

1-phase Filters
FN 2090

Multi-stage EMI Filter with Excellent Attenuation Performance

SCHAFFNER
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)**

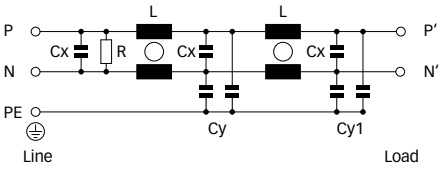
Approvals

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 2030 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	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

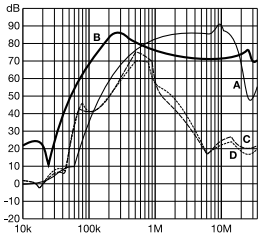
* To compile a complete part number, please replace the -.. with the required I/O connection style. For surge pulse protection, please add Z (e.g. FN 2090Z-10-06, FN 2090BZ-20-08).

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

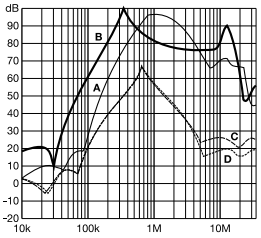
Typical filter attenuation

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

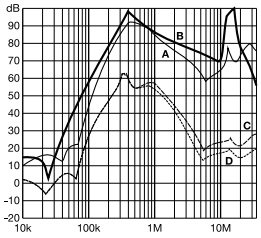
1 to 4A types



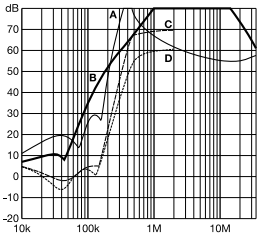
6 to 10A types



12 to 20A types

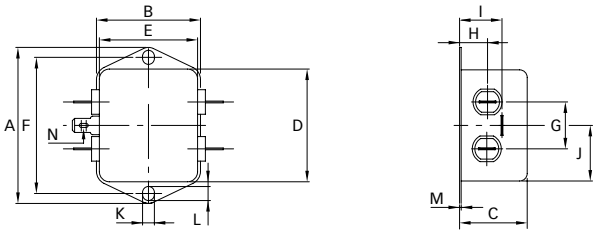


30A types

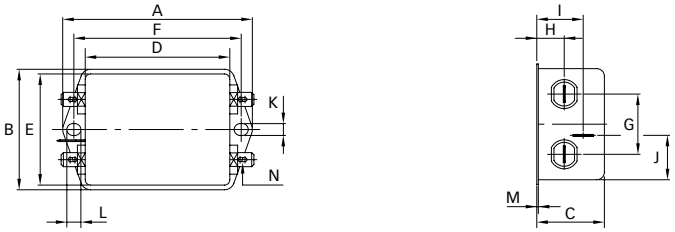


Mechanical data

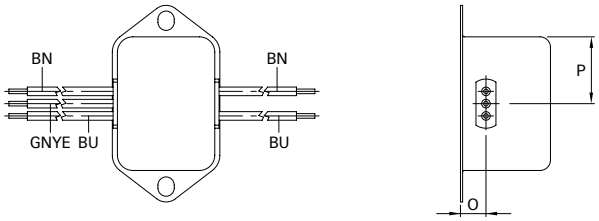
Connection style -06, 1A types



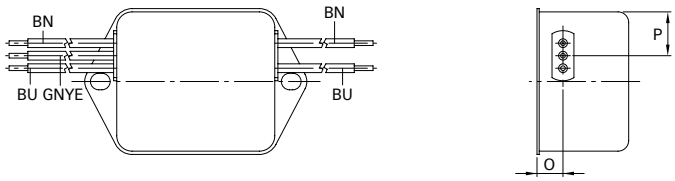
Connection style -06, 3 to 20A types



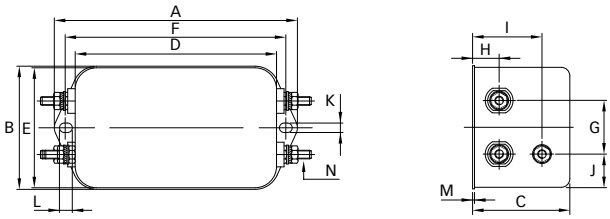
Connection style -07, 1A types (same dimensions as style -06)



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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