

PERFORMANCE MONITORING

Automated Vibration Analysis and Alert System

Flowserve embeds Fast Fourier Transform (FFT) capability onboard IPS Wireless™ Smart Multi-point Transmitters. Critical vibration data from plant equipment can now be frequently and reliably delivered via wireless networks with minimal effect on transmitter battery life and little to no risk of communication failure.

The conventional approach to vibration monitoring involves walk-around activity, where snapshots of vibration data are manually and intermittently collected. More recently, battery-powered monitoring systems have enabled acquired vibration data to be transmitted wirelessly to a data management system. This approach involves sending the entire vibration spectral set for analysis, a process with two inherent shortcomings:

- It depletes battery power of wireless transmitters.
- Streaming data transmissions can be unreliable in many plant environments.

Plant operators are often left analyzing and acting upon incomplete vibration data, potentially leaving critical equipment running in less than ideal conditions.

A TURNKEY SERVICE OFFERING

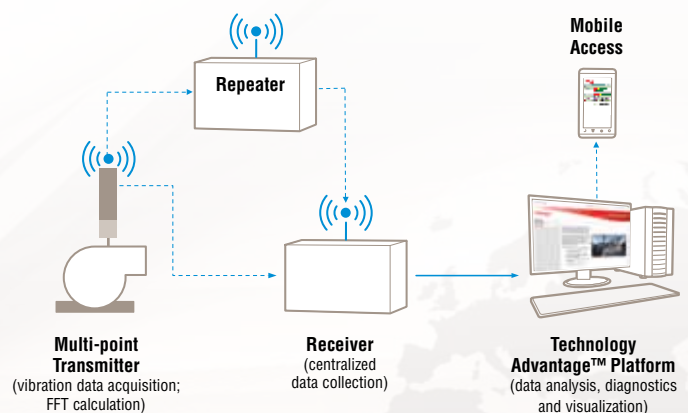
Flowserve has created an integrated suite of technologies and services that allows customers to quickly realize the benefits of ongoing vibration monitoring and analysis. Flowserve experts deliver all system and support services turnkey:

- System design, including hardware selection, based on monitoring needs and plant environment
- Implementation services to configure all required diagnostic, data analysis and visualization tools
- Setup of all necessary equipment alerts, watch lists, reports and communication protocols
- Ongoing support and maintenance of the entire system — from hardware to software

Reliable, Ongoing Wireless Transmission of Vibration Data

The battery-powered IPS Wireless Smart 103 Multi-point Transmitter performs onboard FFT calculations. The transmitter then collects the eight highest vibration amplitudes with their corresponding signal frequencies and widths. The result is a very small, but comprehensive data packet that transmits reliably — even in the most difficult plant environments — with little effect on transmitter battery life. So ongoing wireless monitoring of up to three axes of vibration, plus spectral analysis, is achievable. This solution can effectively augment manual monitoring programs and is capable of sensing and alerting plant operators of:

- Mechanical looseness
- Mis-alignment
- Resonance
- Damaged or clogged impellers
- Damaged rotor bars on motors
- Damaged bearings and couplings
- Dry-running and dead heading





IPS Wireless Smart 103 Battery-Powered, Multi-Point Transmitter With FFT



This transmitter provides wireless data acquisition and transmission of analog and digital signals in a self-contained, self-powered unit, with battery life of three to five years. The multi-channel device comes equipped with five 20-foot stainless steel flex cables and is pre-configured for applicable data types. The transmitter has a range of 1.2 km (0.75 miles) which can be extended infinitely through the use of IPS Wireless Repeaters. In addition to vibration, the transmitter can interface with numerous other sensors.

Key Specifications

- Onboard FFT calculations
- Zone 0 (Class I, Div. I, Groups A, B, C, D, E, F, G)
- PVC housing and 316L stainless steel body
- Replaceable battery

IPS Wireless Intelligent Repeater and Receiver

A repeater extends the transmission range of single- and multi-point transmitters and RTUs by forming a virtual (mesh) network within an entire plant site.

A receiver is the central collection point for transmitter data. It communicates collected data to the analysis, diagnostic, and visualization tools that allow customers to quickly interpret and act upon equipment condition information.

Key Specifications

- Zone 2 (Class I, Div. II, Groups A, B, C, D)
- NEMA 4X enclosure



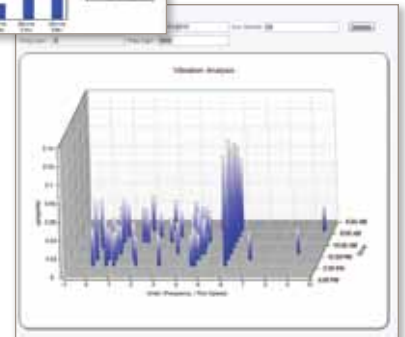
Technology Advantage Platform

The Flowserve Technology Advantage Platform includes a powerful collection of data analysis, diagnostic and visualization tools. Once implemented, customers are equipped with a unique, comprehensive view of key performance indicators for plant equipment. Easy-to-interpret visuals show real-time operational data, comparing actual data to expected performance levels. A vibration analysis and alert system includes a subscription to this customizable platform that incorporates:

- Easy-to-interpret visuals
- Trend-building capability
- Alarm triggers and histories
- Collaboration tools to interact with third party experts
- Integration points for diagnostic programs and real-time data analysis



Example display of eight highest amplitudes with corresponding frequencies



Waterfall format of same data

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