LCL Filters FN 6840

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

- Line side LCL filtering for AFE and AIC applications
- Mandatory interface to connect the AFE or AIC-system to the grid
- Helps to improve the power quality on the grid side
- Reduces ripple currents and voltage distortions
- All LCL components in one package
- Compact design and ready to be connected

**Performance indicators**

<table>
<thead>
<tr>
<th>Typical motor power [kW]</th>
<th>0</th>
<th>11</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>125</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated current [A]</td>
<td>0</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>160</td>
<td>250</td>
<td>380</td>
</tr>
</tbody>
</table>

**Technical specifications**

- **Nominal operating voltage**: 3 x 380...480 VAC
- **Rated operating voltage**: 3 x 340...530 VAC
- **Nominal line frequency**: 50/60 Hz
- **Switching frequency fPWM**: min. 3 kHz up to max. 10 kHz
- **Rated currents**: 25 to 380 A @ 50°C
- **Rated inductance L2 (inverter/converter side)**: 8% @ 400V, 50 Hz and rated current
- **Rated inductance L1 (grid/line side)**: 4% @ 400V, 50 Hz and rated current
- **Overload capability**: 1.6 x rated current for 1 min., ones per hour
- **Filter performance**: Prerequisite: Grid supply by insulated transformer, Line impedance $L_{grid} \geq 1\%$
- **Protection category**: IP 00/IP 20 on request
- **Ambient temperature range**: -25°C to +50°C full operation, +50°C to 70°C derated operation, -25°C to 85°C storage and transportation
- **Insulation class**: EIS 200
- **Flammability corresponding to**: UL 94 V-0
- **Design corresponding to**: Filter: UL61800-5-1, Chokes: EN61558-2-20 or EN60076-6
- **Creepage and clearance distances**: According UL 61800-5-1

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

**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 passiv damping module for damping oscillation
- Compact and user friendly design for ease of installation

**Approvals**

**RoHS**

**Features and benefits**

- 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

**Typical electrical schematic**

**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
Filter selection table

<table>
<thead>
<tr>
<th>Filter</th>
<th>Rated current @ 50°C/50 Hz [A]</th>
<th>*Typical motor drive 400 V/50 Hz [kVA]</th>
<th>Frame size</th>
<th>Nominal inductance [mH]</th>
<th>Nominal capacity [mH]</th>
<th>Nominal C [uF]</th>
<th>Nominal R [Ohm]</th>
<th>Typical power loss** [W]</th>
<th>Input/Output connections</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L2</td>
<td>L1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with damping module:</td>
<td></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>11</td>
<td>D</td>
<td>2.35</td>
<td>1.22</td>
<td>30</td>
<td>15</td>
<td>510</td>
<td>-113</td>
<td>25</td>
</tr>
<tr>
<td>FN 6840-50-115-E0XXR</td>
<td>50</td>
<td>25</td>
<td>E</td>
<td>1.18</td>
<td>0.61</td>
<td>60</td>
<td>8.2</td>
<td>825</td>
<td>-115</td>
<td>47</td>
</tr>
<tr>
<td>FN 6840-80-115-E0XXR</td>
<td>80</td>
<td>37</td>
<td>F</td>
<td>0.74</td>
<td>0.33</td>
<td>100</td>
<td>4.7</td>
<td>1110</td>
<td>-118</td>
<td>79</td>
</tr>
<tr>
<td>FN 6840-160-118-E0XXR</td>
<td>160</td>
<td>75</td>
<td>H</td>
<td>0.37</td>
<td>0.17</td>
<td>200</td>
<td>2.2</td>
<td>2150</td>
<td>-118</td>
<td>125</td>
</tr>
<tr>
<td>FN 6840-250-118-E0XXR</td>
<td>250</td>
<td>125</td>
<td>H</td>
<td>0.24</td>
<td>0.11</td>
<td>300</td>
<td>1.5</td>
<td>3095</td>
<td>-118</td>
<td>153</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>
<td></td>
</tr>
<tr>
<td>FN 6840-25-113-E0XXX</td>
<td>25</td>
<td>11</td>
<td>D</td>
<td>2.35</td>
<td>1.22</td>
<td>30</td>
<td>360</td>
<td>-113</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>FN 6840-50-115-E0XXX</td>
<td>50</td>
<td>25</td>
<td>E</td>
<td>1.18</td>
<td>0.61</td>
<td>60</td>
<td>525</td>
<td>-115</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>FN 6840-80-115-E0XXX</td>
<td>80</td>
<td>37</td>
<td>F</td>
<td>0.74</td>
<td>0.33</td>
<td>100</td>
<td>660</td>
<td>-115</td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>FN 6840-160-118-E0XXX</td>
<td>160</td>
<td>75</td>
<td>H</td>
<td>0.37</td>
<td>0.17</td>
<td>200</td>
<td>1250</td>
<td>-118</td>
<td>123</td>
<td></td>
</tr>
<tr>
<td>FN 6840-250-118-E0XXX</td>
<td>250</td>
<td>125</td>
<td>H</td>
<td>0.24</td>
<td>0.11</td>
<td>300</td>
<td>1595</td>
<td>-118</td>
<td>148</td>
<td></td>
</tr>
<tr>
<td>with damping module and with fan:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FN 6840-380-118-E0FAR</td>
<td>380</td>
<td>200</td>
<td>H</td>
<td>0.15</td>
<td>0.073</td>
<td>500</td>
<td>1.0</td>
<td>4725</td>
<td>-118</td>
<td>159</td>
</tr>
<tr>
<td>without damping module and with fan:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FN 6840-380-118-E0FAX</td>
<td>380</td>
<td>200</td>
<td>H</td>
<td>0.15</td>
<td>0.073</td>
<td>500</td>
<td>2625</td>
<td>-118</td>
<td>164</td>
<td></td>
</tr>
</tbody>
</table>

* At rated current and 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.

Temperature monitoring function

The temperature monitoring device opens a potential-free contact in the case of filter overtemperature (>180ºC). The maximum switching capability is 5 A/240 V.

**Important Note:** The switch MUST be used, for example, as a 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 IP 00 enclosure**

**Frame size D-H**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>U</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>489</td>
<td>260</td>
<td>239</td>
</tr>
<tr>
<td>E</td>
<td>680</td>
<td>220</td>
<td>11</td>
<td>705</td>
<td>633</td>
<td>290</td>
<td>321</td>
</tr>
<tr>
<td>F</td>
<td>730</td>
<td>250</td>
<td>11</td>
<td>752</td>
<td>682</td>
<td>340</td>
<td>322</td>
</tr>
<tr>
<td>H</td>
<td>1115</td>
<td>390</td>
<td>11</td>
<td>1150</td>
<td>1051</td>
<td>462</td>
<td>500</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**</th>
<th>Frame size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(mm²)</td>
<td></td>
<td>(Nm)</td>
<td>cable lug</td>
<td></td>
</tr>
<tr>
<td>-113*</td>
<td>M6</td>
<td>0.75-16</td>
<td>6-18</td>
<td>3</td>
<td>D</td>
</tr>
<tr>
<td>-115*</td>
<td>M8</td>
<td>10-50</td>
<td>1/0-8</td>
<td>8</td>
<td>E, F</td>
</tr>
<tr>
<td>-118*</td>
<td>M10</td>
<td>70-240</td>
<td>3/0-500 kcmil</td>
<td>10</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>14</td>
<td>D</td>
</tr>
<tr>
<td>Earth (PE)</td>
<td>M8</td>
<td>14</td>
<td>E</td>
</tr>
<tr>
<td>Earth (PE)</td>
<td>M10</td>
<td>25</td>
<td>F</td>
</tr>
<tr>
<td>Earth (PE)</td>
<td>M10</td>
<td>25</td>
<td>H</td>
</tr>
</tbody>
</table>

* Max width cable lug = 7 mm

**Note:** For additional information please contact your local Schaffner office or partner.
Headquarters, global innovation and development

Schaffner Group
Nordstrasse 11
4542 Luterbach
T +41 32 681 66 26
info@schaffner.com

Sales and application centers

China
Schaffner EMC Ltd. Shanghai
T20-3 C, No 565 Chuangye Road, Pudong district
201201 Shanghai
T +86 21 3813 9500
cschina@schaffner.com
www.schaffner.com.cn

Finland
Schaffner Oy
Sauvonnirinne 19 H
08500 Lohja
T +358 50 468 7284
finlandsales@schaffner.com

France
Schaffner EMC S.A.S.
16-20 Rue Louis Rameau
95875 Bezons
T +33 1 34 34 30 60
francesales@schaffner.com

Germany
Schaffner Deutschland GmbH
Schoemperlenstrasse 128
76185 Karlsruhe
T +49 721 56910
francengermanysales@schaffner.com

India
Schaffner India Pvt. Ltd
REGUS WORLD TRADE CENTRE
WTC, 22nd Floor Unit No 2238, Brigade Gateway Campus, 26/1, Dr. Rajkumar Road
Malleshwaram (W)
560055 Bangalore
T +91 80 67935355
indiasales@schaffner.com

Italy
Schaffner EMC S.r.l.
Via Ticino, 30
20900 Monza (MB)
T +39 039 21 41 070
italysales@schaffner.com

Japan
Schaffner EMC K.K.
1-32-12, Kamiyuma, Setagaya-ku
7F Mitsui-seimei Sangenjaya Bldg.
154-0011 Tokyo
T +81 3 5712 3650
F +81 3 5712 3651
japansales@schaffner.com
www.schaffner.jp

Singapore
Schaffner EMC Pte Ltd.
#05-09, Kg Ubi Ind. Estate
408705 Singapore
T +65 6377 3283
F +65 6377 3281
singaporesales@schaffner.com

Taiwan R.O.C.
Schaffner EMV Ltd.
20 Floor-2, No 97, Section 1, XinTai 5th Road
22175 XZhi District New Taipei City 22175
T +886 2 2697 5500
F +886 2 2697 5533
taiwansales@schaffner.com

Thailand
Schaffner EMC Co. Ltd.
Northern Region Industrial Estate
67 Moo 4 Tambon Ban Klang
Amphur Muang P. O. Box 14
51000 Lamphun
T +66 53 58 11 04
F +66 53 58 10 19
thailandsales@schaffner.com

USA
Schaffner EMC Inc.
52 Mayfield Avenue
Edison, New Jersey
T +1 732 225 9533
F +1 732 225 4789
usasales@schaffner.com
www.schaffnerusa.com

Schaffner North America
6722 Thirlane Road
24019 Roanoke, Virginia
T +1 276 228 7943
F +1 276 228 7953

Schaffner North America
823 Fairview Road
24382 Wytheville, Virginia
T +1 732 228 7943
F +1 732 228 7953

Schaffner EMC España
Calle Calendula 93, Miniparc III, Edificio E
El Soto de Moraleja, Alcobendas
28109 Madrid
T +34 917 912 901
F +34 917 912 901
spainsales@schaffner.com
www.schaffner.com

Switzerland
Schaffner EMV Ltd.
20 Floor-2, No 97, Section 1, XinTai 5th Road
22175 XZhi District New Taipei City 22175
T +886 2 2697 5500
F +886 2 2697 5533
taiwansales@schaffner.com

Switzerland
Schaffner Group
Nordstrasse 11
4542 Luterbach
T +41 32 681 66 26
info@schaffner.com

© 2018 Schaffner Group

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.