

## General Purpose EMI Filter



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

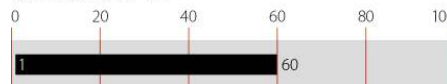


### Performance indicators

Attenuation performance



Rated current [A]



### Technical specifications

|                                                  |                                                                                                                                                               |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Operating voltage</b>                         | 110/250 VAC, 50/60 Hz                                                                                                                                         |
| <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 → PE 2000 VAC for 2 sec<br>P → N 1100 VDC for 2 sec (30 and 60 A types)<br>P → N 760 VAC for 2 sec (1 to 20 A types)<br>P → PE 2500 VAC for 2 sec (B types) |
| <b>Temperature range (operation and storage)</b> | -25 °C to +100 °C (25/100/21)                                                                                                                                 |
| <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/230V (Mil-HB-217F)</b>            | 1,250,000 hours<br>1,750,000 hours (B types)                                                                                                                  |

### Approvals



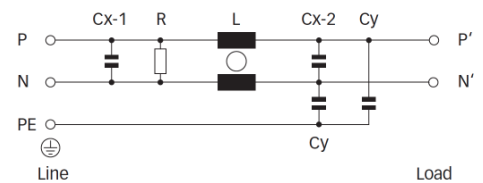
### Features and benefits

- 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/ampere 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
- Datcom equipment

### Typical electrical schematic



## Filter selection table

| Filter*        | Rated current<br>@ 40 °C (25 °C) | Leakage current**<br>@ 230 VAC/50 Hz | Inductance<br>L | Capacitance            |                        | Resistance<br>R | Input/Output<br>connections                                                         |                                                                                     |                                                                                     | Weight |
|----------------|----------------------------------|--------------------------------------|-----------------|------------------------|------------------------|-----------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|
|                | [A]                              | [mA]                                 | [mH]            | C <sub>x</sub><br>[μF] | C <sub>y</sub><br>[nF] | [kΩ]            |  |  |  | [g]    |
| FN 2020-1-..   | 1 (1.15)                         | 0.74                                 | 12              | 0.15                   | 4.7                    | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 80     |
| FN 2020-3-..   | 3 (3.45)                         | 0.74                                 | 2.5             | 0.15                   | 4.7                    | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 80     |
| FN 2020-6-..   | 6 (6.9)                          | 0.74                                 | 1               | 0.15                   | 4.7                    | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 80     |
| FN 2020-10-..  | 10 (11.5)                        | 0.74                                 | 0.8             | 0.15                   | 4.7                    | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 85     |
| FN 2020-12-..  | 12 (13.8)                        | 0.74                                 | 0.7             | 0.15                   | 4.7                    | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 85     |
| FN 2020-16-..  | 16 (18.4)                        | 0.74                                 | 0.65            | 0.15                   | 4.7                    | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 140    |
| FN 2020-20-..  | 20 (23)                          | 0.74                                 | 0.6             | 0.15                   | 4.7                    | 1000            | -06                                                                                 |                                                                                     | -08                                                                                 | 210    |
| FN 2020-30-08  | 30 (34.5)                        | 0.87                                 | 0.67            | 0.47                   | 10                     | 470             |                                                                                     |                                                                                     | -08                                                                                 | 470    |
| FN 2020-60-24  | 60 (69)                          | 0.87                                 | 1               | 1.5                    | 10                     | 220             |                                                                                     |                                                                                     | -24                                                                                 | 1100   |
|                |                                  |                                      |                 |                        |                        |                 |                                                                                     |                                                                                     |                                                                                     |        |
| FN 2020A-1-..  | 1 (1.15)                         | 0.074                                | 12              | 0.15                   | 0.47                   | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 80     |
| FN 2020A-3-..  | 3 (3.45)                         | 0.074                                | 2.5             | 0.15                   | 0.47                   | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 80     |
| FN 2020A-6-..  | 6 (6.9)                          | 0.074                                | 1               | 0.15                   | 0.47                   | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 80     |
| FN 2020A-10-.. | 10 (11.5)                        | 0.074                                | 0.8             | 0.15                   | 0.47                   | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 85     |
| FN 2020A-12-.. | 12 (13.8)                        | 0.074                                | 0.7             | 0.15                   | 0.47                   | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 85     |
| FN 2020A-16-.. | 16 (18.4)                        | 0.074                                | 0.65            | 0.15                   | 0.47                   | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 140    |
| FN 2020A-20-.. | 20 (23)                          | 0.074                                | 0.6             | 0.15                   | 0.47                   | 1000            | -06                                                                                 |                                                                                     | -08                                                                                 | 210    |
| FN 2020A-30-08 | 30 (34.5)                        | 0.074                                | 0.67            | 0.47                   | 0.47                   | 470             |                                                                                     |                                                                                     | -08                                                                                 | 470    |
| FN 2020A-60-24 | 60 (69)                          | 0.074                                | 1               | 1.5                    | 0.47                   | 220             |                                                                                     |                                                                                     | -24                                                                                 | 1100   |
|                |                                  |                                      |                 |                        |                        |                 |                                                                                     |                                                                                     |                                                                                     |        |
| FN 2020B-1-..  | 1 (1.15)                         | 0.002                                | 12              | 0.15                   |                        | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 80     |
| FN 2020B-3-..  | 3 (3.45)                         | 0.002                                | 2.5             | 0.15                   |                        | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 80     |
| FN 2020B-6-..  | 6 (6.9)                          | 0.002                                | 1               | 0.15                   |                        | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 80     |
| FN 2020B-10-.. | 10 (11.5)                        | 0.002                                | 0.8             | 0.15                   |                        | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 85     |
| FN 2020B-12-.. | 12 (13.8)                        | 0.002                                | 0.7             | 0.15                   |                        | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 85     |
| FN 2020B-16-.. | 16 (18.4)                        | 0.002                                | 0.65            | 0.15                   |                        | 1000            | -06                                                                                 | -07                                                                                 |                                                                                     | 140    |
| FN 2020B-20-.. | 20 (23)                          | 0.002                                | 0.6             | 0.15                   |                        | 1000            | -06                                                                                 |                                                                                     | -08                                                                                 | 210    |
| FN 2020B-30-08 | 30 (34.5)                        | 0.002                                | 0.67            | 0.47                   |                        | 470             |                                                                                     |                                                                                     | -08                                                                                 | 470    |
| FN 2020B-60-24 | 60 (69)                          | 0.002                                | 1               | 1.5                    |                        | 220             |                                                                                     |                                                                                     | -24                                                                                 | 1100   |

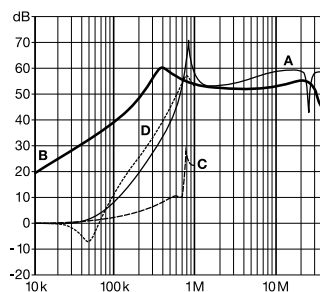
\* To compile a complete part number, please replace the .. with the required I/O connection style (e.g. FN 2020-30-08, FN 2020B-10-06).

\*\* Maximum leakage under normal operating conditions. Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

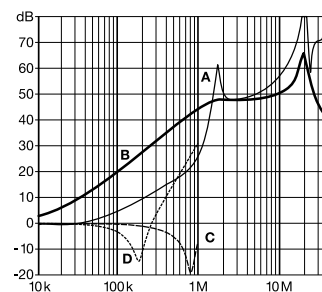
## Typical filter attenuation

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

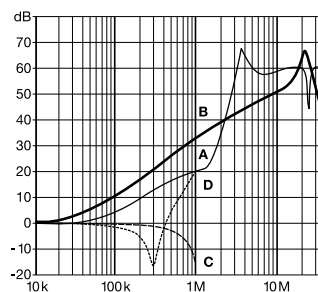
1 and 3 A types



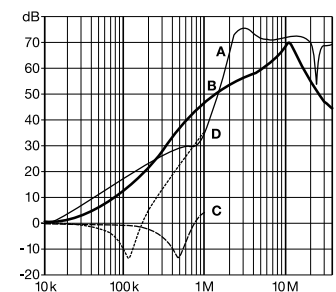
6 to 12 A types



16 and 20 A types

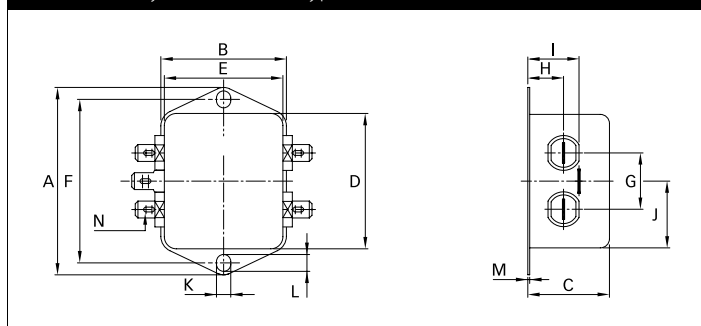


30 and 60 A types

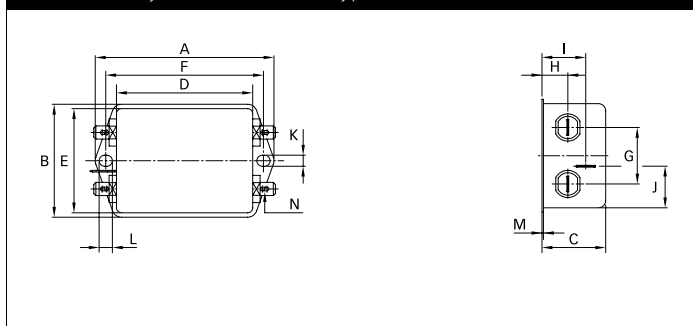


## Mechanical data

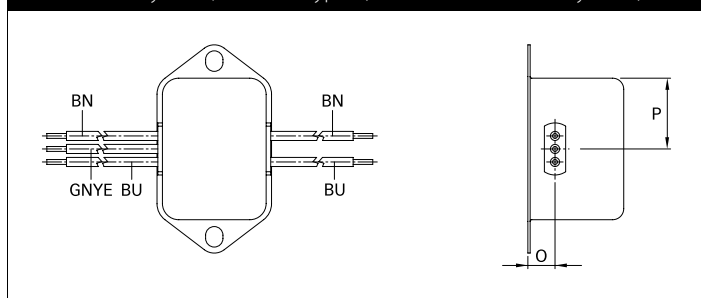
Connection style -06, 1 to 12 A types



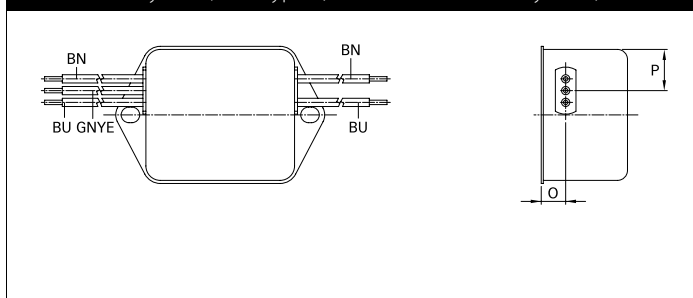
Connection style -06, 16 and 20 A types



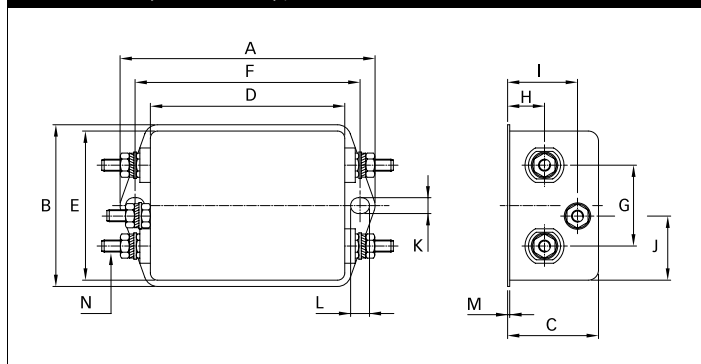
Connection style -07, 1 to 12 A types (same dimensions as style -06)



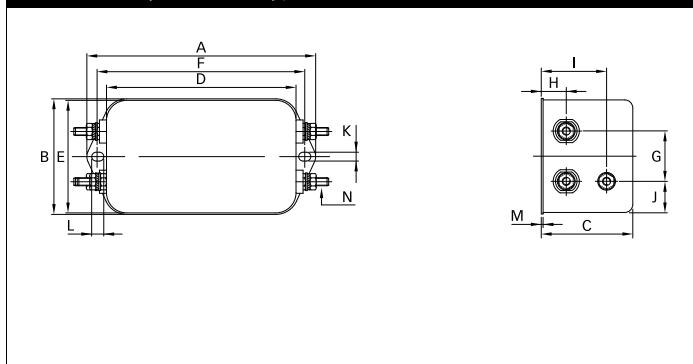
Connection style -07, 16 A types (same dimensions as style -06)



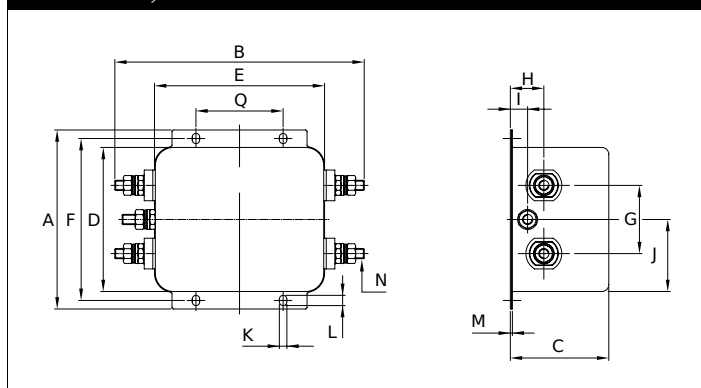
Connection style -08, 20 A types



Connection style -08, 30 A types



Connection style -24



## 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>Connection style -24</b> |           |           |           |           |           |           |           |          |          |            |
| <b>N</b>                    |           |           |           |           |           |           |           |          | M6       |            |
| <b>Q</b>                    |           |           |           |           |           |           |           |          | 51       | ±0.2       |

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.