March 2014

Short Form Catalog
EMC/EMI Components and Power Quality Filters

SCHAFFNER
energy efficiency and reliability

Product selection chart

EMC & output filters

DC

1-phase

Number of phases

3-phase

DC filters

FN 2200

page 4

Feedthrough components

PCB filters

FN 402
FN 405
FN 406
FN 409
FN 410

page 2

IEC inlet filters/ Power entry modules

Chassis mounting filters

1-stage filters

≤ 30A

FN 332
FN 2030
FN 9675 / 76
FN 2450

page 4

≤ 100A

FN 350
FN 2010
FN 2020
FN 2410
FN 2412

page 4

2-stage filters

≤ 16A

FN 343
FN 2080
FN 2360
FN 2415

page 5

≤ 36A

FN 685
FN 2060
FN 2070
FN 2090

page 5

3-stage filters

≤ 30A

FN 352Z
FN 700Z

page 5

≤ 200A

Capacitors

FN 751X
FN 756X

page 9

≤ 250A

Filters

FN 761X
FN 766X

page 9

≤ 20A

IEC inlet filters

FN 9222(E)
FN 9226
FN 9233(E)
FN 9244(E)
FN 9246

page 3

≤ 10A

PEM with fuses or switch

FN 9260
FN 9263
FN 9264

page 3

≤ 10A

PEM with fuses and switch or volt. selector

FN 280
FN 370
FN 380
FN 390
FN 1390
FN 9280(E)
FN 9290

page 3

≤ 10A

IEC power cords

IL 13
IL 19

page 2

Input

Input or output filter?

Output

Harmonic filters

Passive

Technology?

Active

3-phase filters

≤ 300A

FN 258
FN 3258
FN 3268
FN 351
FN 3025/3026
FN 3100
FN 3120

page 6

≤ 2500A

FN 3270
FN 3359

page 6

3-phase + neutral filters

≤ 25A

FN 354
FN 355

page 7

≤ 600A

FN 356
FN 3256
FN 3280

page 7

Output filters

FN 510

page 8

Sinusoidal output filters

FN 530
FN 5020
FN 5030
FN 5040
FN 5040 HV
FN 5045

page 8

FN 3410
FN 3410 HV
FN 3411
FN 3412
FN 3413
FN 3416
FN 3418

page 1

FN 3420
FN 3430

page 1

3-phase reactors

Load

Location at motor drive

Line

Chokes

No

Common-mode

Yes

0.8%

RWK 305

page 8

4%

RWK 212

page 6

Saturating chokes

RI series

page 10

1-phase

≤ 10A

RN series
EV/EH series

page 10

≤ 80A

RD series
RB series

page 10

3-phase

RD series
RB series

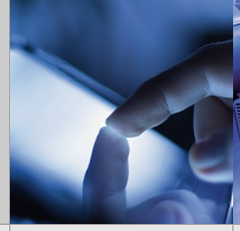
page 10

3-phase + neutral

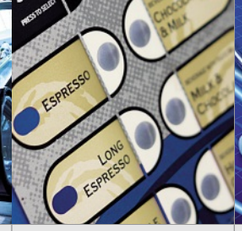
RD series

page 10

To define your proper solution competent assistance and more detailed product specifications can be obtained by your local partner within Schaffner's global network.











	EDP & office	Drives & controls	Process automation	Elevators & cranes	Consumer goods	Medical	Building automation	Power & energy	Telecom & datacom	Machinery
Typical applications	– PCs – Printers – PC periphery – Fax machines – Copy machines – Monitors – Plotters – Mainframe computers	– AC & DC motor drives – SCR drives – Servo drives – Regenerative drives – Rectifiers (AC-DC) – Converters (AC-AC, DC-DC) – Inverters (DC-AC) – Battery chargers	– Robotics – Conveyors – Assembly lines – Control units – Mining industry – Chemical industry – Oil production – Metal processing	– Elevators for people and goods – Escalators – Cranes – Lifts – Hoists – Dumbwaiters	– Amplifiers, audio, video, TV, screens – Receivers, decoders – Laundry machines – Tumblers – Cooking equipment – Induction heaters – Exercise machines – Coffee machines	– X-ray equipment – CAT scanners – Defilibrators – Laboratory equipment – Analyzers – Measurement devices – MRI, MSI, EEG, ECG – Test equipment – Hospitals	– HVAC – Security systems – Control units – Pumps – Self-ballasted lighting equipment – Autom. window shades – Water treatment – Office buildings	– SMPS, UPS – DC/DC converters – Gen-sets – Wind turbines – Fuel cells – Gas turbines – UPS – PV systems	– Base stations for GSM, UMTS, GPRS – Power line communications – Network technology – Servers – Telephone installations – Broadcast installations – Data centers	– Machine tools – Printing machines – Packaging machines – Extruders – Wood working mach. – Milling/drilling mach. – Laser cutting machines – Welding machines – Grinding machines
Line reactors and harmonic filters 		FN 3410/11 (page 1) FN 3412/13 (page 1) FN 3416/18 (page 1) RWK 212 (page 6)	FN 3410/11 (page 1) FN 3412/13 (page 1) FN 3416/18 (page 1) FN 3420 (page 1)	FN 3410/11 (page 1) FN 3412/13 (page 1) FN 3416/18 (page 1) FN 3420 (page 1) RWK 212 (page 6)		FN 3420 (page 1) FN 3430 (page 1)	FN 3410/11 (page 1) FN 3412/13 (page 1) FN 3416/18 (page 1) FN 3420 (page 1) FN 3430 (page 1)	FN 3420 (page 1) FN 3430 (page 1) Customized reactor and filter solutions for (re-newable) energy production and feeding power into the network	FN 3420 (page 1) FN 3430 (page 1)	FN 3410/11 (page 1) FN 3412/13 (page 1) FN 3416/18 (page 1) FN 3420 (page 1) RWK 212 (page 6)
PCB filters 	FN 402 (page 2) FN 405 (page 2) FN 406 (page 2) FN 410 (page 2)				FN 402 (page 2) FN 405 (page 2) FN 406 (page 2) FN 410 (page 2)	FN 402B (page 2) FN 406B (page 2)	FN 406 (page 2) FN 410 (page 2)	FN 402 (page 2) FN 405 (page 2) FN 406 (page 2) FN 409 (page 2) FN 410 (page 2)	FN 409 (page 2)	
IEC inlet filters and Power entry modules 	FN 280 (page 3) FN 390 (page 3) FN 9222(E) (page 3) FN 9233(E) (page 3) FN 9244(E) (page 3) FN 9263 (page 3) FN 9264 (page 3) FN 9280(E) (page 3) FN 9290 (page 3) IL 13 (page 2) IL 19 (page 2)				FN 280 (page 3) FN 3x0 (page 3) FN 9222(E) (page 3) FN 9233(E) (page 3) FN 9260 (page 3) FN 9263 (page 3) FN 9280(E) (page 3) FN 9290 (page 3) IL 13 (page 2) IL 19 (page 2)	FN 280B (page 3) FN 9222(E)B (page 3) FN 9233(E)B (page 3) FN 9244(E)B (page 3) FN 9246B (page 3) FN 9260B (page 3) FN 9264 (page 3) FN 9280B (page 3) FN 9290B (page 3) IL 13 (page 2) IL 19 (page 2)	FN 9246 (page 3)	FN 280 (page 3) FN 3x0 (page 3) FN 9222(E) (page 3) FN 9233(E) (page 3) FN 9244(E) (page 3) FN 926x (page 3) FN 9280(E) (page 3) FN 9290 (page 3)	FN 9246 (page 3)	
Single-phase filters and DC filters 	FN 343 (page 5) FN 20x0 (page 4/5)	FN 350 (page 4) FN 2070 (page 5) FN 2080 (page 5) FN 2090 (page 5) FN 241x (page 4/5) FN 2200 (page 4)	FN 350 (page 4) FN 2070 (page 5) FN 2080 (page 5) FN 2090 (page 5) FN 241x (page 4/5)	FN 685 (page 5) FN 2070 (page 5) FN 2080 (page 5) FN 241x (page 4/5)	FN 332 (page 4) FN 20x0 (page 4/5)	FN 332 (page 4) FN 20x0B (page 4/5) FN 2360 (page 5) FN 700Z (page 5)	FN 350 (page 4) FN 2060 (page 5) FN 2070 (page 5) FN 2090 (page 5)	FN 2030 (page 4) FN 2060 (page 5) FN 2070 (page 5) FN 2090 (page 5) FN 2200 (page 4)	FN 700Z (page 5) Customized single-phase telecom filters	FN 350 (page 4) FN 2070 (page 5) FN 2080 (page 5) FN 2410 (page 4) FN 2412 (page 4) FN 2415 (page 5)
Three-phase filters 	FN 3025/26 (page 6) FN 3258 (page 6) FN 3268 (page 6)	FN 258 (page 6) FN 3025/26 (page 6) FN 3100 (page 6) FN 3258 (page 6) FN 3268 (page 6) FN 3270 (page 6) FN 3359 (page 6)	FN 258 (page 6) FN 3025/26 (page 6) FN 31xx (page 6) FN 3258 (page 6) FN 3268 (page 6) FN 3270 (page 6) FN 3359 (page 6)	FN 258 (page 6) FN 3100 (page 6) FN 3258 (page 6) FN 3268 (page 6)	FN 3258 (page 6) FN 3268 (page 6) FN 3025 (page 6) FN 3026 (page 6)	FN 258P (page 6) FN 258L (page 6) FN 3025/26 (page 6) FN 3268 (page 6)	FN 258 (page 6) FN 351 (page 6) FN 3025/26 (page 6) FN 3258 (page 6) FN 3268 (page 6)	FN 258 (page 6) FN 3025/26 (page 6) FN 3100 (page 6) FN 3120 (page 6) FN 3258 (page 6) FN 3268 (page 6) FN 3359 (page 6)	Customized three-phase telecom filters	FN 258 (page 6) FN 3100 (page 6) FN 3120 (page 6) FN 3258 (page 6) FN 3268 (page 6) FN 3270 (page 6) FN 3359 (page 6)
Three-phase and neutral line filters 	FN 354 (page 7) FN 355 (page 7) FN 3256 (page 7)	FN 356 (page 7) FN 3256 (page 7) FN 3280 (page 7)	FN 356 (page 7) FN 3256 (page 7) FN 3280 (page 7)		FN 354 (page 7) FN 355 (page 7)	FN 354 (page 7) FN 355 (page 7)	FN 3256 (page 7)	FN 356 (page 7) FN 3256 (page 7) FN 3280 (page 7)	FN 354 (page 7)	FN 356 (page 7) FN 3256 (page 7) FN 3280 (page 7)
Output filters and load reactors 		FN 5x0 (page 8) FN 5020 (page 8) FN 5030 (page 8) FN 5040 (page 8) FN 5040 HV (page 8) FN 5045 (page 8) RWK 305 (page 8)	FN 510 (page 8) FN 5020 (page 8) FN 5030 (page 8) FN 5040 (page 8) FN 5040 HV (page 8) FN 5045 (page 8) RWK 305 (page 8)	FN 510 (page 8) FN 5040 (page 8) FN 5040 HV (page 8) FN 5045 (page 8) RWK 305 (page 8)			FN 510 (page 8) FN 5040 (page 8) FN 5040 HV (page 8) FN 5045 (page 8) RWK 305 (page 8)	Customized reactor and filter solutions for (renewable) energy production and feeding power into the network		FN 510 (page 8) FN 5040 (page 8) FN 5040 HV (page 8) FN 5045 (page 8) RWK 305 (page 8)
Feedthrough components 	FN 756x (page 9) FN 766x (page 9)	FN 756x (page 9) FN 766x (page 9)	FN 751x (page 9) FN 761x (page 9)			FN 751x (page 9) FN 756x (page 9) FN 761x (page 9) FN 766x (page 9)		FN 751x (page 9) FN 756x (page 9) FN 761x (page 9) FN 766x (page 9)	FN 751x (page 9) FN 756x (page 9) FN 761x (page 9) FN 766x (page 9)	FN 751x (page 9) FN 761x (page 9)
EMC/EMI chokes 	EV/EH series (page 10) RD series (page 10) RN series (page 10) RB series (page 10)	RD series (page 10) RI series (page 10) RB series (page 10)	RD series (page 10)	RD series (page 10)	EV/EH series (page 10) RD series (page 10) RN series (page 10)	EV/EH series (page 10) RD series (page 10) RN series (page 10) RB series (page 10)	EV/EH series (page 10) RD series (page 10) RI series (page 10) RN series (page 10) RB series (page 10)	EV/EH series (page 10) RD series (page 10) RN series (page 10) RB series (page 10)	EV/EH series (page 10) RN series (page 10) RB series (page 10)	RD series (page 10) RB series (page 10)
Pulse transformers 	IT series (page 11)	IT series (page 11)		IT series (page 11)		IT series (page 11)	IT series (page 11)	IT series (page 11)	IT series (page 11)	

This illustration only contains a few typical products and applications. Schaffner is also active in numerous other industry segments.
Most standard components can be customized to meet special requirements.

Active and passive harmonic filters.

Harmonic filters help to obtain compliance with international standards like e.g. IEEE 519-1992 or EN 61000-3-12, and with local utility codes. They reduce the electrical and thermal stress upon the electrical infrastructure, eliminate the risk of harmonics-related reliability problems, and support long-term energy efficiency and cost savings. ECOsine® advanced passive filters are the industry standard for 6-pulse rectifiers and non-regenerative motor drives to achieve the often specified level of < 5% THID (FN 3410/12). ECOsine® Active harmonic filters provide latest generation digital technology. With a response time of less than 300 µs an efficient harmonics mitigation, power factor correction, and load balancing is achieved in real time.

Approvals *		Nom. voltage	Rated power [kW/HP] / Corrective current [A] (0 100 200 300 400 500)	Features							Typical applications								
Filter family				For 50 Hz grids	For 60 Hz grids	THID < 5%	Power factor correction	Load balancing	3-phase / 3-wire	3-phase / 4-wire	For 6-pulse diode rectifiers	For 6-pulse SCR rectifiers	AC Motor drives	DC Motor drives	Welding machines	HVAC installations	Building power distribution	Semiconductor industry	Water / wastewater treatment
FN 3410		380–500 VAC	4 – 400 kW	■		■			■		■		■			■			■
FN 3410 HV		690 VAC	7.5 – 250 kW	■		■			■		■		■			■			■
FN 3411		380–500 VAC	4 – 400 kW	■					■			■	■	■					■
FN 3412		380–480 VAC	5 – 500 HP		■	■			■		■		■			■			■
FN 3413		380–480 VAC	5 – 500 HP		■				■			■	■	■					■
FN 3416		380–500 VAC	4 – 200 kW	■					■		■	■	■	■		■			■
FN 3418		380–480 VAC	5 – 250 HP		■				■		■	■	■	■		■			■
FN 3420 (active)		200–480 VAC	30 – 300	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■
NEW FN 3420 (active)		500–690 VAC	200	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■
FN 3430 (active)		200–415 VAC	30 – 300	■	■	■	■	■		■	■	■				■	■	■	

* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.

Note: filters FNxx11xx and FNxx13xx are available on request.
Note: power ratings marked with hatchings are in preparation.

PCB filters.

Very compact EMI suppression components can directly be mounted on printed circuit boards of low-power office, medical, telecom and IT equipment, DC/DC converters and power supplies etc. Ideal low cost solution for manufacturers who have planned for EMC compliance throughout the equipment design process already.

Filter family	Approvals *	Max. voltage	Attenuation performance / Rated current [A] (standard / high / very high; 0 3 6 9 12 15)	Features: 1-stage filter circuit	2-stage filter circuit	For DC applications only	PCB mounting	With metal case	Low profile	Small footprint	Typical applications: Automotive	DC/DC converters	IT and telecom applications	Building automation	Power supplies	Medical devices	Office automation equipment	General applications	Consumer electronics
FN 402		250 VAC	0.5 – 6.5	■			■		■			■			■	■	■	■	■
FN 405		250 VAC	0.5 – 10	■			■		■			■			■		■	■	■
FN 406		250 VAC	0.5 – 8.4	■			■	■		■			■	■	■	■	■		■
FN 409		75 VDC	3 – 13		■	■	■		■		■	■	■		■				
FN 410		250 VAC	0.5 – 6		■		■	■	■			■	■	■	■		■		■

Power cords with locking systems for IEC inlet filters.

Guarding against accidental disconnection of all electrical appliances with an IEC inlet, no exchange or modification of the IEC inlet or IEC inlet filter is needed. An easy retrofit for all electronic equipment and devices is possible.

Power cord family	Approvals *	Max. voltage	● standard length / × on request: 6 ft	2 m	3 m	9 ft	12 ft	5 m	10 m	Available line connectors: C14 line side plug IEC C14 male, straight	C20 line side plug IEC C20, male, straight	EU1 line side plug CEE7/VII, right angled	US1 line side plug NEMA5-15, straight	US2 line side plug NEMA5-15, straight hospital grade	UK1 line side plug BS1363, right angled, fused 5A	CH1 line side plug SEV1011, straight	JP1 line side plug JIS8303, straight	Typical applications: Data centers	Industrial equipment	Medical, in-vitro diagnostic devices	Broadcasting stations	Mobile applications
IL 13		250 VAC	●	●	×	●	●	×	×	■		■	■	■	■	■	■	■	■	■	■	■
NEW IL 19		250 VAC		●							■	■	■		■							

* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.

IEC inlet filters / Power entry modules.

All the advantages of IEC connector, EMC/EMI filter, fuses, switch and voltage selector combined in a powerful compact all-in-one solution. Ideal for computers, monitors and office equipment like printers and copy machines.

Approvals *

Attenuation performance

Rated current [A]

standard | high | very high

0 4 8 12 16 20

Filter family	Max. voltage	With earth line choke	For fuse(s)	With switch (1-pole)	With switch (2-pole)	With voltage selector	For PCB mounting	Snap-in version	Extra wide mounting	IT equipment	Medical equipment	Switch-mode power supplies	Office equipment	Prof. audio, TV, VCR	Telecommunication	Light industrial equipment	General purpose
FN 9222 FN 9222E	250 VAC	■						■	■	■	■	■	■	■	■	■	■
FN 9226	250 VAC						■			■	■		■	■	■		■
FN 9233 FN 9233E	250 VAC	■						■	■	■	■	■	■	■	■	■	■
FN 9244 FN 9244E	250 VAC	■						■	■	■	■	■	■	■	■	■	
FN 9246	250 VAC										■	■	■	■	■	■	
FN 9260	250 VAC		■					■			■		■	■	■		■
FN 9263	250 VAC			■				■				■	■	■	■	■	■
FN 9264	250 VAC				■			■			■	■	■	■	■	■	■
NEW FN 9280	250 VAC		■		■			■		■	■		■	■	■	■	■
NEW FN 9280 E	250 VAC	■	■		■			■		■	■	■	■	■	■	■	
NEW FN 9290	250 VAC		■		■			■		■	■	■	■	■	■	■	
FN 280	250 VAC		■		■			■		■	■		■	■	■	■	■
FN 370	250 VAC		■			■		■		■	■		■	■	■		■
FN 380	250 VAC		■		■			■		■	■		■	■	■		■
FN 390 FN 1390	250 VAC	■	■		■	■				■	■		■	■	■	■	■

* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.

Single-phase and DC filters.

Single-phase filters for chassis or DIN-rail mounting are key for EMC compliance of higher power office equipment and low to medium power industrial applications. A broad selection of electrical and mechanical features allows a specific choice and deployment for countless applications. DC filters are specifically optimized for applications with DC supply like e.g. PV inverters.

Approvals *	Filter family	Max. voltage	Attenuation performance / Rated current [A] (standard / high / very high; 0 20 40 60 80 100)	Features: 1-stage filter circuit	2-stage filter circuit	3-stage filter circuit	For DC applications	With overvoltage protection	Low frequency attenuation	High frequency attenuation	Choice of connection style	DIN-rail mounting	Typical applications: Power supplies, SMPS	Medical equipment	Single-phase motor drives	Control unit in machine tools	PV inverters	Office, test & measure. equip.	General purpose
	FN 332	250 VAC	1–10	■				■											■
	FN 350	250 VAC	8 – 55	■									■		■			■	
	FN 2010	250 VAC	1 – 60	■							■			■					■
	FN 2020	250 VAC	1 – 60	■							■			■				■	■
	FN 2030	250 VAC	1 – 30	■				■	■	■	■			■				■	■
	FN 2200	1200 VDC	25 – 2300	■			■		■	■			■				■		■
	FN 2410	250 VAC 520 VAC (H)	8 – 100	■					■				■		■				
	FN 2412	250 VAC 520 VAC (H)	8 – 45	■					■			■	■		■	■			
	FN 2450	250 VAC	1 – 20	■					■	■			■	■				■	■
	FN 9675/76	250 VAC	3 – 16	■									■		■			■	

* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.

Approvals *		Attenuation performance / Rated current [A]	Features									Typical applications						
Filter family	Max. voltage	standard / high / very high; 0 20 40 60 80 100	1-stage filter circuit	2-stage filter circuit	3-stage filter circuit	With earth line choke	With overvoltage protection	Low frequency attenuation	High frequency attenuation	Choice of connection style	TEMPEST protection	Power supplies, SMPS	Medical equipment	Single-phase motor drives	Control unit in machine tools	Interception protection	Office, test & measure. equip.	General purpose
FN 343	250 VAC	1–10		■		■											■	■
FN 685	250 VAC	10 36		■				■		■		■		■				
FN 2060	250 VAC	1 30		■						■		■	■				■	■
FN 2070	250 VAC	1 36		■					■	■		■	■	■			■	
FN 2080	250 VAC	1 16		■				■		■		■	■	■				
FN 2090	250 VAC	1 30		■			■	■	■	■		■	■	■				
FN 2360	250 VAC	3–6		■								■	■				■	■
FN 2415	250 VAC	6–16		■										■	■			
FN 352Z	250 VAC	6 30			■		■		■			■				■	■	
FN 700Z	250 VAC	6 20			■		■	■	■		■	■	■			■	■	

* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.

Three-phase filters and line reactors.

EMC/EMI filter solutions for industrial applications like motor drives and machine tools. Furthermore, these types of filters are also suitable for mainframe computer systems, large uninterruptible power supplies, medical equipment, wind turbine power stations and a vast array of other three-phase power electronics. Line reactors, also operated on the line side of power drive systems, efficiently protect inverter electronics and DC link capacitors from inrush, peak and short-circuit currents. Additionally, low-frequency interference and harmonics are reduced significantly.

Approvals *			Features											Typical applications				
Filter family	Max. voltage	Attenuation performance / Rated current [A] (standard / high / very high; 0 200 400 600 800 >1000)	Multi-stage filter circuit	Safety connector blocks	Busbar connection	Optional protective covers	Standard protective covers	Offering EMC compliance	Low leakage current	Less commutation notches	Inrush current limitation	Harmonics reduction	4% impedance	Inverters, servo drives	Energy regeneration drives	Machinery, machine tools	Industrial automation	General purpose
FN 258	480 VAC 690 VAC (HV)	7 – 250	■	■				■	■					■		■	■	■
FN 351	440 VAC 520 VAC (H)	8 – 280		■				■						■			■	■
FN 3025	520 VAC	10–50		■			■	■	■					■			■	■
FN 3026	520 VAC	10–50		■			■	■	■					■			■	■
FN 3100	520 VAC	35 – 300		■				■						■	■	■	■	
FN 3120	520 VAC (H)	25 – 230		■				■						■	■	■	■	
FN 3258	480 VAC 520 VAC (H)	7 – 180		■				■						■		■	■	■
NEW FN 3268	520 VAC	7 – 180		■				■	■					■		■	■	■
FN 3270	520 VAC (H)	10 – 1000		■	■	■		■						■		■	■	■
FN 3359	520 VAC 690 VAC (HV)	150 – 2500	■		■	■		■						■	■	■	■	
RWK 212	500 VAC	4 – 1100		■	■					■	■	■	■	■		■	■	■

* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.

Three-phase and neutral line filters.

Three-phase and neutral line filters are a compact solution for the interference suppression on the mains input of cabinets and control units of equipment, ranging from industrial applications like machine tools to sensitive medical installations. These typically involve separate and often insufficiently filtered frequency inverters and SMPS, causing current imbalance and significant interference problems. As individual elements they may be interference-suppressed already. The conjunction of several switching components in the same cabinet and a non-EMC conscious cabling will rise the demand for an additional EMC/EMI filter on the mains input of the whole installation. Many times this is the only way to get the CE mark for the cabinet in accordance with the EMC directive.

Approvals *		Max. voltage	Attenuation performance / Rated current [A] (standard / high / very high; 0 120 240 360 480 600)	Features								Typical applications							
Filter family				1-stage filter circuit	2-stage filter circuit	Safety connector blocks	Faston connectors	Offering EMC compliance	For asymmetrical loads	Broadband attenuation	Very low leakage current	For entire systems, install.	Machinery, machine tools	Industrial automation	Power supplies	Medical equipment	For high frequency appl.	High power office equipment	General purpose
FN 354		440 VAC	4–25		■		■	■		■					■	■	■	■	■
FN 355		440 VAC	3–20	■			■	■			■					■		■	■
FN 356		440 VAC	16–150	■		■		■	■			■		■	■				
FN 3256		520 VAC (H)	8–160	■		■		■	■			■	■	■	■			■	■
FN 3280		520 VAC (H)	8–600		■	■		■	■	■		■	■	■	■				

* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.

Output filters and load reactors.

Output components for motor protection and the improvement of system reliability, availability and functionality. Deployed at the output side of frequency inverters, these filters ensure reliable operation by avoiding expensive downtimes of installations, manufacturing plants, machinery and a vast array of other industrial and domestic motor drive applications due to premature motor damage. An appropriate output solution will even allow the deployment of unshielded motor cables, the use of multiple motors in parallel on the same drive or the retrofit of modern drives in existing installations with old motors and unshielded cabling.

Approvals *		Typical motor power [kW] / Rated current [A]	Features												Typ. applications				
Filter family	Max. voltage	0 60 120 180 240 300 0 200 400 600 800 >1000	dv/dt restriction	Overvoltage restriction	Motor temperature reduction	Red. acoustic motor noise	Sym. sinusoidal output signal	Asym. sinusoidal output signal	Eliminat. of bearing damage	Replaces cable shields	Connection to DC link required	Improves overall EMC	Reduces equipment downtime	Motor drives	Servo drives, torque motors	High-speed motor applications	Appl. with long unshield. cabl.	Retrofit of motor drives
FN 510	520 VAC	1.5–30 4–66	■	■	■							■	■	■	■			
FN 530	520 VAC	1.5–7.5 4–16	■	■	■	■	■	■	■	■	■	■	■	■			■	■
FN 5020	500 VAC	11 55 25–120	■	■	■	■	■					■	■	■		■		
FN 5030**	500 VAC	11 55 25–120			■	■		■	■	■	■	■	■	■		■	■	■
FN 5040	500 VAC	1.1 630 4.5 1200	■	■	■	■	■					■	■	■				■
NEW FN 5040 HV	690 VAC	7.5 1200 13 1320	■	■	■	■	■					■	■	■				■
FN 5045	500 VAC	1.1 630 4.5 1200	■	■	■	■	■					■	■	■				■
RWK 305	500 VAC	1.5 630 4 1100	■		■							■	■	■	■			

* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.

** Additional output filter module to be operated in conjunction with FN 5040/45 or FN 5020.

Feedthrough components. Interference suppression up into the GHz range for high-tech applications such as IT, telecom, server and networking equipment.

Approvals *

Capacitance [nF]
Rated current [A]
Attenuation performance

Feedthrough capacitors	Max. voltage	0 1000 2000 3000 4000 5000 0 50 100 150 200 250	Features: AC capacitors	DC capacitors	AC filters	DC filters	Very high performance	Y2 capacitor class	Y4 capacitor class	Typical applications: Medical equipment	Professional power supplies	Power electronic equipment	Telecommunication	Scientific equipment	Test and measurement equip.	Security systems	IT, server and network
FN 7510	300 VAC	2.2–47 / 10–100	■					■		■	■	■	■	■	■		
FN 7511	300 VAC	4.7–220 / 10–200	■					■		■	■	■	■	■	■		■
FN 7512	300 VAC	47–100 / 16–63	■					■		■	■	■	■	■	■	■	■
FN 7513	300 VAC	100 / 16	■					■		■	■	■	■	■	■	■	■
FN 7560	130 VDC	10–100 / 10–200		■					■	■	■	■	■	■	■		
FN 7561	130 VDC	47–470 / 63–200		■					■	■	■	■	■	■	■		■
FN 7562	130 VDC	100–1000 / 16–200		■					■	■	■	■	■	■	■	■	■
FN 7563	130 VDC	470–4700 / 16–200		■			■		■	■	■	■	■	■	■	■	■
Feedthrough filters		standard / high / very high															
FN 7611	300 VAC	10–250			■			■		■	■	■	■	■	■		■
FN 7612	300 VAC	10–100			■		■	■		■	■	■	■	■	■	■	■
FN 7660	130 VDC	10–200				■			■	■	■	■	■	■	■		■
FN 7661	130 VDC	10–200				■	■		■	■	■	■	■	■	■	■	■

* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.

EMC/EMI chokes.

An extensive selection of discrete EMC/EMI chokes with various inductance and current ratings allows optimized circuitry for EMC compliance to be designed easily and economically.

Choke family	Approvals *	Max. voltage	Inductance value [mH] / Rated current [A]	Features: For common-mode noise	Saturating chokes	Single-choke	Dual-choke	Triple-choke	Quad-choke	PCB mounting	With flying leads	Typical applications: Frequency converters, UPS	Medical equipment	Traction systems	DC/DC or AC/DC converters	Switch-mode power supplies	Home electronics, TV, balasts	Battery chargers	Heaters, air conditioners
RD 5000 series		600 VAC 850 VDC	1–10 6–16	■			■	■		■		■		■					
RD 6000 series		600 VAC 850 VDC	1.5 15 6–16	■			■	■			■	■		■					
RD 7000 series		600 VAC 850 VDC	0.2 25 6 36	■			■	■	■		■	■		■					
RD 8000 series		600 VAC 850 VDC	0.2–12 16 64	■			■	■	■		■	■		■					
RN series		250 VAC	0.7 100 0.3–10	■			■			■		■	■			■	■	■	■
EV/EH series		250 VAC	0.5 90 0.3–5	■			■			■		■	■			■	■	■	■
RI series		500 VDC	1.5 25		■	■	■			■	■	■		■	■	■			
NEW RB series		600 VAC 1000 VDC	0.2 3 16 50 (80)**	■			■	■		■		■	■	■	■	■		■	■

* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.

** forced cooling

Pulse transformers. They provide a proper galvanic separation between gate drive circuitry and high voltage path in IGBT, thyristor, triac, power MOSFET and DC/DC converter circuits.

Pulse transformer	Nominal voltage	Voltage-time area [Vµs] / Ignition current [A] (0 1000 2000 3000 4000 5000 / 0 0.6 1.2 1.8 2.4 3)	Features									Typical applications						
			1 : 1	1 : 1 : 1	2 : 1	2 : 1 : 1	3 : 1	3 : 1 : 1	PCB	Faston	Galvanic separation	Thyristors, triac and IGBTs	Driving power MOSFETs	Line coupling transformers	DC/DC converters	Power supplies	Home automation systems	Monitoring systems
IT 155/237 	500 VAC	500–1100 / 0.1–0.25	■						■		■	■	■		■	■	■	■
IT 245/255/258 	750 VAC	250–500 / 0.1–1	■						■		■	■	■		■	■	■	■
IT 239 	1000 VAC	350 / 0.25	■						■		■	■	■			■		
IT 370 	1000 VAC	4000 / 1	■						■		■	■	■			■		
IT 364 	3000 VAC	5000 / 3	■							■	■	■	■					
IT 213 	380 VAC	450 / 0.25		■					■		■	■	■	■	■	■	■	■
IT 312/313 	380 VAC	450–1200 / 0.25–1		■					■		■		■	■	■	■	■	■
IT 143/233/242 IT 243/253 	500 VAC	180–800 / 0.025–0.25		■					■		■	■	■	■	■	■		■
IT 246/248 	750 VAC	200–350 / 0.1–0.25			■				■		■	■	■		■	■		■
IT 249 	500 VAC	350 / 0.25				■			■		■	■	■	■	■	■	■	■
IT 260 	500 VAC	200 / 0.1					■		■		■		■	■	■	■	■	■
IT 314 	380 VAC	500 / 0.25–1						■	■		■		■	■	■	■	■	■
IT 234/244 IT 154 	500 VAC	200–600 / 0.1–0.25						■	■		■		■	■	■	■	■	■

EMC Support

EMI measurement and EMC engineering services.

In addition to offering one of the world's most comprehensive ranges of standard filter products, Schaffner offers the full complement of measurement and engineering services, along with customized product development, to support equipment manufacturers and users.

EMC/EMI testing. Schaffner operates the most sophisticated EMC test facilities available anywhere today with extensive investment in screened rooms, specialized test equipment and application engineering teams. As a global provider these services are distributed at several locations throughout the world.

Service available at these locations include:

- semi-anechoic chamber and open field testing
- harmonics instrumentation for current and voltage up to the 50th harmonic
- emission and immunity tests according to European and international standards (EN, IEC, FCC, CISPR)

Additional services available at the accredited testing facility in Switzerland:

- full load test set-up for motor drives
- safety testing and environmental simulation for passive components for electromagnetic interference suppression according to European, international and North American standards

Engineering services. Schaffner has the world's most engineering experience in solving EMC problems. In addition to testing and measuring services, Schaffner can provide the expert engineering support to help you bring your equipment to market quickly and efficiently.

Services available include:

- custom filter design – to optimize filter performance and solve space, layout, mounting or connection problems
- circuit and equipment design – advising on circuit and equipment or enclosure design to overcome EMC problems
- turnkey component design and build

Schaffner Group

The Schaffner Group is the international leader in the development and production of solutions which ensure the efficient and reliable operation of electronic systems. The Group's broad range of products and services includes EMC/EMI components, harmonic filters and magnetic components as well as the development and implementation of customized solutions. Schaffner components are deployed in energy-efficient drive systems and electronic motor controls, in wind power and photovoltaic systems, rail technology, machine tools and robotics as well as power supplies for numerous electronic devices in sectors such as medical technology or telecommunications. Schaffner provides on-site service to customers around the world through an efficient, global organization and makes ongoing investments in research, development, production and sales to systematically expand its position as leader on the international market.

A global one-stop shop

EMC/EMI filters

- PCB filters
- IEC inlet filters / Power entry modules
- DC filters
- Single-phase filters
- Three-phase filters
- Three-phase + neutral line filters
- Open frame filters

EMC/EMI chokes

Feedthrough filters and capacitors

Automotive components

Customized solutions

Power Quality products

- Line reactors
- dv/dt reactors and filters
- Sine wave filters
- Harmonic filters
- Regen reactors and filters
- Transformers

Customized solutions

Headquarters, 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.com
www.schaffner.com

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

03/2014 EN

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, Kamiuma, 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
usasales@schaffner.com
www.schaffner.com/us

schaffner
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