

# TubeSense® ThermControl

**A smart and reliable solution for the remote monitoring of refrigerators, cold rooms and freezer units.**



## Safe refrigerated storage in your hospital

When safely storing biological samples, blood products, expensive reagents or temperature sensitive pharmaceuticals, it is vital that the temperature conditions remain within set guidelines. From now on, this can be monitored from minute to minute with TubeSense® ThermControl: with the aid of accurate temperature sensors and a robust wireless communication system, all data from every refrigerator or freezer (or other area to be monitored) is centrally monitored and stored. And in the event of a malfunction, the staff responsible are alerted immediately. Even if your hospital has more than 1000 fridges!

## A wireless temperature reporting system

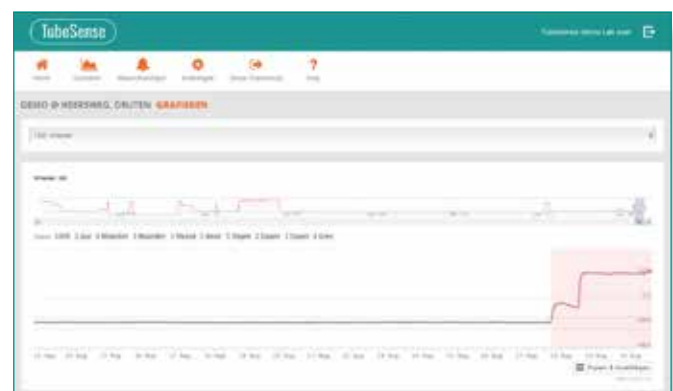
TubeSense® ThermControl is a completely wireless temperature reporting system. It is based on a network of calibrated temperature sensors that are able to communicate wirelessly from the cooling system to gateways installed at strategic locations in the building. These gateways are in turn connected to the server in the Cloud where the temperature recordings are stored, processed and reported.

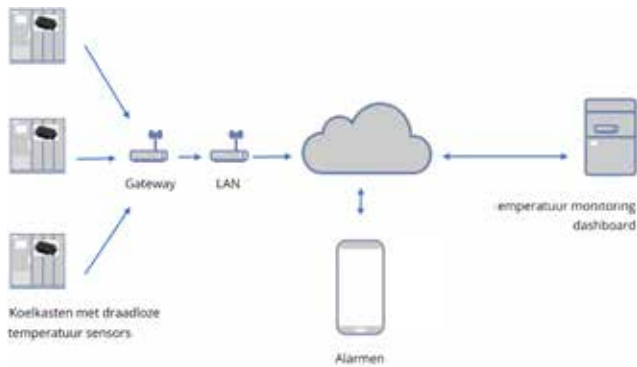
## Immediate reporting of faults

If the set temperature is exceeded or undershot, an alarm is triggered immediately. The alarm is visible in the dashboard software and notifications are automatically sent to the configured contact persons or control rooms, where immediate action can be taken. Alarm notifications can be sent by telephone, SMS or e-mail. This can include information such as: Where did the alarm go off? Which refrigerator, freezer, room or container caused the alarm? At what time did the temperature deviation occur? How long did the deviation last? What is the temperature course and what was the highest or lowest temperature measured?

## Precise temperature measurement

The TubeSense® ThermControl temperature sensors are of the highest quality available and have proven their reliability. The type certified sensors also do not require periodic calibration. As the sensors are completely wireless, they can be easily placed anywhere in a refrigerator or freezer without requiring any modifications. The communication protocol used means that energy consumption is particularly low: the replaceable batteries have a life of 2.5 to 3 years.





## Robust communication

The temperature sensors communicate with the gateways (receivers) based on the extremely robust Mbus protocol. By using very low radio frequencies, they are able to communicate over large distances (up to 20 km!), whereby difficult materials such as metal, liquids and concrete walls are hardly an obstacle in a typical hospital environment. The low communication frequency does not cause unwanted interference with medical equipment or hospital communication devices. In most cases, one to three gateways will suffice for a medium-sized hospital, but for very large or complex buildings, this can easily be extended. If required, the gateways can be equipped with a 4G module in order to continue functioning flawlessly even in the event of a network failure.

## TubeSense® offers:

- Peace of mind, as blood products, reagents and temperature-sensitive medication are safely guarded in the refrigerator;
- A fully automated alarm system that is immediately activated in the event of deviating temperature measurements;
- A highly reliable wireless temperature reporting system that complies with GDP guidelines and ISO-15189 standards;
- A Cloud solution in which temperature registrations are safely stored, processed and reported on the server. Also useful for audit trails!
- Easy installation and commissioning, as the wireless communication system does not require any adjustments to the cooling system.

## More TubeSense® solutions

TubeSense® offers a versatile software suite with specific solutions for hospital logistics. The TubeSense® Hospital Logistics module is specifically designed to regulate and monitor both internal and external transport of, for example, biological samples, PGM and medicines. The package includes modules for tracking & tracing, planning pickup & delivery routes, monitoring transport conditions and registering transport data ('proof of delivery'). The TubeSense® modules HomeCollect, Lab and Pharma are specifically aimed at the temperature-controlled transport of individual samples, transport boxes with PGM and temperature-sensitive medicines. All modules are based on the secure TubeSense® Cloud solution, where front-end applications and dashboards are available for both personal computers (MS Windows) and mobile phones (Android).

## TubeSense® sensor specifications

Temperature range	-50°C to +150°C
Accuracy	+/- 0,3°C
Sensor type	NTC 20k / Optional: 2 x NTC
Frequency	169.431250 MHz
Data Rate	2.4 kbps
RF Power	27 dBm / 500 mW
Range	20 km line-of-sight
Antenna	SMA female connector
Transmission cycle	Adjustable
Battery life	Approx. 2,5 to 3 years
Data format	Wireless M-Bus OMS
Transmission mode	N
Manufacturer ID	SEO (1E85H)
Power supply	1 x of 2 x AA Li Cell
Quiescent power	< 6 µA
Housing	Impact-resistant plastic (ABS), waterproof
LED	Activity LED
Dimensions	132 x 81 x 32 mm