

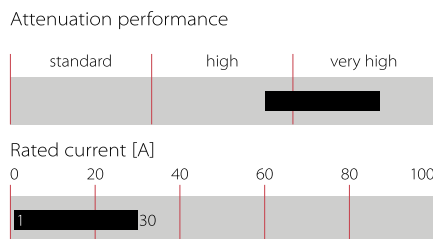
Multi-stage AC/DC EMI Filter with Excellent Attenuation Performance



- 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 enhanced performance versions
- Optional overvoltage protection (Z type)



Performance indicators



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.
- FN 2090 filters offers an optimized filter range for enhanced performance AC and DC applications, in same compact size (KK, LL, NN types)
- All filters provide an exceptional conducted attenuation performance, based on chokes with high permeable core material and excellent thermal behaviour.
- 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 (Z type).
- 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

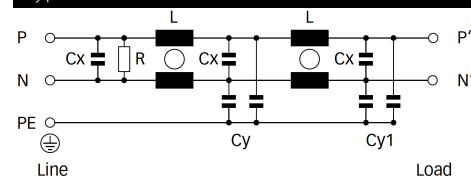
Rated voltage*	250 VAC, 50/60 Hz; 250 VDC
Operating frequency	dc to 400 Hz
Rated currents	1 to 30 A @ 40°C max.
High potential test voltage	P → PE 2000 VAC for 2 sec (equiv. cap <88 nF) P → PE 2550 VDC for 2 sec (equiv. cap >88 nF) P → PE 2500 VAC for 2 sec (B types) P → N 1100 VDC for 2 sec
Temperature range (operation and storage)	-25°C to +100°C (25/100/21)
Certified to	UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (applies to AC and DC applications)
Flammability corresponding to	UL 94 V-2 or better
Surge pulse protection (Z type)	2 kV (PN), IEC 61000-4-5
MTBF @ 40°C/230 V (Mil-HB-217F)	1,300,000 hours (1 to 10 A types) 1,100,000 hours (12 A types) 517,000 hours (16 and 30 A types)

*maximum RMS operating voltage at rated frequency or the maximum DC operating voltage

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** @ 250V AC/50 Hz (@ 120V AC/60 Hz) [mA]	Inductance L [mH]	Capacitance			Resistance R [kΩ]	Input/Output connections		Weight [g]
				Cx [μF]	Cy1 [nF]	Cy2 [nF]				
FN 2090-1-..	1 (1.1)	0.45 (0.26)	20	0.22	2.2	1.0	680	-06	-07	73
FN 2090-3-..	3 (3.4)	0.45 (0.26)	14	0.33	2.2	1.0	470	-06	-07	158
FN 2090-4-..	4 (4.5)	0.45 (0.26)	14	0.33	2.2	1.0	470	-06	-07	176
FN 2090-6-..	6 (6.7)	0.61 (0.35)	8	0.47	3.3	1.0	330	-06	-07	191
FN 2090-8-..	8 (8.9)	0.61 (0.35)	8	0.47	3.3	1.0	330	-06	-07	330
FN 2090-10-..	10 (11.2)	0.61 (0.35)	8	0.47	3.3	1.0	330	-06	-07	369
FN 2090-12-..	12 (13.4)	0.93 (0.54)	4	1	10	1.0	220	-06	-07	391
FN 2090-16-..	16 (17.9)	0.93 (0.54)	4	1	10	1.0	220	-06	-07	425
FN 2090-20-..	20 (22.4)	0.93 (0.54)	2.7	1	10	1.0	220	-06	-08	530
FN 2090-30-08	30 (33.5)	0.93 (0.54)	1.5	1	10	1.0	220		-08	548
FN 2090 A-1-..	1 (1.1)	0.13 (0.07)	20	0.22	0.47	0.47	680	-06	-07	73
FN 2090 A-3-..	3 (3.4)	0.13 (0.07)	14	0.33	0.47	0.47	470	-06	-07	158
FN 2090 A-4-..	4 (4.5)	0.13 (0.07)	14	0.33	0.47	0.47	470	-06	-07	176
FN 2090 A-6-..	6 (6.7)	0.13 (0.07)	8	0.47	0.47	0.47	330	-06	-07	191
FN 2090 A-8-..	8 (8.9)	0.13 (0.07)	8	0.47	0.47	0.47	330	-06	-07	330
FN 2090 A-10-..	10 (11.2)	0.13 (0.07)	8	0.47	0.47	0.47	330	-06	-07	369
FN 2090 A-12-..	12 (13.4)	0.13 (0.07)	4	1	0.47	0.47	220	-06	-07	391
FN 2090 A-16-..	16 (17.9)	0.13 (0.07)	4	1	0.47	0.47	220	-06	-07	425
FN 2090 A-20-..	20 (22.4)	0.13 (0.07)	2.7	1	0.47	0.47	220	-06	-08	530
FN 2090 B-1-..	1 (1.1)	0.00	20	0.22			680	-06	-07	73
FN 2090 B-3-..	3 (3.4)	0.00	14	0.33			470	-06	-07	158
FN 2090 B-4-..	4 (4.5)	0.00	14	0.33			470	-06	-07	176
FN 2090 B-6-..	6 (6.7)	0.00	8	0.47			330	-06	-07	191
FN 2090 B-8-..	8 (8.9)	0.00	8	0.47			330	-06	-07	330
FN 2090 B-10-..	10 (11.2)	0.00	8	0.47			330	-06	-07	369
FN 2090 B-12-..	12 (13.4)	0.00	4	1			220	-06	-07	391
FN 2090 B-16-..	16 (17.9)	0.00	4	1			220	-06	-07	425
FN 2090 B-20-..	20 (22.4)	0.00	2.7	1			220	-06	-08	530
FN 2090 B-30-08	30 (33.5)	0.00	1.5	1			220		-08	548
Enhanced performance										
FN 2090 KK-1-06	1 (1.15)	3.46 (1.99)	20	0.22	22	22	680	-06		95
FN 2090 NN-3-06	3 (3.4)	15.71 (9.05)	14	0.33	100	100	470	-06		200
FN 2090 NN-4-06	4 (4.5)	15.71 (9.05)	14	0.33	100	100	470	-06		210
FN 2090 NN-6-06	6 (6.7)	15.71 (9.05)	8	0.47	100	100	330	-06		220
FN 2090 NN-8-06	8 (8.9)	15.71 (9.05)	8	0.47	100	100	330	-06		340
FN 2090 LL-10-06	10 (11.2)	5.18 (2.98)	8	0.47	33	33	330	-06		470
FN 2090 LL-12-06	12 (13.4)	5.18 (2.98)	4	1	33	33	220	-06		500
FN 2090 LL-16-06	16 (17.9)	5.18 (2.98)	4	1	33	33	220	-06		530
FN 2090 LL-20-..	20 (23)	5.18 (2.98)	2.7	1	33	33	220	-06	-08	580
FN 2090 LL-30-08	30 (33.5)	5.18 (2.98)	1.5	1	33	33	220		-08	600

** 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). The different letters code the used Cy values in the filter type (A = 0.47nF; K = 22nF; L = 33nF; N = 100nF; as the FN2090 is a dual stage filter each letter stands for one stage of Cy)

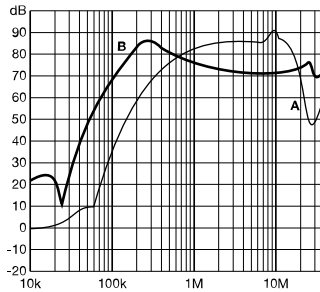
** Maximum leakage under usual AC operating conditions (acc. IEC 60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level. Leakage current for DC application is 0 mA

Typical filter attenuation

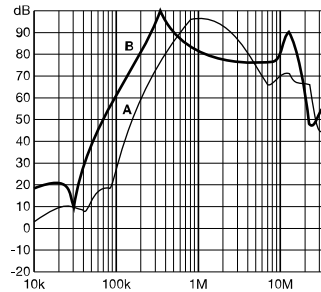
Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

Standard Types

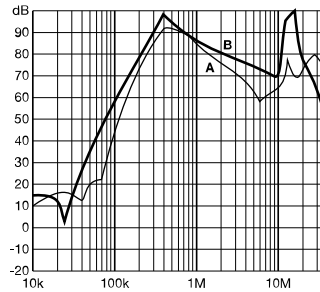
1 to 4 A types



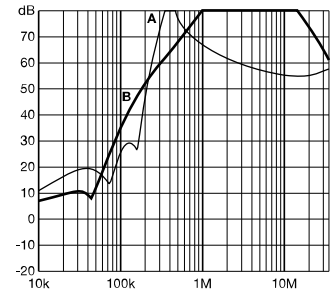
6 to 10 A types



12 to 20 A types

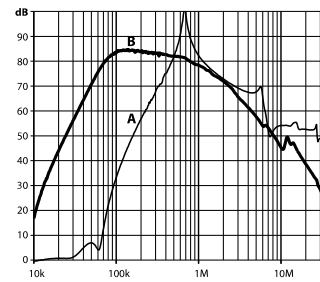


30 A types

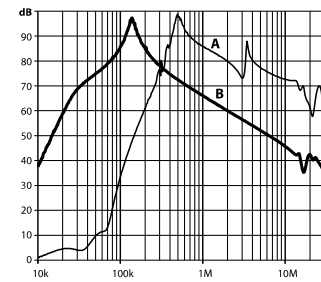


Enhanced Performance Types

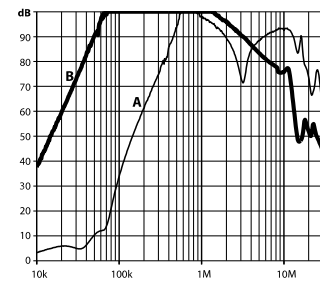
1 A types



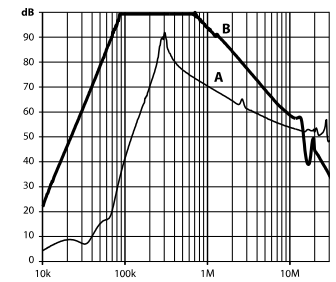
3 A types



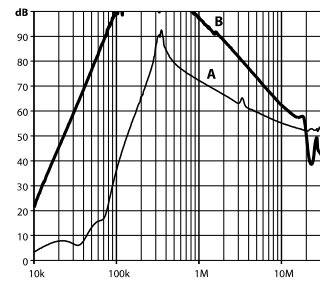
4 A types



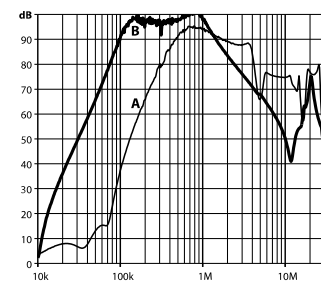
6 A types



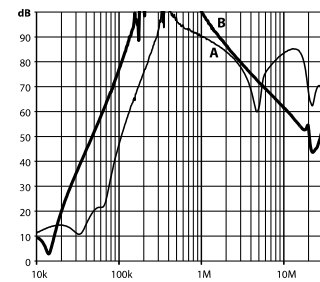
8 A types



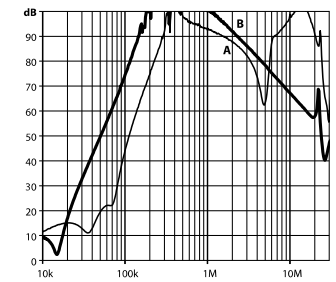
10 A types



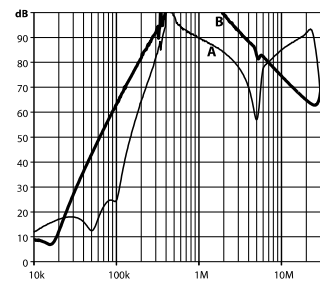
12 A types



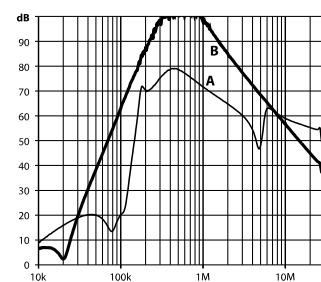
16 A types

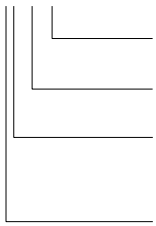


20 A types

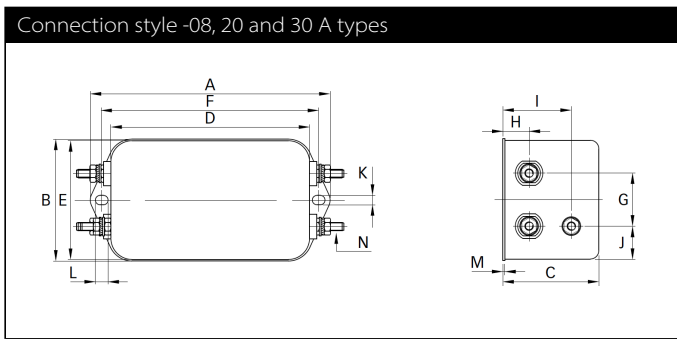
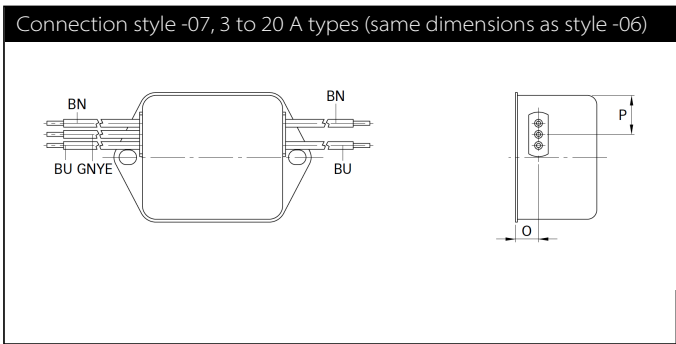
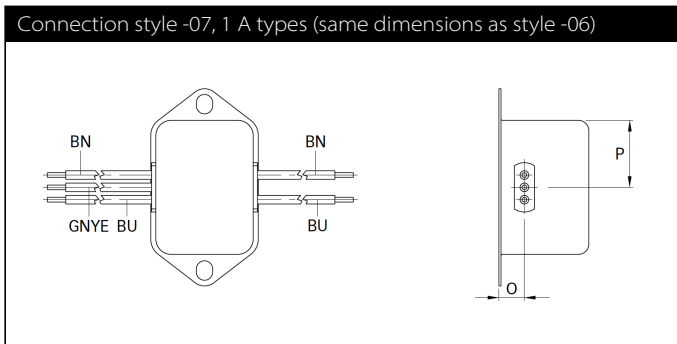
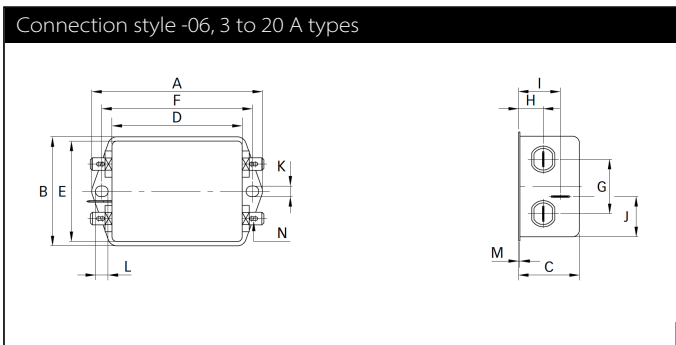
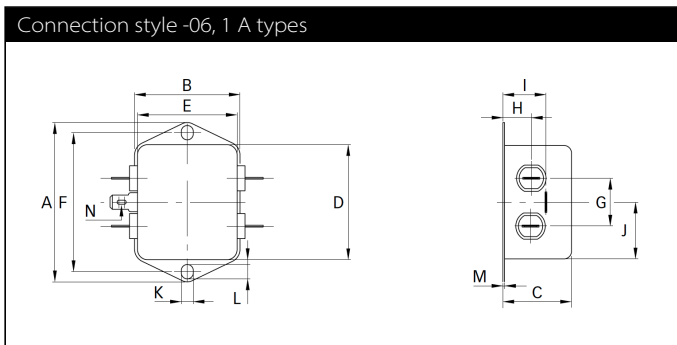


30 A types



Product selector		
FN 2090-xy-xx-yy		
	06	Faston 6.3 × 0.8 mm (spade/soldering)
	07	Wire leads
	08	Studs (M4 screws)
	1 to 60	Rated current
	Blank	Standard version
	Z	With surge protection
	Blank	Standard version
	A	Safety version
	B	Medical version
	KK/LL/NN	High performance version

Mechanical data



Dimensions

	1 A	3 A	4 A	6 A	8 A	10 A	12 A	16 A	20 A	30 A	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	8.4	8.4	±0.5
P	14	14.9	14.9	14.9	18	18	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	AWG 16	AWG 16	
Wire length	140	140	140	140	140	140	140	140	140	140	+5
Connection style -08											
N									M4	M4	
Recommended torque (Nm)									1.2 - 1.3	1.2 - 1.3	

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

Please visit www.schaffner.com to find more details on filter connectors.



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