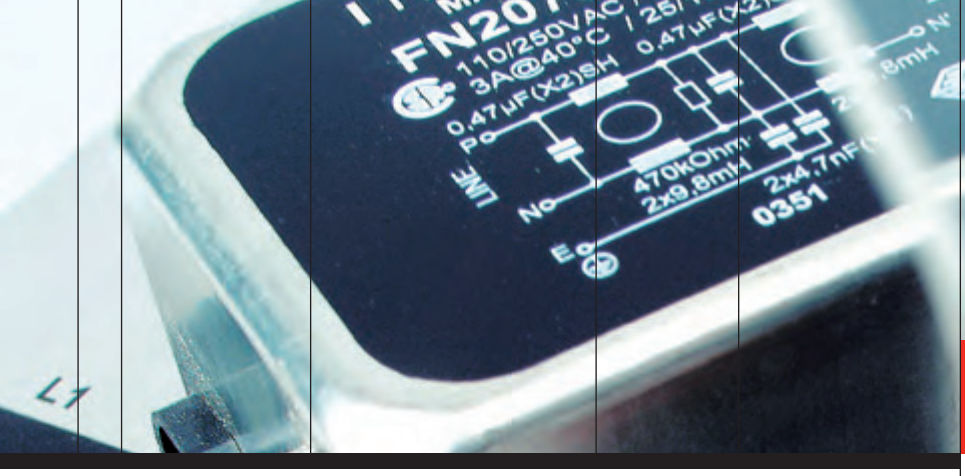
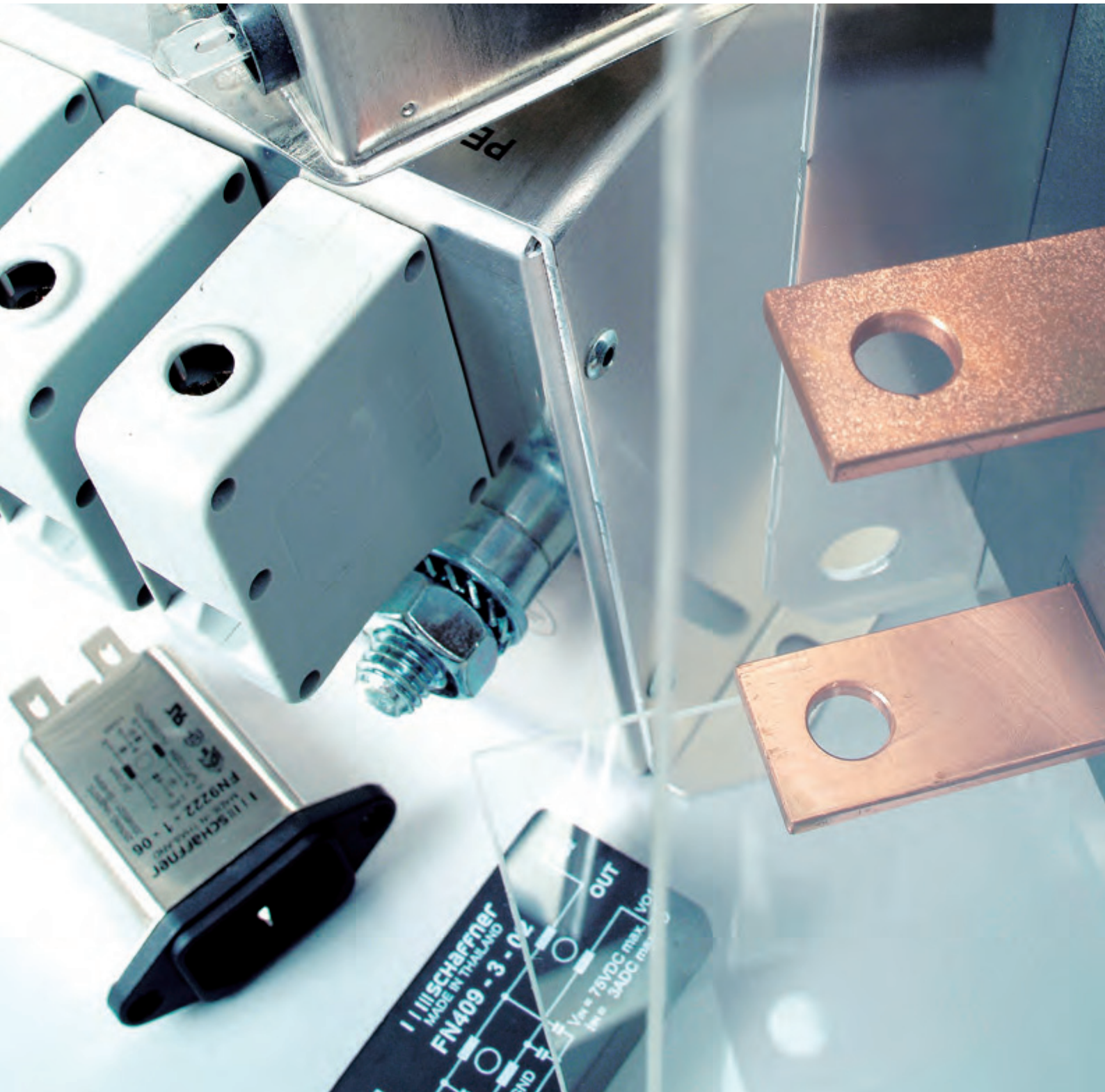


2010

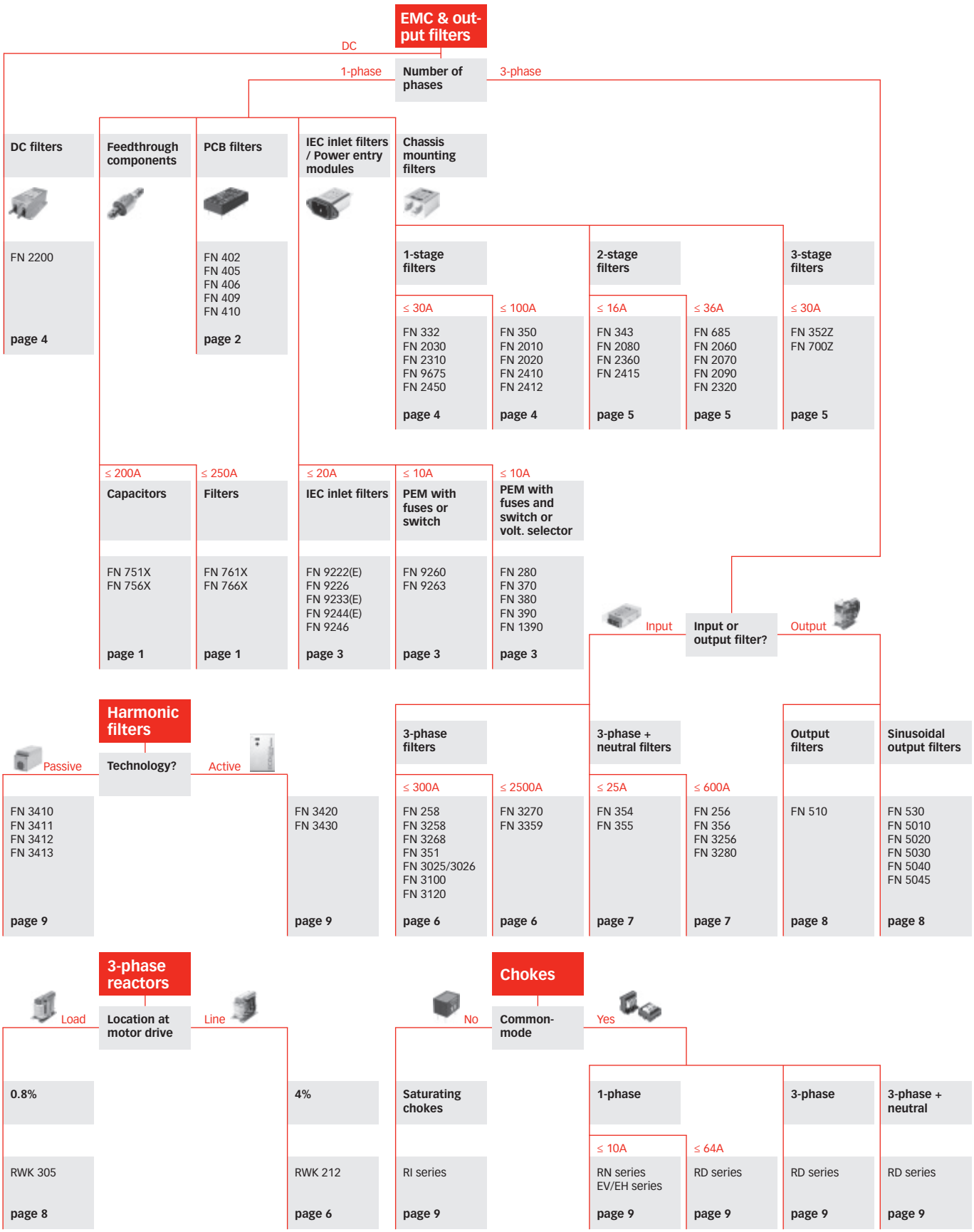
Components short form catalog
EMC/EMI filters and chokes, harmonic filters, feedthroughs, and pulse transformers

SCHAFFNER

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.





Typical applications	Transportation – Rail vehicles – Locomotives – Electric car propulsion – Diesel-electric ship propulsion	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
Feedthrough components 	Customized feedthrough solutions for automotive applications	FN 756X (page 1) FN 766X (page 1)		FN 751X (page 1) FN 761X (page 1)	
PCB filters 	Customized PCB filters for automotive applications	FN 402 (page 2) FN 405 (page 2) FN 406 (page 2) FN 410 (page 2)			
IEC inlet filters and Power entry modules 		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)			
Single-phase filters and DC filters 	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)
Three-phase filters 		FN 3025/26 (page 6) FN 3258 (page 6) FN 3268 (page 6)	FN 258 (page 6) FN 3025/26 (page 6) FN 3100 (page 6) FN 3258 (page 6) FN 3268 (page 6) FN 3270 (page 6) FN 3359 (page 6)	FN 258 (page 6) FN 3025/26 (page 6) FN 31xx (page 6) FN 3258 (page 6) FN 3268 (page 6) FN 3270 (page 6) FN 3359 (page 6)	FN 258 (page 6) FN 3100 (page 6) FN 3258 (page 6) FN 3268 (page 6)
Three-phase and neutral line filters 		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)	
Output filters and load reactors 	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)
Line reactors and harmonic filters 	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)
EMC/EMI chokes 		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)
Pulse transformers 		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.







Consumer goods – Amplifiers, audio, video, TV, screens – Receivers, decoders – Laundry machines – Tumblers – Cooking equipment – Induction heaters – Exercise machines – Coffee machines	**Medical** – X-ray equipment – CAT scanners – Defilibrators – Laboratory equipment – Analyzers – Measurement devices – MRI, MSI, EEG, ECG – Test equipment – Hospitals	**Military** – Security systems – Surveillance equipm. – Communication equipment – Aircraft, ships, tanks, submarines – Radar systems – Navigation systems	**Building automation** – HVAC – Security systems – Control units – Pumps – Self-ballasted lighting equipment – Autom. window shades – Water treatment – Office buildings	**Power & energy** – SMPS, UPS – DC/DC converters – Gen-sets – Wind turbines – Fuel cells – Gas turbines – UPS – PV systems	**Telecom & datacom** – Base stations for GSM, UMTS, GPRS – Power line communications – Network technology – Servers – Telephone installations – Broadcast installations – Data centers	**Machinery** – 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)	




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

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

Approvals *

Capacitance [nF]
Rated current [A]
Attenuation performance

Feedthrough capacitors	Max. voltage	0 / 1000 / 2000 / 3000 / 4000 / 5000 pF 0 / 50 / 100 / 150 / 200 / 250 A	**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	Military (radar, communic.)	Aeronautic	Security systems	IT, server and network
FN 7510	300VAC	2.2 - 47 pF; 10 - 100 A	■					■			■	■	■	■	■			
FN 7511	300VAC	4.7 - 220 pF; 10 - 200 A	■					■			■	■	■	■	■			■
FN 7512	300VAC	47 - 100 pF; 16 - 63 A	■					■			■	■	■	■	■		■	■
FN 7513	300VAC	100 pF; 16 A	■					■			■	■	■	■	■	■	■	■
FN 7560	130VDC	10 - 100 pF; 10 - 200 A		■					■		■	■	■	■	■			
FN 7561	130VDC	47 - 470 pF; 63 - 200 A		■					■		■	■	■	■	■			■
FN 7562	130VDC	100 - 1000 pF; 16 - 200 A		■					■		■	■	■	■		■	■	■
FN 7563	130VDC	470 - 4700 pF; 16 - 200 A		■			■		■		■	■	■	■	■	■	■	■

Feedthrough filters

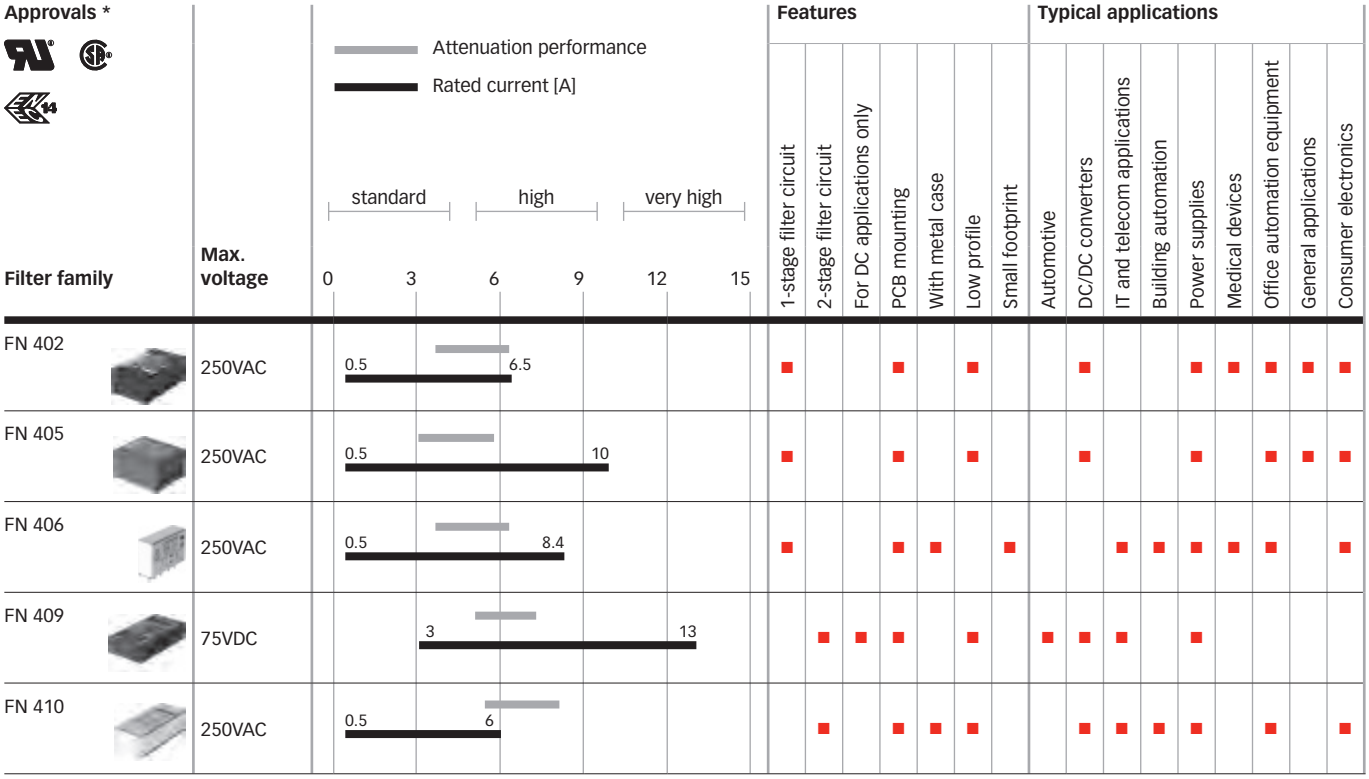
standard | high | very high

FN 7611	300VAC	10 - 250 A			■			■			■	■	■	■				■
FN 7612	300VAC	10 - 100 A			■		■	■			■	■	■	■	■	■	■	■
FN 7660	130VDC	10 - 200 A				■			■		■	■	■	■				■
FN 7661	130VDC	10 - 200 A				■	■		■		■	■	■	■	■	■	■	■

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

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.



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

IEC inlet filters / Power entry modules.

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

Approvals *

IEC/EN 60939

Attenuation performance

Rated current [A]

standard | high | very high

0 4 8 12 16 20

Filter family	Max. voltage	Features								Typical applications							
		With earth line choke	For fuse(s)	With switch	With voltage selector	IEC 60950-compliant	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	250VAC					■		■	■	■	■	■	■	■	■	■	■
FN 9222E	250VAC	■				■		■	■	■	■	■	■	■	■	■	■
FN 9226	250VAC					■	■			■	■		■	■	■		■
FN 9233	250VAC					■		■	■	■	■	■	■	■	■	■	■
FN 9233E	250VAC	■				■		■	■	■	■	■	■	■	■	■	
FN 9244	250VAC					■		■	■	■	■	■	■	■	■	■	
FN 9244E	250VAC	■				■		■	■	■	■	■	■	■	■	■	
FN 9246	250VAC					■					■	■	■	■	■	■	
FN 9260	250VAC		■			■		■			■		■	■	■		■
FN 9263	250VAC			■		■		■				■	■	■	■	■	■
FN 280	250VAC		■	■		■		■		■	■		■	■	■	■	■
FN 370	250VAC		■		■	■		■		■	■		■	■	■		■
FN 380	250VAC		■	■		■		■		■	■		■	■	■		■
FN 390 FN 1390	250VAC	■	■	■	■	■				■	■		■	■	■	■	■

* 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 *

IEC/EN 60939

Attenuation performance

Rated current [A]

standard | high | very high

0 20 40 60 80 100

Filter family	Max. voltage	Attenuation / Rated current [A]	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	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 *			Attenuation performance / Rated current [A]	Features									Typical applications						
Filter family		Max. voltage	standard / high / very high; 0 20 40 60 80 100	1-stage filter circuit	2-stage filter circuit	3-stage filter circuit	With earth line choke	With overvoltage protection	Low frequency attenuation	High frequency attenuation	Choice of connection style	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		■		■											■	■
FN 685		250VAC	10 36		■				■		■		■		■				
FN 2060		250VAC	1 30		■						■		■	■				■	■
FN 2070		250VAC	1 36		■					■	■		■	■	■			■	
FN 2080		250VAC	1 16		■				■		■		■	■	■				
FN 2090		250VAC	1 30		■			■	■	■	■		■	■	■				
FN 2320		250VAC	3 20		■													■	■
FN 2360		250VAC	3 - 6		■								■	■				■	■
FN 2415		250VAC	6 - 16		■										■	■			
FN 352Z		250VAC	6 30			■		■		■			■				■	■	
FN 700Z		250VAC	6 20			■		■	■	■		■	■	■			■	■	

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

Three-phase filters and line reactors.

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

Approvals *			Features											Typical applications				
Filter family	Max. voltage	Attenuation performance / Rated current [A] (standard / high / very high; 0 200 400 600 800 >1000)	Multi-stage filter circuit	Safety connector blocks	Busbar connection	Optional protective covers	Standard protective covers	Offering EMC compliance	Low leakage current	Less commutation notches	Inrush current limitation	Harmonics reduction	4% impedance	Inverters, servo drives	Energy regeneration drives	Machinery, machine tools	Industrial automation	General purpose
FN 258 	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 / Rated current [A] (standard 0–240, high 240–480, very high 480–600)	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 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.

Filter family	Approvals *	Max. voltage	Typical motor power [kW] / Rated current [A] (0 60 120 180 240 300 / 0 200 400 600 800 >1000)	Features: 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	Typ. applications: Motor drives	Servo drives, torque motors	High-speed motor applications	Appl. with long unshield. cabl.	Retrofit of motor drives
FN 510		520VAC	1.5 - 30 / 4 - 66	■	■	■							■	■	■	■			
FN 530		520VAC	1.5 - 7.5 / 4 - 16	■	■	■	■	■	■	■	■	■	■	■	■			■	■
FN 5010		440VAC	1.1 - 355 / 2.5 - 610	■	■	■	■	■					■	■	■				■
FN 5020		500VAC	11 - 55 / 25 - 120	■	■	■	■	■					■	■	■		■		
FN 5030*		500VAC	11 - 55 / 25 - 120			■	■		■	■	■	■	■	■	■		■	■	■
FN 5040		500VAC	1.1 - 630 / 4.5 - 1200	■	■	■	■	■					■	■	■				■
FN 5045		500VAC	1.1 - 630 / 4.5 - 1200	■	■	■	■	■					■	■	■				■
RWK 305		500VAC	1.5 - 630 / 4 - 1100	■		■							■	■	■	■			

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

Active and passive harmonic filters.

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

Approvals

c UL us LISTED CE

Rated power [kW/HP]

Corrective current [A]

Filter family	Nom. voltage	0 100 200 300 400 500	For 50Hz grids	For 60Hz grids	THID <5%	Power factor correction	Load balancing	3-phase / 3-wire	3-phase / 4-wire	For 6-pulse diode rectifiers	For 6-pulse SCR rectifiers	AC Motor drives	DC Motor drives	Welding machines	HVAC installations	Building power distribution	Semiconductor industry	Water / wastewater treatment
Features										**Typical applications**								
FN 3410 	380 - 500VAC	4 — 400kW	■		■			■		■		■			■			■
FN 3411 	380 - 500VAC	4 — 400kW	■					■			■	■	■					■
FN 3412 	440 - 480VAC	5 — 500HP		■	■			■		■		■			■			■
FN 3413 	440 - 480VAC	5 — 500HP		■				■			■	■	■					■
FN 3420 (active) 	380 - 480VAC	30 — 300	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■
FN 3430 (active) 	380 - 415VAC	30 — 300	■	■	■	■	■		■	■	■					■	■	

EMC/EMI chokes.

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

Choke family	Approvals *	Max. voltage	Inductance value [mH] / Rated current [A] (0 20 40 60 80 100 / 0 30 60 90 120 150)	Features: For common-mode noise	Saturating chokes	Single-choke	Dual-choke	Triple-choke	Quad-choke	PCB mounting	With flying leads	Typical applications: Frequency converters, UPS	Medical equipment	Traction systems	DC/DC or AC/DC converters	Switch-mode power supplies	Home electronics, TV, balasts	Battery chargers	Heaters, air conditioners
RD 5000 series 		600VAC 850VDC	1 - 10; 6 - 16	■			■	■		■		■		■					
RD 6000 series 		600VAC 850VDC	1.5 15; 6 - 16	■			■	■			■	■		■					
RD 7000 series 		600VAC 850VDC	0.2 25; 6 36	■			■	■	■		■	■		■					
RD 8000 series 		600VAC 850VDC	0.2 - 12; 16 64	■			■	■	■		■	■		■					
RN series 		250VAC	0.7 100; 0.3 - 10	■			■			■		■	■			■	■	■	■
EV/EH 20 series 		250VAC	0.82 33; 0.3 - 2	■			■			■		■	■			■	■	■	■
EV/EH 24 series 		250VAC	0.5 44; 0.5 - 4	■			■			■		■	■			■	■	■	■
EV/EH 28 series 		250VAC	1.1 36; 1 - 5	■			■			■		■	■			■	■	■	■
EV/EH 35 series 		250VAC	3.6 90; 1 - 5	■			■			■		■	■			■	■	■	■
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.

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 2000 3000 4000 5000	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	500VAC	500 1100 / 0.1 - 0.25	■						■		■	■	■		■	■	■	■
IT 245/255/258	750VAC	250 - 500 / 0.1 1	■						■		■	■	■		■	■	■	■
IT 239	1000VAC	350 / 0.25	■						■		■	■	■			■		
IT 370	1000VAC	4000 / 1	■						■		■	■	■			■		
IT 364	3000VAC	5000 / 3	■							■	■	■	■					
IT 213	380VAC	450 / 0.25		■					■		■	■	■	■	■	■	■	■
IT 312/313	380VAC	450 1200 / 0.25 1		■					■		■		■	■	■	■	■	■
IT 143/233/242 IT 243/253	500VAC	180 - 800 / 0.025 - 0.25		■					■		■	■	■	■	■	■		■
IT 246/248	750VAC	200 - 350 / 0.1 - 0.25			■				■		■	■	■		■	■		■
IT 249	500VAC	350 / 0.25				■			■		■	■	■	■	■	■	■	■
IT 260	500VAC	200 / 0.1					■		■		■		■	■	■	■	■	■
IT 314	380VAC	500 / 0.25 1						■	■		■		■	■	■	■	■	■
IT 234/244	500VAC	200 - 300 / 0.1 - 0.25						■	■		■		■	■	■	■	■	■

EMC SUPPORT

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

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

Service available at these locations include:

- semi-anechoic chamber and open field testing
- harmonics instrumentation for current and voltage 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

energy efficiency and reliability

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Schaffner is an ISO-registered company. Its products are designed and manufactured under the strict quality and environmental requirements of the ISO 9001 and ISO 14001 standards.