MAKING MODERN LIVING POSSIBLE

VLT® Solutions

The dairy industry relies on VLT® drives

VLT®
THE REAL DRIVE

Built to last

VLT® drives are built to last – even when it gets hot. VLT® drives are manufactured to the highest quality standards and are built to operate trouble-free in ambient temperatures of up to 50° C, year after year. This guarantees maximum uptime and lowest possible cost of ownership.

Rugged and robust field enclosure
A range of drives designed for installation in the process environment with no need for any additional enclosure including within wash-down areas.

The preferred drives provider among leading dairy companies globally

Since 1968, when Danfoss launched the world's first frequency converters, VLT® has been the preferred brand among the world's leading dairy companies.

Largest installed base
Danfoss has an installed base of variable speed drives in the dairy industry globally that is larger than any other supplier and we are committed to maintaining this position.

Expert knowledge
Our expert knowledge of dairy processing equipment, packaging machinery and utilities within all types of dairy product manufacturing plants, has helped us design and build a portfolio of products for applications such as:

- Lobe and centrifugal pumps
- Decanters and separators
- High pressure pumps for UF plants
- MVR and dryer fans
- Powder transport blowers
- CIP systems
- Packing room

Excellent VLT® features
- Up to 150 metres screened motor cable with, and up to 300 m without, EMC compliance
- Handles up to 50° C ambient temperature
- IP 66 versions for wash-down areas
- Safe stop function for safety category 3 – feedback not required
- Integrated harmonics filter as standard
- Integrated RFI filters
- CTC coating available (3C2 standard, 3C3 optional)
- Real side-by-side mounting
- USB communication
- User interface won the iF Award
- Standard platform – if you know one, you know them all

Up to 150 metres between the drive and the motor
The basic design of VLT® drives allows for up to 150 metres of screened motor cable – without disturbing other electronic equipment. This allows the VLT® to be installed in a central control room – far away from some of the most remote variable speed conveyors and machines in a modern dairy plant.

Peace of mind
You will find our dedicated sales and service staff all over the world 24 hours a day. They are always ready to support you with commissioning assistance, technical training and troubleshooting. They can even offer a cost-efficient package of DrivePro service agreements to avoid any surprises to your maintenance budget.

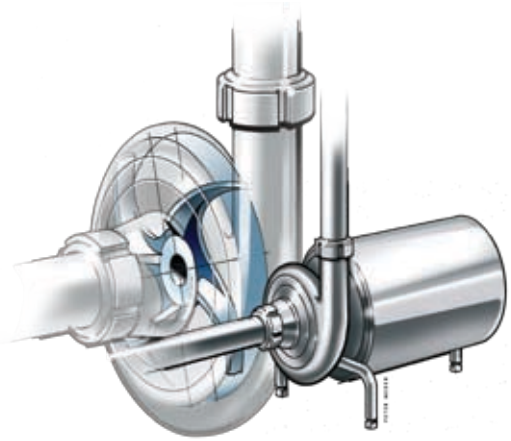
2006 FROST & SULLIVAN Product Innovation Award

Danfoss Drives received the Frost & Sullivan Award for Product Innovation 2006 for the unique VLT® AutomationDrive series.

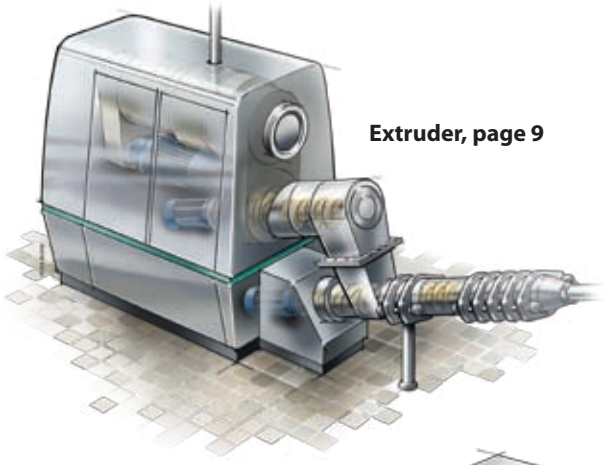
design award winner 2004

The new VLT® series local control panel (LCP) was given the international iF design award in 2004. The panel was chosen from a total of 1,003 entries from 34 countries in the category "interface in communication".

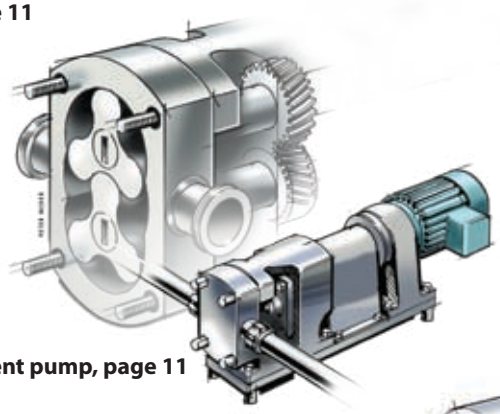
Improved process control using less energy in the dairy industry



Centrifugal pump, page 11

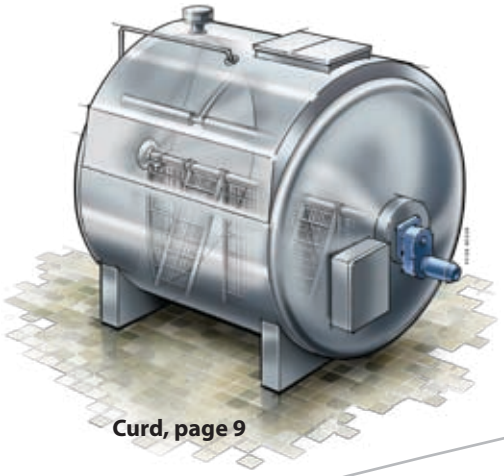


Extruder, page 9

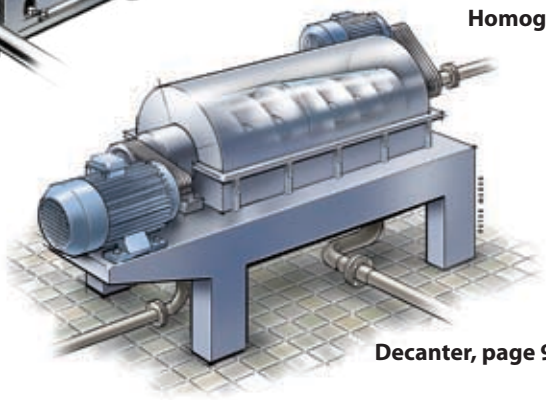


Displacement pump, page 11

Homogeniser, page 7

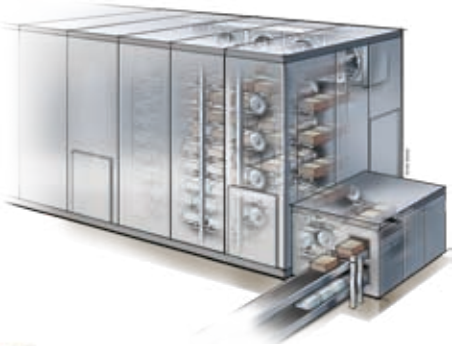


Curd, page 9

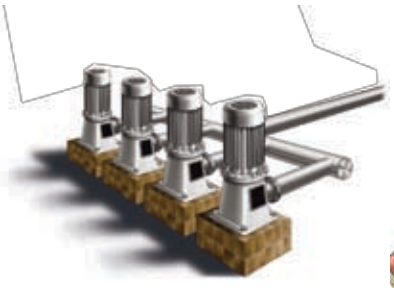


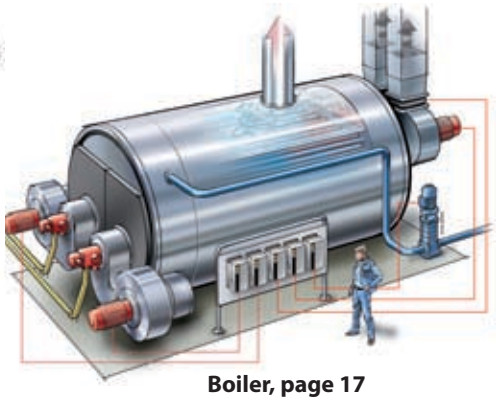
Decanter, page 9

For flexible and reliable handling
Reliable automation is crucial in the handling of cases and pallets. From sorting and rinsing of reused bottles to moulding, filling, labelling and packing, Danfoss offers dedicated features and solutions.

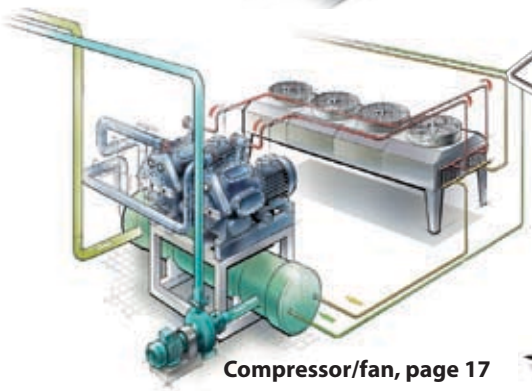


Cheese cooler, page 11

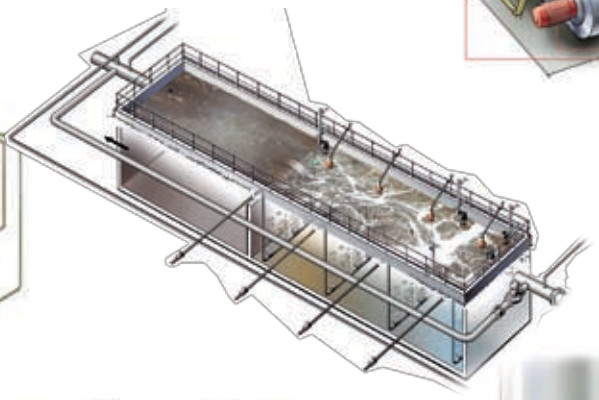


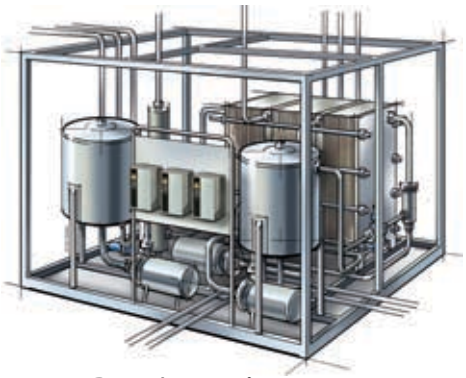


Boiler, page 17

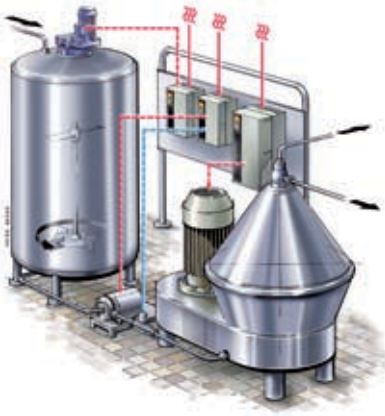


Compressor/fan, page 17

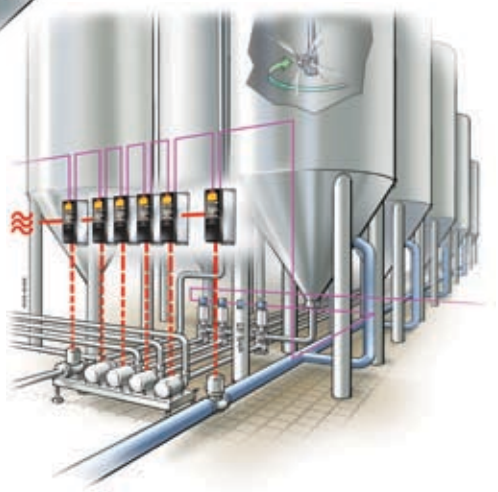




Pump/pasteuriser, page 7



Centrifuge/decanter, page 7



For better products
Pumps, centrifuges, mixers and agitators are meticulously and reliably controlled by VLT® drives. VLT® drives come in all power sizes and offer all the features required to optimise the production of all dairy products.

For energy saving
Heating, cooling, pressurised air, water and waste water are all Danfoss core competencies. Dedicated VLT® drives series offer dedicated features for all these applications.

Energy savings, less waste, better product quality

Wherever wheels turn, VLT® drives will provide optimum control by controlling the power supply to the motor according to the actual power demand, speed, torque, pressure, flow etc.
Change of recipe requires merely shifting between several fixed set-ups.

VLT® benefits are:
- Less energy consumption
- Less waste and material
- Better, more consistent product quality

Improved pump control
VLT® drives have several pump dedicated features that optimise production and protect the drive, the motor and the equipment.

Two-step ramps
The pump quickly reaches minimum speed and fills the system without stressing the valves.

Flow compensation
Flow resistance is dependent on flow speed. The drive will reduce the pressure at low flows to save energy.

Motor alternation
Built-in logic controls can alternate between two pumps in duty/standby applications. Exercising the standby pump prevents the pump from sticking.

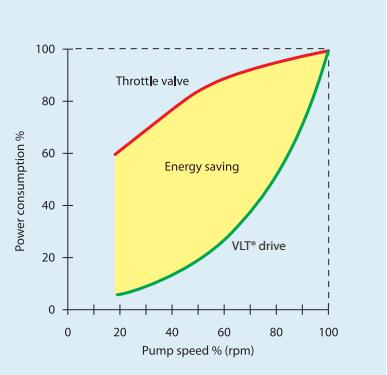
An internal timer ensures equal usage of the pumps.

Energy optimisation
VLT® drives feature Automatic Energy Optimisation, ensuring optimal magnetisation of the motor.

Bus control
Automation means less waste and better process control. VLT® drives handle the most common bus protocols in the industry and integrate seamlessly into the overall control system.

Danfoss provides a broad range of IP 66 enclosed drives suitable for mounting in production areas, exposed to humidity, dust and frequent washdowns.

Comparison of energy consumption



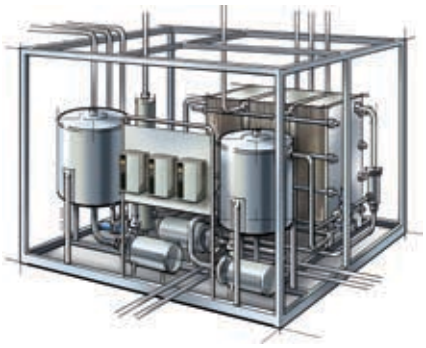
Energy savings using a VLT® drive are achieved even with a modest reduction in speed.

For centrifugal pumps, power consumed is directly proportional to the cube of the speed:

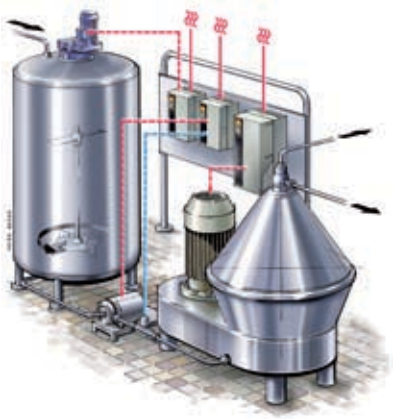
$\%P = (\%rpm)^3$

Therefore a small reduction in pump speed results in a large reduction in energy consumption.

Even a 20% reduction in pump speed results in almost 50% reduction in energy consumption.



Pump/pasteuriser features	Benefits
• Pump Cascade Controller	– Minimises wear and tear
• Automatic Energy Optimisation	– Saves energy
• Dry Pump Detection	– Protects the pump – Saves energy
• End of Curve	– Protects the pump – Reduces energy consumption
• Flow compensation	– Saves energy



Centrifuge/decanter features	Benefits
• High motor torque (flux vector performance)	– Tolerant against impact loads
• Accurate torque control	– Suitable for back-drive applications (decanters)
• AC brake	– Dynamic braking without brake resistors
• Flux mode motor control	– Robust against load shifts
• High enclosure classes	– Suitable for washdown areas
• Flying start	– Catches a rotating centrifuge bowl
• Controlled ramp-up and -down	– Saves time
• Constant torque mode	– Process control
• Multi set-up	– Flexibility

Homogeniser features	Benefits
• High starting torque	– Soft start/stop
• Torque control	– Gearbox failure elimination
• Variable speed operation	– Reduced maintenance cost

Reliable and high quality handling

Critical milk crate lift operations
Milk crate lift operation is critical. Lifts must be able to overcome the high torque demand. VLT® drives ensure this.

Avoid torque damage
Damage from over-torque can be avoided via online monitoring through fieldbus.

Easy change of set-up
The electronic cam disc operation permits a simple change of setup for different packaging types.

Permanent magnet motor operation
VLT® drives are available for permanent magnet motor operation for accurate positioning and synchronising control and fast ramp times.

An algorithm in the VLT® AutomationDrive can manage almost all servo motors in closed-loop control with an external encoder attached to the motor. It communicates via ENDAT, Hyperface, Resolver or incremental encoders.

True low-torque
With dynamic braking and the unique true low-torque feature, VLT® drives are ideal for curd cutting and agitation in either direction for cheese and casein production, minimising fines loss by rough agitation.

Reliability is critical
The internal speed controller provides stable and accurate circulation of the machine.

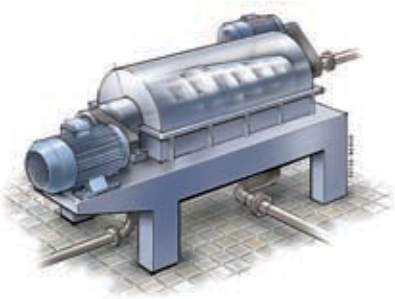
Short downtimes are provided by a brake chopper that turns the motor into a generator to absorb the energy.

VLT® drives provide higher reliability of operation.

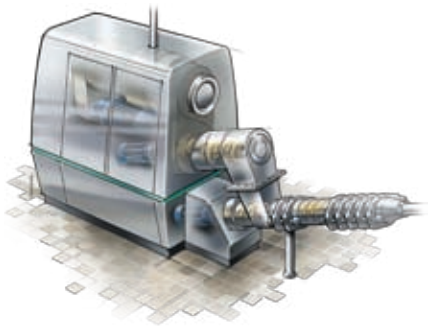
For powder packing lines
For powder packing lines, conveyor start profiles from the packing machines are very critical, especially for residual oxygen levels (RO's). The dynamic torque and start ramp profile of VLT® drives help to avoid the loss of the CO_2 blanket in the powder bag and assists in keeping the bag upright before closure.

Feeds even stiffened butter
High torque at low speed benefits butter feed lines. This prevents the drive from tripping when feeding stiffened butter to the packing machine.

Curd features	Benefits
• Dual rotation	– Less switchgear – No gearbox above the product
• Variability of speed	– Flexibility of curd
• High Torque	– Central agitation – Robust application



Decanter features	Benefits
• Accurate torque control	– Suitable for back-drive applications
• Load sharing through common DC-bus	– Energy savings through regenerated energy
• Variable speed and torque	– Flexible process control and optimisation
• Flux motor control	– Robust against load shifts
• Controlled start and stop	– Reduced maintenance cost



Extruder features	Benefits
• High torque	– No need for larger drive – Better controllability of extrusion process
• Constant torque mode	– Optimised process control
• Certified Safe Stop functionality	– Saves external components

Accurate dosing and fill for packaging applications

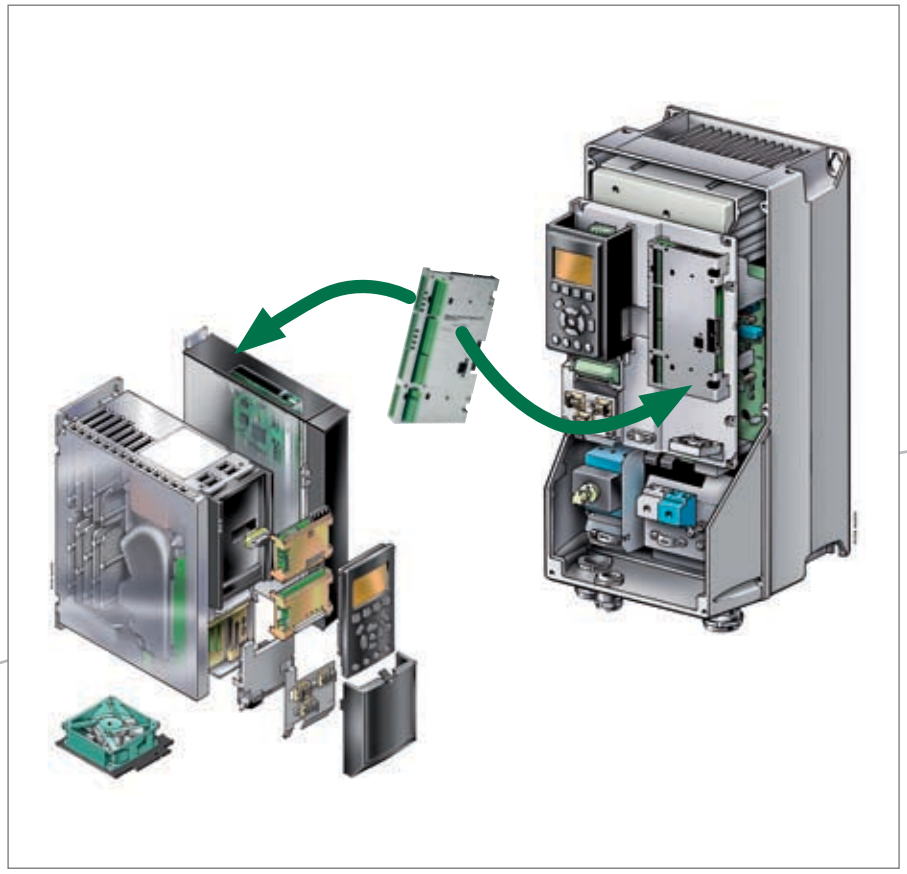
VLT® drives fit for fillers
VLT® drives provide accurate and precise dosing for fruit pulp addition and for the filling of thermoform bottles and pouches whether liquid, semisoft or solid products. This goes for a wide variety of liquid products that can be warm, hot, molten, cold, semi-frozen, viscous, abrasive, particulated, chunky or free flowing.

Overall VLT® benefits are:
- Rapid changeover
- Aseptic/sanitary
- Easily cleaned
- Reduced maintenance
- Ease of operation
- Connectivity
- Load sharing
- Kinetic backup
- Bus communication

Dosing
Maximise yield on vitamin, fruit pulp or lecithin addition rates. Control of flow with different viscosities requires optimum control and rapid response times.

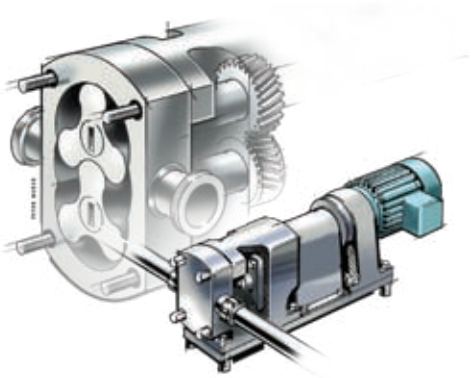
Synchronisation and positioning
With VLT® drives' wide range of motion control options, they allow positioning, synchronising and cam control with almost any motor and feed-back system.

Whether you need an absolute or an incremental feedback system, VLT® drives offer innovative and easy to use motion control solutions.



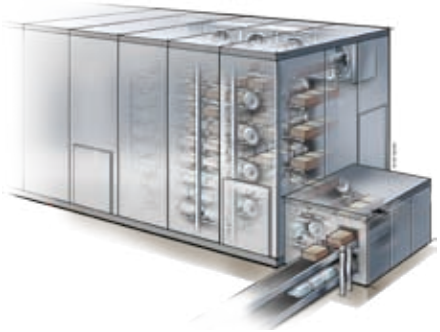
VLT® Motion Control Option
VLT® Motion Control Option is an integrated freely programmable Motion Controller for VLT® AutomationDrive. It adds functionality and flexibility to the already comprehensive standard functionality of these drives.

The option is also available pre-programmed for synchronising or positioning.



Filler features	Benefits
• High performance	– Fast and accurate
• Aseptic drives	– Easy cleaning
• Multi setup	– Reduced machine setup
• Fieldbus	– Permanent monitoring and documentation of capping
• Hygienic optimised design	– Hygienic production
• Synchronisation	– Avoid cap jams – More flexible machine – Less mechanical wear and tear

Dosing features	Benefits
• High performance	– Fast and accurate labelling
• Multi setup	– Reduced machine setup
• Compact servo solution	– More flexible machine – Cost reduction



Rapid Cheese Cooler features	Benefits
• IP 66	– Can be mounted in the production environment
• High performance	– Fast and accurate
• High torque	– No jerk starts – Reduced maintenance
• Built- in PLC	– Can control your lift transition conveyor and more
• VLT® AutomationDrive	– More than one motor can be controlled from a single Danfoss drive – No need for more VSDs – Cost reduction

Precise and configurable speed synchronisation

VLT® drives provide optimum speed regulation between process stations and meet different torque requirements. Wide conveyors such as the Cheddarmaters and Aflomatics require low speeds and higher torques where narrow conveyors require high speeds and lower torques.

Single item conveyors such as butter pat or milk carton lines require high speeds and high torques for quick starts.

Reduced bottlenecks
Weigh stations or metal detectors require vision systems, sensors and an intelligent freely programmable drive. Therefore unders and overs or product with metal detected are rejected.
The sensor can give an input to the VLT® drive to count the number of units processed during a set time frame. If the number of units is less than is required for the next station, then the check station conveyor system is accelerated to meet the demand. The opposite occurs when the count gets too high, to reduce bottlenecks in the conveyor and "Qing" systems.

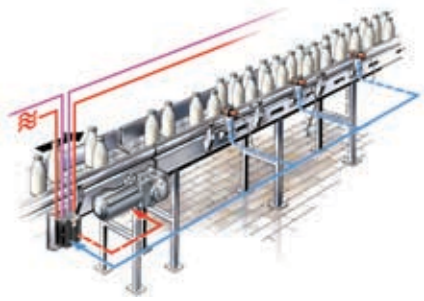
Fewer encoders
New VLT® drives provide open-loop positioning with high accuracy and minimum installation cost, so that encoders and encoder cables often can be omitted.

Less downtime
Adjustable ramps ensure that bottles don't fall over during starts and stops. Positioning functions ensure that bottles are placed correctly in an inspection situation – regardless of production speed.

Less noise – less waste
Synchronisation features adjust conveyor speeds according to the overall production to prevent congestion, damage to product, noise and energy waste.

Overall VLT® benefits
- Line efficiency
- Prevents bottle scuffing
- Reduced maintenance
- Gentle starts and stops
- Minimised noise

Fieldbuses available
- Profibus
- DeviceNet
- CanOpen
- Ethernet IP
- Powerlink



Bottle conveyor features	Benefits
• Real side by side mounting	– Saves cabinet space
• 150 m motor cables	– Flexibility
• Ramping	– Protects products
• Coordinated operation	– Less noise – Easy line modulation – No congestion
• One drive modulating according to a reference for each track	– More efficient line – Modulation – Product preservation – Less noise – More flexible and faster line

Case conveyor features	Benefits
• Coordinated operation	– Less noise – Easy line modulation – No congestion
• Multi-setup configuration, for multipack lines	– More flexible lines – Reduced time for line setup

Pallet conveyor features	Benefits
• Accurate ramping	– Protects bottles
• Variable speed	– Efficiency

Fast and flexible packaging

No need for expensive servo systems
VLT® drives provide very fast accelerations even with high loads in packing machines.

With built-in synchronising and positioning control, VLT® drives make packing/unpacking machines extremely efficient and flexible so that when equipped with VLT® drives, expensive servo systems are unnecessary.

One wire safety
The VLT® AutomationDrive comes as standard with the Safe-Stop functionality suitable for category 3 installations according to EN 954-1.

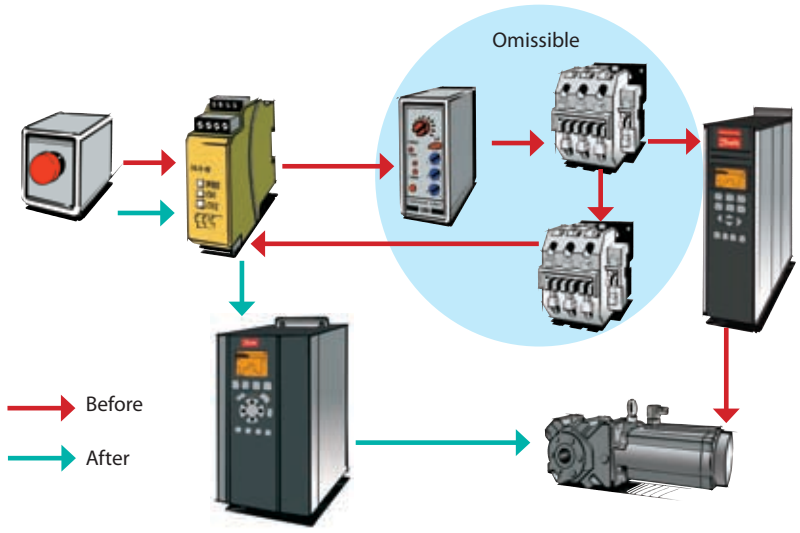
This feature prevents the drive from unintended starts by activating a safe stop. Terminal 37 can be used as "safe coast" for this purpose – the stop function satisfies Stop category 3 EN 60204-1.

No need for external components
Expensive and bulky external components can be omitted, wiring is considerably simplified, and production downtime is minimised with this solution. The safety related signals can be transferred via discrete signal wiring (in compact machinery) or via safe bus communication.

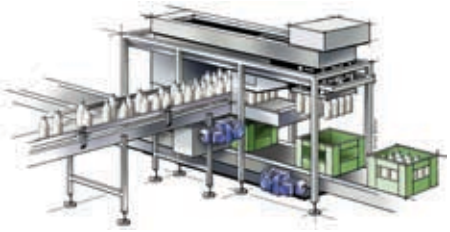
Replace mechanical systems and add flexibility
Wrapping requires precise positioning and synchronising. VLT® operated motors replace mechanical systems and add flexibility.

Optimise palletising
To move crates, for example from a pallet to a conveyor, requires precise stopping. Dynamic braking of the vertical operation with heavy load optimises the process and reduces mechanical wear.

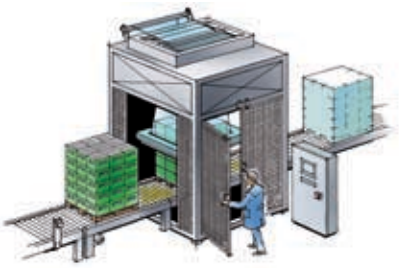
Positioning, synchronising, and load estimation are features that make palletiser operation faster and more flexible.



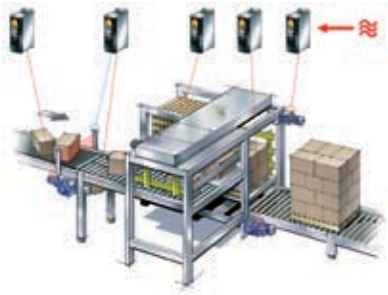
Two contactors and a timer can be omitted in safety installations due to the safety functionality in VLT® AutomationDrive



Packer features	Benefits
• Synchronisation/positioning features	– VLT® drives can replace expensive servo drives
• Cam control	– Fast operation – Flexiblility



Wrapper features	Benefits
• Synchronisation/positioning	– Use of cams – Integrated positioning – Nonlinear synchronous motion sequence on leading axis – Precision stop
• Safe stop	– No additional cabling – Manual shutdown of motors – VLT® drive is still functional



Palletiser features	Benefits
• Synchronisation/positioning features	– VLT® drives can replace expensive servo drives
• Cam control	– Fast operation – Flexibility

Optimise supply of water, heating, and cooling

In any industry – the dairy industry included – VLT® drives are employed to optimise water supplies, heating, cooling, and other functions supporting the production.

Optimised compressor control
VLT® drives can optimise control of compressors, reduce energy consumption and provide constant pressure regulation.

Fewer starts and stops will reduce mechanical wear and speed control is attractive when an air compressor is running for long periods at part-load. VLT® soft starters, high power drives, AHF harmonic filters with built-in cascade controller option, DC coils, and PID controllers can be applied.

Optimised boiler efficiency
VLT® drives optimise the combustion efficiency by controlling both forced draft and induced draft.
The flow rate in the feed water is also controlled via VLT® drives. Overall energy consumption – electricity and fuel – is minimised.

Energy savings and comfort
Fans and compressors benefit from dedicated features in VLT® drives. With the "skip resonance" function damaging resonant frequencies are easily identified and quickly passed over to avoid noise and damage.

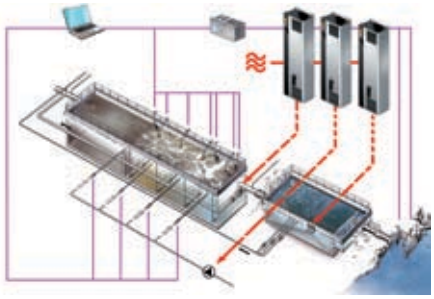
Smart Logic Control
The new VLT® drives have Smart Logic Control built in. With this feature the drive can be made to react to process inputs and events, possibly eliminating the need for a PLC.

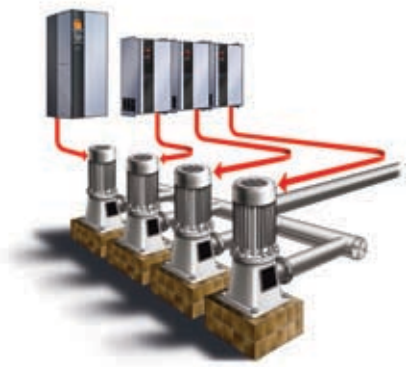
Optimise water and wastewater treatment
Danfoss Drives' long-term involvement within Water and Wastewater has resulted in dedicated drives and features for water handling. The VLT® features improve system hydraulic performance and efficiency.

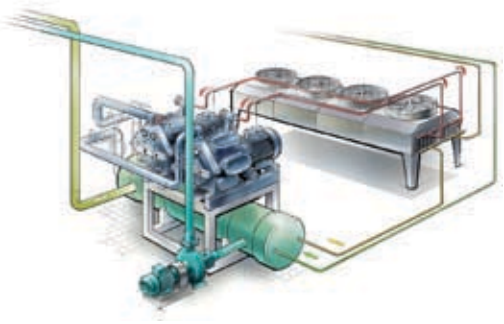
- Saves energy
- Saves commissioning time
- Saves auxiliary equipment
- Optimises pump control
- Optimises process in the aeration tank

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

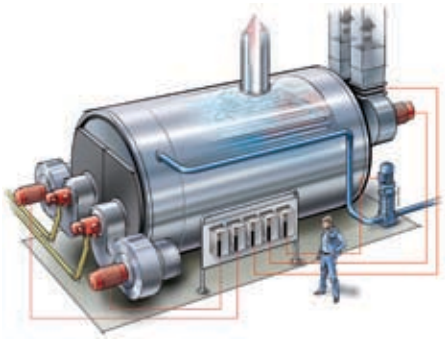
It distributes running hours evenly across all pumps, keeps wear and tear on individual pumps to a minimum and ensures that all pumps are in great shape.





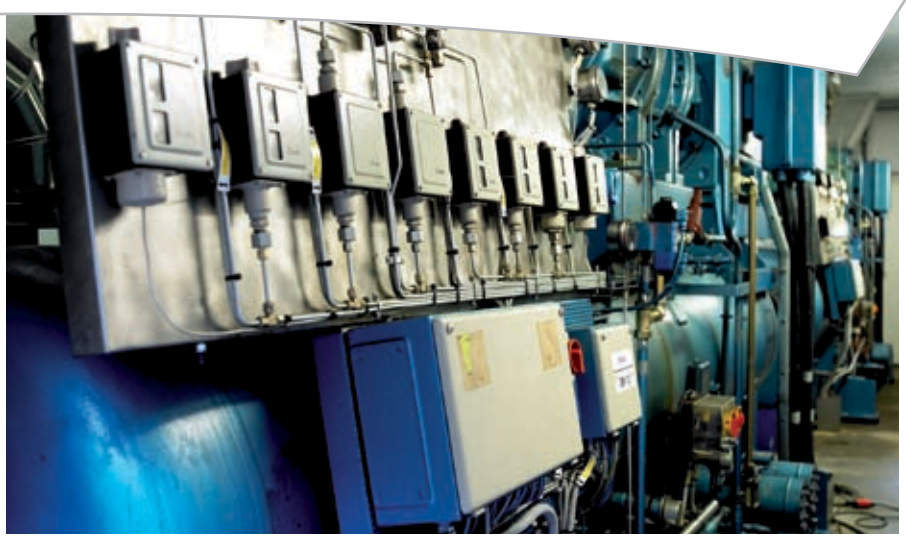


Fan features	Benefits
• Load dependent capacity control	– Energy saved
• Skip resonance	– Noise reduction
• Operate single fans as well as multiple parallel operating fans – or in cascades	– Saves installation cost
• VLT® Pre-heat function	– Eliminate anti-condensation heater



Compressor features	Benefits
• Over-capacity	– No need for larger compressor/drive
• Reduced current limit	– Ensures functionality of cooling system – Protects the application
• Running at current limit	– Extends the systems' capacity
• Minimum starts and stops	– Protects the compressor – Reduces energy consumption
• Setpoint in temperature	– Easy commissioning
• Monitor running hours	– Schedule maintenance
• Electronic control	– Less maintenance
• Cascade control	– Stable pressure

Boiler features	Benefits
• Accurate speed control of blowers	– Less energy consumption – Reduced pollution – Stable temperature
• Electronic control replaces mechanical control	– Reduced maintenance time/costs



Two concepts – two sets of benefits

Whether to use central or decentral drives depends on the layout of the dairy plant, the distance from the control room to the conveyor motors and the installation cost for electrical cabinets and cables.

Decentral concept

The physical layout of many dairy manufacturing plants typically requires long distances between the electrical cabinets and the process equipment. Motor and control cables up to 100 – 150 metres are thus very common.

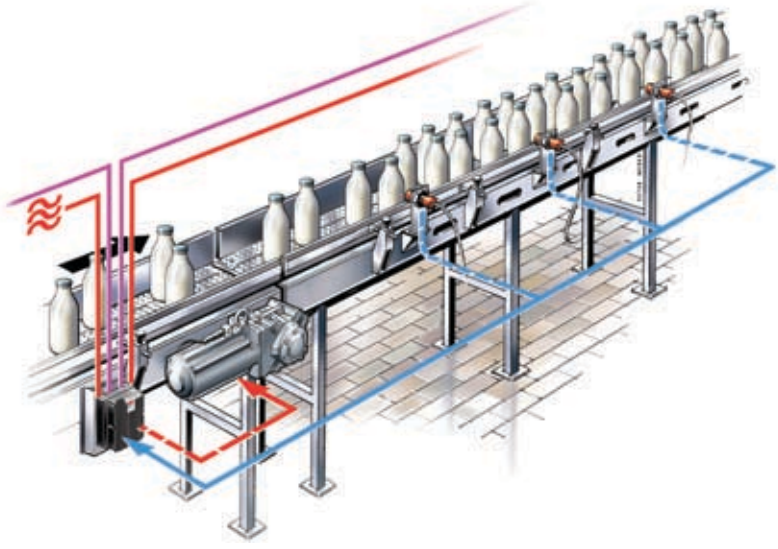
Installation cost savings can often be achieved using a decentral drives concept:

- **Less need for central control panels/rooms**
- **Less need for screened cables**
- **Less need for cooling**

Looping of power- and control cables leads to major savings and flexibility in the plant setup.

Decentral features	Benefits
• Mounted on or near the motor	– No screened cabling – Less need for cooling – Saves cabinet space
• Fieldbus control	– Easy setup – Coordinated operation
• Enclosure class IP 66/NEMA 4	– Suitable for wash-down areas
• Easily changed electronics	– Maximum uptime
• Decentral I/O	– Less cabling
• Automatic Motor Adaptation	– Easy commissioning
• Smooth surfaces • Epoxy coated surfaces	– Easy cleaning

Danfoss provides a broad range of IP 66 enclosed drives suited for mounting in production areas exposed to humidity, dust and frequent washdowns.



A smart, dedicated kit allows larger drive enclosures to be mounted in Rittal cabinets so cool air removes 85% of excess heat without contact with the electronics.

Central concept

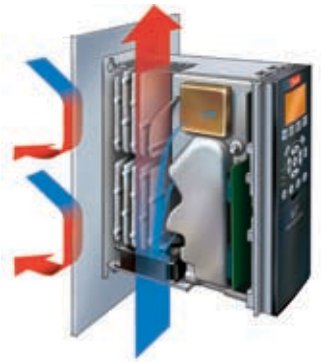
Traditionally drives are placed in control cabinets with other control equipment.

150 metre motor cables
The long motor cables, built-in EMC filters and excellent EMC performance supports the central solution.

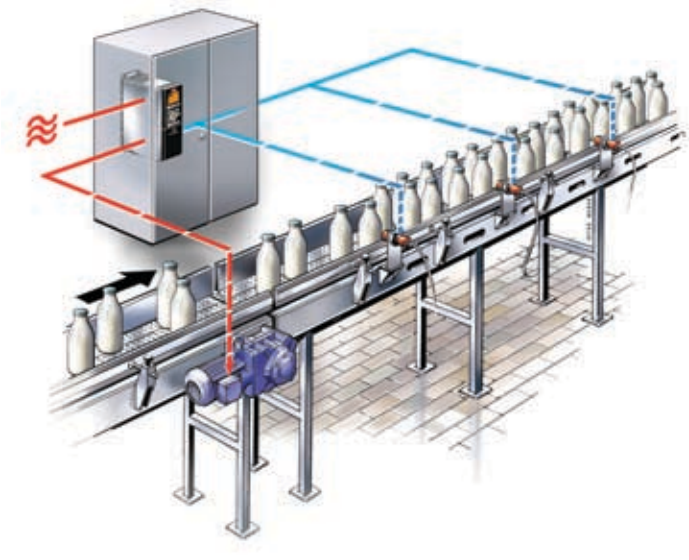
50˚ C ambient temperature

Intelligent cooling solutions
Intelligent cooling solutions, cold-plate solutions, coating solutions, and smart duct cooling solutions for high power drives are available.

Real side-by-side
All central VLT® drives are designed for side-by-side mounting in ambient temperatures up to 50° C without derating.

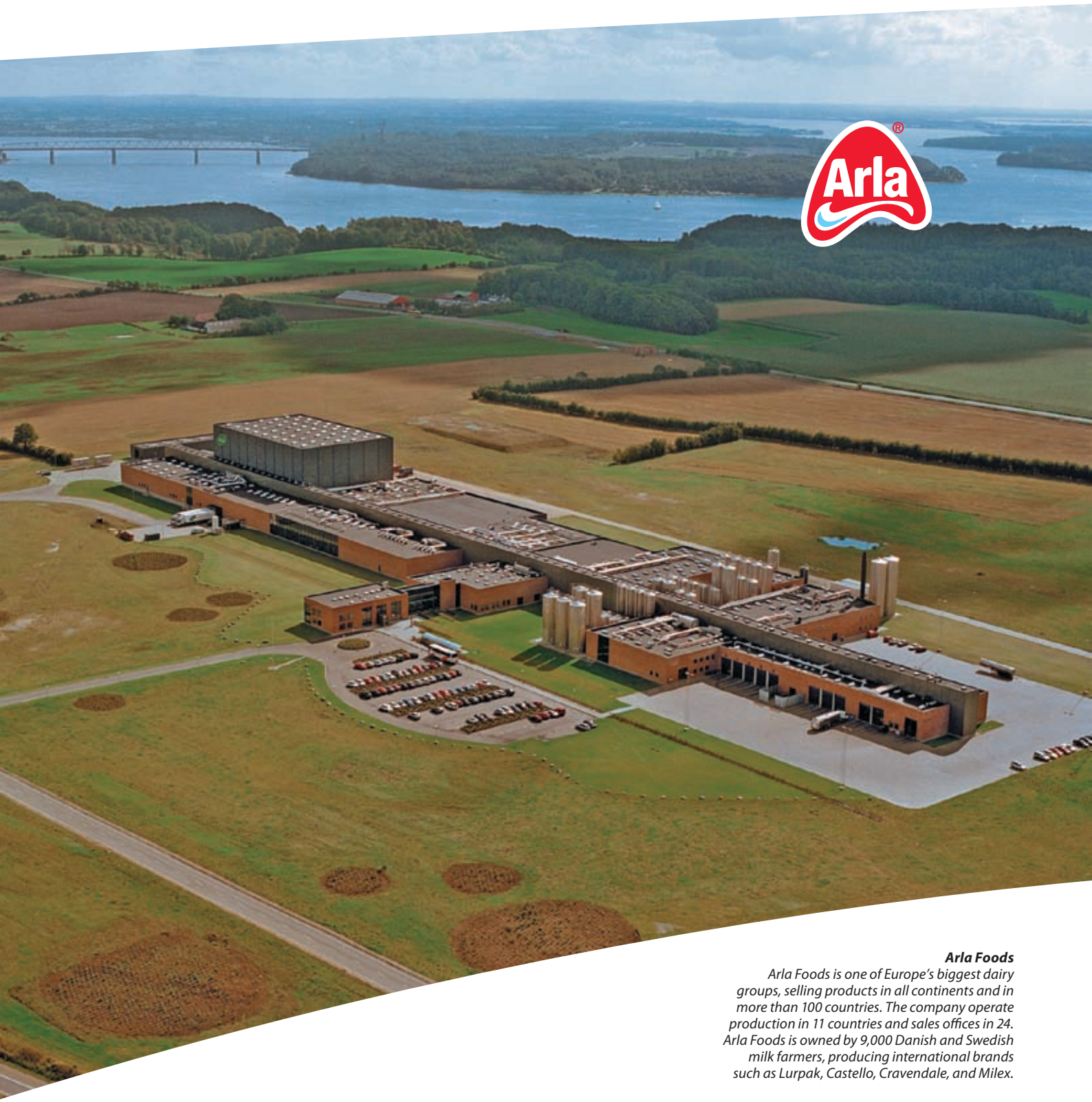


Central features	Benefits
• Multiple I/O	– Easy set-up and commissioning
• Remote mounting	– Low enclosure class sufficient
• Cold-plate cooling available	– No derating issue
• Rittal kit available	– Easy commissioning – No derating issue
• Multiple set-up	– Flexible
• Automatic Motor Adaptation	– Easy commissioning
• Book style concept • True side-by-side mounting	– Space-saving cabinet mounting



Modular concept
VLT® drives are designed for maximum customisation from the factory and maximum flexibility once installed. Choose from thousands of hardware configurations, built and tested from factory.
Upgrades and further options are a matter of plug-and-play.

Proven dairy experience



Arla Foods

Arla Foods is one of Europe's biggest dairy groups, selling products in all continents and in more than 100 countries. The company operate production in 11 countries and sales offices in 24. Arla Foods is owned by 9,000 Danish and Swedish milk farmers, producing international brands such as Lurpak, Castello, Cravendale, and Milex.

Tip Top™ Ice Cream
Founded in 1936 Tip Top™ is New Zealand's leading ice cream company with a production of approx. 50 million litres of ice cream each year.
Tip Top™ is part of Fonterra Co-operative Group, New Zealand's biggest company and one of the largest dairy businesses in the world.
Tip Top™ has been working with Danfoss for over ten years.

Campina
The initially Dutch based international dairy cooperative Campina offers a wide range of dairy products and consumer products as well as ingredients for food and pharmaceutical industries. At the facility in Maasdam (NL), the production of special dairy products rely on Danfoss VLT® drives.

Nestlé
Nestlé Product Technology Center (PTC) in Konolfingen, Switzerland provides technological know-how in products, manufacturing processes, packaging and engineering for Nestlé's shelf-stable milk-based products: mainly liquid and powdered milks, infant and clinical nutrition products and dietetic specialities.
The heart of the PTC is the pilot plant which is like a miniature factory that simulates manufacturing processes on a smaller scale.

Product overview

VLT® AutomationDrive

An extremely flexible and cost-effective drive suitable for all industry applications – from simple speed control to dynamic servo applications.

VLT® AutomationDrive comes in a basic version (FC301) and an advanced version (FC 302) with additional functionalities.

- 0.25 – 3.7 kW, 200 – 240 V, 0.37 – 800 kW, 380 – 500 V, 37 kW – 1.2 MW*, 525 – 690 V
- Built-in DC coils and RFI-filter (optional)
- Bookstyle IP 20/IP 21/NEMA 1/ IP4X top and IP 55/NEMA 12
- Compact drive IP 55 and IP 66/NEMA 4
- Integrated Smart Logic Controller, (USB and RS485) as standard
- Integrated optional communication options (Profibus DP/V1, DeviceNet, CanOpen and more)
- Integrated optional additional I/O (digital I/O's, encoders, (incremental, absolute, sin/cos, resolver))
- Integrated Motion Control Option (PLC)

VLT® 2800 Series

An extremely compact series of drives prepared for side-by-side mounting and developed specifically for the low power market.

- 0.37 – 2.2 kW, 200 – 240 V and 0.55 – 18.5 kW, 380 – 480 V
- Multipurpose
- Side-by-side mounting in any direction
- Built-in PID controller, RFI-filter and DC coils
- Bookstyle IP 20
- Integrated RS 485 interface as standard
- Integrated Profibus (optional)

VLT® Soft Starters

The optimum motor starter for palletiser and other applications where smooth starting and stopping is essential. The MCD 3000 is ideal for turning stations and corner converters thanks to optional reverse operation.

- 7.5 – 800 kW, versions for 200 – 690 VAC
- Current limit soft-start with initial current ramp-up
- Four different auto-adjustable ramp down profiles
- Numerous motor protection features
- Manual or remote control and password protection of parameters

VLT® Decentral Frequency Converter

The optimum variable speed drive for bottle conveyors.
For mounting on (any) motor or near the motor.
No additional installation box due to integrated T-distributor and loop-through cage clamp terminals.
Integrated Profibus or DeviceNet fieldbus interface.
Built-in optional service switch.
Optional electromechanical brake control.

- 0.37 – 3.3 kW (FCD); 0.37 – 7.5 kW (FCM)
- Mounted on the wall close to the motor, or directly on the motor
- IP 66, a corrosion resistant coating
- CE, also IEC 61000-3-2, UL, and C-tick
- Twin part design makes commissioning and service easy

VLT® Motion Control Tool MCT10

For managing drive parameter in systems, the new Motion Control Tool MCT10 is the perfect tool to handle all drive-related data.

The MCT10 offers you:
- Project orientation, one file that contains all parameters settings plus user-defined documents
- Explorer-like view, gives the user a short learning curve
- VLT® Motion Control Tool offers programming of synchronisation and positioning in the same environment: one PC tool for all tasks
- Online and offline commissioning
- Support of different interfaces RS485, RS232, USB and Profibus (plus more to come)
- Import of drive setting from Windows and DOS version of Dialog

Service you can rely on 24/7 – around the world

Sales and Service Contacts worldwide

Helping to optimise your productivity, improve your maintenance, and control your finances.

- 24/7 availability
- Local hotlines, local language and local stock

The 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.

Find your local expert team on www.danfoss.com/drives

Service features	Benefits
• 24/7 availability	– The base for efficient use of your resources and Danfoss Drives assets
• Hotline • On-site repair	– Quick response time – Reduced impact on production
• Certified repair with warranty	– More reliable production – Improved maintenance
• Start-up and commissioning	– Increased performance with on-time failure-free operation
• Application experts	– Optimises performance – Reduced life-cycle cost
• Training	– Trained resources for optimal design and maintenance
• Harmonic survey	– Prevents failure – Optimises performance
• Preventative inspection	– Reduces downtime – Lower maintenance cost
• Optimisation and retrofit	– Life-cycle optimisation
• Installed base evaluation	– Reduced capital and space bindings – Optimised availability
• Stock maintenance and consignment	– Optimised availability with effective finance planning
• Extended warranty	– Predictable budget for repair cost
• Agreed response time	– Minimises downtime
• Fixed repair and maintenance cost	– Effective finance planning for maintenance
• Drives Upgrade Program	– Long-term finance planning for technology upgrade of drives

Pick your dedicated solution from the VLT® service menu:

Keep you running
- Current drives update
- Commissioning and regular adjustments
- Preventive maintenance

Keep you fit
- Training
- Stock maintenance & consignment
- Harmonic Survey
- Environmental Disposal

Fix your costs
- Fixed Price
- Post-warranty agreement
- Transport insurance
- Response time

Environmentally responsible

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

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

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

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

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

What VLT® is all about

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

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

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

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

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

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

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

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