WHITEPAPER

Evolution MOTION SOLUTIONS

rexroth
A Bosch Company

Beyond the Hype: The Real-World ROI of IO-Link Hydraulic Valves

The conversation around Industry 4.0 often focuses on complex data models. However, its most immediate impact is on the factory floor, where technologies like IO-Link are solving decades-old problems related to cost, labor, and downtime. The 4WRPEH directional valve with IO-Link is a prime example, delivering tangible ROI by simplifying every phase of a machine's lifecycle.

THE HIDDEN COSTS OF ANALOG HYDRAULICS

For decades, integrating a high-performance proportional valve involved significant hidden costs:

- Material Costs: Expensive, multi-core shielded analog cables were required to prevent signal interference.
- Labor Costs: Wiring these complex cables often required a specialized (and costly) electrician to ensure correct termination and grounding. One mistake could damage the valve or PLC card.
- Downtime Costs: When a valve fails, troubleshooting was a manual process involving multimeters and guesswork. Diagnosing the problem could take hours, leaving a production line idle.

THE IO-LINK SOLUTION: A THREE-PRONGED COST ATTACK

The 4WRPEH with IO-Link directly addresses these costs with three core benefits:

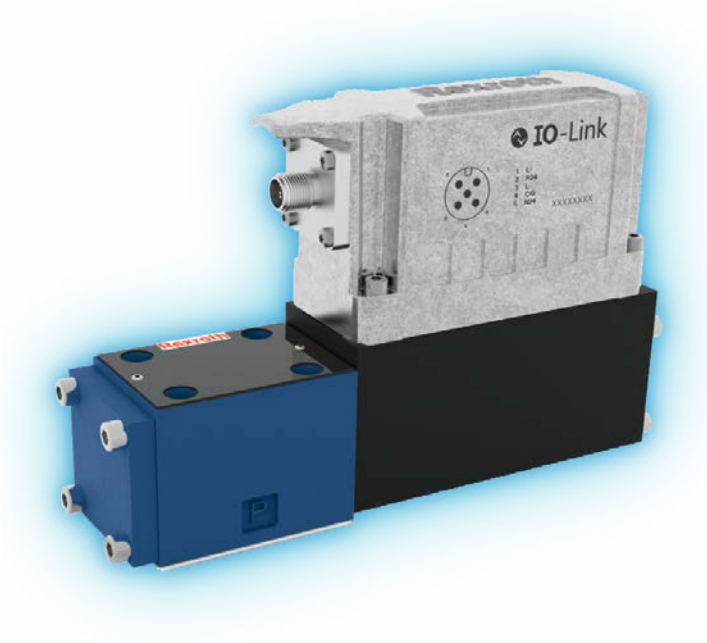
1. Drastically Reduced Installation & Material Costs
   - The complex analog cable is replaced by a standard, unshielded 5-wire M12 cable. This single connection provides power and bidirectional communication.
     - Lower Cable Cost: Standard M12 cables are significantly less expensive than custom, shielded analog assemblies.
     - Lower Labor Cost: The simple, error-proof M12 connection does not require a specialized electrician. A machine assembler can quickly and correctly connect the valve, reducing labor hours and eliminating common wiring mistakes

2. Intelligent Diagnostics That Eliminate Guesswork

   The 4WRPEH is no longer a “dumb” component; it is an intelligent device that constantly communicates its status. If an issue occurs, the valve doesn’t just fail—it reports why it failed.
   - Fault Identification: The PLC receives specific error codes for issues like undervoltage, communication loss, or internal faults.
   - Device Identification: Each valve stores its “digital nameplate” (IODD), including its material number, creation date, and more. A technician can instantly identify the exact valve from the HMI, no matter where it is on the machine. This turns a diagnostic process of “Which valve is it and what’s wrong?” into “Valve C-21 has an undervoltage error.”

3. Simplified Maintenance and Radically Reduced Downtime

   Because all valve parameters are stored on the IO-Link master, valve replacement becomes a simple, fast-turnaround task.
   - Plug & Play Replacement: An operator can swap a faulty valve with a new one. Upon connection, the IO-Link master automatically downloads the correct parameters.
   - No Specialized Tools: No laptop, no programming cable, no software. The machine is back online in minutes, not hours.



PERFORMANCE WITHOUT COMPROMISE

These significant cost and time savings are achieved without sacrificing hydraulic performance. The 4WRPEH is a proven, servo-quality high-response valve, delivering the precision and dynamic control that demanding applications in plastics, presses, and automation require. It combines the robust, reliable mechanics of a Rexroth valve with the economic and diagnostic intelligence of Industry 4.0.

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USH00523/01.2026

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