

# High-Performance EMC/RFI Filter for Conventional and Regenerative Drives



- High performance filter for extremely noisy applications
- Ideal for the latest regenerative drives (with additional line-impedance)
- Significantly improves the reliability and immunity of installations
- Enables compliance with Class B limits even with very long cables

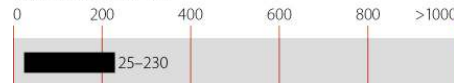


## Performance indicators

Attenuation performance



Rated current [A]



## Technical specifications

|                                           |                                                                                  |
|-------------------------------------------|----------------------------------------------------------------------------------|
| Design corresponding to                   | UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939                                       |
| Flammability corresponding to             | UL 94 V-2 or better                                                              |
| High potential test voltage               | P → E 2750 VDC for 2 sec<br>P → P 2250 VDC for 2 sec                             |
| Maximum continuous operating voltage      | 3x 520/300 VAC (480 VAC +10% possible)                                           |
| MTBF @ 50°C/400V (Mil-HB-217F)            | >300,000 hours                                                                   |
| Operating frequency                       | dc to 60 Hz                                                                      |
| Overload capability                       | 4x rated current at switch on,<br>1.5x rated current for 1 minute, once per hour |
| Protection category                       | IP20                                                                             |
| Rated currents                            | 25 to 230 A @ 50 °C                                                              |
| Temperature range (operation and storage) | -25 °C to +100 °C (25/100/21)                                                    |

## Approvals



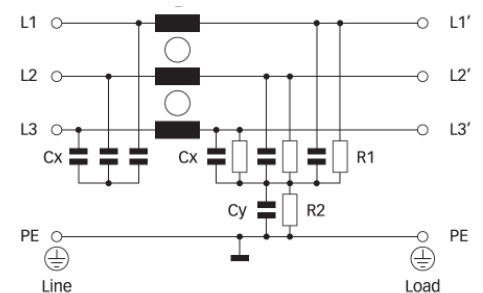
## Features and benefits

- High-performance filter for mainly industrial motor drive applications with extremely high noise levels, providing sufficient interference suppression to achieve Class B even with very long motor cables (e.g. machine tools with up to 12 axes with ~10 to 20 m cables each)
- Broadband attenuation performance and exceptional saturating resistance ensure reliable interference suppression also in applications with regenerative drives (with an additional line impedance)
- FN 3120 operated on the mains input of machines or equipment contributes significantly to the reliability and immunity by offering protection against conducted interference phenomena coming from the environment
- Solid, touch-safe terminal blocks offer sufficient contacting cross section according to the EN 60204-1 installation standard, which is very common for industrial equipment like machine tools
- Compact dimensions and light weight design with good accessibility for automatic and hand tools guarantee a simple time and space-saving installation

## Typical applications

Mainly industrial equipment, machinery and machine tools such as printing machines, packaging machines, extruders, wood working machines, milling and drilling machines, laser cutting machines, welding machines, robotics, conveyors, assembly lines, pumps, oil production, chemical and mining industry, etc. The filters are ideal for most motor drive applications and particularly for regenerative drives.

## Typical electrical schematic



## Filter selection table

| Filter                 | Rated current<br>@ 50 °C (40 °C) | Typical drive<br>power rating* | Leakage current**<br>@ 480 VAC/50 Hz | Power loss<br>@ 25 °C/50 Hz | Input/Output<br>connections                                                         | Weight |
|------------------------|----------------------------------|--------------------------------|--------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|--------|
|                        | [A]                              | [kW]                           | [mA]                                 | [W]                         |  | [kg]   |
| <b>FN 3120H-25-33</b>  | 25 (27)                          | 15                             | 97.9                                 | 17.1                        | -33                                                                                 | 2.4    |
| <b>FN 3120H-50-53</b>  | 50 (54)                          | 30                             | 97.9                                 | 17.5                        | -53                                                                                 | 2.7    |
| <b>FN 3120H-80-35</b>  | 80 (87)                          | 45                             | 97.9                                 | 25.9                        | -35                                                                                 | 5.0    |
| <b>FN 3120H-110-35</b> | 110 (120)                        | 55                             | 97.9                                 | 25.4                        | -35                                                                                 | 6.1    |
| <b>FN 3120H-150-40</b> | 150 (164)                        | 75                             | 97.9                                 | 40.5                        | -40                                                                                 | 6.3    |
| <b>FN 3120H-230-40</b> | 230 (230)                        | 132                            | 97.9                                 | 33.5                        | -40                                                                                 | 13.3   |

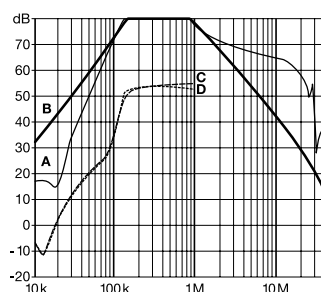
\* Calculated at rated current, 480 VAC and  $\cos \phi = 0.8$ . The exact value depends upon the efficiency of the drive, the motor and the entire application.

\*\* Maximum leakage under normal operating conditions. Note: if two phases are interrupted, worst case leakage could reach 5.4 times higher levels.

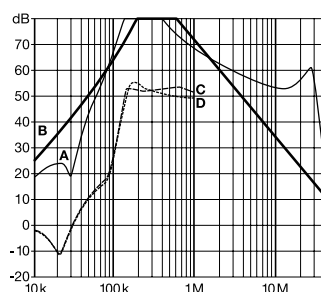
## Typical filter attenuation

Per CISPR 17; A = 50  $\Omega$ /50  $\Omega$  sym; B = 50  $\Omega$ /50  $\Omega$  asym; C = 0.1  $\Omega$ /100  $\Omega$  sym; D = 100  $\Omega$ /0.1  $\Omega$  sym

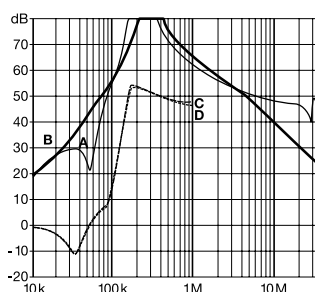
25 A types



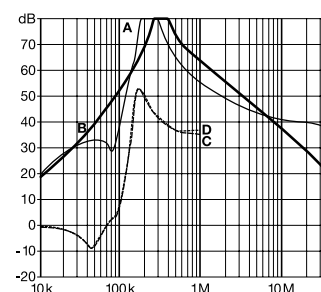
50 to 110 A types



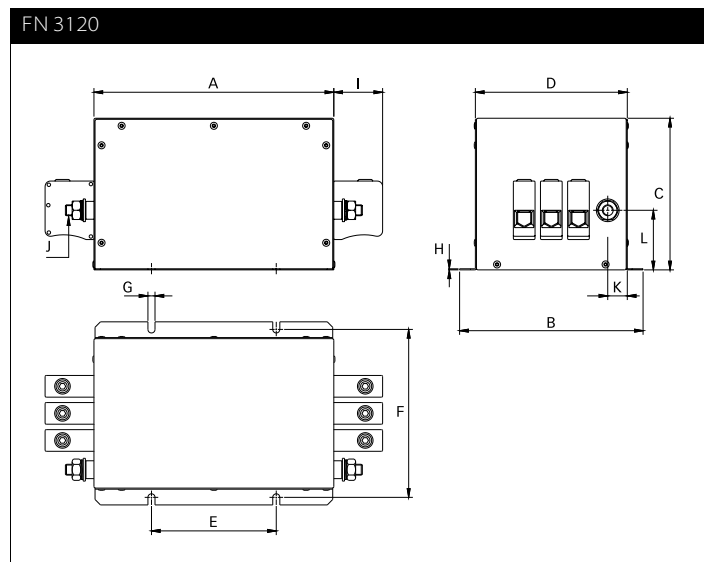
150 A types



230 A types



## Mechanical data



## Dimensions

|          | 25 A | 50 A  | 80 A | 110 A | 150 A | 230 A            |
|----------|------|-------|------|-------|-------|------------------|
| <b>A</b> | 214  | 214   | 221  | 221   | 221   | 300              |
| <b>B</b> | 159  | 159   | 169  | 169   | 169   | 168              |
| <b>C</b> | 64   | 64    | 140  | 140   | 140   | 140              |
| <b>D</b> | 129  | 129   | 140  | 140   | 140   | 140              |
| <b>E</b> | 115  | 115   | 115  | 115   | 115   | 165 (82.5/82.5)* |
| <b>F</b> | 145  | 145   | 155  | 155   | 155   | 155              |
| <b>G</b> | 6.5  | 6.5   | 6.5  | 6.5   | 6.5   | 6.5              |
| <b>H</b> | 1    | 1     | 1    | 1     | 1     | 1                |
| <b>I</b> | 25   | 29.45 | 45   | 45    | 51    | 51               |
| <b>J</b> | M5   | M6    | M10  | M10   | M10   | M10              |
| <b>K</b> | 21.5 | 24.5  | 18   | 18    | 13    | 13               |
| <b>L</b> | 26   | 35    | 55   | 55    | 62    | 62               |

\* 230 A filters provide 2 additional mounting slots, to do justice to the additional product weight. They are located right in the center of those mounting slots shown in the drawing above (82.5/82.5 → 165 mm).

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

## Filter input/output connector cross sections

|                           | -33                                                                                | -35                                                                                 | -40                                                                                  | -53                                                                                  |
|---------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                           |  |  |  |  |
| <b>Solid wire</b>         | 16 mm <sup>2</sup>                                                                 | 50 mm <sup>2</sup>                                                                  | 95 mm <sup>2</sup>                                                                   | 25 mm <sup>2</sup>                                                                   |
| <b>Flex wire</b>          | 10 mm <sup>2</sup>                                                                 | 50 mm <sup>2</sup>                                                                  | 95 mm <sup>2</sup>                                                                   | 16 mm <sup>2</sup>                                                                   |
| <b>AWG type wire</b>      | AWG 6                                                                              | AWG 1/0                                                                             | AWG 4/0                                                                              | AWG 4                                                                                |
| <b>Recommended torque</b> | 1.5-1.8Nm                                                                          | 7-8Nm                                                                               | 17-20Nm                                                                              | 2.0-2.3Nm                                                                            |

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