

ENGINEERING
TOMORROW



Gain **competitive advantages**
from concentrated expertise
and **faster innovation** cycles

Food & Beverage and Packaging Innovation Centre



Danfoss – the leading drive specialist for food, beverage and packaging

Advanced system solutions born of 40 years of experience

Danfoss is one of the leading suppliers of advanced drive systems in all sectors of the food and beverage industry. In 1968 the company launched the first frequency converter products – at that time already on trial in a large brewery.

From the start, Danfoss concentrated on certain sectors and developed its products with a focus on the special requirements of individual targets. Through many years of close cooperation with our F&B customers, Danfoss has developed a profound understanding of the characteristics of this sector and has consequently been able to follow the right trends and to set new ones. The VLT® FlexConcept®, which has been providing innovative drive solutions for conveyors and machines since 2009, is a recent example.

Food, Beverage & Packaging Innovation Centre

Danfoss currently has a wide range of drive products specifically developed for machines and transport systems in the F&B sector. Danfoss constantly emphasises optimisation and concentration and on that basis has now established the F&B and Packaging Innovation Centre in Bruchsal.

Benefits of the innovation process

With the opening of the F&B and Packaging Innovation Centre in Bruchsal, Danfoss has concentrated its expertise in these sectors in one place. Now the specialists can concentrate on the key tasks side-by-side, so that they can develop innovative interdisciplinary solutions to meet the sector's specific requirements for hygiene, energy efficiency, ambient conditions and reliability. The Innovation Centre unites experts in motor and servo technology, frequency converter technology and control technology, who work in teams and encourage each other to come up with new ideas.

Along with the global research & development centres and production facilities in Denmark, China and the US, there are now additional R&D and special test facilities available in the Innovation Centre in Bruchsal to enable rapid testing and optimisation of new solutions.

Last, but not least, assembly facilities for VLT® OneGearDrive® geared motors and VLT® Integrated Servo Drive systems are also now located at the Bruchsal site. Innovation, precision

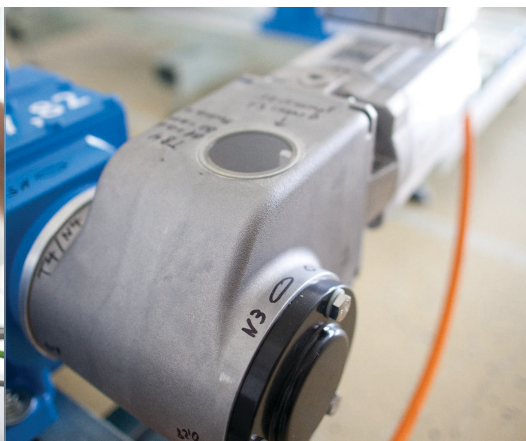
and high quality from a single source, under the same roof!

In focus: Our customers' requirements

Concentrating specific application knowledge in a centre of competence and innovation improves both internal and external communications. Only in this way can specific requirements be understood better and fulfilled more quickly.

Time to market

Regardless of whether a development project involves a standard product or a user-specific product, minimising development time is crucial in rapidly evolving markets and difficult economic conditions. With this new Innovation Centre, Danfoss offers its customers an ideal platform for achieving faster innovation cycles and shorter time to market.



Products, concepts and solutions

Combined expertise under one roof

Typical applications

Bruchsal's development activities concentrate on applications in the areas of food and beverages, pharmaceuticals and cosmetics, and the packaging industry. They focus on aspects such as high throughput with compact, modular systems, which can be optimally operated using VLT® Integrated Servo Drives, or on hygiene-critical applications for sensitive products such as the VLT® OneGearDrive® Hygienic and the VLT® Decentral Drive FCD 302 in EHEDG-certified versions.

Centralised systems, decentralised systems or a combination of the two can be implemented using VLT® FlexConcept® components, offering users the greatest possible freedom in system design and the choice of the most suitable components.

Synergetic engineering

Synergies are easier to utilise in a central R&D centre when the various disciplines are located together. It creates closer co-operation between the individual groups and development teams, as well as a unified, central infrastructure that can build prototypes quickly and effectively and can optimise solutions in close co-operation with developers.

Closer co-operation on customer-specific solutions

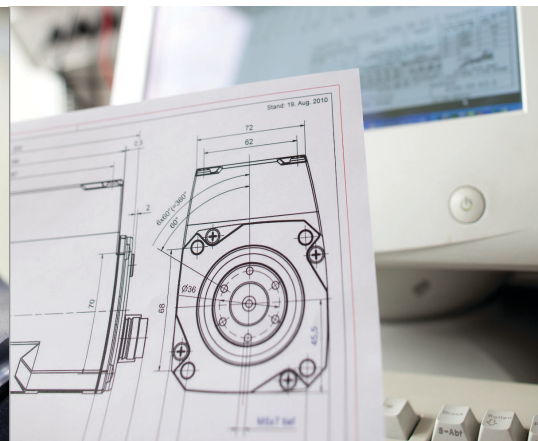
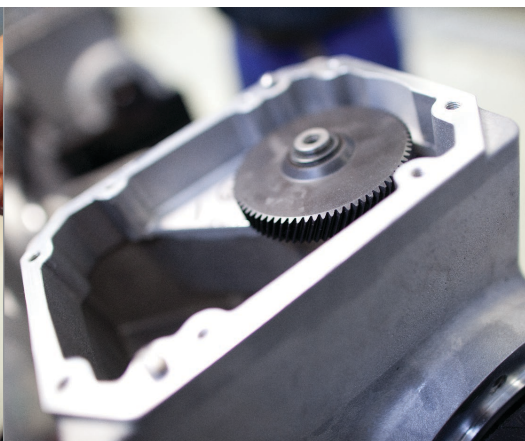
Customer-specific solutions are special and the concentrated expertise of the team significantly accelerates development. This includes analysing whether the adaptation of an existing product is appropriate, or if the Danfoss R&D department, in close co-operation with the customer, should develop a completely new solution and support it all the way to production. Customer-specific solutions can give the customer a considerable competitive advantage, perhaps by significantly reducing installation times, boosting production rates or cost-reducing an OEM's machine.

VLT® Integrated Servo Drive and VLT® OneGearDrive assembly

The Innovation Centre includes a final assembly shop for the motors and electrical components of the VLT® Integrated Servo Drive and the VLT OneGearDrive, ensuring reliable, high-quality final assembly with corresponding final inspection. Test prototypes may be produced during the development process, facilitating early optimisation of products and solutions fully compliant with Danfoss' quality requirements.

Consistent quality management

The close link between development, product planning, production-planning and final assembly allows consistent quality management across the entire process. Any defects can readily be identified and corrected in the first prototypes, before they find their way into series production. Application and product specialists are on hand to assess possible optimisation potential and receive suggestions from the production and assembly areas.



The right ingredients for the development of leading technologies

Developers and manufacturers need extensive expertise and experience to devise successful concepts, innovative products and future-proof strategies.

Diversity of variants

Plants often have 30 or more different types of installed drives, due to the diverse nature of the machines and transport systems. They differ in motor technology, capacity, gear type and gear ratio, and in ambient conditions such as wet, dry or aseptic areas. A reduction in the diversity of variants simplifies planning and commissioning and reduces spares inventory and training costs.

Hygiene

Highly sensitive products, such as bottled water and alcohol-free beer or new materials for packaging and bottles, raise the hygiene requirements in production plants. In addition to the Machinery Directive and national standards, the European Hygienic Engineering & Design Group (EHEDG) regulations are becoming increasingly important for plant design and drive engineering. Danfoss is unique in offering EHEDG and IPA certified solutions and products for use in hygiene-critical sub-systems.

High flexibility

With its open systems, Danfoss focusses on maximum flexibility for both motor technology and motor control with VLT® frequency converters which can drive both asynchronous and PM motors. All components can also be combined with existing plant equipment.

EMC compliant

The increasing use of non-linear loads including frequency converters causes higher levels of mains interference. This has an increasingly detrimental effect on the service life and operation of sensitive electronics and controls leading to the requirement to comply with the EMC limits as specified in various standards. Danfoss offers comprehensive expertise to ensure the provision of compliant products.

Speed

Short time-to-market is key to success in highly competitive markets. Extensive expertise in all the necessary disciplines, close proximity, short communication paths and access to diverse test labs dramatically shorten development times. Close co-operation between all parties in the development process ensures quick success and a solution suited perfectly to the application.





Centralised versus decentralised solutions

Centralised or decentralised – both concepts have their advantages, depending on the system structure. The application determines the design therefore it is essential for the client to carry out a precise, detailed system cost-analysis in co-operation with the drive supplier. Plant engineers and users are better served if their supplier has extensive experience with both concepts and is able to offer the right solution.

Energy efficient drives

Energy costs are continuously increasing, making energy a strategic factor. New energy-efficient technologies, such as PM motors and converters with extremely high efficiency, as well as overall plant efficiency, are gaining prominence.

Common operating concept

Even the most energy-efficient technology is useless if operating staff, maintenance technicians and plant operators don't know how to use it. Simple, safe operation of modern drive technology is still an urgent issue, demanding a consistent, graphical user interface concept that is suitable for both centralised system structures and decentralised devices. Danfoss VLT® Local Control Panel LCP cuts training costs significantly and reduces the incidence of errors, thereby increasing overall system availability.

A safer investment with low maintenance effort

The investment risk and maintenance effort of the selected solution are important considerations for users. A healthy supply of spare parts or replacement devices that can be exchanged quickly and easily to minimise downtime costs is necessary. Rapid availability of customer service from the manufacturer is also vital and operators should be mindful of options for the eventual modernisation of systems. The provisions of current and foreseeable standards, regulations and legislation, such as the EU energy efficiency regulations, are significant for long-term investment security so compliance with the relevant limits in the MEPS should be implemented.

Low Total Cost of Ownership (TCO)

TCO is today more important than first cost, considering the 10 or more year life of a drive system. Danfoss VLT drives and systems offer the lowest TCO due to their high energy efficiency, reliability, low maintenance, reduced spares inventory and global 24/7 service availability.

VLT® FlexConcept®

Energy efficient, flexible and reliable

VLT® FlexConcept® is a prime example of an innovative Danfoss solution specifically for use in the F&B industry. It uses modern technology combined with the latest motor control components. All of the components are optimally matched to each other and developed as a unified system concept for use in production lines.

Variants reduction of 70%

The system simplifies project planning, installation, commissioning and maintenance, especially for conveyor systems. System variants might be reduced by up to 70% so users benefit from maximum flexibility with a minimum number of modules, including motors, drives and frequency converters which offer an unified

operating concept and standardised functionality regardless of whether the system is implemented with a centralised or decentralised structure, in dry, wet or aseptic areas.

Optimised for hygiene-critical systems

The VLT® FlexConcept® is currently the only solution on the market that provides EHEDG-certified components specifically intended for use in hygiene-critical sub systems. The motors are also certified by the Fraunhofer Institute IPA for direct use in cleanrooms.

Highest energy efficiency

Danfoss focussed on ensuring maximum energy efficiency in the devel-

opment of the VLT® FlexConcept®. Every component of the concept offers very high efficiency and fulfils all current user requirements as well as new EU regulations regarding motor use and efficiency.

More flexibility for new systems, replacement and retrofit

In line with the open system architecture of the VLT® FlexConcept®, users can easily and reliably combine components with existing solutions from other manufacturers. This means that they can always find and implement the best possible configuration.

VLT® Integrated Servo Drives

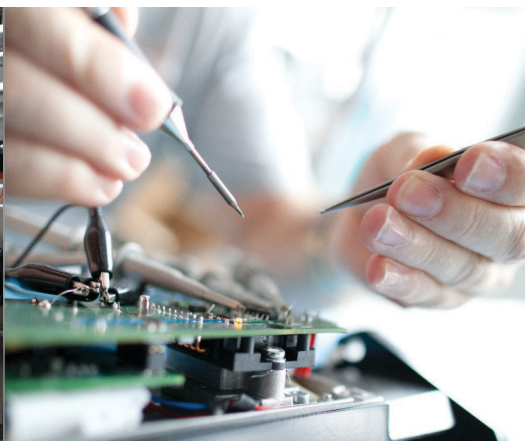
Precise, fast and flexible

Increased productivity, higher accuracy and greater flexibility

VLT® Integrated Servo Drives are another example of product development carried out in part in the Innovation Centre or its predecessor. They are an affordable solution designed for highest performance and maximum flexibility for a variety of drive tasks, specifically in F&B packaging.

The VLT® Integrated Servo Drive ISD 410 combines high performance permanent magnet (PM) synchronous servo motors and drive electronics in a single enclosure. The ISD servo drive fulfill requirements from high machine complexity, a variable number of axes and a modular machine structure. Where machines or installations

allow the use of decentral drive systems, this compact concept reduces installation time and saves space and costs. The open system architecture with CAN interfaces and programming based on IEC 61131-3 CoDeSys makes for higher flexibility and faster commissioning and simplifies project planning.



Innovation Centre Integrated within the global Danfoss Power Electronics business

In addition to the benefits that customers will experience within product development, support and assembly, the Innovation Centre is fully integrated into the global structure of Danfoss Power Electronics. With global research & development centres and production facilities in Denmark, China and the US, customers are assured both the worldwide support and reliability of a true global partner.

International production centres

Power Electronics has several development and production centres around the world. In each of them the developers concentrate on a particular product area, where everything converges. This ensures an intensive exchange between product specialists and guarantees customer-oriented optimisation and the enhancement of drive systems – always with a strong focus on energy efficiency, ease of use and optimum performance for the target industry sector.

In-house power module development

Danfoss is one of the few players in drive technology that develops its own silicon power modules - a major advantage of our integration into power electronics.

Danfoss utilises in-house expertise to produce and refine the core element of drive technology: IGBT and rectifier modules. In this way, Danfoss retains full control over the quality and performance of all components used.

A clean-tech enterprise

For over 78 years Danfoss has given priority to saving energy and conserving our planet's valuable resources with its products.

In recent years, the Group has intensified its transformation into a clean-tech enterprise that strives to reduce the environmental footprint of its production processes. All products in the Danfoss Power Electronics business area significantly reduce CO₂ emissions and energy consumption in production plants and buildings, all benefitting our environment.

Green engineering

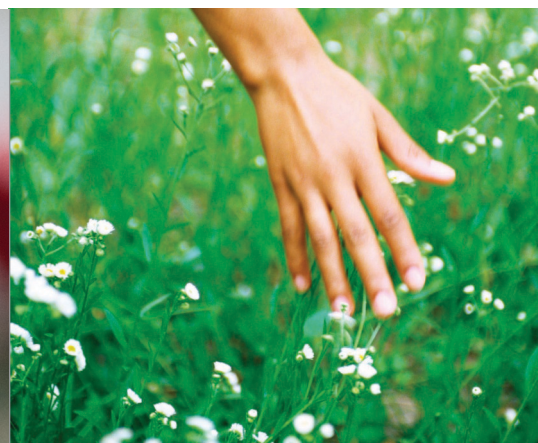
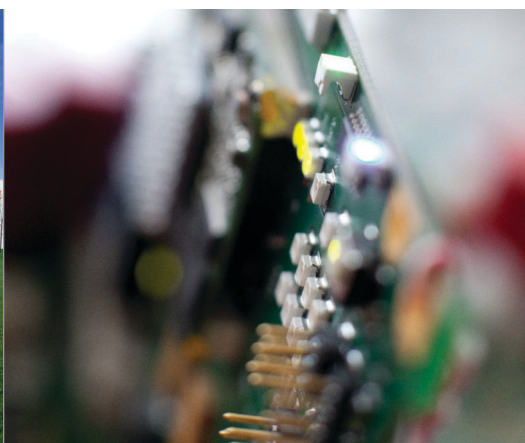
Danfoss Power Electronics is firmly committed to green engineering. How can products be produced with minimal impact on the environment? Can products contribute to meeting energy needs or increasing energy efficiency in plants and systems? Our developers and engineers consider these questions on a daily basis in the design and development of new products or the optimisation of established solutions.

This assures users that with Danfoss products they always have the latest technology and they can increase the energy efficiency of their plant, thereby achieving sustainable competitive advantages.

Danfoss raises the quality bar

Danfoss Power Electronics places great emphasis on the highest quality and reliability of its products. The innovation centres serve the interests of quality assurance and quality monitoring for focused product areas, such as the centre in Bruchsal for products in the F&B and packaging industry.

In many cases, the internal quality standards of Power Electronics division are significantly higher than the industry standards. This guarantees users that Danfoss products will perform as expected and contribute to safe production and the highest system availability.



What VLT® is all about

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

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 pre-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 VLT 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 our annual production of VLT® drives will save the energy equivalent to the energy production from a major power plant. Better process control at the same time improves product quality and reduces waste and wear on equipment.

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®.

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

Intelligent and innovative

Developers at Danfoss VLT 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 VLT Drives' experts located in more than 100 countries are ready to support our customers with application advice and service wherever they may be.

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

