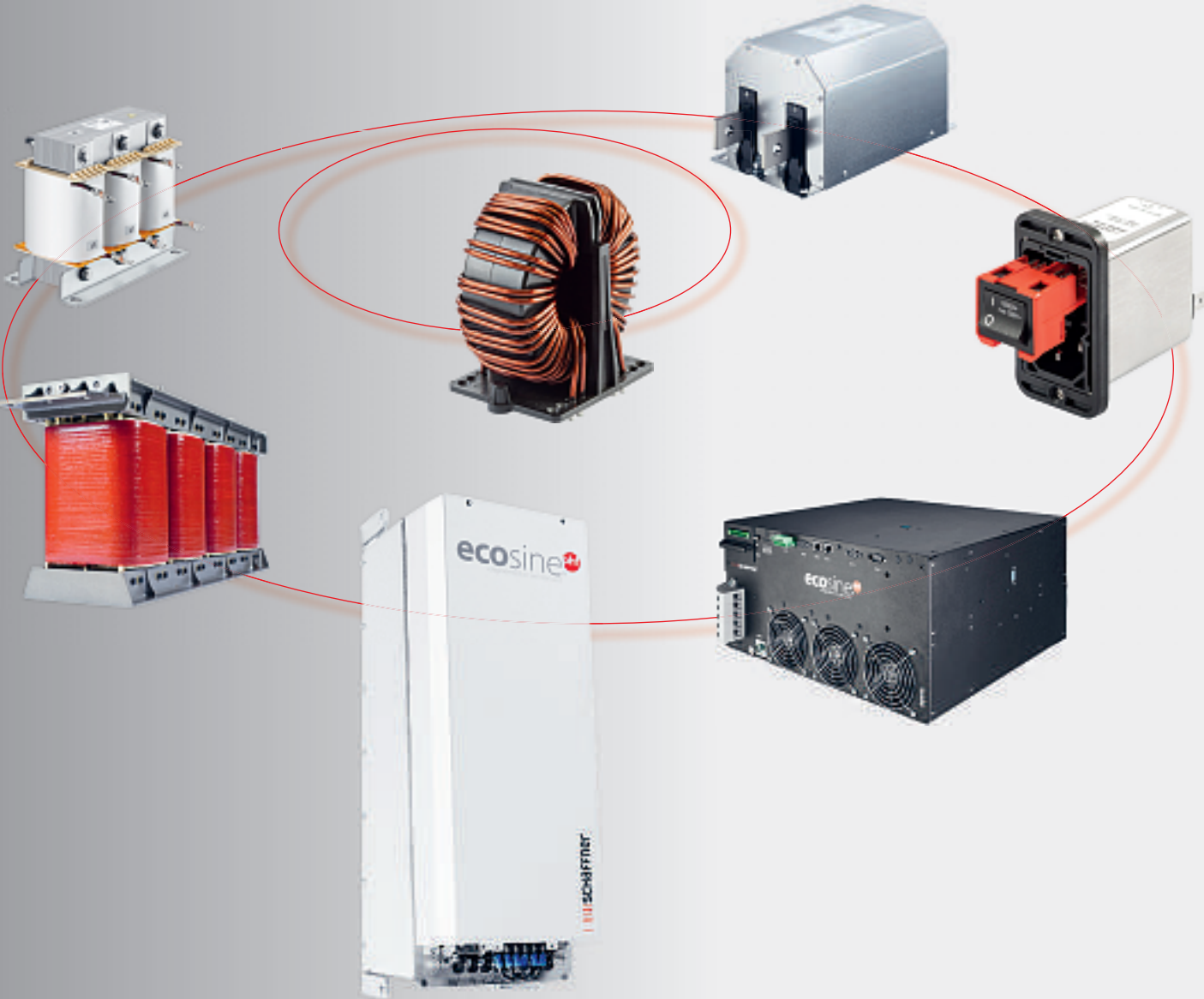


EMC/EMI Components and Power Quality Filters



				
Typical applications	EDP & office – PCs – Printers – PC periphery – Fax machines – Copy machines – Monitors – Plotters – Mainframe computers	Drives & controls – AC & DC motor drives – SCR drives – Servo drives – Regenerative drives – Rectifiers (AC-DC) – Converters (AC-AC, DC-DC) – Inverters (DC-AC) – Battery chargers	Process automation – Robotics – Conveyors – Assembly lines – Control units – Mining industry – Chemical industry – Oil production – Metal processing	Elevators & cranes – Elevators for people and goods – Escalators – Cranes – Lifts – Hoists – Dumbwaiters
Line reactors and harmonic filters 		FN 3416/18 (page 5/6) FN 3440/41 (page 5) FN 3450/51 (page 5) FN 3452/53 (page 5) FN 3470/71 (page 5) FN 3472/73 (page 6) FN 3480/81 (page 5) FN 3482/83 (page 5) FN 3530/31 (page 6) FN 3540/41 (page 6) FN 3532 (page 6) FN 3542 (page 6) FN 3545 (page 6) RWK 3044 (page 12) RWK 3062 (page 12)	FN 3416/18 (page 5/6) FN 3530/31 (page 6) FN 3540/41 (page 6) FN 3532 (page 6) FN 3542 (page 6) FN 3545 (page 6) RWK 3044 (page 12) RWK 3062 (page 12)	FN 3416/18 (page 5/6) FN 3530/31 (page 6) FN 3540/41 (page 6) FN 3532 (page 6) FN 3542 (page 6) FN 3545 (page 6) RWK 3044 (page 12) RWK 3062 (page 12)
PCB filters 	FN 402 (page 7) FN 405 (page 7) FN 406 (page 7) FN 409 (page 7) FN 410 (page 7)			
IEC inlet filters and Power entry modules 	FN 280 (page 9) FN 390 (page 9) FN 9222(E) (page 9) FN 9233(E) (page 9) FN 9244(E) (page 9) FN 9255(E) (page 9) FN 9264 (page 9) FN 9280(E) (page 9) FN 9290 (page 9) FN 9262 (page 9) FN 9266 (page 9) IL 13, IL 13+, IL 19 (page 8) IF 13 (page 8)			
Single-phase filters and DC filters 	FN 343 (page 11) FN 20x0 (page 10/11)	FN 350 (page 10) FN 2070 (page 11) FN 2080 (page 11) FN 2090 (page 11) FN 241x (page 10) FN 2200 (page 10) FN 2210/FN 2210 HV (page 10) FN 2211/FN 2211 HV (page 10)	FN 350 (page 10) FN 2070 (page 11) FN 2080 (page 11) FN 2090 (page 11) FN 241x (page 10)	FN 2070 (page 11) FN 2080 (page 11) FN 241x (page 10)
Three-phase filters 	FN 3025/26 (page 12) FN 3258 (page 12) FN 3268 (page 12)	FN 3025/26 (page 12) FN 3100 (page 12) FN 3258 (page 12) FN 3268 (page 12) FN 3270 (page 12) FN 3287 (page 12) FN 3288 (page 12) FN 3310/FN 3310 HV (page 12) FN 3311/FN 3311 HV (page 12) FN 3359 (page 12)	FN 3025/26 (page 12) FN 31xx (page 12) FN 3258 (page 12) FN 3268 (page 12) FN 3270 (page 12) FN 3287 (page 12) FN 3288 (page 12) FN 3310/FN 3310 HV (page 12) FN 3311/FN 3311 HV (page 12) FN 3359 (page 12)	FN 3100 (page 12) FN 3258 (page 12) FN 3268 (page 12) FN 3287 (page 12) FN 3288 (page 12)
Three-phase and neutral line filters 	FN 354 (page 13) FN 355 (page 13) FN 3256 (page 13)	FN 356 (page 13) FN 3256 (page 13) FN 3280 (page 13)	FN 356 (page 13) FN 3256 (page 13) FN 3280 (page 13)	
Output filters and load reactors 		FN 5x0 (page 14) FN 5020 (page 14) FN 5030 (page 14) FN 5040 (page 14) FN 5040 HV (page 14) FN 5045 (page 14) RWK 305 (page 14) FN 5060/FN 5060 HV (page 14)	FN 510 (page 14) FN 5020 (page 14) FN 5030 (page 14) FN 5040 (page 14) FN 5040 HV (page 14) FN 5045 (page 14) RWK 305 (page 14) FN 5060/FN 5060 HV (page 14)	FN 510 (page 14) FN 5040 (page 14) FN 5040 HV (page 14) FN 5045 (page 14) RWK 305 (page 14) FN 5060 HV (page 14)
Feedthrough components 	FN 756x (page 15) FN 766x (page 15)	FN 756x (page 15) FN 766x (page 15)	FN 751x (page 15) FN 761x (page 15)	
EMC/EMI chokes 	EV/EH series (page 16) RD series (page 16) RN series (page 16) RB series (page 16) RT series (page 16) RS series (page 16) RC series (page 16)	RD series (page 16) RI series (page 16) RB series (page 16) RT series (page 16) RS series (page 16) RC series (page 16)	RD series (page 16) RN series (page 16) RT series (page 16) RS series (page 16) RC series (page 16)	RD series (page 16) RN series (page 16) RT series (page 16) RS series (page 16) RC series (page 16)
Pulse transformers 	IT series (page 17)	IT series (page 17)		IT series (page 17)



Consumer goods		Medical		Building automation		Power & energy		Telecom & datacom		Machinery	
<ul style="list-style-type: none"> - Amplifiers, audio, video, TV, screens - Receivers, decoders - Laundry machines - Tumblers - Cooking equipment - Induction heaters - Exercise machines - Coffee machines 		<ul style="list-style-type: none"> - X-ray equipment - CAT scanners - Defibrillators - Laboratory equipment - Analyzers - Measurement devices - MRI, MSI, EEG, ECG - Test equipment - Hospitals 		<ul style="list-style-type: none"> - HVAC - Security systems - Control units - Pumps - Self-ballasted lighting equipment - Autom. window shades - Water treatment - Office buildings 		<ul style="list-style-type: none"> - SMPS, UPS - DC/DC converters - Gen-sets - Wind turbines - Fuel cells - Gas turbines - UPS - PV systems 		<ul style="list-style-type: none"> - Base stations for GSM, UMTS, GPRS - Power line communications - Network technology - Servers - Telephone installations - Broadcast installations - Data centers 		<ul style="list-style-type: none"> - Machine tools - Printing machines - Packaging machines - Extruders - Wood working mach. - Milling/drilling mach. - Laser cutting machines - Welding machines - Grinding machines 	
		FN 3530/31 (page 6) FN 3540/41 (page 6) FN 3532 (page 6) FN 3542 (page 6) FN 3545 (page 6)		FN 3416/18 (page 5/6) FN 3440/41 (page 5) FN 3450/51 (page 5) FN 3452/53 (page 5) FN 3530/31 (page 6) FN 3532/42 (page 6) FN 3540/41 (page 6) FN 3545 (page 6) FN 3470/71 (page 6) FN 3472/73 (page 6) FN 3480/81 (page 6) FN 3482/83 (page 6) RWK 3044 (page 12) RWK 3062 (page 12)		FN 3530/31 (page 6) FN 3540/41 (page 6) FN 3532 (page 6) FN 3542 (page 6) FN 3545 (page 6) RWK 3044 (page 12) RWK 3062 (page 12)		FN 3530/31 (page 6) FN 3540/41 (page 6) FN 3532 (page 6) FN 3542 (page 6) FN 3545 (page 6)		FN 3416/18 (page 5/6) FN 3530/31 (page 6) FN 3540/41 (page 6) FN 3532 (page 6) FN 3542 (page 6) FN 3545 (page 6) FN 3470/71 (page 6) FN 3472/73 (page 6) FN 3480/81 (page 6) FN 3482/83 (page 6) RWK 3044 (page 12) RWK 3062 (page 12)	
FN 402 (page 7) FN 405 (page 7) FN 406 (page 7) FN 409 (page 7) FN 410 (page 7)	FN 402B (page 7) FN 406B (page 7)	FN 406 (page 7) FN 409 (page 7) FN 410 (page 7)	FN 402 (page 7) FN 405 (page 7) FN 406 (page 7) FN 409 (page 7) FN 410 (page 7)	FN 409 (page 7)							
FN 280 (page 9) FN 390 (page 9) FN 9222(E) (page 9) FN 9233(E) (page 9) FN 9255(E) (page 9) FN 9260 (page 9) FN 9280(E) (page 9) FN 9290 (page 9) IL 13, IL 13+, IL 19 (page 8) FN 9262 (page 9) FN 9266 (page 9) IF 13 (page 8)	FN 280B (page 9) FN 9222(E)B (page 9) FN 9233(E)B (page 9) FN 9244(E)B (page 9) FN 9255(E)B (page 9) FN 9246B (page 9) FN 9260B (page 9) FN 9264 (page 9) FN 9280B (page 9) FN 9290B (page 9) FN 9262 (page 9) FN 9266 (page 9) IL 13, IL 13+, IL 19 (page 8) IF 13 (page 8)	FN 9246 (page 9)	FN 280 (page 9) FN 390 (page 9) FN 9222(E) (page 9) FN 9233(E) (page 9) FN 9244(E) (page 9) FN 9255(E) (page 9) FN 926x (page 9) FN 9280(E) (page 9) FN 9290 (page 9) FN 9262 (page 9) FN 9266 (page 9)	FN 9246 (page 9) FN 9255(E) (page 9)							
FN 332 (page 10) FN 20x0 (page 10/11)	FN 332 (page 10) FN 20x0B (page 10/11) FN 700Z (page 11)	FN 350 (page 10) FN 2060 (page 11) FN 2070 (page 11) FN 2090 (page 11)	FN 2030 (page 10) FN 2060 (page 11) FN 2070 (page 11) FN 2090 (page 11) FN 2200 (page 10) FN 2210/FN 2210 HV (page 10) FN 2211/FN 2211 HV (page 10)	FN 700Z (page 11) Customized single-phase telecom filters	FN 350 (page 10) FN 2070 (page 11) FN 2080 (page 11) FN 2410 (page 10) FN 2412 (page 10)						
FN 3258 (page 12) FN 3268 (page 12) FN 3025 (page 12) FN 3026 (page 12)	FN 3258 (page 12) FN 3025/26 (page 12) FN 3268 (page 12) FN 3287 (page 12) FN 3288 (page 12)	FN 351 (page 12) FN 3025/26 (page 12) FN 3258 (page 12) FN 3268 (page 12) FN 3287 (page 12) FN 3288 (page 12)	FN 3025/26 (page 12) FN 3100 (page 12) FN 3120 (page 12) FN 3258 (page 12) FN 3268 (page 12) FN 3287 (page 12) FN 3288 (page 12) FN 3310/FN 3310 HV (page 12) FN 3311/FN 3311 HV (page 12) FN 3359 (page 12)	Customized three-phase telecom filters	FN 3100 (page 12) FN 3120 (page 12) FN 3258 (page 12) FN 3268 (page 12) FN 3270 (page 12) FN 3287 (page 12) FN 3288 (page 12) FN 3310/FN 3310 HV (page 12) FN 3311/FN 3311 HV (page 12) FN 3359 (page 12)						
FN 354 (page 13) FN 355 (page 13)	FN 354 (page 13) FN 355 (page 13)	FN 3256 (page 13)	FN 356 (page 13) FN 3256 (page 13) FN 3280 (page 13)	FN 354 (page 13)	FN 356 (page 13) FN 3256 (page 13) FN 3280 (page 13)						
		FN 510 (page 14) FN 5040 (page 14) FN 5040 HV (page 14) FN 5045 (page 14) RWK 305 (page 14) FN 5060 (page 14) FN 5060 HV (page 14)	Customized reactor and filter solutions for (renewable) energy production and feeding power into the network		FN 510 (page 14) FN 5040 (page 14) FN 5040 HV (page 14) FN 5045 (page 14) RWK 305 (page 14) FN 5060 (page 14) FN 5060 HV (page 14)						
	FN 751x (page 15) FN 756x (page 15) FN 761x (page 15) FN 766x (page 15)		FN 751x (page 15) FN 756x (page 15) FN 761x (page 15) FN 766x (page 15)	FN 751x (page 15) FN 756x (page 15) FN 761x (page 15) FN 766x (page 15)	FN 751x (page 15) FN 761x (page 15)						
EV/EH series (page 16) RD series (page 16) RN series (page 16) RT series (page 16) RS series (page 16) RC series (page 16)	EV/EH series (page 16) RD series (page 16) RN series (page 16) RB series (page 16) RT series (page 16) RS series (page 16) RC series (page 16)	EV/EH series (page 16) RD series (page 16) RI series (page 16) RN series (page 16) RB series (page 16) RT series (page 16) RS/RC series (page 16)	EV/EH series (page 16) RD series (page 16) RN series (page 16) RB series (page 16) RT series (page 16) RS series (page 16) RC series (page 16)	EV/EH series (page 16) RN series (page 16) RB series (page 16) RT series (page 16) RS series (page 16) RC series (page 16)	RD series (page 16) RB series (page 16) RT series (page 16) RS series (page 16) RC series (page 16)						
	IT series (page 17)	IT series (page 17)	IT series (page 17)	IT series (page 17)							

Most standard components can be customized to meet special requirements.

Product selection chart

EMC filter & components

Number of phases

1-phase			DC			3-phase		
≤ 10 A			≤ 100 A			≤ 2500 A		
FN 402 FN 405 FN 406 FN 409 FN 410	Capacitors FN 751X FN 756X Filter FN 761X FN 766X	1-stage filters FN 332 FN 350 FN 2010 FN 2020 FN 2030 FN 2410 FN 2450	≤ 36 A 2-stage filters FN 343 FN 2060 FN 2070 FN 2080 FN 2090	≤ 30 A 3-stage filters FN 352Z FN 700Z FN 2060 FN 2070 FN 2090	FN 2200 FN 2210 FN 2210 HV FN 2211 FN 2211 HV	≤ 300 A FN 351 FN 3025/3026 FN 3100 FN 3120 FN 3258 FN 3268 FN 3287 FN 3288	≤ 2500 A FN 3270 FN 3359 FN 3310 FN 3310 HV FN 3311 FN 3311 HV	≤ 600 A FN 354 FN 355 FN 356 FN 3256 FN 3280
page 7			page 10			page 10		
page 15			page 11			page 12		
page 10			page 11			page 12		

Chokes






















Commonmode

No			Yes					
≤ 20 A	≤ 10 A	≤ 10 A	≤ 16 A	≤ 4 A	≤ 25 A	≤ 80 A	≤ 80 A	≤ 64 A
FN 9222(E) FN 9226 FN 9233(E) FN 9244(E) FN 9246 FN 9255(E)	FN 9260 FN 9264 FN 9262 FN 9266	FN 280 FN 370 FN 380 FN 390 FN 1390 FN 9280(E) FN 9290	IL 13 IL 13+ IL 19 IF 13	RS series	RI series	EV/EH series RD series RB series RN series RT series RC series	RD series RB series RT series	RD series
page 9	page 9	page 9	page 8	page 16	page 16	page 16	page 16	page 16

Harmonic filter		3-phase reactor		Output filter	
Mitigation requirement		Line and load side		Voltage shape	
Passive	Active	Load	Line	dv/dt	Sinewave
FN 3440/41 FN 3450/51 FN 3452/53 FN 3410/11 FN 3410 HV FN 3416 FN 3418 FN 3470/71 FN 3472/73 FN 3480/81 FN 3482/83	FN 3530/31 FN 3540/41 FN 3532 FN 3542 FN 3545	0.8%	4%	dv/dt filter	Sinusoidal filter
≤ 1100 A		≤ 1000 A		≤ 1200 A	≤ 1320 A
RWK 305		RWK 3044 RWK 3062		FN 510 FN 5060 FN 5060 HV	FN 530 FN 5020 FN 5030 FN 5040 FN 5040 HV FN 5045
page 5/6		page 14		page 14	page 14
page 6		page 12		page 14	

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

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 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 passive filters are the industry standard for 6-pulse rectifiers and non-regenerative motor drives to achieve the often specified level of THDi < 5%.

Approvals *				Features										Typical applications															
  		 Rated power [kW/HP]  Rated mitigation current [A]		Filter family	Nom. voltage	0	100	200	300	400	500	600	For 50 Hz grids	For 60 Hz grids	For 6-pulse diode rectifiers without L _{dc}	For 6-pulse diode rectifiers with L _{dc}	For 6-pulse SCR rectifiers	THDi < 5%	Power factor correction	Load balancing	3-phase/3-wire	3-phase/4-wire	AC motor drives	DC motor drives/welding	HVAC + building technology	Industry	Water/wastewater	Mixed (complex) loads	
		FN 3440	380–415 VAC	1.1			200 kW					■	■	■	1)	■					■	■	■	■	■	■	■	■	
		FN 3441	380–415 VAC	1.1			200 kW					■		■		■					■	■	■	■	■	■	■	■	
		FN 3450	440–500 VAC	1.1			250 kW					■	■	■	1)	■					■	■	■	■	■	■	■	■	
		FN 3451	440–500 VAC	1.1			250 kW					■		■		■					■	■	■	■	■	■	■	■	
NEW		FN 3470	380–500 VAC				250		500 kW			■	■	■	■	■					■	■	■	■	■	■	■	■	■
NEW		FN 3471	380–500 VAC				250		500 kW			■	■	■	■	■					■	■	■	■	■	■	■	■	■
NEW		FN 3480	440–480 VAC					315		560 kW		■	■	■	■	■					■	■	■	■	■	■	■	■	■
NEW		FN3481	440–480 VAC					315		560 kW		■	■	■	■	■					■	■	■	■	■	■	■	■	■
		FN 3410 HV	690 VAC	7.5			250 kW					■	■	2)	3)	■					■	■	■	■	■	■	■	■	■
		FN 3416	200–500 VAC	2.5			200 kW					■	■	■	■	■					■	■	■	■	■	■	■	■	■
		FN 3452	440–480 VAC	1.5				300 HP				■	■	■	1)	■					■	■	■	■	■	■	■	■	■
		FN 3453	440–480 VAC	1.5				300 HP				■	■	■	■	■					■	■	■	■	■	■	■	■	■
		FN 3442	440–480 VAC	1.2				240 HP				■	■	■	■	■					■	■	■	■	■	■	■	■	■
		FN 3443	440–480 VAC	1.2				240 HP				■	■	■	■	■					■	■	■	■	■	■	■	■	■
NEW		FN 3482	380–480 VAC					300		600 HP		■	■	■	■	■					■	■	■	■	■	■	■	■	■
NEW		FN 3483	380–480 VAC					300		600 HP		■	■	■	■	■					■	■	■	■	■	■	■	■	■





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

1) 5% THDi is not guaranteed when FN 3440, FN 3450 and FN 3452 filters are applied to SCRs

2) With and up to 45 A filters






3) 60 A–320 A filters

Active harmonic filters are suitable for mixed load installations and applications with dynamic and are commonly used as a central solution at Point of Common Coupling (PCC). Ecosine active harmonic filters provide a reliable solution for harmonic mitigation, power factor correction and load balancing in real time. The modular concept offers highest flexibility for customization, retrofitting and combination with passive harmonic mitigation components.

Approvals *				Features														Typical applications						
 				 Rated power [kW/HP]  Rated mitigation current [A]																				
Filter family	Nom. voltage																							
		0	100	200	300	400	500	600	For 50 Hz grids	For 60 Hz grids	For 6-pulse diode rectifiers without L _{dc}	For 6-pulse diode rectifiers with L _{dc}	For 6-pulse SCR rectifiers	THDI < 5%	Power factor correction	Load balancing	3-phase/3-wire	3-phase/4-wire	AC motor drives	DC motor drives/welding	HVAC + building technology	Industry	Water/wastewater	Mixed (complex) loads
NEW FN 3472	380–415 VAC				280	480 HP			■	■	■	■	■				■		■	■	■	■	■	■
NEW FN 3473	380–414 VAC				280	480 HP			■	■	■						■		■	■	■	■	■	■
FN 3418	200–480 VAC	2.5			250 HP				■	■	■	■					■		■	■	■	■	■	■
FN 3530/31	200–480 VAC		60 A						■	■	■	■	■	■	■	■	■		■	■	■	■	■	■
FN 3540/41	200–415 VAC		60 A						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
FN 3532	200–480 VAC		60	120 A					■	■	■	■	■	■	■	■			■	■	■	■	■	■
FN 3542	200–415 VAC		60	120 A					■	■	■	■	■	■	■	■		■	■	■	■	■	■	■
FN 3545	200–480/415 VAC		60		300 A ⁴⁾				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

⁴⁾ up to 1200 A mitigation current with sync module SYNC300A

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.

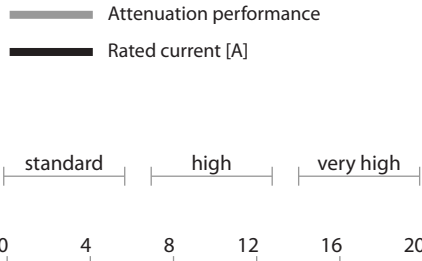
Approvals *										Available line connectors								Typical applications				
		● standard length ✕ on request								C14 line side plug IEC C14 male, straight	C20 line side plug IEC C20, male, straight	EU1 line side plug CEE7/MI, right angled	US1 line side plug NEMA5-15, straight	US2 line side plug 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	Data centers	Industrial equipment	Medical, in-vitro diagnostic devices	Broadcasting stations	Mobile applications
Power cord family	Max. voltage	6 ft	2 m	3 m	9 ft	12 ft	5 m	10 m														
IL 13 	250 VAC	●	●	✕	●	●	✕	✕	■		■	■	■	■	■	■	■	■	■	■	■	
IL 13+ ** 	250 VAC																■	■	■	■	■	
IL 19 	250 VAC		●								■	■	■		■							
IF 13 	250 VAC								■		■	■					■	■	■	■	■	

* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.
 ** Rewireable – offering total flexibility when assembling cables.

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 *



Features

Typical applications

Filter family	Max. voltage	Features											Typical applications							
		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 9255	250 VAC	■								■	■	■	■	■	■	■	■			
FN 9255E	250 VAC	■								■	■	■	■	■	■	■	■			
FN 9260	250 VAC							■		■		■	■	■	■	■	■			
NEW FN 9262 FN 9266	250 VAC	■						■	■	■	■	■	■	■	■	■	■			
FN 9264	250 VAC								■	■	■	■	■	■	■	■	■			
FN 9280 FN 9280E	250 VAC	■						■	■	■		■	■	■	■	■	■			
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 *		Max. voltage	Attenuation performance Rated current [A]	Features										Typical applications				
				0 20 40 60 80 100 standard high very high	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	Power supplies, SMPS	Medical equipment	Single-phase motor drives	Control unit in machine tools	PV inverters
FN 332		250 VAC	1-10	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>										<input checked="" type="checkbox"/>
FN 350		250 VAC	8-55	<input checked="" type="checkbox"/>								<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
FN 2010		250 VAC	1-60	<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
FN 2020		250 VAC	1-60	<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FN 2030		250 VAC	1-30	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FN 2200		1200 VDC	25-2300	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FN 2210 FN 2211		1000 VDC	250-2300	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FN 2210 HV FN 2211 HV		1500 VDC	250-2300	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
FN 2410		250 VAC 520 VAC (H)	8-100	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				
FN 2412		250 VAC 520 VAC (H)	8-45	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
FN 2450		250 VAC	1-20	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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

Approvals *



Filter family	Max. voltage	Attenuation performance			Features										Typical applications					
		standard	high	very high	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	30-60			■	■												■	■
FN 2060 	250 VAC	1-30	30-50			■					■		■	■					■	■
FN 2070 	250 VAC	1-36	30-60			■				■	■		■	■	■				■	
FN 2080 	250 VAC	1-16	40-55			■			■		■		■	■	■					
FN 2090 	250 VAC	1-30	50-65			■		■	■	■	■		■	■	■					
FN 700Z 	250 VAC	6-20	50-70				■	■	■	■		■	■	■				■	■	

* 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					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	Power and energy
		standard		high		very high																	
		0	200	400	600	800	>1000																
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					■			■						■			■	■	■	
FN 3268	520 VAC	7	180					■			■	■					■			■	■	■	
FN 3270	520 VAC	10					1000	■	■	■	■						■			■	■	■	
NEW	FN 3287 FN 3288	530 VAC	10	160				■	■		■	■					■			■	■	■	
NEW	FN 3288 HV	690 VAC	10	160				■	■		■	■					■			■	■	■	
FN 3310 FN 3311	520 VAC		250				2300				■						■			■	■	■	
FN 3310 HV FN 3311 HV	690 VAC		250				2300				■						■			■	■	■	
FN 3359	520 VAC 690 VAC (HV)	150					2500	■	■	■	■						■	■	■	■	■	■	
NEW	RWK 3044	530 VAC	2				1000	■	■				■	■	■	■	■	■	■	■	■	■	
NEW	RWK 3062	760 VAC	1.5				870	■	■				■	■	■	■	■	■	■	■	■	■	

* 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 *



Filter family	Max. voltage	Attenuation performance			Features										Typical applications									
		standard	high	very high	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				■	■		■	■	■		■	■	■	■								


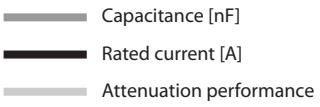








* Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.





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]						Features										Typ. applications					
Filter family	Max. voltage	Rated current [A]						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
		0	60	120	180	240	300																
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					■	■	■	■	■				■	■	■				■	
FN 5040 HV 	690 VAC	7.5-1200	13-1320					■	■	■	■	■				■	■	■				■	
FN 5045 	500 VAC	1.1-630	4.5-1200					■	■	■	■	■				■	■	■				■	
FN 5060 	500 VAC	5-630	12-1100					■	■	■						■	■	■	■				
FN 5060 HV 	690 VAC	7.5-1000	16-1200					■	■	■						■	■	■	■				
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 *							Features						Typical applications								
							AC capacitors	DC capacitors	AC filters	DC filters	Very high performance	Y2 capacitor class	Y4 capacitor class	Medical equipment	Professional power supplies	Power electronic equipment	Telecommunication	Scientific equipment	Test and measurement equip.	Security systems	IT, server and network
Feedthrough capacitors	Max. voltage	0	1000	2000	3000	4000	5000														
		0	50	100	150	200	250														
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	16			200	4700														

Feedthrough filters		standard					high					very high										
Feedthrough filters	Max. voltage	0	1000	2000	3000	4000	5000															
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.

Approvals *		Inductance value [mH]							Rated current [A]							Features										Typical applications									
Choke family	Max. voltage	Inductance value [mH]							Rated current [A]							For common-mode noise	Saturating chokes	Single-choke	Dual-choke	Triple-choke	Quad-choke	PCB mounting	With flying leads	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				
		0	20	40	60	80	100	150	0	20	40	60	80	100	150																				
EV/EH series	250 VAC	0.5	90						0.3-5	90						■			■									■	■	■	■				
RN series	300 VAC 300 VDC	0.4	100						0.3-10	100						■			■										■	■	■	■			
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							■			■	■	■		■												
RT series	600 VAC 425 VDC	2.5-10							6-20 (32)							■			■	■		■						■	■	■	■				
RB series	600 VAC 1000 VDC	0.2-3							16 50 (80)**							■			■	■		■								■	■				
RI series	500 VAC	1.5 25															■	■	■			■	■	■											
RS series	250 VAC	0.003-3.6							0.5-4									■	■			■	■	■	■	■	■	■	■	■	■				
NEW RC series	250 VAC	4.7	47						0.25-0.7							■		■	■			■	■	■	■	■	■	■	■	■	■				

* 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]						Features						Typical applications								
		0-1000	1000-2000	2000-3000	3000-4000	4000-5000	0.1	0.25	1	3	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		0.1	1			■							■	■	■	■			■			
IT 364	3000 VAC					5000	0.1		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 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:

- 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:

- 500 kW 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





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

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and development center

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