

MAKING MODERN LIVING POSSIBLE

Danfoss



VLT® AQUA Drive

The ultimate solution for Water, Wastewater & Irrigation

VLT®
THE REAL DRIVE



Protects the environment

The growing need for clean water and energy conservation is rapidly increasing the pressure on global fresh water resources, wastewater treatment, recycling and power generation.

VLT® AQUA Drive is designed to enhance system operation, protect equipment, reduce chemical consumption and water loss, while providing significant energy savings. VLT® AQUA Drive is the ultimate solution for all water, wastewater and recycling processes.



The VLT® AQUA Drive is innovative – Reduces system, installation and operating costs

Danfoss VLT® AQUA Drive is dedicated to water and wastewater applications. With a wide range of powerful standard and optional features, the VLT® AQUA Drive provides the lowest overall cost of ownership for water and wastewater applications.

Save energy

The VLT® AQUA Drive offers considerable energy savings:

- VLT® efficiency (up to 98%)
- Sleep Mode
- Automatic Energy Optimisation AEO: Typically 3-5% – up to 15% not unusual.
- Flow compensation, lowering pressure set point and thus energy consumption under low flow conditions

Save space

The compact design of the VLT® AQUA Drive makes it easily fit in even small installation spaces.

- Built-in DC coils for harmonic suppression. No need for external AC coils
- Optional, built-in RFI filters in the whole power range
- Intelligent cooling concept reduces need for installation space.

Save cost and protect your system with a series of pump-specific features:

- Cascade controller
- Dry run detection
- End of curve detection
- Motor alternation
- 2-step ramps (initial and final ramp)
- Check valve protection
- Safe stop
- Low flow detection
- Pipe fill mode
- Sleep mode
- Real-time clock
- Password protection
- Overload trip protection
- Smart logic controller
- Cavitation protection

Can be set to either variable or constant torque operation in the full speed range.

Save cabinet

NEMA/UL Type 12 (IP 54/55) enclosure solution is available in the whole power range.

Up to 90 kW, the VLT® AQUA Drive can even be delivered in an IP 66 version.

Save time

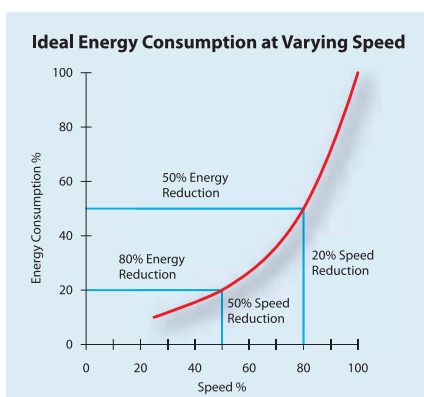
VLT® AQUA Drive is designed with the installer and operator in mind in order to save time on installation, commissioning and maintenance.

- Intuitive user interface with the award-winning control panel (LCP)
- One drive type for the full power range
- Modular VLT® design enables fast installation of options
- Auto tuning of PI controllers
- Robust design and efficient monitoring make the VLT® AQUA Drive maintenance free.

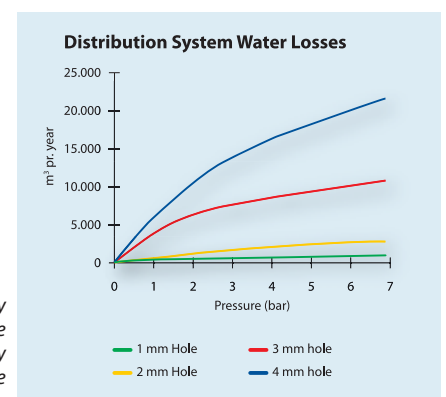
Dedicated to water and wastewater

Danfoss Drives' unequalled experience was used to make the VLT® AQUA Drive the perfect match for AC motor driven applications in modern water and wastewater systems.

Water and Wastewater is a global business area for Danfoss Drives and you will find our dedicated sales and service staff all over the world 24 hours a day.



Energy savings using a VLT® AQUA Drive are achieved even with a modest reduction in speed.



Reducing water losses by lowering system pressure becomes increasingly effective as the size of line breaks increase.

The modular VLT® AQUA Drive

Extremely compact panel mount cabinets



Mains and motor cable terminals are located in the bottom of the cabinet for fast and easy installation.



C3 – frame IP 20 compact panel mounting drive.

The IP 20 enclosure has two individually controlled fans for maximum reliability.

Only a minimum of cooling air passes the electronic components, which increases the lifetime.

The aluminium front hinged door ensures easy access to additional I/O options and control wiring.

IP 21/Type 1 protection can be delivered as a kit solution or as a specific IP 21 drive with easy access plastic cover with snap locks.

- 1 **Fieldbus option**
 - Modbus RTU (std.)
 - Profibus
 - Devicenet
 - Ethernet
 - (Profinet to come)

- 2 **Local Control Panel (LCP)**
Choose numerical, graphical or no display

- 3 **I/O option**
 - General Purpose I/O (3DI + 2AI + 2DO + 1AO)
 - Cascade controller (6 or 8 pumps)
 - Sensor input (3 x PT100/1000 + 1AI)
 - Relay output (3 x relays)

- 4 **24 V supply option**

- 5 **RFI filter**
Built-in RFI Filter for long motor cables according to the IEC 61800-3 and EN 55011 standards.

- 6 **AC mains disconnect**
(Factory mounted option)

- 7 **Input mains option**
Various input plate configurations are available including fuses, mains switch (disconnect), or RFI filter. Input plates are field adaptable if options need to be added after installation.

Extremely robust cabinets for harsh environments



The Danfoss IP 55/NEMA 12 or IP 66 are designed for use in harsh environments with gas, pollution and dust. The electronics are completely separated from the cooling air in order to increase the lifetime.

All terminals and EMC connections are located inside the drive under the robust metal cover for maximum protection.

If ordered as IP 66 the heat sink is protected against corrosion (IP 66 rating is available up to 90 kW).

Coated PCB's 8

Durable in aggressive environments

In water and wastewater applications it is often recommended to protect the drive with coated PCB's. As standard the VLT® AQUA Drive complies with level 3C2 according to IEC 60721-3-3. Protection level 3C3 is optionally delivered from factory.

The option protects significantly better against chlorine, hydrogen sulphide, ammonia and other gasses.

9 Unique cooling concept

- No ambient air flow over electronics up to 90 kW
- Above 90 kW designed with back channel cooling (85% heat dissipated via back channel)

10 Advanced cascade controller option

Controls up to 8 pumps

VLT® quality up to 1.2 MW

The VLT® AQUA Drive is available from 0.25 kW to 1.2 MW.

Drive experience since 1968 lies behind the clever design of VLT® drives. All enclosures are mechanically designed with focus on:

- Robustness
- Easy access and installation
- Intelligent cooling
- High ambient temperatures

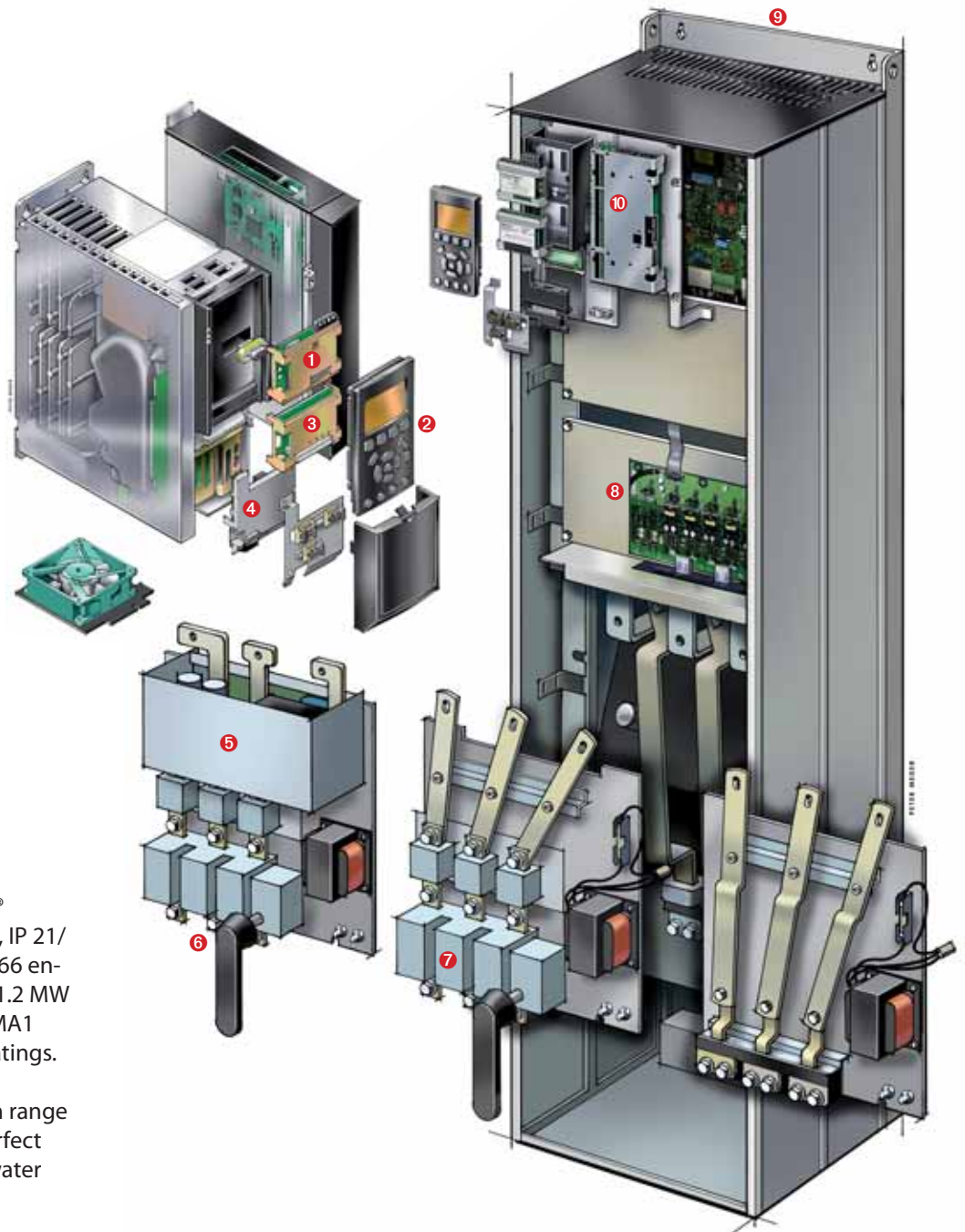
From 0.25 kW to 90 kW the VLT® AQUA Drive is available in IP 20, IP 21/ NEMA 1, IP 55/NEMA 12 and IP 66 enclosure ratings. From 90 kW to 1.2 MW it is available in IP 00, IP 21/NEMA 1 and IP 54/NEMA 12 enclosure ratings.

The broad enclosure protection range makes VLT® AQUA Drive the perfect choice for all water and wastewater applications.

All VLT® AQUA Drives share technology, user interface and basic features with the rest of the new VLT® generation to assure well documented and proven quality.

The modular design of the VLT® AQUA Drive allows even highly customised drives to be mass produced and factory tested.

Plug and play options make upgrading easy and ensure flexibility.

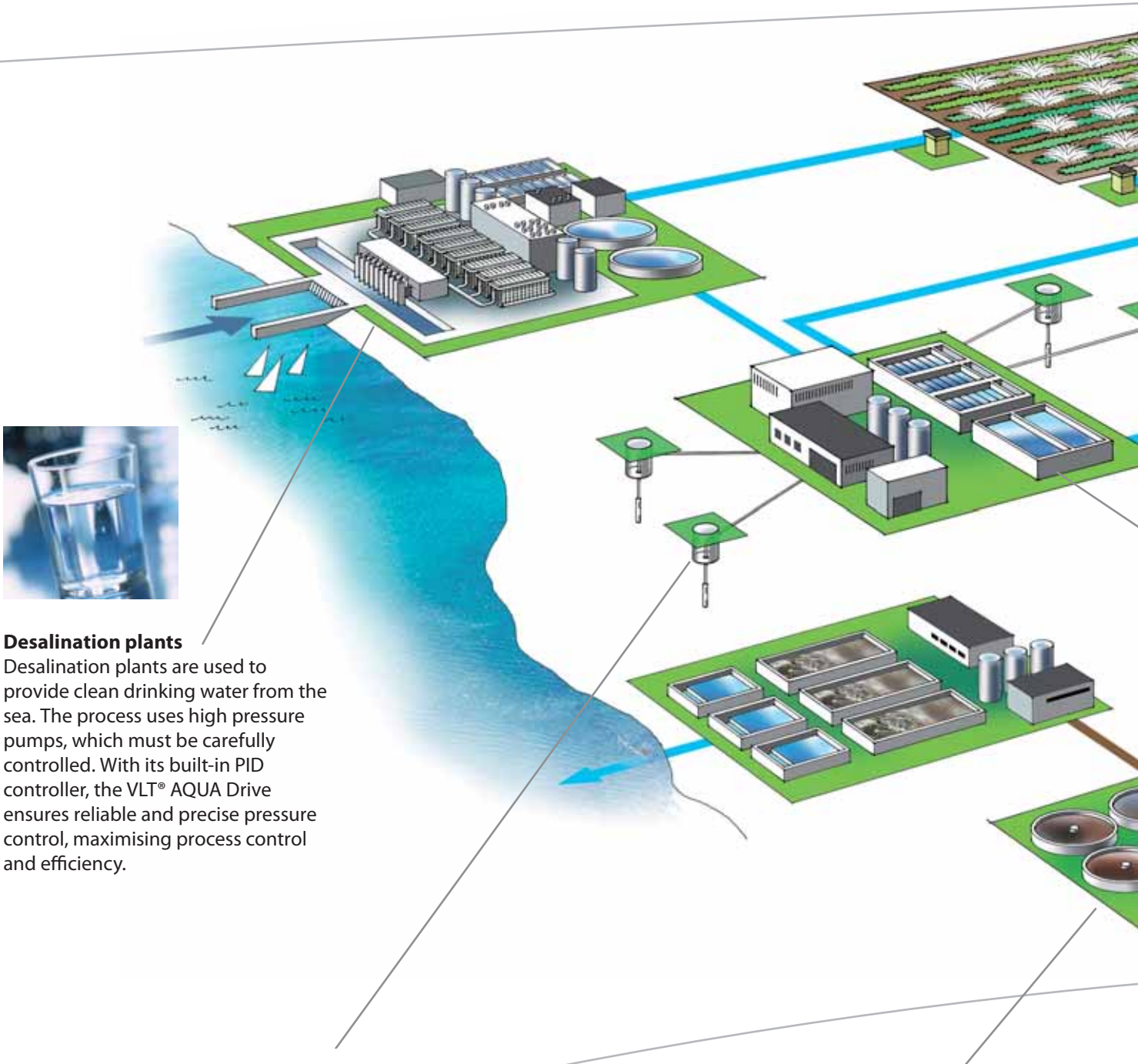


DC coils reduce harmonic noise and protect the drive. Also EMC filters are integrated (meets EN 55011 A2, A1 or B).



Remote access via fieldbus and USB cable. VLT® Set up Software MCT 10 gives intuitive access to all parameters and has scope features with graphs showing feedback, current, frequency etc. for easy fault finding and documentation.

Water and Wastewater processes – Improved control using less energy



Desalination plants

Desalination plants are used to provide clean drinking water from the sea. The process uses high pressure pumps, which must be carefully controlled. With its built-in PID controller, the VLT® AQUA Drive ensures reliable and precise pressure control, maximising process control and efficiency.



Groundwater pumps

Submersible deep well pumps need fast start capability, precise control and protection against running dry. The built-in dry run detection and the initial ramp-up make the VLT® AQUA Drive handle such applications to perfection.

Wastewater plants

Fluctuations in flow can disturb the process and lead to increased costs, increased wear on machines through higher number of starts and stops. Using the VLT® AQUA Drive on pumps, blowers and other equipment will lead to a balanced process and save considerable amounts of energy. The built-in logic can be programmed to prevent segmenting etc. in the pump impellers.



Irrigation systems

In irrigation today great concerns are put on efficiency and energy savings in the water management. Precise pressure control is required. The built-in pump control makes VLT® AQUA Drive a perfect match for irrigation in rural areas. It even offers a special pipe fill function that prevents water hammering and reduces leakage when empty pipes are filled.



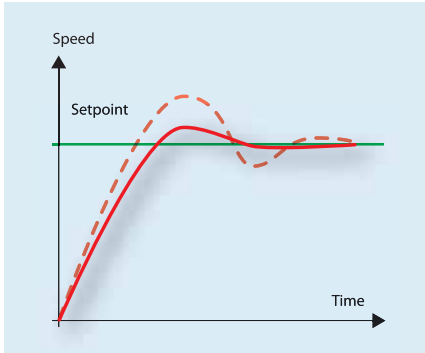
The capability to work in variable and constant torque mode makes VLT® AQUA Drive suitable for all wastewater applications.

Distribution

Pressure booster pumps with precise pressure control lead to significant reductions in water leakage and energy consumption. Costly and unsightly water towers can be eliminated. Built-in features make transducer installation very easy and ensure optimised energy saving at varying flow demand.

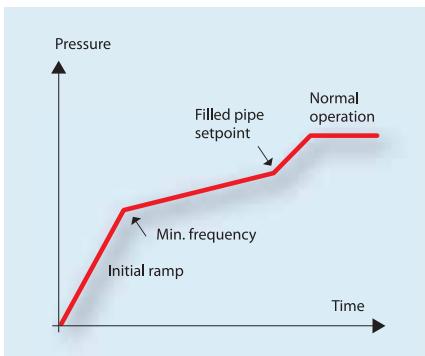


Dedicated water features



Auto tuning of the PI controllers
 With auto tuning of the PI controllers, the drive monitors how the system reacts on corrections made by the drive – and learns from it, so that precise and stable operation is achieved quickly.

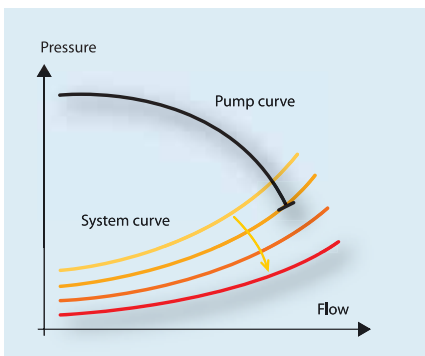
Gain factors for PI are continuously changed to compensate for changing characteristics of the loads. This applies to each PI controller in the 4-menu sets individually. Exact P and I settings at start-up will not be necessary – which lowers the commissioning costs.



Pipe Fill Mode
 Enables controlled (closed loop) filling of pipes. Prevents water hammering, bursting water pipes or blowing off sprinkler heads.

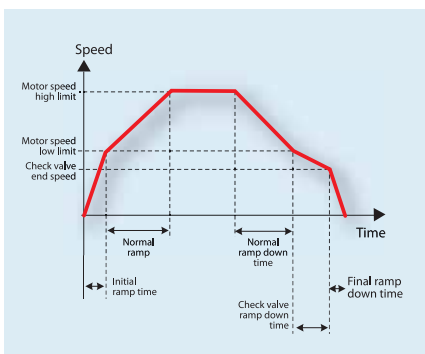
Useful in all applications where controlled pipe filling is demanded, such as irrigation systems, water supply systems, etc.

The new pipe fill mode is usable in both vertical and horizontal pipe systems.



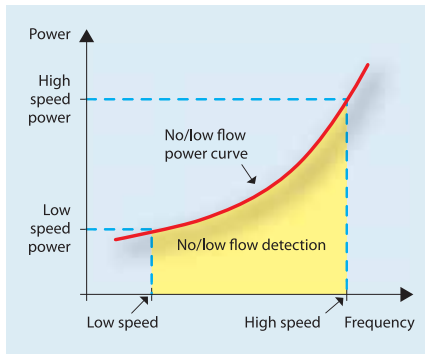
End of Pump Curve detects breaks and leakage
 The feature detects breaks and leakage. End of curve triggers an alarm, shuts off the pump, or performs another programmed action

whenever a pump is found running at full speed without creating the desired pressure – a situation that can arise when a pipe breaks or leakage occurs.



Check Valve Ramp
 The Check Valve Ramp prevents water hammering as the pump stops and the check valve closes.

The Check Valve Ramp slowly ramps down the pump speed around the value where the check valve ball is about to shut.



Dry Pump Protection lowers maintenance costs

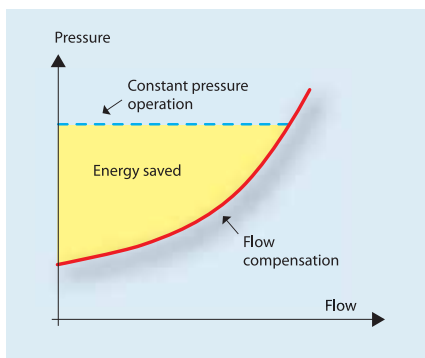
The VLT® AQUA Drive constantly evaluates the condition of the pump, based on internal frequency/power measurements.

In case of a too low power consumption – indicating a no or low flow situation – the VLT® AQUA Drive will stop.

Sleep Mode

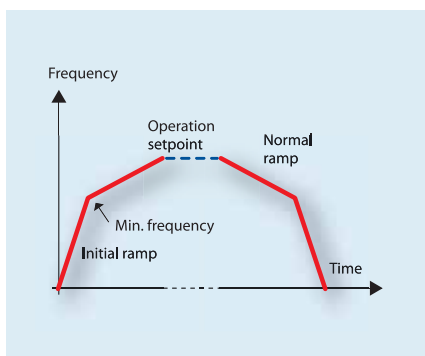
Sleep Mode keeps pump wear and power consumption to an absolute minimum. In low flow situations, the pump will boost the system pressure and then stop.

Monitoring the pressure, the VLT® AQUA Drive will restart when the pressure falls below the required level.



Flow compensation

The flow compensation feature in VLT® AQUA Drive exploits the fact that flow resistance decreases with reduced flow. The pressure set point is accordingly reduced – which saves energy.



Initial/Final Ramp

The initial ramp provides fast acceleration of pumps to minimum speed, from where the normal ramp takes over. This prevents damage to the thrust bearings on the pump.

The final ramp decelerates pumps from min. speed to stop.

Sensorless Pressure or Flow Control

Sensorless pressure or flow control is a patented VLT® feature that allows pump manufacturers to control the constant head (pressure) or flow levels without the use of sensors. The cost and time of installing, cabling and maintaining pressure and flow transducers are eliminated. Reliability is also boosted, as no additional components or connections can cause malfunction.

Payback time indication

One of the major reasons for applying a VLT® drive is the very short payback time due to energy savings. The VLT® AQUA drive comes with a unique feature which continuously shows the remaining payback time for the investment.

Motor Alternation

This built-in logic controls alternation between two pumps in duty/stand-by applications. Motion of the stand-by pump prevents sticking of the pump. An internal timer assures equal usage of the pumps.

With an option card it is possible to control alternations between 8 pumps.

Athens Wastewater Treatment Plant, Greece

VLT® drives up to 315 kW handle wastewater from a population of 5 million in Athens. VLT® operation saves approx. 25% energy. The Psytalia Wastewater Treatment Plant treats daily 750.000 m³ of sewage and has a nominal daily capacity of 1.000.000 m³.



Proven AQUA Experience – world wide



Monterrey City, Mexico

Agua y Drenaje de Monterrey in Mexico is installing Danfoss VLT® drives in wastewater treatment plants, boost pump stations and water wells for both residential and commercial areas in Monterrey – the largest industrial city in Mexico with 3.5 million people. Benefits from VLT® operation of the pumps are energy savings of about 30% and also reduction of water leakage.



Xi'An No.3 Waste Water treatment, China

Danfoss provided VLT® AQUA drives and MCD soft starters for Xi'An No.3 Wastewater treatment plant. It is one of three bundles of a retrofit project to improve the environment in Xi'An City of Shanxi province, China. The treatment capacity is 100,000 tons of sewage and 50,000 tons of recycled water per day.



Izmir Geothermal District Heating System, Turkey

VLT® drives operate the deep well and supply pumps in Izmir geothermal district heating. Applying VLT® drives leads to a very low electricity cost.



Vienna's Main Sewage Treatment Plant, Austria

At Vienna's lowest point, where the Danube Canal meets the Danube, lies Vienna's Main Sewage Treatment Plant. Here around 90% of Vienna's wastewaters is purified. VLT® drives were chosen to operate the pumps that handle more than 500,000 cubic metres per day, which corresponds to a flow of a medium-size river. It takes about five hours for the wastewater to pass through the mechanical and biological purification stages before it is purified and discharged into the Danube Canal.



Perth Seawater Desalination Plant, Australia

VLT® drives and soft starters were chosen to run pumps when The Water Corporation of Western Australia – one of Australia's largest and most successful water service providers – invested \$387 million Australian dollars in Perth Seawater Desalination Plant – the largest of its type in the Southern Hemisphere. The company provides water and wastewater services to the burgeoning city of Perth and hundreds of towns and communities spread over 2.5 million square kilometres.



Changi Water Reclamation Plant, Singapore

The Changi Water Reclamation plant is the cornerstone of the first phase of the Singapore Deep Tunnel Sewerage System. The plant is to replace six existing water reclamation plants in the long term. Danfoss VLT® drives and AHF filters were supplied for chemical and carbon scrubbers for the odour control, sedimentation tanks, bio-reactors, sedimentation tanks and solids building.

AQUA users participated in developing the user interface

Graphical display

- International letters and signs
- Showing bars and graphs
- Easy overview
- Possible to select 27 languages
- iF awarded design

Other benefits

- Removable during operation
- Up- and download functionality
- IP 65 rating when mounted in a panel door
- Up to 5 different variables visible at a time

Illumination

- Important buttons are illuminated when active



design award
winner
2004

The VLT® AQUA Drive has an award-winning Local Control Panel and a well structured menu system that ensures fast commissioning and trouble-free operation of the many powerful functions.



Menu structure

- Based on the well known matrix system in today's VLT® drives
- Easy shortcuts for the experienced user
- Edit and operate in different setups simultaneously

Quick Menus

- A Danfoss defined Quick Menu
- A Personal defined Quick Menu
- A Changes Made Menu lists the parameters unique for your application
- A Function Setup menu provides quick and easy setup for specific applications
- A Logging menu provides access to operation history

Useful functions

- Info ("on board manual")
- Cancel ("undo")
- Alarm log (quick access)

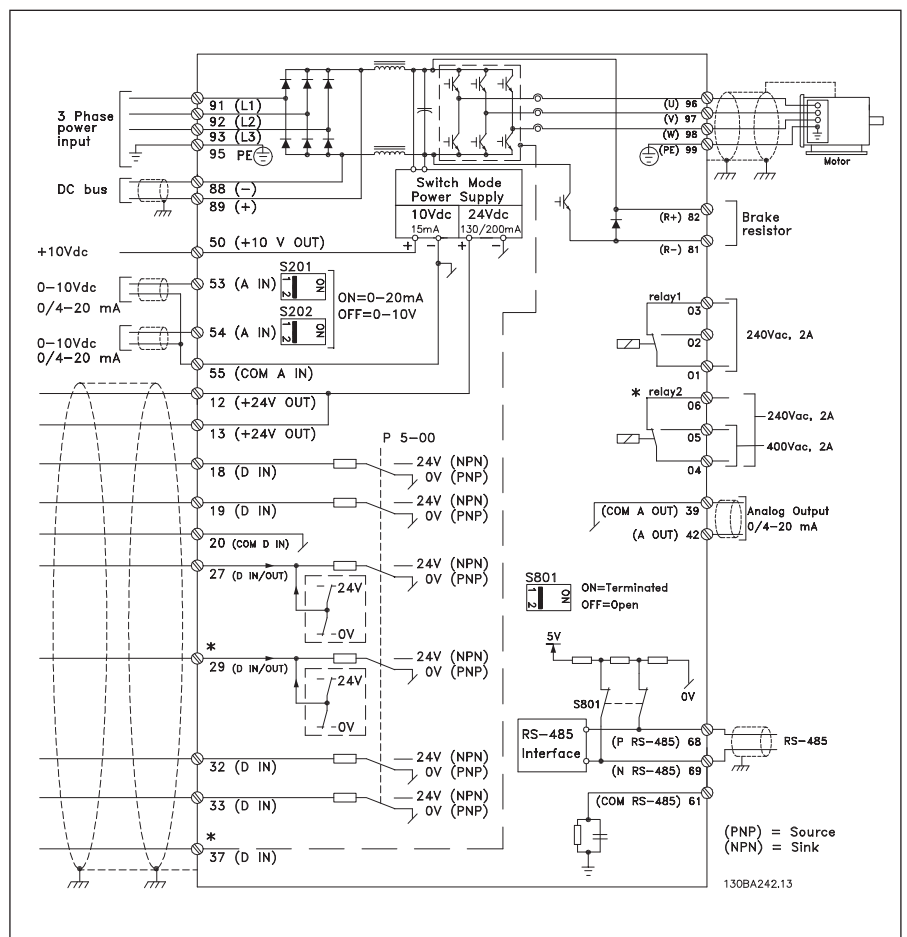
Connection overview

Power is connected to the terminals 91 (L1), 92 (L2) and 93 (L3) and the motor is connected to 96 (U), 97 (V) and 98 (W).

Analog inputs can be connected to the 53 (V or mA), 54 (V or mA) terminals. These inputs can be set up for reference, feedback.

There are 6 digital inputs to be connected to terminals 18, 19, 27, 29, 32, and 33. Two digital input/output terminals (27 and 29) can be set up as digital outputs to show an actual status or warning.

The terminal 42 analog output can show process values such as $0 - I_{max}$.



Specifications

Mains supply (L1, L2, L3)

Supply voltage	200 – 240 V ±10%
Supply voltage	380 – 480 V ±10%
Supply voltage	525 – 600 V ±10%
Supply voltage	525 – 690 V ±10%
Supply frequency	50/60 Hz
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 voltage
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 V
Thermistor inputs	1

*2 can be used as digital outputs

Analog input

Analog inputs	2
Modes	Voltage or current
Voltage level	0 – 10 V (scaleable)
Current level	0/4 – 20 mA (scaleable)

Pulse inputs

Programmable pulse inputs	2
Voltage level	0-24 VDC (PNP positive logic)
Pulse input accuracy	(0.1 – 110 kHz)
Utilize some of the digital inputs	

Analog output

Programmable analog outputs	1
Current range at analog output	0/4 – 20 mA
Max. load (24 V)	130 mA

Relay outputs

Programmable relay outputs (240 VAC, 2 A and 400 VAC, 2 A)	2
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Fieldbus communication

Standard built in	FC Protocol Modbus RTU
Optional	Profibus DeviceNet Ethernet

Temperature

Ambient temperature	up to 55° C
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Application options

A wide range of integrated water application options can be fitted into the drive:

- **Real time clock with battery back-up**
- **General purpose I/O option:**
3 digital inputs, 2 digital outputs, 1 analog current output, 2 analog voltage inputs
- **Relay option/cascade controller option:**
3 relay outputs
- **External 24 VDC supply option:**
24 VDC external supply can be connected to supply control and option cards
- **Brake chopper option:**
Connected to an external brake resistor, the brake chopper limits the load on the intermediate circuit in case the motor acts as generator.
- **Extended cascade control of up to a total of 6 pumps**
- **Advanced cascade control of up to a total of 8 pumps**
- **Analogue sensor input option with up to 3 temperature sensor inputs**

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 and low dU/dt

Complementary products

- A broad range of soft starters
- Decentral drive solutions

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. The software is available for free on www.danfoss.com
- **VLT® Energy Box**
– comprehensive energy analysis tool, shows the drive payback time
- **MCT 31**
– harmonics calculations tool

Sales and Service Contacts worldwide Find your local expert team on www.danfoss.com/drives

- 24/7 availability
- Local service organisation is present in more than 100 countries – ready to support whenever and wherever you need, around the clock, 7 days a week.

Current, power and enclosure ratings

FC 202	kW	200 – 240 V				380 – 480 V						525 – 600 V				525 – 690 V								
		Amp.	IP 20	IP 21	IP 55	IP 66	Amp.		Amp.		IP 00	IP 20	IP 21	IP 54	IP 55	IP 66	Amp.		IP 20	IP 21	IP 55	IP 66		
							<440 V	>440 V	<400 V	>400 V							<550 V	>550 V					550 V	690 V
PK25	0.25	1.8																						
PK37	0.37	2.4					1.3	1.2																
PK55	0.55	3.5					1.8	1.6																
PK75	0.75	4.6	A2	A2	A5	A5	2.4	2.1								1.8	1.7							
P1K1	1.1	6.6					3	2.7			A2	A2	A5	A5		2.6	2.4							
P1K5	1.5	7.5					4.1	3.4								2.9	2.7	A2	A2	A5	A5			
P2K2	2.2	10.6					5.6	4.8								4.1	3.9							
P3K0	3	12.5	A3	A3			7.2	6.3								5.2	4.9							
P3K7	3.7	16.7																						
P4K0	4.0						10	8.2			A2	A2	A5	A5		6.4	6.1	A2	A2	A5	A5			
P5K5	5.5	24.2	B3	B1	B1	B1	13	11			A3	A3	A5	A5		9.5	9	A3	A3	A5	A5			
P7K5	7.5	30.8					16	14.5								11.5	11							
P11K	11	46.2					24	21								18	18							
P15K	15	59.4	B4	B2	B2	B2	32	27			B3	B1	B1	B1		23	22	B3	B1	B1	B1			
P18K	18	74.8					37.5	34								28	27							
P22K	22	88	C3	C1	C1	C1	44	40			B4	B2	B2	B2		36	34	B4	B2	B2	B2			
P30K	30	115					61	52								43	41							
P37K	37	143	C4	C2	C2	C2	73	65								54	52							
P45K	45	170					90	80			C3	C1	C1	C1		65	62	C3	C1	C1	C1	56	54	
P55K	55						106	105								87	83					76	73	
P75K	75						147	130			C4	C2	C2	C2		105	83	C4	C2	C2	C2	90	86	
P90K	90						212	160								137	131					113	108	D3 D1 D1
P110	110							212	190													137	131	
P132	132							260	240	D3		D1	D1								162	155		
P160	160							315	302												201	192		
P200	200							395	361	D4		D2	D2							253	242			
P250	250							480	443											303	290	D4 D2 D2		
P315	315							600	540											360	344			
P355	355							658	590	E2		E1	E1											
P400	400							745	678											418	400	D4 D2 D2		
P450	450							800	730											470	450			
P500	500						880	780												523	500	E2 E1 E1		
P560	560						990	890			F1/F3	F1/F3							596	570				
P630	630						1120	1050												630	630			
P710	710						1260	1160												763	730			
P800	800						1460	1380			F2/F4	F2/F4							889	850	F1/F3 F1/F3			
P900	900																			988	945			
P1M0	1000						1720	1530			F2/F4	F2/F4							1108	1060	F2/F4 F2/F4			
P1M2	1200																			1317	1260			

F3 is a F1 frame with options cabinet; F4 is a F2 frame with options cabinet

IP 00/Chassis	IP 20/Chassis	IP 21/NEMA Type 1	With upgrade kit	IP 54/NEMA Type 12	IP 55/NEMA Type 12	IP 66/NEMA Type 4X
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Dimensions [mm]

	A1	A2	A3	A5	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	F1	F2	F3	F4
H	200	268		420	481	651	350	460	681	770	490	600	1209	1589	1046	1327	2000	1547	2204		2282	
W	75	90	130		242		165	230	308	370	306	370	420		408	600	585	1400	1800	2000	2400	
D		205		200	261		248	242	310		335		380		375	494	498	606		607		
H+		308	372				490	675			760	955										
W+		94	134				170	255			330	395										

H+ and W+ is the height and width of IP 20 drives with IP 21/NEMA 1 upgrade kit

Choose configurations freely

[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18]

FC 202 - [] - [] - [] - [] - [] - [] - [] - [] - X - X - SXX X - X - [] - [] - [] - [] - XX - []

[2] Power Size

See ratings data page 14

[3] AC Line Voltage

T2	3 x 220/240 VAC
T4	3 x 380/480 VAC
T6	3 x 525/600 VAC
T7	3 x 525/690 VAC

[4] Enclosure

D1 frames P110 or larger

E21	IP21/NEMA 1
E54	IP54/NEMA 12
E2M	IP21/NEMA 1 with mains shield
E5M	IP54/NEMA 12 with mains shield

D1 frames P90K size or smaller

E2D	IP21/NEMA 1
E5D	IP54/NEMA 12
E2M	IP21/NEMA 1 with mains shield
E5M	IP54/NEMA 12 with mains shield

D2 frames:

E21	IP21/NEMA 1
E54	IP54/NEMA 12
E2M	IP21/NEMA 1 with mains shield
E5M	IP54/NEMA 12 with mains shield

D3 frames P110 size or larger

E00	IP00/Chassis
C00	IP00/Chassis w/stainless steel back channel

D3 frames P90K size or smaller

E0D	IP00/Chassis
C0D	IP00/Chassis w/stainless steel back channel

D4 frames:

E00	IP00/Chassis
C00	IP00/Chassis w/stainless steel back channel

E1 frames:

E21	IP21/NEMA 1
E54	IP54/NEMA 12
E2M	IP21/NEMA 1 with mains shield
E5M	IP54/NEMA 12 with mains shield

E2 frames:

E00	IP00/Chassis
C00	IP00/Chassis w/ stainless steel back channel

[5] RFI Filter, Terminal & Monitoring Options

D frames:

H2	RFI filter, Class A2 (standard)
H4	RFI filter, Class A1
H6	Maritime use RFI filter (consult Danfoss for applications requiring maritime certification)

E frames:

H2	RFI filter, Class A2 (standard)
H6	Maritime use RFI filter (consult Danfoss for applications requiring maritime certification)

380-480 V only (T4 in position [3]):

H4	RFI filter, Class A1
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[6] Braking & Safety

D & E frames:

X	No brake IGBT
B	Brake IGBT mounted
T	Safe Stop (FC 102/202 only; std. on 302)
U	Brake IGBT plus Safe Stop (FC 102/202 only; safe stop std. on 302)

E frames:

R	Regeneration terminals
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[7] Local Control Panel

D & E frames:

N	Numeric LCP installed
G	Graphic LCP installed

D frames:

IP00/Chassis or IP21/NEMA1 only (E21, E2M, E2D, E00, C00, E0D, C0D in position [4]):

X	Blank faceplate, no LCP installed
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[8] Conformal Coating

D & E frames:

C	Conformal coating on all PCBs
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D frames:

380-480 only (T4 in position [3]):

X	No conformal coating
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[9] Mains Input

X	No option
7*	Fuses
A*	Fuses & load sharing terminals
D	Load sharing terminals
3*	Mains disconnect & fuses
5*	Mains disconnect, fuses & loadsharing terminals

*Not available in D frames with Class A1 RFI filter (525-690 VAC only) or maritime RFI filter

[12] LCP Language

X	The AQUA Drive LCP has all languages as standard
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Consult factory for other language options

[13] Fieldbus

AX	No fieldbus option
A0	MCA 101 Profibus DP V1
A4	MCA 104 DeviceNet
AN	MCA 121 Ethernet I/P

[14] Application

BX	No application option
BK	MCB 101 general purpose I/O
BR	MCB 102 encoder input
BU	MCB 103 resolver input
BP	MCB 105 relay expansion
B0	MCB 109 analogue I/O & real-time clock backup
BY	MCO 101 extended cascade control

[15] Motion Control

C5	MCO 102 advanced cascade control
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[16] Extended Relay

X	No option
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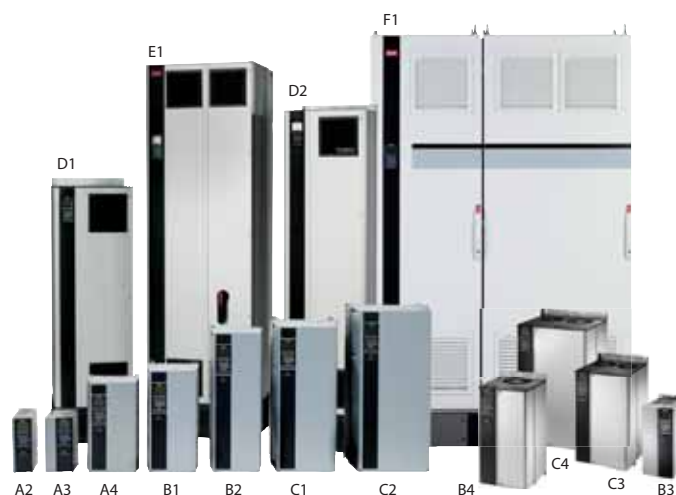
[18] Control Power Backup Input

DX	No DC input installed
D0	MCB 107 24 VDC backup input

An overview showing the many ways to configure a VLT® AQUA Drive

Select the options required for your application to determine the type code for your drive. The factory then uses this type code to build the drive to your exact specifications.

You can configure online at www.danfoss.com/drives – choose “Online Configurator” – or contact your local Danfoss Drives office.





Environmentally responsible

VLT® products are manufactured with respect for the safety and well-being of people and the environment.

All activities are planned and performed taking into account the individual employee, the work environment and the external environment. Production takes place with a minimum of noise, smoke or other pollution and environmentally safe disposal of the products is prepared.

UN Global Compact

Danfoss has signed the UN Global Compact on social and environmental responsibility and our companies act responsibly towards local societies.

EU Directives

All factories are certified according to ISO 14001 standard. All products fulfil the EU Directives for General Product Safety and the Machinery directive. Danfoss Drives is, in all product series, implementing the EU Directive concerning Hazardous Substances in Electrical and Electrical Equipment (RoHS) and is designing all new product series according to the EU Directive on Waste Electrical and Electronic Equipment (WEEE).

Impact on energy savings

One year's energy savings from the annual production of VLT® drives will save the energy equivalent to the energy production from a power plant. Better process control at the same time improves product quality and reduces waste and wear on equipment.

What VLT® is all about

Danfoss Drives is the world leader among dedicated drives providers – and still gaining market share.

Dedicated to drives

Dedication has been a key word since 1968, when Danfoss introduced the world's first mass produced variable speed drive for AC motors – and named it VLT®.

Two thousand employees develop, manufacture, sell and service drives and softstarters in more than one hundred countries, focused only on drives and soft starters.

Intelligent and innovative

Developers at Danfoss Drives have fully adopted modular principles in development as well as design, production and configuration.

Tomorrow's features are developed in parallel using dedicated technology platforms. This allows the development of all elements to take place in parallel, at the same time reducing time to market and ensuring that customers always enjoy the benefits of the latest features.

Rely on the experts

We take responsibility for every element of our products. The fact that we develop and produce our own features, hardware, software, power modules, printed circuit boards, and accessories is your guarantee of reliable products.

Local backup – globally

VLT® motor controllers are operating in applications all over the world and Danfoss Drives' experts located in more than 100 countries are ready to support our customers with application advice and service wherever they may be.

Danfoss Drives experts don't stop until the customer's drive challenges are solved.

