

Picture: SIGMATEK GmbH & CO KG



Flexible Automation Systems Ready for the Smart Factory

The wireless HGW 1033 multi-touch panel with integrated Safety functions promises new operating freedom.

Flexible automation of machines and mobile system components is the basis for production 4.0. The technologies and components for the factory of tomorrow are already available today, SIGMATEK assures. The Salzburg automation provider continuously expands its selection with new solutions accordingly. This includes highly functional decentralized control technology, wireless Safety, mobile HMIs, open system and communication standards as well as data encryption.

“The term Industry 4.0 has already become over-used”, explains Franz Aschl, Innovations Manager at SIGMATEK: “For this reason, we prefer to talk about clear, achievable goals that support implementation of Smart Factories. These intelligent factories already exist today and the number of them is increasing daily.”

To balance highly individualized products, which can also be profitably manufactured in small quantities, companies require flexible machines and systems that guarantee short setup times and very high availability.

“Our customers build such machines and systems, and meet the challenges that reach far beyond the current understanding of control solutions. Modern Machines used in a digitalized product bundle must, so to speak, look left, right and proactively communicate with other systems. The intensive horizontal M2M data exchange and increasing vertical integration of machine data requires completely new solution concepts to control the associated data streams”, stresses Aschl.

New Challenge: Data Streams

Through the specific demands of Smart Factories for extremely flexible production processes and high expectations on quality, as well as their documentation and trackability, new application fields are arising. The processing production and system information domains will thereby reach from IT to machine automation. Data must be collected directly at the machine, recorded, compiled and sent upstream to the overlaid data storage. Down streaming data also provides new possibilities: the transparent availability of huge data volumes enables the required information to be filtered and sent directly to the machine. On the topic of data handling, Aschl explains a further business dimension for manufacturers of machines and systems: “Today, production companies expect more than just the delivery and initial start-up of machines and systems according to a defined specification. They demand clear proof of performance, availability and productivity of the delivered equip-

ment from their business partners. Since these performance indicators are not only dependent on the system itself, but essentially on the peripheral systems as well – such as the intralogistics for placing and transporting – there is clearly a vital interest for seamless documentation and recording of all machine information and production data.

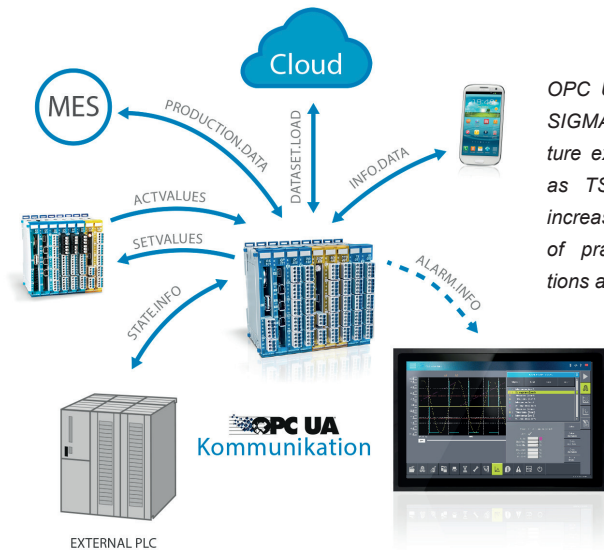
All modern control CPUs from SIGMATEK include the required interfaces, protocols and functions. An extensive selection of tools for displaying this information directly on the machine are provided. As always, proven services such as web server and VNC find use. Even a file transfer initiated from the control – across network boundaries as well – is part of the solution spectrum. Users have the option to not only display PDF files on-site, but also to generate them directly in the control. This opens new possibilities for reporting, such as in the food and pharmaceutical industry regarding CFR Part for example.

OPC UA and Data Encryption

Standardized communication is a must for digitalized production facilities. SIGMATEK has implemented the OPC UA standard, as well as server and client service. Today, increasingly more customers are using this function to integrate the machine control into Scada systems, as well as for seamless data exchange with controls from third-party manufacturers. From SIGMATEK's point of view, the benefits of OPC UA reach significantly further when the integration of product planning and ERP systems or even cloud services are considered. In the IT and data solution environment, OPC UA has matured into an established standard and paved the way for bidirectional exchange of job and process data. As soon as such information leaves the company boundaries, an additional aspect comes to the foreground: Data security and the encryption of data involved with it. SIGMATEK meets this requirement: The compact control systems support not only SSL encryption, but also proven VPN tunneling. "Users of our fully matured solutions profit from proven control disciplines, as well as from versatile data processing and transmission services that are already used today", says Aschl. OPC UA is thereby at the beginning of its possibilities.

"In the foreseeable future, the expansion with TSN will drastically increase the range of applications and benefits for the user even more. With Varan, there is already a proven, one hundred percent

The S-DIAS system with integrated Safety is very thin and designed so that machine manufacturers can even eliminate the control cabinet.



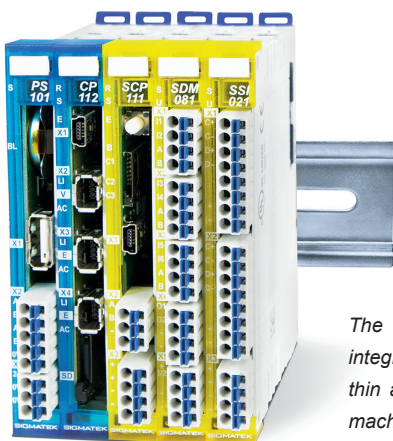
OPC UA is in every-SIGMATEK CPU, future expansions such as TSN will further increase the range of practical applications and benefits.

deterministic real-time bus system that will also remain the backbone for time-critical tasks in machines with SIGMATEK automation." The advantage for the Varan user is among other things, the device requires no configuration and settings to connect with the bus. Which is based on the Ethernet standard. This also applies when bus participants must be exchanged – during servicing for example. "This is an aspect, which Smart Factory operators clearly see as an advantage since the system availability thereby measurably increases", emphasizes Aschl.

Miniaturized, Modular Control Technology

At SIGMATEK, our goal is not only to realize technologically and performance-oriented automation concepts, but to also bring them into a form that helps to reduce the total costs of machine and systems. The especially compact construction of the S-DIAS control system opens various new application possibilities. The modules are only 12.5 mm wide, which is also the standard grid dimension, 104 mm high and 72 mm deep. Even the high-performance CPU, with dual-core processor and power supply to provide the system with an integrated 24 VDC supply, is just three rows wide. This means that the space requirement for machine controls is extremely low. This allows some machine manufacturers to eliminate the need for a control cabinet. This not only saves costs, but a high degree of freedom for the external design of the machine is achieved at the same time, since no disruptive metal housing is required.

For SIGMATEK, it is not just about a reduction in size, but the adaptability of the machine or system. For the Salzburg company, one thing is clear: the future is leading away from centrally installed, complex line structures – to control solutions that are organized by multiple CPUs. Each CPU controls a manageable function unit in the machine and exchanges information with the neighboring controllers as required.



Wireless Data Exchange and Flexible Material Flow

The S-DIAS systems can be easily expanded with Safety controls, and that also with thin 12.5 mm modules. Safety-oriented data exchange is not only possible via the system bus, but also via Ethernet TCP/IP networks and even WLAN. Thereby, SIGMATEK relies on the Black Channel Principle in accordance with EN61784-3 and has already used it in control solutions for portable, mobile system components such as robots, handling units or automated guided transport systems. The logistics within production facilities must also be increasingly integrated into the overall automation concept. Permanently installed handling and conveyor systems are too inflexible for adaptive production systems.

For this reason, autonomous systems often perform transport tasks. You can flexibly react to changing requirements and close the gap in the automated processing chain within a factory. The automation technology used in mobile system components, such as automated guided vehicles for example, must meet high demands. Here, the S-DIAS system provides advantages: compact, vibration proof and wireless data transfer.

HMI Redefined

The future for operating and monitoring sees Franz Aschl as follows: "Currently, there is a trend toward increasingly larger HMI's. We also have standard panels with up to a 23.8" diagonal and glass multi-touch screen in our portfolio that have new high-performance dual-core processors and two independent Ethernet interfaces on board. The demand continues to strongly increase – we also regularly implement customer-specific variants." When it comes to Smart Factory requirements, SIGMATEK also wants to take a parallel approach and completely redesign the HMI: "We are developing a completely new operating concept based on portable and wireless HMIs", reveals Aschl. With the HGW 1033, a mobile operating panel with a 10.1" multi-touch screen, integrated battery pack and standard WLAN interface for 2.4 and 5 GHz will soon be available. The handheld operating panel is also

Ready-to-use: With LASAL Add-Ons, the control of a Delta robot with its visualization for example, can be created with a few menu-guided mouse clicks.



equipped with the Safety functions emergency stop, confirmation button and key switch. When the emergency stop button lights red, the HMI clearly indicates that the Safety function is available and the Safety system is connected correctly. The signals are transmitted to the Safety controller – also wirelessly. The automation supplier has therewith laid the corner stone for future visualization tasks. In modern production facilities, numerous machines and systems operate under the supervision of a single operator and for this person, it is extremely useful to have the collected information clearly organized on a mobile and wireless operating interface that is always within reach. "The feedback from the market is very promising, apparently we hit a nerve with many machine and system manufacturers," says Aschl.

Flexibility and Openness in Engineering

Because there is no way around object-oriented programming for flexible machine concepts 4.0, SIGMATEK focuses on engineering that supports a modular, mechatronic machine design and can be very flexibly configured and adapted. With the integrated design environment LASAL, the software for process, motion and Safety technology, as well as the visualization is created. Since ready to use software functions are available for simple, as well as complex standard functions such as Pick&Place or CNC, the customer's engineering requirements sinks.

"LASAL is constructed in layers", explains Aschl. "On the lower layer, we have standard functions with which we cover around 80 percent of all required functions in machine manufacturing. Here, customers can also program their own special function and regulating algorithms. Our Add-Ons, which are structured like wizards, provide a very comfortable layer for individualization. The customer can create the control for a Delta robot with only a few menu-guided mouse clicks, including the corresponding visualization. Various options such as OPC UA, VNC repeater or integrated web server are also available for communication and remote maintenance mechanisms via Internet. Modern multi-CPU projects can be clearly and comfortably managed in the LASAL Machine Manager.



Wireless Safety enables the flexible use of SIGMATEK systems for example, in automated guided transport systems in production logistics.