Press release

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With brake-by-wire from Bosch to the Arctic Circle

Successful long-distance test for new brake system

- Bosch engineers successfully complete the first journey on public roads over 3,300 kilometers and through different climate zones.
- The brake-by-wire system completely replaces the mechanical connection between the brake pedal and the brake system with electrical signal lines.
- Bosch has already received orders from various vehicle manufacturers and plans the market launch from fall 2025.
- Bosch expects 5.5 million vehicles worldwide equipped with brake-by-wire by 2030.

Stuttgart – For six days, over 3,300 kilometers and through different climate zones to the Arctic Circle: On an unusual test drive, a Bosch development team successfully tested the new hydraulic brake-by-wire system from Bosch for the first time on public roads. What sets brake-by-wire apart: This solution completely eliminates the mechanical connection between the brake pedal and the brake system. The driver’s brake request is transmitted to the brake-by-wire system purely as an electrical signal via redundant signal lines. For this fundamentally new approach, Bosch offers a robust and efficient solution with two independent hydraulic brake actuators – a by-wire brake actuator and an ESP®. Today’s brake systems, such as the integrated power brake from Bosch, still ensure the required redundancy in the event of a fault via a mechanical connection to the brake pedal. This coupling via an input rod to the brake pedal is eliminated in the new Bosch brake-by-wire solution.

As a leading company in braking and steering systems, Bosch is working on innovative by-wire solutions for both vehicle domains – including this hydraulic brake-by-wire system, which is planned to be launched on the market from fall

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2025. In addition to the hydraulic solution, Bosch is also developing a purely electromechanical system. The company has already received orders from various vehicle manufacturers and expects that by 2030, more than 5.5 million vehicles worldwide will be equipped with brake-by-wire.

Advantages of the Bosch brake-by-wire system

New freedom in installation: Due to the omission of the mechanical connection, there is no longer any need to mount the brake system components at the vehicle’s firewall. Instead, the components can now be installed where it is most optimal in terms of crash safety, NVH, and manufacturing. The flexibility in choosing where to install the brake actuators helps to avoid the need for different variants for right-hand and left-hand drive vehicles. By-wire technology enables new pedal concepts with significantly shorter brake pedal travel to create space for new interior designs. The hydraulic brake-by-wire solution from Bosch is based on proven brake system technology and is a combination of a by-wire brake actuator and an ESP®. Its slim design saves installation space and reduces the weight of the brake system. Since both the by-wire brake actuator and the ESP® are assigned to different channels of the redundant electrical system, they can each independently build up the required brake pressure at all four wheel brakes in the event of a fault. Therefore, this Bosch solution is also suitable for highly automated vehicles, meeting the protection of the brake system required for safety reasons.

Successful long-distance test provides valuable data for further development

The brake-by-wire system is being developed at the Bosch development center in Abstatt near Heilbronn. The long-distance journey led the development team from the southwest of Germany via Hamburg, Copenhagen and Stockholm and a short detour to the Arctic Circle to the finish at the Bosch winter test center Vaitoudden in Arjeplog, in northern Sweden. Bosch has specifically applied for and obtained approval for public roadway use for the test vehicle in several countries, based on an extensive safety concept. “The whole team has worked towards this event with incredible motivation and is very proud of this achievement. Our hydraulic brake-by-wire system has worked perfectly on the journey. With our first long-distance test, we impressively demonstrated that we can bring a real brake-by-wire system safely and successfully from the test track to the road", explains Hagen Kuckert, project manager for the by-wire brake actuator at Bosch in Abstatt. „We performed thousands of braking operations during the journey, were able to obtain important insights and data on the behavior of the brake system in a wide variety of traffic situations and compare them with our previous simulations. All this is incorporated into the further development work to further optimize our hydraulic brake-by-wire system."

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Basic information:

Mobility is the largest Bosch Group business sector. In 2023, its sales came to 56.2 billion euros, or just under 60 percent of total Group sales. This makes the Bosch Group one of the leading mobility suppliers. Bosch Mobility pursues a vision of mobility that is safe, sustainable, and exciting. For its customers, the outcome is integrated mobility solutions. The business sector's main areas of activity are electrification, software and services, semiconductors and sensors, vehicle computers, advanced driver assistance systems, systems for vehicle dynamics control, repair-shop concepts, as well as technology and services for the automotive aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP anti-skid system, and common-rail diesel technology.

The Bosch Group is a leading global supplier of technology and services. It employs roughly 417,900 associates worldwide (as of December 31, 2024). According to preliminary figures, the company generated sales of 90.5 billion euros in 2024. 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 86,900 associates in research and development, of which nearly 48,000 are software engineers.

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