

INNOVATIONS 2024



FULL AUTOMATION POWER FOR THE DIN RAIL

CPU UNITS

With the new CPUs of the CP 8xx and CP 9xx series, even more automation power is available. They are equipped with powerful, low-loss Intel processors, making them ideal for demanding control, regulation and motion control tasks.

The extremely compact, robust CPU units are the right choice for both single and multi-CPU concepts. They have many memory, real time clock (RTC) as well as numerous, easily accessible interfaces. The CP 8xx and CP 9xx are passively cooled, a fan module is optionally available.

S-DIAS I/O modules can be directly connected to the CPs via the lateral bus interface. Like all CPUs from SIGMATEK,

the new additions also support the OPC UA communication protocol and are thus well equipped for Industry 4.0 applications.

The project planning and programming of modern automation solutions is done with the object-oriented engineering tool LASAL, which offers a lot of comfort and flexibility.



PRODUCT NAME	CP 8xx	CP 9xx
PROCESSOR	Intel® Atom™ Quad-Core Processor	Intel® Core™ i3 Dual-Core Processor
PROCESSOR CORES	4	2
PROCESSOR CLOCK	1,5 GHz	3 GHz
WORKING MEMORY	4 GB	4 GB
SSD	128 GB SATA	128 GB SATA
REMANENT DATA STORAGE	1 MB MRAM	1 MB MRAM
INTERFACES	CP 831: 2x Ethernet, 2x VARAN Manager, CAN 2x USB 2.0 Type A, 1x USB 3.2 Type C DisplayPort CP 841: additional S-DVI CP 851: additional HMI-Link*	CP 931: 2x Ethernet, 2x VARAN Manager, CAN 2x USB 3.2 Type A, 1x USB 3.2 Type C DisplayPort CP 941: additional S-DVI CP 951: additional HMI-Link*

*in preparation

FOR HTML5 VISUALIZATIONS

WEB PANELS

The ETT xx64 series multitoch widescreen panels are equipped with powerful EDGE3 technology processors, making them the perfect choice for modern operating concepts with HTML5 visualization.

7 inches	1024 x 600	px
10,1 inches	1280 x 800	px
12,1 inches	1280 x 800	px
15,6 inches*	1366 x 768	px
18,5 inches*	1366 x 768	px
21,5 inches*	1920 x 1080	px



HTML5

The ETT xx64 operating panels (IP65 front side) come in a modern, high-quality design with glass front, black anodized aluminum frame and with a lot of visualization power. The four precisely coordinated processor cores (4x 1.6 GHz) of the EDGE3 technology processor ensure a smooth page load of (web) visualizations. With 2 GB DDR4 RAM and 8 GB eMMC, there is enough memory available.

With 2x Gigabit Ethernet (10/100/1000), 2x USB 2.0 type A, 1x USB 2.0 type Mi-

ni-B OTG, 1x microSD slot, the web panels always find the right connection and, like all SIGMATEK HMIs with processor, support OPC UA communication. In addition, the fanless ETTs have two freely programmable status LEDs on the front.

The web-based HMI tool LASAL VISU-Designer provides ready-to-use design themes and controls that enable for maximum flexibility and shortened engineering times.

*in preparation

EVEN MORE SAFETY-FUNCTIONS INTEGRATED AS STANDARD

SERVO DRIVES MDD 2000

The DIAS Drive 2000 series combines high power density and flexibility for servo motor control in a highly compact design. Now even more safety functions are integrated in the MDD 2000 servo drives.

The DIAS Drive series MDD 2000 is designed for highly dynamic multi-axis applications and, in combination with the modular structure, enables precisely fitting and very flexible drive designs.

EVEN MORE SAFETY

Many safety functions are already integrated. In addition to the most important Safe Torque Off (STO), Safe Stop 1 (SS1), Safe Operating Stop (SOS), Safe Brake Control (SBC) and Safely Limited Speed (SLS) functions already included, further

*in preparation

safety functions are now available as standard: safe speed, acceleration, position and rotation direction functions – all SIL 3, PL e, Cat. 4 and TÜV-certified.

FLEXIBLE SYSTEM

For precisely fitting drive solutions, the flexible servo system can be operated single-phase or three-phase with 230*-480 VAC. In addition to one to three axes, supply, line filter, braking resistor and DC link are also on board – and all this on only 75x240x219 mm in size 1. Thus, the

highest power density is achieved.

HIGHEST POWER DENSITY

Size 1 offers a capacity of up to 3x 5 A nominal or 3x 15 A peak current, the double-width size 2 up to 3x 10 A nominal or 3x 30 A peak current. The overload factor is up to 300 percent. Very short controller cycle times of 62.5 µs give the DIAS drives excellent servo performance. The MDP modules can be used standalone or in combination with any number of MDD 2000 axis modules of both sizes. They can



All safety functions at a glance:

Stop functions

- STO (Safe Torque Off)
- SOS (Safe Operating Stop)
- SS1 (Safe Stop 1)
- SS2 (Safe Stop 2)

Brake functions

- SBC (Safe Brake Control)
- SBT (Safe Brake Test)

Speed functions

- SLS (Safely Limited Speed)
- SSM (Safe Speed Monitor)
- SMS (Safe Maximum Speed)

Acceleration functions

- SMA (Safe Maximum Acceleration)
- SLA (Safely Limited Acceleration)

Position functions

- SLP (Safely Limited Position)
- SP (Safe Position)
- SLI (Safely Limited Increment)
- SCA (Safe CAM)

Rotating direction function

- SDI (Safe Direction)



SAFETY FUNCTION BLOCKS

WORKSPACE MONITORING OF ROBOT KINEMATICS



be connected without tools using baying technology. This eliminates the need for complex individual wiring for power, DC link coupling and real-time Ethernet communication.

LESS WIRING EFFORT

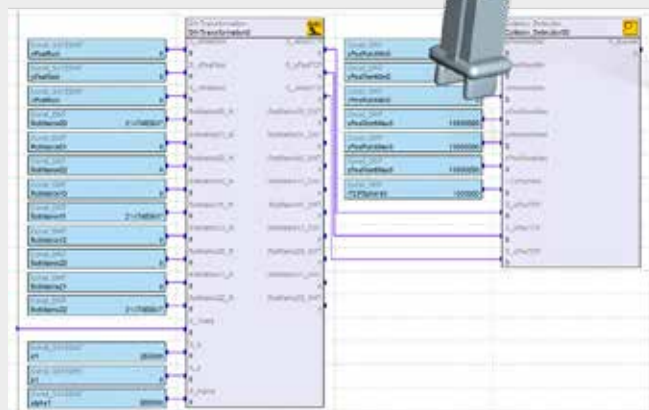
The Hiperface DSL[®] single-cable solution is integrated in the standard, which minimizes the cabling effort. A universal interface is optionally available for resolver, EnDat 2.1[®], Hiperface[®], Sin/Cos, TTL, BiSS-C and Tamagawa encoder variants.

As the synergy between humans and robots deepens, ensuring a safe working environment is paramount. With our MDD 2000 servo drives, combined with the Safety CPU SCP 211 and the advanced safety functions SLS (Safely Limited Speed) and SP (Safe Position), we offer tailored workspace monitoring for all serial kinematics.

Experience the ease of integration with our latest safety function blocks in the LASAL SAFETYDesigner: „Denavit-Harten-

COLLISION DETECTION

Our Collision Detection function is designed to identify any potential interference between the TCP of a robot and surrounding objects. Define your workspace using minimum and maximum XYZ coordinates, creating a parallel cuboid that designates the robot's movement range. Furthermo-



berg (DH) Transformation“ and „Collision Detection“.

Simply configure the necessary parameters, and seamlessly incorporate these functionalities into your project.

DH TRANSFORMATION

The DH Transformation block efficiently converts input spatial coordinates into output spatial coordinates. Achieve a multi-dimensional robot arm functionality by implementing this module multiple times. The resulting coordinate system signifies the TCP (Tool Center Point) of the robot, ensuring precision at every turn.

re, a protective sphere envelops the robot's current position for added safety.

Consistently monitoring the designated area, our Collision Detection function swiftly identifies any deviations by contrasting the protective sphere against the set workspace boundaries. Users have the flexibility to define responses for any out-of-bound movements, from initiating an emergency halt to triggering customized error responses.

With the capability to interlink individual workspaces, creating intricate working zones becomes effortlessly achievable.

FASTER TO BETTER MACHINES THROUGH PARALLELIZATION

DIGITAL TWIN IN LASAL

The LASAL software development environment from SIGMATEK supports model-based development and virtual commissioning with the Digital Twin.

In this process, together with 3D models of the mechanics, a complete Digital Twin is created for the physics-based 3D simulation. It acts as a valid basis for the detailed software development, electrical planning and design of a machine or plant. This makes it possible to virtually represent, simulate, test and validate all development steps from planning to commissioning - whether individual machine functions or complete systems.

ACCELERATION THROUGH PARALLELIZATION

One advantage of this model-based development with the Digital Twin is to parallelize and thus accelerate the development. In addition, there is no need to wait for the real mechanics and hardware to be available before tuning and testing. As another essential step towards better ma-

chines, there is the possibility of virtual commissioning. The Digital Twin replaces the real machine or system. This is initially simulated completely as a computer model with „software in the loop“. Only then the transfer of the programs to the real control hardware follows („Hardware in the Loop“).

FULL INTEGRATION INTO THE DEVELOPMENT TOOL

To make this possible, all outward I/O object classes have been significantly extended in the LASAL development tool. These „advanced I/Os“ no longer necessarily need real connections at their „outer“ end, but can work in various modes with predefined, simulated or values created in the Digital Twin. This helps shorten development time, minimize development risk, and eliminate rework. Machine and

system manufacturers can thus develop better machines faster and secure their market position.

OPTIMIZE PRODUCTION PROCESSES

The application possibilities of the Digital Twin, however, are far from exhausted with commissioning. This can run during operation to detect deviations and take the appropriate actions. Thus, production processes are optimized. The error tolerance as well as the lifespan of the machine is therefore increased and predictive maintenance is enabled.



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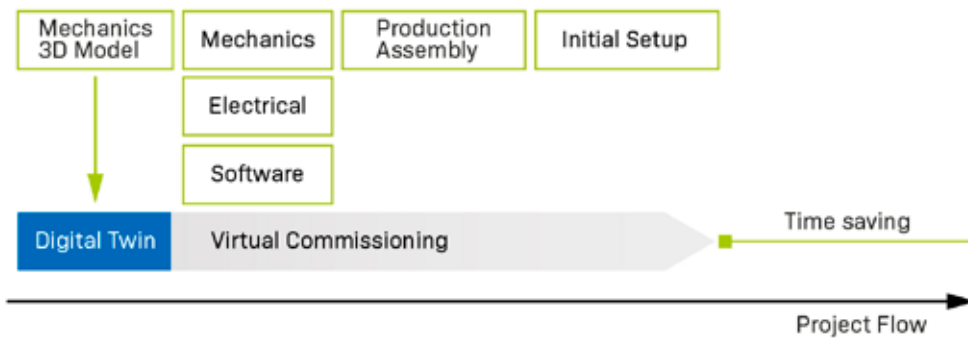
In software development, the art is usually not in programming the normal processes, but in coping with unexpectedly occurring special situations. All possible fault conditions can be simulated and tested on the digital twin, right up to a sudden power failure.



Time to Market - classical way



Time to Market with Digital Twin - efficient way



For machine builders model-based system development with the Digital Twin brings many benefits – such as minimizing risks during software creation and a shorter time-to-market.



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