

advance

The Magazine for Totally Integrated Automation

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SIEMENS

Wireless in Industry

Requirements for
Wireless Technology
in Modern Production

Automation Technology Fail-Safe at Great Heights

F-CPUs ensure fire protection
in an office skyscraper in
Frankfurt

Drive Technology Precisely Oiled, Higher Process Quality

Even oil application through
servo control with Sinamics

Industrial Switching Technology Industrial Solution for Biogas

Motor feeders with IO-Link
ensure higher availability



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Wireless technology
is used to control the
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Siemens AG

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+ Award for Homag Holzbearbeitungssysteme GmbH Industrial PCs Chosen a Million Times

The industrial PC (IPC) used at Homag Holzbearbeitungssysteme GmbH is the one millionth IPC produced by Siemens. To mark this milestone, Frank Minkwitz, head of customized automation at Siemens, presented Winfried Hils, head of research and development system technology at Homag, with an award at this year's Hannover Messe.

Homag Holzbearbeitungssysteme GmbH is a globally leading manufacturer of machines and plants for the woodworking industry. The company offers a wide variety of solutions for the manufacture of furniture and building components and the construction of wooden houses – from single machines all the way to complex production lines.

The IPC was manufactured in the Siemens electronics plant in Karlsruhe, Germany. It is a customer-specific Simatic Box PC. For its Simatic PCs, Siemens places special importance on high quality, long-term availability, compatibility, innovative technology, and industrial suitability. The compact IPCs are multipurpose, sturdy, reliable, and scalable in output. They are also characterized by small space requirements as well as flexible assembly options.

www.siemens.com/pc-based-automation



Winfried Hils of Homag is pleased with the award

Siemens AG

The winning team (from left to right): Luis Galarza, Christian Dirscherl, Vincent Matthews (all Siemens), Carly Lovejoy of Mining Magazine, and Peter Sehl and Steve Kasper of ThyssenKrupp Robins



Mining Magazine

+ Mining Magazine award 2012

Successful Collaboration with ThyssenKrupp

Every year, Mining Magazine presents awards to the mining industry. The awards are given in 12 categories, including machines, environmental campaigns, and innovations. This year, the joint project of ThyssenKrupp and Siemens was honored with a Mining Magazine award. The two companies together developed a gearless conveyor system and for this received the award in the bulk handling category.

"Mining Magazine's award shows that we can offer the mining industry innovative drive solutions and that the market perceives them that way too," explains project manager Christian Dirscherl. He adds: "The award also proves that the collaboration with ThyssenKrupp on gearless conveyor systems is a success."

The conveyor system is expected to be put into operation in the Peruvian Antapaccay mine of the Xstrata mining company in the third quarter of 2012. In the meantime, worldwide demand for gearless conveyor systems has been growing strongly. In addition to Antapaccay, Siemens was also able to win two other projects in South America. For these, Siemens delivers the required drive systems of 4 x 4,400 kW and 5 x 5,000 kW, respectively.

The conveyor system in the Peruvian Antapaccay mine



ThyssenKrupp Robins



The Energy Efficiency Truck is on duty in many cities – here in Nuremberg

+ Energy Efficiency Roadshow 2012

Energy Efficiency Roadshow Gives New Impulses

Siemens addresses public utility providers as well as industry with its Energy Efficiency Roadshow. Different applications vividly demonstrate how the demand for increased productivity may be harmonized with ecologically sustainable production using energy-efficient components and state-of-the-art energy management. The Energy Efficiency Roadshow mainly focuses on the energy efficiency portfolio for industry by Siemens. Numerous exhibits and technical live demonstrations were installed inside a 55 square meter showroom. In combination with a large-format beamer show

this forms a presentation that has already fascinated many visitors on the show truck's route. Be it the continuous engine platform SIMOTICS 1LE1, regenerative SINAMICS converter, innovative SIRIUS switching devices, PROFinergy or energy management for building infrastructure and for SIMATIC automated production, the comprehensive presentation in the truck is convincing and gives important new impulses.

www.siemens.com/energyefficiency

+ iF product design award 2012

Design Award for Comfort Panels and Panel PCs

The high-end operator device of the Simatic HMI Comfort line and the new Simatic Panel PCs have been honored with the iF product design award this year. The new controllers in this series of control panels for controlling manufacturing processes can be installed either in the control cabinet or in the machine. They are available as both touchpad and keypad versions, with screen sizes from 4" to 22".

The goal of the new development was to update the already introduced HMI design and offer a greater visualization surface. In this process, familiar design concepts were retained but expressed in a more modern style: Since keypads will become less important in the future, they were designed to be less obvious on the new panels. They are now reduced to an absolute minimum, and the key assignment now visually complements the keypad. Moreover, sophisticated and elegant aluminum frames emphasize the modern design and the mechanical stability. A special color arrangement supports the impression of the display's size.



Thanks to their elegant look and functional design, the new Comfort Panels and Panel PCs received the coveted iF award

www.siemens.com/simatic-panel-pc

Gaining Ground: Wireless Communication in Industry



BIA-Galvanik's electroplating plant. Here too, wireless technology is being used successfully

During Hannover Messe, the German Industry 4.0 initiative stepped into the limelight for the first time, and quite impressively. The term *Industry 4.0* describes the idea of production based on cyber-physical systems – production that controls itself, so to speak. This approach is of great importance in particular for customized mass production. Among the key technology requirements are reliable identification and powerful connectivity. We spoke with Siemens experts Markus Weinländer and Karl Glas about the role wireless technology plays in this concept.



Markus Weinländer (left) and Karl Glas discuss the importance of wireless technology for Industry 4.0



All photographic portraits: Annette Kradich

Mr. Weinländer, what are the most important requirements industrial enterprises are faced with today? And what role does wireless technology play here?

Markus Weinländer: In addition to globally distributed or mobile manufacturing units, variable production instead of mass production is certainly one of the most important requirements industrial enterprises face today. For this, they have to determine how to efficiently handle many different product versions in smaller units. Centrally controlled systems quickly come up against limiting factors in this process. Decentralization notwithstanding, we still have a central control system somewhere at the highest level above everything else. However, we have learned from the Internet that systems that organize themselves are more stable, sturdy, and affordable. Applied to industry, this means that self-organizing structures in the production units take over tasks ranging from manufacturing planning all the way to control tasks. But this requires that each individual partial product be identifiable. In addition, the product also must

be able to transport metadata such as production instructions and quality data in order to take over control and monitoring tasks, and this data might also have to be updated. We basically have only one option to do this: RFID (radio-frequency identification), the technology with which it is possible to also write data. And for this you need wireless technology.

However, even in self-organizing structures, you need data linkages. RFID has proven itself for the communication between machines and products. For the communication between machines and between the monitoring systems and control systems, the current WLAN technology comes into play.

Mr. Glas, using multiple-input, multiple-output (MIMO) technology, the most recent physical WLAN standard IEEE 802.11n achieves even higher data rates and even greater ranges than the older standards. How does MIMO do this, and what are the benefits, especially in the industrial environment?

Karl Glas: The basic problem during the transmission of wireless signals is the reflections interfering with or weakening the signal – at times so strongly that the signal does not reach its target at all. Sound wireless transmission planning that also takes into account any dynamic changes in the environment is therefore essential for reliable transmission. MIMO technology makes a virtue out of necessity by using the reflections as passive signal repeaters. The signal is sent using several wireless channels at the same time. The partial signals reaching the receiver from various directions – directly or reflected – are combined with a sophisticated algorithm into one amplified overall signal. This allows reliable, strong, and virtually real-time wireless connections to be set up and maintained even in critical environments.

With 450 Mbit/s – the maximum bandwidth of 600 Mbit/s specified in the standard is not yet possible with today's wireless modules – today's premium products based on the new IEEE 802.11n WLAN standard have a bandwidth with which, in addition to process data relevant to ►►



» control, even full HD video data can be transmitted, which in turn can be used not only for monitoring but also for process control.

What does Siemens already offer with regard to the new standard?

Karl Glas: Today we already offer a comprehensive portfolio of access points and clients based on IEEE 802.11n with a bandwidth of up to 450 Mbit/s, both as stand-alone versions and as controller-based versions. Such a WLAN controller – for example, of the Scalance WLC 711 type – can also take on the central administration of the wireless network, which becomes an advantage when more than a certain number of access points are used. Another benefit of the WLAN controller is the option to also use it for making telephone calls through a computer network (VoIP). This simplifies the telephony of the office network, integrating it wirelessly into that of the industrial plant.

In addition to the active components such as access points and client modules, we have also expanded our portfolio of passive components. Examples are MIMO antennas for the parallel transmission of up to three data streams as well as the corresponding cabling.

Real-time communication and security are indispensable in automation technology. How can both be guaranteed for wireless connections?

Karl Glas: A wireless network is also called a shared medium, meaning that all users have to share the transmission link

using the medium air. The wireless systems themselves make sure that the available bandwidth is dynamically distributed among the users. In a WLAN system based on IEEE 802.11, every user is given equal access to the entire bandwidth for a certain period of time – according to the motto “first come, first transmit.” All other users then have to wait. Even if the bandwidth is broad enough and the process fast enough, real-time communication is not necessarily guaranteed with this type of system, since the order of the data transmission is not foreseeable or cannot be predetermined without additional measures. The patented iPCF (industrial Point Coordination Function) protocol of the Scalance W access points and clients ensures that every user is addressed in every cycle, thus guaranteeing real-time communication. In addition, safety com-

munication can also be realized across cells using this method.

What role do the UMTS (Universal Mobile Telecommunications System) and LTE (Long Term Evolution) mobile communication standards play in industry today?

Karl Glas: Global connectivity is playing a decisive role in more and more industrial enterprises. It is no longer possible to imagine the industrial environment without web-based collaboration, services such as maintenance and troubleshooting, or simple texts sent from a mobile phone. UMTS, the third-generation cell network, is the global standard today, even though price-sensitive applications still use GPRS/EDGE-based solutions. As a fourth-generation cell network, LTE now offers a bandwidth of up to 50 Mbit/s, creating a basis



“Even in critical environments, reliable, strong, and real-time wireless connections can be set up and maintained.”

Karl Glas, Head of Product Management, Industrial Network Components



“Nothing stands in the way of the extensive use of UHF-RFID as an integrated identification solution for all steps of the value chain now.”

Markus Weinländer, Head of Product Management, Simatic Ident

for the integration of additional services into the wireless network.

Coming back to Industry 4.0: The trend toward the individualization of mass production for the first time grants a key role to the product being created. What role does UHF technology, which already exists today and is established in industry, play in such a development?

Markus Weinländer: The relatively great range (approximately 5 to 8 meters), combined with low transponder costs, makes UHF-RFID appealing as an integrated identification system in production and logistics. However, the advantage of the greater range is at the same time also a disadvantage. There are large quantities of metal and liquids in the production environment itself and thus quite a lot of in-

terference due to reflection. However, by now we can say that the UHF-RFID systems in production are stable at ranges between 1 and 2 meters.

UHF was developed for industry, with the goal of capturing as many parts as possible in what is called bulk reading. The bulk reading ability is an advantage in assembly lines with low manufacturing depth if all suppliers equip their parts with transponders. However, the system then also has to be able to select. This means it must be clear during the bulk reading whether, for example, the airbag or the car body is the target. This is not entirely trivial, since the reflections caused by the radio waves may cause relevant transponders to not be detected while transponders that are not relevant are detected.

In the meantime, we have developed a new generation of UHF readers as well as

UHF smart labels, with which we are able to control this problem very well. Because of this, UHF-RFID is now suitable for industry. One example is the use of the Simatic RF600 RFID system in the Mercedes factories in Rastatt, Germany, and Kecskemét, Hungary. Here, one-way transponders accompany the car body from the unfinished state to final assembly. With an average reading rate of 99.99 percent, the system successfully meets all the client's requirements for reliability and practical application.

Even if it took a while, UHF is taking industrial identification by storm and is even absolutely compatible with WLAN, since the frequencies don't overlap.

Gentlemen, thank you very much for speaking with us.

IT security note

Suitable protective measures (including IT security, e.g., network segmentation) must be taken to ensure secure operation of the plant. Further information on industrial security can be found at www.siemens.com/industrialsecurity.

MORE ON THIS TOPIC:

- + www.siemens.com/ident/rfid
- + www.siemens.com/iwlan

Cranes on the Team

In order to load and unload more than 6,000 deliveries every month, warehouse technology must combine speed with safety and smooth communication. For this purpose, Becker Stahl uses two overhead traveling cranes that communicate directly with the warehouse management system and the safety system through wireless communication.

Becker Stahl-Service GmbH, based in Bönen, Germany, and part of the Klöckner Group, produces more than a million tons of hot-rolled and cold-rolled sheet steel each year with a wide variety of surface finishes. Part of the company's added value includes customization of the sheets by splitting them and cutting them to size. In order to optimize the material flow and combine locations, Becker Stahl has now built a new warehouse and processing center covering the entire process chain from goods receipt to finished goods storage.

Innovation in warehouse technology

The goods receipt warehouse consists of the loading area, a handover area, and interim storage for the delivered coils. Two automatically controlled overhead traveling cranes handle the material transport. One of the cranes can also be operated manually. Both are directly integrated into the warehouse management system and the machine control system. In collaboration with Demag Cranes & Components and Siemens, an innovative crane system with magnetic pickup – a technology that allows gentle loading processes and more

compact packing of the coils – was created. To ensure smooth operation, reliable communication between the control of the crane and the warehouse management system had to be established and comprehensive safety guidelines needed to be fulfilled. In addition, it was important to make sure that the cranes could not collide with each other.

Automatic loading and unloading

Using one of the cranes, the coils are unloaded manually from the delivering trucks and placed in the handover area.



Outdoor access points:
Scalance W points
enable uninterrupted
data traffic

Requirements for wireless safety

- + iPCF protocol as a requirement for real-time communication and the transmission of safety signals
- + Profinet with Profisafe
- + 5 GHz transmission rate to minimize interference
- + Signal strength of at least 60 percent as a requirement for iPCF (This can be achieved with IWLAN and special antenna solutions such as RCoax.)





Based on the automatically measured coil weight, among other things, the warehouse management system determines the optimal storage location among the 6,000 positions. The fully automated crane then takes each coil and places it in the designated location. In this process, the crane control communicates with a number of safety systems. In order for the cutting and splitting machines to be continuously supplied with coils, the automated crane places the coils on a rotary table with four positions. This table serves as a material buffer for a smooth process flow; warehouse management and process control must be closely interlinked to make this possible.

Secure mobility through RCoax

The close integration of the cranes into the process control requires reliable wireless data communication. Industrial Wireless LAN (IWLAN) is perfect for this. Since the high quantity of metal components in

a warehouse for steel coils can lead to interference and masking, Demag's project manager, Rolf Dechange, decided on a solution with RCoax cables as radiating cables: "With RCoax, we have a stable connection that so far has operated without a single shutdown." The RCoax radiating cable runs next to the two rails for the overhead traveling cranes and is therefore always near the antenna of the crane. This ensures a secure IWLAN connection between the process control system and the crane control through the Profinet Industrial Ethernet standard and the transmission of safety-relevant data through Profisafe. With RCoax, all the requirements of the Machinery Directive can be fulfilled and the highest safety standards realized, combined with high plant availability.

Fast, strong, and fail-safe

The 5 GHz RCoax cabling has been divided into three segments, each of which

is connected to a Scalance W786-1RR access point. Across from these points are two Scalance W747-1RR IWLAN clients, located on the two cranes. They are designed with roaming capabilities, thus allowing uninterrupted data flow even at the transition point between the segments. With IP65-type protection, all devices are perfectly suited for use in the rough operating conditions of the steel processing industry.

The entire crane control system operates with Safety Integrated and transmits all safety-relevant signals using Profibus and Profinet. The Profinet and Profibus interfaces enabling the communication between the two standards provide for fast and fail-safe communication throughout the entire transmission chain. The managing engineer at Becker Stahl, Michael Pöttger, says, "After the consistently positive experiences we've had with the system so far, it is certain that the future at Becker Stahl will be shaped together with Demag Cranes & Components and Siemens." +



Both cranes in the steel warehouse can be controlled safely using wireless communication

IT security note

Suitable protective measures (including IT security, e.g., network segmentation) must be taken to ensure secure operation of the plant. Further information on industrial security can be found at www.siemens.com/industrialsecurity.

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Smart Solutions for the Automotive Industry

As one of the leading German car manufacturers, Daimler already relies on a completely new technology in two of its factories. For the first time, vehicle production is now being controlled with radio-frequency identification (RFID) smart labels. The advantages of the new RFID system thoroughly impressed those in charge.

The advantages of the Simatic RF600 system at a glance

- + Reliable and robust operation even in challenging radio-transmission environments
- + Flexibility and variability through compact design and remote antennas
- + Sturdy components suitable for industry
- + Secure selective individual reading and optional bulk reading
- + High reading speed
- + Flexible system integration via Profibus, Profinet, or Industrial Ethernet
- + Standardized system environment across the entire process chain
- + Possibility of direct identification on the product
- + Simple and direct Simatic integration

The Mercedes-Benz factory in Rastatt, Germany, produces vehicles for the global market – including a whole range of variations of the new B-Class and future A-Class cars. Customers can order these models according to their individual wishes using a configurator. In order to be able to carry out the production of these vehicles efficiently and flexibly, Daimler has been relying on RFID for many years.

Modern technology monitors all production steps

For this purpose, RFID readers were installed wherever information on the vehicle is required during production. These read the wireless transponders attached to the car body, which carry all the data required for the manufacture of the vehicle. This makes it possible, for example, to have cars with a wide variety of equipment or color variations go through the different production steps one right after the other.

Previously, reusable data carriers were used to store the information, but now the Rastatt factory is relying on expendable RFID tags from the Simatic RF600 product line. These wireless tags have been designed as disposable transponders. They are installed in the wheel case of the future vehicle and go with the car body through all the production steps – from the unfinished state to enameling to final assembly.

This is the first time that a German car manufacturer has decided to use UHF-RFID technology that was originally developed for controlling logistics processes. However, it is not only the Mercedes-Benz factory in Rastatt that relies on the modern technology; the new Daimler factory in Kecskemét, Hungary, also decided to use the Simatic RF600 system. All the technology is based on the use of radio frequencies of around 865 megahertz. New, low-cost transponders with a wide range make this possible.

Further development and improvement of smart labels

Working together with Daimler, Siemens was able to improve the technology so that it now meets even the special requirements of industrial production, such as the ability to withstand high ambient temperatures. Innovative, heat-resistant labels were developed that must pass a special testing process during production. These transponders survive both the enameling and the drying processes with temperatures of up to 220°C and can therefore remain on the vehicle throughout the entire production process.

Another advance was the control of the rather unfavorable wireless-communication conditions in the factory. Through new algorithms based on intelligent variation of the transmission power and evaluation of the read results using statistical processes, reliable RFID recognition is possible even in difficult locations. For exam-

ple, even in clean rooms that are completely lined with metal a high degree of read security can be achieved this way – in spite of overshooting and reflections. The RFID readers are furthermore able to automatically adapt to changing conditions within certain limits – but without voiding the compatibility of the Simatic RF600 components with the EPCglobal and ISO 18000-6C standards.

Use of two different types of RFID readers

Two types of RFID readers are being used in the Mercedes-Benz factory in Rastatt: the Simatic RF620R reader, which is especially easy to install thanks to its integrated antenna, and the Simatic RF630R with antenna RF642A, which is suited above all for strongly reflecting locations. The readers are connected to the existing Profinet/Profibus structure using the RF180C and ASM456 standard communication modules. The RFID system is controlled by existing Simatic S7 controls and a visualization system created by Daimler. More than 300 RFID readers are in operation in the Mercedes-Benz factory in Rastatt; 200 RF600 readers were installed in the factory in Kecskemét.

For data storage, Daimler decided on decentralized storage of the most important data on the RFID labels. This way, the required information is quickly available – without having to access a background system. If required, all other data ►►



Special algorithms enable RFID operation with high availability even in demanding radio-transmission environments and in parallel with the legacy system



Every vehicle is controlled by a heat-resistant smart label through all the production steps

► can be called from the production control systems. For this purpose, every label has a unique ID number.

Challenges overcome

During the introduction of the new system, Daimler was confronted with several challenges. For example, the new RFID system had to be installed in parallel with the old system while production was running, since the existing vehicle generations were not to be changed until their respective series' end. During the changeover to the new sys-

tem, RFID experts, control programmers, and plant specialists from Daimler and Siemens all worked together. They made sure that production continued without a hitch. Further developments were applied to the firmware of the RF600 readers during the changeover and are now also used in other applications and industrial areas.

Technology switch paid off

The new smart labels and readers from Siemens completely fulfilled the requirements Daimler had established regarding

reliability and practical application. As a result, it was possible to achieve an average reading rate of 99.99 percent for the surface. Due to its ambient conditions, this area is considered especially critical for RFID. However, the new technology offers even more advantages for the factory: Unlike the previously used system with active transponders, there is now no longer any need for batteries. In addition, the previously required cleaning and in-house recirculation of the transponders from final assembly to the unfinished state is no longer necessary. The new solution has also proven beneficial from a cost standpoint.

Daimler in Rastatt is pleased with the success resulting from the switch to Simatic RF600 and the heat-resistant smart labels. The technological objectives – replacing the previous RFID system with a more powerful one – have been met, and the changeover was realized with as few problems as possible while production was running. So now there are no more obstacles to hinder vehicle production using RFID smart labels in the factories in Rastatt and Kecskemét. +

MORE ON THIS TOPIC:

+ www.siemens.com/ident

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Magic Gates

A different approach to access control: Thanks to radio-frequency identification (RFID) and a Nanobox PC, access badges are a thing of the past. The gate opens fully automatically, saving time for those with a parking permit and making things more convenient.



The automated pass control with RFID technology at Karlsruhe's industrial park has already proven its worth

Everybody knows how tedious it is to have to deal with parking badges in order to pass through a gate leading to a car park or the company premises: Roll down the window, hold the badge as close to the reader as possible, scan it – that all takes time. If the person in front of you does not find his or her badge right away or does not hold it the right distance from the scanner, you have to wait even longer. At the Siemens industrial park in Karlsruhe, Germany, an automated pass control system using RFID technology has recently been implemented. Persons with an access permit receive file transponders (RFID tags) for the windshields of their vehicles, which measure just a few centimeters and contain the required access data. A long-range reader of the Simatic RF600 series reads each RFID tag when the vehicle approaches, and the gate opens automatically.

Savings in logistics

The same technology has already proven its worth in a variety of logistical tasks. For example, an electronics wholesaler in Bel-

gium identifies transport vehicles using RFID tags and then guides them via the fastest route to the unloading bay with the goods waiting for them. Corresponding tags on the cargo ensure that the loads are complete before the transporters leave the premises again.

A large cement plant in Turkey uses inexpensive passive RFID tags in order to record the type and quantity of the goods to be loaded by each customer. This optimizes the traffic flow on the premises and increases both plant capacity and planning security.

Little effort, great convenience

"If the only issue is controlling access permits, direct savings may not be possible. Here, the convenience for those affected is the main concern," explains project manager Roland Maier of the Siemens plant in Karlsruhe. "With the Simatic Nanobox PC, we have an affordable and robust industrial PC as a data processing unit. It needs neither a hard disk nor a fan and can be installed in a simple, unheated switchbox outside because of its expanded tempera-

ture range. Moreover, it is small and compact and therefore especially suited for this application, since we were able to install it directly in the gate." As a full industrial PC, it can be easily combined with the powerful Simatic RF670R RFID system and seamlessly integrated into the corresponding IT environment. It also processes the 96-bit-long ID numbers for the database comparison without any problem. Great convenience, comparatively low cost, and ease of use – this is what a recipe for success looks like. +

MORE ON THIS TOPIC:

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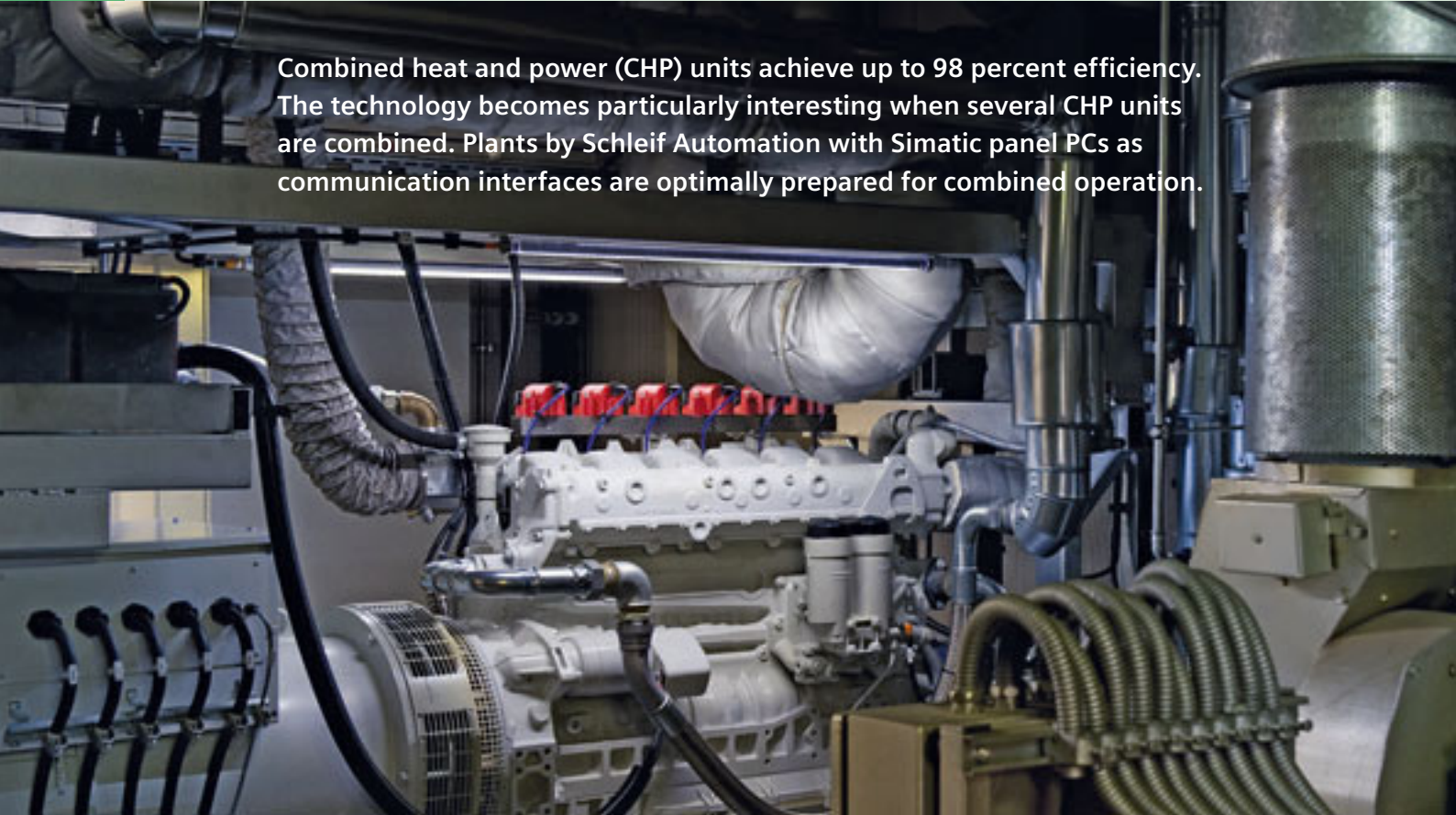
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Efficient Energy Production

Combined heat and power (CHP) units achieve up to 98 percent efficiency. The technology becomes particularly interesting when several CHP units are combined. Plants by Schleif Automation with Simatic panel PCs as communication interfaces are optimally prepared for combined operation.



A community company launched in Baden-Baden, Germany, in 2008 is aiming to transition the central Baden area to renewable energies by 2030. CHP units, along with photovoltaic plants, will play an important role in achieving this goal. Schleif Automation is a technology partner. With more than 10 successfully implemented plants, the innovative company has within a very short time become a CHP specialist that is known beyond the region.

Because heat can only be stored in a limited way, the CHP units are designed with dimensions that cover only the basic requirements. Electrical power, too, is primarily produced only for the units' own requirements; surplus electricity can be fed into the grid.

Schleif Automation produces CHP units with different outputs both for private and for commercial and industrial use. The specialists based in Rheinmünster in

Baden rely on an automation concept that can also be retrofitted to existing plants in order to increase their efficiency and availability. Due to extremely positive customer feedback and additional public funding in the context of the Combined Heat and Power Act, the company has seen a rapid increase in inquiries and orders.

Proven automation concept

"We use a Simatic S7-300 as a control system for our CHPs," says managing director Thilo Schleif, explaining the automation concept favored by his company. "It regulates the speed of the combustion engine and synchronizes the generator. At the same time, it monitors a number of parameters for efficiency optimization and equipment diagnostics. By monitoring the condition of individual units, we increase the predictability of maintenance and prevent

unscheduled downtime. Another advantage is that the Simatic controller can handle all the heating, air-conditioning, and ventilation systems. This results in a cost-effective central control system."

CHP units from Schleif Automation can also be operated with regionally produced biogas or sewage gas. The composition of the gas, and therefore the rate of combustion, is subject to natural fluctuations. By continuously analyzing the gas, the control system is able to always ideally match the ignition point to the rate of combustion of the specialty gas. Determining the exact ignition point optimizes efficiency and prevents wear or overheating of the motor.

To protect the motor, conventional CHP units shut down at a return temperature of 70°C. In order to achieve higher water temperatures, the volumetric flow rate in the heating system must be increased and the output of the motor throttled at the



The CHP is also used as an emergency power generator in backup power operation

All photos: W. Geyer



Successful team: Thilo Schleif (left) and his employees in front of a recently built CHP



Thomas Förderer, project engineer at Schleif Automation, is happy to have access to all the components of the plant with the IPC277D

“We use a Simatic S7-300 as a control system for our CHPs. It regulates the speed of the combustion engine and synchronizes the generator.”

Thilo Schleif, Managing Director, Schleif Automation

same time. Thomas Förderer, project engineer at Schleif Automation, manages this control cascade with the modular control of the Simatic S7-300. This way, return temperatures of more than 82°C can be achieved, meeting the greater hygiene requirements of hospitals, for example.

Universal communication interface

Part of the standard equipment of Schleif Automation CHP units is a panel PC functioning as a control and monitoring unit. The IPC277D is the communication interface to all intelligent sensors and actuators. The advantage of this central PC platform is, among other things, that devices from different manufacturers can be configured, diagnosed, and adjusted from a single interface – even using remote maintenance. Schleif says, “This increases the ease of servicing our plants and their availability.” Schleif Automation purchases

the Siemens products through the Sonepar industrial competence center in Karlsruhe.

Virtual power plants – a realistic vision

Schleif Automation’s longer-term goal is to operate several combined CHP units as a virtual power plant and thus be admitted to the power exchange. Trading power results in substantially lower purchase prices, which can then be passed on to the operators of the plants. A prerequisite is proof that each individual unit and the combination as a whole feed in and extract power. With the panel PC as a central information platform, the CHP units from Schleif Automation are ready for combined operation already. Badische Kraftwerk, a subsidiary of Schleif Automation, offers various operator models, including contracting, to realize this. The customer

does not need to pay any access fees, but only purchases the heat and electricity at an especially low price – thanks to public funding and the high efficiency of the plants. +

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Availability is the Key



The importance of cooling plants in the functioning of converters for high-voltage DC (HVDC) transmission must not be underestimated. Even though the power loss of the high-performance electronics is minimal, the resulting heat would destroy the semiconductor components within a very short time if the cooling were to fail even for a moment. A highly available Simatic controller ensures the reliable functioning of the appropriate cooling systems or safely switches off the electronics to protect them in the event of an emergency.



Siemens is the market leader in grid connections at sea for offshore wind parks

Offshore wind parks make an important contribution to the transition to clean energy. One challenge in their use is that the electricity they produce must be transported across long distances to the mainland. HVDC is becoming increasingly important as a means of minimizing power loss during transport. With a capacity of more than 6,000 MW already installed or being constructed, Siemens is

the market leader when it comes to grid connections at sea.

Siemens is currently connecting the offshore Veja Mate and Global Tech 1 wind parks to the German power grid on behalf of the transmission network provider TenneT TSO, of Bayreuth. The BorWin2 converter station transforms the electricity produced by the wind park into direct current for low-loss and energy-efficient transmis-

sion. The 18-meter-high station is being constructed on its own offshore platform. Siemens also supplies the converter station on the shore, which transforms the direct current back into alternating current. The HVDC grid connection is designed for an output of 800 MW. Siemens Energy produces the power transistors (insulated gate bipolar transistors, or IGBTs) in Nuremberg (see also *advance* 2/2012). »

► Collaboration with specialists

As an expert in the field of heat and flow technology, the German company Neundörfer Anlagenbau GmbH supplies the cooling systems for the high-performance electronics. The company has many years of experience with cooling systems for shipbuilding and classical HVDC plants, for example. The cooling system specialist again works in close partnership with the German company Gesta mbH, which is responsible for the electrotechnical equipment, including the control technology. "Every cooling plant has to be designed differently. Offshore converter stations can be cooled using seawater; installations on land, however, need additional fans. The location also plays an important role. In the north, the plants have to be protected from frost, but condensation can also become a problem. In all cases, we have to ensure the highest possible availability of the plants from the moment they are switched on," explains Martin Haensel, managing director at Neundörfer, outlining the challenges for the installations designed and built by his company. A plant is available only if the water temperature

and flow are within the specified close tolerance ranges and if the water in the converter area is sufficiently deionized so that no electrical current can flow through it, which could result in short circuits, destroying the electronics. The company's expertise in this area, built up over years, includes not only the dimensioning of the heat exchangers and pipe systems but also technical, economical, and ecological optimization through the use of components and materials that are best suited for the purpose.

Multistage redundancy concept

The following data illustrate the dimensions of the cooling plants of the onshore BorWin2 converter station: The plant consists of two cooling circuits. The primary circuit includes the pipe distribution system with 96 branches into the converter area. An impressive kilometer of highest-quality stainless steel pipes leads into the converter area. The deionized water, that is, water that is no longer conductive, is led in plastic pipes through the converters themselves. The secondary circuit is connected through a heat exchanger, the water of which contains antifreeze agents.

The heat of the secondary circuit is discharged through 14 large outside coolers, which can be cooled with up to 168 fans, depending on the outside temperature.

Redundant temperature sensors, flowmeters, and electric current meters ensure almost 100 percent availability of the sensor technology. The pumps were built with "two-of-three" redundancy: The power needed to circulate 13,000 liters per minute is distributed over two pumps. If one of them should fail, a third pump is available as a backup. "However, the probability that a pump will fail is very small, since we continuously monitor the status through an integrated vibration measurement. This increases planning security for maintenance and is another contribution to increasing the availability," explains Haensel.

Intelligence at the control system level

The Neundörfer cooling plant impresses with its efficiency. Considering its cooling capacity, it requires only a very low connected load. This is very positive from an economic and ecological point of view – but also relevant in terms of safety. "The challenge for the control system is that excessive cooling, however minor, can lead to condensation and thus to short circuits in the converter area. During operation, the inertia of the huge system is to our benefit – the start-up is critical because we have to be able to prevent even short-term overshoots," explains Peter Beck, managing director at Gesta. This is why the control system requires not only expertise but also great experience with cooling systems of that size. As a longtime automation partner of Neundörfer, Gesta has already automated many cooling plants, demonstrating its experience in this area.

In the onshore BorWin2 converter station, a highly available Simatic S7-400H controller monitors and controls temperature, flow, and conductivity. It has two identical CPUs in hot standby operation, smoothly replacing each other in case of failure. The plant is visualized using an OP 277 operator panel. For documentation



A. Kradisch

"In order to ensure the availability of the converter stations from the beginning, every cooling system has to be designed differently."

Martin Haensel, Managing Director, Neundörfer Anlagenbau GmbH



“We have had only the most positive experiences with the powerful and robust systems from Siemens available worldwide.”

Peter Beck, Managing Director, Gesta mbH

and archiving purposes, relevant signals are passed on to the central control room of the converter station using a secure transmission protocol. From there it is possible to turn off the entire plant. However, this is planned and contractually specified only for a few maintenance days per year – and all involved are sure that they will reach this goal.

Well equipped for future projects

Haensel and Beck are convinced that the innovative HVDC technology will become very important in the future and are looking forward to bringing their knowledge as pioneers to bear on future projects. “The fact that we have already realized many demanding projects in the ship-building area really helped us with the offshore converter platform projects. These two areas have a lot in common – in terms of both the selection of suitable materials and the fact that they have to meet stringent stipulations, for example, by the German Lloyd,” says Haensel. “In

this process, we’ve had nothing but positive experiences with the automation technology, drive technology, industrial communication, and switching technology from Siemens. The systems are powerful and robust, and are recognized and reliably available the world over. As users who take advantage of all the technical possibilities of the systems, we also really value the fact that we receive expert help around the clock through the premium support program,” adds Beck. +

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Along with many architectural highlights, the safety technology for the fire protection measures in the 200-meter-tall office building is exceptional

Fail-Safe at Great Heights

Safety systems play an important role in building automation – especially with regard to fire protection. Fail-safe industrial controls now regulate the pressure aeration and smoke extraction systems in Tower 185, an office skyscraper in Frankfurt, Germany.

With a height of about 200 meters and a total of 55 floors, Tower 185 proudly reaches into the Frankfurt sky. "For buildings like this, safety aspects are a top priority," explains Thomas Sturm, project manager at Hermos AG, based in Mistelgau, near Bayreuth. One of the core competencies of this family business that operates worldwide is in exactly that area: Hermos offers solutions for building automation.

For the pressure aeration and smoke extraction systems in the office skyscraper in Frankfurt, fail-safe control systems from Siemens were used for the first time. Hermos has proven that building automation can benefit from the experience of industrial applications, because industry has already been using these controls for years. "The standards of industrial and process automation are increasingly being taken into account in building technology, such as in this case for the smoke extraction system or fire protection and personal security," explains Sturm.

In the event of a fire, both the pressure aeration system and the mechanical smoke extraction system are activated through these controls. In addition, ventilation flaps are closed so that the smoke cannot spread. "In an office building of this size, a control system like this is an invaluable advantage," emphasizes Sturm.

Increased flexibility through fail-safe controls

A fire alarm panel located on the ground floor of Tower 185 records all data from the distributed control units in the building. In case of an emergency, the fire department can see the individual fire zones in the tower from there and manually switch certain sectors if required. A fail-safe Simatic S7-319F programmable logic controller (PLC) controls these processes.

The communication takes place through a closed circuit based on Profinet, an Industrial Ethernet-based bus system that has long represented the state of the art in industry. Use of the Profisafe communication standard allows fail-safe data exchange both between the different fail-safe PLCs and with the corresponding distributed I/O stations, using fail-safe modules that have been installed accordingly. "Thanks to their comparatively easy installation and programming, fail-safe control systems are being used more and more frequently in large buildings," explains Matthias Maisel, software project manager at Hermos.



"Thanks to their easy installation and programming, fail-safe controls are being used more and more frequently in large buildings."

Matthias Maisel (left) and Thomas Sturm,
project managers at Hermos AG

About 2 kilometers of Profinet closed-circuit cabling wind their way through the office building, connecting the distributed control units. These units have mostly been realized intelligently – meaning with an integrated CPU – in order to be able to safely process signals from the central fire alarm system even without bus communication.

For this purpose, the fail-safe Simatic S7-315F control system used for smoke extraction and the scalable Simatic ET 200S distributed I/O stations were realized with fail-safe electronic modules.

Smoke extraction system ensures clear escape routes

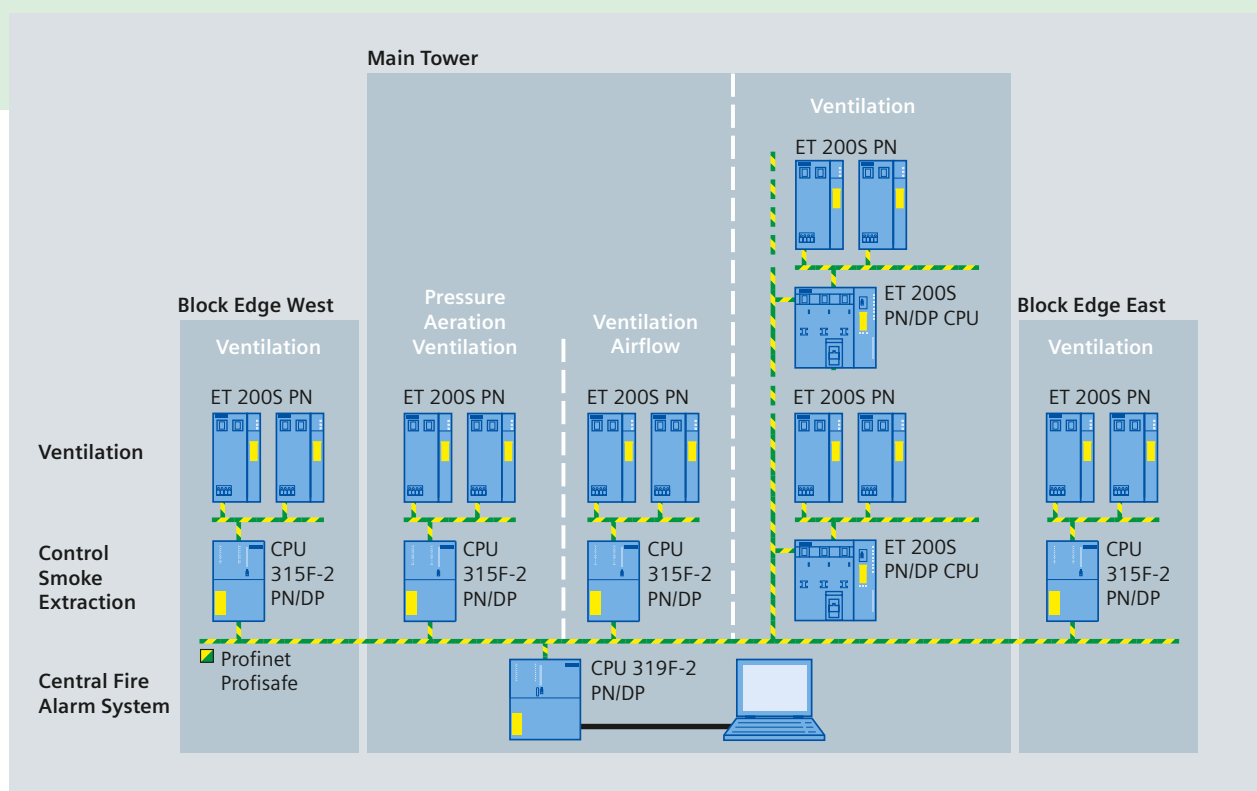
Distributed fail-safe intelligence is used to close the fire dampers, since the dampers go into safe mode when they are not activated. If the central fire alarm system detects a fire and initiates the corresponding measures, the situation is different, however; predefined smoke extraction measures must then be taken based on the fire matrix.

The large fans of the pressure differential system in the basement are the heart of the smoke extraction system. They are acti-

vated by the fail-safe controls in order to build up predefined overpressure in the staircases of the tower. This keeps the staircases smoke-free in an emergency, so they can be used as escape routes. At the same time, the distributed control units on all the floors activate the corresponding isolating dampers in order to ensure the required pressure conditions for smoke extraction the entire height of the tower. The smoke extraction valves for the supply air and exhaust air are allocated to about 40 smoke extraction groups. They are all connected with fail-safe Simatic controls. There are also several pressure relief windows on every floor, letting the volume flow of the pressure aeration fans escape. In addition, the overflow valves are opened so that the overpressure can ensure smoke-free escape routes outside the staircases as well.

Distributed I/O stations pass on the signals

Communication also takes place via the Profinet closed circuit with the Profisafe protocol. There are 12 distributed I/O stations of the Simatic ET 200S type in the entire building for closing the fire dampers. One such unit covers six floors. Here, ►



Automation architecture for controlling smoke extraction measures: The central fire alarm system centrally controls the fans and the smoke valves. The underlying distributed intelligence relieves the main PLC.

► the fail-safe connection to the Profinet closed circuit takes place through the IM151-3 head assembly of the Simatic ET 200S. These units are also able to read the signals of the central fire alarm system in a fail-safe way using the input assemblies.

"Both standard and fail-safe signals can be processed flexibly according to the task – this is one great advantage of these modular stations," says Maisel. In Tower 185, the stations have, among other things, also been supplemented with standard cards for additional building automation tasks.

Smooth process thanks to distributed all-in-one solution

All the fail-safe controls are placed in so-called information centers. Programming a distributed all-in-one solution like this has proven to be especially easy, as Maisel emphasizes: "On the programming level, you only have to install the additional Distributed Safety feature in addition to Simatic Step 7. The safety technology can then be treated the same way as the main

program, without having to switch platforms." Hermos AG shows on a daily basis how smoothly all this works, because commissioning and service tasks can now largely be performed through remote access. "This, too, is one of the great benefits of Ethernet-based automation and safety systems," stresses Sturm. With a password, the experts access the building management system through an encrypted VPN tunnel. This system is connected with the distributed information centers through a Profinet circuit. Using the visualization, the correct functioning of the entire building automation system can be checked and adapted at any time via PC.

Industrial Ethernet-based safety technology is the future

For Hermos AG, the Tower 185 building automation is one of the largest projects realized in this business segment so far. One of the many advantages is that the hardware can process both standard and fail-safe signals on the same platform. The resulting

flexibility, the simple programming with Step 7 software, and the additional Distributed Safety feature created a solid basis for the further development of the building automation system during the realization of the project. Sturm and Maisel agree: "The bus-based safety technology for buildings has great potential."

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Ultimate Safety in Material Handling

With Safety Integrated, a Swedish manufacturer of roll handling systems is able to meet all safety requirements while providing the highest level of flexibility. The company was one of the first in Sweden to choose a fail-safe programmable logic controller (PLC) to control its machines.

Trancel Restatic AB in Hisings Kärra, near Göteborg, is part of the Trancel Group, which is headquartered in Västra Frölunda. Among other things, the company manufactures custom-tailored safe and flexible roll handling systems for the processing of material such as plastic and paper. Trancel Restatic supplies leading companies all over the world.

The mechanical engineering company has relied on integrated safety solutions from Siemens down to the drive level since 2005. "We are working in a sensitive and dangerous industry with large machines and the risk of severe accidents where people might get trapped or even die," explains Bengt Andreasson, who is responsible for the engineering depart-



A view of the Trancel Restatic workshop showing a machine for producing environmentally friendly plastic bags from biodegradable material

Overview of Safety Integrated

- + Fail-safe Simatic S7-319F controller
- + Simotion D445 motion control system
- + Sinamics S120 servodrive
- + Simotics M-1PH7 and S-1FK7 motors
- + Sizer configuration software
- + Programming with Simatic WinCC flexible, Simotion Scout, Starter, Simatic Step 7, and Distributed Safety
- + Bus communication via Profinet and Profibus
- + Simatic ET 200S distributed periphery
- + Controlling and monitoring with Simatic WinCC flexible runtime on PC
- + Sitop power supply

ment at Trancel Restatic. For this reason, the retrofitting of machines that did not conform to current safety requirements became one of the company's special focuses.

Flexible systems from the very beginning

"With a fail-safe control system and integrated safety we are able to configure very flexible systems already at the project planning stage," emphasizes Andreasson. "The functions can be amended at will, depending on changing conditions, so we avoid having to modify the circuits every time." Erik Lundén, sales engineer at Siemens, helps the company develop the appropriate solutions with electronic, automation, and drive components. Sometimes that takes two weeks, but sometimes also up to six months. "These are complex machines that require special engineering," emphasizes Lundén. He helps Trancel Restatic in particular with dimen-

sioning the drive systems and documenting the calculations by means of the Sizer configuration software. The Simotion Scout engineering software, with the Starter commissioning software and Simatic Step 7, is used for programming. "It is a pleasure to collaborate with Trancel Restatic, as the company is a leader when it comes to integrated systems including HMI, logic, motion control, and safety," says Lundén. +

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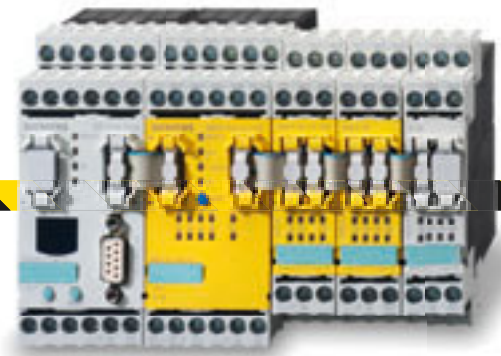
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Safety en Bloc

To be able to comply with the safety requirements of the new European Machinery Directive in an economical way, a manufacturer of linked assembly systems relies on a software-based modular safety system (MSS). Thanks to expansion modules and a Profibus communication module, the basic application can be extended to create a compact "safety block."



Up to nine modules can be connected with MSS Advanced

Jansen Automation, established in Pulheim, near Cologne, Germany, in 1989, specializes in the development and construction of linked assembly systems. A unit recently delivered to an engine manufacturer assembles and verifies air mixers for large-volume diesel engines in construction machines. The unit features two cells with partially automated assembly processes and 10 automated stations. It features modular construction, so that any changes or modifications can be implemented with only short idle times.

Impressive flexibility

Jansen Automation realized a software-based safety concept for the engine manufacturer for the first time. "The modular safety system is exactly the right solution for our demands, as the handling is easy and flexible," explains the director and founder of the company, Dipl.-Ing. Peter Jansen. Division of labor enables parallel operations and saves time during engineering, installation, and final commis-

sioning. The safety engineering is carried out by Jansen's electrical engineering department, while control engineers take care of programmable logic control (PLC) programming. That works perfectly because the Sirius 3RK3 MSS can be easily parameterized via the MSS ES software – by an electrician as well.

Even complex safety concepts can be clearly represented by means of a graphic editor as well as drag and drop. The Forcing function enables the employees of Jansen Automation to simulate all risk scenarios in the program before the plant is even commissioned. "In the end, we are able to conform to the safety requirements of the new Machinery Directive with EN 62061 and EN ISO13849-1 without any problems," says Jansen.

Enormous time savings, detailed diagnostics

Initial experience showed that considerably less time is required for the preliminary planning of a plant with the MSS com-

pared with conventional safety engineering. As far as the time required for engineering and installation, the company saves more than 20 percent on each. Up to seven expansion modules can be connected to the basic component of the MSS Basic system, and nine modules can be connected with MSS Advanced. Inputs and outputs can be adapted individually this way. "Most importantly, the expansion or modification of plants becomes a lot easier and much less costly," explains Jansen.

Another advantage of MSS is the easy diagnostics. A Profibus module enables the transmission of detailed information on the status of the safety engineering to the control unit. In the event of an error, the operator is able to immediately recognize, for instance, where a safety door has not been closed properly or where there is a broken wire. "That considerably increases the availability of such a plant with cycle times of 30 or 45 seconds, depending on the workpiece," says Jansen. Allocation and text layout of messages can be stored in the MSS ES software as plain text by the



Siemens AG

Dipl.-Ing. Peter Jansen (right), CEO of Jansen Automation, with Siemens sales representative Bernhard Höschler

“The state-of-the-art MSS enables us to comply with the safety requirements of the European Machinery Directive in an economical way.”

Peter Jansen, CEO, Jansen Automation GmbH

safety engineer. The control engineer then adapts the text layout for visualization on HMI devices. Jansen uses at least 10" TP277 touchpanels to do so, as machine operators need to have a clear status report displayed at all times.

Top safety level

Various safety circuits can be easily defined with the MSS ES software. If, for instance, a door is open at one station and assembly stops at this point, the rest of the plant continues to run. Because of this advantage, some of Jansen Automation's

customers have already included the MSS in their functional specifications. Performance Level e (the top safety level) solutions conforming to EN ISO 13849-1 or SIL 3 conforming to IEC 61508/62061 can be realized, as well as category 4 of former standard EN 954-1.

As Jansen Automation is a one-stop shop, integrated systems such as those Siemens provides with Totally Integrated Automation (TIA) play a key role. Via remote service, specialists can use the control to read out targeted diagnostic information of the MSS – anytime, anywhere. Thanks to all these advantages, it comes

as no surprise that in the future all systems at Jansen Automation will be equipped with an expandable safety block. +

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Cleaning Cotton More Economically



The new EU Directive 640/2009 comes at the right time for the textile industry's efforts to achieve greater economic viability. One renowned manufacturer of machines for spinning preparation shows the advantages offered by the switch to three-phase induction motors with higher efficiency levels, using the example of blowing-room solutions for cotton.

The Trützschler Group, headquartered in Mönchengladbach, Germany, is a world-renowned manufacturer of high-quality machines and plants for spinning preparation and the nonwovens industry. A good example of the optimization of processing and fabrication solutions at Trützschler is cleaners for cotton, such as its CL-C Cleanomat cleaners. "By consistently using consumption-optimized IE2 motors, we set a very high standard with regard to energy efficiency," explains Peter von Dreusche, head of electrical design and electronics development at Trützschler.

Most of the company's spinning preparation plants are used in three-shift operation, often in the textile regions of Asia and in Brazil. Due to the worldwide rise in energy prices, customers today pay close attention to energy consumption when looking at the return on investment (ROI) – including outside the European economic area, where EU Directive 640/2009 has applied since June 16, 2011, stipulating that the IE2 efficiency requirement be met for

three-phase induction motors between 0.75 kW and 375 kW.

Early switch to IE2 standard

The company switched all the drives in its spinning machines to the IE2 standard early on, including the cleaners in the Cleanomat series. These are some of the most effective cleaners in the world, with up to three cleaning rollers for a high degree of purification combined with minimal fiber loss. The cleaning shafts are driven by three-phase induction motors from Siemens. The opening roller drive requires 4 kW, the two sawtooth roller drives 3.8 kW each. The motors provided by the automation partner made a custom configuration possible during the switch to IE2 motors, and the industry-proven availability of the motors contributes to the high availability and tool life of the machines.

The cotton is usually delivered in tightly pressed bales. A robot mills off these

bales and blows the fibers through an airlock to the next processing steps, with the flow rate reaching up to 1,000 kg/h. In the first step, foreign matter is removed through a centrifugal cleaner; the cotton is then dissolved into individual fibers with lengths of up to 30 mm. Different types of raw cotton are mixed uniformly before this step to be able to guarantee a consistent quality – the recipe. The parallel fibers are then bundled into thumb-thick skeins and placed in cans, with processing outputs of about 200 kilograms per hour. During a complicated control process, six to eight individual strands are then turned into drawing frame slivers. These fiber slivers can later be processed into high-quality yarn in the spinning machines.

Significantly lower power consumption

Due to the energy-efficient solutions necessary for complying with the IE2 standard,



Photo: Trützschler

At Trützschler, the blowing room series for cotton or synthetic fibers is custom configured



Additional photos: Fedella / Burtec, Iulu, Gilles Peire, saginbay

“Energy measures such as the general switch to IE2 motors by Siemens improve the return on investment of our solutions.”

Peter von Dreusche, Head of Electrical Design and Electronics Development, Trützschler GmbH & Co. KG

the machines have become more economical in their operation. “We use motors between 0.19 kW and 18.5 kW, making energy savings of quite a few percentage points possible,” explains von Dreusche. The higher the number of operating hours and the nominal output, the more significant the absolute power savings are compared with IE1 motors. However, the practical businessman lists additional reasons for using the IE2 motors from Siemens. First is the high quality of the products – the basis for a long-term supplier relationship. Also important to him was the efficiency with which the motors could be switched. The support of the manufacturer during the changeover – which affected all series and included the adaptation of CAD drawings, order lists, and so on – confirmed his choice: “Siemens has the right solution even for special cases.”

Due to the compact design of the motors, the construction did not need to be changed. So far, the space provided in the Trützschler machines has always been sufficient for an equivalent IE2 motor, even in machine modules with a very compact build. It was also possible to retain the maintenance and service intervals, and in some cases even to extend them, since due to their construction the IE2 motors are lower in maintenance than those of the previous series from the same manufacturer.

Expert partners

For the head of electrical design, delivery reliability is an important factor in the selection of a motor supplier. After all, about 100 of the described cleaners alone leave the Trützschler factories every year. This is

why the switch to IE2 motors is a double success for von Dreusche: “With Siemens, we have an expert partner operating worldwide, and with the new IE2 motors, we can document the cost-effectiveness of our solutions for our global customers – that goes over well.” +

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Precisely Oiled, Higher Process Quality



For coils and single rolled sheets, oil serves as protection against corrosion and as a rolling and punching medium. Servo-controlled metering pumps in oiling machines enable a more economical, precise, and even oil application, and better process control.

To improve the stability of the surface quality and provide favorable processing characteristics, steel and iron plates receive an oil coating. The oil protects against corrosion and also serves as a lubricant in rolling and punching processes. Usually, an electrostatic field is used for the oil application in order to create a gap-free oil curtain. The thickness and evenness of the oil application are determined by the amount of oil supplied by the metering pump.

One globally operating manufacturer of oiling machines is Duma Maschinen- und Anlagenbau GmbH based in Duisburg, Germany. A trusted partner to manufacturers of industrial-scale equipment in the

iron and steel industry for more than 25 years, the company has long been using servo-controlled drives for its precision axial piston pumps.

"This means that we now have pump speeds from zero to 3,000 rotations per minute available for flow control, which we can operate with very high resolution and control accuracy," explains Robert Schepers, technical plant manager at Duma. This dosing accuracy, which is significantly higher than that provided by conventional drive technology, enables the company to adhere much more precisely to the target or minimum quantities of oil per square meter of sheet metal.

"The Siemens system components offer us a single-axle servo control with very high quality and sufficient dynamics at a good cost/performance ratio."

**Robert Schepers, Technical Plant Manager,
Duma Maschinen- und Anlagenbau GmbH**

With their servo-controlled metering pumps, the oiling machines by Duma ensure an even oil application even at varying speeds



Siemens AG

Furthermore, the necessary safety margins can be greatly reduced, saving oil and decreasing costs.

Improved processing procedures

Even more important is an even oil application. Schepers gives an example: "When sheet metal segments are pushed into a press or a punching machine, the positioning accuracy depends greatly on the sliding properties of the oiled sheet metal – segments with a thicker oil coating slide farther on the bedplate than those with a thin oil coating." Even oil application therefore leads to a more consistent coefficient of friction, better process control,

greater yield, and better parts quality. And the costly calculation methods of the industry to estimate the remaining oil thickness based on the storage duration of the coils or sheet-metal plates become easier and more accurate when the oil application shows less variance.

Due to the ramp-like speed processes, for example, during start-up and shutdown of the line, the quantity dosage must be adapted precisely and quickly to the speed of the sheet metal passing through the oiling station. This is why Duma uses servomotors of the Simotics S-1FK7 type and Sinamics S110 frequency converters as drives for the metering pumps. A Simatic S7 with 315-2 DP CPU serves as a control system.

"A single-axe servo control with very high quality and sufficient dynamics is possible at a good cost/performance ratio this way," explains the technical director. "Furthermore, engineering, commissioning, and service are comparatively simple thanks to the integrated and open system interfaces with drive units, motors, and Simatic S7 control." For example, for the transmission of the signals of the high-definition engine-speed sensor and the motor monitoring, a single cable joint is sufficient – Drivecliq, an open and standardized serial bus at the drive level that supports electronic ID plates. The control system queries the installed components during the initialization phase of the plant. In normal operation, the PLC compares the drive configuration during run-up with the stored nominal values. This ensures that failures at the drive level or changes in a service are detected immediately.

Long useful life, global acceptance

Since the Sinamics S110 frequency converter forms a closed control circuit with the engine speed sensor, it is sufficient to



Marschner

indicate a speed set point calculated for the oil application from the current machine speed and the target quantity. This value is automatically implemented and monitored by the drives. Through this system and also thanks to the support of the nearby Siemens branch in Essen, the machine manufacturer can implement his technological expertise with little software and hardware effort in a robust application suitable for industrial use.

Since the oiling machines are integrated into etching, hot-galvanizing, or inspection lines, they do not need guide rollers or supports. The plants by Duma are contact-free and therefore have a very long useful life. This is why the company prefers to use durable and reliable components. Dependable long-term, globally available support from the electronics supplier is also important. Schepers knows firsthand that a machine equipped with Siemens components is accepted in heavy industry around the world: "We can get replacement parts just as easily and quickly in China or in the United States as in Europe, and the service for the electrical machinery is available worldwide and on short notice even after the warranty has run out. This gives us and the end users security, knowing that shutdowns due to failures can be kept short." +

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Modernization Concept for Gold Mill

Siemens modernized the gearless mill drive for Australia's leading gold-mining company. For the first time, two converter types were used in one gearless drive. The solution offers a new diagnostics system as well as additional remote access, increasing the availability and operating safety of the plant.

Newcrest Mining Limited is an Australian company based in Melbourne. Based on market valuation, Newcrest Mining, with eight operating mines worldwide, is considered the fourth-largest gold producer in the world and the largest in Australia. At the Cadia Valley Operations mining site near Orange in New South Wales, Newcrest operates two underground mines and one surface mine.

Modernization concept relies on smooth implementation

The extracted ore is first processed into a copper concentrate containing a high

quantity of gold through comminution, grinding, and flotation. The two-stage grinding cycle consists of a large SAG (semi-autogenous grinding) mill measuring about 12 meters in diameter with a gearless 20 MW drive and two downstream 10 MW ball mills with gear drives. When Siemens delivered the SAG mill in 1998, it was the first mill with such a large diameter – and it is still the largest mill in the world today.

Siemens was commissioned to retrofit the gearless mill drive of one of the gold mills on the premises. The main argument for the modernization was that the outdated motor control needed to be re-

placed with current technology. Thanks to the modernization concept developed by Siemens, the majority of the electronic equipment already in use could be retained. This helped minimize downtimes during the retrofitting.

First-time use of two different converters

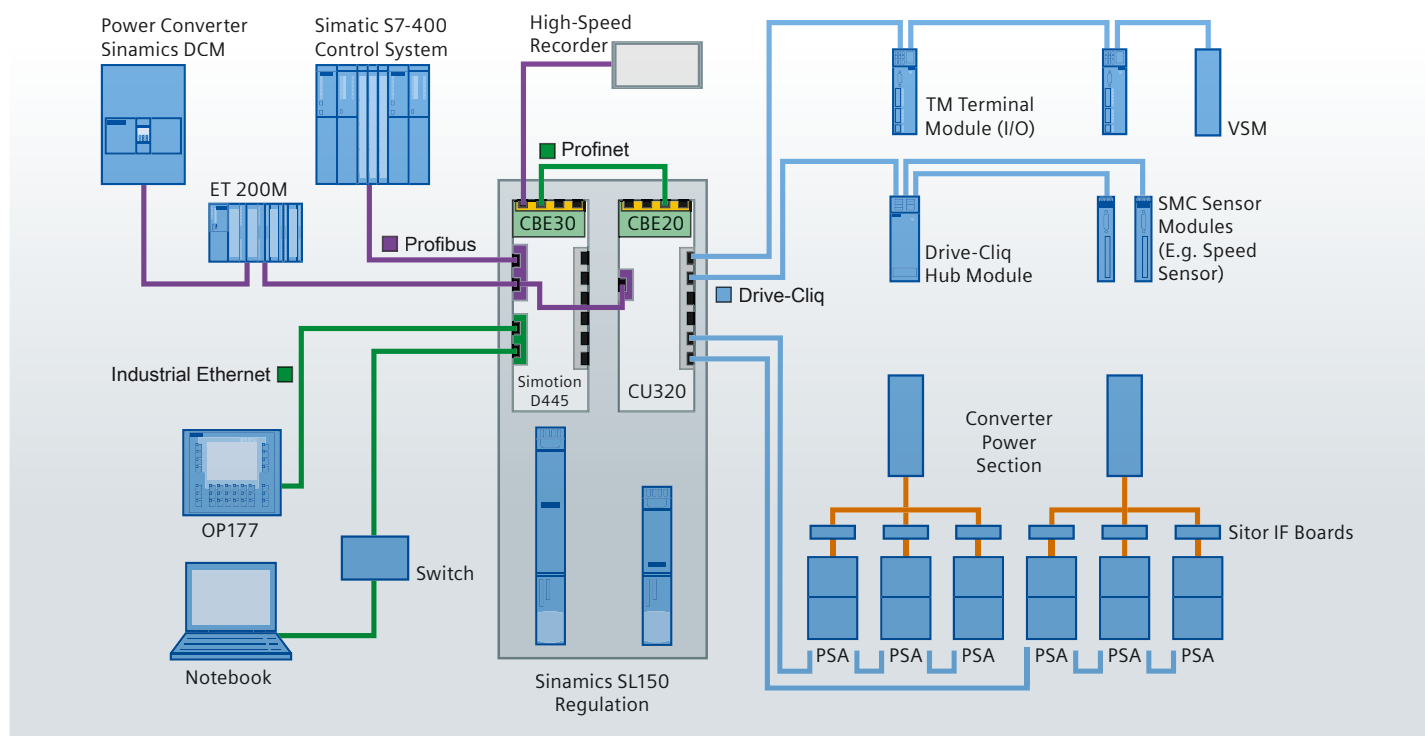
First, Siemens equipped the SAG mill with a Sinamics SL150 direct converter for the motor control. A Sinamics DCM power converter was chosen to actuate the field current. This was the first time that two converter types were used in one gearless drive. The Sinamics SL150 direct converter is the follow-up model to Simovert D and is based on the same platform as all Sinamics converters. The new Sinamics motor control replaces the old Simadyn control system, which has been partially discontinued. The Sinamics control is based on Simotion D 445 and on a CU 320 controller for drive control. The Sinamics DCM control module takes on the functions of the old Simoreg power converter. It was installed on a metal plate together with other components and only had to be screwed into an existing control cabinet and connected.

In addition, the Simatic S5 controllers were upgraded to Simatic S7 and the control system switched to Simatic PCS 7. The modernization included the installation of new air gap and speed sensors. A new router for remote access was installed for plant diagnostics as well.

The project team was able to replace the outdated regulation and control systems without having to replace the motor, the



Through the modernization of the mill drive at a gold mine in Australia, it was possible to increase the availability and operating safety of the plant



The drive system of the SAG mill at Cadia Valley Operations

transformers, or the active components of the existing frequency converter. The new Sinamics platform enables significantly improved system diagnostics, as well as considerably improved options for troubleshooting.

Fail-safe thanks to the latest technology

The grinding equipment is one of the key bottlenecks during gold production – every hour of downtime translates into great financial loss for the customer. In order to minimize potential loss, Siemens developed a concept that made downtimes as short as possible. To achieve this, only those parts that really needed to be replaced were changed. Everything else that was still safe to operate could remain in place. In addition, almost all parts in the control cabinets were preassembled and

tested in advance at the Siemens test site in Erlangen, Germany.

In this project, Siemens was responsible for the engineering of the hardware and software, the delivery and monitoring of the installation, and the commissioning. The implementation took place during a scheduled plant shutdown in parallel with other modernization and expansion work. Siemens took advantage of this opportunity to mechanically overhaul the motor as well.

In 2010, Newcrest Mining Limited concluded an extensive three-year service contract with Siemens, which includes on-call service and preventive maintenance as well as troubleshooting and now also remote diagnostics. The modernization project was a complete success and is considered a global reference in the mining industry. Other customers have already shown interest in this solution. +

IT security note

Suitable protective measures (including IT security, e.g., network segmentation) must be taken to ensure secure operation of the plant. Further information on industrial security can be found at www.siemens.com/industrialsecurity.

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Strong on Steep Tracks

A new drive unit for bucket elevators – with components from the Flender SIG gear unit series and the new Simogear geared motor series – is optimally designed for the extreme conditions in conveyor technology thanks to an improved gearing geometry and a modification of the housing.

Bucket elevators vertically transport bulk material such as cement, lime, and gypsum, but also grain and rice, to another level and discharge it there. In doing so, they often lift the material more than 200 meters, and the weights to be transported are enormous. Central or double chain strands, link chains, or belts, to which the buckets are attached, serve as supporting structures. The drive at the upper station requires comparatively high power, similar to a steep conveyor belt line. Because of the high acceleration force, the start must be soft. This is guaranteed through fluid couplings in the drivetrain. Usually, bevel helical gear pairs are used as single or twin drives on a base frame or swing base.

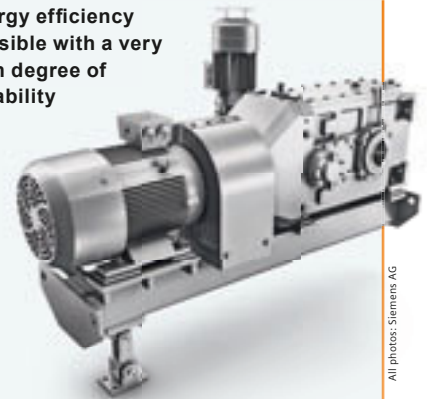
Robust and powerful

With components from the new Simogear geared motor series and the standard gears of the Flender SIG series, Siemens created an especially robust bucket elevator drive unit that is optimally designed for

the extreme conditions in conveyor technology. Warehouses and silos are usually filled in demanding environments. Accordingly, the drive unit must be rugged and powerful in order to transport bulk material quickly, with little wear, and in large quantities. The integrated bucket elevator drive makes maximum energy efficiency possible through improved gearing geometry and the optimization of the housing, with a very high degree of reliability at the same time. This in turn results in improved thermal power limits. The optimally matched components of the drivetrain meet the requirements for conveyor technology, such as dust absorption and defined discharge curves. The sealing systems and operating supplies within the drivetrain also contribute to the drive unit's reliability. The mechanically uncoupled auxiliary drive of the compact drive unit serves as a maintenance and load drive and operates at about 10 percent of the main drive speed. Backstops are standard in the new bucket conveyor drive unit.

Highlights of the Flender SIG transmission series

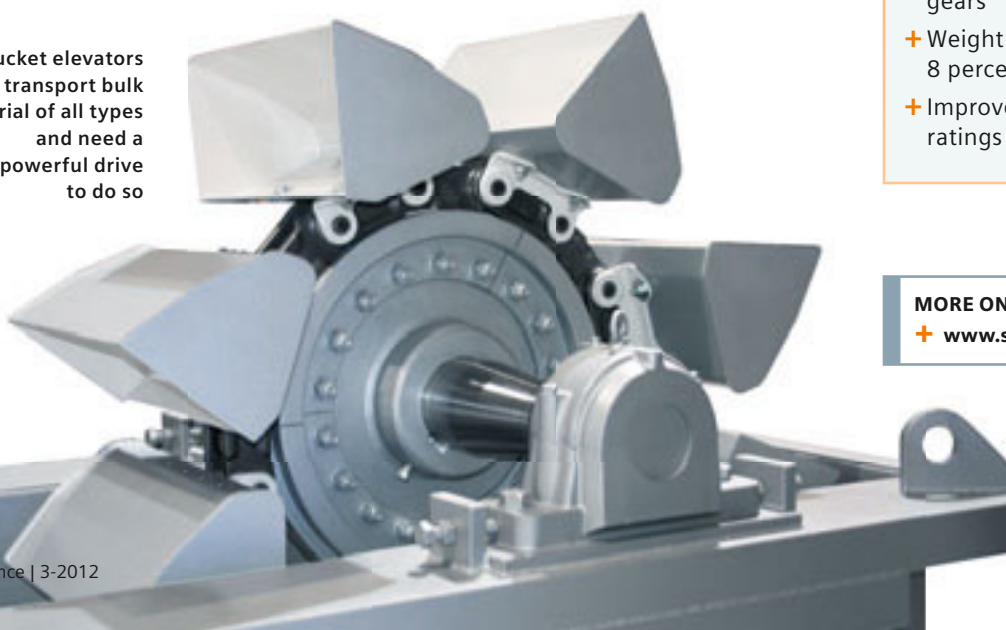
The integrated bucket elevator drive makes maximum energy efficiency possible with a very high degree of reliability



All photos: Siemens AG

- + Increase in torque while the size remains the same (up to +15 percent)
- + Harmonized torque rating
- + Increased service life of bearings
- + Monobloc housing up to 125,000 Nm
- + Interim phases for single-stage gears
- + Weight savings of up to 8 percent
- + Improved efficiency and thermal ratings

Bucket elevators transport bulk material of all types and need a powerful drive to do so

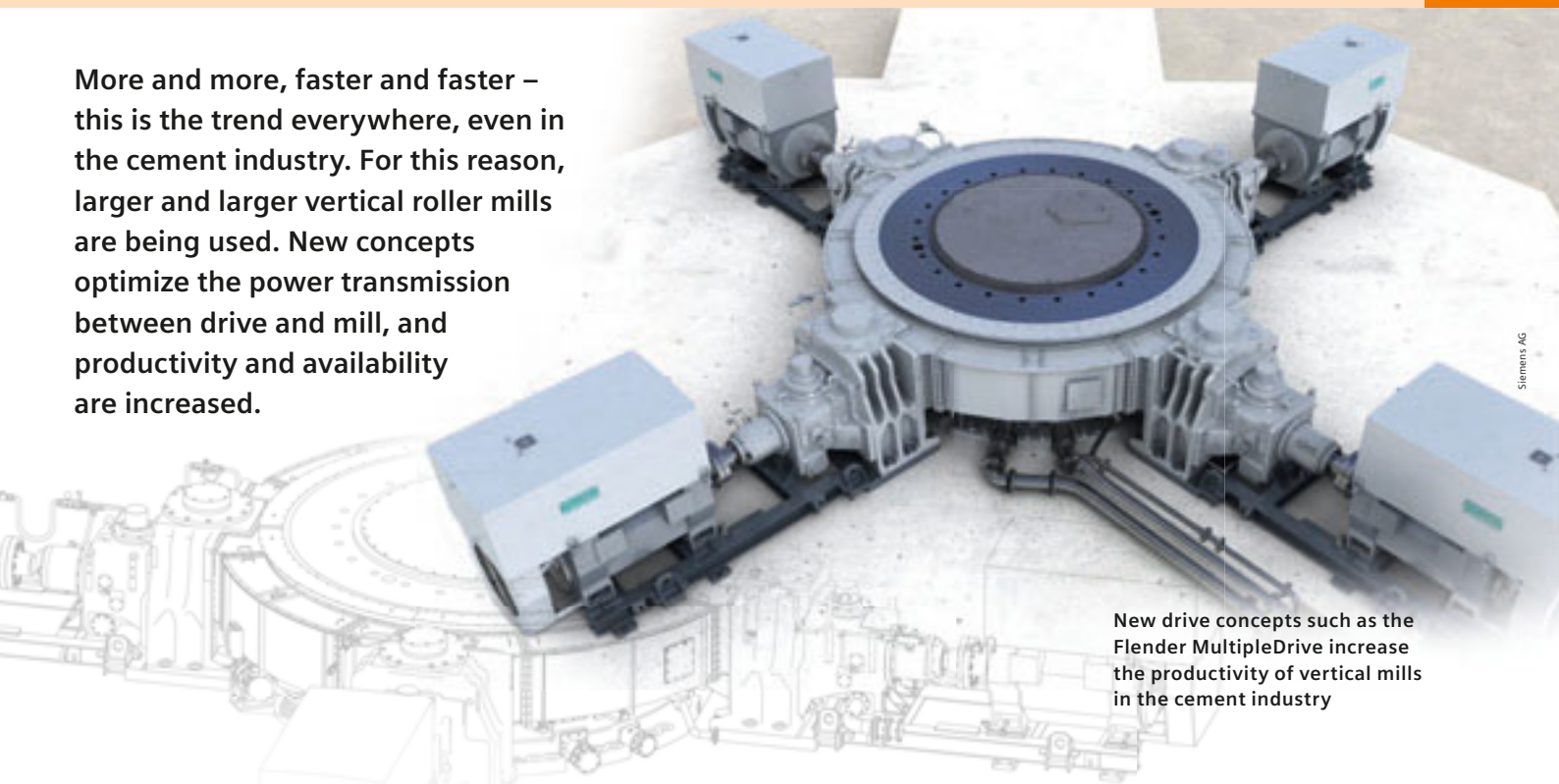


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More Productive Grinding

More and more, faster and faster – this is the trend everywhere, even in the cement industry. For this reason, larger and larger vertical roller mills are being used. New concepts optimize the power transmission between drive and mill, and productivity and availability are increased.



New drive concepts such as the Flender MultipleDrive increase the productivity of vertical mills in the cement industry

The drive systems usually used for vertical roller mills, consisting of a gear unit and asynchronous motor, transmit power of up to approximately 8 megawatts. However, larger ball-and-pebble mills, which are clearly becoming a trend, require much more driving power. With increasing mill size, the availability requirements also grow. In order to enable at least partial-load operation in case of a breakdown, the drive concepts must be modularly structured and sufficiently redundant in their functions. If the processes are then also optimized using precise speed control, it is possible to improve the grinding results and productivity as well.

Innovative systems: Flender MultipleDrive ...

Two new drive systems meet these requirements. The central idea of the Flender MultipleDrive concept is redundancy. The input shafts of the up to six small and compact straight bevel gear pairs are each driven by a frequency-regulated asynchronous motor. Since the gear unit, motor, and connector are arranged on one mount, replacing a drive for maintenance purposes is not

a problem. Because of the redundancy, the mill can continue operation with a reduced number of drives. The parameterization of the Flender MultipleDrive frequency converter ensures even load distribution with low dynamic amplitudes of the drives operating in parallel.

The frequency converter enables all the required operating states along with precise control and regulation of the mill speed. Outputs of up to 16.5 MW are possible. The significantly lower mounting height (compared with that of conventional drives) allows for more efficient mill designs.

... and Flender Empp

The Flender Empp mill drive is based on a new motor located in the gear housing below the planetary stages. The simple design without a bevel gear stage optimizes power transmission. The five planetary gears in the main stage result in a very compact unit. The Flender Empp is mechanically compatible with the previous mill drives but has been optimized with regard to cost and function. The brushless permanent magnet motor is wear-free and

has an efficient cooling system. Moreover, pressure-lubricated slide bearings prolong the operating life of the gear unit and motor. Compared with a system with one bevel gear stage and two planetary stages, the drive system has 20 percent fewer active components, reducing potential errors. Through the integration of the motor into the gear unit, the mounting volume and the weight have been reduced by one-fourth. Finally, the converter-controlled motor enables the active damping of the operation and the optimal adaptation of the speed of the grinding pans to changing grain sizes, resulting in greater efficiency for the ball-and-pebble mills. +

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Efficient Network Control Center



Industry has embraced wireless networks based on the IEEE 802.11 standards as part of a reliable network infrastructure, and the number and complexity of such installations are increasing. They require efficient central management, however. Intelligent Industrial Wireless LAN (IWLAN) controllers are perfect for this task.

A central “instance” is required for the efficient set-up and operation of industrial wireless networks, and IWLAN controllers provide the most comprehensive and efficient solution. Many controller-based access points (APs) are connected via what is also referred to as Switched LAN on one side of a central IWLAN controller, and the remaining company network is connected on the other side.

The controller hardware is often a dedicated PC platform. Via browser-based web interfaces and the Simple Network Management Protocol (SNMP), values such as the transmission performance or network name can be modified easily and for a group of APs at the same time. Licenses make it possible to activate the number of administrable APs or the radio-frequency permits for a particular country. Efficient IWLAN controllers are able to manage sev-

eral hundred controller-based APs – among them robust devices that can be installed directly in the production hall or outside.

IWLAN controllers are used primarily for applications in the transport sector, for language and video transmission, and in warehouse and harbor logistics. Controller-based IWLANS can also be used for Supervisory Control and Data Acquisition (SCADA) connections between automation applications and control center systems.

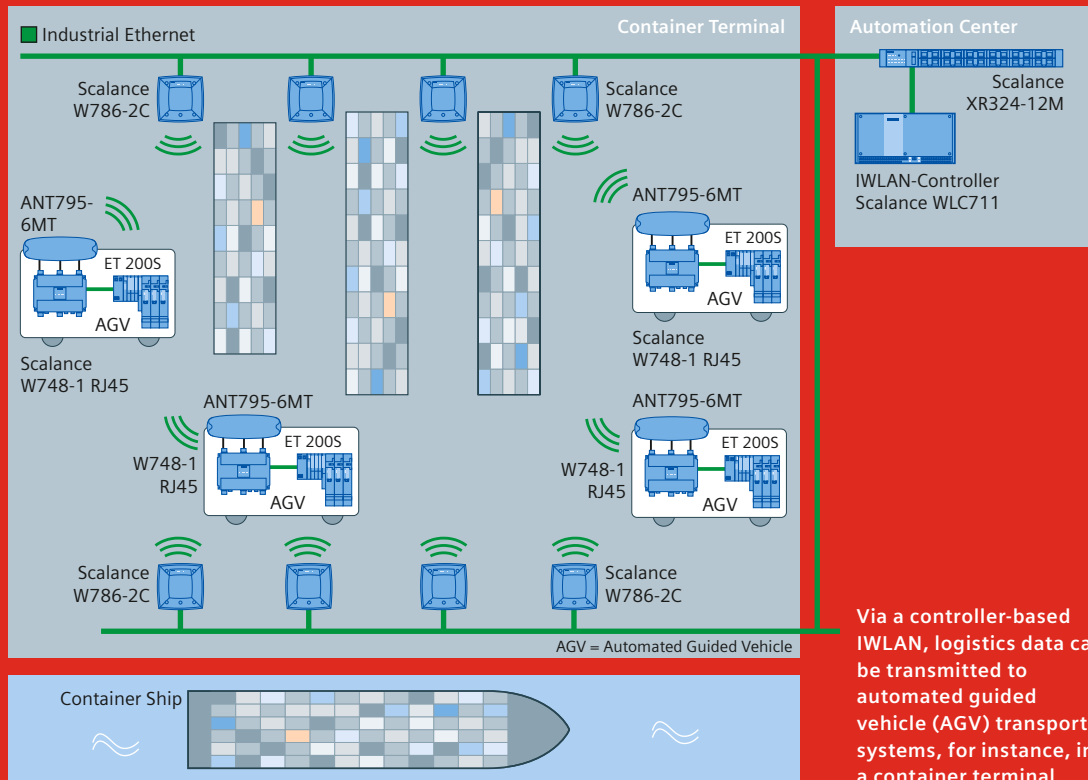
Integrated management functions

Intelligent IWLAN controllers support administrators with many functions that make network operation cheaper and more fail-safe and that cannot be performed by distributed IWLANS with independent stand-alone APs. These control-

lers automatically recognize newly added APs and provide them with the current firmware. The IWLAN channels can be automatically distributed to the APs. If APs are positioned very close to each other, failures can be compensated for through automatically increased sending performance on the part of the remaining APs. Sophisticated functions for bandwidth management ensure that remote bands and APs are equally utilized.

IWLAN controllers also increase the performance of services such as Voice or Video over WLAN, where short roaming times and short delays between IP packages are critical. Moreover, IWLAN controllers enable roaming scenarios that are impossible to achieve with stand-alone APs, such as seamless roaming between IP subnetworks. This ability can also be used for large IWLAN installations in which the APs are allocated to different IP subnetworks due to their

IWLAN controllers are used primarily in applications in the fields of transport and warehouse and harbor logistics



Via a controller-based IWLAN, logistics data can be transmitted to automated guided vehicle (AGV) transport systems, for instance, in a container terminal

All photos: Siemens AG

number. The APs can be furnished with identical features and safety settings by means of AP groups, and users can be allocated to user positions with different rights and features.

Switching modes and deterministic I/O data

In controller-based switching mode, all the data communication is centrally channeled through the controller. In addition to enhanced roaming features, this mode has the advantage that there is only one central network exit point

from the IWLAN and that the configuration effort of LAN switches is low. In local switching mode, user data communication can be directly linked to the wired LAN behind the AP. The controller is then required primarily for management tasks such as authentication of IWLAN clients.

The pinnacle of wireless network performance is the transmission of deterministic real-time data, as in Profinet IO (PN IO), for example. Self-sufficiently operating stand-alone APs can have log enhancements that optimize IWLANS for deterministic I/O data transmission and accelerate roaming as well. Controller-based IWLANS in controller-based switching mode are not yet suitable for deterministic I/O data transmission, but such data can be transmitted in local switching mode, as there is no time-consuming transmission of packages back to the controller.

Redundant controllers for better availability

To guarantee the fail-safe operation of networks, IWLAN controllers can be operated redundantly. Because every controller of a redundant pair is licensed to manage 32 APs, each controller is able to manage 64 APs if the other controller

fails, and the network remains fully functional. Network protection is very important, in terms of both access by IWLAN clients to the network and the encryption of data. Again, IWLAN controllers facilitate the administrator's work by distributing uniform safety policies to all APs. The encryption of data is reliably executed via standardized methods. +

IT security note

Suitable protective measures (including IT security, e.g., network segmentation) must be taken to ensure secure operation of the plant. Further information on industrial security can be found at www.siemens.com/industrialsecurity.

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Explanatory video

A new video explains the use of IWLAN with the Scalance W product line based on standard IEEE 802.11n and introduces the new generation of the Scalance W IWLAN product line.

Video Scalance W:

To watch the video, go to www.youtube.com and search for **Scalance W**.

Wireless Technology Preserves Long Beer Tradition

The British systems integrator FMA managed the successful migration of one of the world's most efficient barrel filling plants to a new control system with only 12 lost working days. An innovative automation concept featuring wireless technology contributed to the project's success.

Plzeňský Prazdroj, a.s., a company of the SABMiller Group, operates one of the world's most efficient barrel filling plants in the Czech Republic, a noted beer country. The Pilsen plant, established in 1994 by GEA Till (now KHS), with a capacity of 1,000 barrels per hour, works 24/7 in the event of strong demand. To guarantee this efficiency, SABMiller decided in 2009 to modernize the automation technology. The plant's downtime during the migration was to be minimized.

Intelligent modernization concept

Technology partner Siemens developed a detailed risk analysis for the filling plant that served as a basic concept for the quick, cost-saving, and intelligent retrofit-

ing project. A key component was the replacement of 14 Simatic S5-115U and S5-95U controls in the central control cabinet by a Simatic S7-400, and 5 Simatic ET 200M peripheral units with Profinet. CPUs and distributed Simatic ET 200S I/O devices took the place of the 12 Simatic S5-95U units in the three main rotating tables. For a quick migration from the Sinec-L2 fieldbus communication system to Profinet, the friction ring transmission to the rotating tables was replaced by wireless Scalance W access points. These measures enable maintenance-free operation, and provide maintenance engineers access to the entire Profinet network and the linked components via standard PCs – during operation and from any location within the plant. Based on the moderniza-

tion concept, the English systems integrator and process engineering specialist FMA developed a precise plan for the modernization that would be carried out within 12 days.

Quick implementation

While FMA reworked the software of the Simatic S5 control and modified it according to Simatic S7 standards, the filling plant continued running around the clock after the end of the demand peak in the summer in order to produce enough warehouse stock for the downtime period. Plzeňský Prazdroj specified Simatic TP 177 and Simatic MP 277 panels made of stainless steel. FMA engineers dimensioned and parameterized nine multifunctional

1,000 barrels per hour are cleaned and filled 24/7 at the Pilsen filling plant



Network management with Sinema E

The Sinema E (Simatic Network Manager Engineering) planning, simulation, and configuration software simplifies the installation and commissioning of an Industrial Wireless LAN (IWLAN) network. It visualizes the signal coverage, data rate, signal-to-noise ratio, and overlapping access points of an IWLAN network. Catalog entries and standard graphic formats facilitate planning and installation. A consistency check reduces possible errors, and report functions document the performance of the installation.



From nine operator stations, the plant operators are able to control functions both locally and in remote parts of the plant, and perform diagnostics

control panels for better operating control. After the solution had passed the factory acceptance test, the British specialists started with the retrofitting process in September. After the scheduled downtime, the barrel filling plant was able to return to operation as early as the beginning of October.

Use of the wireless Profinet network had required some convincing from the FMA specialists. "We were skeptical about this solution in the beginning," says Ondřej Sykora, head of process and control engineering at Plzeňský Prazdroj. "Therefore, FMA contacted a company that monitors the wireless operation and guarantees smooth operation." The reliable operation of the plant finally convinced Sykora. The high speed of 54 Mbit/s is more than sufficient for the exchange of large data volumes between the higher-level CPU, smaller processors, and control panels. Operators and service employees can monitor and adapt the entire system wirelessly from a laptop. The two stationary Scalance W786-1PRO access points with protection class IP65 are perfect for the

rough and wet industrial environment and communicate wirelessly with Scalance W784-1 client modules on each of the rotating tables. To ensure that the wireless technology would work in an environment with many metal structures and rotating parts, the solution was simulated in advance with the Sinema E software tool and successfully tested after implementation.

Increased availability

"We have moved away from a technology for which there won't be support for much longer and have secured ourselves service support for the future," says Sykora, outlining the main benefits. "In addition, modifications and changes have become much easier, and in the event of a power failure all the components restart quickly and without delay now." The migration increased the availability and safety of the barrel filling plant and reduced the number of system components and the diversity of the system. As a result of the positive experience with this project, Plzeňský Prazdroj is now upgrading all its Simatic S5

systems in the Czech Republic to Simatic S7, in cooperation with local systems integrators and Siemens as the system supplier. 

IT security note



Suitable protective measures (including IT security, e.g., network segmentation) must be taken to ensure secure operation of the plant. Further information on industrial security can be found at www.siemens.com/industrialsecurity.

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Self-Organizing Production

Radio-frequency identification (RFID) has long established itself in many fields of application as a means of automatically identifying objects of all kinds. RFID and networks play a key role in the individualization of products and are therefore an integral part of the Industry 4.0 concept.

For the automation of business processes such as individual production steps, warehouse updating, receiving, shipping, and so on, the automatic identification of goods is essential. The goods are therefore furnished with machine-readable individual bar codes, 2-D codes, or electronically saved information.

Data carrier with added value

RFID systems have more to offer than just identification. Because the transponders can carry more data than just code numbers, and because such data can be changed as often as the user wishes, RFID is also perfect for data carriers that can be permanently integrated into any object. The systems have evolved rapidly in the past few years, and ultra-high frequency (UHF) technology with frequencies around 865 megahertz and the use of smart labels have represented tremendous progress. However, traditional RFID in a high-frequency (HF) close range of 13.56 MHz has established itself for reading devices and transponders due to its robust communication and ability to perform well even under unfavorable environmental influences.

The automotive industry would be radically different without the RFID systems that enable the manufacture of bulk goods



A well-established concept in the automation industry: nonstop production of individual products

tailored to individual customer requirements. But many medium-sized companies such as the Westphalian shower and bathtub manufacturer Bette, the Turkish fabric wholesaler Tetas, and the Franconian plastic specialist Rehau have also acquired a strategic competitive edge thanks to RFID.

Self-organizing production

The term Industry 4.0, coined by a German initiative, refers to new approaches to industrial production such as distributed systems, new communication technologies, and the interconnection of product and production parameters. These technologies have great potential, especially

when it comes to the individualization of products, that is, the production of many different product versions according to individual customer requests.

Cyber-physical systems, a self-organizing form of production, are attracting a lot of attention. These are systems in which the workpieces communicate with the machines. The product comes along with its blueprint and coordinates its own way through production.

Today, RFID technology already provides a more than functional basis for the implementation of such concepts. The blueprint and all the required quality information can be saved on the RFID data carriers attached to the products or components. Individual product features such as color or specific

design can either be saved on the RFID data carrier directly or retrieved from the server by using the globally unique identification number of the chip.

The interconnection of the field level with higher-level databases enables the RFID chips, whose storage capacity is limited, to refer to large data records and complex instructions as well.

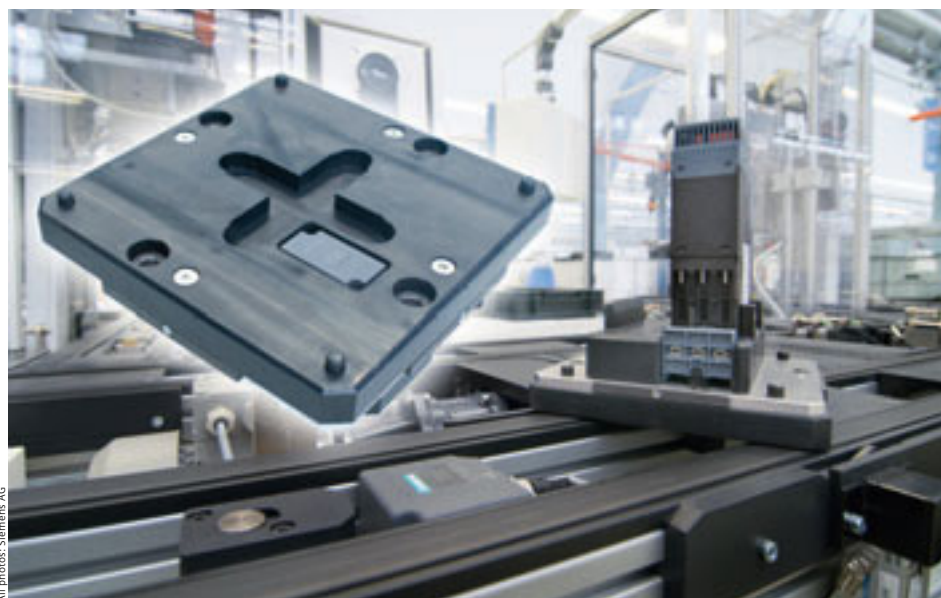
This approach requires flexible machines that are able to carry out a multitude of processes. Moreover, flexible material flow control is required to convey parts through the plant so that it works efficiently. A central control unit prioritizes the jobs and introduces them into the production network.

Successful use in real production

The first examples at German companies prove that the concept of self-organizing production really works. The production line for switching devices at Siemens in Amberg produces 250 versions of electrical switching devices for the global market in a made-to-order production process. For this purpose, special tool carriers are equipped with Simatic RF300 RFID transponders. This system makes it possible to retrieve the necessary data particularly quickly so that the workpiece carriers do not need to stop when they reach the reading device. The transponder contains the detailed blueprint that enables a

testing machine to carry out an individual test program for every device. The results and other quality information are, depending on the quantity of data, either transmitted to the control systems via a Profinet connection or saved on the RFID chip.

Thanks to the RFID chip, the specialist operators know exactly what needs to be done, as the necessary instructions are displayed on-screen. Moreover, parts can be conveyed back to previous stations thanks to a two-line material flow control. The combination of material flow and manual workstations results in an efficient, workload-controlled but still highly flexible production line. +



All photos: Siemens AG

At the manufacturing plant in Amberg, an intelligent material flow control supplies workstations based on workload

MORE ON THIS TOPIC:

+ www.siemens.com/ident/rfid

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Industrial Solution for Biogas

Because biogas plants must work around the clock, great emphasis is placed on diagnostics and availability. A company specialized in the production and service of biogas plants therefore uses motor feeders with IO-Link activation, which allow service and remote maintenance to be optimized.

“We explicitly look for integrated systems that enable high quality and availability,” emphasizes Ralf Breckling, CEO of biogas plant supplier North-Tec Maschinenbau GmbH in Bredstedt, near Husum, Germany. For this reason, the entrepreneur uses robust and reliable industrial control systems and integrated system solutions based on Totally Integrated Automation (TIA): “It is a great advantage for us, with regard to time and cost-efficiency, that the components can be easily integrated and wired from the control unit to the contactor and that performing diagnostics is simple as well.” A high degree of availability – and thus diagnostics (especially remote diagnostics) – is of significant importance in the biogas industry. Longer feeding downtimes result in considerable economic losses, as biology needs time to get back on track.

Cost-saving motor feeders with plug and play

This is why North-Tec used motor feeders with IO-Link for the first time at a plant in Leck-Eng, near the Danish border. The facility with a wet digester, a post-digester, and a digestate storage container supplies two combined heat and power stations with a capacity of 400 kW each. “The combination of a Sirius 3RT2 contactor and a circuit breaker for the Sirius 3RV2 motor contactor enables us to configure feeders up to 18.5 kW very safely and quickly via plug and play,” explains Breckling. He considers the intelligent IO-Link connection a smart complement that saves further wiring effort and provides a wide variety of diagnostic information

Biogas plant
in Leck-Eng



that would not be available in the case of conventional wiring. North-Tec also has turnkey solutions mastered: The WinCC flexible visualization software features a standardized IO-Link template for Sirius motor feeders, which provides important diagnostic information without any additional programming effort.

Easy communication via IO-Link

Up to four IO-Link groups, that is, up to 16 motor feeders, can be linked to the IO-Link master of the Simatic ET 200S distributed periphery. A simple plant controller based on ET 200S is adequate for all the control processes within the biogas plant or linked subsystems with their own control – such as a combined heat and power station in this case. That is, the distributed periphery is also available with an intelligent IM151-8 head component with integrated CPU.

Communication is effected via Profinet. Breckling considers IO-Link the best tech-

nology currently available, as it is easy to integrate into automation via IP addressing, it offers safe and simple remote access, and it can be expanded according to the user's needs. If there is a great distance between automation units, another Simatic ET 200S distributed periphery can simply be linked to the control via Profinet, which is very useful if there are satellites for combined heat and power stations, as in the case of the biogas plant in Leck-Eng. Here, the second combined heat and power station is 2 kilometers away in the engineering room of a residential building; this allows the generated heat to be used without having to cover long distances.

Deep insights into the plant

As diagnostics on this plant can be performed up to each motor feeder via remote access, the service staff of North-Tec immediately knows what alarm or error has been triggered for what reason and



A tangled wiring mass with standardized Sirius connection components is a thing of the past

“Thanks to Totally Integrated Automation we have developed an economic solution that is robust, reliable, and flexible.”

Ralf Breckling, CEO of North-Tec Maschinenbau GmbH



All photos: Siemens AG

IO-Link saves wiring effort

IO-Link is an open concept for connecting sensors, switching devices, and actuators to the control level by means of a point-to-point connection. Up to four motor feeders can be connected to each other and to the associated IO-Link master. Only the first starter of a row is wired to the master; a plug connection suffices for the others.

what is the quickest way to remedy it. Information on power demand, power consumed, power supplied, and grid quality also provides valuable reference points for the optimization of the system's operation. That is why North-Tec integrates Sentron PAC 3200 multifunction measuring instruments as standard procedure.

Exceeding the maximum consumption agreed in the reference contract with the power supplier (EVU) means high costs for the plant operator. To avoid this scenario, the limits are monitored by means of the measuring instrument, and units are switched off or switched on with a delay via software, depending on what the situation calls for. “That way, we can sort of program operational expense optimization,” explains Breckling.

In the biogas expert's opinion, there are about 400 biogas plants in Schleswig-Holstein alone that are running around the clock – and that should be equipped in the same way for cost-optimized remote

maintenance. “The only way to perfectly comply with the service requirements in the long term is to use an industrial solution for which the standard components are available over decades,” he states. **+**

MORE ON THIS TOPIC:

+ www.siemens.com/io-link

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Hot Plates

Hombach produces high-quality plastic discs on Geiss thermoforming machines using the twin-sheet process with top and bottom mold halves

By vacuum forming with two sheets, a Franconian manufacturer of precision parts forms foil material into high-quality plastic discs. Hombach relies on a compact package solution for temperature control.

Ernst Hombach GmbH & Co. KG, a manufacturer of high-quality plastic parts in Uehlfeld, Germany, uses the twin-sheet process to form plates with inside molding out of smooth foil. For this vacuum deep drawing with two sheets, the company uses T9 thermoforming machines from Geiss AG in Sesslach, near Coburg. A very precise process is essential for the high quality of the finished product, but exact temperature control is one of the most demanding challenges.

High degree of function integration

The Siplus HCs716I heating control used for the control of heating elements in the top and bottom heating of the T9 machine was an impressive part of the competitive package solution from the Totally Integrated

Automation (TIA) integrated product line. "The high degree of function integration of this heating control saves space and makes machines clearly arranged," emphasizes Hombach CEO Timo Tobolla.

Each heating control system has a circuit breaker for each outlet channel, a 5A fuse, and communication via Profibus DP on the assembly carrier. There are 16 channels for each assembly group. Up to 12 assemblies can be strung together, which enables the control of 192 heating elements altogether – and all that on an area of only 0.16 m². The modular assembly makes it possible to easily modify the heating areas at a later stage.

Parameterizing is simple and compact. Within the TIA concept, all the components are well matched, from the Simatic S7-317 2DP machine control, the HMI, to the heating control. There is a function block for the heating control system (HCS) for the Step 7 automation software or TIA Portal, which is attached to the hardware as a file. The preset parameters can be adjusted to the machine quickly and easily.

Comprehensive diagnostic options

The halogen spotlights can be adjusted sensitively and precisely. The machine control determines the target value in the function

block in increments of 1 percent, and the target value is then processed in the HCS. The percentage values are indicated in detail with the WinCC flexible visualization software.

Heating elements are grouped by the software in the functional block to create a smooth production process. There are comprehensive diagnostic options: Hombach employees immediately recognize errors and deviations in the process and are able to record them. The HCS informs the higher-level control about broken cables and lights, for instance, and even performs self-diagnoses.

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+ www.siemens.com/siplus

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Certification for Totally Integrated Automation

In addition to qualified further training on the company's entire range of products and solutions, Siemens also offers its employees various possibilities to earn certificates that confirm the knowledge gained. This is why the Sitrain Certification Program has been developed and now updated.

Employee qualification is gaining increasing importance for both employees and employers. In April 2012 the Central Association of the German Electrical and Electronics Industry e.V.

(ZVEI) defined a new standard for the further education required to become an automation technician, as the continuous skill enhancement of automation engineering, moving toward Totally Integrated

Automation (TIA) solutions, required an updating of the previous certificate for programmable logic controller (PLC) technicians. The new certificates for automation with Simatic S7 based on Step 7 V.5 – or TIA Portal – are called Siemens Certified Service Technician Level 1 and 2 and Siemens Certified Programmer.

Both certificates address the entire TIA range and both require a three-step training process before the test itself can be taken. The further education program developed by Siemens offers various possibilities for interested employees to achieve the certificates defined by the ZVEI and to consequently keep pace with the latest trends in the industry.

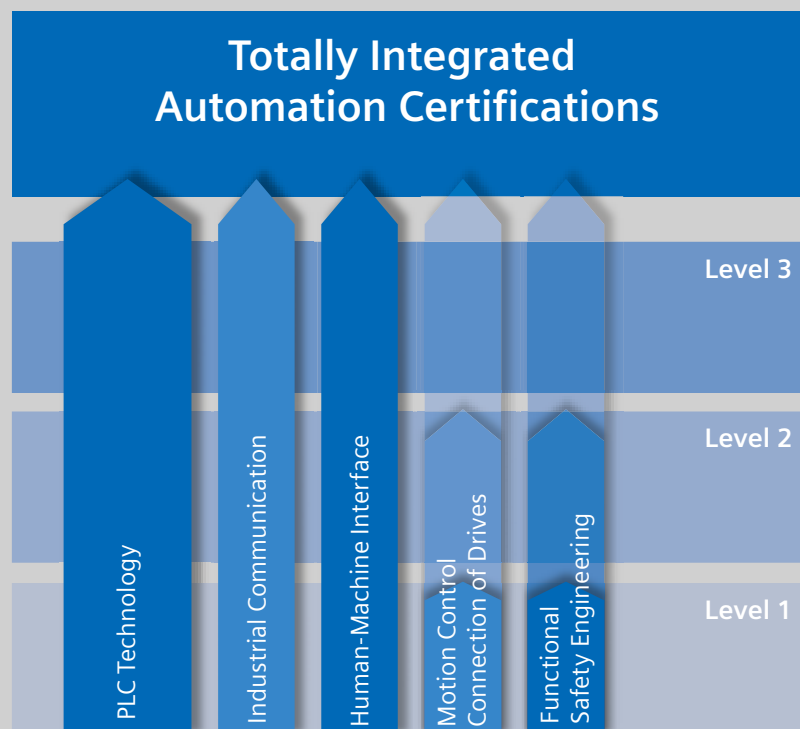
The benefits of the SITRAIN Certification Program are

- Up-to-date qualification through the certificate even though the professional qualification may have been some time ago
- Satisfaction through performance by faster and safer completion of tasks using the acquired knowledge
- More efficient completion of projects through the same technical knowledge of employees from different cultures and languages backgrounds in international projects.

When does it start?

	Step 7 V.5	TIA Portal
Siemens Certified Service Technician Level 1 & 2	October 2012	Summer 2013
Siemens Certified Programmer	October 2012	Summer 2013

Description of course contents



MORE ON THIS TOPIC:

- + www.siemens.com/sitrain-certification-industry

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Siemens AG

Product video

Configuration in No Time at All

The new product video "Efficient Configuration with CAD/CAE Data" shows how the configuration process can become much more efficient and how time savings of up to 80 percent can be achieved. The video addresses everything from the provision of high-quality current product data and their integration into engineering systems to individual standardized plant documentation.

There is also the option of free CAX application support, which can reveal further potential in your engineering process, creating room for more innovation. +

To watch the video, go to www.youtube.com and search for **SIEMENS Industry – CAD/CAE data**.

Siemens Industry Online Support Service 2.0 via the Web

Whether they are on the road or need information on products directly at a plant or machine, more and more customers are using the Industry Online Support portal with their smartphones or tablet PCs, as the Industry Online Support app provides access to all product information. It's fast, simple, and clearly organized.

The most important functions of the app include a product scanner, a product view, offline



Siemens AG

New Siemens industry blog

Always Well Informed



Siemens AG

The Siemens Industry Sector has launched a new blog. Since April, this blog has been keeping readers updated on integrated technologies, industry competencies, and services to increase productivity.

The blog is available in both English and German. +

cache, and support requests. The product scanner uses the smartphone's or tablet PC's camera to scan the codes that are included on more and more products. After the scanner has recognized the product, the new product view, which now also shows graphical information, opens automatically. The app saves pages marked as favorites in the smartphone's or tablet PC's offline cache, so that the most important information is available anytime.

It is now also possible to send support requests – service inquiries to Technical Support – while on the road. Pictures as well as text can be attached to describe the situation as clearly as possible. +

Competitive Industry (German version):
<https://blogs.siemens.com/wettbewerbsfaehige-industrie>

Competitive Industry (English version):
<https://blogs.siemens.com/competitive-industries>

www.siemens.com/industry/online-support-app
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Events

Keep up to date with the latest dates and events on Totally Integrated Automation. +

Event	Location	Date
HUSUM WindEnergy	Husum	September 18–22, 2012
MINExpo International	Las Vegas	September 24–26, 2012
Motek	Bielefeld	October 8–11, 2012
Glasstec	Dusseldorf	October 23–26, 2012
EuroBLECH	Hannover	October 23–27, 2012
Brau Bevale	Nuremberg	November 13–15, 2012
SPS IPC Drives	Nuremberg	November 27–29, 2012

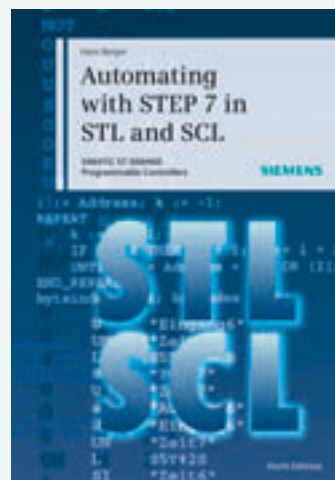
Library

Automating with STEP 7 in STL and SCL

Simatic S7-300/400 Programmable Controllers

6th revised and enlarged edition, 2012, 553 pages, 168 illustrations, 151 tables, hardcover, ISBN 978-3-89578-412-5, €69.90

This book is aimed at all users of Simatic S7 controllers. First-time users are introduced to the field of programmable controllers, while advanced users learn about specific applications of the Simatic S7 automation system. The book gives an introduction to the latest version of engineering software Step 7, V5.5. It describes elements and applications of the text-oriented programming languages statement list (STL) and structured control language (SCL) for use with both Simatic S7-300 and Simatic S7-400, including the new applications with Profinet and for communication over Industrial Ethernet. +



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