



Turck's sensor-based complete solution ensures smooth round-the-clock operation of the AGVs

Fit for Purpose

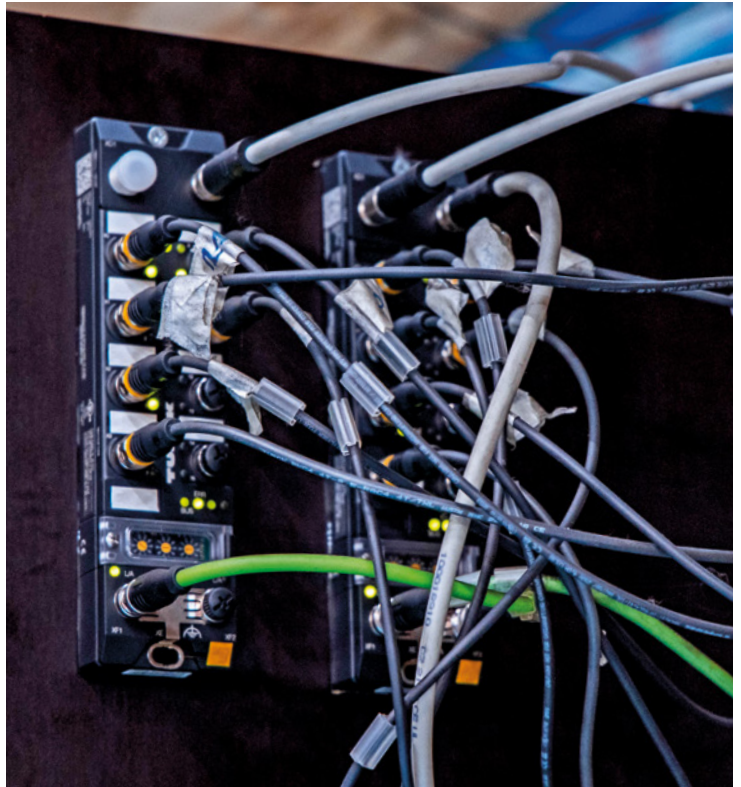
Proferro optimizes production and logistics efficiency as well as safety with automated guided vehicles – with round-the-clock control provided by a sensor-based complete solution from Turck

With over 80 years of experience, Proferro NV is one of the leading specialists in metal processing. Headquartered in Ypres, Belgium, the company manufactures custom castings and offers comprehensive services including cast iron production, machining, assembly and co-engineering for manufacturers of agricultural machinery or mining equipment, compressors, textile machinery and others. With its focus on quality and innovation, Proferro is a reliable, long-term cooperation partner and global partner for OEMs. An extensive machine park with more than 100 CNC-controlled machines and a dedicated team of around 600 employees are the basis for success. Smart automation is a central element of production.

In order to optimize safety and ergonomics for employees and make production and logistics processes more efficient, the company planned the introduction of a fleet of automated guided vehicles (AGVs). These were intended to replace the gas-powered forklift trucks previously in use. The forklift drivers often had to search for the right parts in the warehouse and do a lot of manual scanning, which led to frequent errors and delays. The AGVs now automate the supply and removal of cast parts for CNC machines and enable the maximum possible level of automation in order to eliminate time losses and errors caused by manual operation.

Robust solution for dusty environments

One challenge was the reliable control of the fleet, especially in the dusty production environment of a metal processing company, which requires a particularly robust solution. Reliable sensor technology is just as important as a robust system for recording, saving and transferring data to higher-level systems. "Our aim was an automated logistics solution that would enable just-in-time delivery of parts to the machines in the neighboring production plant," says Mathieu van Den Berghe, transformation manager at Proferro when describing the task. "A fully automated high-bay warehouse ensures that the required parts are already available at the pick-up points. However, the production itself was always a particularly challenging environment due to the dust and dirt present." A system for sensor-based data acquisition and wireless transmission would have to overcome these challenges and



The compact TBEN-LL-16DXP block I/O modules combine the sensor data and transmit it in real time

ensure the smooth operation of automated guided vehicles over the long term.

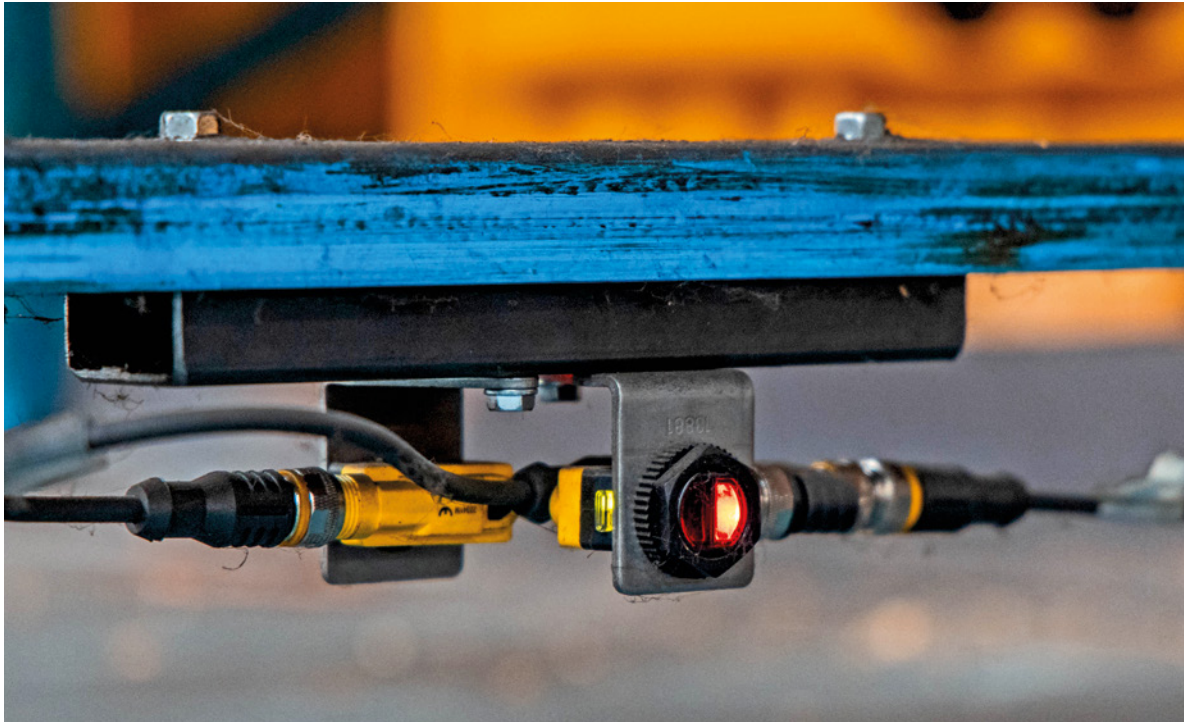
As an RFID system with vision cameras proved to be too expensive due to the large number of parts, Turck proposed an integrated solution with ultrasonic and optical sensors as well as robust I/O modules, switches and an IIoT gateway: "The Turck Multiprox team quickly made it clear to us that sensors alone would not be enough. Although they can reliably detect signals, an overall solution is required for correct data transmission to the target software for AGV control," explains van Den Berghe.

The proposed overall solution stood out on account of its simplicity and robustness. Retroreflective sensors, ultrasonic retroreflective sensors with a switching output and retroreflective laser sensors with adjustable background suppression form the basis. The installation of ultrasonic sensors under the shelves proved to

QUICK READ

As one of the leading specialists for high-precision metal castings, Proferro supplies OEM manufacturers worldwide in various market segments, such as agricultural machinery, earth moving equipment, compressors, textile machinery or mechanical engineering in general. To optimize ergonomics and safety for employees and make production and logistics processes more efficient, the Belgian company has introduced a fleet of automated guided vehicles (AGVs). Turck Multiprox developed a sensor-based complete solution for autonomous and reliable round-the-clock control of the AGVs.

The QS18 optical sensors react reliably to the light reflected by the object



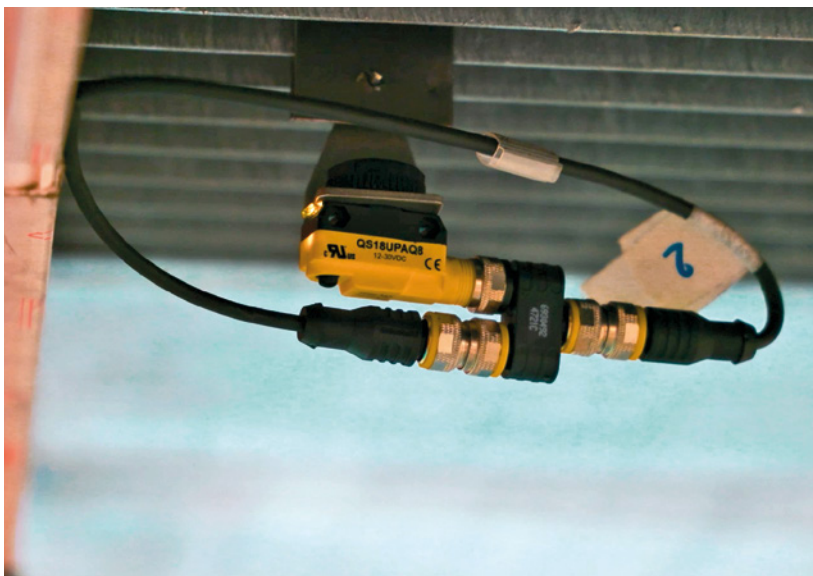
be particularly effective, as this prevented the accumulation of dust deposits. Light barriers and lasers were also used to detect pallets on the shelf.

Real-time transmission and flexibility thanks to multiprotocol

The sensors reliably detect the presence of a pallet and continuously transmit this information to the TBEN-LL-16DXP, the heart of the system. This compact block I/O module with 16 universal digital channels, which can be configured as inputs or outputs, bundles the sensor data and transmits it to the controller in real time. With its IP67 certification, it is protected against water and dust, allowing it to be installed in the field without the need for an additional control cabinet.

This makes it particularly suitable for the intended use in the demanding production environment of a metalworking application, where reliability and durability are crucial.

Another benefit of the block I/O modules is the Turck multiprotocol concept. This enables the modules to automatically adapt to the Ethernet protocol spoken in the network, whether Ethernet/IP, Profinet or Modbus TCP, without any intervention by the user. In this way they can be used flexibly in different systems without the need for complex adaptations. This versatility not only simplifies integration into existing infrastructures, but also makes Turck's overall solution future-proof, as it is compatible with a wide range of systems.



To prevent dust from accumulating, the ultrasonic sensors are protected under the shelves

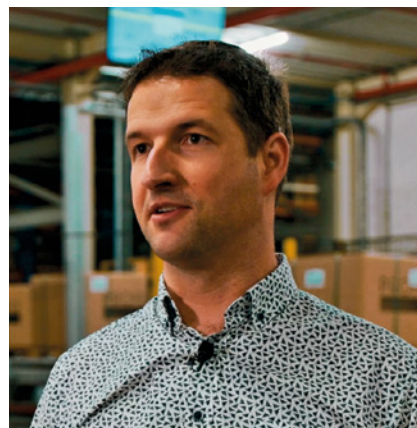
Robust network infrastructure and efficient data transmission

Turck supplied TBEN-L5-SE-M2 managed Ethernet switches to implement a robust network infrastructure. The compact 10-port switches with a GBit high-speed backbone guarantee short cycle times and reliable operation at the highest data rates in the IIoT. The high-speed link-up function supports fast tool changes in under 150 ms for minimum cycle times. Thanks to the decentralized mounting option directly in the field, the switch also reduces the amount of wiring required.

In addition to the switches, the TX700Q was implemented as an IIoT gateway. It forms the interface between the sensors and the higher-level system and controls data transmission and processing as a PLC, which reduces the complexity of the overall system. The TX700Q is particularly suitable for less complex applications, as it enables simple integration into the existing infrastructure. With its three RJ45 Ethernet ports and a serial interface, it offers enough interfaces

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Mathieu van Den Berghe | Proferro



for communication with different devices and systems. The gateway also supports the programming of logic functions using Codesys, which facilitates customization to specific application requirements and shortens implementation time.

The combination of the TBEN-L5-SE-M2 switches with the TX700Q IIoT gateway ensured reliable and efficient data transmission into the production environment. "Besides the hardware, Turck Multiprox also supplied a Codesys software solution to implement the integration with our WMS system. Our AGVs are controlled autonomously and reliably thanks to Turck's solution," van Den Berghe explains.

Autonomous AGV control round the clock

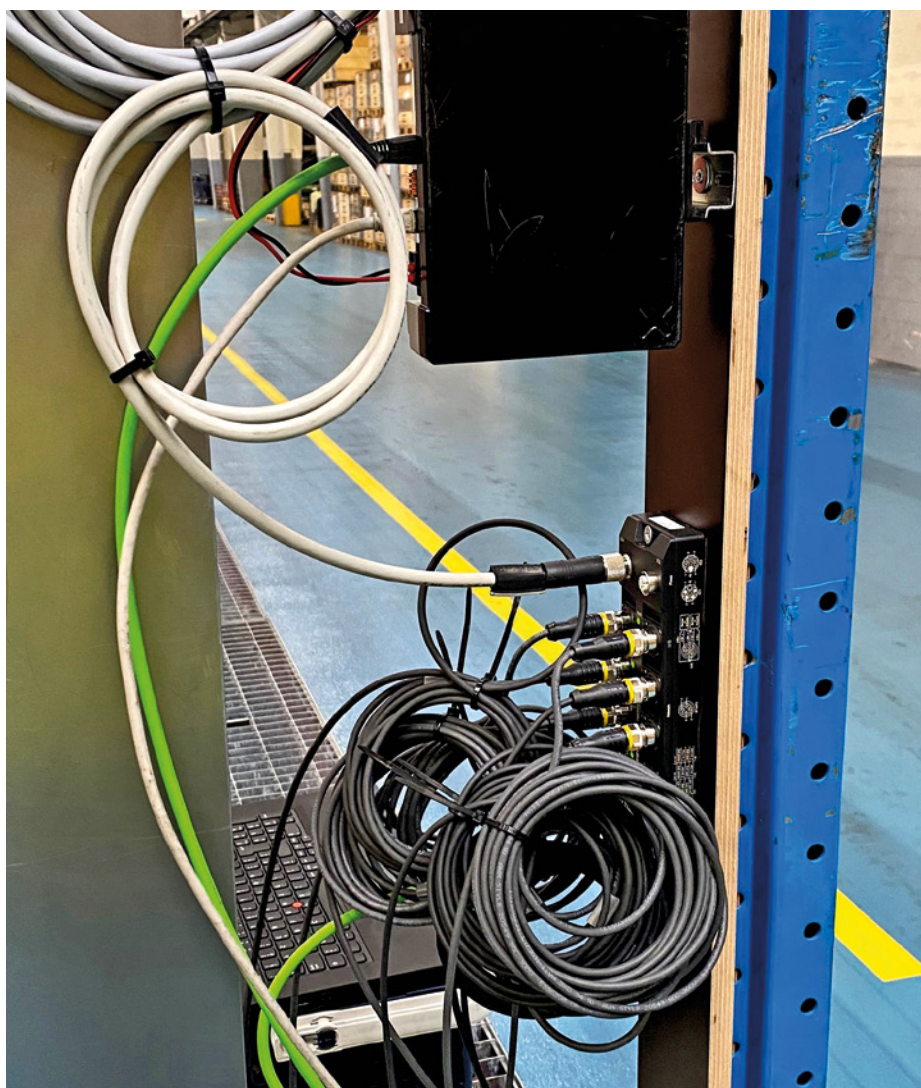
The new solution enables Proferro to now reliably detect whether pallets are present and transmit this data wirelessly to higher-level systems. This information forms the basis for the autonomous control of the AGVs and thus enables smooth operation round the clock.

"Two key elements were critical for the successful implementation of this solution," Mathieu van Den Berghe sums up. "The software to reduce complexity and enable easy monitoring, as well as the reliability of the sensors. Our experience to date has shown that Turck components offer perfect reliability and require no maintenance. This makes it an extremely cost-efficient and robust solution – exactly what we were looking for."

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The TX700Q IIoT gateway not only acts as an interface between the sensors and the higher-level system, but also as a PLC