Ecosine max, 480 VAC 50 Hz Economy Passive Harmonic Filters

Features and benefits

Schaffner ecosine harmonic filters represent an economical solution to the challenge of load-applied harmonics mitigation in three-phase power systems. With a plug-and-play approach and more compact dimensions than comparable products, they can be quickly installed and easily commissioned. They increase the reliability and service life of electric installations, help utilize electric system capacity better, and are the key to meet Power Quality standards such as IEEE 519. Ecosine filters reshape your distorted current back to the desired sinusoidal waveform. Schaffner ecosine filters can be applied to virtually any kind of power electronics with front-end six-pulse rectifiers, 3-phase diode or thyristor bridges, where harmonic current distortion needs to be reduced to defined limits.

Technical specifications

- **Nominal operating voltage**: 3 x 440 VAC to 480 VAC ±10%
- **Operating frequency**: 50 Hz ±1 Hz
- **Nominal motor drive input power rating**: 315 to 560 kW
- **Total harmonic current distortion THDi***: <8% @ rated power for drives without Ldc
- **Efficiency**: >99% for rated voltage and power
- **Overload capability**: 1.6x rated current for 1 minute, once per hour
- **SCCR**: 100 kA (UL approved)
- **High potential test voltage**: P -> E 2520 VAC (1s)
- **Overvoltage category**: OV III (IEC 60664-1)
- **Earthing System**: TN, TT, IT
- **Protection category**: IP 00
- **Cooling**: External cooling***
- **Ambient temperature range**: -25°C to +40°C fully operational
  - +40°C to +70°C derated operation****
  - -25°C to +85°C transport and storage
- **Design corresponding to**: Filter: UL 61800-5-1, EN 61800-5-1
  - Chokes: EN 60076-6
- **Flammability corresponding to**: UL 94 V-0
  - MTBF @ 40°C/480 V (MIL-HB-217F)
  - >200,000 hours

**Note**: performance specifications in this brochure refer to six-pulse diode rectifiers.

Typical electrical schematic

- **L_i**
- **L_o**
- **L_t**
- **TDJ/S**
- **C_t**
### Filter selection table with circuit breaker module

<table>
<thead>
<tr>
<th>Filter</th>
<th>Rated load power @ 480 V/50 Hz [kW]</th>
<th>Motor drive input current* [Arms]</th>
<th>Rated filter input current [Arms]</th>
<th>Required Ldc for 5% THD** [mH]</th>
<th>Typical power losses @ 40°C [W]</th>
<th>Circuit breaker rated current [A]</th>
<th>Weight [kg]</th>
<th>Terminal</th>
<th>Frame size</th>
</tr>
</thead>
<tbody>
<tr>
<td>FN 3481-315-99-E0XXSXX</td>
<td>315</td>
<td>564</td>
<td>393</td>
<td>0.094</td>
<td>2223</td>
<td>50</td>
<td>250</td>
<td>Busbar</td>
<td>S08</td>
</tr>
<tr>
<td>FN 3481-355-99-E0XXSXX</td>
<td>355</td>
<td>630</td>
<td>444</td>
<td>0.083</td>
<td>2274</td>
<td>50</td>
<td>272</td>
<td>Busbar</td>
<td>S08</td>
</tr>
<tr>
<td>FN 3481-400-99-E0XXSXX</td>
<td>400</td>
<td>701</td>
<td>501</td>
<td>0.074</td>
<td>2403</td>
<td>50</td>
<td>288</td>
<td>Busbar</td>
<td>S08</td>
</tr>
<tr>
<td>FN 3481-500-99-E0XXSXX</td>
<td>500</td>
<td>856</td>
<td>630</td>
<td>0.059</td>
<td>3240</td>
<td>50</td>
<td>376</td>
<td>Busbar</td>
<td>L08</td>
</tr>
<tr>
<td>FN 3481-560-99-E0XXSXX</td>
<td>560</td>
<td>947</td>
<td>709</td>
<td>0.053</td>
<td>3256</td>
<td>50</td>
<td>385</td>
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* Motor drive input current without harmonic filter.
** FN 3481 filters can be applied for drives with and without Ldc. 8% THD (at rated power) is achieved when FN3481 is applied to drives without Ldc, while 5% THD (at rated power) is achieved when there is a 4% Ldc present in the drive.

### Filter selection table with trap disconnect jumper

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### Earth terminals

<table>
<thead>
<tr>
<th>Earth (PE)</th>
<th>Screw thread</th>
<th>Screw torque value [Nm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>S08-L12</td>
<td>M12</td>
<td>20-25</td>
</tr>
</tbody>
</table>

### Frame size designation

XX

- 08 for 800 mm width
- 10 for 1000 mm width
- 12 for 1200 mm width
- S for max. 505 mm depth
- L for max. 557 mm depth
**Product selector**

FN 34nn-xxx-yyyy

- X with RC damper
- X without RC damper
- J with trap disconnect jumper
- S with switch
- X without jumper and without switch
- A with power supply
- X without power supply
- F with fan
- X without fan
- O for IP00
- 2 for IP20
- E for IP

Terminal designation

Power rating in kW (HP)

**Filter configurations**

**E0XXSXX**
- For rectifiers without DC-link choke
- Filters contain trap disconnect switch

**E0XXJXX**
- For rectifiers without DC-link choke
- Filters contain trap disconnect jumper
Mechanical data of IP 00 enclosure

**Dimensions**

<table>
<thead>
<tr>
<th>Frame size</th>
<th>W</th>
<th>D</th>
<th>H</th>
<th>R</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>T</th>
<th>LINE</th>
<th>LOAD</th>
<th>Recommended cabinet size WxDxH</th>
</tr>
</thead>
<tbody>
<tr>
<td>S08</td>
<td>max 680</td>
<td>max 505</td>
<td>1120</td>
<td>380</td>
<td>330</td>
<td>230</td>
<td>490</td>
<td>13.5</td>
<td>255 ± 10</td>
<td>470 ± 10</td>
<td>800x600x2000</td>
</tr>
<tr>
<td>S10</td>
<td>890</td>
<td>max 505</td>
<td>1120</td>
<td>370</td>
<td>514</td>
<td>n/a</td>
<td>280</td>
<td>13.5</td>
<td>255 ± 10</td>
<td>240 ± 10</td>
<td>1000x600x2000</td>
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<td>370</td>
<td>684</td>
<td>n/a</td>
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<td>230 ± 10</td>
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<td>max 680</td>
<td>557</td>
<td>1320</td>
<td>458</td>
<td>320</td>
<td>225</td>
<td>485</td>
<td>13.5</td>
<td>290 ± 10</td>
<td>540 ± 10</td>
<td>800x600x2000</td>
</tr>
<tr>
<td>L10</td>
<td>890</td>
<td>max 557</td>
<td>1320</td>
<td>455</td>
<td>504</td>
<td>n/a</td>
<td>285</td>
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<td>max 557</td>
<td>1320</td>
<td>455</td>
<td>674</td>
<td>n/a</td>
<td>285</td>
<td>13.5</td>
<td>290 ± 10</td>
<td>220 ± 10</td>
<td>1200x600x2000</td>
</tr>
</tbody>
</table>

* General tolerance: ISO 2768-v
  All dimensions (and tolerance) are in mm.

**Inlet air flow required for cooling**

<table>
<thead>
<tr>
<th>Frame size</th>
<th>Min air volume[^]</th>
</tr>
</thead>
<tbody>
<tr>
<td>S08, L08</td>
<td>1069 [m³/h]</td>
</tr>
<tr>
<td>S10, L10</td>
<td>1069 [m³/h]</td>
</tr>
<tr>
<td>S12, L12</td>
<td>1069 [m³/h]</td>
</tr>
</tbody>
</table>

* Complete cooling requirement, including air inlet placement, must be followed. Please consult the user manual.
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