

ENGINEERING
TOMORROW



VLT® FlexConcept®

Energy-efficient, flexible and reliable
drives **solutions** for the future

Up to
70%
reduction in number
of variants with
VLT® FlexConcept®

drives.danfoss.com



VLT® FlexConcept®

– efficient drives solutions for the future

Modern manufacturing regimes need higher efficiency, more flexibility and greater reliability in their drive systems than ever before – all necessary to reduce manufacturing costs.

To meet that need, Danfoss has developed the VLT® FlexConcept® – a modern, contemporary drive system using modern motor technology, combined with the most advanced inverter drives and developed as an unified system.

Highest efficiency

The most efficient AC drives in the world, coupled with high-reliability geared motor units with IE5 ultra premium efficient permanent magnet motor is the ideal drives solution for every high-volume manufacturing facility.

Drives – your choice

Danfoss VLT® drives offer the flexible choice of drives for centralized location in control rooms or decentral units for mounting directly onto the conveyor giving you greater flexibility in plant design and maintenance.

Meets the toughest hygiene regulations

To meet the specialized wash-down needs of hygiene-specific conditions such as in food and beverage plants, the geared motor units VLT® OneGearDrive® have been created

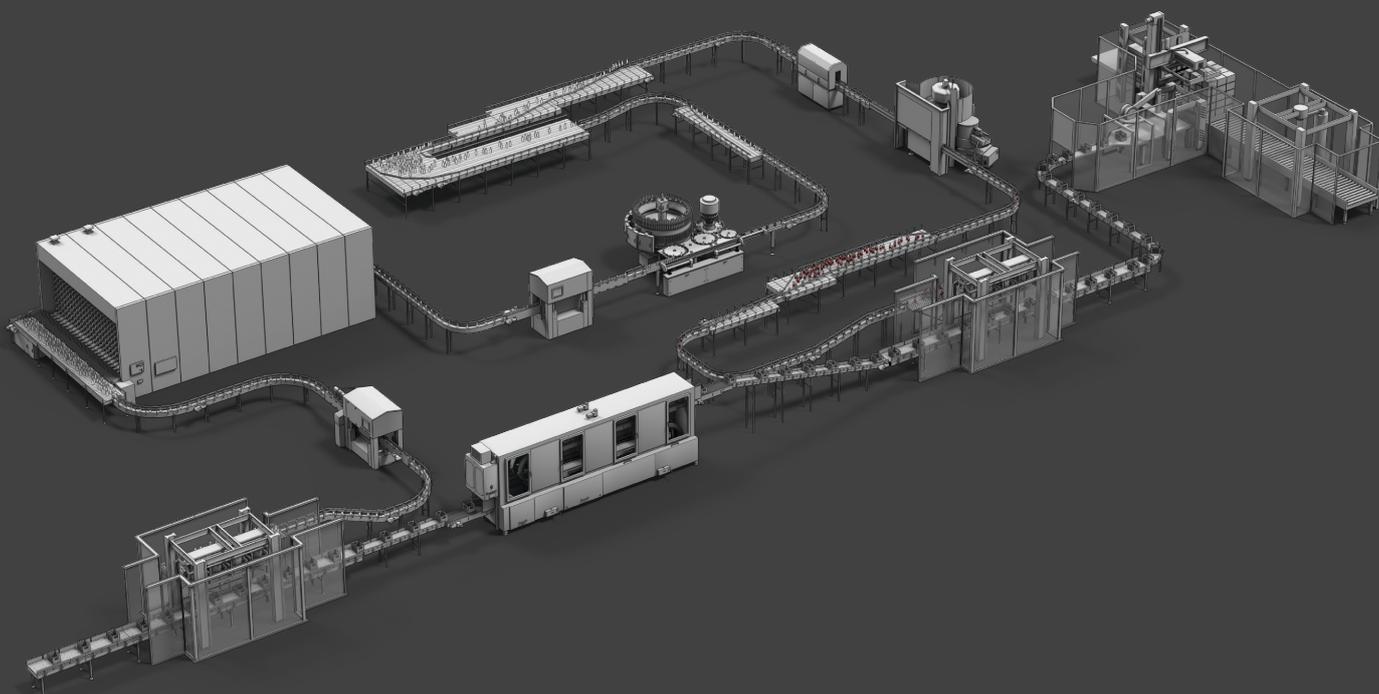
with a smooth crevice-free design that leaves no hiding place for germs or food contamination. At the same time, the durable coating applied to both the VLT® OneGearDrive® and the VLT® Decentral Drive FCD 302 has been designed to withstand the harshest cleaning chemicals and processes, ensuring effective wash-down with no detriment to reliability.

Reduced spares holding

The variety of drive solutions available to the manufacturing industry is greater than ever before, which can result in substantial spares holdings and increasing costs in storing and maintaining those spares. VLT® FlexConcept® cuts through this problem at a stroke and can reduce the number of drive variants by up to 70%.

Drives solutions

for dry, wet, aseptic and hygiene-critical areas



Fewer variants – increased freedom of choice at reduced cost

With fewer variants, VLT® FlexConcept® simplifies project planning, installation, commissioning and maintenance, especially in conveyor applications, irrespective of whether a centralized or decentralized plant design is required.

The system components provide the user with maximum flexibility with a minimum number of units – i.e. gear motors and AC drives, which offer a unified operating design and standard functions.

Variant reduction up to 70%

VLT® FlexConcept® offers the highest level of flexibility in selecting drive components and system structures, regardless of whether the system is to be centralized or decentralized or

whether the drives are destined for use in dry, wet or aseptic areas. The overall number of system variants could be reduced by up to 70%.

Maximum energy efficiency – lowest running costs

Maximizing energy efficiency has been a prime focus in the development of VLT® FlexConcept®.

All the components guarantee a high level of efficiency and either meet or beat the new EU regulations relating to

motors and their use in systems, as well as in the retrofitting or modernization of existing systems. With an efficiency of 94.9% the motor achieves the highest efficiency class IE5 Ultra Premium defined in IEC TS 60034-30-2.

Open system architecture

The open system architecture of the VLT® FlexConcept® allows users to meet the demands of a new system development or a retrofit project by combining with available solutions from other controls vendors to implement the best configuration possible.

This eliminates any dependence on a single supplier while maximizing system efficiency and control flexibility.

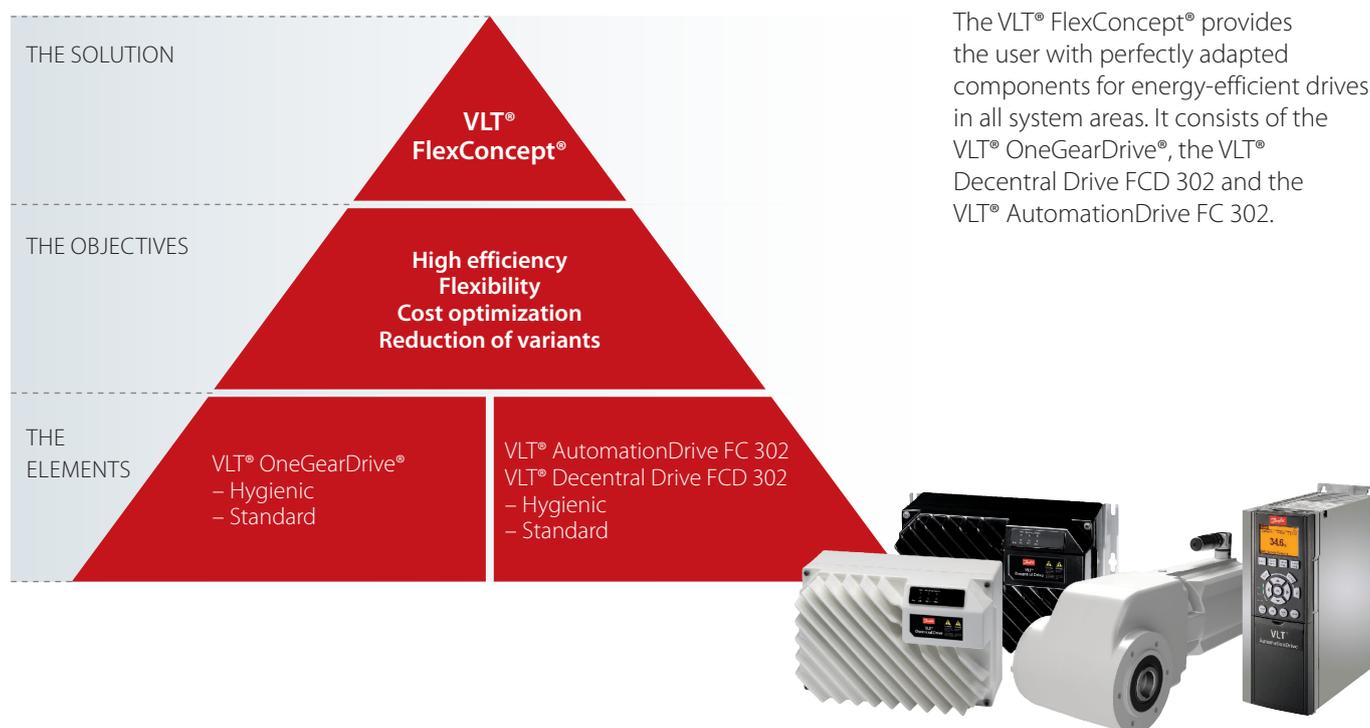
Feature	Customer benefits
Operation of AC and PM motors	Manufacturer independence; suitable for simple or dynamic applications
Centralized or decentralized	Flexible system planning; simple integration of existing system parts
Open-loop operation	Simple cabling; cost reduction
Closed-loop operation	Synchronization of dynamic band sections and machines
Equal parameter structure and operation	Reduced training expenditure; same display and PC software for parameterization; text in national language for rapid diagnosis
Safety function	No costly protective combinations required; high level of operating safety and system availability
Enclosure type up to IP69K	Use in all system areas. Flexibility also in retrofits
High system efficiency of up to 89% (including gearbox) VLT® OneGearDrive® together with VLT® AutomationDrive FC 302	Significant reduction of TCO cost compared to conventional systems
Worldwide support	Worldwide Danfoss service

VLT® FlexConcept®

– quicker and more cost effective

Effective, ongoing cost reduction requires drive solutions that significantly reduce running costs and the adoption of the latest, high-efficiency technology by both the operator and the system manufacturer.

They should also aim to optimize installation, commissioning, maintenance and service costs by optimizing staff resources and maximizing system availability.



The VLT® FlexConcept® provides the user with perfectly adapted components for energy-efficient drives in all system areas. It consists of the VLT® OneGearDrive®, the VLT® Decentral Drive FCD 302 and the VLT® AutomationDrive FC 302.

4 points of cost optimization

High efficiency

All the drives used in the VLT® FlexConcept® stand out for their high level of efficiency and energy savings. The ultra premium efficient PM motor meets the highest efficiency class defined in IEC TS 60034-30-2 in a smaller frame size than current induction motors. Efficiency is maximized in the system as a whole by the matched design of the motors and the inverters.

Fewer variants

Conveyor solutions can be offered with a vastly reduced number of variants by careful motor selection and optimal AC drive adoption, even in large systems.

This in turn affords a smaller spare parts inventory, particularly for larger systems, along with reduced storage costs and faster component availability compared to current standard drive solutions.

Lower training and maintenance costs

Training expenditure and maintenance staff requirements are greatly reduced by the unified operating design and standard operating scope of VLT® drives, in addition to the simple connection of the VLT® OneGearDrive® Hygienic drive motors via stainless steel connectors.

Flexibility

Easily and reliably combine components with existing solutions from other manufacturers on both centralized and decentralized systems.

The open system architecture of the VLT® FlexConcept® means that standard, geared and PM motors can all be controlled and operated at high efficiency by Danfoss VLT® drives.

Centralized or decentralized – always the right solution

The choice of a centralized or decentralized drives solution is not always that clear cut. Both solutions offer advantages depending on the system structure.

The choice of solution relies upon a variety of factors such as spatial and environmental conditions, the extent of the system and the acceptability to the end user. Economic aspects also figure, such as cabinet or control room costs compared to cabling expenditure.

Application-dependent design

Ultimately, the application dictates the system design. It is essential to engage with the drives supplier to conduct an accurate, detailed system cost analysis. Since service staff and technicians will have to gain familiarity with the technology adopted, acceptability by the end user is critical.

Both solutions include the option of shifting the system intelligence to the individual drives. Such a shift increases

efficiency depending on the drives functionality required.

The solution for both designs

VLT® FlexConcept® perfectly meets the needs of both centralized and decentralized systems, ensuring the use of components perfectly adapted to the system structure.

VLT® drives are compact and available with enclosure ratings from IP00 to IP69K. All VLT® FlexConcept® drives benefit from unified operation and are matched to common filters and coils and provide the same interfaces and use the same parameterization software.

The geared motor units are available with FDA compliant aseptic paint designed for the food and beverage in-

dustry. For direct use in hygiene-critical production areas, all the components are resistant to aggressive detergents in the range pH 2..14 to guarantee optimal hygiene with long-term reliability.

For retrofit applications, all VLT® Flex-Concept® components are compatible with existing industry standard system components, including PM motors.

A cost-effective integrated solution

VLT® FlexConcept® provides system manufacturers and end users with a fully integrated drive solution. Costs are reduced at the planning stage since documentation, training, and spare parts and storage requirements are all reduced, thanks to the unified drive operating structure.



IPA certification – for hygiene-critical areas

Hygiene requirements are extremely strict in areas where machines come into direct contact with products in food and beverage production equipment, and in areas in which an increased risk of contamination exists for exposed food and beverages.

Meets current hygiene legislation

Legislation demands that all component construction design must be adapted as effectively as possible to the manufacturing process and the product flow in the food sector.

The materials used must not have any influence on the food (e.g., by the migration of material components) and must all be easy to clean (hygienic design).

IPA certified

The VLT® OneGearDrive® is IPA certified by the Fraunhofer Institute for use directly in clean rooms. All VLT® FlexConcept® components are matched to each other to ensure rapid commissioning and the optimum efficiency of the overall solution.

Smooth surfaces resistant to cleaning materials

Absolute cleanliness demands components with extremely smooth surfaces and no hiding place for germs or contamination. This permits the free flow of liquids and the easy removal of residual products and the prevention of contaminant build-up.

All VLT® FlexConcept® components for installation directly on the production floor are finished with perfectly smooth surfaces and the motors and gears mate with a seamless, crevice-free fit. These components are resistant to all standard detergents and disinfectants of pH 2..14.

The VLT® OneGearDrive® is designed without fans and the gears are filled with special oil suitable for the food sector.

The hygienic version of the VLT® OneGearDrive® is always supplied with a V4A stainless steel shaft and the shaft end is protected with a cover (Stainless steel shaft for the Standard version as an option possible).



A cover is always provided for protection and to complete the hygienic design.



Special screw connections and stainless steel screws provide extreme reliability in hygiene-critical areas.



CleanConnect™ stainless steel connectors provide simple, safe connections even during replacement work.



Six LEDs indicate the current device status of the VLT® Decentral Drive FCD 302.

Access all areas – **robust, reliable and clean**

Wet and hygiene-critical areas

VLT® FlexConcept® offers distinct advantages in wet production areas. The VLT® Decentral Drive FCD 302 enclosure, along with the matched, geared motor enclosure, fulfills the requirements of DIN 1672-2 Hygienic Design and all enclosures are designed to IP66/67 and IP69k. The system components offer no hiding place for contaminants or harmful micro-organisms such as bacteria, yeast or fungus.

The smooth, fan-free design of both motors and drives avoids the circulation or distribution of dirt particles and germs and eliminates the possibility of aerosol formation and the subsequent contamination of products under manufacture, making them ideally suited for use in wet production areas.

A positive benefit of mounting the VLT® Decentral Drive FCD 302 close to the motor is the cable reduction. This not only saves space but eliminates electromagnetic interference with other system components.

A typical combination might be a VLT® OneGearDrive® with a VLT® Decentral Drive FCD 302.

In a centralized system, a VLT® AutomationDrive FC 302 with the same unified control strategy would be used with the VLT® OneGearDrive® as it could support up to 300 m of unshielded cables or 150 m of shielded cables.

be the efficient, compact VLT® OneGearDrive® Standard with either a VLT® Decentral Drive FCD 302 or a VLT® AutomationDrive FC 302 mounted centrally. This drive solution could be equipped with a motor-mounted brake particularly on conveyor belts with inclines or declines.

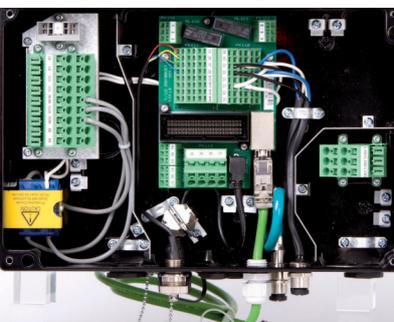
VLT® Decentral Drive FCD 302 is completely flexible and can be used in wet, dry and hygienic areas mounted close to the motor directly onto the conveyor. The matrix below gives an overview of the recommended combinations of motors and drives for differing production areas.

Dry areas

For conveyors in dry areas, a standard VLT® FlexConcept® solution would

	VLT® OneGearDrive® Standard	VLT® OneGearDrive® Hygienic	VLT® Decentral Drive FCD 302 Standard	VLT® Decentral Drive FCD 302 Hygienic	VLT® AutomationDrive FC 302 IP00/IP20	VLT® AutomationDrive FC 302 IP55/IP66
Dry area	■	○	■	○	■	■
Wet area	■	■	■	○	■ ¹	■
Hygiene-critical area	○	■	○	■	■ ¹	■ ¹

¹ Mounted on panel outside hygiene-critical area/wet area.



The FCD 302 connection box with integrated T-distributors allows for rapid installation and commissioning.



The VLT® OneGearDrive® Standard with a terminal box (an optional brake is available).



The VLT® AutomationDrive FC 302 is available for centralized installation.



For simple parameterization, LCP 102 (the graphical control unit of the FC series) can be connected.



Proven **experience**

Today's food and beverage production lines need higher efficiency, more flexibility and greater reliability in order to achieve effective and ongoing cost reductions. The VLT® FlexConcept® conveyor solution combines integrated modern motor technology with the latest motor control components to create a coordinated, standardized

system that optimizes energy consumption and minimizes maintenance costs.

The open system architecture allows users to meet the demands of a new system development or a retrofit by combining with solutions provided by other vendors to implement the best

configuration possible. This eliminates any dependence on a single supplier.

The VLT® FlexConcept® consists of:

- VLT® OneGearDrive®
- VLT® DecentralDrive FCD 302 and/or
- VLT® AutomationDrive FC 302

Reduce spare-part inventory by **up to 70%**

Nestlé Vera Naturae, Castrocielo, Italy



Read the story

Up to 42% energy savings on glass bottle filling line

Molson Coors' Borsodi Brewery, Hungary



Read the story

>30% increase in conveyor efficiency

Peroni Brewery, Italy



Read the story

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