

# ECOsine® 50 Hz Passive Harmonic Filters



- Filters for 3-phase diode and SCR rectifiers
- The industry standard for AC and DC and motor drives
- The most compact 5% THID filter available
- Excellent behavior under partial load conditions



## Technical specifications

<b>Nominal operating voltage</b>	3x 690 VAC
<b>Operating frequency</b>	50 Hz ± 1 Hz
<b>Total harmonic current distortion THID*</b>	<5 % @ rated power
<b>Nominal motor drive input power rating</b>	7.5 to 250 kW
<b>Nominal motor drive input current rating</b>	10 to 320 A @ 50 °C
<b>Total demand distortion TDD</b>	According to IEEE-519, table 10-3
<b>Voltage tolerance range</b>	3x 586 to 760 VAC
<b>Efficiency</b>	> 98 % @ nominal line voltage and power
<b>High potential test voltage</b>	P → E 2500 VAC (1min)
<b>Protection category</b>	IP20
<b>Cooling</b>	Internal fan cooling
<b>Overload capability</b>	1.6x rated current for 1 minute, once per hour
<b>Ambient temperature range</b>	-25 °C to +50 °C fully operational -25 °C to +85 °C transport and storage +50 °C to +70 °C derated operation***
<b>Flammability corresponding to</b>	UL 94 V-2 or better
<b>Design corresponding to</b>	UL 508, EN 61558-2-20, CE (LVD 2006/95/EC)
<b>MTBF @ 50°C/460V (Mil-HB-217F)</b>	200,000 hours
<b>SCCR***</b>	100 kA
<b>Earthing System</b>	TN, TT, IT

\* ECOsine filters reduce RMS input and peak current by reducing harmonic currents and improving true power factor.

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

\*\*\*\* Iderated = Inominal \* √ (85 °C-Tamb)/35 °C

\*\*\*\*\* External UL-rated fuses required. Please consult the user manual.

## Approvals



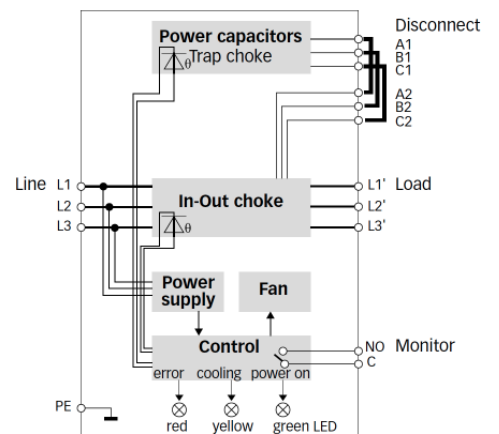
## Features and benefits

Schaffner ECOsine harmonic filters represent an economical solution to the challenge of load-applied harmonics mitigation in three-phase power systems. With a plug-and-play approach and more compact dimensions than comparable products, they can be quickly installed and easily commissioned. They increase the reliability and service life of electric installations, help utilize electric sytem capacity better, and are the key to meet Power Quality standards such as IEEE 519. ECOsine filters calm your harmonic waves. Schaffner ECOsine filters can be applied to virtually any kind of power electronics with front-end six-pulse rectifiers, where harmonic current distortion needs to be reduced to defined limits. Typical applications, where the above-mentioned non-sinusoidal consumers of power can account for a significant portion of the load, include:

## Typical applications

- Equipment with front-end six-pulse rectifier
- AC and DC motor drives
- Factory automation equipment
- Water/wastewater treatment facilities
- Fan and pump applications
- HVAC installations
- Mission-critical processes
- DC fast chargers

## Typical electrical schematic

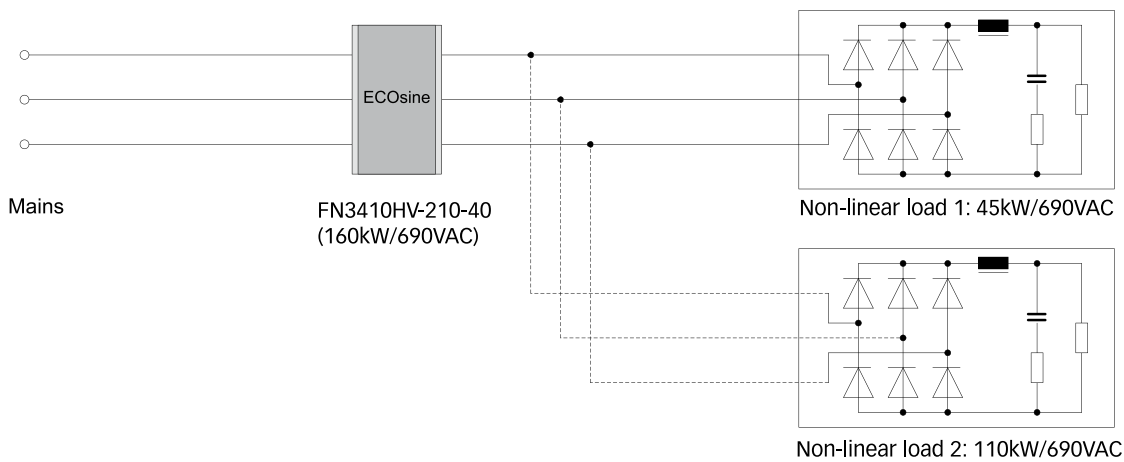


## Filter selection table FN 3410 HV 690

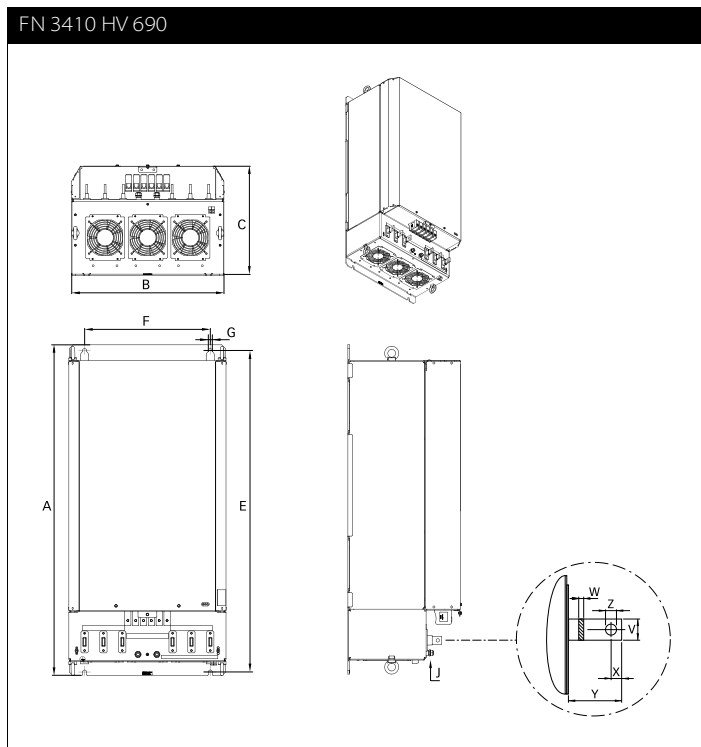
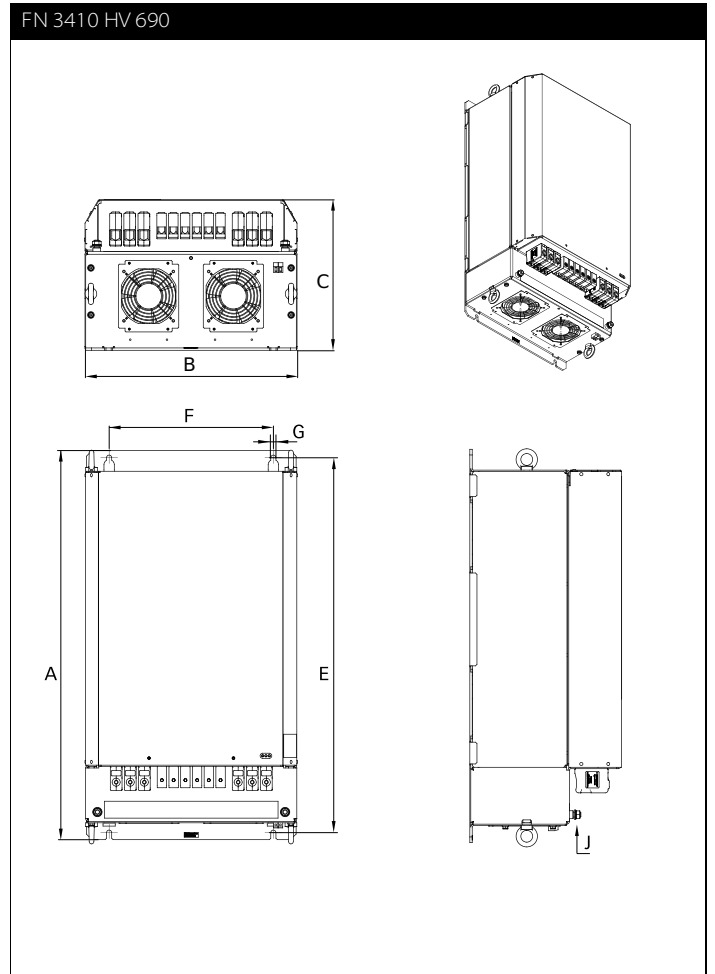
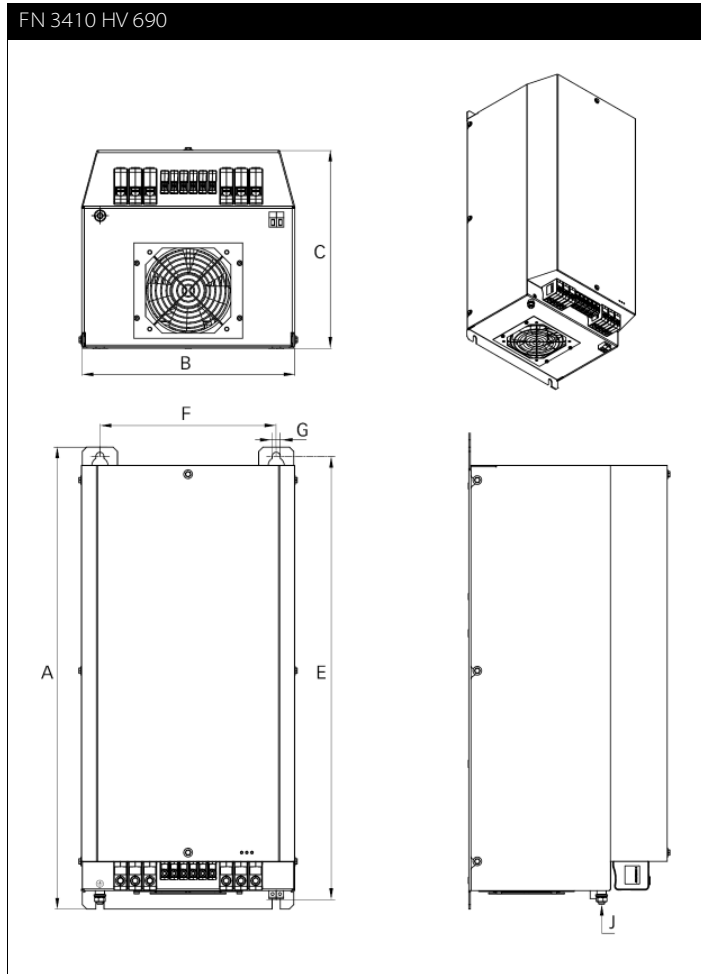
Filter*	Rated load power	Power loss**	Input/Output Connections	Capacitor disconnections	Weight
	@ 690 VAC/50 Hz [kW]	@ 690 V [W]			
FN 3410HV-10-44	7.54	150	-44	-44	20
FN 3410HV-13-44	11	209	-44	-44	21
FN 3410HV-16-33	15	270	-33	-44	29
FN 3410HV-24-33	18.5	333	-33	-44	33
FN 3410HV-32-53	22	374	-53	-33	44
FN 3410HV-38-53	30	480	-53	-33	48
FN 3410HV-45-53	37	555	-53	-33	56
FN 3410HV-60-35	45	610	-35	-34	58
FN 3410HV-75-35	55	690	-35	-34	62
FN 3410HV-90-35	75	860	-35	-34	77
FN 3410HV-110-35	90	960	-35	-34	91
FN 3410HV-150-40	110	1145	-40	-35	131
FN 3410HV-180-40	132	1275	-40	-35	147
FN 3410HV-210-40	160	1600	-40	-35	169
FN 3410HV-260-99	200	1940	-99	-35	230
FN 3410HV-320-99	250	2500	-99	-35	233

\* 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 suitable.

\*\* Calculated power loss at rated load power.



**Mechanical data**



**Installation.** Detailed installation and wiring instructions as well as cooling requirements can be found in the user manual available from every Schaffner sales point or from [www.myecosine.com](http://www.myecosine.com)







## Dimensions

	10	13	16	24	32	38	45	60	75	90	110	150	180	210	260	320
<b>A</b>	430	430	520	520	590	590	590	750	750	750	750	830	830	830	1055	1055
<b>B</b>	210	210	250	250	300	300	300	320	320	320	320	450	450	450	500	500
<b>C</b>	210	210	280	280	300	300	300	300	300	300	300	320	320	320	360	360
<b>E</b>	410	410	495	495	565	565	565	725	725	725	725	800	800	800	1025	1025
<b>F</b>	170	170	200	200	250	250	250	270	270	270	270	350	350	350	400	400
<b>G</b>	9	9	11	11	11	11	11	11	11	11	11	11	11	11	13	13
<b>J</b>	M6	M6	M8	M8	M8	M8	M8	M10	M10	M10	M10	M10	M10	M10	M10	M10
<b>V</b>															25	25
<b>W</b>															6	6
<b>X</b>															12.5	12.5
<b>Y</b>															50	50
<b>Z</b>															11	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	-53
						
<b>Solid wire</b>	16 mm <sup>2</sup>	35 mm <sup>2</sup>	50 mm <sup>2</sup>	95 mm <sup>2</sup>	10 mm <sup>2</sup>	25 mm <sup>2</sup>
<b>Flex wire</b>	10 mm <sup>2</sup>	25 mm <sup>2</sup>	50 mm <sup>2</sup>	95 mm <sup>2</sup>	6 mm <sup>2</sup>	16 mm <sup>2</sup>
<b>AWG type wire</b>	AWG 6	AWG 2	AWG 1/0	AWG 4/0	AWG 8	AWG 4
<b>Recommended torque</b>	1.5-1.8 Nm	4.0-4.5 Nm	7-8 Nm	17-20 Nm	1.0-1.2 Nm	2.0 - 2.3 Nm

Please visit [www.schaffner.com](http://www.schaffner.com) to find more details on filter connectors.



## Headquarters, global innovation and development center

### Switzerland

#### Schaffner Group

Nordstrasse 11  
4542 Luterbach  
T +41 32 6816 626  
F +41 32 6816 630  
[info@schaffner.com](mailto:info@schaffner.com)  
<http://www.schaffner.com>



## Sales and application centers

### China

#### Schaffner EMC Ltd. Shanghai

T20-3, No 565 Chuangye Road  
Pudong New Area  
201201 Shanghai  
T +86 21 3813 9500  
F +86 21 3813 9501 / 02  
[cschina@schaffner.com](mailto:cschina@schaffner.com)  
<http://www.schaffner.com.cn/>

### Finland

#### Schaffner Oy

Sauvonrinne 19 H  
08500 Lohja  
T +358 19 35 72 71  
[finlandsales@schaffner.com](mailto:finlandsales@schaffner.com)

### France

#### Schaffner EMC S.A.S.

112 Quai de Bezons  
Boîte postale 133  
95100 Argenteuil  
T +33 1 34 34 30 60  
F +33 1 39 47 02 28  
[francesales@schaffner.com](mailto:francesales@schaffner.com)

### Germany

#### Schaffner Deutschland GmbH

Schoemperlenstrasse 12B  
76185 Karlsruhe  
T +49 721 56910  
F +49 721 569110  
[germanysales@schaffner.com](mailto:germanysales@schaffner.com)

### Italy

#### Schaffner EMC S.r.l.

Via Galileo Galilei 47  
20092 Cinisello Balsamo (MI)  
T +39 02 66 04 30 45/47  
F +39 02 61 23 943  
[italysales@schaffner.com](mailto:italysales@schaffner.com)

### Japan

#### Schaffner EMC K.K.

1-32-12, Kamiyama, Setagaya-ku  
7F Mitsui-seimei Sangenjaya Bldg.  
154-0011 Tokyo  
T +81 3 5712 3650  
F +81 3 5712 3651  
[japansales@schaffner.com](mailto:japansales@schaffner.com)  
<http://www.schaffner.jp>

### Singapore

#### Schaffner EMC Pte Ltd.

Blk 3015A Ubi Road 1  
05-09 Kampong Ubi Industrial Estate  
408705 Singapore  
T +65 6377 3283  
F +65 6377 3281  
[singaporesales@schaffner.com](mailto:singaporesales@schaffner.com)

### Spain

#### Schaffner EMC España

Calle Caléndula 93, Miniparc III, Edificio E,  
Alcobendas  
Miniparc III, Edificio E  
El Soto de la Moraleja  
Alcobendas  
28109 Madrid  
M +34 618 176 133  
T +34 917 912 900  
F +34 917 912 901  
[spainsales@schaffner.com](mailto:spainsales@schaffner.com)

### Sweden

#### Schaffner EMC AB

Turebergstorg 1, 6  
19147 Sollentuna  
T +46 8 5792 1121 / 22  
F +46 8 92 96 90  
[swedensales@schaffner.com](mailto:swedensales@schaffner.com)

### Switzerland

#### Schaffner EMV AG

Nordstrasse 11  
4542 Luterbach  
T +41 32 6816 626  
F +41 32 6816 641  
[sales@schaffner.ch](mailto:sales@schaffner.ch)

### Taiwan R.O.C.

#### Schaffner EMV Ltd.

6 Floor, No. 413  
Rui Guang Road  
114 Neihu District Taipei City  
T +886 2 87525050  
F +886 2 87518086  
[taiwansales@schaffner.com](mailto:taiwansales@schaffner.com)

### Thailand

#### Schaffner EMC Co. Ltd.

Northern Region Industrial Estate  
67 Moo 4 Tambon Ban Klang  
Amphur Muang P.O. Box 14  
51000 Lamphun  
T +66 53 58 11 04  
F +66 53 58 10 19  
[thailandsales@schaffner.com](mailto:thailandsales@schaffner.com)

### UK

#### Schaffner Ltd.

5 Ashville Way  
Molly Millars Lane  
Wokingham  
RG41 2PL Berkshire  
T +44 118 9770070  
F +44 118 9792969  
[uksales@schaffner.com](mailto:uksales@schaffner.com)  
<http://www.schaffner.uk.com>

### USA

#### Schaffner EMC Inc.

52 Mayfield Avenue  
08837 Edison, New Jersey  
T +1 800 367 5566  
T +1 732 225 9533  
F +1 732 225 4789  
[usasales@schaffner.com](mailto:usasales@schaffner.com)  
<http://www.schaffner.com/us>

#### Schaffner MTC LLC

6722 Thirlane Road  
24019 Roanoke, Virginia  
T +1 276 228 7943  
F +1 276 228 7953  
<http://www.schaffner-mtc.com>

#### Schaffner Trencos LLC

2550 Brookpark Road  
44134 Cleveland, Ohio  
T +1 216 741 5282  
F +1 216 741 4860  
[www.schaffner-trencos.com](http://www.schaffner-trencos.com)

To find your local partner within Schaffner's global network: [www.schaffner.com](http://www.schaffner.com)

© 2014 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.