



# 1-phase Filters FN 2020

## General Purpose EMI Filter

**SCHAFFNER**  
energy efficiency and reliability



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

### Approvals

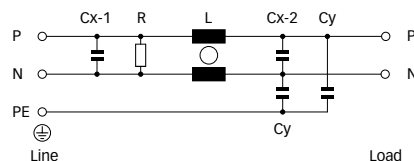


ROHS  
2002/95/EC

### Technical specifications

Maximum continuous operating voltage:	250VAC, 50/60Hz
Operating frequency:	dc to 400Hz
Rated currents:	1 to 60A @ 40°C max.
High potential test voltage:	P → PE 2000VAC for 2 sec
	P → PE 2500VAC for 2 sec (B types)
	P → N 760VAC for 2 sec (1 to 20A types)
	P → N 1100VDC for 2 sec (30 and 60A types)
Temperature range (operation and storage):	-25°C to +100°C (25/100/21)
Flammability corresponding to:	UL 94V-2 or better
Design corresponding to:	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
MTBF @ 40°C/230V (Mil-HB-217F):	1,250,000 hours
	1,750,000 hours (B types)

### Typical electrical schematic



### Features and benefits

- FN 2020 filters are designed for easy and fast chassis mounting.
- FN 2020 filters are also available as B versions without Y-capacitors for medical applications as well as A version with low capacitance 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/ampere 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

Filter selection table

Filter*	Rated current @ 40°C (25°C)	Leakage current** @ 230VAC/50Hz	Inductance L	Capacitance Cx Cy		Resistance R	Input/Output connections			Weight
	[A]	[mA]	[mH]	[μF]	[nF]	[kΩ]				[g]
FN 2020-1-..	1 (1.15)	0.74	12	0.15	4.7	1000	-06	-07		80
FN 2020-3-..	3 (3.45)	0.74	2.5	0.15	4.7	1000	-06	-07		80
FN 2020-6-..	6 (6.9)	0.74	1	0.15	4.7	1000	-06	-07		80
FN 2020-10-..	10 (11.5)	0.74	0.8	0.15	4.7	1000	-06	-07		85
FN 2020-12-..	12 (13.8)	0.74	0.7	0.15	4.7	1000	-06	-07		85
FN 2020-16-..	16 (18.4)	0.74	0.65	0.15	4.7	1000	-06	-07		140
FN 2020-20-..	20 (23)	0.74	0.6	0.15	4.7	1000	-06		-08	210
FN 2020-30-08	30 (34.5)	0.87	0.67	0.47	10	470			-08	470
FN 2020-60-24	60 (69)	0.87	1	1.5	10	220			-24	1100
FN 2020A-1-..	1 (1.15)	0.074	12	0.15	0.47	1000	-06	-07		80
FN 2020A-3-..	3 (3.45)	0.074	2.5	0.15	0.47	1000	-06	-07		80
FN 2020A-6-..	6 (6.9)	0.074	1	0.15	0.47	1000	-06	-07		80
FN 2020A-10-..	10 (11.5)	0.074	0.8	0.15	0.47	1000	-06	-07		85
FN 2020A-12-..	12 (13.8)	0.074	0.7	0.15	0.47	1000	-06	-07		85
FN 2020A-16-..	16 (18.4)	0.074	0.65	0.15	0.47	1000	-06	-07		140
FN 2020A-20-..	20 (23)	0.074	0.6	0.15	0.47	1000	-06		-08	210
FN 2020A-30-08	30 (34.5)	0.074	0.67	0.47	0.47	470			-08	470
FN 2020A-60-24	60 (69)	0.074	1	1.5	0.47	220			-24	1100
FN 2020B-1-..	1 (1.15)	0.002	12	0.15		1000	-06	-07		80
FN 2020B-3-..	3 (3.45)	0.002	2.5	0.15		1000	-06	-07		80
FN 2020B-6-..	6 (6.9)	0.002	1	0.15		1000	-06	-07		80
FN 2020B-10-..	10 (11.5)	0.002	0.8	0.15		1000	-06	-07		85
FN 2020B-12-..	12 (13.8)	0.002	0.7	0.15		1000	-06	-07		85
FN 2020B-16-..	16 (18.4)	0.002	0.65	0.15		1000	-06	-07		140
FN 2020B-20-..	20 (23)	0.002	0.6	0.15		1000	-06		-08	210
FN 2020B-30-08	30 (34.5)	0.002	0.67	0.47		470			-08	470
FN 2020B-60-24	60 (69)	0.002	1	1.5		220			-24	1100

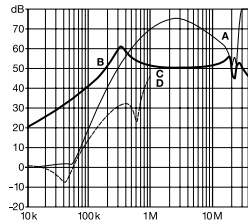
\* To compile a complete part number, please replace the -.. with the required I/O connection style (e.g. FN 2020-30-08, FN 2020B-10-06).

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

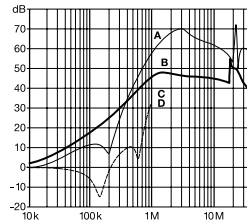
Typical filter attenuation

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

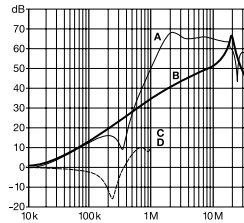
1 and 3A types



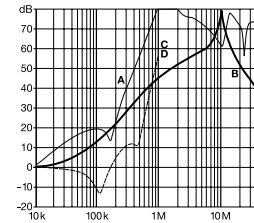
6 to 12A types



16 and 20A types

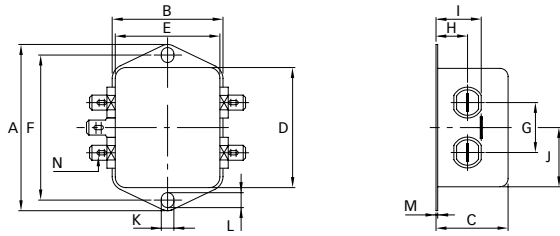


30 and 60A types

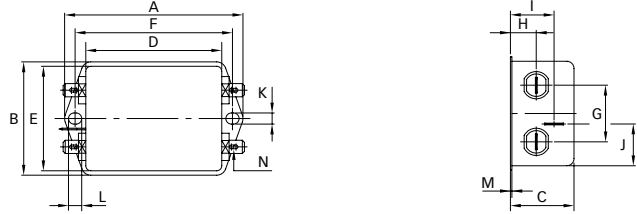


**Mechanical data**

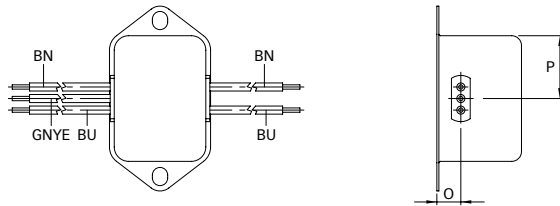
Connection style -06, 1 to 12A types



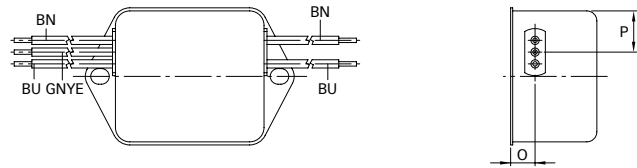
Connection style -06, 16 and 20A types



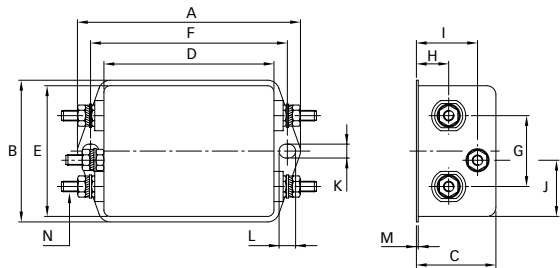
Connection style -07, 1 to 12A types (same dimensions as style -06)



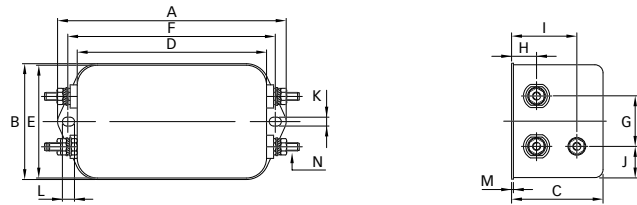
Connection style -07, 16A types (same dimensions as style -06)



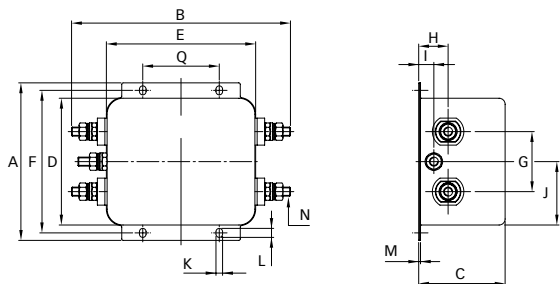
Connection style -08, 20A types



Connection style -08, 30A types



Connection style -24



Dimensions

	1A	3A	6A	10A	12A	16A	20A	30A	60A	Tolerances
<b>A</b>	64	64	64	64	64	71	85	113.5 ±1	105 ±1	±0.5
<b>B</b>	35	35	35	35	35	46.6	54	57.5 ±1	145.9 ±1	±0.5
<b>C</b>	29.3	29.3	29.3	29.3	29.3	29.3	30.3	45.4 ±1	57.6 ±1	±0.5
<b>D</b>	43.5	43.5	43.5	43.5	43.5	50.5	64.8	94 ±1	84.5 ±1	±0.5
<b>E</b>	32.5	32.5	32.5	32.5	32.5	44.5	49.8	56	99.5	±0.5
<b>F</b>	54	54	54	54	54	61	75	103	95	±0.3
<b>G</b>	21	21	21	21	21	21	27	25	40	±0.2
<b>H</b>	9.3	9.3	9.3	9.3	9.3	10.8	12.3	12.4	19.6	±0.5
<b>I</b>	15.3	15.3	15.3	15.3	15.3	19.3	20.8	32.4	10.1	±0.5
<b>J</b>	21.8	21.8	21.8	21.8	21.8	20.1	19.9	15.5	42.25	±0.5
<b>K</b>	5.3	5.3	5.3	5.3	5.3	5.3	5.3	4.4	4.4	
<b>L</b>	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6	6	
<b>M</b>	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.9	1.2	
<b>Connection style -06</b>										
<b>N</b>	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			
<b>Connection style -07</b>										
<b>O</b>	8.3	8.3	8.3	8.3	8.3	8.3				±0.5
<b>P</b>	21.8	21.8	21.8	21.8	21.8	14				±0.5
<b>AWG type wire</b>	AWG 20	AWG 20	AWG 18	AWG 18	AWG 16	AWG 16				
<b>Wire length</b>	140	140	140	140	140	140				+5
<b>Connection style -08</b>										
<b>N</b>							M4	M4		
<b>Connection style -24</b>										
<b>N</b>									M6	
<b>Q</b>									51	±0.2

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

**Headquarters and  
global innovation and  
development center**

**Schaffner Group**  
Nordstrasse 11  
4542 Luterbach  
Switzerland  
T +41 32 681 66 26  
F +41 32 681 66 30  
info@schaffner.ch  
[www.schaffner.com](http://www.schaffner.com)

**Sales and application centers**

**China**

**Schaffner EMC Ltd. Shanghai**  
Building 11, Lane 1365  
East Kangqiao Road  
Shanghai 201319  
T +86 21 6813 9855  
F +86 21 6813 9811  
cschina@schaffner.com  
[www.schaffner.com](http://www.schaffner.com)

**Germany**

**Schaffner Deutschland GmbH**  
Schoemperlenstrasse 12B  
76185 Karlsruhe  
T +49 721 56910  
F +49 721 569110  
germanysales@schaffner.com

**Finland**

**Schaffner Oy**  
Tynninkuja 7  
08700 Lohja  
T +358 19 35 72 71  
F +358 19 32 66 10  
finlandsales@schaffner.com

**France**

**Schaffner EMC S.A.S.**  
112, Quai de Bezons  
95103 Argenteuil  
T +33 1 34 34 30 60  
F +33 1 39 47 02 28  
francesales@schaffner.com

**Italy**

**Schaffner EMC S.r.l.**  
Via Galileo Galilei, 47  
20092 Cinisello Balsamo (MI)  
T +39 02 66 04 30 45/47  
F +39 02 61 23 943  
italysales@schaffner.com

**Japan**

**Schaffner EMC K.K.**  
Mitsui-Seimei Sangenjaya Bldg. 7F  
1-32-12, Kamiiuma, Setagaya-ku  
Tokyo 154-0011  
T +81 3 5712 3650  
F +81 3 5712 3651  
japansales@schaffner.com  
[www.schaffner.jp](http://www.schaffner.jp)

**Sweden**

**Schaffner EMC AB**  
Turebergstorg 1, 6  
19147 Sollentuna  
T +46 8 5792 1121/22  
F +46 8 92 96 90  
swedensales@schaffner.com

**Switzerland**

**Schaffner EMV AG**  
Nordstrasse 11  
4542 Luterbach  
T +41 32 681 66 26  
F +41 32 681 66 41  
sales@schaffner.ch

**Singapore**

**Schaffner EMC Pte Ltd.**  
Blk 3015A Ubi Road 1  
05-09 Kampong Ubi Industrial  
Estate  
T +65 6377 3283  
F +65 6377 3281  
singaporesales@schaffner.com

**Spain**

**Schaffner EMC España**  
Calle Caléndula 93,  
Miniparc III, Edificio E  
El Soto de la Moraleja,  
Alcobendas  
28109 Madrid  
T +34 618 176 133  
spainsales@schaffner.com

**Taiwan**

**Schaffner EMV Ltd.**  
6th Floor, No 413  
Rui Guang Road  
Neihu District  
Taipei City 114  
T +886 2 87525050  
F +886 2 87518086  
taiwansales@schaffner.com

**Thailand**

**Schaffner EMC Co. Ltd.**  
Northern Region Industrial Estate  
67 Moo 4 Tambon Ban Klang  
Amphur Muang P.O. Box 14  
Lamphun 51000  
T +66 53 58 11 04  
F +66 53 58 10 19  
thailandsales@schaffner.com

**UK**

**Schaffner Ltd.**  
5 Ashville Way  
Molly Millars Lane  
Wokingham  
Berkshire RG41 2PL  
T +44 118 9770070  
F +44 118 9792969  
uksales@schaffner.com  
[www.schaffner.uk.com](http://www.schaffner.uk.com)

**USA**

**Schaffner EMC Inc.**  
52 Mayfield Avenue  
Edison, New Jersey 08837  
T +1 732 225 9533  
F +1 732 225 4789  
usasales@schaffner.com  
[www.schaffner.com/us](http://www.schaffner.com/us)

To find your local partner within  
Schaffner's global network, please go to

[www.schaffner.com](http://www.schaffner.com)

May 2011

© 2011 Schaffner EMC.  
Specifications subject to change without  
notice. All trademarks recognized.

Schaffner is an ISO-registered company.  
Its products are designed and manufac-  
tured under the strict quality and environ-  
mental requirements of the ISO 9001 and  
ISO 14001 standards.

This document has been carefully  
checked. However, Schaffner does not  
assume any liability for errors or inac-  
curacies.