

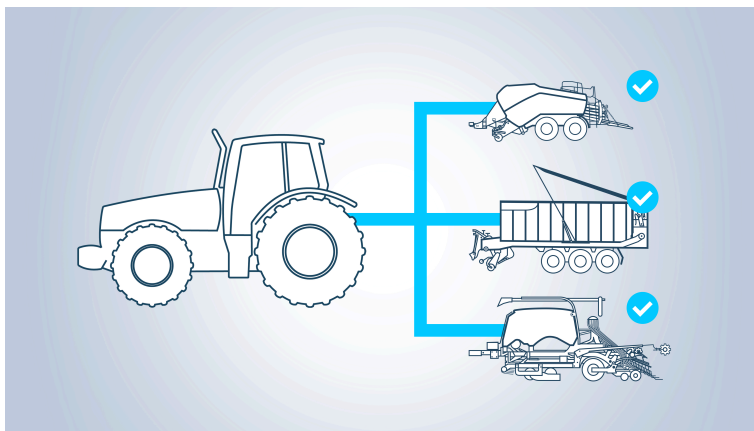
## PRESS INFORMATION

# Leadership Change in Tractor Hydraulics

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## Electronic load sensing ELS optimizes through eOC Pump Control the Use of Implements

- Digital communication replaces hydraulic load sensing pilot lines
- Electronically controlled Variable displacement pumps allow implements to be operated optimally
- User-friendly operation, higher productivity, and energy efficiency



Modular Design for Step-by-Step Electrification of Tractor Hydraulics: Electronic load sensing ELS System Solution from Bosch Rexroth. (Image source: Bosch Rexroth AG)

**Implements take the lead in work processes and demand optimal hydraulic performance for the respective work task. With the next generation of hydraulic systems, Bosch Rexroth has consistently developed this approach and opens up new degrees of freedom with Electronic load sensing ELS. Thanks to the eOC (electronic Open Circuit) variable piston pumps, the hydraulic performance can be flexibly adapted to the requirements of various implements. The advantages for the end-user: simplified operation, highly automated workflows with consistent or even better quality, and higher productivity with improved energy efficiency.**

Up to now, the hydraulic requirements of implements have usually been sent to the tractor hydraulics via hydraulic load sensing pilot lines. With Electronic load sensing ELS, all consumers digitally at the same time communicate their requirements for pressure, oil flow, and response time to the BODAS control unit. The Software running on the BODAS control unit controls then the electronically controlled variable displacement piston pump (eOC-P) according to the demand values in an electronical closed loop.

### **Optimal Conditions for Highly Automated Work**

In contrast to previous concepts, Electronic load sensing ELS hydraulic systems are not limited by a pump factory-setup. With eOC, Bosch Rexroth shifts the variance into Software. This shortens engineering times for machine manufacturers and saves installation space by eliminating previously necessary hydraulic lines and components. Above all, the respective implements now determine the tractor pump pressure, oil flow, and response times, thus ensuring optimal work results. At the same time, the advanced eOC system approach, featuring pumps, ECUs, and electro-hydraulic valves, establishes the foundation for future highly automated operations, like baling. Here, TIM-capable attachments automatically ensure the exact adherence to the diameter and weight of the bales and automatically stop the tractor to deposit the bales.

### **Higher Energy Efficiency and Availability**

The eOC system automatically compensates for line losses to increase productivity. The reduced power loss in standby and the adjustable stand-by pressure improve energy efficiency and

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reduce operating noise. Thanks to the Electronic load sensing ELS system architecture the pressure signals from all components are digitally acquired and digitally sent to the electronically controlled pump. With the acquisition of Hydraforce in 2023, Bosch Rexroth offers now an extensive program of compact valves that completes the hydraulic tractor's system in a space-saving and efficient manner. Bosch Rexroth thus provides the most comprehensive range of motion control systems, which includes hydraulic screw-in cartridges, manifold blocks, and electronic controls with corresponding software.

A full eOC hydraulic system architecture, enable machine manufacturers to develop new diagnosis and service strategies of the hydraulic system. If required, eOC pumps can be set up to new parameters over the air.

### 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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