Precise, flexible, efficient – automation solutions for the semiconductor industry
Perfection in automation with multi-technology solutions

The right solution no matter the application: Rexroth offers the world’s largest automation technology portfolio for the semiconductor industry. The engineering teams which develop our scalable, cross-technology systems have unrivalled application expertise.

The semiconductor industry has a very special set of automation needs including mechatronic modules designed for smooth motion during wafer handling, non-contact material transport through the process chambers and nano-meter-scale positioning accuracies.

Rexroth has more than ten years of in-depth application experience in the industry. This concentrated expertise is channeled into the ongoing development of new components, modules and product lines for the entire front end and back end.

Only Rexroth can offer one-stop shopping for the full range of drive and control technologies. This saves you time and engineering effort, especially when you take advantage of the support provided by our team of industry experts and their wealth of application experience. Our people are familiar with the challenges you face and can provide the right solutions to ensure excellent performance.

You can also count on us to remain at your side after commissioning – anywhere in the world. Rexroth has a presence in more than 80 countries to support you over the entire automation lifecycle wherever you need us.

- in-depth application expertise
- innovative automation solutions
- complete solutions from a single source
- consistent series-production quality
- worldwide partnership
Rexroth has systematically pooled a wealth of industry expertise, and these experts are an ideal resource when you decide to step up from component procurement to customized automation. Working from your requirements profile, we select the best products from the full range of automation technologies and add the software functionality you need.

Take advantage of our in-depth understanding of the physics involved in all drive technologies, and let us help you get the most out of today’s leading-edge solutions. Our experts understand your needs and remain focused on them right from the initial discussion with you.

You tell us what you want and we create the right hardware and software solution from our ready-to-install modules and complete subsystems. We provide a large number of pre-defined profiles to complement the functionality of our open motion control systems. We give you a framework tailored to your individual needs, and you then add your specific expertise. You can even test your software without the hardware in a simulated environment, so that you can continue program development without having to wait until hardware is installed. Simultaneous engineering saves time and lets you concentrate on your core expertise.
The faster way to get the results you want: the pace of innovation in semiconductor manufacturing is faster than in any other industry. Rexroth helps you to achieve a crucial reduction in the time it takes to move from initial idea to production start-up.

Accelerate your time to market by selecting the best solution from a range of automation technologies provided from a single source. Harmonized electrical and mechanical interfaces simplify the assembly process, and intelligent software tools reduce commissioning time.

High-precision mechatronic solutions featuring high-dynamic servo drives, matching zero backlash linear guides and efficient pneumatic subsystems deliver the reproducibility you need. Our high-volume production of series components translates to higher availability for our customers, and our end-to-end quality management system accepts no compromises. Rexroth components have proven to be extremely reliable over the years in a very wide range of front end and back end process applications including clean rooms and aggressive process environments.

We can configure and deliver ready-to-install subassemblies to your specification. Less vertical integration and increased flexibility resulting from our economical modular design concept reduce your manufacturing costs, so you can focus on your core competencies. You also reduce the number of suppliers and your inventory overhead.

- motion control
- electric drives
- linear systems
- pneumatics
- transfer systems

Multi-technology automation solutions from Rexroth minimize time to market – from the first concept to start of production.
Motion control for semiconductor applications: as versatile as the applications spectrum

The NYCe 4000 motion control system gives you an unparalleled degree of freedom. Sophisticated hardware designed to handle complex operations combined with open software architecture provides the ideal platform for tailored motion solutions and simple integration into your automation landscape.

The modular multi-axis controller contains all of the control and drive hardware in an extremely compact housing. High-level programming languages allow you to write complex motion control programs. Extremely high-speed control loops with 32 kHz bandwidth deliver maximum precision and dynamic performance. The motion control system can handle up to 120 digital and analogue I/Os in parallel in real time. You implement complex process operations on standardized hardware.

Pre-defined software algorithms ensure zero-vibration and zero-backlash. The open controller architecture gives you complete freedom to define your own customized kinematics. An intuitive, dialogue-based user interface with numerous wizards makes development work much easier, simplifying the commissioning process and reducing time to market.

- programming in C/C++/.NET
- powerful configuration, tuning and simulation tools
- on-the-fly parameterization of all controllers
- support for various motor types and encoders
- synchronization of more than 100 motors in a network
Mechatronics from a single source: perfection in motion

A comprehensive automation toolkit from a single source: Rexroth offers the world’s largest range of control systems, electric drives, pneumatic, linear and assembly technologies.

The broad spectrum of Rexroth components specifically optimized for the semiconductor industry covers the full range of automation technologies. Whether you need clean-room compatibility, corrosion resistance or highly scalable solutions ranging from miniaturized linear and pneumatic systems to high torque and low-wear linear motors, Rexroth has the solution for you. The products fit seamlessly all along the value chain from wafer fabrication to finished electronics. Increase the standardization level of your machinery and reduce spare parts procurement and inventory costs. Sourcing all of your mechatronic subsystems from Rexroth makes perfect sense. Our team of industry specialists will put together a complete right-fit solution based on your specifications. We supply the items just in time – in kit form or as a pre-assembled unit.

Rexroth mechatronic solutions supplied as kits or assembled units deliver perfection in motion.
Five programs – one major advantage: tailored solutions boost efficiency

Our five automation programs optimized for the semiconductor industry:

- Wafer Handling
- Linear Motion System
- Wafer Stages
- Back End
- Gantry
We offer five scalable automation programs designed for typical semiconductor production applications, which give you the opportunities to reduce your time to market. Each program is built around a set of harmonized components covering the full range of technologies. Tailored mechatronic solutions translate into reduced need for vertical integration. Based on your requirements, our team of specialists designs complete subsystems specifically optimized for the semiconductor industry. All you need to do is install them and set the parameters.
High rigidity, no overshoot, no backlash: Rexroth Wafer Handling solutions are designed for perfect balance between high-dynamic servo drives, high-rigidity linear subsystems and pneumatic actuators. What this means to you is less unproductive idle time combined with standardized handling throughout your front-end operations. Pre-defined algorithms on the motion control systems prevent vibration. Higher-order motion profiles and spline functions produce smoother motion sequences.

- **The LS04 air valves with flexible electrical connection technology are exceptionally compact as well as fast and easy to mount.**

- **Ball screw assemblies are well-suited for high dynamic applications with very smooth travel performance and offer highly effective seals with wiping action. Uniform function is provided by the principle of total internal recirculation.**

- **Mini ball rail systems are characterized by compact design, high load capacities and outstanding travel performance.**

- **IndraDyn servo motors achieve exceptionally high maximum torque while having a compact design with high power density and integrated multi-turn absolute encoder.**
An external non-contact motion system moves the wafers through the process chambers: The Rexroth LMS Linear Motion System features a greatly simplified design which offers extremely high flexibility. Coils mounted outside the chamber provide drive power for magnetic carriers having no need for seals. Availability increases because all of the components are mounted outside the chamber. The technology is suited for virtually all load factors, precision levels and motion profiles. The system offers great flexibility allowing individual carriers to move forwards and backwards at different speeds.

- **NYCe 4000** is a unique motion control system for transport solutions under challenging process conditions. The system minimizes engineering and maintenance cost, while simultaneously providing high speed and positioning accuracy.

- **IndraDyn L** linear motors are compact and highly dynamic. They feature low torque ripple and particularly high maximum forces.

- **IndraControl** is a future-proof control platform, scalable in performance and function for perfect control, operation and visualization.

- **Cam roller guides** are characterized by high speed capabilities, compact design, very low weight, simple assembly and low friction.
The Wafer Stages program supports high-precision motion control in the nanometer range for wafer alignment, positioning and testing, as used in inspection and quality control.

Ironless linear motors work fast and precise with an outstanding degree of smoothness. Thanks to their low component weight, they are able to achieve extremely high acceleration values.

Ball rail systems have high load capacities as well as smooth travel performance. Designed for high speed and acceleration.

NYCe 4000 motion control system guarantees high precision at 1 - 5 nm resolution as well as slow uniform motion ≥ 50 nm/s. Special servo motors and ironless linear and torque motors enhance dynamic performance. High-precision linear guides eliminate vibration. By adding a pneumatic subsystem, we can put together a complete automation package.

The valve terminal system LS04 features flexible electric connection technology. The modular concept permits construction of up to a 24 valve stations.

NYCe 4000 is the perfect motion controller for smooth movement in the nanometer range.
Rexroth’s modular high-speed, high-precision solutions handle work pieces with no overshoot at the end position, seamlessly integrating all types of sensors and actuators. Our Back End program covers the entire process flow from dicing and die bonding to pick-and-place.

Rexroth supports the entire range of motors: servo, 2-phase stepper, voice coil and piezo. The power ratings range from several W to kW.

- **NYCe 4000 is a modular, open motion controller with outstanding tuning and visualization software. Control loops with large bandwidth make for highly precise control of all process cycles.**

- **Compact-Modules are ready-to-install and feature the same structural dimensions for models with ball screw drives, belt drives or linear motors.**

- **IndraDyn servo motors achieve exceptionally high maximum torque while having a compact design with high power density and integrated multi-turn absolute encoder.**

- **Mini slides with pneumatic or electrical drives are characterized by easy assembly, fast commissioning and maintenance-free performance.**
Rexroth Gantry solutions provide absolutely torsion-free positioning for flat-panel displays and solar modules. The product range includes a full set of components covering a wide range of sizes and load ratings. Without any mechanical connections, the motion control system provides high-dynamic, high-precision coordination for two axes, each of which has its own control loop. Sercos-based real-time synchronization ensures maximum contour precision.

With our gantry solutions, you can achieve end position accuracies in the 30 - 100 nm range in your microscopic test applications. An important consideration in complex applications: you can easily integrate additional axes into our gantry solutions, reducing your engineering effort and simplifying production changes over the entire lifecycle.

IndraControl L is the scalable control hardware with standardized communication interfaces suitable for centralized as well as decentralized control topologies.

IndraDrive C/Cs are compact drive systems with standardized communication interfaces, drive integrated safety technology and innovative technology functions.

PSK precision modules are characterized by high precision and rigidity. Additional advantages are simple alignment, fast assembly and cost-effective maintenance.

Roller rail systems are characterized by high stiffness and extremely high load capacity.
Global partnerships that transcend borders

In terms of global networks, few industries can compare with the semiconductor industry. The same applies to Rexroth. We have a presence in more than 80 countries and are available wherever you need us.

Rexroth is unique in our ability to pool our global resources to provide the service you need. You have access to a team of semiconductor industry experts in Europe, America and Asia. Our people have first-hand experience and understand the specific needs in every region. Our ability to provide seamless, best-in-class support becomes particularly evident in cross-border projects. Because our production operations have an international footprint, we are able to exploit local sourcing opportunities to your advantage.

You can rely on us to remain at your side well after commissioning. Our extensive service network places us in close proximity to our customers and yours, ensuring fast response times. Our portfolio of innovative service capabilities, such as condition monitoring, helps machine manufacturers and users improve the availability of their automation systems even more. A global partnership with Rexroth offers distinct advantages over the entire lifecycle: perfect automation solutions for the semiconductor industry.
The data specified above only serve to describe the product. As our products are constantly being further developed, no statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.