VLT® Power Options Sine-wave filter

The perfect solution for:
- Applications with older motors
- Aggressive environments
- Applications with frequent braking
- 690 V applications with general purpose motors
- Motor cable length between 150 and 300 metres

Range
3 x 200 – 500 V, 2.5 – 1,200 A
3 x 525 – 690 V, 13 – 1,320 A

Enclosures
IP00 and IP20 enclosure in entire power range

Mounting
- Side by side mount with drive up to 75 A
- Filters wall mounted up to 75 A and floor mount above

Sine-wave Filters provide a sinusoidal phase-to-phase motor voltage.

Sine-wave Filters reduce motor insulation stress and eliminate switching acoustic noise from the motor. Bearing currents are also reduced, especially in larger motors above 50 kW.

Prevent disturbing pulses
Sine-wave filters prevent disturbing pulses from being transmitted to the motor. Capacitances in screened motor supply cables can otherwise cause high oscillating circuit currents through motor bearings, vaporising lubricant and causing damage to the bearings.

The eddy current losses in the motor can also be minimised in this manner, resulting in a cooler motor and thus extended motor life-time.

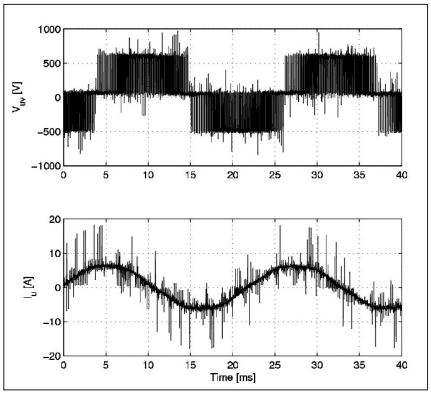
Protects the drive
In addition to protecting the motor, the sine-wave filter also provides protection for the inverter, because the lower pulse load is reflected in lower semiconductor losses.

It should however be noted that this filter does not operate in common mode and the leakage currents are not reduced, therefore it does not enable the use of unlimited motor cables lengths.

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

Features	Benefits
• Reduces voltage peaks in motor	• Prevents flashover in motor windings
• Diminishes over voltages and voltage spikes caused by cable reflections	• Protects the motor insulation against premature aging
• Reduces du/dt stresses	• Increases motor service interval
• Lowers the magnetic interference propagation on surrounding cables and equipment	• Trouble-free operation
• Eliminates acoustic noise in motor	• Noiseless motor operation
• Reduces high frequent losses in motor	• Prolongs service interval of motor

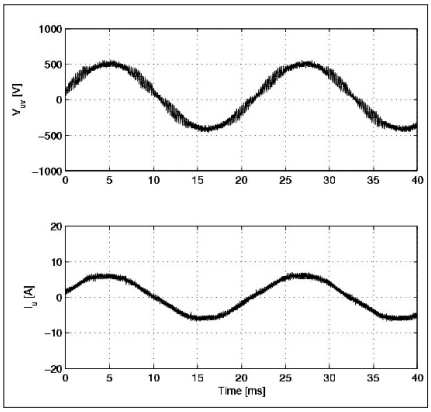
VLT®
THE REAL DRIVE



Voltage and current without filter

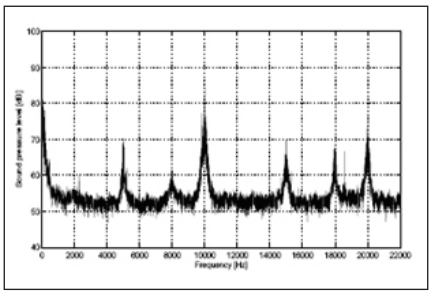
Specifications

Voltage rating	3 x 200 - 500 V and 3 x 525 - 690 V
Nominal current I_N @ 50 Hz	2.5 – 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
Min. switching frequency	f_{min} 1,5 kHz – 5 kHz depending on filter type
Max. switching frequency	f_{max} 8 kHz
Overload capacity	160 % for 60 sec every 10 min.
Enclosure degree	IP00 and IP20
Approvals	CE, UL508

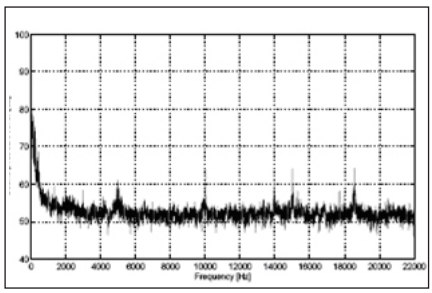


Voltage and current with filter

Relative sound pressure measurements with and without sine wave filter



No filter



With sine wave filter

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

Danfoss Drives, Ulsnaes 1, DK-6300 Graasten, Denmark, Tel. +45 74 88 22 22, Fax +45 74 65 25 80, www.danfoss.com/drives • E-mail: info@danfoss.com