

# 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 (filters ≤37 kW) ~5% @ rated power with DC-link choke (filters ≥45 kW)
<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 (1 min)
<b>Protection category</b>	IP 20
<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/460 V (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.

\*\*\*  $I_{derated} = I_{nominal} \cdot \sqrt{\frac{(T_{max}-T_{amb})}{(T_{max}-T_{nominal})}} = I_{nominal} \cdot \sqrt{\frac{(70^{\circ}C-T_{amb})}{20^{\circ}C}}$

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

## Approvals



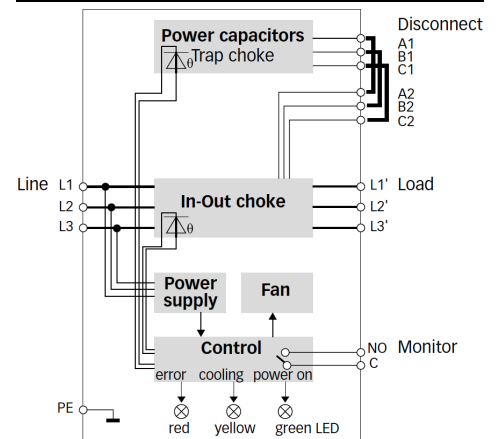
## Features and benefits

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 system 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

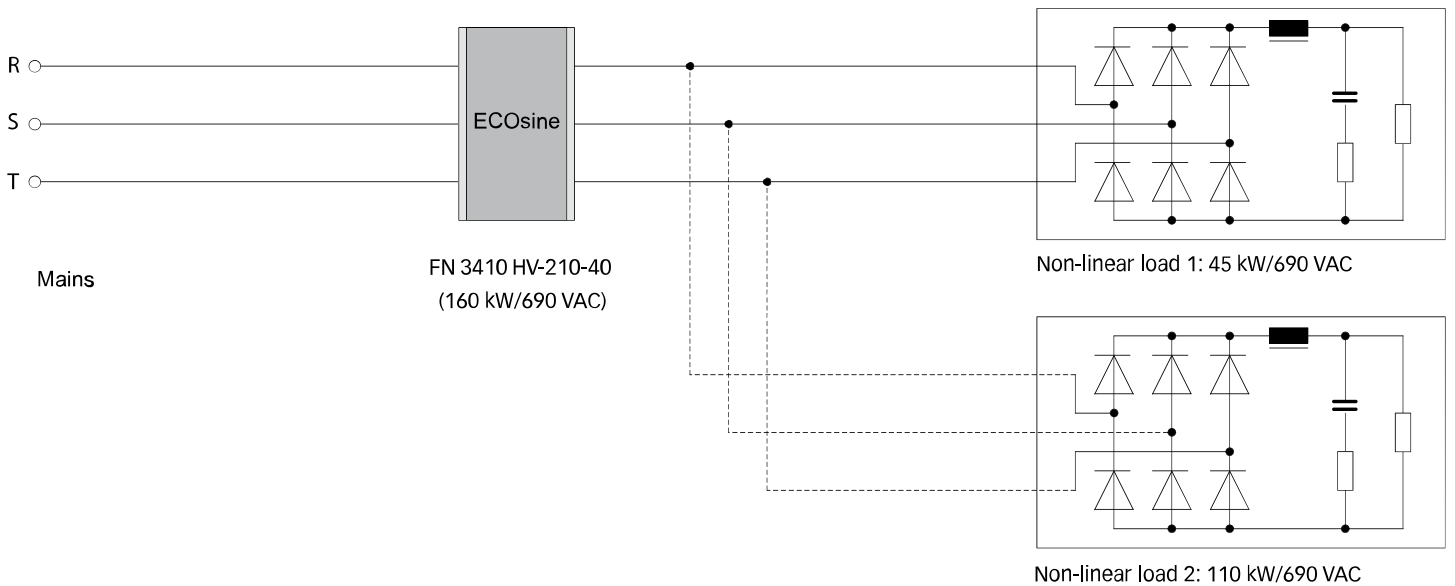
## Typical electrical schematic



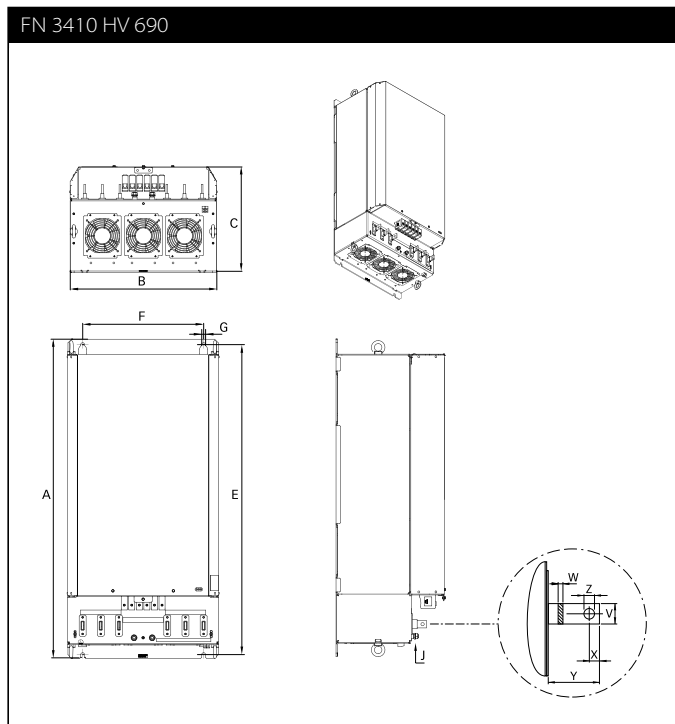
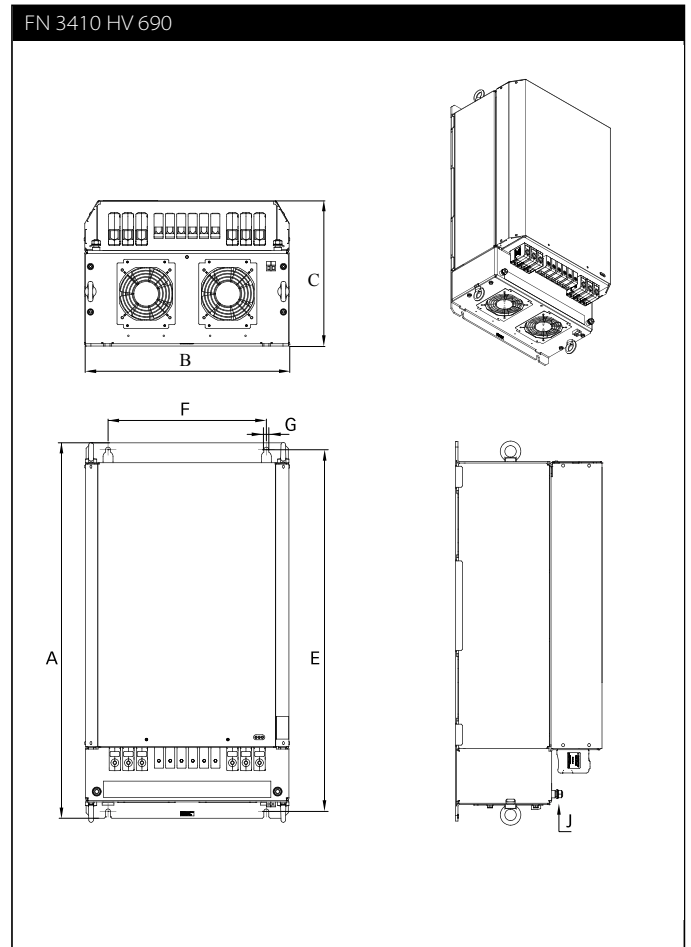
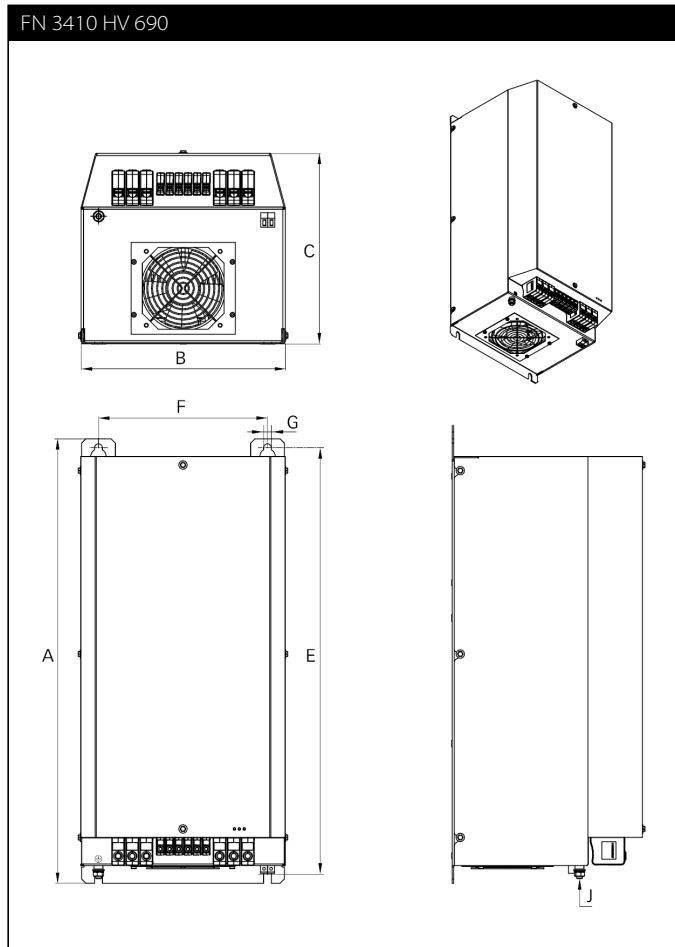
### Filter selection table FN 3410 HV 690

Filter*	Rated load power @ 690 VAC/50 Hz [kW]	Power loss** @ 690 V [W]	min. required L <sub>DC</sub> *** [mH]	min. required L <sub>AC</sub> *** [mH]	Input/Output Connections	Capacitor disconnections	Weight [kg]
FN 3410 HV-10-44	7.54	150			-44	-44	20
FN 3410 HV-13-44	11	209			-44	-44	21
FN 3410 HV-16-33	15	270			-33	-44	29
FN 3410 HV-24-33	18.5	333			-33	-44	33
FN 3410 HV-32-53	22	374			-53	-33	44
FN 3410 HV-38-53	30	480			-53	-33	48
FN 3410 HV-45-53	37	555			-53	-33	56
FN 3410 HV-60-35	45	610	2.313	1.565	-35	-34	58
FN 3410 HV-75-35	55	690	1.169	0.835	-35	-34	62
FN 3410 HV-90-35	75	860	1.143	0.776	-35	-34	77
FN 3410 HV-110-35	90	960	0.867	0.595	-35	-34	91
FN 3410 HV-150-40	110	1145	0.696	0.431	-40	-35	131
FN 3410 HV-180-40	132	1275	0.58	0.37	-40	-35	147
FN 3410 HV-210-40	160	1600	0.478	0.325	-40	-35	169
FN 3410 HV-260-99	200	1940	0.39	0.268	-99	-35	230
FN 3410 HV-320-99	250	2500	0.269	0.184	-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.  
 \*\*\* L<sub>DC</sub> refers to DC-link choke, L<sub>AC</sub> refers to AC line choke



**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.myeosine.com](http://www.myeosine.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	11	13
<b>J</b>	M6	M6	M8	M8	M8	M8	M8	M10	M10	M10	M10	M10	M10	M10	M10	M10
<b>V</b>																25
<b>W</b>																6
<b>X</b>																12.5
<b>Y</b>																50
<b>Z</b>																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.



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