



# VLT® AQUA Drive

– The ultimate solution for water, wastewater & irrigation



Danfoss Drives' unsurpassed experience in advanced drive technologies for water and wastewater applications makes VLT® AQUA Drive the perfect match for pumps and blowers in modern water, wastewater and irrigation systems.

### The perfect match for:

- Water supply
- Wastewater treatment
- District heating
- Irrigation

### 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 – 690 V AC: ..... 11 – 1400 kW

Features	Benefits
<b>Dedicated features</b>	
• Dry run detection	• Protects the pump
• Flow compensation function	• Saves energy
• 2 step ramps (initial ramp)	• Protects deep well pumps
• 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	• Protects the pump, leakage detection
• Pump cascade controller	• Lower equipment cost
• Master/follower control	• High performance pump systems
<b>Energy saving</b>	
• VLT® efficiency (98%)	– <b>Less operation cost</b>
• Automatic Energy Optimisation (AEO)	• Saves energy
• Sleep Mode function	• Saves 5–15% energy
	• Saves energy
<b>Reliable</b>	
• IP 20 – IP 66 enclosures	– <b>Maximum uptime</b>
• All power sizes available in IP 54/55 enclosures	• Outdoor mounting
• Password protection	• Broad usability
• Mains disconnect switch	• Reliable operation
• Optional, built-in RFI suppression	• No need for external switch
• Built-in Smart Logic Controller	• No need for external modules
• One Wire safe stop	• Often makes PLC omissible
• Max. ambient temperature up to 50° C without derating	• Safe operation/less wiring
	• Reduced need for cooling
<b>User-friendly</b>	
• Award winning control panel (LCP)	– <b>Save initial and operation cost</b>
• One drive type for the full power range	• Effective commissioning and operation
• Intuitive user interface	• Less learning required
• Integrated Real Time Clock	• Time saved
• Modular design	• Lower equipment cost
• Auto tuning of PI-controllers	• Enables fast installation of options
• Payback time indication	• Time saved
	• Less worries



## Application options

A wide range of integrated options can be fitted in the drive:

### General purpose I/O option (MCB 101)

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

### Cascade Controller (MCO 101, 102)

Upgrade the built-in cascade controller to operate more pumps and for master/follower pump control.

### Relay & Analogue I/O option (MCB 105, 109)

Upgrade to advanced performance and control using the additional in/outputs.

### Profibus (MCA 101), DeviceNet (MCA 104) and EtherNet IP (MCA 121) Fieldbus options.

### 24 V DC supply option (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.

### Power options

We offer a wide range of external power options for use together with our drive in critical networks or applications:

- **Advanced Harmonic Filters:** For applications where reducing harmonic distortion is critical.
- **dU/dt filters:** For providing motor isolation protection.
- **Sine filters (LC filters):** For noiseless motor.

## Specifications

Mains supply (L1, L2, L3)	
Supply voltage	200 – 240 V ±10%, 380 – 480 V ±10%, 525 – 600 V ±10%, 525 – 690 V ±10%
Supply frequency	50/60 Hz
Displacement Power Factor (cos φ) 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	1 – 3600 sec.
Closed loop	0 – 132 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 VDC
<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 VDC (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 (DeviceNet, Profibus optional, Ethernet IP optional)	
Ambient temperature	
Up to 55° C	

## AQUA PC software

**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, shows the drive payback time.

**MCT 31:** Harmonics calculations tool.

## Dimensions [mm]

	A2	A3	A5	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	F1	F2	F3	F4
H	268		420	480	650	399	520	680	770	550	660	1209	1589	1046	1327	2000	1547				2204
W	90	130		242		165	230	308	370	308	370		420		408	600	585	1400	1800	2000	2400
D	205		195	260		249	242	310	335		333		380		375	494	498				606
H+	375					475	670			755	950										
W+	90	130				165	255			329	391										

H and W dimensions are with back plate. H+ and W+ are with IP upgrade kit. D dimensions are without option A/B.

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

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without consequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.