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Efficient linear drive for tire production

Manuela Kessler | 21.03.2023 | Lohr am Main / Germany | PI 009/23



Together with the tank, safety valves and sensors, the CytroForce modules form a highly compact and efficient servo-hydraulic axis with a closed fluid circuit and an energy-on-demand and standardized drive and control concept. (Image source: Bosch Rexroth AG)

Competitive tire production must be highly flexible and able to respond quickly to volatile market demands. Manufacturers need solutions that enable them to optimize the availability of their plants, reduce their total cost of ownership, and improve their time-to-market. In process steps where higher forces are reliably required, the CytroForce hydraulic linear drive from Bosch Rexroth sets new standards in power density, energy efficiency, and quiet operation.

On account of their enhanced performance credentials, CytroForce actuators, which are robustly designed to meet IP65 protection class criteria, are redefining potential fields of application. Depending on the configuration in question, the CytroForce-M, which was the first to be launched, covers forces of up to 1,200 kN, distances of up to 1.0 m and speeds of up to 0.8 m/s. The positioning accuracy is 10 µm and the repetition accuracy is 5 µm.

With the objective of implementing highly efficient and economical solutions also for the rubber and plastics industry, Bosch Rexroth has developed CytroForce, a solution that sets new standard in efficiency, availability and usability. Possible fields of application are wherever central hydraulics are not used, e.g. for cutting tire tapes or the mixing process in rubber production.

In addition, suitable product documentation up to the 2D or 3D CAD model is available. After mechanical installation, the axes only need to be connected electrically.

Maintenance is also simple: with the help of a service kit, even non-specialist service technicians can take fluid samples for laboratory analyses. Even the refilling process, which needs to be carried out from time to time, does not require any specific expertise. The service kits are available for all Bosch Rexroth servo-hydraulic axes (SHAs), including CytroForce.

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Condition monitoring and/or predictive analytics can also be conducted by combining the system with Rexroth's ODiN service, helping to further increase the machine's availability.

The modular CytroForce is based on the tried-and-tested variable-speed energy-on-demand drive Sytronix. In the case of CytroForce, a manifold and a differential or tandem cylinder are connected to this energy-efficient unit, consisting of servodrive and hydraulic fixed or variable displacement pump. All hydraulic components and interfaces have been flow-optimized with the latest cutting-edge processes. This reduces noise emissions and increases performance whilst minimizing dimensions.

Together with the tank, safety valves and sensors, the CytroForce modules form a highly compact and efficient servo-hydraulic axis with a closed fluid circuit and an energy-on-demand and standardized drive and control concept.

"Our evolutionary solution, available from a single source, is pushing the boundaries in terms of potential applications for hydraulic self-contained actuators", says Stefan Thienen, Product Manager at Bosch Rexroth. "The cross-industry advantages provide machine and system manufacturers from practically all sectors with new and exciting prospects and the potential to implement improvements with regard to presses, machine tools and many other applications."

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 Applications, Machinery Applications and Engineering, and Factory Automation. With its intelligent components, customized system solutions 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 31,000 associates generated sales revenue of around 6.2 billion euros in 2021.

Basic Information Bosch

The Bosch Group is a leading global supplier of technology and services. It employs roughly 402,600 associates worldwide (as of December 31, 2021). The company generated sales of 78.7 billion euros in 2021. Its operations are divided into four business sectors: Mobility Solutions, 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 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 440 subsidiary and regional companies in some 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

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growth is its innovative strength. At 128 locations across the globe, Bosch employs some 76,100 associates in research and development, of which more than 38,000 are software engineers.

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