

# General Purpose AC/DC EMI Filter with High Attenuation Performance



- Rated currents from 1 to 30 A
- High performance filter attenuation
- High differential-mode attenuation
- Optional medical versions (B type)
- Optional safety versions (A type)
- Optional enhanced performance versions
- Optional overvoltage protection (Z type)



## Performance indicators

Attenuation performance



Rated current [A]



## Approvals



## Features and benefits

- FN 2030 filters are designed for easy and fast chassis mounting
- FN 2030 B versions without capacitors to earth comply to 1MOP for ME (medical equipment) acc. IEC 60601-1
- FN 2030 A versions with low capacitance to earth for safety critical applications with a requirement for low leakage currents
- FN 2030 filters offer an optimized filter range for high performance AC and DC applications, in same compact size (M, N1 types)
- All filters provide an exceptional conducted attenuation performance, based on chokes with high permeable core material and excellent thermal behavior
- The higher inductivity versus amperage offers increased attenuation performance with same form factor compared to FN 2010 and FN 2020 filter series
- All FN 2030 filters can be delivered with optional surge pulse protection (Z type).
- Various terminal options allow you to select the desired connection style

## 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 30 A @ 40°C max.                                                                                                                                             |
| <b>High potential test voltage</b>               | 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)<br>P → N 1100 VDC for 2 sec |
| <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>             | Terminal plastic for -06/-08 version: UL 94 V-0<br>Laces for -07 version: UL 94 VW-1<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>           | 2,200,000 hours (1 to 10 A types)<br>1,200,000 hours (12 to 30 A types)                                                                                           |
| <b>Surge pulse protection (Z type)</b>           | Helps compliance to IEC61000-4-5 (Differential Mode only)                                                                                                         |

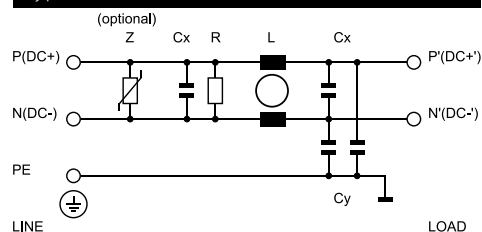
\* maximum RMS operating voltage at rated frequency or the maximum DC operating voltage

\*\* for dedicated requests exceeding this specification (e.g. -40 °C or higher altitude) please contact your local Schaffner Sales office

## Typical application

- Electrical and electronic equipment
- Consumer goods
- Household equipment
- Medical equipment
- Electronic data processing equipment
- Office automation and datacom equipment
- Various noisy applications requiring high filter performance

## Typical electrical schematic



## Filter selection table

| Filter*              | Rated current<br>@ 40°C (25°C) | Leakage current**<br>@ 250 VAC/50 Hz<br>(@ 120 VAC/60 Hz) | Inductance***<br>L | Capacitance*** |      | Resistance***<br>R | Input/Output<br>connections                                                         |                                                                                     |                                                                                     | Weight<br>[g] |
|----------------------|--------------------------------|-----------------------------------------------------------|--------------------|----------------|------|--------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------|
|                      |                                |                                                           |                    | Cx             | Cy   |                    |                                                                                     |                                                                                     |                                                                                     |               |
|                      | [A]                            | [mA]                                                      | [mH]               | [μF]           | [nF] | [kΩ]               |  |  |  |               |
| FN 2030-1-..         | 1 (1.1)                        | 0.31 (0.18)                                               | 20                 | 0.22           | 2.2  | 1000               | -06                                                                                 | -07                                                                                 |                                                                                     | 58            |
| FN 2030-3-..         | 3 (3.4)                        | 0.47 (0.27)                                               | 14                 | 0.33           | 3.3  | 1000               | -06                                                                                 | -07                                                                                 |                                                                                     | 87            |
| FN 2030-4-..         | 4 (4.5)                        | 0.47 (0.27)                                               | 14                 | 0.33           | 3.3  | 1000               | -06                                                                                 | -07                                                                                 |                                                                                     | 92            |
| FN 2030-6-..         | 6 (6.7)                        | 0.66 (0.38)                                               | 8                  | 0.47           | 4.7  | 680                | -06                                                                                 | -07                                                                                 |                                                                                     | 100           |
| FN 2030-8-..         | 8 (8.9)                        | 0.66 (0.38)                                               | 8                  | 0.47           | 4.7  | 680                | -06                                                                                 | -07                                                                                 |                                                                                     | 170           |
| FN 2030-10-..        | 10 (11.2)                      | 0.66 (0.38)                                               | 8                  | 0.47           | 4.7  | 680                | -06                                                                                 | -07                                                                                 |                                                                                     | 196           |
| FN 2030-12-..        | 12 (13.4)                      | 0.79 (0.45)                                               | 4                  | 1.0            | 10   | 330                | -06                                                                                 | -07                                                                                 |                                                                                     | 185           |
| FN 2030-16-..        | 16 (17.9)                      | 0.79 (0.45)                                               | 4                  | 1.0            | 10   | 330                | -06                                                                                 | -07                                                                                 | -08                                                                                 | 225           |
| FN 2030-20-..        | 20 (22.4)                      | 0.79 (0.45)                                               | 4                  | 1.0            | 10   | 330                | -06                                                                                 |                                                                                     | -08                                                                                 | 285           |
| FN 2030-30-08        | 30 (33.5)                      | 0.79 (0.45)                                               | 2                  | 1.0            | 10   | 330                |                                                                                     |                                                                                     | -08                                                                                 | 326           |
|                      |                                |                                                           |                    |                |      |                    |                                                                                     |                                                                                     |                                                                                     |               |
| FN 2030 A-1-..       | 1 (1.1)                        | 0.07 (0.04)                                               | 20                 | 0.22           | 0.47 | 1000               | -06                                                                                 | -07                                                                                 |                                                                                     | 58            |
| FN 2030 A-3-..       | 3 (3.4)                        | 0.07 (0.04)                                               | 14                 | 0.33           | 0.47 | 1000               | -06                                                                                 | -07                                                                                 |                                                                                     | 87            |
| FN 2030 A-4-..       | 4 (4.5)                        | 0.07 (0.04)                                               | 14                 | 0.33           | 0.47 | 1000               | -06                                                                                 | -07                                                                                 |                                                                                     | 92            |
| FN 2030 A-6-..       | 6 (6.7)                        | 0.07 (0.04)                                               | 8                  | 0.47           | 0.47 | 680                | -06                                                                                 | -07                                                                                 |                                                                                     | 100           |
| FN 2030 A-8-..       | 8 (8.9)                        | 0.07 (0.04)                                               | 8                  | 0.47           | 0.47 | 680                | -06                                                                                 | -07                                                                                 |                                                                                     | 170           |
| FN 2030 A-10-..      | 10 (11.2)                      | 0.07 (0.04)                                               | 8                  | 0.47           | 0.47 | 680                | -06                                                                                 | -07                                                                                 |                                                                                     | 196           |
| FN 2030 A-12-..      | 12 (13.4)                      | 0.07 (0.04)                                               | 4                  | 1.0            | 0.47 | 330                | -06                                                                                 | -07                                                                                 |                                                                                     | 185           |
| FN 2030 A-16-..      | 16 (17.9)                      | 0.07 (0.04)                                               | 4                  | 1.0            | 0.47 | 330                | -06                                                                                 | -07                                                                                 | -08                                                                                 | 225           |
| FN 2030 A-20-..      | 20 (22.4)                      | 0.07 (0.04)                                               | 4                  | 1.0            | 0.47 | 330                | -06                                                                                 |                                                                                     | -08                                                                                 | 285           |
| FN 2030 A-30-08      | 30 (33.5)                      | 0.07 (0.04)                                               | 2                  | 1.0            | 0.47 | 330                |                                                                                     |                                                                                     | -08                                                                                 | 326           |
|                      |                                |                                                           |                    |                |      |                    |                                                                                     |                                                                                     |                                                                                     |               |
| FN 2030 B-1-..       | 1 (1.1)                        | 0.00                                                      | 20                 | 0.22           |      | 1000               | -06                                                                                 | -07                                                                                 |                                                                                     | 58            |
| FN 2030 B-3-..       | 3 (3.4)                        | 0.00                                                      | 14                 | 0.33           |      | 1000               | -06                                                                                 | -07                                                                                 |                                                                                     | 87            |
| FN 2030 B-4-..       | 4 (4.5)                        | 0.00                                                      | 14                 | 0.33           |      | 1000               | -06                                                                                 | -07                                                                                 |                                                                                     | 92            |
| FN 2030 B-6-..       | 6 (6.7)                        | 0.00                                                      | 8                  | 0.47           |      | 680                | -06                                                                                 | -07                                                                                 |                                                                                     | 100           |
| FN 2030 B-8-..       | 8 (8.9)                        | 0.00                                                      | 8                  | 0.47           |      | 680                | -06                                                                                 | -07                                                                                 |                                                                                     | 170           |
| FN 2030 B-10-..      | 10 (11.2)                      | 0.00                                                      | 8.45               | 0.47           |      | 680                | -06                                                                                 | -07                                                                                 |                                                                                     | 196           |
| FN 2030 B-12-..      | 12 (13.4)                      | 0.00                                                      | 4                  | 1.0            |      | 330                | -06                                                                                 | -07                                                                                 |                                                                                     | 185           |
| FN 2030 B-16-..      | 16 (17.9)                      | 0.00                                                      | 4                  | 1.0            |      | 330                | -06                                                                                 | -07                                                                                 | -08                                                                                 | 225           |
| FN 2030 B-20-..      | 20 (22.4)                      | 0.00                                                      | 4                  | 1.0            |      | 330                | -06                                                                                 |                                                                                     | -08                                                                                 | 285           |
| FN 2030 B-30-08      | 30 (33.5)                      | 0.00                                                      | 2                  | 1.0            |      | 330                |                                                                                     |                                                                                     | -08                                                                                 | 326           |
|                      |                                |                                                           |                    |                |      |                    |                                                                                     |                                                                                     |                                                                                     |               |
| Enhanced performance |                                |                                                           |                    |                |      |                    |                                                                                     |                                                                                     |                                                                                     |               |
| FN 2030 N1-1-06      | 1 (1.1)                        | 5.34 (3.08)                                               | 20                 | 0.22           | 68   | 1000               | -06                                                                                 |                                                                                     |                                                                                     | 65            |
| FN 2030 M-3-06       | 3 (3.4)                        | 3.69 (2.28)                                               | 14                 | 0.33           | 47   | 1000               | -06                                                                                 |                                                                                     |                                                                                     | 110           |
| FN 2030 M-4-06       | 4 (4.5)                        | 3.69 (2.28)                                               | 14                 | 0.33           | 47   | 1000               | -06                                                                                 |                                                                                     |                                                                                     | 110           |
| FN 2030 M-6-06       | 6 (6.7)                        | 3.69 (2.28)                                               | 8                  | 0.47           | 47   | 680                | -06                                                                                 |                                                                                     |                                                                                     | 120           |
| FN 2030 N1-8-06      | 8 (8.9)                        | 5.34 (3.08)                                               | 8                  | 0.47           | 68   | 3680               | -06                                                                                 |                                                                                     |                                                                                     | 200           |
| FN 2030 N1-10-06     | 10 (11.2)                      | 5.34 (3.08)                                               | 8                  | 0.47           | 68   | 680                | -06                                                                                 |                                                                                     |                                                                                     | 200           |
| FN 2030 N1-12-06     | 12 (13.4)                      | 5.34 (3.08)                                               | 4                  | 1.0            | 68   | 330                | -06                                                                                 |                                                                                     |                                                                                     | 210           |
| FN 2030 M-16-06      | 16 (17.9)                      | 3.69 (2.28)                                               | 4                  | 1.0            | 47   | 330                | -06                                                                                 |                                                                                     | -08                                                                                 | 265           |
| FN 2030 M-20-..      | 20 (22.4)                      | 3.69 (2.28)                                               | 4                  | 1.0            | 47   | 330                | -06                                                                                 |                                                                                     | -08                                                                                 | 326           |
| FN 2030 M-30-08      | 30 (33.5)                      | 3.69 (2.28)                                               | 2                  | 1.0            | 47   | 330                |                                                                                     |                                                                                     | -08                                                                                 | 346           |

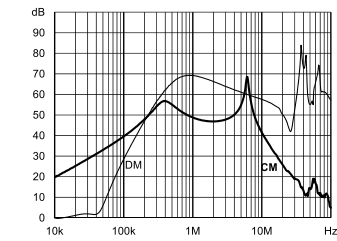
\* To compile a complete part number, please replace the -.. with the required I/O connection style. For surge pulse protection, please add Z (e.g. FN 2030Z-10-06, FN 2030BZ-20-08).

\*\* Maximum leakage under usual AC operating conditions (acc. IEC60939-3). Note: if the neutral line is interrupted, worst case leakage could reach twice this level.

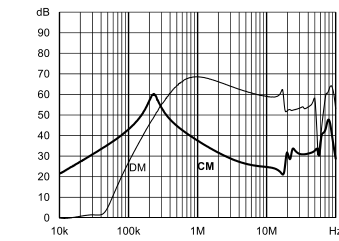
\*\*\* Tolerances apply: Inductance: -30/+50%, Capacitance: ±20%, Resistance: ±10%

## Typical filter attenuation

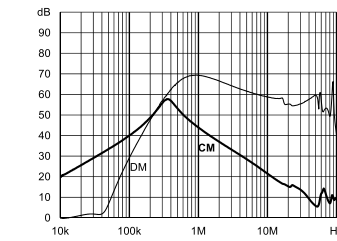
Per CISPR 17; A=50  $\Omega$ /50  $\Omega$  sym; B=50  $\Omega$ /50  $\Omega$  asym



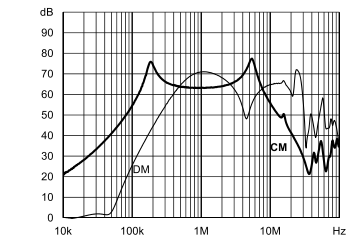
**1 A:** Standard type



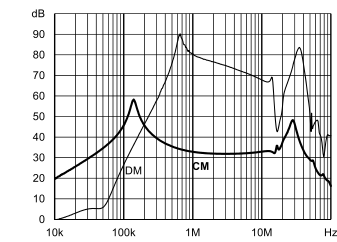
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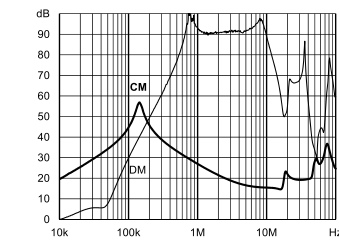
B type



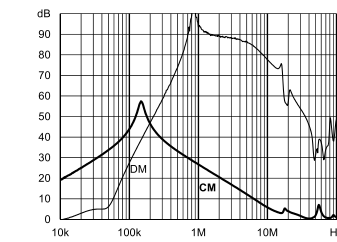
Enhanced performance



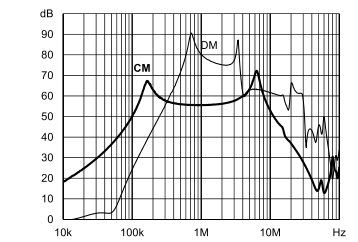
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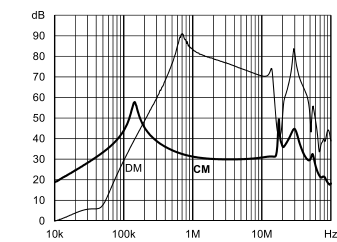
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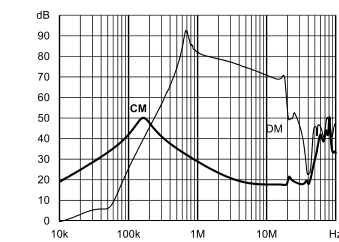
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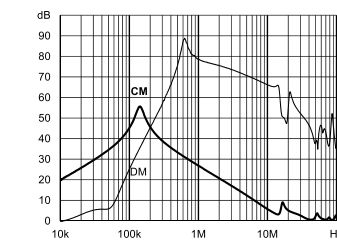
Enhanced performance



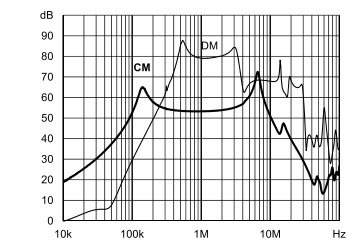
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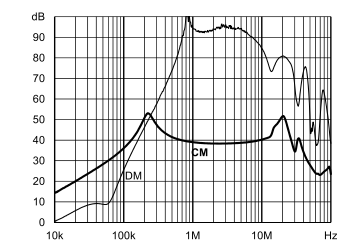
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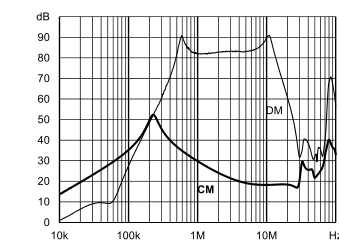
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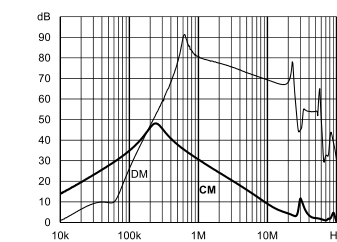
Enhanced performance



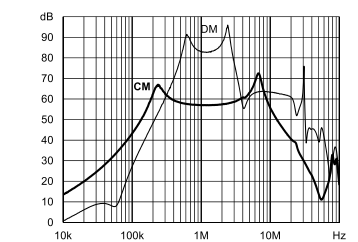
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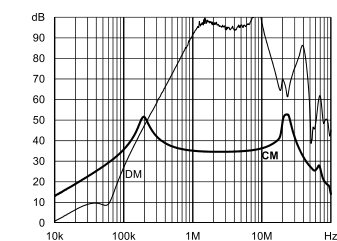
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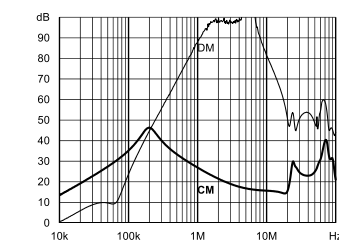
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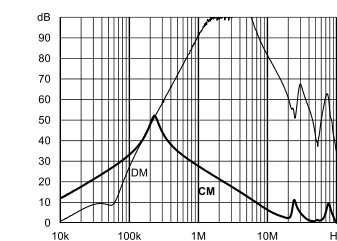
Enhanced performance



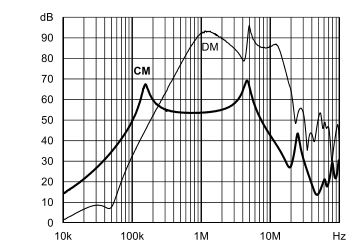
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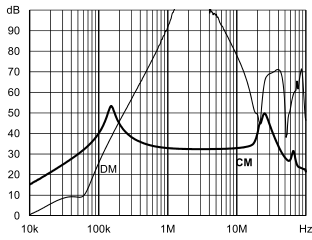
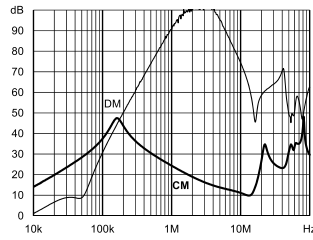
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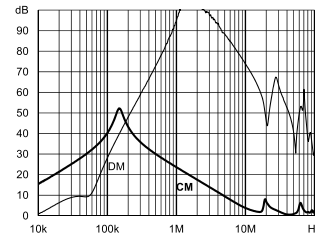
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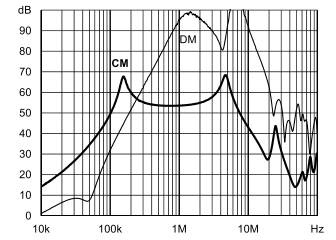
Enhanced performance

**10 A:** Standard type

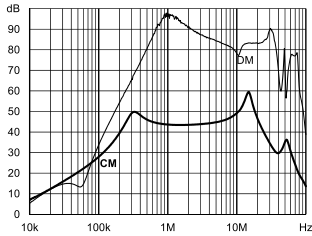
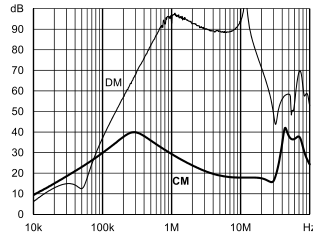
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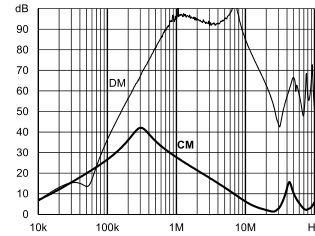
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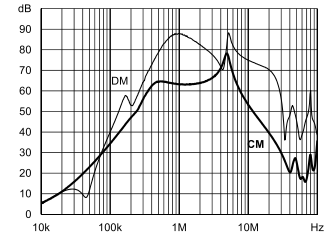
Enhanced performance

**12 A:** Standard type

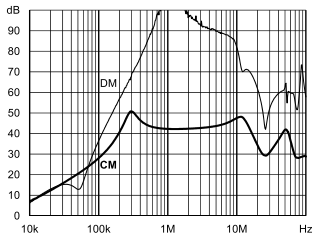
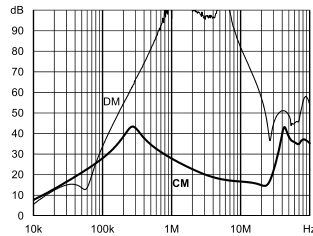
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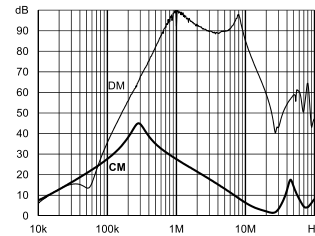
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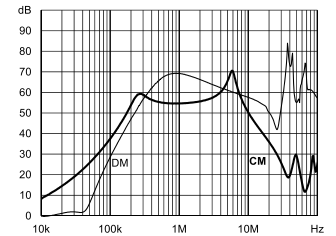
Enhanced performance

**16 A:** Standard type

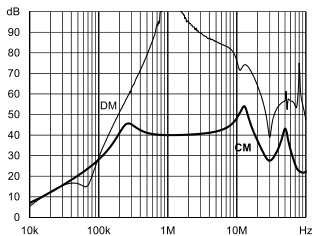
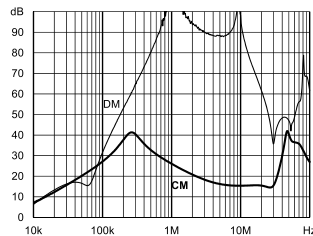
A type



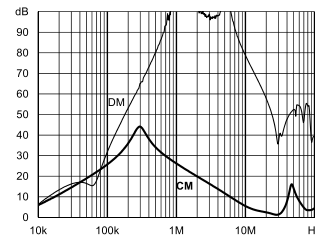
B type



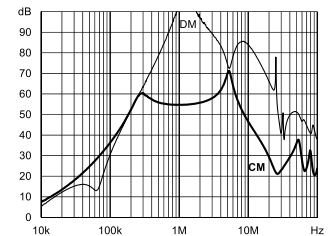
Enhanced performance

**20 A:** Standard type

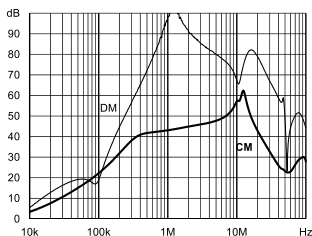
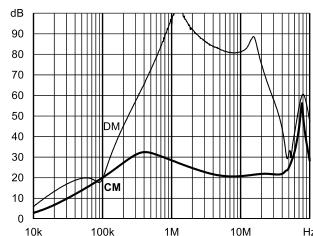
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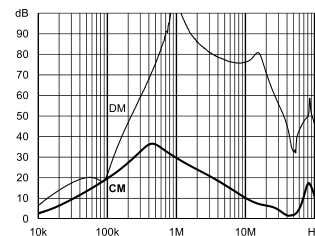
B type



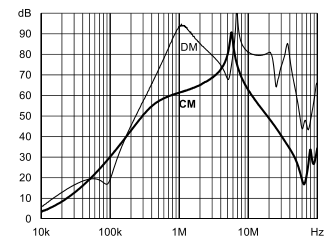
Enhanced performance

**30 A:** Standard type

A type



B type



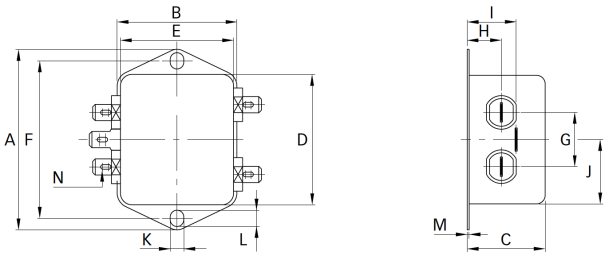
Enhanced performance

Product selector

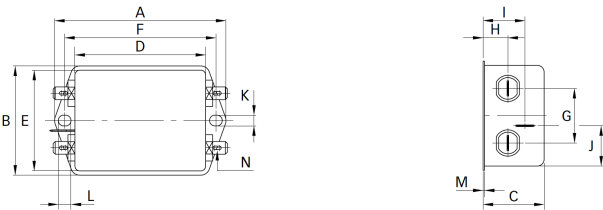
|                  |         |                                       |
|------------------|---------|---------------------------------------|
| FN 2030 xy-xx-yy | 06      | Faston 6.3 × 0.8 mm (spade/soldering) |
|                  | 07      | Wire leads                            |
|                  | 08      | Studs (M4 screws)                     |
|                  | 1 to 60 | Rated current                         |
|                  | Blank   | Standard version                      |
|                  | Z       | With surge protection                 |
|                  | Blank   | Standard version                      |
|                  | A       | Safety version                        |
|                  | B       | Medical version                       |
|                  | N1/M    | High performance version              |

Mechanical data

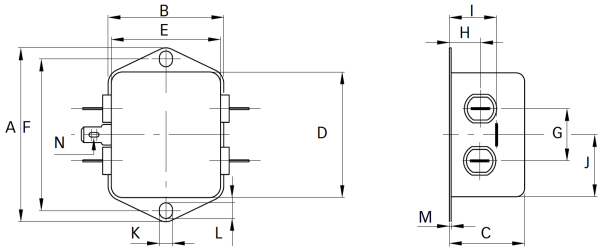
Connection style -06, 1 A types



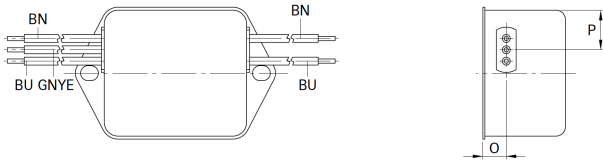
Connection style -06, 8 to 20 A types



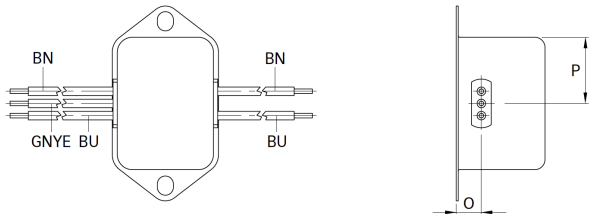
Connection style -06, 3 to 6 A types



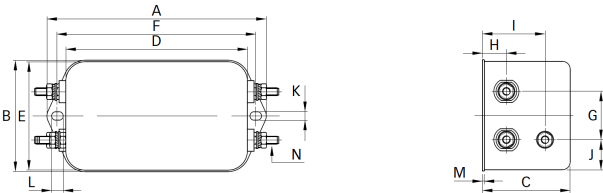
Connection style -07, 8 to 16 A types (same dimensions as style -06)



Connection style -07, 1 to 6 A types (same dimensions as style -06)



Connection style -08, 16 to 30 A types



## Dimensions

|                                | 1 A       | 3 A       | 4 A       | 6 A       | 8 A       | 10 A      | 12 A      | 16 A      | 20 A      | 30 A      | Tolerances |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| <b>A</b>                       | 64        | 71        | 71        | 71        | 85        | 85        | 85        | 85        | 85        | 85        | ±0.5       |
| <b>B</b>                       | 35        | 46.6      | 46.6      | 46.6      | 54        | 54        | 54        | 54        | 54        | 54        | ±0.5       |
| <b>C</b>                       | 24.3      | 22.3      | 22.3      | 22.3      | 30.3      | 30.3      | 30.3      | 40.3      | 40.3      | 40.3      | ±0.5       |
| <b>D</b>                       | 43.5      | 50.5      | 50.5      | 50.5      | 64.8      | 64.8      | 64.8      | 64.8      | 64.8      | 64.8      | ±0.5       |
| <b>E</b>                       | 32.5      | 44.5      | 44.5      | 44.5      | 49.8      | 49.8      | 49.8      | 49.8      | 49.8      | 49.8      | ±0.5       |
| <b>F</b>                       | 54        | 61        | 61        | 61        | 75        | 75        | 75        | 75        | 75        | 75        | ±0.3       |
| <b>G</b>                       | 21        | 21        | 21        | 21        | 27        | 27        | 27        | 27        | 27        | 27        | ±0.2       |
| <b>H</b>                       | 9.3       | 10.8      | 10.8      | 10.8      | 12.3      | 12.3      | 12.3      | 12.3      | 12.3      | 12.3      | ±0.5       |
| <b>I</b>                       | 15.3      | 16.8      | 16.8      | 16.8      | 20.8      | 20.8      | 20.8      | 29.8      | 29.8      | 29.8      | ±0.5       |
| <b>J</b>                       | 21.8      | 25.25     | 25.25     | 25.25     | 19.9      | 19.9      | 19.9      | 11.4      | 11.4      | 11.4      | ±0.5       |
| <b>K</b>                       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       | 5.3       |            |
| <b>L</b>                       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       | 6.3       |            |
| <b>M</b>                       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       | 0.7       |            |
| <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 | 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       | 8.3       |           |           | ±0.5       |
| <b>P</b>                       | 21.8      | 14        | 14        | 14        | 14.9      | 14.9      | 14.9      | 14.9      |           |           | ±0.5       |
| <b>AWG type wire</b>           | AWG 20    | AWG 20    | AWG 20    | AWG 18    | AWG 18    | AWG 18    | AWG 16    | AWG 16    |           |           |            |
| <b>Wire length</b>             | 140       | 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 |            |

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



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