

TECHNOLOGY

Uses latest MEMS sensing elements for reliable long-term measurement

EXPANDABILITY

Based on Bluetooth BLE technology for reliable connectivity and long range

LONG BATTERY LIFE

Field replaceable standard battery lasts up to 5 years

RUGGED

Stainless steel base with sealed body, wide temperature range

EASY INSTALLATION

SWIVEL lock mount option for easy shaft alignment, or fixed mount for tight locations. Fits onto standard accelerometer mounting

SMALL SIZE

Small footprint similar to standard accelerometers

COMMUNICATION

Communicates via standard gateway to ethernet and wifi networks

SOFTWARE

Online software for continuous monitoring, or Android tablet app

EASY CONFIGURATION

Straightforward system configuration by smart device link to gateway

LOW COST

Uses IOT technology to drive down price

WiwibX

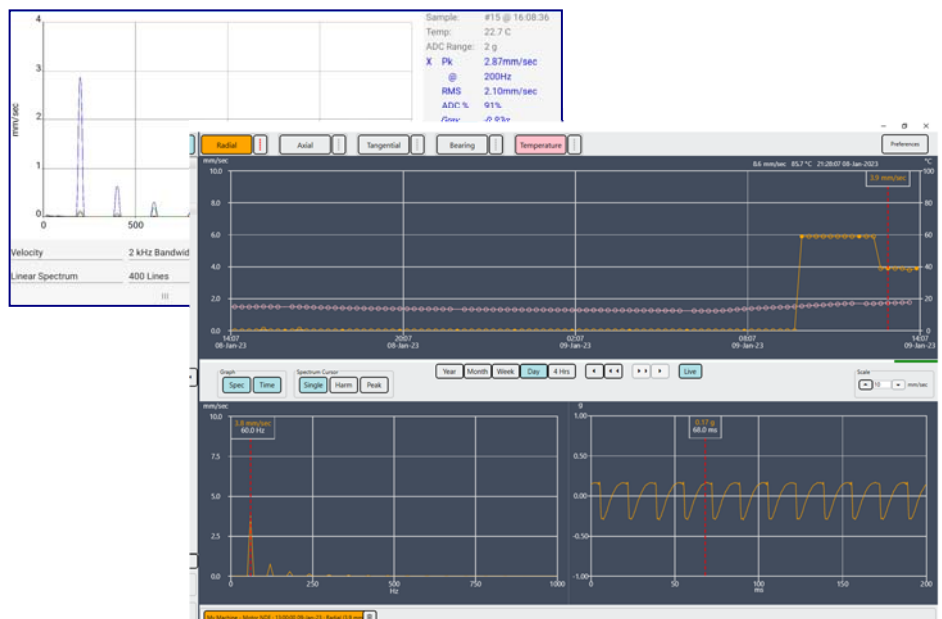
Wireless Monitoring

ICON
RESEARCH

Fixed
Mount



SWIVEL
Lock
Mount



BENEFITS

- ◆ Measures triaxial vibration, bearing condition and temperature
- ◆ Ideal replacement for walk-around manual data collection
- ◆ Monitors machinery every few hours rather than weeks or months
- ◆ Low-cost online surveillance for plant not currently being monitored
- ◆ Provides overall vibration values and high resolution spectra
- ◆ Straightforward installation with choice of mounting methods
- ◆ Sensor battery life up to 5 years

WiVib X Sensor Hardware

WiVib X TRI-AXIAL MULTI-FUNCTION SENSOR

The *WiVibX* from Icon Research is a miniature machine monitoring device that measures triaxial vibration, bearing condition and temperature on rotating and reciprocating plant. It operates standalone or communicates via a standard gateway using Bluetooth BLE for reliable connectivity and long range. The gateway interfaces to standard ethernet and wifi networks.

Acceleration and velocity overall values together with high resolution spectra are available. The inbuilt HFE (high frequency enveloping) function provides clear indication of bearing condition and wear. Temperature measurement is also incorporated. Common machine issues can be tracked such as

- Unbalance
- Misalignment
- Looseness
- Early bearing wear
- Electrical problems

INSTALLATION

Two options for mounting the devices are available. Both require a stud to be mounted on the machine using a hard-setting adhesive or a tapped hole. With a height of a little over 3" and a diameter of just over 1", the *WiVibX* can be fitted into the tightest of locations.

The fixed-mount version is small diameter and fits to the stud or machine using a standard 1/4-28" UNF thread.

The SWIVEL mount version allows the *WiVibX* to be rotated once it is mounted on a machine so that it aligns with the shaft. A special stud and knurled locking ring allow the sensor to be rotated so that the Y-axis marked on the top of the sensor aligns with the shaft.

Two versions of the *WiVibX* sensor are available depending on the mounting method, namely:

WiVib-X33F—fixed mount

WiVib-X33S - swivel mount

OPERATION

The *WiVibX* can operate as a standalone device that communicates with a smart Android device, or via gateways where virtually any number can be deployed as a fixed online monitoring system under the control of a host application running on a PC.

STANDALONE

The *WiVibXScope* application typically running on an Android tablet allows time domain, spectrum and overall measurements to be viewed. The application scans for available *WiVibX*s in range and any can be selected to turn the *WiVibX* into a real time triaxial oscilloscope and spectrum analyser with temperature readout.

ONLINE WITH GATEWAYS

In this mode of operation, *WiVibX* sensors communicate in a network using gateways - the diagram below shows a typical installation. Once a battery is inserted into a *WiVibX* sensor, it advertises to the Bluetooth network that it is available. Gateways that are within range will recognise available sensors using **Just Works** pairing and add them to their REST API database together with the associated RSSI value. The host application then allocates which sensors will be controlled by which gateway based on signal quality and even distribution. If a gateway loses power or goes down, the host can allocate sensors to an adjacent gateway.

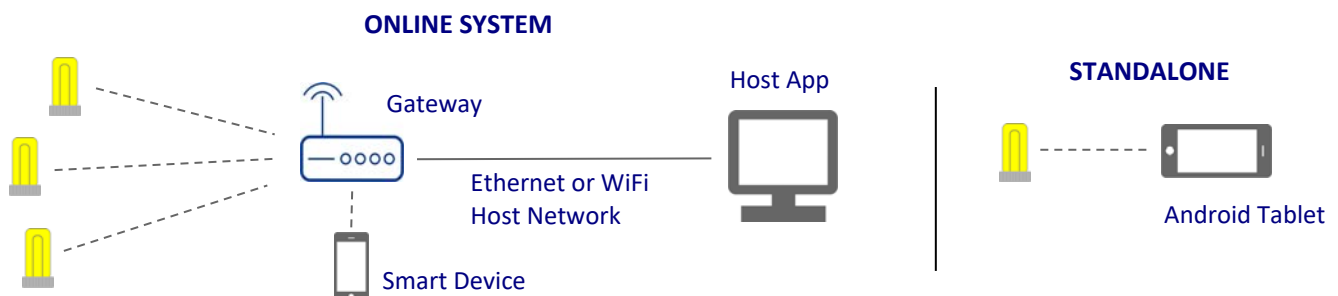
The gateway contains a web server and can be configured using a smart device (eg. tablet or phone) or via the host network. The gateway can link onto an existing ethernet or wifi network. Cellular communication will soon be supported.

The gateway uses a REST API as its communications medium with a host. Details of the REST API are available from Icon Research for users who wish to interface a *WiVibX* array to their own application.

Sensors are configured to take measurements at predetermined intervals. A typical system may be set up to take overall values, say, every hour and a spectrum once a day for base line information. The sensor spends most of its time in an ultra-low power mode but can be instructed at any time to carry out a non-scheduled 'on-demand' measurement as it is always listening to the Bluetooth connection.

BATTERY

The sensor is powered by a 2/3 AA size lithium battery rated at 3V or 3.6V. The popular CR123A from Duracell and other vendors, available in high street stores, is a good choice. For longer life and for operation at sub-zero temperatures, the LS17330 from SAFT can be used.



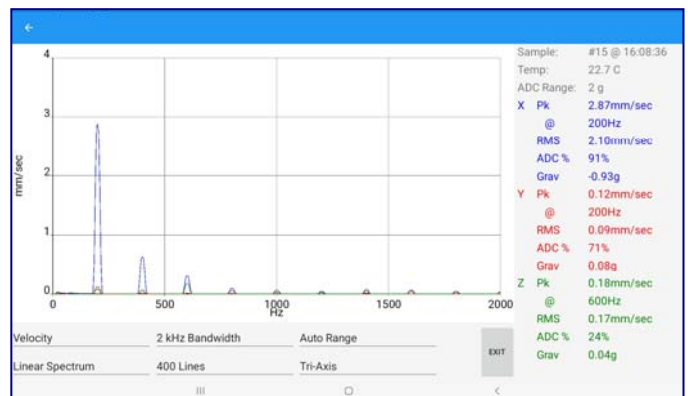
Application Software for *WiVib X*

WiVibXScope

Turns your *WiVib X* into a fully featured Android-based spectrum analyser

WiVibXScope enables either time or spectrum graphs to be displayed in real time from a selected *WiVib X* on an Android device. Triaxial overlaid acceleration and velocity spectra are available with selectable resolution and frequency ranges. Simply select the *WiVib X* that you want to monitor from the list of scanned devices and live traces stream to the high-resolution display. In addition, overall and peak values are displayed for all three axes together with temperature.

WiVibXScope is ideal for detailed analysis, system checks and installation setup.



WiVibXTrend

Easy plant monitoring and analysis

WiVibXTrend provides the core functionality of on-line monitoring systems with features such as trending, alert/alarm indication and full analysis capability. It can support any number of *WiVib X*'s with multiple measurements (for example, velocity vibration, bearing condition) and temperature being available on each device.

Its straightforward setup-and-go interface means that you can be logging and trending within minutes of loading the application.

A moving chart-recorder updates current measurements while historical pan and zoom functions let you examine previously measured data.

This application is ideal for both smaller stand-alone wireless on-line systems and larger installations with 100+

WiVib X's. The SQL database ensures adequate storage capability.

WiVibXTrend supports a user-definable multi-level *Plant ... Machine ... Point* hierarchy. Alerts and alarms are indicated on the hierarchy and summarised in the table underneath. The red/yellow/green traffic light summary lets you know the status of your plant at a glance.

The application allows you to specify the intervals for taking overall and spectral data so you can choose how often you want to scan your machinery. This can be from every few minutes to once a day. It also allows 'on demand' measurements to be taken.

A historical trace, such as a spectrum, can be viewed by selecting the time at which it was gathered on the trend graph. Alternatively, live/latest spectra can be viewed with full cursor readout.

Setting up the machine hierarchy is very straightforward.

First, connect your *WiVib X*'s to the network and then use the single screen setup in *WiVibXTrend* to specify what you want to measure and when. Additional 'viewer' apps can be set up to look at data from different locations. Hardcopies of trends and traces can be printed, and exception reports generated.

WiVibXTrend software and *WiVib X* sensors combine to produce a powerful machinery monitoring package that is low-cost, quick to install and easy to use.



Technical Specification

WiVib-X33 Technical Specification

VIBRATION MEASUREMENT

No of Axes:	3
Accelerometer:	MEMS
Measurement Range (max):	+/-16g
Measurements:	acceleration, high frequency envelope, temperature (velocity by software integration)
Measurement Ranges:	+/-2g, +/-4g, +/-8g, +/-16g
Amplitude Accuracy:	2% typical
Bearing Envelope (HFE) Function:	digital demodulator (HP and LP bandpass filter at 500Hz and 10kHz edges)

TEMPERATURE MEASUREMENT

No of Channels:	1
Measurement Range:	-40°C to +85°C (-40°F to +185°F)
Measurement accuracy:	+/-0.5°C (0°C to +65°C), +/-1°C typical otherwise

PROCESSING

Output Data Rate (max):	26.667kHz
Bandwidth Ranges:	0.5Hz–100Hz to 0.5Hz–10 kHz
Passband Flatness:	nominally flat to 6kHz approx, up to 10kHz for HFE processing
Data Block Lengths:	256 to 8192
Spectral Lines:	up to 3200
Equivalent Resolution:	16 bit
Dynamic Range (primary axis):	68dB
Dynamic Range (secondary axes):	63dB

COMMUNICATIONS

Measurement Schedule:	request interval programmable from five minutes to one day, or on demand
Network:	Bluetooth BLE sensor to gateway
Manual Restart:	magnetic switch

MECHANICAL

Enclosure:	stainless steel base, plastic cap
Dimensions:	height 80mm (3.1") diameter 27mm (1.1") - fixed mount diameter 39mm (1.5") - SWIVEL lock mount
Mounting:	¼-28" UNF threaded hole
Weight (including battery):	88g (3.1oz) approx - fixed mount 95g (3.3oz) approx - SWIVEL lock mount

ENVIRONMENTAL

Operating Temperature:	-40°C to +85°C (-40°F to +185°F)
Sealing:	IP67
Radio Compliance:	FCC, IC, ETSI
General Compliance:	CE, UKCA, RoHS

POWER

Battery Type:	CR123A lithium, 3.0V nominal, 1500mAh, or SAFT LS17330 lithium thionyl chloride, 2100mAh, recommended for low temperature operation (<0°C, <32°F)
Battery Monitor:	internal battery monitor and critical battery shutdown
Battery Replacement:	field replaceable
Battery Life:	up to 5 years depending on frequency of measurements

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