Single-phase EMC Filter for Control Equipment

Filter for the control line of complex equipment and machinery
- To ensure interference-free operation of control equipment (PLC, Motion-, Robot Control etc.)
- To improve operational reliability and system stability
- Compact EMC filter design with minimum space requirement

Performance indicators

<table>
<thead>
<tr>
<th>Attenuation performance</th>
<th>standard</th>
<th>high</th>
<th>very high</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated current [A]</td>
<td>0</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

Technical specifications

- Maximum continuous operating voltage: 250 VAC
- Operating frequency: DC to 400 Hz
- Rated currents: 6 to 16 A @ 50°C
- High potential test voltage:
  - P/N: E 2250VDC for 2 sec
  - P/N: N 1100VDC for 2 sec
- Protection category: IP 20
- Overload capability:
  - 4x rated current at switch on, 1.5x rated current for 1 minute, once per hour
- Temperature range (operation and storage):
  - -25°C to +100°C (25/100/21)
- Flammability corresponding to: UL 94 V-2 or better
- Design corresponding to: UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939
- MTBF @ 50°C/250 V (Mil-HB-217F): 1,300,000 hours

Approvals

- UL
- CSA
- CE

Features and benefits

- An additional filter for the supply cables of controls of rather large and complex systems, to ensure a reliable operation of the control unit.
- To achieve significant system stability improvement by reducing the risk of internal interference propagation and coupling.
- FN 2415 B version without leakage current (0 mA)
- FN 2415 L version with reduced leakage current of 3.5 mA.
- Simple and time-saving installation with good accessibility for automatic and hand tools
- Solid, touch-safe terminal blocks offering sufficient contacting cross section according to the EN 60204-1 installation standard
- By providing a very decent attenuation performance, FN 2415 contributes significantly to the achievement of electromagnetic compliance, e.g. EN50370-1 standards for machine tools.

Typical applications

Ideal for industrial equipment, machinery and diverse process automation systems, which involve any kind of control units (NC, CNC, Motion- and Robot Control(s)). Large and complex machine tools with multiple driving axes and very long motor cables can be subjected to major reliability problems, provoked and by internal coupling of interferences from the drive system to the control wires. This can cause drop outs and interrupts of the control unit and consequently lead to unnecessary downtimes of the entire machine. FN 2415 can also be used for most diverse single-phase applications, e.g. motor drives and power supplies.
## Filter selection table

<table>
<thead>
<tr>
<th>Filter</th>
<th>Rated current @40°C (25°C)</th>
<th>Leakage current*</th>
<th>Power loss</th>
<th>Inductance**</th>
<th>Capacitance**</th>
<th>Resistance**</th>
<th>Input/Output</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>FN 2415-6-29</td>
<td>6 (6.6)</td>
<td>7.85 (4.52)</td>
<td>2.2</td>
<td>8</td>
<td>3.3</td>
<td>100</td>
<td>220</td>
<td>-29</td>
</tr>
<tr>
<td>FN 2415-10-29</td>
<td>10 (11)</td>
<td>7.85 (4.52)</td>
<td>2.4</td>
<td>4.2</td>
<td>3.3</td>
<td>100</td>
<td>220</td>
<td>-29</td>
</tr>
<tr>
<td>FN 2415-16-29</td>
<td>16 (17.5)</td>
<td>7.85 (4.52)</td>
<td>4.3</td>
<td>3</td>
<td>3.3</td>
<td>100</td>
<td>220</td>
<td>-29</td>
</tr>
<tr>
<td>FN 2415B-6-29</td>
<td>6 (6.6)</td>
<td>0.00 (0.00)</td>
<td>2.2</td>
<td>8</td>
<td>3.3</td>
<td>220</td>
<td>-29</td>
<td>0.4</td>
</tr>
<tr>
<td>FN 2415B-10-29</td>
<td>10 (11)</td>
<td>0.00 (0.00)</td>
<td>2.4</td>
<td>4.2</td>
<td>3.3</td>
<td>220</td>
<td>-29</td>
<td>0.4</td>
</tr>
<tr>
<td>FN 2415B-16-29</td>
<td>16 (17.5)</td>
<td>0.00 (0.00)</td>
<td>4.3</td>
<td>3</td>
<td>3.3</td>
<td>220</td>
<td>-29</td>
<td>0.4</td>
</tr>
<tr>
<td>FN 2415L-6-29</td>
<td>6 (6.6)</td>
<td>2.59 (1.49)</td>
<td>2.2</td>
<td>8</td>
<td>3.3</td>
<td>33</td>
<td>220</td>
<td>-29</td>
</tr>
<tr>
<td>FN 2415L-10-29</td>
<td>10 (11)</td>
<td>2.59 (1.49)</td>
<td>2.4</td>
<td>4.2</td>
<td>3.3</td>
<td>33</td>
<td>220</td>
<td>-29</td>
</tr>
<tr>
<td>FN 2415L-16-29</td>
<td>16 (17.5)</td>
<td>2.59 (1.49)</td>
<td>4.3</td>
<td>3</td>
<td>3.3</td>
<td>33</td>
<td>220</td>
<td>-29</td>
</tr>
</tbody>
</table>

* Maximum leakage under normal operating conditions (acc. to 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%

*** Value of both inductors in the same

---

## Typical filter attenuation

Per CISPR 17, DM (differential mode) =50 Ω/50 Ω sym; CM (common mode)=50 Ω/50 Ω asym

### 6 A type

![Typical filter attenuation 6 A type](image)

### 10 A type

![Typical filter attenuation 10 A type](image)

### 16 A type

![Typical filter attenuation 16 A type](image)

---

## Mechanical Data

![Mechanical Data](image)

## Filter input/output connector cross sections

<table>
<thead>
<tr>
<th>Solid wire</th>
<th>Flex wire</th>
<th>AWG type wire</th>
<th>Recommended torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 mm²</td>
<td>4 mm²</td>
<td>AWG 10</td>
<td>0.6-0.8 Nm</td>
</tr>
</tbody>
</table>

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

---

All dimensions in mm; 1 inch = 25.4 mm; Tolerances according ISO 2768-m/EN 22768-m
The content of this document has been carefully checked and understood. However, neither Schaffner nor its subsidiaries assume any liability whatsoever for any errors or inaccuracies of this document and the consequences thereof. Published specifications are subject to change without notice. Product suitability for any area of application must ultimately be determined by the customer. In all cases, products must never be operated outside their published specifications. Schaffner does not guarantee the availability of all published products. This disclaimer shall be governed by substantive Swiss law and resulting disputes shall be settled by the courts at the place of business of Schaffner Holding AG. Latest publications and a complete disclaimer can be downloaded from the Schaffner website. All trademarks recognized.