

COMPONENTS

Total Solutions for Motor Drives
EMC Compliance, Harmonics Suppression,
Motor Protection, Reliability Assurance

SCHAFNER

safety for electronic systems

Total solutions for motor drive systems.



Schaffner's full load test set-up for motor drives

Frequency inverters are among the most widely used pieces of equipment for AC motor control. Nowadays, they are found in virtually every area of industry, in applications as diverse as pumps, air conditioning systems, elevators and cranes, conveyors, machine tools, alternative energy production and in a vast array of other industrial and domestic automation.

Problems associated with modern drives

In the quest for ultra-compact, efficient power conversion, inverter manufacturers employ high speed semiconductor switches and pulse width modulation (PWM) techniques to generate fast rise-time voltage pulses of the appropriate duration and polarity.

Unfortunately, this creates a considerable number of problems for OEM's and system integrators, from purely functional difficulties to most severe motor damage. Following, a brief summary of the most significant problems and phenomena:

Inverter input

- EMC problems
- Harmonics
- Commutation notches
- Inrush & peak currents
- Low frequency interference phenomena

Inverter output

- Excessive dv/dt
- Peak- & overvoltages
- Parasitic earth currents
- Eddy current losses in the motor
- Displacement currents
- Bearing currents
- Additional pulse loads on the inverter
- Acoustic motor noise
- EMC problems

Inverter DC link

- DC link capacitor stress
- Harmonics
- Various other problems in the DC link

Whole system

- Low efficiency/power factor
- Unacceptable interference emissions
- Uncertain system immunity
- Uncertain service security & reliability

Solutions from Schaffner

In most cases, several phenomena occur in the same system, a fact which underlines the idea of combining components to total solutions.

By careful investigation of the equipment, input and output components – if needed – can be chosen carefully and fine-tuned to each other, in order to reduce the overall suppression effort.

As the number 1 solution provider, Schaffner can help against all these problems by offering:

- EMI/RFI input filters
- RFI suppression chokes
- Harmonics filters/chokes
- Line reactors
- Commutation reactors
- Special components for energy regeneration
- Motor protection chokes
- dv/dt filters
- Sinusoidal output filters
- 'Sinus Plus' filters
- Combi filters

Further products on request

- DC link chokes
- Transformers
- Other related products

The decision to favour a certain solution above another depends entirely on the system requirements and should always be backed by a technical and economic analysis.

Advanced testing capabilities

To ensure that our components work properly in the final equipment, Schaffner operates a full load test setup for motor drives at the headquarters in Switzerland.

With the unique ability to test every drive with various loads and cable lengths, switching frequencies and environmental conditions, we are able to serve our customers with the most reliable and cost-effective solutions.

Benefit from 40 years of experience

Schaffner can help you to ensure:

- EMC and harmonics compliance
- Functional security
- System reliability

To obtain more detailed information please contact your local Schaffner sales office, distributor or www.schaffner.com.

Note: motor drives are used as a typical example; Schaffner is also active in numerous other areas.

Schaffner solutions for motor drive systems.

Three-phase line reactor RWK 212

V: 400VAC
I: 4 to 1100A @ 40°C
f: 50/60Hz
z: 4%



- Reduction of harmonics
- Reduction of commutation notches
- Restriction of inrush & peak currents
- Improvement of true power factor

Customized line reactors



V: up to 690VAC
I: up to ~4000A
f: various
Various impedances

- Harmonics chokes/filters
- Commutation notch chokes
- Line impedances
- Energy regeneration reactors

Customized DC link chokes



V: various
I: various
Various electrical & mechanical solutions

- Signal smoothing
- Limitation of inrush current
- Reduction of harmonics
- Storage mode chokes for PFC circuits

Output filter series FN 500



V: 500VAC
I: 4 to 16A (66A) @ 40°C
f_{motor}: up to 200Hz
f_{switch}: various

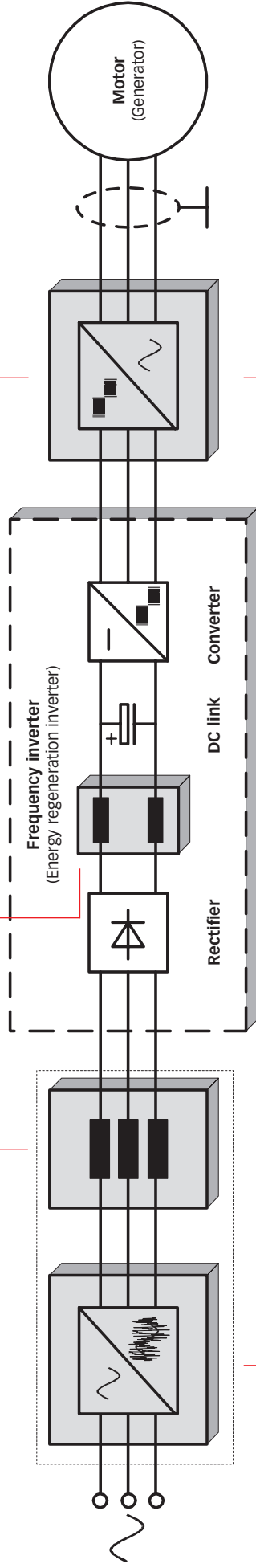
- Filter families:
- FN 510: dv/dt & overvoltage restriction
 - FN 520: sinusoidal output filter
 - FN 530: sinusoidal & EMC output filter

Sinusoidal output filter FN 5010



V: 400VAC
I: 2.5 to 610A @ 40°C
f_{motor}: up to ~70Hz
f_{switch}: 4 to 16kHz

- Increased service life of motors
- Improved system reliability & efficiency
- Reduction of audible motor noise
- Reduced pulse load of the inverter



Various three-phase RFI filters

V: up to 690VAC
I: 5 to 2500A @ 40/50°C
f: DC to 60Hz
Various performances



- For currents up to 300A:
FN 258 / FN 351 / FN 3258
For higher currents:
FN 3270 / FN 3275 / FN 3359

RFI filters for ER units FN 3100 / FN 3110 / FN 3120

V: 520VAC / 480VAC
I: 25 to 300A @ 50°C
f: DC to 60Hz
Various safety approvals



- Designed for energy regeneration drives
- Excellent attenuation from 150kHz to 30MHz
- Noise suppression also from 9 to 150kHz
- Exceptional saturation resistance

Harmonics & RFI filter FN 3400

V: 480VAC
I: 8 to 24A @ 50°C
f: DC to 60Hz
z: 4%



- Reduction of harmonics
- Suppression of conducted EMI
- Restriction of inrush & peak currents
- Defined 4% impedance

dv/dt reactor RWK 305

V: 400VAC
I: 4 to 1100A @ 40°C
f_{motor}: 50/60Hz
f_{switch}: 2 to 16kHz



- Reduction of excessive dv/dt
- Protection of the motor windings
- Less disturbances of neighbouring equipment

Modular output filters FN 5020 / FN 5030

V: 500VAC
I: 25 to 120A @ 50°C
f_{motor}: up to 600Hz
f_{switch}: >6kHz



- Increased service life of motors
- Improved system reliability & efficiency
- Operates as EMC assurance
- No shielded motor cables necessary

Every component can be customized to meet special requirements. Solutions for three-phase + neutral four-wire applications are also available. To obtain more information please contact your local Schaffner sales office or www.schaffner.com



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