

# General Purpose EMC Filter



- EMC solution for industrial inverters and motor drives
- Rated currents from 8 to 280 A
- Selectable voltage level of 440 V and 520 V
- High differential and common-mode attenuation



### Performance indicators

Attenuation performance



## Technical specifications

|  |  |
|--|--|
| <b>Maximum continuous operating voltage</b>      | 3x 440/250 VAC (FN 351)<br>3x 520/300 VAC (FN 351 H)   |
| <b>Operating frequency</b>                       | DC to 60 Hz  |
| <b>Rated currents</b>                            | 8 to 280 A @ 40°C  |
| <b>High potential test voltage</b>               | P → E 2600 VDC for 2 sec (FN 351)<br>P → P 1900 VDC for 2 sec (FN 351)<br>P → E 2750 VDC for 2 sec (FN 351 H)<br>P → P 2250 VDC for 2 sec (FN 351 H) |
| <b>Protection category</b>                       | IP 20  |
| <b>Overload capability</b>                       | 4x rated current at switch on,<br>1.5x rated current for 1 minute, once per hour   |
| <b>Temperature range (operation and storage)</b> | -25°C to +85°C (25/085/21) (FN 351)  |
| <b>Temperature range (operation and storage)</b> | -25°C to +100°C (25/100/21) (FN 351 H)   |
| <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/400 V (Mil-HB-217F)</b>           | 135,000 hours  |

### Approvals



Approvals up to 110 A

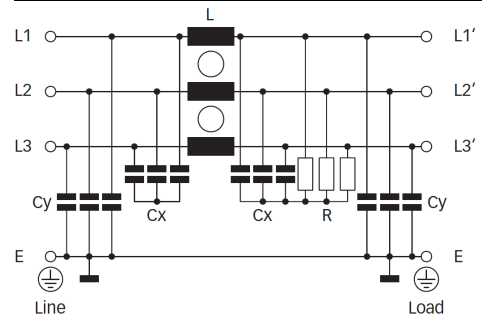
### Features and benefits

- Broad range of power ratings for fast and convenient filter selection
- Available as 440 VAC (FN 351) and 520 VAC (FN 351 H) versions for network-specific applications
- FN 351 filters provide a broadband common and differential-mode attenuation performance, which remains available also when high interference levels are present
- Solid, touch-safe filter terminals contribute to overall equipment safety
- Introduced as one of the very first motor drive EMC filters in the market, FN 351 has been widely imitated and has successfully proven its function over more than 10 years



### Typical applications

- Three-phase motor drives
- Inverters and converters
- Industrial automation equipment
- UPS
- SMPS
- General purpose three-phase filtering

### Typical electrical schematic



### Filter selection table

| Filter*         | Rated current | Typical drive  | Leakage current***  | Power loss   | Input/Output connections  |   | Weight |
|-----------------|---------------|----------------|---------------------|--------------|---|---|--------|
|                 | @ 40°C (25°C) | power rating** | @ 440/520 VAC/50 Hz | @ 25°C/50 Hz |  |  |        |
|                 | [A]           | [kW]           | [mA]                | [W]          |   |   | [kg]   |
| FN 351-8-29     | 8 (9.2)       | 3              | 0.3                 | 7            | -29   |   | 0.8    |
| FN 351-16-29    | 16 (18.5)     | 5.5            | 0.3                 | 8            | -29   |   | 1.3    |
| FN 351-25-33    | 25 (28.9)     | 11             | 3.2                 | 8            | -33   |   | 1.4    |
| FN 351-36-33    | 36 (41.6)     | 15             | 3.2                 | 9            | -33   |   | 1.5    |
| FN 351-50-..    | 50 (57.7)     | 22             | 3.5                 | 11           | -33   |   | 1.6    |
| FN 351-64-..    | 64 (73.9)     | 30             | 3.5                 | 15           | -33   | -34   | 1.7    |
| FN 351-80-34    | 80 (92.3)     | 37             | 3.7                 | 23           | -34   |   | 5.6    |
| FN 351-110-35   | 110 (127)     | 55             | 3.7                 | 25           | -35   |   | 5.8    |
| FN 351-180-36   | 180 (208)     | 90             | 3.7                 | 49           | -36   |   | 13.0   |
| FN 351-280-37   | 280 (323)     | 132            | 4.3                 | 70           | -37   |   | 28.0   |
| FN 351 H-8-29   | 8 (9.2)       | 4              | 0.3                 | 7            | -29   |   | 1.1    |
| FN 351 H-16-29  | 16 (18.5)     | 7.5            | 0.3                 | 8            | -29   |   | 1.3    |
| FN 351 H-25-33  | 25 (28.9)     | 15             | 3.8                 | 8            | -33   |   | 1.4    |
| FN 351 H-36-33  | 36 (41.6)     | 18.5           | 3.8                 | 9            | -33   |   | 1.5    |
| FN 351 H-50-..  | 50 (57.7)     | 30             | 3.8                 | 11           | -33   |   | 1.6    |
| FN 351 H-64-33  | 64 (73.9)     | 37             | 3.8                 | 15           | -33   |   | 1.7    |
| FN 351 H-80-34  | 80 (92.3)     | 45             | 4.4                 | 23           | -34   |   | 5.6    |
| FN 351 H-110-35 | 110 (127)     | 75             | 4.4                 | 25           | -35   |   | 5.8    |
| FN 351 H-180-36 | 180 (208)     | 110            | 4.4                 | 49           | -36   |   | 13.0   |

\* To compile a complete part number, please replace the .. with the required I/O connection style.

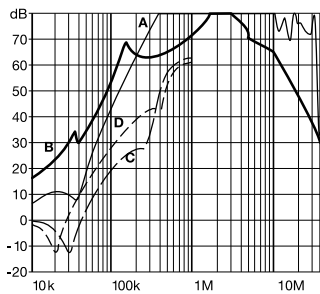
\*\* Calculated at rated current, 400 VAC (FN 351)/480 VAC (FN 351 H) and cos phi=0.8. The exact value depends upon the efficiency of the drive, the motor and the entire application.

\*\*\* Standardized calculated leakage current acc. IEC60939 under normal operating conditions (FN 351 at 440 VAC and FN 351H at 520 VAC).

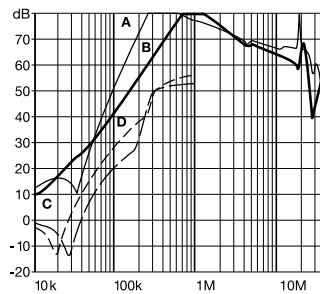
### Typical filter attenuation

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

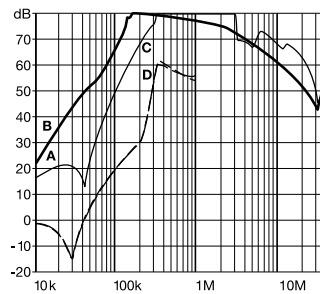
8 A types



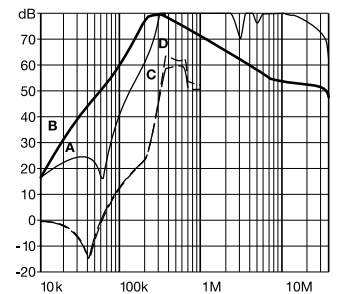
16 A types



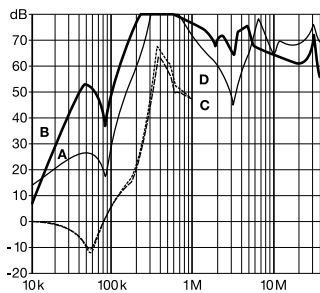
25 A types



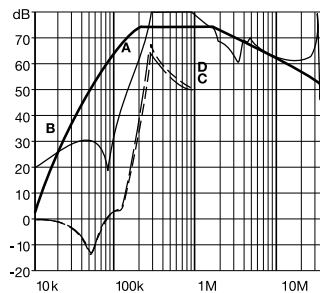
36 and 50 A types



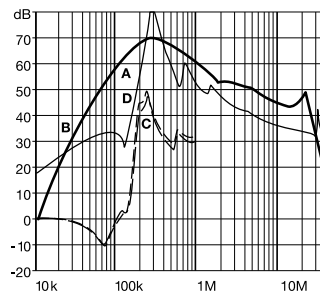
64 A types



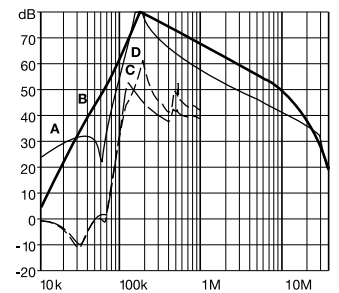
80 and 110 A types



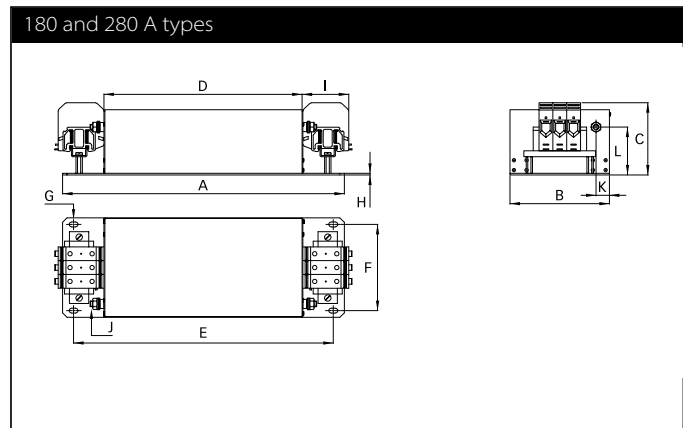
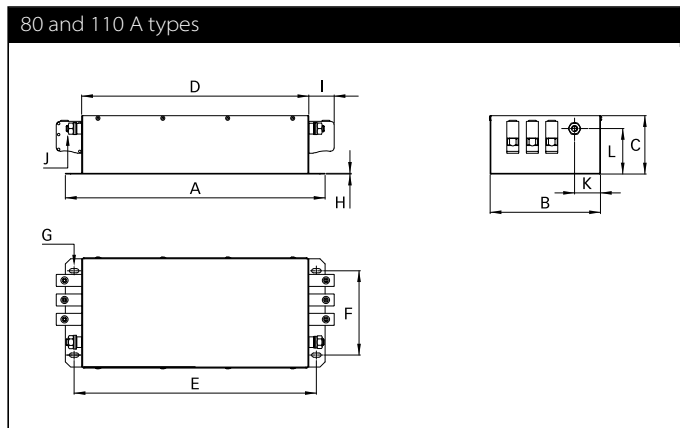
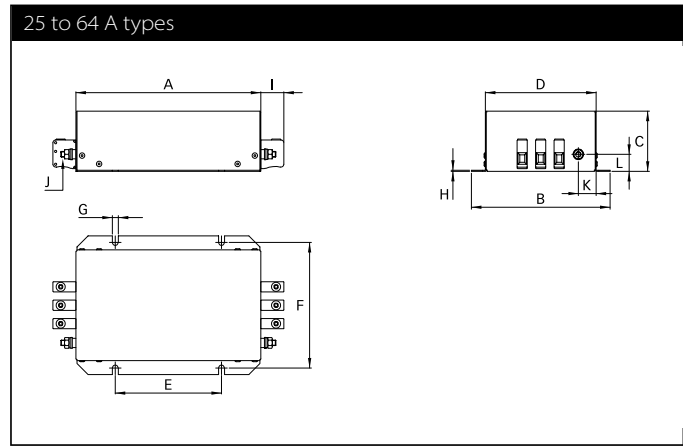
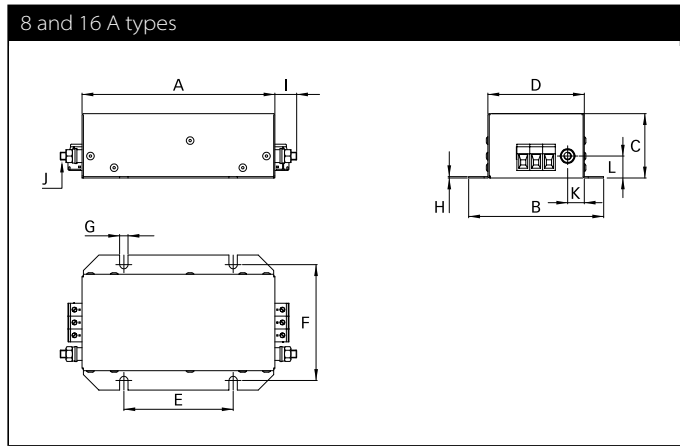
180 A types



280 A types



**Mechanical data**









## Dimensions

|          | 8 A | 8 A<br>(-H) | 16 A  | 25 A  | 36 A  | 50 A<br>(-33) | 50 A<br>(-34) | 64 A<br>(-33) | 64 A<br>(-34) | 80 A     | 110 A    | 180 A  | 280 A  |
|----------|-----|-------------|-------|-------|-------|---------------|---------------|---------------|---------------|----------|----------|--------|--------|
| <b>A</b> | 180 | 200         | 200   | 200   | 200   | 200           | 200           | 200           | 200           | 400      | 400      | 510    | 700    |
| <b>B</b> | 115 | 150         | 150   | 150   | 150   | 150           | 150           | 150           | 150           | 170      | 170      | 180    | 260    |
| <b>C</b> | 60  | 65          | 65    | 65    | 65    | 65            | 65            | 65            | 80            | 90       | 90       | 133    | 155    |
| <b>D</b> | 85  | 120         | 120   | 120   | 120   | 120           | 120           | 120           | 120           | 350      | 350      | 360    | 530    |
| <b>E</b> | 115 | 115         | 115   | 115   | 115   | 115           | 115           | 115           | 115           | 373      | 373      | 470    | 660    |
| <b>F</b> | 100 | 136         | 136   | 136   | 136   | 136           | 136           | 136           | 136           | 130      | 130      | 156    | 220    |
| <b>G</b> | 6.5 | 6.5         | 6.5   | 6.5   | 6.5   | 6.5           | 6.5           | 6.5           | 6.5           | 15 x 6.5 | 15 x 6.5 | 16 x 9 | 16 x 9 |
| <b>H</b> | 1   | 1           | 1     | 1     | 1     | 1             | 1             | 1             | 1             | 1        | 1        | 4      | 4      |
| <b>I</b> | 17  | 17          | 17    | 25    | 25    | 25            | 39            | 25            | 39            | 39       | 45       | 83     | 110    |
| <b>J</b> | M6  | M6          | M6    | M6    | M6    | M6            | M6            | M6            | M6            | M10      | M10      | M10    | M10    |
| <b>K</b> | 13  | 19.25       | 19.25 | 19.25 | 19.25 | 19.25         | 18.75         | 19.25         | 18.75         | 40       | 40       | 25     | 30     |
| <b>L</b> | 17  | 17          | 17    | 18.4  | 18.4  | 18.4          | 17            | 18.4          | 17            | 70       | 70       | 85     | 100    |

All dimensions in mm; 1 inch = 25.4 mm

Tolerances according: ISO 2768-m / EN 22768-m

## Filter input/output connector cross sections

|                           | -29   | -33   | -34   | -35   | -36   | -37   |
|---------------------------|---|---|---|---|---|---|
|                           |  |  |  |  |  |  |
| <b>Solid wire</b>         | 6 mm <sup>2</sup>   | 16 mm <sup>2</sup>  | 35 mm <sup>2</sup>  | 50 mm <sup>2</sup>  | 95 mm <sup>2</sup>  | 150 mm <sup>2</sup>   |
| <b>Flex wire</b>          | 4 mm <sup>2</sup>   | 10 mm <sup>2</sup>  | 25 mm <sup>2</sup>  | 50 mm <sup>2</sup>  | 95 mm <sup>2</sup>  | 150 mm <sup>2</sup>   |
| <b>AWG type wire</b>      | AWG 10  | AWG 6   | AWG 2   | AWG 1/0   | AWG 4/0   | AWG 6/0   |
| <b>Recommended torque</b> | 0.6-0.8 Nm  | 1.5-1.8 Nm  | 4.0-4.5 Nm  | 7-8 Nm  | 17-20 Nm  | 27-30 Nm  |

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



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