LCL Filter for Active Front End Motor Drives and Active Infeed Converter

**Features and benefits**
- Improves the power quality for AFE (Active Front End) or AIC (Active Infeed Converter)
- Effective attenuation of converter switching frequency to the grid/line side
- Reduces the current and voltage ripples to acceptable levels for the grid/line side
- Version with passive RLC damping module for system stability
- Compact and user friendly design for ease of installation

**Typical applications**
- Hoists and cranes
- Elevators
- Test stands
- Winder/Unwinder
- Multiple motor drive systems with active infeed converter
- Motor drives and -systems with braking energy
- Special machines with high inertia
- Centrifuges
- Transportation systems, e.g. chair lifts etc

**Technical specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal operating voltage</td>
<td>3 x 380...480 VAC</td>
</tr>
<tr>
<td>Rated operating voltage</td>
<td>3 x 340...530 VAC</td>
</tr>
<tr>
<td>Nominal line frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Switching frequency fPWM</td>
<td>min. 3 kHz up to max. 10 kHz</td>
</tr>
<tr>
<td>Rated currents</td>
<td>25 to 380 A @ 50°C</td>
</tr>
<tr>
<td>Rated inductance L2 (inverter/converter side)</td>
<td>8% @ 400V, 50 Hz and rated current</td>
</tr>
<tr>
<td>Rated inductance L1 (grid/line side)</td>
<td>4% @ 400V, 50 Hz and rated current</td>
</tr>
<tr>
<td>Overload capability</td>
<td>1.6 x rated current for 1 min, ones per hour</td>
</tr>
<tr>
<td>Protection category</td>
<td>P 00/IP 20 on request</td>
</tr>
<tr>
<td>Ambient temperature range</td>
<td>-25°C to +50°C full operation</td>
</tr>
<tr>
<td></td>
<td>&gt;50°C to 70°C derated operation</td>
</tr>
<tr>
<td></td>
<td>-25°C to 85°C storage and transportation</td>
</tr>
<tr>
<td>Insulation class</td>
<td>EIS 200</td>
</tr>
<tr>
<td>Flammability corresponding to</td>
<td>UL 94 V-0</td>
</tr>
<tr>
<td>Design corresponding to</td>
<td>Filter: UL61800-5-1, EN61800-5-1</td>
</tr>
<tr>
<td></td>
<td>Chokes: EN61558-2-20 or EN60076-6</td>
</tr>
<tr>
<td>Creepage and clearance distances</td>
<td>According UL 61800-5-1</td>
</tr>
</tbody>
</table>

*Note: for detailed resulting ripple current, please contact your local Schaffner office or partner.*
### Filter selection table

<table>
<thead>
<tr>
<th>Filter</th>
<th>Rated current @ 50°C [A]</th>
<th>*Typical motor drive 400 V/50 Hz [kVA]</th>
<th>Frame size</th>
<th>Nominal inductance L2 [mH]</th>
<th>Nominal inductance L1 [mH]</th>
<th>Nominal C capacity [µF]</th>
<th>Typical power loss** [W]</th>
<th>Input/Output connections</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>with RLC damping module:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FN 6840-25-113-E0XXR</td>
<td>25</td>
<td>17</td>
<td>D</td>
<td>2.35</td>
<td>1.22</td>
<td>30</td>
<td>390</td>
<td>-113</td>
<td>26</td>
</tr>
<tr>
<td>FN 6840-50-115-E0XXR</td>
<td>50</td>
<td>35</td>
<td>E</td>
<td>1.18</td>
<td>0.61</td>
<td>60</td>
<td>580</td>
<td>-115</td>
<td>47</td>
</tr>
<tr>
<td>FN 6840-80-115-E0XXR</td>
<td>80</td>
<td>55</td>
<td>F</td>
<td>0.74</td>
<td>0.33</td>
<td>100</td>
<td>750</td>
<td>-115</td>
<td>79</td>
</tr>
<tr>
<td>FN 6840-160-118-E0XXR</td>
<td>160</td>
<td>110</td>
<td>H</td>
<td>0.37</td>
<td>0.17</td>
<td>200</td>
<td>1430</td>
<td>-118</td>
<td>125</td>
</tr>
<tr>
<td>FN 6840-250-118-E0XXR</td>
<td>250</td>
<td>170</td>
<td>H</td>
<td>0.24</td>
<td>0.11</td>
<td>300</td>
<td>1880</td>
<td>-118</td>
<td>153</td>
</tr>
<tr>
<td>FN 6840-380-118-E0FAR</td>
<td>380</td>
<td>260</td>
<td>H</td>
<td>0.15</td>
<td>0.07</td>
<td>500</td>
<td>3005</td>
<td>-118</td>
<td>164</td>
</tr>
<tr>
<td>without damping module:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FN 6840-25-113-E0XXX</td>
<td>25</td>
<td>17</td>
<td>D</td>
<td>2.35</td>
<td>1.22</td>
<td>30</td>
<td>360</td>
<td>-113</td>
<td>24</td>
</tr>
<tr>
<td>FN 6840-50-115-E0XXX</td>
<td>50</td>
<td>35</td>
<td>E</td>
<td>1.18</td>
<td>0.61</td>
<td>60</td>
<td>525</td>
<td>-115</td>
<td>46</td>
</tr>
<tr>
<td>FN 6840-80-115-E0XXX</td>
<td>80</td>
<td>55</td>
<td>F</td>
<td>0.74</td>
<td>0.33</td>
<td>100</td>
<td>660</td>
<td>-115</td>
<td>77</td>
</tr>
<tr>
<td>FN 6840-160-118-E0XXX</td>
<td>160</td>
<td>110</td>
<td>H</td>
<td>0.37</td>
<td>0.17</td>
<td>200</td>
<td>1250</td>
<td>-118</td>
<td>123</td>
</tr>
<tr>
<td>FN 6840-250-118-E0XXX</td>
<td>250</td>
<td>170</td>
<td>H</td>
<td>0.24</td>
<td>0.11</td>
<td>300</td>
<td>1595</td>
<td>-118</td>
<td>148</td>
</tr>
<tr>
<td>FN 6840-380-118-E0FAX</td>
<td>380</td>
<td>260</td>
<td>H</td>
<td>0.15</td>
<td>0.07</td>
<td>500</td>
<td>2625</td>
<td>-118</td>
<td>159</td>
</tr>
<tr>
<td>Versions on special request***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FN6840-580-99-E0XX</td>
<td>580</td>
<td>400</td>
<td>S****</td>
<td>0.104</td>
<td>0.066</td>
<td>600</td>
<td>4890</td>
<td>-99</td>
<td></td>
</tr>
<tr>
<td>FN6840-810-99-E0XX</td>
<td>810</td>
<td>560</td>
<td>S****</td>
<td>0.073</td>
<td>0.041</td>
<td>1000</td>
<td>5553</td>
<td>-99</td>
<td></td>
</tr>
</tbody>
</table>

* Rated current @ 400 VAC/50 Hz. The proper power selection depends upon the drive specification, the motor and the application requirements.  
** Losses calculated at 400 VAC/50 Hz and 3 kHz switching frequency.  
*** Please contact your local sales office or partner for further information or fill in the questionnaire on https://products.schaffner.com/en/lcl-filter  
**** Active cooling required (>1000m³/h)

### Product selector

<table>
<thead>
<tr>
<th align="right">X:</th>
<th>without damping module</th>
</tr>
</thead>
<tbody>
<tr>
<td align="right">R:</td>
<td>with RLC damping module</td>
</tr>
<tr>
<td align="right">XX:</td>
<td>without fan and power supply (not for 380 A)</td>
</tr>
<tr>
<td align="right">FA:</td>
<td>with fan and power supply</td>
</tr>
<tr>
<td align="right">E0:</td>
<td>IP00 version</td>
</tr>
<tr>
<td align="right">E2:</td>
<td>IP20 version (on request)</td>
</tr>
</tbody>
</table>

### Temperature monitoring function

The temperature monitoring device opens a potential-free contact in the case of filter overtemperature (>180°C). The maximum switching capability is 5 A/240 V. **Important Note:** The switch MUST be used, for example, as an input of a logic controller (e.g. PLC, CNC etc.) or as the trip of a circuit breaker in order to interrupt the mains power supply.

### Required drives settings and grid considerations

Ensure the drive's switching frequency is set between the required minimum and maximum switching frequency. The max. permissible motor drives DC link voltage is 850 VDC. Check the drives manufacturer manual whether special settings are necessary. In any doubt contact the drives manufacturer.

**CAUTION:** If the Active Front End (AFE) motor drives or Active Infeed Converter (AIC) settings are not correct the filter may be damaged.
FN 6840 Mechanical data of IP00 design

**Dimensions**

<table>
<thead>
<tr>
<th>Frame size</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>U1</th>
<th>U2</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>540</td>
<td>180</td>
<td>11</td>
<td>560</td>
<td></td>
<td></td>
<td>489</td>
<td>260</td>
<td>238</td>
</tr>
<tr>
<td>E</td>
<td>680</td>
<td>220</td>
<td>11</td>
<td>705</td>
<td></td>
<td></td>
<td>633</td>
<td>290</td>
<td>285</td>
</tr>
<tr>
<td>F</td>
<td>730</td>
<td>250</td>
<td>11</td>
<td>752</td>
<td></td>
<td></td>
<td>682</td>
<td>340</td>
<td>326</td>
</tr>
<tr>
<td>H</td>
<td>1115</td>
<td>390</td>
<td>11</td>
<td>1150</td>
<td></td>
<td></td>
<td>1051</td>
<td>462</td>
<td>500</td>
</tr>
<tr>
<td>S</td>
<td>370</td>
<td>13.5</td>
<td>980</td>
<td>980</td>
<td>514</td>
<td>370</td>
<td>450</td>
<td>990</td>
<td></td>
</tr>
</tbody>
</table>

All dimensions in mm
Tolerances according: ISO 2768-m/EN 22768-m, if not stated otherwise

**Filter power terminals**

<table>
<thead>
<tr>
<th>Screw thread</th>
<th>Cross section</th>
<th>Flex wire AWG</th>
<th>Screw torque value</th>
<th>Max width** cable lug</th>
<th>Frame size</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6</td>
<td>0.75-16</td>
<td>6-18</td>
<td>3</td>
<td>16</td>
<td>D</td>
</tr>
<tr>
<td>M8</td>
<td>10-50</td>
<td>1/0-8</td>
<td>8</td>
<td>22</td>
<td>E, F</td>
</tr>
<tr>
<td>M10</td>
<td>70-240</td>
<td>3/0-500 kcmil</td>
<td>10</td>
<td>30</td>
<td>H</td>
</tr>
</tbody>
</table>

* Recommended connector type: wire or cable lug for 110 to 115, only cable lug for 115 to 118
** Proof final installation for clearance and creepage

**Filter signal and earth terminals**

<table>
<thead>
<tr>
<th>Terminal type</th>
<th>Screw thread</th>
<th>Screw torque value</th>
<th>Frame size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal</td>
<td>M3*</td>
<td>0.5</td>
<td>All</td>
</tr>
<tr>
<td>Earth (PE)</td>
<td>M8</td>
<td>9</td>
<td>D</td>
</tr>
<tr>
<td>Earth (PE)</td>
<td>M8</td>
<td>9</td>
<td>E</td>
</tr>
<tr>
<td>Earth (PE)</td>
<td>M10</td>
<td>17</td>
<td>F</td>
</tr>
<tr>
<td>Earth (PE)</td>
<td>M10</td>
<td>17</td>
<td>H</td>
</tr>
<tr>
<td>Earth (PE)</td>
<td>M12</td>
<td>20</td>
<td>S</td>
</tr>
</tbody>
</table>

* Max width cable lug = 7 mm

**Note:** For additional information please contact your local Schaffner office or partner.
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