YASKAWA

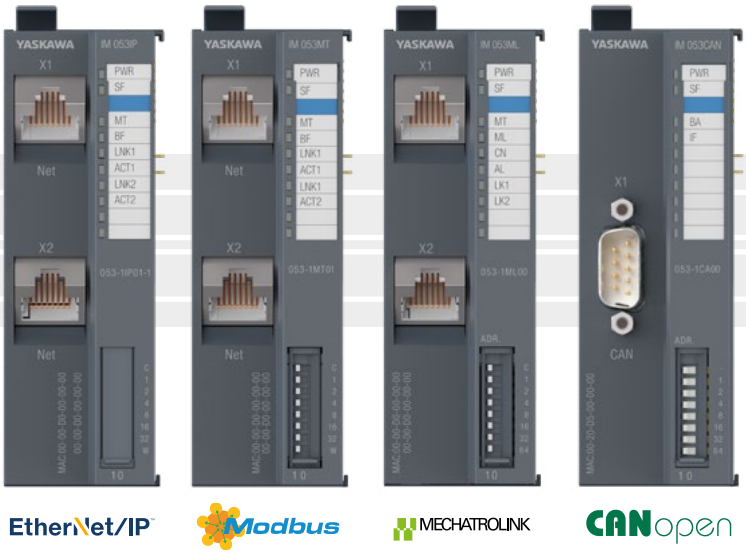
SLIO

The decentralized I/O system

The decentralized concept

SLIO is a modular and extremely compact, decentralized I/O system. It can be universally combined and deployed with each of our established systems and nearly all those of other producers.

No matter which CPU you use: the SLIO I/O system minimizes the engineering effort and is quickly implemented. It is not even necessary to adapt the existing circuit diagram layout. Many different interface modules, each equipped with its own power module, support the following fieldbuses:



Safety first

With modules for FailSafe over EtherCAT and PROFIsafe, the SLIO I/O system is suitable for all applications that require functional safety. The safety modules feature automatic shutdown in the event of a fault in accordance with IEC 61508 SIL3 and EN ISO 13849-1, Cat.4 / PL e.

Modularly expandable

Up to 64 signal and function modules per interface module can be expanded in one line, or with the line extension by up to 8 additional lines (max. 64 modules).

Getting along worldwide!

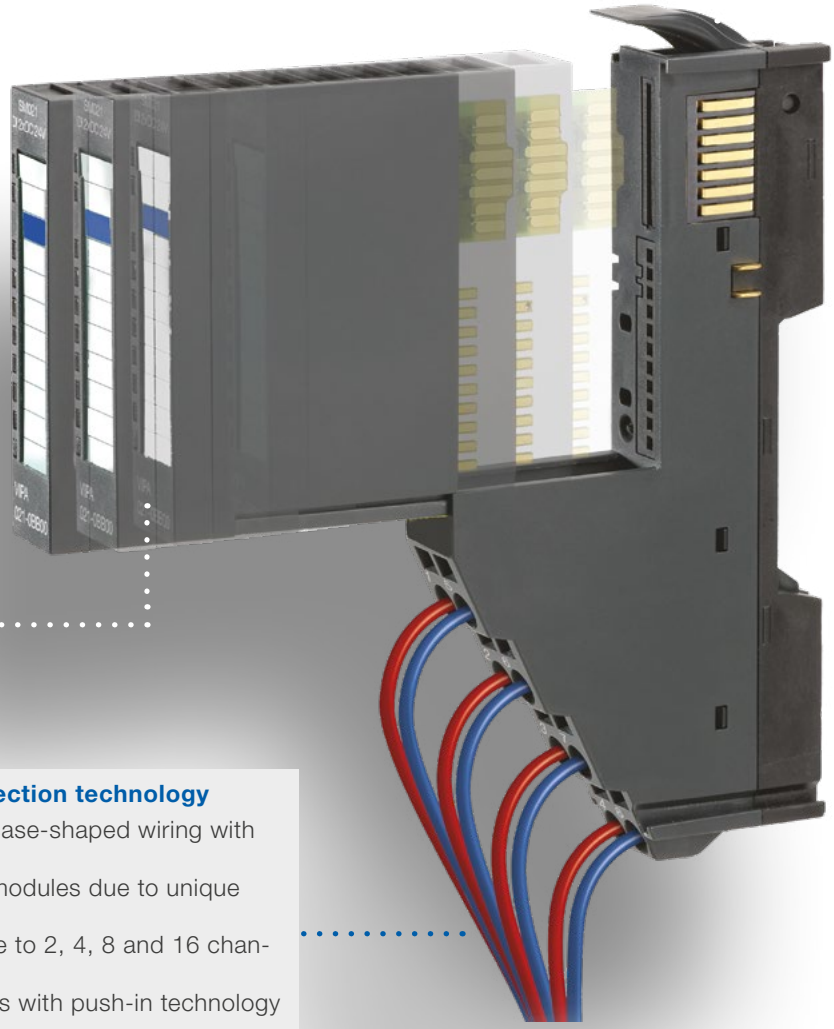
Suppose a German mechanical engineer supplies his plant which is equipped with SLIO to a worldwide production company. In Europe his customer requires PROFINET as a communication basis. In the USA the type of controller has to be an American one which only communicates via EtherNet/IP. And in Asia for example everything works via EtherCAT. SLIO can be used easily for all: only the coupler needs to be exchanged.

High-performance bus

- Transmission rates of up to 48 Mbit/s
- Very fast reaction time of up to 20 µs
- One terminal module for all signal and function modules

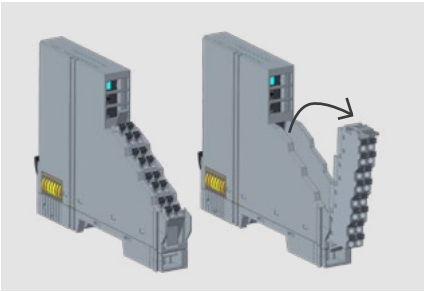
Easy installation and servicing

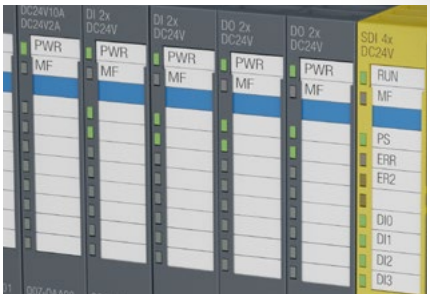
- Easy mounting by safe slice mechanism
- Click connection for fast mounting and easy shielding
- Error protection due to coding
- Unique two stage concept consisting of terminal modules and electronic modules allowing simple and fast maintenance



Space saving connection technology

- Space saving staircase-shaped wiring with cage clamps
- Easy exchange of modules due to unique wiring concept
- High modularity due to 2, 4, 8 and 16 channel modules
- 16-channel modules with push-in technology





Simple wiring

- With our 16-fold I/O modules, the connector can be removed from the basic module
- Allows pre-wiring of the connectors and, together with the push-in technology built into our 16-fold I/O modules, significantly reduces the wiring effort
- In the event of replacement, the wiring can remain on the connector for all modules and simply be plugged into the replacement module

Clear status and diagnosis monitoring

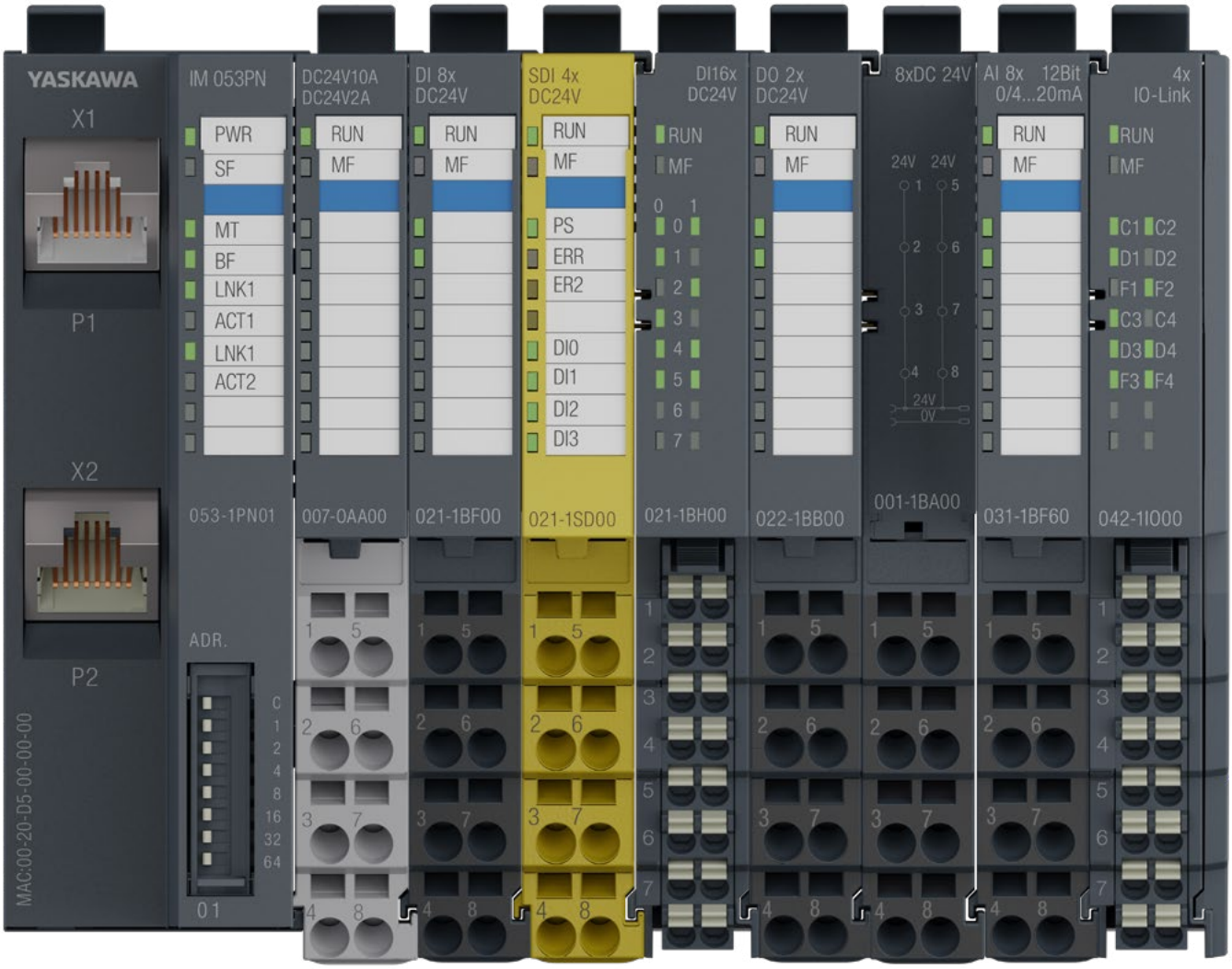
- Monitoring of diagnosis and channel status via LEDs
- Clear allocation and readability of the channel status
- Detailed diagnosis of each electronic module in the system
- Provision of labeling templates

Clever, user friendly labeling

- Labeling strips for individual indication per channel
- Status LEDs with direct allocation on the labeling strip
- Terminal assignment and terminal graph on each module

Find practical labeling templates directly on our website:

System overview



SLIO simplifies your ordering and project planning

We provide you with a single complete assembly consisting of the electronics and terminal module with just one order number.

The terminal module contains the mounting for the electronics module, the backplane bus connector and contacts for distributing the load voltage supply to the electronics, the module connection to the DC 24 V load voltage supply and the staircase-shaped terminal block for the wiring.

The terminal module also has a locking system for fixing to a profile rail. The SLIO system can also be installed „block by block“ outside the control cabinet and later mounted as a complete system in the control cabinet.

The functionality of the function module is defined via the electronics module, which is connected to the terminal module by a secure sliding mechanism. It is mounted on a 35 mm DIN profile rail. Incidentally, no terminating resistor is required for our electronic modules.

If servicing is required, the defective electronic module can be replaced without disconnecting the wiring.

Interface modules

053-1PN01	PROFINET coupler
053-1DP00	PROFIBUS coupler
053-1EC01	EtherCAT coupler
053-1IP01	EtherNet/IP coupler
053-1MT01	Modbus TCP coupler
053-1ML00	MECHATROLINK-III coupler
053-1ML40	MECHATROLINK-IV coupler
053-1CA00	CANopen coupler

Interface modules (IM) form the interface between the process level and the higher-level bus system. All control signals are transmitted to the electronic modules (EM) via the internal backplane bus.

The bus interface and power module (PM) are integrated into one housing in the interface module. Both the bus interface and the electronics of the connected peripheral modules are supplied via the integrated power module for the voltage supply.

Power supply modules

007-1AB00	DC 24 V 10 A
007-1AB10	DC 24 V 4 A DC 24 V +5 V/2A
007-0AA00	DC 24 V electronics module

Power for a SLIO system is supplied via power modules.

Both the bus interface and the electronics of the connected peripheral modules are supplied via the power module (PM) integrated in the interface module (IM) for the power supply. The DC 24 V load voltage supply for the connected peripheral modules is provided via a further connection in the PM.

Clamp modules

001-1BA00	Potential distribution module 8x DC 24 V
001-1BA10	Potential distribution module 8x DC 0 V
001-1BA20	Potential distribution module 4x DC 24 V, 4x DC 0 V

Clamp modules are passive modules for 2- or 3-wire installations whose contacts are internally vertically connected electrically. The backplane bus is looped through within the module. It does not have its own identifier, but is included in the calculation of the maximum number of modules.

Function modules

050-1BA00	1x 32 Bit(AB) DC 24 V, DO 1x DC 24 V 0,5 A
050-1BA10	1x 32 Bit(AB) DC 5 V 2 MHz
050-1BB00	2x 32 Bit(AB) DC 24 V
050-1BB30	2x 32 Bit(AB) DC 24 V ECO
050-1BB40	2x 24 Bit DC 24 V 600 kHz, Frequency measurement
050-1BS00	1x SSI, RS422, 8 ... 32 Bit, 1x DI, 1x CO, 1x CI
054-1BA00	1x Stepper 24 V 1,5 A, 1CH (2 DO), Feedback (2 DI)
054-2BA10	1x Stepper 24-48 V 5 A, 1CH (1 DO / 3 DI)
054-1CB00	1x DC Mot 24 V 1,5 A, 2 CH (2 DO), Feedback (2 DI)
054-1DA00	1x PulseTrain RS422, 0-1000 kHz, 24 V DC, Feedback (2 DI)
060-1AA00	Line Extension, Extension module Master 2 m
060-1AA01	Line Extension, Extension module Master 10m
060-1BA00	Line Extension, Extension module Slave 2 m
061-1BA01	Line Extension, Extension module Slave 10m

Function modules (FM) are intelligent assemblies that independently perform technological tasks such as position detection, counting and positioning tasks and other complex functions in automation. They are used when there are high demands on accuracy and dynamics in the implementation of automation tasks.

Different function modules, e.g. counter modules, SSI modules, provide exactly the functions that are required for the respective tasks.

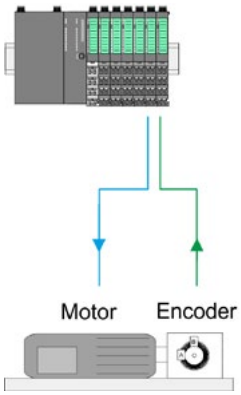
Some function module highlights

Counter module

FM 050-1BA10 adds a counter module with max. 2 MHz counter frequency to your application. Equipped with alarm and diagnostic function, it offers AB 1/2/4-fold sampling or pulse and direction as well as comparison value, set value, input filter and reset.

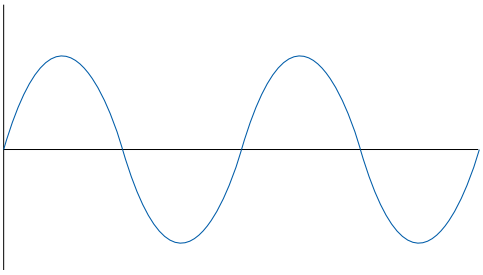
Stepper motor module

FM 054-2BA10 (DC 24-48 V, 5A) integrates a compact motion control solution for stepper motors up to approx. 240 W in the smallest design. The current is controlled in the form of microsteps with a clock rate of 16 kHz. The module can be used to control stepper motors with a small rotational mass as well as low-induction, highly dynamic motors.



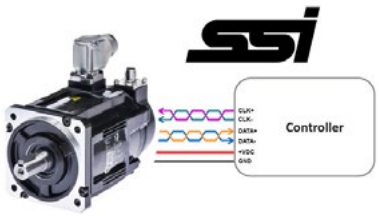
Frequency measurement

FM 050-1BB40 is a frequency measurement module with 2 inputs and 24 bit resolution each. It processes input frequencies from 60 mHz to 600 kHz and measures not only the frequency but also the period duration from 1 µs and revolutions per minute.



SSI module

FM 050-1BS00 adds an SSI encoder for master or slave operation to your automation system. It works with an encoder frequency of 125 kHz up to 2 MHz and offers a clock input and output for co-ordinator operation and master mode.



Communication modules

040-1BA00	RS232C, ASCII, STX/ETX, 3964R, Modbus, PtP
040-1CA00	RS422/485, ASCII, STX/ETX, 3964R, Modbus, PtP
042-1IO00	IO-Link Master, 4 channels, Standard-I/O (SIO) or IO-Link mode

Communication processor modules are used to connect various target or source systems, e.g. via Ethernet to higher-level ERP systems or serially to downstream scanners, printers and other peripheral devices.

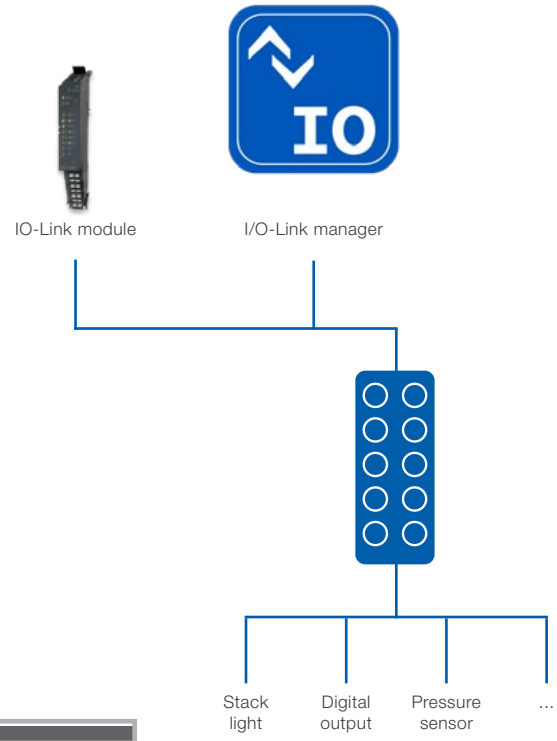
Communication processor highlight

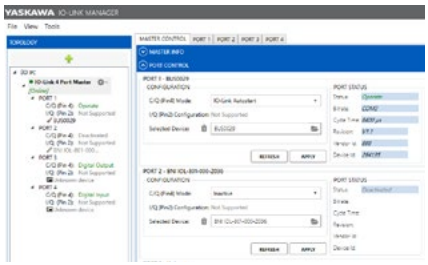
IO-Link master

The SLIO IO-Link module enables communication between the CPU and IO-Link-capable field devices such as sensors and actuators in accordance with IEC 61131-9. The module works as an I/O-Link master, whereby up to six masters can be connected, allowing the operation of up to 24 IO-Link devices per head station. On the hardware side, it has four freely parameterizable 64-byte channels. These can be operated either in standard input/output (SIO) or I/O-Link mode.

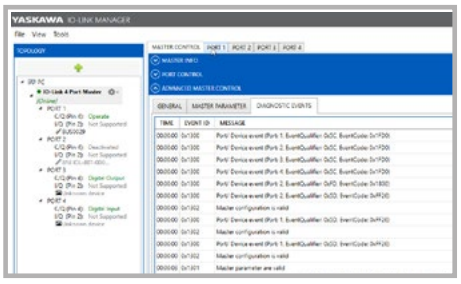
The IO-Link master modules are configured, controlled and updated using the new Yaskawa I/O-Link manager software. The IODD files are reloaded via a server of the I/O-Link community. A high level of data security is guaranteed, as IODD files do not contain any executable code.

The software communicates with one or more connected IO-Link master modules via Ethernet and is able to read out and visualize their configuration. Furthermore, users can change the configuration via a GUI (Graphical User Interface), save it locally on a data carrier and write it to the module again via Ethernet. This makes it easy to configure the module.

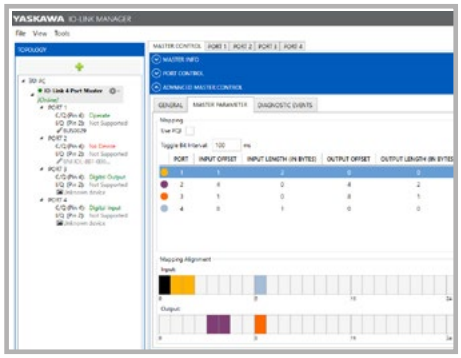




Simple configuration



Detailed diagnosis



The color coding of the port data facilitates the overview

Digital input modules

021-1BB00	DI 2x DC 24 V
021-1BB10	DI 2x DC 24 V 2 µs ... 4 ms
021-1BD00	DI 4x DC 24 V
021-1BD10	DI 4x DC 24 V 2 µs ... 4 ms
021-1BD40	DI 4x DC 24 V 3-wire
021-1BD50	DI 4x DC 24 V NPN
021-1BD70	DI 4x DC 24 V Time stamp
021-1BD80	DI 4x DC 24V Time stamp NPN
021-1BF00	DI 8x DC 24 V
021-1BF01	DI 8x DC 24 V 0.5 ms
021-1BF50	DI 8x DC 24 V NPN
021-1BF51	DI 8x DC 24V 0.5 ms NPN
021-1BH00	DI 16x DC 24 V
021-1DF00	DI 8x DC 24 V Diagnosis
021-1DF50	DI 8x DC 24V Diagnosis NPN

Safety-Module

021-1SD00	DI 4x DC 24 V Safety / PROFIsafe
021-1SD10	DI 4x DC 24 V Safety / FSoE

Digital input and output modules record the binary control signals to and from the process level. A variety of different digital signal modules provide exactly the inputs/outputs required for the respective task. The digital modules differ in the number of channels, voltage and current range, potential isolation and diagnostic and alarm capability.

Digital output modules

022-1BB00	DO 2x DC 24 V 0,5 A
022-1BB90	DO 2x DC 24 V 0,5 A PWM
022-1BD00	DO 4x DC 24 V 0,5 A
022-1BD20	DO 4x DC 24 V 2 A
022-1BD50	DO 4x DC 24 V 0,5 A NPN
022-1BD70	DO 4x DC 24 V 0,5 A Time stamp
022-1BD80	DO 4x DC 24V 0,5A Time stamp NPN
022-1BF00	DO 8x DC 24 V 0,5 A
022-1BF50	DO 8x DC 24 V 0,5 A NPN
022-1BH00	DO 16x DC 24 V 0,5 A
022-1BH50	DO 16x DC 24V 0,5A NPN
022-1DF00	DO 8x DC 24 V 0,5 A Diagnosis
022-1HB10	DO 2x Relais DC 30 V / AC 230 V/3 A
022-1HD10	DO 4x Relais DC 30 V / AC 230 V/1,8 A

Safety-Module

022-1SD00	DO 4x DC 24 V 0,5 A Safety / PROFIsafe
022-1SD10	DO 4x DC 24 V 0,5A Safety / FSoE

Features of the digital input and output modules:

- Digital inputs/outputs electrically isolated from the backplane bus
- 2, 4, 8 or 16 channels
- A wide variety of modules, suitable for switches and proximity switches as well as for transducers
- Direct assignment and readability of the channel statuses via status LEDs
- Safe and time-saving installation thanks to the pin assignment on the module
- Equipment identification (BMK) remains on the TM when the module is replaced
- Individual single-channel labelling via slide-in strips

Safety

The SLIO safety modules with article numbers 021-1SD00 and 022-1SD00 support PROFIsafe, while the 021-1SD10 and 022-1SD10 modules are designed for FSoE (FailSafe over EtherCAT). They can be operated together with the respective fieldbus coupler: the PROFIBUS coupler 053-1DP00, PROFINET coupler 053-1PN01 and of course our EtherCAT coupler 053-1EC01.

PROFIsafe

Safety over EtherCAT®

Analog input modules

031-1BB10	AI 2x12Bit 0(4)...20mA ISO, 2-wire isolated
031-1BB30	AI 2x 12 Bit 0 ...10 V
031-1BB40	AI 2x 12 Bit 0(4) ... 20 mA
031-1BB60	AI 2x 12 Bit 0(4) ... 20 mA 2-wire
031-1BB70	AI 2x 12 Bit -10 ...10 V
031-1BB90	AI 2x 16 Bit Thermocoupler
031-1BD30	AI 4x 12 Bit 0 ...10 V
031-1BD40	AI 4x 12 Bit 0(4) ... 20 mA
031-1BD70	AI 4x 12 Bit -10 ...10 V
031-1BD80	AI 4x 16 Bit R RTD 2x 3/4-wire
031-1BF60	AI 8x 12 Bit 0(4) ... 20 mA
031-1BF74	AI 8x 12 Bit -10 ...10 V
031-1CA20	AI 1x 16 Bit DMS 1x 4/6-wire
031-1CB30	AI 2x 16 Bit 0 ...10 V
031-1CB40	AI 2x 16 Bit 0(4) ... 20 mA
031-1CB70	AI 2x 16 Bit -10 ...10 V
031-1CD30	AI 4x 16 Bit 0 ...10 V
031-1CD35	AI 4x 16 Bit 0 ...10 V Reduced parameter numbers
031-1CD40	AI 4x 16 Bit 0(4) ... 20 mA
031-1CD45	AI 4x 16 Bit 0(4) ... 20 mA Reduced parameter numbers
031-1CD70	AI 4x 16 Bit -10 ...10 V
031-1LB90	AI 2x 16 Bit Thermocoupler
031-1LD80	AI 4x 16 Bit R RTD 2x 3/4-wire
031-1PA00	AI 1x 3 Ph 230/400 V 1 A SLIO Energy measuring clamp
031-1PA10	AI 1x 3 Ph 230/400 V 1/5 A SLIO Energy measuring clamp

Analog input and output modules record the analog control signals (e.g. measured values) at and from the process level. Depending on the application and type, the control signals from the process level are recorded and converted into signals that can be interpreted by the control system. Analog output modules convert the internal control signals into signals suitable for the process level.

Some highlights

Energy measurement terminal 031-1PA00/10

The modules enable the measurement of electrical data for energy metering and power measurement. The voltage of the individual phases is measured directly (or indirectly via voltage transformers) and the current is measured indirectly via current transformers.

Strain gauge module 031-1CA20

The electronic module has one channel and is suitable for connection to strain gauge sensors (strain gauges) in load cells, force transducers and torque measuring shafts. It offers parameterisable input filters and supports diagnostic alarms. It offers absolute accuracy (basic error ±0.1 %).

Analog output modules

032-1BB30	AO 2x 12 Bit 0 ...10 V
032-1BB40	AO 2x 12 Bit 0(4) ... 20mA
032-1BB70	AO 2x 12 Bit -10 ...10 V
032-1BD30	AO 4x 12 Bit 0 ...10 V
032-1BD40	AO 4x 12 Bit 0(4) ... 20 mA
032-1BD70	AO 2x 12 Bit -10 ...10 V
032-1CB30	AO 2x 16 Bit 0 ...10 V
032-1CB40	AO 2x 16 Bit 0(4) ... 20 mA
032-1CB70	AO 2x 16 Bit -10 ...10 V
032-1CD30	AO 4x 16 Bit 0 ...10 V
032-1CD40	AO 4x 16 Bit 0(4) ... 20 mA
032-1CD70	AO 4x 16 Bit -10 ...10 V

Features of the analog input and output modules:

- 2 or 4 channels with 12-bit or 16-bit resolution 16-bit resolution
- Functions of the inputs/outputs can be parameterized
- A wide variety of modules, suitable for sensors (current/voltage sensors, resistance or temperature sensors)
- Direct assignment and readability of the channel statuses via status LEDs
- Safe and time-saving installation thanks to the pin assignment on the module
- Equipment identification (BMK) remains on the TM when the module is changed
- Individual single-channel labelling via slide-in strips

SLIO CPUs

SLIO CPU 013C, 014, 015, 017, 019

In addition to the SLIO IO system series, we offer you one of the most advanced controllers on the market. When developing the IO system, we made sure to create a completely new benchmark in the compact CPU sector with powerful CPUs. They are still one of the fastest S7-compatible CPUs today.

Equipped with the proven SPEED7 technology, our CPUs offer a competitive advantage with a unique price/performance ratio thanks to their high performance and functionality. The integrated Ethernet interface, the high-performance backplane bus and the expandable working memory as well as other features offer you the opportunity to let your control technology grow with your application. You can also retrofit over 100 additional technology functions at a later date. With our VSC card, you can activate the selected features and always have the right CPU for your system.

Our CPUs communicate via PROFIBUS, PROFINET, EtherCAT and many other standards and therefore cover a wide range of applications. Whether it is small applications where a CPU with integrated input and output channels is sufficient, or whether a more powerful CPU with EtherCAT and motion control functionalities is required - SLIO CPUs are always the right choice.

Features of the SLIO CPUs

- High clock rates by the proven SPEED7 technology and fast backplane bus with 48 Mbit/s transmission rate
- Expansion options for up to 64 modules, all module types of the SLIO system deployable
- CPU configuration via VSC for memory sizes and optional PROFIBUS master or slave interface
- PROFINET controller & I-Device
- Webserver/WebVisu for secure access to user specific websites (incl. user- and access management)
- 2 to max. 4 port Ethernet switch for active Ethernet and S7 communication, PROFINET
- Serial interface for MPI communication, switchable for PtP communication and optional via VSC activation as PB-DP master or PB-DP slave interface
- OPC UA Server

OPC UA

SPEED7 performance as compact as ever before

In one casing, the compact CPU 013C combines a programmable logic controller with integrated SPEED7 technology, and digital and analog input and output channels as well as specific channels with special technological functions.

Integrated I/O channels save money and space

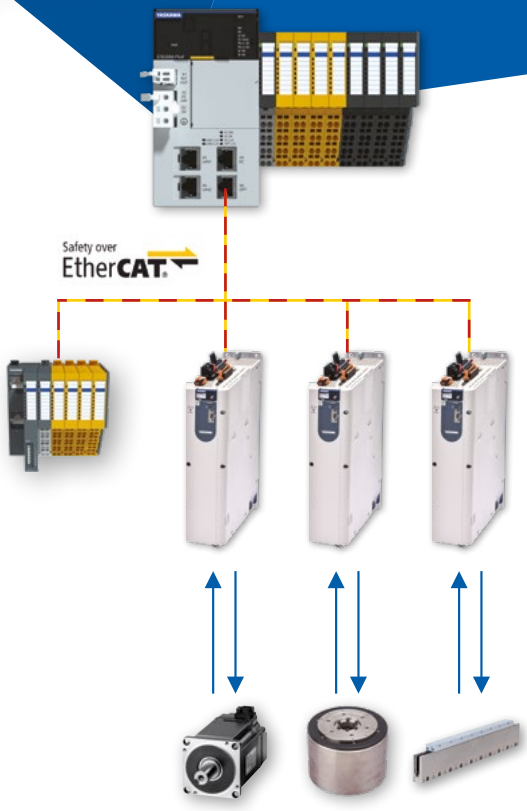
New in the SLIO class is the design of the SLIO compact CPU with integrated input/output channels which for example allows a particularly space saving setup within the serial mechanical engineering installations. The attractive price of the new compact CPU reduces the initial costs and also permits considerable space saving.

Compatible with TIA-Portal, SIMATIC Manager and SPEED7 Studio.

Highlights of the SLIO compact CPU

- Integrated I/O channels: 16 x DI, 12 x DO, 2 x AI
- 6 channels for technology functions: 4 counter/frequency measurement, 2 PWM/PTO

iCube Control



The beginning of a new era

The iC9200 machine controllers are powered by our proprietary Triton processor. They have been developed by Yaskawa specifically for demanding machine control applications, including synchronized multi-axis motion. The controller supports several modern fieldbuses and offers a range of functions that can be tailored to your specific requirements.

Flexibility

- Program in IEC61131-3 and other high-level languages
- Secure cross-team and cross-national collaboration
- Choose from a variety of Yaskawa servo technologies to suit your application

Certainty

- Developed to ensure the highest quality and a long-term product life cycle
- Integrated FailSafe over EtherCAT for a comprehensive machine safety solution
- Safe control communication and web-based management

Scalability

- A machine controller and software engineering tool for motion, logic, safety, HMI and robotics
- Scale the functions of the controller to meet your specific application requirements
- Easy integration of additional components with open network communication

Expert support

- Professional technical resources, from design to development
- Fast, nimble and thorough support, from concept to implementation
- Supplied by Yaskawa, the world's largest manufacturer of robotics and automation systems

YASKAWA Europe GmbH

Drives Motion Controls Division
Hugo-Junkers-Str. 13
90411 Nuremberg
Germany

+49 6196 569-500
support@yaskawa.eu
www.yaskawa.eu.com

08/2024 | YEU_DMC_SLIO_Decentralized_EN

© YASKAWA Europe GmbH. All rights reserved.

YASKAWA