Data on the Hook

Turck's BL ident HF RFID system is robust and fast enough to track and trace the meat production in a Chinese slaughterhouse.

The RFID tag TW-R10 is reliably protected in the metal hook against mechanical damage. In contrast to LF tags the hook has not to be slotted

Since meat products have become a standard in the daily diet of Chinese consumers, the quality assurance of meat production has become a key topic of discussion in the Peoples' Republic. The Chinese administration therefore decided to establish the supervision and tracking of meat production in China. It supervises the whole process from breeding, slaughtering, processing, distribution to shops, and enables the origin of the meat product to be traced so as to establish a food safety pre-alarm mechanism.

The information is reported at municipal level so as to enable the supervision authorities and the public to trace and track the whole process on this platform. This particularly applies to the slaughterhouse, the central hub of many processes and difficult to monitor. The animal arrives here alive and leaves in individual packages. Due to the higher standards of hygiene here compared to when the animals are reared or when they are later packaged after slaughter, the requirements involved are much tougher. The slaughterhouse determines the reliability of traceable meat production, and is always the weakest segment in the entire tracking management chain.

Customer requirements

To implement the tracking of the pork across all process levels, every pig is provided with an electronic earring containing the relevant data. However, the location of the electronic earring on the pig's ear is not suitable for collecting data during operation. This data is transferred to the database of the slaughterhouse when the pig arrives. As every piece of pork is hung on the same hook during the entire process it made sense to fit an RFID tag on the hook.

Several read/write heads are installed beside the production line, which can acquire the information of every piece of pork along it. The continuous correct identification of the pork depends on the correct allocation of the data on the earring to the corresponding tags on the hook. If quality issues are found already at the initial examination in the slaughterhouse, the relevant information is recorded in the RFID tag attached to the hook; and that piece of pork will also be diverted to a special storage zone to prevent any further processing.

TNSLR-Q42TWD with protection class IP69K is the ideal read/write head for use in meat production

The read/write heads read the data from the tag to track production in real time. At the final packaging stage, the pork information is transferred from the tag to a database and linked with a tag on the packaging.

Large ranges and high speeds
Thee key requirement when selecting the BL ident RFID system from Turck was its ability to read and write eight bytes of data on the fly, i.e. within the usual conveying speed. The project manager of integrator Beijing Zhihengda Sci & Tech Co. Ltd. was also impressed by the simplicity and flexibility of the system, which can be parameterized easily without the use of any function blocks. Besides the eight connected read/write heads, other analog or digital signals can be connected to each BL67 gateway, acting as an RFID interface. If additional control points are required, both RFID modules as well as standard I/O modules can be added. This considerably keeps the costs per node to a minimum. The large range of the Turck read/write heads protects tags and read/write heads from mechanical damage.

LF and UHF solutions unsuitable
Alternative frequency bands such as LF and UHF RFID solutions were not suitable for the application. The frequency of the LF RFID was very similar to that of the motors on site so that reliable RFID operation was subject to considerable interference. Moreover, the read/write distance of LF RFID was not enough. The distance between RFID read/write head and tag is only approximately 30 mm, which could not fulfill the requirement at every station. The customer therefore required a larger read/write range to prevent damage to the tag or read/write head.

The UHF RFID products are also not suitable because their range is too large and multiple tags are read simultaneously by the read/write head. This is particularly a problem at high speeds. The slaughtering production line often passes the read/write heads at high speeds of 600 pieces/hour, and so it was not possible to determine which hook is passing through the station. Turck also developed the TW-R10 tag which can be embedded in the metal of the meat hook and thus be provided with reliable protection from

damage. The increased read/write range also enables the RFID readers to be fitted next to the conveyor belt where they are mechanically protected. The read/write heads are protected to IP69K and the tags to IP68. They are thus resistant to moisture and water and are also suitable for high pressure cleaning.

Turck tags can store 146 bytes. Thus all the necessary information can be saved on the tag, which increases safety in the event of a database error. Turck's HF system can detect the tags completely so that production is not slowed down through the use of RFID.

Conclusion
The adoption of the Turck HF RFID solution can not only solve all the existing problems, but also enhance the reliability and accuracy of the data acquired, so as to connect the entire tracking chain, raise production efficiency greatly and guarantee meat product safety.

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In a Chinese meat production plant Turck's RFID system is showing that BL ident with protection to IP67 to IP69K can meet both the demanding requirements of the sector for a robust design as well as the fast read/write speeds required in the meat processing industry. The tags are integrated in the meat hooks so that they cannot be damaged and nevertheless read reliably and quickly.