

ECOsine® 50 Hz Passive Harmonic Filters



- | The industry standard for 6-pulse rectifiers and motor drives
- | The most compact 5% THID filter available
- | Excellent behavior under partial load conditions
- | Filters for diode rectifiers



Technical specifications

Nominal operating voltage	3x 380 to 500 VAC ±10%
Nominal motor drive input power rating	4 to 160 kW
Operating frequency	50 Hz ±1 Hz
Total harmonic current distortion THID*	<5 % @ rated power
Total demand distortion TDD	According to IEEE-519, table 10-3
Efficiency	98.5 to 99.5% @ nominal line voltage and power
High potential test voltage	P → E 2500 VAC (1min)
Protection category	IP20 / NEMA1
Cooling	Internal fan cooling
Overload capability	1.6x rated current for 1 minute, once per hour
Ambient temperature range	-25 °C to +50 °C fully operational -25 °C to +85 °C transport and storage +50 °C to +70 °C derated operation***
Flammability corresponding to	UL 94 V-2 or better
Design corresponding to	UL 508, EN 61558-2-20, CE (LVD 2006/95/EC)
MTBF @ 50°C/460V (Mil-HB-217F)	200,000 hours
SCCR***	100 kA
Earthing System	TN, TT, IT

* 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.
 ** ECOsine filters reduce RMS input and peak current by reducing harmonic currents and improving true power factor.
 *** Iderated = $I_{nominal} * \sqrt{(85^{\circ}C - T_{amb}) / 35^{\circ}C}$
 ****External UL-rated fuses required. Please consult the user manual.

Approvals



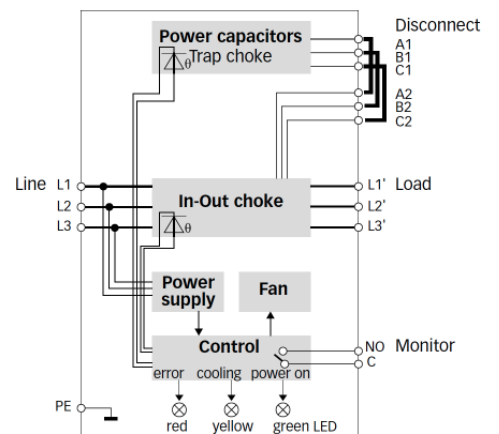
Features and benefits

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
- | Motor drives
- | Factory automation equipment
- | Water/wastewater treatment facilities
- | Fan and pump applications
- | HVAC installations
- | Mission-critical processes
- | DC fast chargers

Typical electrical schematic



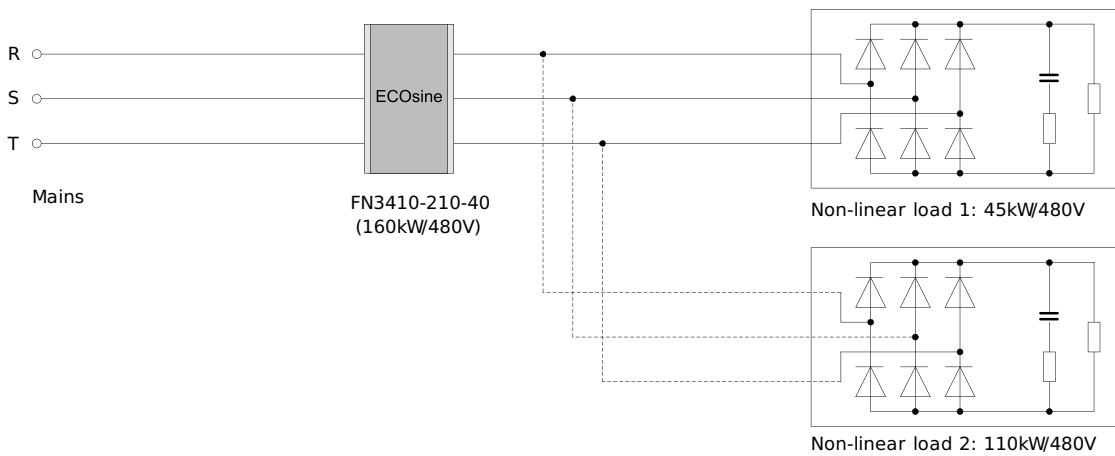
Filter selection table FN 3410

Filter*	Rated load power @ 400 VAC/50 Hz [kW]	Rated load power @ 500 VAC/50 Hz [kW]	Power loss** @ 400 V/500 V [W]	Input/Output Connections	Capacitor disconnections	Weight [kg]	NEMA1 covers*** Order code
FN 3410-10-44	4	5.5	60/83	-44	-44	13	803565
FN 3410-13-44	5.5	7.5	83/113	-44	-44	14	803565
FN 3410-16-44	7.5	11	113/165	-44	-44	21	803566
FN 3410-24-33	11	15	165/225	-33	-44	27	803567
FN 3410-32-33	15	18.5	225/278	-33	-44	31	803567
FN 3410-38-33	18.5	22	259/308	-33	-44	35	803567
FN 3410-45-34	22	30	286/390	-34	-33	45	803568
FN 3410-60-34	30	37	360/444	-34	-33	54	803568
FN 3410-75-35	37	45	407/495	-35	-34	65	803569
FN 3410-90-35	45	55	450/550	-35	-34	77	803569
FN 3410-110-35	55	75	495/675	-35	-34	86	803569
FN 3410-150-40	75	90	600/720	-40	-35	118	803570
FN 3410-180-40	90	110	630/770	-40	-35	136	803570
FN 3410-210-40	110	132	770/924	-40	-35	154	803570
FN 3410-260-99	132	160	792/960	-99	-35	210	803570
FN 3410-320-99	160	200	960/1200	-99	-35	210	803570

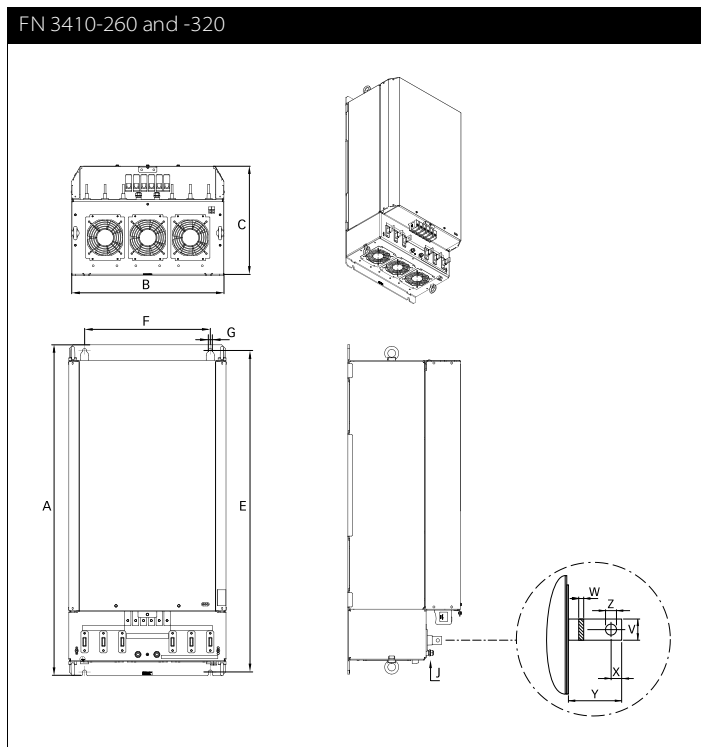
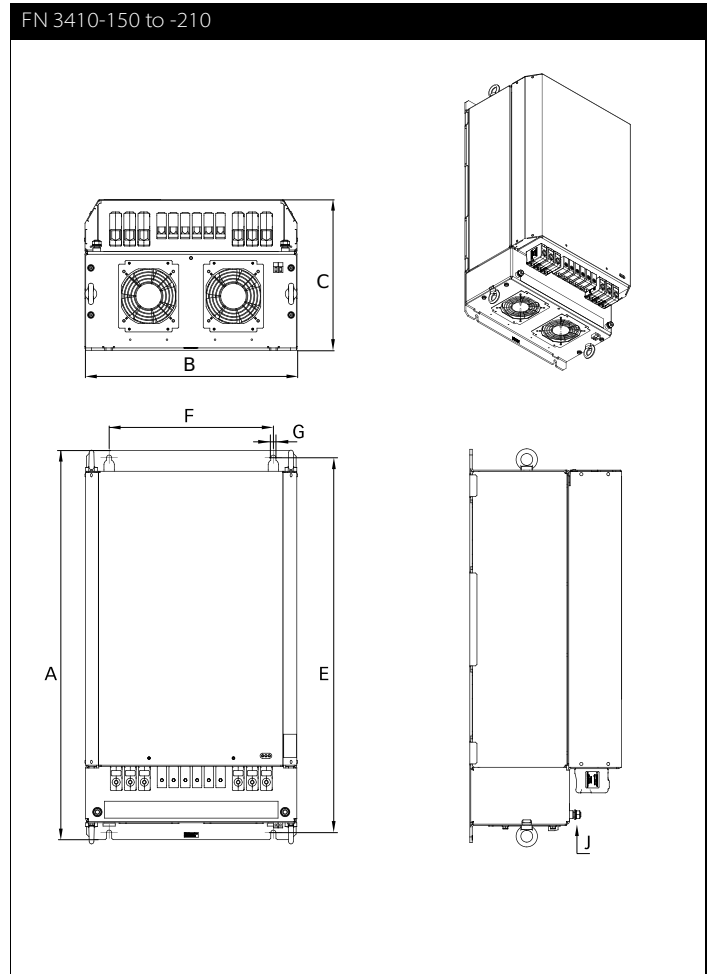
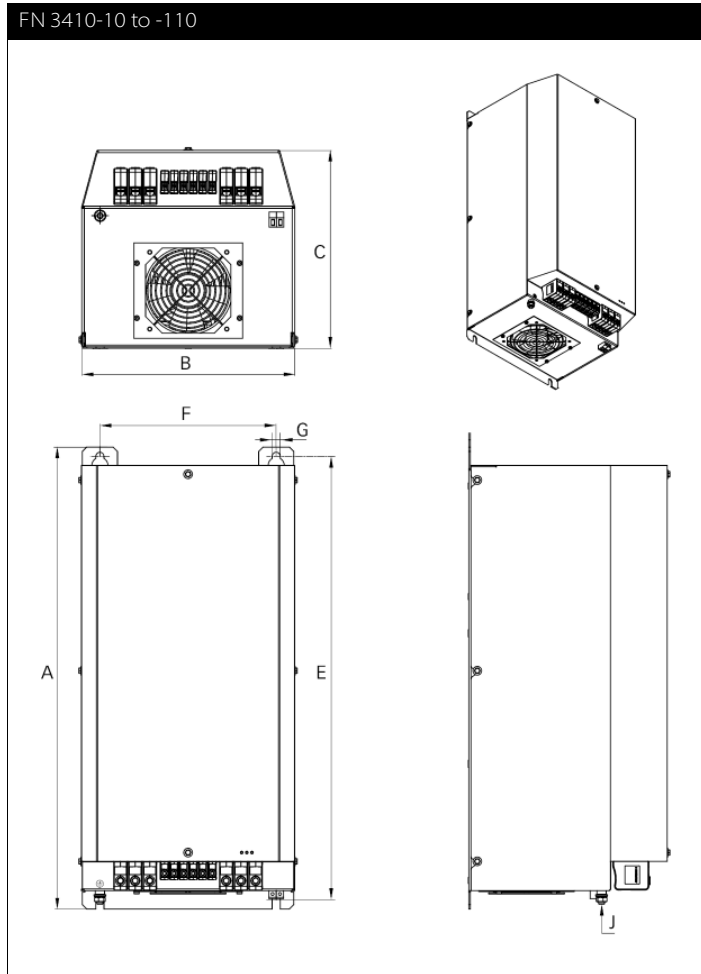
* To compile a complete part number, please replace the x with a 0 for diode or 1 for SCR rectifiers. Filter to be selected by system voltage and load (motor drive) power. Note: the harmonic filter will reduce the RMS input current. Example: the rated RMS input current of an unfiltered 400 V/15 kW/32 A drive will be reduced to approximately 23 A. Therefore, filter selection by current rating, as it is common for EMC/EMI filters, is not suitable.

** Calculated power loss at rated load power.

*** Please contact your local Schaffner partner to order the optional NEMA1 covers with the order code in the table above.

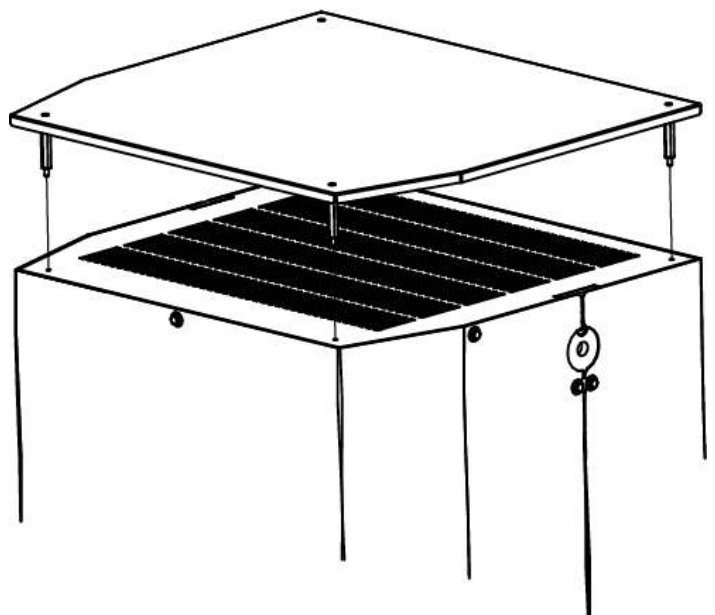


Mechanical data



Installation. All filters from FN 3410-8 to -130 are wall mountable and have to be operated vertically. The filters FN 3410-150 and higher are designed for floor mounting. In order to allow for sufficient air flow all filters must be clear on top and bottom min. 150 mm.

Optional NEMA1 cover. All filters can be optionally fitted with a NEMA1 cover. Please find order codes on previous pages.








Dimensions FN3410

50 Hz	10	13	16		24	32	38	45	60	75	90	110	150	180	210	260	320
A	400	400	430	430	520	520	520	590	590	750	750	750	1000	1000	1000	1000	1000
B	170	170	210	210	250	250	250	300	300	320	320	320	500	500	500	500	500
C	190	190	210	210	280	280	280	300	300	300	300	300	450	450	450	450	450
E	380	380	410	410	495	495	495	565	565	725	725	725	240	240	240	240	240
F	130	130	170	170	200	200	200	250	250	270	270	270	338	338	338	338	338
G	7	7	9	9	11	11	11	11	11	11	11	11	14x30	14x30	14x30	14x30	14x30
J	M6	M6	M6	M6	M8	M8	M8	M8	M8	M10	M10	M10	M10	M10	M10	M10	M10
V																	25
W																	6
X																	12.5
Y																	40
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.



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
<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
<http://www.schaffner.com.cn/>

Finland

Schaffner Oy

Sauvonrinne 19 H
08500 Lohja
T +358 19 35 72 71
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

Germany

Schaffner Deutschland GmbH

Schoemperlenstrasse 12B
76185 Karlsruhe
T +49 721 56910
F +49 721 569110
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

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
<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

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

Sweden

Schaffner EMC AB

Turebergstorg 1, 6
19147 Sollentuna
T +46 8 5792 1121 / 22
F +46 8 92 96 90
swedensales@schaffner.com

Switzerland

Schaffner EMV AG

Nordstrasse 11
4542 Luterbach
T +41 32 6816 626
F +41 32 6816 641
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

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

UK

Schaffner Ltd.

5 Ashville Way
Molly Millars Lane
Wokingham
RG41 2PL Berkshire
T +44 118 9770070
F +44 118 9792969
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
<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

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