

EVERYTHING FOR THE SMART FACTORY

Digitalization along the Process Chain: In SIGMATEKs product catalog, machine builders and automation specialists find everything they need to convert the possibilities of digitization into maximum flexibility and productivity for their factories at a manageable cost. SIGMATEK Managing Director Alexander Melkus explains where the corresponding offer from the Salzburg automation experts begins and how far it reaches. **Interview by Ing. Peter Kemptner / x-technik**



Mr. Melkus, how does SIGMATEK support machine manufacturers in digitizing and building the Smart Factory?

Digitalization is a broad concept. It ranges from simple process data collection to the digital twin. For example, the digital twin of a SIGMATEK controller can be created, complete with time response, which can be integrated into simulation models of entire machines for virtual commissioning. As a manufacturer of control and automation systems, we see our job as enabling machine builders and automation specialists to develop and manufacture future-oriented modular, flexible machines and systems quickly, easily and economically. We do this with the right

hardware in pace with the times, but above all, through standardization and automation in software development.

What does standardization and automation in software development mean to you?

Digitalization begins in the mind of the product planner. This revolves around connectivity and interfacing, modularity, simple exchange of optional modules and functional design, where the functionality of a machine is determined independently of the mechanics and hardware. For more than 20 years, the SIGMATEK design environment LASAL has made object-oriented programming possible.

The object-oriented software development enables very simple, modular and fast function-based **configuration of the software by simply linking and parameterizing objects on a graphical user interface.** For many applications, the complete and tested program modules available to LASAL users in the form of so-called classes in a library or as Add-ons and packages, are enough.





Through their modularity, our automation solutions are perfect enablers for adaptive production.

Alexander Melkus, Managing Director SIGMATEK GmbH & Co KG

Through the reusability of developed and tested program modules, it allows very simple, modular and fast function-based configuration of the software via linking and parameterizing objects on a graphical workspace.

Can this construction set completely replace classic programming?

Yes and no. For many applications, the finished pretested program components provided to LASAL users in the form of so-called classes, templates, Add-ons and packages in a library are enough. It has grown over the years and contains everything from simple individual components – such as PID controllers or positioning, for example – to complete packages and Add-ons that in addition to program elements, also contain visualization elements. An example of this is the Delta Robot Add-on, whereby only mechanical properties must be set. Users can also easily create their own components in their usual programming language. It is even easier to modify functions from the library, thereby creating your own variants without changing the base class.

Which concrete benefits does that bring LASAL users?

In addition to significantly accelerated software creation and an extreme reduction in testing, LASAL enables dividing the development phases. This allows the highly qualified – but short on time – software engineer to focus on the machine-specific functions and create individual components. The application technicians combine standard and individual components and configure them specific

to the customer. For this, they need to be familiar with the machine processes but don't require deep software knowledge. Due to the modularity, the individual software functionalities can be assigned very flexibly to the hardware components actually used. This simplifies the integration of optional machine modules.

How does SIGMATEK support the development of adaptive machines for the Smart Factory?

Through their modularity, our automation solutions are perfect enablers for adaptive production. Creating machines and programs for adaptive manufacturing in the Smart Factory is the task of our customers. We give them the means to do this with high modularity, low development and testing effort, and a short time to market. In addition to the software, we also design the hardware so that they are suited for the modular, flexible and highly efficient construction of machines.

The extremely small form factor of the S-DIAS CPU, I/O and Safety modules enable machine manufacturers to design their machines, including optional modules, in function units with their own intelligence.

Does that mean that SIGMATEK systems have multi-CPU capability?

Exactly. Huge central computers are not only passé in office environments. Decoupling the visualization has long been a standard anyway, also because its performance hunger – especially with HTML5 visualizations – is continuously increasing. Dividing LASAL programs over multiple CPUs is always a standard option. We also recommend it, >>>



For secure **communication with cloud services** such as the Remote Access Platform, SIGMATEK provides the Remote Access Router with GSM connection or WLAN.

since a multi-CPU architecture with needs-based performance directly on-site where it's required, provides significantly more flexibility and future-proofing. The LASAL Machine Manager assumes the orchestration of multiple CPUs. It is an enabler of the Smart Factory, as machine options can also be flexibly and easily added or removed during operation.

What does SIGMATEK offer in communication technology?

The efficient wireless CPU communication via WLAN brings more flexibility a step closer. SIGMATEK provides compact WLAN adapters for this purpose. The WLAN client Wi-Fi-C is already available. The Wi-Fi-Pro, which can be configured as an access point and creates its own WLAN hotspot, is still in development. With these Wi-Fi adapters, existing machines can be made WLAN-capable. They are ideal for maintenance, as well as for the simple retrofit of Brownfield systems towards Industry 4.0. Of course, there are also pre-designed classes and visualization components in LASAL for networking via WLAN.

What about functional Safety for data traffic via WLAN?

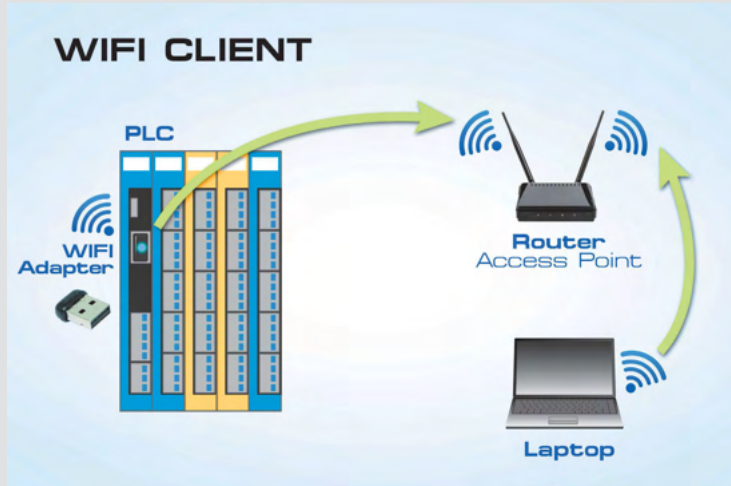
As could be read in the AUTOMATION special edition 2019/20, we can provide TÜV-certified, SIL 3 PL e functional Safety in compliance with EN/IEC

61508 via WLAN. Optional machine modules can therefore also be removed or added during active operation, without compromising functional Safety. With Hot-Swap Safety however, the safety-related function is limited to emergency stop.

The mobile operating panel HGW 1033 with a 10.1-inch multi-touch color screen also has wireless Safety functions. Large, difficult to access machines or machines far away from the control cabinet can therefore be monitored and operated with full functional Safety. It is also used in intralogistics, like operating driverless transport systems, an operating device for robots or as a dedicated maintenance terminal.

One topic of digitalization is the evaluation of machine data by higher-level systems – also using artificial intelligence – in the cloud. What does SIGMATEK offer in this area?

SIGMATEK provides the Remote Access Platform (RAP) as an SaaS (Software-as-a-Service) from the cloud. On the one hand, this offers the possibility of location-independent and cross-location machine and user administration. On the other, it enables the recording and storage of machine data as well as transfer to higher-level software products for data evaluation, including the use of artificial intelligence.



How does data security look in this context?

Our cloud services use redundant server structures from a mid-sized European provider. The customer is thereby independent from SIGMATEK, but also from the large US brands such as Amazon or Microsoft Azure. Of course, SIGMATEK controls can be connected to these when needed.

Although sensor data can also theoretically be transmitted directly, we recommend connecting over an Edge device such as our PC 521. The process CPU will not be data processing and there is a clear separation from the outside world, which increases data security. Data security is not only a main focus in cloud computing, but also for remote access. Our remote access routers with hardware firewall, available with GSM connection or WLAN, provide especially secure communication (VPN, SSL) with the outside world, particularly since access rights can also be managed in the web-based interface of the Remote Access Platform.

Speaking of Remote Maintenance: What ready-made offers are there from SIGMATEK in regard to condition monitoring and predictive maintenance?

Changes to the energy intake allow conclusions to be drawn on the status changes of several components. In the S-DIAS portfolio, the EE 121 is an efficient module that records energy, power and phase angle (Cos φ) directly on the machine and can be used for predictive maintenance and cost monitoring. In LASAL, there are numerous comple-

te function components for measuring and processing energy data. For secure remote access, the remote access router is the ideal solution. It can store the information locally so that the volume of data to communicate does not get out of control and the CPU is not too heavily burdened. SIGMATEK systems can send messages for maintenance personnel through an integrated mail server in the form of an E-mail.

Software repairs or updates via remote access are very simple, since in LASAL, the machine is fully transparent to the applications engineer, including current process values in the LASAL classes. Modifications in the software can be made quickly and easily by exchanging the modules, so that machine stillstands due to error corrections or improvements are very short.

With what does SIGMATEKs drive technology score in the Smart Factory?

The automatic configuration of our drive technology components shortens stillstand times during component exchange. It also extends to the Safety parameters. In addition, monitoring defined limits such as the safe limited speed (SLS), is now possible directly in the drive and no longer in the safe CPU only. The CPU is thereby unburdened and the modular design of machines further supported.

Mr. Melkus, thank you very much for these insights and perspectives!

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For efficient and **wireless CPU communication via WLAN**, SIGMATEK provides compact WLAN adapters. In addition to the WiFi-C WLAN client, which is already available, there will also be a WiFi-Pro version that can set up its own WLAN hotspot as an access point.