schaffner MORE POWER TO YOU is now part of TE connectivity

Ecosine Flex, 200-480 VAC 50 Hz 10% THDi Passive Harmonic Filters

- Reduce THDi to 10% (15% if no DC-Link present in the drive)
- Filters for diode rectifier with and without DC-link choke and thyristor rectifier
- Help to comply with EN 61000-3-12, IEEE 519 and other PQ standards
- Increase the efficiency of energy utilization
- Most compact design
- Plug and play, ready to use

Technical Specifications

Nominal operating voltage	3x200 to 480 VAC ±10% for IP00 3x380 to 480 VAC ±10% for IP20
Overload capability	1.6x rated current for 1 minute, once per hour
Operating frequency	50Hz ±1 Hz
Total harmonic current distortion THDi*	<10% @ rated power (with DC-Link choke 4%) <15% @ rated power (without DC-Link choke or <4%)
Total demand distortion TDD	According to IEEE 519
Nominal motor drive input power rating	4 to 200 kW @ 400 VAC
High potential test voltage	P -> E 2480 VAC for 1 s
Earthing system	TN, TT, IT
Efficiency	≥ 98% at rated voltage and power
Overvoltage category	OV III (IEC 60664-1 / UL 61800-5-1)
Temperature range (operation and storage)	–25°C to +45°C fully operational +45°C to +70°C derated operation*** –25°C to +85°C transport and storage
Cooling	Internal fan cooling or external fan cooling****
Protection category	IP 00, IP 20
Flammability corresponding to	UL 94V-2
Design corresponding to	UL/IEC 61800-5-1, EN 61800-5-1, CE (LVD2006/95/EC) Choke: IEC 61558-2-20
SCCR**	100 kA
MTBF (Mil-HB-217F)	>300,000 h @ 45°C/400 V

* System requirements: THDv <2%, line voltage unbalance <1%
Note: performance specifications in this datasheet refer to six-pulse diode rectifiers.
SCR rectifier front-end will produce different results, depending upon the firing angle of the thyristors.

** External UL-rated fuses required.

*** Iderated = Inominal * √((70°C-Tamb)/25°C)

**** Please check the inlet air flow requirement for cooling, see below in this document and in the user and installation manual.

Approvals & Compliances

CE UKCA RoHS c UL us LISTED c RU us

Features and Benefits

FN3446 (50 Hz) models of the Ecosine product family represent the very compact economical series with a THDi performance of <10% for drives with 4% Ldc and <15% for drives without Ldc.

They are ideal for non-linear three-phase equipment with B6 rectifier front-end that do not require the industry leading <5% THDi performance provided by Schaffner Ecosine Evo series.

The performance targets the requirement of EN 61000-3-12 and IEEE 519 for Isc/IL <50. Schaffner Ecosine filters help to unburden the electrical infrastructure from excess loading and heat caused by current harmonics, and therefore support a better utilization of electric system capacity.

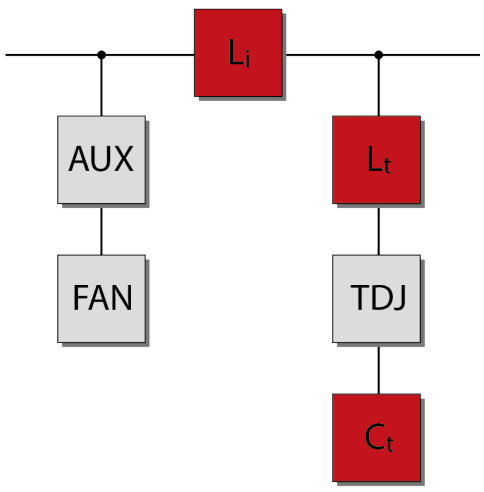
Lower harmonics also reduce the risk of system resonances and potential downtime of sensitive electronic equipment.

FN3446 filters upgrade standard motor drives to low-harmonic drives quickly and easily.

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

Typical electrical schematic



Filter Selection Table

Filter	Rated load power @ 400 VAC/50 Hz [kW]	Rated load power @ 200 VAC/50 Hz [kW]	Motor drive input current [Arms]*	Rated filter input current [A]	Weight [kg]	Typical power losses [W]**	Input /output terminal Type	TDJ terminal Type	Frame size
FN3446-4-44-E0XXJXX	4	2.0	10	5.9	9	75	-44	-44	A
FN3446-6-44-E0XXJXX	5.5	2.8	12.5	8.1	9	129	-44	-44	A
FN3446-8-44-E0XXJXX	7.5	3.8	17.5	11.1	13	129	-44	-44	A
FN3446-11-33-E0XXJXX	11	5.5	25.1	16.2	16	203	-33	-44	B
FN3446-15-33-E0XXJXX	15	7.5	33	22.2	18	327	-33	-44	B
FN3446-19-33-E0XXJXX	19	9.5	42	27.3	21	244	-33	-44	B
FN3446-22-33-E0XXJXX	22	11	50	32.5	26	327	-33	-44	B
FN3446-30-34-E0XXJXX	30	15	67	44.5	34	370	-34	-33	C
FN3446-37-34-E0XXJXX	37	19	81	54.7	40	414	-34	-33	C
FN3446-45-35-E0XXJXX	45	23	99	66.6	43	448	-35	-33	D
FN3446-55-35-E0XXJXX	55	28	120	81.5	45	583	-35	-33	D
FN3446-75-40-E0XXJXX	75	38	160	111	80	618	-40	-34	E
FN3446-90-40-E0XXJXX	90	45	190	132	85	632	-40	-34	E
FN3446-110-40-E0XXJXX	110	55	232	164	92	790	-40	-34	E
FN3446-132-99-E0XXJXX	132	66	271	197	103	711	-99	-35	F
FN3446-160-99-E0XXJXX	160	80	328	236	114	888	-99	-35	F
FN3446-200-99-E0XXJXX	200	100	403	301	136	1105	-99	-40	G

* 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 recommended.
** Calculated power losses at 25°C, 400 V, 50 Hz and rated load power.

Filter Terminals

Terminal designation	LxWxH [mm]	Stranded wire [AWG]	Stranded wire [mm²]	Solid wire [mm²]	Rec. Torque [Nm]	Ring cable shoe
-44	21.9x10x28	20 - 8	0.5 - 6	0.5 - 10	1.0 - 1.2	-
-33	25x11x32	20 - 6	0.5 - 10	0.5 - 16	1.5 - 1.8	-
-34	39x18.5x50.5	10 - 2	6 - 25	6 - 35	4.0 - 4.5	-
-35	45x20x55.5	6 - 1/0	16 - 50	10 - 50	7.0 - 8.0	-
-40	51x25x72.5	1/0 - 4/0	50 -95	50 - 95	17 - 20	-
-99	79x6x25	-	-	-	-	M10
TS	20.5x10x10.9	24 - 10	0.5 - 4	0.5 - 6	0.7 - 0.8	-

Earth Terminal

Frame size	Screw thread	Screw torque [Nm]
A	M6	4.0
B, C	M8	9.0
D, E, F, G	M10	17.0

Inlet Air Flow Required For Cooling

Frame size	Min air volume*	
	[m³/h]	[CFM]
A	0	0
B, C, D	204	120
E (75 and 90 kW only)	408	240
E (110 kW only)	612	360
F, G	612	360

* External air flow required for filter configurations without embedded ventilation

Filter Selection Table

Filter	Rated load power @ 400 VAC/50 Hz [kW]	Motor drive input current [Arms]**	Rated filter input current [Arms]	Weight [kg]	Typical power losses [W]***	Input /output terminals Type	TDJ terminals Type	Frame size
FN3446-4-44-E2XXJXX*	4	10	5.9	10	75	-44	-44	A
FN3446-6-44-E2XXJXX*	5.5	12.5	8.1	10	129	-44	-44	A
FN3446-8-44-E2XXJXX*	7.5	17.5	11.1	15	129	-44	-44	A
FN3446-11-33-E2FAJXX	11	25.1	16.2	18	203	-33	-44	B
FN3446-15-33-E2FAJXX	15	33	22.2	20	327	-33	-44	B
FN3446-19-33-E2FAJXX	19	42	27.3	24	244	-33	-44	B
FN3446-22-33-E2FAJXX	22	50	32.5	29	327	-33	-44	B
FN3446-30-34-E2FAJXX	30	67	44.5	37	370	-34	-33	C
FN3446-37-34-E2FAJXX	37	81	54.7	43	414	-34	-33	C
FN3446-45-35-E2FAJXX	45	99	66.6	46	448	-35	-33	D
FN3446-55-35-E2FAJXX	55	120	81.5	49	583	-35	-33	D
FN3446-75-40-E2FAJXX	75	160	111	85	618	-40	-34	E
FN3446-90-40-E2FAJXX	90	190	132	91	632	-40	-34	E
FN3446-110-40-E2FAJXX	110	232	164	99	790	-40	-34	E
FN3446-132-99-E2FAJXX	132	271	197	111	711	-99	-35	F
FN3446-160-99-E2FAJXX	160	328	236	122	888	-99	-35	F
FN3446-200-99-E2FAJXX	200	403	301	144	1105	-99	-40	G

* Filter rating which does not require forced cooling or fan module
** 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 recommended.
*** Calculated power losses at 25°C, 400 V, 50 Hz and rated load power.

Filter Terminals

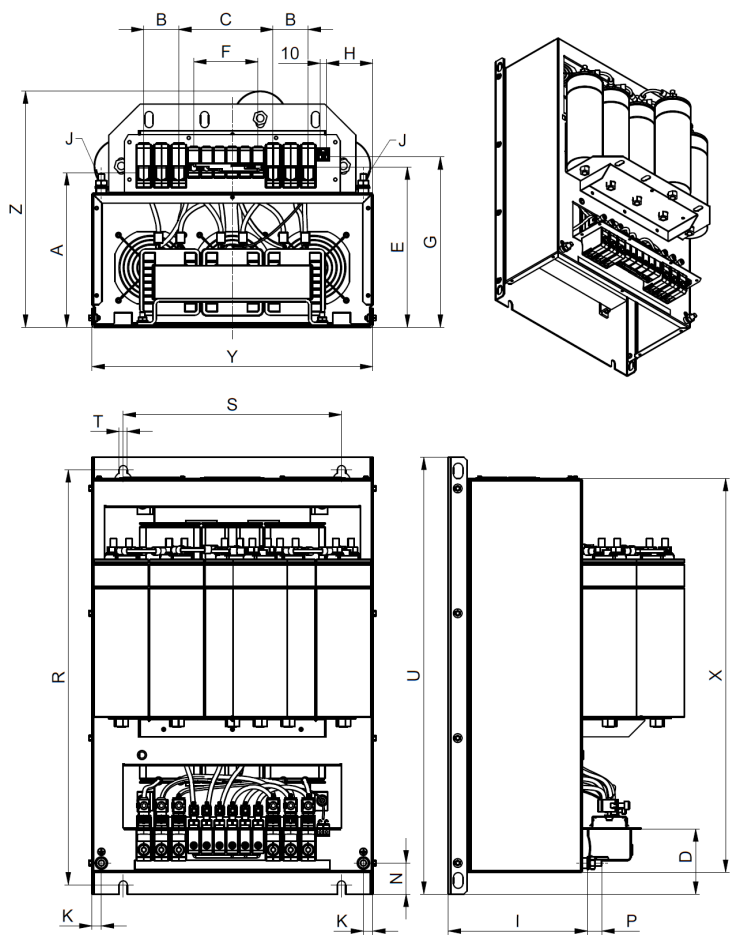
Terminal designation	LxWxH [mm]	Stranded wire [AWG]	Stranded wire [mm²]	Solid wire [mm²]	Rec. Torque [Nm]	Ring cable shoe
-44	21.9x10x28	20 - 8	0.5 - 6	0.5 - 10	1.0 - 1.2	-
-33	25x11x32	20 - 6	0.5 - 10	0.5 - 16	1.5 - 1.8	-
-34	39x18.5x50.5	10 - 2	6 - 25	6 - 35	4.0 - 4.5	-
-35	45x20x55.5	6 - 1/0	16 - 50	10 - 50	7.0 - 8.0	-
-40	51x25x72.5	1/0 - 4/0	50 -95	50 - 95	17 - 20	-
-99	79x6x25	-	-	-	-	M10
TS	20.5x10x10.9	24 - 10	0.5 - 4	0.5 - 6	0.7 - 0.8	-

Earth Terminal

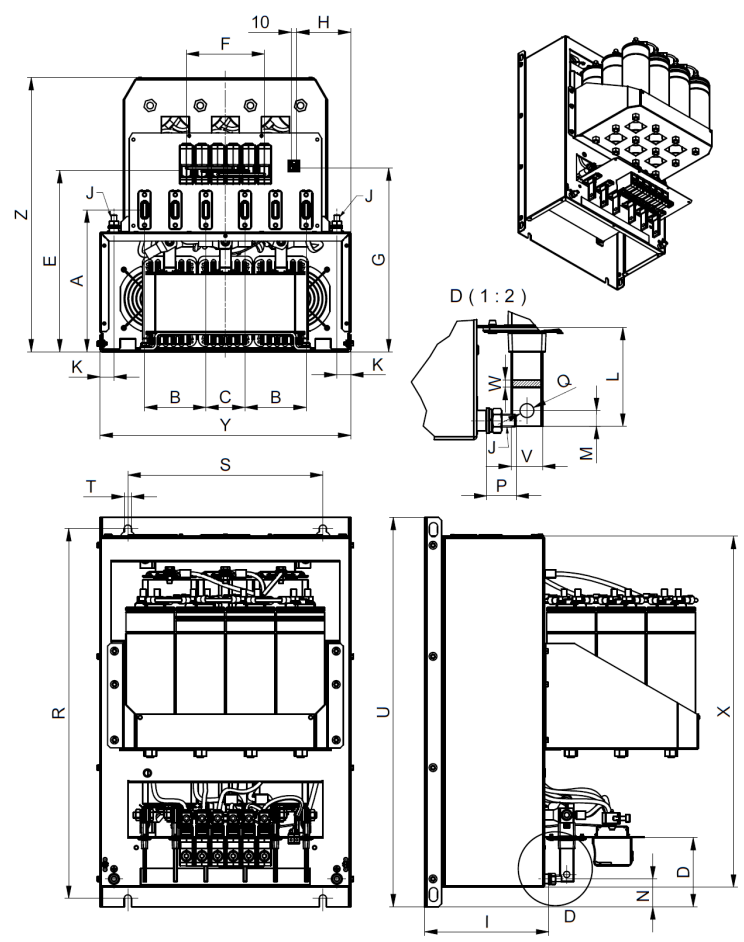
Frame size	Screw thread	Screw torque [Nm]
A	M6	4.0
B, C	M8	9.0
D, E, F, G	M10	17.0

Mechanical Data IP00

Frame size A - E



Frame size F - G



Dimensions

Frame size	A	B	C	D	E	F	G	H	I	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
A	132	23	81	63	132	58	90	22	119	12			35	18		370	140	9	390			349	185	170
B	161	24	82	68	161	58	165	49	146	15			39	21		435	200	11	455			402	250	220
C	176	38	89	78	179	58	188	43	154	15			40	21		500	225	11	520			467	280	238
D	178	42	98	93	165	64	198	115	156	15			44	23		555	225	11	580			522	280	238
E	247	56	151	105	257	103	273	74	223	15			50	23		665	350	13	700			631	450	380
F	255	110	70	125	313	140	325	97	223	25	79	13	50	23	11	665	350	13	700	25	6	631	450	380
G	255	110	70	125	326	140	325	97	223	25	79	13	50	23	11	665	350	13	700	25	6	631	450	495

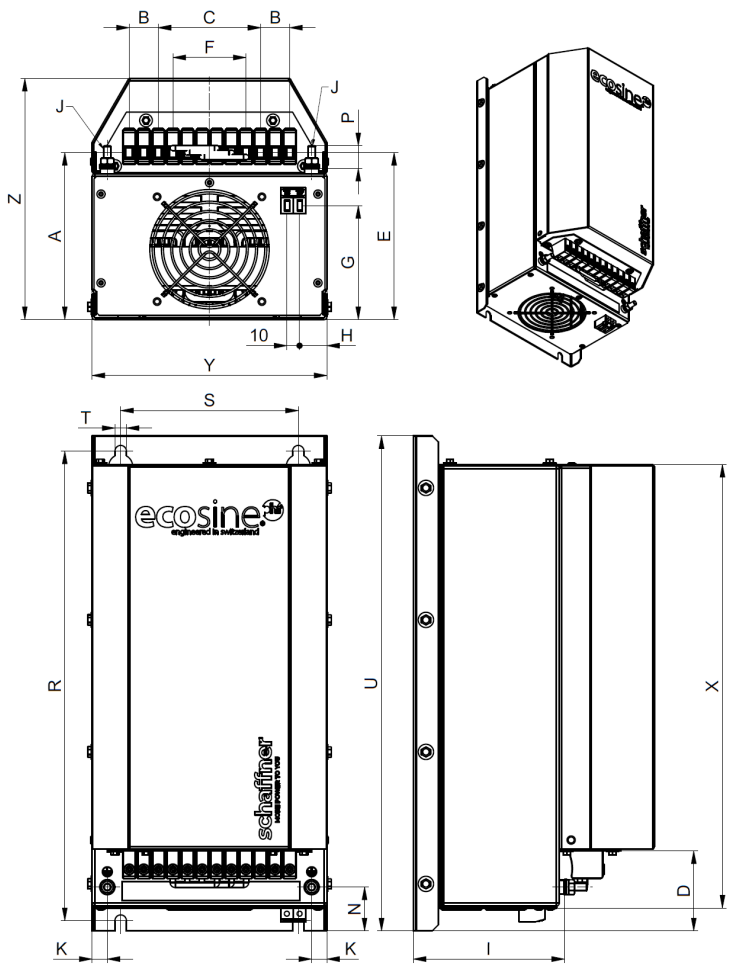
All dimensions in mm; 1 inch = 25.4 mm
Tolerances according to: ISO 2768-m/EN 22768-m

Installation

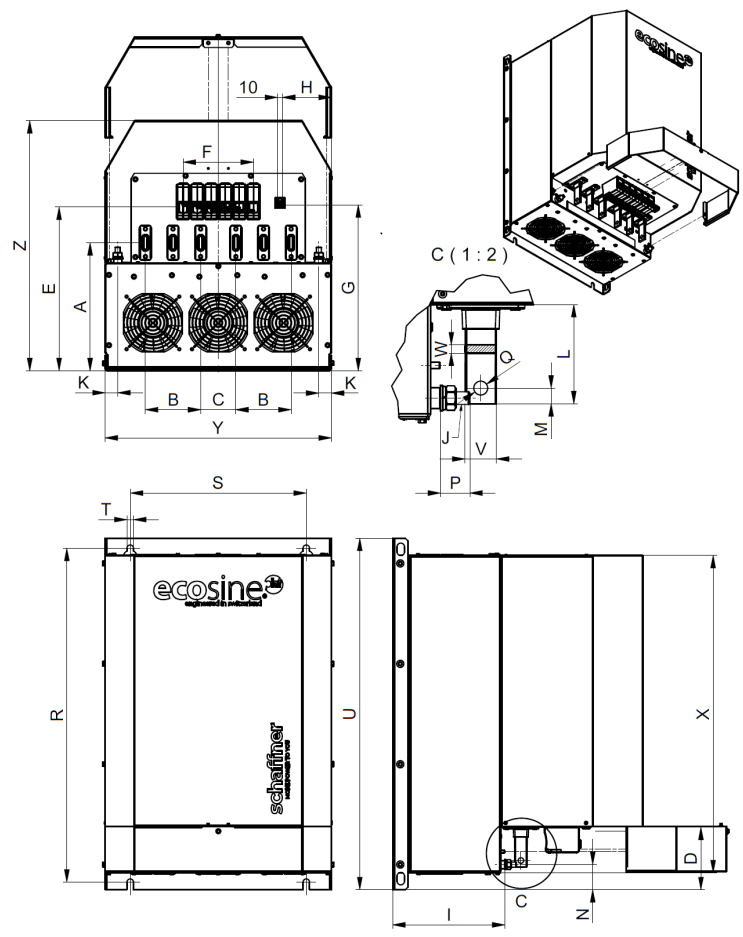
For more detailed information and step by step installation guidelines, please consult the user manual at www.schaffner.com.

Mechanical Data IP20

Frame size A - E



Frame size F - G



Dimensions

Frame size	A	B	C	D	E	F	G	H	I	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
A	132	23	81	63	132	58	90	22	119	12			35	18		370	140	9	390			350	185	190
B	161	24	82	68	161	58	165	49	146	15			39	21		435	200	11	455			403	250	230
C	176	38	89	78	179	58	188	43	154	15			40	21		500	225	11	520			468	280	248
D	178	42	98	93	165	64	198	115	156	15			44	23		555	225	11	580			523	280	248
E	247	56	151	105	257	103	273	74	223	15			50	23		665	350	13	700			633	450	385
F	255	110	70	125	313	140	325	97	223	25	79	13	50	23	11	665	350	13	700	25	6	633	450	385
G	255	110	70	125	326	140	325	97	223	25	79	13	50	23	11	665	350	13	700	25	6	633	450	498

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

Installation

For more detailed information and step by step installation guidelines, please consult the user manual at www.schaffner.com.

Headquarters, Global Innovation and Development

Switzerland
Schaffner Group
Industrie Nord
Nordstrasse 5
4542
Luterbach
+41 32 681 66 26
info@schaffner.com

Sales and Application Centers

Switzerland
Schaffner EMV AG
Industrie Nord
Nordstrasse 5
4542
Luterbach
+41 32 681 66 26
switzerlandsales@schaffner.com

China
Beijing Jingzhe Electronics Co.,Ltd.
Room 307, Building A, Jiahua Building, No.9
Shangdi 3rd Street, Haidian District
Beijing Yiting Ying
China
+86 13810880767
yingyiting@bjjingzhe.com

Singapore
Schaffner EMC Pte Ltd.
Blk 3015A Ubi Road 1 #05-09 Kampong Ubi
Industrial Estate
408705
Singapore
+65 63773283
singaporesales@schaffner.com

To find your local partner within Schaffner‘s global network schaffner.com

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