

Universal sine wave output filter for motor drives

SCHAFFNER

energy efficiency and reliability



- Smoothing of PWM drive output voltage
- Efficient motor protection
- Increase of motor service life
- Reduction of audible motor noise
- Reduction of parasitic losses
- Improvement of system reliability

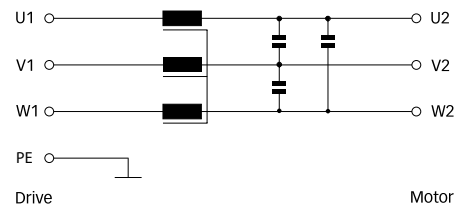
Approvals



Technical specifications

Nominal operating voltage:	3x 400/230VAC ±10%
Motor frequency:	0 to 70Hz
Switching frequency:	4 to 16kHz
Rated currents:	2.5 to 610A @ 40°C
Motor cable length:	400m max.
Impedance (uk):	10% @ nominal voltage, 50Hz & rated current
Residual ripple voltage:	<5%
High potential test voltage:	P → E 3000VAC for 3 sec P → P 2000VAC for 3 sec
Protection category:	IP00 (filters up to 150A according to VBG 4)
Overload capability:	2x rated current at switch on for 30 seconds, 1.5x rated current for 1 minute, once per hour
Temperature range (operation and storage):	-25°C to +85°C (25/085/21)
Insulation class:	T40/F (155°C)
Flammability corresponding to:	UL 94V-2 or better
Design corresponding to:	EN 61558-2-20 (VDE 0570-2-20)

Typical electrical schematic



Features and benefits

- Conversion of the PWM output signal (symmetrical voltage components) of motor drives into a smooth sine wave with low residual ripple.
- Elimination of premature motor damage caused by high dv/dt, overvoltages, motor overheating and eddy current losses.
- Significantly increased service life of electric motors.
- Reduction of the pulse load of motor drive IGBTs and the parasitic losses on long shielded motor cables.
- Cost-effective and space-saving open frame filter design.
- Vacuum impregnation ensures less humming noise and high durability.

Typical applications

- Motor drive applications with long motor cables
- Pumps
- Conveyors
- HVAC applications
- Elevators
- General automation tasks
- Applications with multiple motors in parallel

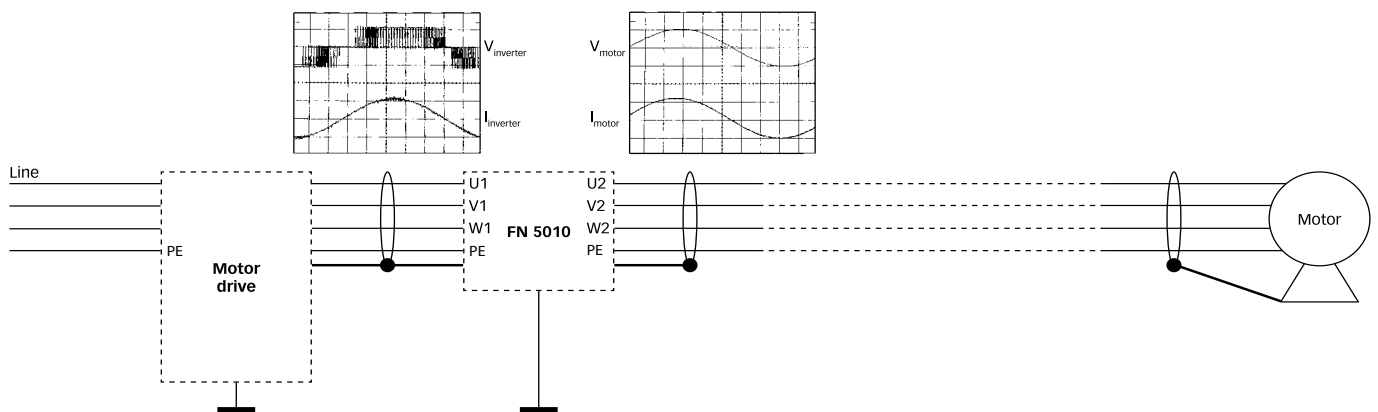
Filter selection table

Filter	Rated current @ 40°C	Typical motor power rating*	Nominal inductance	Nominal capacitance	Typical power loss**	Input/Output connections	Total	Cu.	Weight Al.
	[A]	[kW]	[mH]	[μF]	[W]				
FN 5010-2.5-99	2.5	1.1	22.4	1.5 Δ	50	-99	2.6	0.68	
FN 5010-4.5-99	4.5	2.2	11	1.5 Δ	66	-99	3	1.1	
FN 5010-8-99	8	4	7.2	1.5 Δ	73	-99	6.6	2.2	
FN 5010-10-99	10	5.5	4.2	1.5 Δ	91	-99	6.6	2.6	
FN 5010-13-99	13	7.5	4.2	1.5 Δ	124	-99	7.3	3.2	
FN 5010-18-99	18	11	3.5	1.5 Δ	144	-99	11.5	3.6	
FN 5010-24-99	24	15	2.4	1.5 Δ	191	-99	14	5	
FN 5010-32-99	32	18.5	2	2 Δ	273	-99	16	6.8	
FN 5010-42-99	42	22	1.58	7 Y	252	-99	22	7.4	
FN 5010-48-99	48	30	1.5	7 Y	340	-99	28	8.8	
FN 5010-60-99	60	30	1.1	4 Δ	290	-99	35	10.9	
FN 5010-75-99	75	37	0.9	4 Δ	340	-99	42	11.5	
FN 5010-90-99	90	45	0.8	5 Δ	360	-99	46	12.8	
FN 5010-110-99	110	55	0.7	5 Δ	400	-99	58	13	
FN 5010-150-99	150	75	0.5	7 Δ	716	-99	75	14.8	
FN 5010-180-99	180	90	0.4	10 Δ	820	-99	88	1.4	10.9
FN 5010-210-99	210	110	0.4	10 Δ	1065	-99	115	2.1	11.2
FN 5010-270-99	270	132	0.3	12 Δ	1230	-99	150	2.1	14
FN 5010-325-99	325	160	0.3	12 Δ	1820	-99	194	5.2	21
FN 5010-410-99	410	200	0.2	18 Δ	1830	-99	206	5.2	23.8
FN 5010-510-99	510	315	0.17	20 Δ	2255	-99	290	6.5	32
FN 5010-610-99	610	355	0.14	25 Δ	2520	-99	330	7.7	37.5

* General purpose four-pole (1500r/min) AC induction motor rated 400V/50Hz.

** Exact value depends upon the motor cable type and length, switching frequency, motor frequency and further stray parameters within the system.

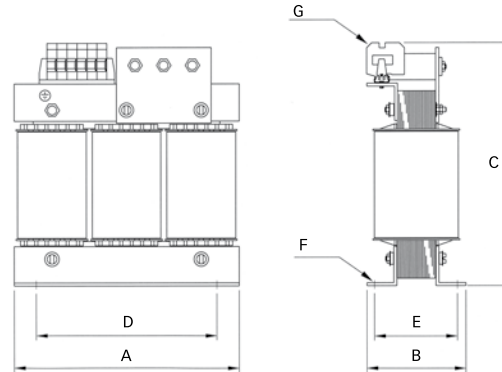
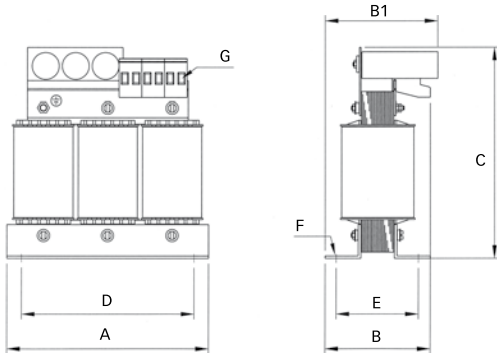
Typical block schematic



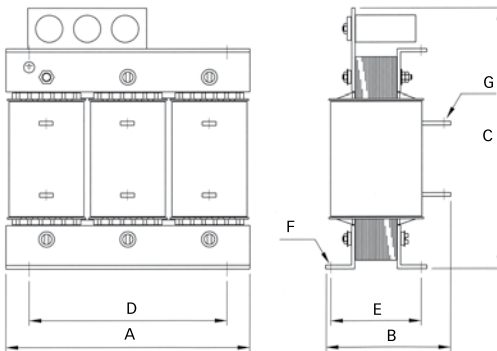
Mechanical data

2.5 to 42A types

48 to 150A types



180 to 610A types



Dimensions

	A	B	B1	C	D	E	F	G
2.5A	125	65	110	180	100	45	5 x 8	2.5mm ²
4.5A	125	75	110	180	100	55	5 x 8	2.5mm ²
8 and 10A	155	95	118	205	130	70	8 x 12	4mm ²
13A	190	100	125	230	170	58	8 x 12	4mm ²
18A	190	120	125	230	170	78	8 x 12	10mm ²
24A	210	125	135	260	175	85	8 x 12	10mm ²
32A	210	135	135	260	175	95	8 x 12	10mm ²
42A	230	170	150	285	180	122	8 x 12	10mm ²
48A	240	210	<B	290	190	125	8 x 12	16mm ²
60A	240	220	<B	290	190	135	8 x 12	16mm ²
75A	300	210	<B	345	240	134	11 x 15	35mm ²
90A	300	215	<B	345	240	139	11 x 15	35mm ²
110A	300	237	<B	345	240	161	11 x 15	50mm ²
150A	420	217	<B	470	370	142	11 x 15	50mm ²
180A	420	235	<B	470	370	157	11 x 15	Ø11
210A	420	260	<B	470	370	182	11 x 15	Ø11
270A	420	295	<B	470	370	217	11 x 15	Ø11
325A	480	310	<B	580	430	238	13 x 18	Ø11
410A	480	320	<B	550	430	238	13 x 18	Ø11
510A	500	350	<B	580	430	255	13 x 18	Ø11
610A	500	370	<B	670	430	268	13 x 18	Ø18

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

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