

PRESS INFORMATION

Full steam ahead towards a nationwide hydrogen filling station network

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Working together with partners, Bosch Rexroth is developing compressor drives to ensure the efficient operation of hydrogen filling stations



Together with partners from the hydrogen industry, Bosch Rexroth has developed a scalable portfolio of servohydraulic drives for compressors in the power range between 10 and 280 kW. (Image source: Bosch Rexroth AG)

Hydrogen produced from renewable energies plays a key role in achieving global climate targets. It is a CO₂-free alternative to fossil fuels, especially for commercial vehicles. However, experience from the switch to electromobility shows how important a comprehensive charging infrastructure is if the new technology is to succeed. At Hannover Messe 2024, Bosch Rexroth will present drive systems for compressors and cryopumps developed together with manufacturers and operators from Europe and the USA for the economical operation of hydrogen filling stations with short refueling times.

According to a decision by the European Union, hydrogen filling stations for cars and heavy commercial vehicles must be installed in all urban nodes and every 200 km along the trans-European transport network by 2030. The USA has set itself ambitious targets too. The Fuel Cell and Hydrogen Association predicts that around 4,300 hydrogen filling stations will be needed in the USA in 2030. "With our new technical solutions and in close collaboration with partners from the hydrogen industry, we can provide outstanding support in achieving these goals," said Dr. Steffen Haack, Chairman of the Executive Board of Bosch Rexroth AG.

Refueling with hydrogen is much more technically complex than with petrol and diesel filling stations or electric charging stations. The challenge: Hydrogen is stored on site either in liquid form at -253 °C or as a gas in tanks with various pressure levels. In order to refuel vehicles, the hydrogen must be compressed in a controlled manner to between 700 and 900 bar. Robust drives for the compressors are needed here.

100 kg of hydrogen in less than 10 minutes

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Based on its decades of experience in hydraulics, Bosch Rexroth is developing customized solutions for an economical hydrogen infrastructure, working together with partners. The aim is to refuel Heavy Goods Vehicles (HGVs) with 100 kg of hydrogen in less than 10 minutes. With a tank full of fuel, HGV can travel around 1,000 km.

Working with the market leader for the commercial operation of hydrogen filling stations in the USA, FirstElement Fuel in California, Bosch Rexroth has for example developed a cryopump that can compress up to 600 kg of liquid hydrogen per hour. The cryopump, which will be presented for the first time at Hannover Messe 2024, combines proven servohydraulic pump drives, software and a newly developed compression cylinder. The first filling stations will be equipped with the new technology from 2025.

More than 100 refueling operations each day

The cryopump is just one example of the various compressor drives in the product portfolio. Bosch Rexroth also offers other drive solutions for compressing both gaseous and liquid hydrogen. Rexroth products in different performance classes cover a wide range of applications: From in-house filling stations for forklift trucks in logistics centers to car filling stations and filling stations for heavy HGVs.

The solutions from Bosch Rexroth are based on series components and use hydrostatic transmission systems that are particularly robust and compact. The drive systems for compressors can be installed in small spaces. Compared to previous electromechanical pump drives, they offer a significantly higher flow rate and are much more efficient. Designed for continuous operation, they can be used for several hundred refueling operations a day operating in start-stop mode.

Bosch is developing technologies for the production, compression, storage and use of hydrogen along the entire value chain. By 2030, Bosch aims to achieve a turnover of around five billion euros with this business segment. Between 2021 and 2026, the company will invest a total of around 500 million euros annually in the development and production of its H2 technologies.

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, around 33,800 associates generated sales revenue of 7.6 billion euros in 2023.

Basic Information Bosch

The Bosch Group is a leading global supplier of technology and services. It employs roughly 429,000 associates worldwide (as of December 31, 2023). The company generated sales of 91.6

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billion euros in 2023. Its operations are divided into four business sectors: Mobility, Industrial Technology, Consumer Goods, and Energy and Building Technology. With its business activities, the company aims to use technology to help shape universal trends such as automation, electrification, digitalization, connectivity, and an orientation to sustainability. In this context, Bosch's broad diversification across regions and industries strengthens its innovativeness and robustness. Bosch uses its proven expertise in sensor technology, software, and services to offer customers cross-domain solutions from a single source. It also applies its expertise in connectivity and artificial intelligence in order to develop and manufacture user-friendly, sustainable products. With technology that is "Invented for life," Bosch wants to help improve quality of life and conserve natural resources. 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. Bosch's innovative strength is key to the company's further development. At 136 locations across the globe, Bosch employs some 90,000 associates in research and development, of which nearly 48,000 are software engineers.

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