RFID tags on the workpiece carriers store production data and enable unique identification of the material on the carrier plate

Production Line in View

Chinese electric motor manufacturer ensures quality and traceability of stator production by using Turck's RFID system to track the workpiece carriers

With the rapid rise of electric vehicles in recent years, the automotive industry has changed considerably. Electric vehicles are increasingly replacing vehicles with pure combustion engines and promise a more environmentally friendly, low-noise and low-maintenance driving experience.

A key component of these vehicles is the electric motor, consisting of a stator and a rotor. Assembling the stator requires maximum precision, especially with regard to the winding and connection of the cables. The materials and components used must be logged throughout the entire production process and be traceable at all times. This ensures that the correct materials are used during production.

A Chinese automobile manufacturer therefore commissioned its system integrator to implement a solution for recording this data for its motor stator production in order to ensure the quality of the motors already in the production stage and to also be able to document the use of the correct materials over the long term. An automated identification solution was

QUICK READ

A Chinese system integrator automates the quality assurance and traceability of its customer's motor stator production using RFID technology. The company chose Turck's BL ident RFID system, which can be seamlessly integrated into the existing systems thanks to multi-protocol Ethernet. The solution enables flexible production on complex mixing lines, provides actual data for production management and allows comprehensive production monitoring. Turck's robust RFID technology guarantees reliable read processes even under harsh conditions, thus increasing the productivity and efficiency of the production line.

needed that would guarantee seamless monitoring and documentation of all production steps.

Digital workpiece carriers as the ideal solution

After carefully evaluating various technologies and making a comparison with optical identification using barcodes, the system integrator finally opted for an RFID solution to capture data from the entire production process. For this purpose, the workpiece carriers are fitted with RFID tags which record them digitally.

Digitized workpiece carriers with embedded RFID tags proved to be the ideal solution. They enable unique identification of the material on the carrier plate, as they can be read and written contactlessly and reliably, even in demanding environments. RFID tags can also store larger amounts of data and are more resistant to soiling than barcodes.

This ensures flexible production on complex mixing lines, as the information about each material and each stator is stored directly on the RFID tag of the respective workpiece carrier. This production data relieves the control logic of the information management system by enabling continuous and precise monitoring and adjustment of the production process.

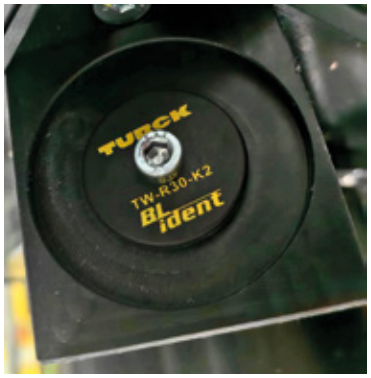
Improved traceability and productivity

At the start of the assembly line, the relevant data is written to the RFID tag on the pallet. Turck's Q80 HF read/write head with its extended read distance is used for this. As soon as a stator is placed on the pallet, the system writes a range of different information, including the product ID, from the Enterprise Management System (EMS) to the RFID tag. As this is a closed circuit application in which the workpiece carriers are reused within the system, no long-term documentation of the RFID data is required. For efficient and reliable data acquisition, the system integrator opted for a TBEN-S RFID interface, which as a Turck multiprotocol device also supports Profinet and offers a 16 kByte data buffer per channel for fast read processes. The Profinet capability enables seamless integration and fast data transmission in the production environment. The module provides a mode in which it automatically reports data to the controller as soon as a tag is located in the detection range of the read/write head. This automatic data reporting function simplifies the programming of the PLC and reduces the load on the control system and the network in the process.

The Q80 HF read/write head with its extended read distance used in the system guarantees reliable operation of the RFID system, even if a tag is not located in the center of the read range with millimeter precision. For the choice of tag, the system integrator opted for the TW-R30-K2 FRAM chip, which supports up to 10 billion write operations. Its 2 kByte data memory is sufficient for the process at hand.

By implementing Turck's RFID system, the system integrator was able to ensure reliable tracking of the materials during stator assembly. The production data collected in this way also provides a solid basis for identifying weak points and error sources and thus for the continuous improvement of production processes.

Turck's compact TBEN-S2 RFID interface ensures fast and reliable data transmission



With 10 billion write operations, the TW-R30-K2 also guarantees very good readability in the long term

Turck's robust RFID technology in IP67 ensures that the carriers can be reliably read even under harsh environmental conditions, thus increasing the overall productivity of the production line and leading to a significant increase in operational efficiency.

"By using Turck's RFID products, we have achieved reliable material traceability in the stator assembly process. This not only opens up the data flow in production, but also provides effective data support for production decisions," the system integrator sums up.

Author | Lin Qiang, marketing & product management department, Turck (Tianjin) Sensors Co.
Webcode | more22453e

Thanks to its large range, Turck's robust Q80 HF read/write head enables reliable RFID detection even if the position of the tags varies