

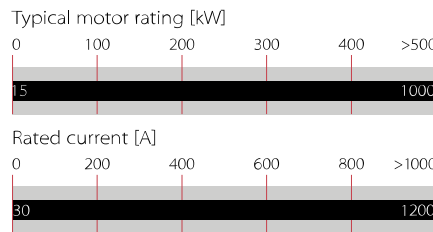
# Output Filter for Motor Drives



- Reduction of drive output voltage dv/dt
- Reduction of voltage stress at motor windings
- Protect AC motors from destructive effect of peak voltages
- Increase of motor service life
- Improvement of system reliability



### Performance indicators



### Approvals



Under preparation: UL recognized label up to 320 A

### Features and benefits

- Efficient reduction of high output voltage dv/dt from IGBT motor drives (as per IEC 60034-17/25)
- Restriction of overvoltages caused by line reflections on motor cables (as per IEC 60034-17/25)
- Protection of motor winding insulation from premature aging and destruction
- Increase service life of electric motors
- Patented solution without capacitors and resistors for ease of installation and increased reliability
- Less interference propagation towards neighbouring equipment or lines
- Output filter with low impedance, ideal for processes requiring exceptional precision and reproducibility of movements

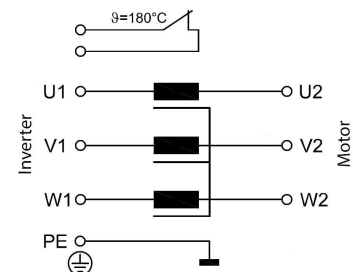
### Technical specifications

<b>Max. operating voltage</b>	3 ph 760 VAC
<b>Rated currents</b>	30 to 1200 A @ 40°C
<b>Motor frequency</b>	0..60 Hz (with derating up to 120 Hz)
<b>Switching frequency</b>	up to 16 kHz, depending on motor cable length and motor frequency -> refer graph on page 2
<b>Typical dv/dt reduction</b>	Factor 8 to 12
<b>Max. peak voltage</b>	≤1850 V (according EN 60034-25B)
<b>Voltage drop</b>	<3 V @ 50 Hz
<b>Rated temperature</b>	+40°C without derating up to 100°C
<b>Operation temperature</b>	-25°C to +100°C (25/100/21)
<b>Transportation and storage temperature</b>	-40°C to +100°C (25/100/21)
<b>Overload capability</b>	1.5 x rated current for 1 minute, once per hour
<b>Protection category</b>	IP 00
<b>Flammability corresponding to</b>	UL 94V-2
<b>Design corresponding to</b>	UL 61800-5-1, CSA 22.2 No.14, EN 61558-2-20

### Typical applications

- Motor drive applications with short to medium motor cable length
- Machinery comprising servo or torque motors
- Submersible- and irrigation pumps
- HVAC equipment, incl. pumps, fans and compressors
- Elevators, hoisting and cranes
- Motor drives for process lines
- Applications where sine wave filters are not suited (e.g. high dynamic operation)

### Typical electrical schematic



### Filter selection table

Filter	Rated current @ 40°C/50 Hz [A]	Nominal inductance [mH]	**Typical power loss [W]	Input/ Output connections	Weight [kg]
FN 5060HV-30-99	30	0.17	641	-99	12
FN 5060HV-45-99	45	0.17	653	-99	12.5
FN 5060HV-75-99	75	0.1	478	-99	23
FN 5060HV-115-99	115	0.069	394	-99	27
FN 5060HV-165-99	165	0.051	301	-99	36
FN 5060HV-220-99	220	0.035	371	-99	44
FN 5060HV-320-99	320	0.023	383	-99	59
FN 5060HV-450-99	450	0.019	376	-99	68
FN 5060HV-660-99	660	0.012	455	-99	100
FN 5060HV-900-99	900	0.009	550	-99	111
FN 5060HV-1200-99	1200	0.007	670	-99	139

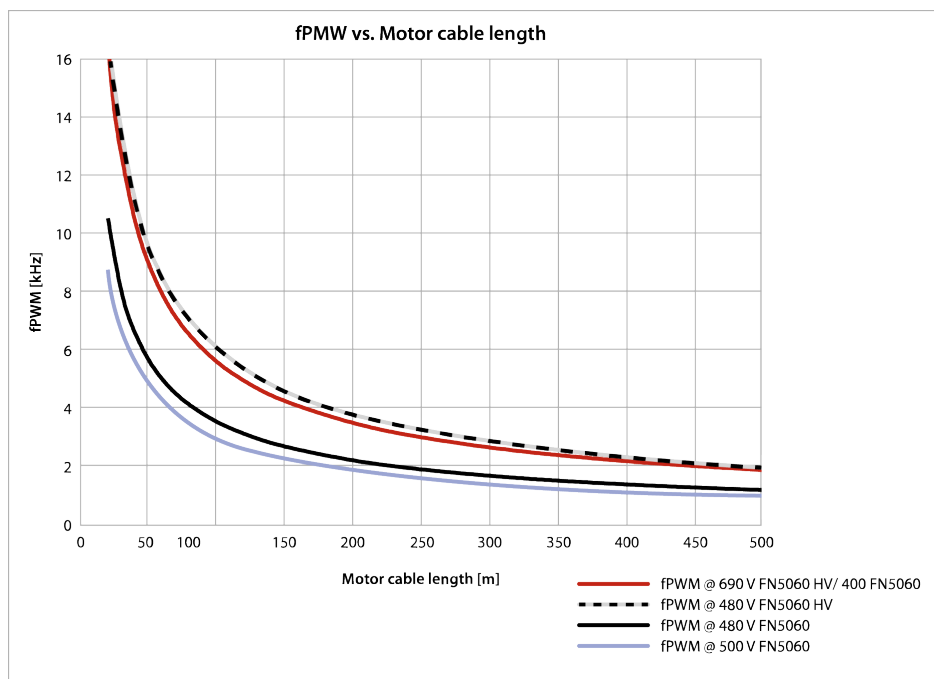
\* General purpose four-pole (1500 r/min) AC induction motor rated 690 V/50 Hz.

\*\* Power loss at 2 kHz switching frequency/80 m motor cable length. Exact value depends upon the motor cable type and length, switching frequency and further stray parameters within the system.

### Switching frequency vs. motor cable length

Ensure the motor drive switching frequency is set to the required switching frequency (see filter selection table). Check the drives manual whether special settings are necessary. For any questions please contact the drives manufacturer.

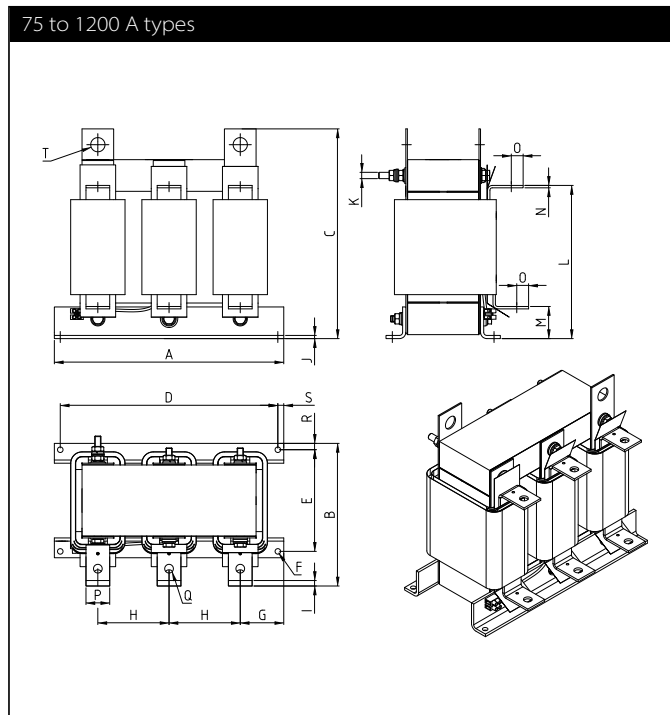
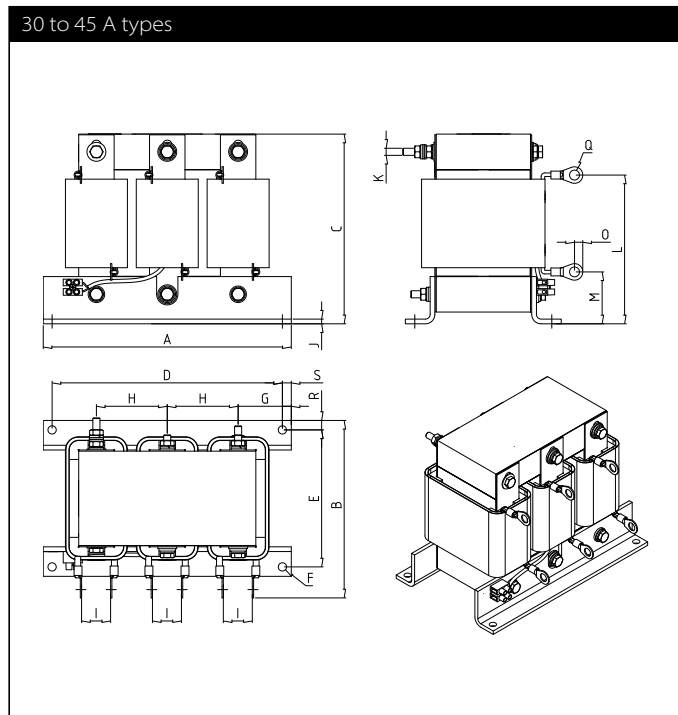
Refer also to the "fPWM/cable length" diagram below:



### Temperature monitoring function

The temperature monitoring device opens a potential-free contact in the case of filter overtemperature (>180°C). The maximum switching capability is 5 A/240 V. The switch can be used, for example, in the input of a CNC controller or as the trip of a circuit breaker in order to interrupt the mains power supply.

## Mechanical data



## Dimensions

	30 A	45 A	75 A	115 A	165 A	220 A	320 A	450 A	660 A	900 A	1200 A
<b>A</b>	210	210	290	290	290	290	390	390	390	390	390
<b>B</b>	138	143	168	180	191	211	187	209	220	229	260
<b>C</b>	161	161	265	265	314	314	444	496	546	595	642
<b>D +/-0.7</b>	195	195	275	275	275	275	366	366	366	366	366
<b>E +/-0.7</b>	111	116	113.5	128.5	138.5	158.5	120.5	120.5	130.5	140.5	160.5
<b>160.5F</b>	Ø7(4x)	Ø7(4x)	Ø7(4x)	Ø7(4x)	Ø7(4x)	Ø7(4x)	Ø9(4x)	Ø9(4x)	Ø9(4x)	Ø9(4x)	Ø9(4x)
<b>G</b>	45	45	55	55	55	55	75	75	75	75	75
<b>H</b>	60	60	90	90	90	90	120	120	120	120	120
<b>I</b>	25	25	9	7	8	8	10	10	11	10	17
<b>J</b>	4	4	4	4	4	4	5	5	5	5	5
<b>K</b>	M6	M6	M8	M8	M8	M8	M8	M8	M8	M8	M8
<b>L</b>	126	126	194	194	245	244	331	381	432	481	533
<b>M</b>	44	44	41	41	41	40	75	76	76	75	75
<b>N</b>			3	3	4	4	6	5	6	6	8
<b>O</b>	7	7	15	15	15	15	15	25	25	25	25
<b>P</b>			30	30	30	30	30	50	50	50	50
<b>Q</b>	Ø8(6x)	Ø8(6x)	Ø11(6x)	Ø11(6x)	Ø11(6x)	Ø11(6x)	Ø11(6x)	Ø13.5(6x)	Ø13.5(6x)	Ø13.5(6x)	Ø13.5(6x)
<b>R</b>	8	8	8	8	8	8	12	12	12	12	12
<b>S</b>	7.5	7.5	7.5	7.5	7.5	7.5	12	12	12	12	12
<b>T</b>			Ø18(2x)	Ø18(2x)	Ø18(2x)	Ø18(2x)	Ø20(2x)	Ø20(2x)	Ø20(2x)	Ø20(2x)	Ø20(2x)

All dimensions in mm; 1 inch = 25.4 mm

Tolerances according: ISO 2768-v/EN 22768-v, if not stated otherwise

Please note:

Make sure to consult and respect local, national and international safety codes.

Connect the protective earth terminal(s) first, before attempting to connect phase terminals.

Please consult the documents „Mounting and Installation Guidelines“ being shipped with the product.

For additional information please consult the document „Basis in EMC and Power Quality“, published in the download section of [www.schaffner.com](http://www.schaffner.com).



## Headquarters, global innovation and development

### Switzerland

#### Schaffner Group

Nordstrasse 11  
4542 Luterbach  
T +41 32 681 66 26  
[info@schaffner.com](mailto:info@schaffner.com)  
[www.schaffner.com](http://www.schaffner.com)



## Sales and application centers

### China

#### Schaffner EMC Ltd. Shanghai

T20-3 C, No 565 Chuangye Road,  
Pudong district  
201201 Shanghai  
T +86 21 3813 9500  
[cschina@schaffner.com](mailto:cschina@schaffner.com)  
[www.schaffner.com.cn](http://www.schaffner.com.cn)

### Finland

#### Schaffner Oy

Sauvonrinne 19 H  
08500 Lohja  
T +358 50 468 7284  
[finlandsales@schaffner.com](mailto:finlandsales@schaffner.com)

### France

#### Schaffner EMC S.A.S.

16-20 Rue Louis Rameau  
95875 Bezons  
T +33 1 34 34 30 60  
F +33 1 39 47 02 28  
[francesales@schaffner.com](mailto:francesales@schaffner.com)

### Germany

#### Schaffner Deutschland GmbH

Schoemperlenstrasse 12B  
76185 Karlsruhe  
T +49 721 56910  
F +49 721 569110  
[germanysales@schaffner.com](mailto:germanysales@schaffner.com)

### India

#### Schaffner India Pvt. Ltd

REGUS WORLD TRADE CENTRE  
WTC, 22nd Floor Unit No 2238, Brigade  
Gateway Campus, 26/1, Dr. Rajkumar Road  
Malleswaram (W)  
560055 Bangalore  
T +91 80 67935355  
[indiasales@schaffner.com](mailto:indiasales@schaffner.com)

### Italy

#### Schaffner EMC S.r.l.

Via Ticino, 30  
20900 Monza (MB)  
T +39 039 21 41 070  
[italysales@schaffner.com](mailto:italysales@schaffner.com)

### Japan

#### Schaffner EMC K.K.

1-32-12, Kamiyama, Setagaya-ku  
7F Mitsui-seimei Sangenjaya Bldg.  
154-0011 Tokyo  
T +81 3 5712 3650  
F +81 3 5712 3651  
[japansales@schaffner.com](mailto:japansales@schaffner.com)  
[www.schaffner.jp](http://www.schaffner.jp)

### Singapore

#### Schaffner EMC Pte Ltd.

#05-09, Kg Ubi Ind. Estate  
408705 Singapore  
T +65 6377 3283  
F +65 6377 3281  
[singaporesales@schaffner.com](mailto:singaporesales@schaffner.com)

### Spain

#### Schaffner EMC España

Calle Caléndula 93, Miniparc III, Edificio E  
El Soto de Moraleja, Alcobendas  
28109 Madrid  
T +34 917 912 900  
F +34 917 912 901  
[spainsales@schaffner.com](mailto:spainsales@schaffner.com)

### Sweden

#### Schaffner EMC AB

Tegeluddsvägen 76, 2tr  
115 28 Stockholm  
T +46 8 5050 2425  
[swedensales@schaffner.com](mailto:swedensales@schaffner.com)  
[www.schaffner.com](http://www.schaffner.com)

### Switzerland

#### Schaffner EMV AG

Nordstrasse 11  
4542 Luterbach  
T +41 32 681 66 26  
[switzerlandsales@schaffner.com](mailto:switzerlandsales@schaffner.com)

### Taiwan R.O.C.

#### Schaffner EMV Ltd.

20 Floor-2, No 97, Section 1, XinTai 5th Road  
22175 XiZhi District New Taipei City 22175  
T +886 2 2697 5500  
F +886 2 2697 5533  
[taiwansales@schaffner.com](mailto:taiwansales@schaffner.com)  
[www.schaffner.com.tw](http://www.schaffner.com.tw)

### Thailand

#### Schaffner EMC Co. Ltd.

Northern Region Industrial Estate  
67 Moo 4 Tambon Ban Klang  
Amphur Muangng P.O. Box 14  
51000 Lamphun  
T +66 53 58 11 04  
F +66 53 58 10 19  
[thailandsales@schaffner.com](mailto:thailandsales@schaffner.com)

### United Kingdom

#### Schaffner Ltd.

5 Ashville Way, Molly Millars Lane  
Wokingham  
RG41 2PL Berkshire  
T +44 118 9770070  
F +44 118 9792969  
[uksales@schaffner.com](mailto:uksales@schaffner.com)

### USA

#### Schaffner EMC Inc.

52 Mayfield Avenue  
08837 Edison, New Jersey  
T +1 800 367 5566  
T +1 732 225 9533  
F +1 732 225 4789  
[usasales@schaffner.com](mailto:usasales@schaffner.com)  
[www.schaffnerusa.com](http://www.schaffnerusa.com)

#### Schaffner North America

6722 Thirlane Road  
24019 Roanoke, Virginia  
T +1 276 228 7943  
F +1 276 228 7953

#### Schaffner North America

823 Fairview Road  
24382 Wytheville, Virginia  
T +1 276 228 7943  
F +1 276 228 7258

To find your local partner within Schaffner's global network: [www.schaffner.com](http://www.schaffner.com)

© 2018 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.