EMC/EMI Filter for PV Inverters

- Reduces conducted emissions towards the solar panel
- Reduces the probability of EMI radiation off the solar panel
- Helps to prevent pre-mature panel aging because of HF leakage currents
- Helps to meet international EMC regulations for the entire PV system
- Most compact standard solution in the industry, optionally available without capacitors to ground (B types)
- New: up to 2300 A

### Technical specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Maximum continuous operating voltage</td>
<td>Max. 1200 VDC</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>DC</td>
</tr>
<tr>
<td>Rated currents</td>
<td>25 to 2300 A @ 55°C</td>
</tr>
<tr>
<td>High potential test voltage</td>
<td>P -&gt; E 3600 VDC for 2 sec</td>
</tr>
<tr>
<td>Protection category</td>
<td>IP 20 (25 to 150 A types), IP 00 (250 to 2300 A types)</td>
</tr>
<tr>
<td>Overload capability</td>
<td>4x rated current at switch on, 1.5x rated current for 1 minute, once per hour</td>
</tr>
<tr>
<td>Temperature range (operation and storage)</td>
<td>-40°C to +100°C (40/100/21)</td>
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<tr>
<td>Design corresponding to</td>
<td>UL 1283, CSA 22.2 No. 8, IEC/EN 60939</td>
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<tr>
<td>Flammability corresponding to</td>
<td>UL 94 V-2 or better</td>
</tr>
<tr>
<td>MTBF @ 55°C/1200 V (Mil-HB-217F)</td>
<td>min. 223,000 hours</td>
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</table>

### Features and benefits

FN 2200 range of standard EMC/EMI filters is based on Schaffner’s years of experience in custom filter design for the global photovoltaic (PV) inverter industry. Installed between the PV inverter and the solar panel, FN 2200 DC filters help to control conducted emissions on the panel side of the system and therefore significantly reduce the potential for high-frequency (HF) interference radiation off the panel. The filter also protects the solar panel from HF stray and leakage currents which can cause pre-mature aging in the PV modules.

### Typical applications

FN 2200 are primarily designed for PV inverters. However, they can potentially also be used in other DC applications within published specifications, like UPS, DC motor drives, or DC quick chargers.
## Filter selection table

<table>
<thead>
<tr>
<th>Filter</th>
<th>Buy</th>
<th>Rated current @ 55°C (40°C) [A]</th>
<th>Typical inverter AC power rating* [kW]</th>
<th>Filter efficiency @ 25°C/DC [%]</th>
<th>Power loss @ 25°C/DC [W]</th>
<th>Input/Output connections</th>
<th>Weight [kg]</th>
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</thead>
<tbody>
<tr>
<td>FN2200-25-33</td>
<td>v</td>
<td>25 (28)</td>
<td>10</td>
<td>&gt; 99.9</td>
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<td>FN2200-50-34</td>
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<td>50 (57)</td>
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<td>&gt; 99.9</td>
<td>17</td>
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<td>FN2200-75-34</td>
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<td>FN2200-100-35</td>
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<td>FN2200-150-40</td>
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<td>150 (173)</td>
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<td>250 (288)</td>
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<td>FN2200-400-99</td>
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<td>400 (460)</td>
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<td>FN2200-2300-99</td>
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* Based on rated DC current of typical 3-phase PV inverters with 900 VDC input. Note: depending upon manufacturer and model, DC currents for a given PV inverter power can differ significantly. Filters with higher current ratings for large central inverters up to the MW range are available upon request.

## Distribution inventory

Up-to-date inventory levels for global distributors is available at [https://products.schaffner.com/stock](https://products.schaffner.com/stock)

## Typical filter attenuation

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

1. **PV modules**
2. **Schaffner FN 2200**
3. **Central Inverter**
4. **Schaffner magnetic components**
5. **Schaffner AC EMC/EMI filter**

### Mechanical data

#### 25 to 150 A types

#### 250 to 600 A types

#### 800 to 2300 A types

**Note:** All FN 2200 provide unsymmetrical mounting hole patterns to prevent inverse filter installation in the field. (Dimensions E1 E2 and F1/F2)
## Busbar connections

### 250 to 1000 A types

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<th>75 A</th>
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</tbody>
</table>

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

## Dimensions

### Filter input/output connector cross sections

<table>
<thead>
<tr>
<th>Connector cross section</th>
<th>250 A</th>
<th>500 A</th>
<th>1000 A</th>
<th>2300 A</th>
</tr>
</thead>
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<td>Solid wire</td>
<td>Ø 16</td>
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<td>Ø 50</td>
<td>Ø 95</td>
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<td>Flexible wire</td>
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<td>AWG type wire</td>
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<tr>
<td>Recommended torque</td>
<td>1.5-1.8 NM</td>
<td>4.0-4.5 NM</td>
<td>7-8 NM</td>
<td>17-20 NM</td>
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</tbody>
</table>

Please visit www.schaffner.com to find more details on filter connectors.
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