



**FUTURE**

**STARTS NOW**

**Connected  
Hydraulics**

Now. Next. **Beyond.**

**rexroth**  
A Bosch Company

Rexroth is working to redefine hydraulics technology. Our passion for innovation and decades of experience drives us to continually incorporate new technology and offer the most valuable hydraulics products on the market. With our portfolio of Connected Hydraulics products, we want to join our customers on their journey into the future, and to continue to provide them with the most valuable solutions. **Now. Next. Beyond.**

Global competition is driving companies to manufacture and utilize equipment that maximizes productivity and performance, while simultaneously reducing downtime and energy consumption. All of these are difficult to attain with traditional, antiquated, hydraulic systems which are unfortunately the most prevalent systems in use, **Now.** Those who do not adapt and incorporate newer technology will be left struggling in an ever-changing industrial landscape.

Today, the most conscientious companies are taking the **Next** steps and adopting new ways to simplify and automate various systems, and reduce complexities in designing and maintaining their equipment.

## **Now. Traditional Hydraulics**

Hydraulic systems are often associated with images of large, noisy, hot, and oily systems used to move heavy pieces of equipment. These systems are characterized by overwhelmingly mechanical components and overly complex hydraulic circuit designs. Both of these factors lead to difficulties in designing, operating, and maintaining these types of systems and play into the negative image of hydraulics as a motion solution. However, this image is old fashioned and no longer accurately portrays the technology.

Modern day hydraulic systems have addressed many of the drawbacks of these antiquated systems. For those looking to be more competitive in their markets, these systems are a must-have upgrade. With Connected Hydraulics, our customers can continuously improve their products and add value to their customers.

## **Beyond. Hydraulics of the Future**

Compact. Quiet. Efficient. Connected. These are the traits of modern hydraulic systems, and will continue to improve as we move into the future.

Throughout the entire hydraulic system, components will not only be easily integrated into the machine control and factory network, but also seamlessly with each other into an ecosystem of components and digital services. Hydraulics of the Future will be designed to improve the experience of integrators, operators, and maintenance personnel.

Using Bosch Rexroth hydraulic and electro-hydraulic products will be simpler, and provide more value than ever before... this journey, Connected Hydraulics, has already begun.



# The Next Steps of Connected Hydraulics

## Simplify your Design



A simple design has benefits across the entire life-cycle of the machine. Traditional hydraulic systems often have a large number of components and a high level of mechanical complexity. This leads to difficulties in the design phase as well as the operation phase of the equipment. With Rexroth's Connected Hydraulics products, the **mechanical complexity of systems can be reduced**, while simultaneously allowing greater longevity, controllability, and data transparency. Because of this, a modern system requires **less effort and hydraulic knowledge to design, install, operate, and maintain**. This allows a greater focus from machine builders on the design of the entire machine, and end users to focus on production.

## Streamline your Installation



Faster installation allows for a faster time-to-market. Connected Hydraulics products from Rexroth can significantly speed up the initial assembly and testing time of new equipment, as well as final commissioning at production facilities. Eliminating mechanical settings and replacing them with electronic configurators allows for parameter files to be easily downloaded into components, **streamlining machine assembly**. They can also be backed up in computers, **facilitating maintenance** in the future.

## Reduce your Footprint



Whether it's in materials, labor, energy, or floor space, larger components and systems means additional up-front and operating cost. Larger hydraulic systems eat up space in a machine and on the shop floor, adding to material cost for structural support and reducing room for additional production equipment. These systems also take more time to install, require more oil, and use additional energy to do the required work. Without sacrificing power, quality, or performance, Connected Hydraulics products from Rexroth **maximize the power density** of hydraulics technology, reducing physical and environmental footprints.

## Maximize your Productivity



Development of new, state-of-the-art machines continues to focus on increasing productivity and output, in order to increase manufacturing revenue. Using components with the highest quality and performance allows machine builders to easily create these next-gen machines with minimal engineering effort. With the ability to help **reduce cycle time, changeover times, and component wear** while simultaneously **increasing precision**, Rexroth's Connected Hydraulics products allow machine builders to provide the highest value and most productive machines into every market.

## Minimize your Downtime



For any equipment operator, downtime is unavoidable, and often necessary in order to prolong the longevity of the equipment. While unplanned downtime can be catastrophically expensive, preventative maintenance can be just as costly and inefficient when performed too frequently. Connected Hydraulics products from Rexroth not only **last longer and require less frequent maintenance**, added technology enables digital methods to **collect and track data**. This can be used to facilitate both troubleshooting and maintenance planning and reduce the frequency and length of downtime.

# Connected Hydraulics

Now. Next. Beyond.

# Key Connected Hydraulics Technologies

## ✔ Sytronix

Sytronix is Rexroth’s variable-speed hydraulic drive system that delivers power-on-demand. With several versions available, it can regulate pressure and flow from the pump, and position and force on an axis. By intelligently limiting the power consumption from the pump and electric motor, there can be significant reductions in energy usage and noise. With versions of Sytronix available for different size and performance requirements, many different applications can gain the benefits of this technology. Compared to traditional systems, power consumption can be reduced up to 80% and the noise level reduced by up to 20 dB(A). Systems using this technology are also more dynamic and versatile, reducing the required installation space, and the size and number of components.

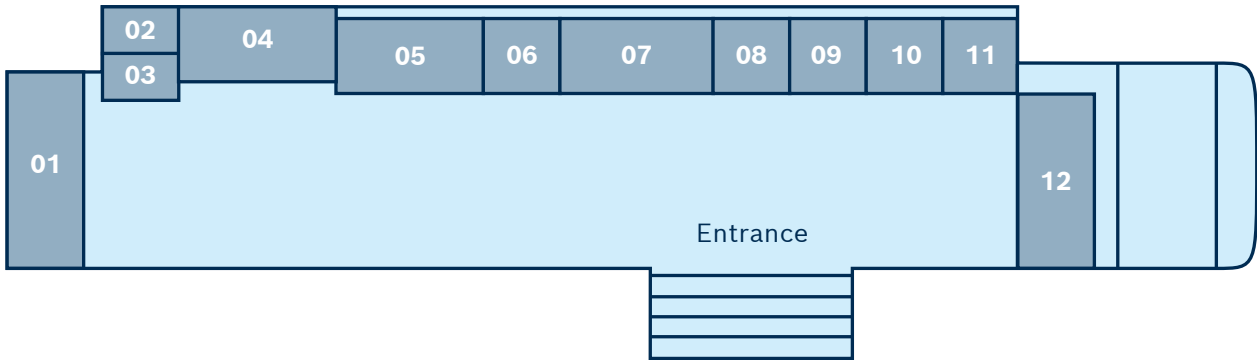
## ✔ IoT-Ready Protocols

Rexroth offers a variety of digital communication methods across the entire Connected Hydraulics product portfolio. This allows machine builders to establish a flexible connection to the higher-level control systems of many different manufacturers, and ensures a open, scalable and easy-to-use design. The Multi-Ethernet platform allows machine manufacturers to choose from key Ethernet protocols such as Sercos III, EtherCAT, Ethernet/IP, PROFINET RT and Varan. It also allows the transfer and transparency of component process data to be easily accessible via the control system. Rexroth now includes hydraulic actuators and sensors with IO-Link communication. IO-Link enables quick and easy digital communication of peripherals with the machine control. With standard M12 connectors, extensive time and fault-intensive wiring is no longer required.

## ✔ myCro

With years of experience in hydraulic applications and design, Rexroth now offers the knowledge of complex fluid flow optimization to the market in a variety of forms. With myCro technology, the required reservoir oil volume in a hydraulic power unit can be significantly reduced. Using computational fluid dynamics (CFD) modeling, design of the reservoir is optimized to allow a greater diffusion of dissolved oxygen in a much faster time. With a myCro reservoir, the system size can be reduced by a factor of five (5), reducing the footprint of the unit, the material cost to manufacture it, and the cost of oil to fill it. Hydraulics circuits designed with myCro technology also tend to have a longer longevity and controllability; two factors which lead to better productivity and less downtime.

## Topics and Exhibits in the Connected Hydraulics Roadshow



- 01 Pumps, Valves, and Motors
- 02 Motion Controllers
- 03 IO-Link
- 04 Servo Hydraulic Actuator

- 05 GoPak
- 06 CytoPac
- 07 Electronic Controller Demo
- 08 Sytronix FcP

- 09 Hägglunds ATOM
- 10 Hydraulic Aftermarket
- 11 Engineered Systems
- 12 CytoBox

## 01 Pumps, Valves, and Motors

Rexroth has long been known for our robust and high quality products. With a broad portfolio of hydraulic components and extensive experience in industry, we are ready to partner with our customers to provide them with the best solutions.

For more information on specific products, please contact a Rexroth associate, your local distributor, or visit our website.



## 02 Motion Controllers

Rexroth offers a variety of electronic motion controllers for various hydraulic applications with proportional control. Completely digital and available as stand-alone, or on-board valve electronics versions, the controllers offer precise and dynamic control. They are easily parameterized from our electronic drives and controllers engineering tool, IndraWorks Ds, which can be downloaded from the Rexroth website. All motion controllers come standard with IoT-Ready Protocols for maximum flexibility.



## 03 IO-Link

The open IO-Link standard establishes continuous communication with sensors and actuators irrespective of the used field bus. This simplifies commissioning in hardware and software and enables flexible adjustment of hydraulic valves for varying production processes. This facilitates integration of new equipment with increasing requirements for flexible machinery and systems. Rexroth offers products across the entire IO-Link framework. Our offering includes masters, sensors, and part of our valve family.

### Key Insights & Considerations

- Open standard for bi-directional point-to-point connections in parallel to field bus
- Easy connection with standard cables and M12 connectors
- No additional engineering tool necessary, possible configuration via control system





## 04 SHA (Servo Hydraulic Actuator)

A complete heavy-duty system, the SHA combines the benefits of hydraulic and electric technologies. With a Sytronix servo-drive and IoT-Ready Protocols, the SHA enables efficient plug-and-play connectivity.



Built for a variety of applications, the SHA's compact close-loop circuit design makes it the perfect single axis hydraulic drive solution.

### Specifications

- Maximum forces up to 2,600 kN (584,500 lbf)
- Stroke length up to 1.8 meter (71 in)
- High speed up to 1.1 meter/sec (43.3 in/sec)



## 05 GoPak

### Configurable Power Unit

The GoPak bridges the gap between off-the-shelf standard power units and custom-built, one-of-a-kind units. Customization is possible including incorporation of Sytronix variable speed pump drives, i4.0 connectivity, predictive maintenance options, safety on board (safe torque off), and ultra-energy efficiency features.

### Specifications

- Reservoir sizes up to 200 gallons
- Pressure range up to 4000 psi
- Pump displacement range up to 140 cm<sup>3</sup> per revolution (variable and fixed models)



## 06 CytroPac

### Compact Power Unit

The CytroPac is Rexroth's revolutionary small power unit; it incorporates all three of the key connected hydraulics technologies: Sytronix FcP, IoT-Ready Protocols, and myCro.

### Specifications

- Hydraulic power up to 5.4 hp
- Pressure up to 3480 psi
- Flow rate up to 9 gpm
- Tank capacity of 5.3 gallons



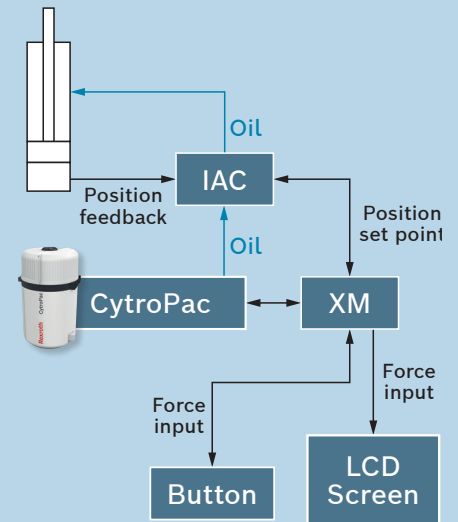
### Three (3) versions available:

- Basic
- Advanced adds integrated sensor monitoring
- Premium adds IoT-Ready Protocols with multi-Ethernet



## 07 Electronic Controller Demo

This functional display shows an XM controller running Rexroth's MLC (motion logic controller) software to demonstrate an axis control system with high performance and high precision control.



## 08 Sytronix FcP

### FcP – Frequency-Controlled Pump Drive

The Sytronix FcP sets consist of a fixed pump with an asynchronous motor and a frequency converter. The FcP product family covers the field of standard performance with regard to dynamics, precision and scope of functions. As part of the Sytronix family, energy savings of up to 80% and noise reduction up to 20 dB(A) can be achieved.

#### Specifications

- Recommended up to 25 hp
- Control modes
  - Pressure control
  - Flow rate control
  - Power limitations



## 09 Hägglunds ATOM

The Hägglunds Atom takes over from the existing Hägglunds CAB – supplying not only more revolutions per minute, but also far more power than motors of similar size. The result is a tiny, power-dense package ideal for mobile, marine, plastics and recycling applications.

The Atom brings your hydraulic drive system a maximum torque of 13.6 kNm. Since the motor can supply full torque at its top speed of 400 rpm, that gives it a maximum power of 394 kW that outstrips other hydraulic motors in its class.

- Max. torque: 13.6 kNm
- Max. speed: 400 rpm
- Max. pressure: 350 bar
- Max. power: 394 kW



## 10 Hydraulic Aftermarket

Rexroth Hydraulic Aftermarket offers an industry-leading set of service products targeted at the market's hydraulics users:

#### Key Features

- State-of-the-art repair equipment designed specifically to interface with Rexroth hydraulics and electro-hydraulic components. Market-driven lead times for quotation, repair, and return of equipment and rapid response emergency services.
- U.S. network of strategically located parts inventories created to assure quick response to your needs. Use genuine Rexroth spare parts and replacement kits to prolong service life and help ensure our hydraulics deliver peak performance throughout your system's life-cycle. Exchange programs to increase your uptime and expedite service turnaround is also available.
- Certified field service technicians with hands-on experience solving hydraulics performance issues on site.
- System startup and troubleshooting programs, both on site and remote, to bring hydraulically powered equipment online fast and keep them operating.



## 11 Engineered Systems

In industrial applications, Rexroth is known not only for the wide array of components we manufacture, but also as a turn key hydraulic system supplier.

Scope of supply may include hydraulic power unit, valve/control manifolds, actuators (hydraulic cylinders or motors), electronic controls, sensors, and interconnecting piping to ensure that the application meets all performance specifications and operates safely.

Rexroth's team has proven capable to solve the most demanding drive and control applications. Core competencies include project management, system engineering, and advanced simulation/modeling to validate applications prior to manufacture.

## 12 CytroBox

The CytoBox is unlike any power unit that has come before it. It is equipped with a Sytronix pump drive, electronic controller, sensor package, and it streams to Rexroth's Industrial Hydraulic IoT solution, CytoConnect. Engineered for retrofits and redesigns alike, the CytoBox is uncompromisingly compact due to its integrated myCro reservoir, and truly plug-and-play thanks to IoT-Ready protocols.

### Specifications:

Hydraulic

- Max. pressure 315 bar (4500 psi)
- Max. flow 160 l/min (42 gpm)
- 150 liter Oil Reservoir (50 gal)

Electric

- Max. power of 30kW (40 HP)
- 400-500 VAC Input

Physical

- 0.5m<sup>2</sup> footprint (5.4 sqft)
- Noise level < 75dB(A)



## Notes

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Subject to revisions!