

# 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



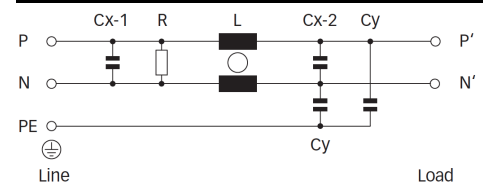
## Features and benefits

- 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**<br>@ 250 VAC/50 Hz<br>(@ 120 VAC/60 Hz) | Inductance<br>L | Capacitance |      | Resistance<br>R | Input/Output connections  |   |   | Weight<br>[g] |
|----------------|---------------|---|-----------------|-------------|------|-----------------|---|---|---|---------------|
|                | @ 40°C (25°C) |   |                 | Cx          | Cy   |                 |   |   |   |               |
|                | [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            |
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| 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            |
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| 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          |

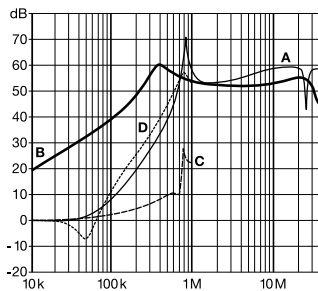
\* To compile a complete part number, please replace the .. with the required I/O connection style (e.g. FN 2020-30-08, FN 2020B-10-06).

\*\* 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;

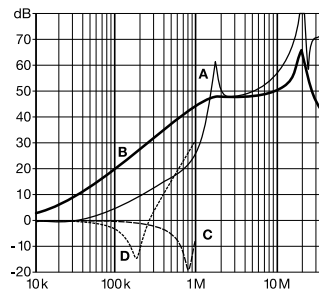
### Typical filter attenuation

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

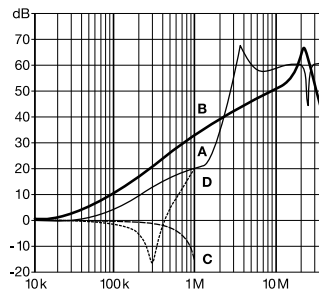
1 and 3 A types



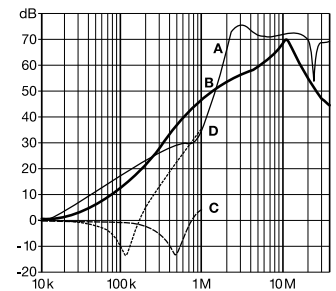
6 to 12 A types



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.



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