

Compact filling machine for the cosmetics industry

Best-in-class automation performance for contract packaging applications

For 35 years, groninger & Co. GmbH based in Crailsheim, Germany, has been a successful developer and manufacturer of highly automated filling equipment for the pharmaceutical and cosmetics industries. In line with its international expansion, the company has built a second manufacturing site in Charlotte, North Carolina, and presented in early 2015 its first new development for the US market at the WestPack trade show in Anaheim, California. The lite-F machine features high precision and speed. As a compact system with low space requirements and a competitive price point, it focuses in particular on the growing contract packaging market.

The new lite-F is the first machine built by groninger USA. It was designed for contract packaging applications and small-batch production runs.





The filling system of the lite-F used Groninger's proven positive displacement pumps for high-accuracy applications.

The machine portfolio of Groninger covers a broad spectrum of functionalities that includes not only the actual filling process, but also the cleaning and sterilization of containers as well as the capping, handling, labeling and storing of goods.

Until a few years ago, all Groninger machines were made in Germany and exported all over the world from there. Groninger USA initially operated only as a sales and service office for the German parent company. This changed in 2013, when the company also started to design and build machines in Charlotte, North Carolina. This step had been preceded by strong sales growth paired with an increase in local upgrades and retrofits of older machines as well as other services. "This gave rise to the idea of manufacturing machines in the US, which recently culminated in the introduction of the lite-F series," recounts Stefan Winzinger, Electrical and Automation Engineer at Groninger USA.

Maximum functionality at an affordable price

The lite-F machine was designed predominantly for non-sterile or non-aseptic filling processes and meets the price and performance needs of contract packaging companies and startups as well as of small batch production runs. The transfer system of the filling machine is designed as a conveyor loop with and without pucks. An alternating gate can be adjusted to suit a wide range of container sizes. The lite-F can transport two objects simultaneously, i.e. handle double-filling, and the fill volume in each bottle can be easily adjusted. "Being competitive in the rapidly growing contract packaging segment requires innovative automation technology that offers maximum functionality and high repeat accuracy at an affordable price point," explains Stefan Winzinger. "With the lite-F, a contract packaging provider who must handle 10 different product types in a single shift, for example, does not need a significant equipment investment in order to achieve the required throughput," adds Dave Gozlan, Groninger's business development manager.

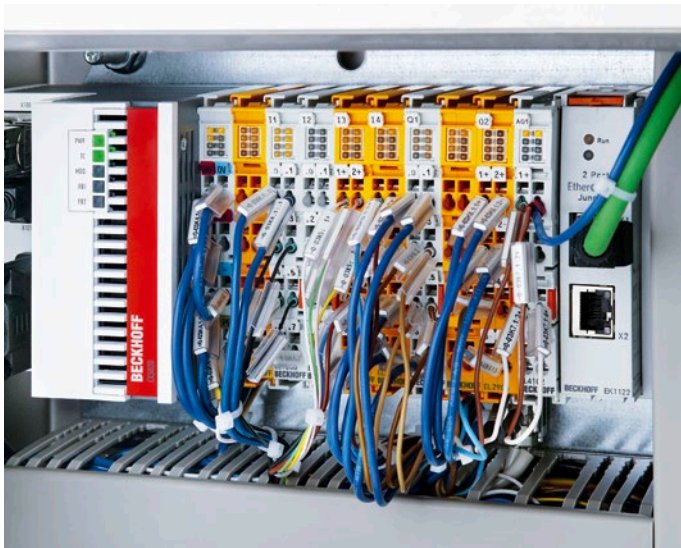
TwinCAT 3 as the universal control platform

When the developers at Groninger USA designed the lite-F machine, they decided to use the Beckhoff PC-based automation solution: "Technological standardization and cost control were the decisive factors," says Dave Gozlan. The control platform on the lite-F is a CX5020 Embedded PC running TwinCAT 3 automation software. "The CX5020 features an outstanding price-to-performance ratio, has ample processing power and is upgradeable," says Stefan Winzinger. "As the central hardware component, it controls PLC, HMI, motion control and safety technology, which eliminates the need for separate expensive hardware devices."

The lite-F ships with a multitude of multimedia-based reference materials, including video tutorials for installation, operation, setup of connected devices and troubleshooting. Using the PC-based control platform, Groninger can offer its customers web-based services, including remote support via VPN for linking the lite-F with its support department in North Carolina. Via webcam, the Groninger support team can get a clear picture of what actually needs to be done to fix a potential problem. The webcam is also used to guide the customer step-by-step through a filling process, for example when new or unusual types of bottles must be filled.

Advanced operator interface with convenient multi-touch capability

For process visualization, the CX5020 is equipped with a 12-inch CP3912 Control Panel. With multi-touch functions like zooming and scrolling, the operator can call up websites, PDFs and other documents. The lite-F's control panel, which Groninger developed in cooperation with Beckhoff, features five mechanical keys, including an Emergency Off switch. "The built-in keys save money by eliminating the need to wire connectors and install accessories in the control area. The plug-and-play design with DVI/USB ports is another welcome benefit,"



The entire filling system is controlled by a CX5020 Embedded PC via EtherCAT Terminals.



The transfer system of the lite-F is designed as a conveyor loop with and without pucks. An alternating gate can be adjusted to suit a wide range of container sizes.

says Stefan Winzinger. He adds: "And let's not forget the elegant design of the CP3912 panel, which accentuates the filling machine's style and quality."

EtherCAT makes it easy to implement customer requirements

Industrial Ethernet technology also played an important role in optimizing the lite-F's control architecture. "The EtherCAT system from Beckhoff helps us easily implement new customer requirements," says Winzinger. "If we need any additional communication interfaces in the future, we have the corresponding hardware and software gateways at our disposal."

Via the EtherCAT I/O components, which are implemented in IP 20 and IP 67 protection ratings, the entire system communication is consolidated into a single bus. "The EtherCAT Box modules in IP 67 can be mounted directly on the machine, which saves space in the control cabinet and makes cabling easier, because they can be installed much more closely to the field devices," explains the electrical engineer.

Integrated safety solution

All safety systems, including the Emergency OFF button on the control panel and the machine's protective doors, are controlled via TwinSAFE. If a hazardous situation arises, the safety system cuts the power to all drives. It can also turn off the pneumatic devices in an emergency or if someone opens the protective doors. "With the integrated TwinSAFE safety solution there is no longer a need for a stand-alone safety system and the related cabling requirements," adds Winzinger.

Lower costs, smaller machine footprint

The lite-F has achieved some impressive results since its introduction in early 2015. "The PC-based control platform and its standardized I/O system with integrated safety features save Groninger roughly 23 percent in equipment

costs and reduce the machine's footprint by over 50 percent," reports Stefan Winzinger. "This is important, because one of the detail specifications included the ambitious requirement of being able to fit the lite-F through a regular doorway without having to disassemble it. This makes the machine especially attractive to contract packaging providers with little space and restrictive infrastructures."

Best-in-class automation features will not be limited to the lite-F machine in the future. As Dave Gozlan explains, Groninger USA wants to install the PC-based control platform in all new filling systems and retrofit its older ones: "The PC-based platform from Beckhoff will also be used in other machines which we are developing and building here in Charlotte. Since the Beckhoff control solution is exceptionally scalable, it can be easily used in other machines for any process with liquid filling requirements."

Further information:

www.groninger.de/en

www.beckhoffautomation.com