

# Rexroth – Flexibility for Success. Solutions for the Food and Packaging Industries

Confectionery and Dry Food







# Endless Variety

**Foods should not only satisfy, they should also be fun. Consumers are increasingly using their choice of purchases to express their attitude towards life, their status and their health awareness. As mega-trends, lifestyle and wellness shape basic attitudes. The result: A continuous stream of new products and packaging with ever shorter life cycles.**

Consumers enjoy the wide range of offerings and constantly place increasing requirements on the products. They pay closer attention to ingredients and external appearance. The rising health awareness promotes strong growth of organic products and functional food with added benefits.

The source and the identification with the brand values of the products are also growing in importance. Consumers increasingly prefer products appearing to be regional in nature and even foods that are practically individualized. In this regard, customers are willing to experiment and try new things, reevaluating their decision the next time they go shopping. For this reason, manufacturers develop several thousand new products and packaging every year in order to satisfy customers' constantly changing tastes. In this rapidly changing environment, life cycles shrink and, as a result, force even traditional brands to offer special promotions and seasonal variations in packaging.

At the same time, the number of single-member and small-family households is growing in nearly all important markets. They purchase resealable bulk packages from which they can take smaller portions for their current needs. In parallel with this, people are spending less and less time preparing their meals and make use of convenience products. This also changes the requirements on packaging. It offers much more than just protection against light and oxygen: it often performs additional functions and serves as a preparation container or as a dish.

The aesthetics and physical appeal of packaging is more important than ever in the business, in order to stand out from a number of similar products.



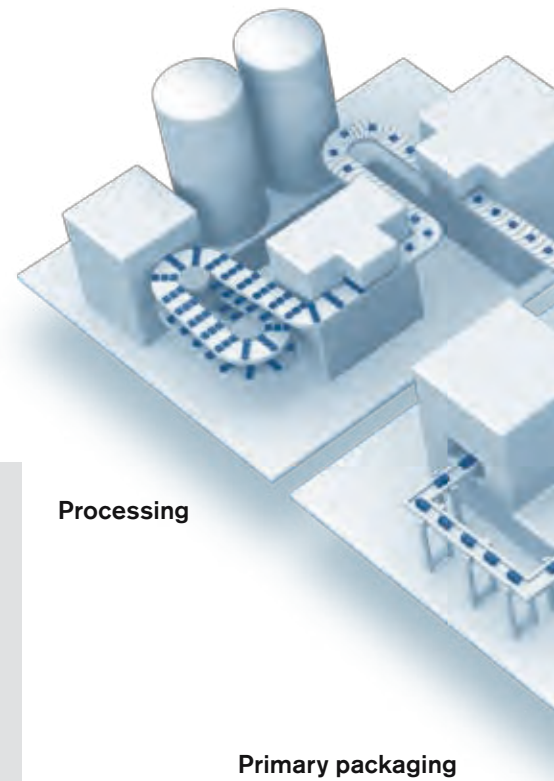
# Flexible Automation Solutions for Greater Productivity



The changes in consumer behavior directly affect the production and packaging of foods and confectionery. The requirements on automation reflect the increased competition with ever shorter product life cycles.

**Flexibility:** The rapid change of product, quantity and format – with constant high productivity – is the key to maximum economic efficiency.

**Overall Equipment Efficiency (OEE):** Availability, performance and quality: more and more end users calculate the actual economic efficiency of their machines and systems on the basis of these three characteristic values. The reliability of all automation components



Processing

Primary packaging

is just as important as keeping the changeover times as short as possible and employing innovative condition monitoring concepts to prevent unplanned downtime.

**Openness:** Internationally accepted communication standards and programming languages ensure transparent data traffic between the individual modules and machines.

Paper bags



Flowwrapping



Thermoform tray



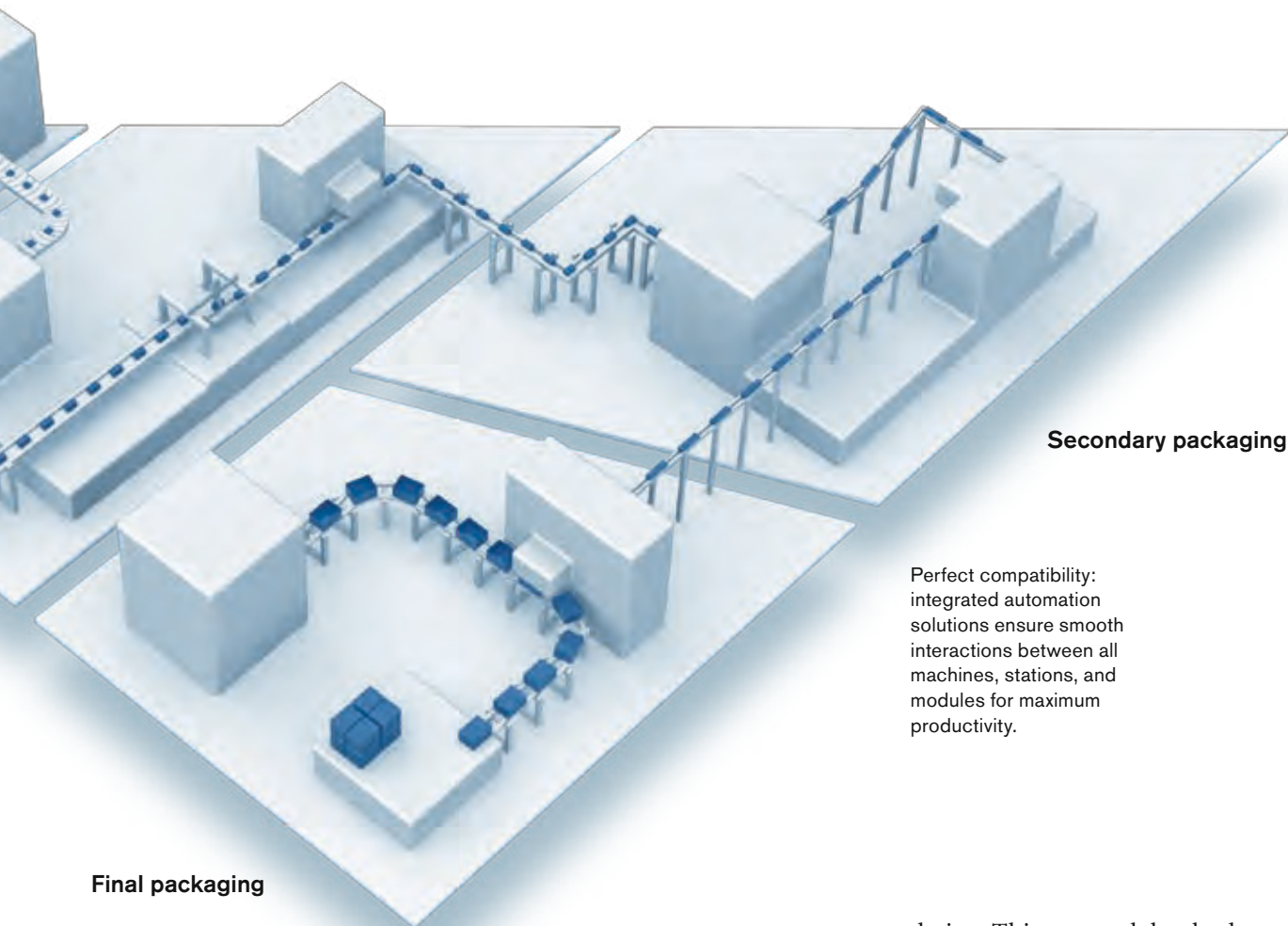
Paperboard cartons



Corrugated boxes







### Secondary packaging

Perfect compatibility: integrated automation solutions ensure smooth interactions between all machines, stations, and modules for maximum productivity.

### Final packaging

**Servo technology:** Intelligent servo drives are increasingly replacing what have, up to now, been mechanically coupled movements. Thus, product changeovers are reduced to just software commands in the control.

**Hygiene:** All direct contact with food requires the highest hygiene

standards. Here, all components must satisfy the highest demands for material selection and for cleanability.

**Energy efficiency:** At least the same level of productivity with lower energy consumption: through energy efficient components, energy recovery, energy on demand and overall energy system

design. This approach has led machine manufacturers towards significant improvements in energy efficiency.

**Safety technology:** Intelligent safety concepts facilitate manual intervention at individual stations, without requiring the entire machine or system be brought to a standstill. This considerably reduces the time required to restart after malfunctions.

Deep-drawn trays

Composite packaging

Foil-packed

Vacuum-packed

Portion-packed

Package



## Manufacturing and Portioning: Even Complex Movements Are Cleanly Executed

**Pour and decorate chocolate, cut food and precisely portion: during direct contact with foods, hygienics is just as important as precise movements.**



Ready for any task:  
industrial solutions for food  
production and packaging

For manufacturers and retailers, the consumers' trust in the quality of their food is the most valuable asset. Around the world, strict regulations apply for hygiene. In many companies, these have been further supplemented by even tougher internal specifications. Direct contact with food requires cleanable materials that can withstand the regular use of highly effective detergents and steam jets. Only materials approved by authorities such as the American FDA may be used here. In the contact area, Rexroth therefore consistently uses materials such as corrosion-resistant steel and high-performance polymers that are designed to withstand these conditions for the long-term.

To satisfy hygienic requirements, the components are also produced in accordance with special construction principles, such as those developed by the European Hygienic Engineering & Design Group. Rexroth has completely updated the entire design of numerous pneumatic and linear-drive components in accordance with the directives of Hygienic Design: bearings located outside of the direct contact zone, smooth surfaces and large angles, no dead spaces, self-draining contours and smoothsurfaced mounts. In addition, Rexroth uses lubricants approved for the food industry.

The use of acid-proof stainless steel cylinder ICS-D1, or the valve manifold CL03 is recommended, above all, for food-processing applications in which the components come – or could come – into direct contact with food.



The stainless-steel version of the VarioFlow chain conveyor system opens great freedoms in the design of complex lines

Satisfies IP69K: CL03 valve manifold system with hygienic design and high chemical resistance

ICS stainless-steel cylinder: corrosion-resistant, hygienic and in accordance with ISO-standardized dimensions







Hygienic Design: linear motion system with smooth, self-draining surfaces and no dead spaces and grooves

Clean: a wide range of linear guidance systems and ball/screw assemblies in corrosion-resistant steel with lubricants in food quality





# Thermoform, Fill and Seal: Efficient Through the Entire Process



Use thermoforming to manufacture and process packaging directly on site: the intelligent drives and controls from Rexroth ensure perfect interaction with maximum energy efficiency.

**4EE**  
ENERGY  
EFFICIENCY

Perfectly synchronized:  
the entire process, from  
thermoforming to final  
packaged food



Producing cups, as well as their filling and sealing, requires precise and gentle movements for both material and machine alike. Rexroth's "IndraMotion for Packaging" system solution is perfectly designed for this purpose. It includes all necessary components, from the Motion Logic control to intelligent drives and HMI devices.

Technology functions developed and predefined by Rexroth, such as print-mark and tension control or crank drive, simplify the implementation of complex movement tasks. The PLC integrated on the same hardware acc. to IEC 61131-3 controls the process tasks. The controller- and PC-based control systems use open standards such

as SERCOS III throughout and thereby simplify the integration of third party components. Extensive control functionalities help to advance modularization here. Smart Belts, which are speed-regulated, servo-controlled belts, feed-in products individually or in groups. The use of decentralized drive technology thereby opens the freedom to incorporate other motor-integrated drives – even retroactively – with minimum cabling and low-space requirements.

Especially when thermoforming with large forces and moving masses, recirculating servo drives from Rexroth open substantial potential for increasing energy

savings. On each brake operation, the motors switch over to generator mode, thereby generating energy for other consumers or for storage.

When designing the pneumatic parts of a machine, online design tools and air consumption calculators simplify the optimum dimensioning of all components. Lightweight valves, well suited for assembly directly on the actuator, and compact valve/cylinder units reduce hose lengths, which directly minimizes air consumption. The movement of an actuator can be divided into various phases with different pressure requirements and, thanks to innovative electro-pneumatic pressure control valves,





Flexible, open and scalable: numerous technology functions simplify automation with Rexroth controls



Simple installation, commissioning and operation: the Rexroth IndraDrive family in the particularly compact book format



This ISO-Clean cylinder is characterized by practical sensor mounting and its hygienic design



can be controlled in an energy-efficient and on-demand based manner. With these functions, Rexroth opens the potential to reduce the energy consumption of the pneumatics by up to 55 percent.

Linear guidance systems with low-friction seals also make a contribution: they cut friction in half, thereby reducing the required drive power. Lightweight axes, such as electromechanical lifting cylinders or eLINE ball/rail track guidance systems, reduce weight, particularly for vertical axes, and further reduce energy consumption.

The electropneumatic pressure control valves of the ED series convert electronic commands to pneumatic pressure



Linear guidance systems with low-friction seals: greater energy efficiency through halved friction



## Flowwrapping Machines: Intelligent Flexibility



They are the workhorses of the packaging industry: flowwrapping machines are used to fill a nearly unimaginable number of products. Here, maximum dynamics are essential for increasing productivity.

Whether coffee, cereal or gummi bears: the physical principle of gravity is simple, but implementing into highly productive and flexible, vertical bagging machines requires high-performance automation. These machines process bags of various sizes and varying materials and special shapes. Operating even faster are the horizontal flowwrappers, which perform more than 1,000 cycles per minute.

At these speeds, intelligent functions ensure maximum flexibility: for example, following a change to a parameter by the operator, Rexroth's "FlexProfile" automatically adapts all affected axial movements. The result: faster format changes and adjustments without waste. Other functions prevent empty bags in the event

High dynamics: high-performance drive and control solutions





Fast format changes:  
intelligent functions in the  
control increase flexibility

that no product is present or sealing in the event of incorrect synchronization. This ensures the highest productivity and the lowest error rate.

The decentralized drive technology with intelligent, motor-integrated drives, sets new standards here for compact machine concepts. The switch-cabinet volume is reduced by up to 70 percent and the cable requirements are reduced by up to 85 percent while maintaining optimum accessibility to the drives. But there is more: with innovative Condition Monitoring for all drive technologies, Rexroth ensures maximum availability. The Productivity Agent monitors entire electromechanical axes with no additional hardware and reports wear before a failure

occurs. Pneumatic sensors that simultaneously report process and diagnostic data safeguard process stability. Minimum quantities and lifetime lubrication in the linear technology reduce maintenance requirements.

The openness and flexibility of the Rexroth system solution forms the ideal basis for consistent automation: the Rexroth controls are perfectly compatible with all machines over the entire production process and standardize operation. The result: maximum flexibility and productivity.

Scalable: the right component for every job



## Pickers and Robots: Detect, Grab, Align, Set Down

Produce and package various products on one line: robots with modern vision systems quickly and reliably assign the right packaging. The integrated safety technology from Rexroth ensures maximum availability.

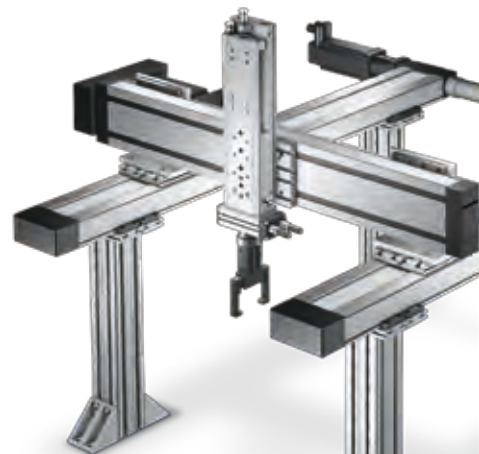


Robot systems have been gaining in importance for years for economical packaging processes. To attain 180 picks per minute, for example, individual axes must accelerate at up to 10g without damaging the product or machine. This is only achieved by highly dynamic drives and high-performance controls.

Rexroth controls bundle motion, PLC and robotic functionalities in a single piece of hardware. More than 100 realized robotic kinematics, including belt synchronization, simplify the implementation of a wide range of tasks. Thus, a control can regulate several robots of different types and kinematics in parallel. This reduces automation requirements considerably and increases flexibility in the event of changes. The system solution with consistently open interfaces and software standards, offers maximum freedom for the integration of vision systems and other peripheral devices.



The drive-integrated “Safety on Board” safety functions significantly reduce changeover and troubleshooting times. The operator switches only the respective modules to safe operation without needing to power down the entire system. As a result, the necessary work can be performed safely and the down time, can be reduced substantially.







Rexroth offers consistent functional safety at all automation levels and in all technologies and products: In this regard, focus is also always on the interplay of different components. Rexroth specialists support machine manufacturers from planning to commissioning during the economical implementation of the current and upcoming safety standards.



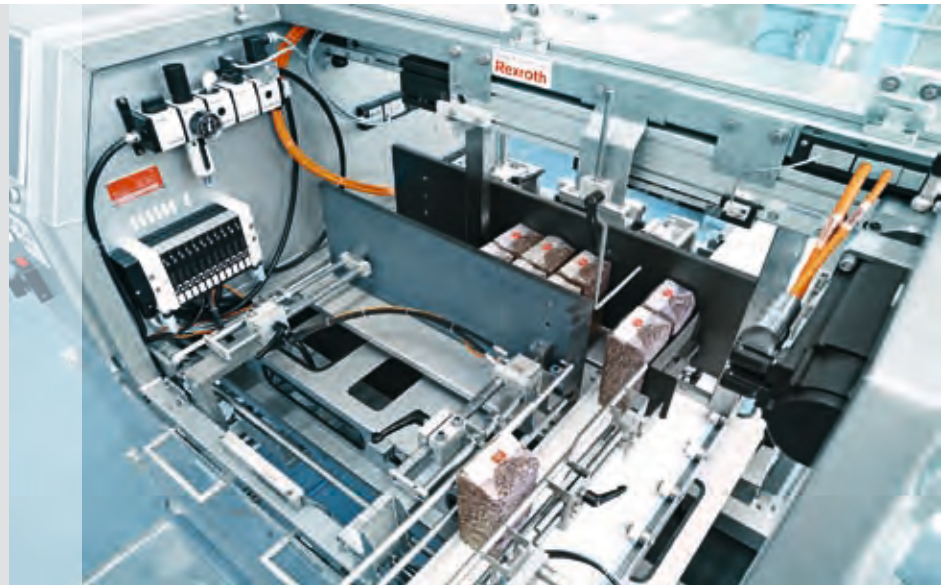
Freely combinable pneumatic and electric actuators – quickly and easily create application-specific handling systems with the camoLINE building system



Flexible: Rexroth controls fully master PLC, motion and robotics

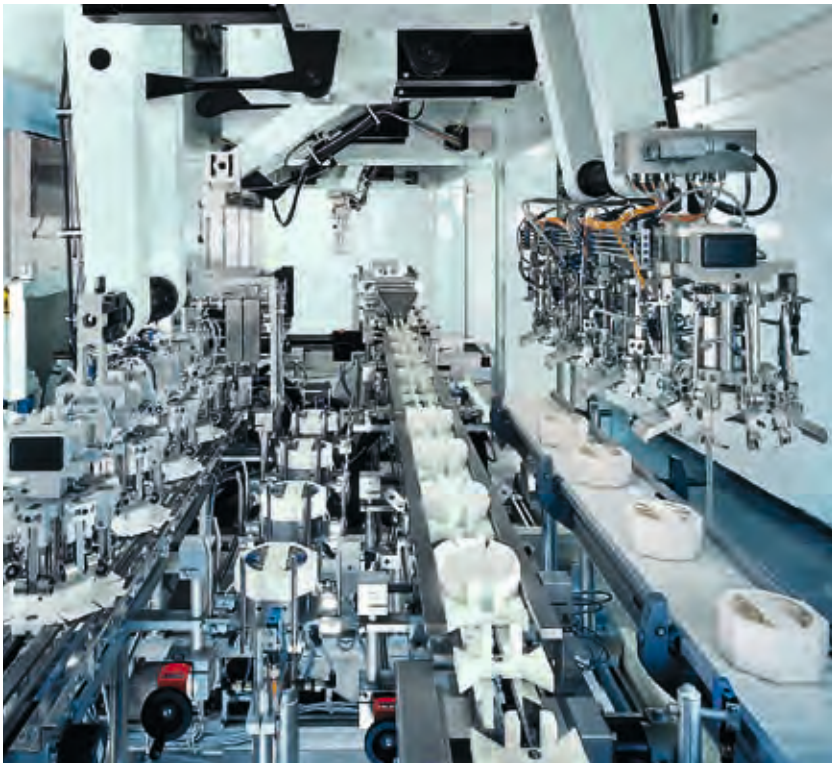
# Cartoning Machines and Case Packers: Open Data Exchange for Secondary Packaging

Grouping a wide range of products and packages and repacking in boxes: for the cartoning machine, a variety of machine types and modules are used. With the finely scalable control technology from Rexroth, they are part of a highly productive complete solution.



Position, fill and seal trays

Perfectly matched to one another: all drive and control technologies from a single source

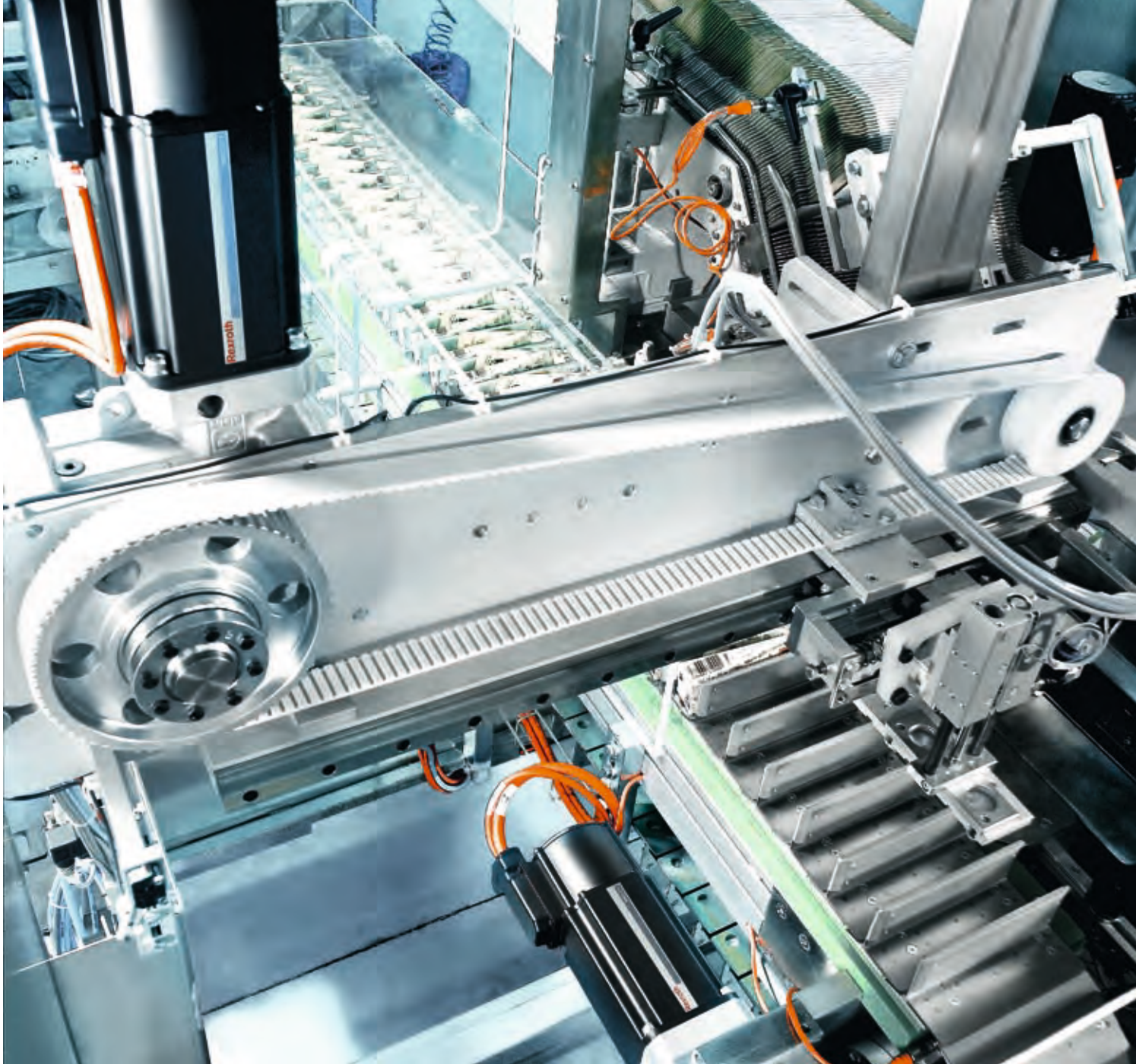


Almost like magic: with the Magic Belt, Rexroth bundles the function of multi-tension chains for intelligent product distribution in one function module. Only through optimum grouping can top and side loaders attain their full speed, for packages of varying sizes. Rexroth simplifies the flexible interaction of various machines and modules. The controls, which are finely scalable with respect to performance and functionality, cover a wide range of complexity levels.

For communication, Rexroth relies on the globally accepted SERCOS III standard. This standard, which is supported by numerous manufacturers, combines Ethernet physics with proven real-time mechanisms for drive communication.

But there is more: SERCOS III facilitates real-time cross-commu-





nication of Rexroth controls. This technology opens new possibilities for arranging machines and modules into production lines according to the needs at hand. With just a few mouse clicks, the participating controls synchronize with one another with no mechanical setup effort and form a production line.

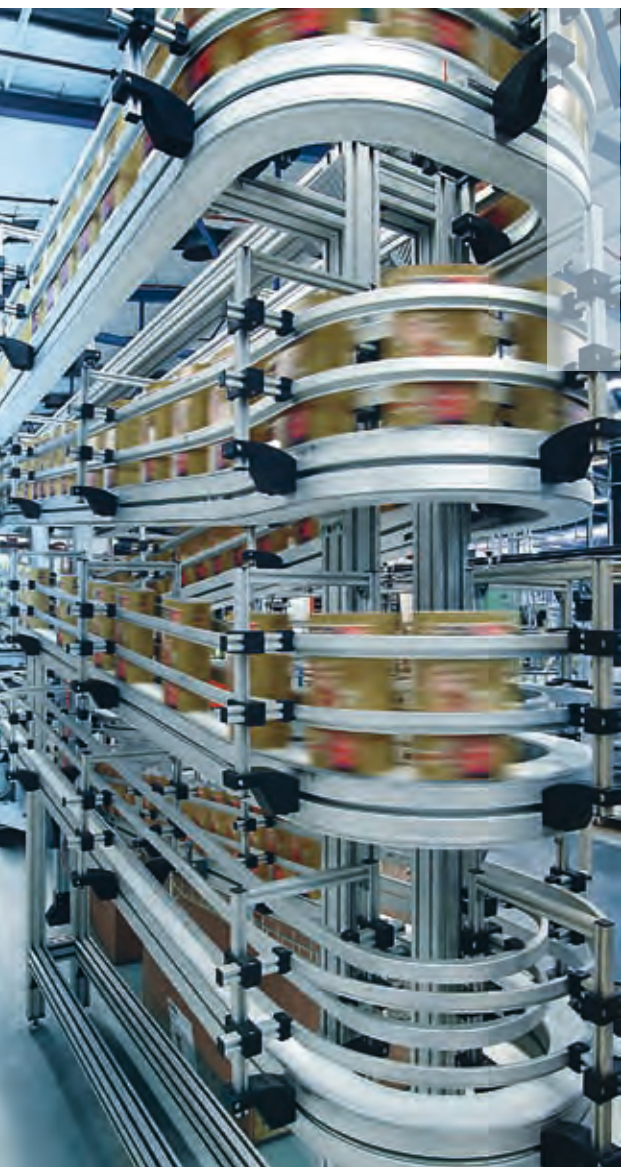
The innovative connection technology with the Easy-2-Combine feature accelerates the adjustment-free assembly and commissioning

of handling facilities. With this system, the user can, assuming identical connection dimensions, freely combine electric and pneumatic actuators, for example for Cartesian robots within the camoLINE axis building system. This saves design time, since the components of the axis building system are perfectly matched to one another. The pneumatic cylinders offer high drive force with stable guidance, even with minimal dimensions. The intelligent stroke-

adjustment concept and the high precision and repeatability ensure high productivity. The form-fit connection technology replaces up to 70 percent of previously necessary self-fabricated adapters. This greatly reduces installation costs and has an additional side effect: the handling system is much lighter and requires less energy – even while maintaining the same dynamics.



## Transport and Palletizing: Able to Meet All Requirements



Customized:  
extensive modular system  
for material flow

**Ready to ship: during order picking, focus is on fast and efficient handling. With drives and controls, electromechanical axes and pneumatic actuators, with highly**

**flexible chain conveyor systems or customized, complete assembly groups, Rexroth contributes to smooth operation.**

Precise supply, gentle transport and customized palletizing round out the automation offerings for the manufacture and packaging of dry food and confectionery, body-care, hygiene and pharmaceutical products. Here, too, customized system solutions from Rexroth increase the Overall Equipment Efficiency. The integration of motion, logic and robotics in a single piece of hardware creates the basis for complete integration in the automation process: from Cartesian systems to Delta and Scara robots, the system solutions control all motion tasks within the entire production line. The consistent engineering environment for all Rexroth controls and drives further expands this advantage and considerably reduces training costs.

In many cases, Rexroth replaces programming by parametrizing, thereby simplifying the implementation of even complex pallet patterns. For example, the belt-tracking function tracks the boxes on the infeed belt and the integrated path planner optimizes the movement sequences. This increases the flexi-



Fast, flexible, space-saving: the VarioFlow chain conveyor system





bility for fast product change-overs and ensures high machine availability, particularly as the integrated safety technology also reduces downtime.

The VarioFlow chain conveyor system, available in many variants, performs transport tasks between the individual stations. Low costs and low noise are achieved through

long transport paths, low motor power and with the patented curve technology. Standard solutions from the extensive line of products satisfy even complex requirements.

## Rexroth: Everything From a Single Source

**Fully compatible with one another, energy efficient, scalable and safe: the extensive Rexroth modular system offers the decisive starting points for reducing the Total Cost of Ownership of a production line.**

The combination of all drive and control technologies from a single source complements the technologies ideally and incorporates the specific advantages of each. Particularly well suited are the components and modules for sensitive wet and dry areas developed in accordance with the directives for Hygienic Design; the excellent scalability supports the economical standardization within the entire filling line. And intelligent assembly groups decentrally automate modules and stations that the Rexroth system solutions flexibly integrate into production lines.



As a one-stop-shopping-partner, Rexroth is able to reduce the complexity of even complicated systems and ensures maximum flexibility, optimum energy efficiency and maximum safety – the decisive lever for reducing costs in the life cycle of a production line.







## Bringing System Partnerships to Life – Experience for Efficient Results

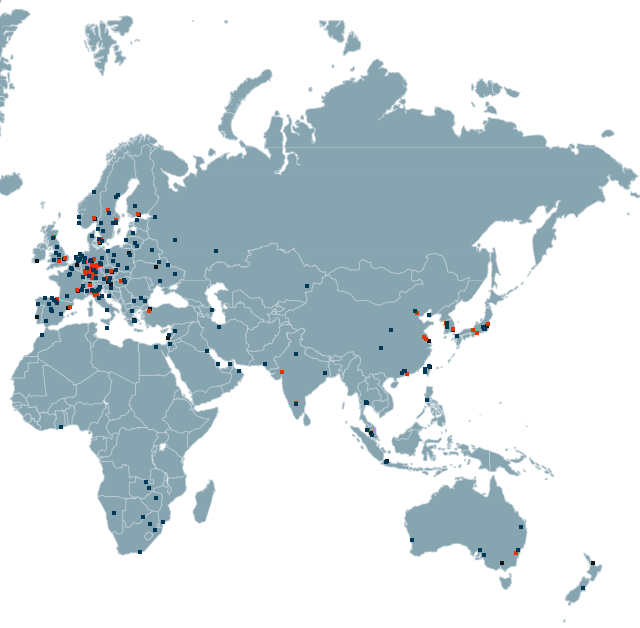
The industry specialists from Rexroth pool their worldwide application experience and are familiar with the special challenges that food and packaging machines pose for automation technology.

As industry insiders, the specialists from Rexroth are aware of the special requirements relating to the automation of food and packaging machines. These specialists cooperate closely with Rexroth's worldwide organization in more than 80 countries. Since Rexroth technologies enjoy an excellent reputation with end customers, the company's specialists constantly pool information on the latest developments and challenges in the plants.

Working closely with machine manufacturers, the industry specialists from Rexroth continually develop innovative solutions. Even after commissioning, the worldwide sales and service network of Rexroth monitors the entire life cycle of machines all over the world.

Rexroth helps end customers to coordinate complex international projects. Projects are managed reliably through the combined resources of Rexroth. Permanent contact partners ensure that projects run smoothly and are completed on time.

The automation solutions tailored perfectly to the particular tasks and the company's worldwide organization are important prerequisites. But the highly qualified industry specialists from Rexroth for all drive and control technologies guarantee more: experience for efficient results.



Further information on  
Rexroth's range of solutions  
for the food and packaging  
industries can be found in the  
overview brochure and in the  
detailed brochures "Beverages  
and Liquid Foods" and "Cos-  
metics and Pharmaceuticals".

Bosch Rexroth AG  
Postfach 13 57  
97803 Lohr, Deutschland  
Bgm.-Dr.-Nebel-Str. 2  
97816 Lohr, Deutschland  
[packaging@boschrexroth.de](mailto:packaging@boschrexroth.de)  
[www.boschrexroth.com/packaging](http://www.boschrexroth.com/packaging)