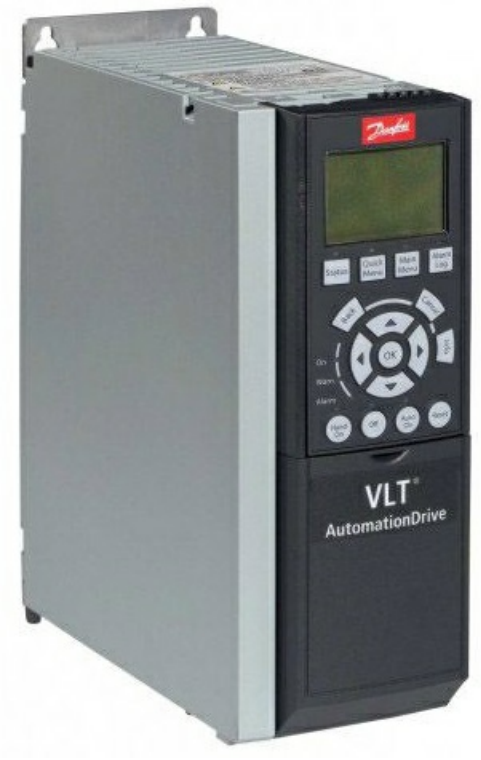
Danfoss FC 301 VLT Automation Drive

Danfoss FC 301 VLT Automation Drive Installation Guide

Contents

Danfoss FC 301 VLT Automation Drive



Product Information

Specifications:

- New brewhouse
- Stainless steel fermentation and storage tanks
- Extensive piping system
- **Capacity:** 120-280 KEGs per hour
- **Capacities:** 10 to 50 litres

Product Usage Instructions

Brewing Process:
The new brewhouse and fermentation tanks allow for the production of specialty beers using traditional methods like cold fermentation and prolonged cold aging under hygienic conditions.

Filling Line:
Ensure that the fully automated KEG filling system is integrated seamlessly into the structure to reduce travel distances. The system handles tasks from cleaning to palletizing, resulting in efficient and hygienic filling of KEGs with specialty beers.

Maintenance and Cleaning:
Regularly clean and maintain the system to ensure optimal hygiene and product quality. Use disinfectants with pH values in the range of 2-12 for cleaning purposes. All motors and components have smooth surfaces to prevent dirt accumulation.

FAQ:

- **Q: What is the capacity of the filling line?**

  A: The filling line can handle 120-280 KEGs per hour with capacities ranging from 10 to 50 liters.

- **Q: Can different types of beers be filled using this system?**
  A: Yes, the system is designed to fill KEGs with different types of beers, ensuring all necessary data like type, ingredients, and expiry date are marked on the plastic covers.
- **Q: How energy-efficient is the new system compared to the previous one?**
  A: The new system allows for increased filling capacity without consuming more energy, maintaining an environmentally responsible approach.

Introduction

- By installing a new KEG filling line using VLT® OneGearDrive® geared motors, frequency converters from the VLT® Automation-Drive series, and VLT® Decentral Drives, Rothaus AG has increased its filling capacity from 120 – 280 KEGs per hour with fewer drive types, and without increasing overall energy consumption.
- Tannenzäpfle, Eiszäpfle, and Weizenzäpfle, to mention just a few of the well-known beers produced by Badische Staatsbrauerei Rothaus AG, have an excellent reputation among beer connoisseurs. The brand image, along with the girl from the Black Forest and the Norway Spruce cones, are also well known beyond the boundaries of Baden-Württemberg. The brewery was founded in the inn “Zum Rothen Haus” in 1791 by Prince-Abbot Martin Herbert II of the Benedictine monastery of St. Blasien and is currently one of the most modern breweries in Germany.
- Superior product quality was the brewery’s highest priority even then, and this tradition has been upheld over the years. The firm therefore focuses on optimum hygiene and advanced production processes, which have required large investments in modern process technology over several years.
- They include a new brewhouse, stainless steel fermentation and storage tanks, and extensive new piping. This allows the specialty beers from the Hochschwarzwald region to be produced using traditional methods such as cold fermentation and prolonged cold aging under optimal hygienic conditions.

Previous experience with Danfoss proven savings potential

- Project manager Ralf Krieger and Filling Manager Roger Jäger, aided by their teams, selected Danfoss products for the drive systems of the new plant.
- “We have used Danfoss frequency converters with success for several years and knew there was a potential to reduce the number of drive types in our production. The VLT® FlexConcept® also helps us to reduce our spare parts inventory,” explains Ralf Krieger, who also took the opportunity to start testing Danfoss VLT® OneGearDrive®.

The components used in the VLT® FlexConcept® have proven their worth in the plant up to now. All motors and frequency converters operate reliably, and their designs offer many benefits compared to conventional drives.

Ralf Krieger, project manager, Rothaus AG

In early 2011 a new, fully automated keg filling line that handles everything from cleaning to palletising was put into service. It is optimally integrated into the overall structure and reduces path lengths

“The KEG filling system also serves as a test system for the hygienic version of the VLT® OneGearDrive®. Although these permanent magnet (PM) motors are not necessarily required in the plant, we decided to fit 25 of them in the wet area to test their long-term behavior,” he continues. The VLT® OneGear-Drives® Hygienic are controlled by 25 VLT® AutomationDrive FC 302 units, which are housed centrally in an electrical cabinet.

Fully automated filling from cleaning to palletizing

- The new, fully automated KEG filling sys-tem was put into service in early 2011 and replaced an outdated

system. As a result of repeated investments and plant remodeling, the route traveled by the beer on its way to the filling stage had become longer and longer in the old plant.

- The new filling line was integrated seamlessly into the overall structure and reduced travel distances.
- “The new filling line is fully automated; the only task that requires manual effort is sup-plying pallet stacks with 6 KEGs on each pallet to the infeed using a stacker. After this, the stainless steel KEGs, which are fitted with RFID tags for quality control and tracking, pass through the entire system automatically. A robot turns the KEGs over with the valves facing downward and places them on a conveyor belt. The KEGs are cleaned on the outside and then automatically emptied and weighed,” explains Ralf Krieger.
- Only empty KEGs are transferred to the three parallel machines, supplied by the plant engineering firm Albert Frey, which handles the tasks of thorough internal cleaning, rinsing, and sterilization followed by filling with beer. The filled KEGs are turned over and fitted with plastic covers marked with all important data, such as the type, ingredients, and expiry date, after which the finished KEGs are palletized by a robot. An automatic pallet truck then transports the freshly filled KEGs of Rothaus specialty beers on pallets to the Rothaus brewery finished goods stock-room.

System architecture

- “We decided to build a centralized system architecture in the wet area of the plant, with the VLT® Automation Drive FC 302 frequency converters housed in a central electrical cabinet. The modular units were mounted directly side by side for compact installation,” says Ralf Krieger.
- The standard induction motors in the dry area of the palletiser are controlled by 40 VLT® Decentral Drive FCD 300 units.
- The compact dimensions of the frequency converters facilitate their installation in the plant. They are fitted with covers to protect them against falling KEGs.
- The decentral drives are powder-coated and are therefore easy to clean. Angled cooling fins and smooth surfaces ensure easy and reliable drainage of cleaning liquids. Five LEDs indicate the drive status at all times, and a connectable display enables easy diagnosis.

Integrated components ensure efficiency

Another advantage of the Danfoss system is that the necessary EMC filter and mains chokes are factory-fitted in all Danfoss VLT® frequency converters as integrated components. This saves even more space in the cabinet, which can be helpful in situations such as retrofitting existing plants, where space is usually limited.

The 25 VLT® OneGearDrive® Hygienic PM motors with high-quality coatings provide optimum protection of the drives against detergents and disinfectants and deliver optimum efficiency

As a result, the cabling effort is reduced while enabling the VLT® frequency converters to comply with the applicable limits in the plant. The filters are also taken into account in the high-efficiency figures, which are 98% or better. In practice, this translates into less heat dissipation and enables energy-efficient operation of the drives. The VLT® AutomationDrive FC 302 supports long motor cables as standard, which is extremely helpful in beverage plants with a centralized system structure. This eliminates the need for extra output filters as long as the cable length does not exceed 300 meters with unshielded cable or 150 meters with shielded cable, which reduces costs even further.

Energy costs unaffected by production boost

The new solution has enabled Rothaus to boost filling capacities from 120-280 KEGs per hour with capacities of 10 to 50 liters. Impressively, the larger plant does not consume more energy than the previous plant.

Modernization of the plant also boosted filling capacity from approximately 120 kegs per hour to as much as 280. The filling line is fully automated; the only task that requires manual effort is supplying pallet stacks with 6 kegs on each pallet to the infeed using a stacker

“The components used in the VLT® Flex-Concept® have proven their worth in the plant up to now. All motors and frequency converters operate reliably, and their designs offer several benefits compared to conventional drives. The equipment may optionally be operated in a centralized, decentralized, or combined structure. All drives are designed for extremely high energy efficiency and provide a good starting point for us to consider other projects with Danfoss products,” concludes Ralf Krieger.

Contact:
Dieter Kiefer Food & Beverage sales engineer Danfoss GmbH VLT Antriebstechnik

Pallet transport motors in the dry area are controlled by 40 VLT® Decentral Drive FCD 300 units. They are fitted with covers for protection against falling kegs.

About VLT® FlexConcept®
The VLT® FlexConcept® used at Rothaus AG is specifically aligned with the requirements of plants in the food and beverage industry. It utilizes advanced technology in the form of PM motors, which have inherently high

energy efficiency thanks to the permanent magnets in their rotors. The VLT® OneGearDrive® also has an especially wide speed range. Together with three gear ratios and optimal matching of the VLT® frequency converters to the motors, users can implement all drive tasks in the plant with a significantly smaller number of versions, resulting in significant savings in the spare inventory.

Hygienic design
All motors, as well as the frequency converters designed for use directly in the plant, have extremely smooth surfaces. This avoids recesses in which dirt could collect or deposits of product residues could form. The gear unit also mates seamlessly with the motor. This allows all detergents and any product residues to flow off easily, thereby preventing the formation of product residue deposits. Disinfectants with pH values in the range of 2..12 may be used.

EHEDG certified
Cleaning is easy because the IP66 or even IP69k enclosure design allows the motors to withstand typical cleaning processes, including high-pressure cleaning. For areas with especially stringent hygiene requirements, such as the aseptic filling of sensitive products, the units are available in an EHEDG-certified version – presently unique in the drive market. An optional antibacterial paint provides even better protection for sensitive foods and beverages.

What VLT is all about

Danfoss VLT Drives is the world leader among dedicated drive 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 standards. All products fulfill 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 prod-uct 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 keyword 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.

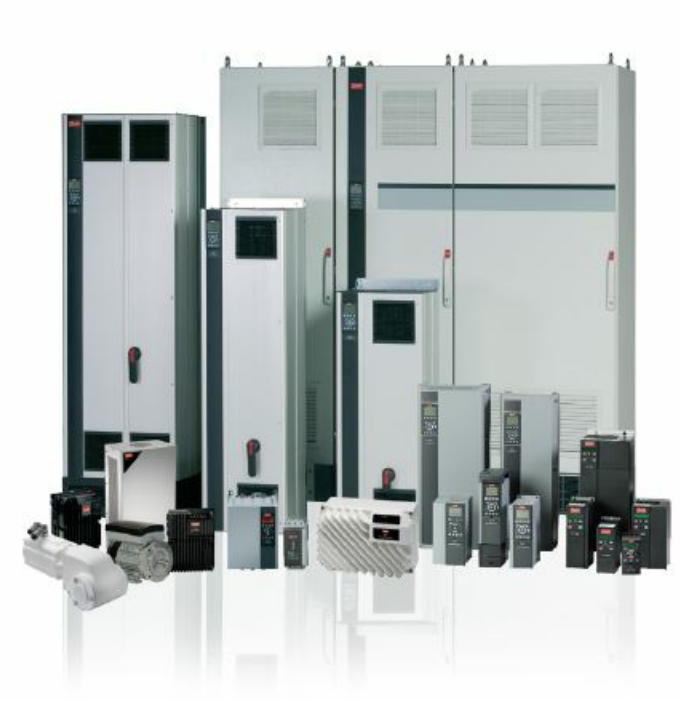
Intelligent and innovative

- 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 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 applica-tion advice and service wherever they may be.
- Danfoss VLT Drives experts don’t stop until the customer’s drive challenges are solved.



Documents / Resources

	Danfoss FC 301 VLT Automation Drive [pdf] Installation Guide FC 301, FC 301 VLT Automation Drive, VLT Automation Drive, Automation Drive, Drive
	Danfoss FC 301 VLT Automation Drive [pdf] Datasheet FC 301, FC 302, FC 301 VLT Automation Drive, VLT Automation Drive, Automation Drive, Drive
	Danfoss FC 301 VLT Automation Drive [pdf] Installation Guide FC 301, FC 302, FC 301 VLT Automation Drive, VLT Automation Drive, Automation Drive, Drive
	Danfoss FC 301 VLT Automation Drive [pdf] Installation Guide FC 301 VLT Automation Drive, FC 301, VLT Automation Drive, Automation Drive, Drive
	Danfoss FC 301 VLT Automation Drive [pdf] Instruction Manual FC 301 VLT Automation Drive, FC 301, VLT Automation Drive, Automation Drive, Drive

References

- Global AC drive manufacturer - Danfoss Drives | Danfoss
- MyDrive® ecoSmart
- Global AC drive manufacturer - Danfoss Drives | Danfoss
- Drives | Danfoss Global Product Store
- Engineering Tomorrow | Danfoss
- Danfoss - Engineering tomorrow | Danfoss
- Global AC drive manufacturer - Danfoss Drives | Danfoss
- Engineering Tomorrow | Danfoss
- Drives knowledge center | Danfoss
- Search | Danfoss
- Search | Danfoss
- User Manual