

# Multi-stage EMI Filter with Excellent Attenuation Performance



- | Rated currents from 1 to 30 A
- | 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)

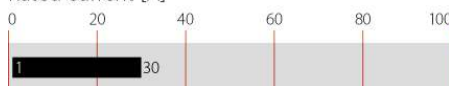


### Performance indicators

Attenuation performance



Rated current [A]



### Approvals



### 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 singlestage filters (FN 2030 series).
- | Various terminal options allow you to select the desired connection style.

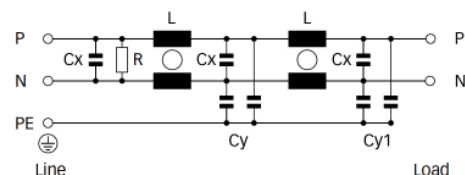
### Technical specifications

<b>Operating voltage</b>	110/250 VAC, 50/60 Hz
<b>Operating frequency</b>	dc to 400 Hz
<b>Rated currents</b>	1 to 30 A @ 40 °C max.
<b>High potential test voltage</b>	P → PE 2000 VAC for 2 sec (standard types) P → N 1100 VDC for 2 sec P → PE 2500 VAC for 2 sec (B types)
<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>Surge pulse protection (optional)</b>	2 kV, IEC 61000-4-5
<b>MTBF @ 40°C/230V (Mil-HB-217F)</b>	1,300,000 hours (1 to 10 A types) 1,100,000 hours (12 A types) 517,000 hours (16 and 30 A types)
<b>Temperature range (operation and storage)</b>	-25 °C to +100 °C (25/100/21)

### 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

### Typical electrical schematic



### Filter selection table

Filter*	Rated current @ 40 °C (25 °C) [A]	Leakage current** @ 230V AC/50 Hz [mA]	Inductance L [mH]	Capacitance			Resistance R [kΩ]	Input/Output connections		Weight [g]
				Cx [μF]	Cy [nF]	Cy1 [nF]				
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.

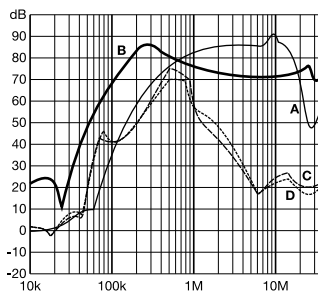
For surge pulse protection, please add Z (e.g. FN 2090Z-10-06, FN 2090BZ-20-08).

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

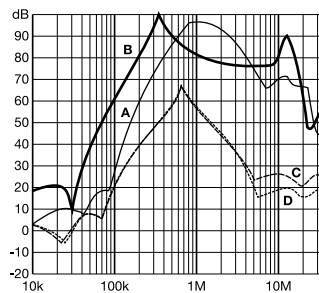
### Typical filter attenuation

Per CISPR 17; A = 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

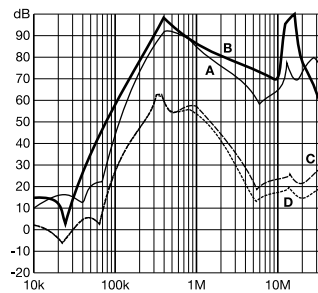
1 to 4 A types



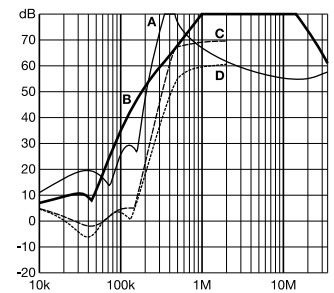
6 to 10 A types



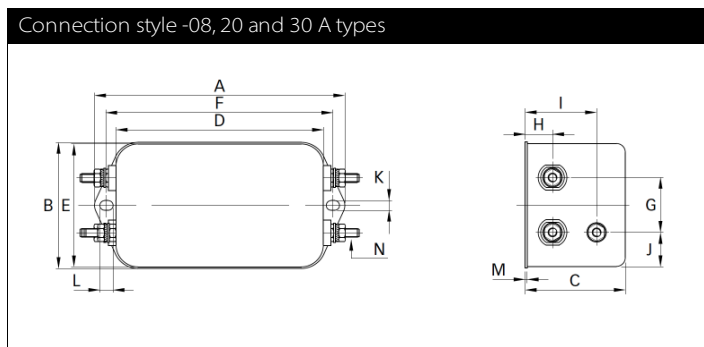
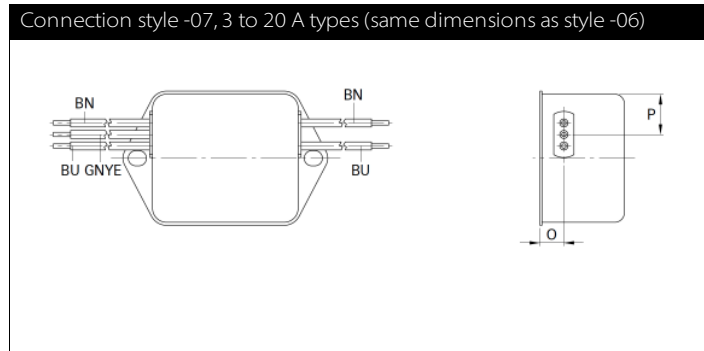
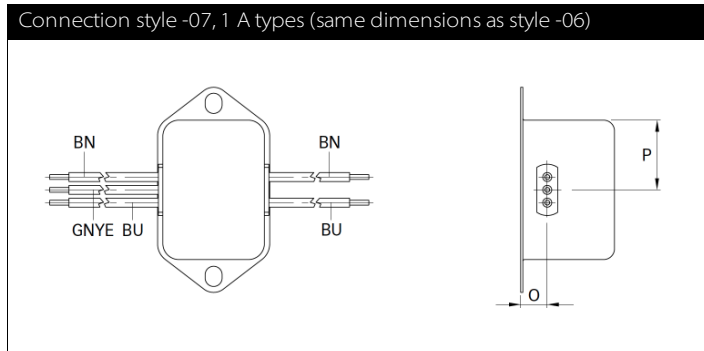
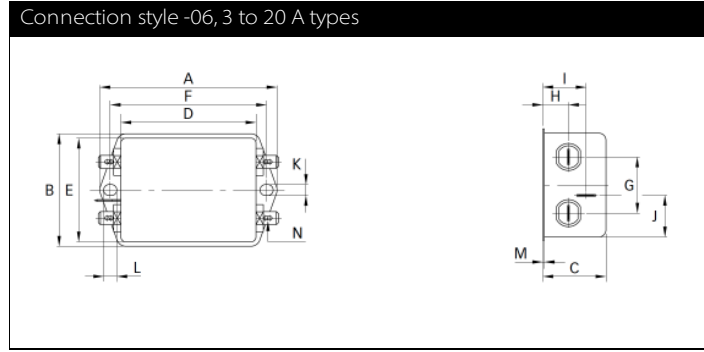
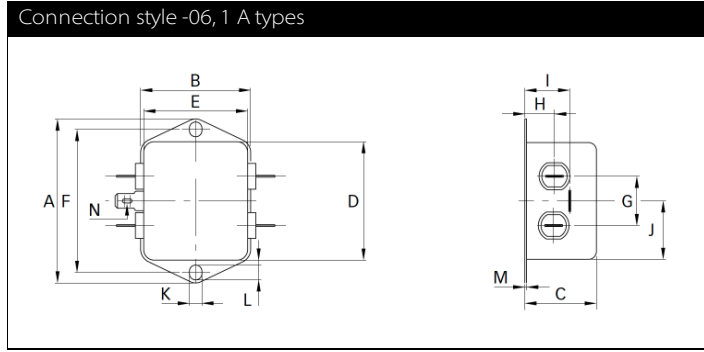
12 to 20 A types



30 A types



**Mechanical data**



## Dimensions

	1 A	3 A	4 A	6 A	8 A	10 A	12 A	16 A	20 A	30 A	Tolerances
<b>A</b>	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>B</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
<b>C</b>	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
<b>D</b>	50.5	64.8	64.8	64.8	94 ±1	94 ±1	94 ±1	94 ±1	94 ±1	94 ±1	±0.5
<b>E</b>	44.5	49.8	49.8	49.8	56	56	56	56	56	56	±0.5
<b>F</b>	61	75	75	75	103	103	103	103	103	103	±0.3
<b>G</b>	21	27	27	27	25	25	25	25	25	25	±0.2
<b>H</b>	10.8	12.3	12.3	12.3	12.4	12.4	12.4	12.4	12.4	12.4	±0.5
<b>I</b>	16.8	20.8	20.8	20.8	32.4	32.4	32.4	32.4	32.4	32.4	±0.5
<b>J</b>	25.25	19.9	19.9	19.9	15.5	15.5	15.5	15.5	15.5	15.5	±0.5
<b>K</b>	5.3	5.3	5.3	5.3	4.4	4.4	4.4	4.4	4.4	4.4	
<b>L</b>	6.3	6.3	6.3	6.3	6	6	6	6	6	6	
<b>M</b>	0.7	0.7	0.7	0.7	0.9	0.9	0.9	0.9	0.9	0.9	
<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	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	8.4	8.4	8.4	8.4	8.4	8.4	±0.5
<b>P</b>	14	14.9	14.9	14.9	18	18	18	18	18	18	±0.5
<b>AWG type wire</b>	AWG 20	AWG 20	AWG 20	AWG 18	AWG 18	AWG 18	AWG 16	AWG 16			
<b>Wire length</b>	140	140	140	140	140	140	140	140			
<b>Connection style -08</b>											
<b>N</b>									M4	M4	

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 filter connectors.



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