schaffner
MORE POWER TO YOU

Ecosine max, 400 VAC 60 Hz Economy Passive Harmonic Filters

- Demonstrate best cost-performance ratio
- Achieve 8% THDi for diode rectifier without Ldc, and 5% THDi for diode rectifier with 4% Ldc
- 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	60 Hz ±1 Hz
Nominal motor drive input power rating	280 to 480 HP
Total harmonic current distortion THDi*	<8% @ rated power for drives without Ldc <5% @ rated power for drives equipped with 4% Ldc
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-0
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*√((Tmax-Tamb)/(Tmax-Tnominal)) = Inom*√((70°C-Tamb)/30°C)

Approvals & Compliances

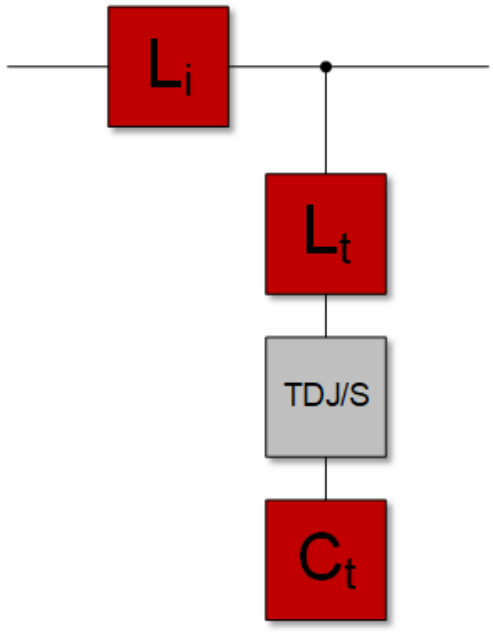
Features and Benefits

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 sytem 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 @ 380 V/ 60 Hz		Motor drive input current*	Rated filter input current	Required Ldc for 5% THDi**	Typical power losses @ 40°C	Circuit breaker rated current	Weight		Terminal	Frame size
	[kw]	[HP]	[Arms]	[Arms]	[mH]	[W]	[A]	[kg]	[lbs]		
FN3473-280-99-E0XXSXX	209	280	472	325	0.074	2085	200	220	485	Busbar	S08
FN3473-315-99-E0XXSXX	235	315	537	374	0.066	2145	200	245	540	Busbar	S08
FN3473-355-99-E0XXSXX	265	355	595	418	0.058	2382	250	270	595	Busbar	S08
FN3473-400-99-E0XXSXX	300	400	656	467	0.052	2223	250	295	650	Busbar	S08
FN3473-480-99-E0XXSXX	358	480	772	561	0.044	3057	300	360	794	Busbar	L08

* Motor drive input current without harmonic filter.

** FN 3473 filters can be applied for drives with and without Ldc. 8% THDi (@ rated power) is achieved when FN 3473 is applied to drives without Ldc, while 5% THDi (@ rated power) is achieved when there is a 4% Ldc present in the drive.

Filter Selection Table With Trap Disconnect Jumper

Filter	Rated load power @380 V/60 Hz		Motor drive input current*	Rated filter input current	Required Ldc for 5% THDi**	Typical power losses @ 40°C	Weight		Terminal	Frame size
	[kw]	[HP]	[Arms]	[Arms]	[mH]	[W]	[kg]	[lbs]		
FN3473-280-99-E0XXJXX	209	280	472	325	0.074	2085	220	485	Busbar	S08
FN3473-315-99-E0XXJXX	235	315	537	374	0.066	2145	245	540	Busbar	S08
FN3473-355-99-E0XXJXX	265	355	595	418	0.058	2382	270	595	Busbar	S08
FN3473-400-99-E0XXJXX	300	400	656	467	0.052	2223	295	650	Busbar	S08
FN3473-480-99-E0XXJXX	358	480	772	561	0.044	3057	360	794	Busbar	L08

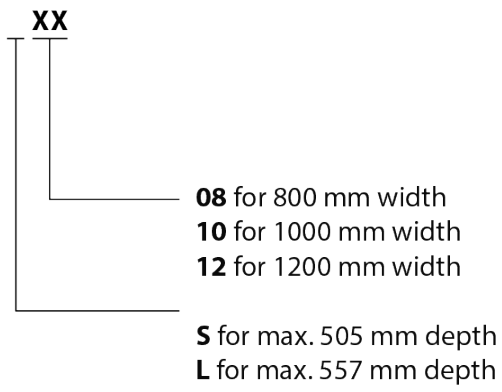
* Motor drive input current without harmonic filter.

** FN 3473 filters can be applied for drives with and without Ldc. 8% THDi (@ rated power) is achieved when FN 3473 is applied to drives without Ldc, while 5% THDi (@ rated power) is achieved when there is a 4% Ldc present in the drive.

Earth Terminals

Earth (PE)	Screw thread	Screw torque value	
		[Nm]	[lbs.in]
S08-L12	M12	20-25	177-221

Frame Size Designation



Product selector

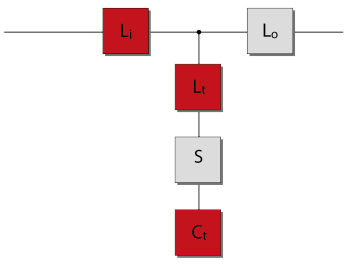
FN 34nn-xxx-yyy-

- **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

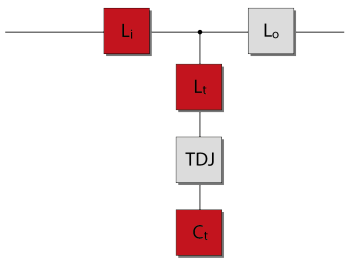
E0XXSXX

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

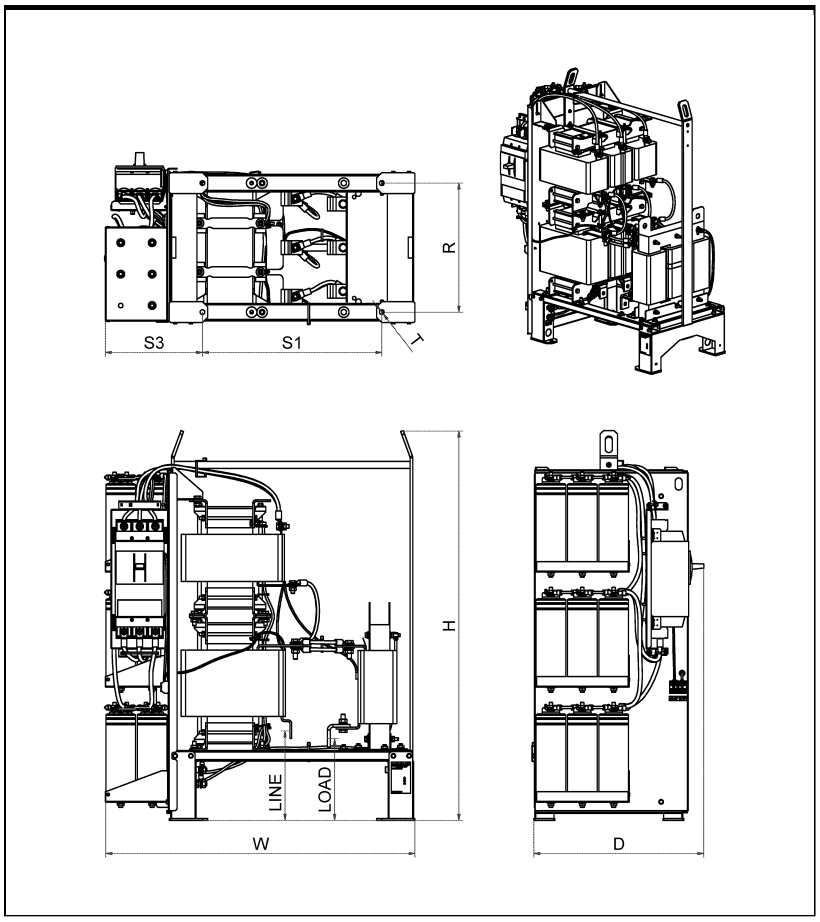


E0XXJXX

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



Mechanical Data Of IP 00 Enclosure



Dimensions In Mm

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

Dimensions In Inches

Frame size*	W	D	H	R	S1	S2	S3	T	LINE	LOAD	Recommended cabinet size WxDxH
S08	max. 25.6	max. 19.88	44.09	14.96	12.99	9.06	19.29	0.53	10.04 ± 0.039	18.5 ± 1.18	31.5x23.6x78.7
S10	35.04	max. 19.88	44.09	14.57	20.24	n/a	11.02	0.53	10.04 ± 0.039	9.45 ± 1.18	39.4x23.6x78.7
S12	41.73	max. 19.88	44.09	14.57	26.93	n/a	11.02	0.53	10.04 ± 0.039	9.06 ± 0.39	47.2x23.6x78.7
L08	max. 26.8	21.93	51.97	18.03	12.60	8.86	19.09	0.53	11.42 ± 0.039	21.26 ± 1.18	31.5x23.6x78.7
L10	35.04	max. 21.93	51.97	17.91	19.84	n/a	11.22	0.53	11.42 ± 0.039	9.06 ± 0.39	39.4x23.6x78.7
L12	41.73	max. 21.93	51.97	17.91	26.54	n/a	11.22	0.53	11.42 ± 0.039	8.66 ± 0.39	47.2x23.6x78.8

* General tolerance: ISO 2768-v

Inlet Air Flow Required For Cooling

Frame size	Min air volume*	
	[m^3/h]	CFM [ft^3/min]
S08, L08	1069	629
S10, L10	1069	629
S12, L12	1069	629

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

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