

# Thinking ahead. Driving forward. Leading the way. Product innovations in 2015





## The solution has to be perfect: Innovation from Bosch Rexroth

All over the world, there are completely different ideas about "innovation": In industrial countries, it is mostly technology-driven, and is generally about "faster, higher, further". In other regions, it refers to solving a task using minimum resources and a design which is concentrated solely on functionality – only those who understand the local requirements and develop customized solutions on-site with researchers and developers can satisfy local needs in a global economy.



Design: Ottenwälder und Ottenwälder

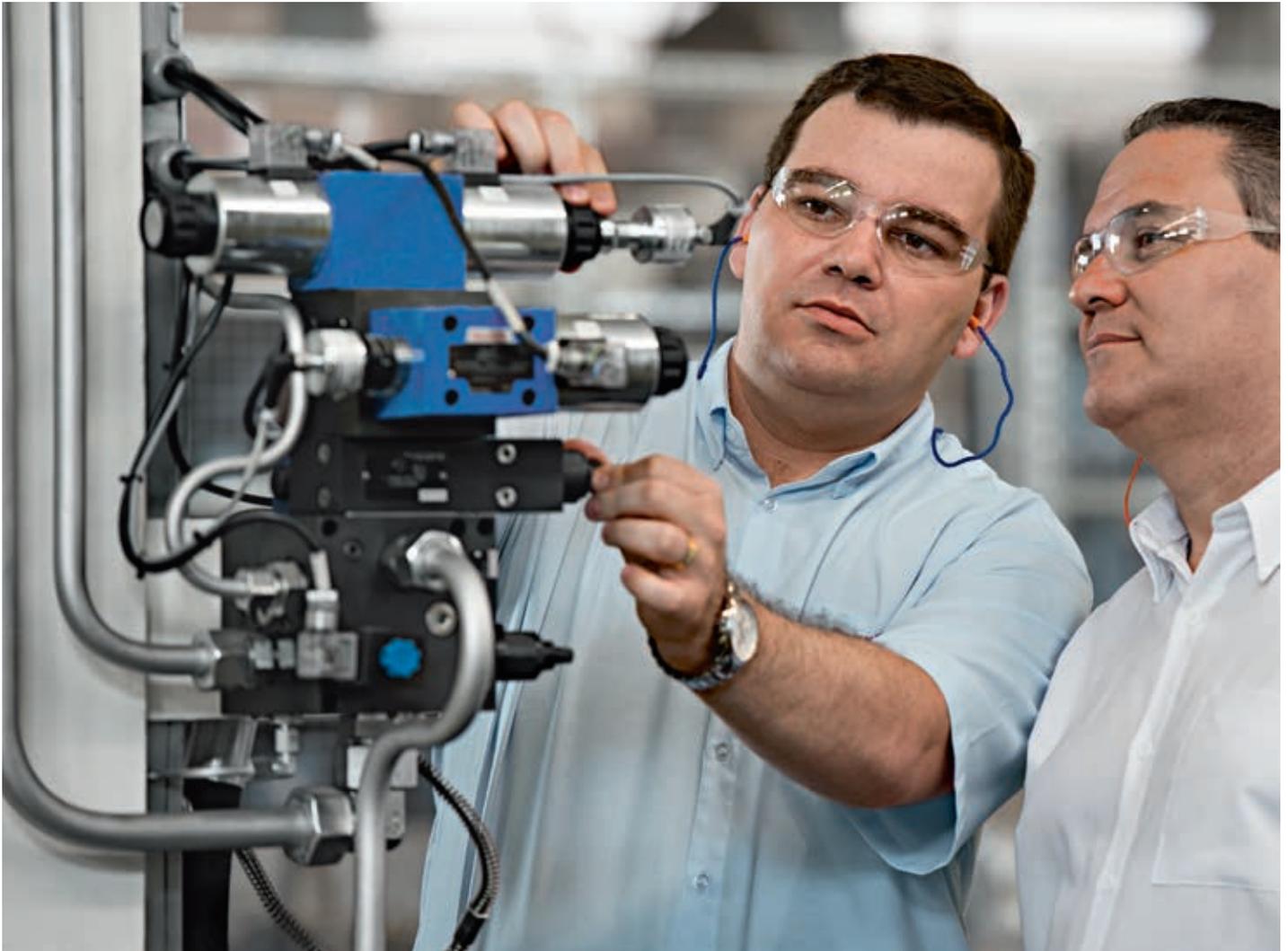
At Bosch Rexroth, regional developers work in a network in close collaboration with their international colleagues. This results in innovations in virtually every field of application and in all industries. They set worldwide standards and help customers on-site, every day.

For this to happen, we invest substantial sums of money and the creativity of thousands of engineers in research and development – year in and year out. Our R&D quota has been above the industry average for years. More than 2,100 specialists work at Rexroth on new products, solutions and services. They identify long-term megatrends which serve as indicators for changes in the markets, society and legislation. For instance, the "Internet of Things" has been in the spotlight for years. From this, we can systematically derive short- and medium-term requirements which we fulfill with developments based on known technologies.

At the same time, we continue to develop existing solution principles for the long term, or look for new approaches. This is why Bosch Rexroth itself also consciously acts both as a supplier and as a user in the field of machinery automation, for example. And in 2014 one of its assembly lines won the industry 4.0 Award for the best networking of people, machinery and processes. The key to this lies in our consistent Open Core Engineering approach, the right components and optimal data networking at production level. Providing modules for this, which just continually improve – that's the Bosch Rexroth goal. This is a requirement for innovation which we, as a worldwide market leader, also have in your industry.

Here you can discover some of the most important innovations of the past and next six months.

# Overview



From the latest components, such as special interfaces for Open Core Engineering to global multi-technologies e.g. variable-speed pump drives: this brochure provides you with an overview of recent innovations at Bosch Rexroth. Completely new developments and significant improvements are detailed with technical highlights that will help you to increase your productivity and lower your operating costs in a sustainable way.

Let us inspire you to make your processes, systems and machinery more economical and future-proof, piece by piece.

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**This brochure contains information on new products. Accurate information about availability can be obtained from your responsible contact person in Sales.**



**Quicker access to all product information**

Rexroth's new service isn't much to look at – just a small QR code that can be as small as 7x7 mm, but it opens up a whole new world of information. Looking for your nearest service contact? Need a manual? Or product data? Information on commissioning? Simply use your smartphone or tablet to scan the QR code and you have all the relevant product information immediately to hand - and in the language of your choice. In the language version that you want.

**Your key to our unique online services**

The QR code is thus gradually becoming the master key, providing easy access to an unrivaled range of online services and tools which Rexroth already offers, and is constantly expanding. Thousands of device numbers have already been incorporated into the system and linked up. More are being added every day. Links to the catalog and the mobile pages of the service area will make you even quicker and more flexible in future, and will increase your operational capabilities. Simple and highly efficient.

**Your benefits**

- ▶ Quicker access to product data, documents and catalogs in your own language as well as local contact information
- ▶ Works with standard smartphones and standard QR code readers
- ▶ Even simpler access to Rexroth's online services and tools – across all fields (hydraulics, control technology, drive technology, linear motion technology, assembly technology)
- ▶ QR code reader function incorporated into product-related Rexroth apps
- ▶ Automatic commissioning operations can be carried out using apps
- ▶ Links to online catalog and web shop will allow you to be even faster in future

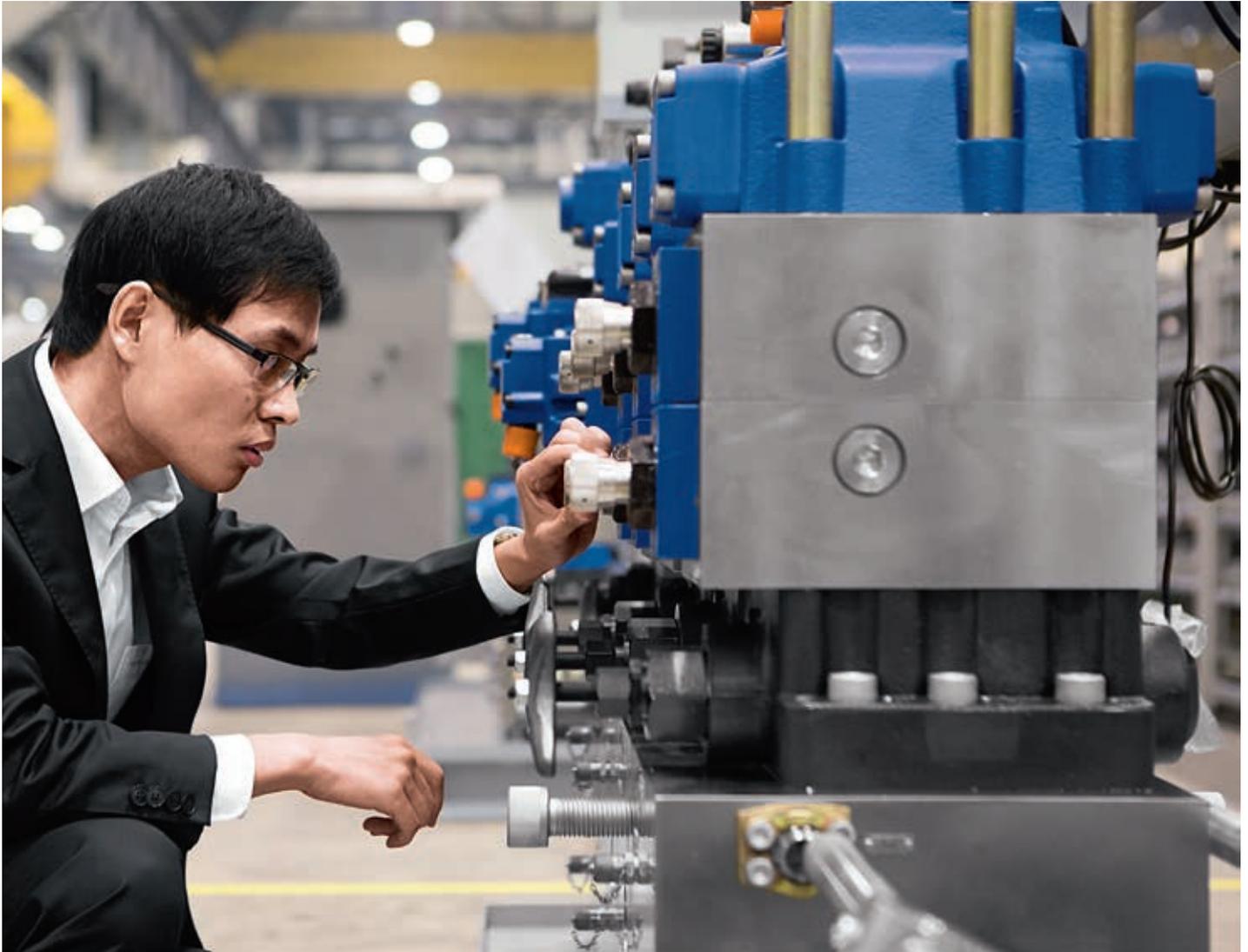


▲ The product QR codes are fixed onto on the component's name plate, or directly on the front of the device where they are clearly visible. This makes them easy to scan using the smart device.



▶ Scan the code to the right to find out more about Rexroth's QR code service concept





## Hydraulics product innovations: for enhanced availability, performance, and engineering consistency

Whether it's a greater torque in the smallest of spaces as with direct drives, the largest flange filter in the market, a new benchmark for pump control systems, powerful ATEX actuators, or universal motion logic engineering tools – Rexroth's system competence is evident in every detail of the new hydraulic components. Why not experience the benefits for yourself?

# Häggglunds CA 10 to 40: Small but highly efficient power packs

Smaller, lighter, and more powerful, the new Häggglunds radial piston motors are a winning combination of extremely high power density and compactness. With its ideal power-to-weight ratio and its wide speed range, as well as its many flexible configuration options, this tried-and-tested technological platform gives you that extra bit of help for making targeted improvements to your machinery.



## Less weight, more torque, more flexibility

The new compact Häggglunds hydraulic motors rely on a technology that has proved itself in the rigors of industrial operations, and they have been continuously enhanced to keep pace with the latest market developments. The result is power packs with unbeatable flexibility and an extremely wide area of application. The basic version is already available and is ideally suited to plastic injection molding machines and an enhanced version will soon be available for use in the high-performance field – for example in presses and in the offshore and recycling sector. Smaller than comparable motors but with a wider torque range extending from 8 to 40 Nm/bar, it is highly efficient and its many connection options enable it to be ideally customized for your specific application. Greater power density in such a compact form is hard to find.

## Benefits of special product features

- ▶ Minimal weight
- ▶ Wide speed range
- ▶ Proven technology, low life cycle costs
- ▶ Optimum power-to-weight ratio for improved efficiency
- ▶ High torque in the smallest of spaces
- ▶ Compact design with flexible connection options

## Key Technical Data

- ▶ Specific torque characteristics:  
8 Nm/bar (CA 10) – 40 Nm/bar (CA 40)
- ▶ Displacement: 503 cm<sup>3</sup>/rev to 2,513 cm<sup>3</sup>/rev
- ▶ Speed: 260 to 350 rpm
- ▶ Max. operating pressure: 250 bar
- ▶ Connections: DIN 5480 N70 x 3 x 30 x 22 (CA10, CA20)
- ▶ DIN 5480 N100 x 3 x 30 x 32 (CA 30, CA 40)

# Häggglunds DUE Compact: the ultra-compact drive unit

The new compact direct-drive unit features everything that you have come to expect from Häggglunds systems: top performance, together with great flexibility and superb functionality, but now in the most compact form ever. Use the tried-and-tested, excellent configuration options and customize the system to suit your wishes. Häggglunds will then provide fast delivery and a sophisticated monitoring system to ensure trouble-free operation.



## Sophisticated technology in the smallest of spaces

Häggglunds drive units have a proven track record in countless applications. The modular system is especially easy to adapt to any requirements. Customers appreciate its great flexibility, its technically sophisticated standard functionalities – and now also its extremely compact design.

Featuring the tried-and-tested Häggglunds monitoring system and seamless technological concept, it takes your whole drive system to a new level – quickly and easily. Permanently.

## Benefits of special product features

- ▶ Compact design
- ▶ Great adaptability to any customer applications
- ▶ Tried-and-tested standard functions (identical to those of the conventional DUE)
- ▶ Very easy to install
- ▶ Sophisticated technology

## Key Technical Data

- ▶ Connection power rating: 11 to 55 kW
- ▶ Max. flow: 265 l/min (50 Hz), 317 l/min (60 Hz)
- ▶ Max. pressure 350 bar
- ▶ Häggglunds Spider Control System

# IndraMotion MLC: motion logic control for hydraulic drives



The enhanced IndraMotion MLC is a motion logic system which is not only optimized for hydraulic drive tasks, but can also be used for the operation of electric, hydraulic, and hybrid drives. With open programming and interfaces, as well as scalable hardware and software, it is consistently easy to use and can reduce your engineering workload by as much as 50%. One of its really useful features is a toolkit function specifically designed for hydraulic drive tasks.



## Quick programming, project planning, commissioning

Every detail of the new IndraMotion MLC really makes users appreciate the know-how that we acquired from designing many thousands of applications: the intuitive operation of all the drives, the S20 module support for incremental encoders, the simple wizard-supported configuration, the open controller interfaces and the customized scalability of the product range – a single tool enables you to control all your drives, no matter what technology they are based on. You save time in programming, project planning and commissioning, as well as in the tracing and rectifying of faults.

## Benefits of special product features

- ▶ Best-in-class hydraulics motion control with optimized controllers for controlling position, speed, pressure and force, changeover control (position/pressure/force), state feedback, comprehensive synchronization functions and variable-speed pump drives
- ▶ Easy and clear programming of motion sequences by means of sequential programming
- ▶ Automatic code generation using GAT template
- ▶ Supports S20 2 axis module for hydraulic drives and S20 incremental encoder module
- ▶ Integration of IAC multi-Ethernet valves and VT-HMC 1 axis controller
- ▶ Extended hydraulic functions (best-in-class controller and sequence programming)
- ▶ Initial parameterization wizard for hydraulic axes incl. pre-calculation of controller parameters

## Key Technical Data

- ▶ Central control of up to 32 hydraulic axes
- ▶ Extensive hydraulics libraries
- ▶ PLC programming to IEC 61131-3
- ▶ Flexible multi-connectivity with Ethernet Sercos, PROFINET, EtherNet/IP and PROFIBUS
- ▶ Scalable control system based on IndraControl L and XM hardware
- ▶ Flexible, hydraulic-specific I/O axis in a modular or block design

# Hydraulic Motion Control

## VT-HMC: optimal control of electro-hydraulic axes



The new VT-HMC motion controller is a digital control system featuring a built-in axis controller and IEC61131-3 programming. A motion-logic system specifically optimized for electro-hydraulic axes – with open programming and interfaces, it is future-proof, scalable, and simple to use.



### Best in Class: simple, open, scalable

With the VT-HMC simplicity is the keyword: simple, highly dynamic control of every aspect (position, speed, pressure and force control, changeover control [position/pressure/force] and state feedback). Simple, seamless engineering. Simple communication and programming via open interfaces and all commonly used bus systems for control, servicing and diagnostics. Simply better control of electro-hydraulic axes.

### Benefits of special product features

- ▶ Best-in-class hydraulic controllers
- ▶ Openness in communication: supports all commonly used Ethernet bus systems
- ▶ Consistently simple engineering due to fast parameterization and operation with IndraWorks
- ▶ Robustness and reliability due to extended temperature range
- ▶ IEC 61131-3 programming, simple and quick programming of a wide range of functions
- ▶ Initial parameterization wizard for hydraulic axes incl. pre-calculation of controller parameters

### Key Technical Data

- ▶ Bus connection (Sercos, EtherCAT, EtherNet/IP, PROFINET RT, PROFIBUS DP, POWERLINK)
- ▶ IEC 61131-3 programming
- ▶ Extended temperature range: -20 °C to 60 °C
- ▶ Extensive hydraulics libraries
- ▶ Scan time: 0.5 ms for force controller/1ms for position controller
- ▶ Actual value recording: 4 analog inputs 1x linear position measuring system SSI or incremental or EnDat2.2

# IAC multi-Ethernet control valve: high-precision, simple operation, and flexible adjustment options



Rexroth is expanding its IAC multi-Ethernet product portfolio with a pilot-operated control valve featuring an integrated axis controller. The robust and user-friendly valves are enhanced with optimized hydraulic controllers, are individually scalable, and support all commonly used Ethernet bus systems. The IndraWorks engineering environment allows intuitive operation for quick and easy commissioning, parameterization and diagnostics.



## **4WRLD25 – scalable, best-in-class hydraulic controllers**

Rexroth has acquired unrivaled knowledge of the interaction between hydraulics and motion control technology. This is the basis on which the control strategies for hydraulic and hybrid drives have been optimized and immediately translated into deployable software. The result is high-precision, highly flexible, best-in-class hydraulic controllers. And optimal scalability: the wide range of valve and axis controller functions enables you to cater for the specific requirements of your applications. Maximum precision and functionality minimize your technical risk, at the same time reducing commissioning costs. The ultimate in efficiency!

### **Benefits of special product features**

- ▶ Integrated digital axis control functionality with position, force, and pressure control, as well as position/pressure or position/force changeover controls
- ▶ Open communication: supports all commonly used Ethernet bus systems (Sercos, EtherCAT, EtherNet/IP, PROFINET RT, Varan and Powerlink)
- ▶ Seamless engineering with the IndraWorks DS engineering tool: simple and quick commissioning of all components, and single-source support
- ▶ Flexible scalability: large selection of different valve types for greater operational flexibility
- ▶ Robust and reliable: extended temperature and vibration ranges
- ▶ Wizard-based configuration (with suggested values)

### **Key Technical Data**

- ▶ Bus connection/service interface (Sercos, EtherCAT, EtherNet/IP, PROFINET RT, Varan)
- ▶ Maximum operating pressure: 315 bar
- ▶ Maximum flow: 900 l/min
- ▶ Scan time: 0.5 ms for force controller, 1 ms for position contr.
- ▶ Actual value capture: 2x configurable analog sensors (current/voltage), 1x linear position measurement system (SSI, EnDat 2.2 or 1Vss)
- ▶ Size 10, 16, 25

# ABPAC Basic – the clever power unit: configurable, modular, networked



Intelligent and customized: the new standard, medium-range power unit is the cost-effective way to quickly build tailor-made solutions. Easy to configure using the online configurator, it features intelligent sensor technology, providing comprehensive condition monitoring reports via open communication interfaces. It is energy-saving in day-to-day use, and can be delivered quickly since most of the components are included in the GoTo program.



## Tailor-made economy, intuitive control

All-round cost-effectiveness and future-proofing: The modular standard power units enable you to respond quickly and flexibly to customer and market demands. An online configurator helps you to put together the motor-pump assembly, control blocks, filters and accessories in a fully customized way. With everything fully documented, including a specified price. Supported by open interfaces, and even with the option of using Rexroth's cloud & remote services and condition monitoring facilities via smart devices – irrespective of the higher-level systems. A user-oriented introduction to Industry 4.0. It all saves money – and energy during operation. And also time – selecting from the GoTo program ensures super-fast delivery schedules.

## Benefits of special product features

- ▶ Customized online configurator for complete power unit
- ▶ Optimized tank volumes
- ▶ Multi-functional block including all basic functions and variable interfaces to the hydraulic control systems
- ▶ Enhanced sensor technology as the basis of condition monitoring
- ▶ User-oriented, platform-independent visualisations on smart devices
- ▶ Connectivity via WLAN and other flexible, open interfaces
- ▶ Web-based, flexible data capture and processing
- ▶ Sytronix FcP and SvP variable-speed drives for energy-efficient drive operation

## Key Technical Data

- ▶ Tank volume: 100–1,000 l/min
- ▶ Maximum flow: 200 l/min
- ▶ Maximum operating pressure: 315 bar
- ▶ Multi-functional block
- ▶ FcP 5020 and SvP 7010 Sytronix drive options
- ▶ Integrated dampening function
- ▶ Simplified, flexible steel construction using Rexroth basic mechanical elements

# Return flow filter 25 TE: robust and powerful

Extremely robust, and made for extreme environments: the cast metal design of the new tank-mounted return line filter is resistant to the effects of external forces, yet extremely practical due to the large line connections which make high flow rates possible, even for low-viscosity fluids. Perfect for the heavy-duty sector.



## **Exterior casting combined with large internal volume**

Particularly in heavy industry and mining, as well as the metallurgical industry, the new 25 TE return flow filters (0101 to 1051) really come into their own: as robust as they are effective, they can be placed directly on the tank of a hydraulic or lubrication system, or built into the pipe-work as an inline filter. Large connections in the most compact overall design enable flows to be maximized throughout, even at low flow speeds. Practical: the modular design of the back pressure indicator.

## **Benefits of special product features**

- ▶ Robust cast metal design: ideal even for heavy-duty applications (mining, metallurgy)
- ▶ Large line connections: for high flow volumes at low flow speeds (ideal for low viscosity fluids)
- ▶ Modular design of back pressure indicator

## **Key Technical Data**

- ▶ Maximum operating pressure 25 bar
- ▶ Maximum flow 314 l/min
- ▶ Connector G1 to SAE3" – 3,000 psi
- ▶ Tank design

# Filter 450 FEN Gen. 2X

## The largest flange filter on the market

It simply devours fluids: the new 450 FEN flange filter permits unprecedented flow rates of up to approx. 1,000 l/min., thanks to a highly effective cyclone action, combined with a 50 millimeter connection. As it is simply mounted laterally onto the manifold block, the whole design remains very compact. The modular design also facilitates subsequent adjustments, as well as replacement of the preceding version.



### Compact, with cyclone action: achieves 1,000 l/min

Maximum power in the minimum space is the defining characteristic of the 450 FEN new generation of filters. With a maximum operating pressure of 450 bar and its highly efficient, special filter materials, it uses a wide pressure differential range to filter out reliably the finest of particles, together with very large amounts of dirt. The maintenance indicator with memory function is just as much a standard feature of the system as the bored and sealed measuring port. Modular attachment of a wide range of electronic switching elements to match your specific needs is also possible. Who else offers anything comparable in the market?

### Benefits of special product features

- ▶ Highly efficient due to the flow-enhancing cyclone effect and special filter materials
- ▶ High-performance: unbeatable flow volumes with fewer filters per unit
- ▶ Compact: smaller filters can be selected to minimize space requirements
- ▶ Modular: fewer components, enhanced adaptability

### Key Technical Data

- ▶ Maximum operating pressure 450 bar
- ▶ Up to DN50, max. flow approx. 1,000 l/min
- ▶ Cyclone effect
- ▶ Connection diameter 50 mm
- ▶ Block mounting
- ▶ Measuring points and series drain screw from size 0160 upwards

# LFA\_DB\_-7X/\_E built-in safety valve to PED standards: Replace up to 15 valves with just one!

Bosch Rexroth's answer to increasing cost pressures and more exacting safety requirements: just one of the new type-examination tested cartridge valves (logic valves) replaces up to 15 cartridge units in hydraulic systems – and caters for pump volumes of up to 5,000 l/min. This considerably reduces manufacturing and operating costs, including when retrofitting or upgrading an existing system.



#### Key Technical Data

- ▶ Max. relief pressure 400 bar
- ▶ Max. flow 5,000 l/min
- ▶ 4 graded pressure ranges (50 to 400 bar)
- ▶ Standard installation bore to ISO 7368
- ▶ Safety valve to PED 97/23/EC
- ▶ Leakage-free

#### Saves space – and costs

The new pilot operated two-way pressure relief logic valves provide high flow volumes and pressures of up to 400 bar – but much more cost-effective than previous solutions. The compact design simplifies hydraulic switching cycles and reduces inspection workload during operation as well as material and installation costs. Up to 15 individual cartridges are replaced by a single "LFA\_DB\_-7X/\_E" valve. And it meets the latest standards and is type-examination tested. The required relief pressure is factory-sealed and can be reduced to lower values as an option, which considerably simplifies functional tests and reduces maintenance workload. What's more, the logic valves are leakage-free and they reduce the dreaded "silting effect". What more could you ask for?

#### Benefits of special product features

- ▶ Compact design: lowers the costs of both block and components
- ▶ 4 graded pressure ranges: for higher relief pressure, fully adjustable to pump volume
- ▶ Modular design with tried-and-tested components
- ▶ Piston seal fitted as standard: no internal leakage, reduced silting effect, optimal response curve

# ND6 explosion-proof, directional valve with inductive proximity sensors: safe, field-proven, certified

Rexroth is adding the new Size 6 position-monitored directional spool valve to its wide range of explosion-proof valves. The integrated contact and contactless position monitoring system enables you to increase your range of explosion-proof applications quickly and simply, using tried-and-tested technology, to improve your safety-related performance.



## Explosion-proof safety to ATEX and IECEx standards

Extremely robust and highly flexible – the new ATEX directional valves incorporate Rexroth's proven know-how in the field of explosion-proof environments. The ATEX- and IECEx-certified valves operate with our customary reliability via solenoid actuation and they use an inductive proximity sensor to monitor switching positions. Even in adverse operating conditions. The valve housing and solenoids are galvanized to cope with such conditions, allowing you to expand your range of applications quickly and easily.

## Benefits of special product features

- ▶ ATEX- and IECEx-certified valve solenoid and inductive proximity sensor
- ▶ Increased diagnostic coverage (DC) for calculating the performance level of safety-relevant applications
- ▶ Practical: Proximity sensor with M12 plug-in connection
- ▶ Proven technology: quick installation of both single and bank assembly options, quick commissioning

## Key Technical Data

- ▶ Max. operating pressure 350 bar
- ▶ Max. flow 70 l/min
- ▶ Use to Explosion Protection Directive 94/9/EC: II 2G
- ▶ Ignition protection of valve solenoid: Ex e mb IIC T4 Gb to EN60079-7:2007/EN 60079-18:2009
- ▶ Ignition protection of the inductive proximity sensor: Ex II 2G Ex ia IIC T6 to IEC60079-0:2011/IEC60079-11:2011
- ▶ Galvanized valve housing and solenoids

# PGH55 internal gear pump: the space-saving specialist for presses and stand-alone axes

Compact high-pressure pumps round off the size range up to 250 cm<sup>3</sup>. Ideally suited to space-saving use in presses and self-actuating axes. Whether acting as a double pump or motor pump unit with alternating rotation, it is a simple and effective way to expand your project planning options.



## Pressure increased, space saved

Compared to standard combinations, the main attraction of the PGH55 internal gear pump is its decidedly short form, which makes it the obvious choice for compact axes. But the best thing is what's inside it: this power pack has a fixed displacement of up to 250 cm<sup>3</sup>, and it operates with a high level of efficiency and very low moment of inertia. And operation is fully variable, either as a double pump or motor pump unit. Your presses and self-actuating axes gain the benefit of this performance.

## Benefits of special product features

- ▶ Extremely compact: saves considerable space compared to standard combinations
- ▶ Efficient: excellent operating efficiency
- ▶ Fast: low moment of inertia
- ▶ Variable: Operates as a double pump or motor pump unit

## Key Technical Data

- ▶ Displacement 160 to 250 cm<sup>3</sup> in combination
- ▶ Nominal pressure 315 bar
- ▶ Peak pressure 350 bar
- ▶ Alternating direction of rotation possible when operating as a motor pump

# A4VHO high-pressure pump: the first variable displacement pump to operate at 630 bar

This is how quickly you can gain an advantage in the market: with with the world's first variable drive to operate at 630 bar. This means that you can build more compactly and reduce your installation workload, saving money as well as avoiding potential impacts in hydraulic systems. Not to mention the great energy efficiency and the reduction of current spikes. A true pioneer.



## Key Technical Data

- ▶ Maximum speed,  $n_{max} = 1,500$  1/min
- ▶ Nominal pressure,  $p_{max} = 630$  bar
- ▶ Q variable from 0 to 675 l/min
- ▶ High swivel speeds of up to 200 ms
- ▶ Through-drive with 100% torque for tandem pumps
- ▶ Up to 2 x 700 kW drives can be installed

## Builds and reduces pressure with the greatest of efficiency

For the first time ever, the A4VHO provides a huge 630 bar nominal pressure at variable quantities. This opens up completely new possibilities for your state-of-the-art drive solutions: Very high power density, with up to 2x 700 kW drive power. Enables pressure to be increased and decreased using the same pump – with no extra effort involved and with superb energy-efficiency, as well as reductions in current spikes. All with minimal installation costs because, for example, movements only by means of the pump's swivel angle (without valves so there is no loss of energy). Utilize this competitive advantage.

## Benefits of special product features

- ▶ High power density: 630 bar nominal pressure, saves space, costs, and installation workload
- ▶ Variable: prevents impacts in hydraulic systems
- ▶ Efficient and inexpensive: pressure build-up and reduction with a single pump
- ▶ Clever: actuator movements only by means of the swivel angle, saves energy and installation costs

# SY(H)DFED multi-ethernet: the new benchmark for precision and flexibility



Best in class: New multi-Ethernet on-board electronics, coupled with tried-and-tested pump technology, opens up entirely new possibilities. It's never been easier to integrate control systems into modern machinery concepts or to retrofit components to existing systems. And all this with first-class closed-loop accuracy that provides the ultimate in simple operation and speedy commissioning.



## More open, scalable and user-friendly

The new SY(H)DFED series is based on the A10 and A4 axial piston pumps, which have a proven track record in a wide range of applications. They make an unbeatable pairing, together with the new on-board electronics using multi-Ethernet for open communication. Numerous electronic and uniform mechanical interfaces facilitate integration into a whole variety of new and existing machine concepts. The advantages of this are speedy integration and consistent scalability across all sizes of pumps. The intuitive IndraWorks engineering tool assists you with commissioning, parameterization, and diagnostics. In addition, this series sets the standard in terms of precision due to its best-in-class controllers.

## Benefits of special product features

- ▶ Openness in communication: supports all commonly used Ethernet bus systems
- ▶ Scalable due to the wide and flexible product program for customized machine concepts
- ▶ Consistently simple engineering due to fast parameterization and operation with IndraWorks DS
- ▶ Robust: service-proven pumps with integrated on-board electronics
- ▶ Energy efficient due to continuously variable pump adjustment
- ▶ Best in class: pressure control, flow control, power limitation

## Key Technical Data

- ▶ Sizes 18 to 355
- ▶ Volume (nmax) 60–533 l/min.
- ▶ Pressure range: 0–280/350 bar
- ▶ Ethernet-based communication: Sercos, VARAN, EtherCAT, POWERLINK, EtherNET/IP, PROFINET RT

# ATEX axial piston pump A10VSO: A low-cost solution for medium pressure needs in harsh environments

The pump that has proved its worth over the years in a larger version has now been made a size smaller: especially designed for the medium pressure range and the harshest of operating conditions (ATEX zone 2), the new A10VSO series of axial piston pump provides Rexroth's customary quality in a more compact form for smaller sizes up to 140 cm<sup>3</sup>. That's how easy it is to reduce costs.



## Robust, proven, variable

Now the new adjustable displacement drives perfectly complement the tried-and-tested portfolio of robust ATEX axial piston pumps, in a lower – i.e. medium – pressure range. Certified for use up to ATEX Zone 2 and with gases at temperatures of up to 135 °C, they make more cost-effective generator sets possible for the first time – in the oil, gas and chemical industries for example. The wide range of sizes available from 18 to 140 cm<sup>3</sup> means that you can match these power packs exactly to your requirements.

## Benefits of special product features

- ▶ Variable: variable displacement
- ▶ Cost-effective: small sizes specifically for the medium pressure field
- ▶ Robust: certified for use up to ATEX Zone 2, so no additional enclosure is needed, even in the harshest of environments.

## Key Technical Data

- ▶ 71/100 cm<sup>3</sup> displacement available  
18/28/45/140 cm<sup>3</sup> available soon
- ▶ ATEX II 3G ck IIB T4
- ▶ Controller: mechanical-hydraulic, DR, DFR(1), DFLR, DRG
- ▶ Medium pressure pump: operating pressure 280 bar/315 bar peak pressure

# ATEX axial piston pump A2FM/A2FE: very small, very powerful, very adaptable

High power density in the smallest of spaces and an extremely wide range of uses in sizes from 10 to 180 cm<sup>3</sup>, has always distinguished the A2FM and A2FE high-performance drives. Now with an ATEX-certified version of this power pack, it still provides Rexroth's proven quality, but it's even tougher than ever.



## Tried-and-tested technology for explosive environments

If you're looking for a compact axial piston fixed displacement motor for use in ATEX Zone 1 up to a pressure of 400 bar, this is the solution. The new high-power motors rely on service-proven Rexroth technology with high overall efficiency, good start-up efficiency and very good power density. Ideally adjustable to any application in an open or closed circuit. No other compact motor offers all this.

## Benefits of special product features

- ▶ Robust: ATEX II2G ck IIB TX, Zone 1 for gases, vapors, mist
- ▶ Certified to ATEX Directive 94/9/EC
- ▶ Flexible: Sizes 10–180 for wide range of applications
- ▶ Optionally includes ATEX-compliant BVD NG20 braking valve for winch drives

## Key Technical Data

- ▶ Geometric displacement per rotation  
Size 10-180 cm<sup>3</sup>
- ▶ Max. displacement 648 l/min (at  $n_{nom}$  and  $V_g$  180 cm<sup>3</sup>)
- ▶ Nominal pressure 400 bar (absolute)
- ▶ Max. speed 4,000 rpm
- ▶ Max. torque 1,146 Nm  
(at  $V_g$  180 cm<sup>3</sup> and  $\Delta p$  400 bar)
- ▶ Open and closed circuit

# Axial piston pump A1VO: more control for less money

More power at less cost – that was the idea behind the development of the new A1VO variable displacement series. Summarized nicely: a high level of control quality, efficiency and power density in the smallest of spaces. You won't find better value for money in the medium pressure range. In many applications it's a better option than fixed displacement pumps.



## Medium pressure, maximum power

Behind its compact, cleverly designed housing the A1VO is brimming with ideas which make these medium-pressure axial piston pumps unique: despite running at constant speed their energy efficiency is excellent – better than any displacement pump. The integrated control system operates without any bypass losses, which means that little, if any, cooling is needed.

Control quality, efficiency and power density levels are very high, whereas the noise level is very low. And costs have been minimized throughout.

## Benefits of special product features

- ▶ Compact: highly cost-effective design
- ▶ Energy-efficient: more economical than displacement pumps despite the constant speed
- ▶ Variable: variable displacement
- ▶ Precise: excellent control quality
- ▶ Quiet-running: low noise level
- ▶ Cost-effective: best value for money in the medium pressure range

## Key Technical Data

- ▶ (11)/18/35 cm<sup>3</sup> displacement available  
28 cm<sup>3</sup> available soon
- ▶ Pressure controller (hydraulic /electro-hydraulic)/pressure/flow controller
- ▶ Operating pressure up to 250 bar
- ▶ Permitted drive speed up to min. 3,000 rpm.

# Axial piston pump A10 FZG/FZO: maintains the pressure all the time, during every rotation

Unlimited – is how the new pumps for variable-speed drives can be summed up: the new A10 FZO and FZG series have unlimited pressure-maintaining abilities without a minimum speed requirement, thanks to their specific optimization for synchronous or asynchronous motors. With 100% permanent maximum operating power and maximum power density, you won't have any limitations in your production cycle.



## Unlimited 2 or 4-quadrant operation

The robust, fixed displacement axial piston pumps operate in 2- (FZO) or 4-quadrant (FZG) mode with alternating direction of rotation, so closed circuits and direct cylinder drive are possible. They are specially designed for unlimited variable-speed use. Their permanent unlimited pressure maintenance ensures the unlimited, smooth running of your production operations. 100% permanent peak operating power is possible, so the pump sizes can be used to their full potential and higher power densities can be achieved. A perfect basis for the energy-efficient Sytronix FcP and SvP systems (see pages 72 and 73).

## Benefits of special product features

- ▶ Optimized for variable-speed use with asynchronous or synchronous motor
- ▶ Unlimited pressure-holding operation: without minimum speed requirement
- ▶ 100% permanent peak operating power possible: for maximum power density
- ▶ 100% through-drive-compatible for multiple pumps
- ▶ Low noise level
- ▶ Basis of Sytronix FcP/SvP system

## Key Technical Data

- ▶ 6–18 cm<sup>3</sup> displacement available  
Sizes 21–63 available soon for 2015
- ▶ Permitted drive speed up to min. 3,000 rpm.
- ▶ No minimum speed in pressure-maintaining operation
- ▶ Operating pressure up to 315 bar

# Axial piston pump A10 VZG/VZO

## Highly adaptable, for variable speeds without limits

Also optimized for variable-speed applications with synchronous or asynchronous motors, the new A10 VZO and VZG series are outstandingly flexible. With their adjustable displacements, they reduce electrical power consumption and can be perfectly adapted to drives, allowing smaller and more cost-effective solutions. All this without any minimum speed requirement in pressure-holding operation provides ideal conditions for efficient production.



### Key Technical Data

- ▶ 10+18 cm<sup>3</sup> displacement available, Sizes 28+45 available soon for 2015
- ▶ Permitted drive speed up to at least 3,600 rpm.
- ▶ No minimum speed in pressure-holding operation
- ▶ Operating pressure 250/280/315 bar

### Adjustable capacities for energy-efficient drives

The new adjustable displacement axial piston pumps can be perfectly adapted to your drives. This means that smaller and more cost-effective components can be used for assembly. You can choose either 2- (VZO) or 4-quadrant (VZG) operation, but each option provides 100% permanent peak operating power and 100% through-drive-compatibility for multiple pumps, as well as being particularly quiet-running. Specially designed for unlimited variable-speed use with synchronous or asynchronous motors. And ideally suited to the energy-efficient Sytronix FcP and SvP systems (see pages 72 and 73).

### Benefits of special product features

- ▶ Optimized for variable-speed use with asynchronous or synchronous motor
- ▶ Adjustable displacement for reducing electrical drive power
- ▶ Unlimited pressure-holding operation: without minimum speed requirement
- ▶ 100% permanent peak operating power possible (250/280/315 bar at n<sub>max</sub>)
- ▶ 100% through-drive-compatible for multiple pumps
- ▶ Low noise level
- ▶ Basis of Sytronix FcP/SvP systems

# High-performance cylinder: the perfect module for mold oscillation

Mold oscillation requires highly dynamic systems which operate with precision, and simultaneously with low constant frictional values. N.B.: the high-performance cylinder is a practical, predefined module made from tried-and-tested components and it incorporates all of Rexroth's system know-how. Quick delivery, simple to integrate. The perfect control axis.



## Key Technical Data

- ▶ Power levels: 16, 40, 63, 100, 250 kN
- ▶ Mounting types: MF3, MF4
- ▶ Frequency: up to max. 50 Hz
- ▶ Pressure-independent (constant) friction
- ▶ Applications with no radial force

## Tried-and-tested components, simple integration

The new high-performance cylinder is not only a mill type hydraulic cylinder, but also a complete module specially designed for mold oscillation. With 5 power levels, 2 mounting types, and a connection diagram to DIN 4401 standards – guaranteeing you shorter delivery times and easier integration. The pressure-independent constant friction maintains defined frictional values and greatly facilitates precision control of your system. Precisely what you should expect from Rexroth as your mold oscillation system partner.

## Benefits of special product features

- ▶ High-precision: control axis with integrated position measuring system for frequencies up to 50 Hz
- ▶ Ready-for-operation: predefined module with 5 power levels/2 mounting types
- ▶ Easy to control: pressure-independent (constant) friction
- ▶ Connection diagram to DIN 4401 standards: Further functions can easily be added, shorter delivery times
- ▶ Rexroth system partnership: comprehensive know-how, tried-and-tested components, easy integration



## Product innovations in the field of Electric Drives and Controls: for maximum flexibility and improved efficiency

Ranging from a highly efficient medium-frequency welding control system to unique, multi-core CNC control systems, a highly user-friendly web connector for use as an industry 4.0 switching center – or a complete Open Core Engineering system for customized real-time control – our new drive and control tools bring high levels of performance to the critical points of your plant, making it easier to use, and also future-proof.

# Synchronous servo motors MS2N: More torque, more dynamics, more efficiency

The new MS2N series combines the highest dynamics with compact dimensions. On the powerful synchronous servo motors, the electromagnetic design has been optimized, significantly increasing the torque density and energy efficiency. With high overload capacity at the same time as low rotor inertia, the motors are ideally suited for highly dynamic positioning tasks. Motor variants with higher rotor inertia allow better mass adaption and optimal control behavior.



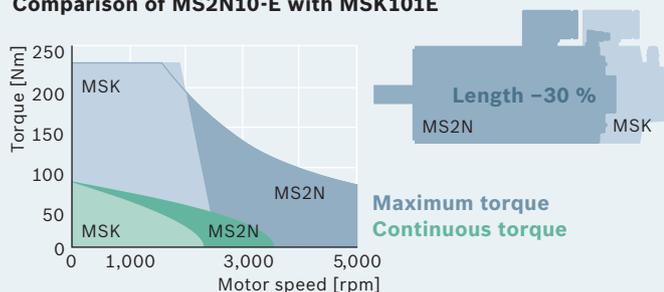
## Up to 30 % higher torque density, tailor-made modular concept

With six sizes and a total of 20 motor lengths, the MS2N series covers a wide range of applications from 0.8 to 146 Nm continuous torque. Higher maximum torques of up to 300 Nm with an increased overload capacity and dynamics make the new servo motors even more flexibly usable. The field weakening operation, standardly available in conjunction with IndraDrive controllers, significantly extends the usable torque-speed range and opens up new operating points beyond the conventional characteristics. Optional air cooling, multiple encoder performance levels and variable connections with conventional cables or a new single-cable connection allow the right drive system for any automation application: tailor-made, cost-effective and with maximum performance.

## Special product features

- ▶ High power density for compact machines:
  - shorter motors
  - higher torques in all sizes
  - increased continuous torque at high motor speeds
- ▶ Single-cable connection for reduced installation effort:
  - full cable length up to 75 m according to IndraDrive standard

Comparison of MS2N10-E with MSK101E



# IndraDrive Mi: the most flexible drive system with no control cabinet



The new generation of the IndraDrive Mi can be customized to specific basic conditions better than any other decentralized drive system. The drive has no control cabinet at all. This means that it is guaranteed to be ideal for use in any modular-design machinery – for maximum flexibility in the smallest of spaces. With up to 90% less cabling – and anything up to a 100% reduction in cooling requirements.



## A stand-alone all-round talent with built-in safety technology

The new IndraDrive Mi gives you all-round flexibility with its many highly sophisticated features: its multiprotocol capabilities mean that it can be used with any major manufacturer's products. The motion-logic system that can be integrated as an option combines the drive, the motion control system and the processing logic, and therefore enables you to achieve complex motion sequences purely at drive level. This takes a great load off the higher-level control systems. And certified safety technology with comprehensive functions also comes as standard. The IP65-rated integrated supply unit makes the drive solution fully stand-alone and removes the need for a control cabinet: The power supply module (KNK) is directly connected to the grid/mains power system. The power supply module (KMV) contains the regenerative power supply and the control electronics. And it's all the ultimate in energy efficiency.

## Benefits of special product features

- ▶ Reduction of up to 100% in the size of the control cabinet. Drive components fully designed to IP65 standard
- ▶ Cabling is reduced by up to 90% through the use of hybrid technology
- ▶ Reduction of up to 100% in control cabinet cooling
- ▶ Multiprotocol capabilities: compatible with all the relevant Ethernet protocols and commonly used control products
- ▶ Motion-logic system integration option: for achieving complex motion sequences at drive level

## Key Technical Data

- ▶ Up to 30 drives on one hybrid cable of up to 200 m in length.
- ▶ Multi-Ethernet – Sercos, Ethernet/IP, PROFINet, EtherCat, POWERLINK
- ▶ Integrated safety technology – Safe Torque Off and Safe Motion
- ▶ IEC 61131-3 integrated motion logic
- ▶ Peripherals incorporated by disconnecting guide communication

# IndraDrive ML large drive: the megawatt-sized universal inverter

**SAFETY  
ON  
BOARD**

**4EE**  
ENERGY  
EFFICIENCY

The new IndraDrive ML extends the IndraDrive series into the upper power range: individually up to 500 kW, connected in parallel up to 8 devices and up to 4 MW. These space-saving, modular inverters are real all-rounders – they can be used as a mains power inverter or as a motor inverter. This minimizes the variants, simplifies handling and reduces your storage costs. And you save energy at the same time.



## **Modular, compact and energy-saving**

These modular universal inverters are predestined for all kinds of multi-axis applications. They are powerful, flexible drives for the megawatt range. Universally usable for standard and servo applications, with extensive additional options for perfect energy-saving adaptation to a wide range of applications. And with everything that characterizes the proven IndraDrive series – from certified Safety on Board, to drive-integrated motion logic solutions, multi-encoder interfaces and multi-Ethernet communication. Simply universal.

## **Advantages resulting from special product features**

- ▶ Modular universal inverters for multi-axis applications: minimize type diversity, simplify handling, reduce storage costs
- ▶ Application-optimized concepts for energy saving: flexibly adapted to each application, they save energy and reduce network load
- ▶ High power density: the compact design saves space in the cabinet
- ▶ Small coolant volume at a high coolant temperature: enables the use of a compact heat exchanger and efficient heat recovery

## **Key technical data**

- ▶ Device settings from 110 kW to 500 kW in 8 graduations
- ▶ System output of up to 4 MW by means of parallel connection
- ▶ Supply voltage: 3 AC 380–500 V/50–60 Hz/TN, TT and IT network
- ▶ Types of cooling: liquid cooling, air cooling
- ▶ 1.5-fold overload for 60 s

# Frequency converter EFC 3610/5610: universally usable, easily integrable

With their freely definable U/f characteristic curves, or alternatively vector-controlled, synchronous motor operation, and their scalable option modules including multi-Ethernet and I/O interfaces and their compact design, the even further-improved family of frequency converters can be universally used in a whole variety of different applications. And they're simple to install, without using additional peripheral devices.



## Key Technical Data

- ▶ Performance range 1 AC (220 V, 0.4 to 2.2 kW), 3AC (400 V, 0.4 to 22 kW)
- ▶ U/v control (EFC 3610) or vector control (EFC 5610)
- ▶ High starting torque (200%) and high overload (150% up to 60 s)
- ▶ Operating control versions: simple LED and plain text LCD
- ▶ Built-in brake chopper and mains filter (EN 61800-3 C3)

## Saves time and space – and enhances quality

Efficient speed control forms the basis of energy-savings and low CO<sub>2</sub> emissions – so these further enhanced frequency converters have been crammed full of intelligent features to meet any engineering and usability requirements. Compact with their space-saving assembly features and clever option modules, and with all external components removed, they provide the ultimate in easy installation and space minimization. I/O and fieldbus modules provide simple extension options. Ease of use is ensured not only due to fast parameterization using autotuning, copy function or a PC (USB port), but also due to the harmonized parameters throughout the series – which saves time, improves quality and facilitates series-production commissioning.

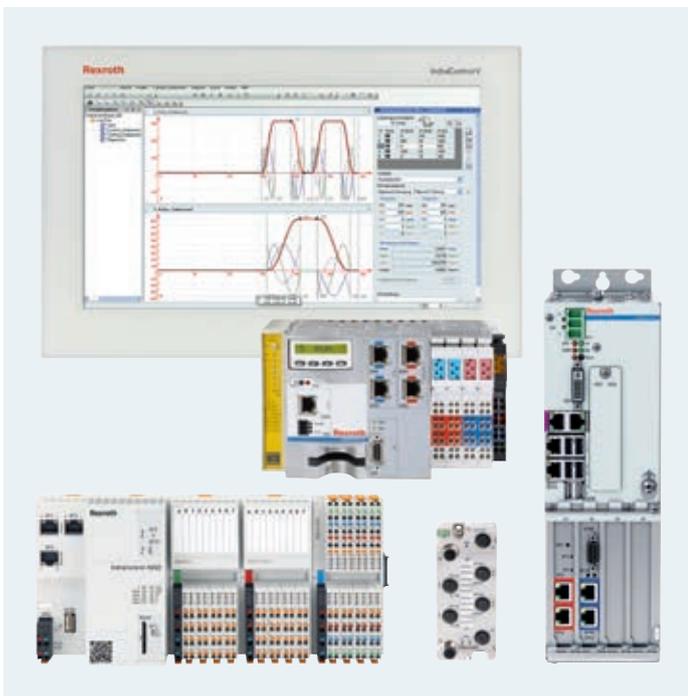
## Benefits of special product features

- ▶ Compact yet complete: space-saving installation and wiring with top hat rail (up to 7.5 kW) and I/O plug terminals, as well as numerous option modules – so installation and integration couldn't be simpler.
- ▶ Simply practical: removable operating unit with accumulator function, optional LCD plain text display, simple parameterization using autotuning, copy function or USB port – for quick, reliable series-production commissioning.
- ▶ Thoroughly flexible: configurable and extendable using I/O or fieldbus modules – for universal use and the simple extending of functions.

# IndraMotion MLC 14VRS: the complete system for all your control tasks



IndraMotion MLC – the first complete automation solution. Motion, robot and logic control merge into a uniform overall system for every control task. Uniformly designed using open standards, they provide high-performance synchronization of all your different drive types. For the new 14VRS system version, the IndraControl XM2 controller-based control hardware and the IndraControl VPB IPC platform provide additional scope for end-to-end machine automation.



## Consistent, open, highly flexible

This is what modern automation looks like. IndraMotion MLC uses the best possible platforms for it: as well as the scalable L device family, the IndraControl XM2 controller-based control hardware offers not just more computing power, but also high-performance, synchronous I/O systems & control data processing within a more compact design. The IndraControl V IPC platform provides a Windows operating system for further software tools as well as true real-time motion-logic functionality. IndraMotion MLC integrates flexibly into a wide variety of topologies via the Sercos automation bus or via PROFINET, PROFIBUS and EtherNet/IP.

## Benefits of extensions in the 14VRS system version

- ▶ Quick, synchronous I/O processing using IndraControl S20 (asynchronous, clock-synchronized, cyclic)
- ▶ "SafetyManager" function toolkit: programming of the optional SafeLogic safety control
- ▶ "Communication" function toolkit: control-integrated OPC UA server with fully comprehensive OPC UA information model (objects for PLC, motion, robotics, field devices, alarms & conditions, ...)
- ▶ "Robot Control" function toolkit: adaptive motion for optimized product handling, and LUA scripting language for programming sequence-oriented processes
- ▶ Open Core Interface: interfaces for high-level language-based applications and the connection of rapid control prototyping and model-based engineering

## Key Technical Data

- ▶ PLC programming to IEC 61131-3
- ▶ Up to 99 axes in one control system with synchronized and coordinated movements
- ▶ Flexible multi-connectivity via Ethernet Sercos, PROFINET, EtherNet/IP and PROFIBUS
- ▶ PLC cycle times up to 250  $\mu$ s
- ▶ Scalable IndraControl L, XM and V families
- ▶ Extendable to safety control up to PL e/cat 4 (EN ISO 13849-1) or SIL 3 (IEC 62061)

# IndraMotion MLC on industrial PC: for more flexibility and power



Today industrial PCs are used in many areas of automated production due to their flexibility, performance and scalability. For example, for the control of plant and machinery, or for data capture. With IndraMotion MLC 14VRS, Rexroth is now offering its motion logic system for the IndraControl VPB platform too. And providing a practice-oriented extension of its hardware portfolio. A Windows 7 operating system is provided in parallel to the IndraMotion MLC in true real time on the same device. So you can react quickly and flexibly at all times.



## Flexible and powerful

With its combination of the IndraControl components VPB, VDP, and optionally VAM or VAK (box PC, display, operating unit and keyboard), Rexroth offers a thoroughly robust and high-performance hardware platform for use in machinery and plant construction. A subordinate hypervisor distributes the hardware resources of the box PC, which is designed for use in control cabinets, to the IndraMotion MLC real-time-capable motion logic system and to the Windows 7 open operating system. This means that in addition to the motion logic application you operate powerful software tools for visualization, systems & control data processing, analysis or reporting – on the same control hardware. It makes you quicker and more flexible.

## Benefits of special product features

- ▶ Windows 7 and motion logic firmware on the same hardware
- ▶ Complete control system with fast systems & control data processing
- ▶ Overall system has a high level of real-time capability
- ▶ Sercos as the universal automation bus
- ▶ Extremely fast data transfer using robust SSD mass storage
- ▶ IndraMotion MLC scalable system firmware for motion logic applications

## Key Technical Data

- ▶ Intel i5/i7 CPU
- ▶ IP rating: IP20
- ▶ Interfaces: 2x Gigabit Ethernet, 6x USB 2.0, 1x DVI
- ▶ Sercos Master, PROFINET, EtherNet/IP, PROFIBUS
- ▶ PLC cycle times up to 250  $\mu$ s
- ▶ Modular extension options using PCIe insertion card
- ▶ Temperature range from +5 °C to +45 °C

# IndraMotion MLD 14VRS: easy control of up to 14 axes, quick automation



For improved communication between the drives: The new IndraMotion MLD 14VRS, with its modern Indralogic 2G version of PLC editors greatly simplifies the engineering tasks and provides all the additional functions for simplifying the automation of complete small systems with electronic and hydraulic drives. Very fast I/O coupling with Sercos Oversampling ensures maximum productivity, and the Sercos connection and Open Core Interface ensures that integration couldn't be simpler.



## Dual master controls: with EtherNet/IP and Sercos

Practical: Now Sercos and EtherNet/IP devices can easily be connected to the same Ethernet connector. The IndraMotion MLD 14VRS automation solution is based on the scalable IndraDrive drive platform, which has been supplemented by the IndraDrive ML series for large drives. High-performance motion control and PLC functions are combined to form a complete automation system for modern machine concepts. Perfectly suited to applications with up to 14 axes. The new version of the integrated Open Core Interface for drives provides direct access to all the drive and control parameters via high-level language-based applications. Open interfaces simplify integration into the automation concept. In short: efficient Open Core Engineering.

## Benefits provided by Open Core Engineering extensions

- ▶ "Visualization" function toolkit: simple implementation of machine operation/monitoring now also with WinStudio and compact IndraControl VR21 and OEM web server touch-screen control panels
- ▶ "Enhanced Control" function toolkit: improved dynamics and accuracy of control functions
- ▶ "Technology" function toolkit with winder and tension controller, now with IndraLogic 2G
- ▶ "Handling" function toolkit: now with IndraLogic 2G (with ready-to-use HMI surfaces for small control panels)

## Key Technical Data

- ▶ Max. 10 motion control axes
- ▶ Max. 4 peripheral devices can be connected via Sercos
- ▶ Minimum Sercos cycle time: 250  $\mu$ s
- ▶ Minimum PLC cycle time: 1 ms
- ▶ New version includes object-oriented programming to IEC 61131-3 3rd Edition

# IndraMotion MTX 14VRS: the unique multi-core CNC control system



Really multi-talented: the IndraMotion MTX is the unique, individually scalable CNC platform with integrated PLC. For successful cutting and pressing concepts. The exceptional performance data and comprehensive technology functions open up completely new horizons for you, including highly dynamic, multi-technology machinery. Now you can control up to 60 channels and 99 axes with one CNC. For maximum productivity and flexibility.



## Top performance in the multi-technology field

The tried-and-tested IndraMotion system has been further enhanced using the current version 14 of the software. You can now control up to 60 independent channels and 99 axes with a single CNC system, and with super-fast PLC and CNC cycle times. So you avoid incurring additional hardware and engineering costs. The 5-axis interpolation is now universally available for all models – for improved scalability. The new beam/jet cutting function (laser, water jet, plasma) makes the MTX series even more universally usable for multi-technology processing in one machine. And with its open standards, it's completely ready for your Industry 4.0. operations. A real all-round talent.

## Benefits of special product features

- ▶ Multi-technology processing with 60 channels, 99 axes: turning, milling, grinding, punch pressing and beam/jet cutting with one CNC system
- ▶ Great performance, even when the maximum number of axes is used
- ▶ Improved scalability: 5-axis interpolation throughout the series
- ▶ Fast actions: fast PLC/CNC communication for reduced cycle times
- ▶ Open Core Engineering: for efficiency in engineering and customer functions
- ▶ Industry 4.0 ready: Features open standards such as on-board OPC-UA

## Key Technical Data

- ▶ Up to 60 independent channels with one CNC system
- ▶ Up to 99 axes with one CNC system
- ▶ 5-axis interpolation from MTX micro to MTX advanced
- ▶ Multi-core CNC system (IndraMotion MTX advanced)
- ▶ Extremely short PLC and CNC cycle times

# IndraMotion MTX micro: the first compact system with 5-axis interpolation



The most economical way possible to start using CNC control. With the full range of functions. The new IndraMotion MTX micro provides everything that you need from small CNC machines. Now even a high-performance 5-axis interpolation facility is making its debut in the compact segment. The MTX micro is nevertheless extremely quick to start, and its large library of technology cycles makes it very easy to program.



## Compact and cost-effective, but with a full range of functions

Coping easily with up to 12 axes in 2 CNC channels – now that's something that the compact class can do too. Even including 5-axis interpolation. For extremely fast, efficient, and above all cost-effective, turning, milling, drilling, grinding and gear cutting. The new MTX micro series smooths your entry into the CNC world. It minimizes commissioning workload, it's extremely easy to operate, and it has comprehensive programming tools even for complex processing tasks. And it's ready for Industry 4.0 right now. The ultimate in economy!

## Benefits of special product features

- ▶ 2 CNC processing channels: Controlling processing and automation in one CNC system saves hardware costs and speeds up commissioning
- ▶ Extensive library of technology cycles: for simple, standardized programming of even complex processing tasks
- ▶ New control panels for ergonomically optimized horizontal or vertical use
- ▶ Industry 4.0 ready: Features open standards such as on-board OPC-UA

## Key Technical Data

- ▶ Up to 12 axes, including 4 CNC spindles
- ▶ 2 CNC processing channels
- ▶ 5-axis interpolation (a first in the compact class)
- ▶ Extensive turning, milling, drilling, grinding and gear cutting functions
- ▶ Optimized control panels for intuitive machine operation

# IndraDrive with SafeMotion: the new generation of control parts for improved productivity

**SAFETY  
ON  
BOARD**

No matter which IndraDrive series you use – by using the new generation of SafeMotion control parts can increase the productivity of all the machines that require comprehensive drive-integrated safety functions. These control parts can be installed quickly, safely, and for less cost because safe logic functions are integrated into the drive, making commissioning even simpler.



## For all IndraDrive families

Whether it's a simple "Safe Torque Off" function or complex motion safety functions "Safe Motion", "Safety on Board" ensures the maximum level of safety in all models of the IndraDrive series. And it consequently improves productivity wherever safe deceleration, stopping, movement and position monitoring is required.

The selection of the safety function via CIP Safety on Sercos or Safety over EtherCAT (less wiring needed) or the integration of safe logic functions directly in the drive (no external logic modules) saves time and money. As does device replacement without the use of a PC when servicing. However, one thing above all is increased by Safe Motion: the operational safety of your plant.

## Benefits of special product features

- ▶ Comprehensive: drive-integrated safety functions for deceleration, stopping, motion, position monitoring
- ▶ Flexible: the safety function is selected via CIP Safety on Sercos, Safety over EtherCAT or alternatively via discreet 24 V signals
- ▶ Clever: safe logic functions integrated in the drive
- ▶ Productive: enhanced machine productivity with reduced costs
- ▶ Universal: for all IndraDrive product families, Cs, C, M, Mi, ML

## Key Technical Data

- ▶ Maximum level of safety (cat. 4, PL e, SIL3) for all safety functions
- ▶ Safe absolute end position replaces hardware limit switch with software
- ▶ 31 secure, configurable cam areas
- ▶ Reduced commissioning workload due to semi-automatic support
- ▶ PC-free device replacement when servicing

# IndraControl L75

## More bang for your buck

The IndraControl L75 is a new performance class above the L65 – but for the same price. Based on cutting edge processor technology, it's an attractive alternative to the L65 for applications with exacting performance requirements. It ideally complements the highly scalable IndraControl L family of controls which has been established in the market for many years.



### Key Technical Data

- ▶ IP rating: IP20
- ▶ Onboard fieldbus master (Sercos, PROFINET, EtherNet/IP, PROFIBUS)
- ▶ Standard Ethernet, CF card slot, diagnostic display
- ▶ Modular extension options with function and I/O modules
- ▶ Great system performance with Intel ATOM "Bay Trail" processor architecture

### New performance class, tried-and-tested system

The new member of the IndraControl-L family provides everything that you are used to getting from these service-proven control systems: it is perfectly customizable to specific motion logic applications due to its standardized interfaces, optional function modules and I/O modules, or visualization components. And it is ideally suited to both centralized and decentralized control topologies. What's more, the new IndraControl L75 offers outstanding value for money – with great system performance but the same price level it will in future be used instead of the established IndraControl L65, and it is also fully compatible with it. So, as previously, you will have the right performance class available for every application.

### Benefits of special product features

- ▶ Compatible: standardized communication interfaces
- ▶ Extendable: optional function and technology modules
- ▶ Flexible: ideal for centralized and decentralized control topologies
- ▶ Future-proof: individually extendable with high-quality visualization components
- ▶ Scalable: modular I/O units
- ▶ 100% functional compatibility with the IndraControl L65

# IndraControl XM21/22: Flexible real-time control

A new family of devices makes its debut: The first variants of the new modular IndraControl XM control hardware: they combine the real-time capabilities of the Sercos automation bus with the new IndraControl S20 I/O family to form a modular and functionally complete control system – for all factory automation applications.



## Simple configuration, high-performance data processing

The IndraControl XM control platform is available for a variety of different motion logic applications. The local connecting circuit of the extremely fast, modular I/O assemblies of the IndraControl S20 expands the control system flexibly for high-performance systems & control data processing. The standard connection of decentralized I/Os, drives and other system peripherals is via Sercos. Optional extension modules open up further integration options. The service-friendly design is an easy way to reduce installation and commissioning costs.

## Benefits of special product features

- ▶ Simple and flexible system configuration with modular I/O extension
- ▶ Complete control system with high-performance systems & control data processing
- ▶ Good real-time capabilities of the overall system
- ▶ Sercos used as universal automation bus for system-wide networking
- ▶ Maintenance-free due to elimination of wear parts such as fans and batteries
- ▶ IndraMotion MLC scalable system firmware for motion logic applications

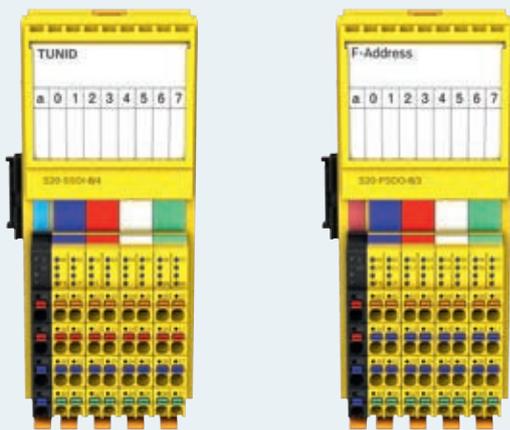
## Key Technical Data

- ▶ IP rating: IP20
- ▶ On-board Sercos Master with 250  $\mu$ s cycle time
- ▶ Great control performance provided by Intel ATOM process architecture with 600 MHz or 1,300 MHz
- ▶ Gigabit Ethernet, USB, SD card slot, diagnostic LED
- ▶ Modular expansion options with extension and I/O modules
- ▶ Extended temperature range from -25°C to 60°C

# IndraControl S20 for Safety: quick and safe automation

**SAFETY  
ON  
BOARD**

The fastest I/O technology in the market is now playing it safe: the new safety modules of the IndraControl S20 family of modular I/O components now make secure communication possible – with CIPsafety or PROFIsafe. For safe and speedy automation. Even for the most demanding applications.



## Flexible integration, simple installation

The IndraControl-S20 I/O portfolio facilitates real-time applications with short cycle times. With the new safety modules of the same frame size, you now have the right elements for your safety applications. Flexibility of use due to the support of CIPsafety on Sercos or PROFIsafe. The safety modules can be combined with the standard modules as required. Simple to install due to tool-free wiring, and simple to parameterize using the IndraWorks engineering tool. For fast and reliable signal processing at all times. For maximum availability. And for time-saving safe automation.

## Benefits of special product features

- ▶ Certified: SIL 3 to EN 61508, SILCL 3 to EN 62061, category 4/PL e to EN ISO 13849-1
- ▶ High-performance: intelligent local bus with optimized data communication for clock-synchronized signal processing
- ▶ Simple installation: quick tool-free wiring, fewer errors
- ▶ Robust design: for high system availability levels
- ▶ Easy to integrate: can be flexibly used without depending on specific safety solutions

## Key Technical Data

- ▶ Secure digital channels 8 (one-channel) or 4 (two-channel)
- ▶ CIP Safety on Sercos, PROFIsafe on PROFINET
- ▶ 10 g shock resistance (continuous shock) to EN 60068-2-39
- ▶ Extended temperature range from -35°C to 60°C
- ▶ IP20 rating

# Motion Control NYCe 4000: modular, compact, and cost saving

The NYCe 4000 modular multi-axis control system controls complex processes in a single unit. Including drive functions, simulations, and diagnoses. So you achieve significant savings in terms of space and wiring – and reduce system and integration costs. Machine availability simultaneously increases and maintenance processes are greatly simplified. Automation was seldom simpler, and you're more flexible than ever.



## **Faster development, faster control**

The NYCe 4000 offers you unrivaled flexibility for a compact unit. With highly sophisticated hardware for complex processes plus an open software architecture, you obtain customized motion solutions faster, and then simply integrate them into your automation landscape. The simulation environment significantly shortens your time-to-market. Integrated control functions, drive modules and I/O interfaces minimize overall machinery costs and increase machine performance. Quick, simple, stress-reducing.

## **Benefits of special product features**

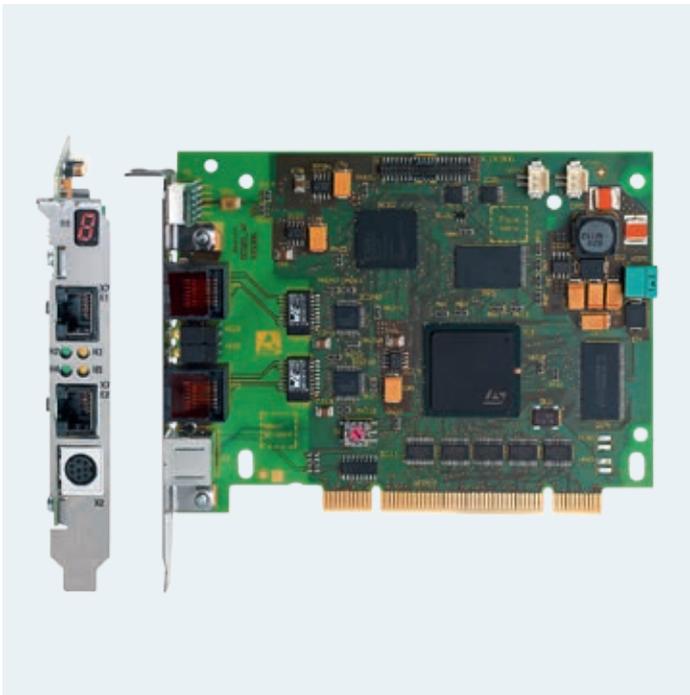
- ▶ Shorter time to market: Integrated simulation environment
- ▶ Overall machinery costs minimized: controls up to 120 digital and analogue I/O interfaces in parallel and in real-time.
- ▶ Great flexibility in the choice of motors: drive modules can be integrated with 15 VDC to 150 VDC link connection for servo and stepping motors
- ▶ Improved machine performance: all control and drive functions are in one unit, including the high-level language programming for complex motion control
- ▶ Optimized availability: due to comprehensive diagnostic tools

## **Key Technical Data**

- ▶ Compact: Integrated motion control, drive modules and I/O interfaces
- ▶ Up to 620 controlled axes in a single system
- ▶ Many pilot control options (32 kHz control loops; max. software flexibility)
- ▶ High-speed data capture: 32 channels @32 kHz
- ▶ Integrated standard environment (parallel engineering; standard programming languages C/C++/.NET/etc.

# Sercos Sercans master module: simply upgrade the control systems with Sercos

OEM control systems upgrades with Sercos have never been so easy or cost-effective. Available in four scalable performance classes from XS to L, the cost-effective Sercans XS is a soft master and operates with a standard Ethernet controller. Sercans S is ideal for small, simple, series production plant. For most applications Sercans M is the ideal standard. And for major, complex, high-end systems, Sercans L with ultra-short cycle times of 62.5  $\mu$ s.



## Key Technical Data

- ▶ Standard Ethernet controller for new Sercans XS
- ▶ Minimal cycle time – now only 62.5  $\mu$ s
- ▶ PCI and PCIe interface available
- ▶ Up to 511 Sercos devices per card and 2,000 per PC
- ▶ Clearly structured memory interface for cyclical data, system and diagnostic data, configuration data, HMI and motion control, and standard Ethernet data
- ▶ System extension via CIP Safety on Sercos for max. 120 secure nodes per card and 480 per PC

## Simple and cost-effective implementation

The new Sercans family is a simple and cost-effective way of implementing Sercos in control systems. The new Sercans XS variant can be used as a soft master in inexpensive PCs and therefore helps you to make considerable cost savings. Version 3 of the firmware now enables Sercos and EtherNet/IP devices to be easily and conveniently connected up to the same Ethernet connector (if the soft stack for EtherNet/IP is available). So you increase your productivity quickly and efficiently.

## Benefits of special product features

- ▶ Increased productivity due to short cycle times
- ▶ Reduced wiring requirements due to control of the safety functions via CIP Safety on Sercos
- ▶ Exchanging of secure data with an extensive range of safety peripherals for widely dispersed plant via CIP Safety on Sercos
- ▶ Minimal cycle times and high rate of data throughput to the host application (Sercans L)
- ▶ Ideal for using TenaSys, Linux with PREEMPT-RT-Patch and QNX Neutrino with the Intime real-time operating system.
- ▶ Sercans XS with interface to the "Common Sercos Master API" (CoSeMa): for initialization, phase switching, and cyclic and acyclic communication

# IndraControl V Multi-touch: operation and visualization with a modern flair

At last, easier operating of processes, systems and machinery – Rexroth's new multi-touch displays make this possible. New intuitive operation and visualization concepts, as known from smart devices, now gain a new brilliant basis that is optimally matched to tough everyday industrial environments. With high-resolution, anti-reflective wide-screens, robust fronts and a long service life.



## Key technical data

- ▶ Robust industry-compliant multi-touch operation displays
- ▶ 7", 15", 18" and 21" display diagonals
- ▶ Operation displays for control cabinet PCs for data transmission of up to 100 m
- ▶ Panel PC as an HMI unit or system platform for control cabinet installation
- ▶ Complete operation terminals for direct support arm installation with protection class IP65

## Robust, resistant to interference and industry approved

Multi-touch operating is simple, fast and flexible. Thanks to the robust and powerful operator displays the functions that are well known from smartphones and tablet PCs, such as zoom, wipe, move, rotate, etc., can now be used in the industrial environment. The thermally tempered anti-reflective glass front and the metal peripheral edge protection safeguard the device against mechanical damage and protect it effectively against environmental influences.

IndraControl V supports new operation concepts in a multitude of applications. The projective capacitive touchscreen detects touch by up to 10 fingers. Display sizes from 7" to 21" for use in portrait or landscape orientation and enclosure variants for control cabinet installation or direct support arm installation offer solutions for an extremely wide range of applications.

## Advantages resulting from special product features

- ▶ Multi-touch operating: detects multiple touches simultaneously; the optimal basis for intuitive operating concepts well known from the smartphone
- ▶ High-resolution widescreens: for brilliant visualizations, better readability and a larger display surface
- ▶ Non-reflective glass surfaces with anti-reflective etching: no disturbing reflections, better legibility
- ▶ Time saving through easy installation and connection techniques

# IndraControl VH2110 Multitouch manual operating unit: see more, operate better, use more flexibly

This is how systems are controlled today: easily, ergonomically, and in a tablet design. The large widescreen display of the IndraControl VH2110 provides an ideal insight into the machines. Operation is intuitive with multi-touch gestures which enable completely new, innovative operating concepts to be used. With tried-and-tested, certified safety functions and maximum flexibility in both mobile and static use, this unit really is cutting-edge.



## Key Technical Data

- ▶ Lightweight, ergonomic, tablet-style manual operating unit
- ▶ Large 10" TFT display in widescreen format
- ▶ Capacitive touchscreen for operation with multi-touch gestures
- ▶ Rugged glass front
- ▶ Certified safety functions for safe system operation

## Ergonomic, robust and safe

Simple, innovative operation of plant and machinery, even in safety zones – this was in the requirements specification of the new IndraControl VH2110. And it's a requirement that is fulfilled: the large 10" widescreen display shows HMI applications in a clear manner, a capacitive touchscreen allows intuitive operation through gestures and without causing operator fatigue, thanks to the lightness and ergonomic design of the device. Offering the choice of static or mobile use and decidedly robust, it adapts flexibly to any applications, even in safety zones. Can things be any simpler?

## Benefits of special product features

- ▶ Fatigue-free working: due to lightness and ergonomic design
- ▶ Options of static or mobile use for maximum flexibility
- ▶ Everything in view: due to large display surface on the widescreen display
- ▶ Simple and innovative operation: due to multi-touch functions
- ▶ Safe operation: due to integrated safety elements

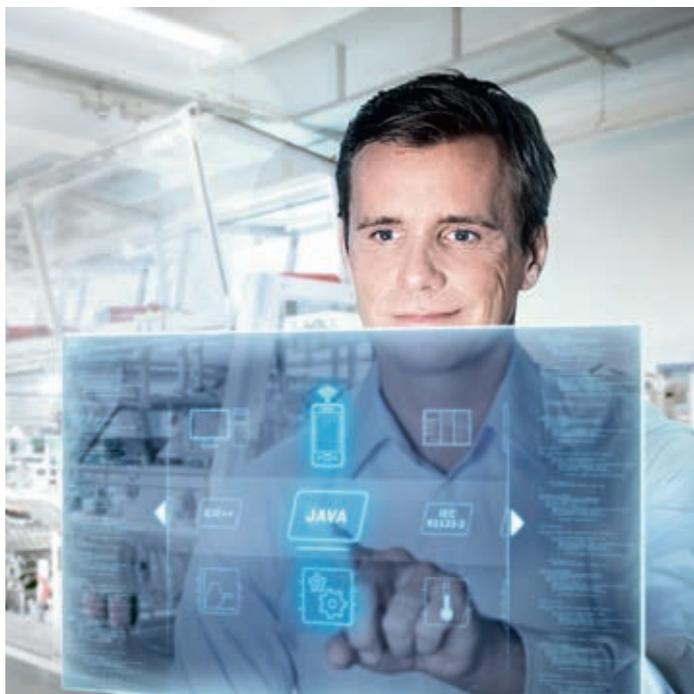
# Open Core Engineering: freedom and efficiency redefined



Open Core Engineering not only accelerates and simplifies your software engineering, it also gives you more freedom and flexibility for the production of tomorrow. State-of-the-art software tools and technology-oriented function packages increase efficiency on the basis of international standards. And with Open Core Interface technology, you can connect your PLC-based automation functions to higher-level languages based on the latest IT automation technology.

## Unique flexibility in programming

Open Core Engineering bundles the engineering portfolio for all software-based and intelligent solutions together with all drive and control technologies. Software tools such as IndraWorks cover the whole engineering workflow, while function toolkits simplify the engineering of complex machine processes and enable the accelerated integration of new and innovative machine functions. In addition the Open Core Interface technology enables direct access to



control and drive functions with high-level language based applications. This enables machine control units to be connected seamlessly to IT automation devices, data and services. Open Core Engineering thus opens up new degrees of freedom in automation and merges the previously separate worlds of PLC and IT automation in an integrated portfolio.

## Advantages resulting from special product features

- ▶ Flexible: a universal engineering framework for all automation tasks
- ▶ Efficient: technology-oriented function packages for reducing complexity
- ▶ Innovative: the implementation of new solutions by building a bridge to IT automation
- ▶ Individual: OEM-specific real-time functions on control systems
- ▶ Future-proof: multi-technology solutions with the support of open standards and interfaces

## Software tools

These cover all steps in the workflow – project planning, programming, parameterization, commissioning and service. Consistent open standards are used in all engineering and communication interfaces to safeguard the investment and the integration of future technologies. The focus here is on IndraWorks, the engineering framework: It provides all the basic tools for PLC-based automation, including the homogeneously integrated CoDeSys V3.

IndraWorks offers integrated operating based on the latest Windows technologies with centralized project management and wizard-supported project planning of control units, drives and peripherals.

### Function toolkits

These expand the PLC-based engineering by means of function-oriented solution packages, accelerate the implementation of machine processes, optimize project workflows and enable the integration of advanced machine functions.

### Examples of system-based function toolkits

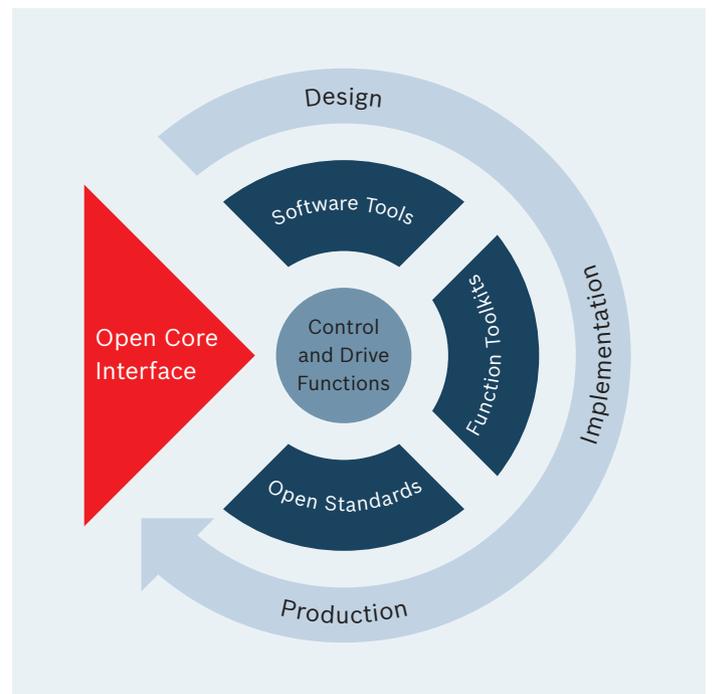
- ▶ Generic Application Template: automated, template-based creation of machine projects
- ▶ FlexProfile: A toolbox for the implementation of non-linear motion profiles
- ▶ Robot Control: a toolbox for the implementation of multi-dimensional motion control
- ▶ SafetyManager: programming of the integrated safety control system SafeLogic

### Examples of system-independent function toolkits

- ▶ Automation Interface: for accessing project data
- ▶ Communication: for OPC/OPC UA communication
- ▶ Team Engineering: links version control systems
- ▶ Visualization: for designing HMI

### Open standards

Open standards in machine automation are the basis for the flexible integration of software-based solutions into the engineering and system environments of the user and for the migration of new technologies into existing automation structures.



### Open Core Interface and its advantages

The bridge-building between PLC- and IT-based automation expands the impact of your control systems with an innovative interface technology. It gives high-level language based applications on external devices flexible access to all control and drive functions.

- ▶ Wide-ranging support for engineering platforms based on high-level languages
- ▶ Customized production of smart apps, integration of smart devices in the automation of machines
- ▶ Simplified simulation and optimization of machine processes
- ▶ Simple connection of Windows-based Windows IT automation applications
- ▶ Direct integration of real-time functions in the control system (system-dependent)

# Open Core Interface for controls: new degrees of freedom for connecting PLC and IT



With the expansion of the Open Core Interface for Controls interface technology you now have even more options when developing plant and machinery. The Open Core Interface for Controls gives users direct access to all the core functions of the control systems. And on a perfect basis: now also with the support of Mathworks Simulink, tools based on the Modelica modeling language, and programming in Lua and Java. Take advantage of this new freedom of choice.

## More options, more flexibility

Model-based engineering and rapid control prototyping open up new possibilities for increasing efficiency in mechanical engineering. As well as the MathWorks MATLAB and National Instruments LabVIEW software platforms that have so far been supported by Open Core Engineering, developers can now also use MathWorks Simulink and tools based on the open source modeling language, Modelica. Open Core Engineering already caters for early phases of

machine workflow with the option of integration in PLM tools.

Open Core Interface for Controls opens up new degrees of freedom for users to directly program control systems with flexible access to functions via high-level languages outside of IEC 61131-3. As well as support for the C/C++ for Works languages, applications written in Lua and Java can be run directly on the control systems. Java as the most commonly used language in business applications, and Lua – a powerful, scripting interpreter language – enable M2M applications to be integrated into the Industry 4.0 vision.



## Benefits of special product features

- ▶ Complete system comprising hardware and software components for rapid control prototyping and model-based engineering
- ▶ Quicker time-to-market due to wide-ranging support of environments like MATLAB, LabVIEW and Simulink and tools based on the Modelica language, such as OpenModelica
- ▶ Innovative programming of, for example, sequence-oriented applications using robot controls in the Lua interpreter-based, scripting language.
- ▶ Implementation of Java-based applications, for example for M2M and IoT (Internet of Things)

# Open Core Interface for drives: direct connecting of IndraDrive and IT automation



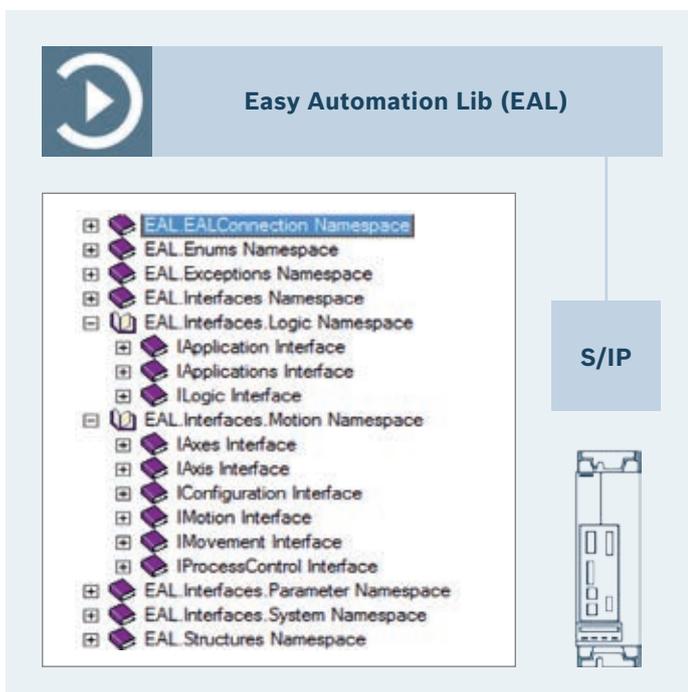
Automation made easy: The Open Core Interface for Drives gives IT automation applications direct access to the all parameters of the IndraDrive family of drives. In order to do this, the Sercos Internet protocol (Sercos IP) makes standardized network communication possible at production level. In addition, the interface technology allows the drives to be directly controlled via library functions – in high-level languages and without routing via the control systems. Simple, quick, flexible

## A consistent PLC and IT portfolio

The interface technology Open Core Interface for Drives enables machine control systems and sub-systems to be perfectly linked to devices, data and IT automation services. This opens up completely new degrees of freedom for you in relation to automation. High-level language-based applications on external devices are provided with flexible access to all the control and drive functions of IndraDrive.

## Benefits of special product features

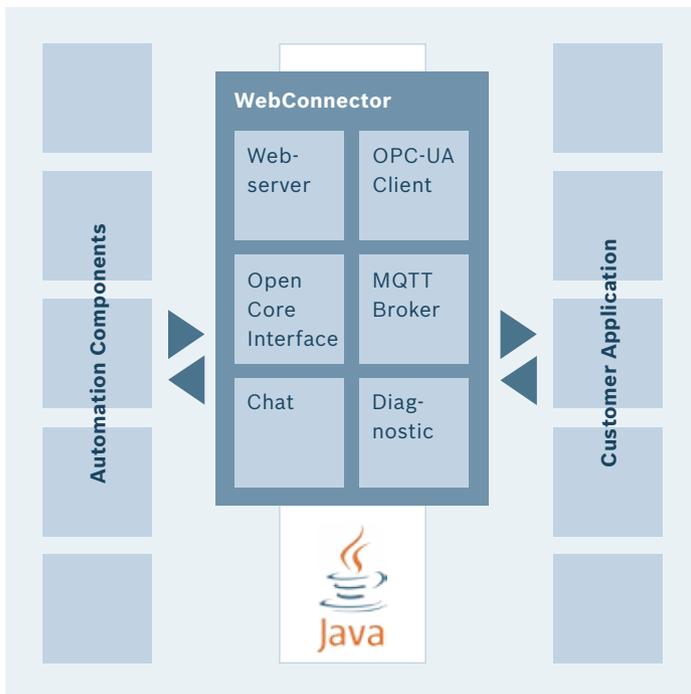
- ▶ High-level language programming with C/C++ and C#
- ▶ Independent integration of smart devices for man-machine communication
- ▶ Programming of smart devices with Java
- ▶ Simple connection of Windows-based IT automation applications
- ▶ Expansion of operation and service concepts
- ▶ Use in Office tools, databases, and MES systems
- ▶ Direct access to all drive parameters
- ▶ Drive-controlled positioning and drive internal interpolation via high-level language functions



# WebConnector: simple connection of automation and web environments



Industry 4.0 needs the right switching centers at the critical points: platform-independent, fast, and easily-programmed communication interfaces for perfect dialog between the control system and the HMI application. The new WebConnector connects the automation environment to static and mobile end devices more simply than ever before: web-based, scalable, modular and absolutely independent thanks to HTML5 and Java technologies. Data networking made easy.



## Key Technical Data

- ▶ Communication interface for simple, customized HMI programming
- ▶ Scalable as regards the number of control connections and the number of HMI clients that can be included
- ▶ Modular use, directly on the control unit or on Java VM-enabled HMI devices
- ▶ Control system connection via Open Core Interface or OPC-UA

## Quick, simple and platform-independent

The WebConnector makes it very easy for you to create web-based HMI applications: high-performance web sockets give you quick access to control systems and drives – without having to know the lower-level protocol. The integrated web server allows you to integrate your own HTML web pages using a standard browser – without additional plug-ins. And due to its focus on Java, the WebConnector is fully platform-independent, running on all operating systems for which a Java Virtual Machine is available. So you can directly manage all Rexroth components or those of third party providers using your smartphone or tablet. A fundamental building block of your data networking system.

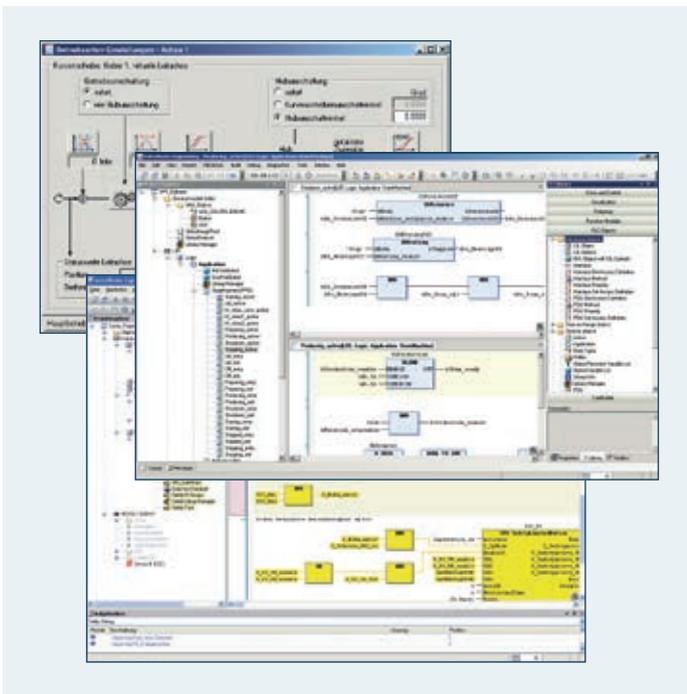
## Benefits of special product features

- ▶ **Fast:** Access via Websockets (JavaScript and .NET) to control systems and drives, no detailed knowledge of the lower-level communication system required.
- ▶ **Flexible:** Connection of C#/.Net and web applications to Rexroth or 3rd party components. Support for Industry 4.0 protocols (e.g. MQTT)
- ▶ **Integrated web server:** for displaying HTML5 web pages using a standard browser
- ▶ **Independent:** able to run on all operating systems for which Java Virtual Machine is available, e.g., Linux, Windows, Raspbian etc.

# IndraWorks 14VRS: the universal tool for efficient engineering



IndraWorks is the first engineering framework to integrate CoDeSys V3 in market- and application-ready form. With IndraWorks, Rexroth is showing the way forward in the engineering of motion logic applications with comprehensive wizards and high-performance solution tool boxes. The new system version provides even more savings in terms of time, costs and programming workload – while quality is enhanced.



## First end-to-end motion logic engineering tool

As part of the range of Open Core Engineering solutions, IndraWorks is the universal engineering framework for Rexroth automation systems. It provides a central project administration facility and all the tools required for project planning, commissioning, visualization, and diagnostics. The enhanced basic functions and powerful function toolkits in the new 14VRS system version ensure quick and efficient implementation of your automation tasks.

## Benefits of extensions and function toolkits

- ▶ Fully included in the basic functions: project planning, parameterization, programming, diagnostics, visualization
- ▶ Consistent operation: intuitive user interface based on current Windows technologies with central project administration and wizard-based support.
- ▶ "Generic Application Template" function toolkit: simple functional extensions of the GAT program framework via plug-Ins
- ▶ Application-related function toolkits: safety manager, robot control, hydraulics, visualization
- ▶ Extensive comparison functions: project, configuration, PLC program, online-offline
- ▶ New interface for the bi-directional exchanging of project data between EPLAN electric P8 2.3 and IndraWorks Engineering 14VRS

## Key Technical Data

- ▶ Uniform software framework – end-to-end engineering of all Rexroth control systems
- ▶ PLC and motion logic programming based on CoDeSys V3 with object-oriented language extensions
- ▶ Comprehensive motion control functions: point-to-point, axis interpolation, robot control, CNC, hydraulics
- ▶ Simple integration: FDT/DTM, automation interface, connection to version control systems, EPLAN electric P8

# HMI Toolbox WinStudio: the engineering tool for multi-touch applications

From easy single-touch applications to individual gesture controls – from now on user interfaces can be made more intuitive, clearer and safer. A universal toolbox from Rexroth for all HMI targets: you can now plan projects easily and uniformly without any additional cost. When it is integrated into the "Visualization" function toolkit, engineering becomes an exciting exercise in breaking new ground.



## Key technical data

- ▶ WinStudio for multi-touch operating is a component part of the IndraWorks engineering framework
- ▶ IndraWorks 13VRS supports development of the new multi-touch panels by means of HMI templates in 16:9 format
- ▶ Intuitive support for all Rexroth multi-touch devices running Windows 7® embedded standard operating systems
- ▶ Multi-touch function available in all license forms, even in the WinStudio Lite license

## Uniform project planning – from a simple compact operation panel to an industrial PC

The multi-touch technology in WinStudio now enables easy implementation of new visualization and operation concepts, for example, two-handed operation or intuitive image navigation via gesture control. Functions such as zooming in on trend graphs and scrolling through alarm and event lists are available without any additional project planning effort. Other multi-touch functions can be easily configured. Extensive interfaces for the programming of individual multi-touch gestures are available via operating system events. You thus obtain a flexible tool for the consistent project planning of all Rexroth HMI devices, which makes state-of-the-art operator interfaces implementable.

## Advantages resulting from special product features

- ▶ Innovative Editor: a tool for all HMI target and uniform project planning
- ▶ Multi-touch runtime support: state-of-the-art user interfaces with gesture control become implementable
- ▶ Product data management: all data are available in an IndraWorks project, including linked graphic objects
- ▶ Extensive programming interfaces for touch events: for versatile application of the new multi-touch technology

# Nexo cordless nutrunner: the most intelligent manual nutrunner in the world



Pretty clever: the Nexo's entire control system is in the nutrunner itself – a world first without which many Industry 4.0 applications would not be possible. The integrated control systems enable the wireless-enabled cordless nutrunners to be connected directly to the higher-level systems, for example without any additional hardware in your corporate network. It couldn't be simpler – or more cost-effective.



## Reliable and high-precision

Rexroth now puts the intelligence that's needed for complex tightening tasks directly into your hand: because the complete control system is in the tool, the Nexo manages without any external control system. It can communicate directly with your servers since its browser-based operator control system is suitable for any operating system. So it saves costs. Extremely accurate results are ensured by a precision action sensor/feedback device which also offers the practical advantage of transmitting the tightening results directly to the large display. So your users are always in the picture.

## Benefits of special product features

- ▶ Complete control system in the nutrunner itself: no additional hardware, reduced costs
- ▶ Large display: Information for the user is always in his field of view
- ▶ High-precision measurement system: for the ultimate in precision torque and rotary angle sensing

## Key Technical Data

- ▶ Speeds up to 880 rpm
- ▶ In the final installed version up to 65 Nm torque
- ▶ Sensing of torque and angle of rotation
- ▶ 2.4 and 5 GHz WIFI
- ▶ Incorporates display of the tightening location
- ▶ All versions also available with barcode scanner
- ▶ Extensive range of accessories
- ▶ Suitable for class A safety-related tightening tasks according to VDI/VDE2862

# CC-ErgoSpin manual nutrunner: its 99 programs can replace a large number of compressed air nutrunners

The new CC-ErgoSpin current-controlled manual nutrunners are tailor-made for the demands of function-critical tightening tasks to VDI/VDE2862. Featuring plug-and-play technology and 99 tightening control programs, they operate reliably and with the greatest of precision – which improves process reliability, and saves money, time and energy. And it allows you to replace several compressed air nutrunners at once.



## Improving process reliability and providing quick pay-back

The new CC-ErgoSpin really is a handy piece of intelligent technology: current-controlled, ergonomic, reliable, economical, immediately ready for use, and designed to be maintenance-free for 1 million cycles ... and above all, it comes with 99 precise tightening programs. The ultimate in convenience and value for money. What's more, it pays for itself very quickly. So it's never been easier to switch from compressed air to EC technology.

## Benefits of special product features

- ▶ Reliability and cost savings: superb precision due to its 99 controlled programs
- ▶ Saves time: due to plug-and-play capability
- ▶ High availability levels: Maintenance-free for 1 million cycles
- ▶ Tried-and-tested ergonomic design
- ▶ Ready for immediate use: simple to adjust to the specific tightening task with the aid of program levels

## Key Technical Data

- ▶ Process reliability:  $cmk > 1.67$  with  $\pm 10\%$  via 6 sigma
- ▶ Contains 99 programs: can replace several compressed air nutrunners
- ▶ Big increase in energy efficiency (compared to compressed air nutrunners)
- ▶ Maintenance-free for 1 million cycles under full load
- ▶ Full compatibility to the 350 system
- ▶ Suitable for function-critical tightening tasks according to VDI/VDE2862

# Medium-frequency welding control system PRC 7000: achieving optimal weld point quality faster

The latest generation of resistance welding control systems delivers what you are entitled to expect from the European market leader: a highly efficient, reliable, medium-frequency control system which is once again setting standards. With intuitive operation, state-of-the-art hardware and adaptive control – for ultra-fast commissioning, energy-saving control, and above all superb weld point quality. Even in the case of complex combinations of metals. The automotive industry isn't the only one that will want to get its hands on it.



## Improved more than 100,000 times – and optimized

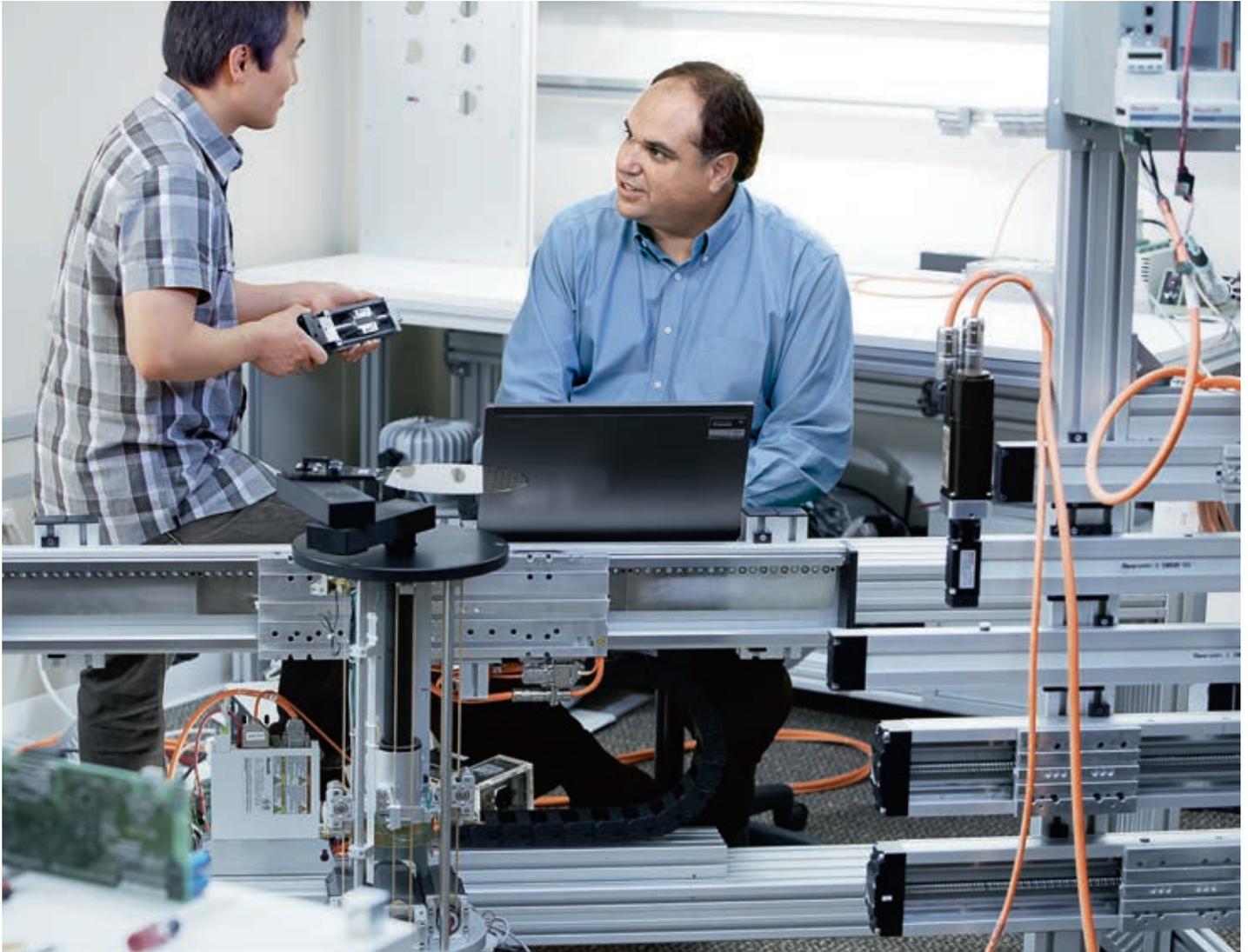
In the case of the new PRC 7000, Bosch Rexroth's specialists have made further specific, targeted improvements to a basic concept which has proved itself in the rigors of industrial use hundreds and thousands of times over. So you can get going even quicker and save costs. A new intuitive user interface makes parameterization, visualization and diagnostics child's play. The commissioning time is reduced by 90%! Just 5 steps and less than 10 seconds is all it takes to optimize the basic settings for the respective weld point. The adaptive control system guarantees maximum weld point quality, minimal reworking, and the highest possible level of reliability. Including when welding aluminum and in the case of tricky combinations of metals. State-of-the-art semi-conductor technology and a flexible system architecture guarantee energy-efficient control at all times – 30% more economical when actually welding, up to 80% between weld operations.

## Benefits of special product features

- ▶ Superb reliability due to adaptive control and monitoring (even in case of tricky metal combinations and Al.)
- ▶ Faster commissioning, visualization and diagnostics thanks to new intuitive user interface (90% reduction in commissioning time)
- ▶ Highly flexible and future-proof due to the modular system architecture with an integrated application layer
- ▶ Energy-efficient and cost-saving due to state-of-the-art hardware technology

## Key Technical Data

- ▶ Medium-frequency control systems for applications up to 320 kA
- ▶ Adaptive control and monitoring
- ▶ Control of electronic servo drives
- ▶ Integrated plier front end
- ▶ Intuitive Windows- and web-based user interface
- ▶ Standardized interfaces for integration into factory networks



## Products innovations in Linear Motion Technology: work more precisely, more powerfully and more efficiently

Measuring positions contactlessly, moving heavy loads with high precision and configuring components quickly and easily online. When it comes to Linear Motion Technology Bosch Rexroth can provide proof of its know-how of processes and practical requirements in a wide range of applications, industries and markets.

# IMS-I integrated measuring system: high-precision guidance and measurement

This integrated measuring system combines ball rail and roller rail systems with an incremental length measuring system in our new IMS-I product. The system accuracy of this inductive measuring system is comparable to high-precision glass scales and is therefore ideally suited for use in external measuring systems on machine tools.



## Inductive measuring with a 40 µm signal period

The IMS-I provides you with a precision instrument that guarantees excellent workpiece quality through accurate position measuring. Thanks to the inductive, contactless measuring principle, the system functions wear-free, which reduces your downtimes. In addition, it is particularly compact thanks to the integration of the systems, which saves installation space.

## Advantages resulting from special product features

- ▶ High system accuracy
- ▶ Inductive, contactless measuring principle
- ▶ Measuring function integrated into the guideway
- ▶ Resistant to contamination without any additional measures

## Key technical data

- ▶ Signal period: 40 µm (1 Vss)
- ▶ Indexing accuracy: ± 3 µm/m
- ▶ Ball rail system: sizes 20/25/30/35/45
- ▶ Roller rail system: sizes 35/45/55
- ▶ Rail lengths: up to 4,500 mm in one piece

# RSHP roller rail system high precision: never before have heavy loads been moved so precisely

High-performance machine tools also require a high-performance rail guide: Extremely heavy loads can be moved with unequalled care and precision using the latest generation of roller rail systems with their patented rolling element run-in. This offers best machining results and optimal surface quality.



## The patented rolling element run-in ensures a high-precision effect

With the new RSHP roller rail system generation, Rexroth has expanded its range with a high-precision guide rail and a guide carriage that permits optimal quality due to its particularly quiet running behavior. The patented rolling element run-in provides for the high-precision effect: the run-in zone is optimized and adapted to the load. This allows you to achieve the best results and an unmatched surface quality in the machining process. With the RSHP you also profit from an optimized lubrication channel, which allows longer service intervals, and from a simpler type selection with 67 % fewer variants.

## Advantages resulting from special product features

- ▶ Patented rolling element run-in with a high-precision effect
- ▶ Optimized lubrication channel for minimum oil consumption and longer service intervals
- ▶ 67 % fewer guide carriage variants: for faster and simpler type selection and reduced inventory
- ▶ Extreme rigidity and durability: with significantly higher static and dynamic load ratings

## Key technical data

- ▶ Load ratings: 30,300 N to 295,900 N
- ▶ Maximum speed: 4.0 m/s
- ▶ Maximum acceleration: 150 m/s<sup>2</sup>
- ▶ Lubrication: oil/grease
- ▶ Ambient temperature range: -10 °C to +80 °C

# BSHP ball rail system high precision: with an innovative run-in specific to the operating load

The high-precision technology of the new BSHP ball rail systems offers many benefits: the run-in zone adapts individually to the respective operating load of the ball carriage, which ensures optimum running accuracy, extremely low frictional fluctuations, the latter providing in turn significant quality improvements. And the best thing is: the BSHP is available for all sizes, versions and classes of accuracy, which increases the dynamic load ratings and doubles the service life.



## HP technology in all classes

The new BSHP ball rail systems with HP technology have an innovative run-in zone that significantly increases the quality: the steel inlays are not supported in the end zone by the ball carriage and can therefore be elastically deformed. The run-in zone adapts itself individually to the current operating load of the ball carriage. As a result the balls run harmoniously without any impulse load into the support zone. The result: very high running accuracy, very low frictional fluctuations and thus optimal machining results. The increased load ratings (26 % better dynamic and up to 50 % better static ratings) are at your disposal across all classes with the BSHP.

## Advantages resulting from special product features

- ▶ High-precision technology across all sizes and precision classes: 26 % better dynamic and up to 50 % better static load ratings all-around
- ▶ Downsizing possible: through improved load ratings
- ▶ Significant quality improvement: extremely high running accuracy, better processing results, higher surface quality
- ▶ Optimal rigidity and robustness: double the service life
- ▶ The material number is retained: no EDP costs

## Key technical data

- ▶ Dynamic load ratings: 3,900 N to 223,000 N
- ▶ Maximum speed: 3–10 m/s
- ▶ Maximum acceleration: 250–500 m/s<sup>2</sup>
- ▶ Lubrication: oil/grease
- ▶ Ambient temperature range: 0 °C to +80 °C

# PLSA planetary screw assembly: high traversing speed, high bearing load, low costs

With the newly developed planetary screw assemblies, Rexroth has expanded the range of electromechanical applications with the fast traversing of heavy loads – all this with the same performance data and an unrivaled price-performance ratio.



#### Key technical data

- ▶ Principle: synchronization of the planets
- ▶ Diameter: 15–99 mm
- ▶ Pitch: 5/10 or 10/20 mm depending on the diameter
- ▶ Accuracy: T5, T7, T9 in accordance with ISO 3408
- ▶ Load ratings: up to C = 900 kN (dynamic),  
up to C<sub>0</sub> = 3,000 kN (static)
- ▶ Lengths: up to 5,000 mm
- ▶ D x n-value: 150,000
- ▶ As a rule, interchangeability with competitors is ensured

#### Compact, robust, economical

Rexroth uses its experience-based lead gained from cost-efficient roller processes in the production of spindles; the planetary screw assemblies can consequently be supplied with the same output but at a lower price than the competition.

A higher load-bearing capacity than that of ball screw assemblies can be achieved in the same installation space. The numerous large contact surfaces also ensure a high level of rigidity, long service life and a high level of efficiency. And because there is no feedback and no contact between the planets, significantly higher movement speeds can be achieved.

#### Advantages resulting from special product features

- ▶ High load-bearing capacity and rigidity thanks to the numerous large contact surfaces
- ▶ Small installation space due to the increased power density
- ▶ Quiet operation due to the guided planets
- ▶ Different nut types available
- ▶ Reduced lubricant consumption due to effective seals
- ▶ An economic solution thanks to the rolled spindle

# Ball screw assembly, Asian series: proven in DIN, adapted in JIS

Different markets, different standards: Bosch Rexroth has expanded its range by the addition of ball screw assemblies with nuts with JIS dimensions so that you can also successfully serve the Asian market.



## For faster success in Asia

The proven ball screw assemblies with DIN dimensions now have Asian brothers, enabling easy and fast access to the Asian market. With all the advantages of the DIN series and special specifications: larger outer diameters and flange diameters, 2 nut designs (FEM, FDM), suitable spindle ends for Asian bearings and corresponding pedestal bearing housings. Existing components can be easily replaced.

## Advantages resulting from special product features

- ▶ JIS dimensions: for easier access to the Asian market
- ▶ Direct replacement of existing components possible
- ▶ Larger outer diameters and flange diameters, but the same internal geometry
- ▶ 2 nut designs (FEM, FDM) available
- ▶ Spindle ends suitable for Asian bearings
- ▶ Pedestal bearing housing in accordance with the Asian series

## Key technical data

- ▶ D x n-value: 150,000
- ▶ Dynamic load rating is the same as the standard ball screw assembly
- ▶ External geometry in accordance with the Japanese standard (JIS)

# EMC-HD electromechanical cylinder – heavy duty: energy-efficient solution for heavy load applications

This robust electromechanical cylinder was developed for use in heavy load applications. Designed as a completely modular system with an integrated planetary or recirculating ball screw assembly, it is designed for cost-efficient work, even under tough conditions.



## Key technical data

- ▶ Basic dynamic load rating (Cdyn): 50 to 470 kN
- ▶ Axial force: up to 290 kN (tension/compression)
- ▶ Maximum traversing speed: 1 m/s
- ▶ Stroke: up to 1,700 mm
- ▶ Protection class: IP65

## The robust complete modular system

The new electromechanical cylinders were created to provide long service life under harsh conditions: a high IP degree of protection and a high level of corrosion protection are achieved with perfect sealing. The precision-rolled linear screw assemblies position accurately and powerfully, while featuring a high level of cost effectiveness, low operating costs and high energy efficiency. The configurable servo drive can be freely programmed, and process parameters can be changed easily – you can therefore also carry out complex processes accurately and adapt them at any time.

## Advantages resulting from special product features

- ▶ High energy efficiency and low environmental impact
- ▶ No leakages
- ▶ A simple, robust design for a long service life, even in tough environments
- ▶ A complete modular system and great variability for high application flexibility
- ▶ Exact positioning, high dynamics, powerful drive and long service life through the use of high-precision linear screw drives
- ▶ Optional connection to a central lubrication system reduces downtime and saves time and money
- ▶ Low design and installation costs as the complete system is ready to install and turn on
- ▶ An intelligent drive system for free programmability and the implementation of complex traversing profiles

# EMC electromechanical cylinder: compact, precise and more flexible

In the new EMC electromechanical cylinder you will notice the high system competence of Rexroth in every detail, thanks to the resolute integration of our proven proprietary technologies. The result is an actuator whose external geometry and mode of operation is equivalent to a pneumatic cylinder, which, however, is much more energy efficient and flexible. In many industries this makes it more than just an alternative to pneumatic linear drive systems.



## Key technical data

- ▶ Basic dynamic load rating (C<sub>dyn</sub>): 2.5 to 93 kN
- ▶ Axial force: up to 55 kN (tension/compression)
- ▶ Maximum traversing speed: 1.6 m/s
- ▶ Stroke: up to 1,500 mm
- ▶ Protection class: IP54, optionally IP65

## Complete system: hygienic design, variable, precise

Its high degree of variability is what makes the new EMC so interesting for many industries and applications. A low-cost simple basic cylinder can be adapted by means of countless options to meet practically any customer requirement. Hygienic design, with a high degree of chemical resistance, perfect sealing and a high IP degree of protection. The available options provide for a long service life even when operated in demanding industrial environments. The powerful EMC works extremely efficiently and economically at all times.

## Advantages resulting from special product features

- ▶ Hygienic design: high resistance to chemicals and cleaning agents
- ▶ Good sealing: degree of protection IP65, seal tight against dirt and water from the outside and lubricant discharge from the cylinder
- ▶ Optimized lubrication concept: optional connection to a central lubrication system reduces downtime and saves time and money
- ▶ High-precision ball screw assemblies Asian series: for high performance with maximum cost effectiveness
- ▶ A complete modular system with a high degree of variability: optimally adaptable to customer applications
- ▶ A complete system that is ready to install and turn on: low design and installation costs
- ▶ An intelligent drive system for free programmability and the implementation of complex traversing profiles

# EasyHandling basic motor mounting configurator: plan your mounting kits online



Bosch Rexroth presents the first online configurator for customized motor mounting: you can now design your specific solution quickly and easily 24 hours a day, seven days a week. Select the mounting kit for the axis configuration that fits your motor. It saves time and money.



## Key technical data

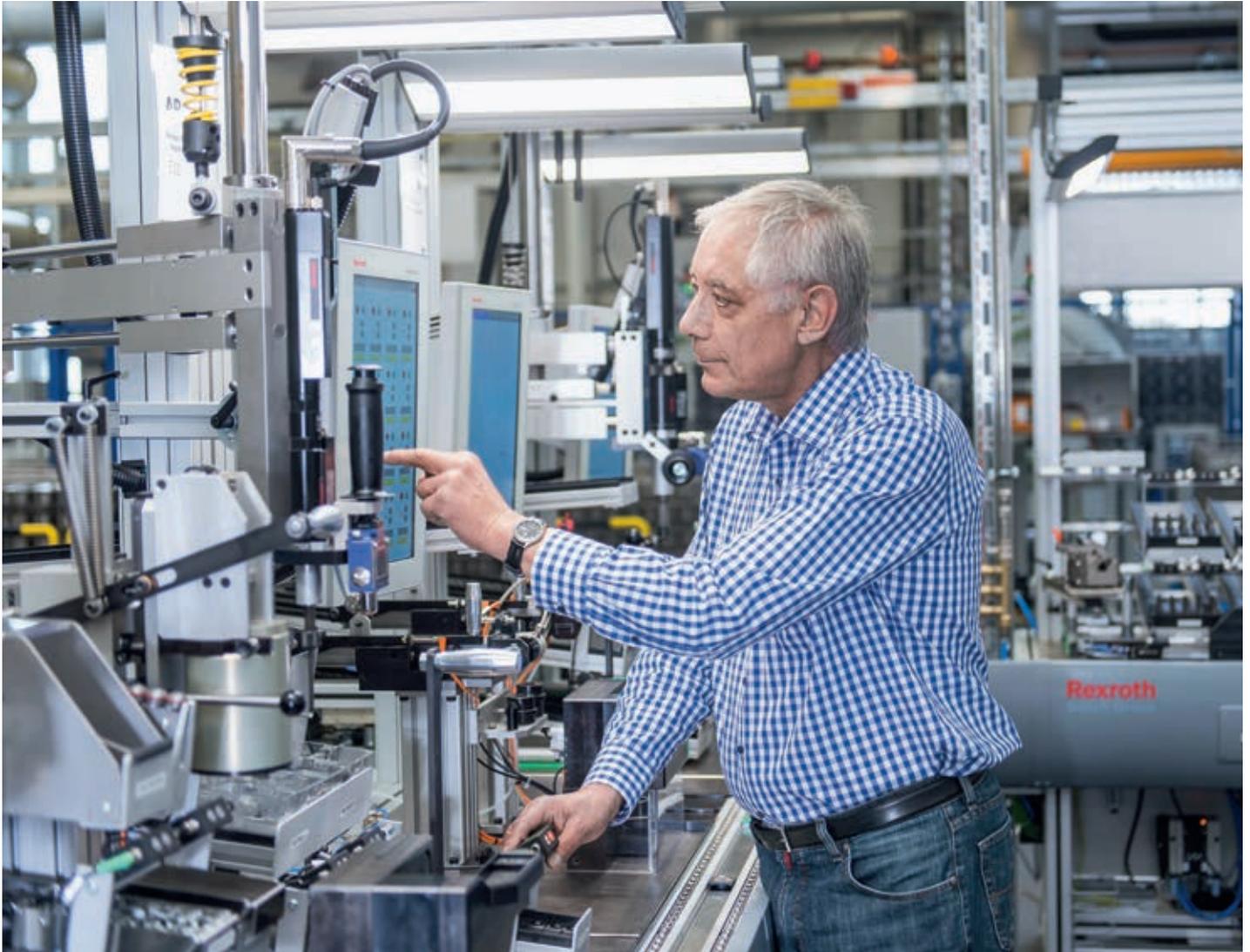
- ▶ Motor mounting kits for over 150 different series/types of customer motor
- ▶ Mounting kits complete with flange, clutch and belt gear
- ▶ No reduction in the performance specifications of the linear axes

## Configured easily, delivered quickly

Once again Bosch Rexroth is a step ahead: With the new online configurator, ordering motor mounting kits for customer motors is now so quick and easy that it is unrivaled. The way that it is practically integrated into the Rexroth e-shop means that you can actually select the right mounting kit for a variety of popular servo motors during the online configuration of the linear axis. You are guided via image control through the configuration process to your specific solution. 2D and 3D data are available to download in all popular formats. Just go online. At any time. It couldn't be easier.

## Advantages resulting from special product features

- ▶ Quick and easy design using image-controlled configuration
- ▶ Configurator integrated into the e-shop
- ▶ Ordering available 24 hours a day, seven days a week
- ▶ 2D and 3D data available to download in all common formats
- ▶ Available online anytime and anywhere

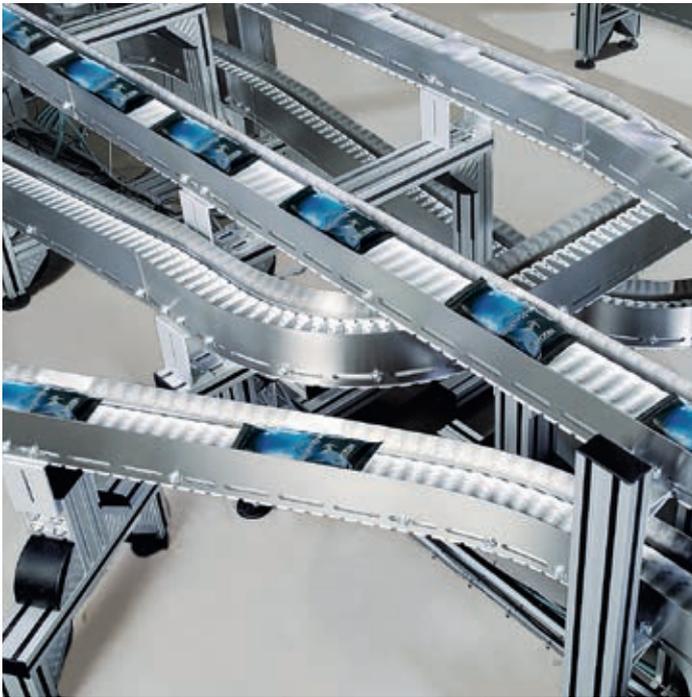


## Product innovations in Assembly Technology: powerful movement of parts, efficient speeding up of processes

Whether it's market-leading transfer systems delivering extremely heavy workpieces, glare-free LED operating lights producing 60% electricity savings, or interactive cockpits with live performance figures speeding up processes – Rexroth is just as innovative in the field of assembly technology as in other fields. Take advantage of our process know-how. And of our meticulously conceived solutions.

# VarioFlow *plus* chain conveyor: the modular system for quick assembly and quiet operation

Easy to configure, three-dimensional, modular, fast and error-free assembly, quiet and economical in operation – if you could wish for a conveying system, this is what it would sound like. Rexroth has implemented all of this in the new VarioFlow *plus* generation. A flexible modular system for a wide range of applications in a wide range of industries. What more could you want?



#### Key technical data

- ▶ Six chain widths of between 65 and 320 mm
- ▶ Optionally available as aluminum or stainless steel versions in all widths
- ▶ FDA-compliant materials
- ▶ Conveying speed of up to 60 m/min and in special cases up to 100 m/min
- ▶ Seven types of chain

#### Ingeniously simple to configure and economical to operate

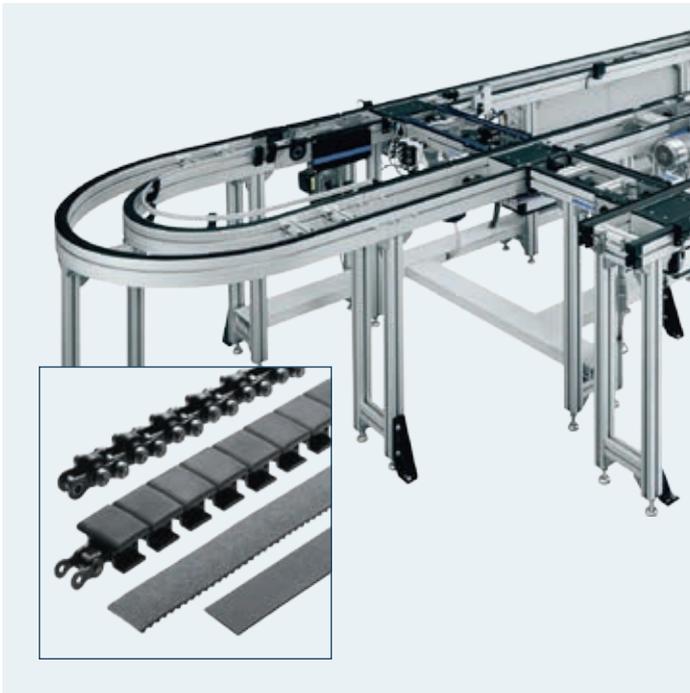
Whether as an interlinking system on assembly lines, in the food and packaging industry or in the interlinking of machine tools, the new VarioFlow *plus* generation is impressive in a wide variety of applications due to its extremely fast assembly and its exceptionally economical and quiet operation. The modular building block concept and technical details, such as its rivetless assembly and the optimized gliding properties, are what make this conveying system so practical to use and universally deployable. Off you go with your project planning: layout planning is ingeniously simple with MTpro.

#### Advantages resulting from special product features

- ▶ Extremely easy project planning: thanks to the modular building block concept and MTpro Layout Designer
- ▶ Rivetless assembly of the glide rail for fast, error-free construction and low-noise, maintenance-free operation
- ▶ Low friction: for long conveying segments per drive, low wear, low costs
- ▶ Ingenious and simple system of compatible modules, chains, and common spare parts offers flexibility without adding complexity
- ▶ Width and chain options to optimally match the transport need

# Transfer system TS 2*plus*: wider, better and able to withstand greater loads

Proven thousands of times in practice, the leading transfer system on the market has now become even more efficient: TS 2*plus* now handles workpieces of up to 240 kg. Supplemented with new lifting-traversing and rotating units and track widths of 160 to 1,200 mm, it is the most comprehensive modular system offered. You will find an optimal economic solution for any application in this system.



## **An extremely wide system of building blocks with all options**

You do not become a market leader by chance, but with better ideas. The conveying specialists at Bosch Rexroth have therefore packed even more practical features into the TS 2*plus* transfer system. The extended load range of up to 240 kg is particularly crucial for many industries. For other industries the universally used conductive components are decisive for safe use in EPA environments and suitability for clean rooms and dry rooms. The large range of track widths is available for all of them, though. And with MTpro the TS 2*plus* can be configured with unrivaled ease. A modular system that has it all: lots of good ideas.

## **Advantages resulting from special product features**

- ▶ 5 transfer media: enable an optimal solution and highly effective overall system for any application
- ▶ A wide, modular system of building blocks: for a wide breadth of applications in a broad range of industries
- ▶ Suitable for clean rooms and dry rooms: reliable even in more challenging conditions (medical engineering, optical systems, battery production, and more)

### **Key technical data**

- ▶ Track width: 160 to 1,200 mm
- ▶ Overall workpiece mass: up to 240 kg
- ▶ Conveying speed: 6/9/12/15 or 18 m/min
- ▶ Accumulation load: up to 2,200 kg per drive
- ▶ Line load: up to 200 kg/m accumulated

# Energy-efficient LED system lights: a dazzle-free saving of 60% in electricity used, for 60,000 hrs

The new LED system lights are real masters of adaptation: they always provide glare-free light of the right intensity wherever it is needed – whether it's the packing area or the testing or production area. Using 60% less energy than conventional fluorescent lamps. And they stay very cool and are maintenance-free for at least 60,000 hours. So you save money, have less stress, and can concentrate better.



## **Dimmable, ergonomic, maintenance-free**

The requirements relating to the right lighting conditions vary as much as the workplaces in which they are to be used. Adapting the LED system lights is simple, including continuous adjustment using a dimmer switch if you wish. And the lights are glare-free at all times due to the combination of parabolic arrays and diffuser films, flicker-free, maintenance-free, highly efficient and ergonomic, and they comfortably produce 5,000 K. The GST connector system also allows you to simply wire up the lights in series and use them as dual or triple lighting units. They make fluorescent lamps look old-fashioned.

## **Benefits of special product features**

- ▶ Glare-free due to the combination of parabolic arrays and diffuser film
- ▶ LED technology: long-lasting, energy-saving, little generation of heat, flicker-free
- ▶ 60% more economical than fluorescent lamps
- ▶ Fully adaptable to all working conditions; controllers can be connected up afterwards
- ▶ 5,000 K color temperature: increases the ability to concentrate, as well as performance

## **Key Technical Data**

- ▶ Power consumption: 15/20/30 W
- ▶ Length: 497/631/899 mm
- ▶ Service life: 60,000 hrs maintenance-free
- ▶ EU power connection: 220–240 V ~ 0/50–60 Hz, max. 16 A
- ▶ GST plug system
- ▶ ESD compatible mounting kit

# Interactive ActiveCockpit: everything displayed live – for quick decisions and fast communication



ActiveCockpit is a powerful communication tool in every respect that provides you with all the performance figures needed for your production operations – in real-time and at a glance. For fast, soundly-based decisions – which you can transmit to the appropriate recipients directly from the team meeting. Whether it's on the small phone or the large screen. ActiveCockpit helps speed up processes and make them more efficient, a major reason why the Industry 4.0 award was achieved by the Rexroth assembly line.



## For a wide variety of back-ends, and for intuitive operation

You've never had a quicker and clearer view of your performance figures – in real time and always consistently presented in pre-defined views for face-to-face on-site discussion and analysis with your team. Intuitive to operate and scalable – from a 4.7" mobile screen to a 65" UHD touchscreen. You can connect up back-end systems conveniently using plug-ins/connectors. You can incorporate your company visualization standards without making any changes to them. Or simply set up your own favorites. Regardless of whether you use email, chat or mobile functions, the ActiveCockpit will enable you to generate a significantly faster and more efficient problem solving process. Communication 4.0 so to speak.

## Benefits of special product features

- ▶ Aggregated data in predefined views: for fast, consistent, live access and quick decision-making.
- ▶ Open system: Visualization standards can be incorporated and historical data displayed, and new favorites can be easily set up
- ▶ Role-based user interface: much more user-friendly
- ▶ Whiteboard function: for efficient consultation on the shop floor
- ▶ Extensive range of email, chat and mobile functions: for speedy problem-solving

## Key Technical Data

- ▶ Browser-based software, extendable via app/widget
- ▶ Connection to back-end systems, e.g. MES/ERP systems, via plug-ins / connectors
- ▶ Scalable end devices: mobile phone, tablet, PC, 54" HD touchscreen, 65" UHD touchscreen
- ▶ Intuitive user interface: customized configuration via administrator
- ▶ Functional data management: supports structured data storage and quick retrieval



## Sytronix variable-speed pump drives: provide energy savings of up to 80 % and are up to 20 dB(A) quieter

Sytronix, a combination of robust hydraulics and efficient electronics, is the intelligent answer to rising energy prices, cost pressure and stringent environmental requirements. In comparison to classic hydraulic concepts, with Sytronix you can control the speed of pump drives according to hydraulic energy demand via intelligent drive electronics with the latest firmware and software. The Sytronix portfolio offers you a finely scaled range of preconfigured sets consisting of a motor-pump assembly, an inverter with the firmware and software optimized for your application and accessories.

# Sytronix FcP 5010/7010: low-cost complete sets of up to 90 kW



The area of application of the Sytronix FcP series has been significantly extended by the qualification of further components. Based on standard motors, the FcP system is a low-cost drive solution that is intended especially for applications with low dynamics requirements, for example, constant pressure systems. Preconfigured drive sets with fixed and variable pumps enable flexible use in a wide range of applications.



## Basic performance, full efficiency – ideal for constant pressure systems

Through the use of the new Rexroth Fv inverter series (on FcP 5010), the FcP series now serves an extended power range from 1.5 to 90 kW. This makes it an ideal drive for constant pressure systems, especially for systems with low dynamic requirements. In the lower power range (< 15 kW), for example, it is highly suitable for machine tools, and in the range up to 90 kW also for presses and in metallurgy. The FcP 7010, together with the IndraDrive controller, enables access to unique additional features, such as Safety on Board, Energy Monitoring and Ethernet-based communication.

## Advantages resulting from special product features

- ▶ A low-cost drive solution for low dynamic requirements
- ▶ Low startup costs due to the preconfigured sets
- ▶ Optimized process controllers, application-specific firmware
- ▶ Operation-safe, thanks to the integrated protection and monitoring functions
- ▶ FcP 5010: easy operation, manual parameterization
- ▶ FcP 7010: additional features, uniform engineering, Ethernet-based communication

### Key technical data

- ▶ Power rating up to 90 kW (higher on request)
- ▶ MOT-FC motors with NEMA and IEC approvals
- ▶ Use in constant pressure systems
- ▶ For closed hydraulic systems
- ▶ Single-quadrant operation
- ▶ Motor-pump assemblies (MPE) can also be ordered separately
- ▶ Ethernet-based communication (Sercos, EtherCAT, PROFINET/IO, EtherNet/IP) and fieldbuses (PROFIBUS, CANopen, DeviceNet)

# Sytronix SvP 7010: more dynamic, more compact and more energy-efficient

The diversified portfolio of preconfigured Sytronix SvP 7010 complete sets has been expanded by direct-coupling motor-pump assemblies (MPA01). Utilize the advantages of these tailor-made, compact solutions, which are easy to install and commission: in an extremely small space you can ensure not only less noise, but also high dynamics with an energy saving of up to 80 %.



## High-performance – finely scalable, highly efficient

The SvP 7010 system consists of a pump that is optimized for variable-speed operation, a highly dynamic synchronous servo motor and a corresponding inverter together with accessories. In this context, a completely modular system with finely scaled performance levels has been created, which has been expanded to 480 L/min and can be optimally adapted to a wide range of requirements. SvP 7010 drives work in open hydraulic systems or apply 4-quadrant operation in closed hydraulic systems. When interconnected in cascaded systems, SVP 7010 drives are ideal, even for extremely high performance requirements in plant manufacturing. SvP systems provide very high performance with optimum efficiency.

## Advantages resulting from special product features

- ▶ Lower noise levels and lower weight
- ▶ More compact: without any additional coupling elements
- ▶ Improved motor cooling thanks to better heat transfer from motor to pump
- ▶ Improved energy efficiency and dynamics due to the reduced moment of inertia
- ▶ Practical: pre-assembled motor-pump assembly
- ▶ Universal: liquid-cooled motors also available with a stainless steel cooling system
- ▶ Application safe: thanks to integrated protection and monitoring functions
- ▶ Easy commissioning and optimization: through application-specific controller structures

## Key technical data

- ▶ Effective power of up to 80 kW
- ▶ For use in axis control systems
- ▶ For open and closed hydraulic systems
- ▶ 2- and 4-quadrant operation possible
- ▶ Scalable performance: with basic and advanced control components from the IndraDrive modular system
- ▶ A shorter installation length of up to 150 mm: 25 % more compact in the upper power range
- ▶ Motor-pump assemblies (MPA) can also be ordered separately

# Sytronix DFE: high performance and high dynamics with variable pumps



Each of the Sytronix DFE system sets consists of an electro-hydraulically controlled axial piston pump which is driven by a variable-speed asynchronous motor. Your benefit: the use of standard motors rated up to 315 kW, and of the especially robust, service-proven SYDFE pressure and flow control systems, means that the DFE drives offer excellent value for money, including in the high performance ranges.



## Advanced Performance – great power and dynamics

Sytronix DFE reduces the load on the motor during pressure-holding operation. This means that ideally the electronic components can be designed to be smaller than in conventional drives. The system can be operated in two modes: in "teach-in" mode the cyclically recurring pressure and flow profiles are firstly stored in the electronics, so that the system accelerates correctly prior to an increase in flow. In non-cyclic machines (e.g. woodworking/metallurgy) on the other hand, "real-time mode" can be used. This involves the controller calculating the optimal combination of motor speed and swivel angle setting while the process is running. This maximizes energy savings.

## Benefits of special product features

- ▶ Reduced investment costs due to simple retrofitting
- ▶ Good value for money in the higher power range due to downsizing of the electronic components
- ▶ Versatility of use: available for A10 and A4 pumps
- ▶ Simple operation and manual parameterization, all on a cost-effective basis
- ▶ Great performance

## Key Technical Data

- ▶ Effective power up to 315 kW
- ▶ Use in open hydraulic systems
- ▶ Multiple-circuit and master-slave systems can be built up
- ▶ Power control: Constant pressure (p) and axis control (p/Q)
- ▶ 2-quadrant operation



## Rexroth service innovations: maximizing plant availability and productivity

Comprehensive all-round Rexroth service doesn't just mean tried-and-tested support available from a single-source throughout the life cycle of plant and machinery, it also means innovative, creative thinking: customized service packages, sophisticated web services, or even cutting-edge analytical tools. All with one goal in mind: prevention of standstills and permanently increasing productivity.

# Service Agreements: Customized packages – for fewer failures and enhanced planning options

If the top priority is maximum plant availability and productivity, a needs-based maintenance concept is required. In order to ensure that the right specialists, the right measures, and the right spare parts are always available at the right place, Rexroth has put together service packages which can be individually tailored to your needs. With predictable costs and professional advice and implementation – all from a single source.



## **Worry-free: Preferential service with fixed costs**

In order to avoid unplanned standstills, systems should be maintained and repaired according to the manufacturer's specification. Customized contracts and preferential service minimize the risks of failures/outages, and they facilitate advance financial planning.

Rexroth Service means: optimal service from the original manufacturer. So you have one less thing to worry about.

## **Customized service packages**

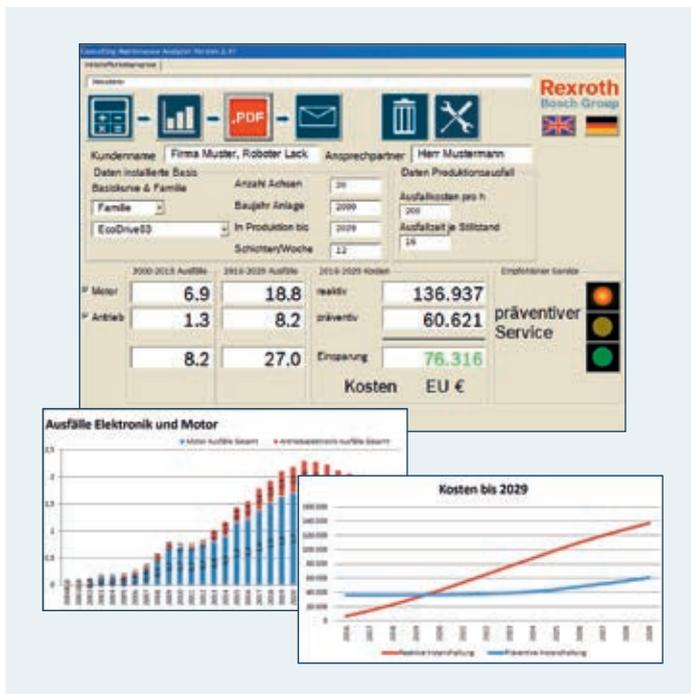
- ▶ Preventive maintenance – PMA: Regular servicing of the plant by Rexroth specialists.
- ▶ On-call service – SBA: experienced service specialists are guaranteed to be on-site within defined periods for troubleshooting and fault rectification.
- ▶ Spare parts management – SPM: The right spare parts at the right place and the right time.

### **Types of contract**

- ▶ Preventive maintenance agreements (PMA)
- ▶ On-call service agreements (SBA)
- ▶ Spare parts management agreements (SPM)

# Consulting Maintenance Analyzer CMA: danger recognized, repair averted, availability secured

Avoid costly repairs and increased downtime with better prevention. Now the complex failure analysis of the installed components necessary for this has been simplified too, without additional hardware or software. Rexroth's service personnel use the newly developed CMA analysis tool to produce the detailed application-specific failure forecasts, and they can recommend the optimal maintenance strategy for maximum plant availability and productivity.



## Complex analyses without additional hardware and software

An ounce of prevention is worth a pound of cure. With its new Consulting Maintenance Analyzer (CMA) Rexroth's service personnel can efficiently draw up customized fault forecasts for you based on your repair statistics, and recommend the best possible maintenance strategy – our charges for doing this are very reasonable and fully transparent. This means that as the operator of factory automation machinery you have the guarantee of professional, single-source service, a continuous overview of the machinery's TCO and availability levels, a major reduction in costs, and above all, less standstill time.

## Benefits of special service features

- ▶ Cost-effective analysis of the installation basis: for customer-specific fault forecasts and for transparency of costs over the remaining service life of the plant.
- ▶ Soundly based recommendations regarding the best course of action can be made by the original manufacturer without the use of additional hardware or software
- ▶ This enables a customized maintenance strategy to be produced for reducing maintenance costs
- ▶ Maximum plant availability and productivity: due to soundly-based analysis and professional service. Everything provided from a single source

## Important key data

- ▶ In terms of products, no additional hardware or software is needed
- ▶ Cost-effectiveness (TCO) and machinery availability can be displayed at any time



**Bosch Rexroth AG**

Bgm.-Dr.-Nebel-Str. 2  
97816 Lohr, Germany  
[www.boschrexroth.com](http://www.boschrexroth.com)

**Find your local contact person here:**

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