

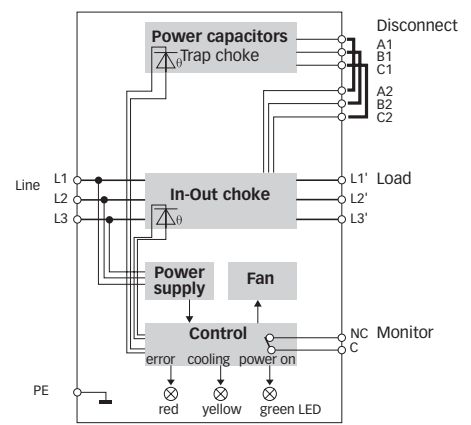


ECOSine™ FN 3410 – filters for 50Hz systems

Technical specifications

Nominal operating voltage:	3x 380 to 500VAC
Voltage tolerance range:	3x 342 to 550VAC
Operating frequency:	50Hz ±1Hz
Nominal motor drive input current rating*:	10 to 260A @ 50°C
Nominal motor drive input power rating:	4 to 160kW
Total harmonic current distortion THID**:	<5% @ rated power
Total demand distortion TDD:	According to IEEE-519, table 10-3
Efficiency:	>98.5% @ nominal line voltage and power
High potential test voltage:	P → P 2300VDC (1min) P → E 2500VAC (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 +50°C to +70°C derated operation*** -25°C to +85°C transport and storage
Flammability corresponding to:	UL 94V-2 or better
Design corresponding to:	UL 508, EN 61558-2-20, CE (LVD 2006/95/EC)
MTBF @ 50°C/500V (Mil-HB-217F):	200,000 hours

Typical electrical schematic



* 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%

*** $I_{derated} = I_{nominal} * \sqrt{(85°C - T_{amb}) / 35°C}$

Filter selection table

Filter*	Rated load power @ 400VAC/50Hz	Rated load power @ 500VAC/50Hz	Filter efficiency @ 25°C/50Hz	Input/Output connections	Capacitor disconnections	Weight
	[kW]	[kW]	[%]			[kg]
FN 3410-10-44	4	5.5	98.5	-44	-44	13
FN 3410-13-44	5.5	7.5	98.5	-44	-44	14
FN 3410-16-44	7.5	11	98.5	-44	-44	21
FN 3410-24-33	11	15	98.5	-33	-44	27
FN 3410-32-33	15	18.5	98.5	-33	-44	31
FN 3410-38-33	18.5	22	98.6	-33	-44	35
FN 3410-45-34	22	30	98.7	-34	-33	45
FN 3410-60-34	30	37	98.8	-34	-33	54
FN 3410-75-35	37	45	98.9	-35	-34	65
FN 3410-90-35	45	55	99.0	-35	-34	77
FN 3410-110-35	55	75	99.1	-35	-34	86
FN 3410-150-40	75	90	99.2	-40	-35	118
FN 3410-180-40	90	110	99.3	-40	-35	136
FN 3410-210-40	110	132	99.3	-40	-35	154
FN 3410-260-99	132	160	99.4	-99	-35	201

* 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 400V/15kW/32A drive will be reduced to approximately 23A. Therefore, filter selection by current rating, as it is common for EMI filters, is not suitable.



ECOsine™ FN 3412 – filters for 60Hz systems

Technical specifications

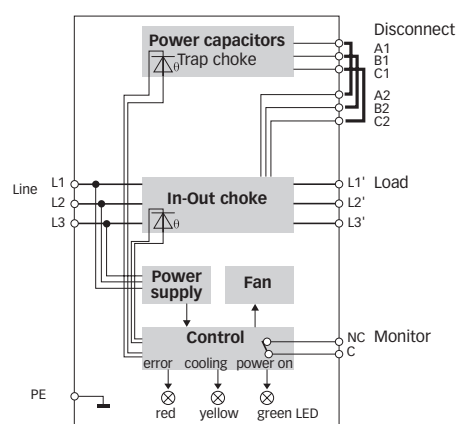
Nominal operating voltage:	3x 440 to 480VAC
Voltage tolerance range:	3x 396 to 528VAC
Operating frequency:	60Hz ±1Hz
Nominal motor drive input current rating*:	8 to 310A @ 50°C
Nominal motor drive input power rating:	5 to 250HP
Total harmonic current distortion THID**:	<5% @ rated power
Total demand distortion TDD:	According to IEEE-519, table 10-3
Efficiency:	>98.5% @ nominal line voltage and power
High potential test voltage:	P → P 2300VDC (1min) P → E 2500VAC (1min)
Protection category:	NEMA1 / IP20
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 +50°C to +70°C derated operation***
Flammability corresponding to:	UL 94V-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

* 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%

*** $I_{derated} = I_{nominal} * \sqrt{(85°C - T_{amb}) / 35°C}$

Typical electrical schematic



Filter selection table

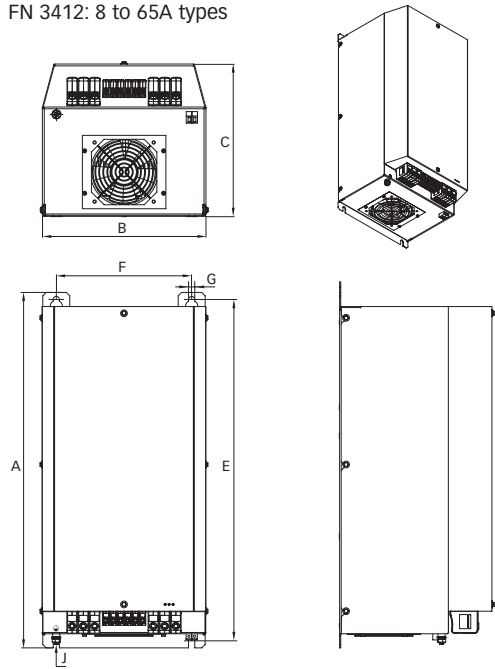
Filter*	Rated load power @ 460VAC/60HZ	Filter efficiency @ 25°C/60HZ	Input/Output connections		Capacitor disconnections	Weight
	[HP]	[%]				[kg]
FN 3412-8-44	5	98.5	-44		-44	12
FN 3412-11-44	7.5	98.5	-44		-44	13
FN 3412-15-44	10	98.5	-44		-44	17
FN 3412-21-44	15	98.5	-44		-44	21
FN 3412-28-33	20	98.6	-33		-44	28
FN 3412-35-33	25	98.6	-33		-44	32
FN 3412-41-33	30	98.7	-33		-44	35
FN 3412-53-34	40	98.9	-34		-33	48
FN 3412-65-34	50	99.0	-34		-33	52
FN 3412-80-35	60	99.1	-35		-34	69
FN 3412-105-35	75	99.2	-35		-34	77
FN 3412-130-35	100	99.3	-35		-34	87
FN 3412-160-40	125	99.4	-40		-35	124
FN 3412-190-40	150	99.4	-40		-35	132
FN 3412-240-99	200	99.5		-99	-35	185
FN 3412-310-99	250	99.5		-99	-35	202

* 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 460V/20HP/28A drive will be reduced to approximately 20A. Therefore, filter selection by current rating, as it is common for EMI filters, is not suitable.

Mechanical data

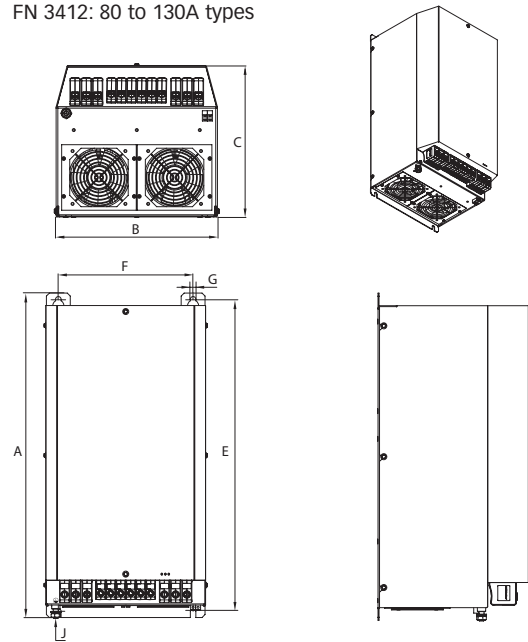
FN 3410: 10 to 60A types

FN 3412: 8 to 65A types



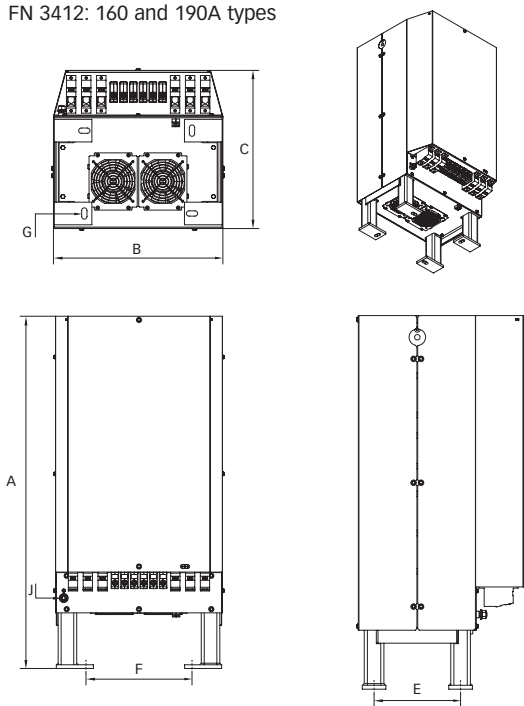
FN 3410: 75 to 110A types

FN 3412: 80 to 130A types



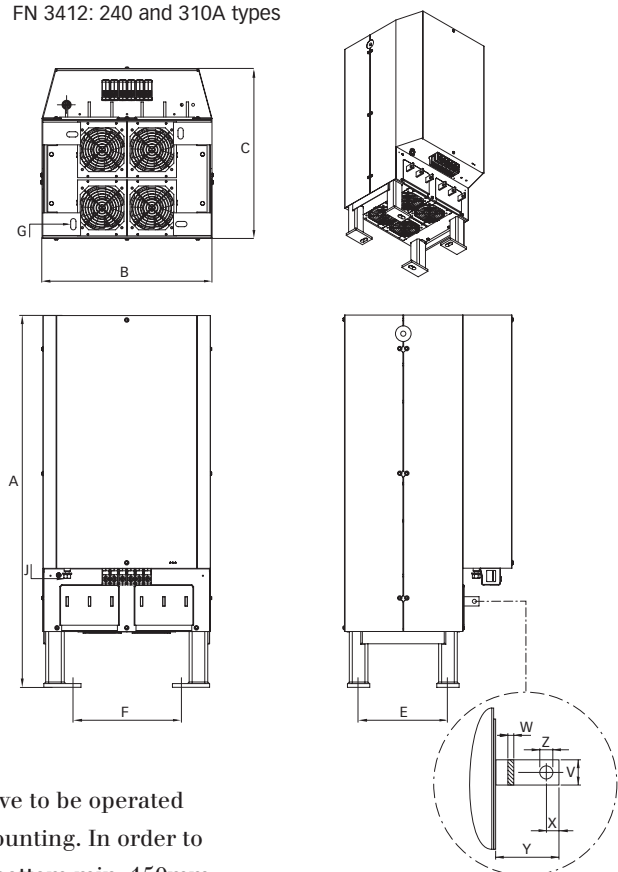
FN 3410: 150 to 210A types

FN 3412: 160 and 190A types



FN 3410: 260A types

FN 3412: 240 and 310A types








Installation. All filters from 8 to 130A are wall mountable and have to be operated vertically. The filters 150A 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. 150mm.

Dimensions

FN 3410 FN 3412	10A 8A	13A 11A	16A 15A	21A	24A 28A	32A 35A	38A 41A	45A 53A	60A 65A	75A 80A	90A 105A	110A 130A	150A 160A	180A 190A	210A	260A 240A	310A
A	400	400	430	430	520	520	520	590	590	750	750	750	950	950	950	1000	1000
B	170	170	210	210	250	250	250	300	300	320	320	320	450	450	450	500	500
C	190	190	210	210	280	280	280	300	300	300	300	300	420	420	420	500	500
E	380	380	410	410	495	495	495	565	565	725	725	725	220	220	220	240	240
F	130	130	170	170	200	200	200	240	240	270	270	270	286	286	286	336	336
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	25
W																6	6
X																12.5	12.5
Y																40	40
Z																11	11

All dimensions in mm; 1 inch = 25.4mm
Tolerances according: ISO 2768 / EN 22768

Filter connector cross sections

	-33	-34	-35	-40	-44
					
Solid wire	16mm ²	35mm ²	50mm ²	95mm ²	10mm ²
Flex wire	10mm ²	25mm ²	50mm ²	95mm ²	6mm ²
AWG type wire	AWG 6	AWG 2	AWG 1/0	AWG 4/0	AWG 8
Recommended torque	1.5 – 1.8Nm	4.0 – 4.5Nm	7 – 8Nm	17 – 20Nm	1.0 – 1.2Nm

Please visit www.schaffner.com to find more details on filter connectors.

Schaffner – more than just filters. Schaffner ECOsine™ standard filters are available for different supply networks throughout the world. They are UL approved, CE marked, and fulfill the requirements of the low voltage directive. A large selection of power, current, voltage and frequency ratings leaves the choice of filter up to the user. However, there are always occasions where different electric or mechanical requirements exist, or where more than just products are needed for the job at hand.

Schaffner is in the unique position of being able to support the user with problem analysis, engineering advice, testing and measurement support, custom products, and a worldwide customer service organisation. Our goal is to ensure that you obtain the level of harmonics mitigation you actually need – guaranteed.

Please contact your local Schaffner partner for comprehensive support. More information can also be obtained from the Schaffner ECOsine™ application note.