

Fizix OPro Datasheet



Optimize Operations and Reduce Energy Consumption with Intelligent Machine Health Sensor: OPro

Fizix OPro is a smart sensor to monitor rotating or moving systems such as motors, pumps, compressors, fans, turbines, cooling towers, crushers, boilers, engines, conveyors systems, textile machines, etc. It communicates wirelessly and sends data directly to the monitoring platform without the need for a gateway. This provides ease of integration and freedom.

The OPro smart sensor has many benefits, but here are the main ones:



Safe Working Environment

It allows you to remotely and securely monitor your hard-to-access or dangerous/risky machines.



Ease of Use at Every Stage

Plug-and-play installation, automatic data collection and analysis, remote monitoring for better maintenance decisions.



Increased Uptime

Uninterrupted production and optimum resource utilization through advance planning. The right maintenance decisions at the right time.



Reduction in Energy Consumption

Healthy machines consume less energy. OPro keeps your machines healthy.

General Specifications

- Tri-Axial Vibration (Accelerometer), Acoustics, Magnetic Flux and Temperature
- IP67-IP68 environmental protection options
- Wide operating temperature range -40 to +85 °C
- Direct wireless connection with network without intermediate gateway or any other device
- Widely used 2.4 GHz 802.11 b/g/n wireless communication
- Continuous monitoring with cabled power (12VDC - 32VDC)
- Different mounting options with ready-made M6 base hole, industrial adhesive or magnetic attachment
- Stay up to date with remote sensor software update (OTA)

Sensor Data Collection and Edge Computing Features

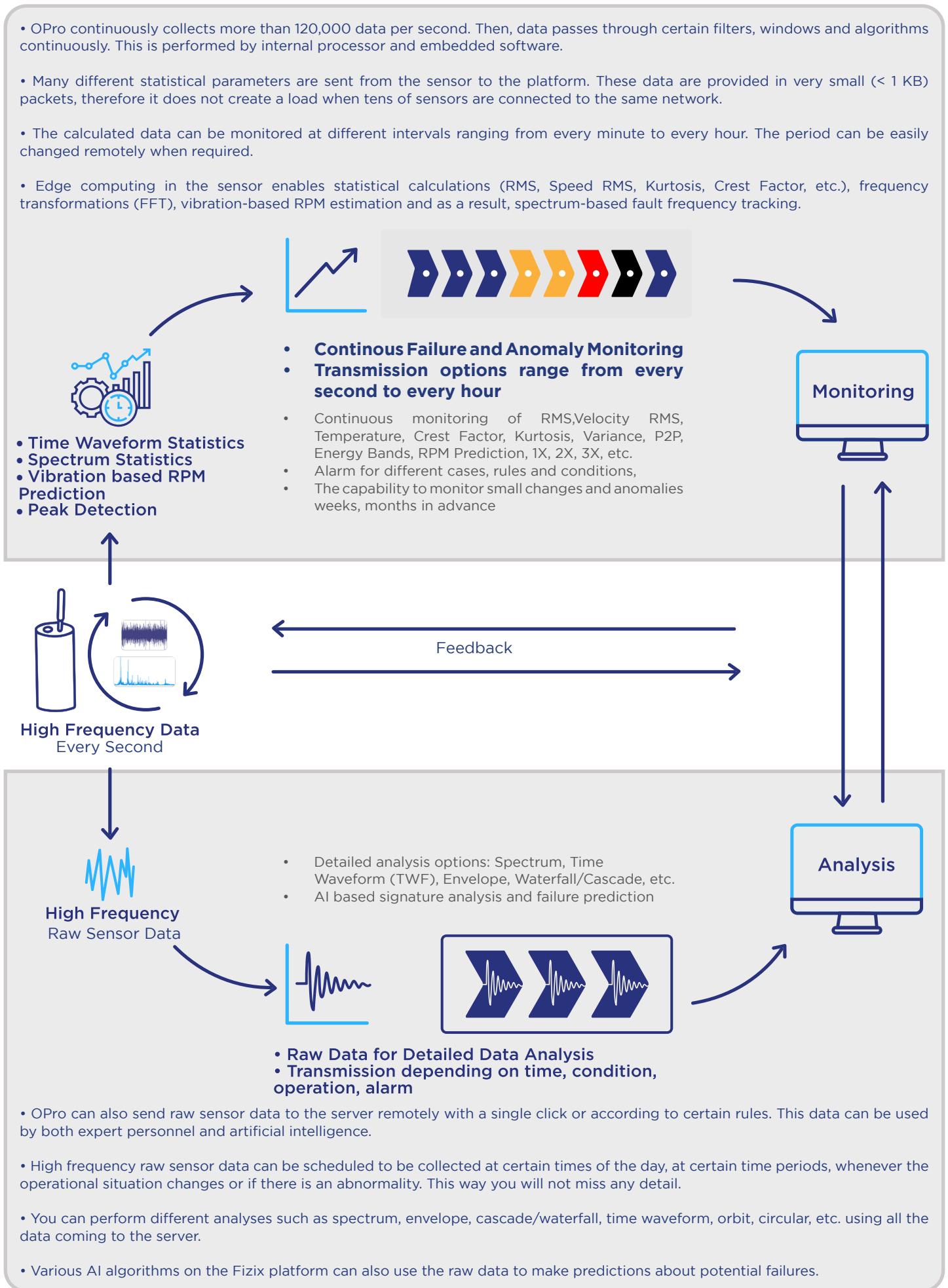
OPro smart sensors can perform different calculations on the sensitive and complex vibration, acoustics, magnetic flux data they collect from machines. This enables meaningful and fault-based monitoring instead of raw sensor data. OPro sends this meaningful data directly to the server via wireless communication.

OPro can also send high frequency raw vibration data to the server. You can receive this data at desired periods, depending on a predefined condition or instantly by pressing a button on platform interface.

All data transferred to the server via secure protocols are processed, stored and displayed on the interfaces according to automated rules.

In addition to high-level facility health monitoring, there are also detailed data analyses options with different platforms provided on the server side.

As can be seen in the data flow graph from the sensor to the server below, the data is sent in an optimised way. While continuous and meaningful data can be monitored with the upper stream, raw data is sent with the lower stream to increase the capabilities of the artificial intelligence and expert user on the platform.



Mate: Smart Machine Health Monitoring Platform

Dashboards, Notifications and Reporting



Comprehensive Summary Screens: Provide historical and real-time data on overall reliability.

Health Score-Based Monitoring: Provides clear and focused insights

Automatic Notifications: Weekly and monthly reports with critical updates.

Notification System: Ensures no important changes are missed. Alarms and notifications can be sent via email, phone apps, or other applications.

Customized Screens: Tailored dashboards for managers, operations personnel, and maintenance staff.

Real-Time Data Monitoring: Specialized screens for monitoring data flow and changes.

Live Data Access: Maintenance personnel can access detailed data without being physically present at the machines.

Next Generation Platform

User-Friendly Interface: Simplifies your workflow.

One-Click Machine Health View: Instant access to machine health status.

Dark Mode & Light Mode: Customize your viewing experience.

Mobile Applications: Available for iOS and Android, access from anywhere, anytime.



Forecasts, Fault Diagnosis with Algorithms, AI, and Experts



Digital Twin-Based Interfaces: Next-generation interfaces for accurate simulations and visualizations.

Automated Fault Detection: Utilizing multiple levels of algorithms and AI systems.

Planned Maintenance: Early detection of potential failures facilitates planned maintenance activities.

Predictive Insights: Trend and forecast analyses offer guidance on potential future conditions.

Certified Expert Support: Available at your chosen parameters/time intervals (monthly, upon alarm, etc.). Provides detailed reports and insights from certified professionals.

Advanced Sensor Data Analysis for Predictive Maintenance

Comprehensive and Detailed Analysis: Enables trend analysis and anomaly detection.

Statistical Parameters: Includes Accel. RMS, Velocity RMS, Crest Factor, Kurtosis, Spectrum Energy Bands, Spectrum Peak Diagnosis, etc.

High-Frequency Data Analysis: Utilizes time waveform, spectrum, envelope, circular, and waterfall/cascade plots for in-depth insights

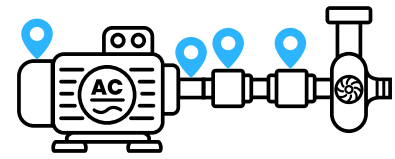




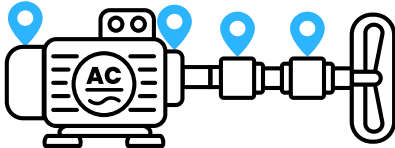
Safe Predictive Maintenance Solution

The Fizix OPro system makes your predictive maintenance easy, fast and expandable with its optimised sensors, embedded software and intelligent interface. Simply stick or screw OPro onto your machines and start monitoring instantly.

You can monitor hard-to-reach or hazardous points so that your personnel are safe. You can be notified of changes in the status of your machines and systems at the warning levels in the standards or at the limits you set yourself.



Motor Pump Group



Motor Fan Group

You can monitor vibration measurements to detect faults such as unbalance, misalignment, looseness, bearing, gear, etc. The Fizix monitoring system monitors and rates the health of your assets according to the levels specified in the standards or user specifications or AI. In this way, you can intervene in changes in levels at the right time and maximise the uptime of your equipment.

You can monitor different types of machines in the industry with the OPro. High-frequency data collection and analysis is performed at the location of the machine so that you can monitor 24 hours a day, 365 days a year without interruption.



Alarms and Warnings

By following the limits defined in ISO standards specific to your machine on the platform, it sends alerts to your mobile phone, computer within seconds when there is an unexpected change / abnormality in the general condition of your machines. In addition, you can also easily define your own alarm limits and create more detailed warning criteria.



Types of Data Sent by the Sensor

OPro smart sensor can collect and process high frequency sensor data simultaneously by its processor and embedded software. Thanks to its processing capacity, it can obtain very different statistical parameters, especially from vibration sensor data such as;

- Triaxial acceleration RMS, velocity RMS, Crest Factor, Kurtosis, Peak to Peak, Standard Deviation, Skewness, Minimum, Maximum, etc. many parameters are calculated using the high frequency time waveform received from the vibration sensor.
- Frequency domain data is calculated by Fast Fourier Transformation (FFT) using vibration data. By using both time and frequency domain vibration data, the rotational speed (RPM) of the machine can be estimated. Sensor send the estimated RPM value continuously. Thanks to the RPM estimation, it also provide RPM information to the sensor from outside.
- Thanks to RPM estimation, it also provides spectrum-based fault monitoring. It can calculate the values at rotational speed multiples used in the diagnosis of unbalance, misalignment, looseness, and similar common faults. In this way, it offers users the opportunity to monitor these faults instantly from the beginning to the growth process.
- In addition, depending on the user's request or Fizix's suggestion, different regions in the frequency domain can be monitored. In this way, for example, when you want to monitor the line frequency fault zone or a different fault zone, you just need to instruct the sensor. For this setting, it is sufficient to fill in a simple web-based form.



Wireless Communication

It is of great importance that there are no interruptions in communication as well as the sensors receiving accurate data. The antenna of the OPro sensor was intentionally left out during the design phase. Thus, more powerful antenna or adjustable angle antenna can be used at areas with reception problems.

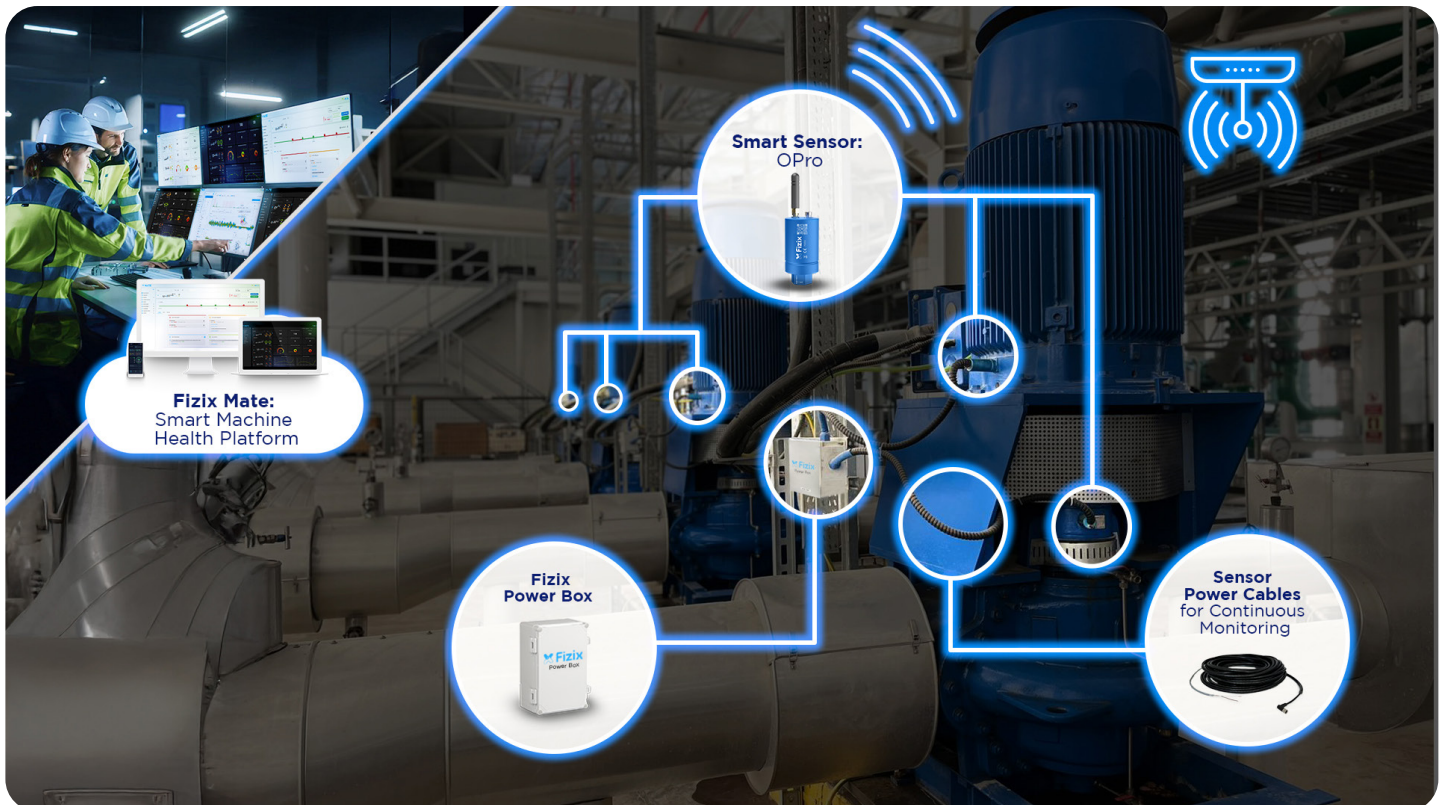
In addition, for the assets working in a completely closed environment, antenna extension cables that can be extended up to 10 metres can be used to connect to wireless networks outside. All these advantages ensure continuous connectivity.



Data Communication Protocol and Data Format

The OPro smart sensor has two-way communication using MQTT, one of the most popular IOT protocols. It provides high level secure communication, thanks to the 'MQTT over SSL' option.

In addition, you can remotely change many of its features at any time through two-sided communication. The OPro sensor delivers all statistical data and calculation results from the collected sensor data directly in readable JSON format. In this way, this enables easy monitoring without the need for special data conversion



Some Assets You Can Monitor with Fizix



Turbine

In many power plants operating in the energy sector such as hydroelectric, wind, etc., turbines and rotors in general.

Fans

Radial, axial, cell and snail type high speed fans for ventilation and air conditioning used in almost every industrial applications.

Blowers

Belt or direct drive multistage centrifugal or roots-type blowers, commonly used for efficient air movement in industrial applications

Centrifugal Pumps

Vertical pumps, horizontal centrifugal suction pumps, turbine or engine driven boiler feed pumps, etc.

Tidal Pumps

Tidal pumps, including horizontal piston and horizontal gear pumps, are designed for efficient water movement in tidal environments

Air Compressors

Reciprocating, rotary screw, with or without internal/external gearbox, etc.

Gearboxes

In various industries, gearboxes with single, two, or multiple stages are commonly used for power transmission and torque conversion.

Motors

Used in a wide range of industries, motors of various types such as AC, DC, and servo motors are essential for driving mechanical systems

Spindles

Spindles, essential in CNC machines and lathes, provide high-precision rotational motion for efficient manufacturing operations.

Technical Specifications

OPro system offers different solutions for your different needs with the sensor options given in the table below.

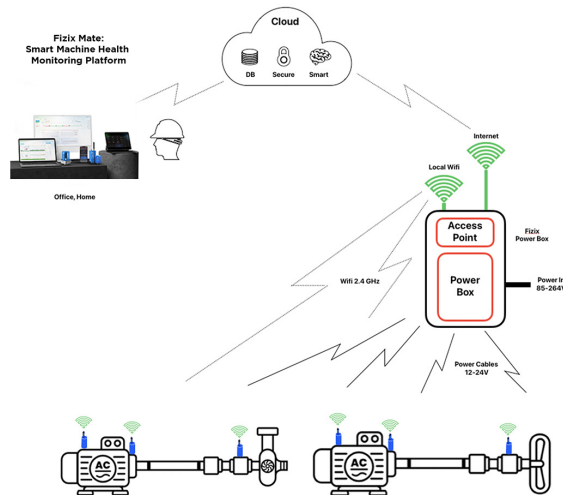
Technical Specifications		OPro
Integrated Sensor Types		Tri-axial MEMS Accelerometer (Vibration) + Temperature + Acoustics (Ultrasound) + Magnetic Flux
Body Material		Aluminium
Base Screw Hole		M6x1
IP Rating		IP67-68 Options
Wireless Communication		2.4 GHz-802.11 b/g/n
Power Requirement		12VDC-32VDC-0.25A-0.094A
Cable Version Average Power Consumption		3W
Size (Including Antenna)		ø=41 mm h=89/134 mm
Weight		135 g
Operating Temperature Range		-40°C to +85°C
MEMS Accelerometer (Vibration)	Number of Axis	3 (x/y/z)
	Measurement Level	2g, 4g, 8g, 16g
	Cross Axis Sensitivity	1%
	Sampling Range	0.1 Hz-26.6kHz
	Noise Density (Under 2g Vibration)	80 micro-g/sqrt (Hz)
Magnetic Flux	Range	± 2 mT (Maks)
	Bandwidth	32 kHz
	Noise	1.5 nT/√Hz
Acoustic Emission	Sensor Type	MEMS Microphone
	Sampling Rate	100 Hz - 80 kHz
	SNR	64.3 dB
Power Connector Cable & Power Connector	Size	M8
	Pin	4
	Type	Male/Female
Antenna	Frequency	2400-2500 MHz
	Gain	2.15 dBi
	Efficiency	50%
	Type	Monopole

Multiple OPro Integration Options

OPro sensors can use the same wireless network with light data packets without causing load on network. Each OPro can easily connect to a wireless modem, router or access point up to 100 metres away in an open area. Usage cases are given below.

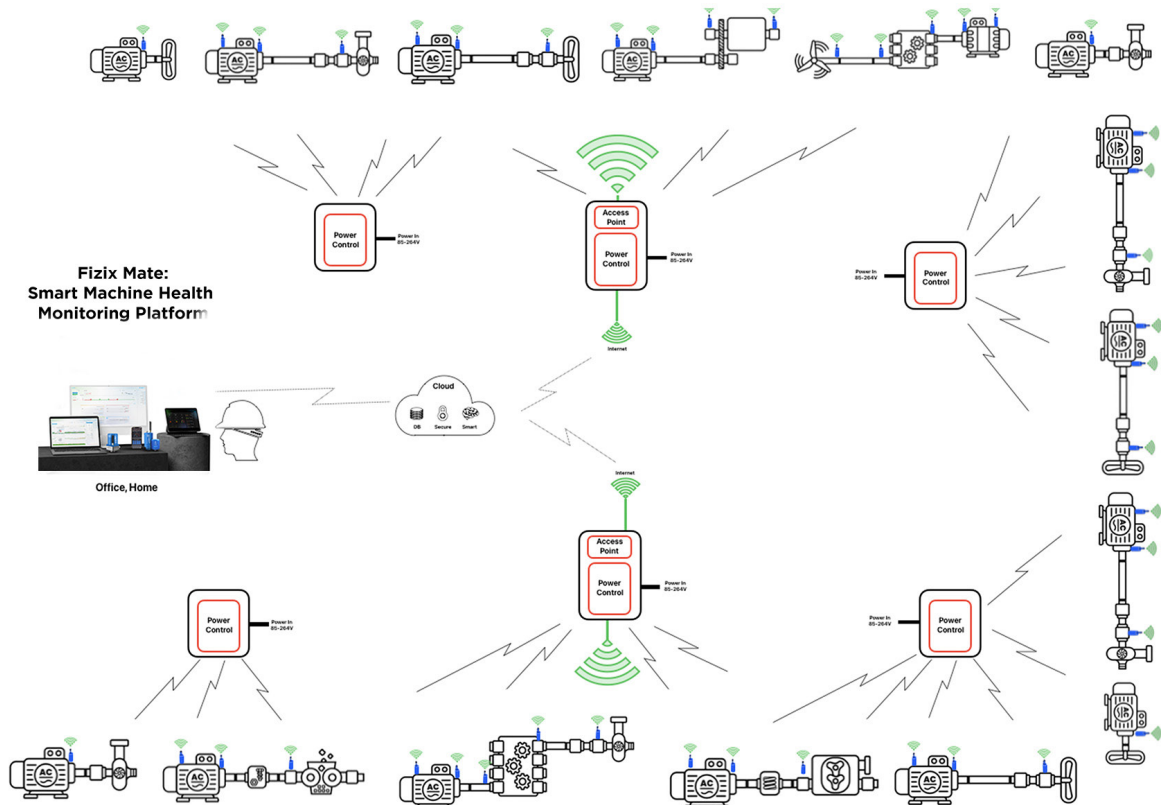
Example 1

- You can monitor your critical assets consisting of motors and connected sub-systems with sensors installed at different points.



Example 2

- You can monitor your non-critical assets by installing one sensor on each subsystem.

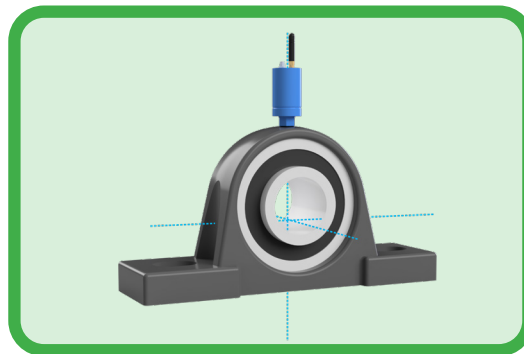
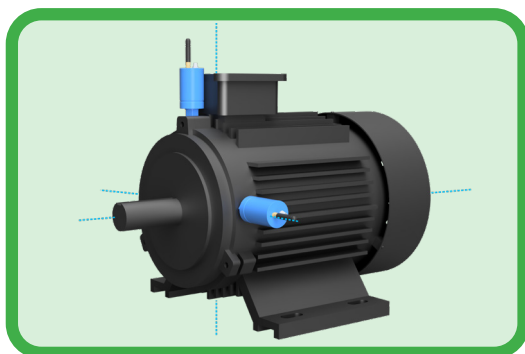
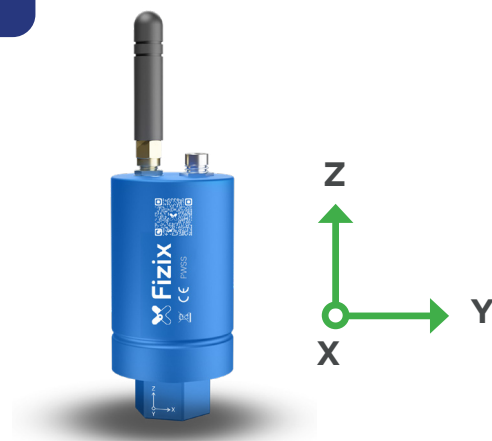


Proper Installation & Accurate Measurement

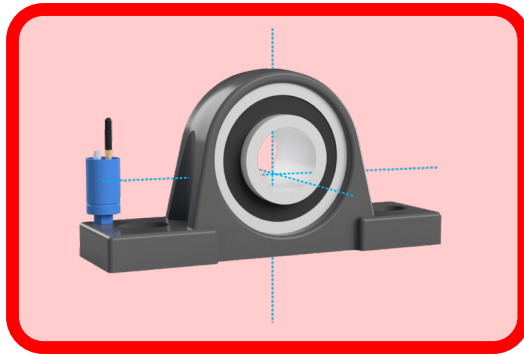
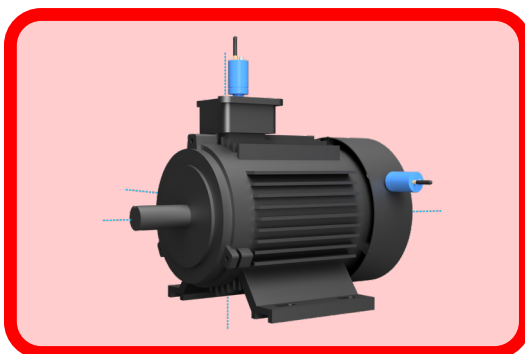
General Rules for Mounting

- Identify the critical points of the machine to be monitored for vibration.
- Only one sensor per measurement point is sufficient.
- The sensor should be mounted on rigid and stiff surfaces to ensure accurate vibration transmission.

Examples: bearing housings, motor casings, gearbox housings



The sensor axes (X-Y-Z) should be aligned with the actual vibration directions of the machine.



Installation on cooling fins, covers, and thin sheet-metal surfaces is not recommended.

Note: In motor applications, if possible, separate measurement points are recommended for the drive side (DS) and the non-drive side (NDS).



Preparations to be made before Order and Integration

- How many assets do you want to monitor?
- How many of your assets are critical and from which points do you want to monitor?
- Is the wireless communication interface suitable?

If you are unsure, you can send an e-mail to hello@fizix.ai for free technical support.



Box Contents

- 1 OPro
- There is a power adapter that converts 220VAC to 12VDC. It is ready to plug into the wall socket. (Optional, single unit is suitable for single unit supply.) A power box is provided for multiple unit supply.



FAQ:

- **What is the guarantee with the sensor?**
OPro systems are guaranteed for 2 (two) years.
- **Can we use 2.4 GHz standard modems, access points, extenders or routers for wireless?**
Yes, OPro easily connect to a 2.4 GHz wifi device s a wireless infrastructure, a Wifi Modem (or GSM Modem) must be available at a maximum distance of 30 meters in an open area.
- **How can we configure sensor? What data sensor sends?**
OPro systems can send vibration (Acceleration and Velocity RMS, Crest Factor, etc.) and temperature data at least every 20 seconds. The data transmission interval can be easily adjusted. In addition, each OPro system sends high-frequency data whenever requested.
- **Do we need an expert for configuration?**
It has an interface that can be easily integrated and used by personnel with vibration-induced maintenance training certificate.
- **What is the cable length? Can we extend it ourselves?**
OPro systems work with 220 V power adapter with 5 (five) meters cable is free of charge with OPro systems. If the customer wishes, it can be 50 meters using the standard power cable.
- **Do we need a gateway for the sensors to connect to wifi?**
There is no need for an additional client (Eng. Gateway) or hardware in the use of OPro systems. It sends the data over the wireless network (Wifi) in the facility by making all data collection and preliminary calculations.
- **How can we integrate sensors on machines?**
There is an M6 screw hole at the bottom of OPro. If there is a grub screw on your machine, apply anti-loosening adhesive to the screw and stick it. If you do not want to use screws, you can stick it directly on your machine in a very short time with industrial metal-metal adhesives.

Contact Us!



Fizix



@fizix_ai



Fizix ai



fizix_ai_



fizix.ai



hello@fizix.ai



Manchester, UK



Ankara, Türkiye