

AUTOMATION SYSTEM



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OUR PRINCIPLES

CONSISTENCY

Fully integrated automation solution

EFFICIENCY

Fast time-to-market for your machines

EXPERTISE

Support from our experienced industry experts

FUTURE-PROOF

Long-term availability of components

SIGMATEK is a worldwide successful company. For 30 years, we have been researching, developing and producing automation technology. We offer our customers modern and flexible automation systems from one source, with a "certain added value" in the engineering of machines and systems.

YOUR ADVANTAGES IN SIGHT

Solid and Flexible Structures

SIGMATEK was founded in 1988 and is 100 percent privately owned. A flat organizational structure and short decision making process are characteristic of our company. We can therefore quickly and flexibly react to the market demands. A first-class range of products, solution expertise, dedicated employees and long-term customer relationships – these are the key factors of our success.

For us, Innovation is a Tradition

We meet any technical challenge. Innovation is the result of our passion for the continuous improvement of products and solutions. Annually, around 18% of sales revenue is invested in research and development. With us, you get flexible and efficient automation solutions with a future.

THE SIGMATEK EXECUTIVE MANAGEMENT



Andreas Melkus



Theodor Kusejko



Marianne Kusejko



Alexander Melkus



INTEGRATED SYSTEM SOLUTIONS

MODULAR, FLEXIBLE AND FUTURE ORIENTED

We focus on complete automation solutions: control and drive technology, as well as Safety, unified in one integrated engineering environment. The engineering is thereby significantly reduced and at the same time, the performance and flexibility of your machines are increased.

Our automation system is constructed like a modular toolbox – in hard and software. The compatibility and scalability of the components are just as guaranteed as the long-term availability. This modularity provides you an important competitive edge: you can implement the most varying customer requirements flexibly and efficiently – also with increasingly smaller lot sizes.

Our product spectrum is always up to date with the latest technology: HMIs, controls, industrial PCs, I/Os, servo drives, motors, real-time Ethernet as well as engineering tools. All components of SIGMATEK automation systems are produced in the main facility in Lamprechtshausen, Salzburg. They are the result of consistent research and continuous development as well as high quality standards in production.



METAL PROCESSING

ROBOTICS

MADE IN AUSTRIA

All automation components from one source

BROAD SPECTRUM

The right solution for any demand

SIMPLE ENGINEERING

ONE tool for all tasks

ECONOMIC

Low total costs of ownership through an integrated approach

MACHINE KNOW-HOW

SUCCESSFULLY UTILIZED IN MANY INDUSTRIES

In automation, we are at home. With our 30 years of industry experience, we can inspire our customers and provide them comprehensive support in implementing their machine concepts with well thought out automation solutions.

SIGMA TEK has combined expertise and decades of experience in the most varying application areas and industries. We understand your specific requirements, have a feeling for trends and quickly turn them into serial products. Naturally, we love technology but our focus is on customer

benefit. We listen to our customers intently, are proactive and never lose sight of the big picture. This enables us to create tailored industry solutions to meet your needs and help to make your machines and systems fit for use in smart factories.



PRINTING AND PAPER



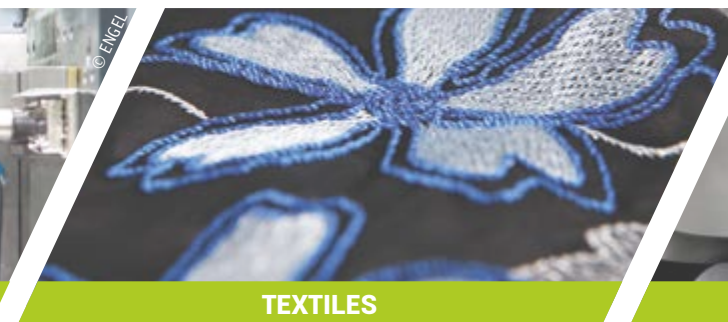
ENERGY



PLASTICS TECHNOLOGY



AND HANDLING SYSTEMS



TEXTILES



PACKAGING AND FOOD



+



=



CLOSE PARTNERSHIPS

WE ARE ALWAYS CLOSE TO THE CUSTOMER

Long-term and successful partnerships are our goal. We want to excite our customers and give them a market advantage with our expertise and know-how. This way, we can grow and evolve together.

Anyone who listens to their customers like our sales engineers and knows exactly what they need, finds the right solution faster. Only in a strong partnership based on trust, continuity and transparency, are extraordinary things possible – and that in a short time.

Our customers know that they can count on SIGMATEK. We score with flexibility in

the design and in applications support. We are always close to the customer: whether engineering, initial start-up on-site at OEM customers, employee training or support via remote maintenance using web technologies.

Solution Finding | Design

Specification | Engineering

Construction | Programming

THE RIGHT MIX IS KEY

We meet any challenge and together with you, find the optimal solution for your application. Standard components, which can be flexibly combined and individually adapted, form the basis of our automation solutions. Through this modularity, you get tailor-made automation components. Our application engineers support you in development with their wide-ranging project experience. Top components are thereby transformed into successful and unique solutions and machines.

Our core expertise lies in complete solutions – especially for fast automation processes, by which the combination of performant control, dynamic drive axes, integrated Safety technology and modern

visualization is in demand. This provides you, as the customer, the advantage of having only one contact partner for all automation questions. With a complete view of the machine process, we offer you an individual 360°-solution for the entire product life cycle: from finding a solution, project development through the application engineering and initial start-up to service and remote maintenance – as long as your machine lives.

INTEGRATED AUTOMATION SYSTEM

MORE FLEXIBILITY AND HIGHER PRODUCTIVITY FOR YOUR MACHINE



Control and I/O System

Our control system offers the right CPU for any task: compact S-DIAS CPU modules for the DIN rail, industrial PCs or control panels – with high performance single or multi-core processors. Scalability and consistency means that compatibility with the application software is guaranteed. The I/Os are available in two series: S-DIAS for IP20 and P-DIAS for IP67 requirements. The S-DIAS system impresses with a unique packaging density and is ideal for modular machines with distributed intelligences.

Human-Machine Interface

In the area of human-machine interfaces, a broad product palette is available: from small operating units with 3.5 inch displays to high-resolution touch panels with a display up to 23.8 inches – with different touch screen technologies. For simple applications, the control panels also perform in addition to classic visualization, control tasks. Naturally customer-specific configurations are possible, for example, HMIs that were especially designed for the specific requirements of the food processing and pharmaceutical industries.

Motion Control

Our modern motion control system convinces: motors, servo drives, gears and software interact perfectly and are seamlessly integrated into the control system. This results in highly dynamic motion sequences from one source. Engineering is simple, since predefined motion components are provided. The precision, dynamics and efficiency of the machine are increased.



🔒 Safety Integrated

SIGMATEK has Safety fully integrated into the automation solution: Safety controller, Safety I/Os and drives with integrated Safety technology. Programming and project development are simplified. For networking, the real-time Ethernet bus VARAN is used, which transports standard as well as Safety data. Separate wiring is therewith eliminated. The modern, freely programmable Safety technology simplifies a modular configuration of your machine or system.

🔒 Real-Time Ethernet VARAN

Integrated, hard real-time communication is the key to modern communication systems. The Ethernet technology based VARAN bus system was designed for flexible and modular machine concepts. With cycle times of 100 μ s, jitter < 100 ns and guaranteed data security, your machines are more productive and precise. Also for project development, VARAN provides complete freedom through various network topologies.

🔒 Software Engineering

The all-in-one engineering tool LASAL enables fast and efficient realization of machine concepts: process control, visualization, motion control, Safety, diagnostics and service. Already in 2000, SIGMATEK was the first to introduce object-oriented programming to industrial automation. The reusability of the software modules helps to reduce the engineering times and costs significantly.

SIGMATEK – THE SYSTEM

ENGINEERING LEVEL



One Tool for all
Automation Tasks

HMI LEVEL



Operating Panels

CONTROL LEVEL

SERVICE & MANAGEMENT LEVEL



OPC UA, LASAL Remote Manager,
VNC Client and Server, Webserver, ...



Mobile Panels



CPU Modules



Industrial PCs



Control Panels



Mobile Panels

FIELD LEVEL



I/O System S-DIAS



Safety System S-DIAS

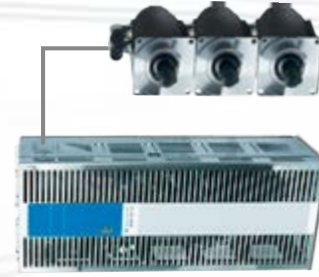


I/O System P-DIAS

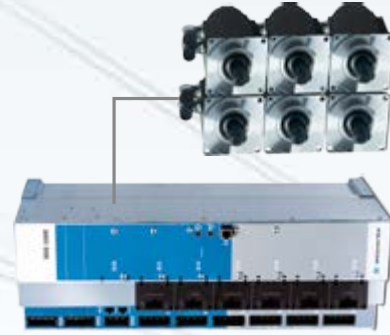
DRIVE LEVEL



DIAS Drives 100



DIAS Drives 300



DIAS Drives 1000



CONTROL CPU

FROM SIMPLE MACHINES TO COMPLEX SYSTEMS

For versatile control tasks, various systems are available: compact CPU modules, industrial PCs, as well as control panels. We use single and multi-core processors with high-performance, low loss EDGE2 Technology as well as from Intel®. All controls are scalable and compatible with one another.



COMPACT CPU MODULES

Grow with the Task

Our CPU modules from the S-DIAS series impress with their especially compact construction and flexibility. With the S-DIAS CPUs, small function units can also be equipped with intelligence and combined into flexible systems or installations. From

the economic single-module-CPU to the high-performance dual-core control processor for demanding applications – with the S-DIAS CPUs for the DIN rail, your machine is ready for Industry 4.0.

INTEGRATED



The software also follows the SIGMATEK idea of integration. Programming is consistent and simple. The hardware platform can be changed without having to adapt the software. The automation system can therefore be easily expanded.

SCALABLE

The right CPU for any application

INTEGRATED

Compatibility of the application software

COMPACT

Space-saving construction and installation in the control cabinet

SIMPLE

One engineering tool for all tasks



INDUSTRIAL PC

Full Power Ahead

If high computing performance is demanded, our robust industrial PC is the right choice. A powerful Intel® processor ensures that even complex applications run perfectly – and that in 24/7 continuous operation. The IPC 221 is compactly designed and has numerous interfaces, with which it can be easily connected to any topology.

CONTROL PANELS

Control and Visualization Unified

The ETV control panels are all-in-one devices. They unify control, visualization and operation in one compact module, and are therewith an efficient solution for simpler applications. The ETV panels, equipped with EDGE Technology processors, are available with 5.7 - 8.4 and 12.1-inch color touch displays. Decentralized solutions can be implemented via the VARAN interface.

For Mobile Application Areas

With 8.4 or 10.4 inch touch displays, the mobile control panels were designed for use directly on-site. They are equipped with EDGE2 Technology processors, emergency stop, confirmation button and key switches. The combination of ergonomic design and low weight ensure fatigue-free operation.

SAVE DEVELOPMENT TIME WITH READY-TO-USE FUNCTION COMPONENTS

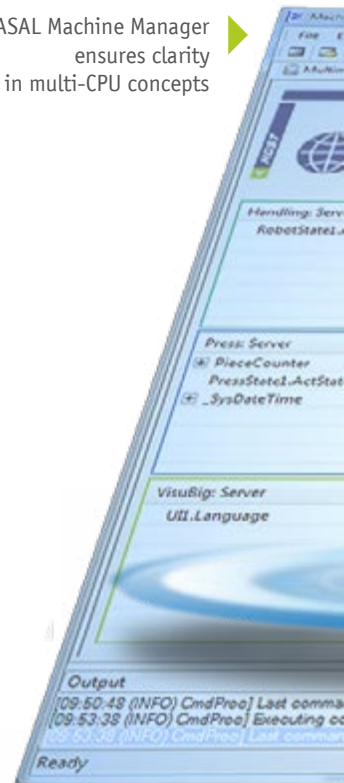
The SIGMATEK system concept provides all control disciplines required for a production machine from one source. As the basis, the complete PLC functionality for tasks such as process control, monitoring, in and output processing and calculations are available.

"Less programming – simply configuring": Our engineering tool LASAL supports you in the implementation of your machine or system software with ready-to-use and tested function components. The extensive libraries contain for example, PID regulators, complex filter and regulation algorithms, various motion modules and robot kinematics.

Application templates are also provided, which in addition to the finished sequence control project, also contain the corresponding visualization. An example thereof are login functions and access authorizations, event journal or data analyzer.

All these functions are ready-to-use and can be modularly implemented in your application using the toolkit principle. There, it's clear that you can reduce the development times considerably and at the same time, the software quality increases. Depending on the complexity of your application, you achieve time savings in engineering time of up to 70%.

The LASAL Machine Manager ensures clarity in multi-CPU concepts



EXAMPLES FOR READY-TO-USE APPLICATION TEMPLATES

■ Control modules

PID regulators, operation mode manager, filter algorithms

■ Access Control

Login function and implementation of access permissions

■ Data logger

Oscilloscope for recording multiple channels

■ Robot kinematics

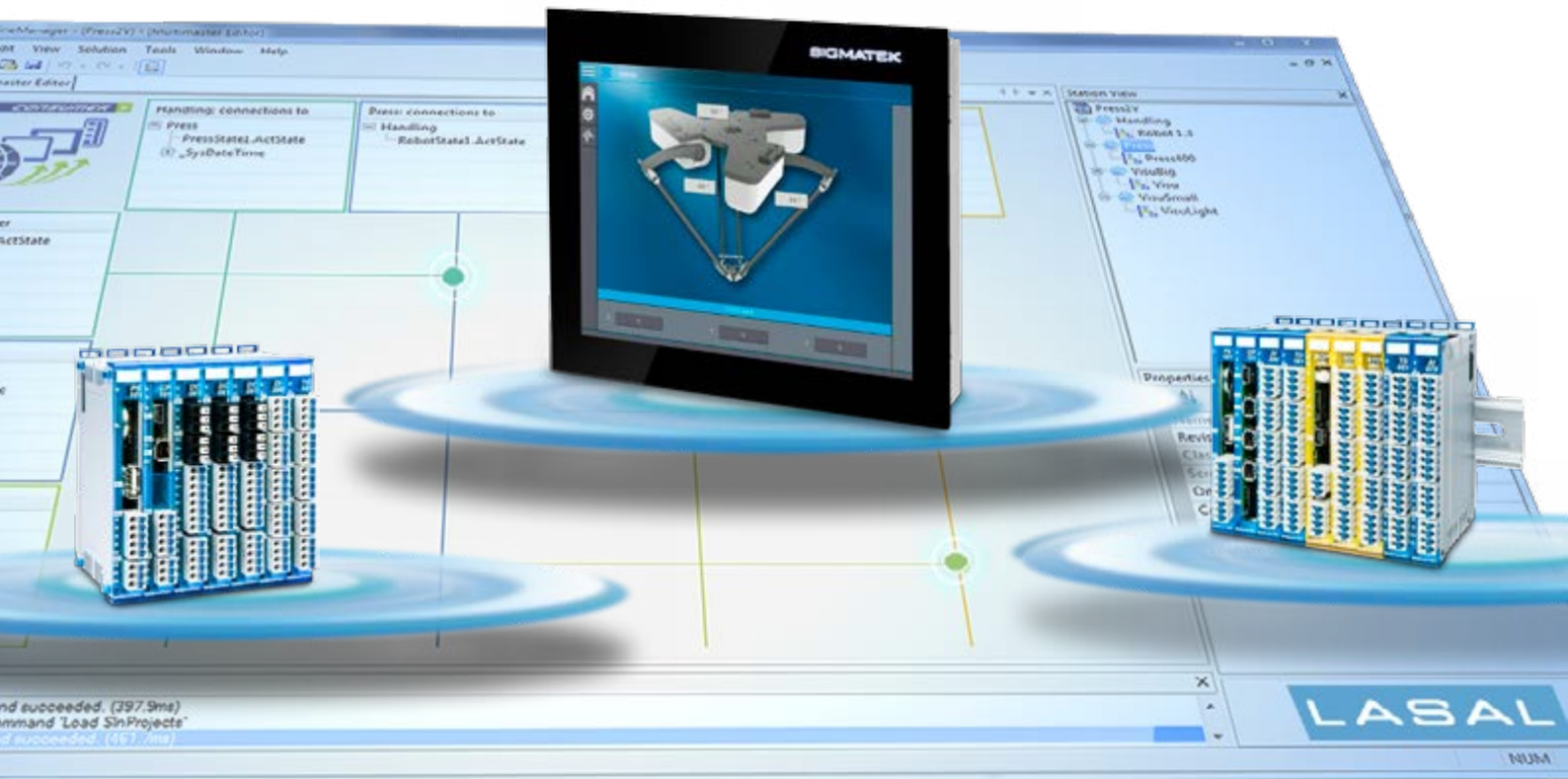
Delta, SCARA, portal

■ Function templates

Synchronous feed, Pick & Place, printmark recognition, unwinding, separating and grouping



SMART CONCEPTS FOR MODULAR MACHINES 4.0



The automation technology from SIGMATEK already provides all options for implementing machine concepts 4.0. To meet the demands of "maximum flexibility", we rely on modularity in hard and software and – especially for complex applications – on multi-CPU concepts.

With modular concepts, the machine or system is divided into function units. Each unit assumes the exact task assigned to them and is equipped with its own intelligence. The automation system can therefore be flexibly expanded and adapted to new requirements.

Software: Basis for Modularization

Through the encapsulation of program components, our object-oriented engineering tool LASAL enables modularization of the application software. This is the basis for outsourcing to decentralized intelligences. To manage a complete solution

with distributed intelligences, the "LASAL Machine Manager" is available. The Machine Manager guarantees clear representation of the individual machine components and their dependencies. It therefore acts as the central management for connected controls and manages the data flow: Who can exchange which data with whom. The entire infrastructure for the control programs, such as the operating system and libraries, is centrally managed by the Machine Manager. With this approach, the effort for creating software and maintenance is minimized.

OPC UA



Whether a control computer, ERP, MES, cloud services or third-party systems with the OPC UA implementation in LASAL (OPC UA server and client), you are provided with an integrated, platform-independent communication interface. Mapping can be easily configured in LASAL. All this reduces the work for initial start-up and handling, and enables implementation of adaptive production strategies.

ROBUST

Installed directly on the machine (IP67)

COMFORTABLE

with pre-assembled cables with M8 or M12 connectors



I/O SYSTEM

COMPACT, MODULAR, ROBUST

The I/Os are available in two series: the super compact S-DIAS system with standard and Safety modules (IP20) and the P-DIAS series (IP67). Our I/O components can be used modularly and impress with their functional versatility.

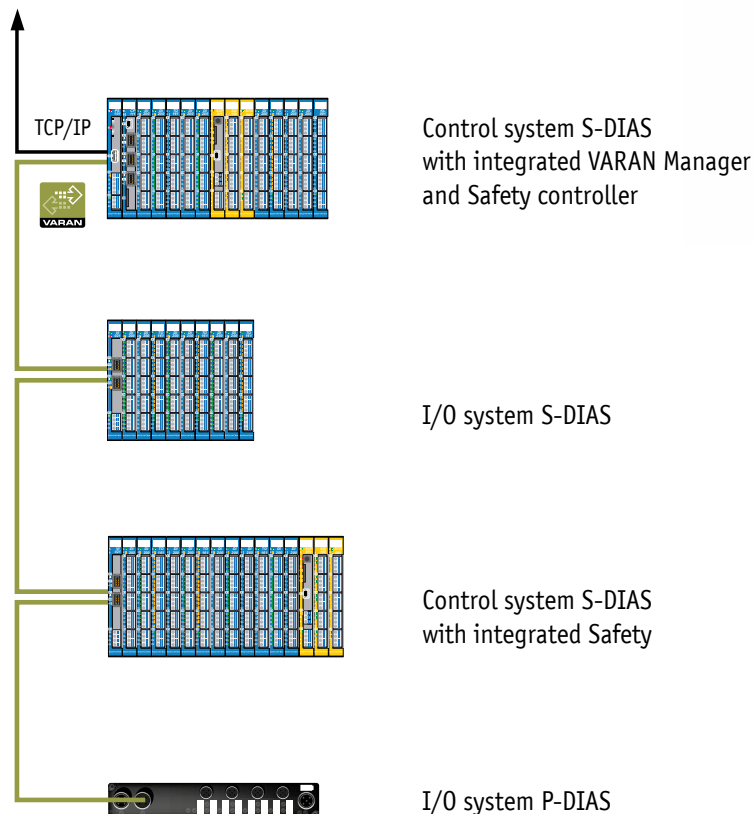
With the modular I/O system family, you can meet the requirements for IP20 as well as IP67. Both series can be combined as desired and communicate with one another without limitation and performance loss. A decentralized configuration with multiple module groups is therefore possible, which can be networked through the real-time Ethernet bus VARAN. Through different network topologies (star, line,

tree), you have numerous options for designing the modular configuration of your machine concepts.

Our systems are open for communication with third-party components. For this purpose different interface modules are available. Individual machines can be thereby easily integrated into production lines.



Operating and Monitoring



I/O SYSTEM P-DIAS

For Harsh Environments

The P-DIAS modules expand the system family in the IP67-protected area. They are ideal for the decentralized configuration of control systems and can be combined with the S-DIAS series as desired. In the field, analog and digital data can be collected or distributed outside of the control cabinet.

The connection of peripheral components is made using M8 connectors, optimized for use in harsh operating environments. Flexibility in use is also an essential feature of the P-DIAS modules. The digital modules have 8 channels, which can be freely selected as in or outputs.

Dimensions: 30x175x33 mm (WxHxD)

HIGHLY COMPACT

20 I/Os within a 12.5 mm width

COMFORTABLE

through toolless DIN rail mounting and push-in wiring

CLARITY

Signal LEDs directly next to the channels

RELIABLE

Modules mechanically interlocked, all contacts with multiple contact points



I/O SYSTEM S-DIAS

Highest Packaging Density

Fast signal processing, highest packaging density to date and Safety integrated – with the S-DIAS series, you can master the growing complexity of your machines – and that with the same or even reduced control cabinet volume.

S-DIAS comes to you as a complete module solution: DIN rail mount, electronics and bus are unified in one housing. This enables fast, toolless assembly of the modules, which can be pre-assembled in blocks. Since standard connectors with push-in wiring are used, which can be pre-assembled and easily removed during service, the installation and wiring times are reduced to a minimum.

Communication is established via the hard real-time capable Ethernet bus VARAN with 100 Mbits/s. Per VARAN bus interface, up to 64 I/O modules with up to 1,280 I/Os can be connected on the DIN rail. Here, the update time is under 60 µs. Module status LEDs and signal LEDs directly next to the channel provide clear identification. The S-DIAS I/Os are interconnected and mechanically interlocked. The module supply and bus connection were implemented with multi-contacts. The highest mechanical reliability and vibration resistance are thereby reached. Standard and Safety modules can be combined as desired.

Dimensions: 12.5x104x72 mm (WxHxD)

MODULE VARIETY

Our many years of experience have produced a variety of modules, which can be modularly combined to create a perfectly tailored solution for any application:

- CPU modules
- Digital in and output
- Analog in and output
- Digital/analog mix
- Counter & position recording
- Motion
- Measuring technology
- Safety (controller, I/Os, relays)
- Bus connection
- Interfaces & splitters
- Special function

Electro Planning Made Easy

For the S-DIAS product family, EPLAN macros for simple schematics integration are available.



HUMAN MACHINE INTERFACE

SIMPLE AND COMFORTABLE OPERATION AND VISUALIZATION

SIGMATEK offers a broad spectrum of panels. While developing our human-machine interfaces, we focused on a compact design and comfortable operating features. With the engineering tool LASAL SCREEN, your visualization is quickly ready to go.

Whether operating, control or mobile panels – the HMIs convince with high-resolution color touch screens in classic 4:3 or wide screen format. In addition to resistive touch screens, numerous multi-touch panels (PCT) for modernity and an intuitive, safe operating experience are available.

With the HMIs, you can also select from various sizes: from 3.5" to 23.8" in vertical format. All panels are, of course, fanless and therewith wear-free.

For demanding visualization and opera-

ting concepts, our panels with integrated EDGE2 Technology processors are the right choice. For simple applications, all-in-one control panels are also available.

The mobile HMIs of the HBG (without processor), as well as the HGT and HGW series (processor integrated), are predestined for a diversity of applications in robotics, assembly and handling technology. Also for special environmental conditions and branch-specific requirements (food processing and pharmaceutical industry), the right solution is available.



HOT FACTS

SCALABLE

The right panel for any need

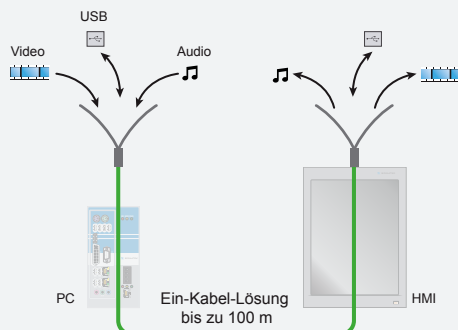
SIMPLE

Comfortable screen design with the all-in-one engineering tool LASAL

ADAPTABLE

Customer-specific housing design possible





HMI-LINK: REMOTE SOLUTIONS UP TO 100 m

One cable, more power and long distances – those are the advantages of HMI-link technology, which was designed for remote solutions. With a standard Cat5e or Cat6 cable, video, audio and USB signals can be transmitted up to 100 m without loss between operating panels with HMI-link and the industrial PCs of the 400 series.

HMI-link is based on a pure hardware solution and is operating system-independent. The HMI-link panels have no internal processor and are therefore more mechanically robust and economic. A possible increase of computing power occurs in the control unit in the cabinet.



FREEDOM REDEFINED: DATA EXCHANGE VIA WLAN

The wireless handheld operating panel HGW 1033 provides you with a new freedom for monitoring, as well as operating directly on-site. Wireless data exchange eliminates cables, which until now, had posed a trip hazard. The 10.1 multi-touch screen provides high operating comfort. In addition, Safety functions are already

integrated. Even the Safety data is transmitted via radio signals. Despite the integrated battery pack, the wireless panel weighs only 1,500 g and therefore ensures low-fatigue operating. The battery pack enables up to two hours of continuous operation (planned availability Q2/2018).

STRONG VISUALIZATION WITH LASAL SCREEN

With the HMI tool LASAL SCREEN, you are provided with a comfortable tool for creating visualizations. Predefined design templates and diverse operating and graphical elements simplify project engineering. Integrated features such as alarm and event management, trend display, text and recipe management, as well as language and unit conversion provide great comfort.





MOTION CONTROL

FROM POSITIONING TO PATH CONTROL

Modern machines and systems require innovative drive technology with maximum flexibility and precision. The economic complete solution from SIGMATEK offers a high degree of freedom to perform motion tasks with your machine.

At SIGMATEK, motion control is fully integrated into the control system. Control, drives, motors and software interact perfectly and enable highly dynamic and exact motion sequences from one source.

The DIAS Drives cover a broad performance spectrum and include the most important Safety functions STO (Safe Torque Off) and SS1 (Safe Stop 1) according to SIL 3, PL e, Cat. 4 in the standard variant. The drives can therefore be easily integrated into the Safety concept of the machine.

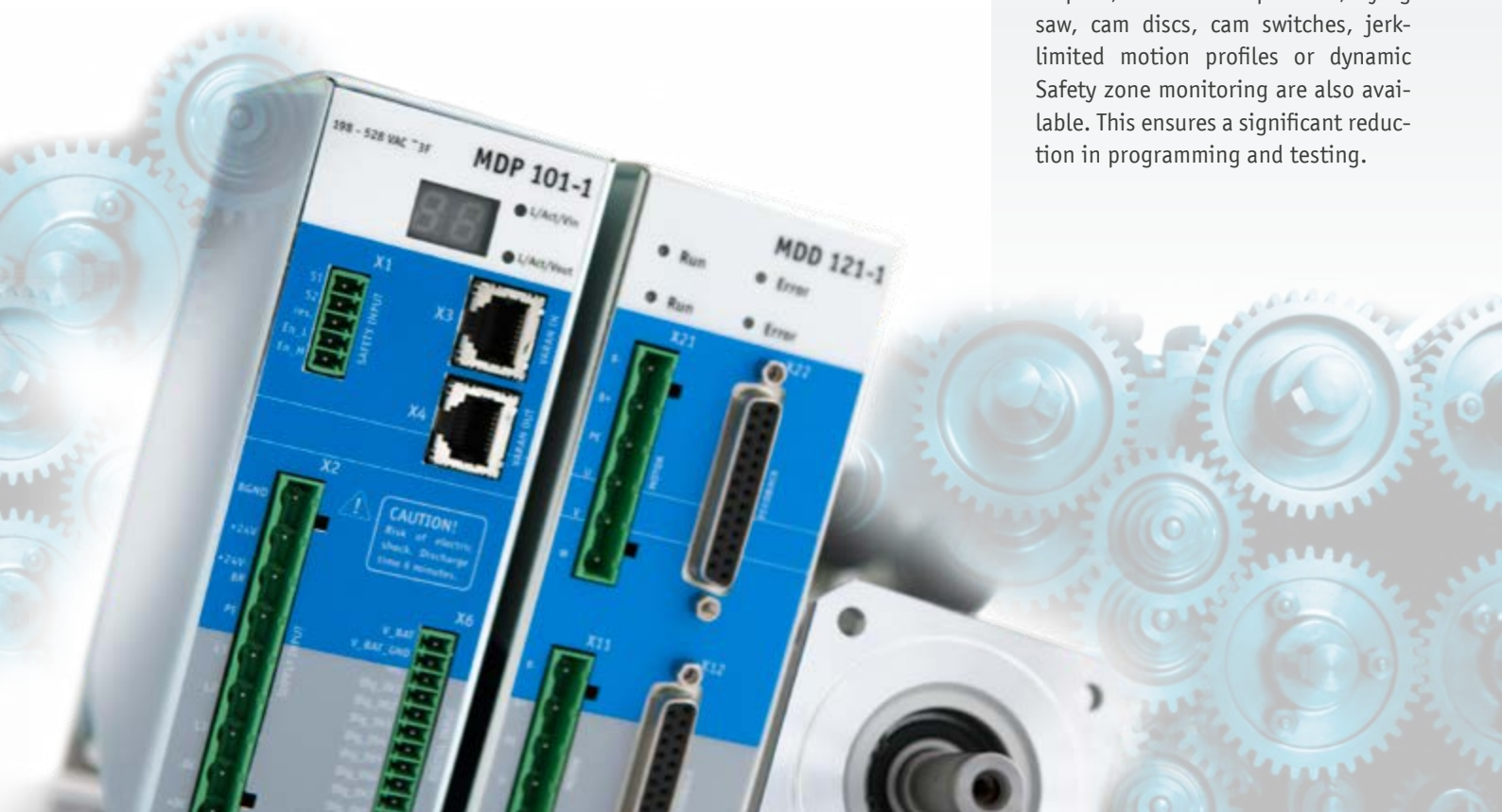
The drive tasks were consciously limited to current, speed and position control. All drive parameters and configuration data are stored centrally in the control and automatically reloaded when a servo amplifier is exchanged. The handling during the initial start-up and servicing are thereby simplified.

This modern control structure is made possible through the hard real-time Ethernet system VARAN with the shortest cycle times.

PREDEFINED MODULES SIMPLIFY THE MOTION DESIGN

The seamless integration of PLC and motion control results in the improved synchronization of process and motion operations in the machine.

LASAL MOTION provides all drive functions needed for a production machine, from simple one-axis to complex multi-axis applications. A large library with predefined modules is available to the user: functions such as absolute, relative and endless positioning, CNC functions as well as coordinated movements and several reference types. In additions, technology modules for synchronization of up to 9 axis in a space, circular interpolation, flying saw, cam discs, cam switches, jerk-limited motion profiles or dynamic Safety zone monitoring are also available. This ensures a significant reduction in programming and testing.





DIAS DRIVE 100

Modular Multi-Axis System

DIAS Drive 100 is a modular servo drive system that was designed for highly dynamic machines in the mid and lower power range (up to 3 kVA). On a module carrier, up to eight drive controllers can be integrated – in an installation space of only 300x155x152 mm (WxHxD). Two power modules, as well as axis modules for 1 or 2 servo drives are available. Drive concepts can therefore be flexibly adapted or scaled to the required number of axes. All common feedback systems can be used. In addition to servo motors, linear, torque and asynchronous motors can also be controlled.

DIAS DRIVE 300

Compact Drive for 1-3 Axes

Up to three drives are integrated into the DIAS Drives of the 300 series and this with the compact dimensions of 158x378x240 mm (WxHxD). The servo drive system is designed for multi-axis applications in a power range from 8 to 14 kVA. Combinations of 10 to 20 A rated and 20 to 40 A peak current are available. High efficiency, reduced power loss and an optimized cooling concept are further arguments for choosing the DIAS Drives 300. Servo, linear, torque and asynchronous motors as well as all conventional feedback systems can be connected.

DIAS-DRIVE 1000

Super Compact 6-axis Servo Drive

With the DIAS Drive 1000, 6 servo motors can be controlled. The drive regulators share the housing, controller, intermediate circuit and heat sink. This results in a unique compactness of only 212x585x216 mm (WxHxD). The drive is designed for dynamic multi-axis applications. Per axis, a maximum rated current of 5 and 20 A and 10 to 40 A peak current are possible (power range up to 14 kVA). In addition to STO and SS1, SBC (Safe Brake Control) is also integrated into the drive. External plug-in encoder systems provide high flexibility: resolver, EnDat 2.1 and Hiperface DSL.

SIMPLE

Integrated motion control simplifies engineering considerably

COMFORTABLE

Ready-to-use motion components and technology modules

COMPACT

Space-saving installation in the control cabinet

FLEXIBLE

Control of various motors



SERVO AXIS MODULES

☞ Servo Amplifiers in Pocket Format

The super compact, fully integrated servo amplifiers of the S-DIAS series, with a rated power of nearly 300 W, are designed to control synchronous servo motors up to 6 A of continuous current at +48 V DC (peak current 15 A). A standard resolver (DC 061) or incremental encoder input (DC 062) for position feedback, a +24 V DC output for controlling a holding brake and a 2-channel enable input used as an STO Safe Torque Off (SIL 3, Cat. 4, PL e) are also integrated.

Dimensions: 12.5x104x72 mm (WxHxD).

STEPPER MOTOR CARDS

☞ Compactly Control Stepper Motors

The S-DIAS module ST 151 and VST 011 and VST 012 modules are compact power components used to control 2-phase stepper motors. Microstepping (64 or 32 steps) is supported. A maximum of 5 A (ST 151 and VST 011) or 10 A (VST 012) of continuous current per motor is possible. The modules have an incremental encoder, the ST151 is also equipped with 2 digital and one 2-channel enable input (STO), the VST modules have 4 digital in and outputs each.

Dimensions: 25x104x72 mm (WxHxD).

Dimensions: 26x151x121 mm (WxHxD).

SERVO MOTORS AKM

☞ Motors for any Motion Task

The synchronous servo motors of the AKM series are power packages for highly dynamic motion tasks: They convince through a high power density with a very large torque to inertial ratio with rotation speeds up to 8,000 rpm. A broad selection of motors with stillstand torques from 0.18 to 53 Nm and peak torques up to 143 Nm is available to choose from. The user can also select different mounting, connection and feedback variations.



SAFETY

SIMPLE AND INTEGRATED

Functional Safety is completely integrated into the SIGMATEK control system. The S-DIAS Safety components can be flexibly combined with the standard modules of their series. Safety functions are implemented in the drives as well. The entire system complies with SIL 3 or SIL CL 3 in accordance with IEC 62061 and PL e, Cat. 4 according to EN ISO 13849-1/-2.

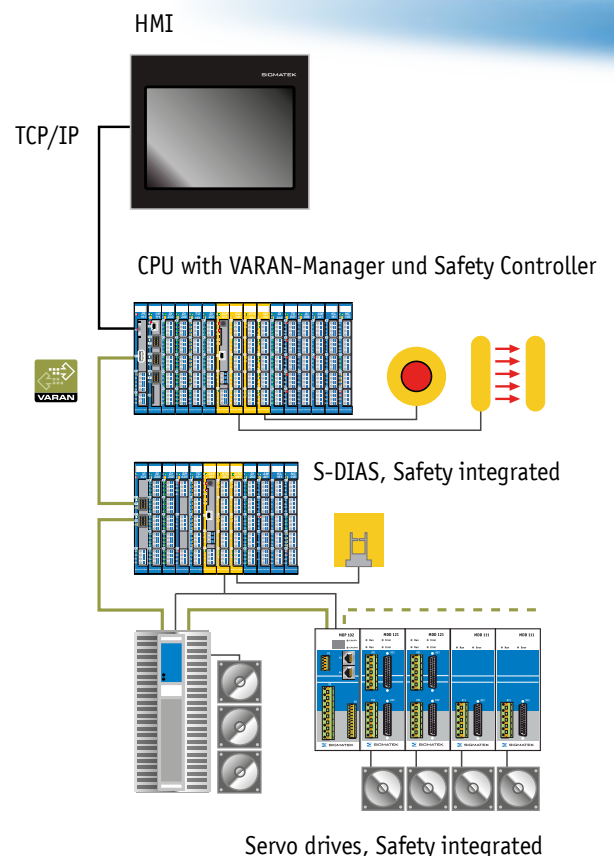
For modular and intelligent machines, flexible and programmable Safety systems are a basic requirement. With the slim S-DIAS Safety system, you can implement Safety functions flexible, easily and scalably. S-DIAS Safety is TÜV certified and

complies with the newest Safety norms (SIL CL 3, PL e, Cat. 4). The Safety solution scores with uncomplicated installation, as well as comfortable programming with the LASAL SAFETY Designer. This contributes to increasing the efficiency of your machine.

FUNCTIONAL SAFETY

The S-DIAS Safety systems can be seamlessly integrated into the SIGMATEK system architecture. Safe and function-oriented components can be combined with each other as needed. This enables individual customization for any requirement. S-DIAS Safety is ideal for use in the most varying applications and industries. If needed, existing systems can also be easily expanded with Safety functions. Through complete integration, the shortest reaction times are achieved for signal processing – which are in the range of a few milliseconds.

The basis of the SIGMATEK Safety solutions is hardware components, which constantly monitor Safety signals to detect possible errors and put the machine in a safe status if necessary. Protection for the operator is therefore ensured without affecting the performance of the machine.



SIMPLE

Fully integrated Safety simplifies engineering

INTEGRATED

One bus system for standard and Safety data

COMFORTABLE

Predefined Safety function blocks



ONE BUS FOR STANDARD & SAFETY / MODULAR SAFETY HARDWARE

For communication, no additional wiring is needed. Standard as well as Safety-relevant data can be exchanged over the hard real-time capable, Ethernet-based VARAN bus. The Safety systems can be flexibly distributed in the VARAN network. For communication between the Safety components, the "Black-Channel" principle is used, in which the bus does not assume any Safety-relevant tasks but serves as a single-channel data exchange medium only and does not have to be included in Safety considerations.

The S-DIAS Safety modules are as compact as the standard modules of the series and measure only 12.5x104x72 mm (WxHxD) each. All hardware components of the safety system have a safe core provided by their two-channel construction. The Safety controller stores the application and monitors and/or controls the Safety in and outputs. Various Safety I/Os, as well as relay outputs, an SSI absolute value encoder and incremental encoder evaluation are available. Safety-relevant requirements can be flexibly implemented, especially since S-DIAS Safety can also be used as a stand-alone solution.

MINI SOLUTION



The Safety controller SCP 111 forms, in combination with the digital Safety mix module SDM 081, a mini Safety system with 6 inputs and 2 outputs – within a control cabinet width of only 25 mm.



INTEGRATE SAFETY EASILY AND SEAMLESSLY

For programming and configuration of the Safety system, a comfortable tool is provided with the LASAL SAFETY Designer.

Based on a function library, you can simply create the logical connections of Safety-oriented processes. For this purpose, certified standard and Safety function blocks based on the PLCopen standard are available. Examples of these are emergency stop, two-hand control or guard locking.

In the integrated graphical editor, function blocks and I/Os can be easily placed as desired via Drag & Drop and connected to the function-oriented variables of the PLC. Per project, several Safety controllers can

be used. A special feature of the S-DIAS Safety system is that independent projects can exchange Safety-relevant information.

It is possible to define individual modules as optional, so that machine components can be removed without having to change the Safety program.

SAFE DRIVE TECHNOLOGY

Highly dynamic motion control applications require, in Safety technology, extremely fast reaction times to prevent uncontrolled movements if an error occurs. In the various

DIAS Drives series, essential Safety functions such as Safe Stop 1 (SS1), Safe Torque Off (STO) or Safe Brake Control (SBC) are already integrated (SIL 3, PL e, Cat. 4).

REAL-TIME ETHERNET VARAN

CONSISTENT AND FLEXIBLE NETWORKING



Flexible and modular machine structures smooth the way to the smart factory. Perfect networking between all components and function units also plays an important role. SIGMATEK relies on the Ethernet bus system VARAN.

The Ethernet technology based VARAN bus system meets all the demands placed on a modern industrial network in machine automation 4.0. The VARAN network connects systems, machines and compo-

nents from the management level to the smallest sensor in hard real time. The Ethernet bus system is safe, fast and simple. Even the high demands of drive technology can be realized with VARAN.

PRECISION IN HARD REAL-TIME

The VARAN bus is based on standard Ethernet physics. The protocol was implemented completely in the FPGA-based hardware. Using the Manager/Client principle, collisions on the bus are avoided. At the start of each bus cycle, the participants are synchronized. Data is exchanged with guaranteed determination at cycle times up to 100 μ s and jitter under 100 ns. To perfectly integrate available networks, TCP/IP packets are tunneled.

PERFORMANCE DATA

Bus cycle times	up to 100 μ s	
Jitter	< 100 ns	
Isochronous access time	1-byte r/w	2.18 μ s
	16-byte r/w (1 Drive)	5.05 μ s
Asynchronous direct access	128-byte r/w	< 25 μ s

GUARANTEED DATA RELIABILITY

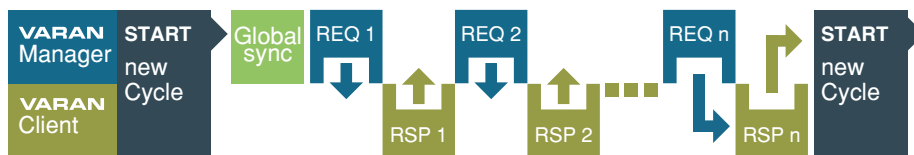
Applications in industrial environments require data security, as well as the highest availability. VARAN provides unique data handling for consistent and safe transmission.

mes, the packet length used in the VARAN bus are a maximum payload of 128 bytes. Through the use of short packets, the probability of communication errors is minimal.

Guaranteed data consistency at the end of each bus cycle: Non-confirmed telegrams are repeated in the same bus cycle.

A significant advantage of VARAN, in comparison to other real-time Ethernet bus systems, is the very small packet size. Instead of the long standard Ethernet fra-

All messages are confirmed by the client components within the same bus cycle. Non-confirmed messages can be repeated within the same bus cycle. The consistency of all process data at the end of the bus cycle is therefore guaranteed. VARAN also provides the unique possibility of asynchronous direct access.

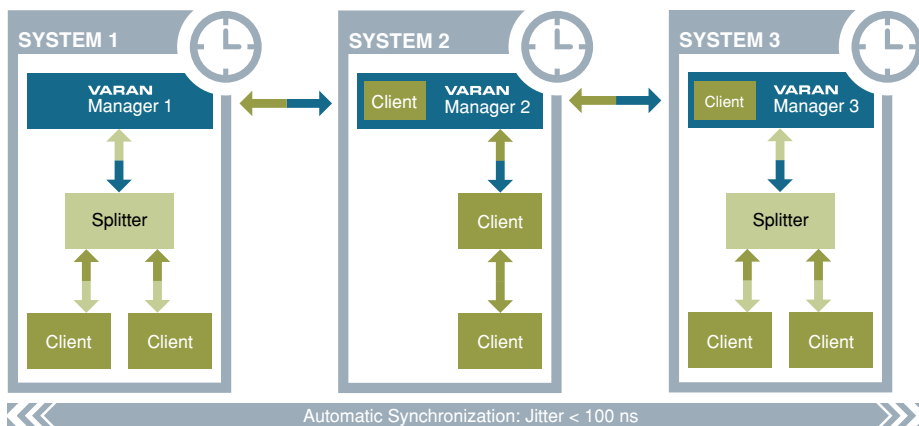


FLEXIBLE NETWORK TOPOLOGIES FOR MACHINES 4.0

The VARAN bus organizes itself during the start-up phase. The participant addresses are assigned automatically. Especially with modular machine concepts, complex bus topologies can be constructed easily and flexibly. Line, star and tree structures can be combined as desired. This open architecture provides you with a high degree of flexibility – also with later expansion of a machine or system.

On a higher level of abstraction, entire production lines can be divided into individual machine modules, which are each automated with a separate control. The various controls of a production line can be automatically synchronized using the multi-manager structure from VARAN. Data is exchanged between the machine modules, as in every network segment, in hard real-time with minimal jitter.

Synchronization of several VARAN networks according to the multi-manager principle



Thanks to the Hot-Plug capability, entire machine components for example, can also be later integrated in or removed from the VARAN network even during operation.

INTEGRATED

One network for the entire machine

HARD REAL-TIME

Cycle times up to 100 µs

SAFE

Error correction within the same bus cycle

FLEXIBLE

Various network topologies

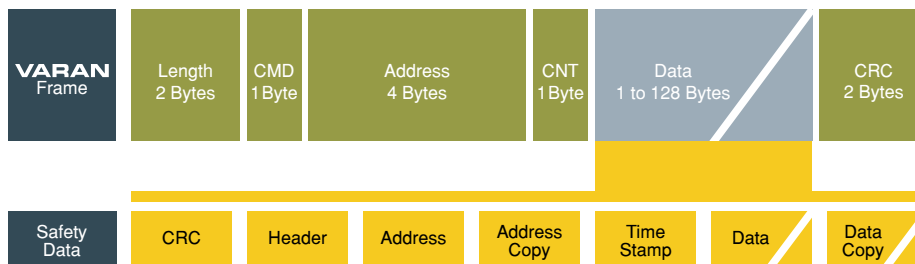
OPEN

and manufacturer-independent

VARAN SPEAKS SAFETY

VARAN provides the possibility to transmit Safety-oriented data using the Black Channel principle. The bus system is thereby excluded from the Safety assessment and allows Safety data to be forwarded over other transport media. The Safety

protocol is embedded in the standard VARAN frame. In the VARAN Safety telegram, the data and addresses are coded twice and saved through a check sum (CRC) and a timestamp. Thereby faulty data during communication is clearly detected.



CONNECTIVITY

The SIGMATEK automation world is open. Our system solutions enable platform and manufacturer-independent data exchange via OPC UA. In addition, Ethernet TCP/IP, CAN, Profibus etc. are integrated into many of our components. VARAN gateways, which enable the connection of other industrial Ethernet systems such as Profinet, are also available.

OPEN



VARAN is an open standard and manufacturer-independent. The rights for the real-time Ethernet technology are held by the VARAN Bus User Organization (VNO). All members have unlimited user rights to VARAN technology.

INTEGRATED

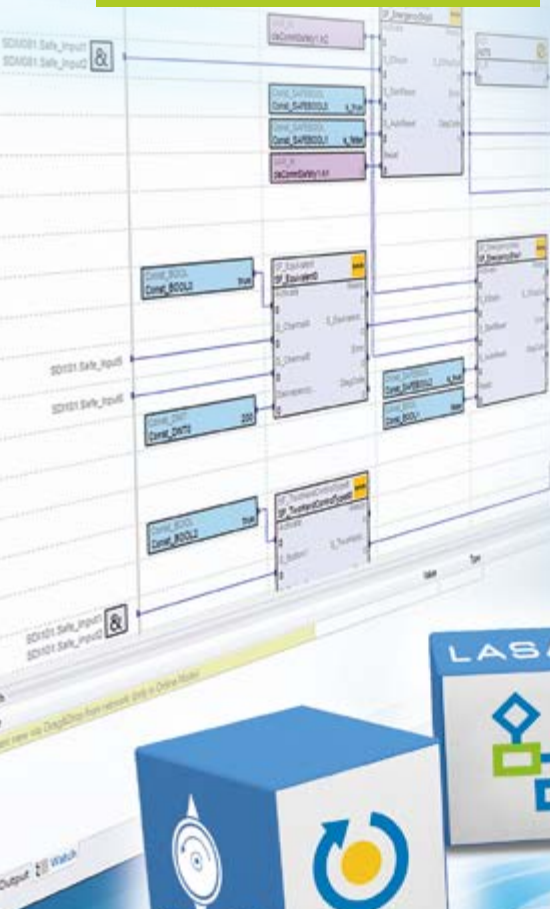
ONE engineering tool for all phases of the development process

EFFICIENT AND CLEAR

With object-oriented programming, the highest modularity and reusability are achieved

COMFORTABLE

Numerous ready-to-use function blocks and efficient tools integrated



```

unsigned long ulOldRandom;
unsigned long ulCntRandom;

void ResetRandom()
{
    ulOldRandom = 0;
    ulCntRandom = 0;
}

// Calculate a random number from random table
void Random(unsigned long ulMaxval, unsigned long ulMinval, unsigned long ulSeed)
{
    unsigned char* pRandomTable = (unsigned char*)a_RandomTable;
    unsigned long ulRandom = 0;

    if(ulMaxval > 0)
    {
        ulOldRandom = (unsigned long)(pRandomTable[ulOldRandom % (sizeof(pRandomTable) - 1)] * ulSeed);
        ulRandom = (ulAbsTime * ulOldRandom) % ulMaxval;
    }
    ulCntRandom += 1;
    *pRandomTable = ulRandom;
}
    
```



ENGINEERING TOOL LASAL

EFFICIENCY IN THE DEVELOPMENT OF MACHINES

The modern all-in-one engineering tool LASAL enables the consistent and very flexible implementation of machine applications. Programming and configuration are greatly simplified – development times and time-to-market cycles are reduced significantly.

ALL-IN-ONE

LASAL is a highly modern engineering tool that provides all functions for solving automation tasks: PLC programming, visualization, motion control, Safety, service, diagnosis and remote maintenance.

Object-oriented programming with LASAL guarantees you maximum flexibility: Through the object-oriented, modular construction of the software, you can quickly and flexibly react to customer-specific needs. The software modules (objects) can be combined in a toolkit system.

OBJECT-ORIENTED

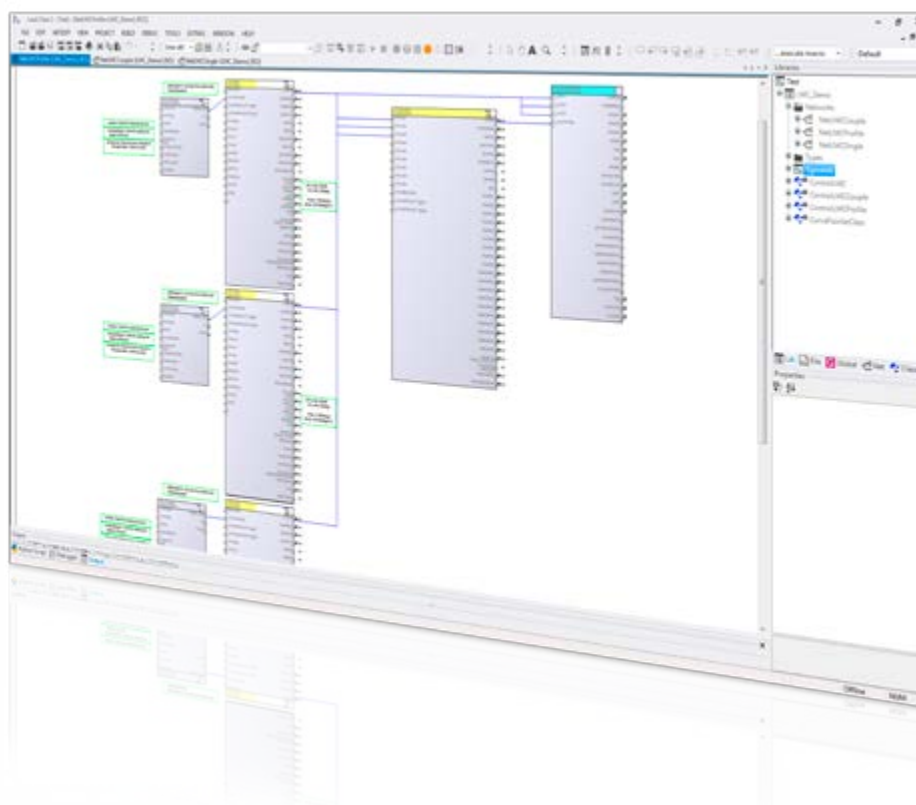
In 2000, SIGMATEK was the first company to integrate object-oriented programming with graphical representation and client-server communication into automation technology. LASAL (IEC 61131-3 standard) also enables the modularization of machine functions in the software and thereby defines a new level for modularity and reusability. As in mechanics, where proven construction is always applied, the modular structure of LASAL enables application components to be easily reused once they have been created and tested without having to test them again. The software becomes thereby sustainable.

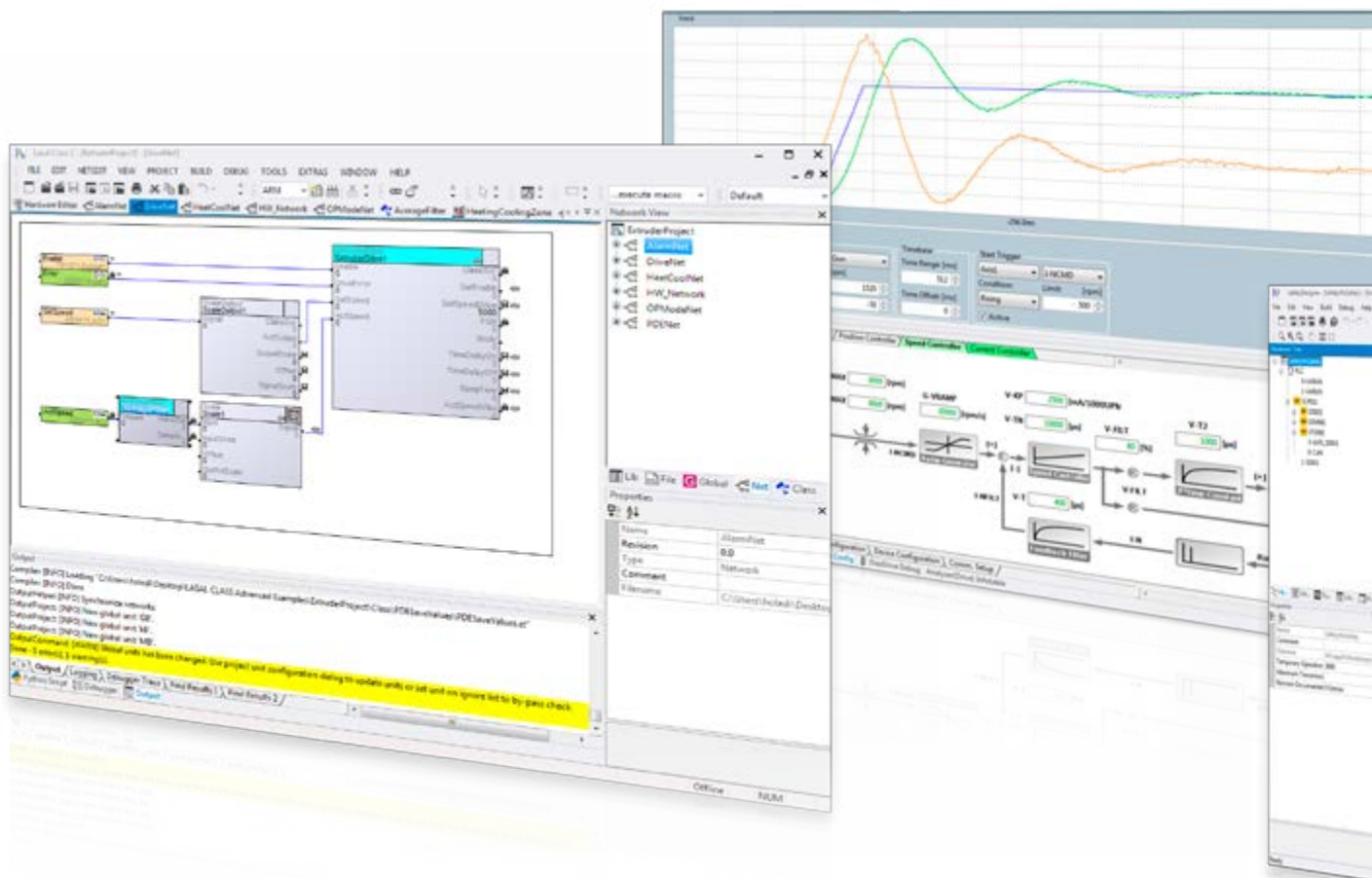
GRAPHICAL REPRESENTATION

Through graphical representation, the clarity of the software is increased. The developer can therefore get a quick overview of the project structure and the relationship between the individual modules is clarified. Even complex applications can be displayed transparently and clearly. This simplifies the implementation and helps shorten the engineering and maintenance times.

THE FUTURE IN SIGHT

LASAL can be used on the entire SIGMATEK product palette. The hardware platform can be changed without having to adapt the software. With a view to Industry 4.0, LASAL supports the OPC UA communications protocol. Manufacturer and platform-independent data exchange is thereby possible.





LASAL CLASS

OBJECT-ORIENTED PROGRAMMING

With LASAL CLASS, the control can be programmed using object orientation. Behind a programming module (called an object), there is a class containing the program code and the corresponding data elements. Each class can assume a specific task, such as controlling a drive for example. The actual program code is written in the conventional IEC 61131-3 languages such as structured text, ladder diagram, sequential function chart or in ANSI-C. Read-to-use application components (classes) reduce engineering enormously: "program less – simply configure".

LASAL SCREEN

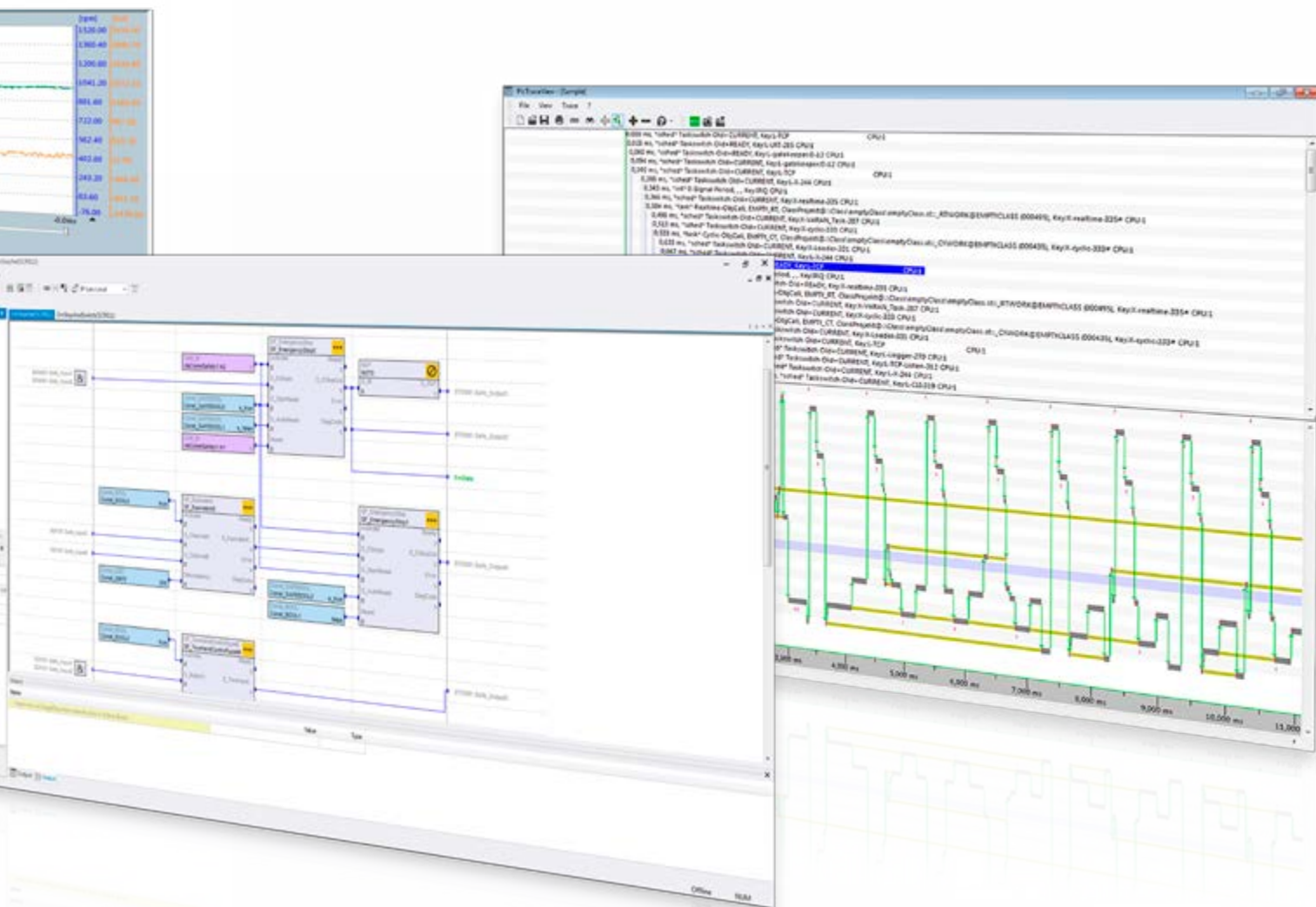
STRONG VISUALIZATION

With the LASAL SCREEN editor, the visualization of your application can be easily created in the corporate design of your company. Design templates and an extensive graphics library are available to engineer your project. Complicated programming is eliminated. Application templates are available, which in addition to the finished sequence control project, also contain the corresponding visualization. Examples therefore are login function and access authorizations, event journal or an oscilloscope for recording multiple channels.

LASAL MOTION

FLEXIBLE MOTION DESIGNS

Motion control is seamlessly integrated into the control system. LASAL MOTION simplifies every drive technology task. Numerous servo drives from SIGMA TEK, as well as external products, are provided as objects to simplify usage. Axis movements can be executed using simple data inputs or instructions without any programming. For frequently required functions, the LASAL drive library provides a large selection of pre-constructed motion function components – from positioning to synchronization of up to nine axes in a space.



LASAL SAFETY

INTEGRATE SAFETY

The full integration of the SAFETY Designer into the LASAL engineering toolkit simplifies the programming and configuration of the Safety controller. Logical operations and I/O configurations can be created comfortably. Predefined function blocks simplify the implementation of the Safety application and its maintenance.

LASAL SERVICE

FIRST CLASS CONNECTIVITY

LASAL is completed with an extensive service package. Remote maintenance, software updates and inter-platform data exchange are comfortably performed using the LASAL SERVICE tools: Web server, Remote Manager, OPC UA, FTP as well as VNC Client and Server. This includes USB boot stick updates, simulation with LARS etc.

FEATURES THAT CONVINCE



Efficient and comfortable tools support you in programming and troubleshooting. Online debugger, real-time data analyzer, Trace-View of the CPU tasks. Using the scripting language Python, software for different variations of a machine type can be automatically generated for the different variations.



SUPPORT AND SERVICE

CUSTOMER ORIENTED AND RELIABLE

We concentrate on your wishes and needs. In addition to our many years of experience in machine building and automation expertise, we bring the concept of service into the partnership – for the entire life cycle of your machine.

Engineering Support

Together with you, we develop your project to a successful conclusion – of course on-site as well. With our engineers and technicians, your machine or system is in the best hands: whether finding solutions, project development, engineering, initial start-up or service. Our goal is to create added value in all phases of the project.

Support Hotline

When you need a fast answer to a technical question, our support is there for you around the clock. You will not get an automated response, rather a competent contact person who will personally address your concerns.

In Use Worldwide

Your machines should run like clockwork and produce with maximum performance. Regardless of where you deliver your machine, we are there when you need us.

Whether for initial start-up, on-site service support or in case of an emergency – we go everywhere – and fast.

Practice-Oriented Training

Regardless of whether you need a first glimpse into control technology or are interested in specific topics, in our practice-oriented training you acquire the necessary technical knowledge first hand. The modularly constructed seminars are customized to various practical requirements.

Fast Delivery of Spare Parts

Spare parts and repairs are always urgent. Therefore it is important to us, even after several years, to be able to deliver you the correct spare parts as fast as possible. Naturally, our high depth of productivity comes into play.

INCREASE PRODUCTIVITY

- Higher output and better quality
- Improved machine processes
- Flexibility through automatic product changeover
- Reduction of down times



SHORTEN DEVELOPMENT TIMES

- Reliable support during the entire product life cycle
- Improved engineering processes through an integrated tool
- Reusability of software modules
- Training and coaching

HOT FACTS

HIGHLY MODERN AUTOMATION

increases the productivity of your machine and makes it more flexible

SHORT DEVELOPMENT TIMES

Our experienced team gladly supports you in all phases

INNOVATIVE IDEAS

for machine concepts of tomorrow

REDUCE COSTS

We make your machine more economic in all areas



MACHINE CONCEPTS 4.0

- Fast implementation of technology trends
- Creative ideas from our experienced industry experts
- Long-term trusting partnerships as the basis for innovations



REDUCE COSTS

- Savings through a total view of a machine's life cycle
- Cost-optimized and scalable hardware components
- High-performance engineering and service tools



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