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Winner of the HERMES AWARD 2023: Smart Flex Effector from Bosch Rexroth as sensitive as a human hand

Manuela Kessler | 17.04.2023 | Lohr am Main / Germany | PI 022/23

- Compensation module for robots with sensor system and independent kinematics in six degrees of freedom
- Increases precision and the level of automation
- Can easily be retrofitted to existing automation systems



The HERMES AWARD 2023 goes to Bosch Rexroth. The award was presented at the opening ceremony of the Hannover Messe. (Image source: Bosch Rexroth AG)

Caption: The HERMES AWARD 2023 goes to Bosch Rexroth. The award was presented at the opening ceremony of the Hannover Messe. On the photo from left to right: Dr. Jochen Köckler (Chairman of the Managing Board, Deutsche Messe AG), winners of HERMES Startup AWARDS, Thomas Donato (Member of the Executive Board responsible for the Factory Automation business at Bosch Rexroth AG), Dr. Ulf Lehmann (Head of the Linear Motion Technology Business Unit at Bosch Rexroth AG), Bettina Stark-Watzinger (Federal Minister for Education and Research). (Image source: Bosch Rexroth AG)

With the unique combination of a sensor system and kinematics working independently in six degrees of freedom, the Smart Flex Effector compensation module gives industrial robots a sense of touch similar to that of a human hand. It thus allows the automation of processes that were previously difficult to manage or could only be performed manually. The innovation was honored at Hannover Messe with the HERMES AWARD 2023, the most prestigious international industry prize. The Smart Flex Effector increases the range of applications for robots because it sensitively compensates for tolerances in real time. Users can thus automate joining process, complicated assembly movements or difficult handling tasks. The compensation module can also be retrofitted in existing robotic applications.

“Bosch Rexroth is shaping the future of automation by intelligently linking hardware and software,” said Thomas Donato, member of the Executive Board responsible for the Factory Automation business at Bosch Rexroth. “Through the interaction of sensors and software, industrial robots can relieve employees of repetitive or strenuous tasks.” Up until now, robots

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could only perform gripping and assembly tasks to a high-quality standard if the workpieces were always exactly at the programmed position. Even the slightest positional deviations resulted in errors because the usually rigid programming cannot sense and react flexibly.

The Smart Flex Effector is designed for use on robots such as articulated robots or Cartesian linear systems and is based on a kinematic system with six degrees of freedom. Via Sensitive Touch, sensors detect the exact position of the workpieces to be gripped and report the actual position in real time to the controller, which adapts the gripper's motion sequence to the specific position. As a result, the Smart Flex Effector can automatically compensate for tolerances when removing and positioning workpieces. This reduces the programming required, especially when handling different workpieces. In addition, employees without programming knowledge can also teach robots manually simply by moving the gripper into the correct position by hand. The Smart Flex Effector was developed in close cooperation between Bosch Research and Bosch Rexroth.

The compensation module is so sensitive that it can safely handle even workpieces made from delicate materials such as glass. Because each movement is recorded as a data set and documented, the Smart Flex Effector improves process monitoring and quality. Based on the data, the control system or higher-level systems can detect troublesome deviations straight away. These are either corrected immediately or reported to the operating personnel. This prevents errors and avoids unnecessary costs owing to rejects or follow-up work.

The Smart Flex Effector can also be retrofitted into existing robots with little effort as it communicates with the relevant controllers via popular interfaces. It thus opens up numerous applications for which there were no economical automation solutions in the past.

Bosch Rexroth at HANNOVER MESSE 2023: Hall 6, Stand D26

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 420,000 associates worldwide (as of December 31, 2022). According to preliminary figures, the company generated sales of 88.4 billion euros in 2022. Its operations are divided into four business sectors: Mobility Solutions, 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

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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 440 subsidiary and regional companies in some 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. With its more than 400 locations worldwide, the Bosch Group has been carbon neutral since the first quarter of 2020. The basis for the company's future growth is its innovative strength. At 128 locations across the globe, Bosch employs some 85,000 associates in research and development, of which nearly 44,000 are software engineers.

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