

PRESS INFORMATION

Full steam ahead towards a nationwide hydrogen filling station network

Jennifer Fanning | 04/22/2024 | USA

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

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 minutesBased 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 (HGV) with 100 kg of hydrogen in less than 10 minutes. With a tank full of fuel, HGVs 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 dayThe 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

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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.

The new drive systems for compressors make an important contribution towards a nationwide hydrogen infrastructure.
(Image source: Bosch Rexroth AG)

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 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. 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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