CASE STUDY

IO-Link Sensors for Industrial Fan Monitoring

Enhancing Reliability and Efficiency in Biomass Fuel and Ethanol Plants

Process fans are among the most critical pieces of equipment for ensuring safety, efficiency, and reliability in biomass fuel and ethanol plants. These fans are used for various applications, including ventilation, cooling, dust control, and support for combustion processes. During regular operation, they often endure extreme temperatures, high vibration, and heavy dust loads, all of which can quickly wear down fan components.

To monitor component health, operators often utilize a variety of local and remote sensor systems that incorporate traditional analog accelerometers, but can face significant challenges in integrating new monitoring hardware. This case study will demonstrate how sensors with IO-Link universal protocol eliminate the guesswork of monitoring system functionality, and streamline setup to significantly cut cost and complexity.

PCB PIEZOTRONICS
AN AMPHENOL COMPANY

CHALLENGE

An ethanol plant needed to outfit their large industrial fans to monitor for multiple fault conditions. Incorporating new analog transmitters proved both costly and complex; the process demands analog-to-digital converters, programmed and configured PLCs, and a new control cabinet for every fan monitored. Additionally, integrating and programming these systems to convert analog data onto the field bus network would require specialized skills and extensive labor. The labor and materials are expected to result in substantial capital expenditures—up to tens of thousands of dollars to accommodate all the fans. And, as the standard analog vibration transmitter provides only a single data point, technicians found the system to be limited in its ability to diagnose multiple potential failure modes within the fan assembly. The company elected to explore other options before beginning their lengthy budget approval and sign-off process.

SOLUTION

PCB's model 674A91, an accelerometer featuring IO-Link digital protocol, was chosen as a user-friendly, low-cost alternative to traditional analog transmitters. IO-Link architecture uses inexpensive, standard cabling to an industrial-rated IO-Link master, and requires no control cabinets or custom enclosures. The plug-and-play configuration of data onto the network was easy and repeatable using the IO-Link Master's configuration software.

The IO-Link Master communicates directly to the cloud through a REST API, pushing sensor data directly from the factory floor to the facility's cloud data management platform. This enabled the customer to bypass any required gateway or PLC hardware configurations, and to remotely set alerts and work orders based upon peak values and trending data from the sensors.

Model 674A91 digitally processes raw vibration data at the edge and transmits key trending values like true peak acceleration, RMS acceleration, RMS velocity, crest factor and temperature. The data facilitates monitoring multiple fault conditions in bearings and fan motors for early warning conditions, like needed lubrication in bearings and misalignment on shaft positioning. The accelerometers are stud-mounted directly to bearing housing and motor blocks with the 4-pin M12 connector directly cabled (point-to-point) to an IO-Link Master.

OUTCOME

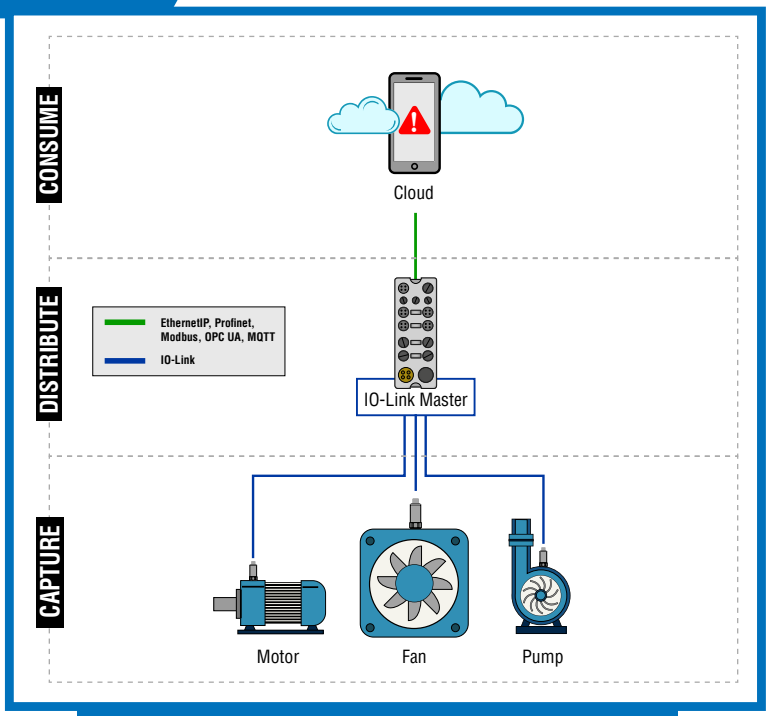
Reduced Costs: Robust IO-Link masters eliminated the need for costly analog-to-digital converters, PLCs, and additional control cabinets, significantly lowering installation expenses.

Simplified Integration: IO-Link's universal protocol allowed for seamless integration within the user's cloud system, reducing the need for additional hardware and programming.

Enhanced Data Collection: Model 674A91 provided a diverse set of trending data, enabling detailed monitoring of various potential failure modes within the fan assembly.

BOTTOM LINE

By reducing cost, reducing complexity, and increasing the data needed to make smarter decisions on equipment health, IO-Link presents an alternative to the traditional hardware needed for monitoring critical fan systems.



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