

Fact Sheet

Single Phase VLT® AQUA Drive

Phase conversion and speed control in a single, compact package.

For applications such as lift stations, farming fields or any location where three-phase power is not available, UL-listed phase-converting VLT AQUA Drives can control three-phase motors using single-phase 240V or 480V service. Since three-phase motors are more readily available and less expensive, a variable frequency drive can be a cost-effective

solution in these applications while providing an attractive alternative to conventional phase conversion devices.

The AQUA Drive provides numerous other benefits not available with traditional phase conversion units, including speed control, motor protection and energy savings.

Danfoss' unsurpassed experience in advanced variable frequency drive technologies makes the VLT® AQUA Drive the perfect choice for all

water and wastewater applications. The first drive designed specifically for water and wastewater applications, the VLT® AQUA Drive offers the most advanced technology and features available in the market.

Power range

- 1-phase, 200–240 VAC: 1.5–30 HP
- 1-phase, 380–480 VAC: 10–50 HP

Perfect
for lift stations,
farming fields, or any
location where three-
phase power is not
available.

Feature	Benefit
Dedicated features	
Modular design	Facilitates maintenance and field upgrades
SmartStart programming	Quick and easy start-up
Info key opens on-board manual	No manual needed to operate
Six-line LCP display	Simultaneously displays multiple parameters
Integrated Real-Time Clock	Time stamping of functions/process control
Enhanced Sleep Mode	Improved energy savings/process control
Initial Ramp	Performance that matches pump demands
Flow compensation	Improved setpoint control
De-ragging	Removes strings and other debris from impeller
End of pump curve detection	Protects pump, detects leakage
No/low flow detection	Pump protection
Pipe fill mode	Eliminates water hammer
Pulse counter with totalizer	VFD can be programmed to shut down at a predefined number of gallons used
Energy saving	
VLT efficiency of >98%	Optimized performance
Automatic Motor Adaptation (AMA)	Optimal motor tuning without spinning motor shaft
Automatic Energy Optimization	Additional 5–15% energy savings
Unique cooling concept	Effective heat management
Reliable	
Short circuit and ground fault protection	Prevents damage to drive
Line or motor phase imbalance monitoring	Maintains full torque under extreme conditions
Over and undervoltage protection	Protects drive and motor
Overtemperature monitoring	Provides operation capabilities in extreme temperatures
Electronic Thermal Protection	Protects motor
Optimum heat dissipation	Lengthens drive life
100% factory load testing	Ensures high reliability
Optional conformal coating on PCBs available	Provides additional protection in harsh environments



Options:

The following options are available:

- RFI filters
- Disconnect
- Fuses
- Mains shielding
- Feedback and I/O options
- Fieldbus options
- dV/dt filters
- Sine wave filters

Enclosure ratings

- Available in Chassis; UL/NEMA Types 1, 12, 3R, and 4X rated enclosures. Designed either for mounting in existing panels or as standalone units.

Available options

- Modular application options: plug-and-play cards facilitate drive upgrades, outdoor weather shield, and startup and servicing
- dV/dt filters: for providing motor isolation protection
- Sine filters (LC filters): reduce motor noise
- PC software tools
- MCT 10: provides powerful functionality for commissioning and servicing drives
- VLT Energy Box: comprehensive energy analysis tool
- MCT 31: harmonics calculation tool



Mains supply (L1, L2, L3)	
Supply voltage	1-phase 200–240 V ±10%; 1-phase 380–480 V ±10% (UL-listed)
Supply frequency	50/60 Hz
Displacement Power Factor (cos φ) near unity	(> 0.98)
Switching on input supply L1, L2, L3	1–2 times/min.
Output data (U, V, W)	
Output voltage	3-phase 200–240 V; 3-phase 380–480 V
Switching on output	Unlimited
Ramp times	1–3600 sec.
Closed loop	0–132 Hz
Digital inputs/outputs	
Programmable digital inputs (standard)	6 (two can be used as digital outputs)
General purpose I/O card (option)	3 additional digital inputs, 2 additional digital outputs
Logic	PNP or NPN
Voltage level	0–24 VDC
Analog inputs	
Analog inputs (standard)	2
General purpose I/O card (option)	2 additional analog inputs
Advanced analog I/O card (option)*	3 additional analog inputs
Modes	Voltage or current
Voltage level	-10 to +10 V (scaleable)
Current level	0/4 to 20 mA (scaleable)
Pulse inputs	
Programmable pulse inputs (standard)	2 (two of the digital inputs can be used as pulse inputs)
Voltage level	0–24V DC (PNP positive logic)
Pulse input accuracy	(0.1–110 kHz)
Analog outputs	
Programmable analog outputs (standard)	1
General purpose I/O card (option)	1 additional analog current output
Advanced analog I/O card (option)*	3 additional analog outputs
Current range at analog output	0/4-20 mA
Relay outputs	
Programmable relay outputs (standard)	2 (240 VAC, 2 A and 400 VAC, 2 A)
Relay card (option)	3 additional dry contact relays (240 VAC, Form C)
Voltage level	0–24V DC (PNP positive logic)
Pulse input accuracy	(0.1–110 kHz)
External DC supply	
External 24V DC supply card (option)	Provides backup power for control and option cards
Fieldbus communication	
FC Protocol and Modbus RTU built in (DeviceNet, Profibus and Ethernet IP modules optional)	
Ambient Temperature Rating	
0° C min – 50° C max	

* Advanced analog I/O option card also provides backup power for the VLT® AQUA Drive's real-time clock.

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