



Each shelf location is equipped with an RFID read/write device that reads the RFID tag underneath the box as soon as it is stored

Seed Center

KWS optimizes and secures its seed production with Turck's RFID solution for the wireless identification and temperature monitoring of silo boxes – Profinet S2 redundancy included

As one of the world's leading seed specialists for corn, sugar beet and cereals, KWS Saat SE & Co. KGaA uses state-of-the-art plant breeding methods to increase farmers' yields and further improve the resistance of plants to diseases, pests and abiotic stress. This

requires the seed to be propagated and processed under controlled climatic conditions and to high standards of quality. In the sugar beet seed production facility at its Einbeck site, KWS prepares the sugar beet seed in a highly automated, multi-stage process. The

»This is the perfect solution for us. The measured values are transferred wirelessly and the storage boxes are identified without contact.«

Dr. Joris van Dort | KWS



seed is transported fully automatically into boxes between the individual process steps and stored in a dynamic high-bay racking system. The temperature inside the storage boxes has to be determined and monitored at all times and as accurately as possible in order to ensure seed quality.

High availability thanks to Profinet S2 redundancy

The seed must meet certain requirements, for example, in terms of tolerance to various diseases or drought. The relevant data is exchanged and processed in the system between a server and the controller. "If silo data were lost as a result of a control system failure, it would no longer be possible to track which seed is stored in which box," says Christian Fricke, technical innovations team leader at KWS. "In this case, there would be nothing left to do but dispose of the seed that could not be identified. For a high-priced product that can't be reproduced at short notice, this is obviously not desirable."

The required warehousing system must therefore guarantee maximum availability and data security. Profinet-based systems can be designed for these tasks with a redundant controller, referred to as S2 redundancy in the Profinet specification, and Turck's compact TBEN RFID interfaces with Profinet S2 system redundancy for highly available systems meet this requirement. In the event of a controller failure, a parallel PLC takes over the process control automatically and without any loss of data. Another benefit: The robust RFID interfaces with IP67 protection can be mounted directly in the warehouse without a protective housing.

Wireless power and measured value transmission

A robot takes over in the treatment process the dynamic removal and placement of the boxes on the appropriate shelf location. As a result of the production team's previous experience, the new solution focused on contactless power and signal transmission:



Turck's TBEN RFID interfaces with IP67 protection are screwed onto a metal panel in a cabinet-free installation in the warehouse

QUICK READ

KWS Saat SE & Co. KGaA is the world market leader for sugar beet seed and supplies its customers with seed varieties for conventional and organic farming that are specially tailored to their requirements. To do this, the seed must be propagated and processed under suitable climatic conditions. In this highly automated treatment process for sugar beet seeds, Turck's BL ident RFID solution ensures the contactless transmission of power, address data and measured values from temperature sensors inside silo boxes and ensures high plant availability – also thanks to Profinet S2 redundancy made possible by the RFID interfaces. The possibility of automatic address assignment and Turck's unique HF bus mode for connecting up to 32 HF read/write devices per port guarantee fast installation, efficient storage and easy device replacement for service tasks.



»The fact that the Turck solution uses HF bus mode suited our requirements perfectly. This enabled us to install the RFID read/write devices for a rack without any major effort and we just had to connect the pre-assembled cables with T pieces.«

Christian Fricke | KWS

“In the previous system, signal transmission was via contact pins underneath the box,” Christian Fricke explains the initial situation. “However, any contamination on the contact pins or inaccurate placement of the boxes on the pins kept causing downtimes in production, and so we looked for a better solution.”

Turck’s RFID solution provides RFID tags at the bottom of each box with an attached sensor element that measures the temperature inside the storage container. Each shelf location is equipped with an RFID read/write device that reads the tag on the box as soon as it is stored. The read/write device supplies the temperature sensor with power via the voltage induced in the tag. This completely eliminates the maintenance effort required with a battery-powered solution.

Automatic identification of the seed storage boxes with RFID

The boxes are managed by the control system of the high-bay supplier. At the same time, a process control system receives the booking telegrams from the controller. For example, if a box is moved to a new position, the process control system updates the entries in the database. “The storage system remembers where a box was stored,” Christian Fricke explains.

RFID technology enables unambiguous and complete monitoring of all boxes during transport and storage. The ID stored on the RFID tag on the bottom of the box can be used to check whether the box is at the correct shelf location. If there are any discrepancies, a stock reconciliation is carried out. The RFID system thus provides the basis for verifying the



The RFID tag has a sensor connected to it which measures the temperature inside the storage container



Thanks to Turck's HF bus mode, the HF read/write device can be connected very easily to each shelf rack using T pieces, thus considerably reducing wiring effort and costs

database information. "This is the perfect solution for us," says Dr. Joris van Dort, technical innovations manager at KWS. "The measured values are transmitted wirelessly and the storage boxes are identified without contact."

Fast commissioning thanks to HF bus mode

A key requirement for the new system was the avoidance of the complex geometry of the old solution and its large cabling and wiring overhead. Turck's RFID interfaces stand out here with a feature that is unique in the market: HF bus mode. This function allows the connection of up to 32 HF write readers per port. In applications with many write and/or read positions, this considerably reduces the wiring effort as well as costs. Temperature values and IDs are read cyclically. This makes it possible to implement continuous temperature monitoring. The read values can also be assigned to the containers at any time. "The fact that the Turck solution uses HF bus mode suited our requirements perfectly," said Christian Fricke. "This enabled us to install the RFID read/write devices for

a rack without any major effort and we just had to connect the pre-assembled cables with T pieces."

Benefits of automatic addressing

The automatic addressing of the RFID read/write devices proved to be a major benefit of the Turck solution both for commissioning and for service operations. After connecting with the T pieces, the devices are automatically assigned addresses which were activated in the web server. If a device is faulty and has to be replaced, the TBEN registers which read/write device is missing when it is removed. If a new module is connected, it is automatically assigned the address of its predecessor. It is no longer necessary to store preconfigured replacement devices or carry out any time consuming addressing of replacements for service tasks.

Author | Thorsten Enthöfer is product manager for RFID HF systems

User | www.kws.com

Web code | more12353e