iQunet®

Wireless Battery-Operated Sensors

iQunet sensors and iQunet network technology are introducing a major breakthrough in wireless battery powered applications for asset management in industry and buildings. The iQunet easy-fit sensors measure physical machine parameters (e.g. bearing vibration, temperature, proximity, rotation, humidity, inclination, etc.).
There are many benefits:

- **reduced costs** by easy equipment and asset monitoring,
- **increased efficiencies** by follow up of status alerts,
- **improved productivity** by generating usage reports,
- **enhanced customer service** by condition-based maintenance scheduling
- **raised competitiveness** by remote access and diagnostics.

A complete system

The iQunet Wireless Machine Condition Sensor is designed for use in a system consisting of the following components:

- iQunet Wireless Condition Monitoring Sensors
- iQunet Repeater/Actuator (optional)
- iQunet Base Station
- iQunet small format Data Management Server
- iQunet Web based Wireless Sensor Dashboard Manager
- iQunet OPC UA embedded server
- iQunet Sheets/Excel/csv Export
- iQunet GraphQL API (+200 well documented instructions)

Network Components

Base station

The base station is the center node of the wireless network. It can serve virtually an unlimited number of sensor nodes and is powered via a standard micro USB connection from the iQunet small format DIN-rail Data Management Server. The base station can easily be attached to the wall with the related clips.

Data Management server

The iQunet Data Management Server is a small size Single Board Computer to which the base station is connected. It has a standard Ethernet connection and is WiFi enabled. It is powered via a 5V micro USB. A 9-24V powered iQunet Server is available as well. The iQunet Server provides via internet, access to the web based Wireless Sensor Dashboard software which monitors the sensor network and drives the dynamic sensor parameterization. The iQunet Server has an embedded OPC UA Server inside guaranteeing seamless data exchange with SCADA systems or OPC UA historians where the data can be stored. The GraphQL API enables smoothless integration with other software platforms.

Repeater

When longer distances need to be bridged, the optional wireless repeater (extender) can be used. The repeater has a small footprint and can easily be attached to the wall with the related clips. The repeater can connect virtually to an unlimited number of sensors and is powered via a standard micro USB connection to a USB charger (included) or via a DIN-rail 5V supply.The Repeater runs although also on 2 standard coin cells acting as an UPS (Uninterruptable Power Supply).

Actuator

The actuator has all functionallities of a Repeater but includes an output connector. The output from the actuator is either a 5V signal or a 24V switching output. This way the actuator can drive a PLC for direct machine communication. The intelligent actuator can work standalone if for any reason the internet connection is temporary unavailable.

Additional sensors and functionality will be released during the coming years.
More info: https://iQunet.com

Sensor Range

The intelligent sensors have a microcontroller on board and run innovative and extremely stable embedded software. Due to the iQunet sleep mode, the power use is extremely low, and the batteries have the longest life time in the market. The optimized wireless protocol is based on the most recent standards, reducing the communication overhead to the minimum, while maximizing the data payload. All sensors can be triggered over radio or activated via a programmable interval. They all have an accurate temperature sensor on board. All sensors return their signal strength within the wireless network, the battery power status and current firmware and hardware version.

Vibration Monitoring Sensors

The iQunet wireless battery-operated machine condition sensor combines a sensor, data collector and radio into one compact, battery-operated device that measures both vibration and temperature data. The sensor collects triple axis vibration time signals and trending values. An “always on” wireless 24V powered version is available as well as other types.

Inclination Monitoring Sensor

The iQunet inclination sensor monitors the inclination angle of machine components. Pitch and roll are collected in burst mode for monitoring purposes. A guard roll parameter can be set to detect whether the machine component surpasses the set angle. An alarm broadcast can be picked up by the iQunet actuator which can drive the machine PLC to switch off the machine.

Proximity Monitoring Sensor

The iQunet proximity sensor monitors (linear) distance of machine components. By measuring the magnetic field the accurate and easily programmable sensors are able to detect the proximity of a magnet in a range of a few µm. This enables accurate monitoring of e.g. alignment and tension of conveyor belts over long periods of time.

Proximity Switch Sensor

The magnetically actuated internal reed switch monitors wireless the presence of machine components. The normally open switch is closed in the presence of a magnet. This allows to collect wireless data about open or close status of e.g. doors, machine cycles, or detect the rotation speed of machinery.

VOC/CO2 Sensor (available 2021)

This wireless sensor measures VOC, CO2, Relative Humidity and temperature of the surrounding air. This allows to monitor both wireless and battery-operated the condition of the workplace air quality and control this according to the most recent regulations.

PIR Motion Sensor (available 2021)

The iQunet PIR motion sensor detects changes in the amount of infrared radiation impinging upon it using a passive infrared sensor (PIR sensor) that measures (IR) light radiating from objects in its field of view. The wireless battery- operated sensor allows to monitor zones and traffic and is therefore very useful to generate valuable data.

Temperature Logger Sensor (available 2021)

The iQunet wireless temperature logger is “armed” via the sensor dashboard. Based on an adjustable vibration level the temperature logging starts even outside the wireless sensor network. Once back in the sensor network, the sensor releases its data. Data is saved in the iQunet server and can be visualized in the sensor dashboard or accessed via OPC UA.

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Industry 4.0 Innovation

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Specifications

Sensor Data Acquisition
- triggered or via programmable interval
- set via integrated and included Dashboard, OPC UA or API

Measurements
- Temperature (all sensors)
- Vibration
- Inclination (pitch and roll, roll guard)
- Proximity (hall field)
- Proximity count (reed contact pulses)
- ...

Wireless Communications
- Battery saving iQunet protocol
- Unlimited number of nodes
- Range: up to 50 m typically in plant (actual range depends on specific site topology, device placement and/or building construction)

Certifications
- CE - FCC
- Vibration Sensor ATEX - IECEx certification (available 2020)

Physical
- Dimensions sensors, repeater, actuator, base station (mm): 57 x 47 x 14
- Weight: 35 g
- Dimensions Data Management Server (mm): 120 x 102 x 18
- Weight: 105 g
- Case material: Thermoplastic

Environmental
- Operating temperature Sensors: −20 to +70 °C
- Recommended storage temperature: +30 °C maximum

Power Sensors
- 2 x 3V primary CR2032 replaceable coin cell (note 1)
- 24V (6-60VDC) powered vibration sensor is available
- Up to 10 year battery life (note 2), depending on settings, usage and operating temperature

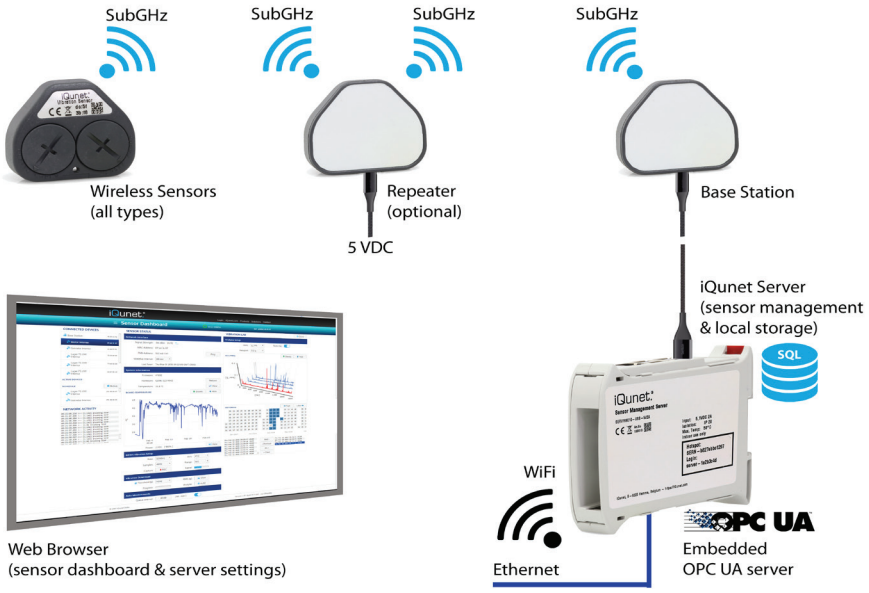
Software

Wireless Sensor Dashboard
The iQunet web based Wireless Sensor Dashboard software is an intuitive Graphical User Interface (GUI) running state of the art Web Real Time Communication (WebRTC). This software is used to manage sensor status information or set burst intervals for auto measurement. Data is relayed to the OPC UA server but can be previewed in dynamic graphs within the Sensor Dashboard. The software controls the sensor measurements and is able – in case a vibration monitoring sensor is connected – to perform data analysis. The Wireless Sensor Dashboard software also processes user requests for "live" data and is able to export to analytical software from third parties.

OPC UA Embedded Server
The iQunet Server runs an embedded OPC UA server. OPC Unified Architecture extends the highly successful OPC communication protocol, enabling data acquisition and information modeling and reliable and secure communication between the plant floor and the enterprise. OPC UA is future ready and easy to configure and to maintain.

Sheets / Excel Exporter
For quick and easy reporting, iQunet created an Export tool in the Sensor Dashboard. By a push on a button data is extracted from the iQunet server database and exported to Sheets or Excel. This way, sample reports are made at a snap which enables easy creation of reports.

GraphQL API
GraphQL is a query language for API and a runtime to fulfil those queries using existing data on the iQunet Server. It provides over 200, fully documented iQunet instructions. There is a complete and understandable description of the data in the API, giving you the power to ask for exactly what you need. Powerful developer tools are available. Using a single, but evolving version, the GraphQL API give applications continuous access to new features and encourage cleaner server code which is easy to maintain.



System Setup

Wireless sensors are installed on the equipment to be monitored. The data is transmitted to the Base Station via SubGHz radio frequencies, optionally via an intermediate Repeater. Data received on the Base Station is stored in the SQL database from the iQunet Server.

This Server also manages the wireless sensor network and runs the embedded OPC UA server. The Server runs the analytical software as well and via the embedded web server, the iQunet dashboard software can be addressed via any web browser without the need for installing software.

The iQunet Server can be securely addressed via 802.3-ethernet or 802.11i-wireless and hotspot functionality is available for direct server access.

***Note 1**: Battery surface may not be touched when installed. Touching the batteries will considerably reduce battery life time due to induced leakage current. Preassembled battery holders are available for easy battery replacement. **Note 2**: Up to 10 years battery life for multiple temperature measurement every hour. Up to 5 years battery life time for vibration monitoring depending i.a. on measuring frequency, ambient temperature, RSSI (Received Signal Strength). See iQunet support pages for more info.*

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