VLT® Power Options du/dt filter

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.

The du/dt filters reduce the motor insulation stress and are recommended in applications with risk of flashover.

Compared to sine-wave filters, du/dt filters cut off frequencies above the switching frequency. Having small inductance and capacitance, the price of the filter is lower.

Voltage overshoots and voltage peaks
Subject to voltage pulses, voltage peaks occur in the choke every time switching takes place. The higher inductance the higher voltage peaks causing stress situations in the winding insulation of the connected motor.

Owing to the cable impedance, the du/dt stress – in the case of longer motor cables – is reduced to less problematic values.

Despite the reduced du/dt owing to the cable impedance, this does not result in any significant stress relief for the motor, since now, the increased voltage amplitudes represent the dominant stress factor.

Advantages
- Protects the motor against voltage peaks and high du/dt values hence prolongs the lifetime of the motor
- Allows the use of motors which are not specifically designed for converter operation, for example in retrofit applications
- Reduced size, weight and price compared to the sine-wave filters
- Possibility of connecting shielded cables with included decoupling plate
- Compatible with all control principle including flux and WC+
- Parallel filter installation is possible with applications in the high power range

The perfect solution for:
- Applications with short motor cables (up to 150 m)
- Applications with older motors
- Aggressive environments
- Applications with frequent braking

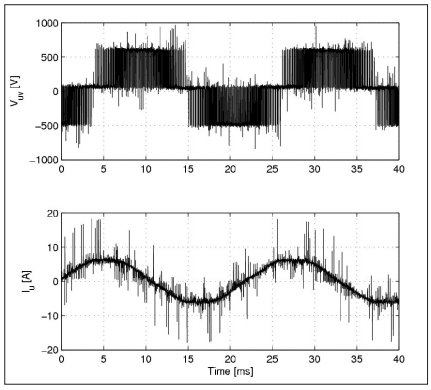
Range
3 x 200 – 500 V, 24 – 2300 A
3 x 525 – 690 V, 28 – 1350 A

Enclosures
IP 00 and IP 20 enclosure in entire power range

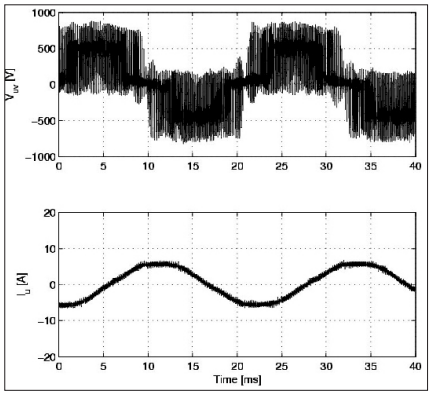
Mounting
- Side by side mounting with the drive
- Filters wall mounted up to 115 A and floor mounted above that size

Features	Benefits
• Reduces du/dt stresses	• Increases motor service interval
• Lowers the magnetic interference propagation on surrounding cables and equipment	• Trouble-free operation

VLT®
THE REAL DRIVE



Voltage and current without filter

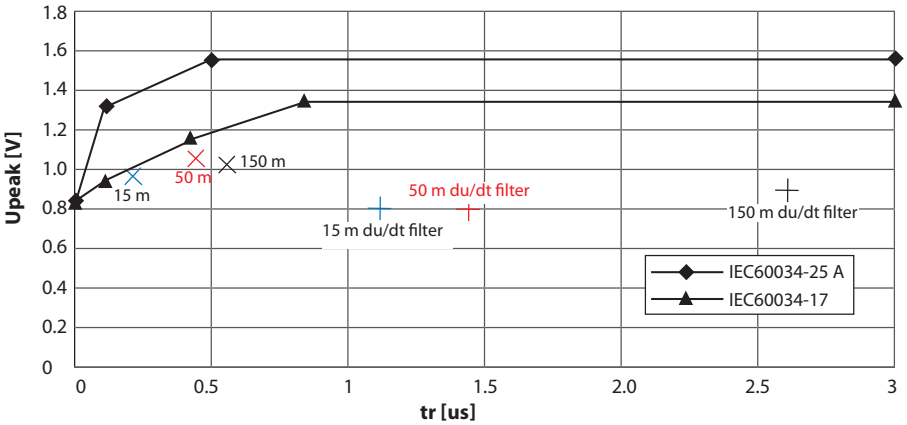


Voltage and current with filter

Specifications

Voltage rating	3 x 200 – 500 V and 3 x 525 – 690 V
Nominal current I_N @ 50 Hz	11 – 1200 A for higher power modules can be paralleled
Motor frequency	0 – 60 Hz without derating 100/120 Hz (up to 10 A) with derating
Ambient temperature	-25° to 40°C without derating
Max. switching frequency	f_{sw} 1,5 kHz – 4 kHz depending on filter type
Mounting	Side-by-side (up to 75 A)
Overload capacity	160% for 60 sec every 10 min.
Enclosure degree	IP 00 and IP 20
Approvals	CE, UL508

du/dt limit curves



The du/dt value decreases with the motor cable length whereas the peak voltage increases. Therefore it is recommended to use sine-wave filters in installations with motor cable lengths above 150 m.

Performance Criteria	du/dt filters	Sine-wave filters
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, only 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 unscreened	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.	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