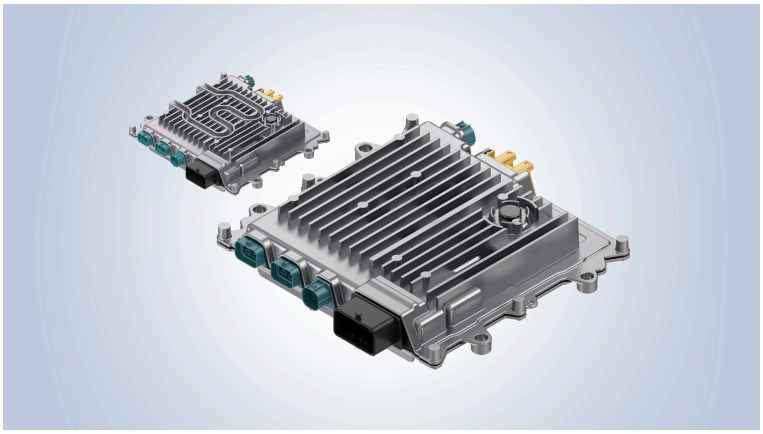
PRESS INFORMATION

Automation solutions for agricultural machinery

Manuela Kessler | 25.09.2025 | Lohr am Main | PI 040/25

Bosch Rexroth creates conditions for partial and high automation of agricultural machinery

- New mobile-capable High Performance Computer ORC2 with integrated AI accelerators
- Ready-to-use solutions for collision avoidance and position detection
- 360°-person detection in preparation
- Customer benefits: Increased safety, productivity, and energy efficiency



The new High Performance Computer ORC2 from Bosch Rexroth, also for AI applications, forms the core of an innovative ecosystem for automating the driving and working functions of mobile machinery. (Image source: Bosch Rexroth AG)

Bosch Rexroth creates the system requirements for the introduction of robotics and automation in agricultural machinery. The new High Performance Computer Offroad Robotic Controller ORC2 paves the way for autonomous and complex driving and working functions. Already, the BODAS ecosystem includes the Collision Avoidance System CAS based on sensors for environment detection. Additionally, the Kinematic Position Sensing KPS reports the exact position of actuators, such as in tractor front loaders.
As the core for partial and high automation of agricultural machinery, the ORC2 offers an open, modular ecosystem with a cost-optimized High Performance Computer, also for AI applications. Based on the widely used real-time operating system QNX with an integrated ROS2 stack, the ORC2 is prepared for safety applications. Building on automotive technologies from the Bosch Group, Bosch Rexroth has developed a functionally safe unit explicitly for off-highway applications. It is optimized for processing data from high-resolution sensors such as LIDAR or radar, video data, complex sensor data, and their combination. With numerous communication interfaces, the control units integrate into various concepts.
In future, the growing software stack will include modules such as position and environment detection, image recognition, perception logics, and bird's-eye view. Additionally, 360° person detection will be implemented. This is a prerequisite for implementing assistance functions for safe operation and workspace monitoring. Furthermore, OEMs can develop solutions themselves on the ORC2.

Collision Avoidance System detects people
Sensors for environment detection expand the proven BODAS Ecosystem. Bosch Rexroth's Collision Avoidance System CAS for an effective collision protection, uses modularly selectable and combination of radar, ultrasound, and smart cameras. BODAS control units evaluate the sensor data to detect and classify objects. With radar sensors, CAS can detect up to 40 objects simultaneously. Near-field monitoring with ultrasound supports up to 12 sensors. In conjunction with smart cameras, CAS also recognizes people and reliably differentiates them from other

objects. The CAS software is developed in accordance with safety standards EN ISO 13849, DIN EN ISO 25119, and DIN EN ISO 19014, thereby ensuring the functionally safe processing of detected objects. It supports the standardized communication interface according to ISO 21815-2. Communication with the powertrain, for example with our drive solutions AgDrive or the software eDA, enables automatic deceleration up to emergency braking, if desired by the machine manufacturer.
The solution platform Kinematic Position Sensing KPS precisely detects machine movements using inertial sensors, thus forming the technical basis for autonomous functions. KPS can also be modularly expanded with additional sensors such as linear or angle sensors, if required. The BODAS ecosystem connects the position information with the electronically controlled hydraulic components, thus creating the foundation for higher automation solutions such as lift height limitation.
If the KPS system is supplemented with pressure sensors, the easy-to-integrate Payload Estimation Loader (PEL) function records the weight of lifted loads throughout the machine's entire working range, even while in motion. The system can be used on all inclines and at all operating points.

Short development times for new concepts

BODAS offers manufacturers full flexibility to scale, unlock, or subsequently install high-performance functions at the software level. This enables manufacturers to freely and individually scale the price and performance of their vehicles and link them with new business models. At the same time, the ecosystem shortens the development times for new agricultural vehicle concepts through extensive libraries. The solution portfolio is prepared for the requirements of the new Machinery Regulation, effective from early 2027, and the Cyber Resilience Act, effective from December 2027.

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, around 32,600 associates generated sales revenue of 6.5 billion euros in 2024.

Basic Information Bosch

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.

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