Detect Bearing Wear and Pulley Drive Misalignment in Belt-Driven Fans with 3-Axis Vibration Monitoring

Challenge

A manufacturing plant relied on a standard 3-axis MEMS vibration sensor to monitor the health of its belt-driven fans. While it provided basic vibration data, excessive noise in the third axis made it unreliable for detecting faults in the vertical radial direction (i.e., up-and-down, perpendicular to the shaft). This put the maintenance team in a difficult position. Hesitating to act on third-axis anomalies sometimes allowed mechanical issues to worsen to the point where the fan had already sustained significant damage by the time a specialist was called in. Alternatively, responding to every anomaly in the third axis made it difficult to determine where their attention was really needed. Without a way to separate actual faults from sensor noise, maintenance personnel found themselves caught between reactive and predictive maintenance—sometimes dealing with unplanned downtime and other times dealing with planned downtime for false alarms.

Solution

The plant deployed the Banner QM30VT3 High-Performance 3-Axis Vibration and Temperature Sensor with built-in VIBE-IQ machine learning software to resolve both issues. Unlike traditional MEMS sensors, which often produce unreliable third-axis data, the QM30VT3 features an ultra-low noise density across all three axes, giving the maintenance team clear, accurate vibration data in every direction, eliminating false alarms, and restoring confidence in third-axis measurements.

The greater impact came from the introduction of VIBE-IQ. Instead of forcing the maintenance team to interpret raw vibration data manually, VIBE-IQ continuously monitors machine health and automatically identifies early signs of bearing wear and misalignment. By using machine-learning to establish the baseline, the sensor detects deviations as they emerged, providing timely alerts for actionable intervention before failures occur.

With the QM30VT3 in place, the fans are now monitored with a predictive maintenance strategy, enabling the maintenance team to act only when the sensor triggers alerts based on deviations from established vibration thresholds. The result is a smarter, more efficient maintenance operation with fewer disruptions and greater long-term asset reliability.

Featured Product

QM30VT3 3-Axis Vibration Sensor

QM30VT3 3-Axis Vibration Sensor with VIBE-IQ machine learning enables predictive maintenance, real-time alerts, and Modbus integration to prevent downtime.