

1-phase Filters FN 2090

Multi-stage EMI Filter with Excellent Attenuation Performance

SCHAFNER
energy efficiency and reliability



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

Approvals

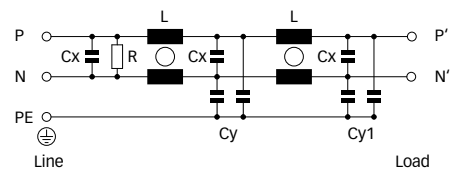


RoHS

Technical specifications

Maximum continuous operating voltage:	250VAC, 50/60Hz
Operating frequency:	dc to 400Hz
Rated currents:	1 to 30A @ 40°C max.
High potential test voltage:	P → PE 2000VAC for 2 sec (standard types) P → PE 2500VAC for 2 sec (B types) P → N 1100VDC 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 94V-2 or better
Surge pulse protection (optional):	2kV, IEC 61000-4-5
MTBF @ 40°C/230V (Mil-HB-217F):	1,300,000 hours (1 to 10A types) 1,100,000 hours (12A types) 517,000 hours (16 and 30A types)

Typical electrical schematic



Features and benefits

- FN 2090 two-stage filters are designed for easy and fast chassis mounting.
- The FN 2090 filters are also available as B versions with no Y-capacitors for medical applications as well as A versions with low capacitance for safety critical applications with a requirement for low leakage currents.
- All filters provide an exceptional conducted attenuation performance, based on chokes with high permeable core material and excellent thermal behavior.
- 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.
- FN 2090 filters are also available as single-stage filters (FN 2050 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 requiring high filter performance

Filter selection table

Filter*	Rated current @ 40°C (25°C)	Leakage current** @ 230VAC/50Hz	Inductance L	Cx	Capacitance Cy	Capacitance Cy1	Resistance R	Input/Output connections			Weight
	[A]	[mA]	[mH]	[μF]	[nF]	[nF]	[kΩ]				[g]
FN 2090-1-..	1 (1.1)	0.5	20	0.22	2.2	1.0	680	-06	-07		73
FN 2090-3-..	3 (3.4)	0.5	14	0.33	2.2	1.0	470	-06	-07		158
FN 2090-4-..	4 (4.5)	0.5	14	0.33	2.2	1.0	470	-06	-07		176
FN 2090-6-..	6 (6.7)	0.67	8	0.47	3.3	1.0	330	-06	-07		191
FN 2090-8-..	8 (8.9)	0.67	8	0.47	3.3	1.0	330	-06	-07		330
FN 2090-10-..	10 (11.2)	0.67	8	0.47	3.3	1.0	330	-06	-07		369
FN 2090-12-..	12 (13.4)	1.02	4	1	10	1.0	220	-06	-07		391
FN 2090-16-..	16 (17.9)	1.02	4	1	10	1.0	220	-06	-07		425
FN 2090-20-..	20 (22.4)	1.02	2.7	1	10	1.0	220	-06		-08	530
FN 2090-30-08	30 (33.5)	1.02	1.5	1	10	1.0	220			-08	548
FN 2090A-1-..	1 (1.1)	0.08	20	0.22	0.47	0.47	680	-06	-07		73
FN 2090A-3-..	3 (3.4)	0.08	14	0.33	0.47	0.47	470	-06	-07		158
FN 2090A-4-..	4 (4.5)	0.08	14	0.33	0.47	0.47	470	-06	-07		176
FN 2090A-6-..	6 (6.7)	0.08	8	0.47	0.47	0.47	330	-06	-07		191
FN 2090A-8-..	8 (8.9)	0.08	8	0.47	0.47	0.47	330	-06	-07		330
FN 2090A-10-..	10 (11.2)	0.08	8	0.47	0.47	0.47	330	-06	-07		369
FN 2090A-12-..	12 (13.4)	0.08	4	1	0.47	0.47	220	-06	-07		391
FN 2090A-16-..	16 (17.9)	0.08	4	1	0.47	0.47	220	-06	-07		425
FN 2090A-20-..	20 (22.4)	0.08	2.7	1	0.47	0.47	220	-06		-08	530
FN 2090B-1-..	1 (1.1)	0.002	20	0.22			680	-06	-07		73
FN 2090B-3-..	3 (3.4)	0.002	14	0.33			470	-06	-07		158
FN 2090B-4-..	4 (4.5)	0.002	14	0.33			470	-06	-07		176
FN 2090B-6-..	6 (6.7)	0.002	8	0.47			330	-06	-07		191
FN 2090B-8-..	8 (8.9)	0.002	8	0.47			330	-06	-07		330
FN 2090B-10-..	10 (11.2)	0.002	8	0.47			330	-06	-07		369
FN 2090B-12-..	12 (13.4)	0.002	4	1			220	-06	-07		391
FN 2090B-16-..	16 (17.9)	0.002	4	1			220	-06	-07		425
FN 2090B-20-..	20 (22.4)	0.002	2.7	1			220	-06		-08	530
FN 2090B-30-08	30 (33.5)	0.002	1.5	1			220			-08	548

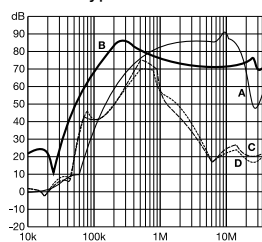
* To compile a complete part number, please replace the -.. with the required I/O connection style. For surge pulse protection, please add Z (e.g. FN 2090Z-10-06, FN 2090BZ-20-08).

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

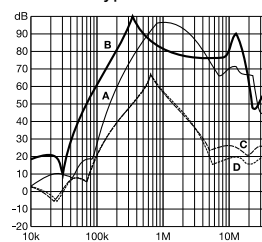
Typical filter attenuation

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

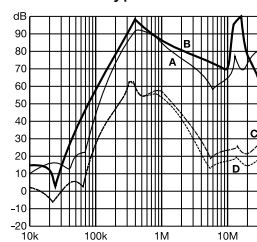
1 to 4A types



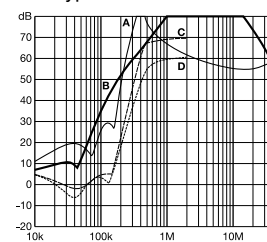
6 to 10A types



12 to 20A types

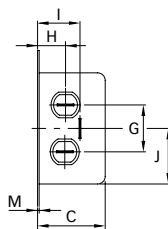
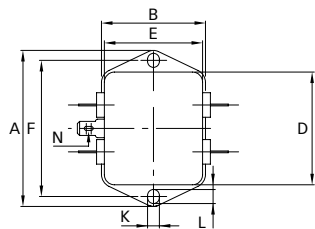


30A types

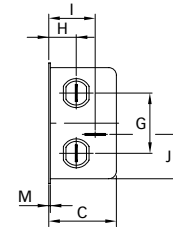
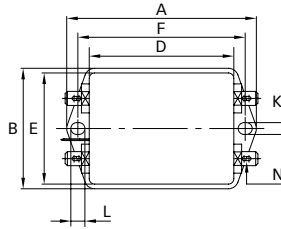


Mechanical data

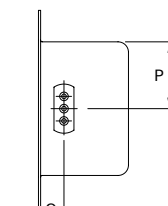
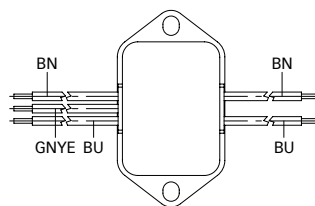
Connection style -06, 1A types



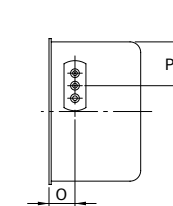
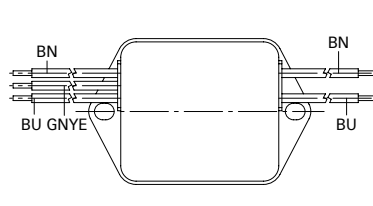
Connection style -06, 3 to 20A types



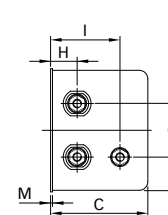
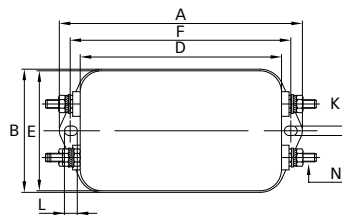
Connection style -07, 1A types (same dimensions as style -06)



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



Connection style -08, 20 and 30A types

**Dimensions**

	1A	3A	4A	6A	8A	10A	12A	16A	20A	30A	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	0.9	0.9	0.9	0.9	0.9	0.9	
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			
Connection style -08											
N									M4	M4	

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

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**Headquarters, global innovation
and development center**

Schaffner Group
Nordstrasse 11
4542 Luterbach
Schweiz
T +41 32 681 66 26
F +41 32 681 66 30
info@schaffner.com
www.schaffner.com

To find your local partner within
Schaffner's global network, please go to
www.schaffner.com

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Sales and application centers

China
Schaffner EMC Ltd. Shanghai
T20-3, No 565 Chuangye Road
Pudong New Area
Shanghai 201201
T +86 21 3813 9500
F +86 21 3813 9501 / 02
cschina@schaffner.com
www.schaffner.com

Finland
Schaffner Oy
Sauvonrinne 19 H
08500 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

Germany
Schaffner Deutschland GmbH
Schoemperlenstrasse 12B
76185 Karlsruhe
T +49 721 56910
F +49 721 569110
germanysales@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, Kamiyuma, Setagaya-ku
Tokyo 154-0011
T +81 3 5712 3650
F +81 3 5712 3651
japansales@schaffner.com
www.schaffner.jp

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

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

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

USA
Schaffner EMC Inc.
52 Mayfield Avenue
Edison, New Jersey 08837
T +1 732 225 9533
F +1 732 225 4789
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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

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