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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]



### 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.

## Technical specifications

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

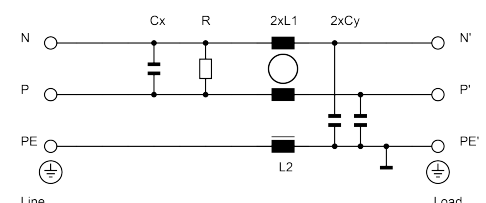
## Features and benefits

- Exceptional conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Rear/front or snap-in mounting
- 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



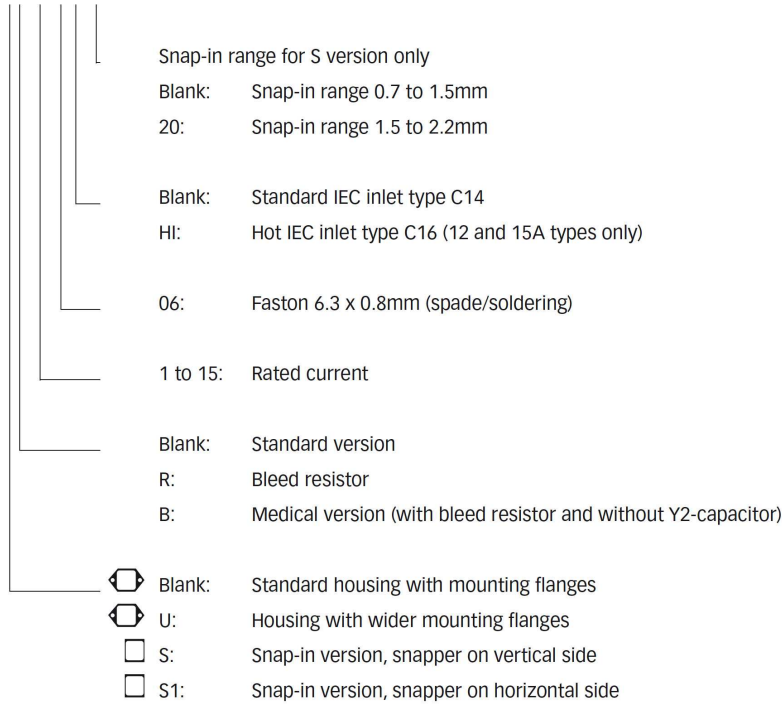
## Filter selection table

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

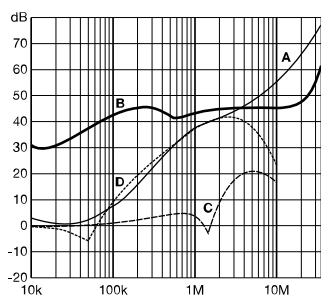


For example: FN 9233 E-15-06, FN 9233 ES1B-10-06-20, FN 9233 ER-12-06HI, FN 9233 EUB-8-06-20

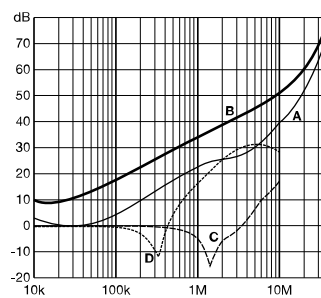
Typical filter attenuation

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

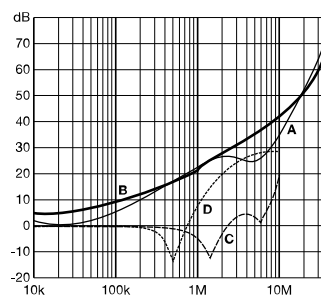
1 and 3 A types

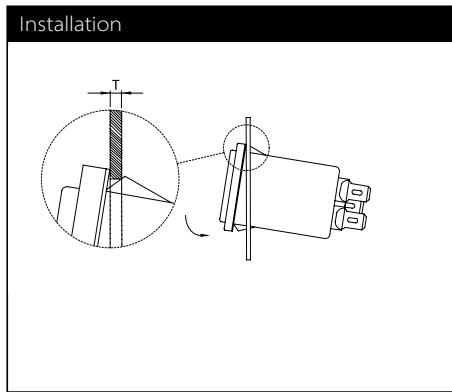
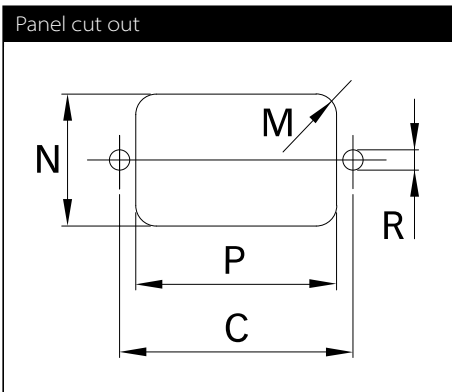
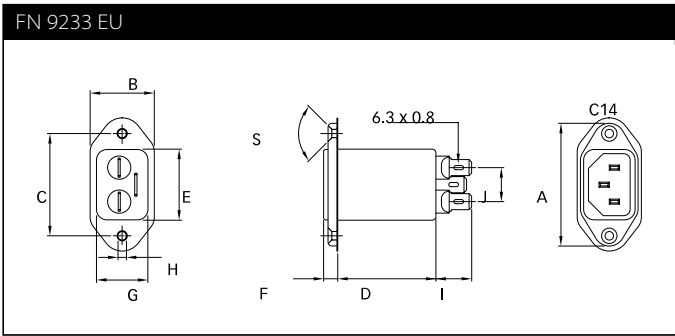
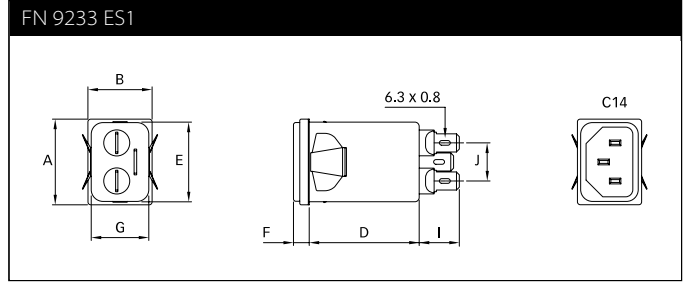
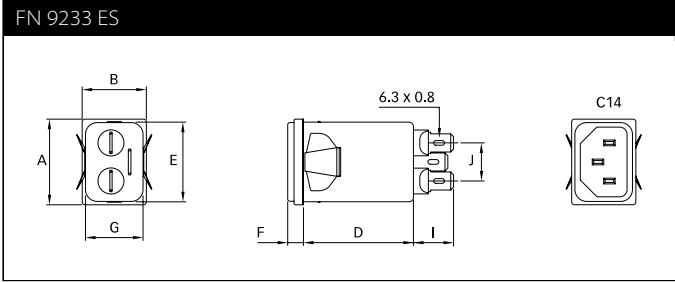
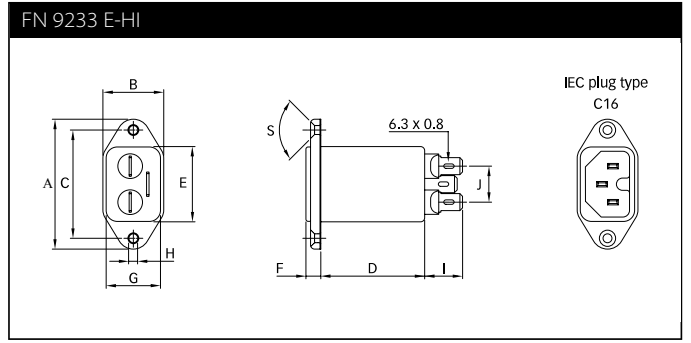
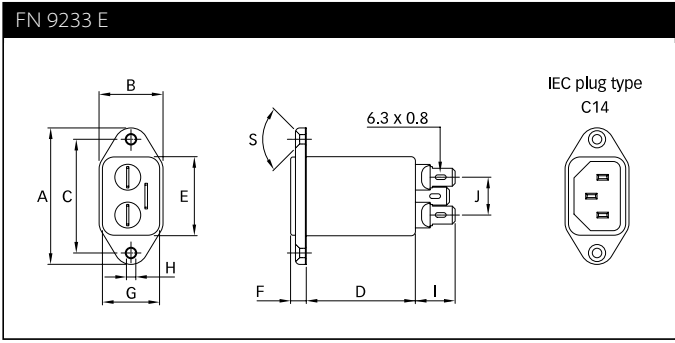


6 to 10 A types



12 and 15 A types





## Dimensions

	<b>FN 9233 E</b>	<b>FN 9233 EU</b>	<b>FN 9233 ES</b>	<b>FN 9233 ES1</b>	<b>FN 9233 E-HI</b>
<b>A</b>	48	48	29.9	29.9	48
<b>B</b>	22.4	25	22.4	22.4	22.4
<b>C</b>	40 ±0.2	40 ±0.2			40 ±0.2
<b>D</b>	46.8	46.7	46.8	46.8	46.8
<b>E</b>	27.8	27.9	27.9	27.9	27.8
<b>F</b>	5.7	5.7	5.7	5.7	5.7
<b>G</b>	20.5	20.5	20.5	20.5	20.5
<b>H</b>	Ø3.3	Ø3.3			Ø3.3
<b>I</b>	14	14	14	14	14
<b>J</b>	13.3	13.3	13.3	13.3	13.3
<b>M</b>	R ≤3	R ≤3	R ≤1.5	R ≤1.5	R ≤3
<b>N</b>	21.5	21.5	20.8	21.9	21.5
<b>P</b>	28.5	28.5	29.4	28.5	28.5
<b>R</b>	M3	M3			M3
<b>S</b>	90°	90°			90°
<b>T*</b>			0.7 - 1.5	0.7 - 1.5	
<b>T*</b>			1.5 - 2.2	1.5 - 2.2	

\* 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](http://www.schaffner.com) to find more details on connectors.



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