3.6-02-0M4	3.6	40	0.4	27	10.0	15.0	20.0	8
RN 212-4-02-0M7	4.0	40	0.7	24	10.0	15.0	20.0	8
RN 214-0.3-02-47M	0.3	40	47.0	1700	12.5	10.0	25.0	14
RN 214-0.5-02-56M	0.5	40	56.0	1700	12.5	10.0	25.0	15
RN 214-0.5-02-39M	0.5	40	39.0	830	12.5	10.0	25.0	14
RN 214-0.8-02-27M	0.8	40	27.0	500	12.5	10.0	25.0	15
RN 214-1-02-15M	1.0	40	15.0	370	12.5	10.0	25.0	14
RN 214-1.2-02-10M	1.2	40	10.0	195	12.5	10.0	25.0	15
RN 214-1.5-02-6M8	1.5	40	6.8	123	12.5	10.0	25.0	15
RN 214-2-02-4M2	2.0	40	4.2	100	12.5	10.0	25.0	14

Choke	Current (I_N) [A]	@ ambient temperature [°C]	Inductance (L_N) [mH]	Resistance (R_{DC}) [mOhm]	A [mm]	B [mm]	H [mm]	Weight (g)
RN 214-2-02-2M2	2.0	40	2.2	67	12.5	10.0	25.0	14
RN 214-2.5-02-3M3	2.5	40	3.3	72	12.5	10.0	25.0	15
RN 214-3-02-2M0	3.0	40	2.0	52	12.5	10.0	25.0	14
RN 214-4-02-1M5	4.0	40	1.5	34	12.5	10.0	25.0	15
RN 216-0.5-02-47M	0.5	60	47.0	960	12.5	10.0	25.0	15
RN 216-0.5-02-39M	0.5	60	39.0	920	12.5	10.0	25.0	15
RN 216-0.5-02-27M	0.5	60	27.0	790	12.5	10.0	25.0	15
RN 216-0.8-02-27M	0.8	60	27.0	370	12.5	10.0	25.0	16
RN 216-1-02-15M	1.0	60	15.0	260	12.5	10.0	25.0	16
RN 216-1-02-10M	1.0	60	10.0	210	12.5	10.0	25.0	15
RN 216-1.3-02-6M8	1.3	60	6.8	140	12.5	10.0	25.0	16
RN 216-1.5-02-10M	1.5	60	10.0	148	12.5	10.0	25.0	16
RN 216-1.7-02-4M0	1.7	60	4.0	87	12.5	10.0	25.0	16
RN 216-2-02-3M3	2.0	60	3.3	70	12.5	10.0	25.0	16
RN 216-2-02-2M2	2.0	60	2.2	66	12.5	10.0	25.0	15
RN 218-0.4-02-100M	0.4	40	100	2800	10.0	12.5	20.0	8
RN 218-0.6-02-47M	0.6	40	47.0	1200	10.0	12.5	20.0	8
RN 218-0.7-02-39M	0.7	40	39.0	1150	10.0	12.5	20.0	8
RN 218-0.9-02-27M	0.9	40	27.0	620	10.0	12.5	20.0	8
RN 218-1-02-22M	1.0	40	22.0	520	10.0	12.5	20.0	8
RN 218-1.1-02-15M	1.1	40	15.0	420	10.0	12.5	20.0	8
RN 218-1.4-02-10M	1.4	40	10.0	330	10.0	12.5	20.0	8
RN 218-1.7-02-6M8	1.7	40	6.8	180	10.0	12.5	20.0	8
RN 218-2.2-02-3M3	2.2	40	3.3	100	10.0	12.5	20.0	8
RN 222-0.5-02-56M	0.5	40	56.0	1800	15.0	12.5	29.3	27
RN 222-0.6-02-47M	0.6	40	47.0	1300	15.0	12.5	29.3	26
RN 222-0.8-02-39M	0.8	40	39.0	1000	15.0	12.5	29.3	27
RN 222-1-02-33M	1.0	40	33.0	1300	15.0	12.5	29.3	29
RN 222-1-02-18M	1.0	40	18.0	630	15.0	12.5	29.3	26
RN 222-1.5-02-10M	1.5	40	10.0	250	15.0	12.5	29.3	26
RN 222-2-02-6M8	2.0	40	6.8	156	15.0	12.5	29.3	28
RN 222-2.5-02-5M6	2.5	40	5.6	110	15.0	12.5	29.3	27
RN 222-3-02-4M5	3.0	40	4.5	80	15.0	12.5	29.3	28
RN 222-4-02-3M3	4.0	40	3.3	46	15.0	12.5	29.3	28
RN 232-0.6-02-47M	0.6	40	47.0	1300	15.0	12.5	34.3	37
RN 232-1-02-18M	1.0	40	18.0	390	15.0	12.5	34.3	38
RN 232-1.6-02-10M	1.6	40	10.0	170	15.0	12.5	34.3	38
RN 232-2.5-02-5M6	2.5	40	5.6	86	15.0	12.5	34.3	38
RN 232-4-02-3M3	4.0	40	3.3	54	15.0	12.5	34.3	38
RN 242-0.5-02-82M	0.5	40	82.0	2700	15.0	12.5	34.3	37
RN 242-1-02-33M	1.0	40	33.0	810	15.0	12.5	34.3	38
RN 242-1.4-02-27M	1.4	40	27.0	500	15.0	12.5	34.3	38
RN 242-2-02-6M8	2.0	40	6.8	192	15.0	12.5	34.3	37
RN 242-4-02-3M3	4.0	40	3.3	67	15.0	12.5	34.3	38
RN 242-6-02-1M8	6.0	40	1.8	20	15.0	12.5	34.3	41

Test conditions: Measuring frequency: 10 kHz; 50 mV; Inductance tolerance: +50%, -30%; Resistance tolerance: ±15% @ 25°C; Electrical characteristics @ 25°C: ±2°C; Stray Inductance measurement between pin 1 and 2 (pin 3 and 4 shorted)
For mechanical tolerances refer to mechanical data section.

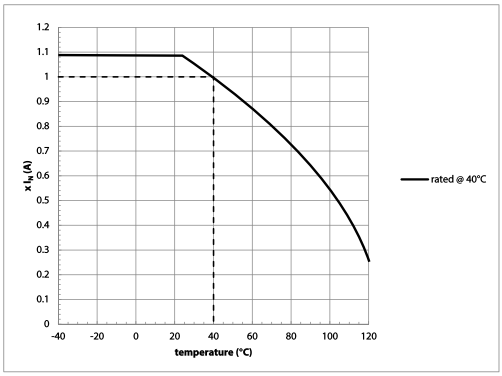
Product selector

RN XYY-II-02-LML

- Rated Inductivity L_N (mH)
- Terminal-Type (–02 Rigid Pin Connection)
- Rated Current I_N (A)
- Size (02 to 52)
- Orientation (1 = horizontal; 2 = vertical)
- Familyname

Thermal Derating

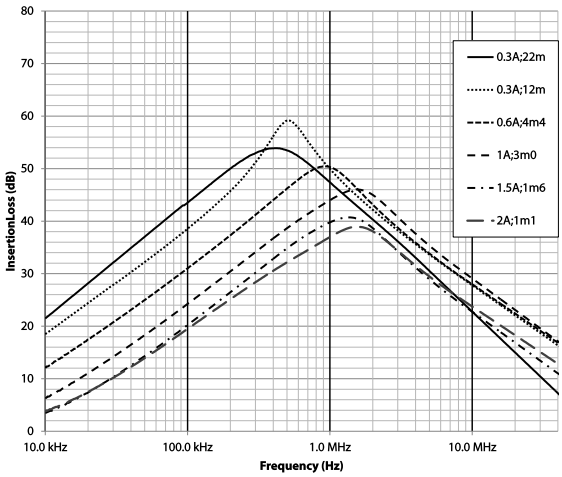
If higher ambient temperatures than the specified apply, the nominal current needs to be reduced according to the graph below.



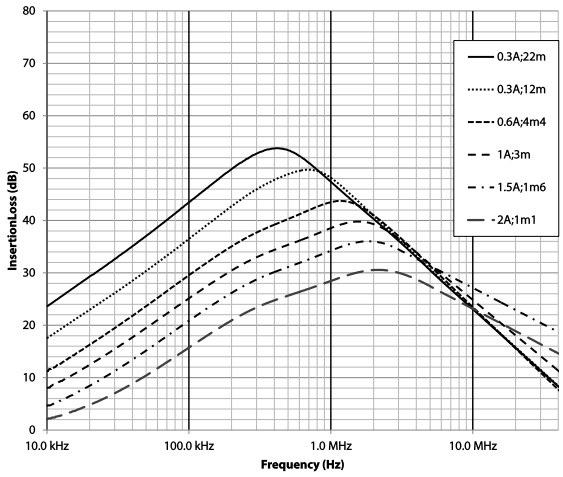
Typical attenuation/resonance frequency characteristics

Per CISPR 17; 50 Ω/50 Ω asym
X can be exchanged with either 1 or 2 for different housing configuration, attenuation is similar

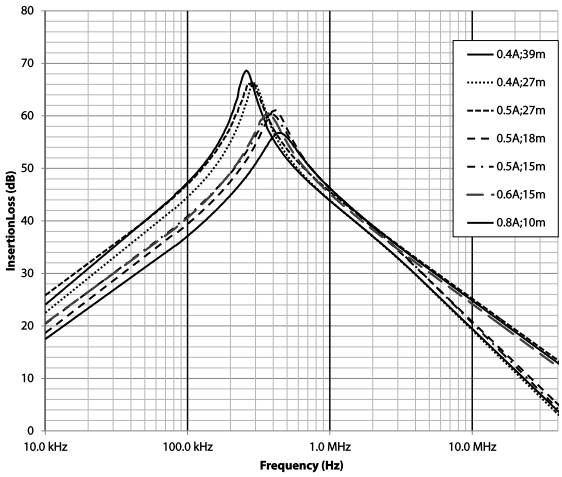
RN 102, RN 202



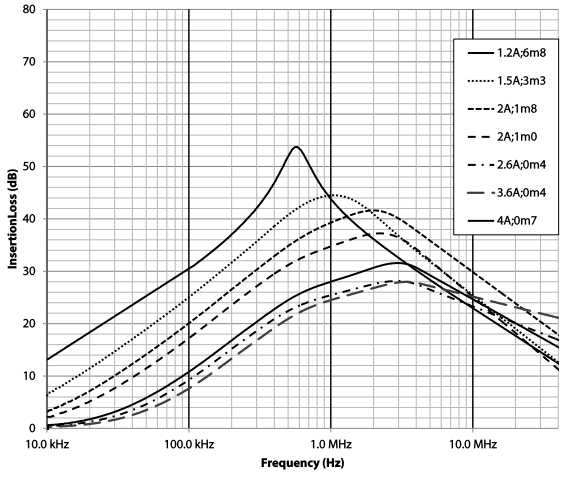
RN 204



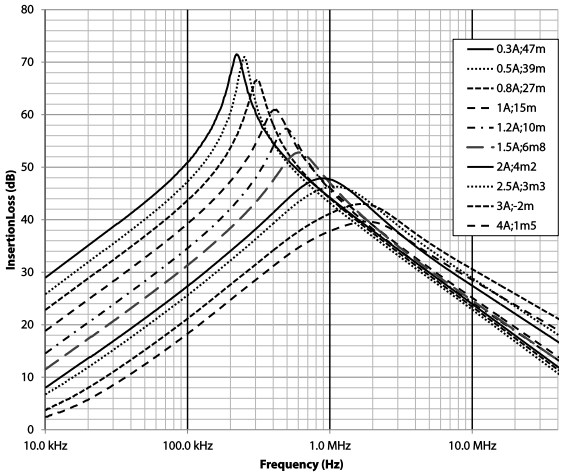
RN 112, RN 212 (<1 A)



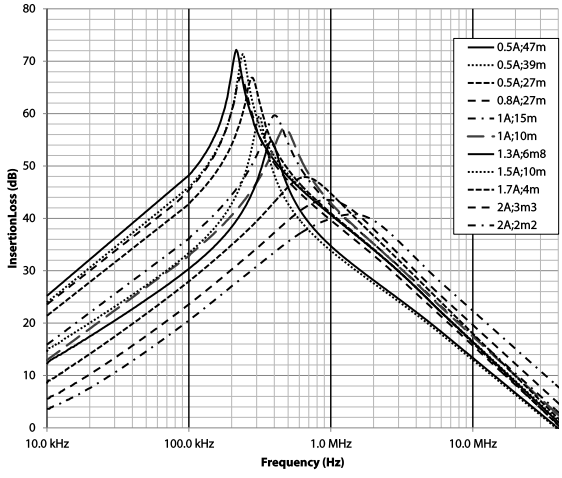
RN 112, RN 212 (>1 A)



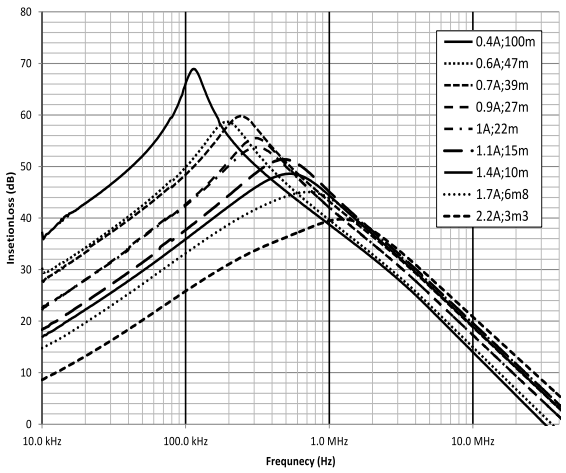
RN 114, RN 214



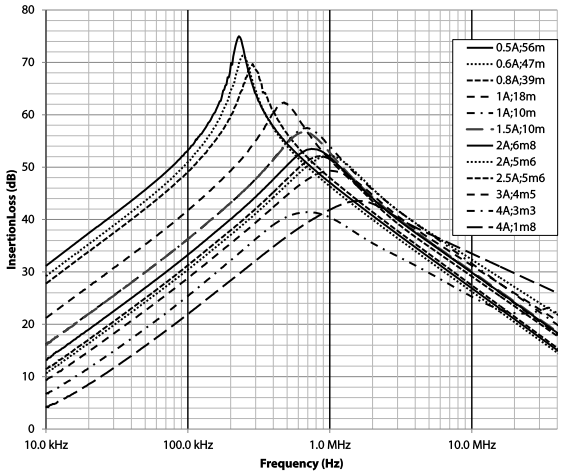
RN 116, RN 216



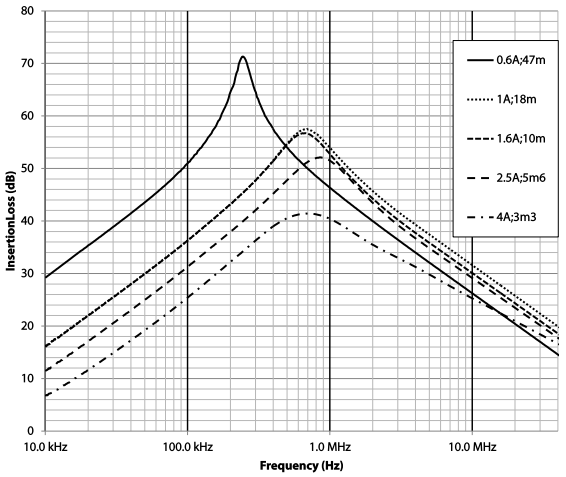
RN 218



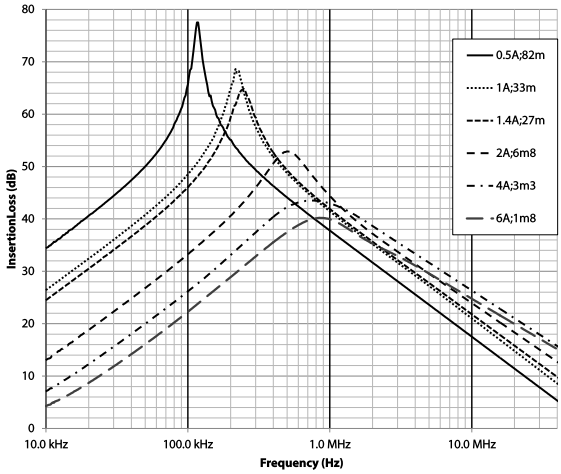
RN 122, RN 222



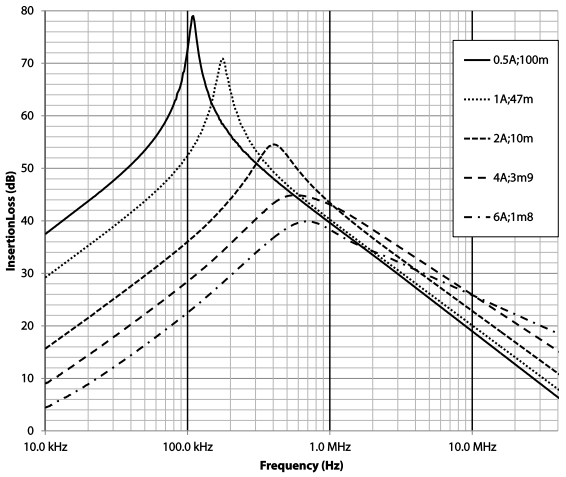
RN 232



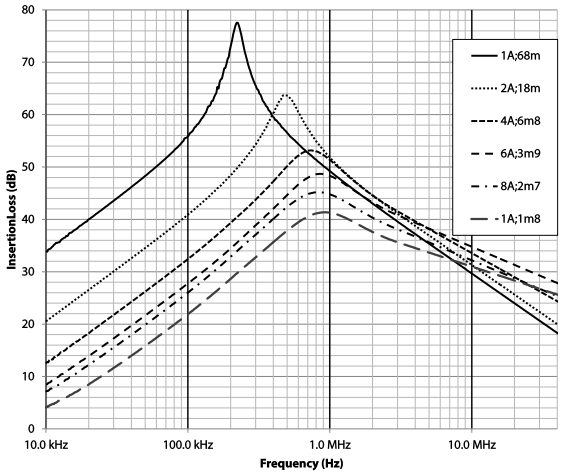
RN 142, RN 242



RN 143

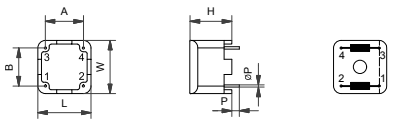


RN 152

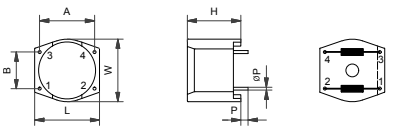


Mechanical data

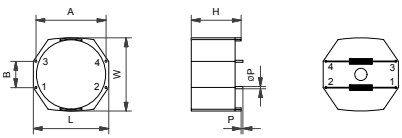
RN 102



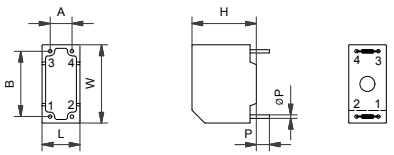
RN 112, RN 114, RN 116, RN 122, RN 142/3



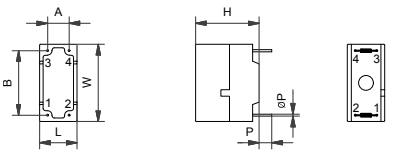
RN 152



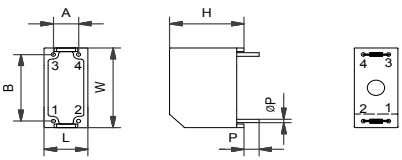
RN 202



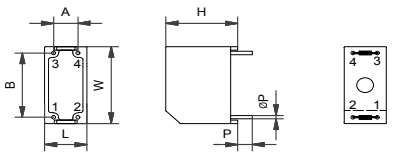
RN 204



RN 212, RN 218



RN 214, RN 216, RN 222, RN 232, RN 242



Pin material: Steel (base), Cu (under plating), Sn (final plating 6µm)

Dimensions

	A (±0.6 mm)	B (±0.6 mm)	H (±0.3 mm)	L (±0.3 mm)	W (±0.3 mm)	P (±0.5 mm)	ØP (±0.1 mm)
RN 102	10.0 mm	10.0 mm	9.0 mm	14.0 mm	14.0 mm	4.0 mm	0.6 mm
RN 112	15.0 mm	10.0 mm	12.6 mm	17.7 mm	17.1 mm	4.0 mm	0.8 mm
RN 114	20.1 mm	12.5 mm	13.2 mm	22.5 mm	21.5 mm	4.0 mm	0.8 mm
RN 116	20.1 mm	12.5 mm	13.2 mm	22.5 mm	21.5 mm	4.0 mm	0.8 mm
RN 122	25.0 mm	15.0 mm	16.5 mm	28.0 mm	27.0 mm	4.0 mm	0.8 mm
RN 142	30.0 mm	20.0 mm	19.7 mm	33.1 mm	32.5 mm	4.3 mm	0.8 mm
RN 143	30.0 mm	20.0 mm	19.7 mm	33.1 mm	32.5 mm	4.3 mm	0.8 mm
RN 152	40.0 mm	15.0 mm	25.0 mm	43.0 mm	41.8 mm	4.5 mm	1.2 mm
RN 202	5.1 mm	15.2 mm	13.5 mm	8.8 mm	18.2 mm	4.5 mm	0.8 mm
RN 204	7.6 mm	10.0 mm	14.3 mm	9.0 mm	14.0 mm	4.0 mm	0.5 mm
RN 212	10.0 mm	15.0 mm	20.0 mm	12.5 mm	18.0 mm	4.0 mm	0.8 mm
RN 214	12.5 mm	10.0 mm	25.0 mm	15.5 mm	23.0 mm	4.0 mm	0.8 mm
RN 216	12.5 mm	10.0 mm	25.0 mm	15.5 mm	23.0 mm	4.0 mm	0.8 mm
RN 218	10.0 mm	12.5 mm	20.0 mm	12.5 mm	18.0 mm	4.0 mm	0.8 mm
RN 222	15.0 mm	12.5 mm	29.3 mm	18.0 mm	31.0 mm	4.0 mm	0.8 mm
RN 232	15.0 mm	12.5 mm	34.3 mm	18.0 mm	31.0 mm	4.2 mm	0.8 mm
RN 242	15.0 mm	12.5 mm	34.3 mm	18.0 mm	31.0 mm	4.2 mm	0.8 mm

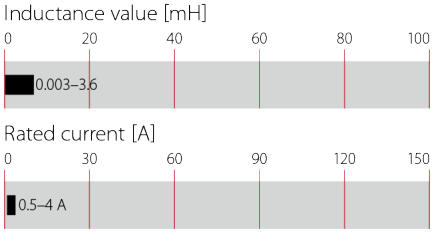
Please visit www.schaffner.com to find more details on filter connections.

schaffner
shaping electrical power

Differential-mode chokes

- Rated currents from 0.5 to 4 A
- DC to 400 Hz frequency
- 500 kHz to 60 MHz differential-mode resonance frequency
- 40 to 450 microjoules storage
- Multiple PCB-mounting options

Performance indicators



Technical specifications

Operating voltage	250 VAC
Operating frequency	DC to 400 Hz
Rated currents	0.5 to 4 A @ rated ambient temperature
Rated inductance	0.003 to 3.6 mH
High potential test voltage winding-to-winding @ 25°C	1500 VAC, 60 sec, guaranteed 1500 VAC, 2 sec, factory test
winding-to-housing @ 25°C	4000 VAC, 60 sec, guaranteed
Surge current @ 10 msec	20 x I_N @ 25°C
Temperature range (operation and storage)	-40°C to 125°C (40/125/56) acc. IEC 60068-1
Flammability corresponding to	Potting compound UL 94V-0 Housing UL 94V-0 Ringcore coating UL 94V-0
Design corresponding to	UL 1283, IEC/EN 60938-1

Approvals

RoHS

RS chokes are state of the art differential-mode or symmetric chokes, which can be used in various kinds of applications. The datasheet gives an overview of three different kinds of applications with the related electrical specifcations.

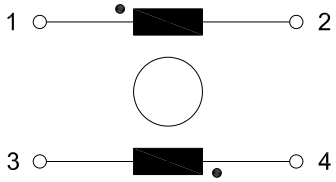
Features and benefits

- 3 different applications specified
- usable for basic and reinforced equipment
- Quasi linear saturation for storage mode
- 40 to 450 microjoules storage
- Resonance Frequency from 500kHz to 60MHz in symmetrical mode
- Custom-specific versions are available on request
- Multiple housing options

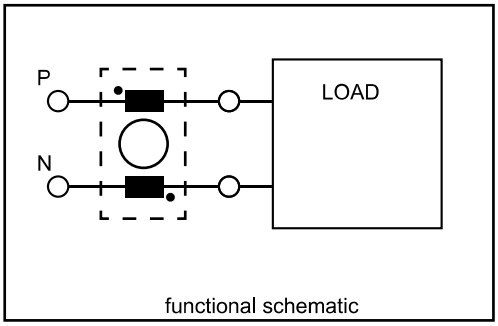
Typical applications

- Energy filtering
- Multistage discrete filtering
- General purpose differential/symmetrical mode filtering
- SMPS and UPS
- DC/DC converters
- Frequency converters

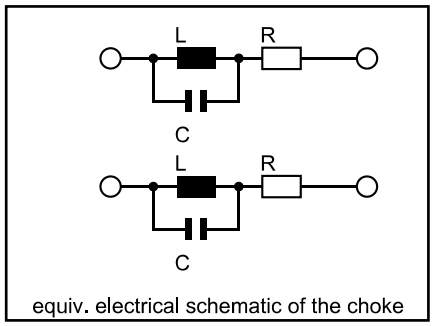
Typical electrical schematic



Application type #1: Symmetrical/differential mode



functional schematic



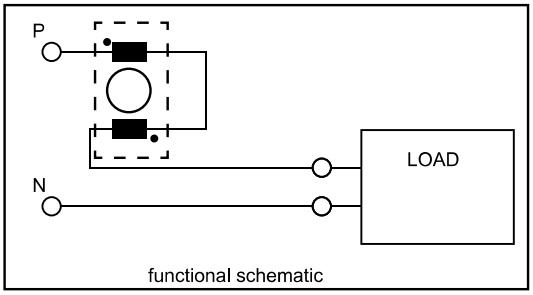
equiv. electrical schematic of the choke

Choke selection table

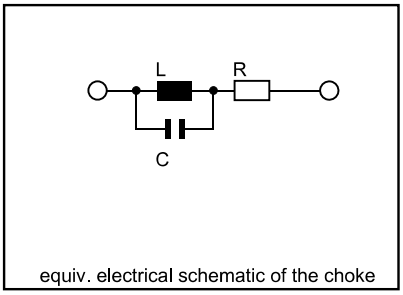
Choke	Current (I_N) @ 40°C ambient [A]	Inductance (L) [µH]	Resistance (R) [mOhm]	typ. Resonance Frequency f_0 [MHz]	typ. Attenuation @ f_0 [dB]	typ. parasitic Capacitance C_p [pF]
RS 512-0.5-02 / RS 612-0.5-02	0.5	200	650	8	44.9	1.98
RS 512-1-02 / RS 612-1-02	1	55	130	20	37.3	3.83
RS 512-2-02 / RS 612-2-02	2	13	30	25	25.3	3.31
RS 512-4-02 / RS 612-4-02	4	3	10	33	10..7	7.75
RS 514-0.5-02 / RS 614-0.5-02	0.5	480	800	7	50.6	8.87
RS 514-1-02 / RS 614-1-02	1	120	200	11	42.7	7.39
RS 514-2-02 / RS 614-2-02	2	30	50	16	32.5	3.66
RS 514-4-02 / RS 614-4-02	4	8	20	22	25.6	3.43
RS 622-0.5-02	0.5	900	1250	2	54.9	12.64
RS 622-1-02	1	225	300	4	46	6.33
RS 622-2-02	2	55	70	7	33.2	9.40
RS 622-4-02	4	15	30	13	28.7	4.86

Test conditions: Measuring frequency: 10 kHz; 50 mV; Inductance tolerance: +50%, -30%; Resistance tolerance: ±15% @ 25°C; Electrical characteristics @ 25°C: ±2°C
For mechanical tolerances refer to mechanical data section.

Application type #2: Symmetrical/differential mode



functional schematic



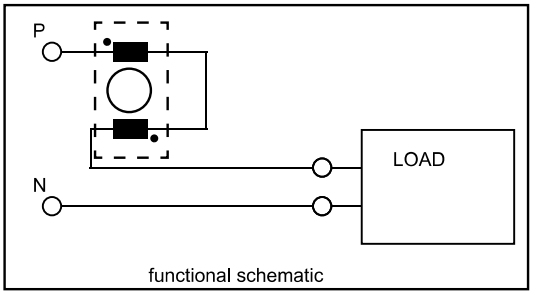
equiv. electrical schematic of the choke

Choke selection table

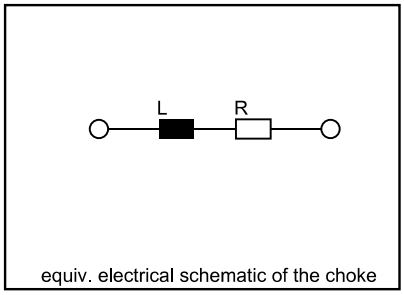
Filter	Current (I_N) @ 40°C ambient [A]	Inductance (L) [µH]	Resistance (R) [mOhm]	calc. Resonance Frequency F_0 [MHz]	typ. Attenuation @ F_0 [dB]	typ. parasitic Capacitance C_p [pF]
RS 512-0.5-02 / RS 612-0.5-02	0.5	800	1300	2	50	7.9
RS 512-1-02 / RS 612-1-02	1	220	260	8	47	4.8
RS 512-2-02 / RS 612-2-02	2	52	60	17	36	3.0
RS 512-4-02 / RS 612-4-02	4	12	20	27	22	2.9
RS 514-0.5-02 / RS 614-0.5-02	0.5	1920	1600	2.5	60	7.0
RS 514-1-02 / RS 614-1-02	1	480	400	5.5	53	6.6
RS 514-2-02 / RS 614-2-02	2	120	100	10	42	4.4
RS 514-4-02 / RS 614-4-02	4	32	40	18	34	5.8
RS 622-0.5-02	0.5	3600	2500	0.6	63	11.7
RS 622-1-02	1	900	600	1.5	55	9.3
RS 622-2-02	2	220	140	3	33	12.8
RS 622-4-02	4	60	60	5	38	5.2

Test conditions: Measuring frequency: 10 kHz; 50 mV; Inductance tolerance: +50%, -30%; Resistance tolerance: ±15% @ 25°C; Electrical characteristics @ 25°C: ±2°C
For mechanical tolerances refer to mechanical data section.

Application type #3: Energy storage



functional schematic



equiv. electrical schematic of the choke

Choke selection table

Filter	Current (I_N) @ 40°C ambient [A]	Inductance (L) [µH]	Resistance (R) [mOhm]	Energy E [µJ]
RS 512-0.5-02 / RS 612-0.5-02	0.5	800	1300	100
RS 512-1-02 / RS 612-1-02	1	220	260	100
RS 512-2-02 / RS 612-2-02	2	52	60	100
RS 512-4-02 / RS 612-4-02	4	12	20	100
RS 514-0.5-02 / RS 614-0.5-02	0.5	1960	1600	240
RS 514-1-02 / RS 614-1-02	1	480	400	240
RS 514-2-02 / RS 614-2-02	2	120	100	240
RS 514-4-02 / RS 614-4-02	4	32	40	240
RS 622-0.5-02	0.5	3600	2500	450
RS 622-1-02	1	900	600	450
RS 622-2-02	2	220	140	450
RS 622-4-02	4	60	60	450

Test conditions: Measuring frequency: 10 kHz; 50 mV; Inductance tolerance: +50%, -30%; Resistance tolerance: ±15% @ 25°C; Electrical characteristics @ 25°C: ±2°C
For mechanical tolerances refer to mechanical data section.

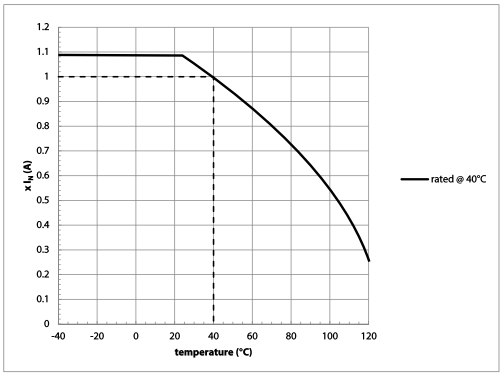
Product selector

RS XYY-II-02

- Terminal-Type (-02 Rigid Pin Connection)
- Rated Current I_N (A)
- Size (12 to 22)
- Orientation (5 = horizontal; 6 = vertical)
- Familyname

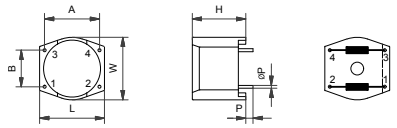
Thermal Derating

If higher ambient temperatures than the specified apply, the nominal current needs to be reduced according to the graph below.

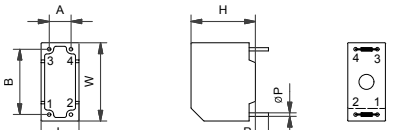


Mechanical data

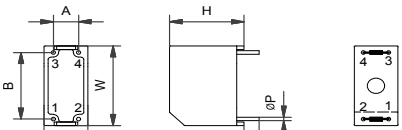
RS 512, RS 514



RS 612



RS 614, RS 622



Pin material: Steel (base), Cu (under plating), Sn (final plating 6µm)

Dimensions

	A (±0.6 mm)	B (±0.6 mm)	H (±0.3 mm)	L (±0.3 mm)	W (±0.3 mm)	P (±0.5 mm)	ØP (±0.1 mm)	weight [g]
RS 512	15.0 mm	10.0 mm	12.6 mm	17.7 mm	17.1 mm	4.0 mm	0.8 mm	6
RS 514	20.1 mm	12.5 mm	13.2 mm	22.5 mm	21.5 mm	4.0 mm	0.8 mm	11
RS 612	10.0 mm	15.0 mm	20.0 mm	12.5 mm	18.0 mm	4.0 mm	0.8 mm	9
RS 614	12.5 mm	10.0 mm	25.0 mm	15.5 mm	23.0 mm	4.0 mm	0.8 mm	15
RS 622	15.0 mm	12.5 mm	29.3 mm	18.0 mm	31.0 mm	4.3 mm	0.8 mm	30

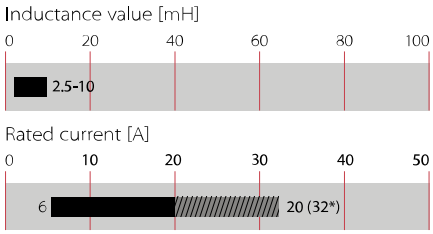
Please visit www.schaffner.com to find more details on filter connections.

schaffner
shaping electrical power

Current-compensated Chokes

- Rated currents from 6 to 20 A
- Up to 600 VAC and VDC
- 2- and 3-wire configurations
- Horizontal and vertical PCB mounting types
- Ruggedized saturation and thermal behavior
- Open construction for forced and convection cooling
- Straightforward pin-out for easy PCB design

Performance indicators



Technical specifications

Maximum continuous operating voltage	600 VAC (3-line) and 300 VAC/425 VDC (2-line)
Operating frequency	dc to 400 Hz
Rated currents	6 to 20 A @ 60°C max. convection cooling
High potential test voltage winding-to-winding @ 25°C	2500 VAC, 60 sec, guaranteed, 2 sec factory test
Temperature range (operation and storage)	-40°C to +100°C (40/100/56)
Flammability corresponding to	UL 94 V-0
Cooling	convection/forced cooling
MTBF @ 40°C/230 V (Mil-HB-217F)	>5,000,000 hours

Approvals

RoHS

RT common-mode chokes are mainly used to filter EMI noise on AC power lines up to 600 VAC. EMI noise of electronic equipment can go to the power lines and disturb the proper function of other devices like communication devices or control logic of robotics. Thus noise generated by the equipment from switched power electronics or by high slew rates of controllers needs to be filtered. RT common-mode chokes are used to suppress EMI noise in PCB integrated filter designs with line bypass capacitors or in combination with single phase filters for extra low leakage filter designs.

Features and benefits

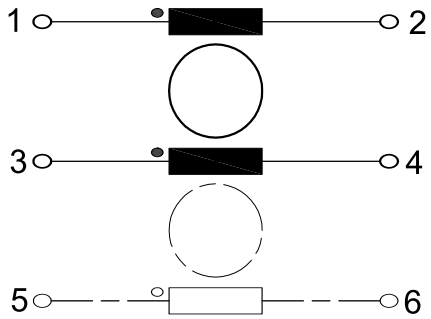
- Cost-effective PCB designs for up to 32 A with forced cooling *
- Compact size and light weight
- Low magnetic leakage flux
- Excellent winding insulation
- Standardized foot print
- Broad range of inductance ratings
- Custom-specific versions on request

* See RB Application Note for forced cooling

Typical applications

- AC and DC filtering for midsize power range drives, photovoltaic inverters, fast chargers, charging stations, UPS and switch mode power supplies
- Filter with low leakage current noise or improved immunity against grid disturbances
- Electronic devices, automation and (industrial) LED lighting
- Communication devices
- Medical and laboratory Equipment
- Converters

Typical electrical schematic **



** 2-line chokes (2x Ln), 3-line chokes (3x Ln)

RT Series

Selection table	convection cooling nominal current @ 60°C [A]	*forced cooling 3 m/s nominal current @ 60°C [A]	Inductance Ln @ 25°C 100kHz [mH/path]	**typ. Inductance Ls @ 25°C 100kHz [µH/path]	Resistance R @ 25°C [mΩ/path]	Choke [size]	***Ø Pin ±0.1 ØP [mm]	Weight [g]
RT8122-6-10M0	6	9.5	10	30	33	1	1.1	80
RT8122-8-8M0	8	12.5	8	24.8	21	1	1.3	80
RT8122-10-6M0	10	16	6	19.2	16	1	1.4	80
RT8122-12-5M0	12	19	5	20.5	14	2	1.5	100
RT8122-16-4M0	16	27	4	17.6	10	2	1.8	110
RT8122-20-3M0	20	32	3	13.5	7	3	2	160
RT8522-6-10M0	6	9.5	10	31.5	33	4	1.1	70
RT8522-8-8M0	8	12.5	8	24	21	4	1.3	80
RT8522-10-6M0	10	16	6	19.2	16	4	1.4	80
RT8522-12-5M0	12	19	5	23	14	5	1.5	90
RT8522-16-4M0	16	27	4	18.8	10	5	1.8	110
RT8522-20-3M0	20	32	3	13.5	7	6	2.0	150
RT8132-6-6M0	6	9.5	6	18	27	7	1.1	80
RT8132-8-4M8	8	12.5	4.8	14.9	17	7	1.3	90
RT8132-10-4M0	10	16	4	16	15	8	1.5	110
RT8132-12-3M6	12	19	3.6	14.4	12	8	1.6	120
RT8132-16-3M0	16	27	3	12	8	9	1.8	170
RT8132-20-2M5	20	32	2.5	10	7	9	2.1	190
RT8532-6-6M0	6	9.5	6	18	27	10	1.1	90
RT8532-8-4M8	8	12.5	4.8	13.9	17	10	1.3	90
RT8532-10-4M0	10	16	4	16	15	11	1.5	110
RT8532-12-3M6	12	19	3.6	15.1	12	11	1.6	120
RT8532-16-3M0	16	27	3	13.8	8	12	1.8	160
RT8532-20-2M5	20	32	2.5	10.8	7	12	2.1	190

Test conditions: Inductance tolerance: +50%, –30%; Resistance tolerance: +15% @ 25°C; Electrical characteristics @ 25°C: ±2°C

* typical current for forced cooling with 3 m/s. Due to the possible turbulences and degradation of the air stream within an equipment please consider thermal validation.

** typical stray inductance, max is 0.1% of Ln

*** Length of pin (Dimension P) is always 5.5 mm ± 1

Product selector

RT 8xxx-xx-xmx

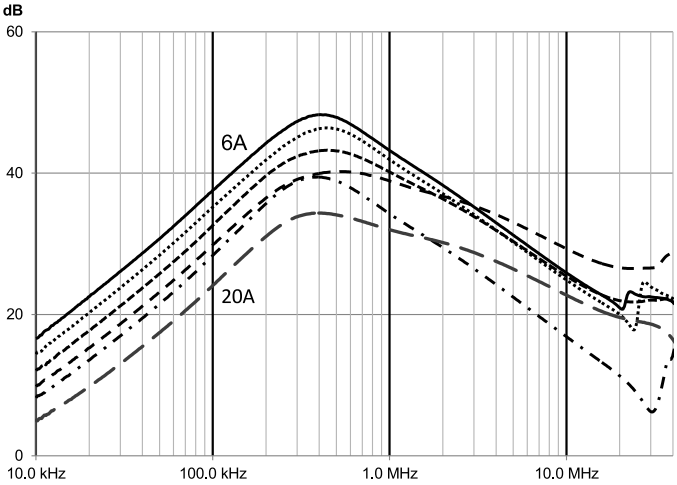
- Inductance value (e.g. 9M6 = 9.6 mH)
- Nominal input current [A] (convection cooling)
- Terminal type (2 for PCB pin)
- 2 = 2-line choke
- 3 = 3-line choke
- 1 = Horizonzal
- 5 = Vertical
- Schaffner standard ring-core choke series RT

Examples: RT8532-16-3M0: Vertical 3-line choke for 16 A, with 3 mH ; RT8122-20-3M0: Horizontal 2-line choke for 20 A, with 3 mH

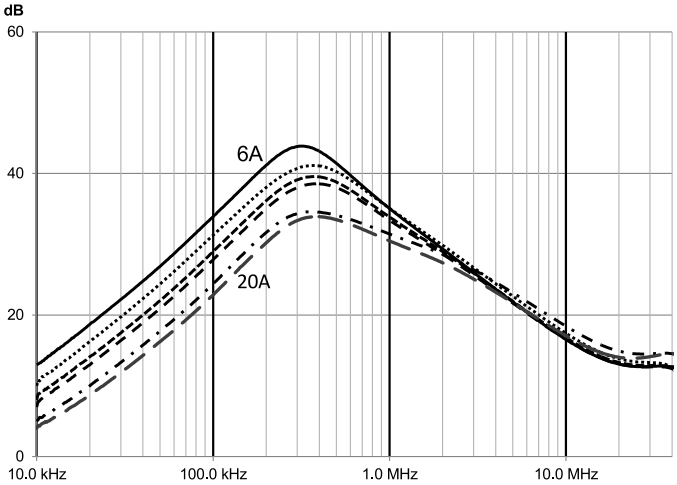
Typical choke attenuation/resonance frequency characteristics

Per CISPR 17; 50 Ω/50 Ω asym

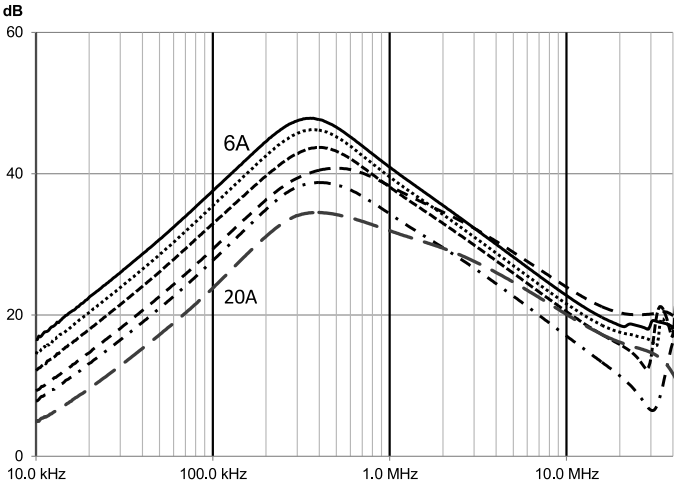
RT 8122



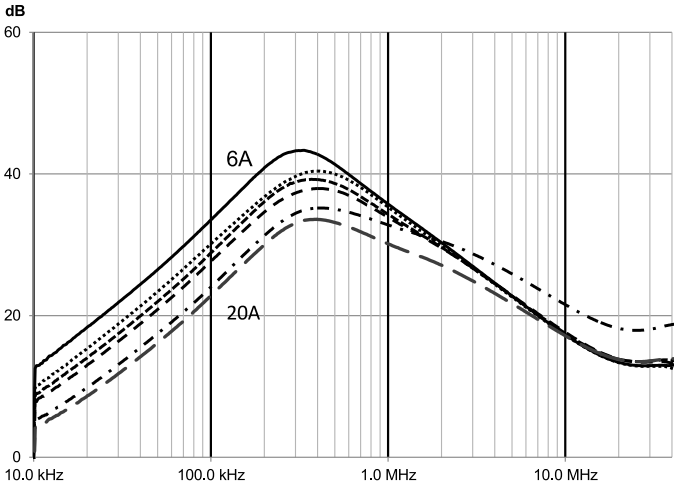
RT 8132



RT 8522



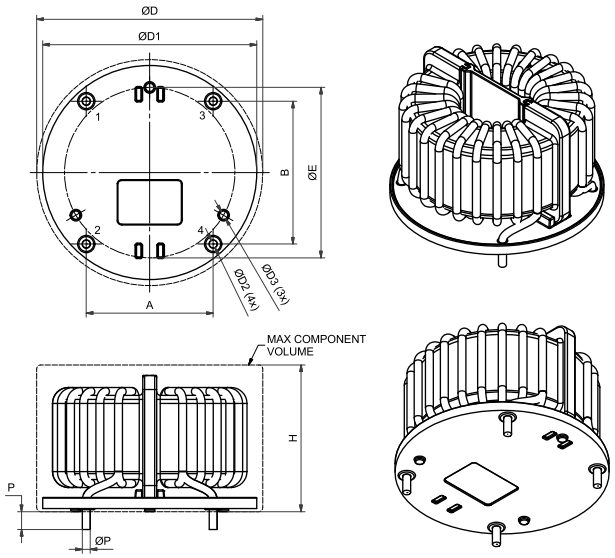
RT 8532



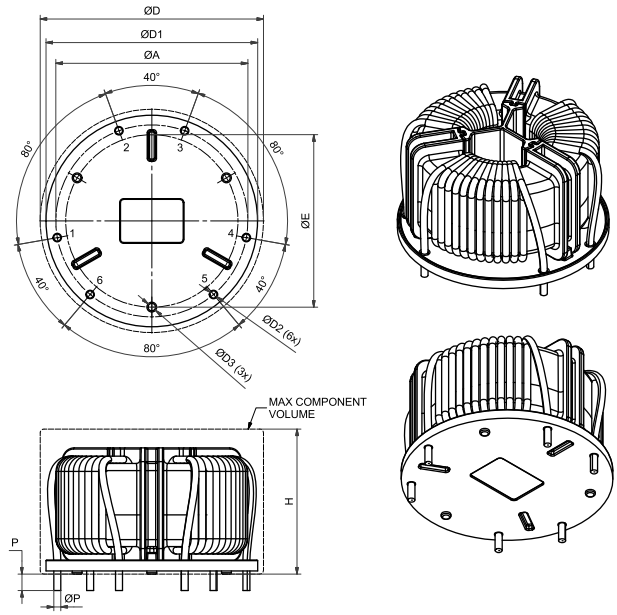
Mechanical data: Horizontal chokes (2-line and 3-line)

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Horizontal 2-line chokes (Size 1-3)



Horizontal 3-line chokes (Size 7-9)



Dimensions

	A	B	ØD (max)	H (max)	ØD1	ØD2	ØD3	ØE
	(±0.5)	(±0.5)			(±0.5)			
Size1 (RT8122-6-10M0, RT8122-8-8M0, RT8122-10-6M0)	21	25	45	34	42	1.5	2.5	36
SIze2 (RT8122-12-5M0, RT8122-16-4M0)	26	30	51	33	48	1.9	2.5	40
Size3 (RT8122-20-3M0)	32	36	57	37	54	2.1	2.5	43
	ØA		**ØD (max)**	**H (max)**	**ØD1**	**ØD2**		
	(±0.5)				(±0.5)			
Size 7 (RT8132-6-6M0, RT8132-8-4M8)	38	-	46	34	43	1.4	2.5	35
Size 8 (RT8132-10-4M0,RT8132-12-3M6)	44	-	51	33	48	1.7	2.5	40
Size 9 (RT8132-16-3M0, RT8132-20-2M5)	49	-	57	37	54	2.3	2.5	44

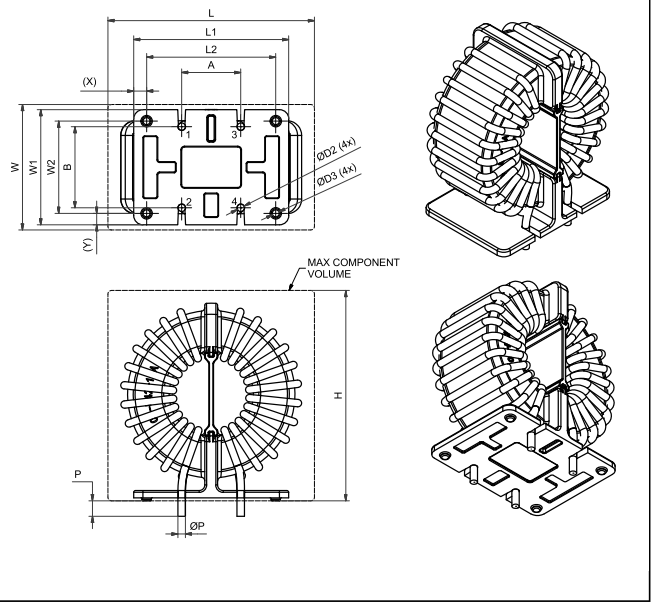
Pin material: Copper (base), Sn (final plating typical thickness 0.15 mm; composition: Sn-1.2AG-4Cu or SN-3Cu-0.25Ni)

Please visit www.schaffner.com to find more details on filter connections.

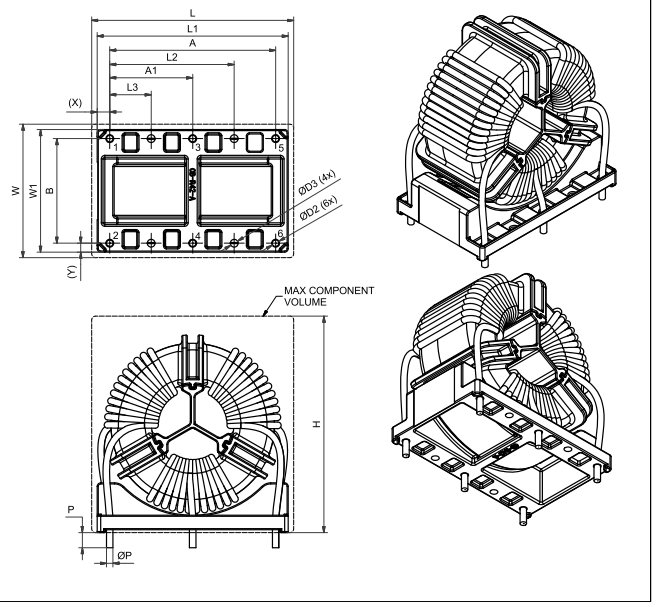
Mechanical data: Vertical chokes (2-line and 3-line)

All dimensions in mm; 1 inch = 25.4 mm
Tolerances according: ISO 2768-m/EN 22768-m

Vertical 2-line chokes (Size 4-6)



Vertical 3-line chokes (Size 10-12)



Dimensions

	A (±0.5)	A1 (±0.5)	B (±0.5)	L (max)	W (max)	H (max)	L1 (±0.5)	L2 (±0.5)	L3	W1 (±0.5)	W2 (±0.5)	ØD2	ØD3	X	Y
Size 4 (RT8522-6-10M0, RT8522-8-8M0, RT 8522-10-6M0)	16	-	20	43	32	44	32	26	-	27.8	22	1.5	2.5	3	2.9
SIze 5 (RT8522-12-5M0, RT8522-16-4M0)	16	-	22	50	32	52	39	33	-	27	23	1.9	2.5	3	2
Size 6 (RT8522-20-3M0)	16	-	22	56	32	57	42	35	-	31.2	25	2.1	2.5	3.5	3.1
Size 10 (RT8532-6-6M0, RT8532-8-4M8)	36	18	24	44	32	47	41	27	9	29	-	1.4	1.4	2.5	2.5
Size 11 (RT8532-10-4M0,RT8532-12-3M6)	38	19	24	49	34	53	46	28.5	9.5	31	-	1.7	1.7	4	3.5
Size 12 (RT8532-16-3M0, RT8532-20-2M5)	46	23	29	56	37	60	53	34.5	11.5	34	-	2.2	2.2	3.5	2.5

Pin material: Copper (base), Sn (final plating typical thickness 0.15 mm; composition: Sn-1.2AG-4Cu or SN-3Cu-0.25Ni)

Please visit www.schaffner.com to find more details on filter connections.

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