

## Factsheet

### Technology Area Mobile Hydraulics

#### Bosch Rexroth. The Drive & Control Company

Bosch Rexroth is one of the leading specialists worldwide in drive and control technology. Under the brand name Rexroth, the company supplies tailored solutions for driving, controlling and moving. Bosch Rexroth is a partner for industrial applications and factory automation, mobile applications and using renewable energies. The Drive & Control Company is the supplier of choice to more than 500,000 customers for high quality electrical, hydraulic, mechatronic and pneumatic components and systems. In more than 80 countries Rexroth is a reliable partner for its customers, supporting their production of safe and efficient machines and thereby contributing to the economical use of natural resources.

Multi-disciplinary know-how is the basis for innovative solutions that are used as components or customized systems. Because Rexroth offers a complete range of drives and controls, advice to customers is free of technological bias, resulting in the most appropriate solution for the task at hand. Rexroth technologies are used in all branches of industry. As system-level partner, service provider and supplier, Rexroth has a fund of knowledge in more than 30 industrial sectors. Comprehensive service offerings fortify Rexroth's leading position worldwide as a partner for machine and system manufacturers.

In 2008, Bosch Rexroth achieved sales of around 5.9 billion Euro with 35,300 employees. The company was created in 2001 through the merger of Bosch Automationstechnik and Mannesmann Rexroth. The entrepreneurial tradition of both companies continues under one roof. In the case of the Rexroth family this extends back to 1795 and in the case of the Bosch family back to 1886.

#### 1. Short Profile of the Technology Field Mobile Hydraulics

Rexroth offers a wide range of components and systems for mechanically, hydraulically and electronically driving and controlling mobile equipment. The product range includes axial piston and external gear units, radial piston motors, mobile controls, gears, compact hydraulics, mobile electronics and worldwide technical service.

The comprehensive product portfolio ensures that there is hardly a major construction site anywhere in the world that does not work with Rexroth components. And many more industries, for example agriculture, forestry, material-handling equipment, road vehicles and special vehicles also use Rexroth components and systems.

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Rexroth will continue to build on its technological leadership in mobile hydraulics with systematic advanced development of its products and system solutions, exploiting innovations and globalization. The focus in this process is not the individual product, but rather the complete machine function. This is necessary because, for example, the requirements in material-handling equipment differ greatly from those in agriculture and forestry. Each application is different, as is each machine for that matter. For this reason, Rexroth runs dedicated application centers that analyze the customer's requirements for the specific application, and then propose appropriate, sustainable drive solutions for mobile hydraulics.

### 2. Products

Axial piston units (pumps and motors), external gear units (pumps and motors), radial piston motors, gears, mobile controls, compact hydraulics, mobile electronics

### 3. Industries

Construction machinery, agriculture and forestry machines, material-handling equipment, utility and municipal vehicles, special vehicles

### 4. Trends in Technology

The factors environment, energy, function and costs are becoming ever more important for mobile hydraulics. Stricter legislation in many regions demands new, more efficient solutions with respect to pollutant and noise emissions and safety. Manufacturers and users demand further reductions in energy consumption and thus in operating costs. Another key objective is to optimize the installation space while at the same time increasing working performance in accordance with the users' requirements for more functionality and comfort. In contrast to stationary (hydraulic) applications, the human remains the central control and regulation element in mobile working machines. In day-to-day operations, he is subjected to an almost infinite range of different influence factors. To support him with further automation of work processes and to optimize his workplace with improved ergonomics therefore is one of the primary tasks in mobile hydraulics.

In the context of energy savings, hydraulic hybrid solutions are increasingly relevant. One of the core developments at Rexroth in this area is the Hydrostatic Regenerative Braking system (HRB). Through storage and re-use of the braking energy, HRB achieves fuel savings of up to 25 percent and moreover reduces wear and maintenance costs for the mechanical drive brake. A prerequisite is a

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corresponding operational mode involving frequent stopping and starting such as is the case, for example, for a refuse truck or a fork lift truck.

The trend towards using electronics in mobile hydraulics cannot be overseen. This will continue, if not intensify, in the future. Digital signals from electronic joysticks and pedals actuate valves, integrate various sensors and in the future will provide information about the performance status of the diesel engine. They make the simple networking of all components possible, for example via CAN bus, to form an electro-hydraulic system. Here, all data is evaluated so that the available power is put to optimum use.

At the same time, the electronics open up new possibilities with respect to drive transmission, for example by adapting drive parameters to limit speed individually or freely selectable acceleration characteristics. In the working hydraulics, they make new valve control concepts possible, for example Electro-hydraulic Flow Matching (EFM). With its BODAS modular system, Rexroth offers tried and tested hardware and software packages with specially tailored interfaces that are ready for immediate use. This creates tailor-made and yet flexible scalable solutions. When it comes to electronics, the link to Bosch is an advantage for Rexroth that cannot be overestimated. Simply the example of the CAN bus underlines its importance - Bosch invented the CAN bus. This allows Rexroth to make use of tried and tested components whose reliability has been demonstrated millions of times over. At the same time, the very closeness to Bosch, also an inventor of technologies like ABS (anti-lock brake system) or ESP (electronic stabilization program), is an important source of new ideas. The know-how transfer guarantees that Rexroth not only accompanies this market development, but actually plays a part in advancing it.

It does not matter what the mobile application is: it can already be seen today that the existing trends will not be broken in the future simply by improving individual components. It is the intelligent combination of mechanics, hydraulics and electronics that will decide over the success of future vehicle generations. A development partner who understands how their machines work in an overall context is therefore increasingly important for the manufacturers of mobile equipment. This is exactly what Rexroth hopes to achieve with its applications centers. Specialists from various product units work on specific applications with an eye on the overall context of the machine functions. On the basis of best-in-class components, the result is drive system and control solutions with which Rexroth is actively setting trends in mobile hydraulics.

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### 5. Production Sites



**Elchingen, Germany**



**Augsfeld, Germany**



**Homburg, Germany**



**Horb, Germany**



**Lohr am Main, Germany**

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**Nuremberg, Germany**



**Schwieberdingen, Germany**



**Witten, Germany**



**Glenrothes, Scotland**



**Vénissieux, France**



**Fountain Inn, USA**

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**Wooster, USA**



**Pomerode, Brazil**



**Tsuchiura, Japan**



**Nagoya, Japan**



**Nonantola, Italy**



**Modena, Italy**

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**Reggio Emilia, Italy**



**Sant'Antonio di Pavullo, Italy**



**Vezzano sul Crostolo, Italy**



**Beijing, China**



**Wujin, China**



**Bursa, Turkey**

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