

Wireless Measurement Platform

WiSensys

www.wisensys.com



WiSensys®

WISSENSYS® the Wireless Measurement Platform

WiSensys® is a wireless, easy to install, ready to use measuring platform with data logging capability. WiSensys® is Wireless Value's product family for accurately measuring, securely transmitting and logging the output signals from a large variety of sensors.

The wireless measurement platform consists of sensor units, a base station and user software. The sensors measure input values like temperature, humidity, energy, CO2 and process signals and transmit the measured data over a secure wireless link to the base station.

The WiSensys® base station receives sensing data from all sensors and automatically transfers these values to the user environment like PC, datalogger etc. Up to 100 sensors can be connected to the base station. The base station can optionally store measurement values on an SD card.

For presentation, logging, alarming etc. the user has two options. He can select a local PC version called SensorGraph or a web based application called Websensys.

Data is stored in a MySQL type database or equal and allows easy access for user defined applications.

Upon installation, the WiSensys® SensorGraph software is used to install the system. Friendly names, measurement frequency and number of samples per transmission alarm values, calibration values etc., can be assigned to each sensor. These values can be changed later when needed.

The sensor can locally store up to 10.000 measurements in non-volatile memory. This storage is used when a connection to the base station is not available to ensure that measurements are not lost. Whenever the sensor and base station are in range again, the data is transmitted to the base station.

The WiSensys® platform offers sensors for:

- Measuring temperature, CO2 levels and humidity
- Analog signals (0-25mA, 0-30V, 0-4V, 0-1V)
- Measuring energy consumption
- Measuring pulses
- Open/close indication

FEATURES AND BENEFITS

Monitoring processes and situations through:

- Measuring quantities
- Generating alarms
- Create action on alarms

Objectives:

- Prevent unsafe situations
- Prevent product losses due to process/ machine malfunctions
- Monitor process trends
- Store data for future quality auditing

Wireless:

- No installation costs
- Adding and removing sensors during operation
- Temporary placement for measurements

Features:

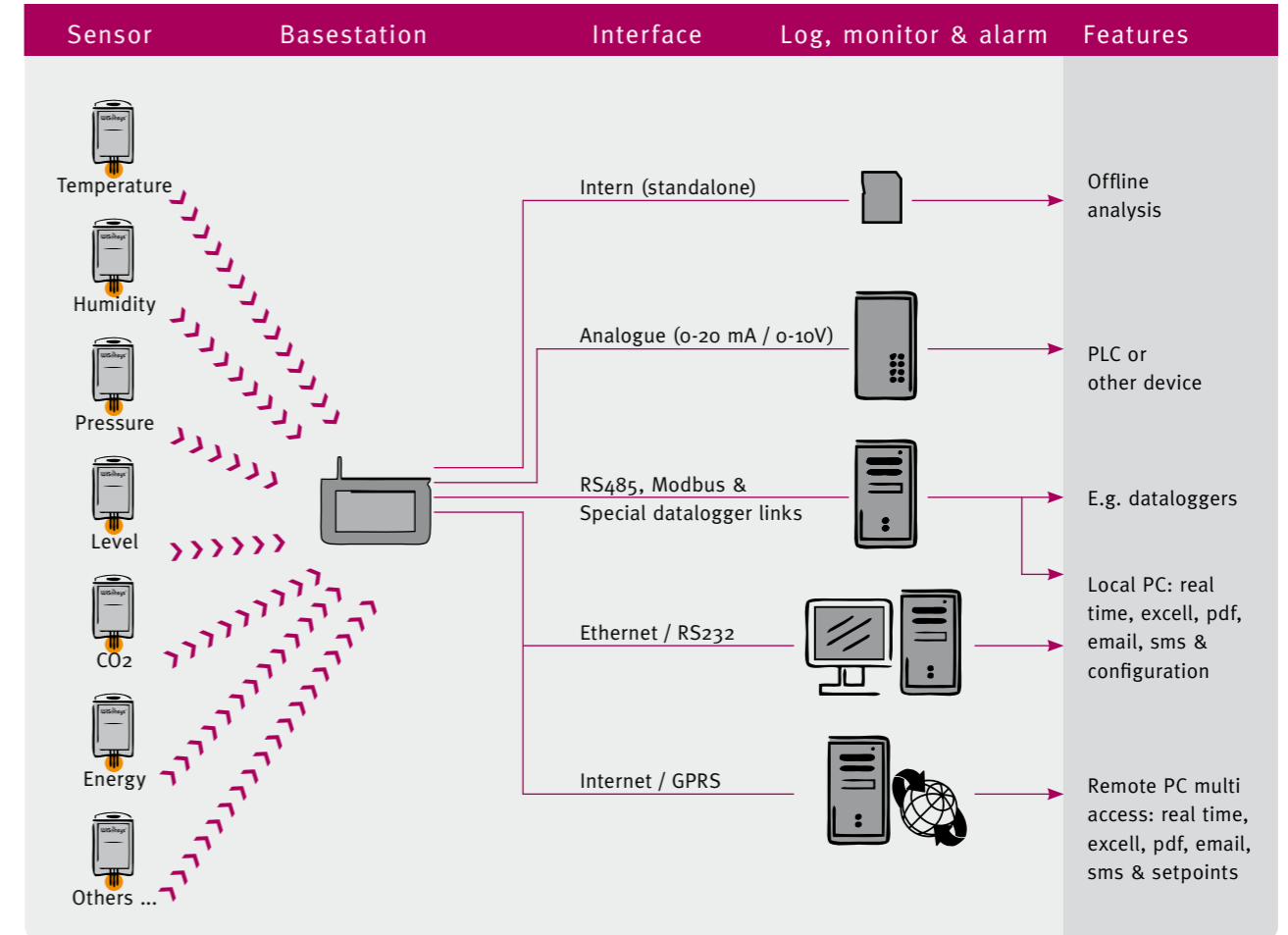
- 1-Minute installation time
- No data loss through data storage in sensor and base station
- Long battery lifetime through adjustable sample intervals
- Long range through advanced radio and antenna design

Standalone:

- Can be used without PC or datalogger connected
- Storage of data inside base station for later retrieval with SensorGraph

Range extension:

- Multiple base stations
- Use of external antenna on basestation and sensor



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TEMPERATURE SENSOR

The WS-DLT family members of Wisensys® measure temperature and transmit data to the base station.

Sensing is done using:

- An internal digital sensor integrated in the RF module electronics
- A PT100 or PT1000 sensor element
- A thermocouple

The intervals for sensing and transmission are set at installation. Values can be changed using SensorGraph running on a PC.

FEATURES

- Measurement of temperature conditions
- Ability to store 10.000 measurements; overwrites oldest data when full
- Programmable measurement interval
- Programmable transmission interval
- Attractive ABS enclosure
- Wall mounting possibilities included in enclosure
- Range: 1000 m with free line-of-sight
- Easy to add sensors to operational system
- PC software for installation
- User replaceable battery
- Variant with external antenna

Temperature WS-DLTi

Measurement range -20°C to +80°C

Sensor element Internal

Measurement accuracy +/- 0,5°C from -10°C to +80°C, +/- 1°C otherwise

Measurement resolution 0,2°C

Battery type 1 AA 3,6V Lithium battery

Life time 3-5 years

Housing IP 65

Temperature WS-DLTa

Measurement range -150°C to +200°C

Sensor element PT100, PT1000

Measurement accuracy +/- 0,1°C from 0°C to +100°C, +/- 0,3°C otherwise

Measurement resolution 0,1°C

Battery type 1 AA 3,6V Lithium battery

Life time 3-5 years

Housing IP 65

Temperature WS-DLTth

Measurement range Depends on sensor type/material

Sensor element Thermocouple K, J or S type

Measurement accuracy +/- 0,1% +/- 0,5°C

Measurement resolution 0,1°C

Battery type 1 AA 3,6V Lithium battery

Life time 3-5 years

Housing IP 65

COMBINED SENSOR T, CO2 AND RH%

The WS-DLT family has two special members being:

- The WS-DLTc sensor measuring relative humidity and temperature
- The WS-DLc sensor measuring CO2 level, relative humidity and temperature

Humidity / Temperature WS-DLTc

Measurement range

RH% 10% - 95% non-condensing

T -20°C - +80°C

Sensor element Internal

Measurement accuracy

RH% +/- 1,8% from 10% to 90%; +/- 4% otherwise

T +/- 0,3°C @25°C; +/- 0,5°C from 0°C to +50°C

+/- 1,2°C from -20°C to +80°C

Measurement resolution 0,1% RH, 0,1°C

Battery type 1 AA 3,6V Lithium battery

Life time 3-5 years

Housing IP 65

CO2 / Humidity / Temperature WS-DLc

Measurement range

CO2 0 ppm to 20.000 ppm

RH% 10% - 95% non-condensing

T -20°C to +80°C (see operating limits)

Sensor element Internal

Measurement accuracy

CO2 +/- 40 ppm + 3% of reading @22°C

RH% +/- 1,8% from 10% to 90%; +/- 4% otherwise

T +/- 0,3°C @25°C; +/- 0,5°C from 0°C to +50°C

+/- 1,2°C from -20°C to +80°C

Measurement resolution 1 ppm, 0,1% RH, 0,1°C

Battery type External power

For more information:
www.wisensys.com



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DIGITAL SENSOR

The digital sensor is part of the WS-DLX family of sensors. Sensing is done using an available sensor that provides a digital output signal. Digital sensors which can be applied are:

- Digital contacts
- Pulses

The intervals for sensing and transmission are set at installation. Values can be changed using SensorGraph running on a PC.

FEATURES OF THE WS-DLX FAMILY

- Measurement of analog input values
- Ability to store 10.000 measurements; overwrites oldest data when full
- Programmable measurement interval
- Programmable transmission interval
- Attractive ABS enclosure; other enclosures upon request
- Wall mounting possibilities included in enclosure
- Range: 1000 m with free line-of-sight

Contact sensor WS-DLXc

Type Contact closure, 1 channel
Measurement range Open / Close
Operating limits -20°C to +80°C
Power options
Battery 1 AA 3,6V Lithium battery
External 8 -24V DC adapter for connection to the grid
Housing IP 65

Pulse counter WS-DLXt

Type Pulse signal, 1 channel
Measurement range Max 10 pulses / second
Operating limits -20°C to +80°C
Power options
Battery 1 AA 3,6V Lithium battery
Housing IP 65



External housing



Battery housing

ANALOG SENSOR

Analog sensors (the WS-DLX family members), measure process signals and transmit data to the base station. Sensing is done using any available sensor that provides an analog output signal. This allows connecting many commercially available sensors that monitor a wide variety of measurement parameters such as flow, level, pressure etc.

Analog sensors which can be applied are:

- 4 - 20 mA
- 0 - 30V
- 0 - 4V
- 0 - 1V

Analog sensor WS-DLXa

0 - 25mA

Type Analog input, 1 channel
Measurement accuracy +/- 0,25% of range
Measurement resolution 25 µA
Operating limits -20°C to +80°C
Power options
Battery 1 AA 3,6V Lithium battery
External 8 -24V DC adapter for connection to the grid
External with switch Grid connection or user defined battery; sensor can be switched on/off
Housing IP 65

Analog sensor WS-DLX...

Type Analog input, 1 channel
Measurement range WS-DLXv: 0 - 30V
 WS-DLXs: 0 - 4V
 WS-DLXm: 0 - 1V
Measurement resolution WS-DLXv: 0 - 30mV
 WS-DLXs: 0 - 3mV
 WS-DLXm: 0 - 1mV
Measurement accuracy +/- 0,25% of range
Operating limits -20°C to +80°C
Power options
Battery 1 AA 3,6V Lithium battery
External 8 -24V DC adapter for connection to the grid
External with switch* Grid connection or user defined battery; sensor can be switched on/off
Housing IP 65

* not implemented for WS-DLXm



Battery housing



External housing



ENERGY SENSOR

The members of the WS-DLR family measure energy usage and transmits data to the base station. Sensing is done on any device connected to the power outlet of the sensor.

In the WS-DLRc version all external connections are done through easily reachable connectors on the outside of the sensor. The device to be measured must run at 230V using a maximum current of 10A. The sensor is equipped with 3 independently operable switch-relays. With this feature the device connected to switch-relays can be switched on/off using a command from the basestation.

With the WS-DLRs version sensing is done on any device plugged into the power outlet of the sensor. The device to be measured must have a regular EU Power connector and run at 230V using a maximum current of 10A. The sensor has an on-board switch-relay which can be switched on/off using a command from the base station.

With the WS-DLXp version sensing is done for 400V, 3 phase electrical systems. The sensor system consists of 3 current transformers (one fo each phase), a KWh meter generating pulses and the WS-DLXp for calculating and transmitting the energy usage.

The distance between sensor and base station can be up to 1000 meters in case of free line-of-sight. Characteristic in-building range values are between 50 and 80 meters.

FEATURES

- Measurement of energy usage;
 $U * I * \text{COS}$ (active power)
- Programmable measurement interval
- Programmable transmission interval
- Range: 1000 m with free line-of-sight
- Easy to add sensors to operational system
- PC software for installation

Energy measurements WS-DLRs



Type Electrical energy usage
Sensor type Internal resistor
Electrical grid voltage 230V AC / 50 Hz
Electrical grid max current 10A
 Caution! More than 3 kW will destroy the device
Measurement accuracy +/- 1% of range
Operating limits 0°C to + 60°C
Housing IP 40

Energy measurements WS-DLRc

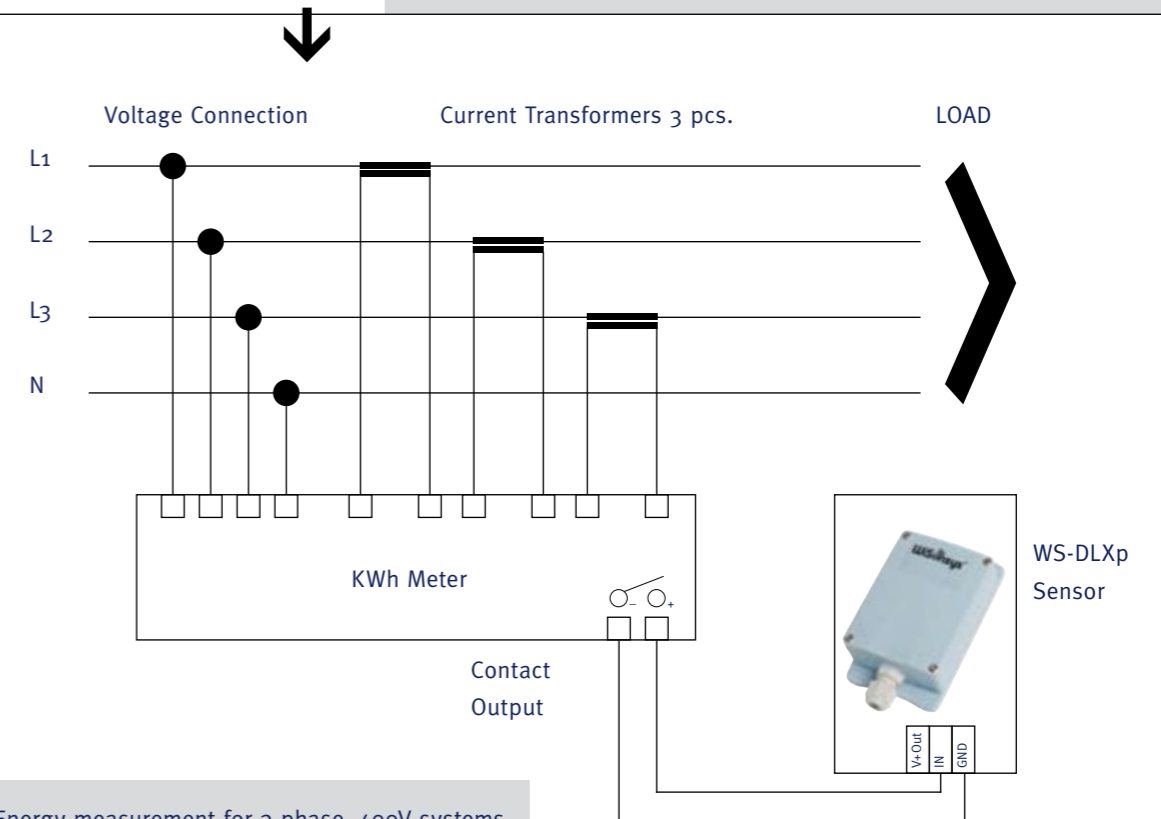


Type Electrical energy usage
Sensor type Internal resistor
Electrical grid voltage 230V AC / 50 Hz
Electrical grid max current 10A
 Caution! More than 3 kW will destroy the device
Measurement accuracy +/- 1% of range
Operating limits 0°C to + 60°C
Housing IP 40

Energy measurements WS-DLXp



Type Pulse sensor, 1 channel
Sensor type External; kWh meter with pulse output
Pulse rate WS-DLXp Max. 10 pulses / seconds
Electrical grid voltage Depends on selected kWh meter / 1 and 3 phase
Electrical grid max current Depends on selected kWh meter
Measurement accuracy Depends on kWh meter
Operating limits -20°C to + 80°C
Housing IP 40



Energy measurement for 3 phase, 400V systems using current transformers, a KWh meter and the WiSensys® sensor for data transmission.



BASE STATION LOCAL AND INTERNET APPLICATIONS

Base stations receive data from a large variety of WiSensys® sensors. Sensor values are sent by the receiving base station to:

- WiSensys® PC software SensorGraph via a serial interface or to WiSensys® internet Websensys via TCP/IP or GPRS
- Or to a data logger, PLC, automation system via RS485/422
- Or in case the base station is equipped with an analog output module the values can be forwarded as analog signals (max 4 outputs) to a data logger or PLC system.

The distance between sensor and base station can be up to 1000 meters in case of free line-of-sight. Characteristic in-building range values are between 50 and 80 meters. If the coverage area of 1 base station is not enough, additional base stations can be used to increase the coverage area. Base stations can be networked to collect all measurement data on 1 location.

The internet application offers the possibility to connect base stations on different sites.

When sensors are configured with alarm thresholds, the WiSensys® base station can power a switched relay to activate a system alarm. Detailed information has to be obtained via SensorGraph or via Websensys.

FEATURES

- Receiving data from WiSensys® sensors
- Forwarding data to connected PC, data logger, PLC system or internet
- Optional SD card storage; overwrites oldest data when full
- Wall mounting possibilities included in enclosure
- Range: 1000 m free line-of-sight
- Analog and digital interface possibilities
- Up to 100 sensors can be connected

Basestation WS BU-rs232

LOCAL

Function Base station, RS232 output
Operating limits -20°C to +60°C
Power 8 - 30V DC
Network 100 sensors
Protection Username and password
Configuration Through WiSensys® SensorGraph
Data destination PC with SensorGraph
Housing IP 40

Basestation WS-BU-rs485 with RS485 I/O

LOCAL

Function Base station, RS485 output
Operating limits -20°C to +60°C
Power 8 - 30V DC
Network 100 sensors
Protection Username and password
Configuration Through WiSensys® SensorGraph
Protocol MODBUS@110 bps - 230 kbps
Memory Optional on SD Card
Alarm Replay Available 2A / 30V; 0,5A / 100V
Data destination Data logger, PC with SensorGraph
Housing IP 40

Basestation WS-BU-ana with analog I/O

LOCAL

Function Base station, analog output
Operating limits -20°C to +60°C
Power 8 - 30V DC
Network 4 analog outputs; max. 100 sensors
Protection Username and password
Configuration Through WiSensys® SensorGraph
Alarm replay Available 2A / 30V; 0,5A / 100V
Measurement range 0-25 mA or 0-10V (selectable)
Measurement accuracy +/- 0,25% of range
Data destination PLC or equal, PC with SensorGraph
Housing IP 40

Basestation WS-BU-ethernet-01/03 with Ethernet I/O

LOCAL AND INTERNET

Function Base station, Ethernet output
Operating limits -20°C to +60°C
Power 8 - 30V DC
Network 100 sensors
Protection Username and password
Configuration Through WiSensys® SensorGraph
Memory Optional on SD Card
Alarm replay Available 2A / 30V; 0,5A / 100V
Data destination
 01 version PC with SensorGraph
 03 version Internet address
Connection Ethernet; auto-detect 10/100 Mbps, RJ45 Programmable net mask, gateway and DNS server
IP configuration Static, DHCP
Housing IP 40

Basestation WS-BU-gprs with GPRS I/O

INTERNET

Function Base station, GPRS output
Operating limits -20°C to +60°C
Power 8 - 30V DC
Network 100 sensors
Protection Username and password
Configuration Through WiSensys® SensorGraph
Data destination Internet address
Connection GPRS link; Programmable APN
Housing IP 40



For more information:
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USERINTERFACE for WiSensys®

For presentation, logging, alarming etc. in WiSensys® the user has two options. He can select a local PC version called **SensorGraph** or a web based application called **WebSensys**.

SensorGraph will be installed on a PC and is meant for monitoring on one location. Although more base stations can be connected most of the applications will work with a system containing one base station and a number of sensors. WebSensys will be used in case monitoring is required on more locations and by different users. The WebSensys database may contain data from different users and different sites.

Both SensorGraph and WebSensys have possibilities for:

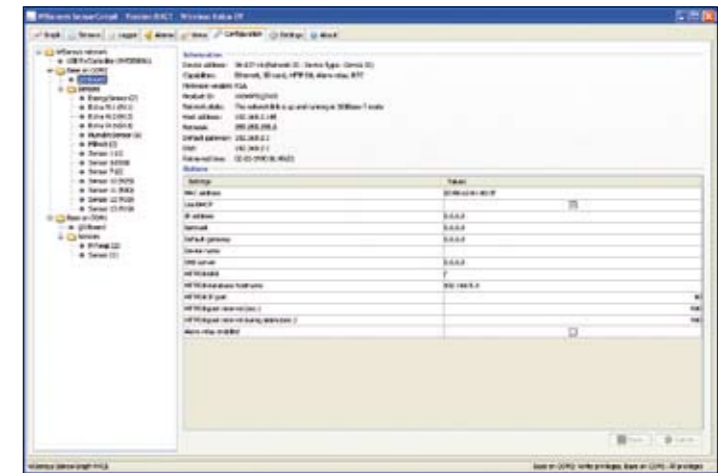
- Presentation real time data in graphical form
- Presenting historical data in graphical form and tables
- Generating alarms via e-mail and sms services
- Recovering of data from sensor memory and SD card in the base station
- Creating user-defined graphs and enhancements to graphics and tables using data from the open database, such as MySQL and PostgreSQL.

SensorGraph is used for installation of the WiSensys® system. Pairing of sensors to the base station, define settings for sample time, friendly name, calibration values and other specific sensor values is possible SensorGraph also presents software and hardware version identification.

SensorGraph

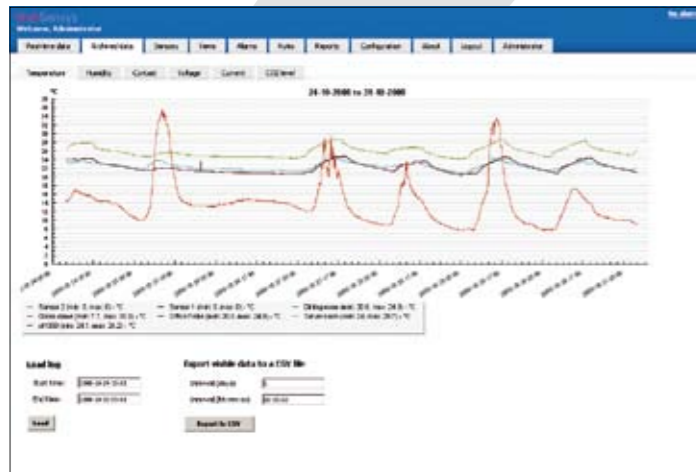


Displaying logged temperature data.



Configuration of WiSensys® network.

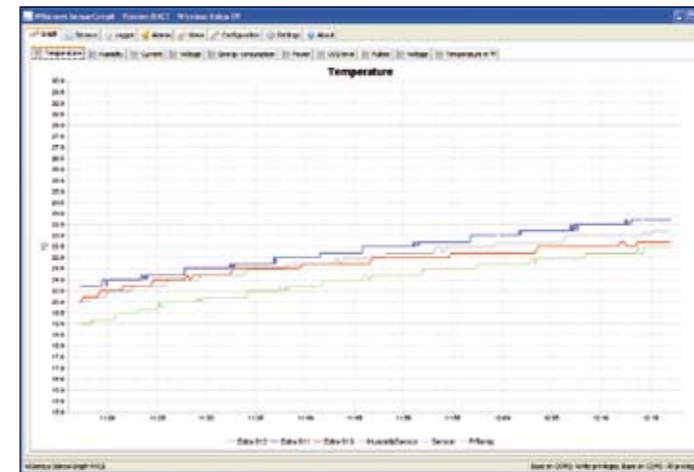
WebSensys



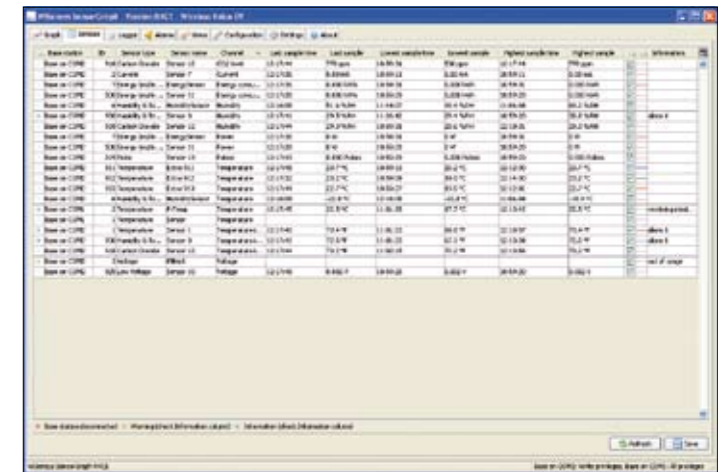
Displaying logged data.



Rules can be defined for remote on/off switching of connected equipment.



Realtime values.



Survey of sensors.

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APPLICATIONS

Cool and freeze systems

Monitoring of temperatures in cooling and freezing units is of importance for controlling food quality from field to fork. In the total food chain from harvesting to transport, food preparation and consumption, strict governmental rulings (HACCP) describe the temperature monitoring. With WiSensys® a wireless measurement and alarm platform is offered for monitoring temperatures in cooling and freezing units for 7 days a week, 24 hours a day. It offers the customer financial and qualitative benefits. The return on investment is less than a year and it offers a database of easy accessible measurement data which can be used as evidence for HACCP audits.

Climate conditions in schools, offices and greenhouses

The WiSensys® platform offers a sensor for measuring temperature, relative humidity and CO₂. These three quantities determine to a large extent the quality of the internal climate conditions. The Dutch organization of applied scientific research (TNO) has proven that environmental conditions determine to a large extent the quality of life. Results in schools and offices are improving

significantly with healthy environmental conditions. The harvest in greenhouses can be substantially increased as soon as the owner has a better knowledge of the micro-climate in his greenhouse.

Energy saving and consumption

Reducing energy consumption is important for the environment and in general brings financial benefits. Insight in the energy consumption offers the possibility to allocate cost for energy usage. The WiSensys® platform contains a family of sensors for measuring electricity consumption, both for 1-phase (<10 A) and 3 phase (>10 A) systems. It offers the possibility for switching on/off equipment with energy savings as result. Measurements in cooling units in supermarkets show that energy conservations up to 30% can easily be achieved.

Process monitoring in industry and transport

Process monitoring is important for efficient and safe operations in industry. Wireless sensors offer here so-called plug and play possibilities with short return on investment times. WiSensys® sensors transmit measurement data wirelessly to

a central base station (receiver). This base station can be connected to existing, available equipment such as data loggers (running MODBUS protocol), a PC or through an analogue board in the base station to a PLC system. Measurement data can also be stored in a database and is easy accessible through the internet.

Laboratories and data acquisition

In laboratories testing is done for product releasing, product certification, product quality assurance etc. During testing it is not only important to monitor and collect data but also to store it for future use. Wired sensors require cables with associated time consuming installation work and these cables may disturb the unit under test. WiSensys® offers the possibility for stand alone (temporarily) installation of sensors and base stations. It can be done easily and with low cost. Measurement data is stored on a SD card in the base station. This data can be loaded to a PC for analyzing and storage after the measurements have been finalized.

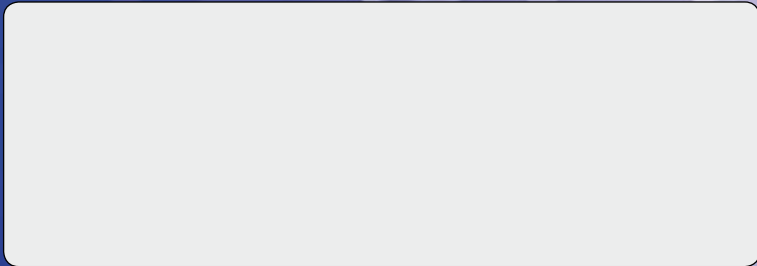
Quality and Condition Monitoring

Processes in industries are being controlled by highly integrated measurement and control systems. Operators rely on these systems. Sometimes it is necessary to install (temporarily) sensors to verify the proper functioning of these complex systems. Also condition monitoring of machineries and equipment can prevent costly standstill losses. Preventive maintenance can be planned and thereby cost can be reduced. Installation of the WiSensys® wireless sensors makes it possible to monitor processes and to collect data in a cost effective way. Furthermore it makes data collection on moving and rotating equipment possible.

Process monitoring on moving machine parts

Wireless sensors offer the possibility to place sensors on moving parts of machinery. Process monitoring and control for machinery in agriculture, dynamic balancing of ship shafts, measurement of temperatures, vibrations and lubrication film thickness in roller bearings are all examples of the strength of wireless information transfer.





WISSENSYS WIRELESS MEASUREMENT PLATFORM

