

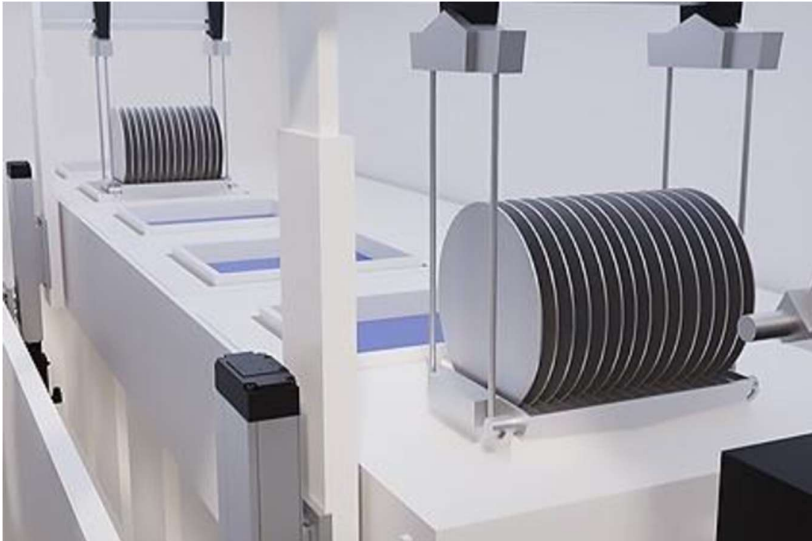
PRESS RELEASE

PI 049/25
2025-10-09

Efficient mechatronics solutions for high-precision semiconductor and electronics manufacturing

Bosch Rexroth accelerates go-to-market time with high-quality Linear Motion Technology, mechatronics modules, and complete subsystems

- ▶ Extensive portfolio of Linear Motion Technology and mechatronics solutions for the semiconductor and electronics industry
- ▶ Ready-to-install and tested mechatronic subsystems, e.g. wafer lifts
- ▶ Engineering support for rapid prototyping and short time to market



Wafer batch cleaning with mechatronic multi-axis system including motor, drive, and control (image source: Bosch Rexroth AG)

The quality, performance, and efficiency of semiconductor and electronics manufacturing depend largely on the mechatronics solutions used. Bosch Rexroth supports machine manufacturers and outsourced semiconductor assembly and test (OSAT) suppliers with a broad range of solutions. These range from compact and clean-room-certified Linear Motion Technology components and mechatronic assemblies right through to ready-to-install subsystems including motion control, such as wafer lifts. The comprehensive range, including suitable surface coatings, covers the entire value stream and enables

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best values in terms of throughput, yield, and scalability – from chip production to frontend and backend, and even electronics production. Custom engineering support speeds up prototyping and reduces time to market.

The level of standardization in semiconductor and electronics manufacturing is continuing to rise. The main drivers are consistent, reliable processes and high requirements in terms of the compatibility of the various devices and systems.

Bosch Rexroth improves standardization and efficiency with a wide and comprehensive range of high-quality Linear Motion Technology and mechatronics solutions with coordinated components. In addition to directly driven linear modules for high-speed applications, linear motor axes, and linear actuators, the modules also include mechatronic handling systems including drive technology as well as ready-to-install subsystems (sub-assemblies) with precise motion control. Profiled rail systems with integrated measuring systems as well as high-precision ball screw assemblies have already proven themselves in many different applications.

Rapid implementation, stable processes, scalable production

Upon request, the Rexroth Engineering Network can support the development departments of machine manufacturers and OSAT suppliers in close partnership from the very first prototype, thus shortening the time from the lab to production. Thanks to the high quality, OEMs benefit from longevity, process stability, scalability, and “copy exact” compliance of plants and processes. Bosch Rexroth also offers technical solutions with suitable materials, suitable lubrication and surface coatings for special environmental conditions in clean room, vacuum, wet and dry chemical processes.

Selected example applications

Typical examples of ready-to-install subsystems in the frontend of semiconductor production are wafer lifts for cleaning, etching, deposition, or chemical mechanical polishing (CMP). Made up of linear axes, servo motors,

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and the future-proof automation platform ctrlX AUTOMATION, they meet the highest standards of uniformity, precision, and reliability. For example, multi-axis handling systems for wafer loading/unloading are used on mechatronic modules. Furthermore, linear modules from Bosch Rexroth have proven to be efficient assemblies for wafer batch cleaning, etching, or deposition.

In the backend of semiconductor production, Rexroth components and solutions offer benefits in terms of acceleration and speed, as well as maximum precision. In the field of chip testing, for example, the range includes profiled rail systems and linear motor axes for precise and repeatable stage movement as well as the actively damped inspection device as a ready-to-install subsystem.

Bosch Rexroth optimizes processes in electronics manufacturing with highly compact miniature ball rail systems for applications such as hot stamping, foil stamping, or laminating. The space-saving and ready-to-install linear motor module (LMM) allows high dynamics and precision during pick-and-place tasks, surface mounting, or visual inspection. Other solutions include the ball screw drives BASA for highly accurate positioning and adjustment as well as profiled rail systems, optionally with the integrated IMScompact measuring system. These solutions ensure highly precise and dynamic motion sequences in screen printing, panel separation, assembly, and in a wide variety of soldering systems.

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 32,600 associates generated sales revenue of 6,5 billion euros in 2024.

To learn more, please visit www.boschrexroth.com

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The Bosch Group is a leading global supplier of technology and services. It employs roughly 418,000 associates worldwide (as of December 31, 2024). The company generated sales of 90.3 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 490 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 87,000 associates in research and development.

Additional information is available online at www.bosch-press.com, www.bosch-mobility.com, www.bosch.com

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