

# Bosch Rexroth Celebrates 30 Years of Linear Motion Innovations

Matthew Jaster, Senior Editor

Bosch Rexroth began developing linear bushings, shafts, slides, and transfer tables as prototypes in the 1960s. The first two complete linear modules with linear guides in combination with a ball screw assembly and toothed belt drive as a ready-to-install subsystem were launched in 1990 — a quantum leap in the linear axes range which had previously been dominated by components. In 1996, they were followed by carriages with an integrated runner block. This in turn led to the introduction of the compact modules which offer high performance yet take up less space.

With the electromechanical cylinder (EMC), the company began electrifying actuators in 2007. These actuators replaced the conventional pneumatic solutions that had a higher energy consumption. In 2018, Bosch Rexroth presented the integrated measuring systems IMS, integrated into linear axes. The solution is largely immune to interference and offers high precision and integrability.

However, the products are not the only things that have changed over the last 30 years. The way the company works with users has changed too, for example through the introduction of CAD systems, 3D models, product configurators and modern eTools such as the selection and sizing tool LinSelect which was developed in 2016. This allows intuitive axis dimensioning and selection and guides engineers to the optimum linear axis with just a few mouse clicks.

PTE recently caught up with Richard Vaughn, automation engineering manager at Bosch Rexroth, to discuss advancements in linear motion today.

**PTE:** What are the key technologies in linear motion at Bosch Rexroth today?

**Vaughn:** The IMS compact measuring system and the Smart MechatroniX platform. With the integrated measuring system IMS-C, the measuring sensor is fully integrated in the runner block, which not only saves a lot of installation space but also reduces cost since there are no add-on parts. Smart MechatroniX is a mechatronics platform intended to serve as “Plug & Produce, Perform, & Proceed.” The three phases in this description all focus on simplicity and speed from development to the start of production; high operating performance and sustainability thanks to permanent updatability and a flexible use of components and modules. As a long-standing leading supplier and operator in linear motion technology, mechatronics, and factory automation, we know what the current and future production requirements are. Furthermore, the Bosch Group has its own sensor and IoT solutions, which we in-



For 30 years, Bosch Rexroth has been developing ready-to-install linear axes and has sold over a million axes during this period. (Image source: Bosch Rexroth AG)

tegrate in our new Smart MechatroniX products and system solutions.

**PTE:** How do engineers view electromechanical alternatives versus hydraulic or pneumatic equipment?

**Vaughn:** While all of the technologies have their purpose based on specific application requirements such as force, electromechanical solutions are often preferred when a choice can be made. A major benefit with electromechanical actuators is having complete control over the motion profile while at the same time offering cost savings due to only consuming power when work is being performed.

**PTE:** What are the greatest challenges in bringing digital linear motion technology to the factory floor?

**Vaughn:** Easy integration into machines and components from different manufacturers are often challenges. An example of this would be procuring a ball rail, linear scale, and control from different suppliers. This would most likely require connectivity and additional effort compared to products developed together such as our IMS-C integrated measuring system with our new ctrlX machine automation platform.

**PTE:** What are the benefits of linear motion product selection tools?

**Vaughn:** Readily available selection and sizing tools such as Bosch Rexroth's LinSelect allow “right sizing” for linear applications while at the same time providing outputs uti-

The Bosch Rexroth Smart Function Kit for Handling is a complete multi-axis material transport and handling solution for Cartesian systems.

lized in CAD configuration. This downloadable, easy to use sizing tool allows engineers to be self-sufficient during the selection process. By inputting your data for an application such as pressing a dowel pin into a plate, you get a properly sized Smart Function Kit for Pressing smart mechatronics solution complete with ordering parameters and CAD models in a matter of minutes.

**PTE:** How will linear motion technology evolve in the coming years?

**Vaughn:** With 30 years of linear axes experience, Bosch Rexroth is established as a technological leader. This linear axis innovation will continue by adding sensors, electronics, and software to components. In addition to the existing Smart Function Kit for Pressing, some examples in our Smart MechatroniX platform coming in the near future are the Smart Function Kit for Handling and the Smart Flex Effector.

**PTE:** What role will these technologies play in the factory of the future?

**Vaughn:** Completely new solutions such as Smart MechatroniX will pave the way to the Factory of the Future by having more intelligent, flexible, networked and software-based products. Simple and fast smart solution packages from a



single source is critical for the market. And, simple configuration and ordering using modern e-tools, fast and intuitive commissioning, and visual programming will play a vital role for future factories in the growing linear and robotic market.

**PTE:** How will service and maintenance change for linear motion components in the coming years?

**Vaughn:** As linear products such as the Smart Function Kit for Pressing continue to evolve within Industry 4.0, service needs will tend to be scheduled due to predictive maintenance monitoring as opposed to having a machine go down in production. IoT-capable, intelligent, and networked products will help future-proof through remote software updates while providing longevity and high overall equipment efficiency (OEE) of products and systems.

**PTE:** What should engineers' as well as programmers do today to better prepare themselves for the digital linear motion technologies of the future?

**Vaughn:** They should prepare for solution competence to meet agility as best-in-class linear components are paired with sensors, electronics, and software for completely new solution approaches. **PTE**

[www.boschrexroth-us.com](http://www.boschrexroth-us.com)

The Bosch Rexroth Smart Flex Effector is a sensor-based compensation unit with independent kinematics in six degrees of motion. As sensitive as the human hand, yet as precise in transport and placement as a robot, the innovative, tactile technology reduces errors and saves time and costs in commissioning and during operation in many applications ranging from handling to joining processes.

