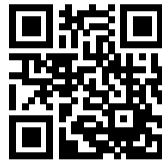


# High Performance EMC/RFI Filter with Earth Line Choke



- 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)



## Approvals & Compliances



(CQC except HI-types)

## Technical Specifications

<b>Maximum continuous operating voltage</b>	250 VAC, 50/60 Hz
<b>Nominal operating voltage</b>	230 VAC
<b>Rated currents</b>	1 to 15 A @ 50°C
<b>Operating frequency</b>	DC to 400 Hz
<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>Temperature range (operation and storage)</b>	-25°C to +85°C (25/85/21)
<b>Protection category</b>	IP 40 according to IEC 60529
<b>Flammability corresponding to</b>	Plastic material: UL 94 V0
<b>Approvals by rated current</b>	1 to 10 A (ENEC, CQC) 1 to 15 A (UL, CSA)
<b>Design corresponding to</b>	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
<b>MTBF (Mil-HB-217F)</b>	>1,710,000 h @ 50°C/230 V

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.

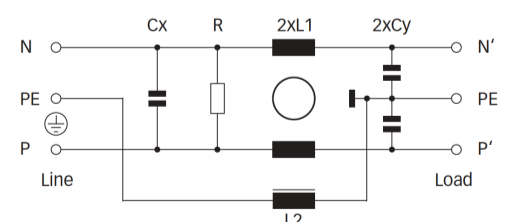
## Features and Benefits

- 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
- FN 9233 B versions comply with the requirements of IMOP 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

## Typical electrical schematic



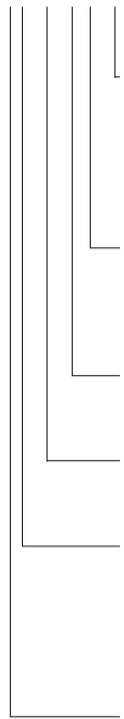
## Filter Selection Table

Filter	Rated current @ 50°C(25 °C)	Leakage current* @ 250 VAC/50 Hz (@ 120 VAC/60 Hz)	Inductance		Capacitance		Resistance R	Output connections 	Weight
			L1	L2	Cx	Cy			
	[A]	[mA]	[mH]	[mH]	[µF]	[nF]	[kΩ]		[g]
<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



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



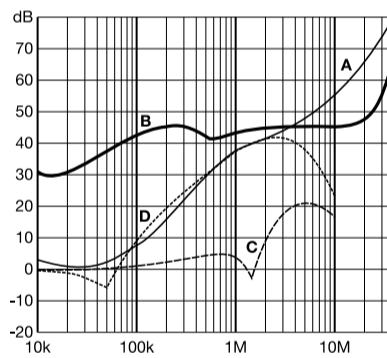
S1: Snap-in version, snapper on horizontal side

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

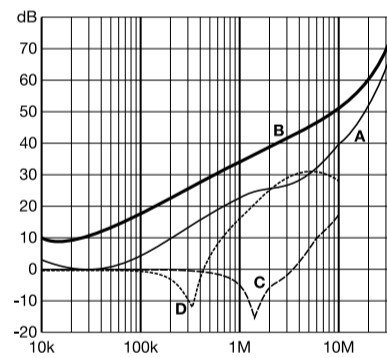
## Typical Filter Attenuation

Per CISPR 17; A=50  $\Omega$ /50  $\Omega$  sym; B=50  $\Omega$ /50  $\Omega$  asym; C=0.1  $\Omega$ /100  $\Omega$  sym; D=100  $\Omega$ /0.1  $\Omega$  sym

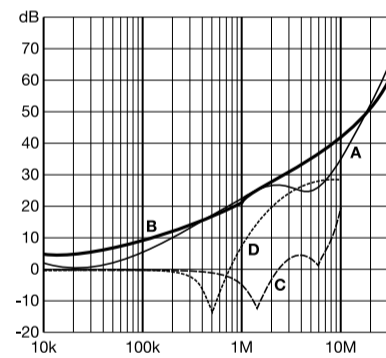
1 and 3 A types



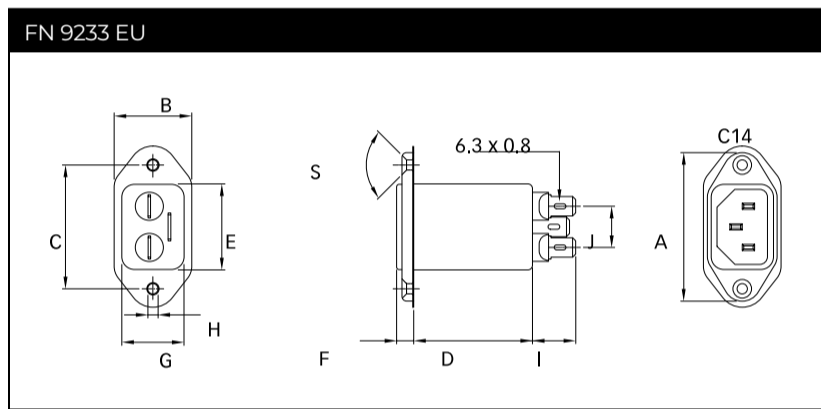
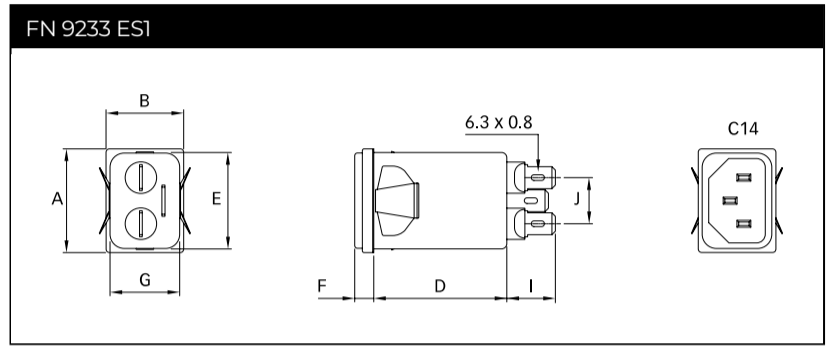
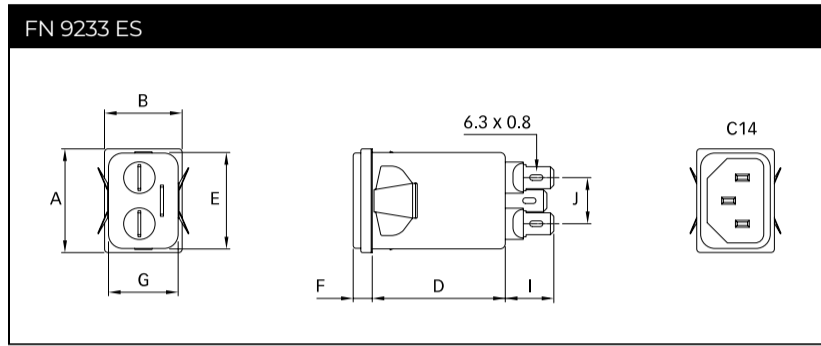
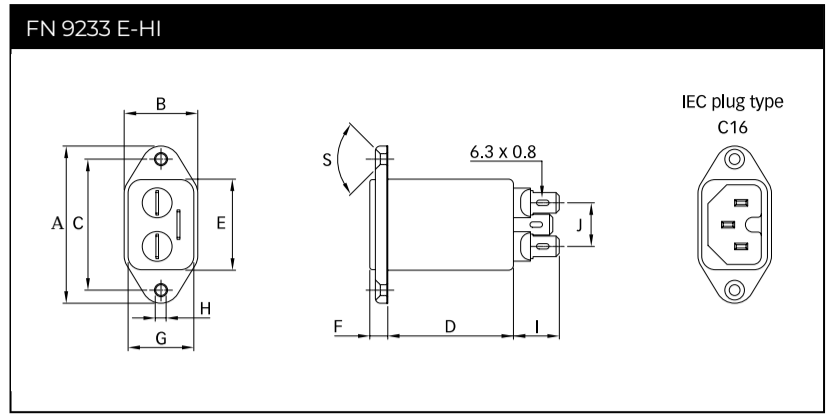
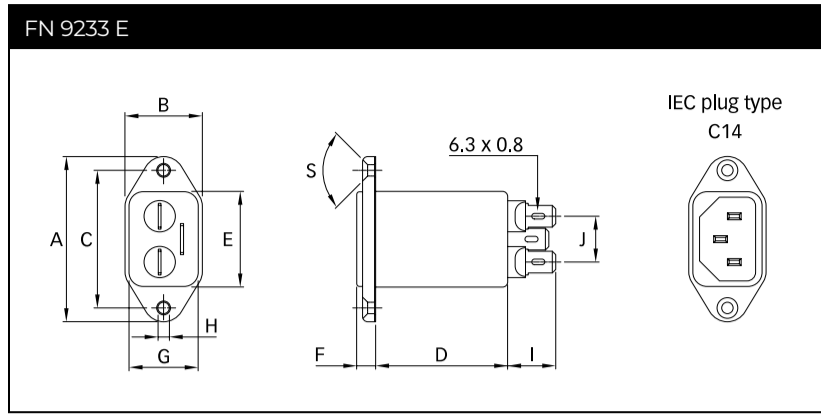
6 to 10 A types



12 and 15 A types

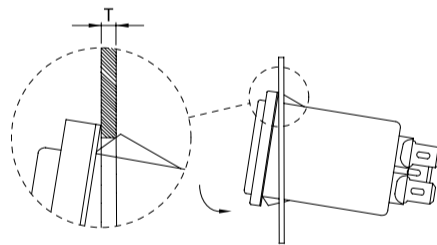
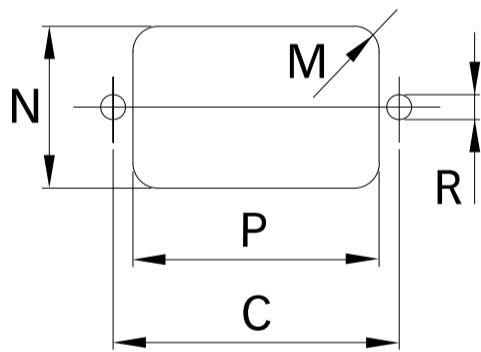


**Mechanical Data**



**Panel cut out**

**Installation**



## Dimensions

	FN 9233 E	FN 9233 EU	FN 9233 ES	FN 9233 ES1	FN 9233 E-HI	Tol.
<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	40			40	0.2
<b>D</b>	47.1	47.1	47.1	47.1	47.1	
<b>E</b>	27.8	27.7	27.8	27.8	27.8	+0.6/-0
<b>F</b>	5.7	5.7	5.7	5.7	5.7	
<b>G</b>	20.1	20.1	20.1	20.1	20.1	+0.6/-0
<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		

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

## Accessories

### IL 13P IEC C13 Rewireable Connectors with Locking System



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

### IL 13P IEC C13 Rewireable Angled Connectors with Locking System



- Protects appliances that are vulnerable to vibration
- Connector cannot be accidentally pulled or vibrated out of the inlet
- Space availability/constraints
- Different angles for ease of access
- Space saving
- Release locking mechanism
- Prevents accidental disconnection

### Power Cord with angled Locking System C13



- Protects appliances that are vulnerable to vibration
- Connector cannot be accidentally pulled or vibrated out of the inlet
- Space availability/constraints
- Different angles for ease of access
- Space saving
- Release locking mechanism
- Prevents accidental disconnection

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