

# Ecosine max, 400 VAC 50 Hz Full Performance Passive Harmonic Filters



- Demonstrate best cost-performance ratio
- Achieve 5% THDi for diode rectifier without DC-link choke and thyristor rectifier
- Best-in-class partial load performance
- Most compact open panel design for cabinet integration
- Reliable and robust
- Plug and play, ready to use



## Approvals & Compliances



## 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 reshape your distorted current back to the desired sinusoidal waveform. Schaffner ecosine filters can be applied to virtually any kind of power electronics with front-end six-pulse rectifiers, 3-phase diode or thyristor bridges, where harmonic current distortion needs to be reduced to defined limits.

## Technical specifications

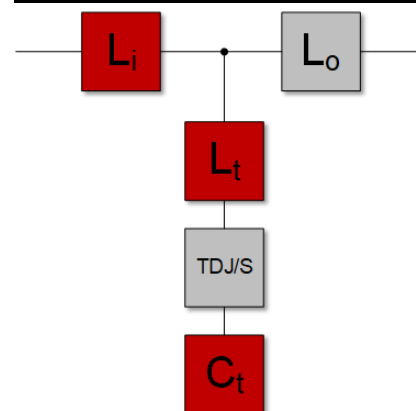
<b>Nominal operating voltage</b>	3 x 380 VAC to 415 VAC ±10%
<b>Operating frequency</b>	50 Hz ±1 Hz
<b>Nominal motor drive input power rating</b>	250 to 500 kW
<b>Total harmonic current distortion THDi*</b>	<5% @ rated power for drives without Ldc ~3.5% @ rated power for drives equipped with 4% Ldc
<b>Efficiency</b>	>99% for rated voltage and power
<b>Overload capability</b>	1.6x rated current for 1 minute, once per hour
<b>SCCR**</b>	100 kA (UL approved)
<b>High potential test voltage</b>	P -> E 2520 VAC (1s)
<b>Overtoltage category</b>	OV III (IEC 60664-1)
<b>Earthing System</b>	TN, TT, IT
<b>Protection category</b>	IP 00
<b>Cooling</b>	External cooling***
<b>Ambient temperature range</b>	-25°C to +40°C fully operational +40°C to +70°C derated operation**** -25°C to +85°C transport and storage
<b>Design corresponding to</b>	Filter: UL 61800-5-1, EN 61800-5-1 Chokes: EN 60076-6
<b>Flammability corresponding to</b>	UL 94 V-2
<b>MTBF @ 40°C/400 V (Mil-HB-217F)</b>	>200,000 hours

\* System requirements: THDv <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.  
\*\* External UL-rated fuses required. Please consult the user manual.  
\*\*\* Please check the inlet air flow required for cooling table further in this document and the user manual.  
\*\*\*\*  $I_{derated} = I_{nominal} \cdot \sqrt{\frac{(T_{max} - T_{amb})}{(T_{max} - T_{nominal})}} = I_{nom} \cdot \sqrt{\frac{(70^{\circ}C - T_{amb})}{30^{\circ}C}}$

## 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 with circuit breaker module

Filter	Rated load power @ 400 V/50 Hz [kW]	Motor drive input current* [Arms]	Rated filter input current [Arms]	Typical power losses @ 40°C [W]	Circuit breaker rated current [A]	Weight [kg]	Terminal	Frame size
FN 3470-250-99-E0XXSXX	250	435	376	3029	250	270	Busbar	S10
FN 3470-315-99-E0XXSXX	315	655	475	3295	250	295	Busbar	S10
FN 3470-355-99-E0XXSXX	355	727	538	3527	300	320	Busbar	S12
FN 3470-400-99-E0XXSXX	400	808	608	4617	400	426	Busbar	L10
FN 3470-500-99-E0XXSXX	500	985	766	4475	400	510	Busbar	L12

\* Motor drive input current without harmonic filter.

## Filter selection table with trap disconnect jumper

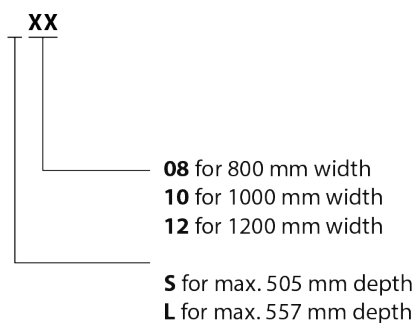
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FN 3470-355-99-E0XXJXX	355	727	538	3527	320	Busbar	S12
FN 3470-400-99-E0XXJXX	400	808	608	4617	426	Busbar	L10
FN 3470-500-99-E0XXJXX	500	985	766	4475	510	Busbar	L12

\* Motor drive input current without harmonic filter.

## Earth terminals

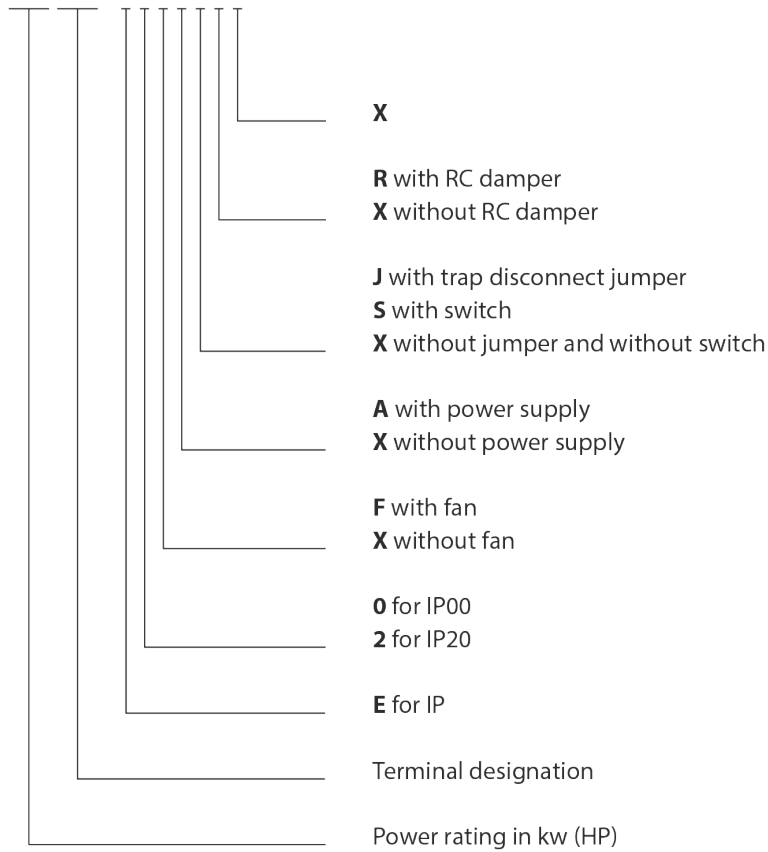
Earth (PE)	Screw thread	Screw torque value [Nm]
S08-L12	M12	20-25

## Frame size designation



Product selector

FN 34nn-xxx-yyy-



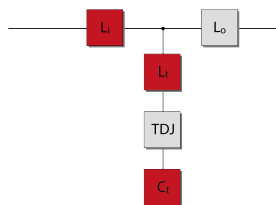
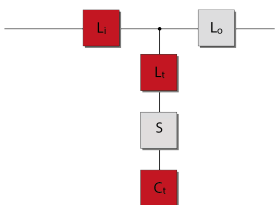
Filter configurations

E0XXSXX

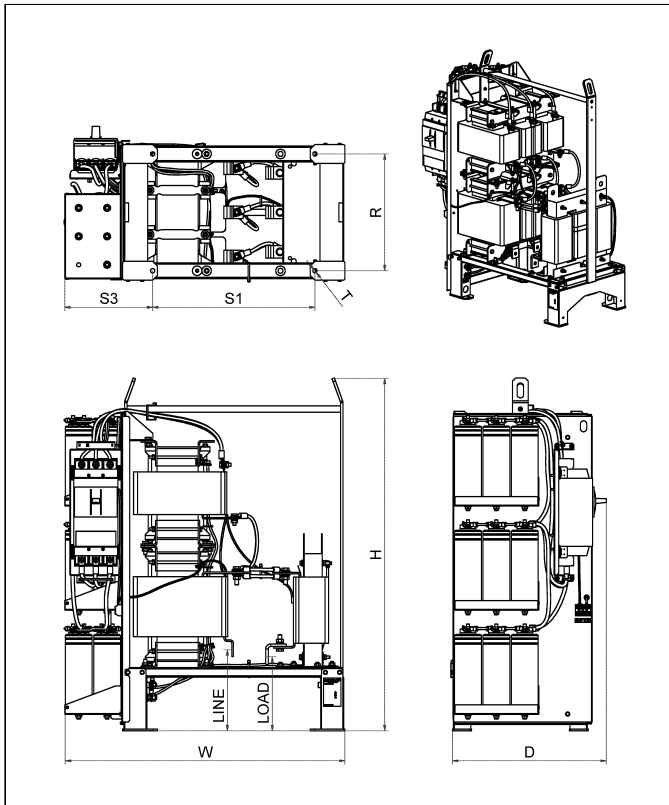
- For rectifiers without DC-link choke
- Filters contain trap disconnect switch

E0XXJXX

- For rectifiers without DC-link choke
- Filters contain trap disconnect jumper



## Mechanical data of IP 00 enclosure



## Dimensions

Frame size*	W	D	H	R	S1	S2	S3	T	LINE	LOAD	Recommended cabinet size WxDxH
<b>S08</b>	max. 650	max. 505	1120	380	330	230	490	13.5	255 ± 10	470 ± 30	800x600x2000
<b>S10</b>	890	max. 505	1120	370	514	n/a	280	13.5	255 ± 10	240 ± 30	1000x600x2000
<b>S12</b>	1060	max. 505	1120	370	684	n/a	280	13.5	255 ± 10	230 ± 10	1200x600x2000
<b>L08</b>	max. 680	557	1320	458	320	225	485	13.5	290 ± 10	540 ± 30	800x600x2000
<b>L10</b>	890	max. 557	1320	455	504	n/a	285	13.5	290 ± 10	230 ± 10	1000x600x2000
<b>L12</b>	1060	max. 557	1320	455	674	n/a	285	13.5	290 ± 10	220 ± 10	1200x600x2000

\* General tolerance: ISO 2768-v  
All dimensions (and tolerance) are in mm.

## Inlet air flow required for cooling

Frame size	Min air volume* [m <sup>3</sup> /h]
<b>S08, L08</b>	1069
<b>S10, L10</b>	1069
<b>S12, L12</b>	1069

\* Complete cooling requirement, including air inlet placement, must be followed. Please consult the user manual.



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