

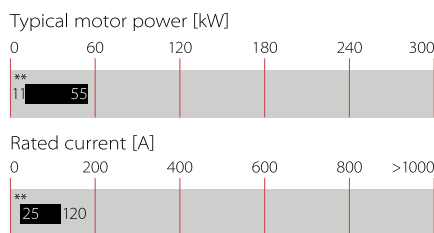
# Add-on Sine Wave Module for Common-mode Voltage Improvement



- Additional module for use with FN 5020 and FN5040/45 sine wave filters
- Reduction of common-mode interferences on motor cables
- Improvement of EMC environment
- Elimination of motor bearing damages
- Possibility to use very long unshielded motor cables
- Improvement of system reliability



### Performance indicators



### Approvals

## ROHS

### Features and benefits

- Add-on output filter module for the use with FN 5040/45 or FN 5020 sine wave output filters with corresponding current rating
- Elimination of premature motor failure caused by bearing damage
- Eliminates interference propagation towards components or conductors in the vicinity
- Restricts pulse currents to ground and hence limits leakage currents in the PE
- Allows the use of extremely long unshielded motor cables without causing radiation problems (EN 55014, MDS clamp)
- Reduces the required EMI suppression efforts on the line side
- Allows the use of lower rated drives with long motor cables due to lower losses in the IGBTs and in the motor cable
- Suitable for rotating fields up to 600 Hz

### Technical specifications

|  |  |
|--|--|
| <b>Maximum continuous operating voltage</b>      | 3x 500/288 VAC                                       |
| <b>dc link voltage</b>                           | 1000 VDC max.  |
| <b>Motor frequency</b>                           | 0 to 600 Hz  |
| <b>Switching frequency</b>                       | 6 to 15 kHz  |
| <b>Rated currents</b>                            | 25 to 120 A @ 50°C                                   |
| <b>Motor cable length</b>                        | 1000 m max. (in combination with FN 5020 only)       |
| <b>High potential test voltage</b>               | P → E 2000 VAC for 2 sec<br>P → P 1100 VDC for 2 sec |
| <b>Protection category</b>                       | IP 20  |
| <b>Overload capability</b>                       | 1.5x rated current for 1 minute, once per hour       |
| <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 @ 50°C/400 V (Mil-HB-217F)</b>           | >100,000 hours                                       |
| <b>Lifetime (calculated)</b>                     | >10 years (25, 55 A)<br>~5 years (75, 120 A)         |


### Typical applications

- Motor drive applications with extremely long motor cables
- Motor drive applications with unshielded motor cables
- Motor drives and motors in high-speed applications
- Mission critical applications
- Applications with multiple parallel motors
- Retrofit of motor drives into existing installations with old wiring and motors

### Important note

FN 5030 are additional common-mode modules. They can NOT work alone! FN 5030 have to be operated downstream of a regular (symmetrical) sine wave output filter. Possible combinations are FN 5020/FN 5030 for motor frequencies up to 600 Hz, or FN 5040/45/FN 5030 for max. 70 Hz. For additional information please consult the Schaffner application note „Sinus Plus – New Output Filter Concept for Power Drive Systems“.

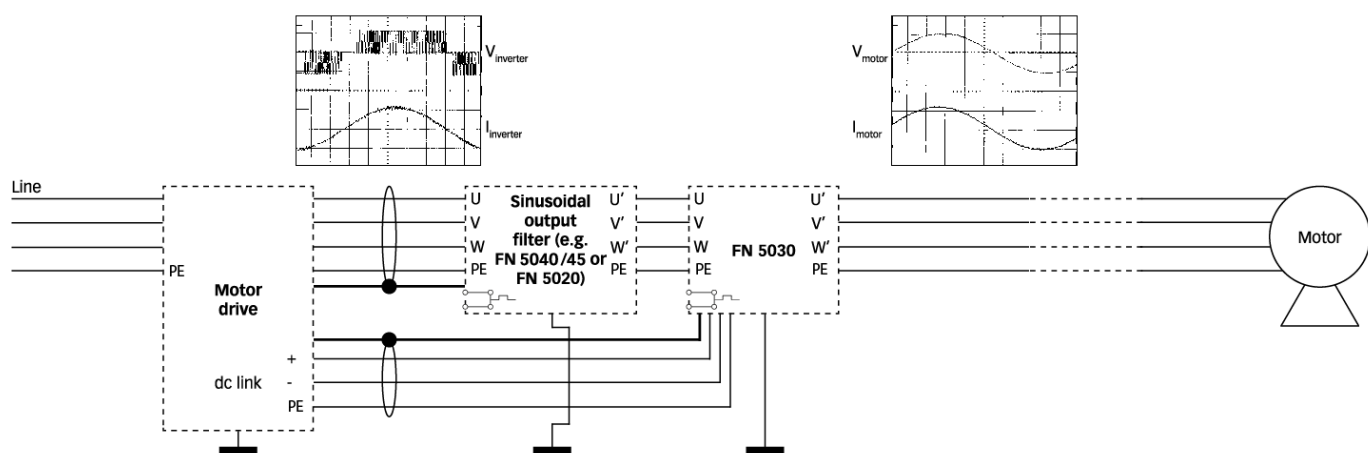
## Filter selection table

| Filter         | Rated current | Typical motor power rating* | Typical power loss** | Output connections  | Weight |
|----------------|---------------|-----------------------------|----------------------|---|--------|
|                | @ 50°C        |                             |                      |   |        |
|                | [A]           | [kW]                        | [W]                  |  | [kg]   |
| FN 5030-25-33  | 25            | 15                          | n.a.                 | -33   | 13     |
| FN 5030-55-34  | 55            | 30                          | n.a.                 | -34   | 14     |
| FN 5030-75-35  | 75            | 45                          | n.a.                 | -35   | 27     |
| FN 5030-120-35 | 120           | 75                          | n.a.                 | -35   | 40     |

\* General purpose four-pole (1500 r/min) AC induction motor rated 480 V/50 Hz.

\*\* Exact value highly depends upon the motor cable type and length, switching frequency, motor frequency and further stray parameters within the system. Please contact your local Schaffner partner for individual application support.

## Typical block schematic



## Temperature monitoring function

All filters of this range are equipped with a temperature monitoring function. The built-in temperature sensor opens a potential-free contact in the case of filter overtemperature (>120°C).

The maximum switching capability is 6 A/250 V. This function can be used, for example, in the input of a CNC controller or as the trip of a circuit breaker in order to interrupt the mains power supply. Connections are located next to the phase connectors (see mechanical data for details).

## Forced cooling

The 75 A and 120 A filters provide internal cooling fans which require external power supply (24 VDC/~4 W). Connections are located next to the connectors of the temperature sensor (see mechanical data for details).

## Connection to the dc link

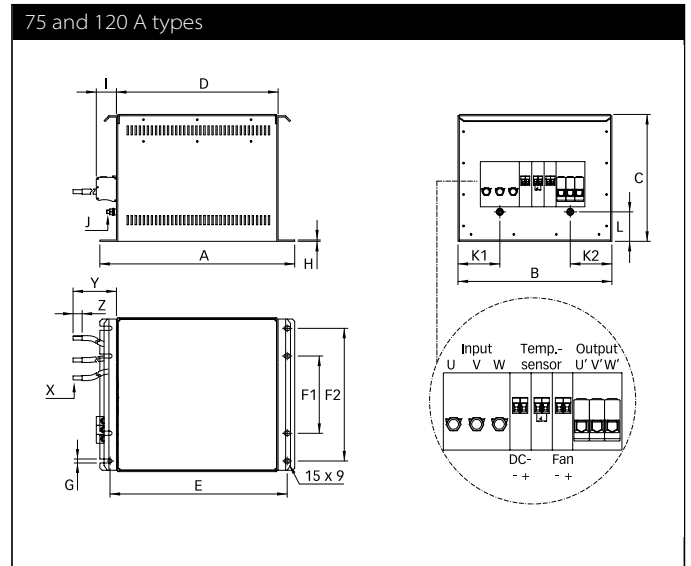
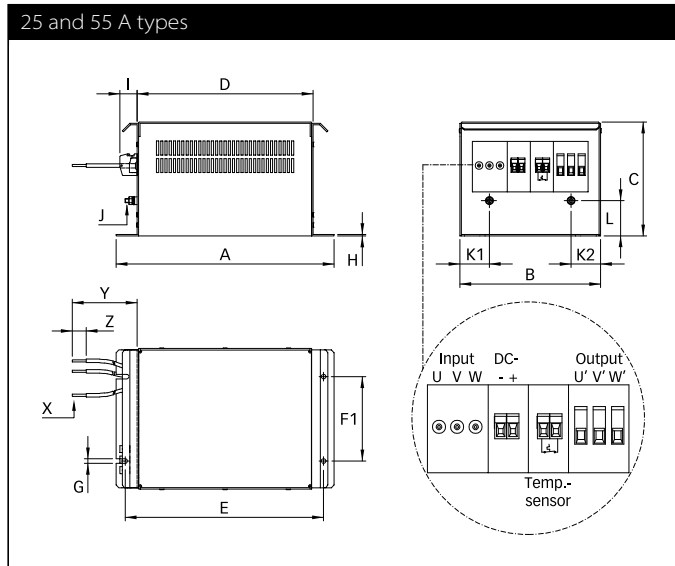
For best results, the connection to the dc link of the motor drive is required with this series of filters.

If only one connection to the dc link is brought out of the drive («+» or «-») then the dc link cable connections from the filter (identified by «DC+» and «DC-») must be connected together to the «+» or «-» motor drive connection.

The operation of the add-on sine wave output filter is not seriously affected as a result. The «+» and «-» connections on the motor drive must never be connected together. Otherwise a short-circuit will result.

The PWM switching frequency must lie within the range from 6 to 15 kHz in order to ensure satisfactory operation of the filter. A lower switching frequency or a pure square wave is unsuitable and will result in the motor drive switching off with the error message «overcurrent» or «short to earth».

### Mechanical data



### Dimensions

|           | 25 A        | 55 A        | 75 A               | 120 A              |
|-----------|-------------|-------------|--------------------|--------------------|
| <b>A</b>  | 310         | 354         | 434                | 434                |
| <b>B</b>  | 200         | 250         | 343                | 343                |
| <b>C</b>  | 162         | 200         | 283                | 283                |
| <b>D</b>  | 246         | 300         | 360                | 360                |
| <b>E</b>  | 280         | 324         | 395                | 395                |
| <b>F1</b> | 120         | 170         | 172                | 172                |
| <b>F2</b> |             |             | 296                | 296                |
| <b>G</b>  | 6.5         | 9           | 9                  | 9                  |
| <b>H</b>  | 2           | 3           | 3                  | 3                  |
| <b>I</b>  | 25          | 39          | 45                 | 45                 |
| <b>J</b>  | M6          | M6          | M8                 | M8                 |
| <b>K1</b> | 42          | 70          | 93                 | 93                 |
| <b>K2</b> | 42          | 55          | 93                 | 93                 |
| <b>L</b>  | 50          | 66          | 66                 | 66                 |
| <b>X</b>  | AWG 10      | AWG 6       | 25 mm <sup>2</sup> | 35 mm <sup>2</sup> |
| <b>Y</b>  | 1000 +20/-0 | 1000 +20/-0 | 1000 +20/-0        | 1000 +20/-0        |
| <b>Z</b>  | 20          | 20          | 20                 | 20                 |

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

### Filter output connector cross sections

|                           | -29               | -33                | -34                | -35                |
|---------------------------|-------------------|--------------------|--------------------|--------------------|
|                           |                   |                    |                    |                    |
| <b>Solid wire</b>         | 6 mm <sup>2</sup> | 16 mm <sup>2</sup> | 35 mm <sup>2</sup> | 50 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> |
| <b>AWG type wire</b>      | AWG 10            | AWG 6              | AWG 2              | AWG 1/0            |
| <b>Recommended torque</b> | 0.6-0.8 Nm        | 1.5-1.8 Nm         | 4.0-4.5 Nm         | 7-8 Nm             |

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



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