

# General Purpose AC/DC EMI Filter



- Rated currents from 1 to 60 A
- High differential-mode attenuation
- Optional medical version (B type)
- Optional safety version (A type)



### Performance indicators

Attenuation performance



Rated current [A]



## Technical specifications

|  |   |
|--|---|
| <b>Rated voltage*</b>                            | 250 VAC, 50/60 Hz; 250 VDC  |
| <b>Operating frequency</b>                       | DC to 400 Hz  |
| <b>Rated currents</b>                            | 1 to 60 A @ 40°C max.   |
| <b>High potential test voltage</b>               | P → N 760 VAC for 2 sec (1 to 20 A types)<br>P → PE 2500 VAC for 2 sec (B types)<br>P → PE 2000 VAC for 2 sec<br>P → N 1100 VDC for 2 sec (30 and 60 A types) |
| <b>Temperature range (operation and storage)</b> | -25°C to +100°C (25/100/21)   |
| <b>Certified to</b>                              | UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939 (applies to AC and DC applications)  |
| <b>Flammability corresponding to</b>             | UL 94 V-2 or better   |
| <b>Design corresponding to</b>                   | UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939  |
| <b>MTBF @ 40°C/230 V (Mil-HB-217F)</b>           | 1,250,000 hours<br>1,750,000 hours (B types)  |

\*maximum RMS operating voltage at rated frequency or the maximum DC operating voltage

### Approvals



### Features and benefits

- FN 2020 filters are designed for easy and fast chassis mounting
- FN 2020 filters are also available as B versions without Y-capacitors for medical applications as well as A version with low capacitance for safety critical applications with necessity for low leakage currents
- All filters provide a general purpose conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- FN 2020 filters can be used to cover a broad range of usage and they offer a good size/amperage ratio
- FN 2020 filters are also available as two-stage filters (FN 2060, FN 2070 series) for more noisy environment
- Various terminal options allow you to select the desired connection style

### Typical applications

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Medical equipment
- Office automation equipment
- Datacom equipment

### Typical electrical schematic



### Filter selection table

| Filter*        | Rated current | Leakage current**                    | Inductance | Capacitance |      | Resistance | Input/Output connections  |   |   | Weight |
|----------------|---------------|--------------------------------------|------------|-------------|------|------------|---|---|---|--------|
|                | @ 40°C (25°C) | @ 250 VAC/50 Hz<br>(@ 120 VAC/60 Hz) | L          | Cx          | Cy   | R          |  |  |  | [g]    |
|                | [A]           | [mA]                                 | [mH]       | [µF]        | [nF] | [kΩ]       |   |   |   |        |
| FN 2020-1-..   | 1 (1.15)      | 0.66 (0.38)                          | 12         | 0.15        | 4.7  | 1000       | -06   | -07   |   | 80     |
| FN 2020-3-..   | 3 (3.45)      | 0.66 (0.38)                          | 2.5        | 0.15        | 4.7  | 1000       | -06   | -07   |   | 80     |
| FN 2020-6-..   | 6 (6.9)       | 0.66 (0.38)                          | 1          | 0.15        | 4.7  | 1000       | -06   | -07   |   | 80     |
| FN 2020-10-..  | 10 (11.5)     | 0.66 (0.38)                          | 0.8        | 0.15        | 4.7  | 1000       | -06   | -07   |   | 85     |
| FN 2020-12-..  | 12 (13.8)     | 0.66 (0.38)                          | 0.7        | 0.15        | 4.7  | 1000       | -06   | -07   |   | 85     |
| FN 2020-16-..  | 16 (18.4)     | 0.66 (0.38)                          | 0.65       | 0.15        | 4.7  | 1000       | -06   | -07   |   | 140    |
| FN 2020-20-..  | 20 (23)       | 0.66 (0.38)                          | 0.6        | 0.15        | 4.7  | 1000       | -06   |   | -08   | 210    |
| FN 2020-30-08  | 30 (34.5)     | 0.79 (0.45)                          | 0.67       | 0.47        | 10   | 470        |   |   | -08   | 470    |
| FN 2020-60-24  | 60 (69)       | 0.79 (0.45)                          | 1          | 1.5         | 10   | 220        |   |   | -24   | 1100   |
| FN 2020A-1-..  | 1 (1.15)      | 0.07 (0.04)                          | 12         | 0.15        | 0.47 | 1000       | -06   | -07   |   | 80     |
| FN 2020A-3-..  | 3 (3.45)      | 0.07 (0.04)                          | 2.5        | 0.15        | 0.47 | 1000       | -06   | -07   |   | 80     |
| FN 2020A-6-..  | 6 (6.9)       | 0.07 (0.04)                          | 1          | 0.15        | 0.47 | 1000       | -06   | -07   |   | 80     |
| FN 2020A-10-.. | 10 (11.5)     | 0.07 (0.04)                          | 0.8        | 0.15        | 0.47 | 1000       | -06   | -07   |   | 85     |
| FN 2020A-12-.. | 12 (13.8)     | 0.07 (0.04)                          | 0.7        | 0.15        | 0.47 | 1000       | -06   | -07   |   | 85     |
| FN 2020A-16-.. | 16 (18.4)     | 0.07 (0.04)                          | 0.65       | 0.15        | 0.47 | 1000       | -06   | -07   |   | 140    |
| FN 2020A-20-.. | 20 (23)       | 0.07 (0.04)                          | 0.6        | 0.15        | 0.47 | 1000       | -06   |   | -08   | 210    |
| FN 2020A-30-08 | 30 (34.5)     | 0.07 (0.04)                          | 0.67       | 0.47        | 0.47 | 470        |   |   | -08   | 470    |
| FN 2020A-60-24 | 60 (69)       | 0.07 (0.04)                          | 1          | 1.5         | 0.47 | 220        |   |   | -24   | 1100   |
| FN 2020B-1-..  | 1 (1.15)      | 0.00                                 | 12         | 0.15        |      | 1000       | -06   | -07   |   | 80     |
| FN 2020B-3-..  | 3 (3.45)      | 0.00                                 | 2.5        | 0.15        |      | 1000       | -06   | -07   |   | 80     |
| FN 2020B-6-..  | 6 (6.9)       | 0.00                                 | 1          | 0.15        |      | 1000       | -06   | -07   |   | 80     |
| FN 2020B-10-.. | 10 (11.5)     | 0.00                                 | 0.8        | 0.15        |      | 1000       | -06   | -07   |   | 85     |
| FN 2020B-12-.. | 12 (13.8)     | 0.00                                 | 0.7        | 0.15        |      | 1000       | -06   | -07   |   | 85     |
| FN 2020B-16-.. | 16 (18.4)     | 0.00                                 | 0.65       | 0.15        |      | 1000       | -06   | -07   |   | 140    |
| FN 2020B-20-.. | 20 (23)       | 0.00                                 | 0.6        | 0.15        |      | 1000       | -06   |   | -08   | 210    |
| FN 2020B-30-08 | 30 (34.5)     | 0.00                                 | 0.67       | 0.47        |      | 470        |   |   | -08   | 470    |
| FN 2020B-60-24 | 60 (69)       | 0.00                                 | 1          | 1.5         |      | 220        |   |   | -24   | 1100   |

\* To compile a complete part number, please replace the .. with the required I/O connection style (e.g. FN 2020-30-08, FN 2020B-10-06).

\*\* Maximum leakage under usual AC operating conditions (acc. IEC 60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level. Leakage current for DC application is 0 mA;

### Typical filter attenuation

Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym; C=0.1 Ω/100 Ω sym; D=100 Ω/0.1 Ω sym

1 and 3 A types



6 to 12 A types



16 and 20 A types



30 and 60 A types



### Mechanical data



## Dimensions

|                                | 1 A       | 3 A       | 6 A       | 10 A      | 12 A      | 16 A      | 20 A      | 30 A      | 60 A     | Tolerances |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|------------|
| <b>A</b>                       | 64        | 64        | 64        | 64        | 64        | 71        | 85        | 113.5 ±1  | 105 ±1   | ±0.5       |
| <b>B</b>                       | 35        | 35        | 35        | 35        | 35        | 46.6      | 54        | 57.5 ±1   | 145.9 ±1 | ±0.5       |
| <b>C</b>                       | 29.3      | 29.3      | 29.3      | 29.3      | 29.3      | 29.3      | 30.3      | 45.4 ±1   | 57.6 ±1  | ±0.5       |
| <b>D</b>                       | 43.5      | 43.5      | 43.5      | 43.5      | 43.5      | 50.5      | 64.8      | 94 ±1     | 84.5 ±1  | ±0.5       |
| <b>E</b>                       | 32.5      | 32.5      | 32.5      | 32.5      | 32.5      | 44.5      | 49.8      | 56        | 99.5     | ±0.5       |
| <b>F</b>                       | 54        | 54        | 54        | 54        | 54        | 61        | 75        | 103       | 95       | ±0.3       |
| <b>G</b>                       | 21        | 21        | 21        | 21        | 21        | 21        | 27        | 25        | 40       | ±0.2       |
| <b>H</b>                       | 9.3       | 9.3       | 9.3       | 9.3       | 9.3       | 10.8      | 12.3      | 12.4      | 19.6     | ±0.5       |
| <b>I</b>                       | 15.3      | 15.3      | 15.3      | 15.3      | 15.3      | 19.3      | 20.8      | 32.4      | 10.1     | ±0.5       |
| <b>J</b>                       | 21.8      | 21.8      | 21.8      | 21.8      | 21.8      | 20.1      | 19.9      | 15.5      | 42.25    | ±0.5       |
| <b>K</b>                       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 4.4       | 4.4      |            |
| <b>L</b>                       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6         | 6        |            |
| <b>M</b>                       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.9       | 1.2      |            |
| <b>Connection style -06</b>    |           |           |           |           |           |           |           |           |          |            |
| <b>N</b>                       | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 | 6.3 x 0.8 |           |          |            |
| <b>Connection style -07</b>    |           |           |           |           |           |           |           |           |          |            |
| <b>O</b>                       | 8.3       | 8.3       | 8.3       | 8.3       | 8.3       | 8.3       |           |           |          | ±0.5       |
| <b>P</b>                       | 21.8      | 21.8      | 21.8      | 21.8      | 21.8      | 14        |           |           |          | ±0.5       |
| <b>AWG type wire</b>           | AWG 20    | AWG 20    | AWG 18    | AWG 18    | AWG 16    | AWG 16    |           |           |          |            |
| <b>Wire length</b>             | 140       | 140       | 140       | 140       | 140       | 140       |           |           |          | +5         |
| <b>Connection style -08</b>    |           |           |           |           |           |           |           |           |          |            |
| <b>N</b>                       |           |           |           |           |           |           | M4        | M4        |          |            |
| <b>Recommended torque (Nm)</b> |           |           |           |           |           |           | 1.2 - 1.3 | 1.2 - 1.3 |          |            |
| <b>Connection style -24</b>    |           |           |           |           |           |           |           |           |          |            |
| <b>N</b>                       |           |           |           |           |           |           |           |           | M6       |            |
| <b>Q</b>                       |           |           |           |           |           |           |           |           | 51       | ±0.2       |
| <b>Recommended torque (Nm)</b> |           |           |           |           |           |           |           |           | 3.5 - 4  |            |

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

Please visit [www.schaffner.com](http://www.schaffner.com) to find more details on filter connections.



## 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.

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».



## JONHON

«**JONHON**» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«**FORSTAR**» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А