

Final inspection: Turck's RFID read/write head (above) identifies the bumper to be examined using the tag fixed inside it, the Sigma middleware Graidware shows the appropriate data set on the display



# Bumper Transparency

System integrator Sigma uses Turck's BL ident UHF-RFID system and its Graidware middleware to ensure complete transparency in bumper production at car parts supplier Magna

In marketing psychology, consumers that make use of new technical innovations at an early stage are called early adopters. The early adopter is the first to use a cell phone, the first to switch from a cell phone to a smartphone, and is the person who has

already been using an e-book reader for several years. Without doubt, the most important early adopters in industry can be found in the automotive sector. They made use of new materials like carbon for standard products early on and have always been trailblazers in



have no relevance for the position concerned. Together with Turck's RFID specialists, the experts at Sigma were able to solve all of the challenges of this pioneer project and fully exploit the benefits of an RFID system for the customer's production plant.

Magna Exteriors and Interiors (MEI), a wholly-owned operating unit of Magna International has capabilities including design and engineering, styling, tooling, manufacturing, assembly and sequencing, testing, continuous improvement, consumer and market research, benchmarking, and electrical/electronic system integration, among others. The products include front and rear fascia systems, sealing systems, exterior trim & lighting, class A composite panels, modular systems, engineered glass, under hood & underbody components, and structural components for automotive, commercial truck, renewable energy, consumer, and industrial markets. With its new location in Meerane, West Saxony, Germany, Magna International Inc. expands its net-work of manufacturing sites in Europe. Since August 2012 MEI Meerane has produced front and rear bumpers for the VW Golf VII and delivers these "just-in-sequence" to Volkswagen Saxony at the site in Mosel.

### Decision for RFID and UHF Technology

The management of MEI Meerane decided during the planning and development phase of the new site to use RFID technology for automated manufacturing and logistics management. The use of barcodes at other Magna production sites, has been assessed and discarded since the RFID solution is more flexible. In addition, scan operations with RFID compared to Barcodes are much faster and less error prone.

At the beginning of the project, due to the longer reading range, UHF RFID was determined to be the standard. Filters that are built in to the Graidware AutoID software, developed by Sigma Chemnitz GmbH, eliminate unwanted or unusable signals that result from confined space use of UHF RFID.

### Transparent process

When the raw bumper leaves the injection machine it is immediately equipped with a RFID tag which is registe-



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**Frank Pyritz,**  
Sigma

production automation. Car manufacturers were some of the first people to use fieldbuses – and today belong to the pioneers of the transition to Industrial Ethernet. Order lists and work pieces have been identified automatically for a long time – firstly using a barcode and increasingly by RFID.

It was a major car parts supplier, Magna Exteriors and Interiors (MEI), for whom the Saxony-based system integrator Sigma implemented a seamless RFID-based production control system last year. Utilizing UHF RFID allows for long sensing ranges. However, these long ranges presented the integrators with considerable challenges. Often the read/write heads detect tags that

#### Quick read

In collaboration with Turck, the Saxony-based system integrator Sigma proved at car parts supplier Magna that, with the right technology and clever software solutions, fully automated UHF-RFID identification solutions can be mastered without having to install inconvenient shielding measures due to the long sensing ranges involved. Today the customer is able to fully exclude the possibility of false reads in its bumper production plant using intelligent software logic.

The quality assurance and polishing workstations are also fitted with UHF readers such as the Turck TN865-Q150L170-V1147



red and managed by the software. This allows tracking and tracing the bumpers during the entire production and logistical process. Prior to lacquering, the position of the bumper inside the skid is detected by a reader, and captured by the middleware. This is used to track the production quality. After the lacquering process the entire paint shop data is automatically linked to the bumper.

Then the bumpers are placed into storage containers according to product type. Multiple RFID readers monitor the correct storage of the bumpers into containers. The AutoID middleware Graidware not only captures the signals, but also checks the signals for plausibility using sophisticated algorithms. Interference signals from neighboring transportation routes or passing forklifts are recognized as false signals and filtered out. The inspected storage containers are stored temporarily until the next request is being recorded. The location of the container is also captured and managed.

After the final production call the painted bumpers are equipped with harnesses, distance sensors, fog lamps, etc. depending on the configuration. The RFID tag controls the machine via an OPC server, displays the next production step, the configuration of the bumper and loads the appropriate machine program for the welding and punching operations. In case of incorrect

placement of the bumper or the wrong machine the operator of the machine receives an alert. Only after explicit confirmation by the operator will the machine start executing the program. Thus operating errors and scrap will be reduced. Upon completion of the production step, and after completion of quality inspection, the bumpers are placed on the appropriate frame for the just-in-sequence delivery for the customer. Finally, the position of the bumper on the frame is checked, since the position on the frame is essential for the further production at the customer site.

### Benefits of the Solution

The data captured during the production process is forwarded via Graidware to 3rd-Party-Applications such as ERP and WMS systems. This enables the customer to monitor the production in realtime. By applying the tags to the parts (bumpers) the customer will be enabled to completely track and identify the parts on the shop floor and the warehouse until the part leaves the site. In addition, statistical data can also be analyzed to improve the production quality, avoid complaints and thus optimize costs. Faulty manual barcode scans are prevented and training of new employees is less time consuming. This leads to a significant reduction



in process time and costs. Sigma Chemnitz GmbH was selected by MEI as partner for implementing the RFID UHF solution in Meerane. Turck was selected as the supplier of the RFID hardware because its hardware met the requirements for an industrial production environment.

### The full range

Sigma utilized Turck's full range of automation products for the project, and this started with the UHF read/write heads in three housing styles. Sigma used the Q150 readers for the shorter ranges of up to 1.5 meters. Longer sensing ranges were required at other positions, which were implemented by the customer with Q240 read/write heads. For some special process steps, the largest type Q280 UHF readers were required which have maximum ranges of 5 meters. Many read operations per unit of time were required for this project, as well as the long sensing range. Sigma chose robust BL67 gateways with the appropriate I/O modules, which Turck also supplied in addition to the connection cables, power supply units and sensors.

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way of the BL67 I/O system to which the modules for the readers are also connected – regardless of whether they are sensors from Turck or not," Frank Pyritz, Sigma managing director, as he describes one of the benefits of the Turck system.

### Production start on schedule

The first request for quotation was in May 2011, just 15 months later MEI could start production on the shop floor on schedule. "It's quite remarkable if such a complex project is on time. We were able to start production at our facility ahead of schedule" commented Jens Turschner, Project Manager at Magna Exteriors & Interiors Meerane. He added: "For those kind of projects it will only work if all parties cooperate. In Sigma we have found a partner that not only has implemented what we wanted, but suggested valuable improvements in many areas."

Hendrik Rothe, managing director of Magna Exteriors & Interiors (Meerane), didn't regret the decision for Sigma and Turck, too: "We are very satisfied with the solution. We could start production on time and our processes run without errors. By eliminating time consuming steps we have achieved a significant improvement in processing times", he summarizes. ■

**The UHF read/write heads (above) monitor the storage of the bumpers in the containers**