Wireless Sensors
Indoor Environments
HOBO ZW Series wireless data nodes provide centralized monitoring of energy and environmental conditions in buildings.

**Supported Measurements**
Air Velocity, AC Current, AC Voltage, Amp Hour, CO2, Compressed Air Flow, DC Current, DC Voltage, Differential Pressure, Gauge Pressure, Kilowatt Hours, Kilowatts, Power Factor, Pulse Signals, Temperature, Relative Humidity, Dew Point, Volatile Organic Compound, Volt-Amp Reactive, Volt-Amp Reactive Hour, Volt-Amps, Water Flow, Watt Hours, Watts, Volts, Amps, 0-10 VDC, 4-20mA

**Key Advantages**
- Provides real-time centralized data collection within a facility
- Scales up to a network of 100 nodes sending data to a single receiver
- Creates self-healing network, using routers, to overcome obstructions in communication paths
- Provides one year battery life @ 15-minute logging intervals
- Provides alarm notifications via email or text messages
- Features powerful software for organizing and viewing data as well as the wireless network

**Self-Healing Technology**
HOBO ZW wireless network uses self-healing technology. This ensures that, despite obstructions, data is automatically routed to the receiver through alternate paths without any manual intervention.

**Centralized Data Collection**
HOBO data nodes, routers, and receiver all work together as a system to provide reliable, accurate, real-time information at a single location. Whether you are a warehouse manager looking to keep a close eye on temperature and humidity conditions, a facility manager looking at indoor air quality, or a building energy manager tracking energy use, HOBO data nodes provide reliable data collection without the hassles of manually offloading data.

**Network Scalability**
HOBO ZW wireless networks are scalable, enabling you to easily add or remove measurement points to your existing network over time. By using routers you can hop data across rooms, partitions, and floor levels, and redirect it to the receiver. This expands the network reach and improves data transfer reliability. The wireless data nodes can be set up in dual mode – data logging and data routing – thereby providing immense flexibility in scaling the network.
Mulder-Hardenberg, est. 1927, is the answer to professional demands in the domain of electronic related environments. We don't just sell products. We use our multidiscipline knowledge to provide the best possible solution, designed to your specific interest.

Contact details:

The Netherlands
Mulder-Hardenberg B.V.
Westerhoutpark 1a
2012 JL Haarlem
Tel.: +31 23 531 91 84
infoNL@m-h.biz

Belgium, France, Luxemburg
Mulder-Hardenberg N.V.
Hoge Weg 129
B-2940 Stabroek
Belgium
Tel.: +32 3 660 13 20
infoBE@m-h.biz

Germany
Mulder-Hardenberg GmbH
Nordring 13
D-65719 Hofheim/Ts
Tel.: +49 6192 - 97 91 85
infoDE@m-h.biz

- Data Loggers
  - Indoor Environments
  - Wireless Sensor Networks
  - Weatherproof
  - Wireless weatherproof
  - Waterproof
  - Data Logging Systems
  - Software
  - Sensors
  - Communications

- Ethernet I/O and PAC's
  - Breakout Boards & Rack Diagrams
  - Installing & Wiring
  - Networking options
  - System Architectures
  - System Components

- Industrial PC's
  - Embedded Systems
  - Extreme Embedded Systems
  - Fanless Systems
  - Industrial PC boards
  - IPC Enclosures
  - Medical Systems
  - Panel PC's
  - Rackmount Systems

- I/O for Allen Bradley
  - Ethernet I/O
  - Breakout Boards & Rack Diagrams
  - Installing & Wiring
  - Networking options
  - System Architectures
  - System Components

- PC Based I/O
  - Analog Modules
  - Brains
  - Digital Modules
  - Interfaces
  - Racks
  - Serial Modules
  - Software

Mulder-Hardenberg, est. 1927, is the answer to professional demands in the domain of electronic related environments. We don't just sell products. We use our multidiscipline knowledge to provide the best possible solution, designed to your specific interest.

Model       ZW-RCVR (Receiver)       ZW-001 (Data node)       ZW-003 (Data node)       ZW-005 (Data node)
Buffer memory       up to 95k measurements       5k measurements       4k measurements       3k measurements
Measurements       r/va       Temp       Temp/RH       Ext T/RH, 1 analog port, 1 pulse input port
Probe size (diameter)       r/va       r/va       r/va       1cm
Sample rate       r/va       1 min to 18 hrs       1 min to 18 hrs       1 min to 18 hrs
Transmission rate       r/va       2 min and greater       2 min and greater       2 min and greater
Power options (included)       AC Power adapter, Battery Backup, USB power       AC Power Adapter, Battery Backup       AC Power Adapter, Battery Backup       AC Power Adapter, Battery Backup
Measurement range       r/va       Temp: -40° to 70°C       Temp: -40° to 70°C       Temp: -40° to 70°C       RH: 5 to 95% RH
Accuracy       r/va       Temp: ± 0.21°C from 0° to 50°C       Temp: ± 0.21°C from 0° to 50°C       Temp: ± 0.21°C from 0° to 50°C       RH: ± 2.5%       Analog: ± 1.544 mV ± 2%
Resolution       r/va       Temp: 0.02°C @ 25°C       Temp: 0.02°C @ 25°C       Temp: 0.02°C @ 25°C       RH: 0.03%       Analog Channel: 0.6 mV       Pulse Channel: 1 pulse

Range       Approx. 100 m (300 ft.) depending on obstructions or interference
Dimensions       96.5 x 108 x 28 mm
CE compliant       Yes

Model       ZW-006 (Data node)       ZW-007 (Data node)       ZW-008 (Data node)       ZW-ROUTER
Buffer memory       3k measurements       3k measurements       3k measurements       r/va
Measurements       4 external analog ports       Ext T/RH, 2 analog ports       2 analog ports       2 pulse input ports
Probe size (diameter)       r/va       1 cm       r/va       r/va
Sample rate       1 min to 18 hrs       1 min to 18 hrs       1 min to 18 hrs       r/va
Transmission rate       r/va       2 min and greater       2 min and greater       r/va
Power options (included)       AC Power adapter, Battery Backup       AC Power Adapter, Battery Backup       AC Power Adapter, Battery Backup
Measurement range       Analog channels: 0 to 2.5 VDC, 0 to 5 VDC       Temp: -40° to 70°C       Temp: -40° to 70°C       Temp: -40° to 70°C       RH: 5 to 95% RH
Accuracy       Analog: ± 1.544 mV plus 2% of reading       Temp: ± 0.21°C from 0° to 50°C       Temp: ± 0.21°C from 0° to 50°C       Analog: ± 1.544 mV ± 2%
Resolution       Analog channel: 0.6 mV       Temp: 0.02°C @ 25°C       Temp: 0.02°C @ 25°C       Analog channel: 0.6 mV       Pulse Channel: 1 pulse

Range       Approx. 100 m (300 ft.) depending on obstructions or interference
Dimensions       96.5 x 108 x 28 mm
CE compliant       Yes
The EpiSensor wireless energy monitoring system uses advanced wireless self-healing mesh networking technology to collect data from wireless nodes. Multiple sensors placed throughout the facilities collect the data, and uniquely log the time-stamped data locally at the sensor, to serve as a redundant back up in case of any network communication issues.

EpiSensor gateways collect and log the data for access through a built-in web server, and can deliver the sensor data to a variety of enterprise software systems for archiving and analysis. The gateway also doubles as the network management tool, providing an intuitive web interface to quickly and easily deploy the wireless monitoring system.

With a highly rugged design targeted to the harshest of industrial environments, the EpiSensor wireless monitoring system is equally suited for installation in clean rooms as it is in the harsh environments of food processing halls. Waterproof enclosures are standard across the product line, and most products are housed in high quality chemical resistant polycarbonate enclosures.

No specialist training is required to install and commission the EpiSensor system. This makes the system quick to deploy and simple to support. As it is fully modular, the scalable system can be installed with minimum disruption to normal operations.

**The NGR-30 Gateway** is an embedded computer that allows users to configure the wireless monitoring system and export data to enterprise-level software systems such as energy management systems (EMS), building management systems (BMS) database servers etc.

Each of the products below represents a ‘wireless node’ that sends data to the NGR-30 Gateway. We have a complete range of wireless products for monitoring energy usage in all types of industrial and commercial environments.
System Architecture
The diagram illustrates the structure of EpiSensor system and how data is provided to 3rd party energy management software and other enterprise software systems. Users can configure data export via the user interface on the NGR-30 Gateway.

Powerful Data Management
Energy data is valuable - EpiSensor’s wireless energy monitoring system provides high quality energy usage data. Merging this data with other business metrics to create Energy Performance Indicators (EPI’s), can significantly reduce energy usage within an organisation. EpiSensor provides this energy usage data in real-time to a variety of enterprise systems so energy managers can focus on taking action.

Data Accessible via web server
All sensor data can be accessed from the built-in web server. The intuitive interface provides users with a buffer of 24hrs of data. This is useful for extracting technical information that would not normally be exported, for example voltage / peak current / battery level. The data view is also a useful tool for commissioning new networks and for troubleshooting.

The interface is fully compatible with all modern smartphones, tablet computers and desktop web browsers. The data view module can also be used as a public display, providing a real-time visualisation of energy usage to raise awareness in a reception area for example.

There are various graphing options available including Line, Area, Bar and Scatter.

Data Export
The NGR-30 Gateway is capable of pushing data to a variety of energy dashboards and enterprise software systems. Data can be sent in formats such as CSV, XML, JSON over various protocols including FTP and HTTPS.

Pre-built data drivers are available for many popular software systems, and custom data drivers can be designed as required.

Communications can be fully secured using a HTTPS web service. Various protocol definitions and sample code is available for users who wish to integrate more closely with the NGR-30 Gateway.

Data Logging
Data logging functionality has been built into every level of the system which makes it very resilient to any network communication issues. This feature is unique to EpiSensor’s wireless energy monitoring system.

If wireless sensor network communications fail, data is stored on each node until the link has been restored (up to 10,000 data points or > 1 year of 15 minute data). If data export to a server fails, data is archived on the Gateway (up to 4 GB, which could represent years of data).
Accuracy, Ruggedness & Security
Many of our customers have already implemented tight control over their energy consumption and aim to reduce energy usage by single figure % points in some cases. Other customers have a requirement to verify utility bills or sub-meter for tenants. Having accurate data that can be relied upon is key. The security, integrity and quality of this data are equally important, and EpiSensor provides best-of-class performance in each of these areas.

Accurate
All EpiSensor electricity monitors are designed to Class 2 standard, which is on par with utility-class fiscal meters. Each electricity monitor is individually calibrated in EpiSensor’s lab at time of manufacture to compensate for minute differences in the performance of each CT, the digital signal processing electronics and the resistance of the cables that are attached to each unit.
Our range of temperature sensors have an accuracy of +/-0.2°C, and all parameters can be adjusted in software based on calibration lab test certificates.

Highly Rugged
Both electrically and mechanically, EpiSensor products have been designed to operate in the most harsh industrial environments. Waterproof enclosures are standard across the EpiSensor range, and most products are housed in high quality chemically resistant polycarbonate enclosures. Our mains powered products have integrated power supplies that have many layers of protection, and can cope with power surges, noisy conditions and have a wide voltage input range.

Fully Secure
The data we manage is valuable and sensitive. EpiSensor’s systems are deployed in some of the world’s most commercially sensitive environments, and we implement enterprise-class security standards across the full chain.
Wireless sensor network communications are secured using AES-128 bit encryption and all sensitive data on the Gateway is stored in encrypted form. We push data to servers using secure HTTPS communications.

Reliable
EpiSensor’s system has redundancy built in at every level. If communications on the wireless sensor network fail, each node will switch to a data logging mode and can record up to 10,000 data points independently of the Gateway - that’s over a year of 15 minute data. If mains power is lost to an electricity monitor, all cumulative values will be securely stored in non-volatile memory until power is restored.
The Gateway also has the capacity to store years of data in the event that communications to the server are no longer available. When communications have been restored, all data will be uploaded in sequence.

Easy to Install & Commission
Installation of an energy management system can form the most significant part of the cost, so it’s essential to have a system that’s easy to deploy. The impact of installing traditional wired systems on normal operations, combined with increased health a safety risk, can significantly impact on the success of an energy management project.
In addition, energy management is a process of discovery where one energy saving leads to the next, so it is essential to be able to start small and expand.

Easy to Install
Each wireless product is designed with easy installation in mind. Our electricity monitors are supplied pre-calibrated CT’s - simply wire in the voltage terminals, clip on the CT’s and data will be produced.
There are also many options for battery powered units, which are even easier to install - all that’s required is a button press.

Quick to Commission
Our wireless products can be configured from the built-in web server on the Gateway without any specialist training using a mobile device or desktop web browser.
The wireless products will automatically form a self-healing mesh network, and data will be available instantly. Users have immediate feedback for troubleshooting installations, and verifying that the correct items are being monitored.

Scalable
EpiSensor’s system is a fully modular and scalable wireless energy monitoring system. Each Gateway can manage 100’s of wireless ‘nodes’, large sites can have many Gateways, and large organisations can have many sites - all being monitored from a central location. With the use of cloud storage and virtual servers, there is no limit to the amount of data that can be managed.

Enterprise Ready
EpiSensor’s wireless energy monitoring system is built on open industry-standard protocols and can integrate with complex IT environments and conform to strict IT policies. Data can be exported in a variety of formats to enterprise software systems such as ERP, MIS, BMS, SCADA. The system can be fully managed by in-house IT, or kept fully isolated from a corporate network.
Customer Examples
Some examples of EpiSensor customers is selected key industries.

**Medical Devices - DePuy / Johnson & Johnson**
The system was deployed gradually over a 6 month period to provide plant-wide wireless sensor network coverage. There are in excess of 4000 individual parameters being monitored to provide a comprehensive view of energy usage within the plant. Data is hosted within the secure corporate network and energy data is analysed using eSight software.

**Food Processing - Foyle Food Group**
EpiSensor has one installation that spans 5 food processing plants in Ireland and the UK with over 500 wireless nodes connected to 10 gateways providing over 3500 discreet data feeds. This is a harsh industrial environment where products are hosed down daily with chemical disinfectant. The system is used as a mission critical part of the operation.

**Manufacturing - Smurfit Kappa Group**
This systems monitors water, electricity and natural gas usage and other parameters in a large manufacturing plant. The system was deployed in less than 1 week and data is sent securely to a fully managed off-site energy management dashboard. There is full wireless mesh network coverage on site to allow for easy expansion of the system.

**Data Centre - Microsoft**
Via our reseller Activation Energy, EpiSensor’s system is used as the energy monitoring arm of a demand / response system which engages stand-by generator sets as required by the electricity distribution grid. The system uses 3G cellular communications for data back-haul and data is managed in a proprietary database which interfaces to the electricity distribution grid in real time.

**Commercial - Citibank**
The system is deployed in a landmark building with 2000 occupants in central Dublin. A range of parameters are monitored including CHP output, temperature, humidity, electricity and gas usage. Data is sent to a hosted energy dashboard where Energy Performance Indicators are produced that have lead to significant energy savings.

**Pharmaceutical - Mylan Group**
All significant electrical loads are being monitored in this highly regulated pharmaceutical manufacturing environment to produce API’s that are driving an energy efficiency program on site. There is full wireless mesh network coverage on site which spans two buildings. Data is back-hauled using a 3G internet connection to a secure off-site data centre, where it is made available to management via the web.

---

**Data Loggers**
- Indoor Environments
- Wireless Sensor Networks
- Weatherproof
- Wireless weatherproof
- Waterproof
- Data Logging Systems
- Software
- Sensors
- Communications

**Ethernet I/O and PAC’s**
- Breakout Boards & Rack Diagrams
- Installing & Wiring
- Networking options
- System Architectures
- System Components

**Industrial PC’s**
- Embedded Systems
- Extreme Embedded Systems
- Fanless Systems
- Industrial PC boards
- IPC Enclosures
- Medical Systems
- Panel PC’s
- Rackmount Systems

**I/O for Allen Bradley**
- PC Based I/O
  - Analog Modules
  - Brains
  - Digital Modules
  - Interfaces
  - Racks
  - Serial Modules
  - Software

---

Mulder-Hardenberg, est. 1927, is the answer to professional demands in the domain of electronic related environments. We don’t just sell products. We use our multidiscipline knowledge to provide the best possible solution, designed to your specific interest.

Contact details:

The Netherlands
Mulder-Hardenberg B.V.
Westerhoutpark 1a
2012 JL Haarlem
Tel.: +31 23 531 91 84
infol@m-h.biz

Belgium, France, Luxemburg
Mulder-Hardenberg N.V.
Hoge Weg 129
B-2940 Stabroek
Belgium
Tel.: +32 3 660 13 20
infof@e-m-h.biz

Germany
Mulder-Hardenberg GmbH
Nordring 13
D-65719 Hofheim/Ts
Tel.: +49 6192 - 97 91 85
infof@e-m-h.biz