

VLT® AQUA Drive

Optimized drive for AC motor driven water and wastewater applications. User friendly setup makes installation easy and enables owners to reach the highest level of performance and lowest cost of ownership.



Featuring a wide range of powerful, standard features, which can be expanded with performance improving options, the VLT® AQUA Drive is equally suited to both new and retrofit projects.

Set up the drive quickly and easily with the user friendly quick menu. By collecting the most important water and pump parameters in one place, the risk of incorrect configuration is reduced significantly.

Instantly benefit from high efficiency, fast payback and the lowest overall cost of ownership for water and wastewater applications.

Power range:

1 x 200 – 240 V AC:	1.1 – 22 kW
1 x 380 – 480 V AC:	7.5 – 37 kW
3 x 200 – 240 V AC:	0.25 – 45 kW
3 x 380 – 480 V AC:	0.37 – 1000 kW
3 x 525 – 600 V AC:	0.75 – 90 kW
3 x 525 – 690 V AC:	11 – 1400 kW

Dedicated

features for water applications

User friendly setup of water and pump settings reduces installation time ensuring maximum energy efficiency and motor control.

Feature	Benefit
Dedicated features	
Dry run detection	Protects the pump
Flow compensation function	Saves energy
2 step ramps (initial/final ramp)	Protects deep well pumps
Check valve ramp	Protects against water hammering and saves installation cost for soft close valves
Pipe fill mode	Eliminates water hammering
Built-in motor alternation feature	Duty stand by operation, cost reduction
Sleep Mode	Saves energy
No/low flow detection	Protects the pump
End of pump-curve detection	Pump protection, leakage detection
Pump cascade controller	Lower equipment cost
Built-in Smart Logic Controller	Often makes PLC omissible
Deragging	Preventive/reactive pump cleaning
Back-channel cooling for frame D, E and F	Prolonged lifetime of electronics
Energy saving	
VLT® efficiency (98%)	Saves energy
Automatic Energy Optimisation (AEO)	Saves 3 – 8% energy
Auto Tuning of Staging Speeds	Smoothens the staging and saves energy
Reliable	
IP 00 – IP 66 enclosures (depending on power size)	Choose the protection class you need
All power sizes available in IP 54/55 enclosures	Broad usability in standard enclosure
Password protection	Reliable operation
Mains disconnect switch	No need for external switch
Optional, built-in RFI suppression	No need for external modules
One Wire safe stop	Safe operation/less wiring
Max. ambient temperature up to 50°C without derating (D-frame 45°C)	Reduced need for cooling
User-friendly	
One drive type for the full power range	Less learning required
Intuitive user interface	Time saved
Integrated Real Time Clock	Lower equipment cost
Modular design	Enables fast installation of options
Auto tuning of PI-controllers	Time saved
Payback time indication	Monitor performance

Application options

Extend the functionality of the drive with integrated options:

VLT® General Purpose I/O MCB 101

3 digital inputs, 2 digital outputs,
1 analogue current output,
2 analogue voltage inputs.

VLT® Extended Cascade Controller MCO 101, VLT® Advanced Cascade Controller MCO 102

Upgrade the built-in cascade controller to operate more pumps with higher energy efficiency using master/follower pump control. Run the pumps in use at the same speed and optimise staging speeds automatically during operation. Runtime of all pumps is balanced to distribute wear and tear evenly.

VLT® Sensor Input MCB 114

Monitors the PT100/PT1000 and protects motors from overheating.

VLT® PTC Thermistor Card MCB 112

The MCB 112 is connected to safe stop and protects the motor from overheating. It is approved for controlling a certified Ex proof motor in a potentially explosive atmosphere (ATEX) in zones 1 + 2 (gas) zones 21 + 22 (dust).

VLT® 24 V External Supply MCB 107

Back-up option to keep the control system alive during mains loss.

Coated PCB available

For harsh environments according to levels in IEC61721-3-3, standard 3C2, optional 3C3.

Relay & Analogue I/O option

(VLT® Relay Card MCB 105, VLT® Analog I/O MCB109)

Flexible I/O options adding 3 relays or 3 analogue inputs and 3 analogue outputs respectively.

High power options

See the VLT® High Power Drive Selection Guide for a complete list.

Specifications

Mains supply (L1, L2, L3)	
Supply voltage	200 – 240 V $\pm 10\%$, 380 – 480 V $\pm 10\%$, 525 – 600 V $\pm 10\%$, 525 – 690 V $\pm 10\%$
Supply frequency	50/60 Hz
Displacement Power Factor ($\cos \phi$) near unity	(> 0.98)
True power factor (λ)	≥ 0.9
Switching on input supply L1, L2, L3	1 – 2 times/min.
Output data (U, V, W)	
Output voltage	0 – 100% of supply
Switching on output	Unlimited
Ramp times	0.1 – 3600 sec.
Output frequency (dependent on power size)	590 Hz
<i>Note: VLT® AQUA Drive can provide 110% current for 1 minute. Higher overload rating is achieved by oversizing the drive.</i>	
Digital inputs	
Programmable digital inputs	6*
Logic	PNP or NPN
Voltage level	0 – 24 V DC
<i>* Two of the inputs can be used as digital outputs.</i>	
Analogue inputs	
Number of analogue inputs	2
Modes	Voltage or current
Voltage level	-10 to +10 V (scaleable)
Current level	0/4 to 20 mA (scaleable)
Pulse inputs	
Programmable pulse inputs	2
Voltage level	0 – 24 V DC (PNP positive logic)
Pulse input accuracy	(0.1 – 110 kHz)
<i>* Two of the digital inputs can be used for pulse inputs.</i>	
Analogue output	
Programmable analogue outputs	1
Current range at analogue output	0/4 – 20 mA
Relay outputs	
Programmable relay outputs	2 (240 VAC, 2 A and 400 VAC, 2 A)
Fieldbus Communication	
FC Protocol and Modbus RTU built-in (Optional: Modbus TCP, Profibus, Profinet, DeviceNet, Ethernet IP)	
Ambient temperature	
Up to 55° C (50° C without derating; D-frame 45° C)	

Power options

Choose from a wide range of external power options for use with our drive in critical networks or applications:

- **VLT® Low Harmonic Drive:**
Optimum reduction of harmonic distortion with built-in active filter.
- **VLT® Advanced Harmonic Filter:**
For applications where reducing harmonic distortion is critical.
- **VLT® dU/dt filter:** Provides motor isolation protection.
- **VLT® Sine wave filter (LC filter):** For noiseless motor.

PC software tools

- **VLT® Motion Control Tool MCT 10**
Ideal for commissioning and servicing the drive, including guided programming of cascade controller, real time clock, smart logic controller and preventive maintenance.
- **VLT® Energy Box**
Comprehensive energy analysis tool. Energy consumption with and w/o drive can be calculated (drive payback time). Online function for accessing drives energy log.
- **VLT® Motion Control Tool MCT 31**
Harmonics calculations tool.