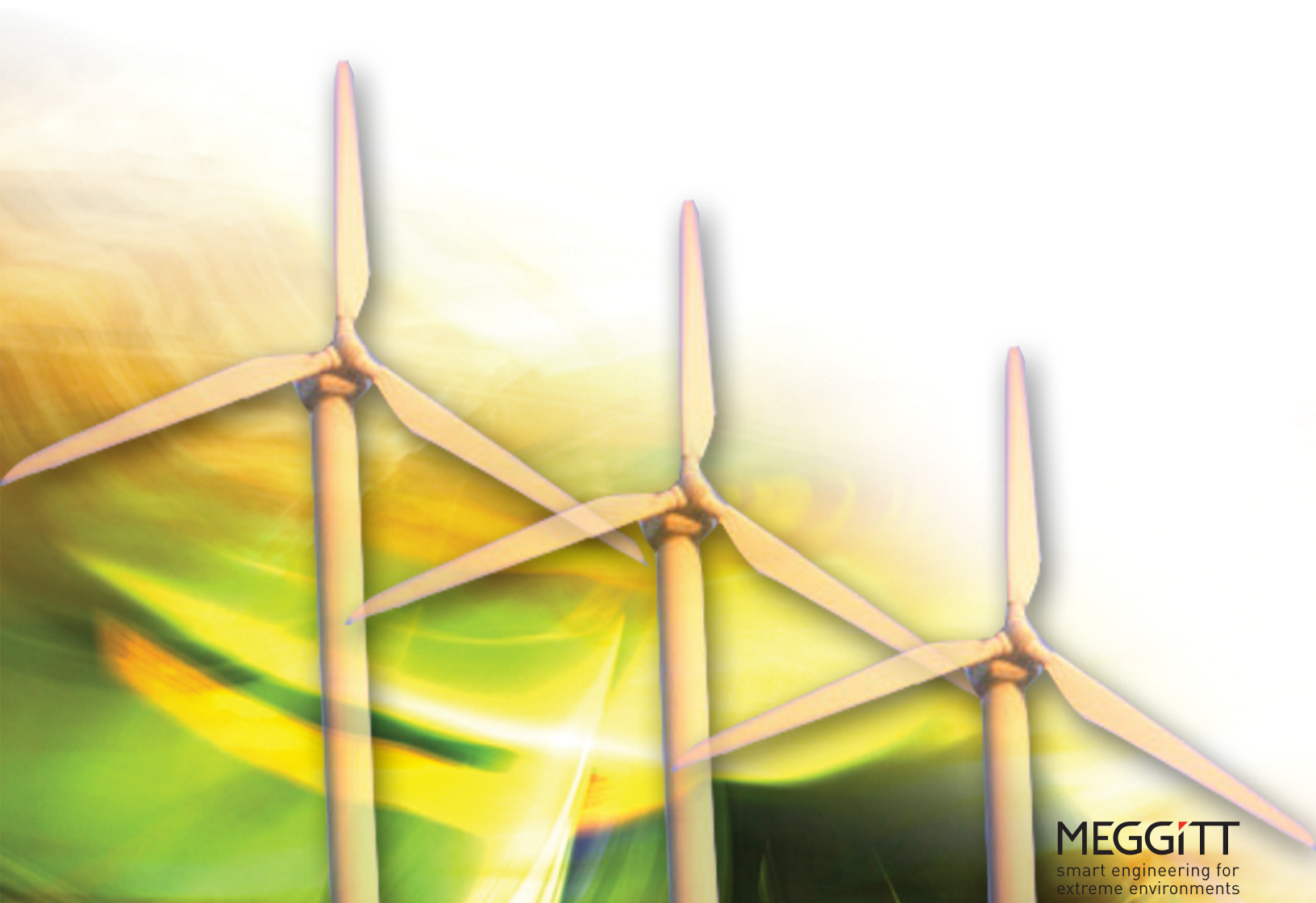# Wilcoxon Research

Cost effective
predictive maintenance solutions

MEGGiTT
smart engineering for
extreme environments

Machinery health monitoring is critical to every plant reliability program

Using preventative and predictive maintenance technologies to track machine health is a proven industry best practice. By monitoring machinery health, **you save money.**

- Increase operational efficiency
- Reduce outages and downtime
- Save time with less data collection
- Decrease spares inventory

Vibration monitoring has been one of the anchors of predictive technologies because it can detect several causes of machinery fault. Do your plant machines ever suffer from shaft misalignment, rotor imbalance, gear failure or bearing fault? Trending vibration data allows you to monitor machines and detect these faults, even if you are not a vibration expert.

Regardless of your application

- Pumps
- Motors
- Fans
- Cooling towers
- Compressors
- Gear boxes

Regardless of your process

- Pharmaceutical
- Food and beverage
- High tech fabrication
- Water and waste water
- Petrochemical
- Pulp and paper
- Power generation

You need machinery health monitoring to evaluate machine condition and perform predictive maintenance.

Simplified condition monitoring

- Trended data can be used for critical assets when no vibration monitoring program exists or for the balance of plant machinery that is not currently being monitored
- Maximize your resources and reduce walk around time by only visiting problem machines
- It's not a new concept, just a practical, cost effective approach

Vibration trending is observing vibration data over time. The overall level of vibration is represented by a loop current of 4-20 mA, with 4 mA representing no vibration and 20 mA representing sensor full scale vibration level. This loop current indicates general machine health with no complex analysis required.

If you already have a process control system that accepts 4-20 mA inputs - like a PLC or DCS network - you are already taking data points on pressure, temperature, or maybe flow. Now you can send vibration data to your PLC or DCS as well. Using vibration trending you do not need vibration expertise or expensive vibration analysis software.

A clear trend
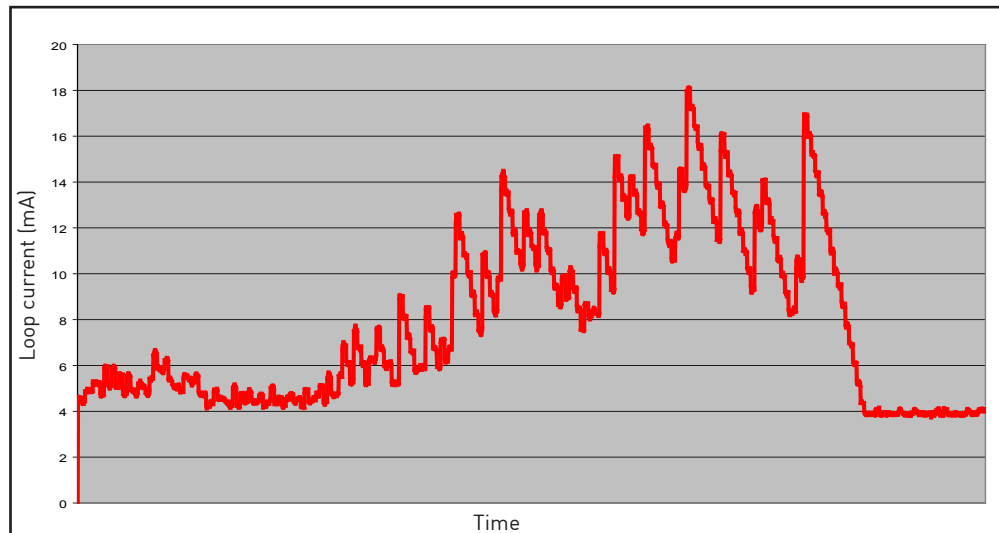
This graph represents data from a pump experiencing cavitations. A clear upward trend in the data shows the value and simplicity of trended data.

Benefits of vibration trending

- Spectrum analysis is not necessary
- Pre-processing allows you to focus on trends in the data
- Simple alarm limits can be set
- 4-20 mA data goes right to your plant process control system where trends are easy to see
- Changes in vibration levels typically warn you within 1 to 3 months of equipment failures
- Spectral data is available as well, and can be accessed to diagnose problems
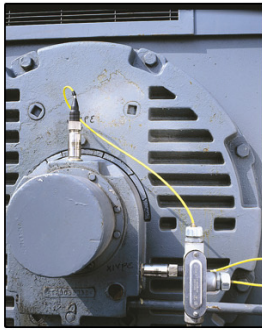
Sensors and transmitters

Loop powered sensors

Wilcoxon's line of 4-20 mA loop powered sensors, the LPS™ Series, consists of an accelerometer and signal conditioner in one sensor. The 4-20 mA LPS™ are available with a host of options to meet every application:

◢ Top connector or side connector for lower clearance; side connector sensors available with integral cable
◢ Selectable full scale for every motor speed, fan speed, etc
◢ Custom frequency banding
◢ Output signals of peak, true peak or rms can represent either velocity or acceleration
◢ Integral temperature sensor provides critical data for temperature-sensitive operations
◢ Intrinsically Safe (IS), Explosion Proof (EX), FM, CSA, and ATEX certifications are available for hazardous area locations

Wilcoxon offers more than 600 LPS™ to ensure we have the sensor that is right for you.

Option 1

Loop powered sensors output 4-20 mA data that can input directly to your process control system
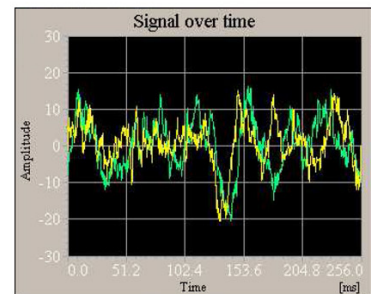
Process control system

Option 2

Standard accelerometers yield raw dynamic data

The iT Transmitter conditions raw vibration data and sends 4-20 mA data to your process control system

A BNC connector on the iT Transmitter's front panel gives you access to the raw vibration data for further analysis

Intelligent Transmitters

The Intelligent Transmitter – our iT Series – accepts input from a traditional IEPE dynamic vibration sensor and converts the signal to 4-20 mA output.

All units are custom configured as ordered to provide the best fit for your specific application.
Adjustable filter settings can be modified in the field to address your changing needs.

Over 30,000 configurations are available! Custom order your iT Transmitter:
◢ Acceleration or velocity input with acceleration, velocity or displacement output
◢ Selectable full scale in English or metric units
◢ Output of rms or peak, or Wilcoxon's exclusive true peak or true peak-to-peak
◢ 10 mV, 100 mV or 500 mV sensor input
◢ Choose high-pass and low-pass filters from over 20 possibilities

iT Alarm module

Wilcoxon's iT Alarm module is the most accurate and powerful relay alarm of its kind. You can use the iT Alarm with the iT Transmitter or any 4-20 mA sensor (including level, flow, pressure, temperature, force and speed) to provide local notification of potential problems. The alarm allows up to three set points for relay control with user established delays for minimizing false alarms. A front-panel LED readout displays real time 4-20 mA data or the percentage of full scale output. You can utilize the three alarm levels to achieve optimal notification, based upon the manufacturer's recommendations. The ISO 10816-3 standard sets forth guidelines for the monitoring of machines at their bearing positions and have suggested alarm and trip levels for various classes of machines.

ISO 10816-3, Vibration Measurements on Rigid Rotor Machines, in situ			
Velocity		Machines 20 HP to 400 HP Integrated drive pumps over 40 HP	Machines over 400 HP Separate drive pumps over 40 HP
in/sec equiv Peak	mm/sec RMS		
0.39	7.1	D	D
			C
0.25	4.5		
0.16	2.8	C	B
0.13	2.3	B	
0.08	1.4		A
0.00	0.0	A	

▰ Region "A" is considered good vibration for new machines
▰ Region "B" is considered acceptable for continuous running
▰ Region "C" vibration is considered unsatisfactory and maintenance should be planned
▰ Region "D" vibration is unacceptable and machinery should be immediately taken out of service for maintenance

The three iT Alarm relays (1, 2, and 3) should be set to the boundary level at the transition of (1) B to C, (2) C to D, and (3) 25% above the C to D transition for a "TRIP" function. Relay 1 is considered the "warning" level where increased inspection or maintenance should be undertaken. Relay 2 is considered the "alarm" level where plans should be made to take the machine out of service for maintenance. Relay 3 is considered the "shutdown" level when the machine should be automatically removed from service for immediate maintenance action.
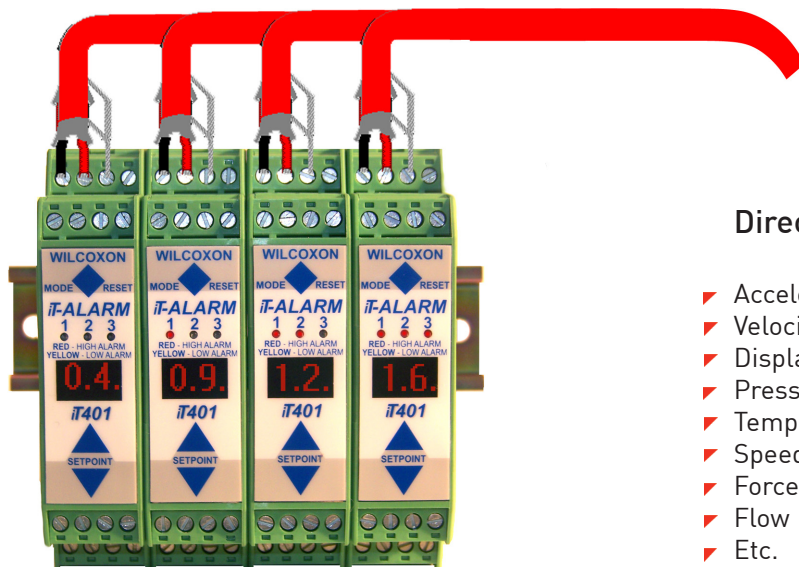
Direct input from any 4-20mA sensor

▰ Acceleration
▰ Velocity
▰ Displacement
▰ Pressure
▰ Temperature
▰ Speed
▰ Force
▰ Flow
▰ Etc.

iT Series Communication Module
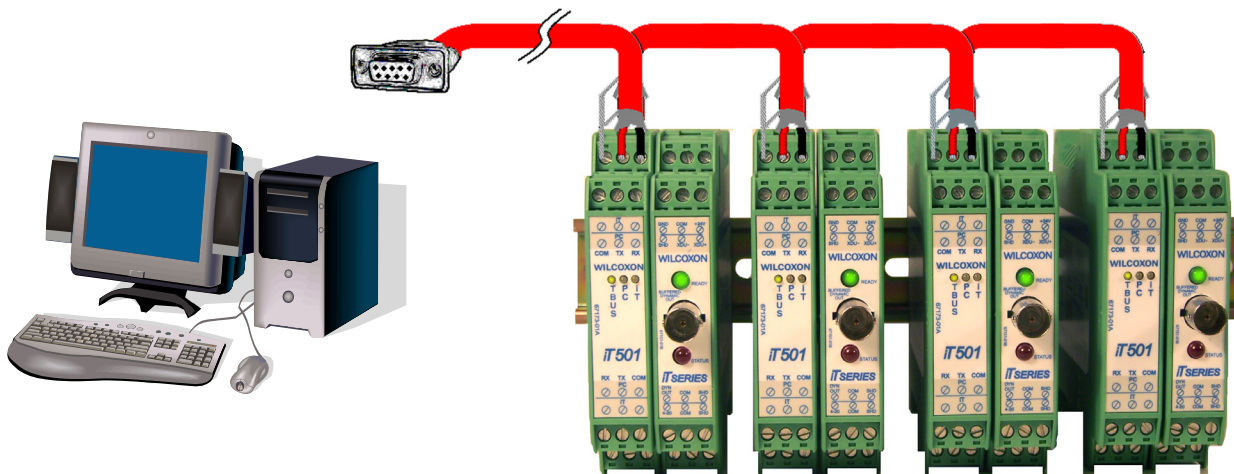
PC-based online vibration monitoring

The iT Communication Module is the only stand-alone digital communication unit for vibration transmitters. You can "daisy chain" link up to eight iT Communication Modules to one RS232 serial port on one computer, allowing you to monitor machine health directly from your workstation without the investment of a costly monitoring system.

The iT Communication Module works in conjunction with Wilcoxon's free VibeLink® software to provide you economical online monitoring with significant capabilities. You can trend machine health over time without walk-around data collection or vibration analysis. Both graphing and data logging views display on your desktop to easily record and recognize upward trends in vibration levels. The digital data stream can be imported to any standard spreadsheet or data logging program.
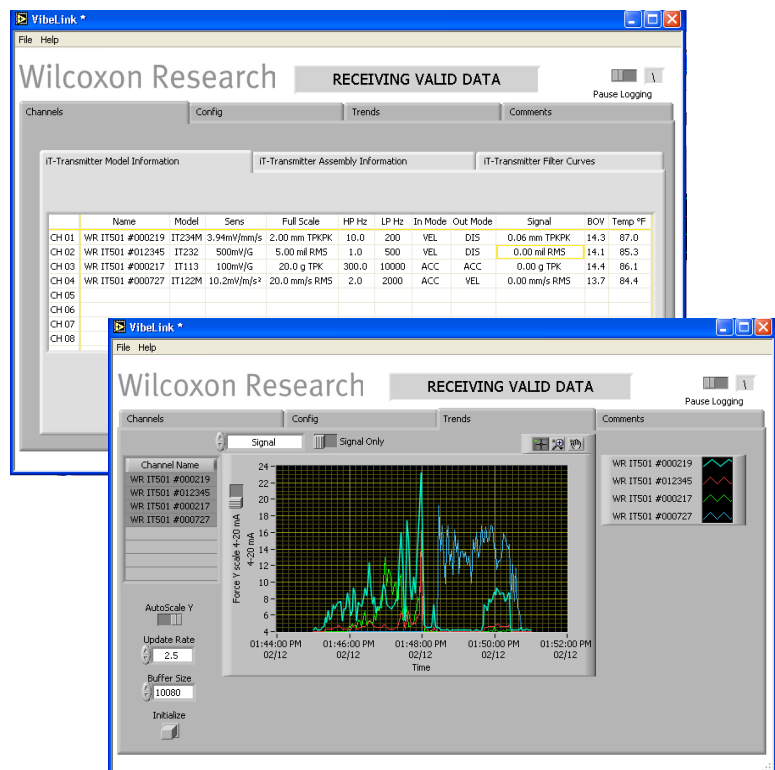
iT installation

To operate the iT Series, standard or custom cables, enclosures, connectors, power and all necessary accessories for online monitoring are available from Wilcoxon.

All units are DIN rail mounted. Attach the iT Alarm and iT Communication Module to a TBUS connector on the DIN rail and the units will automatically engage with the iT Transmitter to obtain all data and power necessary with no external wiring.

Power supplies

Modules operate from a nominal 24 VDC power supply. Supply power to the iT Transmitter and it provides power to any module connected to it on the TBUS and the sensor. One power supply can power up to 30 modules.

Module enclosure

A system enclosure will house iT Transmitters, iT Alarms, iT Communication Modules and 24 VDC power supplies, as well as AC power terminal blocks with fusing and disconnect. Large enclosures can house up to 25 units and power for all.

The enclosure has two cable entry options. One option is a 6-position cable grip gland for sealing the sensor wiring entry. The other option is a standard 1" conduit fitting for connection to plant AC power and PLC wiring.

Cable

The cables recommended for the iT Series network are Wilcoxon R6QI-0-J9T2A-32 cables. These utilize a watertight IP68-rated connector at the sensor and have a durable, chemical resistant Teflon® cable jacket. Custom length, options and environmental protections are available.
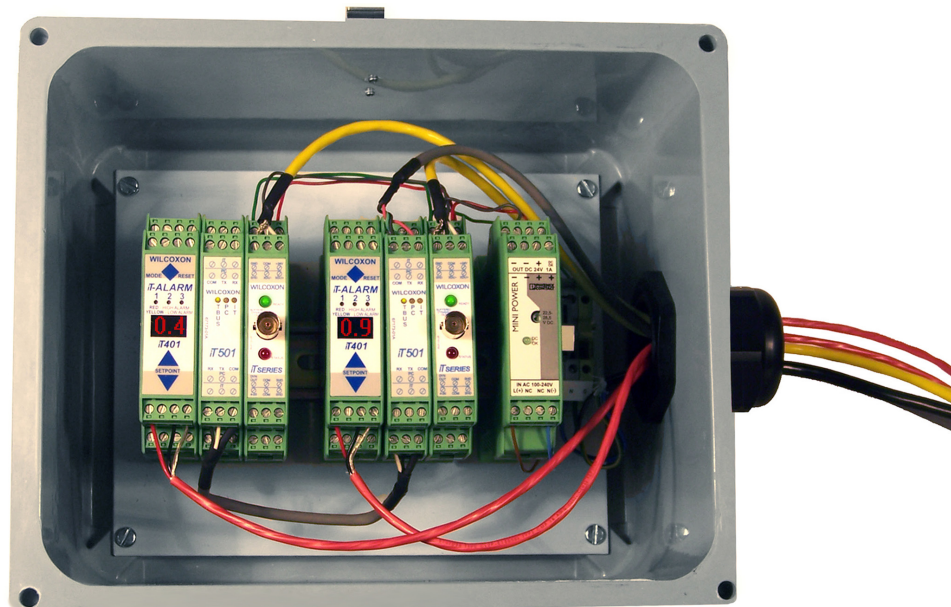
Wilcoxon Research, Inc.

Wilcoxon provides sensor solutions with Total Lower Cost (TLC) of Ownership through:

- World-class products and services
- 98% on-time delivery and shortest lead times
- Industry-leading product quality and reliability
- Competitive pricing
- Technology to enable your success

Wilcoxon's TLC Ownership – making it easy to do business!

Wilcoxon's most popular products

- LPS™ 4-20 mA sensors
- Intelligent Transmitter Series
- iT Alarm
- iT Communications Module
- Economy, standard and premium accelerometers
- High frequency, low frequency and frequency banded sensors
- High temperature sensors
- Triaxial sensors
- Piezovelocity™ sensors
- Dual output temperature and vibration measurements
- Seismic accelerometers
- Underwater sensors
- Portable vibration meter
- Handheld sensor doctor
- Shaker and shaker systems
- Custom cable assemblies
- Mounting hardware and sensor network accessories

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