VLT® HVAC Drive

makes HVAC operation child's play

VLT®
THE REAL DRIVE

Perfect comfort levels and major energy savings can be achieved in any building by harnessing the VLT® HVAC Drive to your applications. Hotels, hospitals, airports, casinos, cleanrooms, sports facilities, concert halls, commercial buildings and residential buildings – if you can name a need, we can name a solution: the VLT® HVAC Drive.

VLT® HVAC Drive features and benefits apply to district heating applications as well – improving control and providing major energy savings.

VLT® – an intelligent part of the intelligent building

The VLT® HVAC Drive, built on Danfoss' new modular plug-and-play platform and dedicated to HVAC applications, makes HVAC operation child's play.

Lowest cost of ownership
VLT® HVAC Drives let you:

- **Save energy**
  The VLT® HVAC Drive includes:
  – 98% basic energy efficiency
  – Sleep Mode
  – Automatic Energy Optimisation
  – Flow compensation

- **Save money**
  The modular design and a host of options allows for a low initial investment and low cost upgrades according to future needs.

- **Save time**
  Operators, equipment and control systems all communicate effortlessly with the VLT® HVAC Drive. It is fluent in all common BMS network protocols and displays every alphabet. 27 languages, including English, German, Mandarin and Cantonese are available.

  The award-winning Local Control Panel constantly improves on the intuitive man-machine interface. Automatic Motor Adaptation and Automatic Energy Optimisation support fast commissioning.

  Due to a series of self-protecting and monitoring features and a highly durable mechanical design, the VLT® HVAC Drive is practically maintenance free.

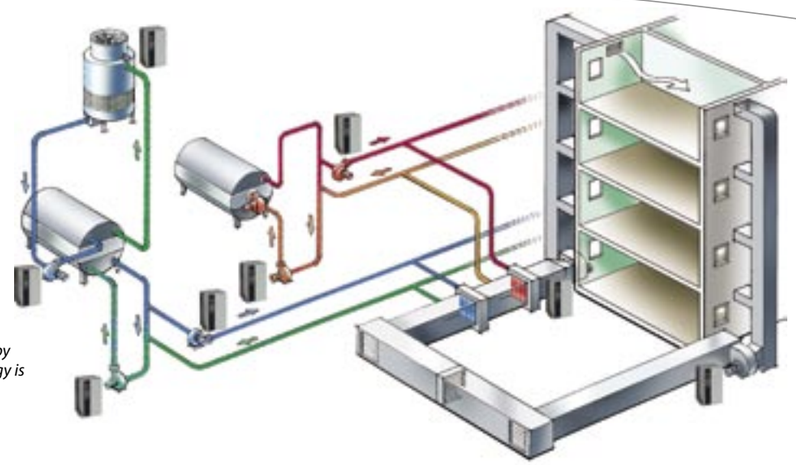
- **Save space**
  Due to its small size, the VLT® HVAC Drive is easily mounted inside a HVAC unit or panel.

- **Fire override mode**
  Fire Override Mode helps keep fire escape routes free of smoke, overrides the drives's self-protecting features and keeps the fan running as long as possible in the event of fire.

- **Save cabinet**
  Protection class IP55 requires no cabinet.

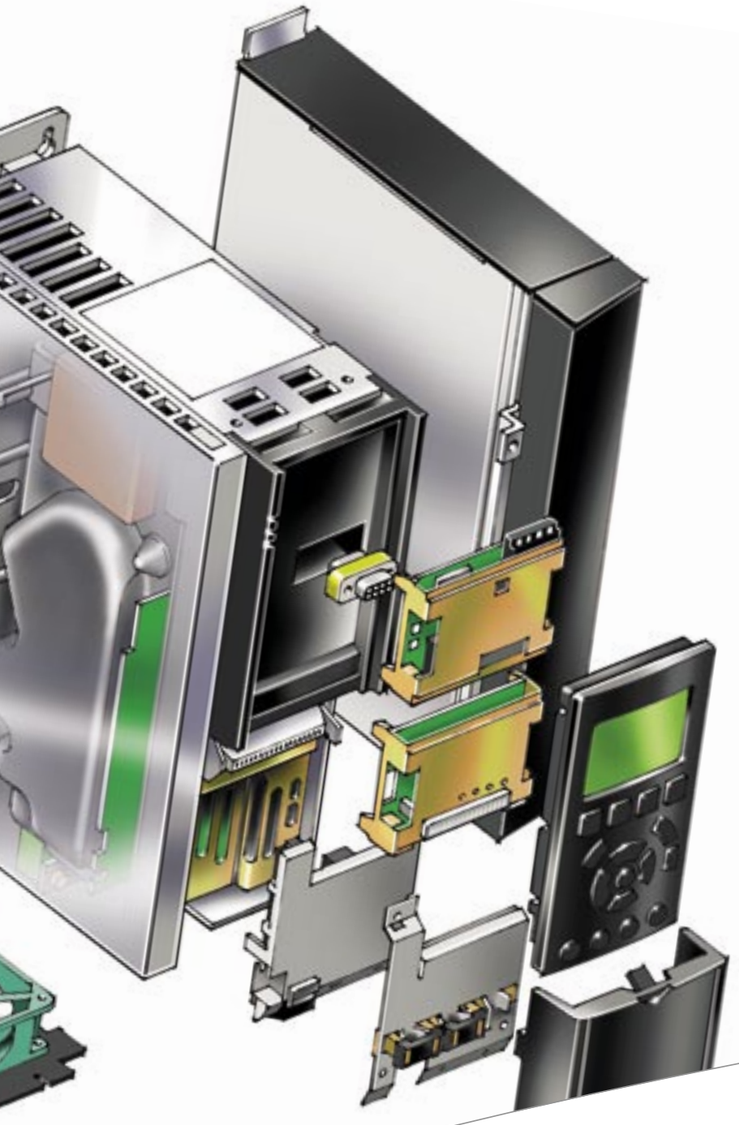
Dedicated to HVAC
Danfoss has unequalled experience in advanced drive technologies for HVAC applications.

This experience has been used to optimise features in the VLT® HVAC Drive and make it the perfect match for pumps, fans and water chillers (compressors) in buildings fitted with sophisticated HVAC solutions.



VLT® HVAC Drive operate all HVAC operations by providing exactly the power required. No energy is consumed by valves and dampers.

The VLT® HVAC Drive unleashes the full potential of HVAC



The VLT® HVAC Drive is built on Danfoss Drives, new generation modular concept. Real plug-and-play adding and exchanging of options. Just upgrade instead of buying a new drive.

Small investment
The VLT® HVAC Drive is available in a range of versions, from a basic serial communication and I/O configuration capable right up to a fully equipped and personalized drive, including all relevant HVAC I/O points and protocols. Delivered from factory.
No extra assembly work on-site!

50° C ambient temperature
The robust VLT® HVAC Drive is designed to work at maximum output in an ambient temperature up to 50° C.

Suitable for "slave" operation
The drive's modular structure makes it suitable for "slave" operation mastered by BMS, PLC's or DDCs.

No dust in electronics
The unique cooling system prevents dusty and agressive ambient airflow to damaging the drive electronics. This extends the drive's lifetime.

Stand-alone unit
VLT® HVAC Drive provides intelligent stand-alone functionality via:

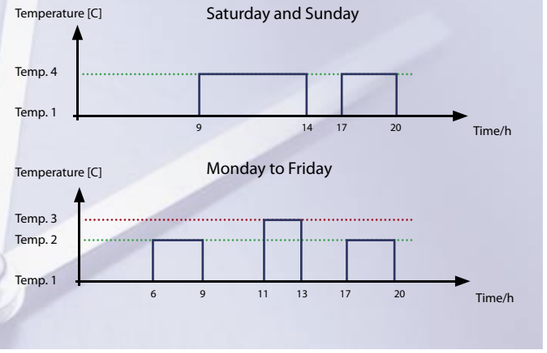
- Built-in Real Time Clock
- Programmable actions
- Smart Logic Controller
- 4 auto-tuned PID controllers.

Automatic Energy Optimisation
The standard feature AEO provides optimized motor magnetisation at all speeds and loads.

This increases energy efficiency by 5-15% at partial loads.

Real Time Clock

Real Time Clock can be used to adjust building comfort to demands that change over the week.



Flow compensation
Significant energy savings and reduced installation costs are provided by flow compensation in both fan and pumps systems. A pressure sensor mounted close to the fan or pump provides a reference enabling pressure to be kept constant at the discharge end of the system. The drive constantly adjusts the pressure reference to follow the system curve.

Energy monitoring
The VLT® HVAC Drive provides a complete range of energy consumption information. Choose to divide absolute energy consumption into hours, days or weeks. Or choose to monitor a load profile for the application.

Energy analysis
This data can even be uploaded to a VLT® Energy Box – PC software that performs in-depth real life/true energy analysis of your application and displays the payback time for the drive.

design award winner 2004

The VLT® HVAC 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.

The VLT® HVAC Drive can be remote commissioned and monitored through a USB pluggable cable or BMS network communications. VLT® Set up Software MCT 10 and Language Changer make drive operation child's play.

Best HVAC performance with VLT® HVAC Drive

Comfort for flight personnel and passengers
Clean air and comfortable temperature supports comfort and soothes frayed tempers. Air is moved, chilled, heated, humidified and cleaned effectively consuming a minimum of energy and financial resources. With VLT® HVAC Drive you get full control of pumps, fans and compressors.

Treated like a guest
When walking into a hotel room you should experience a mild, fresh, clean smell and a feeling of comfort and relaxation.
To provide this and at the same time go easy on energy and operating costs – choose a VLT® HVAC Drive.

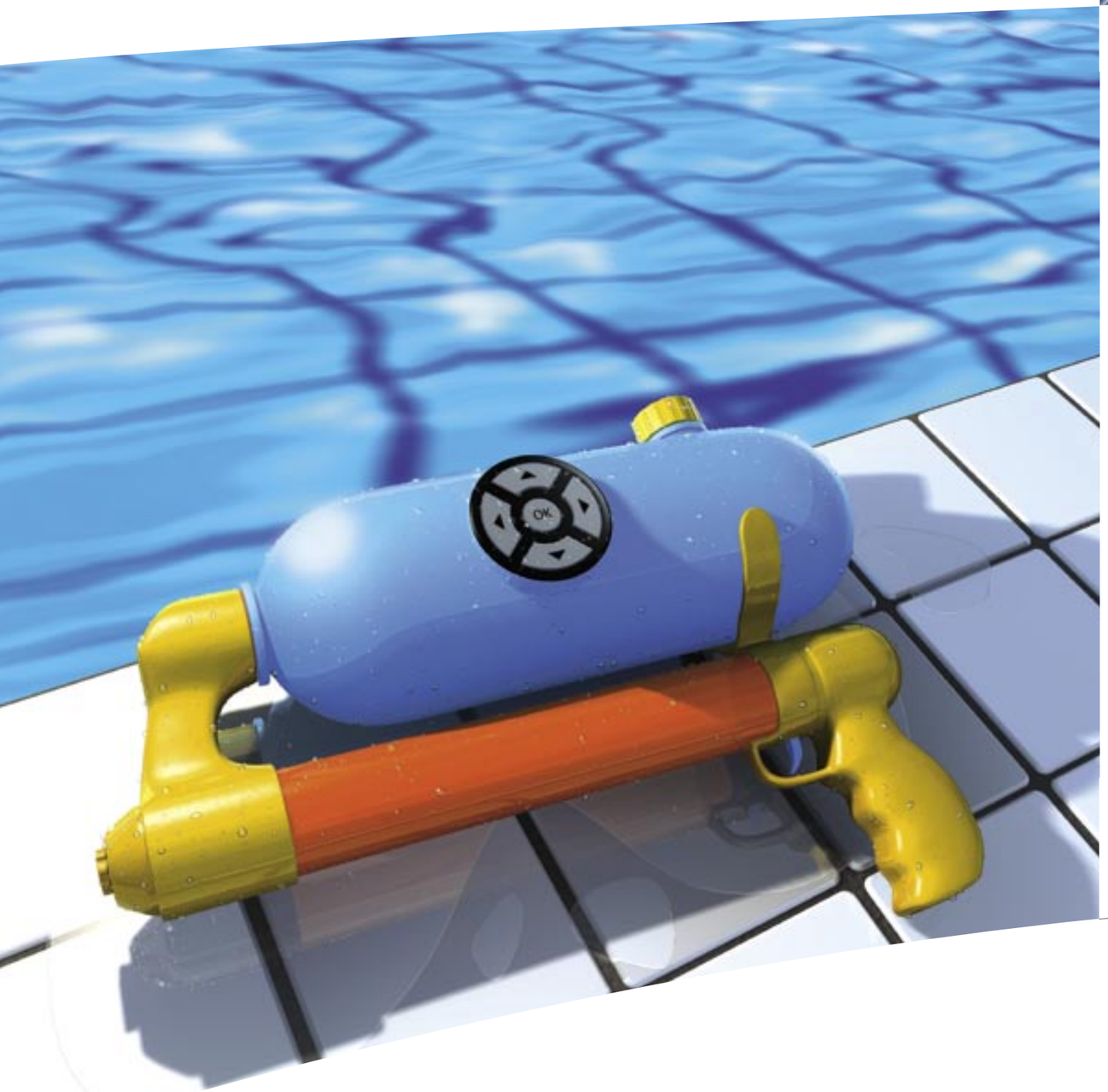
Healthy Environment
Patients thrive better breathing clean, conditioned air. Autotuning PID controllers ensure accurate control of airflow, maintaining a positive pressure in operating rooms to help maintain hygienic conditions and prevent cross contamination.
VLT® HVAC Drive can maintain a negative pressure in isolation wards as well, ensuring a healthy environment for all.

Where dust is critical
Cleanroom facilities for the production of micro electronics like semiconductor chips require special precautions. The VLT® HVAC Drive can meticulously control to maintain air quality and humidity levels under a variety of operating conditions, including continued operation during mains voltage fluctuations.

The bottom line
The initial cost of HVAC is almost negligible. Energy efficient control of fans, pumps and compressors – day and night, during opening and closing hours – ensures maximum economy and low running costs. Let VLT® HVAC Drive impact your bottom line.

Hot business
Let VLT® HVAC Drive provide a reliable, comfortable environment for your office staff. People should be able to work efficiently without being distracted by sudden changes in temperature or humidity. Let a VLT® HVAC Drive quietly and effectively control the indoor climate, improve work efficiency and help you keep cool in a hot business environment.

District heating/Cooling
The larger the system, the larger the savings that can be derived from the use of VLT® HVAC Drive. Precise control of temperature, pressure and flow is done by speed control of pumps and fans – the best way to save natural resources. The larger system, the greater the power required – and VLT ® HVAC Drives goes all the way.



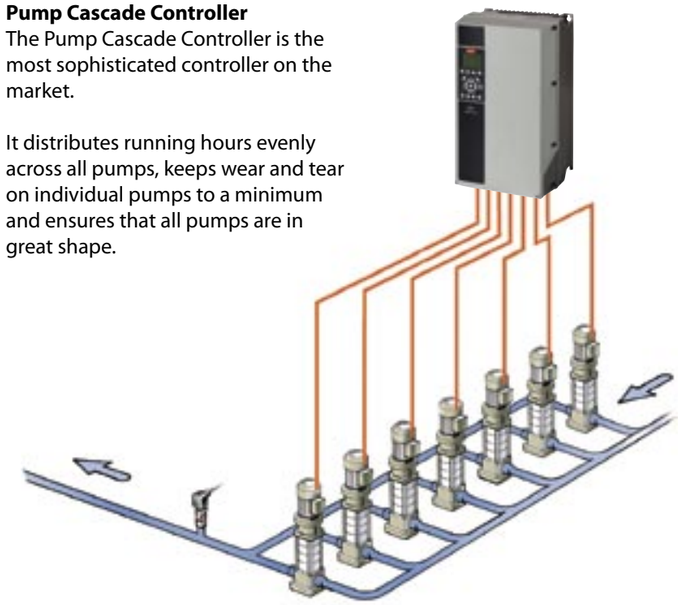
Dedicated pump features in VLT® HVAC Drive

The VLT® HVAC Drive offers a vast number of pump-specific features developed in cooperation with OEMs, contractors and manufacturers around the world.

Pump Cascade Controller
The Pump Cascade Controller is the most sophisticated controller on the market.

It distributes running hours evenly across all pumps, keeps wear and tear on individual pumps to a minimum and ensures that all pumps are in great shape.

Vital water supply
Vital water supply can be assured in the event of leakage or a broken pipe. For example overload is prevented by reducing speed – and supply is secured at lower flow.



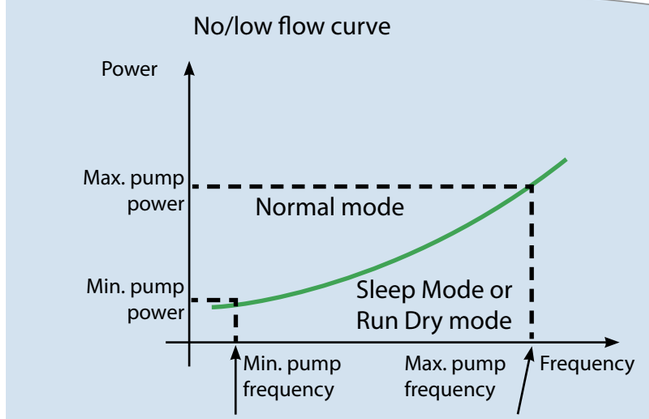
Sleep Mode
In Sleep Mode the drive detects situations with low or no flow.
Instead of continuous operation it boosts the system pressure and then stops to save energy. The drive starts automatically when the pressure falls below the lower set point.

Dry Pump Protection and End of Curve
Dry Pump Protection and End of Curve relate to situations where the pump runs without creating the desired pressure – as when a well runs dry or a pipe leaks.

The drive sets off an alarm, shuts off the pump, or performs another programmed action.

An operating pump will normally consume more power the faster it runs – according to a curve determined by the pump and application design.

VLT® HVAC Drive will detect situations where the pump runs fast but is not fully loaded – and thereby not consuming adequate power. This is the case when water circulation stops, the pump runs dry or when when pipes leak.



Dedicated fan features

User-friendly, distributed intelligence and reduced power consumption are beneficial for fan applications.

Lower AHU costs
The VLT® HVAC Drive is fitted with a built-in Smart Logic Controller and 4 auto tune PID controllers and can control air handling functions with fans, valves, and dampers. The building management's DDC-'s are thereby released and valuable data points (DP) are saved.

Extends BMS capacity
When integrated into the BMS network, all the HVAC Drive I/O points are available as remote I/O's to extend BMS's capacity. For example, room temperature sensors (Pt1000/Ni1000) can be directly connected.

Resonance Monitoring
By pressing a few buttons on the Local Control Panel the drive can be set to avoid frequency bands at which connected fans create resonances in the ventilation system. This improves building comfort.

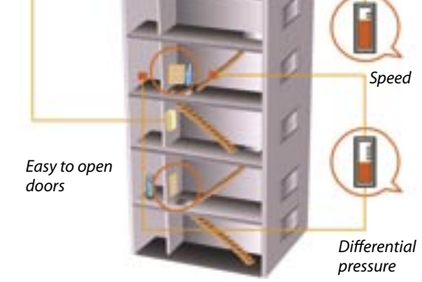
Intelligent AHU functions
The VLT® HVAC Drive handles logical rules and input from sensors, real-time functionality, and time-related actions. This enables the HVAC Drive to control a wide range of functions, including:

- Weekend and working-day operations
- Cascaded P-PI for temperature control
- Multi-zone pressure control
- Flow balancing between fresh and outlet air

Belt Monitoring
From the relation between current and speed, the VLT® HVAC Drive is able to reliably recognize a broken belt. Lack of air flow detected immediately, first cost and down-time is reduced.

Fire Override Mode
In Fire Override Mode the VLT® HVAC Drive will not react to control signals, warnings or alarms. It will continue its reliable operation as long as possible and run until it eventually selfdestruct.

Stairwell Pressurization
In the event of fire, the VLT® HVAC Drive can maintain a higher level of air pressure in stairwells than in other parts of the building and ensure that fire escapes remain free of smoke.

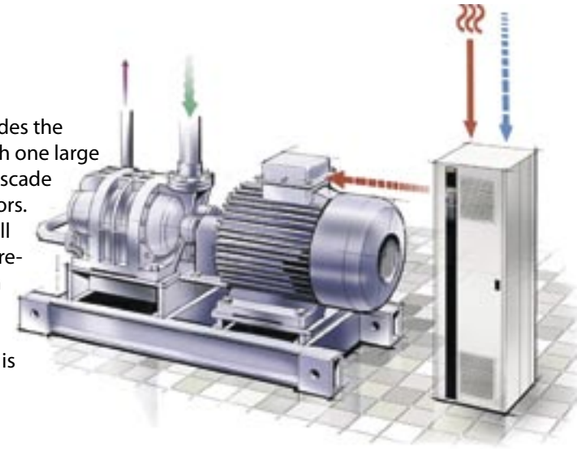


Meticulous control of fans saves energy and keeps noise and draft at a minimum.

Dedicated compressor features

The VLT® HVAC Drive has been designed to offer flexible, intelligent control of scroll, screw and centrifugal compressors, making it even easier to optimize cooling capacity with constant temperature and pressure levels for water chillers, and other typical compressor applications in HVAC.

Replace a cascade with a single compressor
The VLT® HVAC Drive provides the same level of flexibility with one large compressor instead of a cascade of 2 or 3 smaller compressors. The HVAC Drive operates all compressors at a far more refined range of speeds than normal – even above nominal speed – meaning that one large compressor is now enough.



Set point in temperature
The VLT® HVAC Drive calculates the actual room temperature from the pressure in the cooling media and refines compressor operation accordingly – without the need for additional software, sensors or controllers.

This calculation is also applicable to the set point as well, so the desired temperature is set via the Local Control Panel – and not a pressure value.

Fewer starts and stops
A maximum number of start/stop cycles within a given period of time can be set via the Local Control Panel. Since start-up is the most critical part of compressor operation (all parts of the unit are under mechanical stress before the system is sufficiently lubricated) this extends compressor lifetime.

Quick start-up
To extend life even further, the VLT® HVAC Drive opens a bypass valve and lets the compresser start quickly without load.

The VLT® HVAC Drive provides 130% break away torque and can give 110% torque for 60 seconds in normal operation. This torque demand would normally require larger and more expensive drives.

VLT® HVAC drive allows you to rethink your compressor operation.

Flexible compressor mode operation even above nominal speed and high break away torque for start-ups allow for better control and major savings.

Proven HVAC experience

Toronto Airport, Canada
Toronto Pearson International Airport is Canada's busiest airport, welcoming close to 29 million passengers in 2004. The airport is currently in the middle of an ambitious 10-year, almost $5 billion dollar Airport Development Program which began in 1998 – and Danfoss has provided hundreds of HVAC drives as part of this program.

Orlando Medical Center, Florida, USA
Danfoss drives are part of the economical and energy smart solution that helps keep staff and patients cool and comfortable in the 20,000 m^2 Orlando Regional Medical Center in the middle of sunny Florida.

National Theatre, Hungary
In the new National Theatre of Hungary Danfoss HVAC drives in the air handling system ensure that audiences can enjoy performances in a tranquil and pleasant environment. The 20,800 m^2 building housing 620 visitors, was built in 15 months which required easy installing equipment.

Torre Mayor, Mexico City
With its 55 floors and a height of 225 m the Torre Mayor is the highest building in Latin America. Danfoss drives control the heating and ventilation.

Tropical Islands Resort near Berlin, Germany
A steady 25° C air temperature, 31° C water temperature, no rain, and a pleasant 40% to 60% humidity for the resort's tropical plants. Everyone's idea of perfect weather!
All this is possible with a first class climate and water control system driven by VLT® HVAC Drives.

Opera House in Sydney, Australia
The Sydney Opera House is one of the architectural wonders of the world, and perhaps the best known building of the 20th century. In 2001, the NSW Government provided $69 million for several projects to improve the facilities and environment for performing arts companies, patrons and visitors. Danfoss provided the drives.

Shanghai General Motors, China
Shanghai General Motors Co Ltd. is a 50-50% joint venture between General Motors and the Shanghai Automotive Industry Corporation Group (SAIC). Shanghai GM has an annual production capacity of 200,000 vehicles. Danfoss provides the VLT® HVAC drives to maintain the production environment.

Grand Hyatt, Dubai
Set within a lush oasis of 37 acres of landscaped gardens, the Grand Hyatt Dubai is an outstanding combination of resort facilities, luxury hotel guest rooms and suites, residential apartments and one of the most advanced conference centers in the Middle East. Danfoss provided the VLT® HVAC Drives.

Guangzhou Baiyun Pharmaceutical Factory, China
Guangzhou Baiyunshan Pharmaceutical Manufacturer was established in 1993 and is a listed company with a good reputation in the pharmaceutical field in China. Its share value is around RMB 374 million and sales turnover in 2004 was RMB 2,5 billion.
Danfoss provided the drives.

HVAC 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
- IP65 rating when mounted in a panel door
- Numerical version also available

Illumination
- Important buttons are now illuminated when active

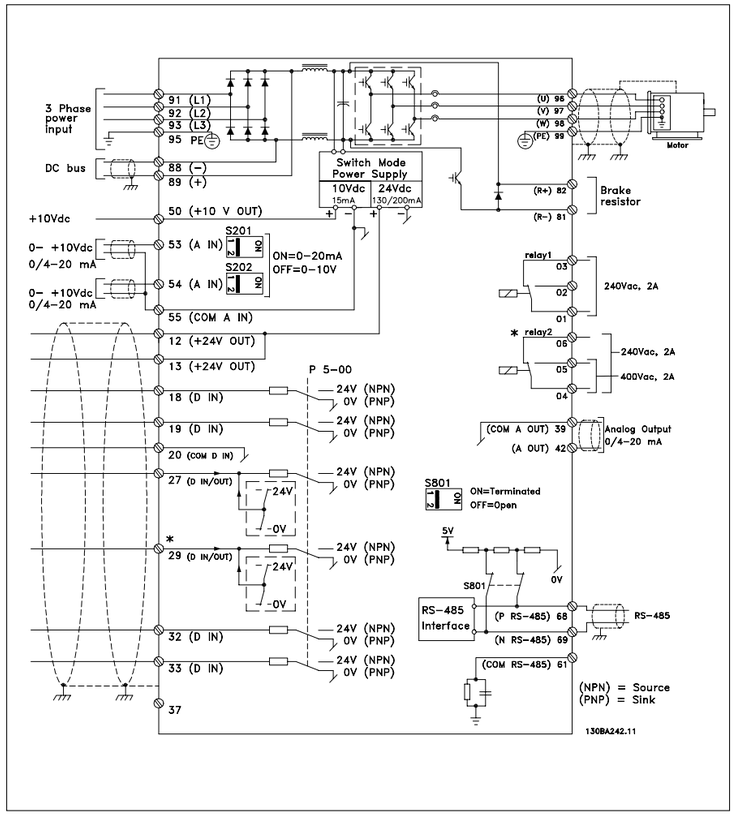
Menu structure
- Based on the well known matrix system in today's VLT® drives
- Easy short cut for the experienced user
- Edit and operate in different set-ups simultaneously

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

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

Connection overview

This diagram shows a typical installation of the VLT® HVAC Drive.
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).
Terminals 88 and 89 are used for load sharing between drives.
Analog inputs can be connected to the 53 (V or mA), 54 (V or mA) terminals.
These inputs can be set up to either reference, feedback or termistor.
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$_{max}$.
On the 68 (P+) and 69 (N-) terminals' RS 485 interface, the drive can be controlled and monitored via serial communication.



Mains supply 3 x 200 – 240 VAC

Type	Typical shaft output		Output current [A] 3x200-240V		Enclosure Weight IP20/21**		Enclosure Weight IP55		Dimensions IP20/21**	Dimensions IP55
	kW	HP	Cont.	60s*	kg	Lbs.	kg	Lbs.	H x W x D	H x W x D
FC102P1K1T2	1.1	1.5	6.6	7.3	4.8	10.6	14.2	31.4	268x90x205	420x242x195
FC102P1K5T2	1.5	2.0	7.5	8.3	4.9	10.8	14.2	31.4	268x90x205	420x242x195
FC102P2K2T2	2.2	3.0	10.6	11.7	4.9	10.8	14.2	31.4	268x90x205	420x242x195
FC102P3K0T2	3.0	4.0	12.5	13.8	6.6	14.6	14.2	31.4	268x130x205	420x242x195
FC102P3K7T2	3.7	5.0	16.7	18.4	6.6	14.6	14.2	31.4	268x130x205	420x242x195
FC102P5K5T2	5.5	7.5	24.2	26.6	22	49	23	51	480x242x260	480x242x260
FC102P7K5T2	7.5	10	30.8	33.9	22	49	23	51	480x242x260	480x242x260
FC102P11KT2	11	15	46.2	50.8	27	60	28	62	650x242x260	650x242x260
FC102P15KT2	15	20	59.4	65.3	27	60	28	62	650x242x260	650x242x260
FC102P18KT2	18.5	25	74.8	82.3	62	137	65	144	680x308x310	680x308x310
FC102P22KT2	22	30	88.0	96.8	62	137	65	144	680x308x310	680x308x310
FC102P30KT2	30	40	115	126.5	62	137	65	144	775x370x335	775x370x335
FC102P37KT2	37	50	143	157.3	43	95	45	100	775x370x335	775x370x335
FC102P45KT2	45	60	170	187	43	95	45	100	775x370x335	775x370x335

* I max for 60 s – ** IP21 from 5.5 kW to 45 kW – H x W x D means Height x Depth x Width

Mains supply 3 x 380 – 480 VAC

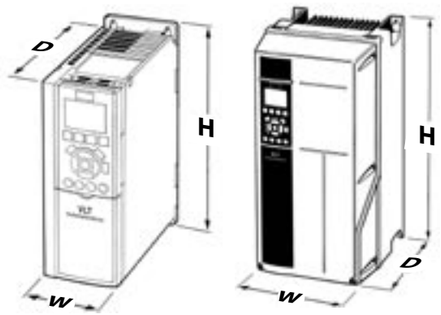
Type	Typical shaft output		Output current [A] 3x380-440V		Output current [A] 3x440-480V		Enclosure Weight IP20/21**		Enclosure Weight IP55***		Dimensions IP20/21**	Dimensions IP55***
	kW	HP	Cont.	60s*	Cont.	60s*	kg	Lbs.	kg	Lbs.	H x W x D	H x W x D
FC102P1K1T4	1.1	1.5	3.0	3.3	2.7	3	4.8	10.6	14.2	31.4	268x90x205	420x242x195
FC102P1K5T4	1.5	2.0	4.1	4.5	3.4	3.7	4.9	10.8	14.2	31.4	268x90x205	420x242x195
FC102P2K2T4	2.2	3.0	5.6	6.2	4.8	5.3	4.9	10.8	14.2	31.4	268x90x205	420x242x195
FC102P3K0T4	3.0	4.0	7.2	7.9	6.3	6.9	4.9	10.8	14.2	31.4	268x90x205	420x242x195
FC102P4K0T4	4.0	5.5	10.0	11	8.2	9	4.9	10.8	14.2	31.4	268x90x205	420x242x195
FC102P5K5T4	5.5	7.5	13.0	15.2	11.0	12.2	6.6	14.6	14.2	31.4	268x130x205	420x242x195
FC102P7K5T4	7.5	10	16.0	17.6	14.5	16	6.6	14.6	14.2	31.4	268x130x205	420x242x195
FC102P11KT4	11	15	24.0	26.4	21.0	23.1	22	49	23	51	480x242x260	480x242x260
FC102P15KT4	15	20	32.0	35.2	27.0	29.7	22	49	23	51	480x242x260	480x242x260
FC102P18KT4	18.5	25	37.5	41.3	34.0	37.4	22	49	23	51	480x242x260	480x242x260
FC102P22KT4	22	30	44.0	48.4	40.0	44.0	27	60	28	62	650x242x260	650x242x260
FC102P30KT4	30	40	61.0	67.1	52.0	57.2	27	60	28	62	650x242x260	650x242x260
FC102P37KT4	37	50	73.0	80.3	65.0	71.5	43	95	45	100	680x308x310	680x308x310
FC102P45KT4	45	60	90.0	99	80.0	88	43	95	45	100	680x308x310	680x308x310
FC102P55KT4	55	75	106	116.6	105	115.5	43	95	45	100	680x308x310	680x308x310
FC102P75KT4	75	100	147	161.7	130	143	62	137	65	144	775x370x335	775x370x335
FC102P90KT4	90	125	177	194.7	160	176	62	137	65	144	775x370x335	775x370x335
FC102P110T4	110	150	212	233	190	209	96	212	96	212	1208x420x373	1208x420x373
FC102P132T4	132	200	260	286	240	264	104	230	104	230	1208x420x373	1208x420x373
FC102P160T4	160	250	315	347	302	332.2	125	277	125	277	1588x420x373	1588x420x373
FC102P200T4	200	300	395	434	361	397.1	136	301	136	301	1588x420x373	1588x420x373
FC102P250T4	250	350	480	528	443	487.3	151	334	151	334	1588x420x373	1588x420x373
FC102P315T4	315	450	600	660	540	594	263	582	263	582	2000x600x494	2000x600x494
FC102P355T4	355	500	658	724	590	649	270	597	270	597	2000x600x494	2000x600x494
FC102P400T4	400	600	745	820	678	745.8	272	602	272	602	2000x600x494	2000x600x494
FC102P450T4	450	600	800	880	730	803	313	693	313	693	2000x600x494	2000x600x494

* I max for 60 s – ** IP21 from 11 kW to 90 kW – *** IP54 from 110kW – H x W x D means Height x Dept x Width

Mains supply 3 x 525 – 600 VAC

Type	Typical shaft output		Output current [A] 3x525-550V		Output current [A] 3x551-575V		Enclosure Weight IP20		Dimensions IP20
	kW	HP	Cont.	60s*	Cont.	60s*	kg	Lbs.	H x W x D
FC102P1K1T6	1.1	1.5	2.6	2.9	2.4	2.6	6.5	14.3	268x130x205
FC102P1K5T6	1.5	2.0	2.9	3.2	2.7	3	6.5	14.3	268x130x205
FC102P2K2T6	2.2	3.0	4.1	4.5	3.9	4.3	6.5	14.3	268x130x205
FC102P3K0T6	3.0	4.0	5.2	5.7	4.9	5.4	6.5	14.3	268x130x205
FC102P4K0T6	4.0	5.5	6.4	7	6.1	6.7	6.5	14.3	268x130x205
FC102P5K5T6	5.5	7.5	9.5	10.5	9.0	9.9	6.6	14.6	268x130x205
FC102P7K5T6	7.5	10	11.5	12.7	11.0	12.1	6.6	14.6	268x130x205

* I max for 60 s
** Planned
H x W x D means Height x Dept x Width



Specifications

Mains supply (L1, L2, L3):

Supply voltage:	200-240 V ±10%
Supply voltage:	380-500 V ±10%
Supply voltage:	525-600 V ±10%*
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	0-100% of supply voltage
Switching on output	Unlimited
Ramp times	1 - 3600 sec.
Closed loop	0-132 Hz

Digital inputs:

Programmable digital inputs:	6*
Logic	PNP or NPN
Voltage level	0 - 24 VDC

* 2 can be used as digital outs

Analog inputs:

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)	
Utize some of the digital 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:

Standard built in:	Optional:
• FC Protocol	• LonWorks
• N2 Metasys	• BACnet
• FLN Apogee	• DeviceNet
• Modbus RTU	• Profibus

* planned

Application options:

A wide range of integrated HVAC 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

Relay option:
3 relay outputs

Analogue I/O option:
3 Pt1000 / Ni1000 inputs, 3 analog voltage 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 built in brake chopper limits the load on the intermediate circuit in case the motor acts as generator.

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 critical demands on harmonic distortion
- **dv/dt filters**: For special demands on motor isolation protection
- **Sine filters** (LC filters): For noiseless motor

HVAC PC software

- **MCT 10**
  – ideal for commissioning and servicing the drive
- **VLT HVAC Planet**
  – an interactive design guide including application examples.
- **VLT Energy Box**
  – comprehensive energy analysis tool, shows the drive pay-back time
- **MCT 31**
  – harmonics calculations tool

Choose freely from thousands of configurations delivered from factory

	P = Power				T	E = Normal; Z = Size up*			H = Hardware options				X	X	X	S = Software	X	X	X		A		B		C						
FC 102	P				T				H				X	X	X	S	X	X	X		A		B		C						

Power size [kW]

1K1	1.1
1K5	1.5
2K2	2.2
3K0	3.0
4K0	4.0
5K5	5.5
7K5	7.5
11K	11
15K	15
18K	18.5
22K	22
30K	30
37K	37
45K	45
55K	55
75K	75
90K	90
110	110
132	132
160	160
200	200
250	250
315	315
355	355
400	400

Mains Voltage

2 :	200-240 VAC
4 :	380-480 VAC
6 :	525-600 VAC*

* Planned

Enclosure

E20 :	IP20 / Chassis
E21 :	IP21 / Type 1
E54:	IP54
E55 :	IP55/ Type 12
P21:	IP21 /Type 1 (with back plate)
P55:	IP55/Type 12 (with back plate)

RFI
X : No RFI filter ●
1 : A1/B
2 : A2
3: A1/B Reduced cable length

Brake
X : No brake
B : Brake chopper

LCP
X : Blind cover
N : Numerical LCP
G : Graphical LCP

Coating
X : wo coated PCB
C : Coated PCB

□ = Only 3 x 200 - 240 VAC units
● = Only 525 - 600 VAC units

A-options
X : No option
0 : Profibus DP V1
4 : DeviceNet
J : BACNet
G : LonWorks

B-options
X : No option
0 : Analog I/O
K : General Purpose I/O
P : Relay card

C-options
X : No option

X : No selection

XX : Latest standard software version
1X : Software option 1
2X : Software option 2

D-option
X : No option
0 : 24V DC backup

An overview showing the thousands of ways to configure a VLT® HVAC Drive.
Choosing between options creates a unique drive number.

The drive is factory built using this number.

You can configure online at www.Danfoss.com/Drives.

What VLT® is all about

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

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 – and nothing but drives and softstarters.

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 each element to take in parallel, at the same time reducing time to market and ensuring that customers always enjoy the benefits of the latest features.

Local backup – globally
VLT® motor controls are operating in applications all over the world and Danfoss Drives, experts are ready to support our customers with application advice and service wherever they may be.

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

Danfoss Drives experts only ever stop when the customer's drive problems are solved.