

SIEMENS

SIMATIC Ident

Reference

Edition  
07/2014

# Transparency meets Efficiency

## RFID Technology optimizes Supply Processes for Drugstore Chain

Optimizing the supply to over 700 chain stores throughout Europe was the motive for a renowned drugstore chain to comprehensively employ RFID technology in the warehousing ((goods traffic)). The now wireless identification and verification of correctness and direction of all roll cages during the loading of the trucks reduce incorrect deliveries to a minimum. At other places in the warehouse network, too, logistics processes become more efficient and transparent with that.

From its headquarters in Ulm-Jungingen, Germany, the drugstore chain Müller supplies over 700 stores at home and abroad with traditional drugstore goods, multimedia products, toys and stationery, materials for store design and much more. For this purpose, the company operates a central warehouse, to which several field warehouse in the surrounding area are linked. In the central warehouse, the flows of goods come together. In here, the shipments for the chain stores are consolidated and loaded onto trucks or swap bodies. Especially during peak times – such as the weeks before Christmas – this represents a logistical challenge, when up to 25,000 roll cages (dollies) have to be order-picked and filled daily in two shifts.

A dolly consists of several small and/or large transport crates, which are assigned to a pedestal as well as a store order via barcode scanner, filled with the goods ordered and then assembled into truckloads by hand and/or automatically. Double-stacked, 132 dollies fit into a swap body – averaging 140 truckloads per day.

Together with the increased handling rate, incorrect deliveries and thus complaints from the stores increased as well, which necessitated extra work for additional deliveries. In the future, this is to be avoided, while at the same time increasing the efficiency and transparency of the intralogistics – also at other places in the central and field warehouses.

Answers for industry.



**Image 1:** On over 18,000 dollies per day, the goods order-picked from several warehouses are assembled to store deliveries and loaded onto truck in the central warehouse



**Image 2:** Two RFID antenna pairs, activated by motion sensors, contactlessly read the transponders/tags on the dollies and in doing so recognize the correctness of the goods and the load direction

### RFID for optimized Processes

Targeted from the very beginning was an RFID solution by Siemens with contactlessly readable and writable data media (transponders/tags). In initial experimental setups, this solution has proven to be very efficient and economical. For the goods issue in the central and field warehouses as well as for the extensive materials handling area, customized Siemens RFID solutions were developed. For their connection to the higher-level warehouse management system "LISA", the mercatis information systems GmbH of Ulm, Germany, was retained, which has been maintaining the system for many years. Operator of the warehouses is the Drogerie-Dienst (Drugstore Service) Ulm GmbH – a logistics service provider and wholly-owned subsidiary of Müller.

### Goods Issuing practically error-free

To improve the goods issue processes at a total of 50 loading ramps/gates (Image 1), of which over 30 are in the central warehouse, an installation on the basis of the RFID system SIMATIC RF600 was developed, implemented and – during running warehouse and delivery operations – optimized. The gates are the interface between warehouse and truck

(chain store) and a highly frequented, potential error source. To largely rule out incorrect deliveries, each gate is equipped with a reader of the type RF670R, to which two pairs of RFID antennas of the type RF640A (Image 2) are connected. The antennas cover the area in front of the gate and/or in front of the truck, and are each activated (triggered) to read by two motion sensors. The range of the antennas to the left and right of every gate is adjusted and algorithmically monitored to only capture roll cages that are passing through the corresponding gate and not a neighboring one, which could be possible due to the range of the UHF system. By reading twice one after another, a simple but efficient way of direction monitoring was created. From the direction, the system automatically recognizes whether dollies are loaded or unloaded. Successful read operations as well as read errors or incorrect loading processes not conforming to target specifications are acoustically signaled to employees and also visualized on the touchscreen of a SIMATIC IPC477D industrial PC. The loading progress is clearly depicted as well. Location and status of still missing dollies can be viewed on the higher-level warehouse management system. The RFID readers SIMATIC RF670R communicate via TCP/IP-native and XML messages with the associated industrial PCs, which are connected over Ethernet to the warehouse management system.



**Image 3:** The RFID tags SIMATIC RF630L are affixed protected to approximately 190,000 dollies and store their unique number

The individual dollies are uniquely identified and thus assigned to a specific loading/store order by means of an RFID transponder of the type RF630L made of durable plastic (Image 3), which is glued into an indentation for protection. The self-adhesive tags contain a so-called dogbone antenna and the actual RFID chip. All approximately 190,000 dollies in circulation will gradually be fitted with this tag. Damaged tags can be easily replaced at any time and registered anew in the warehouse management system using the handheld reader SIMATIC RF680M. The read quality is constantly monitored.

The configuration and commissioning software SIMATIC RF-MANAGER Basic contributed greatly to the speedy implementation and optimization of the overall system. In conjunction with the new reader firmware for the RF670R, all relevant setting for antennas, data sources, read triggers, etc. can be conveniently made with it on a networked PC. "We optimized the RFID system at one gate and then simply transmitted the configuration to all others and fine-adjusted it via the RF-MANAGER," states Uwe Lindner, logistics project manager at the Drogerie-Dienst Ulm GmbH.

### Material Handling integrated

Somewhat easier was the integration of the RFID systems at several read stations along the materials handling in the central warehouse and in the new, fully Siemens-equipped warehouse Ulm-North. Issues here involve placing the order picked transport crates – which have been handed over to an automatic sorting system – on "tagged" dollies and individually channeling them into the specified supply process. For the identification of the dollies on the conveyor route, the reader RF630R with two external antennas RF620A each is employed. The simple and convenient integration into the SIMATIC automation systems and the compact form factor distinguish the products used. The readers are optimally prepared for the application in metallic environments thanks to high interference immunity and special algorithms. "Extremely valuable in this environment was the updated reader firmware V2.0, which – among other things – made adjusting the transmitting power to the prevailing conditions very user-friendly," says Uwe Lindner. I.e., the so-called power-ramp algorithm enables the gradual increase of the power of an antenna. Compared to a constant power setting, the advantage is that the power only increases until a transponder is detected. This avoids high power settings and limits side effects such as overshooting or interfering with neighboring reader applications. The algorithm works antenna-specifically; each individual antenna can thus be optimally adjusted, which greatly accelerated the setup in this project.

### Transparent, efficient and highly available

"Currently, the read rate of the Siemens RFID system is over 99 percent, which drastically reduces, nearly eliminates, incorrect deliveries in comparison with the previous process, where only visual inspections were made by employees," confirms Uwe Lindner. Furthermore, the automatic documentation of all goods movements in the warehouse management system simplifies tracking & tracing and enables conclusions regarding optimization potential to be drawn. "The functionality is right and the availability of the overall system is very high. From our perspective, the investment has paid off."

Armin Haaf as well, responsible at mercatis for the software-side connection of the whole to the higher-level warehouse management system, is very satisfied with the solution implemented. Initially, he was skeptical about an RFID solution, since a warehouse can hold a variety of interference sources, which may alternate, e.g., reflections and signal attenuation caused by water-containing products (such as shampoos) and tin cans (such as pet food). He, too, has been won over by the smooth implementation and the error-free operation. Apart from the fact that due to the absence of malfunctions, he has very little opportunity to familiarize his colleagues from the service department with the processes.

### Further Expansions planned

The positive experience has encouraged the persons in charge to equip other areas with Siemens RFID technology. For instance, the newly constructed warehouse for toys and stationery in Ulm-North – in large parts implemented under the guidance of Siemens – was automated according to the proven model. In the expansion currently being planned, all of the intralogistics is to be monitored by up to 100 RFID readers. The final result strived for is a completely transparent, faultless flow of materials, which also integrates the goods received in the chain stores and/or intermediate storage facilities. An automated generation of shipping documents by the system is also planned.

### Growing to over 700 Chain Stores in 60 Years

The drugstore chain Müller Ltd. & Co. KG is a business enterprise still being led by its founder Erwin Müller that operates very successfully in Germany, Austria, Switzerland and Hungary as well as the Balkan States Slovenia and Croatia and on the resort island of Mallorca. In 2013, the company celebrated its 60th anniversary and today employs about 30,000 people in over 700 chain stores. According to the company, Müller carries the largest assortment of drugstore goods in Germany and is among the leading providers in the categories of perfumery, stationery, toys and multimedia. All in all, the range of products is comprised of approximately 185,000 different articles, which must be delivered to the right locations, in the right quantity, at the right time.

Siemens AG  
Industry Sector  
Sensors and Communication  
Postfach 4848  
90026 NÜRNBERG  
GERMANY

Subject to change without prior notice  
PDF  
Reference FAV-202-2014 En  
Produced in Germany  
© Siemens AG 2014

The information provided in this brochure contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners.