



# Turn-key logistics solution for small parts storage

IFG Ingolstadt GmbH, Germany

automotive industry

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# Visionary High-Tech Solutions



**Siemens has delivered an automated small-parts storage system to an automotive company that sets new standards in terms of energy efficiency, smooth operation, and high availability.**

The new warehouse represents a milestone in the implementation of future-oriented logistics concepts for an automotive manufacturer based in southern Germany. The new parts logistics system, which includes a 16-aisle rack storage facility with around 100,000 spaces and a 16-aisle order-picking storage facility, was commissioned in May 2010, after a construction phase of just nine months. The existing 13-aisle small-parts warehouse will also be modernized and connected to the new storage facility. When this integration process is complete, the turnkey plant will be able to roll out 2,800 containers of all kinds per hour, without the need for additional retrieving systems, as well as taking in 2,400 containers.

## A smart, fast, high-quality solution

The short implementation time and the complexity of the project demanded an experienced and highly competent partner. Siemens took on this challenge as general contractor and developed a compellingly cost-effective and energy-saving overall design,

which was implemented in its entirety. First, Siemens developed an efficient sorting concept with stock replenishment and rapid order-picking functions, enabling significant savings on the initial investment as well as on space and energy requirements. In addition, Siemens built its solution with the integrated, systematic use of highly standardized modules. A particular highlight proved to be the integrated modular automation solution, featuring high-tech automation components and easily programmable software modules.

## Economical, smooth, and safe

The logistics system is set into motion by some 950 drives, which are controlled by 150 Simatic ET 200pro modules. As specified, these components are configured via Profinet using the conveyor technology controllers. Error messages, hours of operation, and downtimes are recorded for each individual conveyor element. Targeted evaluation of this information ensures that seamless preventive maintenance and optimization can be carried out, thereby

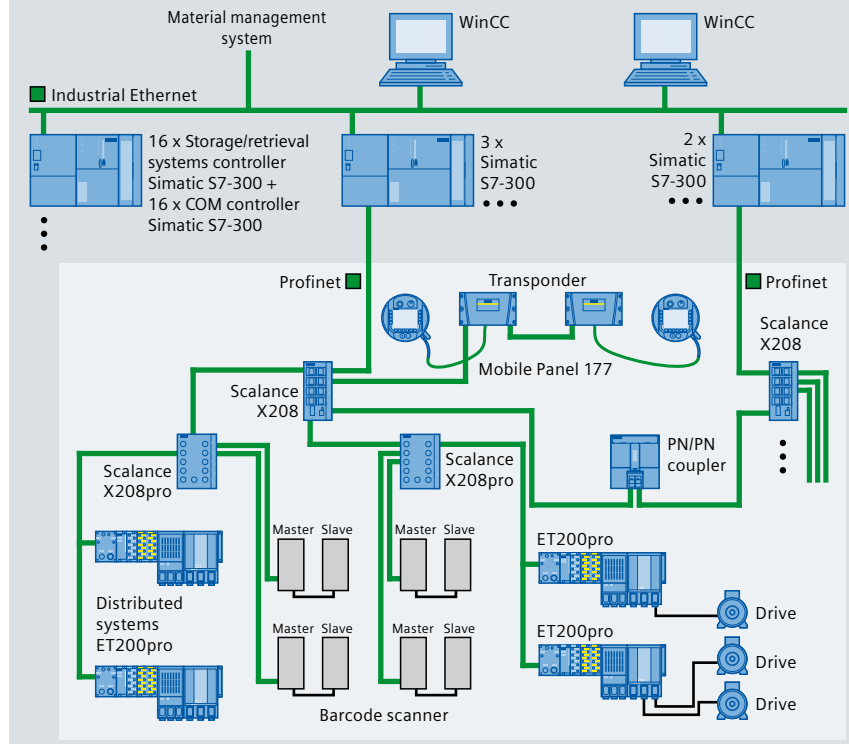
## The configuration of the automation solution in the new logistics center

significantly increasing the availability of the system. The storage and retrieval systems are operated using Sinamics S120 frequency converters. The frequency converters' ability to be precisely adjusted is not their only benefit: via the Active Line Module (ALM) they also guarantee the highest level of energy efficiency thanks to the controlled, stable intermediate-circuit voltage and controlled sinusoidal energy recovery ( $\cos\phi = 1$ ). The storage and retrieval system controllers monitor each other and optimize motion paths to protect the materials and reduce energy consumption. For example, the storage and retrieval system controllers notify each other when a particular device is in braking mode. The recovered energy is then used to accelerate another device.

In addition, when the storage and retrieval system is lowered, the controllers initiate the lowering motion via the chassis axis. As part of this process, the energy recovered in the lowering motion is used to accelerate the drive for horizontal movement. In the reverse scenario, the hoist gear lift is controlled to achieve an optimum motion sequence. This prevents excessive peak currents and results in cost optimization thanks to the use of a smaller infeed transformer, a smaller low-voltage distribution design, smaller cable cross-sections, and a reduction in energy consumption during operation. The safety technology for the system was implemented using Profisafe. This allows the system to be more easily configured to deal with the various safety-related situations via software rather than via individual safety relays.

Reliability was a top priority when developing the computer system for the flow of goods and for inventory management, in order to achieve extremely high levels of availability in the automated order-picking storage facility. The master computer system is therefore designed as a production system and parallel backup system. The application for material and inventory management was implemented on the backup system with its own simplified backup strategies. This ensures that logistical errors in the software will not lead to downtime. If problems occur in the production system, operation and control are switched over to the backup system within a short period of time, and the dispatch procedure is automatically maintained with the current system status. The entire system communicates via a single TCP/IP network. This enables the service hotline to provide efficient online support, even for individual drives, via secure remote access.

The material logistics computer is the main controller for the system. It controls the 51 Simatic S7-300 lower-level controllers by placing and acknowledging orders. All controllers have equal rights in the network and continuously identify the optimum solution in terms of time, space, and energy require-



### Project highlights

- ▶ The logistics solution was completed 15% faster using a modular concept for mechanical and electrical systems rather than conventional designs
- ▶ A modular automation solution with the latest components guarantees high productivity and efficient maintenance
- ▶ Energy savings of around 10% are achieved through energy management of storage and retrieval systems and conveyor technology
- ▶ Integrated safety technology ensures maximum operational safety

ments. Thanks to a consistent focus on reducing energy requirements, a 10 percent savings was achieved.

### Storage fit for the future

Thanks to intelligent automation and drive solutions, the new automated order-picking storage facility, constructed and equipped by Siemens as the general contractor, impresses with its high level of availability and the simple, standardized modular design of the conveyor, storage, and personnel-free order-picking technology. The reliable long-term operation of this main supply unit was particularly important for the automotive manufacturer, as it ensures demand-oriented, sustainable, and efficient material supply. ■

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