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inMotion

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Drives and motors

Danfoss Drives presents the new generation of VLT® AQUA Drive

VLT® performance goes up to 1.2 MW

EtherNet/IP option for VLT® AutomationDrive

Panel optimised VLT® AutomationDrive

Extended range of IP66 VLT® Drives

Easy upgrade to VLT® Automation-Drive with the Profibus converter

Cases

VLT® HVAC drives will keep Hyderabad International Airport cool

VLT® frequency drives for high quality pet food

Company

Danfoss VLT® High Power Drives elected as "Electroprodukt 2006" in Poland

Quality mark for Danfoss Silicon Power

Relations

Award recognizes Danfoss NAMC's commitment to employees



*This particular species is the size of a hamster: it weighs between 30 and 60 grams and has been given the scientific name *Microcebus danfossi*. Danfoss is helping support work to protect the lemur in Madagascar and the continuing research within the field in cooperation with BIOPAT.*

Danfoss lends its name to a recently discovered lemur species

Researchers from the veterinary college Tierärztliche Hochschule in Hannover (TiHo), Germany, have discovered a previously unknown lemur species in Madagascar. Now this newly identified species has been given the scientific name "*Microcebus danfossi*" – after Danfoss - and Danfoss is contributing to further research in the field, as well as to the maintenance of the natural environment of these extremely endangered animals.

The small lemur is a prosimian. It is a nocturnal animal that communicates via ultrasound and feeds primarily on fruits and insects. Its most remarkable feature is

its ability to lower its metabolic rate during the day in the dry, cold season, from June until September. In a sleep-like state (torpor), its body temperature is reduced by almost half and the energy it needs is cut by 25 to 40 per cent.

Danfoss' German-based Heating division had used lemurs in a marketing campaign and compared the highly efficient, energy-saving features of Danfoss components with the internal heating 'controls' of a lemur. The species was discovered by Gillian Olivieri, the veterinary college in Hannover (TiHo), Germany.

Danfoss Drives presents new generation of VLT® AQUA Drive



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.



Full power range
VLT® AQUA Drive is available in the full power range from 0.37 to 1,200 kW

Auto tuning of the PI controllers

When enabling auto tuning of the PI controllers, the drive will enter Auto Tune Mode, where the drive for a short period of time operates in open loop with a constant speed.

When the signal is stabilised at constant speed the drive will automatically change the speed, monitor the feedback reaction and in that way adjust the optimised settings for gain constant (P) and Integral time (I).

After setting the constants, the drive will automatically switch to closed loop and ensure optimised operation. The commissioning time is reduced and closed loop settings are optimised.

Pipe Fill Mode

The controlled filling of pipes prevents water hammer, water pipes bursting or sprinkler heads being blown off. This feature is useful in irrigation systems, water supply systems, etc.

The Pipe Fill feature in the new VLT® AQUA Drive has 2 modes of operation. One for horizontal pipes where the system is operated with constant speed for a set time period and one for vertical pipes, where the system is operated in closed loop with a filling rate in units/sec.

End of Pump Curve detects breaks and leakage

The “End of curve” function 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.

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 enter sleep mode.

Sleep Mode in the new drive is based on speed and power.

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

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 low power consumption at high speed – indicating a no-flow or low-flow situation – the VLT® AQUA Drive can be programmed to stop.

Two-step ramps

Fast acceleration of the pumps to the minimum frequency from where the normal ramp takes over.

The feature prevents submersible bore-hole pumps from excessive wear and damage as they are brought up to minimum speed quickly. The final ramp takes

Unique cooling concept

- no ambient air flow over electronics

Advanced cascade controller option

Bus-option (A-option)

- select any of the most common fieldbus protocols

Local control panel (LCP)

- choose numerical, graphical or no display

I/O Relay option)

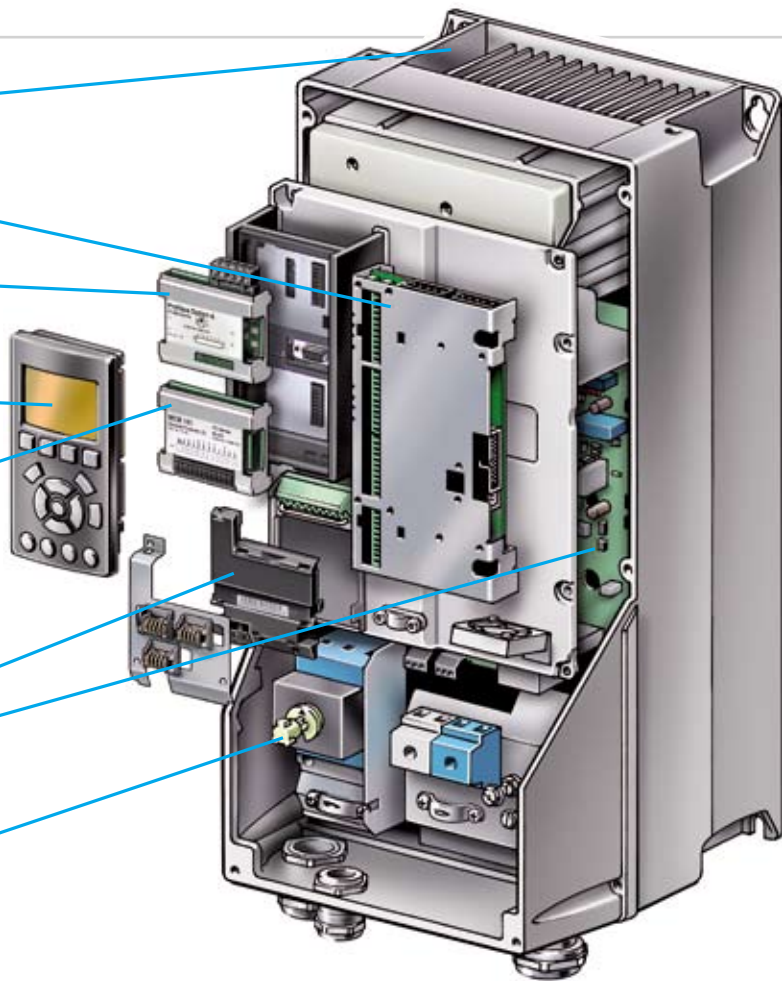
- Additional I/O option or extended cascade controller option module with support of up to 6 pumps or blowers.

24 V supply option (D-option)

Coated PCB's

- Durable in aggressive environments

AC mains disconnect



over in a stop situation from min. speed to stop in order to quickly stop a submersible borehole pump to prevent damaging of the thrust bearings.

Another ramp called check valve ramp can be enabled in, for instance, wastewater systems etc. in order to ensure controlled closing of check valves .

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 also is increased, 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 pay-back time for the investment. The user enters the specific energy price, the investment and the load profile for the application – the drive makes the calculation and provides the result. All this is easily done with the Danfoss Drives energy calculation PC software, VLT® Energy Box.

Preventive maintenance function
20 preventive maintenance events can be scheduled based on the Real Time Clock, running hours or operating hours. Items can be user-defined words/messages, e.g. "Service pump 1."

Advanced cascade Controller
Support up to 8 pumps/blowers in traditional direct-on-line cascade control or as Master/Follower. Very easy set up. A basic (up to three units) cascade controller is standard built into the VLT® AQUA Drive

Software

- MCT 10 PC software tool for drive supervision and programming
- MCT 31 PC software tool for harmonic calculations
- VLT® Energy Box for calculation of energy savings

Complete motor control for the water business with VLT® AQUA Drive

A complete package of complementary products is available with the VLT® AQUA Drive:

- A broad range of soft starters
- Decentral drive solutions
- 5% and 10% passive AHF harmonic filters
- dU/dt and sine wave filters

Service

Danfoss service organisation is present in more than 100 countries – ready to respond whenever and wherever you need, around the clock, 7 days a week.

VLT® performance goes up to 1.2 MW



Whatever you came to experience of VLT® qualities since Danfoss put the first mass produced drives on the market in 1968, you will find in the VLT® high power range.

The perfect match for:

- Industrial appliances
- HVAC applications
- Water & Waste water applications
- OEM

Power range:

3 x 400 (380 – 440) V AC..... 110 – 1000 kW
 3 x 460 (441 – 500) V AC..... 150 – 1350 HP
 3 x 690 (551 – 690) V AC..... 45 – 1400 kW
 3 x 575 (551 – 690) V AC..... 50 – 1500 HP
 Voltage range 380-690 volts.

Available in IP00 chassis, IP 21/NEMA 1 and IP 54/NEMA 12 enclosure protection.

Modular configuration provides solutions for > 450 kW/600 HP by paralleling proven power modules.

VLT® Series High Horsepower drives reduce energy usage in driven equipment. High efficiency of the VLT® series also drives down energy costs in cooling requirements.

98% efficiency greatly reduces energy consumption not only in driven equipment, but also in heat removal requirements. Smaller footprint reduces space requirements.

- NEMA12 seal between power and control cooling air
- Reduced air volume inside the enclosure
- Removes 85% of losses using drive main fan
- Fewer contaminants enter the enclosure
- Pre-engineered, thermally tested cooling kits available for IP 00 enclosures

Ducted Cooling

An innovative air cooling system provides the capability to route cooling air for power components through a back channel, significantly reducing contamination of electronic components.

Cooling air can either be ducted in and out the back of the enclosure, or ducted from the bottom to the top of the enclosure. In either case, 85% of the cooling air volume never enters the controls area, making heat sink cleaning easy and reducing the air volume inside of the enclosure.



Currents and powers

Normal Overload		High Overload		Frame
IN Amps	PN kW	IH Amps	PH kW	
400VAC (380-440 VAC)				
212	110	177	90	D1
260	132	212	110	D1
315	160	260	132	D2
395	200	315	160	D2
480	250	395	200	D2
600	315	480	250	E1
658	355	600	315	E1
745	400	658	355	E1
800	450	695	400	E1
880	500	800	450	F1
990	560	880	500	F1
1120	630	990	560	F1
1260	710	1120	630	F1
1460	800	1260	710	F2
1720	1000	1460	800	F2
690 VAC (551-690 VAC)				
54	45	46	37	D1
73	55	54	45	D1
86	75	73	55	D1
108	90	86	75	D1
131	110	108	90	D1
155	132	131	110	D1
192	160	155	132	D1
242	200	192	160	D2
290	250	242	200	D2
344	315	290	250	D2
400	400	344	315	D2
450	450	380	355	E1
500	500	410	400	E1

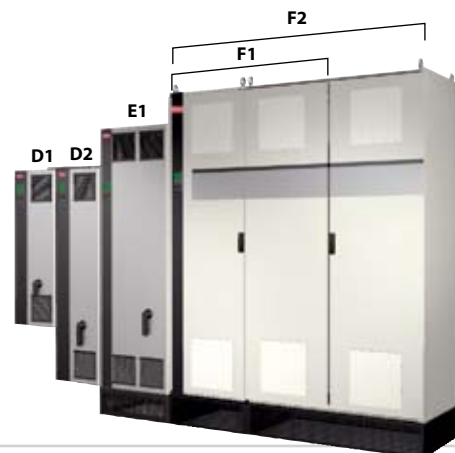
Normal Overload		High Overload		Frame
IN Amps	PN HP*	IH Amps	PH HP*	
460 VAC (441-500 VAC)				
190	150	160	125	D1
240	200	190	150	D1
302	250	240	200	D2
361	300	302	250	D2
443	350	361	300	D2
540	450	443	350	E1
590	500	540	450	E1
678	550/600	590	500	E1
730	600	678	550	E1
780	650	730	600	F1
890	750	780	650	F1
1050	900	890	750	F1
1160	1000	1050	900	F1
1380	1200	1160	1000	F2
1530	1350	1380	1200	F2
575 VAC (551-690 VAC)				
54	50	46	40	D1
73	60	54	50	D1
86	75	73	60	D1
108	100	86	75	D1
131	125	108	100	D1
155	150	131	125	D1
192	200	155	150	D1
242	250	192	200	D2
290	300	242	250	D2
344	350	290	300	D2
400	400	344	350	D2
450	450	380	400	E1
500	500	410	400	E1

IP21 (NEMA 1) and IP54 (NEMA 12) Enclosures Dimensions

	Height		Width		Depth	
	mm	inches	mm	inches	mm	inches
D1	1208	47,6	420	16,5	373	14,7
D2	1588	62,5	420	16,5	373	14,7
E1	2000	78,7	600	23,6	494	19,4
F1	2204	86,8	1400	55,1	606	23,9
F2	2204	86,8	1803	71,0	606	23,9

Chassis IP00 Dimensions

	Height		Width		Depth	
	mm	inches	mm	inches	mm	inches
D1	1046	41,2	408	16,1	373	14,7
D2	1327	52,2	408	16,1	373	14,7
E1	1547	60,9	585	23,0	494	19,4



EtherNet/IP option for VLT® AutomationDrive



EtherNet/IP™ was introduced in 2001 and is today the most developed, proven and complete industrial Ethernet network solution available for manufacturing automation.

EtherNet/IP is a member of a family of networks that implements the Common Industrial Protocol (CIP™) at its upper layers. CIP encompasses a comprehensive suite of messages and services for a variety of manufacturing automation applications, including control, safety, synchronization, motion, configuration and information.

As a truly media-independent protocol that is supported by hundreds of vendors around the world, CIP provides users with a unified communication architecture throughout the manufacturing enterprise.

EtherNet/IP provides users with the network tools to deploy standard Ethernet technology for manufacturing applications while enabling Internet and enterprise connectivity. The result: data anytime, anywhere.

High performance EtherNet/IP fieldbus option for VLT® AutomationDrive and VLT® HVAC Drive.

The VLT® Ethernet Option offers connectivity to EtherNet/IP based networks, such as Rockwell PLC-system via the Common Industry Protocol (CIP™) protocol.

The option is able to handle a single EIP Class 1 connection with an Actual Packet Interval (API) of 1 ms in both directions, positioning it among the highest performing EIP devices in the market.

The option features a build-in 2-port switch, enabling the possibility for traditional line network topology, and eliminating the need for complex cabling and expensive industrial Ethernet switches.

Other features:

Build-in web-server for remote diagnosis and read-out of basic drive parameters.

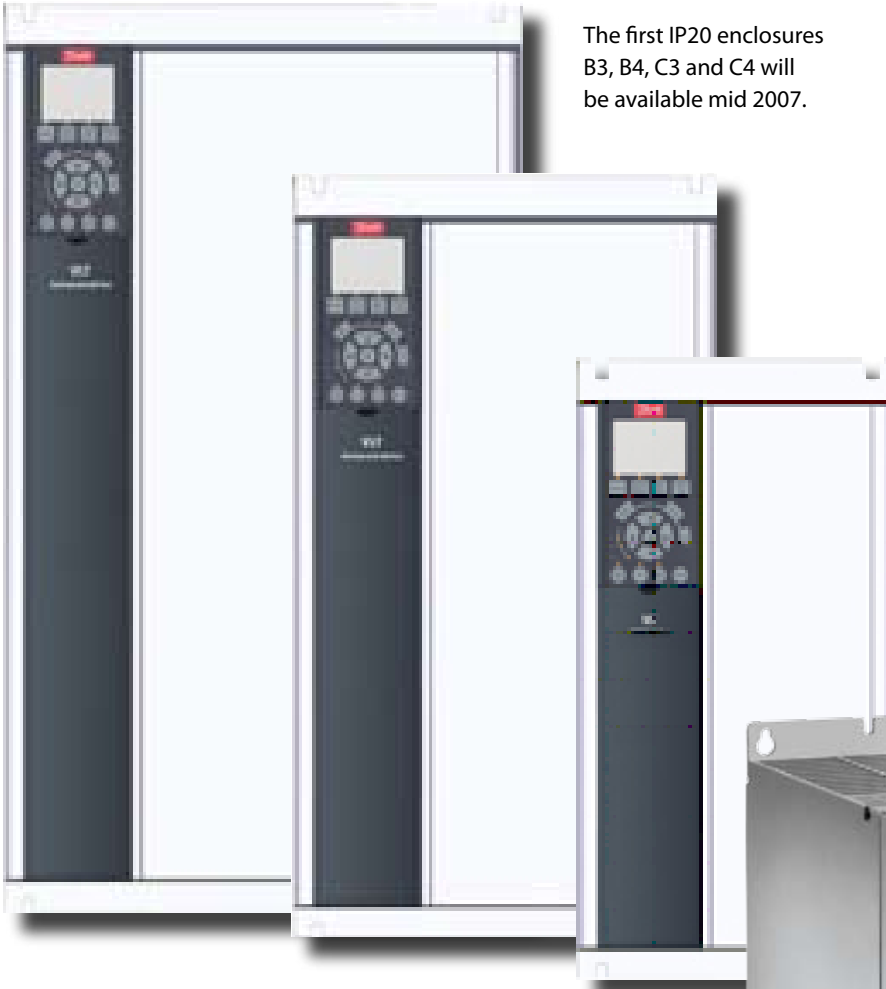
An E-mail notifiicator can be configured for sending an e-mail message to one or several receivers, if certain warnings or alarms occurs, or has cleared again.

The option has obtained the ODVA "Industrial Graded" approval.

Application Protocols:

- EtherNet/IP (Industrial Protocol) for controlling and parameter setting.
- HTTP (Hypertext Transfer Protocol) for diagnosis via build-in web server.
- SMTP (Simple Mail Transfer Protocol) for e-mail notification.
- DHCP (Dynamic Host Configuration Protocol) automatic IP address configuration
- FTP (File transfer Protocol) file up- and download.
- TCP/IP (legacy TCP/IP) transparent Socket Channel connection to MCT-10.

Panel optimised VLT® AutomationDrive



The first IP20 enclosures B3, B4, C3 and C4 will be available mid 2007.

Save installation time

The IP 20 series is designed for easy accessibility and time-saving installation. Mechanical fastening points are easy to access from the front even with automatic tools. All terminals are sufficiently dimensioned and clearly marked. One need only loosen a few screws to get to the terminals. Accessories for bonding of screened cables are included. The compact enclosures are easier to install. This is important especially within existing installations with poor accessibility.

Modular and fully compatible

The IP 20 enclosed series completes the enclosure program of the modular VLT Automationdrive series with IP 21, IP 55 and IP 66 enclosures. They all support completely the modular platform of the VLT automation drive series.

An extensive range of options and accessories is available, optimising the drive for the respective application.



VLT® AutomationDrive in the power range 11 – 75/90 kW will soon be available in compact IP 20 enclosures designed for cabinet mounting.

The installation volume and/or the mounting surface are reduced by up to 60% compared with previous series. The service sections nevertheless fulfil the highest requirements even for applications with high overload, long motor cables and ambient temperatures up to 50° C.

Optimised design
Optimised efficiency and intelligent cooling technology make the compact and service friendly design possible. Even equipment such as EMC filters, harmonics suppression and brake modules are integrated in the enclosure.

Extended range of IP66 VLT® Drives



Stainless steel back plate

For open mounting - as on a frame - a stainless steel back plate is available to guide the air from the fan through the rear heat sink.



Watertight USB plug

A watertight USB plug is available for mounting in a gland hole in the bottom of the drive. With this plug it is possible to commission the drive via the VLT® Set-up Software MCT 10 without opening the drive

VLT® AutomationDrive, VLT® HVAC Drive and VLT® AQUA Drive come in IP 66 versions covering 0.25 to 90 kW (normal overload).

IP 66 drives are suitable for installation in wash-down areas in food & beverage plants and are built to withstand the harsh cleaning agents used in the industry.

IP 66 drives can be installed directly at the processing equipment without the need for extra protective covers and installation costs.

All cast aluminium parts are powder coated with a strong epoxy coating. The corrosion resistance has been successfully tested with detergents commonly used in the industry.

Power range (200-240 V)	0.25-3.7 kW	5.5-7.5 kW	11-15 kW	18.5-22 kW	30-37 kW
(normal overload) (380-600 V)	0.37-7.5 kW	11-18.5 kW	22-30 kW	37-55 kW	75-90 kW
Enclosure name	A5	B1	B2	C1	C2
Height	420	481	651	680	770
Width	242	242	242	308	370
Depth	200	260	260	310	335

Easy upgrade to VLT® AutomationDrive with the Profibus converter



This Profibus Converter option will make it possible for customers using Profibus DP Norm to easily change over from a VLT® 3000 to a VLT® AutomationDrive.

The change-over can be done without changes to the PLC programme, merely adapting the electrical connections.

With the option, the VLT® AutomationDrive will simulate a VLT® 3000 on a Profibus DP network.

The Option is as standard delivered with conformal coating.

Profibus Converter option (130B1245), MCA 113

VLT® HVAC drives will keep Hyderabad International Airport cool



Danfoss India is going to furnish the prestigious Hyderabad International Airport Limited with VLT® HVAC drives for air handling applications.

148 pcs. VLT® drives rating from 2.2 to 37 kW will be installed in the passenger terminal block.

The airport is the first in India being executed by a private consortium. The project is executed by HIAL, a GMR group company.

Sub contractors

The VLT® drives are delivered via "Antia Electricals Pvt Ltd." into whose scope the drives were put. Antia Electricals supplies

electrical panels to the project through the main electrical contractor - M/s. Antepec Limited. The entire electrical work for HVAC was awarded to Antepec by the main HVAC contractor - M/s. Voltas Limited - International Operations Business Group.

Support all the way

Andrew Cooper, Director, SBA-HVAC/R, Asia Pacific and Danfoss India provided technical support to the project as well as confirmations and selections to comply with the tough GMR-HIAL technical reviews. Danfoss Drives was involved in continuous technical discussions with MR-HIAL for the past 6 months."

VLT® water supply too

The secondary chilled water system and pressure booster water supply system for this project are also being supplied with Danfoss drives, through the respective contractors.

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VLT® frequency drives for high quality pet food



The reliability of Danfoss drives plays an important role for Nestlé Purina. With only one production line problems will bring production to a standstill.

Nestlé has used Danfoss Drives for many years. The operators and engineers are therefore familiar with the drives.

Around 1860 Henri Nestlé, a Swiss pharmacist, was the first to develop a special food for babies unable to be breast fed. His goal was to reduce the infant mortality rate. Today Nestlé is a global leader within the production of foodstuffs including baby food and a multitude of milk and breakfast products as well as ice-cream and chocolates. With the take over of Ralston Purina Nestlé has added pet food to their portfolio.



One of the production sites of Nestlé Purina PetCare is located in IJmuiden, The Netherlands. The production of canned dog and cat food at this location goes back 46 years. Hundreds of cans of pet food are produced per minute, - 24 hours a day, 7 days a week.

More than 150 VLT® drives
A total of more than 150 drives play an important role in all stages of the production. The drives, rating from 0.37 to 250 kW control conveyor belts, choppers, wormgears, mixers, palletizers and packing, labelling and foil machines. Nestlé has used VLT® Drives for many years. The operators and engineers are therefore familiar with the drives.

Benefits of Danfoss Drives

Using the same type of flexible Danfoss Drives throughout:

- Parameter settings, parts and options are easily interchanged.
- The number of spare parts held can be reduced.

Real side by side mounted VLT® drives

Reliability is crucial

The reliability of the Danfoss drives plays an important role for Purina. "We have only one production line," says Maarten ten Wolde, responsible for the production process. "So if there are problems, the complete production comes to a stop. That is of course something we want to avoid."

Danfoss drives have a very long service life. The old Danfoss Drives installed many years ago were still going strong. Only because of the need for Profibus communication, Purina was forced to replace these old drives for newer models. Today most of the drives in use are VLT® 5000 models. Recently Purina purchased their first VLT® Automation Drives, the new generation of Danfoss VLT frequency converters.

Serial communication saves time

The VLT® drives used by Purina are equipped with a Profibus interface making it possible for the PLC's to communicate with the drives. This communication enables Purina to save time when changing the process from one product to another. The digital communication also makes it possible for Purina to communicate wirelessly and from remote locations, both with the production process and with the drives that are connected to the network.

Purina can now concentrate on their production of food now they have reliable and intelligent Danfoss Drives on board

Benefits of The VLT® Automation Drive compared to the VLT® 5000 Series

- modular design offering even more possibilities of adding or exchanging options and parts
- smaller dimensions
- more intelligent
- more useful functions
- easier to use

Contact:

Hans de Groot, Danfoss Netherlands

Danfoss VLT® High Power Drives elected as “Electroprodukt 2006” in Poland

Introducing new products and most of all expanding the power range with VLT® drives to over 90 kW are the reasons for awarding Danfoss Driver the statue “elektroprodukt 2006” in the category “Drives and Controls” by the Polish magazine “Elektrosystemy”.

“Elektrosystemy” is a leading trade magazine with over 200 pages monthly with review of reliable products within electrical engineering. It is a reflection of the market and its trends.

The reward is the result of a ranking carried out among the “Elektrosystemy” readers. 115 products were submitted in 11 categories. Readers voted during a year to indicate the product’s position on the market and the readers’ opinion.

Danfoss also received a distinction in the annual “Elektrosystemy” in 2005. The statue was given to the new drive generation VLT® AutomationDrive.

The winners were presented with awards on 21st of February 2007 in Warsaw. Danfoss was represented by Tadeusz Minksztym, Manager of VLT® Marketing and Sales Support Dept.



Quality mark for Danfoss Silicon Power



As of January 1, 2007 Danfoss Silicon Power became organisationally independent of Danfoss Drives.

Danfoss Silicon Power increased its number of employees by 27% from 2005 to 2006 and turnover increased by nearly 50%. In 2007 turnover is expected to increase by another 50% and employees will increase by 35%.

The German Quality Society for Certification of Management Systems (DQS) has presented Danfoss Silicon Power, Germany, with the ISO/TS 16949.

The quality management system based on ISO 9001:2000 also includes additional demands of the automotive industry. The certificate is globally recognized by all automotive manufacturers.

Danfoss Silicon Power provides semiconductor modules for power steering, pump and lighting controls, and brake power controls for well-known suppliers within the automotive industry. To this will be added hybrid and fuel cell vehicles in the future. The company also develops and produces power electronics for VLT® drives and other large customers

Award recognizes Danfoss NAMC's commitment to employees

Danfoss Drives North American sales company was presented with the Employer of the Year award at the 89th annual Employers' Association Conference and Membership Luncheon

Danfoss, which has been a member of the Employers' Association (EA) for over ten years, was selected from a field of 16 area companies to receive the award for Employer of the Year in the "For-profit, over 100 employees" category. In order to be considered for the award, employers were required to demonstrate great practices in the areas of effective communication, encouraging and recognizing the value of employee input, encouraging and fostering employee development, demonstrating strong work/life practices and promoting a positive culture. "We felt it was time to establish an awards program honoring great employers that recognize employees as their greatest asset. There are many employers that work with imagination and conviction to create organizational value and business results through their policies and best practices in human resources management," said Mary Pille, CAE, SPHR, EA's President and CEO.

"It was time to establish an awards program honoring great employers that recognize employees as their greatest asset."

EA cited Danfoss' attitude towards employees in granting the award, quoting President Chuck Manz: "We don't do what we do to get an award. The award is nice, but we do the things we do because that's the way we think the company should be run." EA also noted the many programs Danfoss has in place to ensure that HR is continually equipped to meet the needs of its employees. "We partner with EA to bring local training in lead roles, in addition to partnering with Rock Valley College," said Kim Niedfeldt, HR Manager. Employee communication was also a significant factor in deciding on the winner of the award. "The best global businesses have both upward and downward communication," said Mary Pille. The Employers' Association cited several programs at Danfoss that serve to improve and expand employee communication, such as the multiple newsletters, all-company meetings, and the Employee Perception Survey (EPS). "The EPS is successful because it fits with the organization," said Kim Niedfeldt. "We try to be honest with employees and say, 'this is what we're doing well, and this is what we need to work on.'"



Chuck Manz added, "The key is that we've told people what we're going to do and how we're going to do it, and we've tried to communicate that at every opportunity."

Other practices cited by EA in the presentation of the award included:

- New lean manufacturing program
- Open-book management philosophy
- Employee development dialogue
- Wellness program initiative