

TEKON

CASE STUDY

# TEMPERATURE MONITORING IN HOSPITAL ENVIRONMENT

## MEDICINES STORAGE AND COMPUTER SERVERS

Solution for monitoring storage equipment  
and areas of operation with high impact.





## OBJECTIVE

Monitor temperature of the equipment where medicines are storage, intended for users of Loulé Hospital.

Supervise the ambient temperature of server room, which supports the computer network of the entire hospital infrastructure.

## SOLUTION



### TRANSMITTER

The temperature regesting was performed by the DUOS Temp, from DUOS wireless product family. In this way, it was possible to guarantee the temperature monitoring, without the need for fixed points of permanent power supply for each transmitter. Battery power ensures its performance and effectiveness in this process.



### REPEATER

The physical distance between the equipment / locations to be monitored, implied the user of a DUOS Repeater signal repeater, in order to provide wireless communications between the transmitters and the gateway, which incorporate the same dedicated network.

### GATEWAY

regarding the distribution of monitoring points, two DUOS IoT gateways were implemented, responsible for being the bridge between the aggregation of data from the transmitters and their availability in the cloud, for later consultation with the IoT platform.



### TEKON IoT PLATFORM

As a tool that allows native integration with the equipment of the DUOS wireless solutions, was used to visualize the data in real time. Alarms were also set up focused on the recorded values, thus creating a security layer, responsible for notifying registered users, of temperature deviations, which can compromise the quality of the monitored goods.





## TECHNICAL DETAILS

Goods of clinical nature, intended for administration to users of Loulé Hospital, have an increased susceptibility to exposure to temperature fluctuations, so they must be stored in places or equipment with controlled temperature.

In this particular application, the equipment used are refrigerators, found in the areas of Inpatient, Operating Room, Pharmacy and External Consultations / SAP.

Refrigerators in the Pharmacy and Operating Room areas store medications with an identical safety temperature range. In turn, the remaining refrigerators (Internment and External Consultations / SAP) store consumables without a regulated safety temperature, however they are stored in refrigerators in order to keep the product exposed to a

uniform and controlled temperature.

Given the context of the application and the impact of medications on public health, it is important to perform a periodic check on the monitoring equipment in order to detect opportunities for correction and ensure the reliability of the temperature monitoring process.

In this way, the DUOS Temp installed in the refrigerators, the external probe responsible for monitoring the environment temperature, is composed of a set of probe and cable with 0.5 meters, in order to streamline the periodic checks carried out by the competent entities.



## TECHNICAL DETAILS

Server room houses computer equipment that ensures the computer system and has an added relevance, in the correct operation of the hospital unit. These racks are cooled by air conditioning equipment, which cool the space, so that the equipment does not reach a critical temperature for operation.

In this space, was installed a DUOS Temp that monitors the temperature of the space and makes the data available in the cloud, alongside the data from the refrigerators.

After initial configurations, the data from the transmitters, stored in the cloud, are readily available on the Tekon IoT Platform. Access to information is restricted to the heads of each service, who can freely view the data at any time. The data arrangement was organized in a dashboard, dedicated to each of the sections where the transmitters are located.



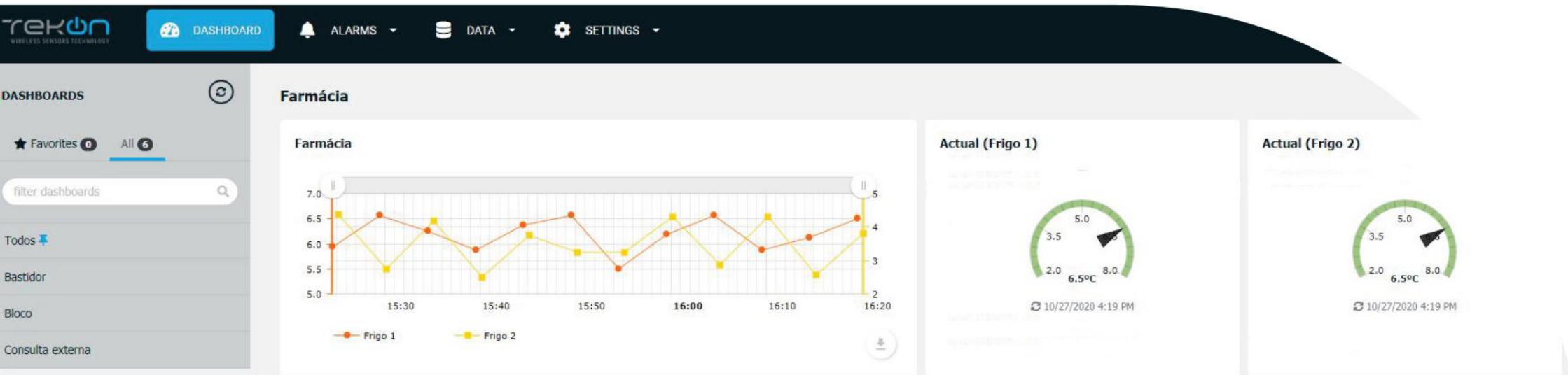
## TECHNICAL DETAILS

The alarm system, prevents offsets from normal operating standards, unnoticed from the responsables of each section. So, the alarms set, in addition to the visual notification on the platform, also issue alert notifications via SMS or email, to the nursing chiefs, pharmaceutical chiefs and server administrator of the respective service, who are notified about the offsets recorded in the variables:

- **Temperature** - records of the external probe of each transmitter;
- **Inactivity** - connection loss with the gateway;

Tekon IoT Platform management is from responsibility of the IT department from Loulé Hospital, which defines user accesses and the necessary dashboards for data visualization.

All transmitters were installed autonomously by technicians from the IT department of Loulé Hospital, with no need for technical assistance from Tekon Electronics.





## CONCLUSION

The legal requirement to the storage of pharmaceutical products in controlled temperature equipment, guarantees the quality and effectiveness of the product, when administered to users undergoing treatment. The monitoring of the storage refrigerators temperature assumes an important role and an almost direct relationship with the users' health.

Loulé Hospital manifests a preventive and careful posture, in the preservation of its hospital assets, and provides to its users, drugs with the quality and prognosticated effects.

Temperature monitoring in the racks where the computer servers are located, certifies that the environment will always be in the ideal conditions for the proper functioning of this equipment, which manages the hospital circuit.



## THANK YOU NOTE

Tekon Electronics expresses its thanks to the Loulé Hospital institution, for the acquisition of our technological solutions and availability for sharing this project. It proved to be an opportunity of added value that allowed us to evolve as professionals.

We wish you the greatest professional success for the future and that you continue to make your valuable contribution to society.



# Hospital de Loulé

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