

The Power Unit Revolution



How Intelligent, Compact Hydraulics are Changing Machine Design

For decades, hydraulic power units meant bulky assemblies, complex wiring, and a frustrating disconnect between the machine and its power source. This whitepaper explores how integrated electronics, modular design, and Industry 4.0 connectivity are transforming the hydraulic power unit from a necessary component into a competitive advantage.

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THE TRADITIONAL POWER UNIT PROBLEM

In most industrial machines, the hydraulic power unit is assembled from individual components: a motor, a pump, a reservoir, a cooler, filters, sensors, and a separate control cabinet. Each piece is sourced, mounted, wired, and integrated on-site or in the OEM's assembly facility.

This approach creates multiple pain points:

- Space consumption: Large, custom-built units that demand valuable floor space.
- Complex installation: A tangle of hydraulic lines, electrical cables, and cooling connections.
- Difficult diagnostics: Limited visibility into system health and performance.
- Long commissioning times: Each component must be configured and tested individually.
- Maintenance uncertainty: Without integrated monitoring, failures are often reactive rather than predictive.

For machine builders, this means longer build times, higher costs, and machines that are harder to service in the field.

THE INTEGRATED, INTELLIGENT SOLUTION

The CytroBox represents a fundamentally different approach. It's a complete hydraulic power unit delivered as a single, pre-engineered package with the drive controller, motor, pump, reservoir, cooling, filtration, and sensors already integrated and tested.

What makes it different:

- Plug-and-produce simplicity: A wizard-based setup gets the unit operational in a fraction of the time.
- Compact footprint: A vertical, space-optimized design with a degassing-optimized tank that minimizes hydraulic fluid volume.
- Integrated intelligence: Onboard electronics and sensor packages provide real-time monitoring of pressure, temperature, contamination, and more—all accessible via IO-Link and Multi-Ethernet interfaces.
- Flexible power delivery: Servo-drive technology allows precise flow and pressure control up to 160 l/min and 315 bar, adapting dynamically to the machine's needs.

THE INDUSTRY 4.0 ADVANTAGE

One of the most transformative aspects of the CytroBox is its connectivity. Unlike traditional power units that operate as "black boxes," the CytroBox is a fully networked device.

Through its standard CytroConnect interface, it provides:

- Remote monitoring: Track system health, oil condition, and performance from anywhere.
- Predictive maintenance: Sensors for filter contamination, water content, dissolved air, and even particle count enable proactive servicing before problems cause downtime.
- Cloud-based analytics: Integration with Bosch Rexroth's cloud platform allows for trend analysis and fleet-wide insights.
- Simplified diagnostics: Clear, real-time data eliminates guesswork and reduces troubleshooting time.

This isn't just a convenience—it's a fundamental shift in how hydraulic systems are managed. For OEMs, it means machines that are easier to support. For end users, it means higher uptime and lower total cost of ownership.



REAL-WORLD IMPACT

Consider a manufacturer of injection molding machines. In their previous designs, the hydraulic power unit was a custom-built assembly that required 8-10 hours of installation and commissioning per machine. Wiring alone involved over 30 individual connections. Cooling water plumbing was complex and prone to leaks during initial setup.

After switching to the CytroBox:

- Installation time dropped to under 3 hours. The unit arrived pre-wired and pre-tested, requiring only power, cooling water (or none, with the compressor cooler option), and hydraulic line connections.
- Machine diagnostics improved dramatically. Integrated sensors provided data that previously required add-on instrumentation.
- Service calls decreased by 40%. Predictive alerts for filter changes and oil condition allowed the customer to schedule maintenance during planned downtime, not during a breakdown.

The result was faster production, lower warranty costs, and a machine that was significantly easier to sell based on its advanced monitoring capabilities.

The hydraulic power unit has long been a necessary but unglamorous part of machine design. The CytroBox proves it doesn't have to be. By integrating intelligence, connectivity, and precision control into a compact, pre-engineered package, it transforms a complex assembly task into a simple installation and turns a maintenance liability into a predictive, manageable system. For machine builders looking to reduce complexity and increase value, it's not just an upgrade—it's a strategic advantage.

Ready to simplify your next machine build? Contact a Bosch Rexroth specialist to explore how the CytroBox can fit your application.

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