EXAMINATION OF INTELLIGENT MEASUREMENT SYSTEM (IMRE) APPLICATIONS

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Abstract

Building management systems of the cold storages also perform measuring functions, so with the help of an appropriate algorithm, each parameter of the cooling system can be checked with great confidence. Chilled food transportation and distribution does not have much of this kind a high-tech system. In delivering food to local retail stores, it has a significant share in smaller, simpler refrigerated lorries or vans. With these systems, supervision, monitoring the temperature it is usually not possible for the driver. As a result, food safety risk in the transport of refrigerated isothermal operating safety, measurement, data collection will be in focus.

In the case of an examined system, the task of the diagnostic is to quantify the parameters by comparing the parameters with the expected values to determine whether the system is functioning properly. When using instrumental tests, we infer from some measurement data the right functionality. If the parameters are within the expected limits, the test ended with good result, even if there are some malfunctions during operation. Short-term or momentary measurements cannot detect the problems or deficiencies that cause problems. After few hours of continuous data collection and visualizing, a change in the measured parameters can be detected even if there could not be identified any irregularities during measurements. Graphic display of the data allows visual evaluation, so analysing the measured parameters in function of time can easily and quickly reveal the hidden failure.

The IMRe (Intelligent Measuring System, in Hungarian **I**ntelligens **M**érő **Re**ndszer) device shall be setup one time, then no further user command (resetting the device) shall be required. To ensure the device can always restart itself when an issue detected an additional monitoring micro-controller must be added which restarts the main micro-controller if needed. When data is measured, it is uploaded to a server. An input or data record value may be further processed and then stored in a feed which collect all the data received. A feed then can be visualized using line plots or bar diagrams or other methods. Visualisation of different feeds can be grouped together into a single page. A group of visualisations arranged by the user is called a dashboard. Each user can have several dashboards. These dashboards are freely editable, and expendable based on the usecase needs.

In our study we identify a hidden failure in the cooling system only by analysing the data collected by IMRe. Faulty behaviour was caused by a misplaced sensor. The temperature sensor collects air temperature data instead of the temperature of the evaporator, in this way sending incorrect data to control system of the cooling unit. The temperature sensor faultless, elements of cooling system are correct, the defective operation simply caused by the incorrect data signal coming from the misplaced sensor. To eliminate the problem temperature sensor was placed between heat exchanger disks. Subsequently, a few days of testing had a good result.

Key words: wireless data analysing, diagnostic, measuring system, microcontroller