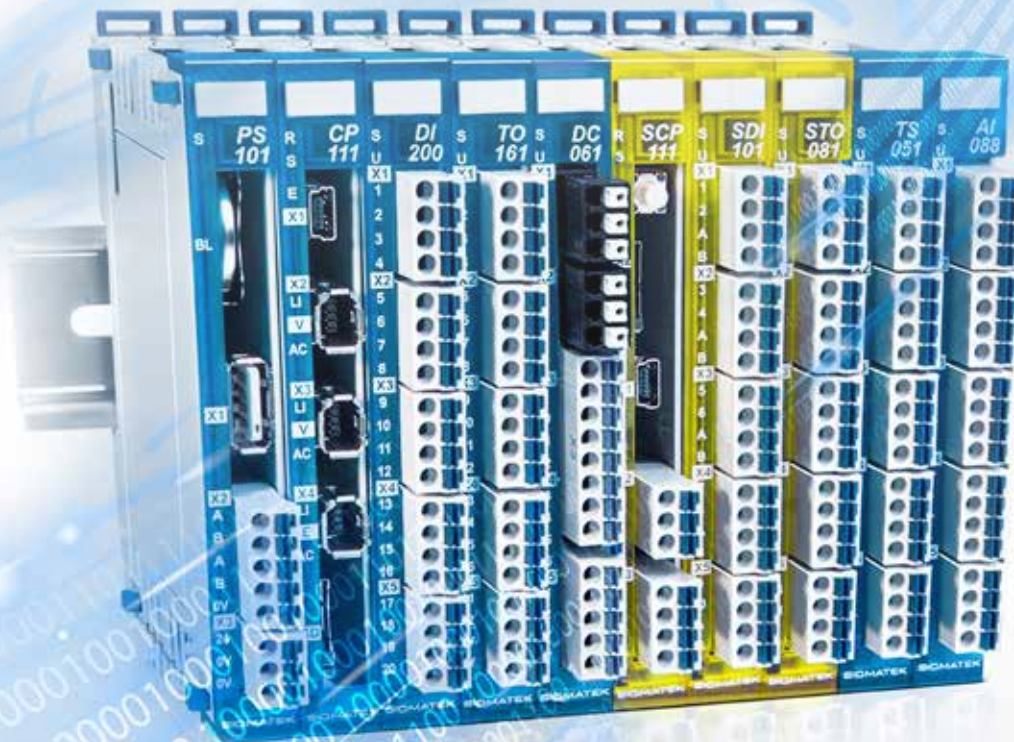# SIGMATEK

CONTROL SYSTEM
S-DIAS

CONTROL, I/O, MOTION AND SAFETY IN POCKET FORMAT
ONE SYSTEM – MANY FUNCTIO

Fast signal processing, comfortable handling, high vibration resistance – and that in a super-compact form. Furthermore, safety is included as an integral system component. The S-DIAS system is best equipped for the most varying automation 4.0 tasks.

Up to 20 channels are packed into one S-DIAS DIN rail module. With this package density, you save significant space in the control cabinet.
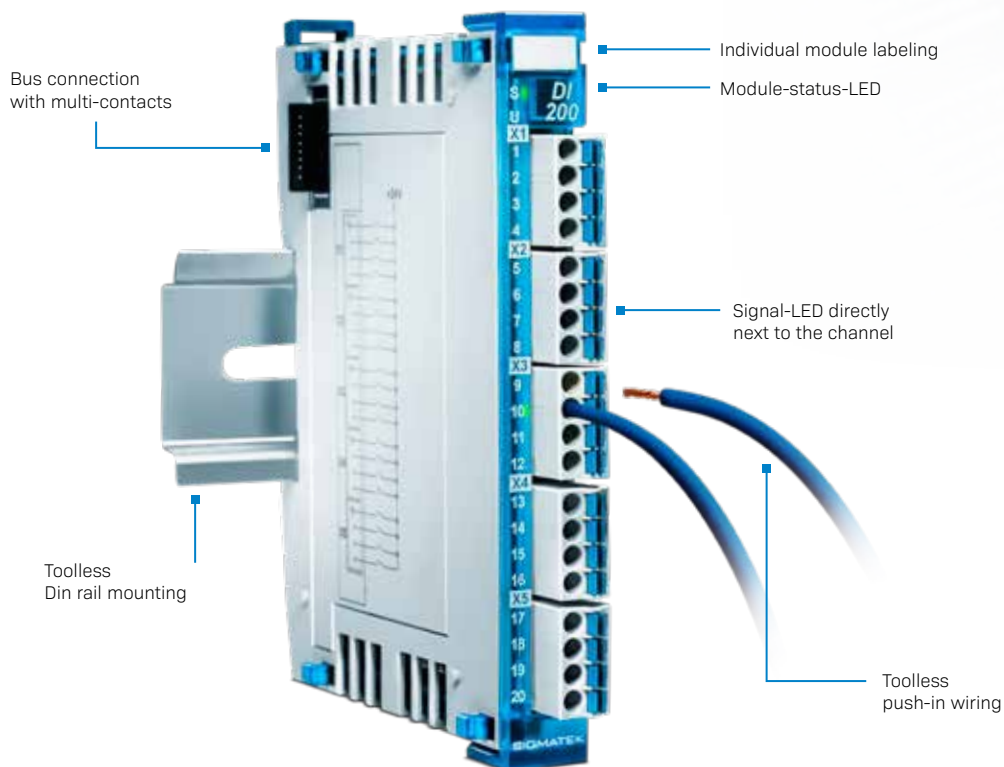
FOR ANY APPLICATION

Thanks to the powerful and high mechanical stability, S-DIAS can be used in the most varying applications – even in places where until now, only special board-based solutions with or without limited expandability could be used because of space restrictions.

MODULE VARIETY

From a versatile, modular system toolkit, the CPUs, digital and analog I/Os, motion, safety and special function modules can be combined and configured as needed.

Individual module labeling

Module-status-LED

Bus connection with multi-contacts

Signal-LED directly next to the channel

Toolless Din rail mounting

Toolless push-in wiring

Dimensions: 12.5 x 104 x 72 mm (WxHxD)

NS

FLEXIBLE SYSTEM DESIGN

S-DIAS is modularly structured and optimally suited as a system solution for central and decentralized automation designs. You can flexibly combine standard and safety components and have a high degree of freedom in the design of the system. Especially for modular machine 4.0 concepts, an integrated and flexible network from the control to the field level plays an important role. Here, the real-time Ethernet bus VARAN scores with a high user data rate, guaranteed data security and hot-plug capability. Interface modules enable integration into existing systems and production lines.

HMI

TCP/IP

CPU with VARAN manager and safety controller

VARAN

S-DIAS, safety integrated

Servo drives, safety integrated
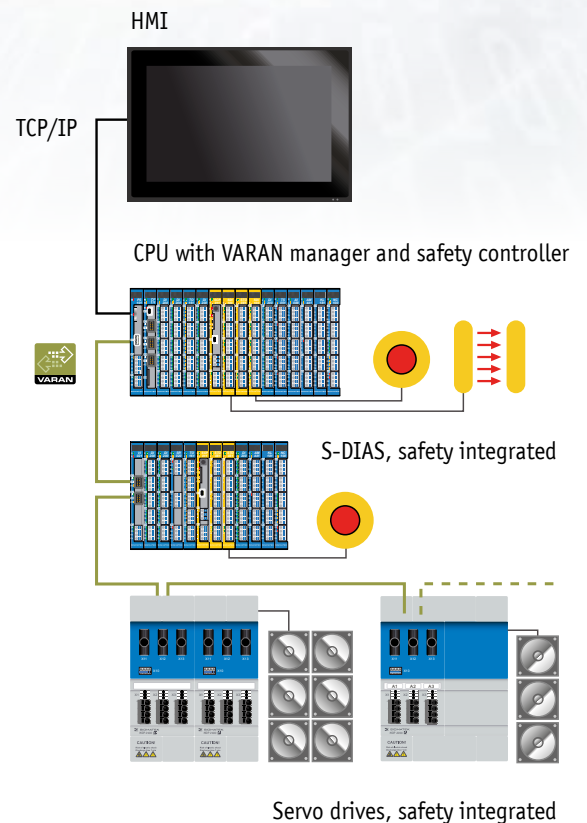
MANY BENEFITS THIN ON A RA

The S-DIAS series provides a large portion of user benefits in the smallest installation space.

Up to 20 channels per module are possible and this with dimensions of only 12.5 mm width, 104 mm height and 72 mm depth. The S-DIAS achieves therewith, a unique package density of only 63 mm² per channel. In addition to this compactness, there are further advantages with which the efficient system solution convinces:

Saves Space

With up to 20 I/Os per module, S-DIAS sets new standards when it comes to package density. For you, this miniaturization means: more function in less space. Within an 80 cm width, 64 modules with up to 1,280 I/Os can be installed. Even when the complexity of your machines increases, with S-DIAS, the control cabinet volume is reduced. That is an essential aspect, since control cabinet space is unavoidably linked to costs.

Robust and Vibration Proof

S-DIAS is consciously designed as a complete module solution. Electronics, bus and DIN rail mount are combined in one stable housing – extra connections are eliminated and the stability of the application increased. The module supply, as well as bus connection is provided over a robust multi-contact plug. A unique feature is the mechanical interlocking – it creates a form-fitting, vibration resistant connection of the modules.

Operation Ready

The modules are delivered to you ready to use – including standard connectors with push-in spring terminals. The I/Os can therefore be wired quickly and without tools, pre-assembled into blocks and mounted on the DIN rail. 1, 2 or 3 wire connection technology is possible – up to a cross-section of 1.5 mm². The smart complete module solution also simplifies ordering and storage, since only one component must be ordered, unpacked and installed.

Channel-specific Diagnosis

S-DIAS scores with clear module allocation. The status LEDs provide information on the communication status. In addition, next to the connection point of each individual channel, a signal LED is located that provides information on the status of the contact point. A fast and above all, clear identification and diagnosis are achieved and service simplified. The module labelling enables individual marking. This increases clarity in the control cabinet.

Real-time Communication

The S-DIAS series communicates over the hard real-time Ethernet bus VARAN with a speed of 100 Mbit/s and is therefore perfectly suited for very fast, dynamic applications. Individual I/O modules can be accessed within 1.12 µs. Per CPU module or VARAN bus interface, 64 participants with up to 1,280 I/Os can be connected; the update time is under 60 µs. With splitter and interface modules (VARAN, Ethernet, EtherCAT, CAN, Profinet), the S-DIAS system can be integrated into a system bundle of different manufacturers.

CPU MODULES: GROW WITH THE TASK

COMPACT CPU-UNITS

The CPUs in S-DIAS format with high-performance EDGE2 Technology processors are the right choice for versatile control and motion tasks. You can tune the processor performance exactly to your application: from the economic single-CPU to the high-performance dual-core CPU (2x 800 MHz).

Depending on the module, various interfaces such as VARAN bus, Ethernet, EtherCAT Drive Controller, CAN and USB are integrated. The network connection is made with industrial Mini I/O connector plugs. With their 2-point contact principle, these standard connectors provide an exact, vibration resistant connection.

HIGH-PERFORMANCE CPU UNITS FOR THE DIN RAIL

Equipped with extra high-performance processors, our CPU units are optimally suited for complex control, regulation and motion control tasks.

The CP 731 and CP 733 impress with an Intel® Atom™ dual-core processor (2x 1.75 GHz) and 2 GB RAM as well as two VARAN managers that can be operated in parallel, thus ensuring flexibility.

The robust CPU units, which can also be used as a central control platform in decentralized multi-CPU concepts, bring with them a wide range of interfaces that are located on the front panel for practical use: VARAN-Out, Ethernet, CAN and USB. The CP 733 also has an EtherCAT drive controller.

The bus interface is located on the side so that S-DIAS I/O modules can be directly attached.

INTELLIGENCE 4.0

To design machine controls more flexibly, distributed intelligences are a smart approach: The machine or system is divided into mechatronic function units and equipped with processing intelligence directly on-site. With the S-DIAS system, multi-CPU concepts can be easily implemented. You have the advantage of being able to flexibly adapt your control system to customer requirements at any time — whether power, configuration variants or expansions. And: All CPUs speak OPC UA.

The CP 731 and the CP 733 with powerful Intel® Atom™ dual-core processor.

MOTION IN POCKET FORMAT

STO INTEGRATED

Safety function Safe Torque Off for applications up to SIL 3 (EN 62061) and Category 4, PL e (EN ISO 13849-1/2).

EPLAN-MACROS

Electro planning made easy: For the S-DIAS product family, EPLAN macros are available for simple integration into the control cabinet.

SERVO FUNCTIONALITY

The super compact, fully integrated servo amplifier of the S-DIAS DC series, with a rated power of nearly 300–480 W, is designed to control synchronous servo motors with up to 6 A or 10 A of continuous current at 48 V DC (peak current 15 A or 20 A). A standard resolver (DC 061/101) or incremental encoder input (DC 062/102) for position feedback, a +24 V DC output for controlling a holding brake and a 2-channel enable input. It can be used to implement the safety function STO (SIL 3, PL e).

The modules SR 011/012 are available for control and regulation of economic DC brush motors with a phase current of up to 5 A and a 15 A (SR 011) or 10 A (SR 012) peak current. The SR 011 is equipped with an integrated brake chopper and a switchable incremental encoder, the SR 012 has four digital inputs that can be used as limited switches.

STEPPER MOTOR CARD

The ST 151 is used to control 2-phase stepper motors. Up to 5 A continuous current is possible. The stepper motor output stage can be operated in full, half or micro steps (64). An incremental encoder interface for position control, as well as two digital inputs (+24 V DC, 10 µs) are already on board. These can be used as an end switch, a position latch or for reference profiles. The integrated two-channel enable input allows the implementation of the safety function STO (SIL 3, PL e).
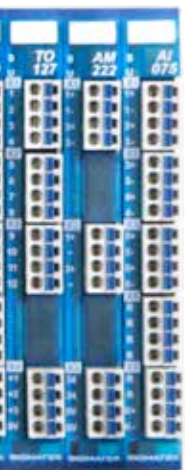
SAFETY: SLIM, FLEXIBLE AND FREELY PROGRAMMABLE

With future-oriented machine concepts, a programmable, integrated safety solution is a must. With the S-DIAS Safety system, safety technology can be flexibly and very economically integrated into the standard system.

SAFETY UNDER CONTROL

The modular, easily configurable safety solution consists of a safety controller in combination with safe I/Os. The slim SCP 111 and SCP 211 safety controllers monitor and control the application and provide the bus interface to the safe I/O modules. The SCP 211 safety CPU module has four times the processing speed of the

SCP 111 and more memory for application programs. In addition to various safety I/Os, a relay, an SSI absolute value encoder and an incremental encoder module are available. The safety data is transmitted via VARAN, TCP/IP and wireless networks (WiFi) according to the Black Channel principle.
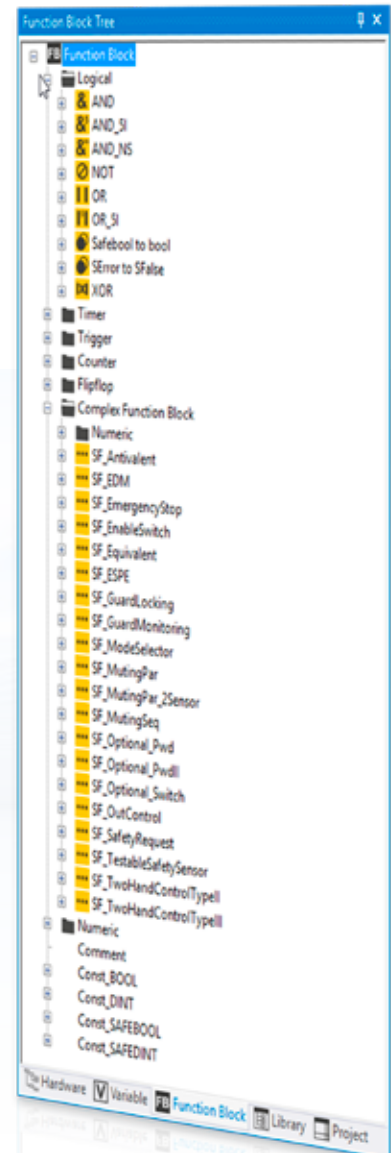
INTEGRATED OR STAND-ALONE

Through complete integration, the shortest reaction times are achieved for signal processing – which are in the range of a few milliseconds. The S-DIAS Safety system is TÜV-certified (SIL 3 in accordan-

ce with IEC 62061 and EN ISO 13849-1/-2, Cat. 4, PL e) and can also be used as a stand-alone solution.

Comfortably create the safety application: In the LASAL SAFETYDesigner, function blocks based on PLCopen are available.

MINI-SOLUTION

Within a 25-mm width, a mini safety solution can be implemented – whether for emergency stop, door contact or light grids: the safety controller SCP 111, combined with the digital mix module SDM 081 with 6 inputs and 2 outputs.

HIGH-PRECISION MEASURING TECHNOLOGY

Record measurement values quickly and precisely: The S-DIAS measurement technology series has the right module for any task. The selection of products includes I/O cards for measuring:

- Current
- Voltage
- Frequency
- Temperature (PT 100/PT 1000)
- Strain gauge load cells
- Absolute and differentia pressure
- SSI absolute value encoder
- Energy recording
  (Predictive Maintenance)
- IEPE analysis
  (Condition Monitoring)

Through the modular construction, you can configure the measurement values specifically for your application. You save costs and profit from a perfectly tuned system solution with the smallest space. That is efficiency.
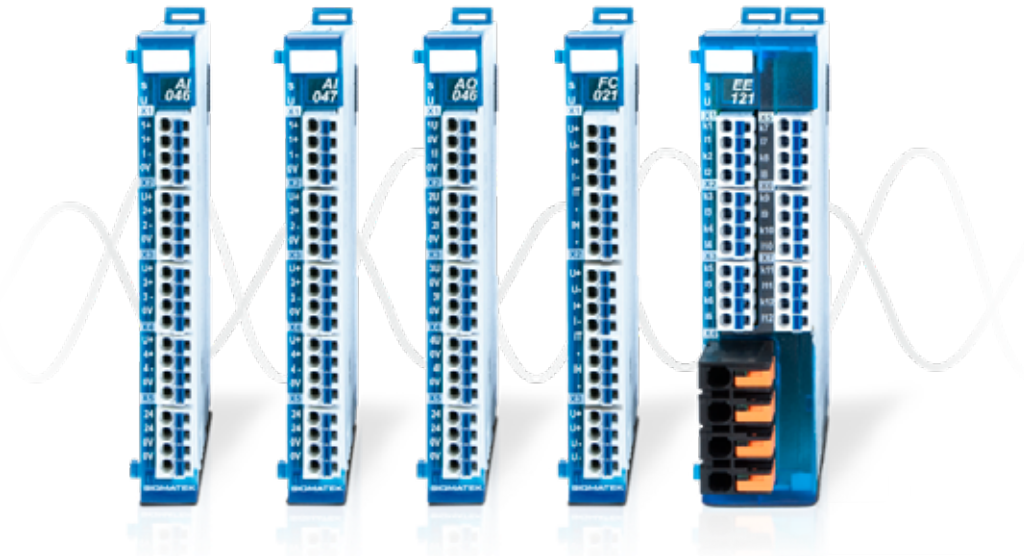
▲
The highly compact S-DIAS measurement modules are optimally suited for diverse areas of applications in the industry.
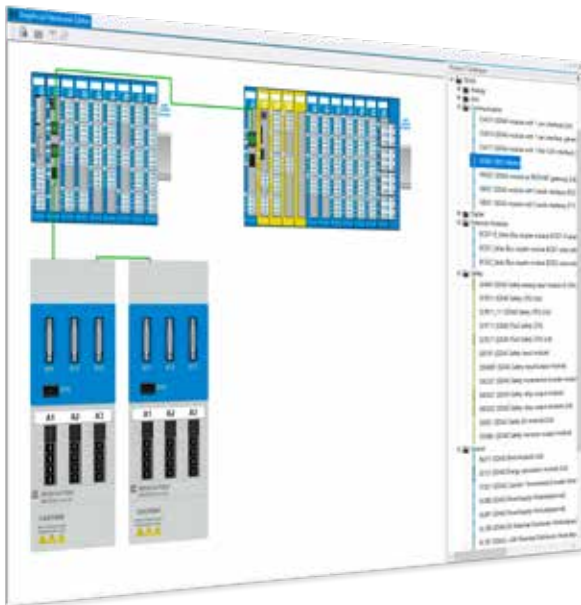
▲
In the graphical hardware editor, the S-DIAS modules can be easily programmed, parameterized and diagnosed.

EFFICIENT ENGINEERING

Project development and programming are also user-friendly with the object-oriented engineering tool LASAL. Control, visualization, motion control, safety, service and remote maintenance are combined in an integrated platform (according to IEC 61131-3 Norm).

LASAL supports a modular, mechatronic approach to machine design. Machine components are simulated in the software objects. Code and data are combined into logical units (objects).

The graphical representation provides high clarity and via object orientation, the highest modularity and reusability are achieved. This contributes to a significant reduction of development times and costs.

The graphical hardware editor supports you in project development, parameterization and diagnostics. Even safety projects can be comfortably designed in the LASAL SAFETYDesigner.

COMPLETE OVERVIEW S-DIAS MODULES

CPU & Bus Connection	
CP 102	EDGE2 Technology processor, 1x Ethernet, 1x CAN, 1x USB OTG (On-the-Go)
CP 111/PS 101	EDGE2 Technology processor, microSD, 1x Ethernet, 2x VARAN Out, 1x CAN, 1x USB Device, 1x USB Host
CP 112/PS 101	EDGE2 Technology processor, microSD, 2x Ethernet, 1x VARAN Out, 1x CAN, 1x USB Device, 1x USB Host
CP 311	EDGE2 Technology processor, microSD, 1x Ethernet, 2x VARAN Out, 1x CAN, 1x USB Host, 1x USB OTG, voltage supply integrated
CP 312	EDGE2 Technology processor, microSD, 2x Ethernet, 1x VARAN Out, 1x CAN, 1x USB Host, 1x USB OTG, voltage supply integrated
CP 313	EDGE2 Technology processor, microSD, 2x Ethernet, 1x EtherCAT Drive Controller, 1x VARAN Out, 1x CAN, 1x USB Host, 1x USB OTG, voltage supply integrated
CP 731	Intel® Atom™ dual-core processor, microSD, 2x Ethernet, 2x VARAN Manager, 1x CAN, 1x USB 3.0, 1x USB Device 2.0
CP 733	Intel® Atom™ dual-core processor, microSD, 1x Ethernet, 2x VARAN Manager, 1x CAN, 1x USB 3.0, 1x USB 2.0, 1x EtherCAT Drive Controller
VI 021	Bus connection, 1x VARAN In, 1x VARAN Out, +24 V DC supply
EC 121	1x EtherCAT In, 1x EtherCAT Out, +24 V DC supply
Interfaces & Splitters	
ICA 011	1x CAN
ICA 012	1x CAN (galvanically separated)
IIO 041	4x SDCI ports according to IEC 61131-9 (IO-link), 4 digital inputs +24 V DC, 0.5 ms
IPN 021	1x Profinet I/O In, 1x Profinet I/O Out
ISE 021	1x RS232, 1x RS485
ISE 031	1x RS232, 1x RS485, 1x TTY
SE 051	Ethernet-Switch (RJ45), 1x In, 4x Out
SE 052	Ethernet-Switch (Tyco Mini I/O), 1x In, 4x Out
SV 141	1x VARAN In, 4x VARAN Out
SV 142	1x VARAN In (Tyco Mini I/O), 4x VARAN Out (Tyco Mini I/O)
Digital Input	
DI 080	8 inputs +24 V DC, 5 ms
DI 160	16 inputs +24 V DC, 5 ms
DI 169	16 counter inputs, GND switching, +24 V DC, 50 µs
DI 200	20 inputs +24 V DC, 5 ms
DI 202	4 counter inputs +24 V DC, 10 µs, 16 inputs +24 V, 0.5 ms
DI 203	20 inputs +24 V DC, 0.5 ms
DI 204	2 incremental encoders with TTL signal +5 V DC, 1.5 mA, 10 µs, 14 digital inputs +24 V DC, 3.7 mA, 0.5 ms
DI 205	20 inputs, GND switching, +24 V DC, 5 ms
Digital Output	
TO 081	8 outputs +24 V DC, 0.5 A, short-circuit proof
TO 127	12 outputs +24 V DC, 1.7 A, short-circuit proof, outputs separated by optic coupler
TO 161	16 outputs +24 V DC, 0.5 A, short-circuit proof
PW 022	2 PWM outputs +18-30 V DC, +24 V-switching, pulse width modulation, adjustable frequency 30.5 Hz - 20 kHz
PW 161	16 outputs +18-52 V DC, GND switching, 0.5 A, pulse width modulation, frequency 20 kHz
RO 041	4 relay outputs +230 V AC, 6 A or +24 V AC, 6 A (closer contacts)
RO 051	5 relay outputs +115 V AC, 6 A or +24 V AC, 6 A (changeover contacts)
Digital Mix	
DM 046	4 inputs +24 V DC, 5 ms, 4 outputs +24 V DC, 1.7 A, short-circuit proof, galvanically separated
DM 081	4 inputs +24 V DC, 5 ms, 4 outputs +24 V DC, 0.5 A, short-circuit proof
DM 108	4 inputs + 24 V DC, 5 ms, 4 outputs +24 V DC, 0.5 A, short-circuit proof, 2 back-readable outputs +24 V DC, 0.5 A, short-circuit proof
DM 161	8 inputs +24 V DC, 5 ms, 8 outputs +24 V DC, 0.5 A, short-circuit proof
DM 162	4 inputs +24 V DC, 5 ms, 4 inputs with counter function/time measurement, 8 outputs +24 V, 0.5 A, short-circuit proof
DM 167	8 inputs +24 V DC, 5 ms, 8 outputs +24 V DC, 1.7 A, short-circuit proof, outputs separated with optic coupler
Analog Input	
AI 022 / AI 022-1	2 strain gauge inputs (24 bits), measurement range ±1.875 to ±120 mV / 2 strain gauge inputs (24 bits), measurement range ±1.25 to 80 mV
AI 023	2 inputs PT100/PT1000/KTY
AI 031	3 inputs 0-5 A AC (12 bits)
AI 040	4 inputs for vibration sensors with IEPE interface, condition monitoring
AI 043	4 inputs PT100/PT1000/KTY
AI 046	4 inputs ±11 V DC or ±1.1 V DC (18 bits)
AI 047	4 inputs 0-22 mA or 4-22 mA (18 bits)
AI 075	6 inputs ±10 V DC (16 bits), 1 KTY/PT1000 temperature input
AI 0812	8 inputs PT1000/KTY (16 bits)
AI 084	8 inputs 0-20 mA (16 bits)
AI 088 / AI 088-1	8 thermal element inputs 0-40 mV (16 bits) / 8 thermal element inputs 0-50 mV (16 bits)

Analog Output		
AO 026	2 outputs ±10 V DC or 0-20 mA (16 bits), switchable per channel	⎍
AO 046	4 outputs ±10.8 V DC or 0-21.6 mA (16 bit), switchable per channel	⎍
AO 081	8 outputs ±10 V DC (12 bits)	
Analog Mix		
AM 221	2 inputs ±10 V DC (16 bits), 2 outputs ±10 V DC (12 bits), 1 reference output +10 V DC, max. 5 mA	
AM 222	2 inputs 0-20 mA (16 bits), 2 outputs 0-20 mA (12 bits)	
AM 441	4 inputs ±10 V (16 bits), 4 outputs ±10 V (12 bits), 1 reference output +10 V, max. 10 mA	
AM 442	4 inputs 0-20 mA (16 bits), 4 output 0-20 mA (12 bits)	
Digital Analog Mix		
IO 011	6 digital inputs (0.5 ms), 8 digital outputs (0.5 A), 1 analog input (±10 V DC), 1 analog current input (0-20 mA)	
IO 011S	6 digital inputs (1 µs), 8 digital outputs (0.5 A), 1 analog input (±10 V DC), 1 analog current input (0-20 mA)	
Counter & Position Recording		
BC 031	Gyroscope sensor, 1x Ethernet, 1x RS485	
DI 204	2 ABR counter, TTL signal, 10 µs, 14 digital inputs +24 V DC, 0.5 ms	
FC 021	2 digital RS422 inputs, 2 digital TTL inputs galvanically separated, 2 digital HTL inputs galvanically separated, all inputs with counter function	⎍
NC 100	Incremental encoder, 1 ABR counter, TTL/RS422, encoder supply 5 V, 4 digital inputs +24 V, 10 µs, 4 digital outputs +24 V, 2 A	
SI 021	2 SSI absolute encoders (up to 32 bits)	⎍
TS 041	Transsonar module for 4 distance measurement systems, DPI/IP protocol	
TS 051	Transsonar module for 5 distance measurement systems, DPI/IP protocol	
Motion		
DC 061-1	Servo motor output stage, resolver, 6 A continuous / 15 A peak current, +48 V DC, holding brake, STO	
DC 062	Servo motor output stage, incremental encoder, 6 A continuous / 15 A peak current, +48 V DC, holding brake, STO	
DC 101	Servo motor output stage, resolver, 10 A continuous / 20 A peak current, +48 V DC, holding brake, STO	
DC 102	Servo motor output stage, incremental encoder, 10 A continuous / 20 A peak current, +48 V DC, holding brake, STO	
SR 011	DC motor output stage, incremental encoder RS422/TTL, 5 A continuous / 15 A peak current, brake chopper, 2 enable inputs, 1 digital output	
SR 012	DC motor output stage, 5 A continuous / 10 A peak current, brake chopper, 2 enable inputs, 4 digital inputs, 1 digital output	
SR 020	DC motor current controller, 12-30 V DC supply, 0-3.5 A, power LED output 0-350 mA	
SR 022	DC motor current controller, 12-30 V DC supply, 0-3.5 A, 1 incremental encoder, 3 digital inputs	
ST 011	Stepper/servo motor power component control, 1 incremental encoder, 2 digital inputs, 2 potential-free digital outputs	
ST 151	Stepper motor output stage, +50 V DC, 5 A, incremental encoder, 2 enable inputs (STO), 2 latch/digital inputs	
Special Functions		
CO 041	4 current-controlled outputs / pulse-signal outputs for valve control, 4 digital inputs +5 V	
DEE 021	3 voltage inputs, 12 current inputs, 1x VARAN In, 1x VARAN Out (optional Ethernet), 1x CAN, energy recording	⎍
DM 811	1 absolute pressure input 0-1600 mbar, 1 PT100, 8 digital inputs +24 V DC, 0.5 ms	⎍
DM 822	2 differential pressure inputs -2068 mbar ... +2068 mbar, 8 digital inputs +24 V DC, 0.5 ms	⎍
EE 121	Energy recording, 3 voltage inputs (0-600 V AC, 16-bits), 12 current inputs (0-2 A AC, 16-bits), power grid synchronization	⎍
EZ 101	10 digital inputs for implementing Euromap interface	
EZ 102	10 digital outputs for implementing Euromap interface	
EZ 122	12 digital outputs for implementing Euromap interface	
KL 090/KL 091	Potential distribution 9x 0 V (ground), 9x +24 V DC (supply), current limited; difference: connector layout	
KL 180	Potential distribution 18x 0 V ground	
KL 181	Potential distribution 18x +24 V DC (supply)	
PL 221	2 outputs RGB pixel LED strips (24 bits), 2 outputs +24 V PWM LED strips	
PSB 001	Expansion supply	
RC 001	1x real-time clock	
VA 011	VARAN Analyzer, 1x VARAN In (RJ45), 1x VARAN Out (RJ45), 1x Gigabit Ethernet 10/100/1000	
BL 011	Placeholder for expansions	
Safety		
SCP 111	Safety controller, 1x USB device, microSD slot, Flash 224 kbyte, SRAM 24 kbyte, total current 800 mA	
SCP 211	Safety controller, 1x USB device, microSD slot, Flash 1 Mbyte, SRAM 500 kbyte, total current 1600 mA	
SDI 101	10 safe digital inputs +24 V DC, 0.5 ms	
SAI 041	4 safe analog current inputs 4-20 mA, 16 bits, +24 V DC	
STO 081	8 safe digital outputs +24 V DC, max 2 A, short-circuit proof	
SDM 081	6 safe digital inputs +24 V DC, 0.5 ms, 2 safe digital outputs +24 V DC, max 2 A	
SRO 021	2 safe relay outputs max. +30 V DC, max. 6 A	
SRO 022	2 safe relay outputs max. +230 V DC, max. 6 A	
SSI 021	Evaluation of 2 SSI absolute encoder signals (up to 32 bits)	
SNC 021	Evaluation of 2 incremental encoder signals (up to 12 bits), encoder supply +5 V, counter frequency 3 MHz	

⎍ Measurement technology modules

SIGMATEK

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