GesySense®

The Wireless Sensor System

Fits anywhere

Sturdy wireless sensor modules
with long lasting batteries

For stationary and mobile usage

Suited for freezer temperatures

Easiest installation
and set-up

Flexible connection
to control systems

Gesytec

Contents

Wireless Measuring

Data Recording – Flexible and Easy

Cordless data acquisition and device monitoring via radio is effortlessly achieved with GesySense®. Continuously capture temperature and meter values by cordless sensor modules via radio and ensure permanent logging of system status with wireless status indicators.

Due to the use of battery operated sensor modules and radio transmission between measuring point and data capturing device a continuously up-to-date data capturing can be realized without much installation effort or risky interventions into existing systems. In addition, this also allows for easy and fast modification of the sensors' measuring spots.

Currently GesySense® sensors meet the following demands:

- Recording of ambient temperatures
- Spot measurement of temperatures using PT1000 probe
- Recording of relative humidity
- Capturing pulse counters
- Reading digital inputs
- Setting digital outputs
- local control with relay switching

In their Logger version the wireless modules archive measured values internally. Triggered by an external signal they radio transmit the values. This qualifies GesySense® for mobile applications and usage in shielded environments.

The broad variety of possible application requirements the GesySense® wireless sensor network meets with flexible system concepts. Depending on the needs measured data can be used locally or in the central systems of distributed structures. For implementation different receivers, repeater and software for data capturing, network and sensor management are available.

Wireless remote monitoring easily becomes a reality.

Easy is a Must!

It's a matter of retrofitting when the obligations related to monitoring of the cold chain set new requirements. And – it should be integrated without much effort into existing systems. However, if the handling is complicated this could result in errors caused by wrong operation. Thus easy installation and handling are a must!

Reliability is a Must!

Any proof requires the data to be safely captured, archived and accessible upon request. A system separated from the operative control system offers the independence each monitoring system should provide – from measuring to independent supply. It has to be reliable in operation and for documentation!

It should have an Additional Benefit!

Can I benefit, further to complying with the official regulations, from an additional system? Does data evaluation provide conclusions related to energy consumption, failure causes and optimization potential? Is there an econimic advatage, e.g. by saving time? The system should provide an additional benefit!

GesySense got it!!

The Benefits:

- Wireless sensor modules
- Long lasting battery
- Broad coverage within buildings
- High sensor density
- Loggers for mobile application
- Continuous up-to-date data
- System independent recording
- Easy installation and start of operation

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Flexible Usage

Applicable in all industries

Where built-in measuring systems are not available, a radio based system provides the ideal solution for re-fitting. GesySense® wireless Thermo-Sensors are a snap to set-up fast and can, if necessary, be used flexibly at different locations. Radio-based digital modules report device failures or capture metering pulses. Actual values are available; the parameters of optimization can now be set.

Optimize Consumption by Continuous Measurement

Cooling devices are electricity hogs. In terms of environmentally friendly energy use and economic requirements they should be operated as close as possible to the limit.

From laboratories to gourmet restaurants, from food technology plants to retailers – cooling devices are used everywhere and they consume energy. The efficiency of use frequently remains in the dark. At this point the correlation of consumption profiles with actually measured temperature values provides saving potentials.

Data from Every Corner of the Building

Building management systems operate based on measured values. Additional installations are required when old systems are to be extended by new functions. Radio based measuring considerably reduces the required effort. Monitoring of system status, the counting pulses of a meter, the temperature within a part of the building – GesySense® wireless modules capture all this without extensive cabling.

Check Measuring in the Storage Area

Are the goods stored at the correct temperature? Not everything is that crucial to need permanent monitoring. However, if something delicate happens to be stored in a non-air conditioned room, a wireless temperature sensor is at your fingertips in no time at all. Based on its data, continuous protocols and monitoring of limit values are no problem.

Mobile usage in vehicles

Transported between warehouses or delivered to the front door, frozen food requires cold chain monitoring. With the records of an accompanying data logger or with intelligent wireless GesySense® modules additionally taking care of the cooling you are on the safe side.

GesySense®
The Wireless Sensor Network

Overview on the Radio System

System Structures

Wireless Modules

Network Components

Low Power Devices

Secured Communication

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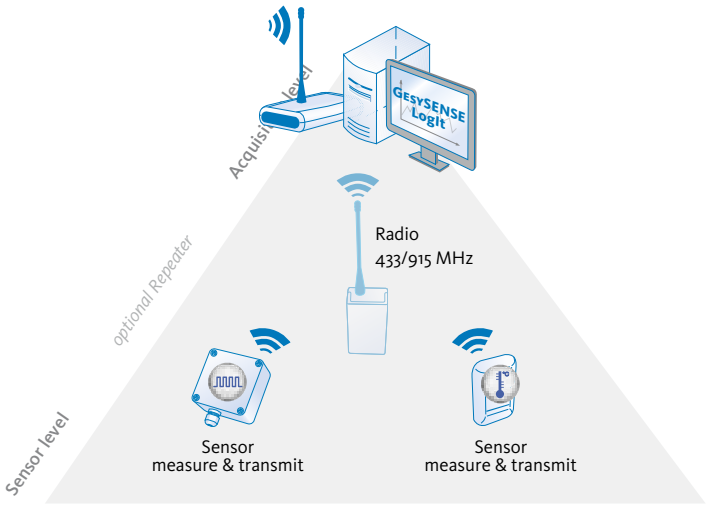
GesySense® – The Wireless Sensor Network

Measuring, Messaging, Recording, Making Available

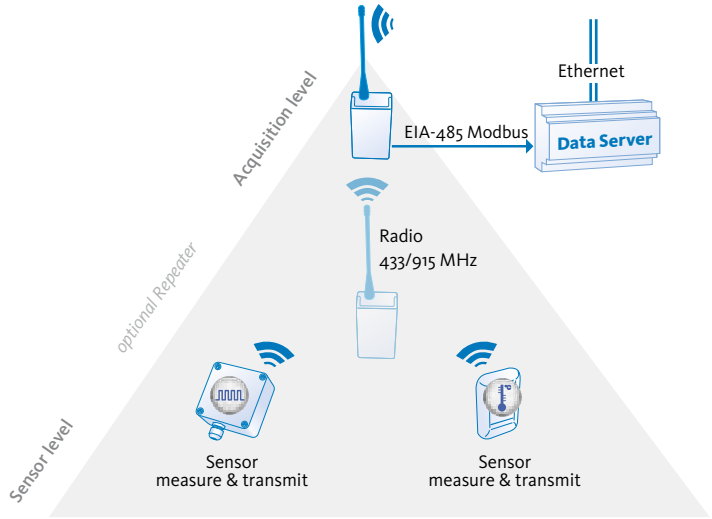
The battery operated GesySense® wireless modules measure temperatures, accumulated counter pulses or capture the status of a connected contact in fixed intervals. The measured value is immediately radio transmitted including sensor ID and a timestamp.

Where to? Well, there are several solutions in the GesySense® wireless sensor system. Here are some network structures for stationary installation. Structure 3 can additionally operate with mobile modules.



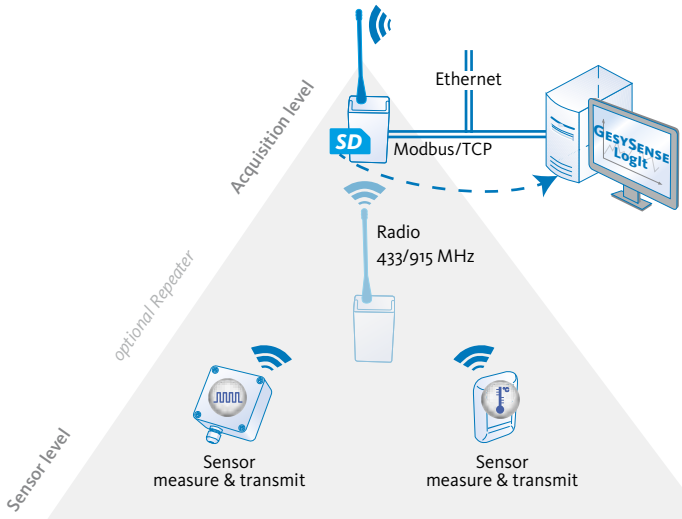
1. Direct connection to a PC

The simplest system: A PC with wireless adapter and the GesySense® LogIt software can directly record the data.



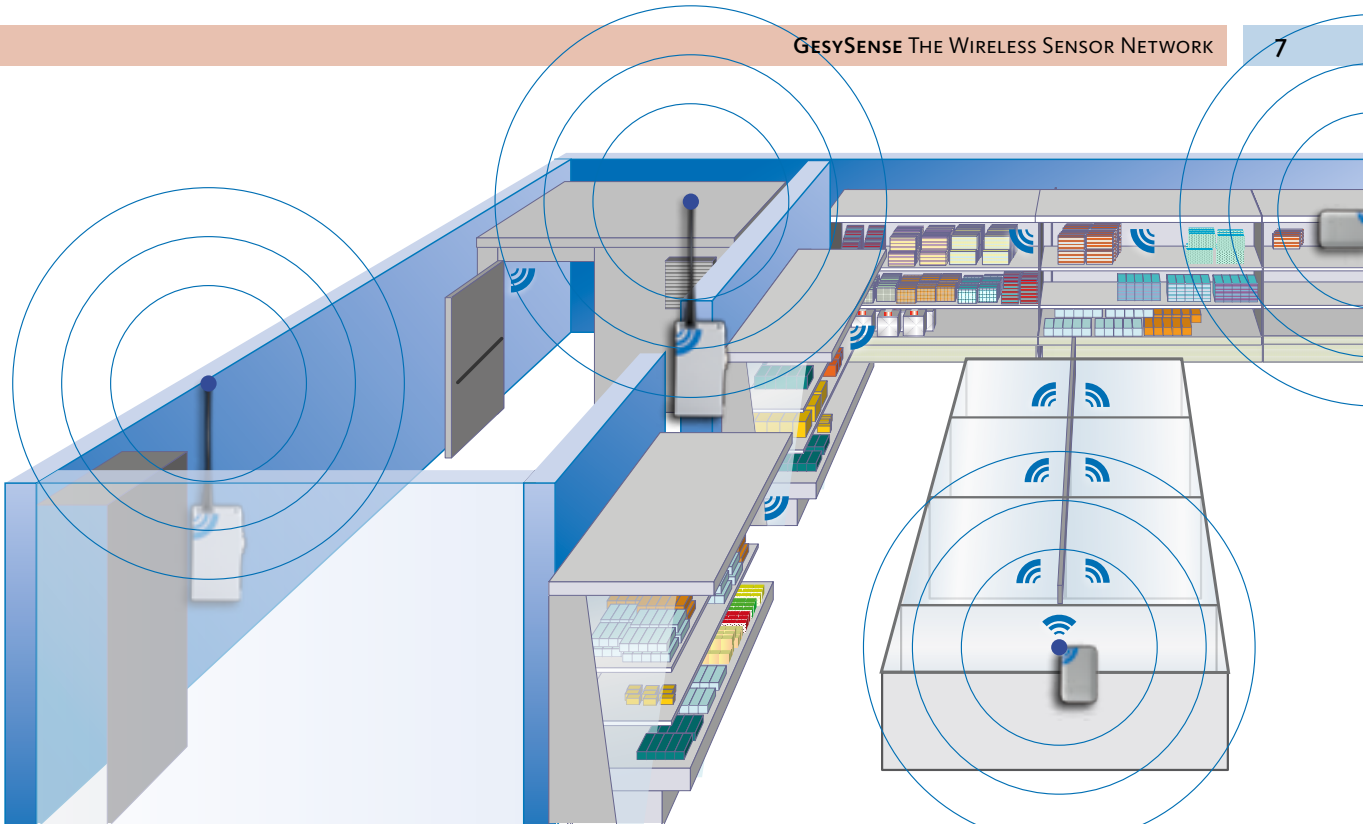
2. Transfer to other systems

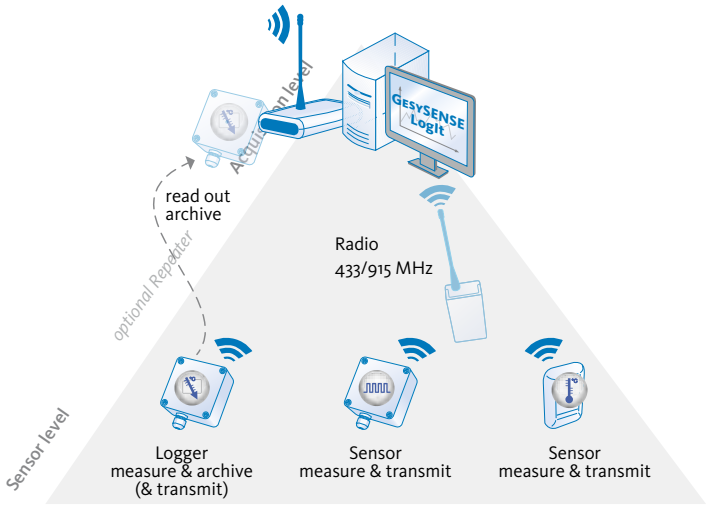
If the GesySense® Receiver is connected to a networked data server, e.g. a Delta 2000, all messages are transferred immediately to it (Modbus protocol). Other systems, local ones or the servers of superior data centers, can access the data there. Devices from different brands can be used here.



3. Transmit to networked Receiver

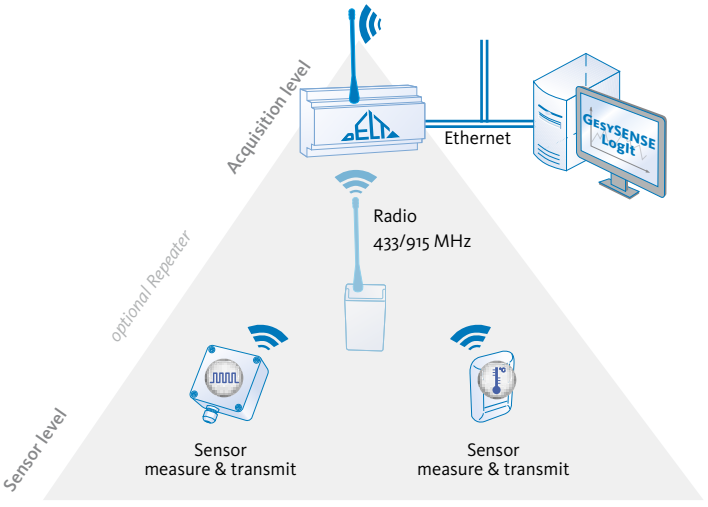
The GesySense® Receiver \LAN provides measured date via Modbus/TCP. An SD card stores them additionally in an archive. Ftp and http access via Ethernet can be used.





4. Measure, store and send on request

GesySense® loggers correspond to the wireless sensors, but additionally provide local memory. The values measured regularly are stored in the module but can be radio transmitted at measuring time as well. This ensures a continuous documentation of the temperature. The archive is later read out by short range radio connection. Either the module is exchanged with another one and sent to the respective station or reading out is done on-site. Thus the temperature record can be checked any time.



5. Direct connection to Delta 1000 GesySense

A Delta 1000 device by Gesytec fitted with a GesySense® receiver module collects all measurement messages. From this device data is available for browser access or transfer to other systems.

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All-In-One Sensors

Measuring Around the Clock

GesySense® wireless modules are encapsulated measuring and radio units with internal antenna, powered by a 3.6 V AA battery.

Currently the following device types are available:

- Thermo-Sensor/-Logger for measuring of ambient temperature in the range of -35 °C – +70 °C (-31 °F – +158 °F)
- PT1000-Sensor/-Logger for spot measurement of temperatures in a maximum range of -99 °C – +319 °C (-146 °F – +606 °F)
- Digital-Sensor/-Logger to read digital input as
  - Status-Sensor or
  - Counter-Sensor as pulse counter up to 20 Hz
- Sensor-Actuator-Module for spot temperature measurement with digital input and switching output
- Thermo-Humidity-Sensor/-Logger to measure ambient temperature and humidity

This is completed by modules for mixed input signals.

Sensors and Loggers

GesySense® wireless sensors measure and transmit the values to the central receiver at a defined time cycle. In addition to these sensor modules loggers are available. The logger modules store measured values locally. The size of the fail safe memory is, e.g. in case of the Thermo-Logger, compliant with DIN EN 12830, i.e. based on the measurement cycle required therein data of 1 year can be recorded. The stored values can be read out and presented using the GesySense® LogIt software. Along with the local storage measured values can be transmitted immediately in the way the sensors operate.

Communication on 2 Frequencies

GesySense® sensors combine measurement and ISM band radio transmission in a single module. Different versions for the European 433 MHz band and the American 915 MHz band are available. A short range receiver operating in the 13.56 MHz ISM band is additionally integrated, used for module configuration and to trigger data read-out of logger modules.

The antennas of both radio systems are integrated in the module. Within the standard network frequency band (433/915 MHz) the modules transmit with the usual coverage of approximately 250 m. To ensure reception of the configuration data, the GesySense® Configurator, the transmitter/receiver used for commissioning, must be located close to (<10 cm) the module.

GesySense® wireless modules

GesySense	°C	ON / OFF or pulses/min	%RH
Thermo-Sensor Thermo-Logger			
PT1000-Sensor PT1000-Logger			
Digital-Sensor Digital-Logger			
SAM 2PT-1D-1R			
T-H-Sensor T-H-Logger			
T-2D-Sensor T-2D-Logger			
T-PT-1D-Sensor T-PT-1D-Logger			

GesySense® - inconspicuous and quickly mounted

The Wireless Modules

Batteries for low Temperatures

Long-Lasting Battery

The energy concept of the sensor modules aims at an extreme serviceable life of the batteries – especially at low temperatures. Once put into operation, an operating period of 5 years is granted. This is based on the short 4 ms transmission pulse and a reasonable measuring interval of 4.5 minutes. The theoretical serviceable battery life of a Thermo-Sensor realizing measurements within a range of around -25 °C is approximately 10 years. It goes without saying that the influence of the ambient temperature and the measuring interval is crucial to the serviceable life. The durability at room temperature is even better.

In order to be informed about the actual battery status at any time, the value of the battery voltage is added to the messages from a sensor. If required by the operating situation a change of battery can be made at any time.

Temperature Measuring without Drift

The accuracy of the temperature measuring depends on the long-term accuracy of the used test circuit. GesySense® uses a temperature sensor which doesn't require a recalibration within the scope of the intended use and the indicated measuring accuracy.

With 0.1 °C the wireless temperature sensor provides a high resolution. A comparison of the plots of the outdoor temperature and a measuring spot inside the building shows the sensitivity of the Thermo-Sensor. The variation of daytime temperature of 1 degree is clearly reflected in the course of the temperature.

Convenient Housings

Against splash water and dust the electronics is protected by IP 64 or IP 66 housings. In addition the electronics are sealed with a nano-coating against humidity and condensed water, as well as against acetone or benzenes.

Two types of housings are used for the GesySense® sensors and loggers: a box shaped enclosure for wall mounting and a flat housing.

The flat housings are used for modules measuring ambient temperature. The material is rigid, scratch-resistant and features a good dimensional stability. Even under low temperatures it possesses a high impact resistance. Being washable and sterilizable, it is perfectly suitable for the use in food processing and especially in refrigeration units.

For mounting a bayonet adapter is used. It is screwed on the measuring spot and the wireless module is snapped-on at the adapter. A tool is required to open the interlock in order to avoid the devices being removed. Thus the GesySense® modules can also be used in public areas.

An assembly plate is available if shifting of mounting spot relative to the measuring point is necessary.

The box enclosure is usually used for modules requiring external connections. Glands ensure the necessary imperviousness to connect PT1000 probes or those for digital signals. The material is of course suited for the low temperatures for which the GesySense® system has been designed.

The Wireless Modules

... measuring – sending – pausing – measuring ...

Thermo-Sensor

The GesySense® **Thermo-Sensor** measures the ambient temperature and radio transmits it. The measuring range is from -35 °C to + 70 °C. Within this range the radio system adapts to the environmental conditions; thus a temperature related drift of the emitter is of no concern.

The module is also available as **Thermo-Logger**. Its DIN EN 12380 certificate allows application according to regulation EC 37/2005 on the monitoring of temperatures in the means of warehousing and storage of quick-frozen foodstuffs.

PT1000 Modules

PT1000-Sensor and **PT1000-Logger** are two modules for spot measuring temperatures. The module captures temperatures measured by a PT1000 probe. In the range of -40 °C to +40 °C an accuracy of <1 °C is reached. Technically the module is prepared for a measurement range from -99 °C to +319 °C. The IP 66 enclosure for wall mounting comprises battery, measuring electronics, radio transmitter and, in loggers, local memory. Commissioning and read-out are done using the GesySense® Configurator and the LogIt software.

Digital Modules

The sensor module with 2 digital inputs offers two alternatively usable modes of operation: Status monitoring or pulse counting. A logger version is available as well.

Status-Sensor

The GesySense® Status-Sensor realizes the status monitoring of devices and system parts such as they are signalized by a notification relay. It captures the status at each of its two connections and transmits them in a defined interval. To prevent "oscillating" contacts to generate false alarms, a status must exist for a minimum time to be considered valid.

Counter-Sensor

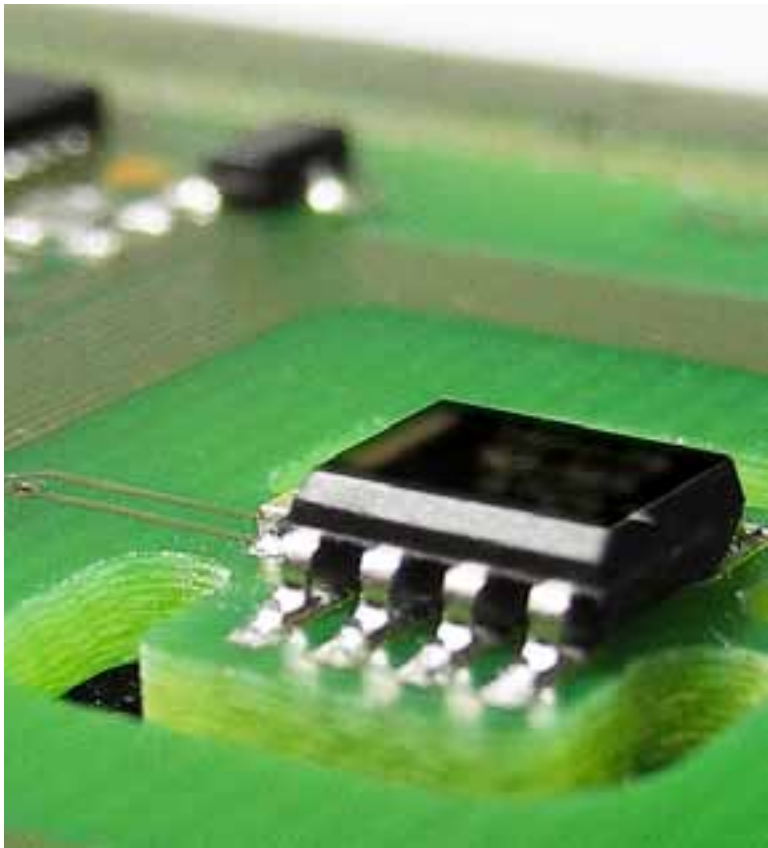
With its two digital inputs the GesySense® Counter-Sensor counts pulses with a frequency of up to 20 Hz and locally stores and transmits them. Thus it can be used to capture consumption values.

Mixed-Signal Modules

If different signals have to be captured in one spot, mixed-signal sensors are at hand. Measure the ambient temperature while monitoring a door or recording the humidity. The T-2D-Sensor, e. g., offers the combined functionality of Thermo-Sensor and Digital-Sensor. Measurement of ambient and spot temperatures along with a digital input is provided by the T-PT-D-Sensor. Of course the modules are available in a logger version as well.

Sensor-Actuator-Module

Especially designed for mobile usage this module features a receiver. Thereby the implemented control is parameterized, a relay can be switched, and data archives can be read on the operating frequency (433 MHz) triggered by radio command. Offering temperature recording, monitoring of the power supply, a digital input and output, with an internal control working with this information, this is a complex device for special tasks.



Network Components

Receivers for all Situations

At the center of the wireless sensor network must be a receiver. GesySense® is offering different solutions. (cf. pages 6/7)

Receiver/Repeater

The GesySense® Receiver/Repeater is a device for different use. Usually the **Receiver** directly gets the messages from the wireless modules and transmits them via serial connection to a data server.

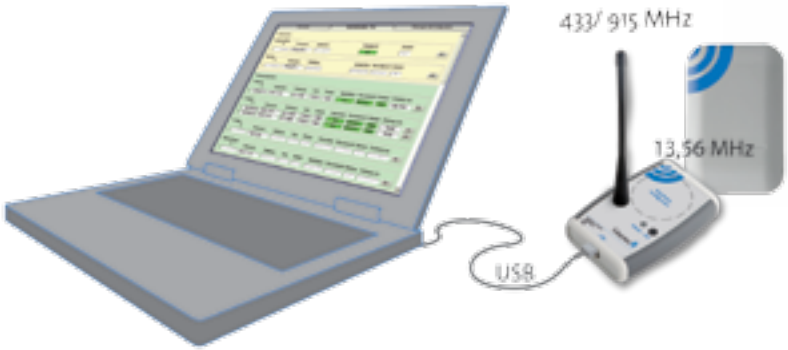
In case of longer distances or poor reception conditions, the device is used as **Repeater** in the communication line (even consecutively) to receive the messages of more distant devices and to forward them.

From a control center, GesySense® Receivers and Repeaters can be provided with new firmware via the data server; thus they are open to future system extensions.

Receiver \LAN

This receiver connects the GesySense® system to other systems by Ethernet. The Modbus/TCP protocol is used in data communication. The device also provides a serial EIA-485 connection like the Receiver/Repeater as well. Measured data is recorded on a micro SD card. These data can be accessed through FTP. A switching output can be used for special applications, e.g. an alarm signal.

The GesySense® Receiver \LAN displays the current values in its web interface. Using a common browser you can always keep an eye on it.



Configurator

The GesySense® Configurator is a PC – wireless adapter connecting the PC to the radio network via USB. In the wireless sensor network it is the receiver for PC based applications. Generally it is the configuration interface for sensors and loggers. Therefore the device operates at the usual network radio frequency of 433/915 MHz and with the near field frequency of 13.56 MHz to transmit configuration data to the wireless modules.

Delta 1000 GesySense®

Receiver and data server in one: the Delta 1000 GesySense® combines both functionalities. Thus it presents a compact and reliable device as data center of the GesySense® wireless sensor network.

- Wireless data capturing
- Data server
- On line access to current values
- Alarm generator

The Delta 1000 can be directly accessed using a web browser, for configuration, or reading current measured values and other information about the wireless network. Archived values can be read out to a PC via FTP using the GesySense® LogIt software. This can be done spontaneously or following a schedule.

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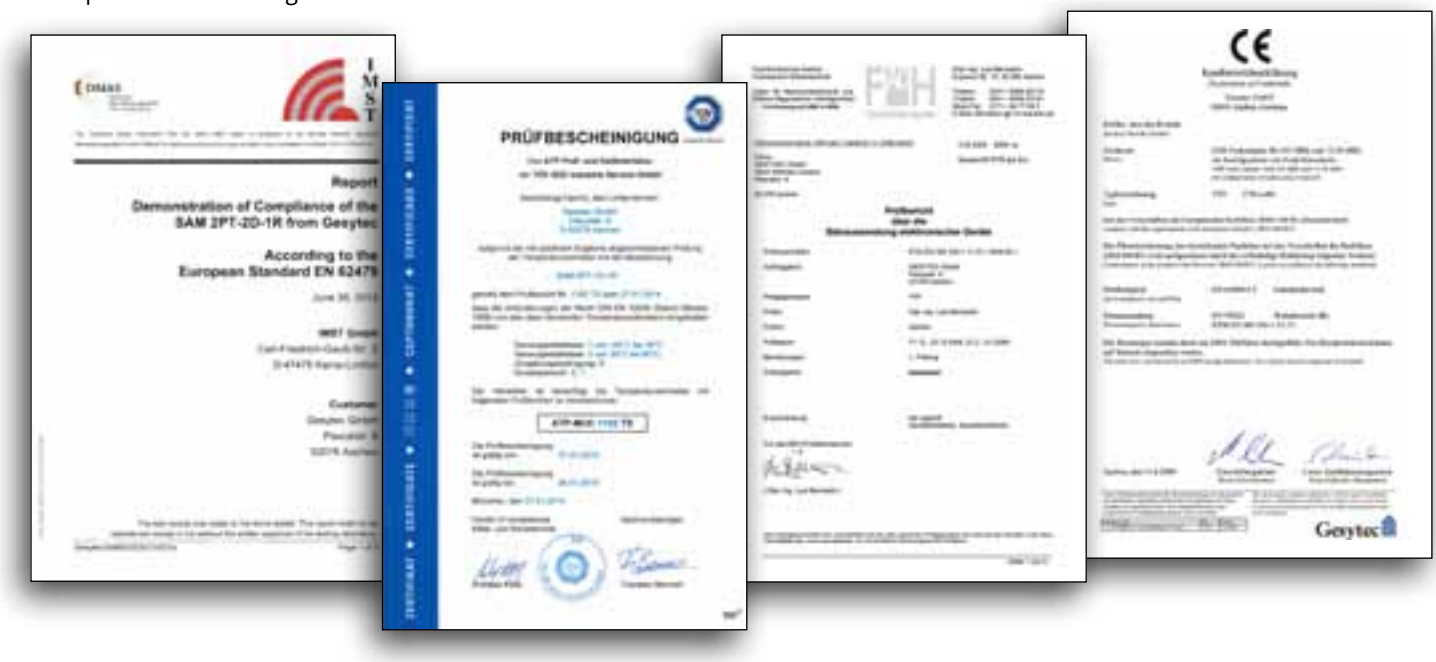
Low Power Devices

Broadcasting Within the ISM Band

The GesySense® wireless sensor system uses low power devices with a maximum power output of 10 mW in compliance with the International standard and operates, in Europe, within the 433 MHz ISM Band (industrial, scientific, and medical band). In America the system operates in the 915 MHz ISM band.

Each radio component of the GesySense® System is assigned an individual, unique 10 digit identification number (ID). Thereby all devices can be clearly identified at any time.

With the use of the 433/915 MHz bands the system provides a better penetration of solid matter than systems operating at higher frequencies. Therefore GesySense® is especially suitable for operation in buildings.



Secured Communication

Usually communication within the radio sensor system goes from the sensors to the receiver, if necessary, via repeaters.

Each GesySense® component is provided with a unique, inalterable ID which, together with a consecutive message number, is an integral part of each message. There is as well an identification of the radio system itself. Further to those data and the measured values the messages include a checksum to secure the transmission.

Transmission takes place as a short pulse in the set time interval on the radio channel set during commissioning. In order to avoid collisions with the transmissions of other sensors, the precise moment is determined by a random process.

The signal is either directly read by a receiver or by a repeater located within the transmission path. These receive the signal on one channel and transmit it. The transmission to a receiver can run via several repeaters.

The first receiving device within the transmission path completes the messages with additional information:

- Time stamp,
- Received field strength,
- Transmission quality,
- Battery status,
- Network ID of any potentially used repeater.

Altogether this is ample information to assess the stability of network operation.

Another safeguard of operation is the network identification. This parameter, settable by Gesytec, ensures that only messages of the same identification are accepted by a receiver. This allows operation of neighboring networks, which may even be run by different owners.

GesySense® in Operation

Easy Data Collecting and Documenting

Scenarios of Operation

At the Supermarket

GesySense® Mobile

Putting into Service

Data Server

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Continuous Measurements via Radio

Independent Data Collection Made Easy

- Temperature profiles from chillers
- Documentation of storing temperatures
- Measurement of core temperatures
- On transport temperature recording
- Meter capturing for consumption billing
- Device failure monitoring
- Access control
- Switching dependent on measured values

And everything cordless!

Radio transmission and batteries allow for the flexibility in usage of the GesySense® system. Logger modules with capacities of more than a year enable operation even outside the receiver's range.

- Uncomplicated retrofitting
- DIN EN 12830 certified modules
- Low installation effort
- No interference with existing systems
- Independent monitoring system
- Open data format

Designed for quick and easy retrofitting of data acquisition the GesySense® wireless sensor system is at home in many fields. Especially with temperature recording of chiller devices it really proves. To measure ambient or spot temperatures – there are sensors for both. Using the DIN EN 12830 compliant Thermo-Loggers you fulfill the documentation requirements of EC regulation 37/2005 for the storage of quick-frozen foodstuffs.

Wireless modules for recording digital inputs and with mixed signal input extend the range of possible measurements. Even a control, based on measured temperature is feasible. This lets you react to limit value infringements, e.g. to start a cooling process.

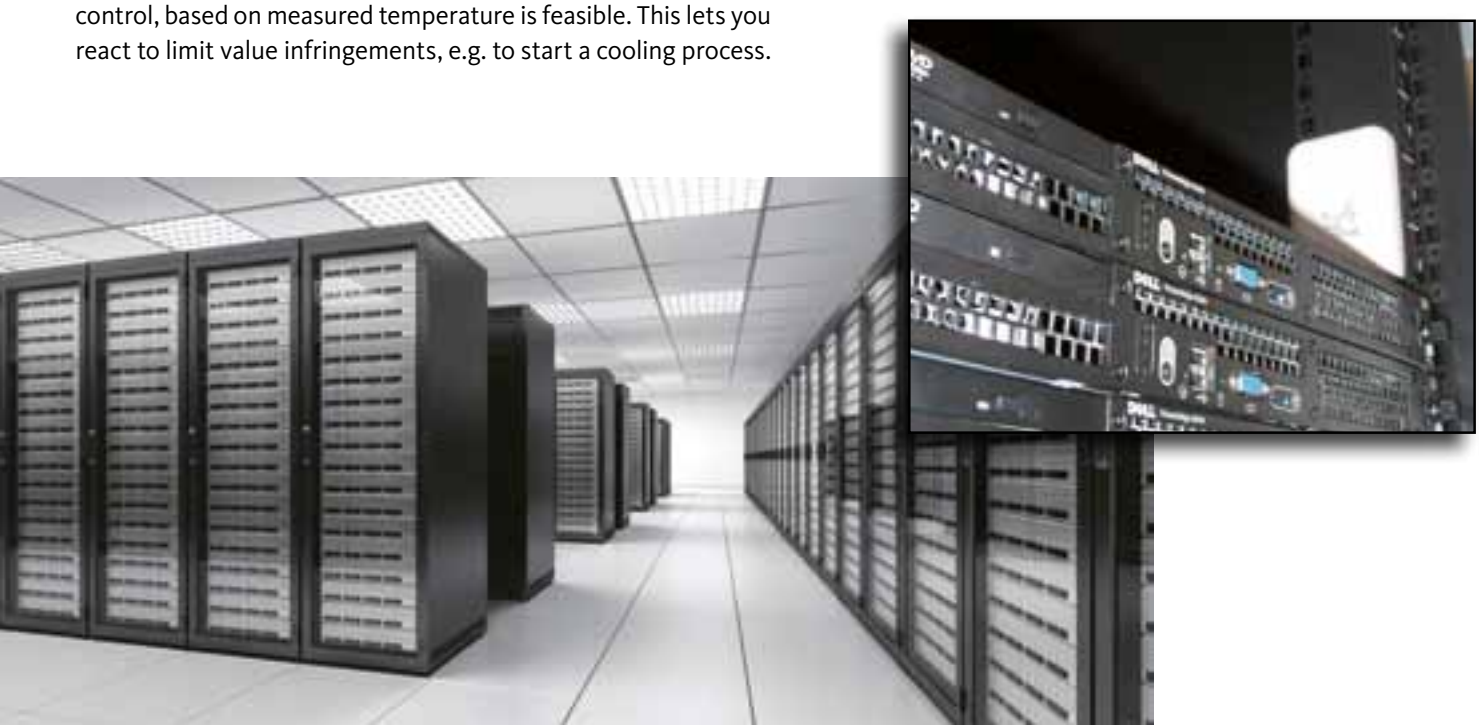
At the Retail

Counter, cold storage room and freezer: Only a few locations require temperature monitoring and documentation in retail stores or restaurants. If the data of the wireless sensors are stored on a receiver or directly on the user's PC actually is only a matter of PC availability. The usual solution will rather be a GesySense® Receiver with memory card reliably collecting the messages from the sensors.

If the user wants access to current data any time the GesySense® Receiver \LAN is recommended. This receiver with Ethernet connection collects all measured values. A web browser gives access to the desired information.

If a single measuring spot is radio technically "too far off" a logger module can be used. To prove admitted storage temperatures the logger as well as the memory card can be read out using GesySense® LogIt on a PC.

An additional operation monitoring or a door alarm is quickly integrated into the system with the digital counter and status sensors.



During Transport

Ideally temperature recording during a refrigerated goods transport will be running on its own. This means, the temperature logger is added to the container and here we go. Once the goods arrive at the retailer the accompanying logger is read out. Then it will become evident how long the chilled goods remained at the loading dock before being brought to the cold store room. Definite module ID and registered consignment number assure the assignment. The GesySense® LogIt software serves for data read out and configuration management of the logger modules.

In the next stage of extension the system will automatically transmit its values while passing checkpoints provided with wireless GesySense® receivers.

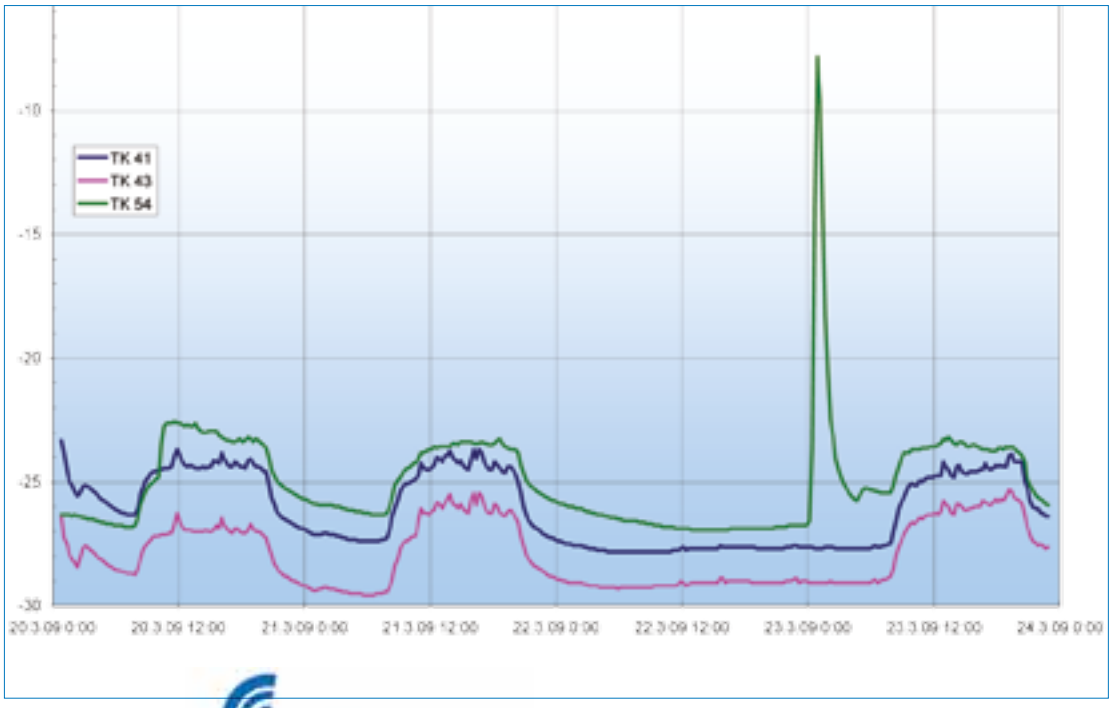
At the Cold Storage Room

A cold storage room can be a problem for radio transmission. GesySense® wireless modules operating at a low frequency have shown convincing examples of matter permeation and coverage especially in large warehouses, but even they have their limitations.

Then logger modules are needed, continuously recording the temperature, e.g. the GesySense® Thermo-Logger. It measures the cold storage temperature in fixed intervals and stores it. The cordless module can be fixed at a suitable position or just be placed at a spot to be specially monitored.

If the connection to the receiver must be maintained in such a difficult situation, a PT1000 module (sensor or logger) can be mounted outside the cold store and the probe can be led into the room.

The PT1000 module is the fitting solution if the core temperature of goods is to be monitored.



Temperature profiles of a week

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In temporary usage

Plans to improve an installation or a plant should be based on knowledge about the current conditions. With the GesySense® loggers as temperature probes or counters measuring spots are quickly distributed e.g. throughout a building. After the study period the loggers are collected and their data evaluated.

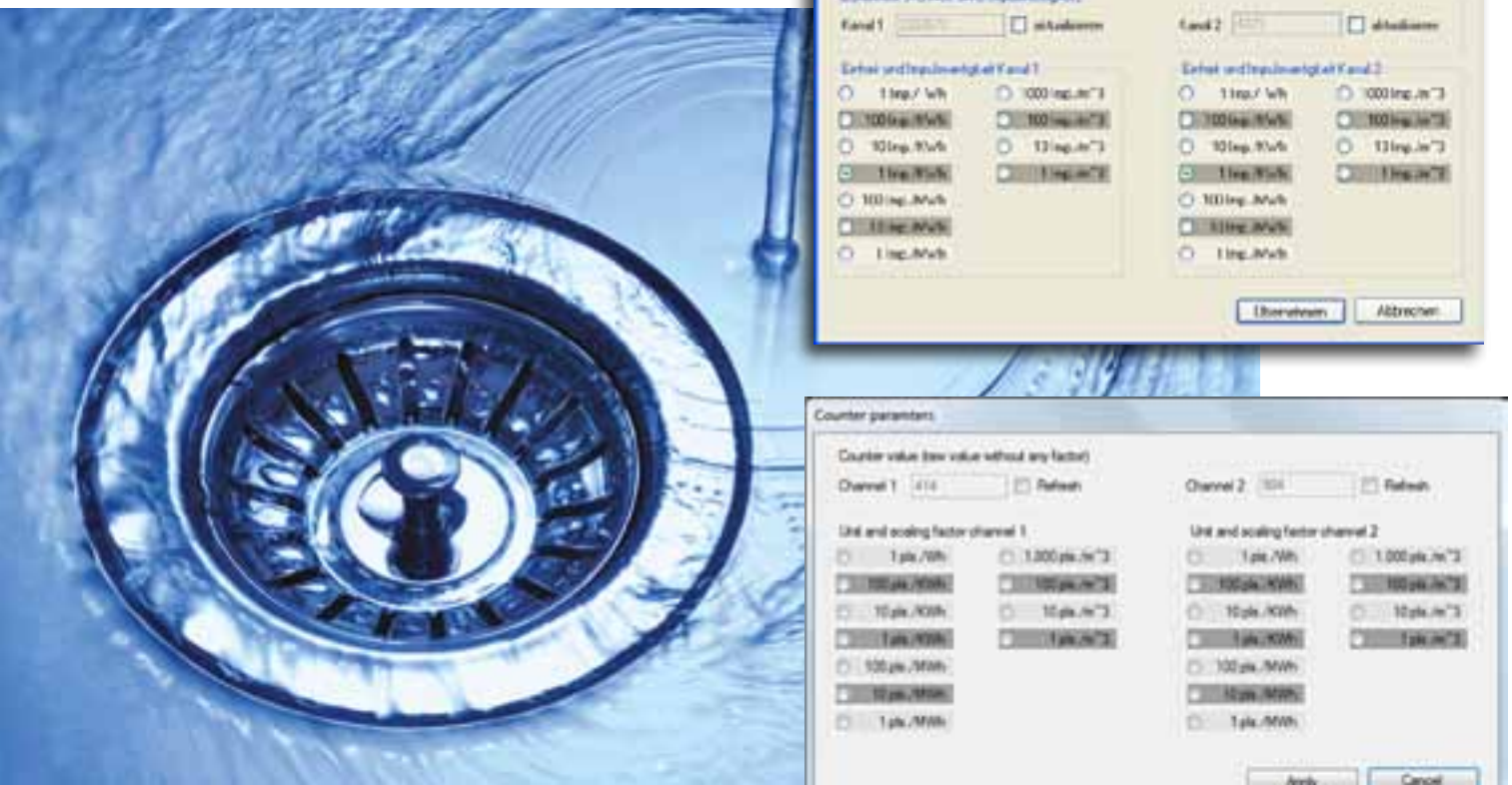
A temporary measuring system as well meets production or laboratory requirements.

If an HVAC installation is then retrofitted requiring more measurement data than there are wired ones, an unobtrusive battery operated system is number one choice. Via repeaters from a single wireless network or from networked data servers of several ones current values are continuously at hand.

In Consumption Logging

Recording consumption data is a pre-condition for an optimized use of resources. This should not be an issue unless there were some measuring spots difficult to be reached with ordinary means, e.g. pits leading to water and gas pipes. With wireless GesySense® sensor modules spots where laying cable would demand extended effort can be connected to monitoring rapidly. Permanently radio connected to the water supply counter it becomes easy to detect a leakage by flow values significantly above average.

GesySense® LogIt makes analysis easy. Scaling and allocation of physical units to measured pulse values are part of the representation. So-called “virtual modules” can be assigned to the single inputs of real counter modules. Related to a definable time interval the virtual modules can present minimum, maximum, mean or differential value. A limit value can be defined on these.



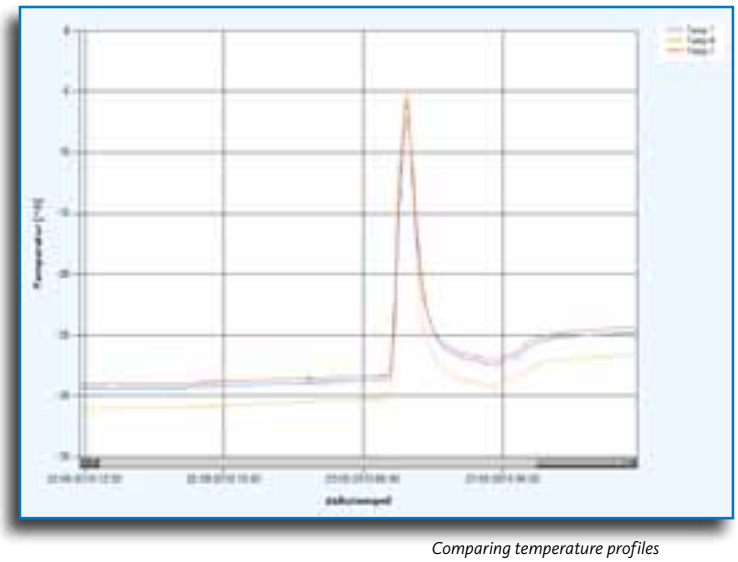
At the Supermarket

Keeping an Eye on Energy Hogs

Cooling devices are Energy hogs. To operate them as close as possible to the temperature limits is only sensible with respect to environmentally friendly energy usage and economic requirements.

Refrigerator control often does not take care of the actual temperature at the loading limit but acts on the basis of worst-case considerations. Correlation of consumption profiles with actually measured values opens the way to energy saving.

If no devices to capture the current temperature are available in chest freezers, chiller cabinets, storage areas and crucial sections of the store, a radio based temperature logging represents the smartest solution for retrofitting.



Comparing temperature profiles

Cold Chain Automatically Documented

GesySense® replaces manual temperature recording in the selling floor by an independent and reliable system.

Temperature Probe for Chiller Devices

GesySense® Thermo-Sensors have been especially designed to capture low temperature in chest freezers and dairy cabinets. Current values are recorded reliably around the clock and become centrally available for documentation and system optimization. The theft protected modules can be mounted in public areas. Large sales areas are covered by cascaded repeaters.

Data Server for Building Automation and Central IT

Data collected by GesySense® is available to further usage on a networked data server. For instance for building automation applications. In chain store companies information is transferred from the data server directly to the superior server center.

Data communication with a data server is using the Modbus communication protocol.

Sensor in freezer chest

Depending on the local situation GesySense® allows for safe capturing of up to 120 sensors. Wide areas are covered by repeaters operating in series.

GesySense® Mobile

A Solution for Mobile Temperature Recording

Under the HACCP approach, continuous temperature recording is required for transport of cooling mandatory products such as comestible goods and pharmaceutical products (temperature controlled transport). This also applies to the delivery to the consumer. Using a suitable temperature logging, however, additionally allows for optimization of the cooling system operation.

The task is clear:

- Continuously record temperatures
- Monitor and control the cooling system
- Optimize energy consumption

For this purpose just a few simple things are required:

- Temperature sensors
- Temperature logging and threshold recognition
- Control switch
- Data system integration

Flexible by Radio

During transport the battery operated, radio based system continuously logs the temperature development inside the vehicle. At its operational base – within radio distance of the receiver – data is transmitted wirelessly to the company's data system.

System Operation

During the vehicle's delivery tours, the SAM captures and saves e.g. product and indoor temperature or the outdoor temperature. When the vehicle returns to its base facility, the module transmits the logged values via the GesySense® Receiver \LAN to the data system.

As soon as the vehicle is connected to the supply voltage of the cooling system, the module switches from battery to 24V supply, transmitting this status. The centralized application now transmits the control parameters and the module autonomously runs the control process. The application provides the option to override the local control process because of superordinate points of view, such as the control of peak and total energy consumption.

During the control process, the module can log the runtime of the cooling unit and transmit it as 15 minutes value. If the vehicle is provided with an energy meter with pulse output, the value for the counting pulses per 15 minutes can be transmitted alternatively. These values are converted to appropriate physical units in the receiver. Due to those features, the system is suitable for energy optimization, especially if several vehicles are connected to the power supply for cooling at the same time.

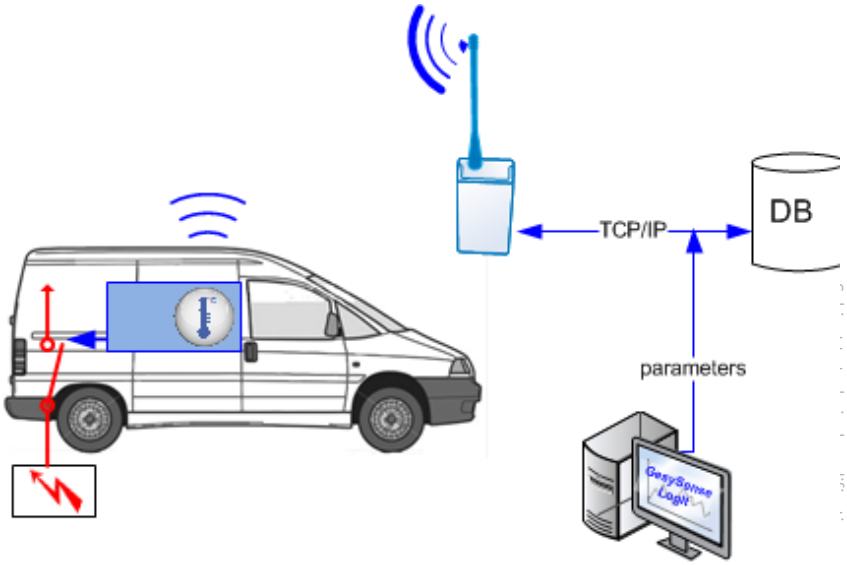
Installation and Integration

In the simplest version, the system configuration at a location where the vehicles are cooled consists of a SAM module in the vehicle, a receiver with EIA-485 or Ethernet connection and, for initial tests and evaluation purposes, the PC application software GesySense® LogIt. The data transmitted by the systems can be easily integrated into existing applications.

Adjustment of the Cooling Cycle

Apart from control parameter settings received via radio, a local adjustment control including a contactor to switch power supply on and off is required to adjust the cooling process during parking times at night and on weekends.

With the sensor-actuator module SAM 2PT-1D-1R GesySense® provides the appropriate solution. The Receiver \LAN is used as receiving station for data transmitted from the vehicles and to transmit the control parameters to the modules.



Time is Money, Comfort Helps

Fifty and more measuring spots in the chiller devices of a supermarket are quite normal. If a large number of sensors has to be retrofitted time counts. Quick mounting, speedy putting into service, tools for optimization – GesySense® is prepared.

For small systems identically installed in dozens of chain stores there is a special installation scenario using preconfigured modules: activate, fix, ready.

Individual systems can be configured according to operational requirements using the GesySense® LogIt software.

Self-configuring Systems

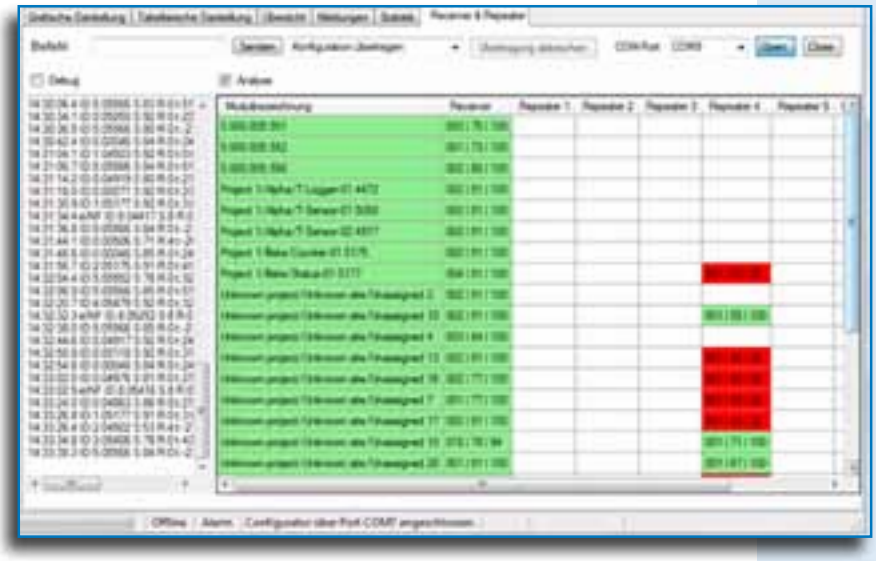
Mobile usage of the wireless modules requires flexibility. Self-configuring GesySense® systems automatically register and organize modules received for the first time. Anyhow, for a Modbus master their data are clearly accessible. This scenario requires certain modules and the Receiver \LAN.

PC, Software and Wireless Adapter

Two things are essential in the commissioning of the wireless sensor network:

- A Windows PC running the GesySense® LogIt software
- The GesySense® Configurator as PC interface to the wireless network.

GesySense® LogIt collects information from all wireless components via the Configurator.



Commissioning and Optimization

For Small and Large Systems

Tasks of putting into service then are:

1. Create the operation related organization structure of the wireless sensor system.
   For instance, names for measuring spots can be specified.
2. Assign modules on the basis of their ID to the defined structure. Each wireless module is identified by its unique ID. GesySense® LogIt captures all active modules via radio and lists them.
3. Start up the modules and set their operation parameters. Templates for module parameterization can be defined which can be applied for identical usage. The launch date, which is important for battery monitoring, is recorded and a commissioning mode with a temporarily increased broadcasting interval is initiated.
4. Commission the receiver by loading the defined system configuration. This defines the Modbus registers in which the data received from the modules will be stored.
5. Check the transmission quality and, if necessary, add repeaters. Commission the repeaters and, if necessary, optimize the installation location.
6. Run a system test and optimize if necessary.

LogIt provides the functions for all these tasks and the information from the wireless network.

GesySense® LogIt will show to you all currently sent messages and can even record them. The reason for any failure and the best place for mounting a repeater are thus quickly found.

GesySense® LogIt

- Is the commissioning software for the system
- manages and configures the wireless modules and receivers
- directly captures the data from the wireless modules
- logs the data traffic of the Receiver
- reads out logger data and memory cards
- automatically reads out data from GesySense® receivers
- depicts measured values graphically and in tables
- displays graphic comparisons between the values of selected modules
- provides information on connection status, transmission quality and battery runtime
- sets limit values and triggers alarms in case of their violation

Gesytec

Data Server

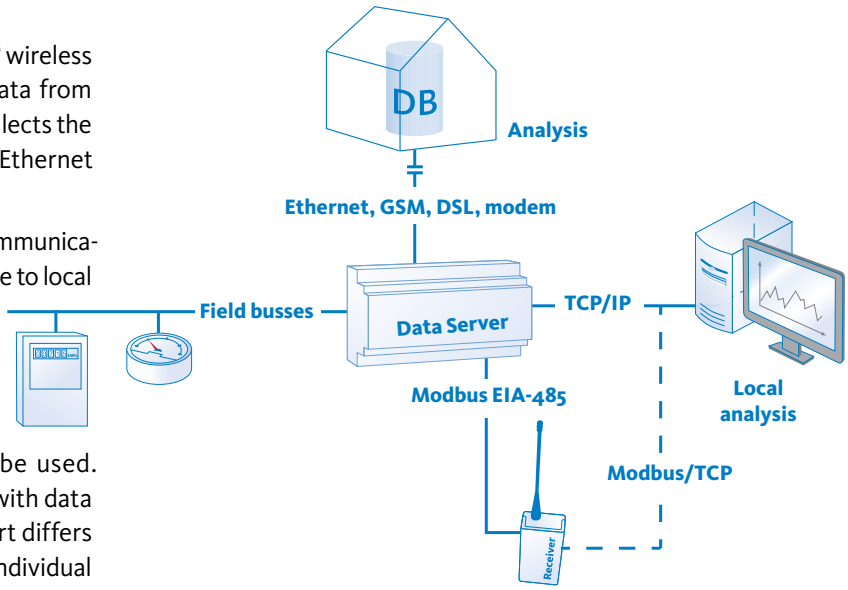
Make Measured Values Widely Available

A data server is one possible interface of the GesySense® wireless sensor system to other systems. It can as well store data from other application, e.g. HVAC or building automation. It collects the messages from the GesySense® Receiver via a serial or Ethernet connection using the Modbus protocol.

Depending on its type a data server provides different communication interfaces by which it can make collected data available to local and to superior IT systems for evaluation. This includes local Ethernet networks as well as long range broadband connection, GSM, GPRS, or modem connection.

Apart from Gesytec's embedded devices of the Delta series suitable devices by other manufacturers can be used. GesySense® wireless systems are successfully running with data servers of different manufacturers. The handling comfort differs of course depending on the functionality offered by the individual devices.

Similar to the Receiver \LAN the Delta devices by Gesytec provide a web interface, by which current values can be observed at any time.



GesySense® Components

Technical Specifications

Sensors and Loggers

Receivers

Software

Radio Waves Everywhere

Gesytec

Overview Wireless Modules

	Housing		Sensor	Logger	Measurement Types				Aktuator
	flat	box			$T_{ambient}$	PT1000	digital	analog	Relay
					°C	°C	ON/OFF or pulses/min	rel. humid.	
Temperature									
Thermo-Sensor	+		+		+				
Thermo-Logger	+		+	+	+				
PT1000-Sensor		+	+		+	1			
PT1000-Logger		+	+	+	+	1			
Digital									
Digital-Sensor		+	+				2		
Digital-Logger		+	+	+			2		
Sensor-Aktuator									
SAM-2PT-1D-R		+	+	+		2	1		1
Mixed Signal									
T-H-Sensor	+		+		+			+	
T-H-Logger	+		+	+	+			+	
T-2D-Sensor	+		+		+		2		
T-2D-Logger	+		+	+	+		2		
T-PT-1D-Sensor		+	+		+	1	1		
T-PT-1D-Logger		+	+	+	+	1	1		

The system is continuously enhanced.
Current information is available at www.gesytec.com.

GesySense® Thermo-Sensor / -Logger

Wireless Thermometer on Site

- Compact wireless sensor for temperature measurement
- Temperature logger for long term measurement
- Battery life greater than 5 years
- No calibration required
- Food safe and freezer suitable
- Convenient fitting adapters

The GesySense® Thermo-Sensor measures the ambient temperature in fixed intervals with an accuracy of 0.3 °C and transmits it to the receiver.

In its Logger variant measured values including time stamp (RTC in module) are stored on the module. Memory capacity is sufficient for 1 year. Even at a battery failure the values will be preserved. Correct operation of the module is indicated by a LED.

The measuring range is between -35 °C and +70 °C. Within this range the radio system adapts itself to the environmental conditions and compensates any temperature dependent drift of the transmitter. A calibration of the temperature measurement is not necessary.

The wireless module is powered by a 3.6 V AA battery. Running at a sensible measurement cycle of 4.5 minutes the replaceable battery will operate a minimum of 5 years up to and possibly exceeding a 10 years life expectancy depending on circumstances.

The flat housing is made of fiber glass reinforced ABS which can be safely used in the food industry. It provides high impact strength even at low temperatures. It is suited for a temperature range of -50 °C to approximately +70 °C.

For mounting an adapter is available, also allowing for step joint installation towards the potential fixing spot.

The GesySense® Thermo-Logger is compliant with regulation EC 37/2005 on the monitoring of temperatures in the means of warehousing and storage of quick-frozen foodstuffs intended for human consumption

A special variant for self-configuring systems is available.

Thermo-Sensor

Measuring range	-35 – +70 °C, (-31 F to 158 F)
Accuracy	0.3 °C
Resolution	0.1 °C

Logging

Interval	15 min
Time stamp	real time clock
Capacity	>1 year at 1 value/15 min
Storage	non-volatile flash memory
Operation indicator	1 LED

Radio Data Transmission

Emitter	low power radio system
Europe	ISM 433-MHz band (433.05 – 434.79 MHz), <10 mW
America	ISM 915 MHz band (902 – 928 MHz), <1 mW
Free field range	up to 250 m
Emitter recognition	unique 10 digit ID
Measuring-/transmission interval	270 s, option. adjustable from 15 to 3600 s

Parameterization

Receiver, inductive	ISM 13.56 MHz band
Range	<10 cm

Power Supply

Lithium Battery	3.6 V, 2.4 Ah, size AA
Battery use	>5 years at a measuring interval of 270 s and operating temperature -30 – +25 °C (deviant times and temperatures may result in reduced operating periods)

Dimensions & Environmental Conditions

Weight	90 g	
Housing dimensions	77 x 110 x 18.5 [mm]	
material	ABS, 20% glass fiber reinforced	
color	light gray, RAL 7035	
Flammability	UL94 HB, self-extinguishing	
Temperature	operating	-35 – +70 °C
	storage	0 – +30 °C
Protection class	IP 64 acc. to DIN EN 60 529	

Certificates

EMC	emission	EN 55022
	immunity	EN 61000-6-2
Radio		ETSI EN 300 220-1
		DIN EN 62479
EC 37/2005		DIN EN 12830: S, C, 1,

GesySense® Thermo-Sensor

Wireless temperature sensor	
- for European ISM band	P.W00101
- for American ISM band	P.W01101
Wireless temperature sensor for self-conf. systems	
- for European ISM band	P.W00107
- for American ISM band	P.W01107

GesySense® Thermo-Logger

Wireless temperature sensor with data storage	
- for European ISM band	P.W00111
- for American ISM band	P.W01111

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GesySense® PT1000-Module

Documentation of Spot Temperature Measurements

- Wireless module for PT1000 probe connection
- Continuous temperature measurements via radio
- Data recording for 1 year with logger
- Read out via radio
- Battery life exceeding 5 years
- IP66 housing for wall mounting

The GesySense® PT1000-Sensor is a wireless module for radio transmitting temperature values measured by a connected PT1000 probe. A version as PT1000-Logger is available storing the measured values internally.

The module regularly measures the temperature using a PT1000 probe in 2-wire technology. The time stamped values are transmitted to receivers of the GesySense® wireless sensor network from where they are available to further processing.

The logger generates a 15-minute value which is stored on the module in a memory with a capacity sufficient for one year. Even at a battery failure the values will be preserved. Along with this operation mode measured values can be radio transmitted as well immediately. Correct operation of the module is indicated by a LED.

Parameterization of the logger module as well as reading out the data is done via radio using the GesySense® Configurator.

The wireless module is powered by a 3.6 V AA battery. Running at a sensible measurement cycle of 4.5 minutes the replaceable battery will operate a minimum of 5 years up to and possibly exceeding a 10 years life expectancy depending on circumstances.

Generally the module is prepared for PT1000 probes measurements in the range from -99 °C to + 391 °C. Within the operating range of -40 °C – +40 °C measurement accuracy is compliant with the requirements of regulation EC 37/2005 on the monitoring of temperatures in the means of warehousing and storage of quick-frozen foodstuffs.

Sensor Input

Number	1 connection for PT1000 probe
Measuring range	-99 °C – +319 °C (-146 °F – +606 °F)
Method	2-wire measurement
Accuracy	≤1 °C, for DIN B probes, between -40 °C and +40 °C (-40 °F – +104 °F)
Resolution	0.04 °C
Connection	4-pole screwing terminal 0.13 – 1.5 mm²

Logging

Interval	15 min
Time stamp	real time clock
Capacity	>1 year at 1 value/15 min
Storage	non-volatile flash memory
Operation indicator	1 LED

Radio Data Transmission

Emitter	low power radio system
Europe	ISM 433 MHz band (433.05 – 434.79 MHz), <10 mW
America	ISM 915 MHz band (902 – 928 MHz), <1 mW
Free field range	up to 250 m
Emitter recognition	unique 10 digit ID
Measuring-/transmission interval	270 s, option. adjustable from 15 to 3600 s

Parameterization

Receiver, inductive	ISM 13.56 MHz band
Range	<10 cm

Power Supply

Lithium Battery	3.6 V, 2.4 Ah, size AA
Battery use	>5 years, cf. Thermo-Sensor p. 23

Dimensions & Environmental Conditions

Weight	210 g	
Housing dimensions	94 x 94 x 57 [mm], w/o gland	
material	Polycarbonate	
color	light gray, RAL 7035	
Flammability	UL94 HB-V2, self-extinguishing	
Temperature	operating	-40 – +70 °C
	accuracy guarant.:	-40 – +40 °C
	storage	0 – +30 °C
Protection class	IP 66 acc. to DIN EN 60 529	

Certificates

EMC	emission	EN 55022
	immunity	EN 61000-6-2
Radio		ETSI EN 300 220-1
		DIN EN 62479

GesySense® PT1000-Sensor

Wireless module for PT1000 connection

- for European ISM band	P.W00104
- for American ISM Band	P.W01104

GesySense® PT1000-Logger

Wireless module for PT1000 connection with memory

- for European ISM band	P.W00114
- for American ISM Band	P.W01114

Peripherals

PT1000 probe, DIN B, -50...+105 °C, cable 2 m	P.WZ0311
PT1000 probe, DIN B, -50...+105 °C, cable 5 m	P.WZ0312

GesySense® Digital-Modules

Monitoring and Counting

- Digital wireless sensors
- Settable for status monitoring or pulse counting
- Data recording for 1 year with logger
- Battery life greater than 5 years
- IP66 housing for wall mounting

Digital Inputs

Status-Sensor	2 contacts for switches or
Counter–Sensor	2 pulse counters, 20 Hz max.
Resolution	32 bit
Switching voltage	3.3 V
Switching current	0.33 mA
Max. cable length	1.5 m
Connection	4-pole screwing terminal 0.13 – 1.5 mm²

Logging

Interval	15 min
Time stamp	real time clock
Capacity	>1 year at 1 value/15 min
Storage	non-volatile flash memory
Operation indicator	1 LED

Radio Data Transmission

Emitter	low power radio system
Europe	ISM 433 MHz band (433.05 – 434.79 MHz), <10 mW
America	ISM 915 MHz band (902 – 928 MHz), <1 mW
Free field range	up to 250 m
Emitter recognition	unique 10 digit ID
Measuring-/transmission interval	270 s, option. adjustable from 15 to 3600 s

Parameterization

Receiver, inductive	ISM 13.56 MHz band
range	<10 cm

Power Supply

Lithium battery	3.6 V, 2.4 Ah, size AA
Battery use	>5 years, cf. Thermo-Sensor p. 23

Dimensions & Environmental Conditions

Weight	230 g	
Housing dimensions	94 x 94 x 57 [mm], w/o gland	
material	Polycarbonate	
color	light gray, RAL 7035	
Flammability	UL94 HB, self-extinguishing	
Temperature	operating	-35 – +70 °C
	storage	0 – +30 °C
Protection class	IP 66 acc. to DIN EN 60 529	

Certificates

EMC	emission	EN 55022
	immunity	EN 61000-6-2
Radio		ETSI EN 300 220-1
		DIN EN 62479

GesySense® Digital-Sensor

- for European ISM band	P.W00102
- for American ISM band	P.W01102

GesySense® Digital-Logger

- for European ISM band	P.W00122
- for American ISM band	P.W01122

The GesySense® Digital -Sensor offers 2 functionalities:

- Status-Sensor
- Counter-Sensor

As **Status-Sensor** it is used to monitor devices and system components. It reads the status of connected passive contacts.

The Status-Sensor transmits the status of the connected contacts at a fixed interval. To avoid that “oscillating” contacts generate false alarms, there must be a minimum period of time for a status message to be considered as valid.

As **Counter-Sensor** the module records pulses up to 20 Hz at its 2 digital inputs and stores the values locally. The resolution is 32 bit. The meter reading of the previous interval is reported in the defined transmission interval.

Operation of the two inputs can only be set for both as status or counter inputs using the GesySense® configuration software.

Further to the sensor there is a logger version of the module storing measured pulses or status modifications in the module. The logger stores 15-minute value in a memory which is even preserved at a battery failure. Along with this operation mode measured values can be radio transmitted as well immediately. Correct operation of the module is indicated by a LED.

The module is supplied by a 3.6 V AA battery. At a measuring and broadcasting interval of 5 min a service life of 5 years can be achieved, dependent on the circumstances even 10 years can be realized.

Gesytec

GesySense® T-H-Modules

Measurement of Temperature and Humidity

- Compact module measuring temperature and humidity
- Continuous data acquisition via radio
- Reliable long-term data logging
- Read out via radio
- Battery life greater than 5 years

The GesySense® T-H-Sensor measures ambient temperature and humidity in fixed intervals and transmits it to the receiver.

In its Logger variant measured values including time stamp (RTC in module) are stored on the module. Memory capacity is sufficient for 1 year. Even at a battery failure the values will be preserved. Correct operation of the module is indicated by a LED.

Parameterization of the logger module as well as reading out the data is done via radio using the GesySense® Configurator.

The temperature measuring range is between 5 °C and + 50 °C, with a high accuracy in a smaller range. A calibration of the temperature measurement is not necessary.

Humidity measurement has a high accuracy in the range of 10 to 90 %rH.

The module is supplied by a 3.6 V AA battery. At a measuring and broadcasting interval of 5 min a service life of 5 years can be achieved, dependent on the circumstances even 10 years can be realized.

The flat housing is made of fiber glass reinforced ABS which can be safely used in the food industry.

For mounting an adapter is available, also allowing for step joint installation towards the potential fixing spot.

Ambient temperature measurement

Measuring range	+5 – +50 °C, (41 °F to 122 °F)
Accuracy	0.2 °C, typically
Resolution	0.01°C

Humidity measurement

Measuring range	10 – 90 %rH
Accuracy	1,8 %rH , typically
Resolution	0,04 %rH

Logging

Interval	15 min, adjustable
Time stamp	real time clock
Capacity	>1 year at 1 value/15 min
Storage	non-volatile flash memory
Operation indicator	1 LED

Radio Data Transmission

Emitter	low power radio system
Europe	ISM 433-MHz band (433.05 – 434.79 MHz), <10 mW
America	ISM 915 MHz band (902 – 928 MHz), <1 mW
Free field range	up to 250 m
Emitter recognition	unique 10 digit ID
Measuring-/transmission interval	270 s, option. adjustable from 15 to 3600 s

Parameterization

Receiver, inductive	ISM 13.56 MHz band
Range	<10 cm

Power Supply

Lithium Battery	3.6 V, 2.4 Ah, size AA
Battery use	>5 years, cf. Thermo-Sensor p. 23

Dimensions & Environmental Conditions

Weight		100 g
Housing	dimensions	77 x 110 x 18.5 [mm]
	material	ABS, 20% glass fiber reinforced
	color	light gray, RAL 7035
Flammability		UL94 HB, self-extinguishing
Temperature		operating +5 – +50 °C
		storage 0 – +30 °C
Protection class		IP 61 acc. to DIN EN 60 529

Certificates

EMC	emission	EN 55022
	immunity	EN 61000-6-2
Radio		ETSI EN 300 220-2
		EN 62479

GesySense® T-H-Sensor

Wireless temperature-humidity sensor

- for European ISM band	P.W00208
- for American ISM band	P.W01208

GesySense® T-H-Logger

Wireless temperature sensor with data storage

- for European ISM band	P.W00218
- for American ISM band	P.W01128

PT1000 Inputs

Measuring range	-99 °C – +319 °C (-146 °F – +606 °F)
Method	2-wire measurement
Accuracy	≤1 °C, for DIN B probes, between -40 °C and +40 °C (-40 °F – +104 °F)
Resolution	0.04 °C

Digital Input

Status sensor	2 x input, 1 used for internal power supply monitoring
Voltage	24 V
Relay Output	open contact
Nominal voltage	24 V
Current	3 A, use surge proof fuse max. 6 A (C)

Logging

Interval	15 min
Time stamp	real time clock
Capacity	6 months at 1 value/15 min
Storage	non-volatile flash memory
Operation indicator	1 LED

Radio Transmission of Data, Switching Parameters

Emitter, Receiver	ISM 433 MHz band (433.05 – 434.79 MHz)
Transmitter power	low power radio system <10 mW
Free field range	up to 250 m
Emitter recognition	unique 10 digit ID
Measuring-/transmission interval	270 s, option. adjustable from 15 to 3600 s

Parameterization

Receiver, inductive	ISM 13.56 MHz band
Range	<10 cm

Power Supply

External	24 V AC (min: 19.2 V, max: 26.4 V), max. 100 mA
Internal	Lithium battery 3.6 V, 2.4 Ah, size AA

Dimensions & Environmental Conditions

Weight	250 g	
Housing dimensions	130 x 94 x 57 [mm] , w/o gland	
material	Polycarbonate	
color	bottom	light gray, RAL 7035
	cover	transparent
Flammability	UL94 HB-V2, self-extinguishing	
Temperature	-20 – +50 °C	
Protection class	IP 66 acc. to DIN EN 60 529	

Certificates

EMC	emission	EN 55022
	immunity	EN 61000-6-2
Radio		ETSI EN 300 220-2
		EN 62479
EC 37/2005		DIN EN 12830: TS, B, 1/2

GesySense® SAM 2PT-1D-1R
Sensor-actuator module
- for European ISM band P.W00146-3

GesySense® SAM 2PT-1D-1R

Sensor-Actuator Module with Relay

- Wireless module for connection of 2 PT1000 probes
- Wireless recording of digital input
- Wireless or locally controlled relay
- Data recording and direct transmission
- 24 V or battery supply

The GesySense® Sensor-Actuator Module 2PT-1D-1R is used to record temperatures by the connected PT1000 probes and allows measurement-based switching actions. With its integrated receiver it can be parameterized via radio. In addition, an active switch contact can be connected.

The module collects and sends within the specified time interval the temperatures measured by 2-wire method through PT1000 probes and the value from one digital input. Time stamped readings are transmitted to the receiving station of the GesySense® wireless sensor network and further processed.

All values are additionally recorded in the local memory of the module. These records can be automatically transmitted as soon as a vehicle-installed module re-enters the reception range of a GesySense® Receiver \LAN.

In addition, the module switches the digital output based on preset limit values or times. This can be controlled locally or by direct radio command. The local control algorithm is active only at 24 V supply of the module. Only then the module can receive wireless commands. An external voltage supply is automatically detected and interrupts the battery supply.

The module can be used in self-configuring systems.

The GesySense® SAM 2PT-1D-1R is compliant with regulation EC 37/2005 on the monitoring of temperatures in the means of warehousing and storage of quick-frozen foodstuffs intended for human consumption.

GesySense® T-PT-1D-Modules

Temperature Measurement and Digital Input

- Wireless sensor with triple input
- Ambient and spot temperature measurement
- Settable for status monitoring or pulse counting
- Battery life greater than 5 years

The GesySense® T-PT-D-Sensor combines the functionality of the Thermo-Sensor with those of the PT1000 and the Digital-Sensor. In one measuring spot ambient and spot measured temperature and the operational status of a device or the number of pulses can be continuously captured.

The specification of this mixed signal module corresponds to those of the separate sensors with respect to measurement method and data transmission as well as to radio technology and battery operation. However, there is just one digital input available in this module, which can be used either as status or as counter input.

This module with ample functionality is available in box shaped IP 66 housing for wall mounting.

A logger version with local memory offering as well the operation mode of immediate radio transmission is also available.

Ambient Temperature Measurement

Measuring range	-35 – +70 °C, (-31 °F – 158 °F)
Accuracy	0.3 °C
Resolution	0.1 °C

PT1000 Input

Measuring range	-99 °C – +319 °C (-146 °F – +606 °F)
Method	2-wire measurement
Accuracy	≤1 °C, for DIN B probes, between -40 °C and +40 °C (-40 °F – +104 °F)
Resolution	0.04 °C

Digital Input

Status-Sensor	1 contact for switches or
Counter-Sensor	1 pulse counter, 20 Hz max.
Resolution	32 bit
Switching voltage	3.3 V
Switching current	0.33 mA
Max. cable length	1.5 m

Logging

Interval	15 min
Time stamp	real time clock
Capacity	>1 year at 1 value/15 min
Storage	non-volatile flash memory
Operation indicator	1 LED

Radio Data Transmission

cf. GesySense® T-2D-Modules on previous page

Parameterization

Receiver, inductive	ISM 13.56 MHz band
Range	<10 cm

Power Supply

Lithium Battery	3.6 V, 2.4 Ah, size AA
Battery use	>5 years, cf. Thermo-Sensor p. 23

Dimensions & Environmental Conditions

Weight	230 g	
Housing dimensions	94 x 94 x 57 [mm], w/o gland	
material	Polycarbonate	
color	light gray, RAL 7035	
Flammability	UL94 HB-V2, self-extinguishing	
Temperature	operating	-35 – +70 °C
	storage	0 – +30 °C
Protection class	IP 66 acc. to DIN EN 60 529	

Certificates

EMC	emission	EN 55022
	immunity	EN 61000-6-2
Radio		ETSI EN 300 220-1
		DIN EN 62479

GesySense® T-PT-1D-Sensor

- for European ISM band	P.W00126
- for American ISM band	P.W01126

GesySense® T-PT-1D-Logger

- for European ISM band	P.W00136
- for American ISM band	P.W01136

GesySense® Receiver / Repeater

Radio Path to Data Acquisition

- Receiver in wireless sensor system
- Repeater in the transmission path
- Modbus connection to data logger
- Range increase of the radio system
- Cascading of repeaters

Receiver and Repeater of the GesySense® wireless sensor network are devices identical in construction but for different use, which is set at commissioning. They are reception and emitting devices operating within the 433 MHz (Europe) or 915 MHz (America) ISM band.

For connection with a data server or a PC they are fitted with a serial connection optionally usable with either EIA-232 or EIA-485. Data transfer to the data server is using the Modbus protocol.

A download of updated device software is realized through the serial connection and further on to the repeaters via radio transmission. The optional real-time clock of the devices is synchronized via the connection to the data server. The devices require a mains power supply.

An assembly bracket is provided for wall or ceiling mounting of the devices, allowing the alignment of the antenna vertical to the floor for optimal reception. The device antenna may also be replaced by a displaced antenna with cord connection.

Radio Data Transmission

Receiver, Emitter	low power radio system
Europe	ISM 433 MHz band (433.05 – 434.79 MHz), <10 mW
America	ISM 915 MHz band (902 – 928 MHz), <1 mW
Free field range	up to 250 m
Emitter recognition	unique 10 digit ID

Serial Interface

EIA-232	TxD, RxD, GND, CTS, RTS
EIA-485	RxTx, GND, RxTx, 3.3 V
Connection	9-pin socket, D-type

Power Supply

Supply Voltage	230 V, 50 Hz (or 120 V, 60 Hz)
Power Input	2 W typ., 3 W max
Connection	internal, fixed, cable length 1.5 m

Features

Real-time clock	battery buffered
Monitoring	watchdog timer
LEDs	4: Power, Status, Radio, Comm.
Antenna connector	SMA socket, 50 Ohm

Dimensions & Environmental Conditions

Weight	310 g, incl. mains cable	
Housing dimensions	w/o antenna	40 x 65 x 120 [mm]
	with antenna	40 x 65 x 285 [mm]
material	ABS	
Mounting	wall mounting with assembly bracket	
Fitting position	vertical	
Assembly bracket	40 x 65 x 160 [mm]	
Weight	145 g	
Flammability	UL94 HB, self-extinguishing,	
Temperature	operating	-20 – +55 °C
	storage	-20 – +35 °C
Protection class	IP 40 acc. to DIN EN 60 529	

Certificates

EMC	emission	EN 55022, living space (B)
	immunity	EN 61000-6-2
Radio		ETSI EN 300 220-3
		DIN EN 62479

GesySense® Receiver/Repeater

- for European ISM band	P.W00211
- for American ISM band	P.W01211

Accessories

EIA-232 connection cable	P.WZ0200
Antenna cable 1.5 m	P.WZ0202
Antenna cable 5 m	P.WZ0203
Splitter/combiner with 1.5 m cable and antenna	P.WZ0212

GesySense® Receiver \LAN

Networked Wireless Data Acquisition

- Receiver in wireless sensor system
- Ethernet connection
- Local data storage on microSD card
- Modbus/TCP or EIA-485 connection
- Base station for self-configuring systems
- Local control operation
- Switching output

The GesySense® Receiver \LAN is receiver and networked data recorder in the wireless sensor network. The receiving and emitting device is operating within the 433 MHz ISM band (European version). A 915 MHz version for American ISM band is also available.

Data connection of the Receiver \LAN is using Modbus/TCP or Modbus via the EIA-485 connector. Its Ethernet connection allows web browser access to measured data and for configuration purposes. For a quick view on current values an ordinary web browser is sufficient.

A microSD card serves for local storage of measured values in .csv format. The information can be read out and further processed using the GesySense® LogIt software. Archived data can as well be downloaded via FTP.

The real-time clock of the device is synchronized with an NTP server. The device requires a mains power supply. A variant with PoE supply is alternatively available.

An assembly bracket is provided for wall or ceiling mounting of the device, allowing the alignment of the antenna vertical to the floor for optimal reception. The device antenna may also be replaced by a detached antenna with cord connection, e.g. to place it on the other side of a wall.

Radio Data Transmission

Receiver, Emitter	low power radio system
Europe	ISM 433 MHz band (433.05 – 434.79 MHz), <10 mW
America	ISM 915 MHz band (902 – 928 MHz), <1 mW
Free field range	up to 250 m
Emitter recognition	unique 10 digit ID

Interfaces

EIA-485	Data+, Data-, GND
Connection	3-pin screw-plug terminal
Ethernet	10/100baseT
Connection	RJ 45
Relay	switch over
Electric strength	max. 230 V
Nominal current	2 A, use 2 A surge proof fuse (C)

Power Supply

Supply Voltage	90 – 264 V AC, 50 – 63 Hz
Power input	2 W typ., 3 W max
Connection	internal, fixed, cable length 1.5 m
Alternatively	Power over Ethernet, 802.3af, PD
Power input	2 W typically, 3 W max.

Features

Real-time clock	battery buffered
Monitoring	watchdog timer
LEDs	4: Power, Status, Radio, Comm., Ethernet
Local memory	slot for FAT32 microSD card

Dimensions & Environmental Conditions

Housing dimensions	w/o antenna	50 x 80 x 150 [mm]
	with antenna	50 x 80 x 315 [mm]
material	ABS	
Mounting	wall mounting with assembly bracket	
Fitting position	vertical	
Assembly bracket	40 x 79 x 170 [mm]	
Flammability	UL94 HB, self-extinguishing,	
Temperature	operating	0 – +55 °C
	storage	-20 – +70 °C
Humidity	class F acc. DIN 40 040, 5 – 93%, no condensation	
Protection class	IP 40 acc. to DIN EN 60 529	

Certificates

EMC	emission	EN 55022, living space (B)
	immunity	EN 61000-6-2
Radio		ETSI EN 300 220-1 V2.3.1
		DIN EN 62479

GesySense® Receiver \LAN

Wireless receiver with Ethernet and	
- mains supply	P.Wof204
- power over Ethernet	P.Wof214
f = 0 for European ISM band	
f = 1 for American ISM band	

Accessories

Antenna cable 1.5 m	P.WZ0202
Antenna cable 5 m	P.WZ0203
Splitter/combiner with 1.5 m cable and antenna	P.WZ0212

GesySense® Configurator

Radio Commissioning and Operation

- PC interface to GesySense® wireless network
- Receiver for measured values
- Parameterization tool for wireless modules

The GesySense® Configurator is a receiver and transmitter device connecting a PC to the wireless sensor network via USB.

On one hand the Configurator is the PC's receiver for messages transmitted in the network. On the other hand it serves as a tool for commissioning the wireless sensor network and to configure and read out GesySense® sensors and loggers. The device is used with the PC program GesySense® LogIt.

The GesySense® Configurator represents the radio bridge to the system. It broadcasts and receives within the 433 MHz or 915 MHz band and inductively, at a frequency of 13.56 MHz, transmits configuration data to the sensors or triggers logger modules to transmit archived values. The Configurator is supplied by the PC via the USB connection. The antenna can be removed during configuration transmission for better handling.

Radio Data Transmission

Receiver, Emitter	low power radio system
Europe	ISM 433-MHz band (433.05 – 434.79 MHz), <10 mW
America	ISM 915 MHz band (902 – 928 MHz), <1 mW
Free field range	up to 250 m
Emitter recognition	unique 10 digit ID

Parameterization

Emitter, inductive	ISM 13.56-MHz band
Range	<10 cm

Interface

USB	2.0 full speed
Power Supply	via USB connection

Features

LED	1 tricolor: communication, configuration process
Push button	1
Acoustic signal	configuration process

Dimensions & Environmental Conditions

Weight	135 g	
Housing dimensions	w/o antenna	79 x 117 x 24 [mm]
	antenna	165 mm
	material	ABS, TPE
	color	light gray RAL 7035
		basalt gray RAL 7012
Flammability	UL94 HB, self- extinguishing	
Temperature	operating	-30 – +70 °C
	storage	-5 – +35 °C
Protection class	IP 30 acc. to DIN EN 60 529	

Certificates

EMC	emission	EN 55022 living space (B)
	immunity	EN 61000-6-2
Radio		ETSI EN 300 330-1
		ETSI EN 300 220-3
		DIN EN 62479

System Requirements

IBM compatible PC from Pentium 3
Operating system Windows XP or later

GesySense® Configurator

- for European ISM band	P.W00401
- for American ISM band	P.W01401

Delta 1000 GesySense®

Receiver and Data Server in Sensor Network

- Receiver in wireless network
- Data server with Ethernet connection
- Online presentation of current values
- FTP access to recorded data
- Remote monitoring unit
- Browser interface for setup and diagnosis

Interfaces

Receiver	Europe	ISM 433 MHz band (433.05 – 434.79 MHz)
Serial Interface		EIA-232, not optically isolated
	Connector	9 pin D-type
Ethernet Interface		100 Mbps
	Connector	RJ45
USB Host		acc. full speed USB standard 2.0
	Connector	USB type B

Power Supply

Voltage	24 V DC (± 20%),
Consumption	10 W max.

Display & Operation

LEDs	power, USB active, status, radio, comm.
Push button	terminate USB

Dimensions & Environmental Conditions

Weight		350 g
Housing dimensions	w/o antenna	157 x 86 x 58 [mm],
	height w. antenna	218 mm
material	top	Lexan 940
	base	Noryl VO 1550
color	top	RAL 7035 (grey)
	base	RAL 7021 (black)
Mounting		top hat rail (EN 60715: 35x15, 35x7.5)
Humidity		class F, accord. DIN 40040, 5 – 93 %, no condensation
Flammability		UL94-V0, self-extinguishing
Temperature	operating	0 – +55 °C
	storage	-20 – +70 °C
Protection class		IP 20 acc. to DIN EN 60 529

Certificates

EMC	emission	EN 55022 A/B
	immunity	EN 61000-6-2
Radio		ETSI EN 300 220-3
		DIN EN 62479

Delta 1000 GesySense®

Delta 1000 with GesySense® receiver module for europ. ISM-Band	P.L50400-2

Accessories

Antenna cable 1.5 m	P.WZ0202
Antenna cable 5 m	P.WZ0203

The Delta 1000 GesySense® integrates the functionalities of receiver and data server. It is a compact and reliable solution for smaller wireless sensor networks.

The device receives the messages from the GesySense® wireless sensors and archives them in its data base. Networked PCs can access these data via Ethernet.

The Delta 1000 GesySense® offers a browser interface by which current values can be accessed online any time. Further to the measured values this comprises information on signal quality or battery status of the sensor modules. Device parameterization is made through this interface is as well.

The GesySense® LogIt software is used to read archived values into a PC. This can be done spontaneously or following a schedule. Furthermore e-mails can be configured, which will be sent on alarm conditions.

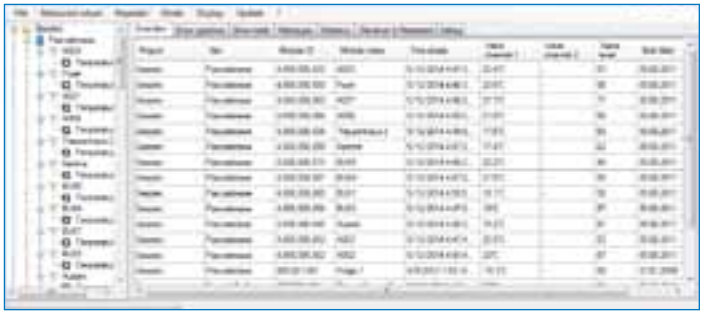
If the device for DIN rail mounting is installed in a switching cabinet a detached antenna can be used.

Gesytec

GesySense® LogIt

PC Software for Wireless Network Operation

- Configuration of wireless modules
- Configuration of receivers
- Online recording and presentation of sensor data
- Data transfer from loggers and memory cards
- Data transfer from receivers
- Analysis of measured values



GesySense® LogIt is software for Windows PC from Windows XP onward. This application is used for setting up, operation and data analysis of the wireless sensor network. Furthermore it serves for configuration of GesySense® wireless modules and receivers.

As configuration software GesySense® LogIt provides different methods to commission GesySense® systems and put them into operation. For this GesySense® LogIt communicates with the wireless modules and the system Receiver. Configurations can be modified, received messages can be stored. Numerous data for network analysis and optimization is provided.

The program can read the archives of logger modules and write individual information into them, supporting a mobile usage. Archives collected on the microSD card of a receiver are read as well. Defining conditions for e-mail messages, or starting manual updates are further operations.

As software of a PC based data center GesySense® LogIt archives the messages transmitted by sensors and displays the contents. Further to tabular presentations measured values can be displayed graphically. Graphical comparisons between selected sensors can be shown and printed. Data is stored in a Microsoft Access data base.

For ease of handling the software enables a structured organization of the wireless modules. Definition and monitoring of limit values can as well be done.

The software requires the GesySense® Configurator to receive messages from the wireless network and communication with the modules.

System requirements

PC with	
Operating system	Windows XP, Vista, 7, 8
Interfaces	USB
	EIA-232 (EIA-485)
	Ethernet
Peripherals	GesySense® Configurator as interface to wireless network and modules

GesySense® LogIt

Software for Windows PC	P.W00431

GesySense® LogIt Software with

GesySense® Configurator	
- for European ISM band	P.W00432
- for American ISM band	P.W01432

Software Features

- Setting up an organization structure for sensor data
- Allocating wireless modules to the structure
- Management of wireless modules if used in different sites
- Activation and configuration of modules including parameterization of limit values and alarming in off-limit conditions
- Activation and deactivation of modules
- Online representation of received values
- Archiving of values from modules received
- Protection of archived data against manipulation
- Graphical presentation of measured values including accentuation of limit value infringements for one or more data series
- Tabular presentation of measured values including accentuation of limit value infringements. Comments can be added to single entries
- Special analysis of counter module data:
  - scaling
  - start value
  - interval definition for consumption analysis
  - physical units
- Data reduction by storing of minimum, maximum, mean or differential value calculated for a definable interval
- Graphic print of measured values
- Export of measured values in csv format
- Transfer of defined network configuration to GesySense® receivers
- Recording of receiver data

Radio Waves Everywhere

Can a concentration of radio devices in a relatively small area possibly have an impact on humans? Actually this question has already been answered by the approval of this frequency range for general utilization for the use with low power devices and short signals (EN 62 479), as in general the standards for low power radio systems consider the impact on humans and exclude an influence to the human being by compliant radio systems. However, some basic thoughts concerning this matter are appropriate.

The impact of electromagnetic waves on human beings can be divided into 3 ranges:

- Thermal effect
- Impact on cells
- Impact on cell modules

First of all there is a thermal effect. The electromagnetic radiation induces vibrations to the water molecules, resulting in a warming such as known from microwave ovens and also used for therapeutic purposes in medicine. The intrusion depth into the human body decreases with increasing radiation frequency. At 433 MHz permeation can be assumed if the applied power is reaches several Watt. With 10 mW maximum power output the GesySense® system is considerably below the threshold at which such an effect may occur.

The second effect is due to an influence on the cells affecting impulse transmission and impulse evaluation, which are based on electric pulses. Here also no impact by the radio sensor system is given as it only uses minor power and because its frequency is too high for such effects. The impact by the 50 Hz of European common power supply is more crucial. The 60 Hz used in the US already have a considerably lower impact.

The third effect consists in an impact on cell modules by electromagnetic radiation, especially on the RNA of mitochondria and the DNA of the cell itself. Those giant molecules have electric properties themselves, but the surrounding water molecules can also influence the giant molecules. The best known example is the destruction of DNA elements by radioactive radiation, which is an extremely high-frequency form of electromagnetic radiation. The higher the frequency of the radiation, the higher the effect. Of course this effect depends on the transmission power. Both, the very low transmission power and the very low frequency (for these effects) of 433 MHz rule out impact on this level.

It can be concluded that the “electric smog properties” of low power radio systems are negligible. The impacts from the common mains supply, but also from the ever present mobile phones are considerably higher.

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