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Danfoss and the ALMA Project devoted to space research



altitude, in one of the driest desert zones of the world.

The ALMA project is a difficult technical challenge, since the antenna surface accuracy must be within 25 microns, the pointing accuracy within 0.6 arc seconds, and the antennas must be able to be moved over a distance of 10 kilometers, and offer Sun-sighting capability. The observation array will cover about 75,600 sq ft.

JCI/York won the implementation of the HVAC systems for the complex. Danfoss will supply the VLT® 6000 variable frequency converters and AHF005 filters, which will help in the temperature and pressure control process of the equipment. All equipment will communicate through Metasys N2 Protocol.

The challenge for Danfoss has been to supply equipment that performs under extreme conditions. The extremely high altitude is a major factor, and temperatures range from very cold to very warm. VLT® drives will control the HVAC system in this difficult environment. To eliminate any problems with voltage discharges due to static effects, special protectors have been included.

When completed, ALMA will be the largest and most capable imaging array of telescopes in the world. The deployment of equipment will take place through 2011.

VLT® Drives and filters provide advantages in the temperature and pressure control process of 64 radiotelescopes in Chile.

The ALMA (Atacama Large Millimeter Array) Project is an important and innovative initiative devoted to space research, and Danfoss is playing a part. The project was formed through a partnership between Associated Universities Incorporated (AUI) from North America. and the European Southern Observatory (ESO). ALMA will enable the most sensitive radio-telescope network in the world to collect information in millimetric and sub-millimetric wavelengths.

The system, which will consist of 64 radioantennas, will have a resolution that is 10-fold higher than the famous Hubbel Space Telescope. The powerful telescopes will be located in the foothills of Chile's Andes Mountains, at 16,400 feet

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Danfoss Brazil brings smiles to orphaned children





VLT® drives optimise oil production in Texas

At an oilwell in Texas VLT® drives maintain an optimum pressure balance between oil wells and surrounding reservoirs. More oil flows into the wells, thereby raising overall production.

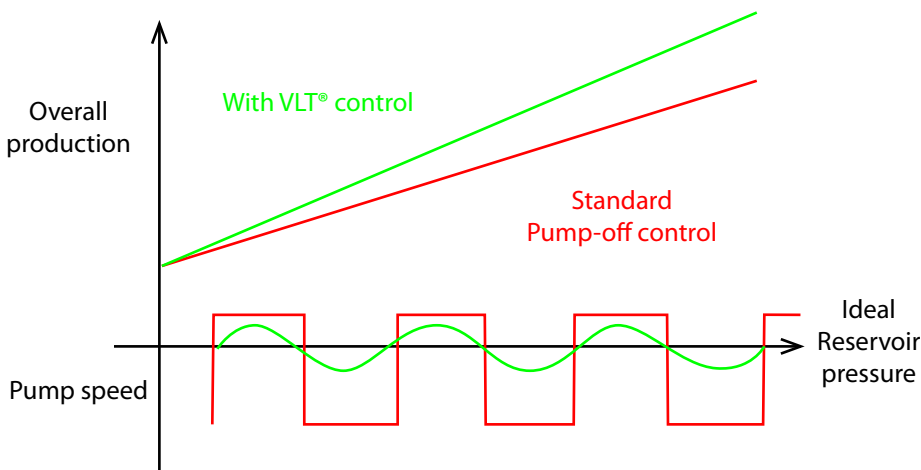
In 1962, Jed Clampett used a mere bullet to accidentally pierce the thin veneer of soil holding back a massive amount of oil on his land. The scenario played on a bit of Texan mythology—that oil bubbles under constant pressure just below ground were waiting to surface and that one well-placed piercing would release all the “black gold”.

The idea was promoted by the lore of places like Elektra, Texas, where a rancher named W.T. Waggoner frequently com-

plained that he kept striking oil while drilling water wells for his cattle.

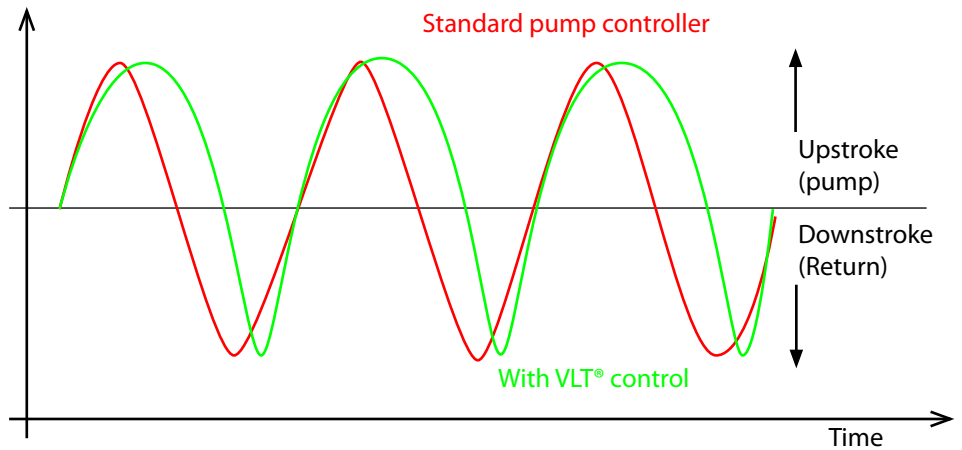
Today, Elektra literally has more oil pumps than it has residents (5000 pumps within a 10 mile radius, compared to a population of 3500). In fact, many areas of the southwestern United States are covered with the machines often referred to as “nodding donkeys” or “thirsty birds.”

This part of the pump — the equipment most people picture when they think of oil pumps — is actually called a walking



A standard pump-off controller simply shuts the pump off when oil production drops below a certain level. This is done to protect the pump equipment and to give the well time to “recover.” However, slowing the pump down with a VLT® 5000 Series drive maintains a better pressure balance between the well and the surrounding reservoir. More oil flows into the well, thereby raising overall production.

As the pump jack moves up and down, it creates stress on the rod and the other equipment connected to it. At certain points in its travel, this stress is greater than at other points. Using a VLT® drive to vary the speed of certain parts of the stroke can minimize this stress, making the components last longer. This can be accomplished while still maintaining the same number of strokes per minute, which keeps production up.

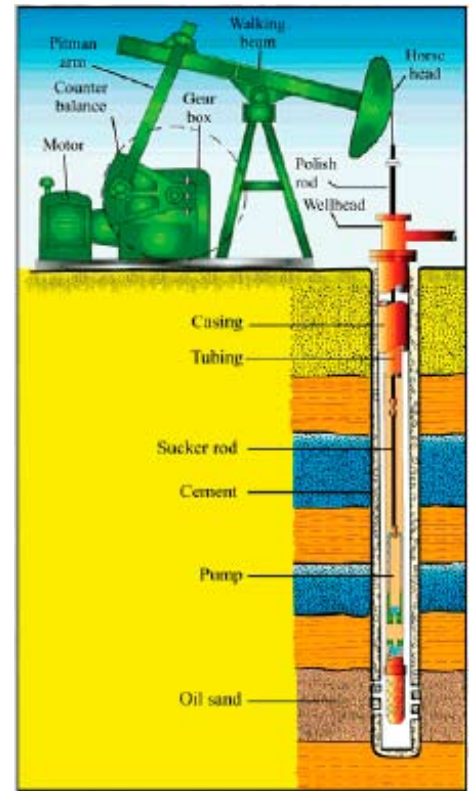


beam pump or pump jack. Pump jacks convert the rotary motion of a motor into a vertical motion that is used to extract oil from a well. But they're only part of the picture.

After a well is drilled, a pump jack is installed at the site. Attached to the pump jack is a long rod that goes all the way down into the well, deep underground. At the end of the rod is the pump head, which pulls oil up to the surface. As oil is removed from the well, more oil flows into it from the surrounding earth, which is called the reservoir. But there is a delicate balance that is unique to each well. Pump too much, and you'll dry out the pump and risk damaging it; pump too little, and you'll lose production and won't

make as much money. So pump jacks typically use a device that detects when the level of oil in the well is getting low. The device then shuts the pump off, allowing the well to "recover."

While this method works, it's not terribly energy efficient, and it can be hard on the equipment. Instead, some pumps use VLT® 5000 Series drives, which allow them to maximize the amount of oil extracted from the well by slowing down to match the recovery rate of the well rather than just shutting off completely. SyncPos cards also allow the drives to precisely control the speed of the motor during both the upstroke and downstroke of the pump to minimize stress on the well rod.





Leading Indian Sugar companies choose Danfoss Drives

Danfoss Drives in New Delhi, India, has won orders for two major sugar projects.

The first order is for Upper Ganges Sugar and Industries Ltd. (UGSIL), which is setting up a 24 megawatt bagasse-based cogeneration plant at its Seohara location. The order amounts to DKK 1.1 million, and was delivered to the Seohara site the first week of November.

The second order is for Ramgarh Chini Mills (RCM), which is setting up a 25 megawatt bagasse-based cogeneration plant at its Ramgarh location. This order amounts to DKK 1 Million and was delivered to the Ramgarh site during the last week of November.

Danfoss VLT® frequency converters are already working in two other Indian projects at Uttam Sugars and Prabhulingeshwar Sugars respectively.

Improved ROI in co-generation plants

The by-products of sugar cane after the sugar production is used as fuel in cogeneration of power and heat. The produced power is purchased by the Government electricity boards.

In these power plants, VLT® drives operate fans, boiler feed water pumps and increase manufacturer's ROI (return on investments).

VLT® a strong brand

"We have created a brand name by numerous marketing activities at National Sugar Federation, sugar consultants and end users", says Bhadresh Dani, Business Area Manager, Food & Beverage.

Prompt pre- and post-support

"The sugar industry chooses VLT® because we provide complete engineered panels, create customer satisfaction through prompt pre- and post-support and good application knowledge.

Immediate competitors are considering us as a major threat in the sugar segment with 300 sugar mills.

Danfoss strives to become the number one player in this segment in India by 2008, says Bhadresh Dani.



High tech suture material for the medical industry in Korea and Japan

Advances in AC drive technology have helped Fibre Extrusion Ltd win a valuable order for a machine for a customer in Korea and subsequently Japan. FET Ltd manufactured two machines to produce a high tech suture material for the medical industry.

Synthetic absorbable PGA sutures biodegrade within the human body, whereas traditional synthetic sutures were based on monofilament nylon and were not dissolvable, making them unsuitable for internal stitching. Following the BSE (Bovine Spongiform Encephalopathy or "Mad cow disease) crisis, absorbable natural sutures or gut carried a small risk to the patient as BSE prions do not respond to established sterilisation methods, and threaten viral transmission. PGA also offers tensile strength, pliability, knot strength and a smooth finish. Critically, synthetic suture

material must also have a consistent diameter (denier). Control of denier during manufacture is FET's speciality.

The manufacture of PGA is a melt spinning process and was originally developed for the manufacture of polypropylene, used for high strength straps such as seatbelts, lifting straps, cordage, etc. Following polymerisation of the raw material, it is extruded through highly specialised heated dies. The melt pumps must be very accurately speed controlled to ensure constant denier of the fiber. Whereas in the original evolution of the

machines, synchronous or synchronous reluctance motors were driven by standard inverters, the more accurate vector control of modern drives enables standard 1.5kW induction motors fitted with encoder feedback to be adopted.

High speed accuracy and stability are critical

Passing from the die, the fibre is air quenched to solidify and stabilise it before it passes to a series of 4 pairs of heated draw rolls, each pair of rolls driven by a single inverter drive. Here again high speed accuracy and stability are critical, as the accuracy of draw ratio between roll pairs imparts molecular orientation and governs the material denier. There is a final relaxation to condition the yarn before it passes to a wind-up section where the fibre is 'laid on' to a bobbin in

an accurately controlled pattern to ensure a stable pack.

In this application there were a total of nine VLT® AutomationDrives on each machine.

3 x 7.5 kw, 2 x 5.5 kw, 2 x 2.2 kw and 2 at 0.37 kw. These were connected to a Danfoss Ethernet master module, which enables the machine to communicate remotely. The ability to offer high performance closed loop speed control, and an Ethernet solution was fundamental in securing the business. Global support played an important part in the decision process due to the location of the customer.

According to Managing Director Richard Slack "We selected the new Danfoss VLT® AutomationDrive for a number of reasons. In addition to the accurate vector

control, there are a number of features on the AutomationDrive that simplified their adoption and gave us confidence to meet the demands. Not least of these is the ability to connect the drives on an Ethernet network, which enables us to interrogate the machine set-up remotely.

Well represented worldwide

Danfoss is also well represented worldwide so service considerations for Korea and Japan were fully met. Mr. Slacvk says: "From the first evolution of these machines almost 20 years ago, we've always relied upon our drive suppliers not only to supply first class products but also to provide a high level of consultancy during the development process. Danfoss again met that need in every regard."



VLT® quality preferred by Dutch dairy company

Danfoss quality made the Dutch company Van Uitert win a project for the Dutch dairy company Friesche Vlag.

VLT® is now Van Uitert's standard solution.

Danfoss quality won a project with the Dutch company Van Uitert for the Dutch dairy company Friesche Vlag. Van Uitert manufactures conveying and packaging systems, and until now, their preferred supplier of decentral drives was a Danfoss competitor.

Friesche Vlag, on the other hand, is a long-term Danfoss customer and therefore prefers a Danfoss solution.

Van Uitert planned to offer the project about 200 geared motors and decentral drives from our competitor. However they would also give Danfoss a chance to offer a solution for both geared motors and drives. Consequently Danfoss in the Netherlands decided to try to win the project.

VLT® - standard choice in the future.

Danfoss' offer was convincing and Van Uitert decided to place the order with Danfoss, but also to make Danfoss solutions the standard choice in the future.

The project was up against a very tight time schedule. The drives had to be supplied by the end of October, and product adaptations would make our decentral drives more suitable for this type of conveyor. Additionally, Van Uitert had to get all drives up and running in a very short time.

Thanks to a very tight follow-up on all designs, excellent support and flexibility from all departments involved, we met the customer's demand.



The VLT® Motion Control Tool now supports VLT® HVAC Drive

**MCT 10 now also supports
VLT® HVAC Drive.
Latest update is available on
the Internet.**

Danfoss introduces an update of the set-up and configuration software MCT 10.

The new version 2.26, Build 512 now also supports the VLT® HVAC Drive suited for Building Controls. It is now possible to configure and programme the HVAC Drive using the software. MCT 10 allows the user to access the frequency converter via USB or RS 485-interface.

Also new is an optimized access to MCO 305, which is freely programmable for special control tasks or can be used for synchronisation, positioning and cam control.

To simplify the adaptation of the VLT® frequency converters to the Danfoss Bauer gear motors, MCT 10 now comprises a database with all necessary motor data. This makes for easy commissioning of VLT® frequency converters used in combination with Danfoss Bauer gear motors – which saves time and thereby money.

In order to facilitate the planning of especially large-scale projects, MCT 10 now gives quicker access to these project databases.

Find the new software on the internet here :

Software Download

(www.danfoss.com/BusinessAreas/DrivesSolutions/Softwaredownload)



New VLT® Ethernet Powerlink Option

The VLT® Ethernet Powerlink protocol uses standard Fast Ethernet, extended by specific scheduling mechanisms, for deterministic data transfer.

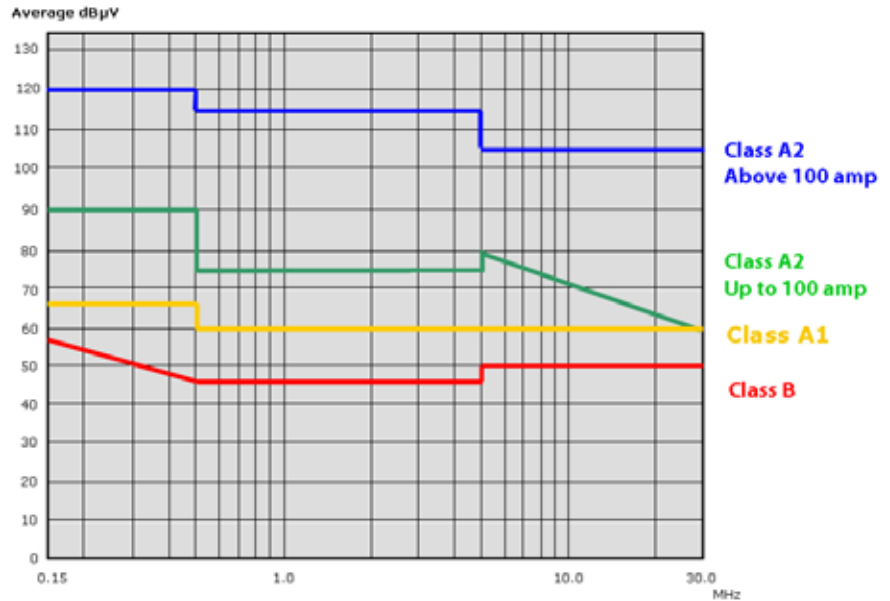
Ethernet Powerlink represents the second generation of field-bus. It uses high bit rate of Industrial Ethernet, applying the full power of IT technologies to the automation world for the first time. Ethernet, when introduced in automation, is still open and independent. Ethernet Powerlink provides high performance real-time and time synchronization features. Due to its CANopen-based communication models, network man-

agement and device description, this model offers much more than just a fast communication network. This architecture provides all additional system features necessary for distributed automation systems in a standardized manner. This makes it easy to provide integration of systems built up with devices from multiple manufacturers.

The perfect solution for:

- Dynamic motion control applications
- Material handling
- Synchronisation and positioning applications

Features	Benefits
• Cycle-times down to 200us	• meets toughest real-time demands
• High bandwidth Asynchronous IP data access	• multi-purpose bus
• Jitter < 1us	• maximum performance and precise timing
• Velocity, position and marker synchronizing	
• Integrated hub for daisy chaining	• supports any network topology
• No proprietary ASICs needed	• saving money
• License free	
• Industry proven	• widely supported
• Large installed base	• available and widely deployed
• Plug-and-Play commissioning	• easy to learn and use
• CANopen application layer	• backwards compatibility
• Integrated safety technology	• saves cabling and commissioning costs



Limits of EN55011 cl. B, A1 and A2

New EU standard places more EMC responsibility with users and operators

New EMC categories for electric drives are described in the revised product standard EN 61800-3. Dependent on their interpretation this may in the future move the responsibilities on the side of the plant and machine builders.

By:
Christian Mieslinger, Danfoss Germany

The revised EMC product standard for electric drives EN 61800-3: 2005-07 (as of July 2007) defines new categories C1 to C4. Depending on the user's needs, the new categories allow extended use of the existing emission limits in different surroundings. But does this really mean benefits for machine builders, machine plant operators or end-users of power drive systems?

The widely used and still applicable EMC emission standard EN 55011 (conditions: 08/2003) describes the requirements for each environment by the limit values after class B (residential area), or Class A1 (industrial area). In addition an EMC standard (EN 61800-3) has been introduced in 1996, which is mandatory for manufacturers and importers of electrical drives for the CE marking in the EU.

In the first version of the EN 61800-3 the limit values for electromagnetic emission were harmonized with the classes B and A1 as described in the standard EN 55011.

In addition, relatively high limit values were allowed in the EN 61800-3 standard after class A2 but only for industrial areas with their own power supply (transformer). This was already violating the harmonization, since the A2 limits in the EN 55011 were intended only for special applications with high frequencies (no electric drives). In practice this could result in sporadic operation failures, making it necessary to improve the EMC characteristics of the equipment later on.

In the meantime a revised version of the EN 61800-3 took effect and becomes obligatory in July 2007. In this version, new EMC categories C1 to C4 are defined (see table 1), which also refer to the limit values of the past classes. However this revised version of the product standard permits a different use in the different environments.

While the category C1 is consistent with the strict limit values after EN 55011, Class B, and therefore is allowed without restrictions for public nets and resi-

Category	C1	C2	C3	C4
Distribution	General availability	Limited availability	Limited availability	Limited availability
Environment	1st environment	1st or 2nd environment (choice of the user)	2nd environment	2nd environment
Supply voltage/current	< 1000 V			> 1000 V, I _r > 400 A or IT supply network
EMC knowledge	No requirements	Installation and commissioning by EMC expert only		EMC plan required
Limits according to EN 55011	Class B	Class A1 (+ warning notice)	Class A2 (+ warning notice)	Exceeds values Class A2

Table 1:
C-Categories in the revised EN61800-3

Table 2:
Comparison of the
EMC classes/categories

dential areas (1. Environment), the product standard now leaves the decision to the drives user whether it is appropriate to engage drives with EMC emissions of category C2 within this surrounding. The C2 limit values, however, correspond to those of the EN 55011, Class A1, which were, so far only permissible for industrial surroundings.

A similar situation is applicable in the case for installations in industrial environments.

Here the limit values clearly applies after class A1 according to EN 55011 (exception: voltages > 1000V, rated currents above 400A or IT network supply).

The operator can now, according to the new product standard, also decide to permit drives that only fulfil the requirements of category C3 (corresponding to EN 55011/class A2).

In both described cases it is mandatory to place a clear warning in the documentation to inform about the increased danger of EMC disturbance.

At first sight reduced EMC limit values appear positive, leading to clearly reduced screening and filtering measures and by this reduced installation costs. Also drives

	EN 55011: 2003 Still valid	EN 61800-3: 1996 First edition	EN 61800-3: 2005-07 Revision valid from 2007
Emission limits	Class B (residential area) Group 1+2	Environment 1 (residential area) Class B(1)	Environment 1 (residential area) Category C1
	Class A (Industrial area) Group 1 (HF internal)	Environment 2 (Industrial area) Class A1	Environment 1 or 2 (depending on the decision of the user) Category C2
	Class A Group 2 (HF External, not applicable to drives)	Environment 2 (Industrial area with own supply) Class A2	Environment 2 (Industrial area) Category C3
			Category C4 (Exceeds the Class A2 limits)

manufacturers in particular could benefit since they possibly could provide products in higher environment classes but with cheaper EMC filter design.

But by this the decision over, and thus the responsibility for, employment rests explicitly on the operator of the machine and plant. This means, that in case of EMC problems he has to remove arising functional problems at his own expense.

Or differently expressed: the manufacturer of the drive system is only responsible for the adherence to limit values in accordance with the indicated C-category. For consequences cling only users and operators.

Since the operator will have defined default EMC values for individual components, the machine builder is however

responsible for the overall functioning of his plant. The situation becomes particularly difficult if components come from several suppliers.

In such controversies for EMC examinations the limit values are consulted anyway according to the environment standard EN55011. Even if the product standard is kept, other components might suffer from EMC emissions.

It can be expected that this may become even worse in future as more and more PLC and fieldbus functionalities in modern controls and drive controllers will also lead to an increasing number of microprocessors with rising clock frequencies. This inevitably leads to more high frequency interference sources in the plants.

Machine suppliers are therefore doing well to pay good attention in using components with good EMC performance also in the future. Within the industrial area this means limit values after EN 55011, Class A1 (corresponding to EN 61800-3, Category C2) or within the residential area the limit values after EN 55011, Class B (corresponding to EN 61800-3, Category C1). Only this way you can be sure to avoid functional impairment of other components and unintended machine standstill.

Recommended limit values:

Residential area / Environment 1:
EN 61800-3, Category C1
(Limits equivalent to EN 55011 Class B1)

Industrial area / Environment 2:
EN 61800-3, Category C2
(Limits equivalent to EN 55011 Class A1)

Modern electronic drives can, if originally constructed according to the rules of electromagnetic noise suppression, even keep the strict limit values for residential (private house) areas and for use of the public net even without additional external filter components. Such “embedded” EMC performance also creates increased reliability in harsh industrial environments reducing plant standstill and related costs.



Danfoss Brazil brings smiles to orphaned children

Danfoss brought in several boxes of toys and clothing, as well as non-perishable food.

Danfoss Brazil is putting smiles on the faces of orphaned children at PIVI (in Portuguese Project to Improve Lives), which houses more than 90 children of all ages. Danfoss has set up a donation box in the reception for everyone to make contributions and so far has brought in several boxes of toys and clothing, as well as non-perishable food.

The children and the project's managers are grateful to all who have contributed so far.