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Tempting machine design – modular, control cabinet-free and connective

Manuela Kessler | 04/05/2023 | Lohr am Main / Germany | PI 016/23



Tidy and easily accessible: The modular ConfecPRO with decentralized drive technology from Bosch Rexroth. (Image source: WDS)

WDS is modularizing its confectionery machines with control cabinet-free drive technology from Bosch Rexroth. Users benefit from faster commissioning, space-saving production and optional M2M communication as far as packaging.

A modular machine design has a number of advantages for confectionery machine manufacturers: Pre-installed and tested equipment saves time and money during on-site set-up. At the same time, modules which can quickly be combined to produce customer-specific solutions have valuable standardizing effects. Decentralized drive technologies from Bosch Rexroth play a significant role here as they do not require a control cabinet and can be wired quickly and easily.

At interpack 2023, Winkler und Dünnebier Süßwarenmaschinen GmbH (WDS) will demonstrate just how effective the new modular concept is on a molding station for the ConfecPRO modular confectionery machine. It can fill up to 25 molds for chocolate, jelly or over-the-counter products per minute depending on the product and the equipment. This corresponds to an hourly output of up to three tons, with a dosing accuracy of only 0.5 percent of the average product weight.

Synchronized transport with a decentralized drive

The exacting requirements in terms of quality and productivity call not only for precision mechanics but also a powerful control system. “In larger systems, we combine up to 120 axes and 100 drives in synchronous mold transport,” said Bernd Plies, head of digitalization at WDS. “Each drive can have its own optimized movement profile.” In order to achieve this decentralization, WDS chose a combination of the control cabinet-free drive solution IndraDrive Mi and the IndraDrive MLC motion control system. “We’ve been working with Bosch Rexroth for approximately thirty years and know of no other provider with an equally sophisticated solution

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that can be integrated into our machines with such flexibility and with no additional effort – including supply units in protection class IP65.”

In this type of modular confectionery machine, the IndraMotion MLC coordinates around 40 electronically synchronized transport movements with its own decentralized drive. This way, the polycarbonate molds can be transported seamlessly through the machine using a chain drive in accordance with the loose mold principle. A warming period is followed by the first molding process with liquid chocolate. Afterwards, a shell is created using the patented Flash Shell Cooling technology which is filled again, cooled and sealed. The control unit can connect the dosing unit and other individual axes as required.

Quick ramp-up without a control cabinet

The modular design reduces the electrical installation work on site by up to 70 percent. The previous power and feedback lines to the central control cabinet are no longer needed. Instead, the individual drive modules are connected via hybrid cables using the daisy chain method. Compared to the previous machine generation, WDS now requires over 50 percent fewer supply and feedback cables. In the first ConfecPRO, the control cabinet was only 1.8 m long instead of 12 m as it was before. The latest generation now requires no control cabinet at all. The power consumption is also reduced: Replacing the former central cooling systems with decentralized enclosures featuring filter fans reduced the power required for temperature control by a total of 7.5 kW. The use of recovered energy via the DC-bus coupling of the servo system further improves the energy balance.

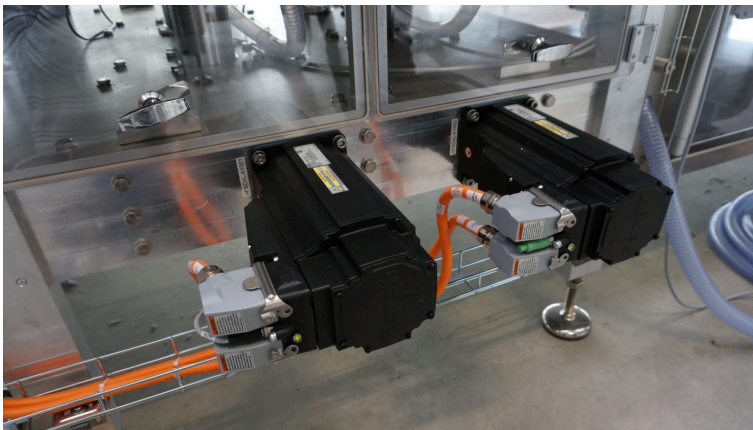
IIoT and digitalization options across the entire production line

The many connectivity options of Rexroth's control system ctrlX CORE as an edge device also helped to win over WDS. They range from vertical interfaces in accordance with the Weihenstephan Standards (WS) or PackML (Packaging Machine Language) to direct data access via ERP and MES systems and horizontal communication on the basis of OPC UA and WS Sweets, the new library in the Weihenstephan Standards. Tobias Gerhard, Business Development Fast Moving Consumer Goods at Bosch Rexroth, explained the potential that the system offers: “M2M communication makes it possible to pass the current status on to the upstream and downstream machine. Thanks to the completely transparent value stream, the whole line can flexibly adjust to new products and situations – from the preparation and the mold system to primary and secondary packaging. According to Bernd Plies, another advantage of the ctrlX CORE edge solution is the fact that it can easily be connected to the SweetConnect industry platform – an open platform ecosystem developed for the confectionery industry which will be presented by various machine manufacturers at interpack.

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Control cabinet-free: The decentralized IndraDrive Mi drive solution allows a modular construction and reduces cabling thanks to serially laid hybrid cables. (Image source: WDS)



Decentralized servo drives ensure precise forward feeding of the chocolate molds. The IndraDrive MLC motion control system synchronizes the individual transport movements. (Image source: WDS)

Basic Information Bosch Rexroth

As one of the world's leading suppliers of drive and control technologies, Bosch Rexroth ensures efficient, powerful and safe movement in machines and systems of any size. The company bundles global application experience in the market segments of Mobile and Industrial Applications as well as Factory Automation. With its intelligent components, customized system solutions, engineering and services, Bosch Rexroth is creating the necessary environment for fully connected applications. Bosch Rexroth offers its customers hydraulics, electric drive and control technology, gear technology and linear motion and assembly technology, including software and interfaces to the Internet of Things. With locations in over 80 countries more than 32,000 associates generated sales revenue of around 7.0 billion euros in 2022.

Basic Information Bosch

The Bosch Group is a leading global supplier of technology and services. It employs roughly 421,000 associates worldwide (as of December 31, 2022). The company generated sales of 88.2 billion euros in 2022. Its operations are divided into four business sectors: Mobility, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT provider, Bosch offers innovative solutions for smart homes, Industry 4.0, and connected mobility. Bosch is pursuing a vision of mobility that is sustainable, safe, and exciting. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is

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to facilitate connected living with products and solutions that either contain artificial intelligence (AI) or have been developed or manufactured with its help. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is “Invented for life.” The Bosch Group comprises Robert Bosch GmbH and its roughly 470 subsidiary and regional companies in over 60 countries. Including sales and service partners, Bosch’s global manufacturing, engineering, and sales network covers nearly every country in the world. With its more than 400 locations worldwide, the Bosch Group has been carbon neutral since the first quarter of 2020. The basis for the company’s future growth is its innovative strength. At 136 locations across the globe, Bosch employs some 85,500 associates in research and development, of which nearly 44,000 are software engineers.

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