

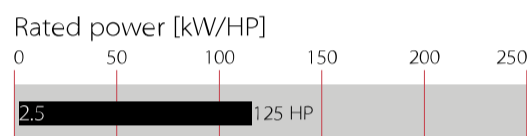
Ecosine Low-Voltage Economy Line of Passive Harmonic Filters



- Economy line of passive harmonic filters for THID <7%
- Help to comply with EN 61000-3-12, IEEE-519 and other PQ standards
- Support an efficient utilization of electrical system capacity
- Ideal for AC or DV motor drives with 6-pulse rectifier front-end
- Suitable for 200-240 V diode and thyristor (SCR) rectifiers applications



Performance indicators



Approvals & Compliances



Features and Benefits

FN 3418 LV (60 Hz) models of the ECOsine product family represent the very compact &€œeconomy line&€ with a THID performance of ≤7% (with Ldc).

The performance is still sufficient to comply with EN 61000-3-12 or with IEEE-519 for $I_{sc}/I_L < 50$. Schaffner ECOsine filters help to unburden the electrical infrastructure from excess loading and heat caused by current harmonics, and therefore support a better utilization of electric system capacity.

Lower harmonics also reduce the risk of system resonances and potential downtime of sensitive electronic equipment.

FN 3418 LV filters upgrade standard motor drives to &€œlow-harmonic drives&€ quickly and easily.

Technical Specifications

Nominal operating voltage	3x200 to 240 VAC $\pm 10\%$
Overload capability	1.6x rated current for 1 minute, once per hour
Operating frequency	60 Hz ± 1 Hz
Total harmonic current distortion THDi*	<7% @ rated power (with DC-Link choke) <13% @ rated power (without DC-Link choke)
Total demand distortion TDD	According to IEEE-519
Nominal motor drive input power rating	2.5 to 125 HP
High potential test voltage	P -> E 2500 VAC (2 sec)
Earthing system	TN, TT, IT
Efficiency	>98% @ nominal line voltage and power
Temperature range (operation and storage)	-25°C to +45°C fully operational +45°C to +70°C derated operation*** -25°C to +70°C transport and storage
Cooling	Internal fan cooling, unregulated
Protection category	IP 20
Flammability corresponding to	UL 94 V-0
Design corresponding to	UL 508, EN 61558-2-20, CE (LVD 2006/96/EC)
SCCR**	100 kA

* System requirements: THVD <2%, line voltage unbalance <1%
Note: performance specifications in this datasheet refer to six-pulse diode rectifiers. SCR rectifier front-end will produce different results, depending upon the firing angle of the thyristors.

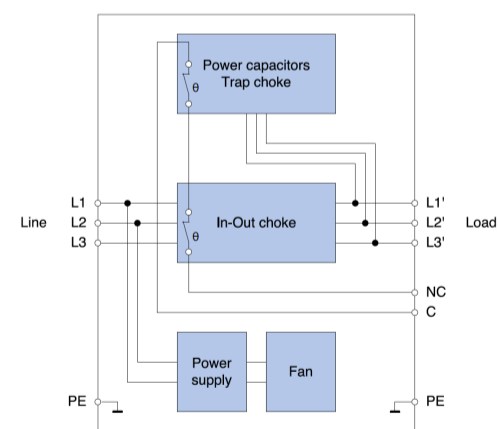
** External UL-rated fuses required.

*** Iderated = $I_{nominal} * \sqrt{(70^\circ C - T_{amb}) / 25^\circ C}$

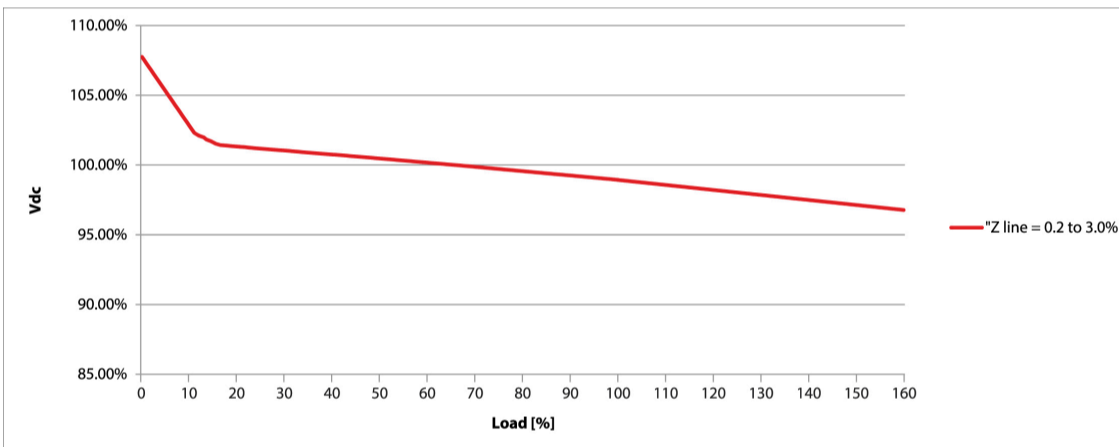
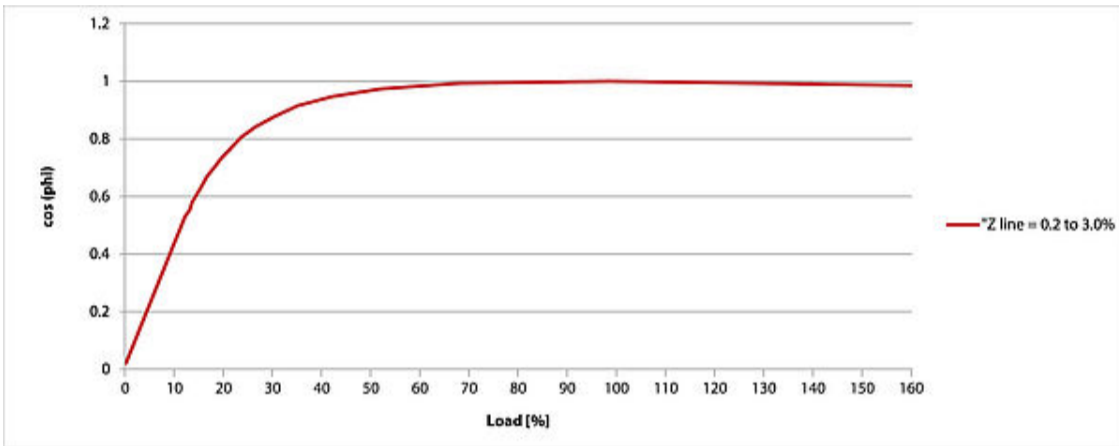
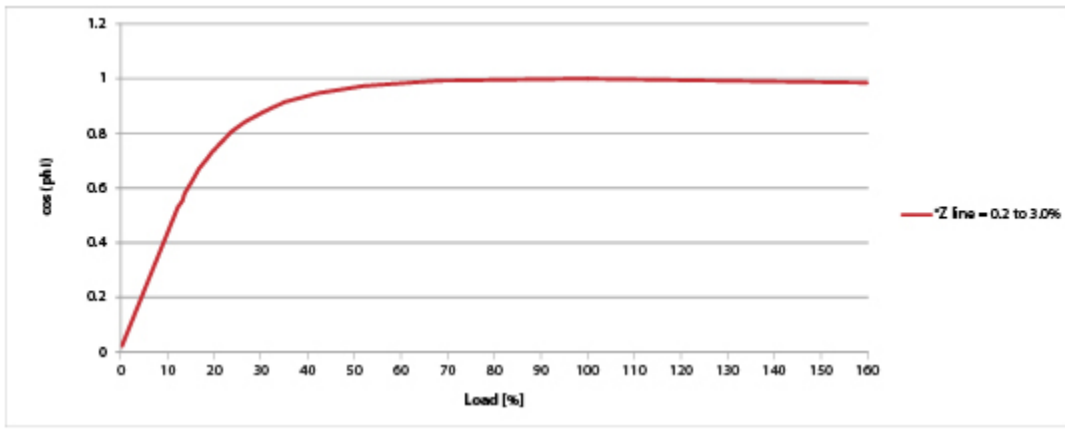
Typical Applications

- Three-phase power conversion equipment with front-end six-pulse rectifier (diode or SCR)
- Motor drives, like those used e.g. in pump and fan applications
- Battery chargers, incl. DC fast chargers for e-cars

Typical electrical schematic



Performance Characteristics (For Diode Rectifiers)



THID – Total Harmonic Current Distortion

ECOsine high power passive harmonic filter performance is optimized for rectifiers/motor drives with a dc-link choke. In such applications, a THID of roughly 7% can be expected. The use of a dc-link choke is highly recommended. In a system without L_{dc} a THID of 13% can be expected.

Displacement Power Factor

At full load, ECOsine filters yield unity power factor. At lower load levels, the capacitive current into the power capacitors of the trap circuit cause a leading displacement power factor. This is the case with all types of passive filters with large capacitors. However, compared to traditional filters the useful range of Schaffner ECOsine is much extended (cos phi >0.9 from 35 to 100% of rated load).

DC-link Voltage

ECOsine harmonic filters have a very low impact on the dc-link voltage of the motor drive. The voltage boost/buck as a function of load can be seen in the performance graph beside. Tolerances are kept narrow in order to ensure that motor drives do not suffer from nuisance tripping because of under- or over-voltage situations.

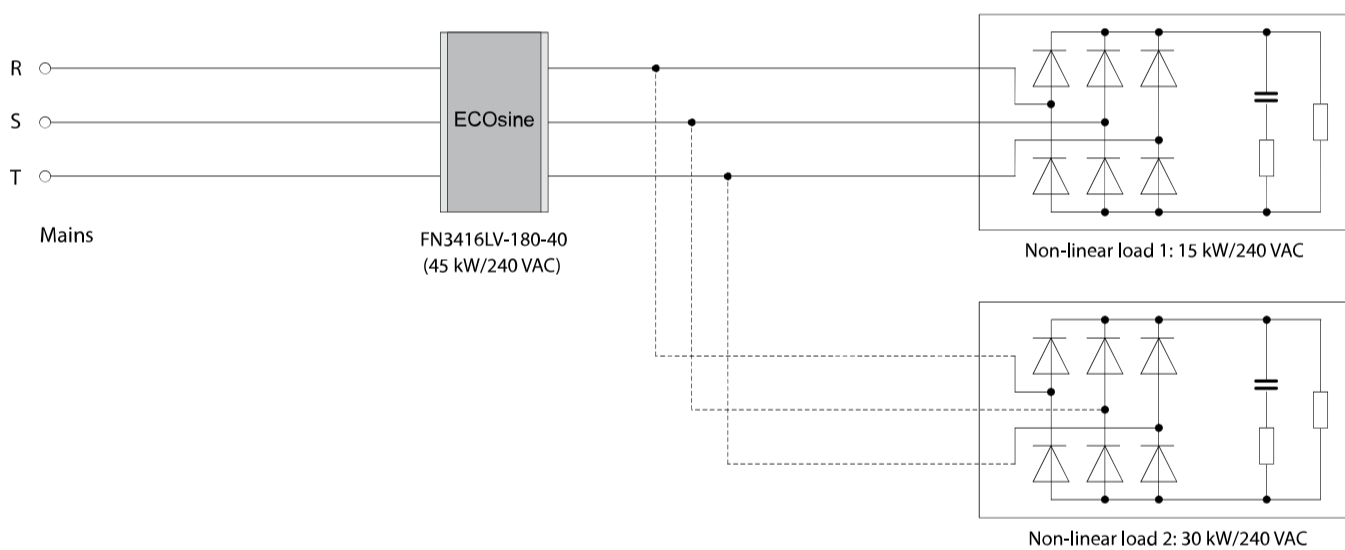
Filter*	Rated load power @ 208 VAC/60 Hz	Power loss** @ 25°C/60 Hz	Input /output connections	Weight [kg]
	[HP]	[W]		
FN 3418 LV-8-44	2.5	41	-44	10
FN 3418 LV-11-44	3.5	81	-44	10
FN 3418 LV-15-44	5	72	-44	16
FN 3418 LV-21-33	7.5	152	-33	20
FN 3418 LV-28-33	10	214	-33	22
FN 3418 LV-35-33	12	277	-33	25
FN 3418 LV-41-33	15	289	-33	28
FN 3418 LV-53-34	20	383	-34	38
FN 3418 LV-65-34	25	393	-34	42
FN 3418 LV-80-35	30	493	-35	45
FN 3418 LV-105-35	40	514	-35	54
FN 3418 LV-130-40	50	741	-40	78
FN 3418 LV-160-40	60	832	-40	87
FN 3418 LV-190-40	75	873	-40	100
FN 3418 LV-240-99	100	876	-99	126
FN 3418 LV-310-99	125	984	-99	135

* Filter to be selected by system voltage and load (motor drive) power. Note: the harmonic filter will reduce RMS input current. Therefore, filter selection by current rating, as it is common for EMC/EMI filters, is not recommended.

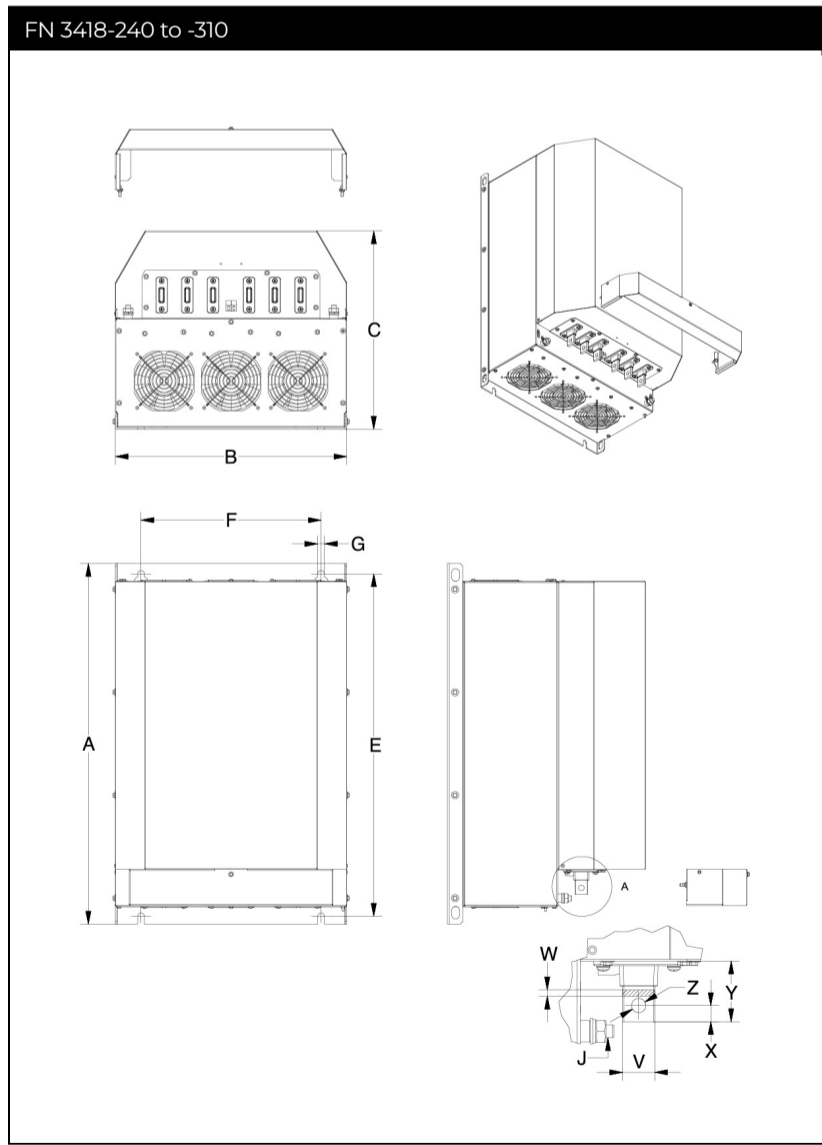
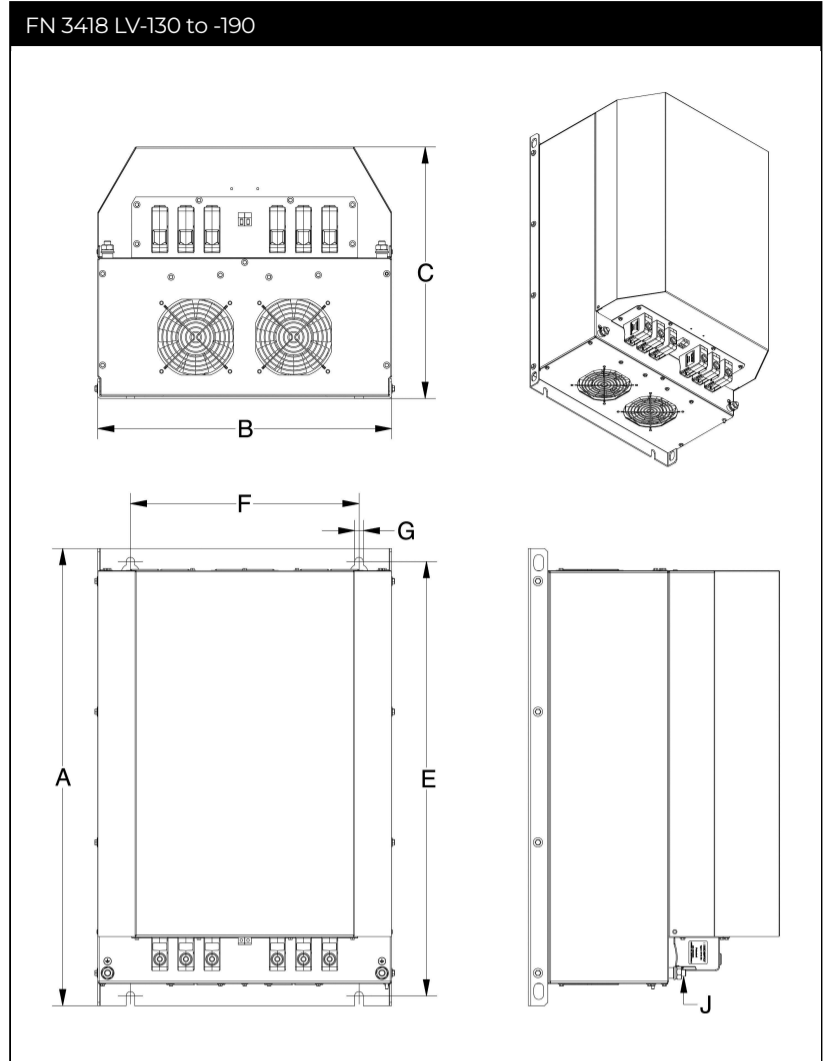
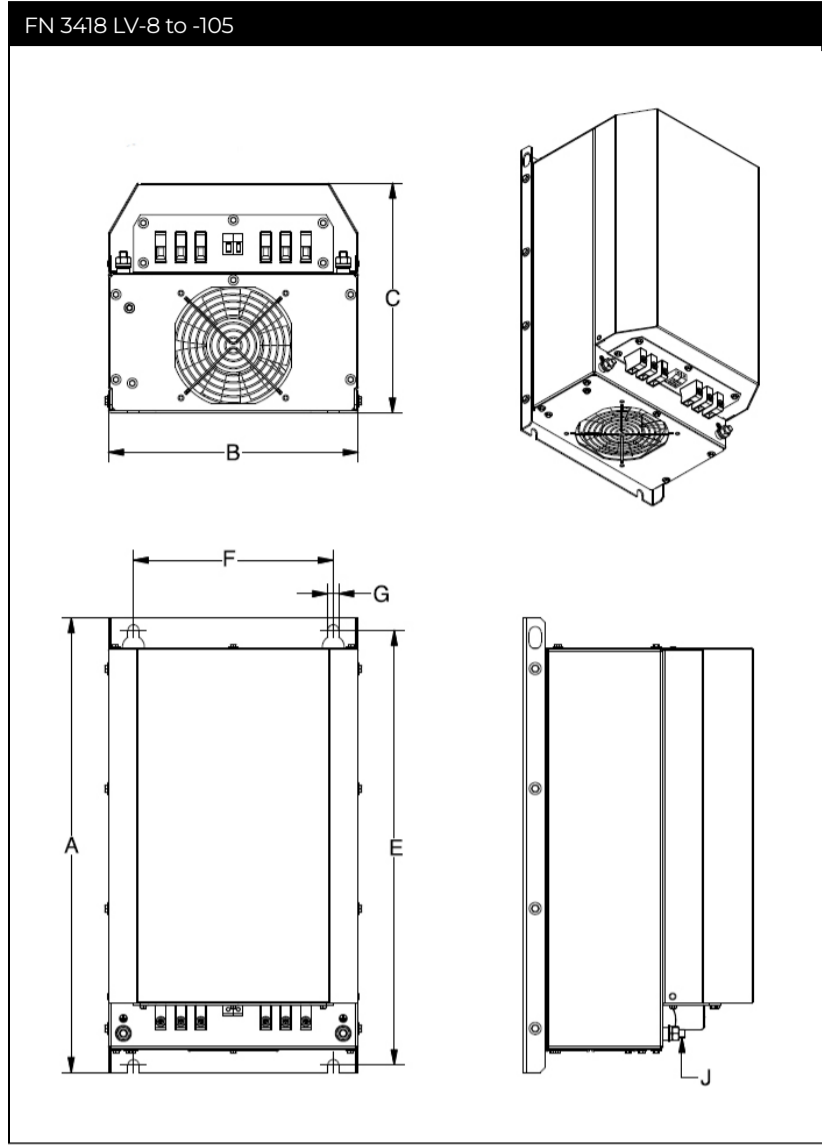
** Calculated power loss at rated load power.

Filter Application

ECOsine filters are best installed directly at the input of 6-pulse rectifiers. It is possible to connect several non-linear loads (e.g. motor drives) in parallel. In this case the rating of the filter must match the sum of the power ratings of drives connected to it. The use of a (built-in) DC-link choke is recommended for best harmonics mitigation performance. If the expected input power exceeds the rating of the largest available filter, and a custom solution is not desired, then two or more filters can be wired in parallel. In this mode of operation, it is recommended to use filters with equal power ratings to ensure proper current sharing.



Mechanical Data








Dimensions

FN 3416 LV-...	10	13	16	24	32	38	45	60	75	90	110	150	180	210	260	320
A	390	390	390	455	455	455	455	520	520	580	580	700	700	700	700	700
B	185	185	185	250	250	250	280	280	280	280	280	450	450	450	450	450
C	190	190	190	230	230	230	230	248	248	248	248	385	385	385	385	385
E	370	370	370	435	435	435	435	500	500	555	555	665	665	665	665	665
F	140	140	140	200	200	200	200	225	225	225	225	350	350	350	350	350
G	9	9	9	11	11	11	11	11	11	11	11	13	13	13	13	13
J	M6	M6	M6	M8	M8	M8	M8	M8	M8	M10	M10	M10	M10	M10	M10	M10
V																25
W																6
X																12.5
Y																47
Z																11

All dimensions in mm; 1 inch = 25.4 mm

Tolerances according to: ISO 2768-m/EN 22768-m

Filter connector cross sections	-33	-34	-35	-40	-44
					
Solid wire	16 mm ²	35 mm ²	50 mm ²	95 mm ²	10 mm ²
Flex wire	10 mm ²	25 mm ²	50 mm ²	95 mm ²	6 mm ²
AWG type wire	AWG 6	AWG 2	AWG 1/0	AWG 4/0	AWG 8
Recommended torque	1.5–1.8 Nm	4.0–4.5 Nm	7–8 Nm	17–20 Nm	1.0–1.2 Nm

Please visit www.schaffner.com to find more details on filter connectors.

Installation

For more detailed information and step by step installation guidelines, please consult the user manual at www.schaffner.com or the installation instructions (delivered with each filter).

Headquarters, Global Innovation and Development

Switzerland

Schaffner Group

Industrie Nord
Nordstrasse 5
4542
Luterbach
+41 32 681 66 26
info@schaffner.com

Sales and Application Centers

Switzerland

Schaffner EMV AG

Industrie Nord
Nordstrasse 5
4542
Luterbach
+41 32 681 66 26
switzerlandsales@schaffner.com

China

Beijing Jingzhe Electronics Co.,Ltd.

Room 307, Building A, Jiahua Building, No.9
Shangdi 3rd Street, Haidian District
Beijing Yiting Ying
China
+86 13810880767
yingyiting@bjjingzhe.com

Singapore

Schaffner EMC Pte Ltd.

Blk 3015A Ubi Road 1 #05-09 Kampong Ubi
Industrial Estate
408705
Singapore
+65 63773283
singaporesales@schaffner.com

To find your local partner within
Schaffner's global network schaffner.com

© 2025 Schaffner Group

The content of this document has been carefully checked and understood. However, neither Schaffner nor its subsidiaries assume any liability whatsoever for any errors or inaccuracies of this document and the consequences thereof. Published specifications are subject to change without notice. Product suitability for any area of application must ultimately be determined by the customer. In all cases, products must never be operated outside their published specifications. Schaffner does not guarantee the availability of all published products. This disclaimer shall be governed by substantive Swiss law and resulting disputes shall be settled by the courts at the place of business of Schaffner Holding AG. Latest publications and a complete disclaimer can be downloaded from the Schaffner website. All trademarks recognized.