Danfoss Drives
– for your applications

Quality
application-optimized products, which target your needs
True system independence

System independence
When it comes to optimizing system efficiency to meet your needs exactly, the right components are vital. Whether it’s a particular vendor, certain motor technology or a standardized way to communicate, Danfoss Drives can provide the right AC drive to meet your specific needs. You’ll always get the most flexible VLT® or VACON® drive adapted to:
- Meet the unique requirements of your applications
- Operate at peak performance
- Optimize efficiency

When you have the freedom to select the optimal components for your system, a potential energy saving of up to 60% is possible.

Fieldbus independence
One other important aspect of any system is the ability to efficiently communicate over standard interfaces such as PROFINET or EtherNet/IP in industrial applications or BACnet/IP in building automation applications. Regardless of your application or your preferred communication protocol, both VLT® and VACON® drives have an extremely wide variety of communication protocols to select from. In this way you can ensure that the AC drive integrates seamlessly into your chosen system. The control system attains optimal efficiency while also reducing costs related to training, commissioning and maintenance.

Motor independence
With increasingly stringent demands on motor efficiency, traditional induction motors cannot always comply. New motor technologies therefore continue to emerge, extending both full-load and part-load efficiency. The unique requirements of these newer motor technologies – such as permanent magnet (PM) motors and synchronous reluctance (SynRM) motors – also demand special motor control algorithms within the AC drive. Both VLT® and VACON® drives have the built-in capabilities to control whatever motor technology your application requires, at optimum efficiency. The required performance of your system is always available exactly when you need it.
VLT® drives position you at the forefront of the energy-efficiency race. Outmaneuvering other precision drives, they excel, with remarkable fit, functionality and diverse connectivity.

VLT® drives play a key role in the rapid urbanization through an uninterrupted cold chain, fresh food supply, building comfort, clean water and environmental protection. Benefit from the universally-compatible VLT® effectiveness where ease of use unites seamlessly with high precision, synchronization and speed. You achieve servo-like performance with rationalized elegance, free of complexity.

Secure long-term economic benefits with documented low system-lifetime cost. VLT® drives consistently deliver, whether in Food and Beverage, Water and Wastewater, HVAC, Refrigeration, Material Handling, or Textile applications.

The steadfast longevity of VLT® drives is directly attributable to world-class quality assurance placing VLT® drives right at the sharp end. The sharp end of global resource management and factory automation.

VLT® Micro Drive FC 51
The smallest AC drives in the VLT® Micro Drive FC 51 series are particularly suitable for side-by-side mounting with a high integration density. The typical features of Danfoss Drives are still retained.

Compact
VLT® Micro Drive is up to 40 percent smaller than other AC drives with comparable power and built-in features.

Protection for electronics
To ensure a long service life, the cooling air does not flow directly over the power electronics.

Power range
1 x 200-240 V ...... 1/4 to 3 HP (0.18-2.2 kW)
3 x 200-240 V ...... 1/3 to 5 HP (0.25-3.7 kW)
3 x 380-480 V ...... 1/2 to 30 HP (0.37-22 kW)

VLT® Midi Drive FC 280
The VLT® Midi Drive delivers flexible and efficient motor control for use in a wide variety of automation and machine building applications.

Flexible. Communicative.
This medium power-range drive is strong on control performance, functional safety, and flexible fieldbus communication. Integrated functionality such as DC choke, RFI filter, Safe Torque Off (STO), and brake chopper saves you from finding space and budget to install extra components.

Easy retrofit
VLT Midi Drive is prepared for compatibility with the VLT® 2800. Its exterior dimensions, cable plugs, cable lengths, and set-up software tools enable easy retrofit in established plant or machinery concepts.

Easy to use
A USB port provides easy PC connectivity. The VLT® Memory Module MCM 102 option facilitates fast implementation of factory settings, and transfer of settings during retrofit.

Power range
1 x 200-240 V ...... 1/2 to 3 HP (0.37-2.2 kW)
3 x 200-240 V ...... 1/2 to 5 HP (0.37-3.7 kW)
3 x 380-480 V ...... 1/2 to 30 HP (0.37-22 kW)

Fieldbus

Enclosure

Fieldbus

Enclosure
VLT® HVAC Basic Drive FC 101
Optimized for basic operation of pumps and fans, the variable torque VLT® HVAC Basic Drive has built-in HVAC functions that reduce initial costs and increase productivity.

The FC101 is part of the Danfoss 2-tier strategy leaving the product available to OEM HVAC accounts only.

Features
- Integrated fan, pump functionality
- Fire Override Mode for enhanced safety
- Automatic Energy Optimizer function
- Saves 5 – 25% energy
- Unique cooling concept with no forced air flow over electronics
- Built-in DC coils – no harmonic concerns
- Category C1 filters: meets protection Class C1 and C2

Power range
- 3 x 200-240 V ...... 1/3 to 60 HP (0.25-45 kW)
- 3 x 380-480 V ...... 1/2 to 125 HP (0.37-90 kW)
- 3 x 525-600 V ...... 5 to 125 HP (3.7-90 kW)

VLT® Refrigeration Drive FC 103
A variable torque drive specialized for control of compressors, pumps and fans for significant energy savings in refrigerating plants, whilst prolonging the service life of components.

Improving COP
(Coefficient of performance)
Intelligent power adjustment increases system stability and optimizes the volumetric efficiency of the evaporator, the compressor, and the total refrigeration system.

Refrigeration terminology
The use of refrigeration terminology allows quick and easy configuration.

AC drive as standard
The combination of speed-controlled and mains-operated compressors enables the design of low-wear and energy-efficient systems.

Power range
- 3 x 200-240V ...... 1 1/2 to 60 HP (1.1 - 45 kW)
- 3 x 380-480V 1 1/2 to 1350 HP (1.1 - 1000 kW)
- 3 x 525-600V 1 1/2 to 1550 HP (1.1 - 1400 kW)
With 110% overload torque
VLT® HVAC Drive FC 102
The ideal choice for fan and pump applications in modern buildings. The drive offers maximum flexibility in installation, bus connections and control intelligence.

HVAC Inside
The VLT® HVAC Drive FC 102 is specially engineered for building automation with intelligent HVAC functions.

Optimal EMC protection
Standard integrated chokes and high-quality RFI filters ensure interference-free operation at all times.

EC+
The intelligent VVC+ control principle enables the use of permanent magnet motors or synchronous reluctance motors with efficiency equal to or better than EC technology.

Power range
1 x 200-240V .... 1 1/2 to 30 HP (1.1 - 22 kW)
3 x 200-240V .... 1 1/2 to 60 HP (1.1 - 45 kW)
3 x 380-480V 1 1/2 to 1350 HP (1.1 - 1000 kW)
3 x 525-600V 1 1/2 to 1550 HP (1.1 - 1400 kW)
3 x 525-690V ...................... 1.1-1400 kW
With 110% overload torque
Available in LHD and 12 pulse options.

Fieldbus
MOD | META | BAC | FLN | FC
--- | --- | --- | --- | ---
DN | LON | BAC | TCP | EIP
PB | PN | BIP

Enclosure
IP00 | IP20 | IP21/Type 1
--- | --- | ---
IP54 & IP55/Type 12 | Type 3R | IP66/Type 4X

VLT® AutomationDrive FC 301 & 302
A modular drive designed to comply with modern automation application requirements with easy configuration and a wide power range.

Safety where it matters
The VLT® AutomationDrive FC 302 features Safe Torque Off as standard. Easily configurable options are available: SS1, SLS, SMS & SSM.

High functionality
All functions necessary for automation applications with common motor technologies can be realized and configured quickly and easily.

Harmonic mitigation
Active compensation of harmonics is available via variants incorporating advanced active filters (AAF) or 12-pulse technology.

Power range (FC-301)
3 x 200-240V .... 0.33 to 50 HP (0.25 - 37 kW)
3 x 380-480V .... 0.33 to 100 HP (0.37 - 75 kW)

Power Range (FC-302)
3 x 200-240V .... 0.33 to 50 HP (0.25 - 37 kW)
3 x 380-500V 1/2 to 1200 HP (0.37 - 800 kW)
3 x 525-600V 1 to 1350 HP (0.75 - 1000 kW)
3 x 525-690V ...................... 1.1 to 1200 kW
With 110% overload torque
Available in LHD and 12 pulse options.

Fieldbus
MOD | FC
--- | ---
DN | CAN | PB | TCP | EIP
ECAT | PN | FL

Enclosure
IP00 | IP20 | IP21/Type 1
--- | --- | ---
IP54/Type 12 | IP55/Type 12 | IP66/Type 4X

VLT® AQUA Drive FC 202
The VLT® AQUA Drive FC 202 drives and controls all types of pumps. In addition to the widely used centrifugal pumps (quadratic load torque), the VLT® AQUA Drive FC 202 is ideal for displacement pumps or eccentric screw pumps (constant load torque).

Focusing on water and pumps
Dedicated functions such as burst pipe monitoring, dry-running protection and flow compensation secure and empower your pumping application independent of the motor technology.

Cascade controller as standard
The cascade controller connects or disconnects pumps as necessary and according to specified limits. It also enables master/follower operation. Extended functionality is available via an option.

Power range
1 x 200-240V .... 1 1/2 to 30 HP (1.1 - 22 kW)
1 x 380-480V .... 10 to 50 HP (7.5 - 37 kW)
3 x 200-240V .... 3 to 60 HP (0.25 - 45 kW)
3 x 380-480V 1/2 to 1350 HP (0.37 - 1000 kW)
3 x 525-600V 1/2 to 1550 HP (0.75 - 1200 kW)
3 x 525-690V ...................... 1.1-1400 kW
With 110% Normal Overload
Available in LHD and 12 pulse options.

Fieldbus
MOD | FC
--- | ---
PN | DN | PB | TCP | EIP

Enclosure
IP00 | IP20 | IP21/Type 1
--- | --- | ---
IP54 & IP55/Type 12 | Type 3R | IP66/Type 4X
VLT® Low Harmonic Drive

Meets the toughest harmonic requirements under all load/grid conditions. The Danfoss VLT® Low Harmonic Drive is the first solution combining an active filter and a drive in one package. The VLT® Low Harmonic Drive continuously regulates harmonic suppression according to the load and grid conditions without affecting the connected motor.

The Total Harmonic Current Distortion is reduced to less than 3% under ideal conditions and to less than 5% on heavy distortion grids with up to 2% phase unbalance. As individual harmonics also fulfill the toughest harmonic requirements, the VLT® Low Harmonic Drive meets all present harmonic standards and recommendations. Unique features such as sleep mode and back channel cooling offer unmatched energy efficiency for Low Harmonic Drives.

**Power range - Low harmonic drive**

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<tr>
<th>Voltage Range</th>
<th>Normal Overload</th>
<th>High Overload</th>
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<tr>
<td>380-480 V</td>
<td>250 to 1000 HP (160-710 kW)</td>
<td>250 to 1000 HP (132 - 630 kW)</td>
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VLT® 12-Pulse Drive

The VLT® 12-Pulse Drive is perfect for retrofit or new construction. Danfoss starts with its 6-pulse FC102, FC103, FC202, and FC302 premiere drive technology and adds an additional rectifier to accept two outputs from a phase shifting transformer (not supplied by Danfoss). This effectively cancels the 5th and 7th harmonic resulting in a possible Tid level of 10%.

**Power range**

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<td>450 to 1350 HP (315 - 1000 kW)</td>
<td>350 to 1200 HP (250 - 800 kW)</td>
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<tr>
<td>525-600 V</td>
<td>450 to 1550 HP (450 - 1400 kW)</td>
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<td>525-690 V</td>
<td>450 - 1200 kW</td>
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**VLT® Advanced Active Filter AAF 006**
The active filter analyzes load-applied harmonics and compensates these by active counter-control. It is suitable for the compensation of AC drives and improvement of the system quality.

**Easy to use**
The VLT® Advanced Active Filter is configured for most applications upon leaving the factory.

**Optimal filtering**
Use the individually adjustable compensation modes for adaptation to suit specific requirements.

**Versatile**
VLT® Advanced Active Filter supporting central, individual or group compensation.

**Power range**
380-480 V ................ 190/250/310/400 A
Up to 4 units can be paralleled for higher power

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**VLT® Advanced Harmonic Filter AHF 005/010**
Harmonic filters with additional functions specially adapted for use with VLT® drives. When connected upstream of an AC drive, the filter reduces the total current distortion fed back to the system to 5% or 10% based on product selected.

**Compact units**
The small, compact enclosure fits perfectly in a control cabinet.

**Retrofit**
The filter is simple to use for retrofitting in existing installations.

**Flexible**
One filter module can be used for several AC drives in parallel.

**Power range**
440 – 480 V AC (60 Hz) ........ 10 - 436 Amps*
600 V AC (60 Hz) ............. 15 - 395 Amps*

* Higher rating when connected in parallel

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VLT® power options

VLT® MCC 101 Sine-wave Filter
VLT® Sine-wave Filters smooth the output voltage of a VLT® drive and reduce motor insulation stress and bearing currents as well as noise development in the motor.

For critical motors
Use the filter especially for AC drive operation of older motors, low permitted voltages in terminal boxes or without phase insulation.

Long motor cables
Enable use of motor cables with a length of 500 m and more, using a sine-wave filter.

Power range
3 x 200 – 500 V, 2.5 – 800 A
3 x 525 – 690 V, 4.5 – 660 A

VLT® dV/dt Filters
VLT® dV/dt Filters reduce the rate of voltage rise on the motor terminals and protect old or weak motor insulation against breakdown. This is particularly important for short motor cables.

Retrofit
Retrofit is easy in older systems or motors.

Compact
These filters are smaller, lighter and more affordable, compared to sine-wave filters.

Power range
3 x 200 – 690 V (up to 880 A)

VLT® Common Mode Filter
High-frequency common mode cores reduce electromagnetic interference and protect against bearing currents.

Wide coverage
Just five sizes cover the Danfoss FC series drives from A thru F frames.

Combinable
The filters can be combined with other output filters.

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* wall-mounted enclosure up to 75 A (500V)/45 A (690V)
** floor-standing enclosure from 115 A (500V)/76 A (690V)
VLT® Decentral Drive FCD 302
This decentral drive in a rugged design offers a high degree of flexibility and functionality. It can be mounted close to the motor and is ideal for demanding applications.

One-box concept
Integrated two pc design (drive and Installation Box) house all required modules into one single housing. Integrated service switch and Safe Torque Off (STO) function available.

Minimizing installation costs
Fewer external components and connectors save installation, assembly and maintenance time. Integrated power and fieldbus looping reduces installation cost.

Hygienic design
The VLT® Decentral Drive FCD 302 complies with requirements for ease of cleaning and hygienic design.

Power range
3 x 380-480 V ………… 1/2 to 4 HP (0.37-3 kW)

VLT® DriveMotor FCM/FCP 106
A fully-integrated motor and drive solution, available with either an IE4 PM motor or IE2 induction motor.

You can order a complete assembled system, the FCM 106 or just the drive, to mount on your own motor, FCP 106.

NEMA motor ready
The FCP 106 is designed to be motor independent. Choose a NEMA motor for the application and size the FCP 106 to match.

Reduce cost and complexity
The compact design helps to reduce both installation costs and complexity significantly. By eliminating the need for cabinets, additional cooling and long motor cables, costs are reduced further.

IE3 alternative
EU Regulation 640/2009 defines IE2 motors with AC drives as an alternative to IE3 motors.

Power range
3 x 380-480 V ………… 0.75 to 10 HP (55 - 7.5 kW) (with 110% overload torque)
3 x 380-480 V ………… 0.75 to 7.5 HP (55 - 5.5 kW) (with 160% overload torque)

VLT® OneGearDrive®
The highly efficient combination of a permanent magnet motor and optimized bevel gearing, powered by a central or decentral VLT® drive, contributes significantly to operating and maintenance cost savings.

Long service intervals
VLT® OneGearDrive® operating under partial load does not require an oil change until after 35,000 operating hours.

Fewer variants
With only one motor type and three gear ratios available, the motor concept covers most typical conveyor drives.

Hygienic version
Use it with confidence in wet areas including aseptic areas and clean room production areas.

Power range
380-400 V ………………. 1 to 4 HP (75 - 3 kW)

Fieldbus
MOD MOD EIP EAC FC
PN PB PL ECAT

Enclosure
IP00 IP20 IP21/Type 1
IP54/Type 12 IP55/Type 12 IP66/Type 4X

*FCM 106
** FCP 106

Fieldbus
MOD MOD EAC FC
PN PB PL ECAT

Enclosure
IP00 IP20 IP21/Type 1
IP54/Type 12 IP55/Type 12 IP66/Type 4X

*FCM 106
** FCP 106

Enclosure
IP00 IP20 IP21/Type 1
IP54/Type 12 IP67/IP 69K IP65/IP 67

*OGD-H version
** OGD-S version
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.

Danfoss Drives: Rugged - Reliable - Respected

VLT® Traditional Bypass Panels
Danfoss Traditional Bypass Panels are known for their product quality and premium design standards. With this quality comes a wide array of choices among our standard base products, insuring you can have your Danfoss drive panel your way.

Drive features and options
Danfoss bypass panels are built to UL508 and UL508A standards and most have been seismically certified and OSHPD pre-approved. Disconnects include fused, or circuit breaker. We utilize Class 20 overloads in the bypass and 24V control for all but the largest sizes. The panels are available in Electronic or Electromechanical bypass and feature our premium VLT® HVAC or AQUA drive. Bypass options include 2 contactor with optional drive disconnect or 3 contactor.

Power Range
Normal Overload
3 x 208-240 V ........ 0.5 to 60 HP (.37 - 90 kW)
3 x 480 V ............. 0.5 to 350 HP (.37 - 250 kW)
3 x 600 V ............. 0.5 to 400 HP (.37 - 400 kW)

Fieldbus
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* BIP coming in Q2 2016

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VLT® Vertical Bypass Panel
The Vertical Panel design gives the installer and drive user a reduced horizontal footprint to make better use of available wall space. Engineered panels are available in a variety of configurations with user-specified options to best match individual application requirements.

Drive features and options
The Vertical Panels utilize the same features and options as the Traditional panels but is built in a subset of the Traditional panel sizes. It is available in a 3 contactor bypass design.

Power range
3 x 208-240 V ........ 7.5 to 60 HP (5.5 - 45 kW)
3 x 480 V ............. 15 to 125 HP (11 - 90 kW)
3 x 600 V ............. 15 to 125 HP (11 - 90 kW)

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Preferred Harmonic Design (PHD)
The VLT® PHD-102 for HVAC applications and VLT® PHD-202 for Water applications are full-featured, dedicated drive solutions when conformance to IEEE-519 is required, even at the drive terminals. This design has excellent partial load performance often maintaining 5% THDi down to 50% load and outperforms multi-pulse, AFE, and competitive passive filter solutions. The PHD-102 and PHD-202 have an array of functions developed to meet the diverse needs of HVAC and Water applications, and are the most efficient solution to address growing harmonic concerns in the HVAC and Water/Wastewater industries.

Panel features and options
Include non-bypass, 3 contactor bypass or softstart bypass with either a fused or circuit breaker disconnect.

Oshpd pre approval is a result of testing that can place these products in any floor of any building in the United States.

Power range
3 x 460 V ........ 1.5 to 600 HP (1.1 - 673 kW)
3 x 575 V ........ 1.5 to 650 HP (1.1 - 600 kW)
(Normal Overload)

VLT® Multi-pulse Drive Panels
12-Pulse & 18-Pulse Low Harmonic Solutions offer a cost-effective and completely integrated system for applications requiring enhanced harmonic mitigation. Packages seamlessly combine the reliability and advanced performance of the VLT® Series Drives with best in class 12 & 18 pulse harmonic reduction technology. The result is a complete solution from the supplier you trust.

Each unit ships completely assembled in a free standing enclosure labeled NEMA/UL Type 1, 12, or 3R as required by the installation. Units require simple three-wire-in and three-wire-out power connections. The entire package is UL 508A Compliant.

Panel features and options
Include non-bypass, 3 contactor or softstart bypass with fused or circuit breaker disconnect, all in a 100ka sccr unit. In a 40°C maximum ambient the panels are available as a standard NEMA /Type 1, 12, or 3R. For special requirements custom units are available.

12-Pulse
All 12-Pulse units include two diode bridge rectifiers separate from the VFD’s standard 6-pulse bridge to ensure appropriate load sharing and harmonic reduction. Input to the rectifiers is an electro-statically shielded phase shifting drive isolation transformer.

Power range - 12-pulse drive
3 x 380-480 V ................. 250-200 kW

18-Pulse
All 18-Pulse units include three diode bridge rectifiers separate from the VFDs standard 6-pulse bridge to ensure appropriate load sharing and harmonic reduction. Input to the rectifiers is phase shifting transformer with the following design criteria:

The high quality phase shifting 18-pulse transformer is the latest topology that performs with a phase imbalance up to 2%. Separate thermal switches are included on each coil.

Power range
3 x 480V ...............1.5 – 300 HP (1.1 - 361 kW)

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VLT® Soft Start Controller MCD 100
The compact soft starter series is a cost-effective alternative to traditional contactors and can also replace star/delta combinations. The ramp time and the starting torque and kick start are adjusted via controls on the front of the unit.

Almost unlimited number of motor starts
For a power rating of up to 25 A, up to 480 starts per hour are possible. This is a true “fit and forget” soft starter for DIN rail mount. The unique contactor design allows an almost unlimited number of starts per hour without derating.

Technical data
Control voltage .............. 24-480 V AC or DC
Power ............................. 0.1-11 kW (25 A)

Power range 208-600 V
MCD 100-001 ......................... 2 HP
MCD 100-007 ......................... 10 HP
MCD 100-011 ......................... 15 HP

VLT® Compact Starter MCD 200
While the basic and the starting torque VLT® Compact Starter MCD 201 version is only used for motor starting, the extended VLT® Compact Starter MCD 202 version offers additional motor protection functions. These include, for example, current limitation during motor starting.

Built-in bypass
After the motor is started, the MCD 200 automatically connects the motor to the mains supply via the built-in bypass relay. This minimizes losses during operation under full load.

Technical data
Control voltage 24 V AC or DC/110-440 V AC
3 x 200-575 V 10 to 150 HP 7.5-110 kW (200 A)

VLT® Soft Starter MCD 500
A comprehensive solution for soft starting and stopping three-phase asynchronous motors. Integrated current transducers measure the motor current and provide important data for optimal start and stop ramps. A built-in bypass is available up to 961 A.

Fast commissioning
The four-line graphic display (choice of eight languages) and quick menu ensures easy and reliable configuration and read-out.

Load-oriented start
Adaptive Acceleration Control (AAC), adjusted to the respective load, ensures the best possible start and stop ramps to avoid water hammer.

Comprehensive protection
Phase error detection, thyristor monitoring and bypass contact overload are just a few integrated monitoring functions.

Technical data
Input .......................... 3 x 200-690 V
Control voltage ...... 24 V DC or 110-240 V AC
Power ............... 7.5-850 /2400* (1600A) kW
*”Inside delta connection”

Enclosure
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Fieldbus
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- EIP

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Fieldbus
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VLT® Energy Box
Calculate the energy consumption of HVAC applications controlled by VLT® drives and compare this with alternative - and less energy efficient methods of air flow control.

Using VLT® Energy Box it is easy to evaluate and document the savings achieved by using a VLT® HVAC Drive by comparison with other types of capacity control systems - for new installations as well as retrofit situations.

VLT® Motion Control Tool MCT 10
VLT® Motion Control Tool MCT 10 is a windows-based engineering tool with a clearly structured interface that provides an instant overview of all the AC drives in a system of any size. The software runs under Windows and enables data exchange over a traditional RS485 interface, fieldbus (PROFIBUS, Ethernet, or other) or via USB.

Parameter configuration is possible both online on a connected drive and offline in the tool itself. Additional documentation, such as electrical diagrams or operating manuals, can be embedded in VLT® Motion Control Tool MCT 10. This reduces the risk of incorrect configuration while offering fast access to troubleshooting.

VLT® Motion Control Tool MCT 31
This software is designed to quickly assess the loads placed on the system by AC drives in the planning phase. This allows suitable measures to be taken to correct the system harmonics in advance.

VLT® Motion Control Tool MCT 31 calculates system harmonic distortion for both Danfoss and non-Danfoss AC drives, and calculates the effects of using various harmonic mitigation measures, including Danfoss harmonic filters.

Use VLT® Motion Control Tool MCT 31 in the planning phase to determine whether harmonics will be an issue in your installation, and if so, which strategy is most cost-effective in addressing the problem.


VACON® 20

VACON® 20 has the compactness and programming functionality that makes it one of the most easily-adaptable drives available for OEM applications.

Saves machine costs

The VACON® 20 has a built-in PLC functionality according to IEC 61131-1 which brings cost savings to the user. For the OEM or machine builder it is easy to change the software logic of the drive to adapt to their own control needs.

High fieldbus connectivity

The VACON® 20 enables effective machine integration, eliminating the need for external fieldbus gateways and parallel I/O connections.

Configure without mains power

With the optional copying module, parameter configurations can be copied into the VACON® 20 during the installation with no need for mains power - saving both time and effort.

Power range

- 1 x 105-120 V .. 1/3 to 1 1/2 HP (0.25-1.1 kW)
- 1 x 208-240 V ...... 1/3 to 3 HP (0.25-2.2 kW)
- 3 x 208-240 V ...... 1/3 to 15 HP (0.25-11 kW)
- 3 x 380-480 V ... 1/2 to 25 HP (0.37-18.5 kW)
- 3 x 520-600 V .... 1 to 7-1/2 HP (0.75-5.5 kW)

VACON® 20 Cold Plate

For flexibility in cooling, with focus on customer-specific cooling solutions, the VACON® 20 Cold Plate is the perfect AC drive for OEMs with special cooling requirements.

Cooling flexibility

Cold plate cooling allows the drive to be used in the best possible cooling configurations, such as passive heat sinks, liquid-based cooling or any other cold surface onto which the AC drive can be mounted.

Goes into sealed enclosures

VACON® 20 Cold Plate operates at up to 70 °C ambient temperatures without derating, and is installable at low depth due to its flat form factor. For the user, this means the greatest possible flexibility and the ability to install the drive into sealed enclosures.

VACON 20 benefits

The VACON® 20 Cold Plate contains same user interfaces and options as in the other VACON® 20 products, including built-in support for IEC 61131-1 PLC programming.

Power range

- 1 x 208-240 V ........ 1 to 2 HP ( 0.75-1.5 kW)
- 3 x 208-240 V ........ 1 to 5 HP ( 0.75-4.0 kW)
- 3 x 380-480 V ....... 1 to 10 HP (0.75-7.5 kW)

Fieldbus

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Combining innovation and high durability for the sustainable industries of tomorrow.

For long lifetime, top performance, and full-throttle process throughput, equip your demanding process industries and marine applications with VACON® single or system drives.

Reduce emissions and increase fuel efficiency through trailblazing innovation in hybridization trends. Manage heat intelligently, and win focus, with functionalities dedicated to your industry alone. Connect rapidly and program with exceptional flexibility.

All these abilities mean VACON® drives form the robust foundation for optimization in harsh environments.

Whether in Marine and Offshore, Oil and Gas, Metals, Mining and Minerals, Pulp and Paper, Renewable Energy, or other heavy-duty industries, VACON® drives meet the challenge.

Tune total operational cost and cut capital expenditure thanks to compact size and lower air-conditioning load. Of course uncompromising reliability is a constant.

The exceptional VACON® range is continuously advancing, with rigorous application-optimized innovation, ready to be put to work.

Low power drives
Full power range and dedicated VACON® drives

VACON® 100 INDUSTRIAL
The VACON® 100 INDUSTRIAL is a workhorse for a wide range of industrial applications. It is easy to integrate into all major control systems and is easily adaptable to different needs.

Modules and enclosed drives
All power sizes are available as drive modules. The free-standing enclosed drive version for higher power sizes contains a wide range of configurable options and an innovative control compartment for safe access, without opening the cabinet door.

Cost-effective communication
Integrated Ethernet interfaces support all major industrial protocols. Save on extra interface cards - and use the same drive for all major protocols required.

Easy adaptation
For OEMs, utilizing VACON® PROGRAMMING enables the built-in PLC functionality according to IEC61131-1 to integrate their own functionality into the drive. The VACON® DRIVE CUSTOMIZER facilitates smaller logic adaptations for special needs or retrofit situations.

Power Range [High Overload]
3 x 208-240 V .... 1/2 to 100 HP (0.37-75 kW)
3 x 380-500 V .... 1 to 800 HP (0.75-500 kW)
3 x 525-600 V ............... 3-650 HP
3 x 525-690 V ....... 5 to 650 HP (5.5-630 kW)

VACON® 100 FLOW
Delivering all the benefits of the VACON® 100 family of drives, the VACON® 100 FLOW offers dedicated functionality. It improves flow control and saves energy in industrial pump and fan applications in power sizes up to 800 kW.

Dedicated industrial flow control
The VACON® 100 FLOW provides specific flow control functions to enhance pump and fan performance and protect pipes and equipment, ensuring reliable operation.

Runs high-efficiency motors
Select the most efficient motor for your task, with the ability to run the new high-efficiency motor technologies, such as permanent magnet and synchronous reluctance motors, for improved system efficiency.

Power Range [Low Overload]
3 x 208-240 V .... 3/4 to 125 HP (0.55-90 kW)
3 x 380-500 V .... 1.5 to 1000 HP (1.1-630 kW)
3 x 525-600 V .................... 3 to 200 HP
3 x 525-690 V ........... 5 to 800 HP (5.5-800 kW)

Fieldbus

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*Dependent upon enclosure size
VACON® NXS
VACON® NXS is an AC drive for heavy use in machines, buildings and all branches of industry. Typical applications include pumps, multi-pump, conveyors, compressors.

Simplified programing
Seven built in application packages for easy commissioning of the drive.

Flexible I/O selection
There are no fixed inputs or outputs in the control unit. There are five slots for I/O boards, and a suitable board can be selected for each slot.

Modular packaging
The drive has the same footprint if IP21/UL Type 1 or IP54/UL Type 12 enclosure. Allows for field upgrade if required with no change in size.

Power Range [High Overload]
3 x 208-240 V .... 3/4 to 100 HP (0.55 - 75 kW)
3 x 380-480 V .... 1 to 550 HP (0.75 - 355 kW)
3 x 525-690 V .... 2 to 500 HP (1.5 - 500 kW)

VACON® X Series – X4, X5
The VACON® X Series is a rugged family of variable speed AC drives, built and designed for harsh industrial environments. IP66/UL Type 4X and IP55/UL Type 3R enclosures are available for the ultimate protection from potential hazards such as moisture, dust or extreme temperatures.

Built-in sequencer
The VACON X series features a built-in multi-step sequencer that can replace a small PLC in many applications. X4 supports 9 steps and X5 supports 25 steps.

Power range [High Overload]
1 x 110-120 V ............... 1/2 HP (0.37 kW)
1 x 200-230 V ........... 3 to 10 HP (2.2 - 7.5 kW)
3 x 208-240 V .... 1/2 to 20 HP (0.37 - 15 kW)
3 x 380-480 V .. 1/2 to 150 HP (0.37 - 110 kW)
3 x 575 V ........ 1/2 to 150 HP (0.37 -110 kW)

VACON® X5 HazLo
VACON X5 HazLo is a first in the world of AC Drives. It has been certified for Class I, II and III; Division 2, Groups A, B, C, D, F and G in a UL Type 4X enclosure.

Unique enclosure
There is no longer a need for bulky UL Type 7 enclosure to keep driving in harsh environments. The VACON X5 HazLo drive is much smaller and lighter to install.

Proven usability
The keypad is highly accessible from the front face of the drive giving operator ability to control, program and view display locally at all times.

Typical Application Areas
Refrigeration, Spray finishing, Water and Waste Water, Graineries, Gypsum Processing, Textile Facilities

Power Range [High Overload]
3 x 380-480 V ...... 10 to 75 HP (7.5 - 55 kW)
3 x 575 V ........... 10 to 75 HP (7.5 - 55 kW)

Fieldbus
- MOD
- META
- PB
- DN
- CAN
- BAC
- LON
- TCP
- EIP
- PN

Enclosure
- IP00
- IP20
- IP21/UL Type 1
- IP54/UL Type 12
- IP55/UL Type 12
- IP66/UL Type 4X

Fieldbus X4
- MOD

Fieldbus X5
- MOD

Enclosure
- IP00
- IP20
- IP21/UL Type 1
- IP54/UL Type 12
- IP55/UL Type 3R
- IP66/UL Type 4X

Fieldbus
- MOD
- DN
- EIP
- PB

Enclosure
- IP00
- IP20
- IP21/UL Type 1
- IP54/UL Type 12
- IP55/UL Type 12
- IP66/UL Type 4X
**VACON® NXP Air Cooled**
The VACON® NXP Air Cooled drive is designed for a broad range of demanding industrial applications, focusing on higher power sizes and system drives.

**Top performance**
VACON® NXP control flexibility delivers maximum motor control performance and dynamics, in both single-shaft machines and drive systems.

**Configurable on all levels**
Fully configurable I/O and fieldbuses cater for any connectivity need. Fast optical drive-to-drive communication gives you the flexibility of load sharing and paralleling of power units.

**Extremely flexible**
Adapt the drive to many diverse usage requirements by loading the VACON application software that best suits the needs. Built-in PLC functionality according to IEC61131-1 enables you to create new functionality in the drive to obtain cost savings and deeper machine integration.

**Power Range**
3 x 208-240 V ... 3/4 to 125 HP (0.55-90 kW)  
3 x 380-500 V ... 1.5 to 1800 HP (1.5-1200 kW)  
3 x 525-690 V ... 3 to 2250 HP (2.0-2000 kW)

---

**VACON® NXC Air Cooled Enclosed Drives**
The VACON® NXC combines the VACON® NXP product range with a wide range of options in a single enclosed drive format.

**Reliable operation**
Based on a Rittal TS8 enclosure, the VACON® NXC enclosed drive is fully pre-designed and factory tested in order to ensure reliable and trouble-free operation.

**Easy to work with**
Access to the control equipment is easy and safe, due to the dedicated control compartment located at the front part of the enclosed drive. It is also internally protected against unintentional touch to increase user safety.

**Easy to configure**
When ordering, choose between a wide range of cabinet-installed options. Both 6 and 12-pulse versions are available.

**Power range**
3 x 380-500 V 200 to 2250 HP (132-1200 kW)  
3 x 525-690 V 125 to 2250 HP (110-2000 kW)

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**Fieldbus**

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*Dependent upon enclosure size
VACON® NXP Common DC Bus

VACON® NXP Common DC Bus components are designed to enable systems integrators, machine builders, and OEMs to design and build efficient industrial drives systems.

**Comprehensive range**
Build almost any kind of system imaginable, with this fully complete range of components, including inverter units (INU), active front-end units (AFE), non-regenerative front-end units (NFE), and brake chopper units (BCU).

**Maximum uptime**
Designed for absolutely reliable operation, the common DC bus range supports full availability with a minimum of operational interruptions.

**Minimal installation width**
Reduce installation cost and space requirements, with slim INU components optimized for minimal width of the complete drive line-up.

**Power Range**
- DC @ 465 – 800 VDC 2 – 2000 HP single module
- DC @ 640 - 1100 VDC 3 – 2300 HP single module

*Parallel up to 4 modules with Drive Synch*
- 3 x 380-500 V .... 2 to 2300 HP (1.5-1850 kW)
- 3 x 525-690 V ...... 3 to 2250 HP (3-2000 kW)

VACON® NXP System Drive

By combining common DC bus components the VACON® NXP System Drive provides you a drive configured and assembled to meet your needs - regardless of whether you need to control one or several motors.

**Simplicity in projects**
Using pre-designed enclosed drive sections for all main system parts, it enables a short engineering and configuration time for any drive system. Every project design is fully documented for the specific configuration.

**Reliability is key**
The verified and tested solutions that combine VACON® AC Drives, DC bus components and options result in verified and tested reliability.

**Easy serviceability**
A pullout system allows quick replacement of drives modules in service situations. Safety is a priority with internal touch protection and high power busbar sections in separate compartments.

**Current ratings (main busbars)**
- 3 x 380-500 V ................. 630-5000 A
- 3 x 525-690 V ................. 630-5000 A

VACON® NXP Liquid Cooled

A dedicated liquid-cooled drive for applications where air quality is critical, space is limited, and efficient heat transfer is essential. No need for air ducts or large fans and the compact size delivers high power density in your installation - and virtually silent operation.

**Uptime and cost savings**
Save on both investment and operating costs when removing heat using the liquid medium. Achieve maximum uptime, with robust operation in demanding conditions and minimal air filtering in dusty conditions.

**Highest control flexibility**
The drive utilizes the full VACON® NXP family control functionality to achieve modularity and scalability in a wide range of applications.

**Power Range: Common DC Bus**
- DC @ 465 – 800 VDC 2 – 2000 HP single module
- DC @ 640 - 1100 VDC 3 – 2300 HP single module

*Parallel up to 4 modules with Drive Synch*
- 3 x 380-500 V . 200 to 2300 HP (132-2700 kW)
- 3 x 525-690 V . 125 to 2250 HP (110-2800 kW)

**Fieldbus**
- MOD
  - PB
  - DN
  - CAN
  - BAC
  - LON
- TCP
  - EIP
  - PN

**Enclosure**
- IP00
  - IP20
  - IP21/Type 1
- IP54/Type 12
  - IP55/Type 12
  - IP66/Type 4X
VACON® NXP Liquid Cooled Enclosed Drive
The VACON® NXP Liquid Cooled Enclosed Drive offers all the benefits of VACON® NXP Liquid Cooled drives for high power applications in a compact IP54 rated enclosed drive package.

Predesigned is easy
Being predesigned and engineered, these drives are ready to go as soon as you receive them. Simply connect to the cooling system and the power and motor supplies.

Active Front End for clean supply
Drives with active front end minimize harmonic disturbance to the grid, enable regenerative braking and reduce the scale of infrastructure required, such as transformers and generators.

Fast serviceability
Fast access to the modules using pull-out rails saves time and money in service and maintenance situations.

Power range
3 x 525-690 V 800 to 1700 HP (800-1550 kW)

VACON® NXP Liquid Cooled Common DC Bus
This range of liquid-cooled common DC bus components brings the benefits of liquid cooling into common DC bus systems.

For demanding systems
Liquid cooling offers strong benefits in applications where cooling air supply or quality is limited, enabling creation of solutions that work even in demanding situations.

Minimum amount of spare parts
Built on a unified product platform reduces costs and increases availability of spare parts and service units, since there is a common hardware platform for all variants used.

Reliable and cost-saving
Enjoy economical installation cost, maximum uptime and full VACON® NXP control functionality.

Power range
3 x 380-500 V .... 2 to 600 HP (7.5-2700 kW)
3 x 525-690 V .... 3 to 3100 HP (110-2800 kW)

VACON® NXP Grid Converter
This range of air and liquid-cooled drives is specifically designed for energy storage and marine energy management applications.

Reliable grid
VACON® NXP Grid Converter assures a reliable grid in applications for energy storage and energy management.

Save on fuel and emissions
In marine applications fuel savings and reduced emissions are immediate benefits of grid converters in shaft generator applications.

Power range
Air-cooled
3 x 380-500 V ................. 180-1100 kW
3 x 525-690 V ................. 200-1200 kW

Liquid-cooled
3 x 380-500 V ................. 160-1800 kW
3 x 525-690 V ................. 210-1800 kW
To achieve even higher power capacity, combine multiple VACON® NXP Grid Converter units.

Fieldbus
MOD META
PB DN CAN BAC LON
TCP EIP PN

Enclosure
IPX0 IPX2 IPX1/Type 1
IPX4/Type 12 IPX5/Type 12 IPX6/Type 4X

Fieldbus
MOD META
PB DN CAN BAC LON
TCP EIP PN

Enclosure
IPX0 IPX2 IPX1/Type 1
IPX4/Type 12 IPX5/Type 12 IPX6/Type 4X

Fieldbus
MOD META
PB DN CAN BAC LON
TCP EIP PN

Enclosure
IPX0 IPX2 IPX1/Type 1
IPX4/Type 12 IPX5/Type 12 IPX6/Type 4X
## Decentral drives

**VACON® 20 X**

The VACON® 20 X decentral drive offers all the benefits of decentralized solutions up to 10 HP.

**Robust and resistant**

Due to the IP 66 enclosure and the high vibration resistance the drive is suitable for tough environments. The Gore® vent membrane ensures reliability even when wet.

**Easy to integrate**

A one-plug I/O connection and access to all main fieldbus protocols ensures easy integration for machine builders. Built-in IEC61131-1 programmability opens up for customized software modification, to meet the needs of most applications.

**Power Range [High Overload]**

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<tr>
<th>Voltage</th>
<th>HP</th>
<th>kW</th>
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<td>1 to 2</td>
<td>0.75-1.5</td>
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<td>308-380 V</td>
<td>1 to 5</td>
<td>0.75-4.0</td>
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<td>380-480 V</td>
<td>1 to 10</td>
<td>0.75-7.5</td>
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- IP21/Type 1
- IP54/Type 12
- IP55/Type 12
- IP66/Type 4X

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**VACON® 100 X**

Robust enclosure and high functionality is provided by the VACON® 100X for indoor and outdoor applications.

**No extra enclosure - even outdoors**

The drive withstands high-pressure water, high vibration levels, heat and dirt. The Gore® vent membrane and IP66 enclosure give you the freedom of indoor and outdoor use.

**A really cool drive**

An optional space heater is available for cold environments.

**Wide power range**

With power range extending up to 50 HP, this drive makes the benefits of decentralized solutions available for a wide range of applications.

**Power Range [High Overload]**

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<td>308-380 V</td>
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For full specifications, please refer to the documentation.
VACON® Software

VACON® Live
Commissioning, maintenance, parameterization and monitoring of multiple drives.
Supported drives:
VACON® 10, VACON® 20, VACON® 20 X, VACON® 100, VACON® 100 family

VACON® Loader
Updating drive software.
Supported drives:
VACON® 10, VACON® 20, VACON® 20 X, VACON® 100, VACON® 100 family

NCDrive
Commissioning, maintenance, parameterization and monitoring of drives.
Supported drives:
VACON® NXL, VACON® NXS, VACON® NXP

NCLoad
Updating drive software.
Supported drives:
VACON® NXL, VACON® NXS, VACON® NXP

VACON® Customizer
To freely customize the operation of an AC drive.
Supported drives:
VACON® 100 or VACON® 100 INDUSTRIAL and VACON® 100 FLOW

VACON® Programming
An AC drive application programming tool to optimize drive behavior.
Supported drives:
VACON® 20, VACON® 20 X, VACON® 100, VACON® 100 X, VACON® NXS, VACON® NXP

VACON® Key
Manage and handle VACON® NXP Grid Converter licenses.
Supported drives:
VACON® NXP Grid Converter

VACON® Harmonics
Simulate the expected harmonics of an AC drive or group of drives.
Supported drives:
VACON® NXS, VACON® NXP, VACON® 10, VACON® 20, VACON® 20 X, VACON® 100 family

VACON® Save
Calculate energy savings when using an AC drive with pumps, fans and compressors.
Supported drives:
VACON® NXS, VACON® NXP, VACON® 10, VACON® 20, VACON® 20 X, VACON® 100 family

VACON® Layout
Configure and obtain documentation
Supported drives:
VACON® NXP System Drive

VACON® Documentation Wizard
Diagrams and drawings
Supported drives: VACON® NXC
Danfoss VLT® and VACON® drives are optimized to create value for you. They enable maximum performance in all major applications irrespective of industry. Contact Danfoss Drives to learn how your own applications can benefit from using a VLT® or VACON® drive.

## APPLICATIONS

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<th>INDUSTRIES</th>
<th>HVAC</th>
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<th>Water and Wastewater</th>
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<td>Positioning, Synchronization</td>
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A better tomorrow is **driven by drives**

**Danfoss Drives is a world leader in variable speed control of electric motors.** We offer you unparalleled competitive edge through quality, application-optimized products and a comprehensive range of product lifecycle services.

You can rely on us to share your goals. Striving for the best possible performance in your applications is our focus. We achieve this by providing the innovative products and application know-how required to optimize efficiency, enhance usability, and reduce complexity.

From supplying individual drive components to planning and delivering complete drive systems; our experts are ready to support you all the way.

You will find it easy to do business with us. Online, and locally in more than 50 countries, our experts are never far away, reacting fast when you need them.

You gain the benefit of decades of experience, since 1968. Our low voltage and medium voltage AC drives are used with all major motor brands and technologies in power sizes from small to large.

**VACON® drives** combine innovation and high durability for the sustainable industries of tomorrow.

For long lifetime, top performance, and full-throttle process throughput, equip your demanding process industries and marine applications with VACON® single or system drives.

- Marine and Offshore
- Oil and Gas
- Metals
- Mining and Minerals
- Pulp and Paper
- Energy
- Elevators and Escalators
- Chemical
- Other heavy-duty industries

**VLT® drives** play a key role in rapid urbanization through an uninterrupted cold chain, fresh food supply, building comfort, clean water and environmental protection.

Outmaneuvering other precision drives, they excel, with remarkable fit, functionality and diverse connectivity.

- Food and Beverage
- Water and Wastewater
- HVAC
- Refrigeration
- Material Handling
- Textile

**Danfoss**

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