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Maximum precision thanks to integrated temperature control

Manuela Kessler | 12.03.2024 | Lohr am Main / Germany | PI 004/24

Patented temperature control for linear guides and screw drives improves the precision, performance and modularity of machine tools

- Higher process stability, shorter cycle times
- More “Good” parts thanks to a run-up-free production start
- Part precision increased by up to 75%



With integrated temperature control, profiled rail systems, screw drives and the IMS integrated measuring system from Bosch Rexroth work even more precisely and efficiently. (Image source: Bosch Rexroth AG)



In linear motion technology, integrated temperature control is an economical solution for improving the thermal behavior of the linear guide and drive components involved in the process. (Image source: Bosch Rexroth AG)

Modern machine tools benefit from innovative linear motion technology. With the new temperature control option from Bosch Rexroth, profiled rail systems and screw drives work even more precisely and efficiently with no need for additional installation space. Thanks to the cost-effective solution, machining processes in machine tools can be stabilized, waste can

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be avoided and materials can be saved. At the same time, production can start sooner and cycle times can be made shorter. Users benefit from various performance packages which can be put together in a cost-effective manner for new and existing machine tools.

Mechanical engineering companies that are keen to retain their market position in the high-precision sector need innovations which allow even more stable processes but without applying excessive cost pressure. In linear motion technology, integrated temperature control is an economical solution for improving the thermal behavior of the linear guide and drive components involved in the process. High-speed and precision milling for example benefit from this.

Profiled rail systems and screw drives with the optional temperature control function use pipes that are integrated directly into the guide rail or the screw drive screw and can easily be connected to the machine's central cooling circuit. Energy losses resulting from friction can be dissipated from the linear guide. The ideal operating temperature can also be reached so quickly by preheating that the machine is immediately available without a run-in time and the first part can be machined without errors. This increases productivity while minimizing waste and the use of materials.

Available for a range of linear guides and drives

Bosch Rexroth offers the optional temperature control function for all common sizes of ball and roller rail systems as well as for ball and planetary screw assemblies. The patented TCRS Thermo Compensating Rail System which is available for profiled rail systems is also available as an option for the IMS integrated measuring system. This way, Bosch Rexroth has for the first time combined the three functions of guiding, measuring and temperature control in a highly compact, retrofittable solution. By integrating the linear encoder function and the optional TCRS into the profiled rail system, high-precision applications can now be realized or retrofitted with minimal design and operating costs and with no need for additional installation space.

Modular packages also for retrofitting

Unlike non-integrated solutions, the temperature control option from Bosch Rexroth requires neither external cooling systems nor additional installation space. As a result, high-performance applications with the same mechanical properties can be achieved with minimal effort. It is also possible to convert existing systems into precision machines with minimal effort or to offer various service packages for existing machine concepts, including retrofitting. With this modular approach, integrated temperature control from Bosch Rexroth also helps to increase competitiveness in machine tool manufacturing.

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

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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 428,000 associates worldwide (as of December 31, 2023). According to preliminary figures, the company generated sales of 91.6 billion euros in 2023. 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 90,000 associates in research and development, of which roughly 48,000 are software engineers.

Press Contact

Please get in touch with our Press Contact



Manuela Kessler

Spokesperson
technology topics
+49 9352 184145

Manuela.Kessler@boschrexroth.de