

Technical Article



Bosch Rexroth brings its customers Factory of the Future-capabilities into the present with its wide portfolio of automation solutions.

The Factory of the Future is Now – and it's Everywhere

Introduction

By now, anyone involved in the industrial sector has heard of the Factory of the Future. Those four words encompass an industrial utopia defined by increased productivity with reduced downtime, data transparency, previously-untapped levels of customization, improved safety capabilities, all boiling down to more profitable production processes. At the heart of the Factory of the Future is the automation and IoT software that makes this vision a reality. “Full flexibility, individuality and scalability. This is exactly what the factory of the future is about.” That’s how Dr. Henier Lang, senior vice president of Automation & Electrification Solutions at Bosch Rexroth defines

the Factory of the Future. As a leading provider of automation and assembly solutions, Bosch Rexroth is heavily involved in bringing its customers Factory of the Future-capabilities into the present with its wide portfolio of automation solutions. With automation under the Factory of the Future’s microscope, technology such as hydraulic components, linear motion and assembly technologies can easily fall out of view. Drawing from years of multi-technology expertise, Bosch Rexroth demonstrates how the automation technologies driving the Factory of the Future interacts with other product groups to make full flexibility, individuality and scalability a reality.

Key Insights & Considerations

- **Hydraulics outfitted with IO-Link capabilities increase flexibility, individuality and scalability.**
- **Linear motion tools for the Factory of the Future guide customers through individual processes from start to finish.**
- **Open communication is a primary factor to a successful Factory of the Future and it extends beyond networking capabilities.**
- **The Factory of the Future is connected and solutions enabling that connectivity will only continue to advance.**
- **The Factory of the Future is more than just a vision, it's happening *Now*.**



Rexroth's Multi-Product Line brings together hydraulic power units with embedded sensor technology to provide predictive indicators.



The Factory of the Future and Hydraulics

The future of hydraulics begins when real-time diagnostics and predictive maintenance meet Rexroth's tried-and-true hydraulic technology. In Rexroth's Factory of the Future, this idea comes to life. Using a marriage of industrial hydraulics components and industrial control components, Bosch Rexroth is able to provide integrated, ready-to-go solutions. Whether this is an integrated solution with variable speed drives or industrial power units equipped with onboard PLCs, the market can rest assured that the products work out of the box.

In almost all industries, machine users require increased flexibility and availability for production of small batches and continuous diagnostics of all actuators and sensors. This specifically comes to life with Hydraulics. For example, the [Multi-Product Line](#) installed in the Bethlehem, PA facility brings together hydraulic power units with embedded sensor technology to provide predictive indicators or required maintenance. By utilizing CISS sensors, we are able to monitor vibration and noise as part of simple predictive measures.

In addition to this, the general industry has an increasing demand and need for horizontal and vertical connections of machinery and systems for Industry 4.0 applications. The open standard IEC 61131-9, IO-Link, fulfills these requirements at low connection costs and energy consumption. By including an IO-Link interface into a few of its most popular hydraulic products, Bosch Rexroth promotes the integration of fluid technology into Industry 4.0 applications. Starting with select proportional control valves and pressure switches, the implemented IO-Link interface enables users to have direct access to all data provided by the actuator and sensor, in addition to the field bus, helping to enable a batch size of one. As the Factory of the Future continues to advance, a wider variety of hydraulic products outfitted with IO-Link capabilities will be available to provide increased flexibility, individuality and scalability to more applications.

The Factory of the Future and Linear Motion

Customization and scalability are key in the Factory of the Future and Rexroth's linear motion digital platform allows users to design a unique linear

motion system perfectly tuned for the specificities of the individual application. Before the Factory of the Future became a reality, Bosch Rexroth was already a primary provider of linear motion eTools such as the Linear Motion Designer, LinSelect and a variety of eConfigurators. With digitalization at the forefront of the industry, Rexroth enhanced its established database of linear motion tools to create a complete digital platform designed for the entire product lifecycle. Of course, because it's a digital platform the data is available anytime, anywhere, at the simple push of a button increasing accessibility for the user. From seeking information, selection, purchase, supply, commissioning, start-up, operation and service, linear motion tools for the Factory of the Future guide customers through individual processes from start to finish.

The Factory of the Future and Assembly Technology

When the personalization of the Factory of the Future and assembly technology collide, amazing things can happen. Open communication is another primary factor to a successful Factory of the Future and it extends beyond open networking capabilities. ActiveCockpit, Bosch Rexroth's data visualization tool, encourages open communication throughout the entire plant and provides an efficient way for workers to collaborate and view plant data in real-time. Bosch Rexroth prides itself in not just being a lead provider of Industry 4.0-ready technology, but also a lead user of its technology. The ActiveCockpit is another one of those technologies that is executed on the Multi-Product Line and plays a vital role in its day-to-day operations. Centrally located in the plant, the ActiveCockpit is responsible for collecting, filtering and continually displaying production data and has contributed to increasing transparency, productivity and efficiency in our facility. For added flexibility, the software is compatible with mobile devices and laptops, meaning employees can access the information from anywhere in the plant or remotely. Its open software platform makes it customizable for almost any application and ideal for your factory.

In addition to enabling smaller batch sizes and increasing flexibility, the Factory of the Future is worker-centric and the ever-developing smart workstation technology is paving the way. Harnessing the personalization capabilities that make the Factory of the Future the model of efficiency, smart

workstations make assembly tasks significantly easier for the worker by providing interactive step-by-step tutorials on the task at hand, and customizing the instructions to their individual needs to ensure a quality result. The smart workstation technology of *Now* embodies the personalization needed for an efficient work environment. As the industry enters into the *Next and Beyond* of assembly technology for the Factory of the Future, the innovations will only get more flexible, more customized, and more scalable.



The Factory of the Future and Automation

The Factory of the Future wouldn't be possible without the automation and electrification solutions that help drive it. Solutions such as cabinet-free drive technology enable machine manufacturers to integrate all electrical drive components directly into the machine, resulting in entirely cabinet-free, modular machines with minimized required space. Improved machine safety capabilities via advanced solutions for a variety of applications bring a competitive edge to operations. From drive-integrated safety functions to centralized-safety PLC's, each solution is engineered to enhance the transparency of

the plant and enable a safer, more transparent work environment.

Having an efficient Factory of the Future doesn't require new machines. Future-proof new or existing machines with an IoT gateway software solution. IoT gateways makes it easy to connect to Industry 4.0 environments without intervening in the automation logic. To illustrate the capabilities of an IoT gateway, Bosch Rexroth dusts off a human-powered lathe from 1887 once used in Robert Bosch's manufacturing plants. It is powered by a foot treadle and adjusted with hand cranks, arguably making it a pre-Industry 1.0 machine. By implementing one of Rexroth's IoT Gateways and an XDK sensor, valuable data could still



The ActiveCockpit data visualization tool encourages open communication throughout the entire plant.

be collected, despite it being an archaic innovation. An IoT gateway allows value to be extracted from the process without replacing or redesigning the machine. The Factory of the Future is connected and the solutions enabling that connectivity are available Now and will only continue to advance.

Conclusion

The Factory of the Future is more than just a vision, it's a journey and it's happening *Now*. But today is just the beginning. Increasingly short production life cycles, smaller batch sizes and individual product design mark

the requirements for future productions, and the *Next and Beyond* of Factory of the Future technologies still to come will bring the industry closer to economic customization than imagined possible. This is the Factory of the Future!

Do you have technical advice worthy of an article?

Contact Susan Strauss at 610-694-8352 or susan.strauss@boschrexroth-us.com

**Full flexibility,
individuality
and scalability.**



Having an efficient Factory of the Future doesn't require new machines thanks to IoT gateway software solutions.



The smart workstation technology of Now embodies the personalization needed for an efficient work environment.

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