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

Technical Specifications

Nominal operating voltage	3 x 380 VAC to 415 VAC ±10%
Operating frequency	50 Hz ±1 Hz
Nominal motor drive input power rating	250 to 500 kW
Total harmonic current distortion THDi*	<5% @ rated power for drives without Ldc ~3.5% @ rated power for drives equipped with 4% Ldc
Total demand distortion TDD	According to IEEE 519
Efficiency	>99% for rated voltage and power
Overload capability	1.6x rated current for 1 minute, once per hour
SCCR**	100 kA (UL approved)
High potential test voltage	P -> E 2520 VAC (1s)
Overvoltage category	OV III (IEC 60664-1)
Earthing System	TN, TT, IT
Protection category	IP 00
Cooling	External cooling***
Ambient temperature range	–25°C to +40°C fully operational +40°C to +70°C derated operation**** –25°C to +85°C transport and storage
Design corresponding to	Filter: UL 61800-5-1, EN 61800-5-1 Chokes: EN 60076-6
Flammability corresponding to	UL 94 V-2
MTBF @ 40°C/400 V (Mil-HB-217F)	>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.
**** Iderated = Inominal*SQRT((Tmax-Tamb)/(Tmax-Tnominal)) = Inominal*SQRT((70°C-Tamb)/30°C)

Approvals & Compliances

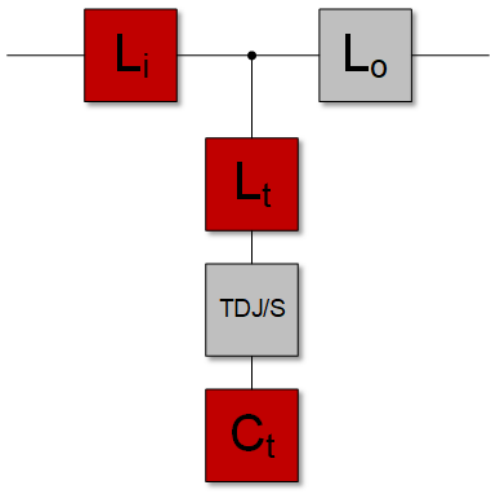
Features and Benefits

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.

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

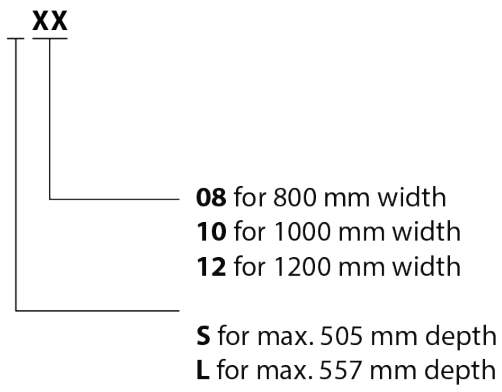
Filter	Rated load power @ 400 V/50 Hz [kW]	Motor drive input current* [Arms]	Rated filter input current [Arms]	Typical power losses @ 40°C [W]	Weight [kg]	Terminal	Frame size
FN 3470-250-99-E0XXJXX	250	435	376	3029	270	Busbar	S10
FN 3470-315-99-E0XXJXX	315	655	475	3295	295	Busbar	S10
FN 3470-355-99-E0XXJXX	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 [Nm]
S08-L12	M12	20-25

Frame Size Designation



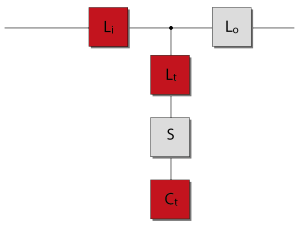
Product selector

FN 34nn-xxx-yyy-

- **X**
- **R** with RC damper
  X without RC damper
- **J** with trap disconnect jumper
  S with switch
  X without jumper and without switch
- **A** with power supply
  X without power supply
- **F** with fan
  X without fan
- **0** for IP00
  2 for IP20
- **E** for IP
- Terminal designation
- Power rating in kw (HP)

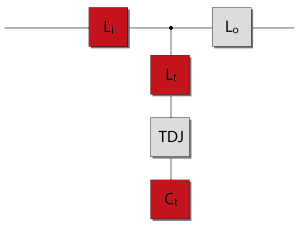
Filter Configurations

E0XXSXX



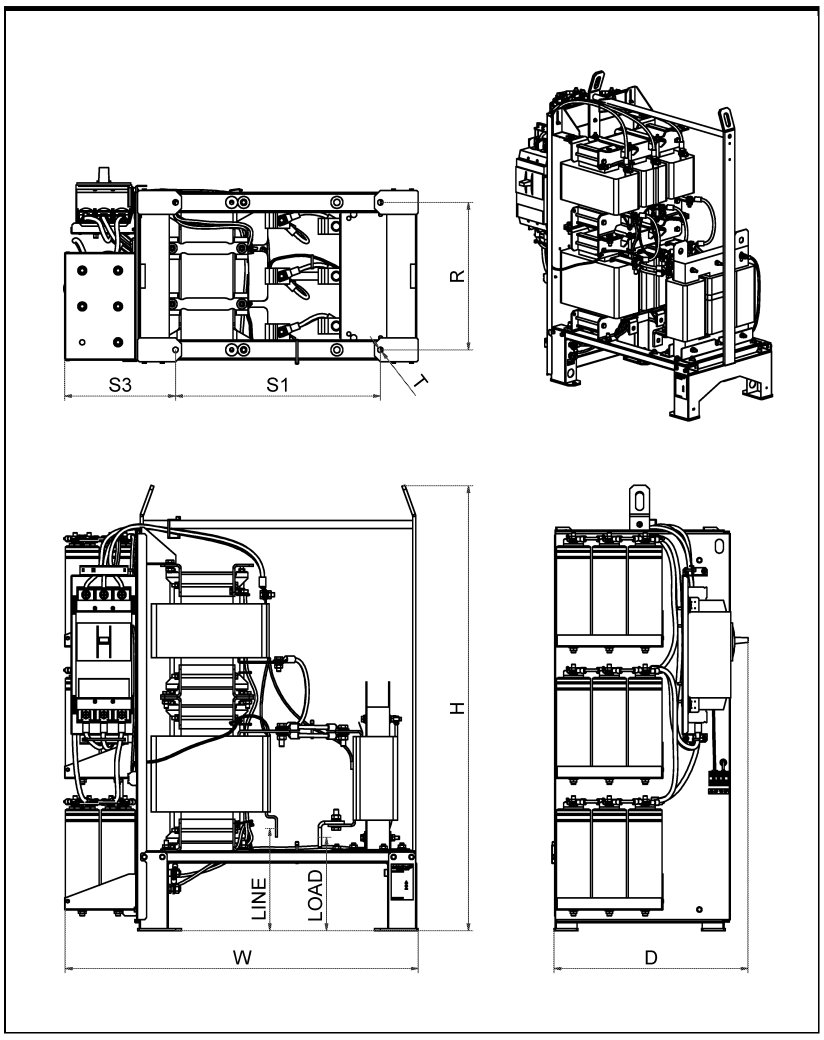
- For rectifiers without DC-link choke
- Filters contain trap disconnect switch

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
S08	max. 650	max. 505	1120	380	330	230	490	13.5	255 ± 10	470 ± 30	800x600x2000
S10	890	max. 505	1120	370	514	n/a	280	13.5	255 ± 10	240 ± 30	1000x600x2000
S12	1060	max. 505	1120	370	684	n/a	280	13.5	255 ± 10	230 ± 10	1200x600x2000
L08	max. 680	557	1320	458	320	225	485	13.5	290 ± 10	540 ± 30	800x600x2000
L10	890	max. 557	1320	455	504	n/a	285	13.5	290 ± 10	230 ± 10	1000x600x2000
L12	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^3/h]
S08, L08	1069
S10, L10	1069
S12, L12	1069

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

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