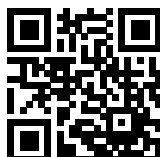


# General Purpose AC/DC EMI Filter



Images are for reference only. Please see product specifications

- Rated currents from 1 to 60 A
- General purpose filtering performance
- Optional medical versions (B type)
- Optional safety versions (A type)
- Optional enhanced performance versions
- Optional DC optimized versions



### Performance indicators

Attenuation performance



Rated current [A]



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## 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 1100 VDC for 2 sec<br>P → PE 2000 VAC for 2 sec (equiv. cap <88 nF)<br>P → PE 2550 VDC for 2 sec (equiv. cap >88 nF)<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>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>             | Laces for -07 version: UL 94 VW-1<br>Terminal plastic for -06/-08 version: UL 94 V-0<br>Grommet for -07 version: UL 94 V-0  |
| <b>Overvoltage category</b>                      | II acc. IEC 60664-1   |
| <b>Pollution degree</b>                          | 2 acc. IEC 60664-1  |
| <b>Altitude</b>                                  | 2000m (above derating applies)**  |
| <b>MTBF @ 40°C/230 V (Mil-HB-217F)</b>           | 1,250,000 hours<br>3,200,000 hours (B types)  |

\* maximum RMS operating voltage at rated frequency or the maximum DC operating voltage  
 \*\* for dedicated requests exceeding this specification (e.g. -40 °C or higher altitude) please contact your local Schaffner sales office

### Approvals & Compliances



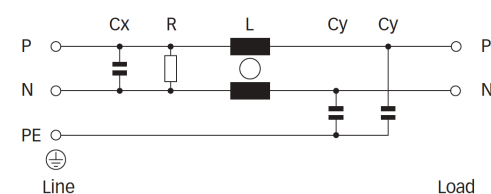
### Features and Benefits

- FN 2010 filters are designed for easy and fast chassis mounting
- FN 2010 B versions without capacitors to earth comply to 1MOP for ME (medical equipment) acc. IEC 60601-1
- FN 2010 A versions with low capacitance to earth for safety critical applications with necessity for low leakage currents
- FN 2010 filters are also available as enhanced performance and DC optimized versions. With higher attenuation in very compact housing (M, N1,N types)
- All filters provide a general purpose conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- FN 2010 filters can be used to cover a broad range of usage and they offer a good size/amperage ratio
- 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*                     | Buy   | Rated current<br>@ 40°C (25°C) | Leakage current**<br>@ 250 VAC/50 Hz<br>(@ 120 VAC/60 Hz) | Power loss<br>@25°C/DC | Inductance***<br>L | Capacitance*** |      | Resistance***<br>R | Input/Output connections  |   |   | Weight<br>[g] |
|-----------------------------|---|--------------------------------|---|------------------------|--------------------|----------------|------|--------------------|---|---|---|---------------|
|                             |   |                                |   |                        |                    | Cx             | Cy   |                    |   |   |   |               |
|                             |   | [A]                            | [mA]  | [W]                    | [mH]               | [µF]           | [nF] | [kΩ]               |  |  |  |               |
| FN2010-1-..                 |    | 1 (1.15)                       | 0.66 (0.38)   | 0.8                    | 12                 | 0.1            | 4.7  | 1000               | -06   | -07   |   | 65            |
| FN2010-3-..                 |    | 3 (3.45)                       | 0.66 (0.38)   | 1.1                    | 2.5                | 0.1            | 4.7  | 1000               | -06   | -07   |   | 65            |
| FN2010-6-..                 |    | 6 (6.9)                        | 0.66 (0.38)   | 1.7                    | 1                  | 0.1            | 4.7  | 1000               | -06   | -07   |   | 65            |
| FN2010-10-..                |    | 10 (11.5)                      | 0.66 (0.38)   | 2.5                    | 0.8                | 0.1            | 4.7  | 1000               | -06   | -07   |   | 85            |
| FN2010-12-..                |    | 12 (13.8)                      | 0.66 (0.38)   | 3.6                    | 0.7                | 0.1            | 4.7  | 1000               | -06   | -07   |   | 85            |
| FN2010-16-..                |    | 16 (18.4)                      | 0.66 (0.38)   | 2.5                    | 0.7                | 0.1            | 4.7  | 1000               | -06   | -07   | -08   | 140           |
| FN2010-20-..                |    | 20 (23)                        | 0.66 (0.38)   | 3.8                    | 0.6                | 0.1            | 4.7  | 1000               | -06   | -07   | -08   | 210           |
| FN2010-30-08                |    | 30 (34.5)                      | 0.79 (0.46)   | 6.3                    | 0.7                | 0.47           | 10   | 1000               |   |   | -08   | 470           |
| FN2010-60-24                |    | 60 (69)                        | 0.79 (0.46)   | 14.7                   | 1                  | 1.5            | 10   | 330                |   |   | -24   | 1100          |
|                             |   |                                |   |                        |                    |                |      |                    |   |   |   |               |
| FN2010A-1-..                |    | 1 (1.15)                       | 0.07 (0.04)   | 0.8                    | 12                 | 0.1            | 0.47 | 1000               | -06   | -07   |   | 65            |
| FN2010A-3-..                |    | 3 (3.45)                       | 0.07 (0.04)   | 1.1                    | 2.5                | 0.1            | 0.47 | 1000               | -06   | -07   |   | 65            |
| FN2010A-6-..                |    | 6 (6.9)                        | 0.07 (0.04)   | 1.7                    | 1                  | 0.1            | 0.47 | 1000               | -06   | -07   |   | 65            |
| FN2010A-10-..               |    | 10 (11.5)                      | 0.07 (0.04)   | 2.5                    | 0.8                | 0.1            | 0.47 | 1000               | -06   | -07   |   | 85            |
| FN2010A-12-..               |   | 12 (13.8)                      | 0.07 (0.04)   | 3.6                    | 0.7                | 0.1            | 0.47 | 1000               | -06   | -07   |   | 85            |
| FN2010A-16-..               |  | 16 (18.4)                      | 0.07 (0.04)   | 2.5                    | 0.7                | 0.1            | 0.47 | 1000               | -06   | -07   | -08   | 140           |
| FN2010A-20-..               |  | 20 (23)                        | 0.07 (0.04)   | 3.8                    | 0.6                | 0.1            | 0.47 | 1000               | -06   | -07   | -08   | 210           |
| FN2010A-30-08               |  | 30 (34.5)                      | 0.07 (0.04)   | 6.3                    | 0.7                | 0.47           | 0.47 | 1000               |   |   | -08   | 470           |
| FN2010A-60-24               |  | 60 (69)                        | 0.07 (0.04)   | 14.7                   | 1                  | 1.5            | 0.47 | 330                |   |   | -24   | 1100          |
|                             |   |                                |   |                        |                    |                |      |                    |   |   |   |               |
| FN2010B-1-..                |  | 1 (1.15)                       | 0.00  | 0.8                    | 12                 | 0.1            |      | 1000               | -06   | -07   |   | 65            |
| FN2010B-3-..                |  | 3 (3.45)                       | 0.00  | 1.1                    | 2.5                | 0.1            |      | 1000               | -06   | -07   |   | 65            |
| FN2010B-6-..                |  | 6 (6.9)                        | 0.00  | 1.7                    | 1                  | 0.1            |      | 1000               | -06   | -07   |   | 65            |
| FN2010B-10-..               |  | 10 (11.5)                      | 0.00  | 2.5                    | 0.8                | 0.1            |      | 1000               | -06   | -07   |   | 85            |
| FN2010B-12-..               |  | 12 (13.8)                      | 0.00  | 3.6                    | 0.7                | 0.1            |      | 1000               | -06   | -07   |   | 85            |
| FN2010B-16-..               |  | 16 (18.4)                      | 0.00  | 2.5                    | 0.7                | 0.1            |      | 1000               | -06   | -07   | -08   | 140           |
| FN2010B-20-..               |  | 20 (23)                        | 0.00  | 3.8                    | 0.6                | 0.1            |      | 1000               | -06   | -07   | -08   | 210           |
| FN2010B-30-08               |  | 30 (34.5)                      | 0.00  | 6.3                    | 0.7                | 0.47           |      | 1000               |   |   | -08   | 470           |
| FN2010B-60-24               |  | 60 (69)                        | 0.00  | 14.7                   | 1                  | 1.5            |      | 330                |   |   | -24   | 1100          |
|                             |   |                                |   |                        |                    |                |      |                    |   |   |   |               |
| <b>Enhanced performance</b> |   |                                |   |                        |                    |                |      |                    |   |   |   |               |
| FN2010N1-1-06               |  | 1 (1.15)                       | 5.34 (3.08)   | 0.8                    | 12                 | 0.1            | 68   | 1000               | -06   |   |   | 70            |
| FN2010N1-3-06               |  | 3 (3.45)                       | 5.34 (3.08)   | 1.1                    | 2.5                | 0.1            | 68   | 1000               | -06   |   |   | 70            |
| FN2010N1-6-06               |  | 6 (6.9)                        | 5.34 (3.08)   | 1.7                    | 1                  | 0.1            | 68   | 1000               | -06   |   |   | 70            |
| FN2010N1-10-06              |  | 10 (11.5)                      | 5.34 (3.08)   | 2.5                    | 0.8                | 0.1            | 68   | 1000               | -06   |   |   | 85            |
| FN2010N1-12-06              |  | 12 (13.8)                      | 3.69 (2.13)   | 3.6                    | 0.7                | 0.1            | 47   | 1000               | -06   |   |   | 85            |
| FN2010M-16-..               |  | 16 (18.4)                      | 3.69 (2.13)   | 2.5                    | 0.7                | 0.1            | 47   | 1000               | -06   |   | -08   | 140           |
| FN2010M-20-..               |  | 20 (23)                        | 3.69 (2.13)   | 3.8                    | 0.6                | 0.1            | 47   | 1000               | -06   |   | -08   | 220           |
| FN2010N-30-08               |  | 30 (34.5)                      | 7.85 (4.52)   | 6.3                    | 0.7                | 0.47           | 100  | 1000               |   |   | -08   | 400           |
| FN2010N-60-24               |  | 60 (69)                        | 7.85 (4.52)   | 14.7                   | 1                  | 1.5            | 100  | 330                |   |   | -24   | 1120          |

\*\*\* To compile a complete part number, please replace the -.. with the required I/O connection style (e.g. FN 2010-30-08, FN 2010B-10-06). The different letters code the used Cy values in the filter type (A = 0.47nF; M = 47nF; N1 = 47nF; N = 100nF)

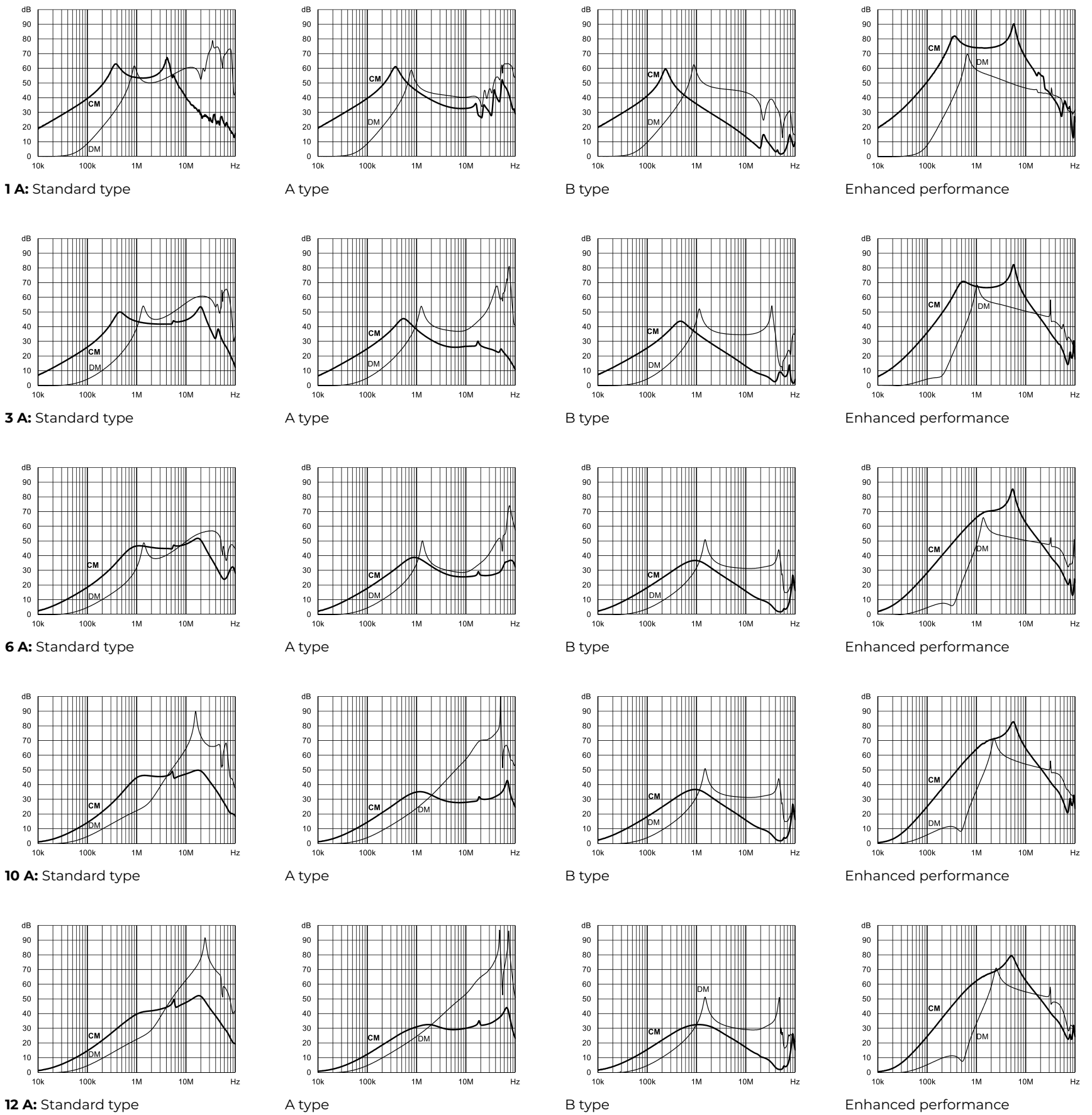
\*\*\* Maximum leakage under usual AC operating conditions (acc. IEC 60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

\*\*\* Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

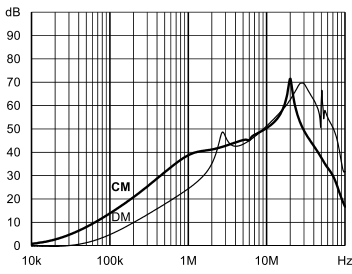
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## Typical Filter Attenuation

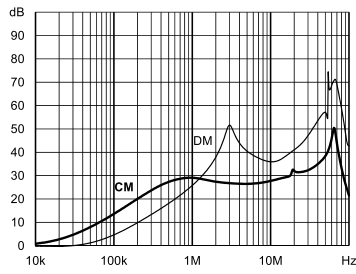
Per CISPR 17; CM=50 Ω/50 Ω sym; DM=50 Ω/50 Ω asym



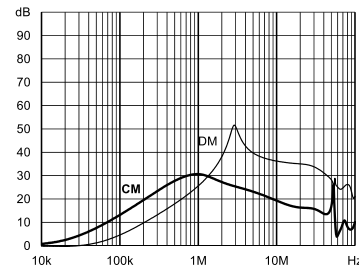
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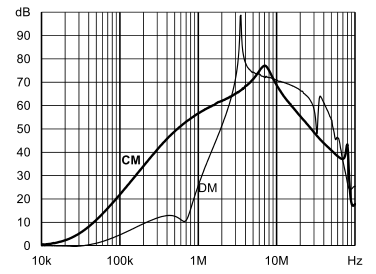
16 A: Standard type



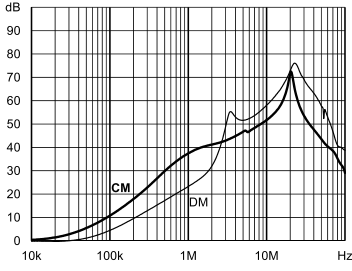
A type



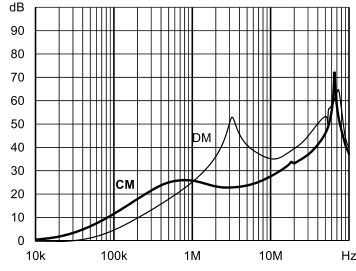
B type



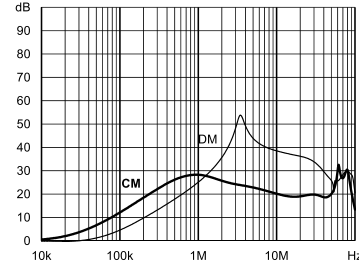
Enhanced performance



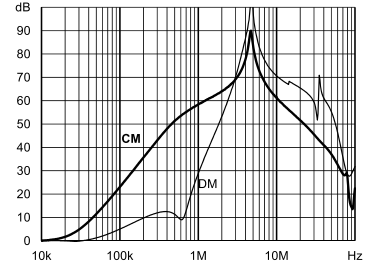
20 A: Standard type



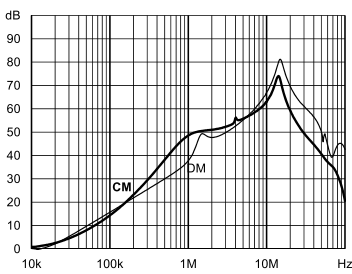
A type



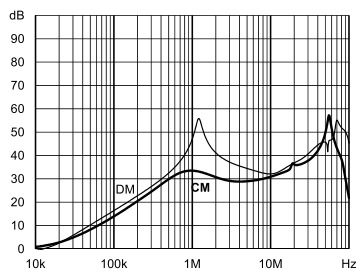
B type



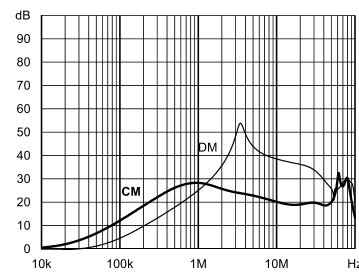
Enhanced performance



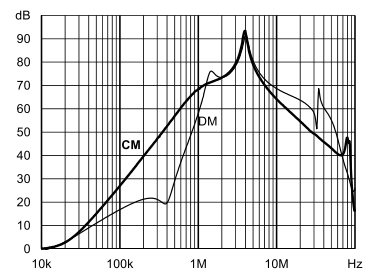
30 A: Standard type



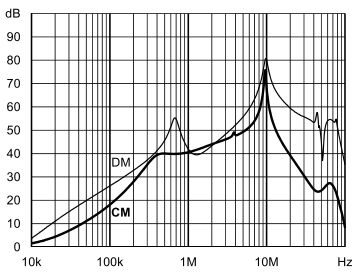
A type



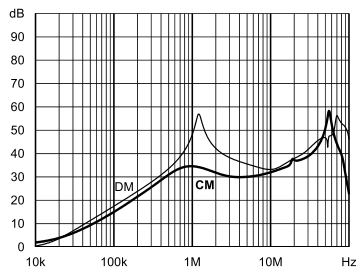
B type



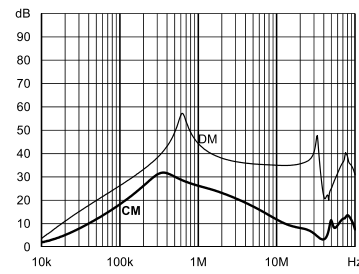
Enhanced performance



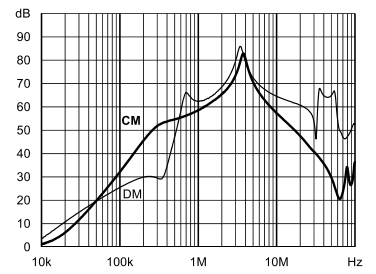
60 A: Standard type



A type



B type

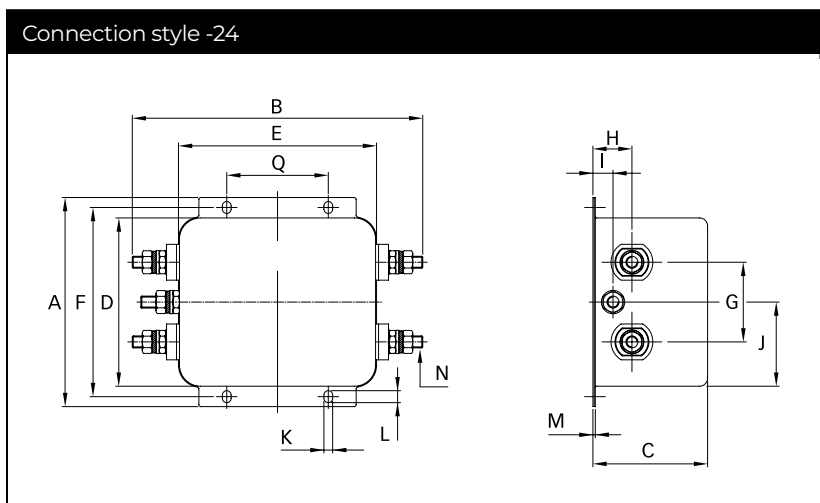
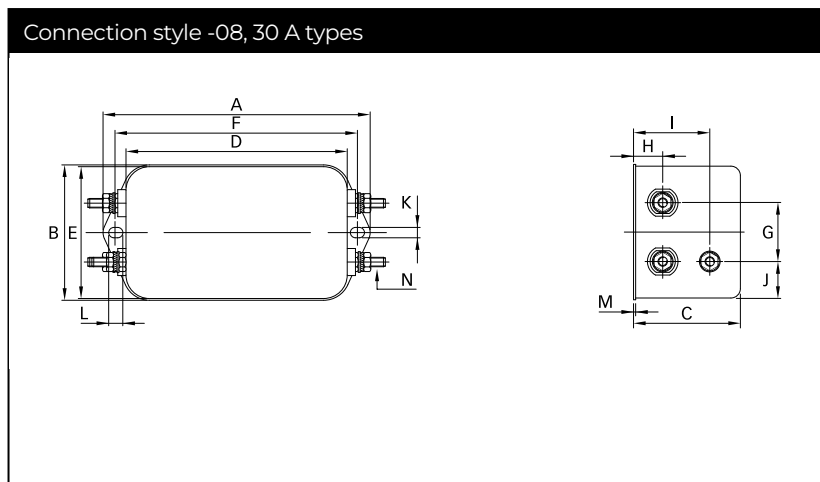
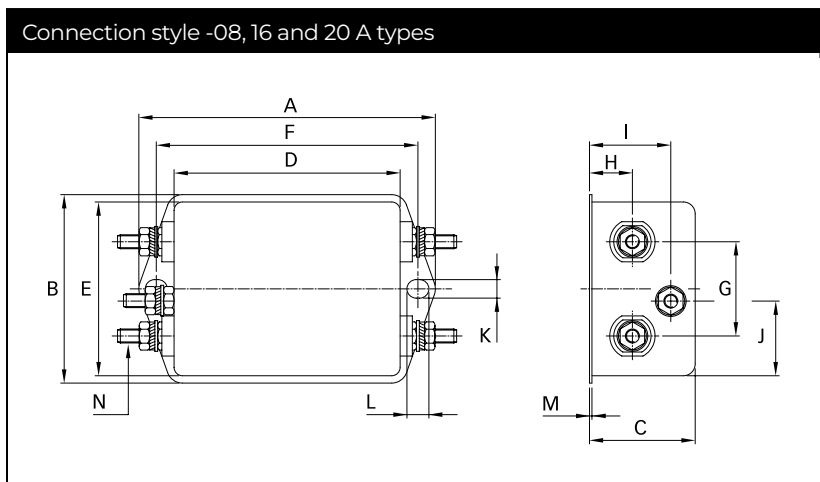
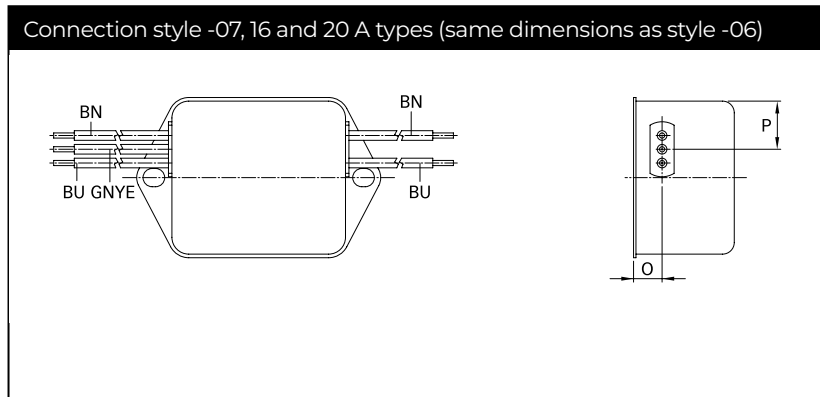
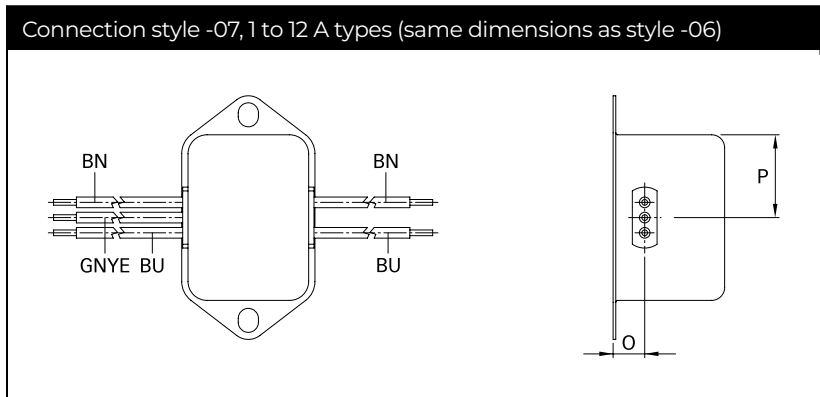
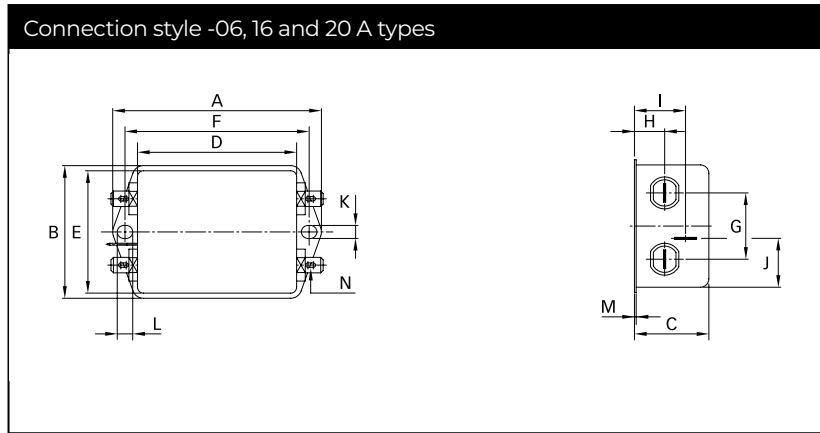
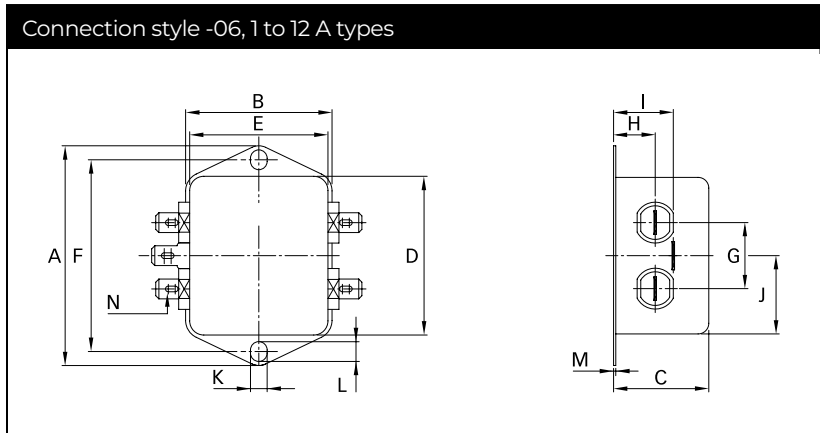


Enhanced performance

| Product Selector |                                       |  |
|------------------|---------------------------------------|--|
| FN 2010-xy-xx-yy |                                       |  |
| 06               | Faston 6.3 × 0.8 mm (spade/soldering) |  |
| 07               | Wire leads                            |  |
| 08               | Studs (M4 screws)                     |  |
| 24               | Studs (M6 screws)                     |  |
| 1 to 60          | Rated current                         |  |
| Blank            | Standard version                      |  |
| Z                | With surge protection                 |  |
| Blank            | Standard version                      |  |
| A                | Safety version                        |  |
| B                | Medical version                       |  |
| N1/N/M           | High performance version              |  |

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**Mechanical Data**



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## 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>                       | 24.3      | 24.3      | 24.3      | 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       | 1         | 1.2      | ±0.3       |
| <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       | 8.3       |           |          | ±0.5       |
| <b>P</b>                       | 21.8      | 21.8      | 21.8      | 21.8      | 21.8      | 14        | 14.9      |           |          | ±0.5       |
| <b>AWG type wire</b>           | AWG 20    | AWG 20    | AWG 18    | AWG 18    | AWG 16    | AWG 16    | AWG 14    |           |          |            |
| <b>Wire length</b>             | 140       | 140       | 140       | 140       | 140       | 140       | 140       |           |          | +5         |
| <b>Connection style -08</b>    |           |           |           |           |           |           |           |           |          |            |
| <b>N</b>                       |           |           |           |           |           | M4        | M4        | M4        |          |            |
| <b>Recommended torque (Nm)</b> |           |           |           |           |           | 1.2 - 1.3 | 1.2 - 1.3 | 1.2 - 1.3 |          |            |
| <b>Earth terminal</b>          |           |           |           |           |           | 1.5 - 1.7 | 1.5 - 1.7 | 1.5 - 1.7 |          |            |
| <b>Connection style -24</b>    |           |           |           |           |           |           |           |           |          |            |
| <b>N</b>                       |           |           |           |           |           |           |           |           | M6       |            |
| <b>Q</b>                       |           |           |           |           |           |           |           |           | 51       | ±0.2       |
| <b>Recommended torque (Nm)</b> |           |           |           |           |           |           |           |           | 3.5 - 4  |            |
| <b>Earth Terminal</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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