

Fact Sheet

VLT® dU/dt Filter MCC 102



Perfect match for

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

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 U_{peak} 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

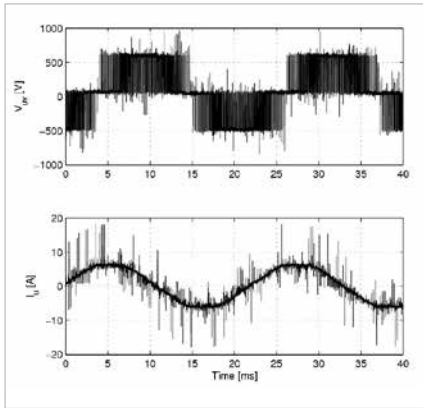
Mounting

- 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)

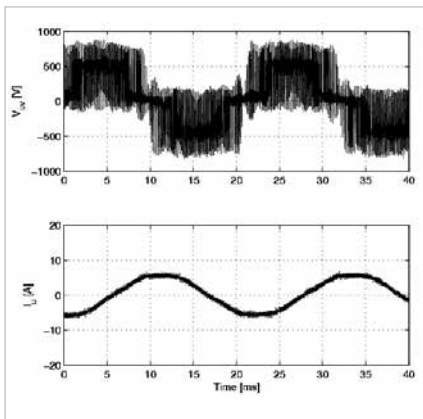
Feature	Benefit
Reduces dU/dt stresses	Increases motor service interval
Lowers the magnetic interference propagation on surrounding cables and equipment)	Trouble-free operation
Low voltage drop makes dU/dt filters the ideal solution for highly dynamic applications with flux vector regulation	Small size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

Accessories

- NEMA 1/IP21 upgrade kit for wall-mounted IP20 filters.
- L-shaped terminal kits for filters with bus-bar connection



Voltage and current without filter

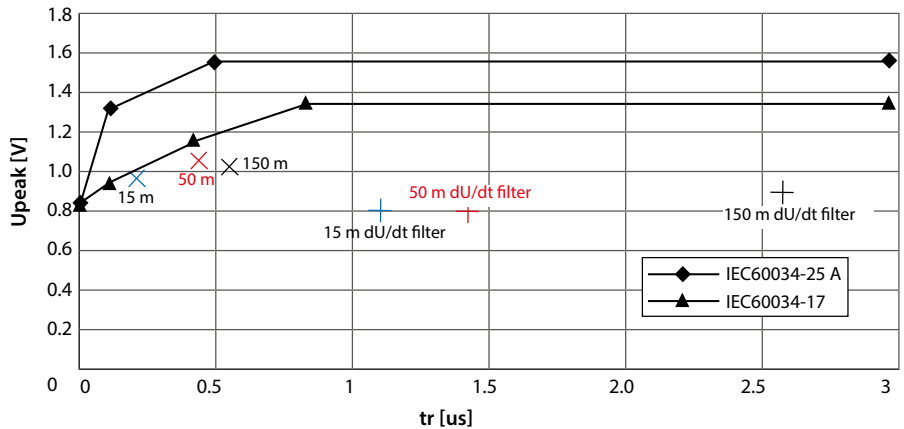


Voltage and current with filter

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 (shaft currents).
EMC performance	Eliminates motor cable ringing. Does not change the emission class. Does not allow longer motor cables as specified for the frequency converter's built-in RFI filter.	Eliminates motor cable ringing. Does not change the emission class. Does not allow longer motor cables as specified for the frequency converter's built-in RFI filter.
Max. motor cable length	100 m ... 150 m With guaranteed EMC performance: 150 m screened Without guaranteed EMC performance: 150 m unshielded	With guaranteed EMC performance: 150 m shielded and 300 m unshielded (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%
Relative price	50%	100%

* Not 690 V

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