VLT® AQUA Drive
makes water and wastewater operation pure child's play

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

The perfect match for:
- Water supply
- Wastewater treatment
- Irrigation

Power range:

200 – 240 V AC:	0.25 – 45 kW
380 – 480 V AC:	0.37– 450 kW *(Up to 1 MW planned)*
525 – 690 V AC:	11 – 630 kW *(Up to 1.2 MW planned)*

Features	Benefits
Dedicated features	
• Sensorless pump control	• Less wiring cost
• Dry run detection	• Protects the pump
• Flow compensation function	• Saves energy
• 2 step ramps (initial ramp)	• Protects pumps and system
• 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
Energy saving	**– Less operation cost**
• VLT® efficiency (98%)	• Saves energy
• Automatic Energy Optimisation (AEO)	• Saves 5–15% energy
• Sleep Mode function	• Saves energy
Reliable	**- Maximum uptime**
• IP 66 enclosures	• Outdoor mounting
• All power sizes available in IP 54/55 enclosures available in the full range	• Broad usability
• Password protection	• Reliable operation
• Mains disconnect switch	• No need for external switch
• Optional, built-in RFI suppression	• No need for external modules
• Built-in Smart Logic Controller	• Often makes PLC omissible
• One Wire safe stop	• Safe operation/less wiring
• Max ambient temperature up to 50° Celcius without derating	• Reduced need for cooling
User-friendly	**– Save initial and operation cost**
• Award winning control panel (LCP)	• Effective commissioning and operation
• 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	• Less worries

VLT®
THE REAL DRIVE

Application options

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

General purpose I/O option:
3 digital inputs, 2 digital outputs,
1 analog current output,
2 analog voltage inputs

External 24 V DC supply option:
24 V DC external supply can be connected to supply, control and option cards.

Coated PCB available
For harsh environments.

Power options
Danfoss Drives offers 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

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

Specifications

Mains supply (L1, L2, L3)	
Supply voltage	200-240 V ±10%, 380-480 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

** VLT® AQUA Drive can provide 110% current for 1 minute.*
Higher overload rating is achieved by oversizing the drive.

Digital inputs	
Programmable digital inputs	6*
Logic	PNP or NPN
Voltage level	0 – 24 VDC

** Two of the inputs can be used as digital outputs.*

Analog inputs	
Number of analog 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)

** Two of the digital inputs can be used for pulse inputs.*

Analog output	
Programmable analog outputs	1
Current range at analog 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 (LonWorks, DeviceNet, Profibus optional)

Ambient temperature
Up to 50° C

Cabinet sizes [mm]

			IP 66								
	IP 20		IP 21 and IP 55								
Enclosure	**A2**	**A3**	**B1**	**B2**	**C1**	**C2**	**D1**	**D2**	**E1**	**E2**	**E3**
Height	268	268	481	651	680	770	1159	1540	2000	2000	2000
Width	90	130	242	242	308	370	420	420	600	1400	1600
Depth	205	205	261	261	310	335	373	373	494	600	600

	IP 54 and 66		IP 00	
Enclosure	**A5**		**D1**	**D2**	**E1**
Height	420		997	1277	1499
Width	242		408	408	585
Depth	200		373	373	494

Note: Smaller IP20 versions in range B1 to C2 will be introduced mid 2007.
Note: C2 enclosures in IP66 protection class is introduced later.
Note: E2 and E3 power sizes will be introduced in 2007.

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