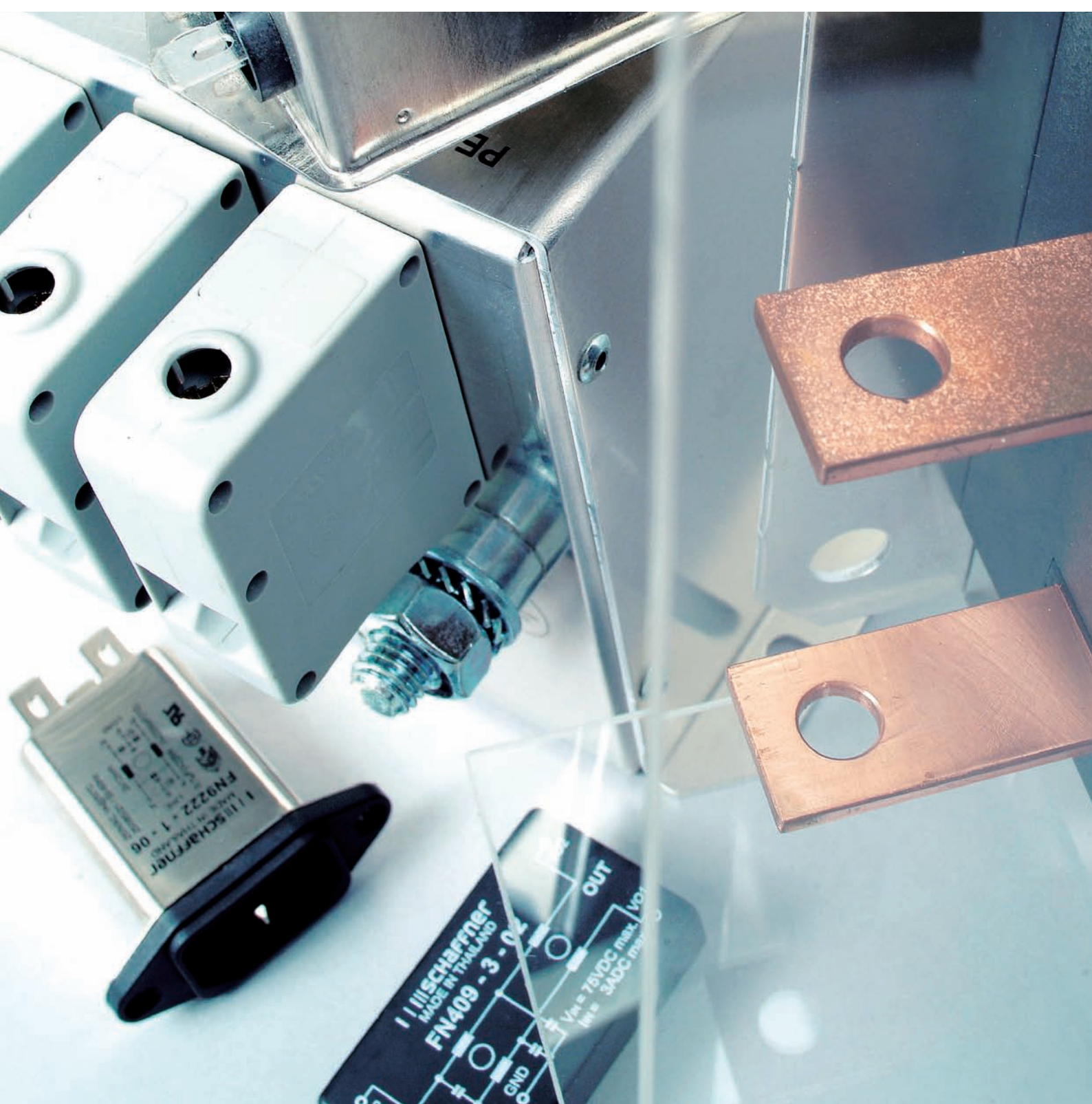


2011

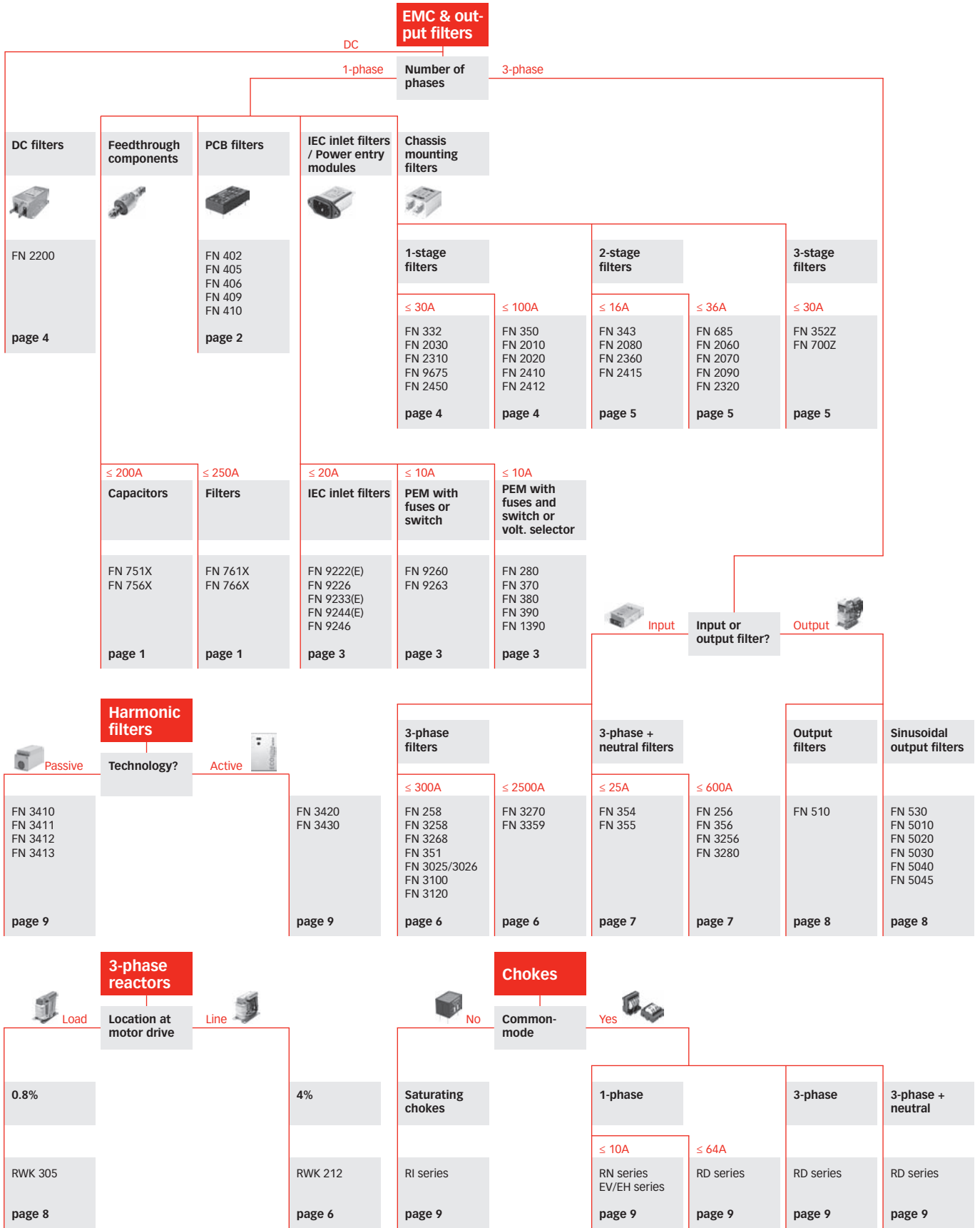
**Components short form catalog**  
EMC/EMI filters and chokes, harmonic filters,  
feedthroughs, and pulse transformers






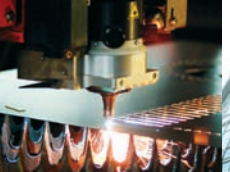











energy efficiency and reliability










# Product selection chart.



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

					
<b>Typical applications</b>	<b>Transportation</b> <ul style="list-style-type: none"> <li>– Rail vehicles</li> <li>– Locomotives</li> <li>– Electric car propulsion</li> <li>– Diesel-electric ship propulsion</li> </ul>	<b>EDP &amp; office</b> <ul style="list-style-type: none"> <li>– PCs</li> <li>– Printers</li> <li>– PC periphery</li> <li>– Fax machines</li> <li>– Copy machines</li> <li>– Monitors</li> <li>– Plotters</li> <li>– Mainframe computers</li> </ul>	<b>Drives &amp; controls</b> <ul style="list-style-type: none"> <li>– AC &amp; DC motor drives</li> <li>– SCR drives</li> <li>– Servo drives</li> <li>– Regenerative drives</li> <li>– Rectifiers (AC-DC)</li> <li>– Converters (AC-AC, DC-DC)</li> <li>– Inverters (DC-AC)</li> <li>– Battery chargers</li> </ul>	<b>Process automation</b> <ul style="list-style-type: none"> <li>– Robotics</li> <li>– Conveyors</li> <li>– Assembly lines</li> <li>– Control units</li> <li>– Mining industry</li> <li>– Chemical industry</li> <li>– Oil production</li> <li>– Metal processing</li> </ul>	<b>Elevators &amp; cranes</b> <ul style="list-style-type: none"> <li>– Elevators for people and goods</li> <li>– Escalators</li> <li>– Cranes</li> <li>– Lifts</li> <li>– Hoists</li> <li>– Dumbwaiters</li> </ul>
<b>Feedthrough components</b> 	Customized feedthrough solutions for automotive applications	FN 756X (page 1) FN 766X (page 1)		FN 751X (page 1) FN 761X (page 1)	
<b>PCB filters</b> 	Customized PCB filters for automotive applications	FN 402 (page 2) FN 405 (page 2) FN 406 (page 2) FN 410 (page 2)			
<b>IEC inlet filters and Power entry modules</b> 		FN 280 (page 3) FN 390 (page 3) FN 922x (page 3) FN 9233(E) (page 3) FN 9244(E) (page 3) FN 926x (page 3)			
<b>Single-phase filters and DC filters</b> 	Custom designs for electric car propulsion	FN 343 (page 5) FN 20x0 (page 4/5) FN 23x0 (page 4/5)	FN 350 (page 4) FN 2070 (page 5) FN 2080 (page 5) FN 2090 (page 5) FN 2410 (page 4/12) 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)
<b>Three-phase filters</b> 		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)
<b>Three-phase and neutral line filters</b> 		FN 256 (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 356 (page 7) FN 3256 (page 7) FN 3280 (page 7)	
<b>Output filters and load reactors</b> 	Customized magnetics for rail vehicles and ship propulsion		FN 5x0 (page 8) FN 5010 (page 8) FN 5020 (page 8) FN 5030 (page 8) FN 5040 (page 8) FN 5045 (page 8) RWK 305 (page 8)	FN 510 (page 8) FN 5010 (page 8) FN 5020 (page 8) FN 5030 (page 8) FN 5040 (page 8) FN 5045 (page 8) RWK 305 (page 8)	FN 510 (page 8) FN 5010 (page 8) FN 5040 (page 8) FN 5045 (page 8) RWK 305 (page 8)
<b>Line reactors and harmonic filters</b> 	Customized magnetics for rail vehicles and ship propulsion		FN 3410/11 (page 9) FN 3412/13 (page 9) RWK 212 (page 6)	FN 3410/11 (page 9) FN 3412/13 (page 9) FN 3420 (page 9) RWK 212 (page 6)	FN 3410/11 (page 9) FN 3412/13 (page 9) FN 3420 (page 9) RWK 212 (page 6)
<b>EMC/EMI chokes</b> 		EV/EH series (page 10) RD series (page 10) RN series (page 10)	RD series (page 10) RI series (page 10)	RD series (page 10)	RD series (page 10)
<b>Pulse transformers</b> 		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.

						
<b>Consumer goods</b> – Amplifiers, audio, video, TV, screens – Receivers, decoders – Laundry machines – Tumblers – Cooking equipment – Induction heaters – Exercise machines – Coffee machines	<b>Medical</b> – X-ray equipment – CAT scanners – Defibrillators – Laboratory equipment – Analyzers – Measurement devices – MRI, MSI, EEG, ECG – Test equipment – Hospitals	<b>Military</b> – Security systems – Surveillance equipm. – Communication equipment – Aircraft, ships, tanks, submarines – Radar systems – Navigation systems	<b>Building automation</b> – HVAC – Security systems – Control units – Pumps – Self-ballasted lighting equipment – Autom. window shades – Water treatment – Office buildings	<b>Power &amp; energy</b> – SMPS, UPS – DC/DC converters – Gen-sets – Wind turbines – Fuel cells – Gas turbines – UPS – PV systems	<b>Telecom &amp; datacom</b> – Base stations for GSM, UMTS, GPRS – Power line communications – Network technology – Servers – Telephone installations – Broadcast installations – Data centers	<b>Machinery</b> – Machine tools – Printing machines – Packaging machines – Extruders – Wood working mach. – Milling/drilling mach. – Laser cutting machines – Welding machines – Grinding machines
	FN 751X (page 1) FN 756X (page 1) FN 761X (page 1) FN 766X (page 1)	IT series (page 11) FN 756X (page 1) FN 761X (page 1) FN 766X (page 1)		FN 751X (page 1) FN 756X (page 1) FN 761X (page 1) FN 766X (page 1)	FN 751X (page 1) FN 756X (page 1) FN 761X (page 1) FN 766X (page 1)	FN 751X (page 1) FN 761X (page 1)
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 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)	
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 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)	Customized filter solutions with military connectors	FN 9246 (page 3)	FN 280 (page 3) FN 3x0 (page 3) FN 922x (page 3) FN 9233(E) (page 3) FN 9244(E) (page 3) FN 926x (page 3)	FN 9246 (page 3)	
FN 332 (page 4) FN 20x0 (page 4/5) FN 23x0 (page 4/5)	FN 332 (page 4) FN 20x0B (page 4/5) FN 2360 (page 5) FN 700Z (page 5)	FN 352Z (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)
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 3258 (page 6) FN 3268 (page 6) FN 3359 (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)
FN 256 (page 7) FN 354 (page 7) FN 355 (page 7)	FN 256 (page 7) FN 354 (page 7) FN 355 (page 7)	FN 354 (page 7)	FN 256 (page 7) FN 3256 (page 7)	FN 256 (page 7) FN 356 (page 7) FN 3256 (page 7) FN 3280 (page 7)	FN 256 (page 7) FN 354 (page 7)	FN 356 (page 7) FN 3256 (page 7) FN 3280 (page 7)
		FN 510 (page 8) FN 530 (page 8) RWK 305 (page 8)	FN 510 (page 8) FN 5010 (page 8) FN 5040 (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 5045 (page 8) RWK 305 (page 8)
	FN 3420 (page 9) FN 3430 (page 9)		FN 3410/11 (page 9) FN 3412/13 (page 9) FN 3420 (page 9) FN 3430 (page 9)	FN 3420 (page 9) Customized reactor and filter solutions for (renewable) energy production and feeding power into the network	FN 3420 (page 9) FN 3430 (page 9)	FN 3410/11 (page 9) FN 3412/13 (page 9) FN 3420 (page 9) RWK 212 (page 6)
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)	RD series (page 10) RN series (page 10)	EV/EH series (page 10) RD series (page 10) RI series (page 10) RN series (page 10)	EV/EH series (page 10) RD series (page 10) RN series (page 10)	EV/EH series (page 10) RN series (page 10)	RD series (page 10)
	IT series (page 11)	IT series (page 11)	IT series (page 11)	IT series (page 11)	IT series (page 11)	



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

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

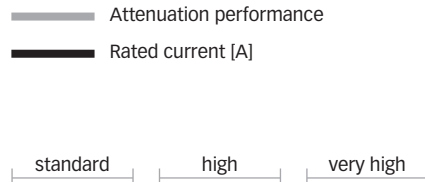


**Single-phase and DC filters.** Single-phase filters for chassis or DIN-rail mounting are key for EMC compliance of higher power office equipment and low to medium power industrial applications. A broad selection of electrical and mechanical features allows a specific choice and deployment for countless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

Approvals *				Features										Typical applications						
Filter family	Max. voltage	Attenuation performance			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
		standard	high	very high																
FN 332	250VAC	1 - 10			■									■					■	
FN 350	250VAC	8	55		■								■		■				■	
FN 2010	250VAC	1	60		■						■			■					■	
FN 2020	250VAC	1	60		■						■			■					■	
FN 2030	250VAC	1	30		■			■	■	■	■			■					■	
FN 2200	1200VDC		25	1500	■		■		■	■			■					■	■	
FN 2310	250VAC	3 - 10			■														■	
FN 2410	250VAC 520VAC (H)	8	100		■				■					■		■				
FN 2412	250VAC 520VAC (H)	8	45		■				■				■	■	■	■				
FN 2450	250VAC	1	20		■				■	■				■	■				■	
FN 9675/76	250VAC	3	16		■									■		■			■	

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

Approvals \*














Features

Typical applications

Filter family	Max. voltage	Performance			Features											Typical applications					
		Rated current [A]	Attenuation performance	Category	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	NEMP, TEMPEST protection	Power supplies, SMPS	Medical equipment	Single-phase motor drives	Control unit in machine tools	Military applications	Office, test & measure. equip.	General purpose	
FN 343	250VAC	1 - 10	Standard	Standard	■		■												■	■	
FN 685	250VAC	10 - 36	High	High	■				■		■		■		■		■				
FN 2060	250VAC	1 - 30	Standard	Standard	■						■		■		■		■		■	■	
FN 2070	250VAC	1 - 36	High	High	■						■		■		■		■		■		
FN 2080	250VAC	1 - 16	Standard	Standard	■						■		■		■		■				
FN 2090	250VAC	1 - 30	Standard	Standard	■				■		■		■		■		■				
FN 2320	250VAC	3 - 20	Standard	Standard	■														■	■	
FN 2360	250VAC	3 - 6	Standard	Standard	■										■		■		■	■	
FN 2415	250VAC	6 - 16	High	High	■												■		■		
FN 352Z	250VAC	6 - 30	High	High			■		■		■				■				■	■	
FN 700Z	250VAC	6 - 20	High	High			■		■		■		■		■		■		■	■	







\* 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					
		Rated current [A]																						
		standard   high   very high																						
		0	200	400	600	800	>1000																	
FN 258	 480VAC 690VAC (HV)	7	250																					
FN 351	 440VAC 520VAC (H)	8	280																					
FN 3025	 520VAC	10 - 50																						
FN 3026	 520VAC	10 - 50																						
FN 3100	 520VAC	35	300																					
FN 3120	 520VAC (H)	25	230																					
FN 3258	 480VAC 520VAC (H)	7	180																					
FN 3268	 520VAC	7	180																					
FN 3270	 520VAC (H)	10	1000																					
FN 3359	 520VAC 690VAC (HV)	150	2500																					
RWK 212	 500VAC	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 *				Features										Typical applications													
Filter family	Max. voltage	Attenuation performance										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
		standard		high		very high																					
		0	120	240	360	480	600																				
FN 256 	480VAC	8 - 160		—																							
FN 354 	440VAC	4 - 25		—																							
FN 355 	440VAC	3 - 20		—																							
FN 356 	440VAC	16 - 150		—																							
FN 3256 	520VAC (H)	8 - 160		—																							
FN 3280 	520VAC (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	520VAC	1.5 - 30	4 - 66					■	■	■						■	■	■	■				
FN 530	520VAC	1.5 - 7.5	4 - 16					■	■	■	■	■	■	■	■	■	■	■			■	■	
FN 5010	440VAC	1.1				355		■	■	■	■					■	■	■				■	
FN 5020	500VAC	11	55					■	■	■	■					■	■	■			■		
FN 5030*	500VAC	11	55						■	■		■	■	■	■	■	■	■			■	■	■
FN 5040	500VAC	1.1				630		■	■	■	■					■	■	■				■	
FN 5045	500VAC	1.1				630		■	■	■	■					■	■	■				■	
RWK 305	500VAC	1.5				630		■	■							■	■	■	■				
		4				1100																	

\* Additional output filter module to be operated in conjunction with FN 5010 or FN 5020



## 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]							Features								Typical applications							
Choke family	Max. voltage	Inductance value [mH]							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	0																
RD 5000 series 	600VAC 850VDC	1 - 10							■		■	■				■		■						
RD 6000 series 	600VAC 850VDC	1.5 - 15							■		■	■				■	■	■						
RD 7000 series 	600VAC 850VDC	0.2 - 25							■		■	■	■			■	■	■						
RD 8000 series 	600VAC 850VDC	0.2 - 12							■		■	■	■			■	■	■						
RN series 	250VAC	0.7					100		■		■					■	■			■	■	■	■	
EV/EH 20 series 	250VAC	0.82 - 33							■		■					■	■			■	■	■	■	
EV/EH 24 series 	250VAC	0.5 - 44							■		■					■	■			■	■	■	■	
EV/EH 28 series 	250VAC	1.1 - 36							■		■					■	■			■	■	■	■	
EV/EH 35 series 	250VAC	3.6 - 90							■		■					■	■			■	■	■	■	
RI series 	500VDC	1.5 - 25							■	■	■					■	■			■	■	■		

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





## 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 to the 49th harmonic
- emission and immunity tests according to European and international standards (EN, IEC, FCC, CISPR, Mil)

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



energy efficiency and reliability

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