dU/dt filters reduce the dU/dt values on the motor terminal phase-to-phase voltage – an issue that is important for short motor cables.

dU/dt filters are differential-mode filters which reduce motor terminal phase-to-phase peak voltage spikes and reduce the rise time to a level that lowers the stress on the insulation of motor windings.

Compared to sine-wave filters, the dU/dt filters have a cut-off frequency above the switching frequency. The voltage at the motor terminals is still PWM pulse shaped, but the rise time and Upeak are reduced. They are smaller, weigh less and have a lower price compared to sine-wave filters. Furthermore, because of the smaller inductance and capacitance, the dU/dt filters introduce a negligible reactance between inverter and motor and are therefore suitable for high dynamic applications.

Superior compared to output chokes
Output chokes cause undamped oscillations at the motor terminals which increase the risk of double pulsing and over-voltages higher than twice the DC link voltage. The dU/dt filters are low-pass L-C filters with a well defined cut-off frequency. Therefore the ringing oscillations at the motor terminals are damped and there is a reduced risk of double pulsing and voltage peaks.

Quality and Design
All dU/dt filters are designed and tested for operation with the VLT® AutomationDrive FC 302, VLT® AQUA Drive FC 202, and the VLT® HVAC Drive FC 102. They are designed to match the look and quality of the VLT® FC series drives.

Advantages
- Compatible with all control principles, including flux and WC+
- Parallel filter installation is possible for applications in the high power range

Range
3 x 200 – 690 V (up to 880 A)

Enclosures
- IP00 and IP20/23 enclosure in the entire power range
- IP54 enclosure available up to 180 A

Mounting
- Side-by-side book-style mounting alongside the drive, for wall-mounted filters only.
- Footprint mounting behind the drive, for limited size range only
- Wall mounting up to and including filter rating 590 A (380 V)
- Floor mounting above filter rating 303 A (380 V)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
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</thead>
<tbody>
<tr>
<td>Reduces dU/dt stresses</td>
<td>Increases motor service interval</td>
</tr>
<tr>
<td>Lowers the magnetic interference propagation on surrounding cables and equipment</td>
<td>Trouble-free operation</td>
</tr>
<tr>
<td>Low voltage drop makes dU/dt filters the ideal solution for highly dynamic applications with flux vector regulation</td>
<td>Small size and cost compared to sine-wave filters</td>
</tr>
</tbody>
</table>

Perfect match for
for applications with short motor cables, older motors, frequent braking, or aggressive environments

www.vlt-drives.danfoss.com
Specifications

Voltage rating | 3 x 200 – 690 V

Nominal current $I_n$ @ 50 Hz
- 17 – 880 A @ 200 – 380 V, 15 – 780 A @ 460 V
- 12 – 630 A @ 600 V and 11 – 630 A @ 690 V

for higher power modules can be paralleled.

Motor frequency
- 0 – 60 Hz without derating
- Max. 100 Hz (with derating)

Ambient temperature
- -25° to 45°C without derating
- Max. switching frequency $f_{sw}$ 1,5 kHz – 4 kHz depending on filter type

Mounting
- Side-by-side

Overload capacity
- 160% for 60 sec every 10 min.

Enclosure degree
- IP00, IP20/23 and IP54

Approvals
- CE, UL508

dU/dt limit curves

The dU/dt value decreases with the motor cable length whereas the peak voltage increases. The curves show typical values.

Performance Criteria | dU/dt filter | Sine-wave filter
--- | --- | ---
Motor insulation stress | Up to 100 m cable (shielded/unshielded) complies with the requirements of IEC60034-17* (general purpose motors). Above this cable length the risk of “double pulsing” increases. | Provides a sinusoidal phase-to-phase motor terminal voltage. Complies with IEC-60034-17* and NEMA-MG1 requirements for general purpose motors with cables up to 500 m (1 km for frame size D and above). |
Motor bearing stress | Slightly reduced, mainly in high power motors | Reduces bearing currents caused by circulating currents. Does not reduce common-mode currents (shafts currents). |
Max. motor cable length | 100 m ... 150 m With guaranteed EMC performance: 150 m screened Without guaranteed EMC performance: 150 m unscreened | With guaranteed EMC performance: 150 m shielded and 300 m unscreened (only conducted emissions). Without guaranteed EMC performance: up to 500 m (1 km for frame size D and above). |
Acoustic motor switching noise | Does not eliminate acoustic switching noise from the motor | Eliminates acoustic switching noise from the motor caused by magnetostriction |
Relative size | 15 – 50% (depending on power size) | 100%

* Not 690 V

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