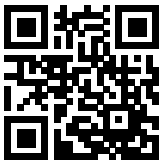


Ecosine Flex, 400-480 VAC 50 Hz 10% THDi Passive Harmonic Filters



- 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



Approvals & Compliances



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.

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.

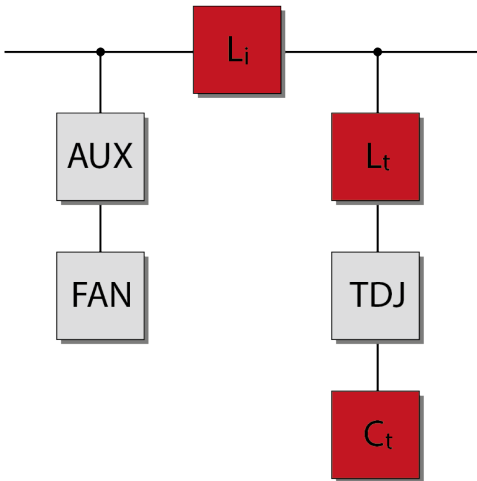
*** Iderated = Inominal * √((70°C-Tamb)/25°C)

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

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	Rated load power @ 200 VAC/50 Hz	Motor drive input current	Rated filter input current	Weight	Typical power losses	Input /output terminal	TDJ terminal	Frame size
	[kW]	[kW]	[Arms]*	[A]	[kg]	[W]**	Type	Type	
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.

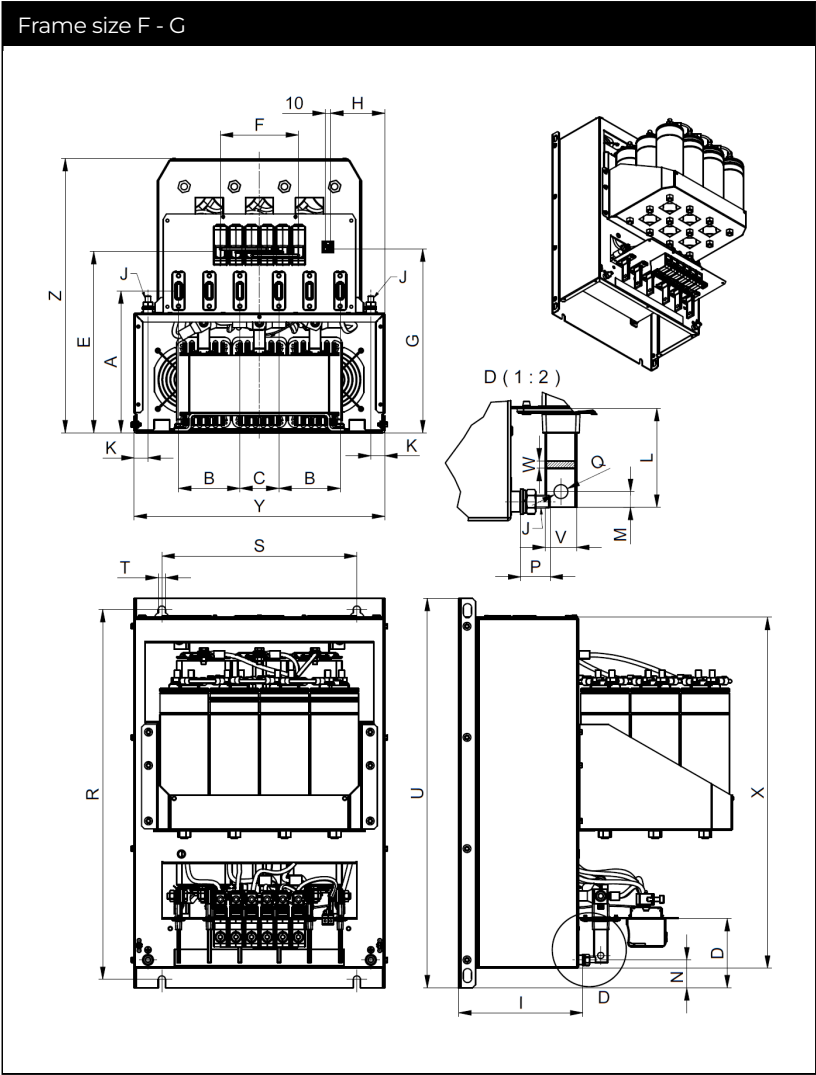
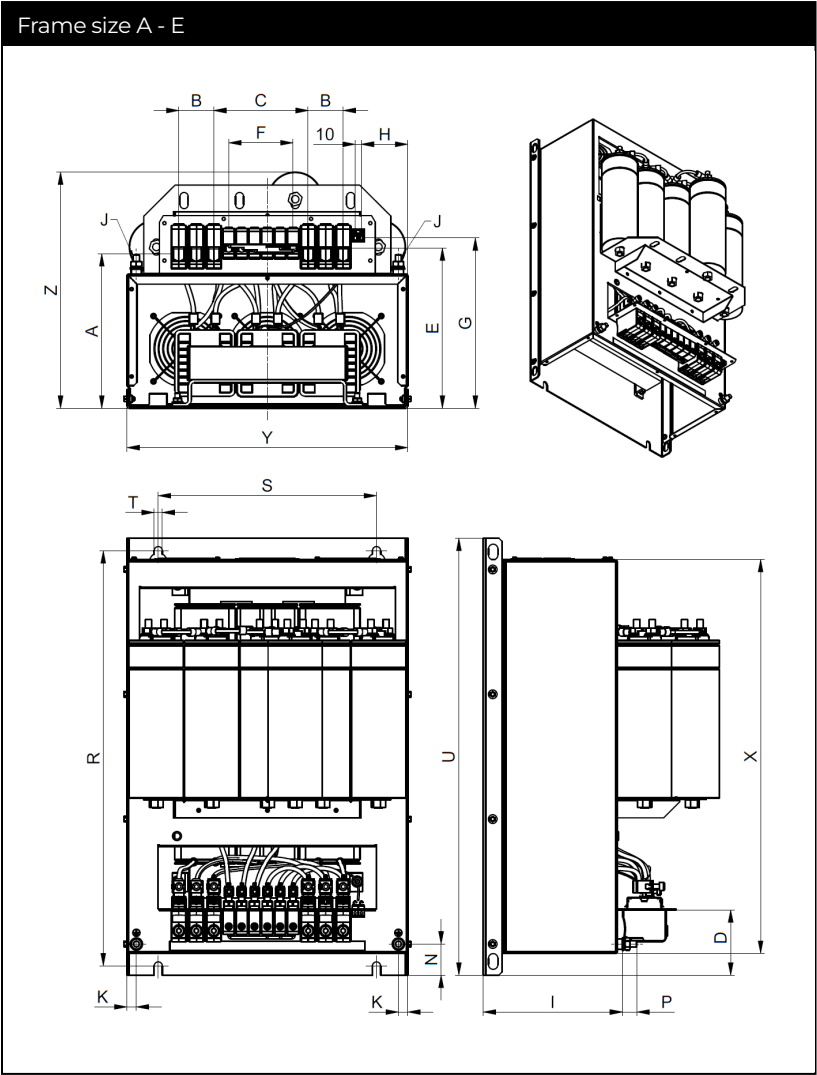
Filter Terminals

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



Dimensions

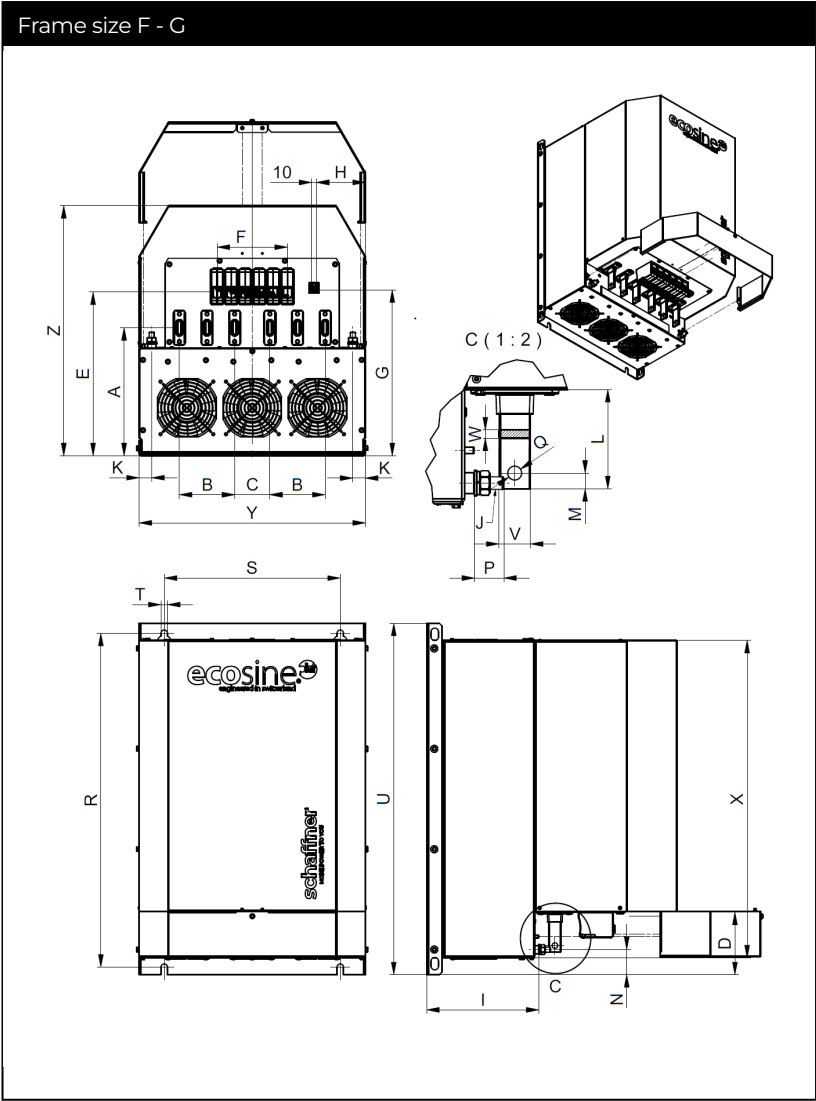
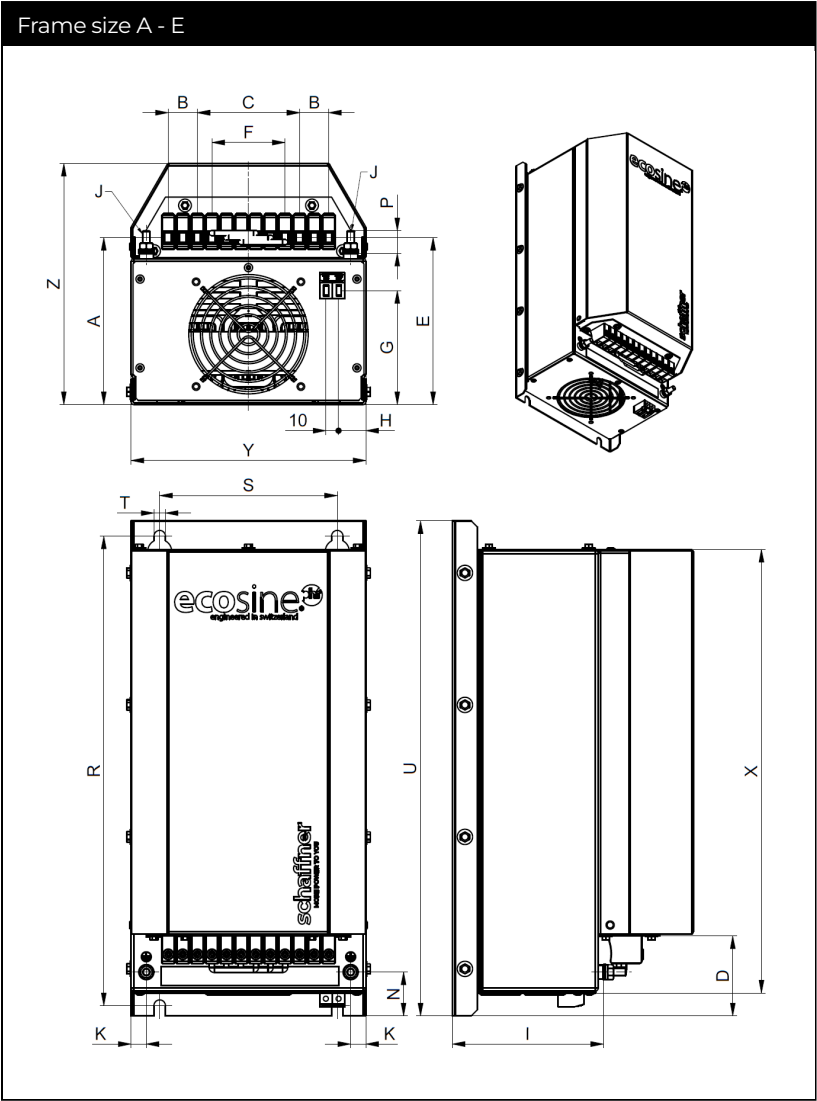
Frame size	A	B	C	D	E	F	G	H	I	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
A	132	23	81	63	132	58	90	22	119	12			35	18		370	140	9	390			349	185	170
B	161	24	82	68	161	58	165	49	146	15			39	21		435	200	11	455			402	250	220
C	176	38	89	78	179	58	188	43	154	15			40	21		500	225	11	520			467	280	238
D	178	42	98	93	165	64	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



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](https://www.schaffner.com)

© 2024 Schaffner Group

The content of this document has been carefully checked and understood. However, neither Schaffner nor its subsidiaries assume any liability whatsoever for any errors or inaccuracies of this document and the consequences thereof. Published specifications are subject to change without notice. Product suitability for any area of application must ultimately be determined by the customer. In all cases, products must never be operated outside their published specifications. Schaffner does not guarantee the availability of all published products. This disclaimer shall be governed by substantive Swiss law and resulting disputes shall be settled by the courts at the place of business of Schaffner Holding AG. Latest publications and a complete disclaimer can be downloaded from the Schaffner website. All trademarks recognized.