CASE STUDY

IO-Link Sensors for Pump Monitoring

Guaranteed Reliability in Critical Automotive Manufacturing Processes

Downtime in automotive manufacturing can cost as much as $10K per minute, making uninterrupted operations a top priority. Within this environment, industrial pumps play a vital role by delivering electrocoating—a process essential for both corrosion resistance and a protective finish on vehicle bodies. If these pumps experience cavitation or bearing wear, coating uniformity declines, resulting in product defects and costly rework. Consequently, ensuring reliable pump performance is critical to maintain quality standards and avoid expensive production delays.

PCB PIEZOTRONICS
AN AMPHENOL COMPANY

CHALLENGE

A Japanese auto manufacturer, constructing a new facility and embracing digital transformation, sought to modernize its pump monitoring strategy. Traditional PLC-based systems were expensive to install and configure, largely due to extensive cabling requirements and complex engineering tasks. While wireless solutions could reduce cabling, they often relied on non-standard protocols and frequently lacked the bandwidth to detect subtle high-frequency signals critical for early bearing fault detection. The manufacturer recognized that the solution would need to be flexible, have real-time data capabilities, and a simplified deployment that would seamlessly integrate pump vibration data with electrocoating process controls to maintain coating uniformity and minimize downtime.

SOLUTION

PCB IO-Link sensor, model 674A91, was chosen for its piezoelectric technology, which reliably captures the high-frequency vibrations associated with early bearing failures. Each sensor mounts directly on the pump, then connects via standard cabling to an IO-Link master unit. From there, users can transmit the data through their choice of virtually any wireless communication protocol — such as Ethernet, Ethernet/IP, or PROFINET — to a central control room. By correlating vibration readings with variables like pump pressure and coating thickness, operators can detect problems early and adjust process parameters to maintain optimal electrocoating quality. After a successful proof of concept, the manufacturer intends to implement this monitoring framework across all facilities as part of its companywide adoption of the IO-Link technology.

OUTCOME

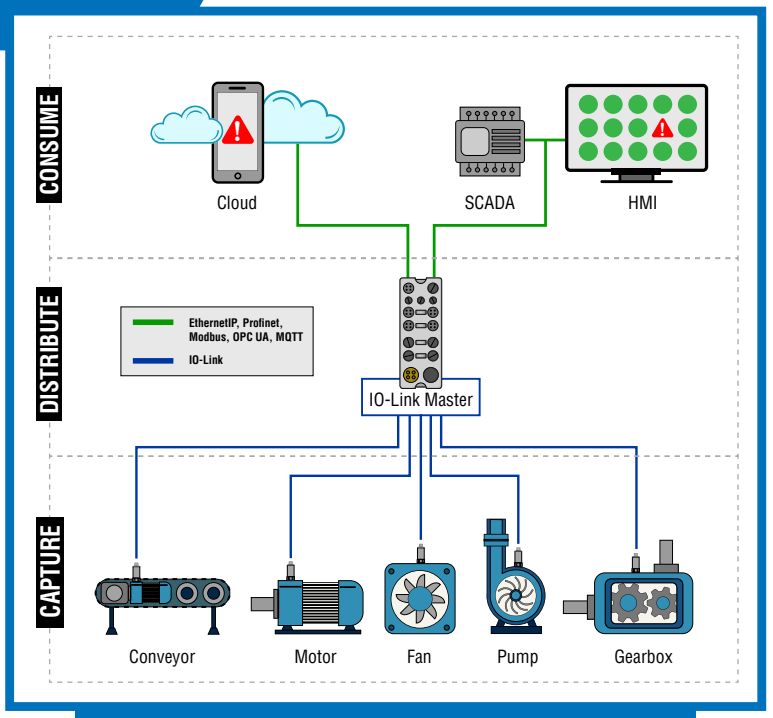
Reduced Costs: IO-Link masters eliminate much of the hardware, cabling, and associated engineering overhead typically required by traditional PLC-based systems, significantly cutting both capital and labor expenses.

Simplified Integration: A unified IO-Link network provides straightforward connectivity, minimizes custom programming, and ensures compatibility with widely used industrial communication protocols.

Enhanced Data Collection: Piezoelectric sensing delivers the bandwidth needed to detect the earliest signs of bearing and shaft issues. Combining this vibration data with electrocoating metrics enables both proactive maintenance and refined process control.

BOTTOM LINE

By implementing PCB IO-Link sensors, the Japanese auto manufacturer has streamlined pump monitoring and integrated real-time vibration data with electrocoating process controls. This approach enabled early detection of bearing faults, ensured coating consistency, and substantially lowered installation and engineering expenses. With a scalable IO-Link architecture, the plant is well-positioned for future growth and continued digital transformation.



Easily integrate with your current control system

Take measurements and averages at user-specified intervals

Receive maintenance alerts when peak values or sensor specifications are exceeded