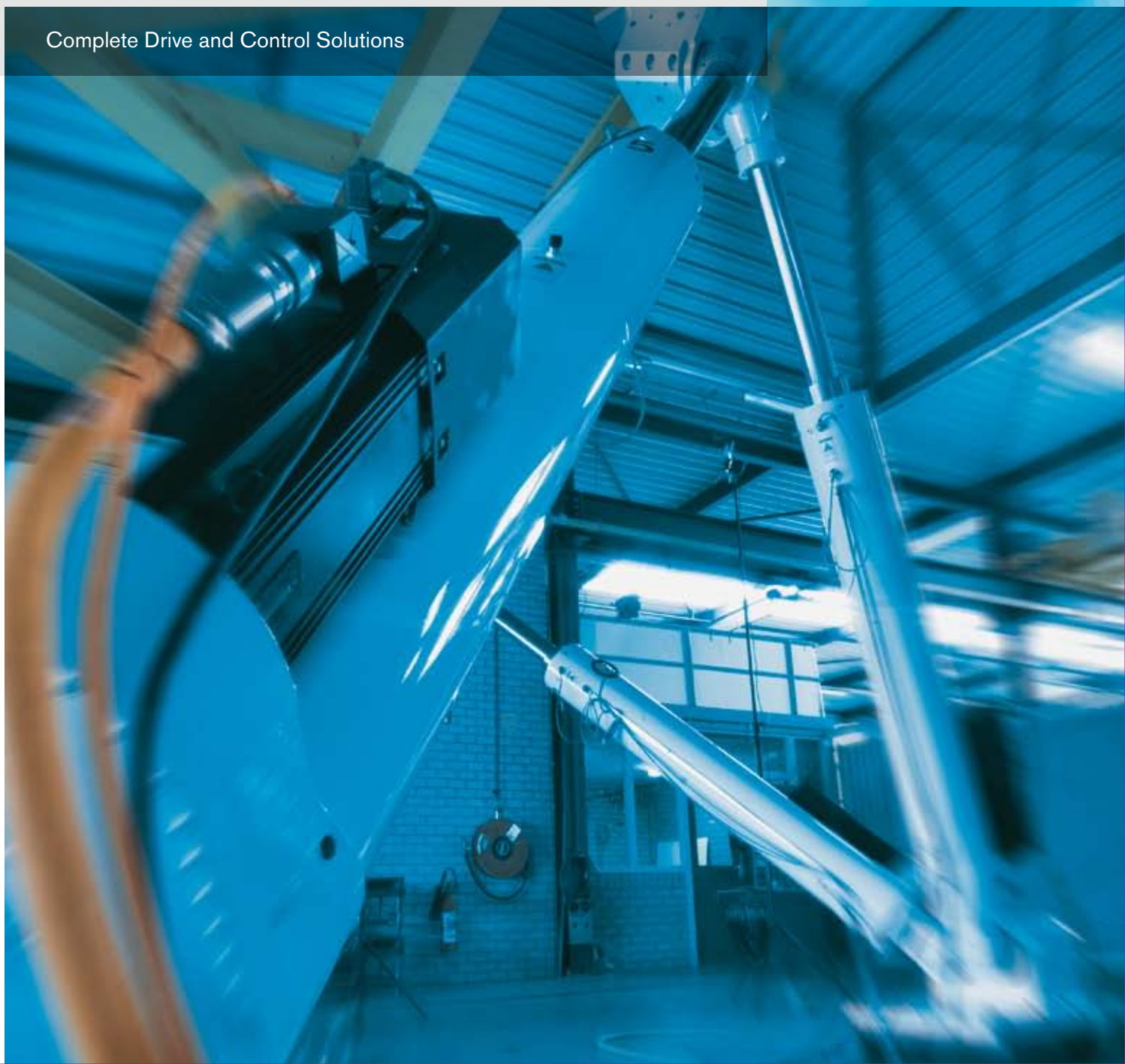
Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

Rexroth
Bosch Group

Creating the Illusion of Reality
Motion Technology

Complete Drive and Control Solutions



Your Demand Is Our Challenge: You Define The Task – We Supply The Solution

Rexroth Systems & Engineering
Your Solution Partner

For each application, there is a specialist department at Rexroth Systems and Engineering. These "Corporate Centers of Competence", are formed by engineers with decades of experience in hydraulic drive and control, focused on specific application areas.

Customers, e.g. designers of technical installations, are often faced with a wide range of technological disciplines which they have to implement into their product. The strategy of offering application related package solutions (up to turn-key) is of decisive advantage, especially for the plant designer and operator.

They can concentrate on the key questions of project planning without having to deal with the Drive & Control system itself. The customer is able to ask for performance instead of technical details.

Especially if it comes to highly sophisticated drive and control functions this implementation turns out to become very demanding. It even becomes one of the success factors to the whole installation created by the customer.

That is where Rexroth Systems and Engineering comes into place. We have specialized in implementing complete drive and control systems into the clients products and installations, generally on a turn-key basis.

Rexroth Systems and Engineering is able to select a close-knit team from its staff of experienced, creative and highly trained engineers and project managers, experts in the field of each specific application.

The unique marriage between application know-how with Drive & Control technology could be ideally achieved for the benefit of the customers of Rexroth.

Project implementation is carried out in close cooperation with the client. The four most important Systems & Engineering competences for successful projects are

- **Market and application know how**
  This means knowledge and experience with customer needs and the translation of his requirements into a round and economic solution.

- **Technical and commercial project management**
  The technical capability to design, simulate and detail systems toghether with the knowledge of legal aspects, risk & insurance management, and claim & site management for instance.

- **Drive and Control Competence**
  We take the opportunity to use the wide range of technologies and first class components like cylinders, power units, valves, pumps, control systems and piping, that are available within the Bosch Rexroth organization.

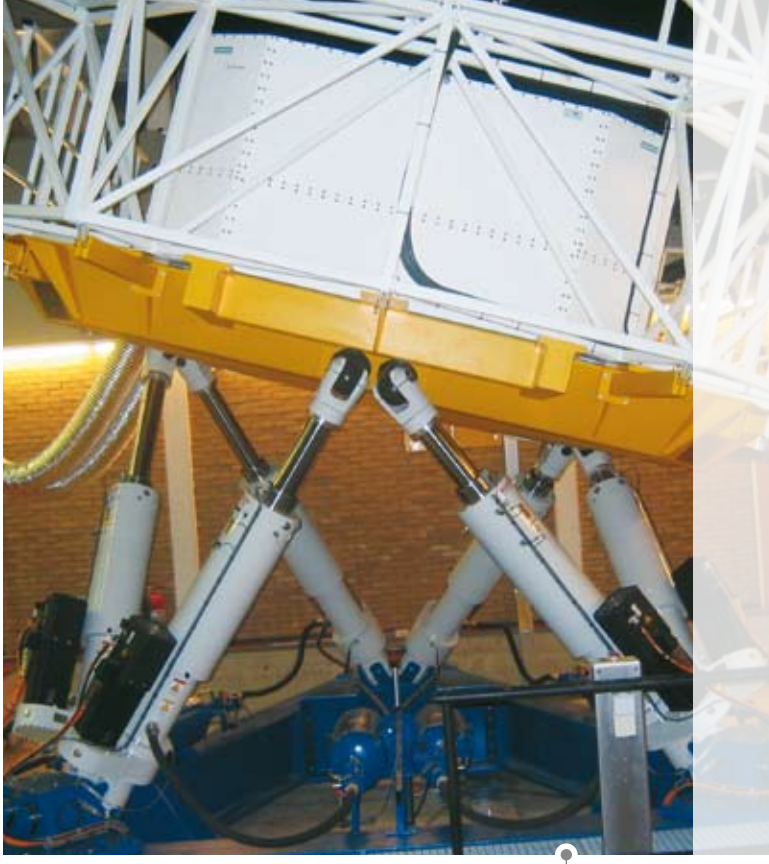
- **Worldwide network**
  Our representation gives us the opportunity to offer our know how where it is most needed: close to our customers. Bosch Rexroth is represented in over 80 countries, has sales and service subsidiaries in 37 countries and 85 production facilities in Europe, Americas and Asia/ Pacific. You can find your partner on www.boschrexroth.com

Creating the Illusion of Reality

"Ladies and gentlemen, fasten your seatbelts, we will be landing shortly". After this cabin message the airplane flies through unexpected turbulence and starts to shake heavily. Controlling the airplane becomes difficult. The airplane rolls from left to right while approaching the runway. Heavy winds make it even more difficult to keep the airplane under control with only one engine operational. A hard bump and rumble goes through the cockpit... touchdown! The pilot decelerates the airplane, hanging forwards in his seatbelts because of the high forces. Suddenly the airplane comes to a standstill... the cockpit crew succeeded to end this journey safely and with sweat on their face they walk out of the flight simulator. It was another realistic training session and a Rexroth motion system created the illusion of reality. The motion system must be capable of accurately simulating the forces (cues) a pilot would feel in the real aircraft. More and more, simulators incorporate high fidelity hydraulic or electric motion systems to provide the driver or pilot with motion cues, creating the essential perception of reality.

With an experience of over 20 years, Bosch Rexroth Systems and Engineering, has specialized in a wide range of professional motion systems. The range of motion system products vary from small hexapod systems with payloads of 600 kg, up to large flight and cabin crew trainers with payloads up to 33 tons. Systems & Engineering offers both electric and hydraulic driven motion systems. In-house designed motion control software is included with each delivery to ensure accurate control of the motion system. Our Bosch Rexroth Service organization can take full responsibility for the complete installation of the motion system, worldwide.
Systems & Engineering has experience with third party certification, such as TÜV, Bureau Veritas, Lloyd's and many others, which can be included from design to final testing of the drive and control system.

Hydraulic motion system with Rexroth servo valve STWS0034-10 and customer supplied platform, for full flight simulation



Electric motion system with Rexroth electrical drive MHD115C-058-PG1-AA, for full flight simulation

Motion Technology for Flight Simulation

In modern flight simulation the objective performance and subjective behavior of a motion system has become a key feature for pilot training. Our knowledge of flight simulation is applied to optimize the motion performance. Continuous developments are a key to Best-In-Class performance. Two different technologies are available for your simulation application:

Electric Motion Systems

- Electric motion systems benefit from an entirely new and fully digital technology of Drive & Control.
- From 1,000 kg (2,200 lbs) to 12,000 kg (25,000 lbs) for applications such as: helicopter, fixed-wing aircraft, engineering and research and fast jet Full Flight Simulators.

Hydraulic Motion Systems

- Hydraulic motion systems are a reliable solution for Full Flight Simulators in heavy-duty circumstances.
- The hydraulic servo technology provide opportunities for high dynamic and high payload applications.

Rexroth's electric and hydraulic motion systems are proven in practice and pass the highest standards of objective and subjective Level D criteria for Full Flight Simulators.

Cabin Emergency Evacuation Trainer with the Rexroth abort valve 4WE10D73-3X/CG24N9K4A12, for Boeing 747 and Airbus A340 training

Motion Technology for Driving Simulation

A range of electric motion systems is available to provide additional training effectiveness of perceptible and high quality motion cues.

- High bandwidth motion adds significantly to the effectiveness of training because it creates an as-close-to-reality-as-possible simulator environment.
- Sustained linear movements provide optimized simulated vehicle behavior closest to the real car behavior.
- The 6 Degrees Of Freedom (DOF) combined with large linear movements is ideally suitable for Research and Engineering simulation.
- 2-DOF or 3-DOF motion systems provide a perfect combination of cost-effectiveness and high quality movements.
- The geometry of the low payload 6-DOF systems is based on optimal availability of linear excursions.

All motion systems rely on heavy-duty hardware designs that provide the basis for reliability and a carefree service-life.

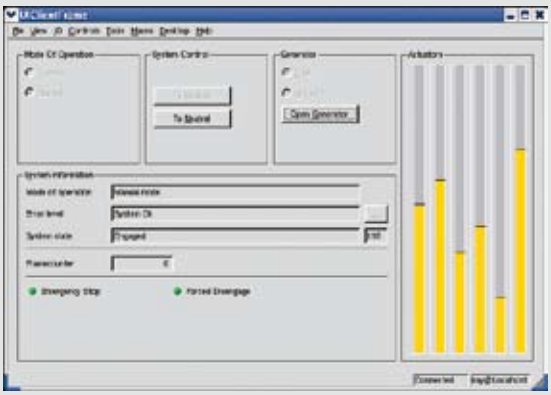
Cabin Emergency Evacuation Trainers

Cabin Emergency Evacuation Trainers (CEET), provide training to cabin crew members, who face an increasingly stressful working environment. High workload, rapidly changing onboard situations, emergency procedures and hazardous circumstances such as heavy turbulence, often conflict with the requirement for friendliness and on board service.

- The CEET motion systems are designed to duplicate the real aircraft behavior to the maximum extent possible. Training institutes recognize a distinct training effectiveness for the cabin crew when realistic motion acceleration cues (versus static positions) are added.
- CEET single aisle motion systems are available for medium and wide body aircraft types.

Cabin Emergency Evacuation Trainer with the Servo Proportional Valve STW0182-1X/25V220L, for Airbus A340 training

Motion Control Software



Rexroth Motion Control software

- **Linux real time kernel.**
- **Ethernet interface (alternative interfaces such as VMIC are available).**
- **Built-in graphical user interface.**
- **Test features.**
- **Trouble shooting features.**

For specific applications additional features are developed. They allow for optimized use and best performance and provide the added value of high quality Rexroth motion technology.

User Tuneable Software (UTS)

In specific cases the application of motion requires the possibility to fine-tune the motion system behavior in case of a change in the payload, in the vehicle characteristics or in the case of multiple and interchangeable cabins.

- The user can modify a distinct number of tuning parameters and change the behavior of the simulator without the need for an intervention of Bosch Rexroth.
- Password secured.
- Fully documented.
- Extensive training to operate the system in a safe way.

Cooperation with the automotive industry and leading research institutes resulted in excellent motion cue performance for driving simulation.

Advanced Dynamic Algorithm Selection (ADAS)

ADAS is a unique dynamic module in the software, specifically designed for helicopter simulator applications.

ADAS provides the capability to change the cueing algorithm continuously and imperceptibly to optimize the behavior of the system, depending on the flight condition (hover or flight).

Official U.S. Marine Corps photo by: Sgt. Jemssy Alvarez

Bosch Rexroth around the corner

Rexroth offers a complete range of pumps and motors exploiting all design principles. These include in particular axial piston pumps, internal gear pumps, variable- and fixed-displacement vane pumps, external gear pumps and radial piston pumps. The range is supplemented by pump combinations and compact units, composed of an electric motor and pump unit as a ready-built subassembly.

Pumps and Motors

The cylinders for industrial hydraulics comprise tie-rod cylinders, mill-type cylinders, servo cylinders with hydrostatic bearings, and special cylinders up to 45 m long. For many branches of industry, tries-and-tested application-adapted cylinder systems are available on demand.

Cylinders

With Rexroth's comprehensive industrial hydraulics range, which comprises products and system technology containing on/off valves, servo and proportional valves, control electronics, open- and closed-loop control systems, and control plates, solutions are possible for every conceivable application.

Controls

In industrial hydraulics, Rexroth builds small, customized and large scale units for virtually any application to uniform specifications at its various production locations worldwide. Modularization extends to drive units, motor-pump groups, oil tankers, filter-cooler heat exchanger units, accumulator stations and pressure relief blocks for pumps.

Power Units

In a training environment, simulator availability is the key success factor. In order to provide maximum availability Bosch Rexroth offers preventive maintenance and service contracts. These contracts can be optimized for your specific requirements, budget, workforce skills and application. With Bosch Rexroth present in more than 80 countries, 24-hour service and maintenance support of your motion system is readily available.

Services

Intelligent Hydraulics in New Dimensions

Whether it's a case of raising or lowering loads smoothly, undertaking linear or rotational movements, achieving even acceleration or accurate positioning, maintaining preset speeds, transmitting power or linking motion sequences – in fact, wherever economical power is required, this is where hydraulics comes into its own.

Rexroth is technology and market leader in industrial hydraulics with an extensive product program and proven applications know-how. With the widest selection of hydraulic products in the world, Rexroth will provide you with standard products, application-orientated systems and customized solutions of the highest quality. Furthermore, with the aid of the latest microelectronics, Rexroth has made hydraulics even more powerful than ever.

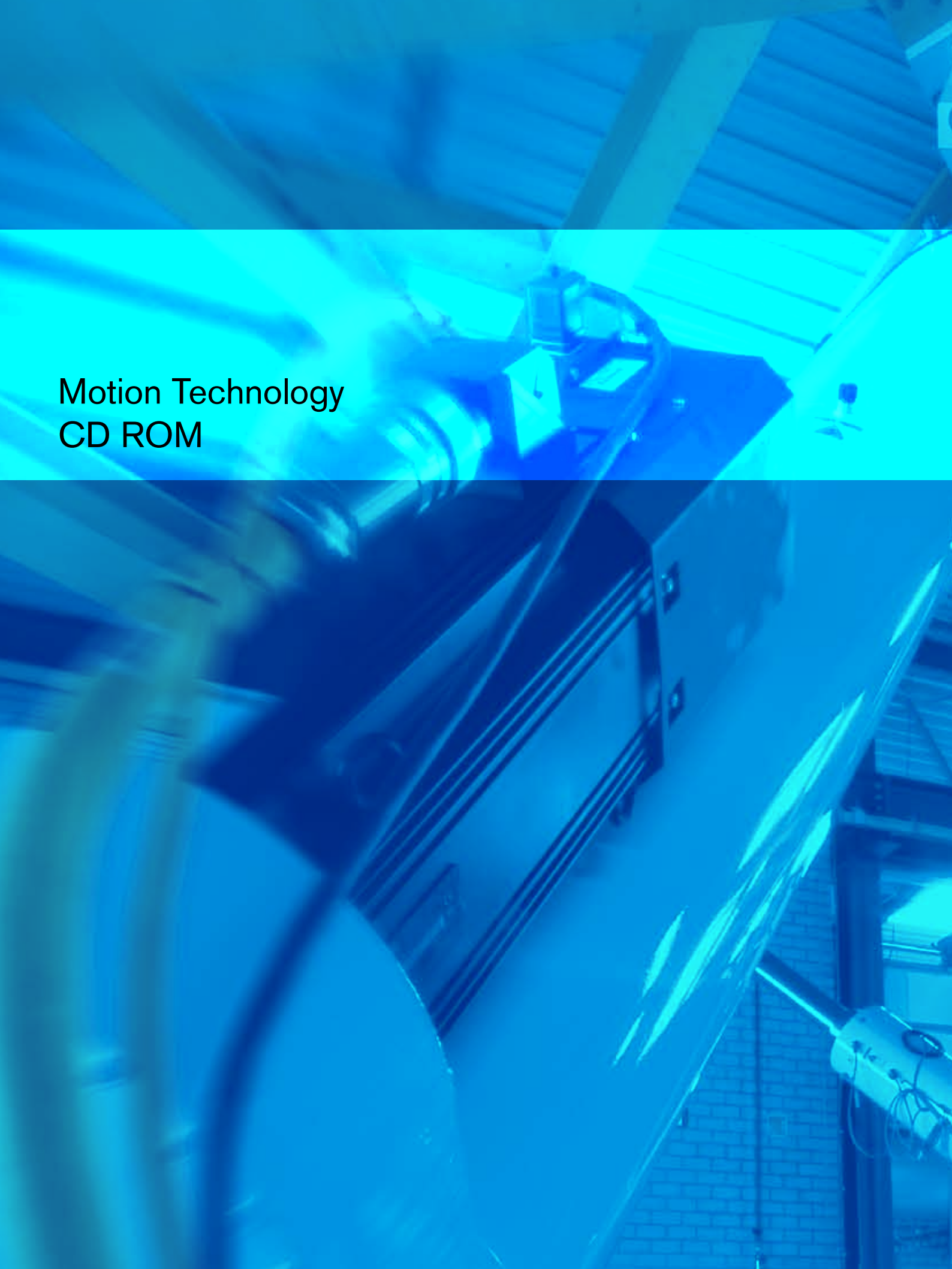
Rexroth is the ideal partner if you want to develop highly efficient machines and production facilities – from the first point of contact right through to commissioning and across the complete life cycle. Teams operating worldwide will take on the complete project design work of your systems, even producing a turnkey solution if required.

Whether it's competent support on the telephone, urgent repairs or supply of spare parts, or a callout by one of our engineers – whichever service you require, experienced personnel and a worldwide service network will guarantee that the problem is swiftly solved.

Using hydraulic drive and control technology from Rexroth will help you become more competitive than ever.

The Drive & Control Company
Rexroth is unique. No other brand on the world market can offer its customers all drive and control technologies, both on a specialized and integrated basis. We are considered to be the worldwide benchmark when it comes to drives, controls and motion. Our technological leadership is continually setting us new challenges, with approximately 28,000 employees in more than 80 countries around the world. This is possible thanks to an infrastructure designed with partnership and customer proximity in mind.

As a company Bosch Rexroth can look back on more than 200 years of tradition. As a wholly owned subsidiary of Robert Bosch GmbH, we are part of a globally operating technology group. All this is both our drive and our commitment. And it is unique – just like Bosch Rexroth. The Drive & Control Company.



Motion Technology
CD ROM

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