SHORT FORM CATALOG

NOVEMBER 2018

EMC/EMI Components and Power Quality Filters

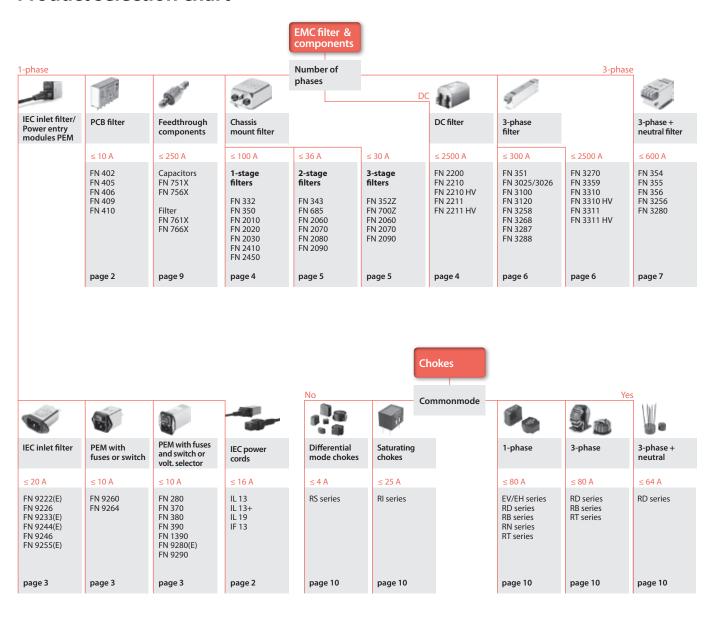


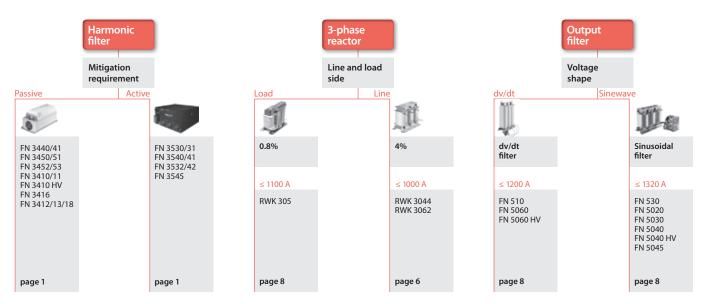


								1	Especial Control
Typical applications	EDP & office - PCs - Printers - PC periphery - Fax machines - Copy machines - Monitors - Plotters - Mainframe com		Drives & control AC & DC motor of SCR drives Servo drives Regenerative dr Rectifiers (AC-Do Converters (AC- Inverters (DC-AC Battery chargers	ives C) AC, DC-DC)	Process automat - Robotics - Conveyors - Assembly lines - Control units - Mining industry - Chemical industr - Oil production - Metal processing	у	Elevators & crar - Elevators for people and good - Escalators - Cranes - Lifts - Hoists - Dumbwaiters		Consumer - Amplifiers, video, TV, s - Receivers, c - Laundry m - Tumblers - Cooking ec - Induction h - Exercise ma - Coffee mac
Line reactors and harmonic filters			FN 3410/11 FN 3412/13 FN 3416/18 FN 3440/41 FN 3450/51 FN 3452/53 RWK 3044 RWK 3062	(page 1) (page 1) (page 1) (page 1) (page 1) (page 1) (page 6) (page 6)	FN 3410/11 FN 3412/13 FN 3416/18 FN 3530/31 FN 3532 FN 3545 RWK 3044 RWK 3062	(page 1) (page 1) (page 1) (page 1) (page 1) (page 1) (page 6) (page 6)		(page 1) (page 1) (page 1) (page 1) (page 1) (page 1) (page 6) (page 6)	
PCB filters	FN 402 FN 405 FN 406 FN 409 FN 410	(page 2) (page 2) (page 2) (page 2) (page 2)							FN 402 FN 405 FN 406 FN 409 FN 410
IEC inlet filters and Power entry modules	FN 280 FN 390 FN 9222(E) FN 9223(E) FN 9233(E) FN 9244(E) FN 9255(E) FN 9264 FN 9280(E) FN 9290 IL 13 IL 13+ IL 19 IF 13	(page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 2) (page 2) (page 2) (page 2)							FN 280 FN 390 FN 9222(E) FN 9233(E) FN 9255(E) FN 9260 FN 9280(E) FN 9290 IL 13 IL 13+ IL 19 IF 13
Single-phase filters and DC filters	FN 343 FN 20x0	(page 5) (page 4/5)	FN 350 FN 2070 FN 2080 FN 2090 FN 241x FN 2200 FN 2210/FN 2210 FN 2211/FN 2211		FN 350 FN 2070 FN 2080 FN 2090 FN 241x	(page 4) (page 5) (page 5) (page 5) (page 4/5)	FN 685 FN 2070 FN 2080 FN 241x	(page 5) (page 5) (page 5) (page 4/5)	FN 332 FN 20x0
Three-phase filters	FN 3025/26 FN 3258 FN 3268	(page 6) (page 6) (page 6)	FN 3025/26 FN 3100 FN 3258 FN 3268 FN 3270 FN 3287 FN 3288 FN 3310/FN 3310 FN 3311/FN 3311 FN 3359		FN 3025/26 FN 31xx FN 3258 FN 3268 FN 3270 FN 3287 FN 3288 FN 3310/FN 3310 FN 3311 FN 3359		FN 3100 FN 3258 FN 3268 FN 3287 FN 3288	(page 6) (page 6) (page 6) (page 6) (page 6)	FN 3258 FN 3268 FN 3025 FN 3026
Three-phase and neutral line filters	FN 354 FN 355 FN 3256	(page 7) (page 7) (page 7)	FN 356 FN 3256 FN 3280	(page 7) (page 7) (page 7)	FN 356 FN 3256 FN 3280	(page 7) (page 7) (page 7)			FN 354 FN 355
Output filters and load reactors			FN 5x0 FN 5020 FN 5030 FN 5040 FN 5040 HV FN 5045 RWK 305 FN 5060/FN 5060	(page 8) (page 8) (page 8) (page 8) (page 8) (page 8) (page 8) HV (page 8)	FN 510 FN 5020 FN 5030 FN 5040 FN 5040 HV FN 5045 RWK 305 FN 5060/FN 5060 F	(page 8) (page 8) (page 8) (page 8) (page 8) (page 8) (V (page 8)	FN 510 FN 5040 FN 5040 HV FN 5045 RWK 305 FN 5060 FN 5060 HV	(page 8) (page 8) (page 8) (page 8) (page 8) (page 8) (page 8)	
Feedthrough components	FN 756x FN 766x	(page 9) (page 9)	FN 756x FN 766x	(page 9) (page 9)	FN 751x FN 761x	(page 9) (page 9)			
EMC/EMI chokes	EV/EH series RD series RN series RB series RT series RS series	(page 10) (page 10) (page 10) (page 10) (page 10) (page 10)	RD series RI series RB series RT series RS series	(page 10) (page 10) (page 10) (page 10) (page 10)	RD series RN series RT series RS series	(page 10) (page 10) (page 10) (page 10)	RD series RN series RT series RS series	(page 10) (page 10) (page 10) (page 10)	EV/EH series RD series RN series RT series RS series
Pulse transformers	IT series	(page 11)	IT series	(page 11)			IT series	(page 11)	
	This illustration on	y contains a fev	v typical products a	nd application	ns. Schaffner is also a	ctive in nume	erous other industry s	segments. Mo	st standard cor

	K		H			R	WY			7
goods audio, creens decoders achines quipment neaters achines thines	Medical - X-ray equipment - CAT scanners - Defilibrators - Laboratory equipm - Analyzers - Measurement devid - MRI, MSI, EEG, ECG - Test equipment - Hospitals		Building automat - HVAC - Security systems - Control units - Pumps - Self-ballasted light equipment - Autom. window sh - Water treatment - Office buildings	ing	Power & energy - SMPS, UPS - DC/DC converters - Gen-sets - Wind turbines - Fuel cells - Gas turbines - UPS - PV systems		Telecom & datace - Base stations for C UMTS, GPRS - Power line communications - Network technolo - Servers - Telephone installa - Broadcast installa - Data centers	gsM, pgy ations	Machinery - Machine tools - Printing machines - Packaging machine - Extruders - Wood working machine - Milling/drilling machines - Welding machines - Grinding machines	:h. :h. ines
	FN 3530/31 FN 3532/42 FN 3540/41 FN 3545	(page 1) (page 1) (page 1) (page 1)	FN 3410/11 FN 3412/13 FN 3416/18 FN 3440/41 FN 3450/51 FN 3530/31 FN 3530/31 FN 3532/42 FN 3540/41 FN 3545 RWK 3044 RWK 3062	(page 1) (page 1) (page 1) (page 1) (page 1) (page 1) (page 1) (page 1) (page 1) (page 1) (Seite 6) (Seite 6)	FN 3530/31 FN 3532/42 FN 3540/41 FN 3545 RWK 3044 RWK 3062	(page 1) (page 1) (page 1) (page 1) (page 6) (page 6)	FN 3530/31 FN 3532/42 FN 3540/41 FN 3545	(page 1) (page 1) (page 1) (page 1)	FN 3410/11 FN 3412/13 FN 3416/18 FN 3530/31 FN 3532 FN 3545 RWK 3044 RWK 3062	(page 1) (page 1) (page 1) (page 1) (page 1) (page 1) (page 6) (page 6)
	FN 402B FN 406B	(page 2) (page 2)	FN 406 FN 409 FN 410	(page 2) (page 2) (page 2)	FN 402 FN 405 FN 406 FN 409 FN 410	(page 2) (page 2) (page 2) (page 2) (page 2)	FN 409	(page 2)		
(page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 2) (page 2) (page 2) (page 2)	FN 280B FN 9222(E)B FN 9233(E)B FN 9244(E)B FN 9255(E)B FN 9246B FN 9260B FN 9264 FN 9280B FN 9290B IL 13 IL 13 IL 13 IL 19 IF 13	(page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 2) (page 2) (page 2)	FN 9246	(page 3)	FN 280 FN 390 FN 9222(E) FN 9233(E) FN 9244(E) FN 9255(E) FN 926x FN 926x FN 9280(E) FN 9290	(page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 3) (page 3)	FN 9246 FN 9255(E)	(page 3) (page 3)		
(page 4/5)	FN 332 FN 20x0B (FN 700Z	(page 4) page 4/5) (page 5)	FN 350 FN 2060 FN 2070 FN 2090	(page 4) (page 5) (page 5) (page 5)	FN 2030 FN 2060 FN 2070 FN 2090 FN 2200 FN 2210/FN 2210 HV FN 2211/FN 2211 HV		FN 700Z Customized single-phase telecom filters	(page 5)	FN 350 FN 2070 FN 2080 FN 2410 FN 2412	(page 4) (page 5) (page 5) (page 4) (page 4)
(page 6) (page 6)	FN 258L FN 3025/26 FN 3268 FN 3287 FN 3288	(page 6) (page 6) (page 6) (page 6) (page 6)	FN 351 FN 3025/26 FN 3258 FN 3268 FN 3287 FN 3288	(page 6) (page 6) (page 6) (page 6) (page 6) (page 6)	FN 3025/26 FN 3100 FN 3120 FN 3258 FN 3268 FN 3287 FN 3288 FN 3310/FN 3310 HV FN 3311/FN 3311 HV FN 3359		Customized three-phase telecom filters		FN 3100 FN 3120 FN 3258 FN 3268 FN 3270 FN 3287 FN 3288 FN 3310/FN 3310 HV FN 3311/FN 3311 HV FN 3359	
	FN 354 FN 355	(page 7) (page 7)	FN 3256	(page 7)	FN 356 FN 3256 FN 3280	(page 7) (page 7) (page 7)	FN 354	(page 7)	FN 356 FN 3256 FN 3280	(page 7) (page 7) (page 7)
			FN 510 FN 5040 FN 5040 HV FN 5045 RWK 305 FN 5060 FN 5060 HV	(page 8) (page 8) (page 8) (page 8) (page 8) (page 8) (page 8)	Customized reactor filter solutions for (renewable) energy production and feed power into the netw	ling			FN 510 FN 5040 FN 5040 HV FN 5045 RWK 305 FN 5060 FN 5060 HV	(page 8) (page 8) (page 8) (page 8) (page 8) (page 8) (page 8)
	FN 751x FN 756x FN 761x FN 766x	(page 9) (page 9) (page 9) (page 9)			FN 751x FN 756x FN 761x FN 766x	(page 9) (page 9) (page 9) (page 9)	FN 751x FN 756x FN 761x FN 766x	(page 9) (page 9) (page 9) (page 9)	FN 751x FN 761x	(page 9) (page 9)
(page 10) (page 10) (page 10) (page 10) (page 10)	RD series RN series RB series RT series	(page 10) (page 10) (page 10) (page 10) (page 10) (page 10)	EV/EH series RD series RI series RN series RB series RT series RS series	(page 10) (page 10) (page 10) (page 10) (page 10) (page 10) (page 10)	RD series RN series RB series RT series	(page 10) (page 10) (page 10) (page 10) (page 10) (page 10)	EV/EH series RN series RB series RT series RS series	(page 10) (page 10) (page 10 (page 10) (page 10)	RB series RT series	(page 10) (page 10) (page 10) (page 10)
	IT series	(page 11)	IT series	(page 11)	IT series	(page 11)	IT series	(page 11)		

Product selection chart





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 < 5% THDi. Active harmonic filters are suitable for mixed load installations and applications with dynamic behaviour. Ecosine active harmonic filters provide latest generation digital technology. With a response time of less than 100 µs an efficient harmonics mitigation, power factor correction, and load balancing are achieved in real time.

Approvals *	•		_	Rate	d power [kW/HP1		Fea	atur	es								Тур	oical	арр	licat	tions	5
CUL) US LISTED	US	Nom.		Rate	d mitigati	on current		For 50 Hz grids	For 60 Hz grids	For 6-pulse diode rectifiers without L _{dc}	For 6-pulse diode rectifiers with Lac	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
Filter family	y	voltage	0 100	200	300	400	500	For	For	For with	For with	For	呈	Pow	Load	3-pł	3-pł	AC	DC	HVA	Indu	Wat	Mixe
FN 3440	6	380– 415 VAC	1.1	200 kW				•		•		1)	•			•		•	•	•	•	•	
FN 3441	-	380– 415 VAC	1.1	200 kW				•			•					•							
FN 3450		440– 500 VAC	1.1	2	50 kW			•		•		1)	•			•		•	•		•	•	
FN 3451	5	440– 500 VAC	1.1	2	50 kW			•			•					•							
FN 3410		380- 500 VAC			200	400 kW		•			-					•		•		•		•	
FN 3411		380- 500 VAC			200	400 kW		•				•				•			•	•			
FN 3410 HV	000	690 VAC	7.5	2	50 kW			•		2)	3)					•		•		•		•	
FN 3416	0	200- 500 VAC	2.5	200 kW				•		•	-	•				•		•	•	•			
FN 3452	9	440– 480 VAC	1.5		300 HP				•	•		1)	•			•		•	•	•	•		
FN 3453	9	440– 480 VAC	1.5		300 HP				•		-					•		•		•			
FN 3412		380– 480 VAC				300	500 HP		•		-		•			•		•		•	•	•	
FN 3413		380- 480 VAC				300	500 HP		•			•				•			•	•			
FN 3418	0	200- 480 VAC	2.5	2	50 HP				•	•	-					•		•	•				
FN 3530/31	200	380– 480 VAC	60 A					•	•	•	-	•	•	•	•	•		•	•	•	•	•	•
FN 3540/41	1	380– 415 VAC	60 A					•	•	•	-	•	•	•	•		•	•	•	•	•	•	•
FN 3532	High speed bus	380– 480 VAC		120 A				•	•	•	-	•			•	•		•	•	•			•
FN 3542	High speed bus	380– 415 VAC		120 A				•	•	•	•	•	•	•	•		•	•	•	•	•		•
FN 3545	No.	200–480/ 415 VAC	60		300 A			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

- * Products evaluated by one or more of the above certification agencies. For details please consult the detailed data sheet.
- $^{\mbox{\tiny 1)}}$ $\,$ 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

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.

Approvals *						Fea	ature	es					Тур	ical	арр	licat	tion	S			
		standa	Attenuation perRated current [Aard high]	ry high	1-stage filter circuit	2-stage filter circuit	For DC applications only	nting	al case	<u>e</u>	tprint	ve	inverters	IT and telecom applications	Building automation	pplies	levices	Office automation equipment	General applications	Consumer electronics
Filter family	Max. voltage	0 3	3 6	9 12	2 15	1-stage fi	2-stage fi	For DC ap	PCB mounting	With metal case	Low profile	Small footprint	Automotive	DC/DC converters	IT and tel	Building	Power supplies	Medical devices	Office au	General a	Consume
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.

Approvals *									Avai	lable l	ine co	nnec	tors				Тур	ical a	pplic	ation	ns
PS PS Power cord family	Max. voltage		standard on requ	d lengtl est 3 m	n 9 ft	12 ft	5 m	10 m	4 line side plug IEC C14 male, straight		11 line side plug CEE7/VII, right angled	1 line side plug NEMA5-15, straight	52 line side plug NEMA5-15, straight hospital grade	(1 line side plug BS1363, right angled, fused 5A	11 line side plug SEV1011, straight	1 line side plug JIS8303, straight	Data centers	Industrial equipment	Medical, in-vitro diagnostic devices	Broadcasting stations	Mobile applications
IL 13									C14	C20	EG	US1	USZ	UK1	문	Ъ	Da	luc	de M	Bro	ĕ
12.13	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 *								Fe	atur	es						Турі	ical	арр	licat	tions	;		
N° ®		=		Attenua Rated c		formance]		e				J.			g			salddns				pment	
KEMA KEUR		sta	ndard	d	high		ery high	With earth line choke	(s)	With switch (1-pole)	With switch (2-pole)	With voltage selector	For PCB mounting	Snap-in version	Extra wide mounting	ment	Medical equipment	Switch-mode power supplies	Office equipment	Prof. audio, TV, VCR	Telecommunication	Light industrial equipment	General purpose
Filter family	Max. voltage	0	4	8	3 1	12	16 20	With ea	For fuse(s)	With sw	With sw	With vo	For PCB	Snap-in	Extra w	IT equipment	Medica	Switch-	Office e	Prof. au	Telecon	Light in	Genera
FN 9222 FN 9222E	250 VAC	1					20	•							•	•	•	•	•	•	•	•	•
FN 9226	250 VAC	1			10								•			•	•		•	•	•		•
FN 9233 FN 9233E	250 VAC	1_				15		•						•	•	•	•	•	•	•	•	•	•
FN 9244 FN 9244E	250 VAC	1				15		•						•	•	•	•	•	•	•	•	•	
FN 9246	250 VAC	1					20										•	•	•	•	•	•	
FN 9255	250 VAC		2		•		20							-					•		-	-	
FN 9255E	250 VAC		2		,	15		ŀ						-		-	-	-	•	-	•	•	
FN 9260	250 VAC	1		_	10				•					•			•		•	•	•		•
FN 9264	250 VAC	1		_	10									•			•	•	•	•	•	•	•
FN 9280 FN 9280E	250 VAC	1		_	10			-	•		•			•		•	•		•	•	•	•	•
FN 9290	250 VAC	1			10				•		•			•		•	•	•	•	•	•	•	
FN 280	250 VAC	1			10				•		•			•		•	•		•	•	•	•	•
FN 370	250 VAC		2	6								•					•		•	•	•		•
FN 380	250 VAC		2	6					•		•					•	•		•	•	•		•
FN 390 FN 1390	250 VAC	1			10			•	•		•	•				•	•		•	•	•	•	•

^{*} 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 *									Fea	ature	es							Тур	ical	арр	licat	tions	;	
FL' (S) IEC/EN 60939						ation perfo urrent [A]	ormance						otection	uation	nuation	n style		S		drives	ine tools		e. equip.	
Filter family		Max. voltage	0	standar 20		high		ery 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	Office, test & measure. equip.	General purpose
FN 332	90 90	250 VAC		1–10	_				•				•											•
FN 350		250 VAC		8	_	55												•		•			•	
FN 2010		250 VAC		1		60										•			•					•
FN 2020		250 VAC		1		60										•			•				•	•
FN 2030	40	250 VAC		1	30								•	•	•	•			•				•	•
FN 2200	11/	1200 VDC			25			2300				•		•	•			•				•		•
FN 2210 FN 2211	tt.	1000 VDC		-				250-2300				•		-	•			•						•
FN 2210 HV FN 2211 HV	u	1500 VDC		-				250-2300				•		•	•			•						•
FN 2410	10	250 VAC 520 VAC (H)		8		_		100						•				•		•				
FN 2412		250 VAC 520 VAC (H)		8		45								•			•	•		•	•			
FN 2450		250 VAC		1 20										•	•			•	•				•	•

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

Approvals *							Fea	ature	es							Тур	ical	арр	lica	tions	í	
71 ° ®				tion perfor	mance														S			
IECON COSSS		standa		urrent [A] high	_ Ve	ery 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
Filter family	Max. voltage	0 20	40	60	80	100	1-stage	2-stage	3-stage	With ea	With ov	Low fre	High fre	Choice	TEMPES	Powers	Medica	Single-	Control	Interce	Office, t	Genera
FN 343	250 VAC	1–10								-											•	•
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 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 *				Attenuat	tion perfor	mance		Fe	atur	es									Тур	ical	app	lica	tion	S
9 1° @		١.		Rated cu							,s	S			Si					Se				
EC/FN 69399			standa	rd	high	ve	ry high	Multi-stage filter circuit	Safety connector blocks	nnection	Optional protective covers	Standard protective covers	Offering EMC compliance	Low leakage current	Less commutation notches	Inrush current limitation	Harmonics reduction	lance	Inverters, servo drives	Energy regeneration drives	Machinery, machine tools	Industrial automation	urpose	d energy
Filter family	Max. voltage	0	200	400	600	800	>1000	Multi-stag	Safety co	Busbar connection	Optional	Standard	Offering E	Low leaka	Less com	Inrush cu	Harmonic	4% impedance	Inverters,	Energy re	Machiner	Industrial	General purpose	Power and energy
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 23	30					•				•							•	•	•		•
FN 3258	480 VAC 520 VAC (H)		7 180						•				•						•		•	•	•	
FN 3268	520 VAC		7 180						•				•	•					•		•	•	•	
FN 3270	520 VAC		10				1000				•		•								•		•	•
FN 3287	480 VAC		10 160					-					_								•	-	-	
FN 3288	690 VAC		10 160					-					_								-	-	-	
FN 3310 FN 3311	520 VAC			250			2300						•								•	•	•	•
FN 3310 HV FN 3311 HV	690 VAC			250			2300	1		•			•						•		•	•	•	•
FN 3359	520 VAC 690 VAC (HV)		15	0			2500	•			•		•						•	•	•	•		•
RWK 3044	530 VAC		2				1000			-					-	•	-	-			-	-	-	
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	*							Fea	ture	es						Тур	ical	арр	licat	ions	;		
N° ©)		sta		nuation perfo d current [A] high		ery 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	upplies	Medical equipment	For high frequency appl.	High power office equipment	General purpose
Filter family	′	Max. voltage	0	120 2	240 36	0 480	600	1-stage	2-stage	Safety o	Faston c	Offering	For asyn	Broadba	Very low	For entir	Machine	Industri	Power supplies	Medical	For high	High po	General
FN 354	1	440 VAC	4-25		-				-		-	-		•					•	•	-	•	•
FN 355		440 VAC	3-20					•			-	•			•					•		•	•
FN 356	A STATE OF THE STA	440 VAC	16	150				•				-	-			•		•	•				
FN 3256	4	520 VAC (H)	8	160		_		-				•	-			•	•	•	•			•	•
FN 3280	ão/	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 *								Fea	ature	es									Тур	o. ap	olica	tion	s
CFL® US	Max. voltage	0 0	60	Typical r Rated cu	180	240 800	300 >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 1200	•		•		•					•	•	•				•
FN 5040 HV	690 VAC		7.5 13				1200 1320	•		•		•						•	•				•
FN 5045	500 VAC		1.1				630 1200	•	•	•		•					•	•	•				•
FN 5060	500 VAC		5				630 1100	•	•	•							•	•	•	•			
FN 5060 HV	690 VAC		7.5 16				1000	•	•	•								•	•	•			
DWW 205			1.5				630																_
RWK 305	500 VAC		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 *								Fea	ture	s					Тур	ical	appl	icati	ons			
Feedthrough capacitors	Max. voltage	000	1000	Capacita Rated cu Attenuat	rrent [A] cion perfor	4000	5000 250	AC capacitors	DC capacitors	ACfilters	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
					.50			AC	8	AC	8	Ver	Y2	7.	We	Prc	Po	Tel	Sci	Tes	Sec	Ë,
FN 7510	300 VAC	ľ	2.2–47	100				•					•		•	•	•	•	•	•		
FN 7511	300 VAC		4.7–220 10			200		•					•		•	•	•	•	•	•		•
FN 7512	300 VAC		47–100 <u>16</u>	63				•					•		•	•	•	•	•	•	•	-
FN 7513	300 VAC	1	100 16					•					•		•	•	•	•	•	•	•	•
FN 7560	130 VDC		10–100			200			•					•	•	•	•	•	•	•		
FN 7561	130 VDC		47–470	63		200			•					•	•	-	•	-	•	•		•
FN 7562	130VDC		100–1000			200			•					•	•	-	-	-	•	•	•	•
FN 7563	130 VDC		470 16			200	4700		•			•		•	•	•	•	•	•	•	•	-
Feedthrough filters		H	standar	d	high	ve	ry 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.

Approvals *							Fe	ature	es						Тур	ical	арр	licati	ons			
Choke family	Max. voltage				80		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
EV/EH series	250 VAC	0.5 0.3-5				90	•						•		•	•						•
RN series	300 VAC 300 VDC	0.4				100	-						•		•	•			•	•		•
RD 5000 series	600 VAC 850 VDC	1–10					•			•	•		•		•							
RD 6000 series	600 VAC 850 VDC	1.5 15					•				•			•	•		•					
RD 7000 series	600 VAC 850 VDC	0.2	25 36				•			•	•	•		•	•		•					
RD 8000 series	600 VAC 850 VDC	0.2–12		64			•			•	•	•		•	•		•					
RT series	600 VAC 425 VDC		ui.				•				•		•		•	•	•	•	•			•
RB series	600 VAC 1000 VDC	0.2–3	uii	50 (80)**			•				•		•		•	•	•	•	•			•
RI series	500 VAC	1.5 25							•	•			•	•	•		•	•	•			
RS series	250 VAC	0.003-3.6 0.5-4											-									-





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.

	Voltage-time area [Vμs]						Fea	Features								Typical applications							
Pulse transformer	Nominal voltage	0 1000 0 0.6	Ignition	time area current [A 3000 1.8	4000	5000 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 0.1–0.25	1100				•						•		•	•	•		•	•	•	•	
IT 245/255/258	750 VAC	250–500 0.1	1				•						•		•	•	•		•	•	•	•	
IT 239	1000 VAC	350 0.25					•						•		•	•	•			•			
IT 370	1000 VAC	0.1	1 1		4000		•						•		•	•	•			•			
IT 364	3000 VAC	0.1				5000 3 1	•							•	•	•	•						
IT 213	380 VAC	450 0.25						•					•		•	•	•	•	•	•	•	•	
IT 312/313	380 VAC	450 0.25	1200					•					•		•		•	•	•	•	•	•	
IT 143/233/242 IT 243/253	500 VAC	180–800 0.025–0.25	5										•		•	•	•	•	•	•		•	
IT 246/248	750 VAC	200–350 0.1–0.25							-				•		•	•	•		•	•		•	
IT 249	500 VAC	350 0.25								•			•		•	•	•	•	•	•	•	•	
IT 260	500 VAC	200									•		•		•		•	•	•	•	•	•	
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:

- I open field testing
- I 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:

- I 500 kW full load test set-up for motor drives
- I 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:

- Loustom filter design to optimize filter performance and solve space, layout, mounting or connection problems
- I circuit and equipment design advising on circuit and equipment or enclosure design to overcome EMC problems
- I 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	Cι
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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