SIEMENS

SIRIUS

Industrial Communication

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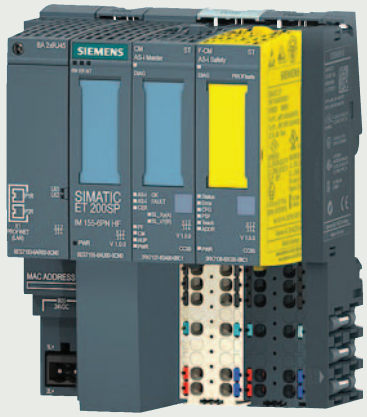


1) See Catalog D 31.2.

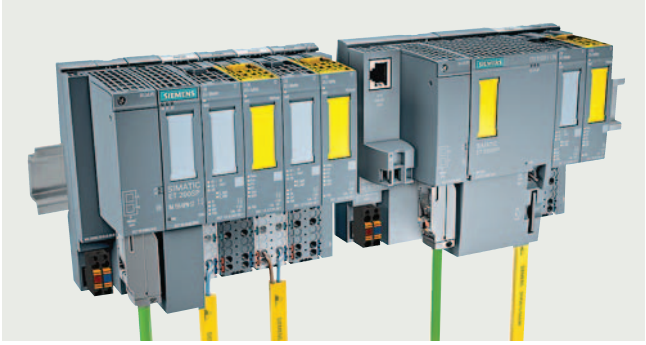
1) See Catalog KT 10.1.
2) See Catalog ID 10.
3) See Catalog FI 01.

Overview

More information

Homepage, see www.siemens.com/as-interface
SiePortal, see www.siemens.com/product?as-interface

TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=AsInterface
System Manual for AS-Interface, see https://support.industry.siemens.com/cs/ww/en/view/26250840



AS-Interface

AS-i = simple!	AS-i = flexible!	AS-i = efficient!
• Only one cable for data and energy	• Flexible topologies	• User-friendly addressing
• Time-saving assembly/installation	• Open standard	• Fast device replacement
• Engineering in the TIA Portal	• Expandability	• Ruggedness and stability
• User-friendly maintenance	• Safety technology	• Device and network diagnostics

IC01_00210

AS-Interface – the smart communication standard for universal connection of the field level to the control system

The AS-Interface (AS-i) – the Actuator-Sensor-Interface, to be more precise – is a smart bus system for the field level that connects all the sensors and actuators in the field to the higher-level control system more simply, flexibly and efficiently than any other.

The structure of a complex automation system is not always clear at first glance. The field level in particular, with its large numbers of devices with real-time requirements, needs a clear structure.

That is exactly what the AS-i fieldbus delivers: Via a simple twisted pair – the yellow AS-i cable – in an AS-i network up to 62 bus nodes can be connected to the AS-i master and simultaneously supplied with power. The standard here is robust data transmission in a rugged environment with a high degree of protection for the AS-Interface.

AS-i from Siemens has everything in its favor

- Complete AS-i product range for bus-based standard and safety technology from a single source
- System-wide integration of the AS-i devices into SIMATIC, SINUMERIK and the TIA Portal engineering framework
- Integration of ASIsafe applications into SIMATIC F controller safety programming
- Central configuration of standard and safety technology in the TIA Portal and in STEP 7 (Classic) – just one engineering framework for controller, AS-i master and safety
- Quick diagnostics of master and slave components via web browser, HMI or TIA Portal
- Planning, calculation and verification of the whole safety chain based on AS-i Safety via Safety Evaluation with the TIA Selection Tool, see www.siemens.com/safety-evaluation-tool
- Integration of lower-level AS-i networks into the PCS 7 process control system
- Global spare parts logistics, consulting and service

	Article No.	Page
ASIsafe		
ASIsafe enables integration of safety-related components in an AS-Interface network, for example: • EMERGENCY-STOP buttons • Protective door switches • Cable-operated switches • Other AS-i safety sensors Your advantage: The simple wiring of AS-Interface is maintained.		
 AS-i Master and AS-i Safety module **AS-i Master and AS-i Safety module for ET 200SP** The CM AS-i Master ST and F-CM AS-i Safety ST modules are plugged into an ET 200SP configuration and connect an AS-i network, including safety-related inputs and outputs, with the controller. • Single, double and multiple masters possible • Per CM AS-i Master ST module up to 496 DI/496 DQ/124 AI/124 AQ possible • Per F-CM AS-i Safety ST module up to 31 safe input signals (2-channel)/16 safe output channels possible • Configuring with TIA Portal or STEP 7 (Classic) • Plant-wide safety programming of the F-CPU via SIMATIC Distributed Safety/ Safety Advanced/F Systems • Integrated diagnostics • No other programming tools required Your advantage: Modular connection of fail-safe AS-i networks with system-wide programming in SIMATIC and SINUMERIK controllers.	**6ES7**	From 2/29

AS-Interface

		Article No.	Page
ASIsafe (continued)			
 K45F  SC17.5F	**AS-Interface safety modules** • Complete portfolio of ASIsafe modules • For connection of safety switches with contacts (e.g. position switches) • Degree of protection IP65/IP67 or IP20 • Especially compact dimensions, with widths from 17.5 mm • Up to four safe inputs per module • Standard outputs are available on the module in addition • Up to SIL 3/PL e Your advantage: Easy integration of safe signals both in the control cabinet and in the field.	**3RK1**	From 2/26
 Safety switch	**SIRIUS 3SF1 mechanical safety switches for AS-Interface** • Plastic with degree of protection IP65 and metal with degree of protection IP66/IP67 • ASIsafe electronics integrated into the enclosure • Available with separate actuator, with or without tumbler Your advantage: Conventional wiring of safety functions no longer required.	**3SF1**	From 12/101
 EMERGENCY-STOP mushroom pushbutton in enclosure	**SIRIUS ACT EMERGENCY-STOP mushroom pushbuttons for AS-Interface** • Degree of protection IP66/IP67/IP69 (IP69K) • Metal or plastic version • Connection of an EMERGENCY-STOP device according to ISO 13850 to AS-Interface • Safety-related AS-Interface module is snapped onto the commanding device from behind • Can be used up to SIL 3/PL e Your advantage: Easy direct connection of control elements to ASIsafe.	**3SU14 modules** **3SU18 enclosure**	13/89 From 13/102

Masters

The AS-Interface master connects SIMATIC controllers to AS-Interface. It automatically organizes the data traffic on the AS-Interface cable and handles not only signal processing, but also parameter setting, monitoring and diagnostics functions.

CM AS-i Master ST for SIMATIC ET 200SP

Masters for SIMATIC ET 200

CM AS-i Master ST for SIMATIC ET 200SP — **3RK7** — From 2/29

- Connection of up to 62 AS-Interface slaves per master
- Connection of up to 496 inputs and 496 outputs per AS-Interface network
- Integrated analog value transmission
- Simple configuration by adopting the ACTUAL configuration on the AS-Interface network
- Easy operation in the input/output address range of the SIMATIC (or other controller) comparable to standard I/O modules
- Monitoring of the control supply voltage on the AS-Interface shaped cable
- Integrated ground fault monitoring

Your advantage: Easy connection of AS-i networks to distributed I/Os.

F-CM AS-i Safety ST for SIMATIC ET 200SP

F-CM AS-i Safety ST for SIMATIC ET 200SP — **3RK7** — From 2/34

- Monitoring of up to
  - 31 fail-safe AS-i input slaves per F-CM
  - 16 fail-safe AS-i outputs per F-CM
- Transmission via PROFIsafe into the F-CPU for safety-related applications up to SIL 3 (IEC 62061)/PL e (ISO 13849-1)
- As a result, these sensors become part of the "unlimited programming and data archiving" options of SIMATIC and of Safety Integrated.

Your advantage: Easy connection of fail-safe AS-i networks to the distributed I/Os.

CM 1243-2 for SIMATIC S7-1200

Masters for SIMATIC S7

AS-Interface master connections:

- CM 1243-2 for SIMATIC S7-1200 — **3RK7** — From 2/37
- CP 343-2P, CP 343-2 for SIMATIC S7-300 and ET 200M — **6GK7** — From 2/39

Features:

- Connection of up to 62 AS-Interface slaves
- Connection of up to 496 inputs and 496 outputs per master or AS-Interface network
- Integrated analog value transmission
- Simple configuration by adopting the ACTUAL configuration on the AS-Interface network
- Easy operation in the input/output address area of the SIMATIC S7 comparable to standard I/O modules
- Monitoring of the control supply voltage on the AS-Interface shaped cable

Your advantage: Easy connection to SIMATIC controllers.

CP 343-2, CP 343-2P for SIMATIC S7-300

Gateways

DP/AS-Interface Link 20E

- Degree of protection IP20 — **6GK1** — From 2/41
- PROFIBUS slave and AS-Interface master
- Connection of up to 62 AS-Interface slaves per AS-Interface network
- Connection of up to 496 inputs and 496 outputs per AS-i network
- Integrated analog value transmission
- Configuring and uploading of AS-Interface configuration in STEP 7 possible
- User-friendly selection of AS-Interface slaves

Your advantage: Compact transition to PROFIBUS
A high-performance gateway can be set up between PROFINET and AS-Interface by combining the CM AS-i Master ST and F-CM AS-i Safety ST modules (for safety-related applications) in an ET 200SP station, see pages 2/32 and 2/36.

Slaves

Slaves contain the AS-Interface electronics and connection options for sensors and actuators in the field and in the control cabinet. A total of up to 62 slaves can be connected to one bus. The slaves then exchange their data in cyclic mode with a control module (master).

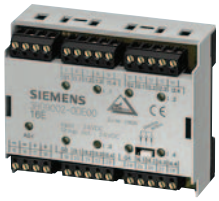
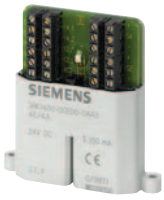
	Article No.	Page
I/O modules for use in the field, high degree of protection		
Digital I/O modules, IP67 - K60, K60R, K45 and K20 • Degree of protection IP65/IP67 or IP68/IP69 (IP69K) • Modules available with up to degree of protection IP68/IP69 (IP69K) • Connection sockets in M8/M12 • Up to eight inputs and four outputs • A/B technology available • Contacting protected against polarity reversal • DIN-rail mounting and wall mounting possible • Mounting of the module on the base plate using just one screw • Diagnostics LEDs Your advantage: Reduction of mounting and startup times by up to 40%.	**3RK1, 3RK2**	From 2/44
Analog I/O modules, IP67 - K60 • Degree of protection IP65/IP67 • Detects or transmits analog signals locally • 2-/4-channel • Input modules for up to four current, voltage or thermal resistance sensors • Output modules for current or voltage Your advantage: Easy integration of analog values.	**3RK1**	From 2/54


K20 digital module


K45 digital module

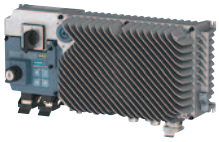

K60 digital module

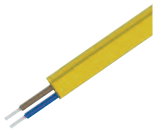

K60 analog module

		Article No.	Page
Slaves (continued)			
 SlimLine Compact SC17.5  SlimLine Compact SC22.5	**I/O modules for use in the control cabinet** • Degree of protection IP20 • No M12 plugs required for connection • Especially narrow design for SlimLine Compact modules with widths of 17.5 mm and 22.5 mm • Analog modules are also available • Removable, finger-safe terminal blocks that cannot be inadvertently interchanged when using the SlimLine Compact modules • Flat design of the flat modules for small control boxes and confined conditions • Connection with screw terminals or spring-loaded terminals • DIN-rail mounting and wall mounting possible • Diagnostics LEDs Your advantage: Modules enable space-saving use in control cabinets and small local control boxes.	**3RG9, 3RK1, 3RK2**	From 2/57
 F90 module			
 Flat module			
	Modules with special functions		
 Counter module	Counter modules • Degree of protection IP20 • For evaluation of pulses • Connection with screw terminals or spring-loaded terminals Your advantage: Evaluation of pulses which exceed even the clock frequency of AS-Interface.	**3RK1**	2/63
 Ground fault detection module	Ground fault detection modules • Degree of protection IP20 • Display using LEDs • Two signaling outputs Your advantage: Automatic diagnostics of ground faults on AS-Interface	**3RK1**	2/64
 Overvoltage protection module	Overvoltage protection modules • Degree of protection IP67 • Discharge through ground cable with oil-proof outer sheath • Protection at transition of lightning protection zones Your advantage: The AS-Interface overvoltage protection module protects downstream AS-Interface devices or individual sections in AS-Interface networks from conducted overvoltages.	**3RK1**	2/65

Slaves (continued)

		Article No.	Page
 SIRIUS contactor 3RT203.-1NB30-0CC0	**Contactors and contactor assemblies**		
	SIRIUS 3RT contactors, 3-pole up to 250 kW	**3RT20**	From 3/18
	SIRIUS 3RA23 reversing contactor assemblies, up to 55 kW	**3RA23**	From 3/140
	SIRIUS 3RA24 contactor assemblies for star-delta (wye-delta) starting, up to 90 kW	**3RA24**	From 3/156
	• Notable reduction of wiring in the control circuit		
	• Integrated mechanical interlock		
	• Prevention of wiring errors in the main circuit		
 SIRIUS 3RA2712 function module	SIRIUS 3RA27 function modules	**3RA2712**	From 3/102
	• Connection of 3RT20 power contactors with communication capability, 3RA23 reversing contactor assemblies, and 3RA24 contactor assemblies for star-delta (wye-delta) starting to AS-Interface		
	• Reduction of control current wiring through plug-in design and integrated monitoring of circuit breaker/motor starter protector and contactor		
	• Reduced space requirement in the control cabinet through fewer digital inputs and outputs in the control system		
	• Easy configuration through operation of feeders instead of individual contactors		
	• Enhanced operational reliability and quick wiring thanks to spring-loaded terminals		
	• Small number of versions through use of identical modules for size S00 to S3 contactors		
	Your advantage: Shortening of mounting and startup times.		
 3RA61 compact starter	**Motor starters for use in the control cabinet**		
	SIRIUS 3RA6 compact starters	**3RA6**	From 8/77
	3RA61 direct-on-line starters, 3RA62 reversing starters	**3RA61, 3RA62**	From 8/67
	• Degree of protection IP20		
	• Very compact load feeders with the integrated functionality of an electronic overload relay		
	• As direct-on line or reversing starters for motors up to 15 kW/400 V		
	• Easy expansion into a communication-capable load feeder using AS-i add-on modules		
	• On-site safe disconnection also possible using AS-i add-on modules		
	• Standardized integration of the loads in higher-level control systems using AS-i		
	Your advantage: Compact solution with minimum wiring outlay for actuating direct-on-line and reversing starters in the control cabinet.		
 SIRIUS M200D motor starter	**Motor starters for use in the field, high degree of protection**		
	SIRIUS M200D motor starters for AS-Interface	**3RK1**	From 9/21
	• High degree of protection IP65 for cabinet-free design		
	• As direct-on line or reversing starters for motors up to 5.5 kW/400 V		
	• Mechanical or electronic switching for high switching frequencies		
	• Optional with manual operation and brake actuation		
	• Expanded diagnostics and parameterization possible through AS-Interface		
	• Easy and consistent integration in STEP 7 through AS-Interface		
	Your advantage: The correct solution for all simple applications in conveyor systems with spatially distributed drives.		

		Article No.	Page
Slaves (continued)			
 SINAMICS G115D frequency converters, wall-mounted	**SINAMICS G115D distributed converters** • Robust, with degree of protection IP65/IP66, wide operating temperature range -30 to +55 °C • Wide power range from 0.37 to 7.5 kW • Preconfigured with geared motors • Local commissioning via DIP switch, USB interface and potentiometer or SINAMICS G120 Smart Access • Integrated safety function: STO (Safe Torque Off) via fail-safe digital input F-DI or PROFIsafe and, from firmware V4.7 SP14 in conjunction with SINAMICS Startdrive V18 SP1 or higher, SLS (Safely-Limited Speed) with Safety Extended license • Integrated applications for conveyor systems, e.g. for roller conveyor, rotary table, transfer carriage • Expanded diagnostics and parameterization through AS-Interface • Flexible connection method for cables, choice of screw connection or plug-in design, compatible with SINAMICS G120D • Optional maintenance switch (SINAMICS G115D wall-mounted) • Optional manual local operation (SINAMICS G115D wall-mounted) Your advantage: The simple solution for consistent implementation of distributed plant concepts with requirements for variable-speed drives with Safety functionality.	**SINAMICS G115D wall-mounted: 6SL352**	Catalog D 31.2
 AS-Interface module  AS-i enclosure	**Commanding and signaling devices** SIRIUS ACT pushbuttons and indicator lights for AS-Interface • AS-Interface modules for snap-on mounting on front plate • AS-Interface modules for base mounting for mounting in enclosure • Modular configuration of enclosure based on individual specifications • Enclosures with standard fittings • Up to six command points for standard signals or EMERGENCY STOP • Degree of protection IP66/IP67/IP69 (IP69K) • Metal or plastic version • Indicator lights with integrated LED • Any change of equipment possible even after installation Your advantage: Complete operating system with simple AS-Interface integration for your plant.	**3SU14 modules** **3SU18 enclosure**	13/89 From 13/103
 8WD42, 8WD44 signaling columns  AS-Interface adapter element	SIRIUS 8WD42 and 8WD44 signaling columns • Many optical and acoustic elements can be combined • Up to four signaling elements can be connected using an AS-Interface adapter element • With integrated LEDs or with BA15d base for LEDs/incandescent lamps • For fastening to connection elements (screw or spring-loaded terminals) • 24 V DC, 50 mm (8WD42) diameter and 70 mm diameter (8WD44) • Connection with bayonet mechanism Your advantage: Signaling columns for monitoring production sequences and for visual or acoustic warnings in emergency situations, with easy AS-Interface integration.	**8WD42, 8WD44**	From 13/173

		Article No.	Page
Power supply units and data decoupling modules			
	AS-Interface power supply units generate a controlled direct voltage of 30 V DC with high stability and low residual ripple in conjunction with data decoupling. They are an integral component of the AS-Interface network and enable the simultaneous transmission of data and energy on one cable. In conjunction with data decoupling modules, AS-Interface can also be operated with standard power supply units.		
 IP20, 3 A	**AS-Interface power supply units** • With wide performance spectrum from 2.6 to 8 A • Degree of protection IP20 • Separation of data and energy by means of the integrated data decoupling • UL/CSA approval means the power supplies can be used worldwide, 2.6 A version with output power restricted to max. 100 W (for Class 2 circuits according to NEC) • Certified for global use • Integrated ground fault and overload detection save the need for additional components and make applications reliable • Diagnostics memory, remote signaling and remote RESET allow fast detection of faults in the system • Ultra-wide input range permits 1-phase and 2-phase use (8 A version). Your advantage: Optimum performance for each application.	**3RX9**	From 2/67
 IP20, 8 A			
 PSN130S, 30 V DC, 8 A	**30 V power supply units** Standard 30 V power supply units without data decoupling • Power spectrum 3 A, 4 A and 8 A • Overload and short-circuit-proof in every performance class • Diagnostics: With output voltage > 26.5 V DC LED and signaling contact for output voltage 30 V O.K. • Primary-side connection to 120/230 V AC (1-phase) with automatic range selection Your advantage: Economical alternatives in conjunction with data decoupling modules while making full use of the maximum AS-Interface cable length.	**3RX9**	From 2/69
 SITOP PSU100M, 24 V DC, 20 A	**24 V power supply units** Standard 24 V power supply units (SITOP), without data decoupling • Power spectrum 2.5 to 40 A • Overload and short-circuit-proof in every performance class • Add-on modules for signaling, redundancy, buffering and UPS • 1-, 2- and 3-phase versions Your advantage: Economical alternatives in conjunction with data decoupling modules.	**6EP**	From 15/1 onwards or Catalog KT 10.1
 S22.5 data decoupling module	**S22.5 data decoupling modules** • Degree of protection IP20, narrow design 22.5 mm • Supply of several AS-i networks with a single power supply unit • Single and double data decoupling • Operation with 24 V DC or 30 V DC Your advantage: Cost-effective installation of AS-i networks in conjunction with standard power supply units.	**3RK1**	From 2/71
 DCM 1271 data decoupling module	**DCM 1271 data decoupling module for SIMATIC S7-1200** • Simple data decoupling in IP20 design • Supply of several AS-i networks with a single power supply unit • Operation with 24 V DC or 30 V DC Your advantage: Cost-effective installation of AS-i networks in conjunction with standard power supply units in the design of a SIMATIC S7-1200 module.	**3RK7**	From 2/73
Transmission media			
	AS-Interface shaped cable for connection of network stations		
 Shaped cable	**AS-Interface shaped cable** • No polarity reversal thanks to trapezoidal shape • Cables made of optimized material for different operating conditions • Special version according to UL Class 2 available Your advantage: Fast replacement and connection to AS-Interface by displacement method.	**3RX9**	2/76

		Article No.	Page
System components and accessories			
	Accessories comprise tools for mounting, installation and operating as well as individual components.		
 Repeater	**Repeaters and extension plugs** • Repeaters for extending the AS-Interface cable by 100 m per repeater • Extension plug for extending the AS-Interface segment to max. 200 m • Parallel connection of several repeaters possible (star configuration option) • Maximum size increases (when combined) to more than 600 m • Easy mounting • IP67 module enclosure Your advantage: Lower infrastructure costs, more possibilities of use and greater freedom for plant planning.	**6GK1 repeater** **3RK1 extension plug**	From 2/77 2/79
 Extension Plug Compact			
 Addressing unit for AS-Interface V 3.0	**Addressing units** • Reading out and adjusting the slave address 0 to 31 or 1A to 31A, 1B to 31B, with automatic addressing aid and prevention of double addresses • Reading out the slave profile (IO, ID, ID2) and reading out and setting the ID1 code • Input/output test when commissioning the slaves, on all digital and analog slaves according to AS-Interface specification V3.0, including safe input slaves and complex CTT2 slaves • Display of the operational current in case of direct connection of an AS-i slave (measuring range from 0 to 150 mA) • Storage of complete network configurations (profiles of all slaves) to simplify the addressing Your advantage: Easiest way to address and test the slaves.	**3RK1**	From 2/80
 Analyzer	**AS-Interface analyzer** • Diagnostics units for completely checking the quality and function of an AS-Interface installation • Transmission of collected data through an RS 232 interface to a PC, evaluation by software • Easy and user-friendly operation • Automatically generated test logs • Advanced trigger functions enable exact analysis • Process data can be monitored online • In addition to digital I/O data it is possible to view analog values and safety slaves in data mode. Your advantage: Preventative testing of an AS-Interface network is possible, recorded logs facilitate remote diagnostics.	**3RK1**	From 2/82
 M12 sealing cap  Cable end terminator	**Miscellaneous accessories** Individual components such as sealing caps, cable adapters, distributors, M12 plugs and cables, cable end terminator, etc.	**3RK1, 3RX9, 6ES7**	From 2/86

AS-Interface

		Article No.	Page
Diagnostics			
 Diagnostics for AS-Interface via HMI panels	The following diagnostics blocks with visualization via HMI or web browser for AS-Interface can be downloaded free of charge in SiePortal: Diagnostics blocks • For CM AS-i Master ST and F-CM AS-i Safety ST in ET 200SP, see https://support.industry.siemens.com/cs/ww/en/view/109479103 • For other Siemens AS-i master and links, see https://support.industry.siemens.com/cs/ww/en/view/50897766 Your advantage: Detailed diagnostics display for fast fault analysis and short downtimes - for easy integration into STEP 7 projects.	--	--
Software			
 AS-Interface block library for PCS 7	**AS-Interface block library for SIMATIC PCS 7** • Engineering and runtime software • Easy connection of AS-Interface to PCS 7 • Engineering work reduced to positioning and connecting the blocks in the CFC • No additional configuring steps required for connection to the PCS 7 Maintenance Station, diagnostics for the AS-i system optimally guaranteed Your advantage: Easy connection of AS-Interface to PCS 7, little engineering and configuration.	**3ZS1635**	From 14/22

Connection methods

	Screw terminals
	Spring-loaded terminals, spring-loaded terminals (push-in)
	COMBICON connectors (plug-in screw terminals)

The connection method is indicated in the corresponding tables by the symbols shown on orange backgrounds.

Ordering notes for multi-unit packaging

SlimLine Compact modules SC17.5, SC17.5F and SC22.5 can be ordered in practical and environmentally friendly multi-unit packaging on request.

Multi-unit packaging with order code X90

When ordering products in multi-unit packaging, the article number of the product concerned must be supplemented with **"-Z"** and, in addition, the order code **"X90"** must be specified.

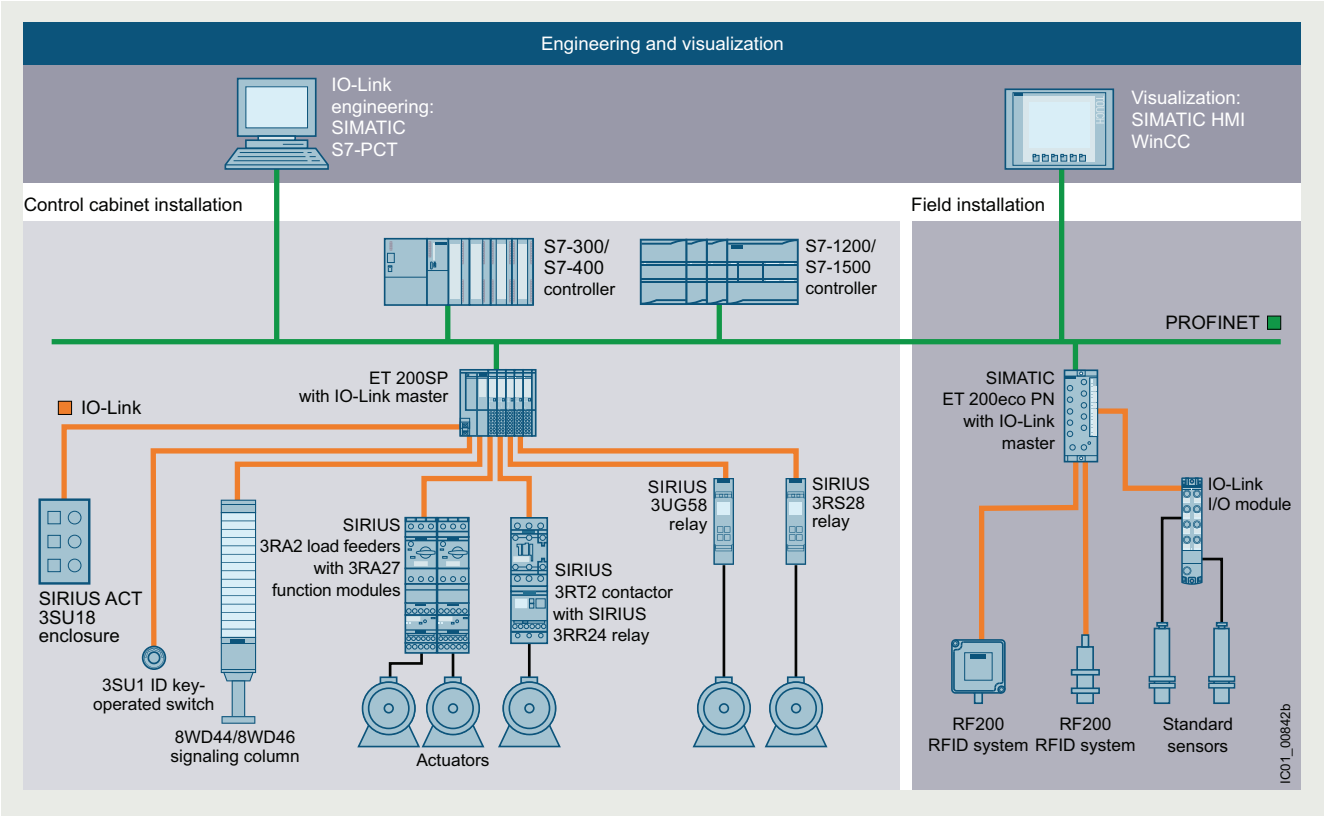
Ordering examples:

- SC17.5F SlimLine Compact safety module 3RK1205-0BE00-2AA2-Z X90;
  Order quantity 16 items → Packed number of items 16
- Analog SC22.5 SlimLine Compact module 3RK1207-0CE00-2AA2-Z X90;
  Order quantity 12 items → Packed number of items 12

For more information, see page 16/7.

Overview

More information	
Homepage, see www.siemens.com/io-link TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=IoLink	For important topics at a glance, see https://support.industry.siemens.com/cs/ww/en/view/109737170



Engineering and visualization

IO-Link – more than just another interface

IO-Link is an open communication standard for sensors and actuators – defined by the IO-Link Consortium.

IO-Link is a smart concept for the uniform connection of actuators and sensors to the control level by means of a low-cost point-to-point connection.

As an open interface, IO-Link can be integrated into all standard fieldbus and automation systems.

The IO-Link communication standard below fieldbus level enables central error diagnostics and localization down to actuator/sensor level, and facilitates both startup and maintenance by allowing parameter data to be dynamically changed directly from the application.

The increasing intelligence of field devices and their integration into automation as a whole now allows data to be accessed right down to the lowest field level. The result: greater plant availability and less engineering work.

Transparency in the process through IO-Link

High system availability and data transparency are market requirements that must also be met by the connecting of innovative control technology to a control system. A systematic diagnostics concept and efficient handling of parameter data are required for this purpose in automation.

With the aid of the IO-Link communication standard, a communication link is established between switchgear and controller, and this allows data to be exchanged efficiently. Based on a standard cable, it is therefore possible to integrate parameter, process and diagnostics data and measured values into the plant automation with ease. For example, the available diagnostics data allow potential errors to be detected quickly, thus avoiding lengthy plant downtimes.

As a consequence of their basic function, such as overvoltage protection (SIRIUS 3UG5 monitoring relays for IO-Link), many controls have measured values. The availability of these via IO-Link now allows conclusions to be drawn at an early stage concerning wear and tear in the application.

At the same time the option of parameterizing via IO-Link supports the device not just when parameters concerning operating time are changed, but also when the device is replaced. In the case of a spare part, for example, the parameters can be quickly transmitted to a new device via the communication system.

Masters

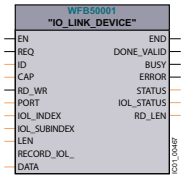
		Article No.	Page
	The IO-Link master modules form the heart of the IO-Link system.		Catalog ST 70
 CM 8xIO-Link for SIMATIC S7-1500	**IO-Link master module for SIMATIC S7-1500** CM 8xIO-Link • Communications module for connecting up to 8 IO-Link devices (three-wire connections) or 8 standard sensors according to IO-Link specification V1.1 • Can be used directly downstream of an S7-1500 CPU or distributed in ET 200MP via PROFINET or PROFIBUS • Simple replacement of sensors/actuators without time-consuming parameterization • Data transfer rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd) Your advantage: Easy connection of IO-Link connections to the SIMATIC S7-1500.	**6ES7547**	2/97
 SM 1278 4xIO-Link for SIMATIC S7-1200	**IO-Link master module for SIMATIC S7-1200** SM 1278 4xIO-Link master • IO-Link master as serial communications module with four ports (channels) according to IO-Link specification V1.1 • Easy device exchange with automatic data recovery without engineering for IO-Link device • Up to four IO-Link devices (three-wire connections) can be connected to each IO-Link master module • Data transfer rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd), automatic adjustment to the data transfer rate supported by the device Your advantage: Easy connection of IO-Link connections to the SIMATIC S7-1200.	**6ES7278**	2/98
 CM 4xIO-Link for ET 200SP	**IO-Link master module for ET 200SP** CM 4xIO-Link V1.1 Standard • IO-Link master module as serial communications module with four ports (channels) according to IO-Link specification V1.1 • Module replacement with automatic data recovery without engineering for IO-Link master and device • Up to four IO-Link devices (three-wire connections) can be connected to each IO-Link master module. • Data transfer rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd), automatic adjustment to the data transfer rate supported by the device Your advantage: Easy connection of IO-Link connections to distributed I/Os.	**6ES7137**	2/99
 IO-Link master module for ET 200pro	**IO-Link master module for ET 200pro** 4 IO-LINK HF • IO-Link master module as serial communications module with four ports (channels) according to IO-Link specification V1.1 • Easy device exchange with automatic data recovery without engineering for IO-Link device • Up to four IO-Link devices can be connected to each IO-Link master module • Support of IO-Link Port Class B • Data transfer rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd), automatic adjustment to the data transfer rate supported by the device Your advantage: Easy connection of sensors and actuators to the I/Os directly in the machine's field area.	**6ES7147**	2/100
 6ES7148-6J.00-0.B0	**IO-Link master module for ET 200eco PN** IO-Link master module • 4 IO-L + 8 DI + 4 DO 24 V DC/1.3 A - Up to four IO-Link devices (IO-Link Port Class A) can be connected - Up to eight standard sensors and up to four standard actuators can be additionally connected - Enclosure width 60 mm • 4 IO-L - Up to four IO-Link devices (IO-Link Port Class B) can be connected - Enclosure width 30 mm • 8 IO-L + 4 DI 24 V DC - Up to eight IO-Link devices (4 x Port Class A + 4 x Port Class B) can be connected - Additionally four digital inputs - Enclosure width 45 mm Your advantage: Easy connection of sensors and actuators to the I/Os directly in the machine's field area.	**6ES7148**	2/101
 CM IO-Link for ET 200AL	**IO-Link master module for ET 200AL** CM IO-Link • IO-Link master module as serial communications module with four ports (channels) according to IO-Link specification V1.1 • Easy device exchange with automatic data recovery without engineering for IO-Link device • Up to four IO-Link devices can be connected to each IO-Link master module • Support of IO-Link Port Class B • Data transfer rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd), automatic adjustment to the data transfer rate supported by the device Your advantage: Easy connection of sensors and actuators to the I/Os directly in the machine's field area.	**6ES7147**	2/103

		Article No.	Page
IO-Link digital modules			
 IO-Link I/O modules	**IO-Link I/O modules**		2/104
	• IO-Link, digital input modules - DI 8 x 24 V DC, 8 x M8 - DI 16 x 24 V DC, 8 x M12	**6ES7141**	
	• IO-Link, digital output modules - DQ 8 x 24 V DC/2 A, 8 x M12	**6ES7142**	
	• IO-Link, digital input/output modules - DIQ 4+DQ 4 x 24 V DC/0.5 A, 8 x M8 - DIQ 16 x 24 V DC/0.5 A, 8 x M12	**6ES7143**	
	Your advantage: Simple connection of binary standard sensors and actuators to IO-Link.		
Industrial controls			
	Starters and contactor assemblies for direct-on-line, reversing and star-delta (wye-delta) starting can be connected to IO-Link through function modules without any additional, complicated wiring.		
	Contactors and contactor assemblies		
 SIRIUS contactor 3RT201.-1B...-0CC0	SIRIUS 3RT contactors, 3-pole up to 250 kW SIRIUS 3RA23 reversing contactor assemblies, up to 55 kW SIRIUS 3RA24 contactor assemblies for star-delta (wye-delta) starting, up to 90 kW	**3RT20** **3RA23** **3RA24**	From 3/18 From 3/140 From 3/156
	• Notable reduction of wiring in the control circuit • Integrated mechanical interlock • Prevention of wiring errors in the main circuit Your advantage: Shortening of mounting and startup times.		
 SIRIUS 3RA2711 function module for IO-Link	SIRIUS 3RA27 function modules	**3RA2711**	From 3/102
	• Connection of 3RT20 power contactors with communication capability, 3RA23 reversing contactor assemblies, and 3RA24 contactor assemblies for star-delta (wye-delta) starting to IO-Link • Reduction of control current wiring through plug-in technology, feeder groups and integrated monitoring of circuit breaker/motor starter protector and contactor • Reduced space requirement in the control cabinet through fewer digital inputs and outputs in the control system • Simple user program through operation of feeders instead of individual contactors • Enhanced operational reliability and quick wiring thanks to spring-loaded terminals • Can be flexibly combined with many automation solutions using the open, standardized IO-Link wiring system • Small number of versions through use of identical modules for size S00 to S3 contactors Your advantage: Shortening of mounting and startup times.		

		Article No.	Page
Industrial controls (continued)			
	Monitoring relays		
 SIRIUS 3RR24 monitoring relay	SIRIUS 3RR24 monitoring relays for mounting on 3RT2 contactors for IO-Link • Monitoring relays for mounting on 3RT2 contactors • Parameterization and diagnostics via the display on the device or via IO-Link • Adjustable warning and switch-off limit values and on/tripping delay times • All current measured values available in the control system Your advantage: Communication-capable monitoring relay enables remote diagnostics and preventive maintenance.	**3RR24**	From 10/65
 SIRIUS 3UG58 monitoring relay	SIRIUS 3UG58 monitoring relays for stand-alone installation for IO-Link depending on device version: • Line monitoring: Phase failure, phase sequence, phase asymmetry, undervoltage and overvoltage, N conductor failure, and frequency (3UG5816) • Current, active current, voltage, power factor, and power monitoring (3UG5842) • Residual current monitoring (3UG5825) • Speed monitoring (3UG5851) • Parameterization and diagnostics via the display on the device or via IO-Link • Adjustable warning and switch-off limit values and on/tripping delay times • All current measured values available in the control system Your advantage: Simplest way of monitoring the motor feeder and of transferring the measured values to the control system.	**3UG58**	From 10/76
 SIRIUS 3RS28 temperature monitoring relay	SIRIUS 3RS28 temperature monitoring relay for IO-Link • Measuring the temperature of solids, liquids and gases • Use of resistance sensors or thermocouples • Parameterization and diagnostics via the display on the device or via IO-Link • Adjustable warning and switch-off limit values and on/tripping delay times • All current measured values available in the control system Your advantage: Independent monitoring easily linked to the control system.	**3RS28**	From 10/121
	SIRIUS ACT pushbuttons and indicator lights		
 SIRIUS ACT 3SU1 ID key-operated switch	SIRIUS ACT 3SU1 ID key-operated switches for IO-Link • Access system and selection system for four authorization levels • Authentication of groups and persons • Five ID keys with different coding • Option for individual coding via IO-Link • For installation in enclosures or fastening on front plate • Electronic module for ID key-operated switches must be ordered separately Your advantage: Only authorized personnel can work on plants and machines.	**3SU1900**	13/12
 SIRIUS ACT 3SU1 electronic module	SIRIUS ACT 3SU1 electronic modules for IO-Link • Eight digital inputs and outputs possible • DI and DQ freely selectable (programmable) • Input and output functions configurable • Spring-loaded terminals (push-in) • For installation in enclosures or fastening on front plate Your advantage: No wiring required if ordered in a 3SU1 enclosure via configurator.	**3SU1400**	13/90

	Article No.	Page
Industrial controls (continued)		
SIRIUS 8WD4 signaling columns		
 8WD46 signaling column Electronically configurable 8WD46 signaling columns, 70 mm diameter Signaling columns for IO-Link, with or without audible signal • Configuration of signaling column via IO-Link interface (IODD) • Fast connection of signaling columns to application using 4-pole M12 plugs • Via the IO-Link interface, the light pattern, color and brightness of the individual segments (9 to 15 segments) can be set. • The audible signal can also be set (volume, type of sound up to 105 dB). Your advantage: Signaling columns for monitoring production sequences and for visual or acoustic warnings in emergency situations, with easy IO-Link connection.	**8WD46**	From 13/166
 8WD44 signaling column  8WD44 IO-Link adapter element 8WD44 signaling columns, 70 mm diameter • Up to five signaling elements can be connected using an IO-Link adapter element • 24 V DC • Connection with bayonet mechanism • For fastening on feet • Connection elements with screw or spring-loaded terminals or connection element with 5-pole M12 plug Your advantage: Signaling columns for monitoring production sequences and for visual or acoustic warnings in emergency situations, with easy IO-Link connection.	**8WD44**	From 13/173
IO-Link RFID systems		
 RFID system for IO-Link **SIMATIC RF200 RFID system in the HF range** Products SIMATIC RF210R, SIMATIC RF220R, SIMATIC RF240R, SIMATIC RF250R, SIMATIC RF260R • Simple identification tasks such as reading an ID number (UID) • Reading of user data • Writing of user data • No RFID-specific programming, ideal for those new to RFID • Simple connection via master modules for IO-Link, such as SIMATIC S7-1200, ET 200SP, ET 200pro, ET 200eco PN and ET 200AL • Use with the tried and tested ISO 15693 transponders (MDS Dxxx)	**6GT2**	Catalog ID 10
IO-Link SITRANS		
 FM100 **SITRANS FM100** Magnetic-inductive sensor with a compact design for basic applications of various process and OEM industries • Connection 1/2", 3/4", 1", 2" • Flow rate and temperature measurement • IO-Link communication • Proportioning function with external control • Configurable multiparameter TFT color display, can be rotated 90° Your advantage: Measurement of small or medium flow rates of conductive liquids with a small size device for almost any installation location with transmission of the measured values to the control system.	**7ME6010**	Catalog FI 01
 LCS050 **SITRANS LCS050** Compact, capacitive limit switches with two-wire technology for measuring levels of water-based liquids, sludge, and foam in tight spaces. • Straightforward mounting without any need for adjustment • Low maintenance because it has no moving parts • Easy-to-read 360° status display • M12 plug for easy connection Your advantage: Compact design for easy installation even in tight spaces with support for transmission of values to a control system via IO-Link.	**7ML5772**	Catalog FI 01
IO-Link SITOP		
 SITOP PSU8400 **SITOP PSU8400** The 3-phase SITOP PSU8400 power supply system 24 V 3 AC/40 A features an IO-Link interface, which provides the user with a wide range of options for parameter setting and diagnostics information for further processing in higher-level automation systems. • Regulated 960 W power supply with 24 V DC/40 A output • Display with control keys on the front of the device • Robust wide-range input 400 ... 500 V 3 AC, continuous 2-phase operation possible • Efficiency up to 96% • High overload capability • Output can be switched on and off Your advantage: IO-Link enables you to support energy management and activate energy-saving mode by measuring the current and voltage of the output.	**6EP3437-8SB00-4AY0**	Catalog KT 10.1

IO-Link

		Article No.	Page
IO-Link Device Description (IODD)			
 IODD files for IO-Link	**IODD files** These files provide the device description for IO-Link devices. • Comprehensive IODD catalog of SIEMENS IO-Link devices • Freely available for downloading from SiePortal, see https://support.industry.siemens.com/cs/ww/en/ps/15851	--	2/95
 IODDfinder for IO-Link	**IODDfinder** The entire world of IO-Link under one roof The IODDfinder is a service provided by the IO-Link community. It is a central cross-vendor database for descriptive files (IODDs). In addition, the platform provides an overview of the available IO-Link devices. For more information, see https://ioddfinder.io-link.com/#/.	--	2/95
IO-Link software			
 S7-PCT	**S7-PCT (Port Configuration Tool)** Engineering software for configuring the IO-Link master modules for SIMATIC S7-1200, ET 200MP, ET 200SP, ET 200pro, ET 200eco PN and ET 200AL • Available as a stand-alone version or integrated into STEP 7 (V5.5 SP1 and higher) and TIA (V12 and higher) • Engineering of the IO-Link devices connected to the master • Monitoring of the process image of the IO-Link devices • Open interface for importing further IODDs • Freely available for downloading from SiePortal, see https://support.industry.siemens.com/cs/ww/en/view/32469496	--	2/95
 Library for IO-Link (LIOLink)	**Library for IO-Link (LIOLink)** This library provides blocks and PLC data types to enable easy communication between the SIMATIC controller and the IO-Link master module or IO-Link device. • Freely available for downloading from SiePortal, see https://support.industry.siemens.com/cs/ww/en/view/82981502	--	2/95
 Function block IO-Link device	**Application of the device-specific blocks for IO-Link** This application shows on a specific example how easy it is to connect Siemens IO-Link devices to a SIMATIC S7 CPU using the library for IO-Link (LIOLink). • Freely available for downloading from SiePortal, see https://support.industry.siemens.com/cs/ww/en/view/90529409	--	2/95

Overview

AS-Interface is an open, international standard according to IEC 62026-2 for process and field communication. Leading manufacturers of actuators and sensors all over the world support the AS-Interface. Interested companies are provided with the electrical and mechanical specifications by the AS-Interface Association.

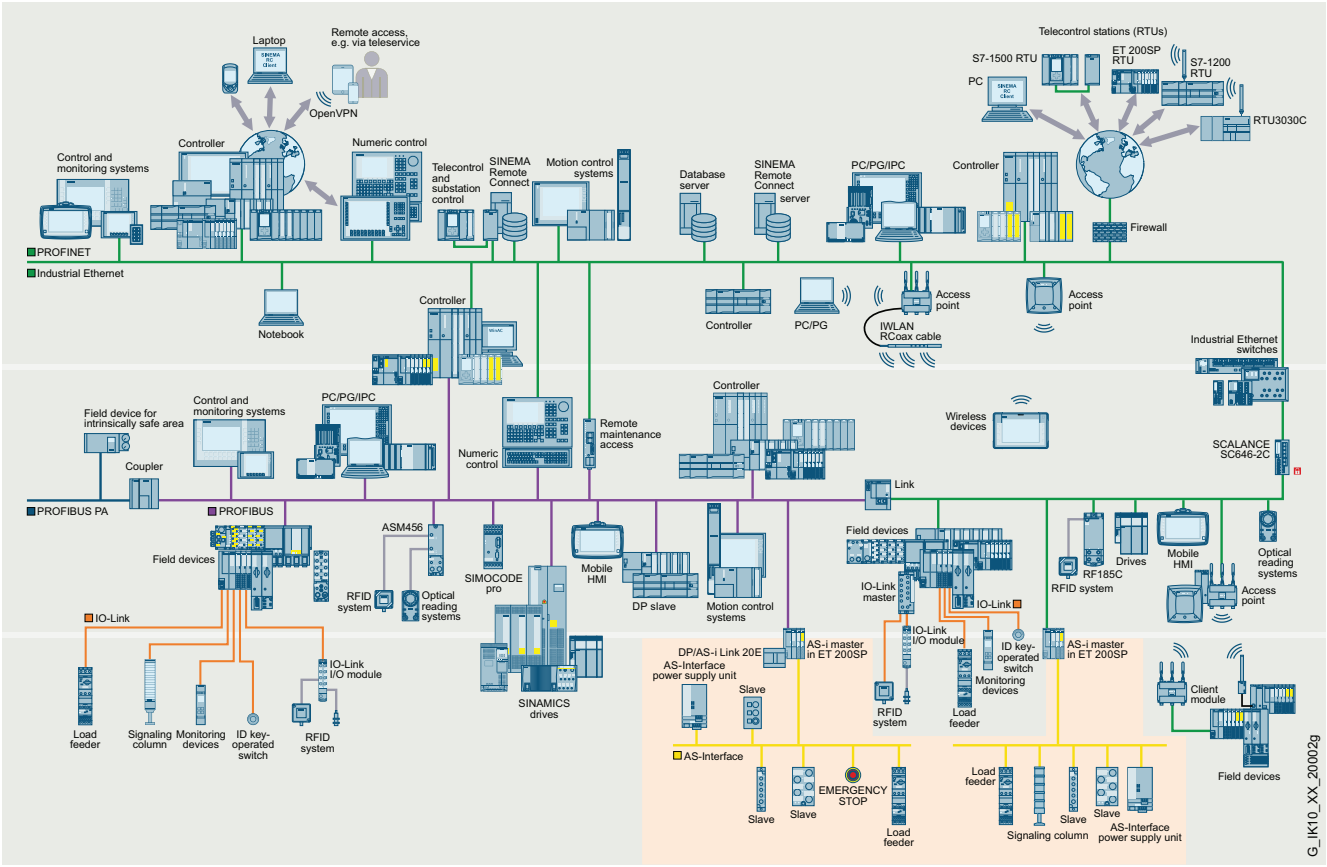
AS-Interface is a single master system. For automation systems from Siemens, there are communications processors (CPs), communications modules (CMs) and gateways (links) that control the process or field communication as masters, and actuators and sensors that are activated as AS-Interface slaves.

Video: AS-Interface – Powerful integration in SIMATIC ET 200SP

More information

Homepage, see www.siemens.com/as-interface
SiePortal, see www.siemens.com/product?as-interface

TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=AsInterface



AS-Interface in the SIMATIC NET communications landscape

Benefits

An important characteristic of the AS-Interface technology is the use of a shared twisted pair for data transmission and distribution of auxiliary power to the sensors and actuators. An AS-i power supply unit or alternatively a standard power supply unit that meets the requirements of the AS-Interface transmission method and has an external AS-i data decoupling module is used for the distribution of auxiliary power. The AS-Interface cable used for the wiring is mechanically coded and hence protected against polarity reversal and can be easily contacted by the insulation piercing method.

Elaborately wired control cables in the control cabinet and marshaling racks can be replaced by AS-Interface.

The AS-Interface cable can be connected to any points thanks to a specially developed cable and connection by the insulation piercing method.

With this concept you become extremely flexible and achieve high savings.

Application

I/O data exchange

The AS-i master automatically transfers the inputs and outputs between the controller and the digital and analog AS-Interface slaves. Slave diagnostics information is forwarded to the control system when required.

The latest AS-Interface masters according to the AS-Interface specification V3.0 support integrated analog value processing. This means that data exchange with analog AS-Interface slaves is just as easy as with digital slaves.

Command interface

In addition to I/O data exchange with binary and analog AS-Interface slaves, the AS-Interface masters can provide a number of other functions through the command interface.

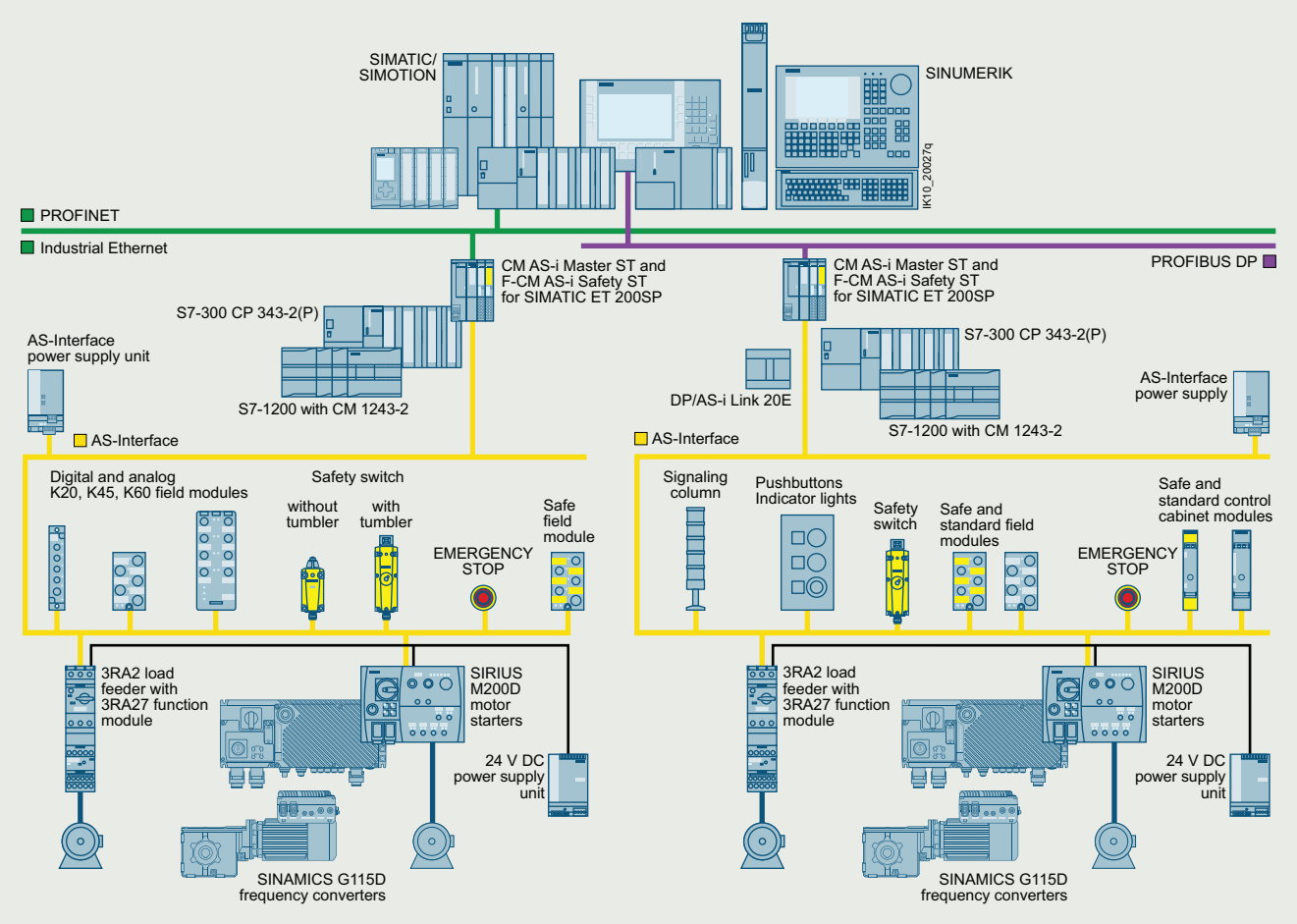
Hence it is possible, for example, for slave addresses to be issued, parameter values transferred or configuration information read out from user programs.

For more information, see https://support.industry.siemens.com/cs/ww/en/view/51678777.

Overview

To implement communication, the following components of a system installation are available:

- AS-i master modules for central control units such as SIMATIC S7, ET 200M/ET 200SP distributed I/Os, or gateways from PROFIBUS to AS-Interface
- AS-i power supply unit or alternatively a standard power supply unit in combination with an AS-i data decoupling module for the power supply to the slaves and sensors
- AS-Interface shaped cables
- Network components such as repeaters and extension plugs (cannot be used for AS-i Power24V)
- I/O modules (AS-i slaves) for connection of standard sensors/actuators
- Actuators and sensors with integrated AS-i slave
- Safe I/O modules (ASIsafe slaves) for transmitting safety-related data through AS-Interface
- Addressing device for setting slave addresses during commissioning



Example of a configuration with the system components

Features

Standard	IEC 62026-2
Topology	Line, star or tree topology (same as electrical wiring)
Transmission medium	Unshielded twisted pair (2 x 1.5 mm^2) for data and auxiliary power
Connection methods	Contacting of the AS-Interface cable by insulation piercing method
Maximum cable length	• 100 m without repeater, without an extension plug • 200 m with an extension plug • 300 m with two repeaters in series connection • 600 m with three extension plugs and two repeaters connected in parallel Longer cable lengths also possible through parallel connection of more repeaters.

Maximum cycle time	• 5 ms in maximum configuration with 31 standard addresses • 10 ms in maximum configuration with 62 A/B addresses • Profile-specific for slaves with extended data, e.g. analog slaves
Number of stations per AS-Interface line	• Up to 62 slaves (A/B addressing) • Integrated analog value transmission
Number of binary sensors and actuators	Max. 496 DI/496 DQ
Access control	• Cyclic polling master/slave procedure • Cyclic data acceptance from host (PLC, PC)
Error safeguard	Identification and repetition of faulty message frames

Overview

Scope of AS-Interface specification V3.0

Maximum number of slaves			Number of digital inputs	Number of digital outputs
Digital	Analog	ASIsafe	DI	DQ
62	62	31	62 X 8 = 496	62 X 8 = 496

Basic data

- AS-Interface specification V3.0 describes a fieldbus system with an AS-i master and up to 62 AS-i slaves.
- Every AS-i slave with standard addressing occupies one AS-i address (1...31).
- Slaves with extended addressing divide an AS-i address into an A address (1A...31A) and a B address (1B...31B). Up to 62 A/B slaves can be connected accordingly to one AS-Interface network.
- Mixed operation of slaves with standard addressing and extended addressing (A/B slaves) is possible without difficulty. The AS-i master identifies automatically which type of slave is connected, so no special adjustments are required of the user.
- One digital AS-i slave typically has up to four digital inputs and four digital outputs.
- Transmission of the digital input/output data requires max. 5 ms cycle time for 31 slaves; for further values, see Communication cycle.
- Integrated analog value transmission permits access to both analog values and digital values without the need for any special function blocks.

Communication cycle

Maximum cycle time (digital signals)
• 5 ms with 31 slaves • 10 ms with 62 slaves • Up to 20 ms for slaves with A/B address and 4 DI/4 DQ • Up to 40 ms for slaves with A/B address and 8 DI/8 DQ

Each address is queried in max. 5 ms cycle time. If two A/B slaves are operated on one basic address (e.g. 12A and 12B), a maximum of 10 ms will be required to update the data of both slaves.

Slaves with A/B addressing transmit max. 4 DI/3 DQ in one cycle.

Slaves with A/B addressing and 4 DQ or 4 DI/4 DQ transmit the output data in two consecutive cycles. The double transmission time of these outputs has no effect in typical applications. The transmission procedure is performed automatically by the AS-i master according to AS-i specification V3.0. These slaves are identified in the selection data with addressing type A/B (spec. V3.0).

Slaves with a single A/B address and 8 DI/8 DQ transmit the input and output data in four consecutive cycles. The transmission time of the inputs/outputs of these slaves increases accordingly. The transmission procedure is performed automatically by the AS-i master according to AS-i specification V3.0.

The slaves offered by Siemens with 8 DI or 8 DI/2 DQ use two AS-i addresses so that the time-consuming procedure is not needed and a fast data update is ensured.

All slave types can be mixed and used on a single AS-Interface network.

For more information, such as the addressing type used by the AS-interface slave (standard or A/B address), see the Selection and ordering data for the relevant slave.

More information

System Manual for AS-Interface, see https://support.industry.siemens.com/cs/ww/en/view/26250840

AS-Interface product range

AS-Interface products from Siemens use the current AS-Interface specification V3.0, which is standardized internationally as IEC 62026-2.

The alternating pulse modulation developed more than 20 years ago for AS-Interface has proven to be a reliable transmission method with which the direct voltage supply for the bus modules and the connected sensors is provided on the standard twisted pair.

Multiple development stages were implemented to produce the proven-in-use system components with optimum EMC properties available today. The extensive product range with AS-Interface specification V3.0 undergoes constant innovation and is extremely cost-efficient, both to install and operate.

The bus cable can be retrofitted with repeaters of AS-Interface specification V3.0, and the modules function without any reciprocal interference. Master modules from Siemens enable ideal integration into the SIMATIC environment, in particular for the AS-Interface master of the ET 200SP distributed I/O system.

The underlying industrial requirements for the system concept are still applicable today: Numerous individual digital input and output signals are spatially distributed in the machine. Rather than having to install thick cable harnesses from the control cabinet to the sensors and actuators, smaller, more manageable AS-i modules are simply inserted in situ onto the bus cable in the IP67 enclosure, and the sensors and actuators connected with short M12 cables.

An additional AS-i module is installed in proximity to the next sensor to ensure that the length of the M12 cables is kept as short as possible. As analog signals are likewise transmitted without any problems, the AS-Interface also replaces the long, shielded analog cables.

Depending on requirements, the switching devices can also be connected to AS-i modules with terminal connection or conveniently used with the integrated AS-i connection. Motor controllers with digital and analog inputs and outputs are also offered with the current AS-Interface specification V3.0.

Safety signals are also transmitted simply and flexibly by the AS-Interface. The safety-related sensors for protective doors and EMERGENCY-STOP buttons can be installed and retrofitted in any position.

The AS-i Safety functionality from Siemens has been continuously optimized and complies with the proven AS-Interface specification V3.0.

For industrial components which require greater transmission capacities, Siemens provide respective solutions with the suitable communications systems.

The AS-Interface system from Siemens continues to provide an ideal and consistent solution for a multitude of simple sensors and actuators, including safety technology and special applications.

Available masters with the latest AS-Interface specification V3.0

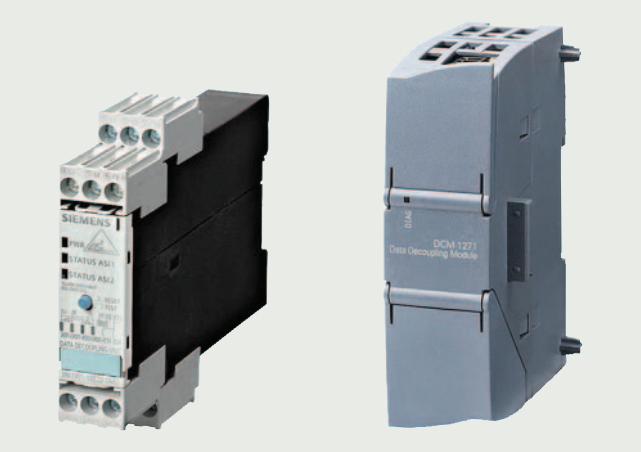
- CM AS-i Master ST, F-CM AS-i Safety ST (ET 200SP)
- CM 1243-2 (S7-1200)
- CP 343-2P/CP 343-2 (S7-300/ET 200M)
- DP/AS-Interface Link 20E

Overview

More information

For a complete overview of AS-i Power24V-capable devices currently available from Siemens, see https://support.industry.siemens.com/cs/ww/en/view/42806066

For details of AS-i Power24V, see System Manual for AS-Interface, https://support.industry.siemens.com/cs/ww/en/view/26250840



AS-Interface data decoupling modules for AS-i Power24V
Left: S22.5 data decoupling module,
Right: DCM 1271 data decoupling module for SIMATIC S7-1200

Parallel wiring frequently dominates, above all, in applications with very few I/Os. AS-Interface can, however, also replace extensive parallel wiring in small applications at a favorable price.

AS-i Power24V enables an already existing standard 24 V DC power supply unit to be used for the AS-i network.

Data and power in the standard AS-Interface network

One of the great advantages of AS-Interface is the ability to convey not only data, but also the power needed for the connected slaves and sensors via the same unshielded twisted pair. This is owed to the service-proven AS-Interface power supply units which provide integrated data decoupling as well as overload and short-circuit protection and integrated ground fault monitoring.

AS-i Power24V

Instead of the AS-Interface power supply unit (with 30 V output voltage and integrated data decoupling) the AS-i cable is supplied via a data decoupling module from a 24 V standard power supply unit. The communication technology of AS-Interface works at the same high level of quality with an operational voltage of both 30 V DC and 24 V DC.

	Key data of AS-i Power24V
Number of slaves	Up to 62 slaves and up to 31 safe slaves
Topology	Any
Range	Up to 50 m
Components	• 24 V power supply unit with low residual ripple and limitation to max. 40 V • AS-i Power24V-capable data decoupling with integrated ground fault detection • AS-i Power24V-capable masters, slaves and components

Requirements for operation of an AS-i Power24V network

- When 24 V power supply units are used, the maximum network range of 50 m must be observed to reach slaves and sensors with a sufficient level of voltage (at least 18 V).
- The power supply units must comply with the ES1 (IEC 62368-1) or PELV (Protective Extra Low Voltage)/SELV (Safety Extra Low Voltage) standards, have a residual ripple of < 250 mV_{pp}, and must limit the output voltage to a maximum of 40 V in the event of a fault. We recommend SITOP power supplies, see page 15/1 or Catalog KT 10.1, https://support.industry.siemens.com/cs/ww/en/view/109745655.
- When used in conjunction with standard 24 V power supply units, each AS-Interface network requires AS-i Power24V-capable data decoupling, see page 2/71 onwards.
- For reliable operation of an AS-i network with 24 V voltage, it is important that the masters, slaves and other components are approved for AS-i Power24V. AS-i Power24V-capable AS-i components can also be used without restriction in standard 30 V AS-i networks.
- Use of repeaters or extension plugs in AS-i Power24V networks is not permitted.

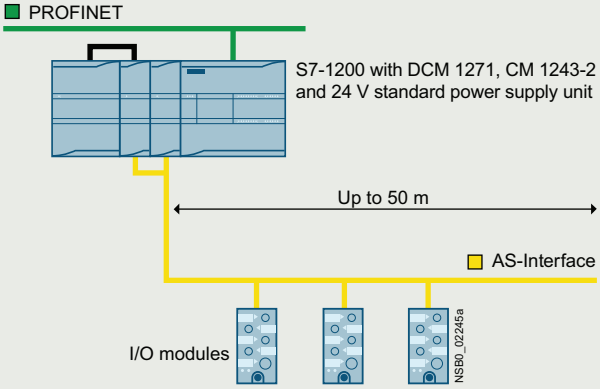
Benefits

In small control cabinets the AS-i power supply unit can be replaced by an AS-i data decoupling module that is connected to an existing 24 V power supply unit.

- The advantages of the AS-i communications system in terms of commissioning, maintenance and diagnostics can be fully exploited.
- If a double data decoupling module is used, two AS-i networks can be supplied.

Application

Configuration of an AS-i Power24V network



Configuration of an AS-i Power24V network with an AS-Interface DCM 1271 data decoupling module and S7-1200 (simple network)

Introduction

Overview

More information

For more information and typical circuit diagrams on safety technology, see https://support.industry.siemens.com/cs/ww/en/view/83150405

ASIsafe – Safety is included

ASIsafe enables the integration of safety-related components such as EMERGENCY-STOP buttons, protective door switches, cable-operated switches or other AS-i safety sensors in an AS-Interface network. These are fully compatible with the familiar AS-Interface components (masters, slaves, power supply units, repeaters, etc.) according to IEC 62026-2 and are operated in conjunction with them on the yellow AS-Interface cable.

Tested safety

- Protective door switches
- Cable-operated switches
- Other AS-i safety sensors

The transmission method for safety-related signals is released for applications up to SIL 3 (IEC 62061)/PL e (ISO 13849-1).

Higher-level control

As usual, nodes on the AS-Interface bus are controlled in operation by the standard program of the higher-level SIMATIC (F) CPU or by a SINUMERIK control.

Configuring safety functions

In order to implement safe functions, the information from the safe and standard nodes must be combined logically and further parameters set.

In conjunction with the modular safety AS-i master, which is formed by combining the CM AS-i Master ST and F-CM AS-i Safety ST modules in an ET 200SP station, all safety functions and combinations are configured via STEP 7 and processed in the controller (F-CPU) by the Failsafe program.

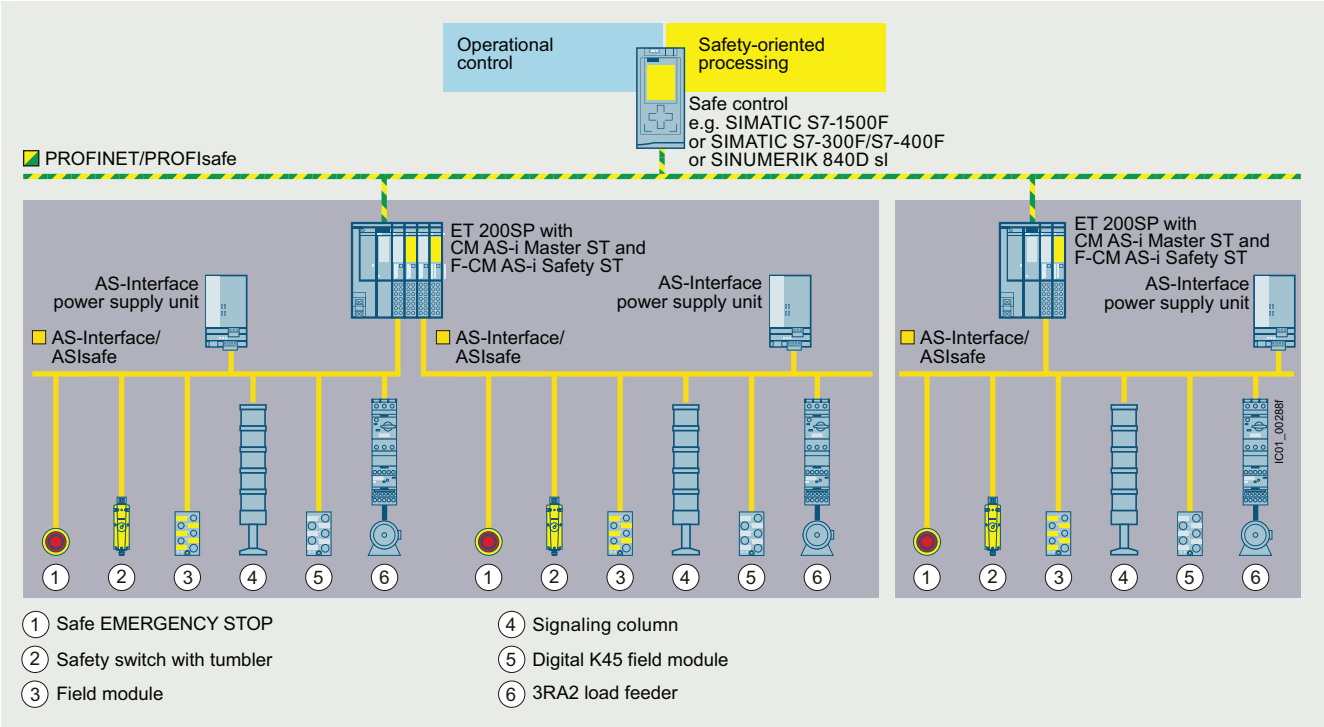
Benefits

- Simple system structure thanks to standardized AS-Interface technology
- Safety-related and standard data on the same bus
- Existing systems can be expanded quickly and easily
- Optimum integration in TIA (Safety Diagnostics) and Safety Integrated
- Inclusion of the safety signals in the plant diagnostics, also on existing HMI Panels
- Approved up to SIL 3 (IEC 62061)/PL e (ISO 13849-1)
- ASIsafe is certified by TÜV (Germany), NRTL (USA) and INRS (France)

Application

Integrated safety technology in the AS-Interface system can be used wherever EMERGENCY-STOP buttons, protective door interlocks, safety switches, light arrays and two-hand operation are installed.

Overview



AS-Interface configuration with AS-i master modules in the ET 200SP

The AS-i communications modules in the ET 200SP facilitate the use of AS-Interface under fail-safe SIMATIC or SINUMERIK controllers.

The allocation of tasks is as follows:

- Detection of safety-related signals via safe input slaves on the AS-Interface bus.
  Further signals can be detected through other F-DI modules of the SIMATIC.
- Evaluation and processing of signals via the fail-safe SIMATIC or SINUMERIK control
- Reacting by means of SIMATIC F-DQ modules

Simple combination of the CM AS-i Master ST and F-CM AS-i Safety ST modules in one ET 200SP station results in a powerful, safety-related gateway between PROFINET (or PROFIBUS) and AS-Interface, which can be expanded further in a modular fashion with further I/O modules of the ET 200SP.

Using these design methods, it is possible to create expansion versions for virtually any application. Besides the single AS-i master, double, triple or generally multiple masters can be realized with or without Failsafe functionality.

F-CM AS-i Safety ST for SIMATIC ET 200SP, see page 2/34 onwards.

Overview

AS-Interface safety modules: K45F (left), K20F (center) and SC17.5F (right)

Safety modules for AS-Interface (ASIsafe modules) are available for field use in degree of protection IP67 (K20F and K45F compact modules) and for the control cabinet (SC17.5F SlimLine Compact modules) in degree of protection IP20.

A very compact module with an optimum price/performance ratio is thus available for every application.

All modules for the connection of (mechanical) switches and safety sensors with contacts feature cross-circuit monitoring of the connected sensor cable.

Function

The safety-related modules with 2 F-DI have two safe inputs. These inputs can be used in a 2 x 1-channel configuration for applications up to SIL 1/PL c or as 1 x 2-channel for applications up to SIL 3/PL e according to IEC 62061 or ISO 13849-1. According to the AS-Interface specification, the two safe inputs are always evaluated in AND-gated pairs, i.e. the two inputs always influence the safety function as a pair and cannot therefore influence the two different actuators independently. A safety-related module takes up one AS-i address (1 ... 31) with standard addressing and no A/B address.

If the module is used in a 2 x 1-channel configuration, the actuator can be activated as soon as the contacts are closed at both inputs. No discrepancy check is made.

If the module is used in a 1 x 2-channel configuration, the actuator can be activated as soon as the contacts are closed at both inputs and no discrepancy has first been detected at the input pair. The response of the discrepancy check can be set via the evaluation unit (e.g. F-CM AS-i Safety module).

The safety-related modules with 4 F-DI have four safe inputs, where each pair of 2 F-DI exert an influence jointly as described above (2 x 2 F-DI). The two input pairs work independently of each other. Each input pair can influence one actuator (i.e. a safety function). The safety-related modules with 4 F-DI take up two AS-i addresses.

Safety-related modules with 2 F-DI/2 DQ contain not only the safety-related inputs but also non-safety-related standard outputs. The standard outputs must not be used for safety-related switching functions.

The safe inputs are designed for connecting (mechanical) switches with contacts. Safety sensors with solid-state outputs (OSSD) cannot be used at the safe inputs.

AS-Interface safety modules

The following modules are available for selection:

K20F compact safety modules for use in the field

Being only 20 mm wide, the K20F module is particularly well suited for applications where modules need to be arranged in the most confined space. The K20F modules are connected to the AS-Interface with a round cable with M12 cable box instead of with the AS-Interface flat cable. This enables extremely compact installation. The flexibility of the round cable means that it can also be used on moving machine parts without any problems. The K20 modules are also ideal for such applications as their non-encapsulated design makes them particularly light in weight.

K45F compact safety modules for use in the field

The platform of the K45F modules covers the connection of ("mechanical") switches/safety sensors with contacts:

- K45F 2 F-DI: two safety-related inputs. These can be used in a 2 x 1-channel configuration for applications up to SIL 1/PL c or as 1 x 2-channel for applications up to SIL 3/PL e according to IEC 62061 or ISO 13849-1.
- K45F 2 F-DI/2 DQ: There are also two standard outputs in addition to the safe inputs. Depending on the selected K45F module, the outputs are powered either from the yellow AS-Interface cable or via the auxiliary voltage U_{aux} from the black 24 V DC cable. Modules with degree of protection IP67 do not have a switch for setting the power supply on the module.
- K45F 4 F-DI: four safety-related inputs. Functionality as for two K45F 2 F-DI modules, but combined with a K45F enclosure. Extremely compact double slave (uses two AS-i addresses)

SC17.5F SlimLine Compact safety modules with a width of just 17.5 mm for use in control cabinets and local control boxes

With a width of only 17.5 mm, SC17.5F SlimLine Compact safety modules are ideal for space-saving use in a control cabinet. The modules have two safety inputs for connecting signals to an ASIsafe network in the control cabinet. In operation up to SIL 1/PL c, the two inputs can be assigned separately (with AND gating of the inputs); if SIL 3/PL e is required, the inputs must be used in a 2-channel configuration.

There are also two module versions which have two standard outputs in addition to the two safety inputs. These outputs are supplied with power either via the yellow AS-Interface cable only or via the 24 V DC auxiliary voltage. The type of supply voltage is set via a slide switch on the rear of the device.

When using several modules, they can be connected simply via the optional device connector. This simplifies the wiring. The yellow AS-i bus cable and the 24 V DC auxiliary voltage U_{aux} then only need to be connected to one module.

Selection and ordering data

For multi-unit packaging for SC17.5F, see page 16/7.

Version			Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1205-0BQ30-0AA3							
K20F compact safety module Slave addressing type: Standard address							
I/O type	U_{aux} 24 V	Degree of protection					
2 F-DI	--	IP67	**3RK1205-0BQ30-0AA3**		1	1 unit	42C
 3RK1205-0BQ00-0AA3							
K45F compact safety modules Slave addressing type: Standard address (modules supplied without mounting plate)							
I/O type	U_{aux} 24 V	Degree of protection					
2 F-DI	--	IP67	**3RK1205-0BQ00-0AA3**		1	1 unit	42C
4 F-DI[1)]	--		**3RK1205-0CQ00-0AA3**		1	1 unit	42C
2 F-DI/2 DQ	--		**3RK1405-0BQ20-0AA3**		1	1 unit	42C
2 F-DI/2 DQ	✓		**3RK1405-1BQ20-0AA3**		1	1 unit	42C
 3RK1405-2BE00-2AA2							
SC17.5F SlimLine Compact safety modules Slave addressing type: Standard address							
I/O type	Outputs	Degree of protection					
		IP20	**Screw terminals**				
2 F-DI	--		**3RK1205-0BE00-2AA2**		1	1 unit	42C
			Spring-loaded terminals (push-in)				
2 F-DI	--		**3RK1205-0BG00-2AA2**		1	1 unit	42C
			Screw terminals				
2 F-DI/2 DQ	Power supply U_{AS-i}/U_{aux} can be switched over		**3RK1405-2BE00-2AA2**		1	1 unit	42C
			Spring-loaded terminals (push-in)				
2 F-DI/2 DQ	Power supply U_{AS-i}/U_{aux} can be switched over		**3RK1405-2BG00-2AA2**		1	1 unit	42C

✓ Available or possible
-- Not available or not possible
1) Module occupies two AS-Interface addresses

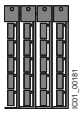
Standard I/O modules for AS-Interface
- For degree of protection IP67, see page 2/44 onwards
- For degree of protection IP20, see page 2/59 onwards

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Accessories

More information

For the Equipment Manual for SlimLine Compact modules, see https://support.industry.siemens.com/cs/ww/en/view/109481489

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Accessories for compact safety modules					
 3RK1901-2EA00  3RK1901-1AA00	**K45 mounting plates** For mounting K45F				
	• For wall mounting	**3RK1901-2EA00**	1	1 unit	42C
	• For DIN-rail mounting	**3RK1901-2DA00**	1	1 unit	42C
	Input jumpers for K20F and K45F For screwing into M12 input sockets, connects pin 1 to pin 2, for bridging input 2 when used with 1-channel sensor at input 1				
	• Black version	**3RK1901-1AA00**	1	1 unit	42C
	• Red version	**3RK1901-1AA01**	1	1 unit	42C
 3RK1901-1KA00  3RK1901-1KA01	**AS-Interface sealing caps M12** For free M12 sockets (one set contains 10 sealing caps)				
	• Standard version	**3RK1901-1KA00**	100	10 units	42C
	• Tamper-proof	**3RK1901-1KA01**	100	10 units	42C
Accessories for SlimLine Compact safety modules					
 3RK1901-1YA00  3RK1901-1YA01	**Device connectors** For the electrical connection of SlimLine Compact modules (connects AS-i bus cable and 24 V DC auxiliary power supply U_{aux} when using several SlimLine Compact modules)				
	• Width 17.5 mm	**3RK1901-1YA00**	1	1 unit	42C
	• Width 22.5 mm	**3RK1901-1YA10**	1	1 unit	42C
	Device termination connectors Required for the last module in the network				
	• Width 17.5 mm	**3RK1901-1YA01**	1	1 unit	42C
	• Width 22.5 mm	**3RK1901-1YA11**	1	1 unit	42C
 3ZY1121-2BA00	**Removable terminals, without inscription**	**Screw terminals**			
	• Screw terminals up to 2 x 1.5 mm^2 or 1 x 2.5 mm^2				
	- 2-pole	**3ZY1121-1BA00**	1	6 units	41L
	- 4-pole	**3ZY1141-1BA00**	1	6 units	41L
		Spring-loaded terminals (push-in)			
	• Push-in terminals up to 2 x 1.5 mm^2				
	- 2-pole	**3ZY1121-2BA00**	1	6 units	41L
	- 4-pole	**3ZY1141-2BA00**	1	6 units	41L
	**Hinged covers** Replacement for SlimLine Compact module, without terminal labeling, width 17.5 mm, yellow	**3ZY1450-1BA00**	1	5 units	41L
	Push-in lugs for wall mounting (Two lugs are required per device)	**3ZY1311-0AA00**	1	10 units	41L
	Coding pins for removable terminals For mechanical coding of the terminals	**3ZY1440-1AA00**	1	12 units	41L
 3ZY1450-1BA00					
 3RT2900-1SB20	**Blank labels** Unit labeling plates[1]				
	• 10 mm x 7 mm, titanium gray	**3RT2900-1SB10**	100	816 units	41B
	• 20 mm x 7 mm, titanium gray	**3RT2900-1SB20**	100	340 units	41B
 3RA2908-1A	**Screwdriver** For all SIRIUS devices with spring-loaded terminals	**Spring-loaded terminals (push-in)**			
	Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	**3RA2908-1A**	1	1 unit	41B

[1] PC labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH
(see page 16/18).

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Overview

CM AS-i Master ST for SIMATIC ET 200SP

Video: AS-Interface – Powerful integration in SIMATIC ET 200SP

More information

Equipment Manual, see
https://support.industry.siemens.com/cs/ww/en/view/71756485

SIMATIC ET 200SP Manual Collection, see
https://support.industry.siemens.com/cs/ww/en/view/84133942

Diagnostics blocks with visualization, see
https://support.industry.siemens.com/cs/ww/en/view/109479103

AS-Interface block library for SIMATIC PCS 7 for easy connection of AS-Interface to PCS 7, see page 14/22 onwards

Released combinations of the AS-i modules for ET 200SP, see
https://support.industry.siemens.com/cs/ww/en/view/103624653

The CM AS-i Master ST communications module is designed for use in the SIMATIC ET 200SP distributed I/O system and has the following features:

- Connection of up to 62 AS-Interface slaves
- Supports all AS-Interface master functions according to the AS-Interface specification V3.0
- User-friendly configuration with graphic or tabular display of the AS-i line in TIA Portal or STEP 7 (Classic) or via GSD in other systems
- Supply via AS-Interface cable
- Suitable for AS-i Power24V and for AS-Interface with 30 V voltage
- Extended temperature range from -25 °C (from hardware function status FS20 onwards)
- Integrated ground fault monitoring for the AS-Interface cable
- Through connection to AS-Interface, the number of digital inputs and outputs available for the control system is greatly increased (max. 496 DI/496 DQ on the AS-Interface per CM AS-i Master ST).
- Integrated analog value processing

AS-i gateways with ET 200SP

An AS-i gateway or AS-i link enables access to the AS-Interface data via PROFINET, PROFIBUS, EtherNet/IP or Modbus TCP.

With the CM AS-i Master ST module, flexible and powerful solutions or autonomous ET 200SP CPU stations with an AS-i connection are set up. Depending on the requirements, even several AS-i masters can be plugged into one ET 200SP station, so that the setup can easily be extended from a single master to double masters or multiple masters.

The maximum number of modules is determined by the ET 200SP interface module (IM): Up to 32 AS-i masters with PROFINET IM 155-6PN Standard (6ES7155-6AU02-0BN0), up to 43 AS-i masters with IM 155-6PN High Feature, or a single AS-i master with IM 155-6PN Basic. For the connection to PROFIBUS, the IM 155-6DP HF interface module with up to 7 AS-i master modules is used. With the MultiFieldbus interface module IM 155-6MF, the AS-i master modules are connected to PROFINET, EtherNet/IP, and Modbus TCP.

Since in many plants an ET 200SP station is provided with I/O, motor starter or other peripheral modules, the AS-i master modules are simply plugged in without any additional effort. There are countless possible combinations.

An AS-i Safety gateway can also be implemented without any problems by adding the safety-oriented module F-CM AS-i Safety ST in the ET 200SP station. This greatly simplifies the cabling and connection of distributed EMERGENCY-STOP buttons and protective door monitoring systems to a Failsafe CPU. The AS-i Safety application is completely configured in TIA Portal/STEP 7.

The ET 200SP modules CM AS-i Master ST and F-CM AS-i Safety ST (see from page 2/34) can of course also be used directly on an ET 200SP CPU or F-CPU, so that an extremely compact SIMATIC control system with AS-i bus connection can be set up.

For further application possibilities, see the brochure "The modular AS-i Master".

More information, see the SIMATIC ET 200SP Manual Collection.

Design

The CM AS-i Master ST module has an ET 200SP module enclosure with a width of 20 mm. A C0 type BaseUnit (BU) is required for use in the ET 200SP.

The communications module has LED displays for diagnostics, operation, AS-i voltage and AS-i slave status and offers informative module inscription on the front for

- Plain-text marking of the module type and function class
- 2D matrix code (Article No. and serial number)
- Circuit diagram
- Color coding module type communications module: light gray
- Hardware and firmware version
- Supported BaseUnit type BU: C0

Function

The CM AS-i Master ST communications module supports all specified functions of the AS-Interface specification V3.0.

The input/output values of the digital AS-i slaves can be activated via the cyclic process image. The values of the analog AS-i slaves are accessible via the cyclic process image or via data record transfer.

If required, master calls can be performed with the command interface, e.g. read/write parameters, read/write configuration.

Changeover of the operating mode, automatic application of the slave configuration and the re-addressing of a connected AS-i slave can be implemented via the online function in STEP 7/TIA Portal.

For the implementation of modular machine concepts, the AS-i slaves can be activated or deactivated via the PLC program (option handling). The configuration of AS-i slaves can be modified while being executed, thus enabling variable machine setups and tool changing with integrated input/output modules during ongoing operation. AS-i input/output modules can be added to the system without deactivating the controller.

An existing AS-i installation can be read into the STEP 7 hardware configuration and adapted and documented in the project. Analog values are transmitted via the cyclic process image, the length of which is adjustable and extendable up to 288 bytes (depending on the interface module (IM) used).

Diagnostics information is accessed via automatic alarm indications, via the status information in the process image or via the graphical status display in the online diagnostics of the TIA Portal. The transmission quality of the AS-i network can also be read out. To avoid configuration errors, duplicate addresses can be detected on the AS-i network.

Configuration is possible with SIMATIC CPUs S7-300 up to S7-1500 and with a SINUMERIK 840D sl or other controller.

The online diagnostic status of the AS-i slaves can be displayed directly on the slaves in the network view in TIA Portal.

Notes on security:

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens products and solutions represent one component of such a concept.

For more information on industrial cybersecurity, see www.siemens.com/cybersecurity-industry.

Configuration

The following software is required for configuration of the CM AS-i Master ST module:

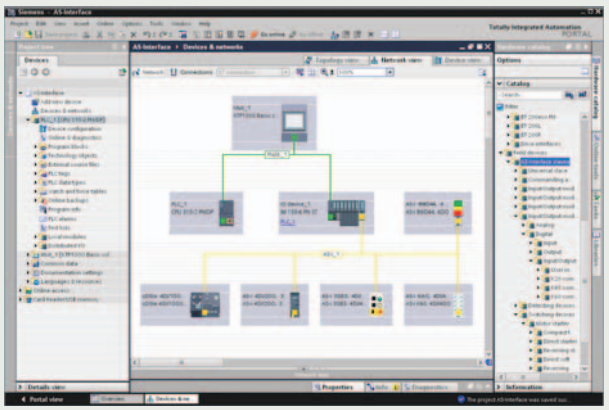
- STEP 7 (TIA Portal) or
- STEP 7 (Classic) or
- the GSD file of the ET 200SP with STEP 7 or another engineering tool

STEP 7 enables user-friendly configuration and diagnostics of the AS-i master and any connected slave modules.

Alternatively, you can also apply the AS-Interface ACTUAL configuration as the TARGET configuration at the "touch of a button" via the online function integrated in the TIA Portal or an optional expansion button. Configuration with the GSD file is possible only with the button.

In the default setting, the CM AS-i Master ST module occupies 32 input/output bytes. To adapt the number and type of AS-i slaves used, the I/O address space can be reduced, or expanded up to 288 bytes.

Together with an ET 200SP CPU 1510SP, 1512SP, 1514SP or 1515SP PC, preprocessing of safe AS-i signals directly in the ET 200SP station and setting up of an independent AS-i station without a higher-level CPU are possible.



Configuration of an AS-Interface network with CM AS-i Master ST via the TIA Portal

Benefits

The CM AS-i Master ST communications module for ET 200SP enables modular, simple and high-performance expansion of AS-interface networks via engineering in the TIA Portal.

Up to 32 CM AS-i Master ST units can be plugged into one ET 200SP station with IM 155-6PN Standard. When using the IM 155-6 PN High Feature, the number of CM AS-i Master ST in the ET 200SP station can be further increased. The maximum configuration depends on the interface module used. Multiple masters as well as single masters can thus be implemented in the ET 200SP depending on the number of modules.

Together with the interface module, a scalable PROFINET/AS-i link or PROFIBUS/AS-i link can be assembled.

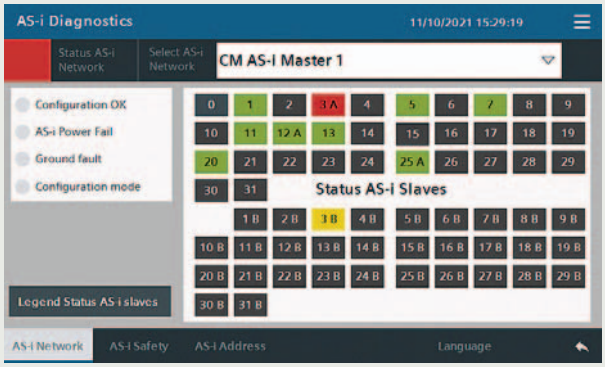
For the connection of an AS-i network to systems with EtherNet/IP and Modbus TCP, the ET 200SP MultiFieldbus interface module IM 155-6MF in combination with the CM AS-i Master ST module is available.

Using TIA Portal/STEP 7, the AS-i network in the SIMATIC controller is consistently configured and programmed with only one configuration tool.

The PRONETA PC program (for ET 200SP with PROFINET interface module) is available for convenient input/output testing during the commissioning of an AS-i network without a CPU; see www.siemens.com/proneta.

The CM AS-i Master ST module can be used in a system with PROFINET system redundancy S2. Furthermore, the CM AS-i Master ST module (from FW version V1.1.11 onwards or from FW version 2.0 onwards) can be used in a system with PROFINET system redundancy R1 with SIMATIC S7-1500R/H CPU.

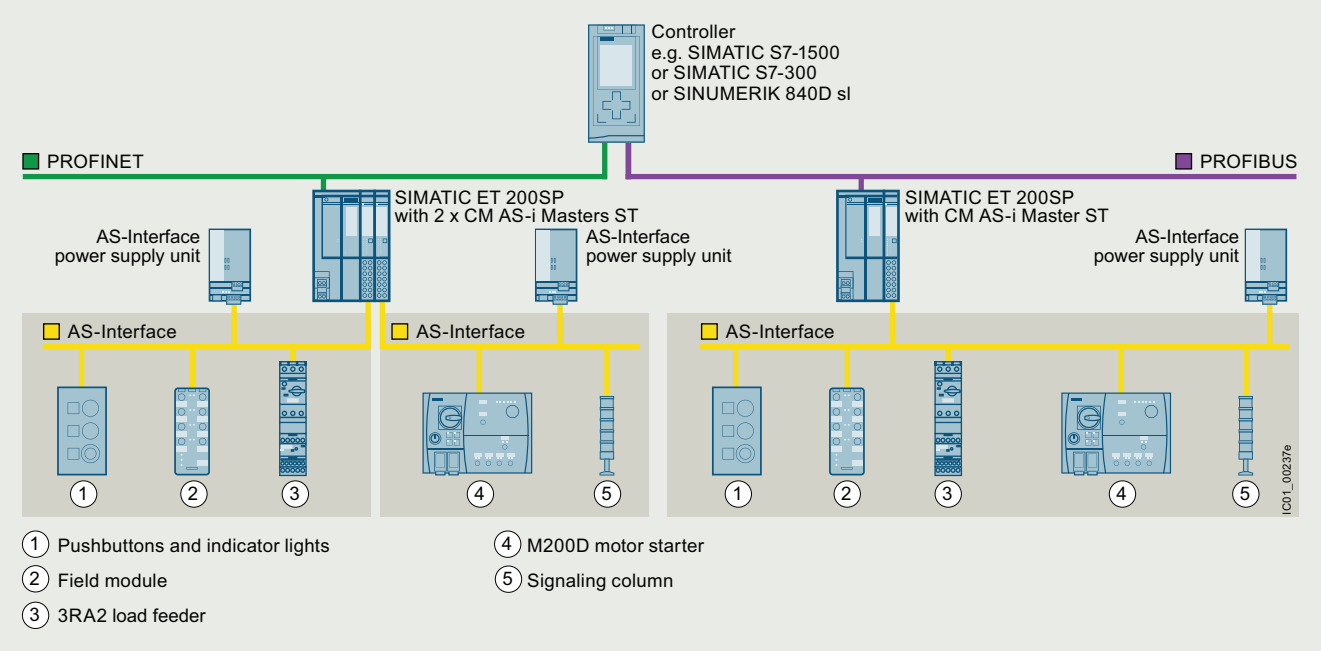
For diagnostics during ongoing operation, diagnostics blocks with clearly arranged visualization on the SIMATIC HMI panel are available or can be downloaded free of charge via a web browser, see https://support.industry.siemens.com/cs/ww/en/view/109479103.



CM AS-i Master ST diagnostics block

Application

Configuration examples of AS-Interface networks with CM AS-i Master ST for SIMATIC ET 200SP



Configuration of AS-Interface networks under a SIMATIC ET 200SP

Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK7137-6SA00-0BC1	**CM AS-i Master ST communications module** • AS-Interface master for SIMATIC ET 200SP, can be plugged onto BaseUnit type C0 • Corresponds to AS-Interface specification V3.0 • Dimensions W x H x D (mm): 20 x 73 x 58	**3RK7137-6SA00-0BC1**		1	1 unit	42C

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Accessories

Version	Spring-loaded terminals Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 6ES7193-6BP20-0DC0	**BaseUnit BU20-P6+A2+4D** • BaseUnit (light), BU type C0 • Suitable for the CM AS-i Master ST module • For connection of the AS-Interface cable to the CM AS-i Master ST • Start of an AS-i network, isolation of the AS-i voltage from the left-hand module	**6ES7193-6BP20-0DC0**		1	1 unit	255

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 6ES7155-6AR00-0AN0  6ES7155-6AA02-0BN0	**PROFINET interface module IM 155-6PN Basic** Max. 12 I/O modules, max. 32 bytes of I/O data per station					
	• Including server module and 2 x RJ45 ports (supplied without RJ45 plug)	**6ES7155-6AR00-0AN0**		1	1 unit	255
	PROFINET interface modules IM 155-6PN Standard NEW Max. 32 I/O modules, max. 1440 bytes of I/O data per station					
	• Including server module and BusAdapter 2 x RJ45 (supplied without RJ45 plug)	**6ES7155-6AA02-0BN0**		1	1 unit	255
	• Including server module (BusAdapter must be ordered separately, see below)	**6ES7155-6AU02-0BN0**		1	1 unit	255
 6ES7155-6AU01-0CN0	**PROFINET interface modules IM 155-6PN High Feature** Max. 64 I/O modules, max. 1440 bytes of I/O data per station					
	• **IM 155-6PN/2 High Feature** 2-port IM with a BusAdapter slot, including server module (BusAdapter must be ordered separately, see below)	**6ES7155-6AU01-0CN0**		1	1 unit	255
	• **IM 155-6PN/3 High Feature** 3-port IM with two BusAdapter slots, including server module (BusAdapter must be ordered separately, see below)	**6ES7155-6AU30-0CN0**		1	1 unit	255
 6ES7155-6AU00-0DN0	**PROFINET interface module IM 155-6PN High Speed** Max. 30 I/O modules, max. 968 bytes of I/O data per station					
	• Including server module (BusAdapter must be ordered separately, see below)	**6ES7155-6AU00-0DN0**		1	1 unit	255
	PROFIBUS interface module IM 155-6DP High Feature Max. 32 I/O modules, max. 244 bytes of I/O data per station					
	• Including server module and PROFIBUS plug	**6ES7155-6BA01-0CN0**		1	1 unit	255
 6ES7155-6MU01-0CN0	**MultiFieldbus interface module IM 155-6MF High Feature** NEW For operation on PROFINET, EtherNet/IP or Modbus TCP controllers, one slot for BusAdapter, max. 64 I/O modules, max. 1440 bytes of I/O data per station					
	• Including server module (BusAdapter must be ordered separately, see below)	**6ES7155-6MU01-0CN0**		1	1 unit	255
	For more information, see https://support.industry.siemens.com/cs/ww/en/view/109779189.					
 6ES7193-6AR00-0AA0  6ES7193-6AF00-0AA0	**BusAdapters for PROFINET/Ethernet/Modbus TCP** For connection of the Ethernet cable to the PROFINET IM 155-6PN interface module and the MultiFieldbus IM 155-6MF interface module					
	• Connection 2 x RJ45 (supplied without RJ45 plug)	**6ES7193-6AR00-0AA0**		1	1 unit	255
	• Connection 2 x FC (FastConnect)	**6ES7193-6AF00-0AA0**		1	1 unit	255
	For more BusAdapters with fiber-optic cable connection, see SiePortal.					

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

F-CM AS-i Safety ST for SIMATIC ET 200SP

More information

Equipment Manual, see
https://support.industry.siemens.com/cs/ww/en/view/90265988

SIMATIC ET 200SP Manual Collection, see
https://support.industry.siemens.com/cs/ww/en/view/84133942

Diagnostics blocks with visualization, see
https://support.industry.siemens.com/cs/ww/en/view/109479103

Released combinations of the AS-i modules for ET 200SP, see
https://support.industry.siemens.com/cs/ww/en/view/103624653

The F-CM AS-i Safety ST fail-safe communications module supplements an AS-Interface network without additional wiring to produce a safety-related AS-i network.

Important features:

- Fail-safe communications module for the ET 200SP
  - 31 fail-safe input channels in the process image
  - 16 fail-safe output channels in the process image
  - Certified up to SIL 3 (IEC 62061)/PL e (ISO 13849-1)
  - Parameterization conforms with other Failsafe I/O modules of the ET 200SP
- The communications module supports PROFIsafe in PROFINET and PROFIBUS configurations. Can be used with fail-safe SIMATIC S7-300F, S7-400F CPUs and S7-1500F CPUs and also the Failsafe versions of the ET 200SP station with ET 200SP F-CPU 1510SP F, 1512SP F, 1514SP F or 1515SP PC F.
- For reading up to 31 fail-safe AS-i input slaves
  - Two sensor inputs/signals for each fail-safe AS-i input slave
  - Adjustable evaluation of sensor signals: 2-channel or 2 x 1-channel
  - Integrated discrepancy evaluation in the case of 2-channel signals
  - Integrated AND operation in the case of 2 x 1-channel signals
  - Input delay configurable
  - Start-up test can be set
  - Sequence monitoring can be activated
- For control of up to 16 fail-safe AS-i output circuit groups
  - The output circuit groups are controlled independently of one another.
  - One output circuit group can act on one or more actuators (e.g. to switch drives simultaneously).
  - The F-CM AS-i Safety ST module transmits the switching command of the output circuit group on the AS-i cable. A safe AS-i output module that is installed at any point on the AS-i cable receives the switching command and switches the connected actuator (e.g. contactor).
  - Simple fault acknowledgment via the process image
- Simple module replacement thanks to automatic importing of the safety parameters from the coding element
- Comprehensive diagnostics options
- Can be plugged onto type C1 or type C0 BaseUnits (BU)
- Informative automatic alarm indications
- Supply via AS-Interface voltage
- Eight LED displays for diagnostics, operating state, fault indication and supply voltage
- Informative module inscription on the front
  - Plain-text marking of the module type and function class
  - 2D matrix code (Article No. and serial number)
  - Circuit diagram
  - Color coding module type communications module: light gray
  - Hardware and firmware version
  - Supported BaseUnit type BU: C1, C0

Design

The fail-safe F-CM AS-i Safety ST module has an ET 200SP module enclosure with a width of 20 mm.

One AS-i master according to the AS-i specification V3.0 and safe AS-i input slaves and/or safe AS-i output modules are needed for operation. The CM AS-i Master ST communications module (Article No. 3RK7137-6SA00-0BC1) is recommended as the AS-i master for the ET 200SP, see page 2/29 onwards.

Simple combination of the CM AS-i Master ST and F-CM AS-i Safety ST modules in one ET 200SP station results in a powerful, safety-oriented gateway between PROFINET (or PROFIBUS) and AS-Interface, which can be expanded further in a modular fashion.

Combination of an ET 200SP interface module, CM AS-i Master ST and F-CM AS-i Safety ST

With the digital and analog I/O modules of the ET 200SP, additional local inputs and outputs can be realized so as to ensure that the modular AS-i gateway complies precisely with customer requirements. Expansion versions for almost every application are possible thanks to the selection of standard and Failsafe I/O modules.

Besides the single AS-i master, double, triple or generally multiple masters can be realized with or without fail-safe functionality.

Supported BaseUnits

With the combination of the CM AS-i Master ST and F-CM AS-i Safety ST modules, the CM module is plugged onto a light type C0 BaseUnit and, immediately to the right of it, the F-CM module is plugged onto a dark type C1 BaseUnit. The AS-i cable is connected only on the light BaseUnit of the CM module.

Notes on security:

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens products and solutions represent one component of such a concept.

For more information on industrial cybersecurity, see www.siemens.com/cybersecurity-industry.

Configuration

The following software is required for configuration of the F-CM AS-i Safety ST module:

- STEP 7 (TIA Portal) and Safety Advanced or
- STEP 7 (Classic) and Distributed Safety or F-Configuration Pack SP11 or SIMATIC S7 F/FH Systems

In other PROFIsafe-enabled systems, configuration via GSD is possible. Configuration and programming are done entirely in the STEP 7 user interface. No additional configuration software is needed for commissioning.

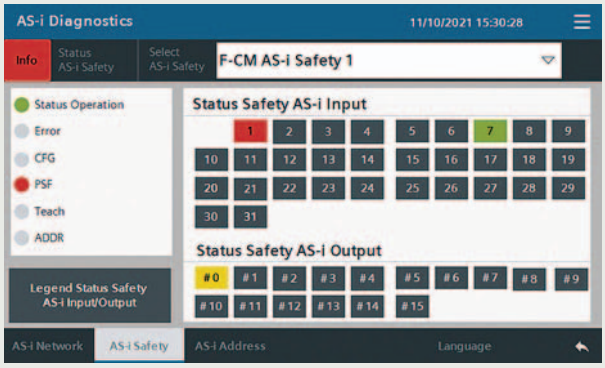
Data management – together with all other configuration data of the SIMATIC – is realized completely in the S7 project.

The input and output channels are assigned to the process image automatically and manual linking via configuration blocks is not necessary.

If the F-CM AS-i Safety ST module is replaced, all necessary settings are automatically imported into the new module.

The F-CM AS-i Safety ST module occupies 16 input bytes and 8 output bytes in the I/O data of the ET 200SP station.

For diagnostics during ongoing operation, diagnostics blocks with clearly arranged visualization on the SIMATIC HMI panel are available or can be downloaded free of charge via a web browser, see https://support.industry.siemens.com/cs/ww/en/view/109479103.



Diagnostics block for F-CM AS-i Safety ST

Application

Thanks to the use of the fail-safe module in the ET 200SP, it is possible to fulfill the safety-related application requirements in a manner that is integrated in the overall automation solution.

The safety functions required for fail-safe operation are integrated in the modules. Communication with the fail-safe SIMATIC S7 CPUs is realized via PROFIsafe.

The safety application is programmed in the SIMATIC S7 F-CPU with Distributed Safety, S7 F/FH Systems or Safety Advanced. The fail-safe input signals of the ASIsafe input modules are read in via the AS-i bus line and are combined with any chosen further signals in the fail-safe program.

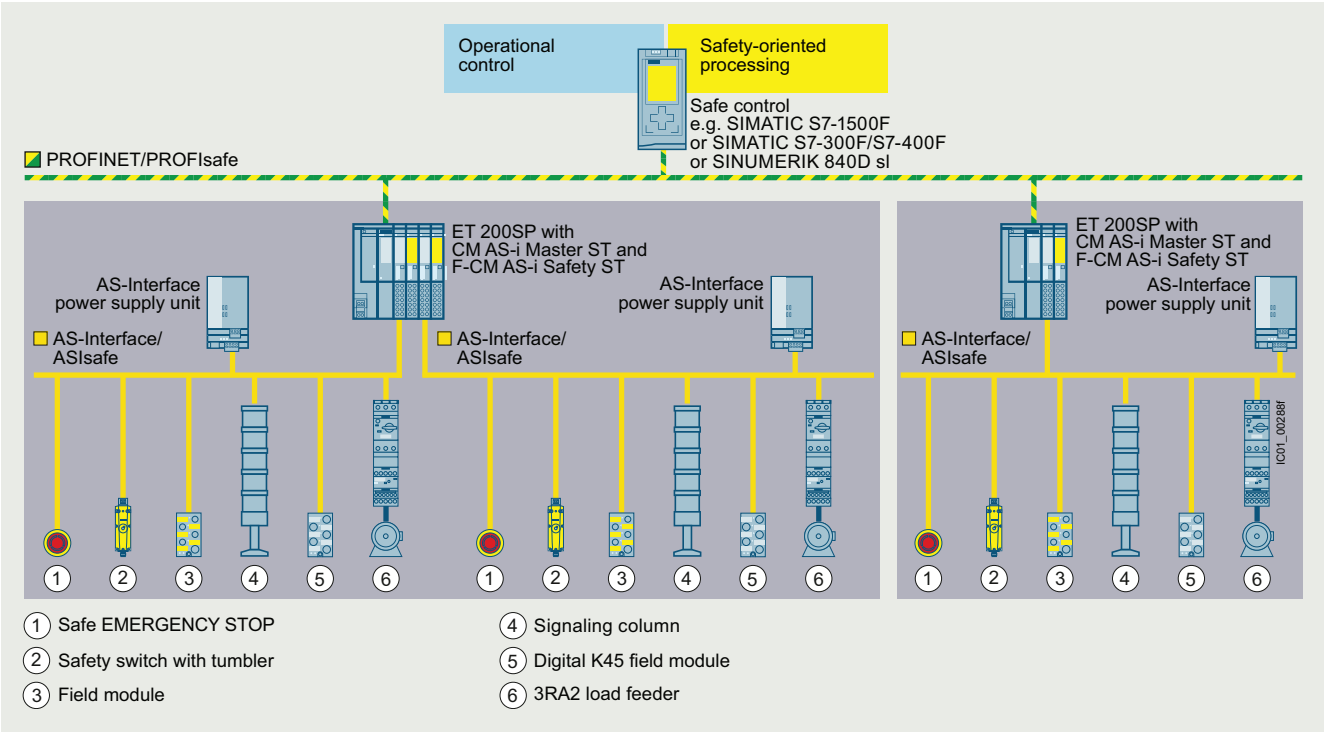
The fail-safe F-CM AS-i Safety ST module can be configured independently of the AS-i master. In this way, the F-CM AS-i Safety ST module can be connected to any AS-i network as required to evaluate the Safety data of the safe AS-i input modules and forward them to the F-CPU. In this case, the fail-safe module is plugged into a light BaseUnit of type C0.

The fail-safe output signals can be output via safe SIMATIC output modules or also directly via fail-safe AS-i output modules. No special functions are required for this in the program.

Operation with SINUMERIK 840D sl is possible with SINUMERIK software version V4.7 SP2 HF1 or higher.

Together with an ET 200SP station with ET 200SP F-CPU 1510SP F, 1512SP F, 1514SP F or 1515SP PC F, pre-processing of safe AS-i signals directly in the ET 200SP station is possible, as well as the configuration of an autonomous AS-i Safety station without a higher-level CPU.

Configuration examples of AS-Interface networks with CM AS-i Master ST and F-CM AS-i Safety ST for SIMATIC ET 200SP



AS-Interface configuration comprising an ET 200SP station with CM AS-i Master ST and F-CM AS-i Safety ST modules

Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK7136-6SC00-0BC1	**F-CM AS-i Safety ST communications module** • Fail-safe module for SIMATIC ET 200SP, can be plugged onto BaseUnit type C1 (alternatively type C0) • Operation requires an AS-i master, e.g. CM AS-i Master ST (see page 2/29 onwards) • Can be used up to SIL 3 (IEC 62061)/PL e (ISO 13849-1) • Coding element type H (included in scope of supply) • Dimensions W x H x D (mm): 20 x 73 x 58	**3RK7136-6SC00-0BC1**		1	1 unit	42C

Accessories

	Version	Spring-loaded terminals Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 6ES7193-6BP20-0BC1	**BaseUnit BU20-P6+A2+4B** • BaseUnit (dark), BU type C1 • Suitable for the F-CM AS-i Safety ST fail-safe communications module • Continuation of an AS-i network, connection with the AS-i voltage of the left-hand module	**6ES7193-6BP20-0BC1**		1	1 unit	255
	Coding elements type H (spare part) • For the ET 200SP modules F-CM AS-i Safety ST and CM 4xIO-Link • Packing unit 5 items	**6ES7193-6EH00-1AA0**		1	5 units	256

More accessories, see page 2/33.

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Overview

CM 1243-2 communications module for S7-1200

More information

Equipment Manual for AS-i Master CM 1243-2 and AS-i DCM 1271 data decoupling module, see https://support.industry.siemens.com/cs/ww/en/view/57358958

The CM 1243-2 communications module is the AS-Interface master for the SIMATIC S7-1200 and has the following features:

- Connection of up to 62 AS-Interface slaves
- Integrated analog value transmission
- Supports all AS-Interface master functions according to the AS-Interface specification V3.0
- Indication of the operating state on the front of the device displayed via LED
- Display of operating mode, AS-Interface voltage faults, configuration faults and peripheral faults via LED behind the front flap
- Compact enclosure in the design of the SIMATIC S7-1200
- Suitable for AS-i Power24V and for AS-Interface with 30 V voltage: A standard 24 V power supply unit can be used in combination with the optional DCM 1271 data decoupling module.
- Configuration and diagnostics via the TIA Portal
- Improved performance with current firmware version V1.2

Design

The CM 1243-2 communications module is positioned to the left of the S7-1200 CPU and linked to the S7-1200 via lateral contacts.

It has:

- Terminals for two AS-i cables (internally jumpered) via two screw terminals
- One terminal for connection to the functional ground
- LEDs for indication of the operating state and fault statuses of the connected slaves

The screw terminals (included in scope of supply) can be removed to facilitate installation.

Function

The CM 1243-2 supports all specified functions of the AS-Interface specification V3.0.

The values of the digital AS-i slaves can be activated via the process image of the S7-1200. During configuration of the slaves in the TIA Portal, the values of the analog AS-i slaves can also be accessed directly in the process image.

If required, master calls can be performed with the data record interface, e.g. read/write parameters, read/write configuration.

Changeover of the operating mode, automatic application of the slave configuration and the re-addressing of a connected AS-i slave can be implemented via the control panel of the CM 1243-2 in the TIA Portal.

The optional DCM 1271 data decoupling module (see Accessories, page 2/38) has an integrated detection unit for detecting ground faults on the AS-Interface cable. The integrated overload protection also disconnects the AS-Interface cable if the drive current required exceeds 4 A. For more information on DCM 1271, see page 2/73.

Notes on security:

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens products and solutions represent one component of such a concept.

For more information on industrial cybersecurity, see www.siemens.com/cybersecurity-industry.

Configuration

The TIA Portal enables user-friendly configuration and diagnostics of the AS-Interface master and any connected slave modules.

When operated on an S7-1200 CPU with firmware version V4.0 or higher, the firmware version V1.1 (or higher) is required for the CM 1243-2 module.

Benefits

- More flexibility and versatility in the use of SIMATIC S7-1200 as the result of a significant increase in the number of digital and analog inputs/outputs available
- Very easy configuration and diagnostics of the AS-Interface via the TIA Portal
- Simple operation with AS-Interface power supply unit (see page 2/67) possible without restrictions.
- Alternatively: No need for the AS-i power supply unit with AS-i Power24V. The AS-Interface cable is supplied through an existing 24 V DC PELV power supply unit. For decoupling, the AS-i DCM 1271 data decoupling module is required, see Accessories and page 2/73.
- LEDs for indication of fault statuses for fast diagnostics
- Monitoring of AS-Interface voltage facilitates diagnostics

Application

The CM 1243-2 is the AS-Interface master connection of the SIMATIC S7-1200. Through connection to AS-Interface, the number of digital inputs and outputs available for the S7-1200 is greatly increased (max. 496 DI/496 DQ on the AS-Interface per CM).

The integrated analog value processing also makes the analog values available at the AS-Interface for the S7-1200. Up to 31 analog slaves with a standard address (each with up to four channels) or up to 62 analog slaves with an A/B address (each with up to two channels) are possible per CM.

Operating conditions

- The CM 1243-2 communications module exchanges data with the S7-1200 CPU with a cycle time of 10 ms.
- The AS-i cycle time depends on the AS-i bus capacity and is up to 5 ms in the case of 31 slaves addresses; for more information, see Equipment Manual for AS-i Master CM 1243-2 and AS-i DCM 1271 data decoupling module, https://support.industry.siemens.com/cs/ww/en/view/57358958.
- For calculation of the maximum switching frequency at inputs/outputs of AS-i slaves, these cycle times and the runtime of the user program must be added up.

Selection and ordering data

	Version	Screw terminals Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK7243-2AA30-0XB0	**CM 1243-2 communications module** • AS-Interface master for SIMATIC S7-1200 • Corresponds to AS-Interface specification V3.0 • Removable terminals (included in the scope of supply) • Dimensions W x H x D (mm): 30 x 100 x 75	**3RK7243-2AA30-0XB0**		1	1 unit	42C

Note:

The CM 1243-2 communications module is available as a SIPLUS version under article number 6AG1243-2AA30-7XB0 in the extended temperature range (from -25 to +70 °C) and for use in harsh environmental conditions (coated according to environment standard IEC 60721).

For more information, see www.siemens.com/siplus-extreme.

Accessories

	Version	Screw terminals Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK7271-1AA30-0AA0	**DCM 1271 data decoupling module** • Max. 1 x 4 A • Removable terminals (included in the scope of supply) • Dimensions W x H x D (mm): 30 x 100 x 75	**3RK7271-1AA30-0AA0**		1	1 unit	42C
	Screw terminals (spare part)					
	• 5-pole, For AS-i master CM 1243-2 and AS-i DCM 1271 data decoupling module	**3RK1901-3MA00**		1	1 unit	42C
	• 3-pole, For AS-i DCM 1271 data decoupling module for connecting the power supply unit	**3RK1901-3MB00**		1	1 unit	42C

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

CP 343-2P/CP 343-2

More information

Manual, see
https://support.industry.siemens.com/cs/ww/en/view/5581657

For diagnostics during ongoing operation, diagnostics blocks with clearly arranged visualization on the SIMATIC HMI panel are available or can be downloaded free of charge via a web browser, see
https://support.industry.siemens.com/cs/ww/en/view/61892138

AS-Interface block library for SIMATIC PCS 7 for easy connection of AS-Interface to PCS 7, see page 14/22 onwards

The CP 343-2P communications processor is the AS-Interface master for the SIMATIC S7-300 and the ET 200M distributed I/O station, with user-friendly parameterizing options.

The CP 343-2 is the basic version of the module.

The CP 343-2P/CP 343-2 has the following characteristics:

- Connection of up to 62 AS-Interface slaves
- Integrated analog value transmission
- Support of all AS-Interface master functions according to the AS-Interface specification V3.0
- Status displays of operating states and indication of the readiness for operation of connected slaves by means of LEDs in the front plate
- Fault indications (including AS-Interface voltage errors, configuration errors) by means of LEDs on the front plate
- Compact enclosure in the design of the SIMATIC S7-300
- Suitable for AS-Interface with 30 V voltage and AS-i Power24V
- Additionally for CP 343-2P: Supports the detailed configuration of the AS-Interface network with STEP 7

Design

The CP 343-2P/CP 343-2 is connected like an I/O module to the S7-300. It has:

- Two terminal connections for connecting the AS-Interface cable directly.
- LEDs in the front panel for indicating the operating state and the readiness for operation of all connected and activated slaves
- Pushbuttons for switching over the master operating state and for adopting the existing ACTUAL configuration of the AS-i slave as the TARGET configuration

Function

The CP 343-2P/CP 343-2 supports all specified functions of the AS-Interface specification V3.0.

Each CP 343-2P/CP 343-2 occupies 16 bytes in the I/O address area of the SIMATIC S7-300. The digital I/O data of the standard slaves and A slaves are saved in this area. The digital I/O data of the B slaves and the analog I/O data can be accessed with the S7 system functions for read/write data records.

If required, master calls can be performed with the command interface, e.g. read/write parameters, read/write configuration.

For more information, see
https://support.industry.siemens.com/cs/ww/en/view/51678777.

Notes on security:

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens products and solutions represent one component of such a concept.

For more information on industrial cybersecurity, see
www.siemens.com/cybersecurity-industry.

Configuration

All connected AS-Interface slaves are configured at the press of a button. No further configuration of the CP is required.

Additionally for CP 343-2P

The CP 343-2P also supports configuring of the AS-Interface network with STEP 7. Specifying the AS-i configuration in HW Config facilitates the setting of slave parameters and documentation of the plant. Uploading the ACTUAL configuration of an already configured AS-Interface network is also supported. The saved configuration cannot be overwritten at the press of a button and is therefore tamper-proof.

Benefits

- Shorter startup times through simple configuration at the press of a button
- Design of flexible machine-related structures using the ET 200M distributed I/O system
- Provides diagnostics of the AS-Interface network
- Well suited also for complex applications thanks to connection options for 62 slaves and integral analog value processing
- Reduction of standstill and servicing times in the event of a fault thanks to the LED displays:
  - Status of the AS-Interface network
  - Slaves connected and their readiness for operation
  - Monitoring of the AS-Interface voltage
- Lower costs for stock keeping and spare parts inventory because the CP can be used for the SIMATIC S7-300 and also for the ET 200M
- Additionally for CP 343-2P: Improved plant documentation and support for service assignments thanks to a description of the AS-Interface configuration in the STEP 7 project
- Simple operation with AS-Interface power supply unit (see page 2/67) possible without restrictions.
- Alternatively: No need for the AS-i power supply unit with AS-i Power24V. The AS-Interface cable is supplied through an existing 24 V DC PELV power supply unit. An S22.5 AS-i data decoupling module (e.g. 3RK1901-1DE12-1AA0) is required for the decoupling, see page 2/71.

Application

The CP 343-2P/CP 343-2 is the AS-Interface master connection for SIMATIC S7-300 and ET 200M.

Through connection to AS-Interface it is possible to access max. 248 DI/248 DQ per CP, using 62 A/B slaves with 4 DI/4 DQ each.

With the integrated analog value processing, it is easy to transmit analog signals. Up to 62 analog slaves with an A/B address (each with up to two channels) or up to 31 analog slaves with a standard address (each with up to four channels) are possible per CP.

The CP 343-2P is the further development of the CP 343-2 and contains its entire functionality. An existing STEP 7 user program for a CP 343-2 can thus be used without restrictions with a CP 343-2P. It is only in STEP 7 HW-Config that the two modules are configured differently, with the CP 343-2P offering additional options. This is why the CP 343-2P is recommended.

Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 6GK7343-2AH11-0XA0	**CP 343-2P communications processor** • Device version with expanded configuration options for connection of SIMATIC S7-300 and ET 200M to AS-Interface • Configuration of the AS-i network using the SET key or STEP 7 • Without front connector • Corresponds to AS-Interface specification V3.0 • Dimensions W x H x D (mm): 40 x 125 x 120	**6GK7343-2AH11-0XA0**		1	1 unit	42C
 6GK7343-2AH01-0XA0	**CP 343-2 communications processor** • Basic version for connection of SIMATIC S7-300 and ET 200M to AS-Interface • Configuration of the AS-i network using the SET key • Without front connector • Corresponds to AS-Interface specification V3.0 • Dimensions W x H x D (mm): 40 x 125 x 120	**6GK7343-2AH01-0XA0**		1	1 unit	42C

Accessories

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Front connectors, 20-pole					
• With screw terminals	**6ES7392-1AJ00-0AA0**		1	1 unit	230
• With spring-loaded terminals	**6ES7392-1BJ00-0AA0**		1	1 unit	230

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Overview

DP/AS-Interface Link 20E

More information

Manual, see
https://support.industry.siemens.com/cs/ww/en/view/5281638

PN	DP-M	DP-S	AS-i M		
		●	●		

IK10_10195a

DP/AS-Interface Link 20E connects PROFIBUS DP to AS-Interface and has the following features:

- PROFIBUS DP slave and AS-Interface master
- Up to 62 AS-Interface slaves, each with four digital inputs and four digital outputs as well as analog slaves can be connected
- Integrated analog value transmission
- Supports all AS-Interface master functions according to the AS-Interface specification V3.0
- Supply from AS-Interface cable; hence no additional power supply required
- Suitable for AS-i Power24V (from product version 2/firmware version 3.1) and for AS-Interface with 30 V voltage
- Supports uploading of the AS-Interface configuration in STEP 7

Gateways

High-performance gateways between PROFINET and AS-Interface and between PROFIBUS and AS-Interface can be set up by combining the CM AS-i Master ST and F-CM AS-i Safety ST modules in an ET 200SP station (for safety-related applications), see pages 2/29 and 2/34.

Design

- Compact plastic enclosure in degree of protection IP20 for DIN-rail mounting
- LEDs in the front panel for indicating the operating state and functional readiness of all connected slaves
- Setting of PROFIBUS DP address is possible by pressing a button
- LED display of the PROFIBUS DP slave address, PROFIBUS DP bus faults and diagnostics
- Two pushbuttons for switching over the operating state and for adopting the existing ACTUAL configuration as the TARGET configuration

Functionality

Communication

The DP/AS-Interface Link 20E enables a DP master to access all the slaves of an AS-Interface network.

The DP/AS-Interface Link 20E occupies a standard 32 bytes of input data and 32 bytes of output data in which the digital I/O data of the connected AS-Interface slaves (standard and A/B addressing) of an AS-i line are stored.

The size of the input/output image can be compressed so that only the actually required I/O address area is occupied in the system of the PROFIBUS DP master.

The analog I/O data can be accessed with the S7 system functions for read/write data records.

Configuration

The DP/AS-Interface Link 20E is configured as follows:

- With STEP 7 (TIA Portal) or STEP 7 (Classic)
  When configuring, the AS-Interface configuration can be uploaded to STEP 7. Furthermore, AS-Interface slaves from Siemens can also be conveniently configured in HW Config (slave selection dialog).
- By adopting the ACTUAL configuration of the AS-Interface by using the SET pushbutton on the front panel.
- Alternatively, DP/AS-Interface Link 20E can be integrated by means of the PROFIBUS GSD file in the engineering tool (e.g. for non-Siemens engineering tools).

Benefits

- Reduction of installation costs because the power is supplied entirely via the AS-Interface cable, which means that no additional power supply is required
- Short startup times thanks to easy configuration at the touch of a button
- The LED displays help reduce downtime and service times if a slave fails
- Quick and easy commissioning by reading the AS-Interface configuration
- For diagnostics during ongoing operation, diagnostics blocks with clearly arranged visualization on the SIMATIC HMI panel are available or can be downloaded free of charge via a web browser; see
  https://support.industry.siemens.com/cs/ww/en/view/61892138.

DP/AS-Interface Link 20E

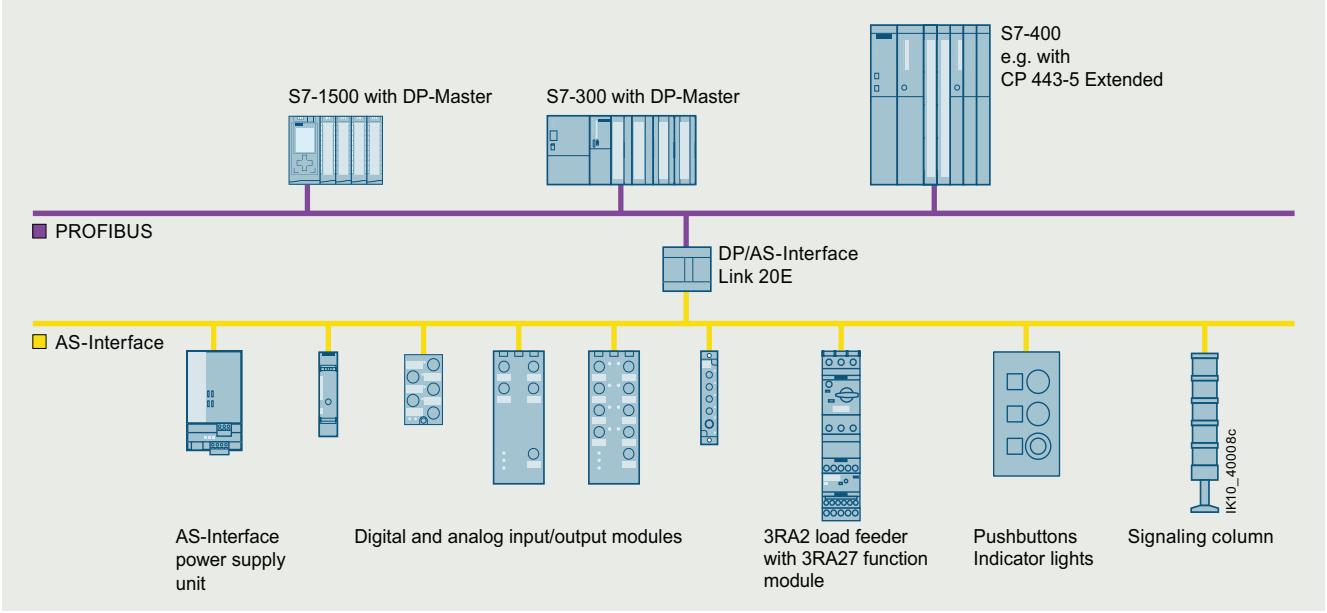
Application

The DP/AS-Interface Link 20E is a PROFIBUS DP slave (according to IEC 61158/IEC 61784) and an AS-Interface master (according to IEC 62026-2). It enables the AS-Interface to be operated on PROFIBUS DP.

Up to 248 DI/248 DQ can be operated via the DP/AS-Interface Link 20E using 62 A/B slaves with 4 DI/4 DQ each.

PROFIBUS DP masters (DP-V0) can exchange digital I/O data cyclically with the AS-Interface.

PROFIBUS DP masters with acyclic services (DP-V1) are additionally able to exchange analog I/O data and initiate AS-Interface master calls (e.g. reading/writing the AS-i configuration during normal operation).



Transition from PROFIBUS DP to AS-Interface using DP/AS-Interface Link 20E

Selection and ordering data

Version	Screw terminals Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
DP/AS-Interface Link 20E					
Gateway between PROFIBUS DP and AS-Interface in degree of protection IP20; including screw terminals for connection of the AS-Interface cable; corresponds to AS-Interface specification V3.0; dimensions W x H x D (mm): 90 x 80 x 60 (dimensions without fixing lugs)	**6GK1415-2AA10**		1	1 unit	42C

6GK1415-2AA10

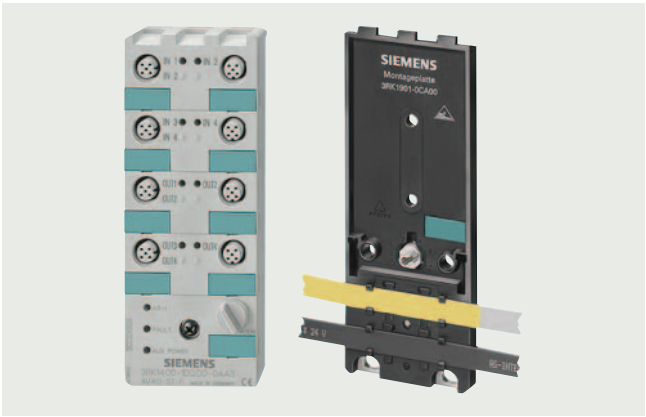
* You can order this quantity or a multiple thereof.
Illustrations are approximate

Accessories

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
PROFIBUS FC standard cable GP FastConnect standard type with special design for fast installation, 2-core, shielded	**6XV1830-0EH10**		1	1 M	5K1
PROFIBUS FastConnect bus connectors With insulation displacement connection, max. transfer rate 12 Mbps, activatable terminating resistor integrated					
• RS 485 bus connector with 90° cable outlet					
- Without programming device socket	**6ES7972-0BA52-0XA0**		1	1 unit	250
- With programming device socket	**6ES7972-0BB52-0XA0**		1	1 unit	250
• RS 485 bus connector with diagonal cable outlet (35°)					
- Without programming device socket	**6ES7972-0BA61-0XA0**		1	1 unit	250
- With programming device socket	**6ES7972-0BB61-0XA0**		1	1 unit	250
PROFIBUS FastConnect stripping tool Preset stripping tool for speedy stripping of PROFIBUS FastConnect bus cables	**6GK1905-6AA00**		1	1 unit	5K2

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview



K60

K45

K20

Three coordinated series of AS-Interface compact modules with digital and analog compact modules and a high degree of protection are available for use in the field:

- Digital modules with a high degree of protection
  - Series K60, see pages 2/46 and 2/48
  - Series K45, see page 2/51
  - Series K20, see page 2/52
- Analog modules with a high degree of protection
  - Series K60, see page 2/55

All compact modules are characterized by particularly simple handling. The K60 and K45 modules are mounted with a mounting plate. The mounting plate is used to mount the AS-Interface flat cables and enables mounting on a wall or DIN rail.

The particularly narrow K20 modules are directly mounted without a mounting plate and connected to the AS-Interface using a round cable.

Connection types

For flexible connection of different sensors and actuators, the following pin assignments are available on the I/O modules with M12 sockets:

Standard assignment

With the standard assignment, one sensor/actuator is connected per M12 socket. In this case the signal for the outputs is acquired at pin 4 while the signal for the inputs is acquired at pin 4 and pin 2. As the result, sensors can be connected directly to pin 2 and pin 4.

Y-assignment

With the Y-assignment, two sensors or two actuators can be connected to one M12 socket. In this case, both pin 4 and pin 2 are provided for one sensor signal and one actuator signal on each M12 socket.

In this case, the second socket is not required and is closed with a sealing cap.

Y-II assignment

The Y-II assignment offers the following options:

- Individual connection of a sensor/actuator to one M12 socket
- Connection of two sensors/actuators to one M12 socket as follows:
  - The signal of the first sensor/actuator is connected to pin 4 of the first socket.
  - The signal of the second sensor/actuator is connected to pin 2 of the first socket and to pin 4 of the second socket.

Overview of digital compact modules

The following table provides an overview of the important features of the digital compact modules.

Version	K60	K45	K20
8 inputs/2 outputs	✓	--	--
8 inputs	✓	✓	--
4 inputs/4 outputs	✓	✓	✓
4 inputs/3 outputs	✓	--	--
4 inputs/2 outputs	✓	--	--
4 inputs	✓	✓	✓
2 inputs/2 outputs	--	✓	✓
4 outputs	✓	✓	✓
3 outputs	--	✓	--
AS-Interface connection	Flat cable/ round cable	Flat cable	Round cable
I/O connection method	M12	M12/M8	M12/M8
Pin assignment	Standard/Y-II/Y	Standard/Y	Standard/Y
Degree of protection	IP65/IP67/IP68/ IP69 (IP69K)	IP65/IP67	IP65/IP67
Addressing type A/B address	✓	✓	✓

✓ Available
-- Not available

Safety modules for AS-Interface, see page 2/27.

Overview

K60

The K60 digital AS-Interface compact modules are characterized by optimized handling characteristics and user-friendliness. They permit the mounting times and startup times of AS-Interface to be reduced by up to 40%.

Mounting and connection of the AS-Interface shaped cables

Assembly of the K60 modules is performed with a mounting plate which accommodates the AS-Interface shaped cables. Two different mounting plates are offered for

- Wall mounting
- DIN-rail mounting

The mounting plate and the compact module are joined together by means of a screw, with simultaneous contacting of the AS-Interface cable by the service-proven insulation piercing method.

Addressing and connection of the sensors/actuators

Addressing of the K60 modules is performed using an addressing socket integrated in the compact module. The addresses can also be assigned after installation.

K60 modules with a maximum of four digital inputs and outputs

These compact modules contain the M12 standard connections for inputs and outputs. Using M12 standard plugs, a maximum of four sensors and four actuators can be connected to the compact module.

K60 compact modules with a maximum of eight digital inputs

These modules have eight digital inputs for connection through M12 plugs.

The module requires two AS-Interface addresses for processing all eight inputs. The addressing can thus be performed through a double addressing socket integrated in the module.

K60 data couplers

An AS-Interface data coupler has been added to the K60 compact module range. Integrated in this module are two AS-i slaves which are connected to two different AS-i networks. Each of the two integrated slaves has four virtual inputs and four virtual outputs. The bidirectional data transmission of four data bits between two AS-i networks is thus possible in a simple and cost-effective manner. The data coupler needs its own address in each AS-i network. The data coupler is supplied with power directly from the AS-i cable.

Each AS-i network works with a different cycle time depending on the number of stations. Hence two AS-i networks are not necessarily synchronous. For this reason, the AS-i data coupler can be used to transmit only standard data and no safety data.

Selection and ordering data

3RK1400-1DQ00-0AA3

Digital I/O modules, IP67 - K60

- PNP transistor
- Width 60 mm
- Connection method: M12
- Modules supplied without mounting plate

Type	Current-carrying capacity of outputs	Slave addressing type	Pin assignment	Sensor power supply via	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
8 inputs/ 2 outputs[1]	2 A	A/B	Special	AS-i	**3RK2400-1HQ00-0AA3**		1	1 unit	42C
8 inputs[1]	--	Standard	Y-II	AS-i	**3RK1200-0DQ00-0AA3**		1	1 unit	42C
	--	A/B	Y-II	AS-i	**3RK2200-0DQ00-0AA3**		1	1 unit	42C
	--	A/B	Y-II	U_{aux}	**3RK2200-1DQ00-1AA3**		1	1 unit	42C
4 inputs/ 4 outputs	2 A	Standard	Y-II	AS-i	**3RK1400-1DQ00-0AA3**		1	1 unit	42C
	2 A	Standard	Standard	AS-i	**3RK1400-1CQ00-0AA3**		1	1 unit	42C
	1 A	Standard	Y-II	AS-i	**3RK1400-1DQ01-0AA3**		1	1 unit	42C
	1 A	Standard	Standard	AS-i	**3RK1400-1DQ03-0AA3**		1	1 unit	42C
	2 A	A/B (spec. V3.0)	Y-II	AS-i	**3RK2400-1DQ00-0AA3**		1	1 unit	42C
	2 A	A/B (spec. V3.0)	Y-II	U_{aux}	**3RK2400-1DQ00-1AA3**		1	1 unit	42C
4 inputs/ 3 outputs	2 A	A/B	Y-II	AS-i	**3RK2400-1FQ03-0AA3**		1	1 unit	42C
4 inputs/ 2 outputs	2 A	Standard	Y-II	AS-i	**3RK1400-1MQ00-0AA3**		1	1 unit	42C
4 inputs	--	Standard	Y-II	AS-i	**3RK1200-0CQ00-0AA3**		1	1 unit	42C
	--	A/B	Y-II	AS-i	**3RK2200-0CQ00-0AA3**		1	1 unit	42C
2 x 2 inputs/ 2 x 2 outputs	1 A	Standard	Y	AS-i	**3RK1400-1DQ02-0AA3**		1	1 unit	42C
4 outputs	2 A	Standard	Y-II	--	**3RK1100-1CQ00-0AA3**		1	1 unit	42C
	2 A	A/B (spec. V3.0)	Y-II	--	**3RK2100-1CQ00-0AA3**		1	1 unit	42C

Digital I/O module, IP67 - K60 data coupler

Modules supplied without mounting plate

Type	Current-carrying capacity of outputs	Slave addressing type	Pin assignment	Sensor power supply via	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Data coupler 4 inputs/4 outputs (virtual)	--	Standard	--	--	**3RK1408-8SQ00-0AA3**		1	1 unit	42C

[1] Module occupies two AS-Interface addresses

Safety modules for AS-Interface, see page 2/27 onwards.

Accessories

3RK1901-0CA00

K60 mounting plates
Suitable for all K60 compact modules

• Wall mounting	**3RK1901-0CA00**	1	1 unit	42C
• DIN-rail mounting	**3RK1901-0CB01**	1	1 unit	42C

3RK1901-1KA00

AS-Interface sealing caps M12
For free M12 sockets
(one set contains 10 sealing caps)

3RK1901-1KA00 100 10 units 42C

3RK1902-0AR00

Sealing set

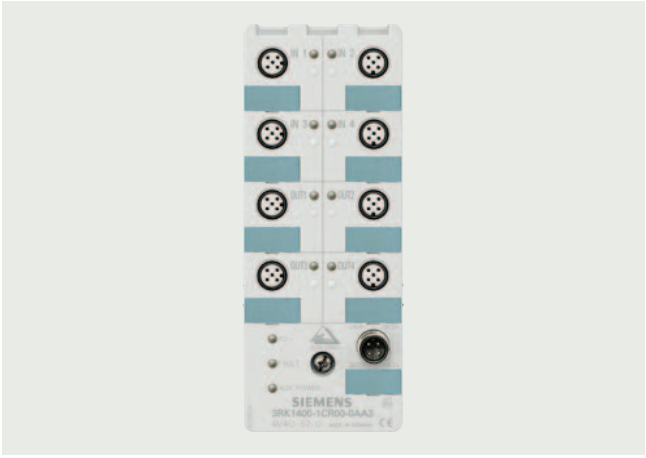
- For K60 mounting plate
- Cannot be used for K45 mounting plate
- One set contains one straight and one shaped seal

3RK1902-0AR00 100 5 units 42D

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

Operation in particularly harsh environments



K60R module in degree of protection IP68/IP69 (IP69K)

Modules with degree of protection IP67 cannot be used in areas exposed to permanently high levels of humidity, in applications with drilling emulsions and cutting oils or when cleaning with high-pressure cleaners. The answer for these applications is provided by the expansion of the K60 compact modules with the K60R module with degree of protection IP68/IP69 (IP69K).

The K60R modules are connected instead of the AS-Interface flat cable using a round cable with M12 cable box. The AS-Interface bus cable and the 24 V DC auxiliary power supply are routed in this case in a shared round cable.

Degree of protection IP68 permits many new applications that were impossible with the former field modules with degree of protection IP67. In applications such as filling plants or machine tools, the K60R with degree of protection IP68 enables the module to be used directly in zones exposed to permanent loading by humidity. It is thus possible to make even more rigorous savings in wiring with AS-Interface. For more information on IP68 test conditions, see IP68/IP69 (IP69K) tests, page 2/48.

Cleaning with high-pressure cleaners, such as is regularly required in the food and beverages industry for instance, is possible without difficulty (IP69).

In applications with cable carriers, many users rely on placing the AS-Interface bus cable in a round cable. With the K60R module, a round cable connection enables direct connection to a round cable. No adapter is required.

Mounting

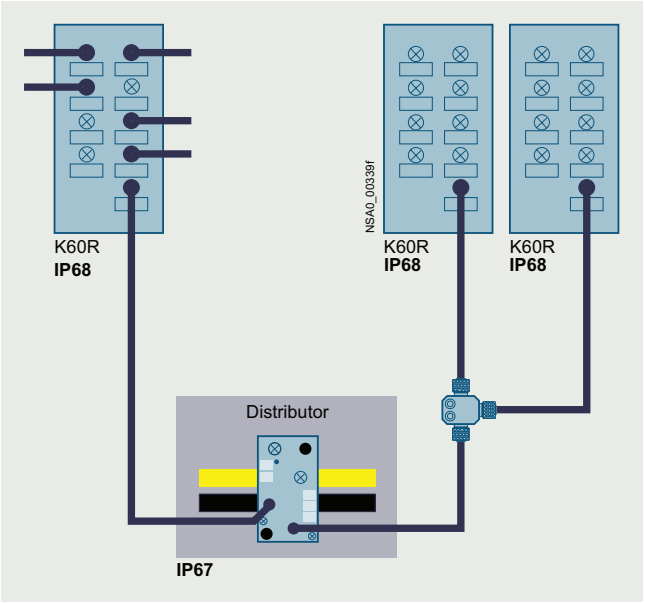
The same mounting plates are used as for the K60 modules. Instead of using flat cables, the K60R is connected using a 4-pole round cable with an M12 connection. With the K60R the mounting plate thus serves only as a fixture and ground terminal.

Addressing

Addressing is performed using the same socket as for the bus connection. Connecting the module to the addressing unit takes place over a 3-pole standard M12 cable.

When the mounting is finished, the module is connected with the addressing cable to the addressing unit and addressed. The addressing cable is then removed and the module connected to the bus cable.

Connection



K60R connection options

In the IP67 environment, the service-proven standard components are connected using flat cables. Spur lines are laid into the IP68 environment by means of an AS-Interface M12 feeder (3RK1901-2NR..). The module is connected with a round cable to an M12 cable box. For this purpose, the module has an M12 bus connection instead of the former addressing socket. The AS-Interface bus cable and the 24 V DC auxiliary voltage are routed together in a 4-pole round cable. There must be no ground conductor in this round cable. Connection to ground is made through the mounting plate.

In the IP68 environment, only cables with extruded M12 plugs may be used.

Please note the following conditions:

- The configuration guidelines for AS-Interface apply. For all M12 connecting cables, the maximum permissible current is limited to 4 A. The cross-section of these cables is just 0.34 mm^2. For connection of the K60R modules, the aforementioned M12 connecting cables can be used for the spur lines. The voltage drop caused by the ohmic resistance (approx. 0.11 Ω/m) must be taken into account.
- For round cable connections with shared AS-i and U_{aux} in a single cable, the following maximum lengths apply:
  - Per spur line from feeder to module: max. 5 m
  - Total of all round cable segments in an AS-Interface network: max. 20 m

IP68/IP69 (IP69K) tests

K60R modules were tested with the following tests:

- Stricter test than IP67: 90 min at 1.8 m depth of water (IP67: 30 min at 1 m depth of water)
- Salt water test: Five months in salt water, 20 cm deep, at room temperature
- Test with particularly creepable oil: Five months completely under oil at room temperature
- Test with drilling emulsion: Five months at room temperature (components of the drilling emulsion: Anionic and non-ionic emulsifiers, paraffinic low-aromatic mineral oil, boric acid alkanolamines, corrosion inhibitors, oil content 40%)
- Test in oil bath (Excellence 416 oil) with alternating oil bath temperature: 130 cycles of 15 to 55 °C, two months
- Cleaning with a high-pressure cleaner according to IP69 (IP69K): 80 to 100 bar, 10 to 15 cm distance, time per side > 30 s, water temperature 80 °C

To simulate requirements as realistically as possible, the modules were artificially aged prior to the tests by 15 temperature cycles of -25/+85 °C. During the test, the modules were connected to 3RX1 connecting cables. Unassigned connections were closed with 3RK1901-1KA00 sealing caps.

Note:

Sealing caps and M12 connections must be tightened with the correct torque.

Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1400-1CR00-0AA3	**Digital I/O modules, IP68/IP69 - K60R** • 4 inputs/4 outputs • Width 60 mm • IP68/IP69 (IP69K) • Standard assignment • Current-carrying capacity - 200 mA (inputs) - 2 A (outputs) • Slave addressing type: Standard address • Modules supplied without mounting plate	**3RK1400-1CR00-0AA3**		1	1 unit	42C

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Accessories

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-0CA00	**K60 mounting plates** Suitable for all K60 and K60R compact modules					
	• Wall mounting	**3RK1901-0CA00**		1	1 unit	42C
	• DIN-rail mounting	**3RK1901-0CB01**		1	1 unit	42C
 3RK1901-1KA00	**AS-Interface sealing caps M12** For free M12 sockets (one set contains 10 sealing caps)	**3RK1901-1KA00**		100	10 units	42C
 3RK1901-2NR21	**AS-Interface M12 feeders** • Current-carrying capacity up to 4 A • Degree of protection IP67/IP68/IP69 (IP69K)					
	For flat cable: AS-i/U_{aux}; For: M12 socket; Cable length: --; Cable end in feeder: Not available	**3RK1901-2NR20**		1	1 unit	42C
	For flat cable: AS-i/U_{aux}; For: M12 cable box; Cable length: 1 m; Cable end in feeder: Not available	**3RK1901-2NR21**		1	1 unit	42C
	For flat cable: AS-i/U_{aux}; For: M12 cable box; Cable length: 2 m; Cable end in feeder: Not available	**3RK1901-2NR22**		1	1 unit	42C
 3RK1901-1NR04	**AS-Interface M12 feeder, 4-fold** • Current-carrying capacity up to 4 A • Degree of protection IP67					
	For flat cable: AS-i/U_{aux}; For: 4-fold M12 socket, delivery includes mounting plate (for wall and DIN-rail mounting); Cable length: --; Cable end in feeder: Not available	**3RK1901-1NR04**		1	1 unit	42C
 3RK1902-4PB15-3AA0	**M12 connecting cable** • 3-pole • For addressing AS-i slaves with M12 bus connection • Cable length 1.5 m	**3RK1902-4PB15-3AA0**		1	1 unit	42D

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

Compact modules K45

The K45 series of compact modules supplements the large K60 compact modules which have a proven track record in industry. They are the logical consequence for rounding off the bottom end of the existing product range.

The acclaimed advantages of the existing K60 compact modules are fully emulated by the K45 modules. The K45 modules have a substantially smaller basic area and installation depth, however.

Yet in spite of these small dimensions all the modules have large labels and an integrated addressing socket.

Two mounting plates are offered for the K45 compact modules:

- Mounting plate for wall mounting
  This has a hole pattern that is identical to that of the K60 compact modules. This means that K60 compact modules can be mounted together with K45 modules in an aligned arrangement. The shaped cables can be inserted in the recesses of the mounting plates where they cause no hindrance.
- Mounting plate for DIN-rail mounting

Connection of the AS-Interface shaped cables

The mounting plate and the compact module are joined together by means of a screw, with simultaneous contacting of the AS-Interface cable by the service-proven insulation piercing method.

Now, mounting the AS-Interface shaped cables is in fact easier than ever. The yellow and black AS-Interface shaped cable can be inserted into the mounting plates from the left or right regardless of the position of the coding lug. The correct polarity of the applied voltages is thus guaranteed.

Addressing and connection of the sensors/actuators

Addressing of the K45 compact modules is performed using an addressing socket integrated in the module. The addresses can be assigned even when mounted.

K45 modules with a maximum of four digital inputs and outputs

These compact modules contain up to four M12 standard connections or M8 standard connections for inputs and outputs. Using M12 or M8 standard plugs, a maximum of four sensors and four actuators can be connected to the compact module. Depending on the module, the sockets can be assigned in duplicate.
Pin assignment: Y – i.e. via a socket, two sensors or one sensor/one actuator are connected.

K45 modules with a maximum of eight digital inputs

These modules have eight digital inputs for connection through M12 plugs. The sockets have duplicate assignments.
Pin assignment: Y – i.e. via a socket, two sensors or one sensor/one actuator are connected.

The module requires two AS-Interface addresses for processing all eight inputs. The addresses can be assigned through a double addressing socket integrated in the module.

Selection and ordering data

3RK1400-0GQ20-0AA3

Digital I/O modules, IP67 - K45

- PNP transistor
- Width 45 mm
- Current-carrying capacity of the inputs: 200 mA
- Modules supplied without mounting plate

Type	Current-carrying capacity of outputs	Slave addressing type	Pin assignment	U_{aux} 24 V	Connection methods	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
8 inputs[1]	--	A/B	Y	--	M12	**3RK2200-0DQ20-0AA3**		1	1 unit	42C
4 inputs	--	Standard	Standard	--	M12	**3RK1200-0CQ20-0AA3**		1	1 unit	42C
	--	Standard	Standard	--	M8	**3RK1200-0CT20-0AA3**		1	1 unit	42C
	--	A/B	Standard	--	M12	**3RK2200-0CQ20-0AA3**		1	1 unit	42C
	--	A/B	Standard	--	M8	**3RK2200-0CT20-0AA3**		1	1 unit	42C
2 x 2 inputs	--	A/B	Y	--	M12	**3RK2200-0CQ22-0AA3**		1	1 unit	42C
2 inputs/ 2 outputs	2 A[2]	Standard	Standard	✓	M12	**3RK1400-1BQ20-0AA3**		1	1 unit	42C
2 x (1 input/ 1 output)	0.2 A	Standard	Y	--	M12	**3RK1400-0GQ20-0AA3**		1	1 unit	42C
4 x (1 input/ 1 output)	0.2 A	A/B (spec. V3.0)	Y	--	M12	**3RK2400-0GQ20-0AA3**		1	1 unit	42C
	0.5 A	A/B (spec. V3.0)	Y	✓	M12	**3RK2400-1GQ20-1AA3**		1	1 unit	42C
4 outputs	1 A	A/B (spec. V3.0)	Standard	✓	M12	**3RK2100-1CQ20-0AA3**		1	1 unit	42C
3 outputs	1 A	A/B	Standard	✓	M12	**3RK2100-1EQ20-0AA3**		1	1 unit	42C
4 outputs	1 A	Standard	Standard	✓	M12	**3RK1100-1CQ20-0AA3**		1	1 unit	42C
2 outputs/ 2 inputs	2 A	A/B	Standard	✓	M12	**3RK2400-1BQ20-0AA3**		1	1 unit	42C

✓ Available
-- Not available

[1] Module occupies two AS-Interface addresses
[2] The typical current-carrying capacity per output increases with version "E12" from 1.5 to 2 A (available since approx. 07/2003).

Safety modules for AS-Interface, see page 2/27 onwards.

Accessories

3RK1901-2EA00

3RK1901-1MN00

3RK1901-1KA00

3RK1901-1PN00

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
K45 mounting plates					
• For wall mounting	**3RK1901-2EA00**		1	1 unit	42C
• For DIN-rail mounting	**3RK1901-2DA00**		1	1 unit	42C
Cable end terminators For sealing open cable ends of the AS-Interface shaped cable with IP67	**3RK1901-1MN00**		1	10 units	42C
AS-Interface sealing caps (one set contains 10 sealing caps)					
• For free M12 sockets	**3RK1901-1KA00**		100	10 units	42C
• For free M8 sockets	**3RK1901-1PN00**		100	10 units	42C

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

Digital I/O modules, IP67 - K20

The K20 compact module series rounds off the AS-Interface compact modules with a particularly slim design and only 20-mm width. Thanks to its extremely compact dimensions, these modules are particularly suited for handling machine applications in the field of production engineering where modules need to be arranged in the smallest of spaces.

Robotics is yet another application area. The K20 modules are connected to the AS-Interface with a round cable with M12 cable box instead of with the AS-Interface flat cable. The AS-Interface bus cable and the 24 V DC auxiliary power are routed in this case in a shared round cable. This enables extremely compact installation.

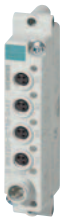
The flexibility of the round cable means that it can also be used on moving machine parts without any problems. The K20 modules are also ideal for such applications as their non-encapsulated design makes them particularly light in weight.

In applications with cable carriers, many users rely on placing the AS-Interface bus cable in a round cable. In this case, the K20 modules support direct connection to the round cable. No flat to round cable adapter is required.

The K20 compact module range includes standard AS-Interface modules, as well as an ASIsafe version for the connection of safety-related sensors, such as EMERGENCY-STOP buttons or protective door monitoring.

For particularly space-saving dimensions, the sensors and actuators are connected over M8 plug-in connectors. Alternatively, M12 connectors with Y-assignment can be used.

Selection and ordering data



3RK2200-0CT30-0AA3

Version					Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Digital I/O modules, IP67 - K20									
Width 20 mm									
Type	Current-carrying capacity of outputs	Slave addressing type	Pin assignment	Connection methods					
4 inputs	--	A/B	Standard	M8	**3RK2200-0CT30-0AA3**		1	1 unit	42C
	--	A/B	Y	M12	**3RK2200-0CQ30-0AA3**		1	1 unit	42C
2 inputs/ 2 outputs	1	A/B	Standard	M8	**3RK2400-1BT30-0AA3**		1	1 unit	42C
	1	A/B	Y	M12	**3RK2400-1BQ30-0AA3**		1	1 unit	42C
4 outputs	1	A/B (spec. V3.0)	Standard	M8	**3RK2100-1CT30-0AA3**		1	1 unit	42C
4 inputs/ 4 outputs	1	Standard	Standard	M8	**3RK1400-1CT30-0AA3**		1	1 unit	42C
	1	A/B (spec. V3.0)	Standard	M8	**3RK2400-1CT30-0AA3**		1	1 unit	42C
2 safe inputs	--	Standard	Special ASIsafe assignment	M12	**3RK1205-0BQ30-0AA3**		1	1 unit	42C

Safety modules for AS-Interface, see page 2/27 onwards.

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Accessories

	Version				Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-1KA00  3RK1901-1PN00	**AS-Interface sealing caps** (one set contains 10 sealing caps)								
	• For free M12 sockets				**3RK1901-1KA00**		100	10 units	42C
	• For free M8 sockets				**3RK1901-1PN00**		100	10 units	42C
 3RK1901-2NN10	**AS-Interface compact distributor, for AS-Interface flat cable AS-i or U_{aux}**								
	• Current-carrying capacity up to 8 A								
	• Degree of protection IP67/IP68/IP69 (IP69K)								
	For flat cable	For	Cable length	Cable end in feeder					
	AS-i or U_{aux}	Flat cable AS-i or U_{aux}	--	Not available	**3RK1901-2NN10**		1	1 unit	42C
 3RX9801-0AA00	**AS-Interface M12 feeder**								
	• Current-carrying capacity up to 2 A								
	• Degree of protection IP67								
	For flat cable	For	Cable length	Cable end in feeder					
	AS-i	M12 socket	--	Available	**3RX9801-0AA00**		1	1 unit	42C
 3RK1901-2NR10	**AS-Interface M12 feeders**								
	• Current-carrying capacity up to 4 A								
	• Degree of protection IP67/IP68/IP69 (IP69K)								
	For flat cable	For	Cable length	Cable end in feeder					
	AS-i	M12 socket	--	Not available	**3RK1901-2NR10**		1	1 unit	42C
	AS-i	M12 cable box	1 m	Not available	**3RK1901-2NR11**		1	1 unit	42C
	AS-i	M12 cable box	2 m	Not available	**3RK1901-2NR12**		1	1 unit	42C
 3RK1901-2NR21	AS-i/U_{aux}	M12 socket	--	Not available	**3RK1901-2NR20**		1	1 unit	42C
	AS-i/U_{aux}	M12 cable box	1 m	Not available	**3RK1901-2NR21**		1	1 unit	42C
	AS-i/U_{aux}	M12 cable box	2 m	Not available	**3RK1901-2NR22**		1	1 unit	42C
 3RK1901-1NR04	**AS-Interface M12 feeder, 4-fold**								
	• Current-carrying capacity up to 4 A								
	• Degree of protection IP67								
	For flat cable	For	Cable length	Cable end in feeder					
	AS-i/U_{aux}	4-fold M12 socket, delivery includes mounting plate (for wall and DIN-rail mounting)	--	Not available	**3RK1901-1NR04**		1	1 unit	42C
 6ES7194-1KA01-0XA0	**M12 Y-shaped coupler plug** For connection of two sensors to one M12 socket with Y-assignment				**6ES7194-1KA01-0XA0**		1	1 unit	250
 3RK1902-4PB15-3AA0	**M12 connecting cable**				**3RK1902-4PB15-3AA0**		1	1 unit	42D
	• 3-pole								
	• For addressing AS-i slaves with M12 bus connection								
	• Cable length 1.5 m								

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

K60 analog compact module

More information

Manual for AS-Interface analog modules, see https://support.industry.siemens.com/cs/ww/en/view/7643815

AS-Interface analog modules from the K60 compact series detect or issue analog signals locally. These modules are linked to the higher-level controller through an AS-Interface master according to specification V2.1 or specification V3.0.

The analog modules are divided into the following groups:

- Input modules for
  - Current sensor
  - Voltage sensor
  - Thermal resistance sensors
- Output modules for
  - Current actuators
  - Voltage actuators

The input modules according to profile 7.3/7.4 are available with two or four input channels. It is possible in addition to convert the 2-channel module to using only one input channel, thus enabling very short times before the analog value is available. The conversion is effected by means of a jumper plug at socket 3. The transmission times achieved with analog modules according to profile 7.A.9 are twice as fast as those achieved with profile 7.3/7.4. Operation is adjustable in this case, e.g. it is possible to choose with the ID1 code whether the module is operated with 1 or 2 channels.

The output modules are configured as 2-channel modules as standard.

The input and output channels are electrically separated from the AS-Interface network. If sensors with a higher power requirement are to be connected, more power can be supplied through the auxiliary voltage as an alternative to the internal supply.

In the manual (see More information), the modules are presented in great detail along with their technical specifications and in-depth notes on operation. Sample function blocks round off the manual.

Benefits

- Analog modules are just as easy to integrate in AS-Interface as digital modules
- Analog values can be easily detected and issued locally
- Preprocessing of the analog value transfer in the master enables rapid evaluation of the analog values
- Up to four values can be detected using one analog module
- Faster transmission and conversion of analog values thanks to the new option for switching to single-channel operation

In addition, specification V3.0 now also offers:

- A/B technology, now also with analog modules
- On average, double fast transmission times (only 3 or 4 cycles, depending on the resolution selected)
- Variable adjustable mode: 12-bit or 14-bit resolution, 1-channel or 2-channel, selectable via the ID1 code

Selection and ordering data

3RK1207-1BQ44-0AA3

3RK2207-2BQ50-0AA3

Version			Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Analog I/O modules, IP67 - K60, analog profile 7.3 • Slave addressing type: Standard address • Width 60 mm • Modules supplied without mounting plate							
Inputs	Type	Measuring range					
1 or 2 inputs (selectable using jumper plug at socket 3)	Current	4 ... 20 mA or ± 20 mA (selectable)	**3RK1207-1BQ40-0AA3**		1	1 unit	42C
	Voltage	± 10 V or 1 ... 5 V (selectable)	**3RK1207-2BQ40-0AA3**		1	1 unit	42C
	Thermal resistance	Pt100 or Ni100 or 0 ... 600 Ω (selectable)	**3RK1207-3BQ40-0AA3**		1	1 unit	42C
4 inputs	Current	4 ... 20 mA or ± 20 mA (selectable)	**3RK1207-1BQ44-0AA3**		1	1 unit	42C
	Voltage	± 10 V or 1 ... 5 V (selectable)	**3RK1207-2BQ44-0AA3**		1	1 unit	42C
	Thermal resistance	Pt100 or Ni100 or 0 ... 600 Ω (selectable)	**3RK1207-3BQ44-0AA3**		1	1 unit	42C
Outputs	Type	Output range					
2 outputs	Current for two-wire actuators	4 ... 20 mA or ± 20 mA or 0 ... 20 mA (selectable)	**3RK1107-1BQ40-0AA3**		1	1 unit	42C
	Voltage for two-wire actuators	± 10 V or 0 ... 10 V or 1 ... 5 V (selectable)	**3RK1107-2BQ40-0AA3**		1	1 unit	42C
Analog I/O modules, IP67 - K60, analog profile 7.A.9 • Slave addressing type: A/B (spec. V3.0) • Width 60 mm • Modules supplied without mounting plate							
Inputs	Type	Measuring range					
1 or 2 inputs (variably adjustable)	Current	4 ... 20 mA or ± 20 mA (selectable)	**3RK2207-1BQ50-0AA3**		1	1 unit	42C
	Voltage	± 10 V or 1 ... 5 V (selectable)	**3RK2207-2BQ50-0AA3**		1	1 unit	42C

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

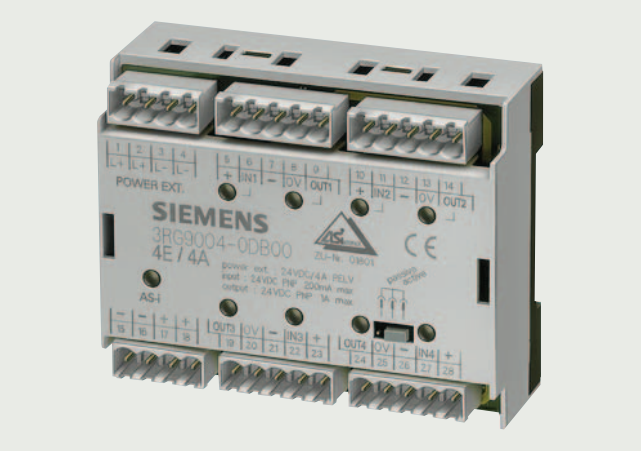
Accessories

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-0CA00	**K60 mounting plates** Suitable for all K60 compact modules					
	• Wall mounting	**3RK1901-0CA00**		1	1 unit	42C
	• DIN-rail mounting	**3RK1901-0CB01**		1	1 unit	42C
 3RK1901-1KA00	**M12 sealing caps** For free M12 sockets (one set contains 10 sealing caps)	**3RK1901-1KA00**		100	10 units	42C
 3RK1902-0AR00	**Sealing set** • For K60 mounting plate • Cannot be used for K45 mounting plate • One set contains one straight and one shaped seal	**3RK1902-0AR00**		100	5 units	42D
 3RK1901-1AA00	**Input jumper** For deactivating analog input 2 on 2-channel analog input modules 3RK1207-.BQ40-0AA3, for screwing into M12 socket 3, connects pin 1 to pin 2, color black	**3RK1901-1AA00**		1	1 unit	42C

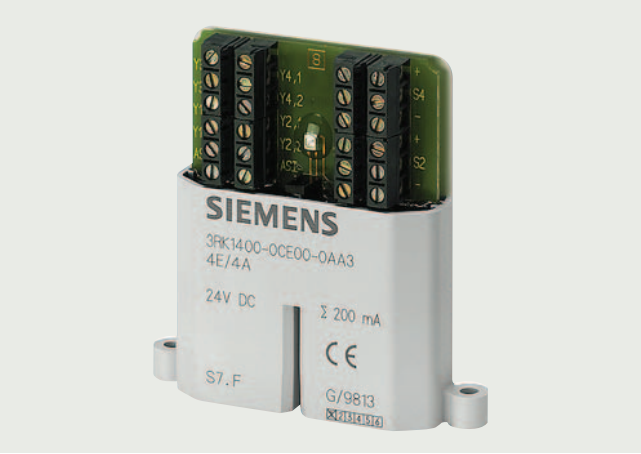
*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

SlimLine Compact modules SC17.5F, SC17.5 and SC22.5



F90 module



Flat module

For AS-Interface applications inside control cabinets, there are various module series for the most diverse requirements:

- SlimLine Compact – particularly slim design ideal for space-saving use in the control cabinet
- F90 module – particularly flat design for flat control boxes
- Flat module – special design for integration into customer-specific solutions

The existing SlimLine series of modules S22.5 and S45 are being replaced by the innovative new devices in the SlimLine Compact SC17.5, SC17.5F and SC22.5 series. The previous SlimLine modules are still available as replacements for existing systems.

Available versions

The following table provides an overview of the key features of the different series of control cabinet modules.

Feature	SlimLine Compact	F90 module	Flat module
Digital I/O	✓	✓	✓
Analog I/O	✓	--	--
Safe inputs	✓	--	--
Relay outputs	✓	--	--
Addressing type A/B address	✓	--	--
Mounting on TH 35 DIN rail according to IEC 60715	✓	✓	--
Wall mounting using push-in lugs	✓	--	--
Integrated lugs for screw fixing	--	--	✓
Width in mm	17.5 or 22.5	90	80

✓ Available
-- Not available

Overview

SlimLine Compact modules

SC17.5 and SC22.5 SlimLine Compact modules with screw terminals

SC22.5 SlimLine Compact module with connector with screw terminals

The AS-Interface module series for the control cabinet SlimLine Compact with degree of protection IP20 creates space in the cabinet and in distributed local control boxes. A width of just 17.5 mm or 22.5 mm ensures considerable space savings in the control cabinet.

The SlimLine Compact module series comprises not only digital and analog I/O modules but also ASIsafe modules with safe inputs. Digital outputs are available as solid-state and relay outputs.

Sensors and actuators, as well as the AS-Interface bus cable, are connected by means of removable screw or push-in spring-loaded terminals. Device connectors available as accessories offer the possibility of looping through the AS-Interface bus cable and the 24 V DC power supply U_{aux} from one module to additional modules. This significantly simplifies the wiring, as the AS-Interface bus cable and U_{aux} only have to be connected to one device.

All devices for the connection of three-wire sensors offer the option of supplying the sensors either from the AS-Interface bus cable or alternatively from the 24 V DC voltage supply U_{aux} depending on the requirements of the particular application. A slide switch is used to make the selection. If supply via U_{aux} is selected, the wiring of the sensor terminals remains unchanged. This means that no external supply is required for the sensors.

All modules have LEDs on the front that provide diagnostics information and indicate the status of the module inputs and outputs. Devices with semiconductor outputs indicate the status of each output by means of a dual LED. Thus the status (on/off/overload) is displayed for each output. An addressing socket integrated on the front enables the module to be addressed also when it is installed. Integrated adapters permit mounting on a DIN rail – either directly for the module or for the device connector. Alternatively, the modules can also be screw-mounted using push-in lugs (accessories). These lugs for screw fastening must be ordered separately.

Selection and ordering data

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 42C

More information

Equipment Manual, see
https://support.industry.siemens.com/cs/ww/en/view/109481489

Multi-unit packaging, see page 16/7.

Version I/O type	Width mm	Inputs	Outputs	Screw terminals Article No.	Screw terminals Price per PU	Spring-loaded terminals (push-in) Article No.	Spring-loaded terminals (push-in) Price per PU
SC17.5 and SC22.5 digital SlimLine Compact modules							
Slave addressing type: A/B address							
4 inputs	17.5	Two-wire	--	**3RK2200-0CE00-2AA2**		**3RK2200-0CG00-2AA2**	
	22.5	Three-wire	--	**3RK2200-2CE00-2AA2**		**3RK2200-2CG00-2AA2**	
4 outputs	22.5	--	2 A semiconductor	**3RK2100-1CE00-2AA2**		**3RK2100-1CG00-2AA2**	
4 inputs/ 2 outputs, relays	22.5	Three-wire	Relay (change-over contacts)	**3RK2402-2ME00-2AA2**		**3RK2402-2MG00-2AA2**	
4 inputs/ 4 outputs, relays	22.5	Three-wire	Relay (NO contacts)	**3RK2402-2CE00-2AA2**		**3RK2402-2CG00-2AA2**	
4 inputs/ 4 outputs	22.5	Three-wire	2 A semiconductor	**3RK2400-2CE00-2AA2**		**3RK2400-2CG00-2AA2**	
Slave addressing type: Standard address							
4 inputs/ 4 outputs	22.5	Three-wire	2 A semiconductor	**3RK1400-2CE00-2AA2**		**3RK1400-2CG00-2AA2**	
SC22.5 analog SlimLine Compact modules							
Slave addressing type: Standard address							
4 inputs	22.5	Voltage/ current selectable (1 ... 5 V, ± 10 V, 4 ... 20 mA, ± 20 mA)	--	**3RK1207-0CE00-2AA2**		**3RK1207-0CG00-2AA2**	
		Thermal resistance (Pt100, Ni100, 0 ... 600 Ω)	--	**3RK1207-3CE00-2AA2**		**3RK1207-3CG00-2AA2**	
2 outputs	22.5	--	Voltage/ current selectable (0 ... 10 V, 1 ... 5 V, ± 10 V, 0 ... 20 mA, 4 ... 20 mA, ± 20 mA)	**3RK1107-0BE00-2AA2**		**3RK1107-0BG00-2AA2**	
SC17.5F ASIsafe SlimLine Compact modules							
Slave addressing type: Standard address							
2 safe inputs	17.5	For mechanical contacts	--	**3RK1205-0BE00-2AA2**		**3RK1205-0BG00-2AA2**	
2 safe inputs/ 2 standard outputs	17.5	For mechanical contacts	Semiconductor, power supply U_{AS-i}/U_{aux} can be switched over	**3RK1405-2BE00-2AA2**		**3RK1405-2BG00-2AA2**	


3RK2200-0CG00-2AA2

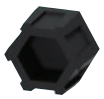
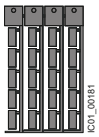

3RK2400-2CG00-2AA2


3RK1207-0CG00-2AA2


3RK1405-2BE00-2AA2

For safety modules for AS-Interface, see page 2/27 onwards.

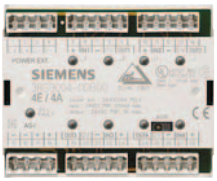
Accessories

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-1YA00 3RK1901-1YA10					
Device connectors					
For electrical connection of SlimLine Compact modules (connects AS-i bus cable and 24 V DC auxiliary power supply U_{aux} when using several SlimLine Compact modules)					
• Width 17.5 mm	**3RK1901-1YA00**		1	1 unit	42C
• Width 22.5 mm	**3RK1901-1YA10**		1	1 unit	42C
 3RK1901-1YA01 3RK1901-1YA11					
Device termination connectors					
Required for the last module in the network					
• Width 17.5 mm	**3RK1901-1YA01**		1	1 unit	42C
• Width 22.5 mm	**3RK1901-1YA11**		1	1 unit	42C
 3ZY1121-2BA00					
Removable terminals, without inscription	**Screw terminals**				
• Screw terminals up to 2 x 1.5 mm^2 or 1 x 2.5 mm^2					
- 2-pole	**3ZY1121-1BA00**		1	6 units	41L
- 4-pole	**3ZY1141-1BA00**		1	6 units	41L
	Spring-loaded terminals (push-in)				
• Push-in terminals up to 2 x 1.5 mm^2					
- 2-pole	**3ZY1121-2BA00**		1	6 units	41L
- 4-pole	**3ZY1141-2BA00**		1	6 units	41L
 3ZY1450-1BA00 3ZY1450-1AB00					
Hinged covers					
Replacement for SlimLine Compact module, without terminal labeling					
• Width 17.5 mm					
- Titanium gray for SC17.5	**3ZY1450-1AA00**		1	5 units	41L
- Yellow for SC17.5F	**3ZY1450-1BA00**		1	5 units	41L
• Width 22.5 mm					
- Titanium gray for SC22.5	**3ZY1450-1AB00**		1	5 units	41L
 3ZY1311-0AA00					
Push-in lugs for wall mounting	**3ZY1311-0AA00**		1	10 units	41L
(Two lugs are required per device)					
 3ZY1440-1AA00					
Coding pins for removable terminals	**3ZY1440-1AA00**		1	12 units	41L
For mechanical coding of the terminals					
 3RT2900-1SB20					
Blank labels					
Unit labeling plates[1]					
• 10 mm x 7 mm, titanium gray	**3RT2900-1SB10**		100	816 units	41B
• 20 mm x 7 mm, titanium gray	**3RT2900-1SB20**		100	340 units	41B
 3RA2908-1A					
Screwdriver	**Spring-loaded terminals (push-in)**				
For all SIRIUS devices with spring-loaded terminals					
Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	**3RA2908-1A**		1	1 unit	41B

[1] PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH (see page 16/18).

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Selection and ordering data

	Version		Inputs	Outputs	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	F90 modules • Slave addressing type: Standard address • Width 90 mm • With COMBICON version: Delivery without COMBICON plug								
 3RG9002-0DB00	Type: 4 inputs/ 4 outputs	Connection: Screw	Two and three-wire PNP transistor	PNP transistor 1 A	**3RG9002-0DB00**		1	1 unit	42C
			Two and three-wire PNP transistor	PNP transistor 2 A	**3RG9002-0DA00**		1	1 unit	42C
			Two and three-wire PNP transistor floating	PNP transistor 2 A	**3RG9002-0DC00**		1	1 unit	42C
 3RG9004-0DB00		COMBICON[1]	Two and three-wire PNP transistor	PNP transistor 1 A	**3RG9004-0DB00**		1	1 unit	42C
			Two and three-wire PNP transistor	PNP transistor 2 A	**3RG9004-0DA00**		1	1 unit	42C
			Two and three-wire PNP transistor floating	PNP transistor 2 A	**3RG9004-0DC00**		1	1 unit	42C

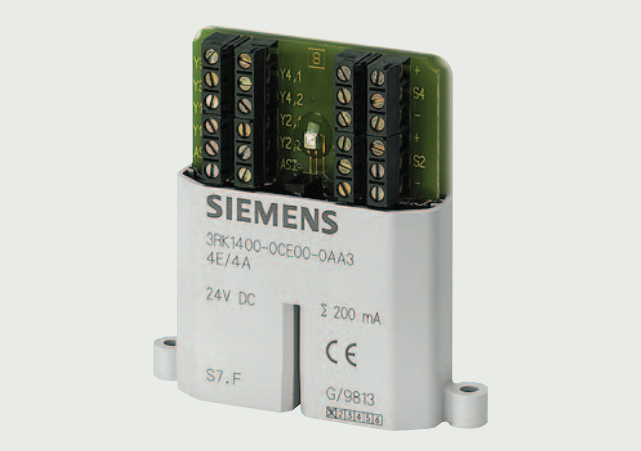
[1] Scope of supply does not include COMBICON connector set 3RX9810-0AA00, this must be ordered separately, see Accessories.

Accessories

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
COMBICON connector set For 4I/4O modules with COMBICON connection; one set comprises: • 4 x 5-pole plug for connection • Standard sensors/actuators • 2 x 4-pole plug for AS-Interface and external auxiliary voltage	**3RX9810-0AA00**		1	1 unit	42C

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview



Flat module 4I/4O

The flat module for the control cabinet in degree of protection IP20 has four inputs and four outputs.

The module is fitted at the front with an LED which indicates the module's status.

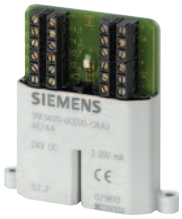
With the integrated lugs, the modules can be screwed on.

An integrated addressing socket enables the module to be addressed when it is installed.

Standard sensors/actuators and the AS-Interface cable can be connected using screw terminals.

Selection and ordering data

Version	Screw terminals	PU (UNIT, SET, M)	PS*	PG
	Article No. / Price per PU			
Flat module 4I/4O Slave addressing type: Standard address • 4 inputs/4 outputs • 200 mA for all I/Os	**3RK1400-0CE00-0AA3**	1	1 unit	42C



3RK1400-0CE00-0AA3

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

Counter module with spring-loaded terminals

The counter module is used to send hexadecimally coded count values (LSB=D0, MSB=D3) to a higher-level controller. The count value is increased by 1 for each valid count pulse at terminal 8. Beginning at 0, the module counts up to 15 and then begins again at 0. The controller adopts the current value and determines the number of pulses between two host invocations through subtraction from the previous value. The total number of count pulses is determined by adding these differences.

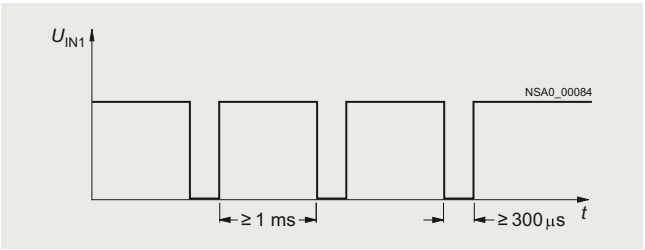
For the values sent to be unambiguous, no more than 15 count values are allowed between two host invocations or AS-Interface master invocations at terminal 8. The maximum permissible transmission frequency is calculated from these times:

$f_{Trmax} = 15/T_{max}$

T_{max}: max. possible transmission time from the slave to the host

A further condition for the maximum frequency is the required pulse shape. For the counter to accept a pulse as valid, a Low must have been applied at the input for at least 300 µs and a High for at least 1 ms.

This results in a maximum frequency of f_{Zmax} = 1/1.3 ms = 769 Hz independently of the control system (see figure below).



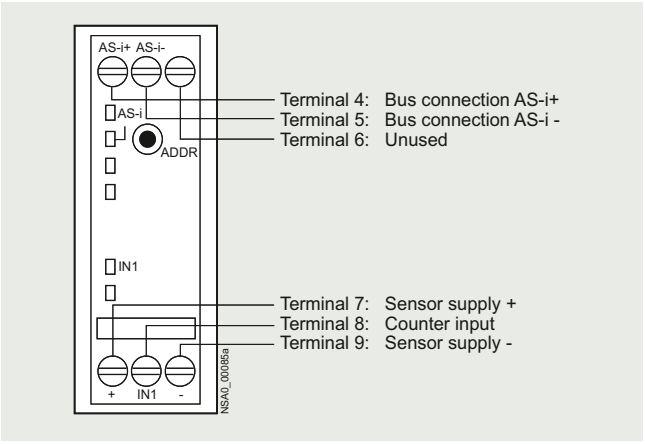
Maximum frequency for the counter module

If the time criterion stipulated in the figure is violated, the count value is rejected.

The counter is active only for the reset parameter P2 (default). The counter is deleted when P2 is set, and the incoming count pulses are not registered until after P2 is reset again.

Note:

A customized function block is necessary or must be programmed.



Counter module connection options

Selection and ordering data

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Counter modules					
Slave addressing type: Standard address					
Width 22.5 mm					
• With screw terminals	**3RK1200-0CE03-0AA2**		1	1 unit	42C
• With spring-loaded terminals	**3RK1200-0CG03-0AA2**		1	1 unit	42C

3RK1200-0CG03-0AA2

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

Ground fault detection module with spring-loaded terminals

"Ground faults in any control circuit must not lead to unintentional starting or potentially hazardous movements or prevent the machine from stopping." (IEC 60204-1/VDE 0113-1).

The AS-Interface ground fault detection module is used to meet these requirements. Using this module from the SlimLine series, ground faults in AS-Interface systems can be reliably detected and reported.

The following ground faults are detected:

- Ground fault from AS-i "+" to ground
- Ground fault from AS-i "-" to ground
- Ground fault on sensors and actuators that are supplied from the AS-Interface voltage.

Note:

Not suitable for AS-i Power24V.

Check whether the AS-i power supply unit or the AS-i master module, etc. features integrated ground fault detection, and therefore whether a separate ground fault detection module can be omitted.

It should be noted that an AS-i cable segment behind an AS-i repeater requires its own ground fault monitoring.

Selection and ordering data

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Ground fault detection modules					
Module does not require an AS-i address					
Width 22.5 mm					
• With screw terminals	**3RK1408-8KE00-0AA2**		1	1 unit	42C
• With spring-loaded terminals	**3RK1408-8KG00-0AA2**		1	1 unit	42C

3RK1408-8KG00-0AA2

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

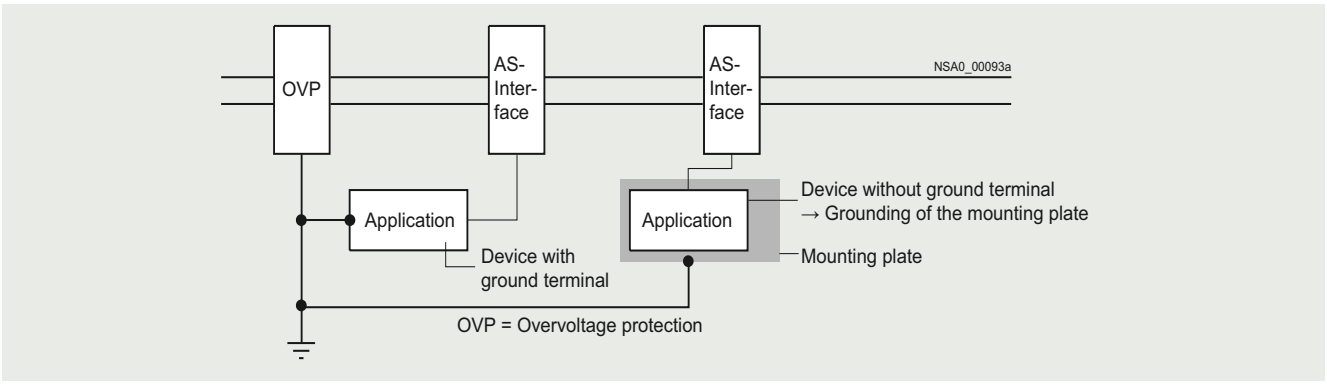
Overview

AS-Interface overvoltage protection module

The AS-Interface overvoltage protection module (protection module) protects downstream AS-Interface devices or individual sections in AS-i networks from conducted overvoltages which can be caused by switching operations and remote lightning strikes. The location of the protection module forms the transition from zone 1 to 2/3 within the lightning protection zone concept. Direct lightning strikes must be coped with using additional protective measures at the transitions from lightning protection zone 0A to 1.

With the AS-Interface overvoltage protection module, it is now also possible to integrate AS-Interface in the overall overvoltage protection concept of a plant or machine.

Configuration guidelines



The grounding of protection modules and the units to be protected must be effected through a shared grounding point.

If insulated devices are protected, their mounts must be included in the grounding points.

The module has the same design and degree of protection (IP67) as the AS-Interface K45 compact modules. It is a passive module and as such does not need its own address on the AS-Interface network. The module can be used to protect the AS-Interface cable and the cable for the auxiliary voltage from overvoltage. Overvoltages are discharged through a ground cable with a green/yellow oil-proof outer sheath. This cable is fixed in the module and must be connected with low resistance to the system's ground.

Rated discharge current I_{sn}

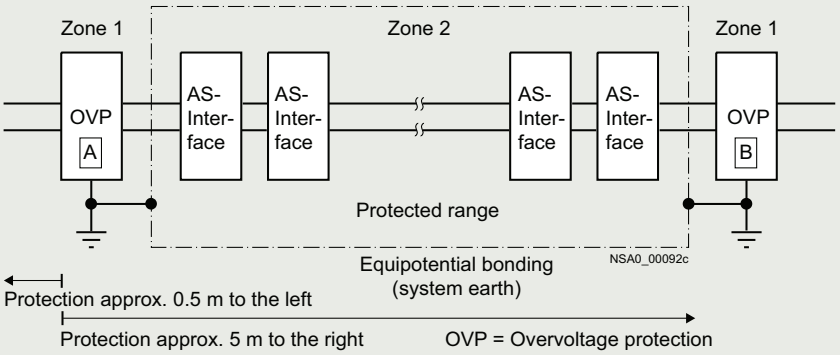
The rated discharge current is the peak value of a surge current of the form 8/20 µs (microseconds), for which the protection module is designed according to a specified test program. With an 8/20 waveform, 100% of the value is achieved after 8 µs and 50% after 20 µs.

Protection level U_p

The protection level of a protection module is the highest momentary value of the voltage at the terminals, established in individual tests and characterizes the capability of a protection module to limit overvoltages to a residual level.

2

Sample application



Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	**AS-Interface overvoltage protection module** Module does not require an AS-i address Delivery includes mounting plate (for wall and DIN-rail mounting)	**3RK1901-1GA01**		1	1 unit	42C

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Overview

AS-Interface power supply unit for 3 A

More information

Operating Instructions for AS-i power supply units, see https://support.industry.siemens.com/cs/ww/enview/21489904 and https://support.industry.siemens.com/cs/ww/en/view/22317836

AS-Interface power supply units feed 30 V DC into the AS-Interface cable and supply the AS-Interface components. They include power-optimized data decoupling for the separation of communication signals and supply voltage. As the result, AS-Interface is able to convey both data and power along a single line. The power supply units are resistant to overload and short circuits.

Dimensions

AS-Interface power supply units have compact dimensions in widths of 50/70/120 mm. No distances from other devices need to be observed when mounting the power supply units.

Features

- Higher rating: The power supply units deliver currents of 2.6 to 8 A.
- Integrated data decoupling: As the result, AS-Interface is able to convey both data and power along a single line.
- Integrated ground fault detection: The power supply units perform the reliable detection and signaling of ground faults according to IEC 60204-1. The AS-Interface voltage can be disconnected automatically in the event of a ground fault.
- Integrated overload detection: An output overload is detected and reported over a diagnostics LED.
- Diagnostics memory: Any ground faults or overloads on the output side are stored in a diagnostics memory and signaled until the device is RESET.
- Remote RESET and remote signaling: Using relay contacts, a ground fault can be signaled and evaluated by a central controller and/or indicator light.
- Diagnostics LEDs: Three different LEDs indicate the status of the AS-Interface power supply unit locally at the power supply unit.
- Ultra-wide input range/2-phase connection: The ultra-wide input range of 120 to 500 V of the 8 A version means that the supply units can be used in virtually any network worldwide. In addition, this version dispenses with the need for an N conductor as the device can be connected directly between 2 phases of a network.
- Operation with 24 V DC: The 3 A power supply unit is also available as a version with a 24 V DC input. This power supply unit is suitable for use in battery-powered systems or in systems with UPS (uninterruptible power supply).
- Removable terminal blocks with spring-loaded terminals: For easy exchanging of devices, each power supply unit has three removable terminal blocks: for the input side, for the output side and for Signal/RESET connections.

Benefits

- Complete solution for supplying AS-Interface networks while making full use of the maximum possible cable length per AS-i segment
- Only AS-i masters and AS-i slaves need to be connected to the AS-Interface cable in order to operate AS-Interface
- Compact, space-saving dimensions
- Reliable power supply even for large numbers of AS-Interface modules with a high power requirement
- Integrated ground fault and overload detection saves the need for additional components and enhances safety
- Fast fault detection and reduced downtimes thanks to diagnostics memory, remote signaling and remote RESET
- Reduced downtimes as the result of removable terminal blocks which enable the fast exchanging of devices
- Ultra-wide input range of the 8 A version permits 1-phase and 2-phase operation and removes the need for an N conductor
- Can be used world-wide thanks to, for example, UL/CSA approval (UL 508)
- With the 2.6 A version, the output power is restricted to max. 100 W for use in Class 2 circuits according to NEC (National Electrical Code)

AS-Interface power supply units

Selection and ordering data

3RX9501-0BA00

3RX9503-0BA00

Version		Spring-loaded terminals Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
AS-Interface power supply units, IP20 • AS-i single output 30 V DC • Output voltage ES1 according to IEC 62368-1 • With integrated ground fault detection • Ambient temperature during operation -10 ... +70 °C • 2.6 A version with output power restricted to max. 100 W (for Class 2 circuits according to NEC) • Dimensions: Width: 50 mm (2.6 A/3 A), 70 mm (5 A), 120 mm (8 A); Height: 125 mm; Depth: 125 mm						
Output current	Input voltage					
3 A	120/230 V AC (selectable)	**3RX9501-0BA00**		1	1 unit	42C
5 A	120/230 V AC (selectable)	**3RX9502-0BA00**		1	1 unit	42C
8 A	120/230 ... 500 V AC (selectable)	**3RX9503-0BA00**		1	1 unit	42C
For special applications						
3 A	24 V DC	**3RX9501-1BA00**		1	1 unit	42C
2.6 A/max. 100 W	120/230 V AC (selectable)	**3RX9501-2BA00**		1	1 unit	42C

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Overview

PSN130S 30 V power supply units for 3 A, 4 A and 8 A

More information

For operating instructions and other technical information, see https://support.industry.siemens.com/cs/ww/en/view/64364000 and https://support.industry.siemens.com/cs/ww/en/view/44030789

The PSN130S 30 V power supply units feed 30 V DC into the AS-Interface cable and supply the AS-Interface components, but do not include data decoupling. Data decoupling modules are needed in addition therefore to separate communication signals and control supply voltage, see page 2/71 or 2/73.

The power supply units are resistant to overload and short circuits.

Dimensions

The 30 V power supply units have compact dimensions with widths of 50 and 70 mm. No distances from other devices need to be observed when mounting the power supply units.

Features

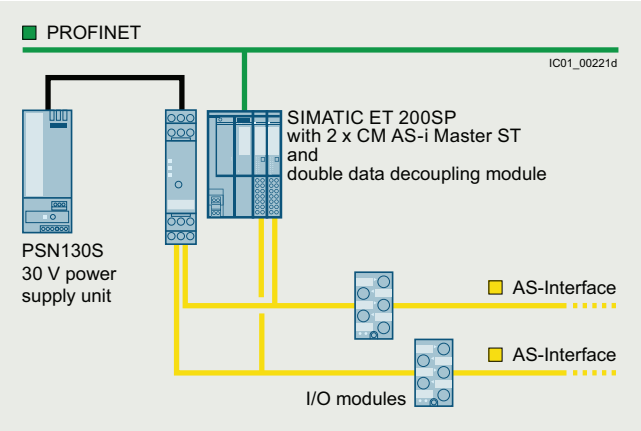
- Primary switched-mode power supplies for connection to a 1-phase AC system
- Power for currents of 3 A, 4 A and 8 A
- The output voltage is floating, and resistant to short-circuits and no-load operation. If there is an overload, the output voltage is reduced or cut-off. After a short circuit or overload, the devices start up again automatically.
- In the event of a device fault, the output voltage will be limited to max. 37 V.
- Modular installation devices in degree of protection IP20 and protection class I
- Diagnostics: With an output voltage > 26.5 V DC, the green LED (30 V O.K.) is lit and the signaling contact 13-14 is closed.

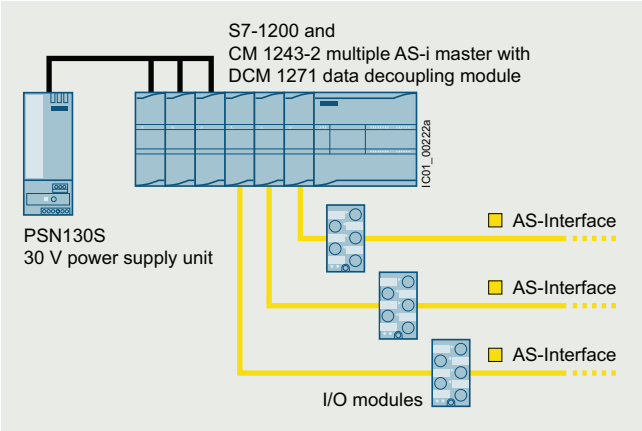
Benefits

- Low-cost alternative solution for supplying AS-Interface networks while making full use of the maximum possible cable length per AS-i segment
- Cost advantage particularly for multiple networks
- Compact, space-saving dimensions
- Reliable power supply even for large numbers of AS-Interface modules with a high power requirement
- Can be used world-wide thanks to, for example, UL/CSA approval (UL 508)

Application

Configuration examples of AS-Interface networks with a 30 V power supply unit





Configuration of AS-Interface multiple networks with one PSN130S 30 V power supply unit (examples with schematic representation):
Left: Double network based on the S22.5 double data decoupling module and a SIMATIC ET 200SP with two CM AS-i Master ST modules
Right: Triple network based on the SIMATIC S7-1200 with DCM 1271 data decoupling modules and CM 1243-2 communications processors

30 V power supply units

Technical specifications

PSN130S 30 V DC power supply unit		3 A	4 A	8 A
Input data				
• Input voltage, rated value U_e	V AC	120/230 V, 1-phase, automatic selection		
• Range of input voltage	V AC	85 ... 132/174 ... 264		
• Mains frequency	Hz	50/60		
• Power consumption at full load, typ.	W	103	139	270
Output data				
• Output voltage, rated value U_a	V DC	30		
• Residual ripple	mV_{pp}	< 150		
• Output current, rated value at -20 ... +60 °C	A	3	4	8
• Max. output current at +60 ... +70 °C	A	3	3	4
Degree of efficiency under rated conditions				
• Degree of efficiency	%	87	88	90
• Power loss, typ.	W	12	17	25

PSN130S 30 V DC power supply unit		3 A	4 A	8 A
Protection and monitoring				
• Output overvoltage protection	V	< 37		
• Current limiting, typ.	A	4	5.5	11
Operating data				
Ambient temperature				
• Operation	°C	-20 ... +70		
• Transport/storage	°C	-40 ... +85		
Pollution degree		2		
Humidity class		Climate class according to DIN 50010, relative air humidity max. 100%, without condensation		
Dimensions and weight				
• Width	mm	50	50	70
• Height x depth	mm	125 x 126.5		
• Weight	kg	0.4	0.4	0.7

Selection and ordering data

	Version	Screw terminals	PU (UNIT, SET, M)	PS*	PG
		Article No. / Price per PU			
	PSN130S 30 V DC power supply units (without AS-i data decoupling) • Output voltage 30 V DC • Output voltage ES1 according to IEC 62368-1 • Dimensions: Width: 50 mm (3 A/4 A); 70 mm (8 A); Height: 125 mm; Depth: 126.5 mm				
	Output current / Input voltage				
 3RX9511-0AA00	3 A / 120/230 V AC (automatic selection)	**3RX9511-0AA00**	1	1 unit	42C
 3RX9512-0AA00	4 A / 120/230 V AC (automatic selection)	**3RX9512-0AA00**	1	1 unit	42C
 3RX9513-0AA00	8 A / 120/230 V AC (automatic selection)	**3RX9513-0AA00**	1	1 unit	42C

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Overview

AS-Interface S22.5 double data decoupling module:
Screw terminal version (picture on left),
Spring-loaded terminal version (picture on right)

More information

Operating Instructions, see
https://support.industry.siemens.com/cs/ww/en/view/44030789

More information on AS-i Power24V, see
System Manual for AS-Interface,
https://support.industry.siemens.com/cs/ww/en/view/26250840

With the aid of the S22.5 data decoupling module, the AS-Interface network can also be supplied with 24 V DC or 30 V DC from a standard power supply unit and the transmission of data and power can be realized along one cable.

The combination of data decoupling modules and standard power supply units is therefore a cost-efficient alternative to the service-proven AS-Interface power supply units.

The quality of the data signals and the reliable operation of the AS-i network are not negatively affected as the result.

Features of the S22.5 data decoupling module

- Degree of protection IP20
- Narrow design: 22.5 mm wide
- Version with screw or spring-loaded terminals
- Versions for single and double data decoupling
- Supply of several AS-i networks with a single power supply unit
- Operation with 24 V DC or 30 V DC, grounded or non-grounded
- Adjustable current limiting up to 2 x 4 A
- Integrated ground fault detection with fault storage, display can optionally be switched off
- Diagnostics LEDs and signaling contacts
- RESET by button or remote RESET

Ground fault detection

The integrated ground fault detection works with a grounded and non-grounded supply: The connection of negative pole and ground (upstream from the data decoupling module) customary with 24 V DC power supplies is permitted. A ground fault to the negative or positive pole on the AS-Interface network (downstream from the data decoupling module) is detected and stored as a fault and will be signaled using LEDs and a relay contact.

Using the ground fault detection in the AS-i master is recommended for non-grounded supply. In this case, the ground fault indicator can be deactivated in the data decoupling module to avoid any unwanted LED messages.

Benefits

- Compatible expansion of the AS-Interface system
- An existing standard power supply unit with 24 V DC or 30 V DC can be used for supplying AS-i networks
- The AS-Interface system can also be used in tightly budgeted applications because no AS-Interface power supply unit needs to be purchased
- Applications benefit in addition from the advantages of a modern bus system:
  - High level of standardization
  - Additional diagnostics and maintenance information
  - Faster commissioning
- Easy and cost-efficient design of single and multiple networks is possible

Application

The AS-Interface data decoupling module is designed for AS-Interface networks with 30 V or 24 V supply (AS-i Power24V).

Operation of an AS-i network with the data decoupling module and a 30 V standard power supply unit is technically equivalent to the use of an AS-Interface power supply unit and offers the service-proven features of AS-Interface for all applications.

AS-Interface Power24V uses a 24 V power supply unit in conjunction with a data decoupling module and is particularly suitable for:

- Compact machines using AS-Interface input/output modules
- Applications in the control cabinet for AS-Interface integration of SIRIUS 3RT2 contactors using 3RA27 function modules

When using the double data decoupling module or other data decoupling units, several AS-Interface networks can be operated with a single power supply unit. This results in an additional cost advantage.

Note:

The power supply units must comply with the ES1 (IEC 62368-1) or PELV (Protective Extra Low Voltage)/SELV (Safety Extra Low Voltage) standards, have a residual ripple of < 250 mV_{pp}, and must limit the output voltage to a maximum of 40 V in the event of a fault.

We recommend

- SITOP power supplies, see page 15/1 or
  Catalog KT 10.1,
  https://support.industry.siemens.com/cs/ww/en/view/109745655
- PSN130S 30 V power supply units, see page 2/69

Note on AS-i Power24V:

The length of an AS-i Power24V network is restricted to 50 m in order to limit the voltage drop along the cable.

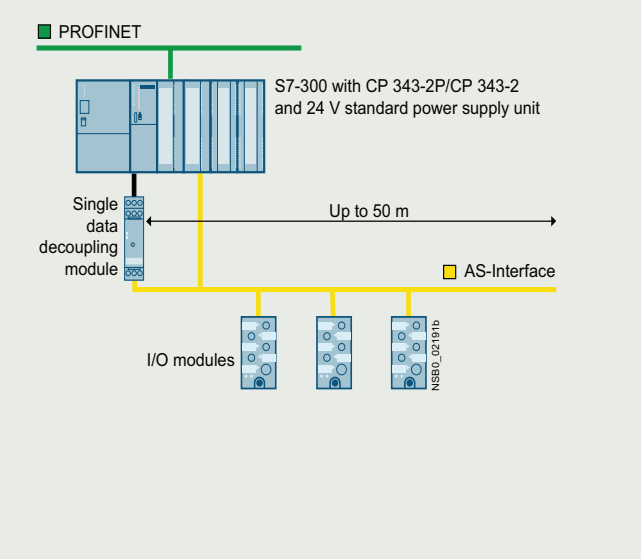
AS-i masters, AS-i slaves and the sensors and actuators supplied through the AS-i cable must be designed for the reduced voltage. Sensors and actuators for the standard voltage range of 10 to 30 V can be supplied with sufficient voltage.

Please also observe the requirements specified in "AS-i Power24V" for the operation of an AS-i Power24V network, see page 2/23.

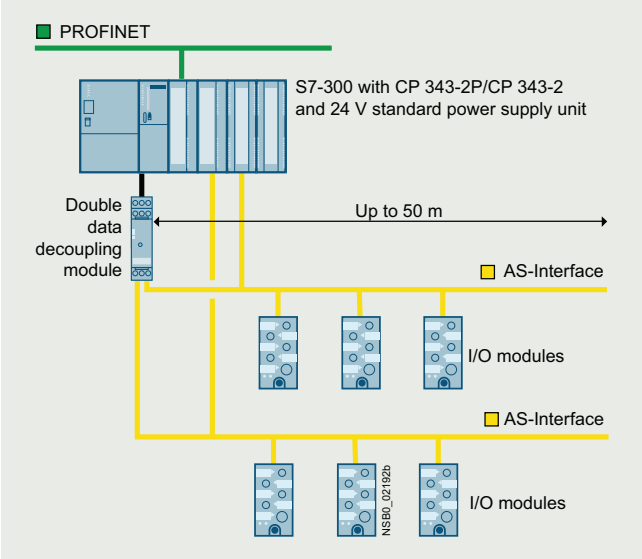
For more information on AS-i Power24V, see System Manual for AS-Interface,
https://support.industry.siemens.com/cs/ww/en/view/26250840.

S22.5 data decoupling modules

Configuration of an AS-i Power24V network with AS-Interface S22.5 data decoupling module



Single network



Multiple network

Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-1DE12-1AA0	**S22.5 data decoupling modules** With screw terminals, removable terminals, width 22.5 mm, height 101 mm, depth 115 mm	**Screw terminals**				
	• Single data decoupling module, 1 x 4 A	**3RK1901-1DE12-1AA0**		1	1 unit	42C
	• Double data decoupling module, 2 x 4 A	**3RK1901-1DE22-1AA0**		1	1 unit	42C
 3RK1901-1DG12-1AA0	**S22.5 data decoupling modules** With spring-loaded terminals, removable terminals, width 22.5 mm, height 105 mm, depth 115 mm	**Spring-loaded terminals**				
	• Single data decoupling module, 1 x 4 A	**3RK1901-1DG12-1AA0**		1	1 unit	42C
	• Double data decoupling module, 2 x 4 A	**3RK1901-1DG22-1AA0**		1	1 unit	42C

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Overview

DCM 1271 data decoupling module for SIMATIC S7-1200

More information

Manual for AS-i Master CM 1243-2 and AS-i DCM 1271 data decoupling module, see
https://support.industry.siemens.com/cs/ww/en/view/57358958

For more information on AS-i Power24V, see
System Manual for AS-Interface,
https://support.industry.siemens.com/cs/ww/en/view/26250840

With the aid of the DCM 1271 data decoupling module, the AS-Interface network can also be supplied with 24 V DC or 30 V DC from a standard power supply unit and the transmission of data and power can be realized along one cable.

The DCM 1271 data decoupling module has the same enclosure design as the S7-1200 module and is therefore ideal for combining with the CM 1243-2 AS-i master.

The DCM 1271 data decoupling module has no connection to the backplane bus of the SIMATIC S7-1200 and is not counted as a communications module when calculating the maximum configuration.

Features of the DCM 1271 data decoupling module

- Design: S7-1200, width 30 mm, degree of protection IP20
- Detachable terminals (included in the scope of supply)
- Single data decoupling
- Supply of several AS-i networks with a single power supply unit
- Operation with 24 V DC or 30 V DC, grounded or non-grounded
- Current limiting at 4 A
- Integrated ground fault detection
- Diagnostics LEDs for ground faults and overloads
- Signaling contacts for ground fault detection

Ground fault detection

The integrated ground fault detection works with a grounded and non-grounded supply: The connection of negative pole and ground (upstream from the data decoupling module) customary with 24 V DC power supplies is permitted. A ground fault to the negative or positive pole on the AS-Interface network (downstream of the data decoupling module) is identified and signaled via LED and a transistor output.

Benefits

- An existing standard power supply unit with 24 V DC or 30 V DC can be used for supplying AS-i networks
- The AS-Interface system can also be used in tightly budgeted applications because no AS-Interface power supply unit needs to be purchased
- Applications benefit in addition from the advantages of a modern bus system:
  - High level of standardization
  - Additional diagnostics and maintenance information
  - Faster commissioning

Application

The AS-Interface data decoupling module is designed for AS-Interface networks with 30 V or 24 V supply (AS-i Power24V).

Operation of an AS-i network with the data decoupling module and a 30 V standard power supply unit is technically equivalent to the use of an AS-Interface power supply unit and offers the service-proven features of AS-Interface for all applications.

AS-i Power24V uses a 24 V power supply unit in conjunction with a data decoupling module and is particularly suitable for

- Compact machines using AS-Interface input/output modules
- Applications in the control cabinet for AS-Interface integration of SIRIUS 3RT2 contactors using 3RA27 function modules

Note:

The power supply units must comply with the ES1 (IEC 62368-1) or PELV (Protective Extra Low Voltage)/SELV (Safety Extra Low Voltage) standards, have a residual ripple of < 250 mV_{pp}, and must limit the output voltage to a maximum of 40 V in the event of a fault.

We recommend

- SITOP power supplies, see page 15/1 or Catalog KT 10.1, https://support.industry.siemens.com/cs/ww/en/view/109745655
- PSN130S 30 V power supply units, see page 2/69

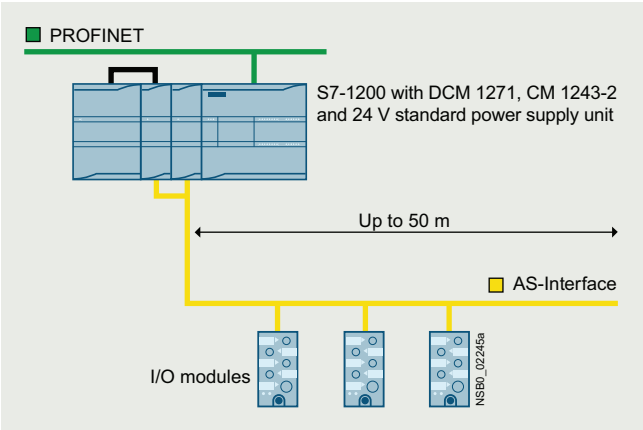
Note on AS-i Power24V:

The length of an AS-i Power24V network is restricted to 50 m in order to limit the voltage drop along the cable.

AS-i masters, AS-i slaves and the sensors and actuators supplied through the AS-i cable must be designed for the reduced voltage. Sensors and actuators for the standard voltage range of 10 to 30 V can be supplied with sufficient voltage.

Please also observe the requirements specified in "AS-i Power24V" for the operation of an AS-i Power24V network, see page 2/23.

For more information on AS-i Power24V, see System Manual for AS-Interface, https://support.industry.siemens.com/cs/ww/en/view/26250840.



Configuration of an AS-i Power24V network with AS-Interface DCM 1271 data decoupling module

Selection and ordering data

Version	Screw terminals Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
DCM 1271 data decoupling module • Max. current: 1 x 4 A • Removable terminals (included in the scope of supply) • Dimensions W x H x D (mm): 30 x 100 x 75	**3RK7271-1AA30-0AA0**		1	1 unit	42C

3RK7271-1AA30-0AA0

Accessories

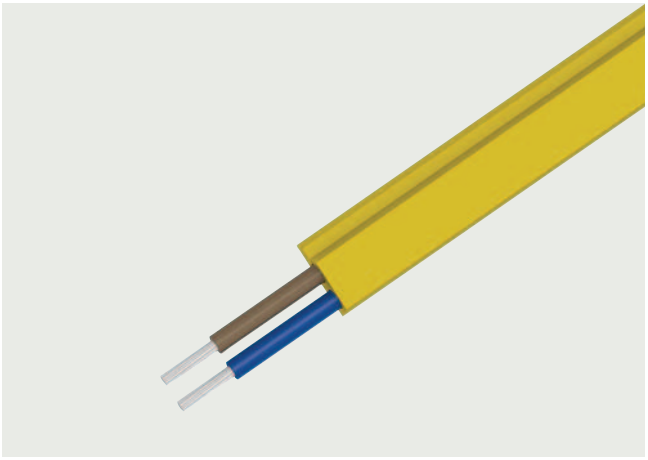
Version	Screw terminals Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Screw terminals (spare part)					
• 5-pole, for AS-i master CM 1243-2 and AS-i DCM 1271 data decoupling module	**3RK1901-3MA00**		1	1 unit	42C
• 3-pole, for AS-i DCM 1271 data decoupling module for connecting the power supply unit	**3RK1901-3MB00**		1	1 unit	42C
CM 1243-2 communications module • AS-Interface master for SIMATIC S7-1200 • Corresponds to AS-Interface specification V3.0 • Removable terminals (included in the scope of supply) • Dimensions W x H x D (mm): 30 x 100 x 75 see also from page 2/37 onwards	**3RK7243-2AA30-0XB0**		1	1 unit	42C

3RK7243-2AA30-0XB0

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

AS-Interface shaped cable

Overview



AS-Interface shaped cable

The actuator-sensor interface – the networking system used for the lowest field area – is characterized by very easy mounting and installation. A new connection method was developed specially for AS-Interface.

The stations are connected using the AS-Interface cable. This two-wire AS-Interface shaped cable has a trapezoidal shape, thus ruling out polarity reversal.

Connection is effected by the insulation piercing method. In other words, contact pins pierce the AS-Interface shaped cable and make reliable contact with the two wires. Cutting to length and stripping are superfluous. Consequently, AS-Interface stations (e.g. I/O modules, intelligent devices) can be connected in the shortest possible time and exchanging devices is quick.

To enable use in the most varied ambient conditions (e.g. in an oily environment), the AS-Interface cable is available in different materials (rubber, TPE, PUR).

For special applications it is also possible to use an unshielded standard round cable H05VV-F 2 x 1.5 mm^2 according to AS-i specification. With AS-Interface, data and energy for the sensors (e.g. proximity switches) and actuators (e.g. indicator lights) are transmitted over the yellow AS-Interface cable.

The black AS-Interface cable must be used for actuators with a 24 V DC supply (e.g. solenoid valves) and a high power requirement.

Suitable for operation in cable carriers

The use of the AS-Interface shaped cables with TPE and PUR outer sheath was checked in a cable carrier test with the following conditions:

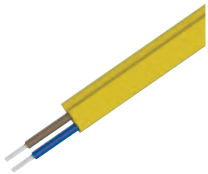
Chain length	m	6
Travel	m	10
Bending radius	mm	75
Travel speed	m/s	4
Acceleration	m/s^2	4
Number of cycles		10 million
Duration of test		approx. 3 years (11 000 cycles per day)

After termination of the 10 million cycles only slight wear was visible due to the lugs of the cable carrier. No damage to the cores and core insulation could be detected.

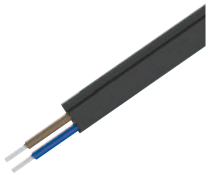
Note:

When using a cable carrier, the cables must be installed in such a way that they are not subject to tensile forces. On no account may the cables be twisted, but they must be routed flat over the cable carrier.

Selection and ordering data



3RX901.-0AA00



3RX902.-0AA00

Version			Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
AS-Interface shaped cables							
Material	Color	Quantity					
Rubber	Yellow (AS-Interface)	100 m roll	**3RX9010-0AA00**		1	1 unit	42C
	Yellow (AS-Interface)	1 km drum	**3RX9012-0AA00**		1	1 unit	42C
	Black (24 V DC)	100 m roll	**3RX9020-0AA00**		1	1 unit	42C
	Black (24 V DC)	1 km drum	**3RX9022-0AA00**		1	1 unit	42C
TPE	Yellow (AS-Interface)	100 m roll	**3RX9013-0AA00**		1	1 unit	42C
	Yellow (AS-Interface)	1 km drum	**3RX9014-0AA00**		1	1 unit	42C
	Black (24 V DC)	100 m roll	**3RX9023-0AA00**		1	1 unit	42C
	Black (24 V DC)	1 km drum	**3RX9024-0AA00**		1	1 unit	42C
TPE special version according to UL Class 2	Yellow (AS-Interface)	100 m roll	**3RX9017-0AA00**		1	1 unit	42C
	Black (24 V DC)	100 m roll	**3RX9027-0AA00**		1	1 unit	42C
PUR	Yellow (AS-Interface)	100 m roll	**3RX9015-0AA00**		1	1 unit	42C
	Yellow (AS-Interface)	1 km drum	**3RX9016-0AA00**		1	1 unit	42C
	Black (24 V DC)	100 m roll	**3RX9025-0AA00**		1	1 unit	42C
	Black (24 V DC)	1 km drum	**3RX9026-0AA00**		1	1 unit	42C

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

AS-Interface repeater

The AS-Interface repeater is used to extend the AS-Interface cable.

- In its basic version, an AS-i network comprises one segment with a maximum cable length of 100 m. An extension plug (see page 2/79) can be used to increase the cable length for a segment to a maximum of 200 m.
- If this is insufficient, however, you can use one or more repeaters.
- A repeater adds an extra segment to an existing segment. The extra segment can have a cable length of up to 100 m (without extension plug) or up to 200 m (with an extension plug in the extra segment).
- Each segment requires a separate AS-i power supply unit. The repeater is automatically supplied with power by the AS-i power supply units.
- Electrical separation of the two AS-Interface shaped cable lines, e.g. interfering signals or ground faults are blocked at the repeater. The wanted signals are prepared by the repeater and passed on after amplification.
- Slaves can be used on both sides of the repeater because the repeater has a symmetrical internal structure. The AS-i master can be positioned before or after the repeater.
- The additional power supply can increase the current infeed for slaves/sensors and lower the voltage drop on the AS-i cable.
- Separate display of the correct AS-Interface voltage by means of LED for each segment
- Installed in K45 module enclosure IP67 with mounting plate
- Easy mounting

Benefits

- More possibilities of use and greater freedom for plant planning through extension of the AS-Interface network
- Reduced downtime and servicing times in the event of a fault thanks to separate display of the correct AS-Interface voltage for each side
- Increased operational reliability in extensive networks due to conditioning and amplification of the wanted signals.

Design of an AS-Interface network with repeaters

- Parallel connection of several repeaters possible (star configuration)
- Combination of series and parallel connection possible

The following conditions apply to enable the signal propagation times to be maintained:

- When used without an extension plug no more than two repeaters are permitted between AS-i master and slave (repeaters connected in series)
- When used with an extension plug no more than one repeater is permitted between AS-i master and slave

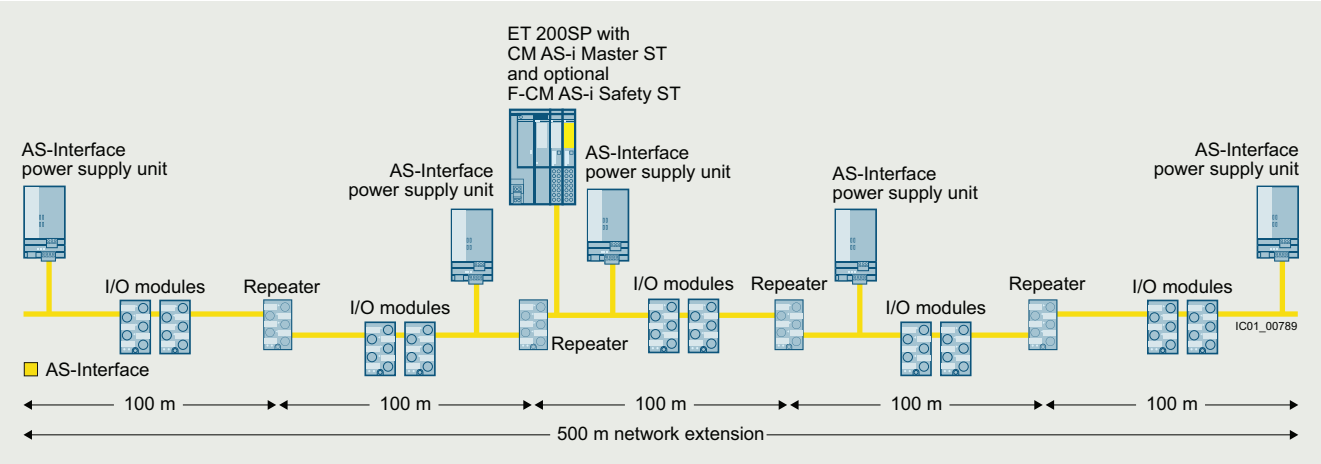
In safety-related applications the following also applies:

- When used without an extension plug, no more than two repeaters are permitted between evaluation unit (e.g. F-CM AS-i Safety ST for ET 200SP) and ASIsafe input slave or safe output module.
- When used with an extension plug, no more than one repeater is permitted between the evaluation unit (e.g. F-CM AS-i Safety ST for ET 200SP) and ASIsafe input slave or safe output module.

Note:

The open end of an AS-i bus cable must not be in the AS-Interface repeater. The AS-Interface shaped cable can be terminated by means of a cable end terminator to provide degree of protection IP67 where required, see Miscellaneous accessories on page 2/86.

The AS-Interface repeater is not suitable for AS-i Power24V networks. It is recommended for use in AS-Interface networks with AS-Interface power supply units (e.g. 3RX9501-0BA00).



Configuration example AS-Interface network with repeaters (without extension plugs)

Repeaters

Application

The repeater is used to extend the AS-Interface network. In this case there are AS-Interface slaves and one AS-Interface power supply unit on each side of the repeater.

As with all AS-Interface networks, any network topology (line, tree, star) is possible.

In a configuration example with two repeaters and three extension plugs, the maximum possible size of the AS-Interface network is 600 m, see configuration example with extension plug on page 2/79.

Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 6GK1210-0SA01	**Repeater for AS-Interface** • Cable extension due to expansion of an existing cable segment by an additional segment • Doubling of the total cable length to 200 m when a repeater is used • Amplification of the wanted signals • Delivery includes mounting plate (for wall and DIN-rail mounting) • Direct connection to AS-Interface shaped cable using the insulation piercing method • Repeater does not require an AS-i address	**6GK1210-0SA01**		1	1 unit	42C

Accessories

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-1MN00	**Cable end terminators** For sealing open cable ends of the AS-Interface shaped cable with IP67	**3RK1901-1MN00**		1	10 units	42C

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

AS-Interface Extension Plug Compact

With the Extension Plug Compact, it is possible to double the cable length possible in an AS-Interface segment from 100 to 200 m.

Only one AS-i power supply unit is needed to supply power to the slaves on the up to 200 m long segment.

The extension plug suppresses interfering signals that can arise due to reflection at the end of a long cable. The extension plug contains no amplification of the wanted signals.

The extension plug is mounted directly on the AS-Interface shaped cable by means of the insulation piercing method and does not require its own power supply.

Design of an AS-Interface segment with an extension plug

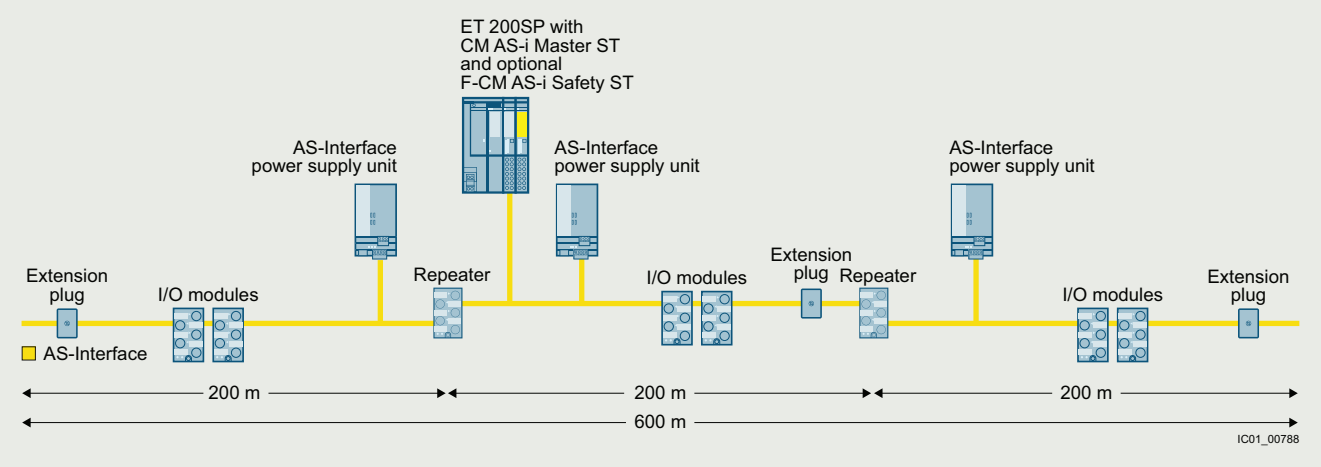
To construct an AS-Interface segment with a cable length of more than 100 m and up to a maximum of 200 m, the extension plug is installed in a radius of around ± 10 m at the point of the network that is furthest from the AS-i power supply unit (tolerance up to 10 m from the end point). The extension plug is not allowed to be used in AS-Interface networks smaller than 100 m. Generally, any network topology (line, tree, star) is possible when using the extension plug. Only one extension plug is required per 200 m segment even with a tree or star topology.

The extension plug can be combined with the AS-Interface repeater, see page 2/78.

Note:

The open end of an AS-i bus cable must not be in the extension plug. The AS-Interface shaped cable can be terminated by means of a cable end terminator to provide degree of protection IP67 where required, see Miscellaneous accessories on page 2/86.

The AS-Interface extension plug is not suitable for AS-i Power24V networks. It is recommended for use in AS-Interface networks with AS-Interface power supply units (e.g. 3RX9501-0BA00).



Configuration example AS-Interface network with repeaters and extension plugs

Selection and ordering data

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-1MX02 **AS-Interface Extension Plug Compact** • Doubling of the cable length to 200 m per AS-Interface segment • Direct connection to AS-Interface shaped cable using the insulation piercing method • Extension Plug Compact does not require an AS-i address	**3RK1901-1MX02**		1	1 unit	42C

Accessories

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-1MN00 **Cable end terminators** For sealing open cable ends of the AS-Interface shaped cable with IP67	**3RK1901-1MN00**		1	10 units	42C

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Addressing units

Overview

The innovated addressing unit for AS-Interface of the AS-i specification V3.0

The addressing unit is used to assign an address during commissioning to each AS-Interface slave. The device detects a connected slave module or a complete AS-i network and displays the found module in the LCD display. Each address can be individually set using the Up/Down keys. By turning the rotary switch, further commissioning functions are selected intuitively. The innovative device has been adapted to the current AS-i specification V3.0 and can now also handle the I/O data of the latest slaves.

Functionality

- Reading out and adjusting the slave address 0 to 31 or 1A to 31A, 1B to 31B, with automatic addressing aid and prevention of double addresses
- Reading out the slave profile (IO, ID, ID2)
- Reading out and adjusting the ID1 code
- Input/output test when commissioning the slaves: Read input signals and write outputs with all digital and analog slaves according to AS-Interface specification V3.0, including safe input slaves and complex CTT2 slaves
- Measuring the voltage on the AS-Interface cable (measuring range from 2 to 35 V)
- Display of the operational current in case of direct connection of an AS-i slave (measuring range from 0 to 150 mA)
- Storage of complete network configurations (profiles of all slaves) to simplify the addressing
- Adjusting the slave parameters for commissioning
- Reading out the identification and diagnostics of CTT2 slaves
- Reading out the code table of safe input slaves (ASIsafe)

Note:

For operation of the addressing unit on an AS-Interface cable with connected power supply unit, the following applies:
The AS-Interface addressing unit is suitable for standard AS-i networks and AS-i Power24V networks (min. operational voltage on the AS-Interface cable 19 V).

Benefits

- Increased power supply to the slaves up to 150 mA
- Better utilization of the battery capacity thanks to improved circuitry
- Support for the current AS-i specification V3.0
- Expanded display for simultaneously displaying input and output states
- Clearly recognizable display of status of digital inputs/outputs in binary format (0/1), optionally also available as hexadecimal values
- Intuitive display of analog data either as decimal, hexadecimal or as a percentage (e.g. 100% corresponds to input/output value 20 mA)
- I/O data of complex slaves (CTT2 profile) can be displayed
- Decoded display of the input data of safe input slaves, including code table
- Simplification of the operating steps when setting the slave address with automatic read back of the set address
- Addressing cable, ready for operation even without screwing in tight into the M12 socket, thus faster availability of the addressing unit
- Proven compact enclosure with smooth keys and rotary switch
- Connection of standard AS-i networks possible with 30 V as well as Power24V networks
- Complex slaves with high operating currents can be addressed without external supply
- Longer operating time by automatic shutdown after approx. 5 minutes (or approx. 1 minute when data exchange is active) after last operation
- Can be used with all types of digital and analog slaves
- Comprehensive and fast input/output test of plants, even for A/B slaves with 4 DI/4 DQ and current analog modules with an A/B address
- Faster and more reliable commissioning of the AS-Interface modules
- One-hand operation possible, with unique selection of the functions
- Connection via M12 socket (pin 1: ASI+; pin 3: ASI-; pins 2, 4, 5: not used)
- Universal applicability for all AS-i networks

Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1904-2AB02	**AS-Interface addressing unit V3.0** • For AS-Interface modules and sensors and actuators with integrated AS-Interface according to AS-i specification V3.0 • For setting the AS-i address of slaves with standard addresses, and slaves with extended addressing mode (A/B slaves) • With input/output test function and many other commissioning functions • Battery operation with four type AA batteries (IEC LR6, NEDA 15) • Degree of protection IP40 • Dimensions W x H x D (mm): 84 x 195 x 35 • Scope of supply: - Addressing unit with four batteries - Addressing cable, with M12 plug to addressing plug (hollow plug), length 1.5 m	**3RK1904-2AB02**		1	1 unit	42C

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Accessories

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1902-4PB15-3AA0	**Addressing cable, with M12 plug to M12 socket**[1] • For addressing slaves with M12 connection, e.g. K20 or K60R modules or light curtains • Length 1.5 m, 3-pole, 3 x 0.34 mm^2	**3RK1902-4PB15-3AA0**		1	1 unit	42D
 3RX9801-0AA00	**AS-Interface M12 feeder** • Transition of AS-Interface cable to a standard round cable • Insulation piercing method for connection of AS-Interface cable • M12 socket for connection of standard round cable • Current-carrying capacity up to 2 A • Degree of protection IP67	**3RX9801-0AA00**		1	1 unit	42C
 3RK1901-2NR10	**AS-Interface M12 feeder** • AS-Interface cable transition without U_{aux}, with M12 socket • Insulation piercing method for connection of AS-Interface cable • M12 socket for connection of standard round cable • Current-carrying capacity up to 4 A • Degree of protection IP67/IP68/IP69 (IP69K)	**3RK1901-2NR10**		1	1 unit	42C
 3RK1902-4HB50-5AA0	**M12 cable plug**[2] • Extruded M12 plug (angled cable outlet 90°), other cable end open • Length: 5 m, 5-pole, color: Black	**3RK1902-4HB50-5AA0**		1	1 unit	42D
 3RK1902-4BA00-5AA0	**M12 plug, straight**[2] • For screw fixing, 5-pole screw terminal, max. 0.75 mm^2 • A-coded, max. 4 A	**3RK1902-4BA00-5AA0**		1	1 unit	42D
	Addressing cable, with M12 plug to addressing plug (hollow plug)[3] • Included in the scope of supply of the addressing unit • Length 1.5 m	**Z236A**				

1) Not included in scope of supply of the 3RK1904-2AB02 addressing unit.

2) For connecting the addressing unit to an AS-i network via AS-Interface M12 feeder it is necessary to establish a connection by means of a connecting cable (M12 plug to M12 plug) which must be wired as follows:
- M12 cable plug: pin 1/core brown ↔ M12 plug: Pin 1,
- M12 cable plug: pin 3/core blue ↔ M12 plug: Pin 3,
- Pin 2, 4, 5 not connected.

3) Addressing cable available from:
GMC-I Messtechnik GmbH
(see page 16/18).

Overview

AS-Interface analyzer

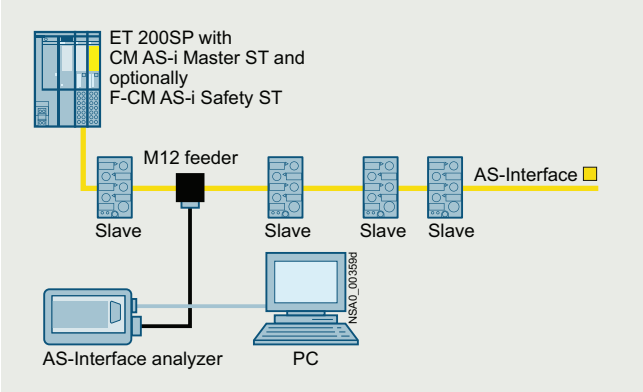
The AS-Interface analyzer is used to test AS-Interface networks.

Installation errors, e.g. loose contacts or EMC interference under extreme loads, can be revealed by this unit.

Thanks to the easy-to-use software the user can assess the quality of complete networks even if he lacks detailed specialist knowledge of AS-Interface. In addition it is an easy matter with the AS-Interface analyzer to create test logs from the records produced, thus providing documentation for startups and service assignments.

For advanced AS-Interface users there are trigger functions for detailed diagnostics.

Connection



Connection of AS-Interface analyzer to PC and AS-Interface network

The AS-Interface analyzer follows the communication on the AS-Interface network as a passive station. The unit is supplied simultaneously from the AS-Interface cable.

This analyzer interprets the physical signals on the AS-Interface network and records the communication.

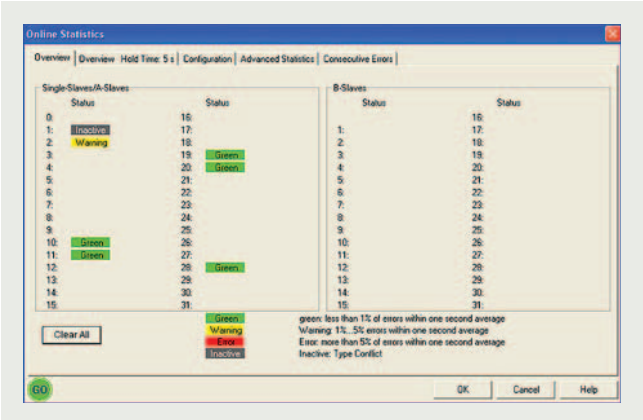
The data thus obtained are transferred through an RS 232 interface to a PC such as a notebook, for evaluation with the supplied diagnostics software.

Benefits

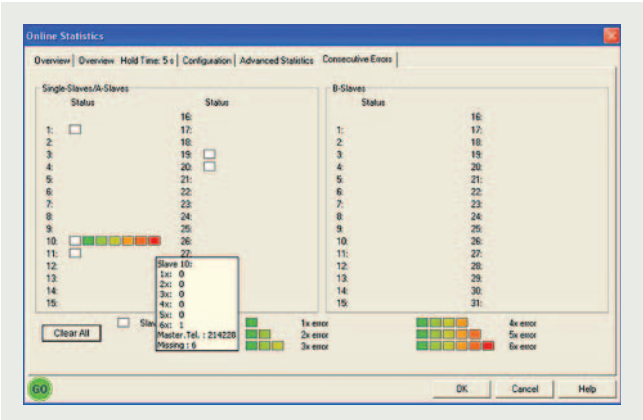
- Simple and user-friendly operation enables diagnostics of AS-Interface networks without help from specialists
- Speedy troubleshooting thanks to intuitive display in statistics mode
- Test logs provide verification of the state and quality of the installation for service and approval
- Recorded logs facilitate remote diagnostics by Technical Support
- Comprehensive trigger functions enable exact analysis
- Process data can be monitored online

Application

Online statistics



Online statistics, overview



Online statistics, details, e.g. here a fault on slave 10

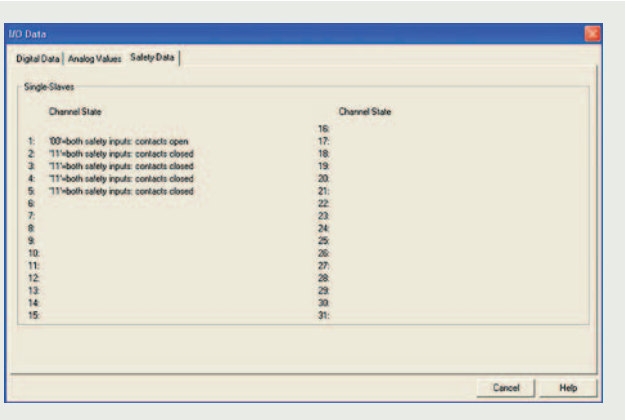
This mode provides a quick overview of the existing AS-Interface system. The error rates are displayed per slave in a traffic-light function (green, yellow, red).

The bus configuration and the currently transmitted data of the slaves are shown in a well arranged presentation.

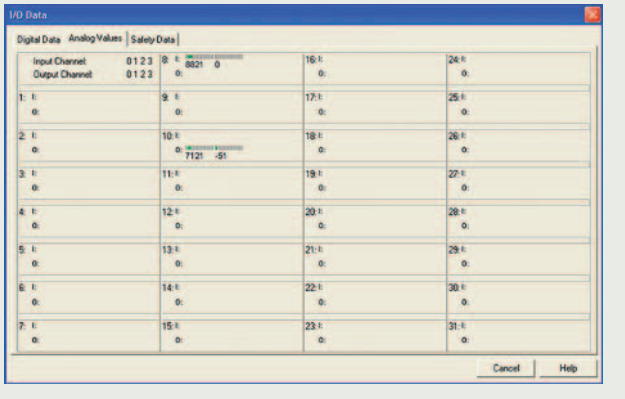
With the expanded statistics function, it is possible to determine the error rates as the number of transmitted or faulty bus message frames.

The bundle error overview shows in steps how many multiple repetitions of message frames occurred in order to enable a selective and look-ahead assessment of the transmission quality.

Data mode



Presentation of the I/O data: Safety data

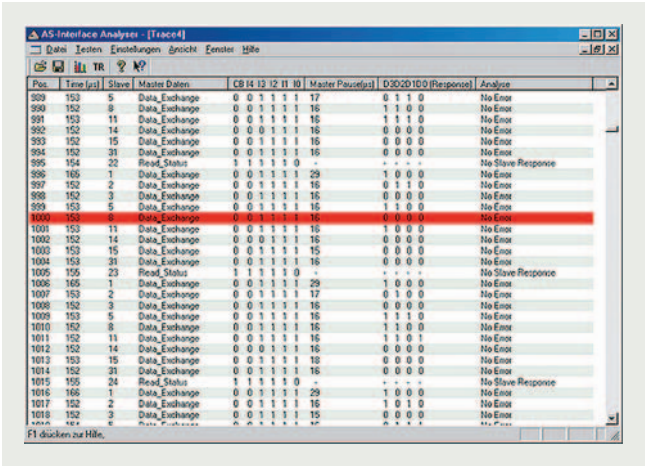


Presentation of the I/O data: Analog values

In this mode, the analyzer shows not only the digital input/output values but also the current analog values and the input status of the safety slaves.

Analyzer

Trace mode



Presentation of message frames in trace mode

The presentation of message frames in the style of a classic fieldbus analyzer is indispensable for complex troubleshooting. Extensive trigger functions and recording and viewing filters are available for this purpose. An external trigger input and trigger output round off the scope of functions in order to find even the most difficult errors.

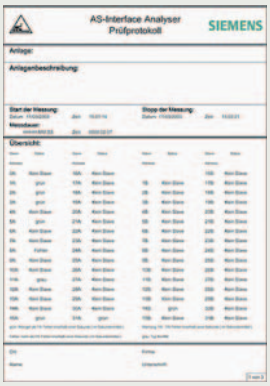
For troubleshooting in connection with ASIsafe applications, changes of status in the code tables of safety slaves are identified and assessed.

The AS-i analyzer can be used with an AS-i master according to AS-Interface specification V3.0 or a predecessor version.

The analyzer does not automatically decode the process values for type CTT2 - CTT5 AS-i slaves. As for other slave types, the message frames are recorded and evaluated in the statistics. If required, decoding can also be performed by the user manually.

For more information, see https://support.industry.siemens.com/cs/ww/en/view/109746763.

Test log



Example of a test log

The recorded data of the online statistics are easy to output and document using a test log. Verification of the state of the plant can thus be provided for approvals or service assignments.

The integrated measurement assistant records the bus signals for a variable duration, thereby triggering creation of an automatic test log. A standardized quality test of AS-i plants is thus possible.

Note:

The AS-Interface analyzer is suitable for standard AS-i networks and AS-i Power24V networks (min. operational voltage 20 V).

Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1904-3AB01	**AS-Interface analyzer** • For testing AS-Interface systems • For troubleshooting and service assignments in installations and networks with AS-Interface systems • Dimensions W x H x D (mm): 145 x 30 x 92 • Scope of supply: - AS-Interface analyzer - RS 232 cable for connecting to a PC - USB-to-serial/RS 232 adapter - Screwdriver - Magnetic adhesive tape for fastening the analyzer to metal surfaces - Service case with foam insert, dimensions W x H x D (mm): approx. 260 x 70 x 200 - Diagnostics software (CD-ROM) for PC with Windows operating system	**3RK1904-3AB01**		1	1 unit	42C

Note:

Download the current version of the diagnostics software for PC with Windows operating system, see https://support.industry.siemens.com/cs/ww/en/view/109750259.

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Accessories

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RX9801-0AA00	**AS-Interface M12 feeder** • Transition of AS-Interface shaped cable to a standard round cable • Insulation piercing method for connection of AS-Interface cable • M12 socket for connection of standard round cable • Current-carrying capacity up to 2 A • Degree of protection IP67	**3RX9801-0AA00**		1	1 unit	42C
 3RK1901-2NR10	**AS-Interface M12 feeder** • AS-Interface cable transition without U_{aux}, with M12 socket • Insulation piercing method for connection of AS-Interface cable • M12 socket for connection of standard round cable • Current-carrying capacity up to 4 A • Degree of protection IP67/IP68/IP69 (IP69K)	**3RK1901-2NR10**		1	1 unit	42C
 3RK1902-4HB50-5AA0	**M12 cable plug** • PUR cable, 5-pole • Length 5 m • Color black • Extruded M12 plug (angled cable outlet 90°), other cable end open	**3RK1902-4HB50-5AA0**		1	1 unit	42D

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Selection and ordering data

More information

System Manual for AS-Interface, see https://support.industry.siemens.com/cs/ww/en/view/26250840

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-2NN10	**AS-Interface compact distributor, for AS-Interface flat cable** • Current-carrying capacity up to 8 A • Degree of protection IP67/IP68/IP69 (IP69K) For flat cable: AS-i or U_{aux} · For: Flat cable AS-i or U_{aux} · Cable length: -- · Cable end in feeder: Not available	**3RK1901-2NN10**		1	1 unit	42C
 3RX9801-0AA00	**AS-Interface M12 feeder** • Current-carrying capacity up to 2 A • Degree of protection IP67 For flat cable: AS-i · For: M12 socket · Cable length: -- · Cable end in feeder: Available	**3RX9801-0AA00**		1	1 unit	42C
 3RK1901-2NR10	**AS-Interface M12 feeders** • Current-carrying capacity up to 4 A • Degree of protection IP67/IP68/IP69 (IP69K)					
	For flat cable: AS-i · For: M12 socket · Cable length: -- · Cable end in feeder: Not available	**3RK1901-2NR10**		1	1 unit	42C
	For flat cable: AS-i · For: M12 cable box · Cable length: 1 m · Cable end in feeder: Not available	**3RK1901-2NR11**		1	1 unit	42C
 3RK1901-2NR21	For flat cable: AS-i · For: M12 cable box · Cable length: 2 m · Cable end in feeder: Not available	**3RK1901-2NR12**		1	1 unit	42C
	For flat cable: AS-i/U_{aux} · For: M12 socket · Cable length: -- · Cable end in feeder: Not available	**3RK1901-2NR20**		1	1 unit	42C
	For flat cable: AS-i/U_{aux} · For: M12 cable box · Cable length: 1 m · Cable end in feeder: Not available	**3RK1901-2NR21**		1	1 unit	42C
	For flat cable: AS-i/U_{aux} · For: M12 cable box · Cable length: 2 m · Cable end in feeder: Not available	**3RK1901-2NR22**		1	1 unit	42C
 3RK1901-1NR04	**AS-Interface M12 feeder, 4-fold** • Current-carrying capacity up to 4 A • Degree of protection IP67 For flat cable: AS-i/U_{aux} · For: 4-fold M12 socket, delivery includes mounting plate (for wall and DIN-rail mounting) · Cable length: -- · Cable end in feeder: Not available	**3RK1901-1NR04**		1	1 unit	42C
 6ES7194-1KA01-0XA0	**M12 Y-shaped coupler plug** For connection of two sensors to one M12 socket with Y-assignment	**6ES7194-1KA01-0XA0**		1	1 unit	250
	AS-Interface sealing caps (one set contains 10 sealing caps)					
 3RK1901-1KA00  3RK1901-1KA01	• For free M12 sockets					
	- Standard version	**3RK1901-1KA00**		100	10 units	42C
	- Tamper-proof	**3RK1901-1KA01**		100	10 units	42C
 3RK1901-1PN00	• For free M8 sockets - Standard version	**3RK1901-1PN00**		100	10 units	42C
 3RK1901-1MD00	**AS-Interface M20 seals** • For AS-Interface shaped cable • For insertion in M20 glands	**3RK1901-1MD00**		100	10 units	42C

* You can order this quantity or a multiple thereof.
Illustrations are approximate

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-3QM00	**Cable adapters for flat cables**					
	Connection of AS-Interface cable to metric gland with insulation piercing method					
	• Continuation using standard cable					
	- For M16 gland	**3RK1901-3QM00**		1	1 unit	42C
	- For M20 gland	**3RK1901-3QM10**		1	1 unit	42C
	• Continuation using pins					
	- For M16 gland	**3RK1901-3QM01**		1	1 unit	42C
	- For M20 gland	**3RK1901-3QM11**		1	1 unit	42C
 3RK1901-3QA00	**Cable clips for cable adapters**	**3RK1901-3QA00**		100	10 units	42C
 3RK1901-1MN00	**Cable end terminators**	**3RK1901-1MN00**		1	10 units	42C
	For sealing open cable ends of the AS-Interface shaped cable with IP67					
 3RK1901-2EA00  3RK1901-0CA00	**Mounting plates**					
	• K45, suitable for all K45 compact modules					
	- For wall mounting	**3RK1901-2EA00**		1	1 unit	42C
	- For DIN-rail mounting	**3RK1901-2DA00**		1	1 unit	42C
	• K60, suitable for all K60 compact modules					
	- For wall mounting	**3RK1901-0CA00**		1	1 unit	42C
	- For DIN-rail mounting	**3RK1901-0CB01**		1	1 unit	42C
 3RK1902-0AR00	**Sealing sets**	**3RK1902-0AR00**		100	5 units	42D
	• For K60 mounting plate					
	• Cannot be used for K45 mounting plate					
	• One set contains one straight and one shaped seal					
 3RK1902-4GB50-4AA0	**Control cables, assembled at one end**					
	Angled M12 socket for screw fixing, 4-pole, 4 x 0.34 mm^2, A-coded, black PUR sheath, max. 4 A					
	• Cable length 5 m	**3RK1902-4GB50-4AA0**		1	1 unit	42D
 3RK1902-4CA00-4AA0	**M12 socket, angled**	**3RK1902-4CA00-4AA0**		1	1 unit	42D
	For screw fixing, 4-pole screw terminals, max. 0.75 mm^2, A-coded, max. 4 A					
 3RK1902-4BA00-5AA0	**M12 plugs**					
	For screw fixing, 5-pole screw terminals, max. 0.75 mm^2, A-coded, max. 4 A					
	• Straight	**3RK1902-4BA00-5AA0**		1	1 unit	42D
 3RK1902-4DA00-5AA0	• Angled	**3RK1902-4DA00-5AA0**		1	1 unit	42D
 3RK1902-4H...-5AA0	**Control cables, assembled at one end**					
	Angled M12 plug for screw fixing, 5-pole, 5 x 0.34 mm^2, A-coded, black PUR sheath, max. 4 A					
	• Cable length 1.5 m	**3RK1902-4HB15-5AA0**		1	1 unit	42D
	• Cable length 5 m	**3RK1902-4HB50-5AA0**		1	1 unit	42D
	• Cable length 10 m	**3RK1902-4HC01-5AA0**		1	1 unit	42D
 3RK1902-4PB15-3AA0	**Control cable, assembled at both ends**	**3RK1902-4PB15-3AA0**		1	1 unit	42D
	Straight M12 plug, straight M12 socket, for screw fixing, 3-pole, 3 x 0.34 mm^2, A-coded, black PUR sheath, max. 4 A					
	• Cable length 1.5 m					
	• Also for addressing AS-i slaves with M12 bus connection (e.g. K20, K60R compact modules, M200D motor starters)					

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Communication overview

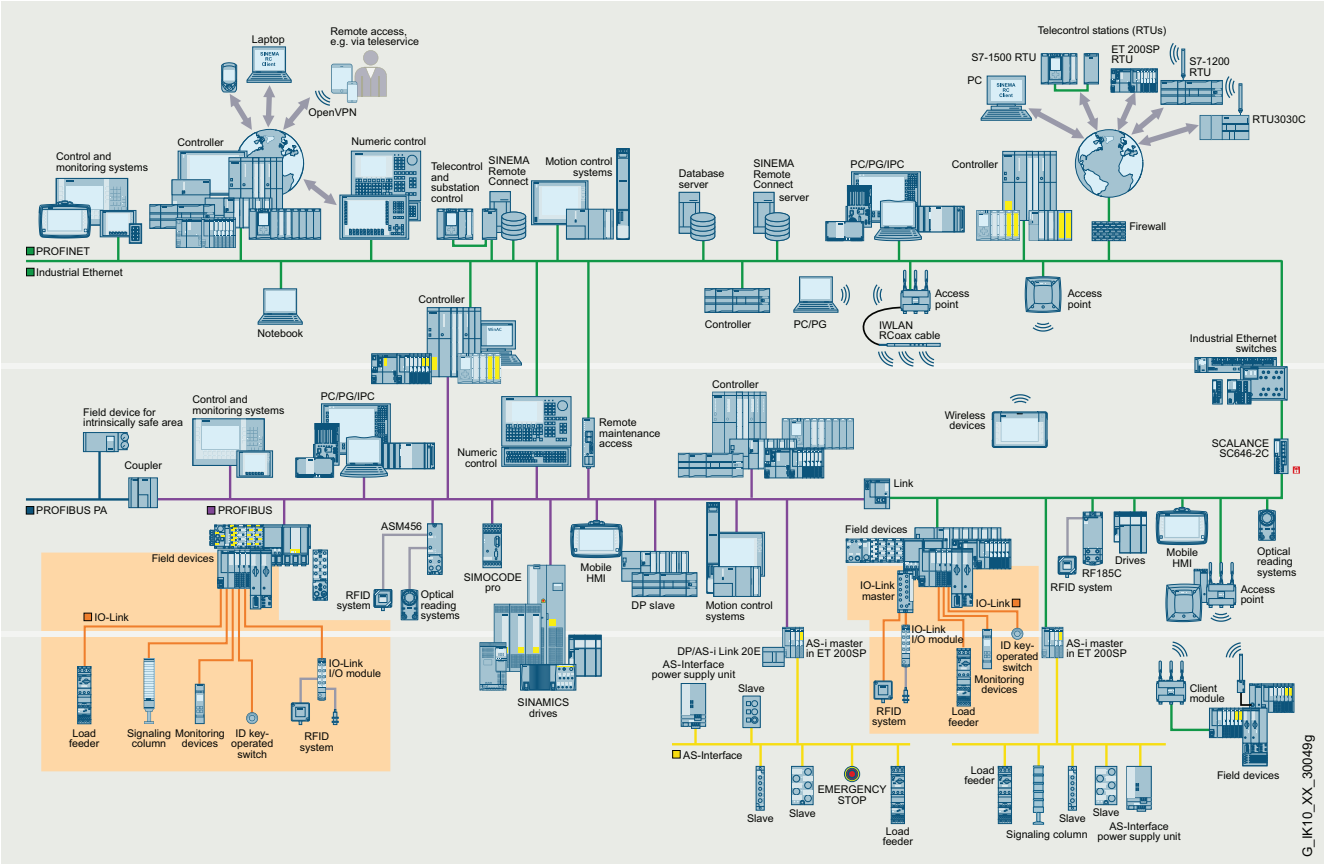
Overview

More information	
Homepage, see www.siemens.com/io-link TIA Selection Tool Cloud (TST Cloud), see www.siemens.com/tstcloud/?node=IoLink	For important topics at a glance, see https://support.industry.siemens.com/cs/ww/en/view/109737170

Video: The IO Link open communication standard

IO-Link is an open communication standard for sensors and actuators – defined by the PROFIBUS User Organization (PNO). IO-Link technology is based on the point-to-point connection of sensors and actuators to the control system.

Parameter and diagnostics data are transmitted in addition to the cyclic operating data for the connected sensors/actuators. The simple, unshielded three-wire cable customary for standard sensors is used for this purpose.



IO-Link in the SIMATIC NET communications landscape

Benefits

Engineering

- Standardized, open system for greater flexibility (non-Siemens IO-Link devices can be integrated in engineering)
- Uniform, transparent configuring and programming through integrated engineering (SIMATIC STEP 7)
- Unassigned SIMATIC function blocks for easy parameterization, diagnostics and read-out of measured values
- Efficient engineering thanks to pre-integration into SIMATIC HMI
- Low error rate in CAD circuit diagram design as a result of reduced control current wiring

Installation and commissioning

- Faster assembly with minimized error rate as a result of reduced control current wiring
- Less space required in the control cabinet
- Low-cost circuitry where there are several feeders by making full use of existing components

Operation and maintenance

- High transparency in the system right down to field level and integration into energy management systems
- Reduction in downtimes and maintenance times thanks to system-wide diagnostics and faster fault correction
- Support of predictive maintenance
- Shorter changeover times, even for field devices, by means of parameter and recipe management

Application

IO-Link can be used in the following main applications:

- Easy connection of complex IO-Link sensors/actuators with a large number of parameters and diagnostics data to the control system
- Wiring-optimized replacement of sensor boxes for connecting binary sensors with the IO-Link input modules
- Optimized cable connection of switching devices to the control system
- Simple transmission of energy values from the device to the control system for integration into a user program or energy management

In these cases, all the diagnostics data are transmitted to the higher-level control system through IO-Link. The parameter settings can be changed during operation.

Integration in STEP 7

Integration of the device configuration in the STEP 7 environment guarantees:

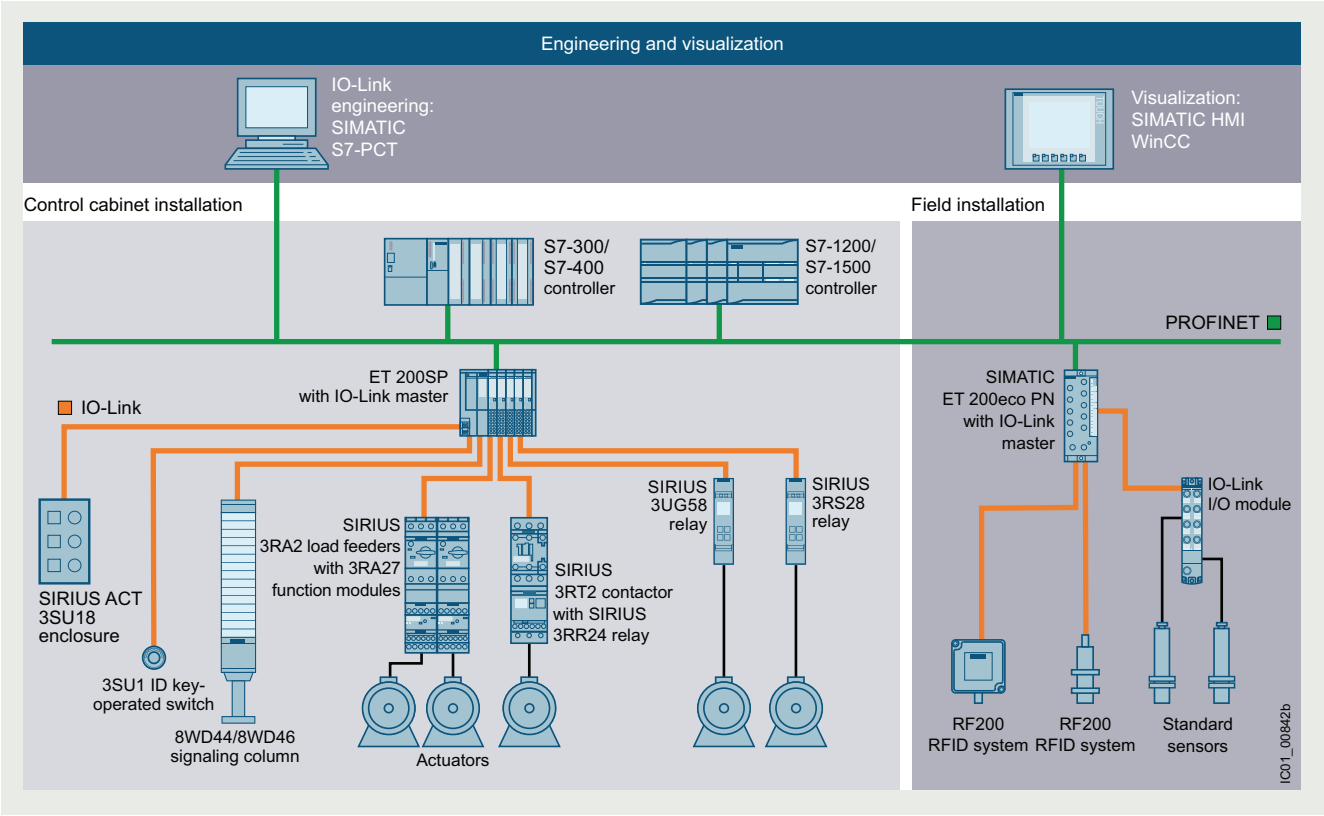
- Quick and easy engineering
- Consistent data storage
- Quick localization and rectification of faults

Overview

IO-Link product family

To implement communication, a system installation has the following main components:

- An IO-Link master module
- One or more IO-Link devices, such as sensors (e.g. RFID systems), actuators or combinations thereof
- A standard three-wire sensor/actuator cable



Example of a configuration with the system components

IO-Link compatibility

IO-Link ensures compatibility between IO-Link-capable modules and standard modules as follows:

- IO-Link sensors can generally be operated both on IO-Link modules (masters) and standard input modules.
- IO-Link sensors/actuators as well as today's standard sensors/actuators can be used on IO-Link master modules.
- If conventional components are used in the IO-Link system, then of course only the standard functions are available at this point.

Analog signals

Another advantage of IO-Link technology is that analog signals are already digitized in the IO-Link sensor itself and are digitally transmitted via IO-Link communication. As the result, faults are prevented and there is no extra cost for cable shielding.

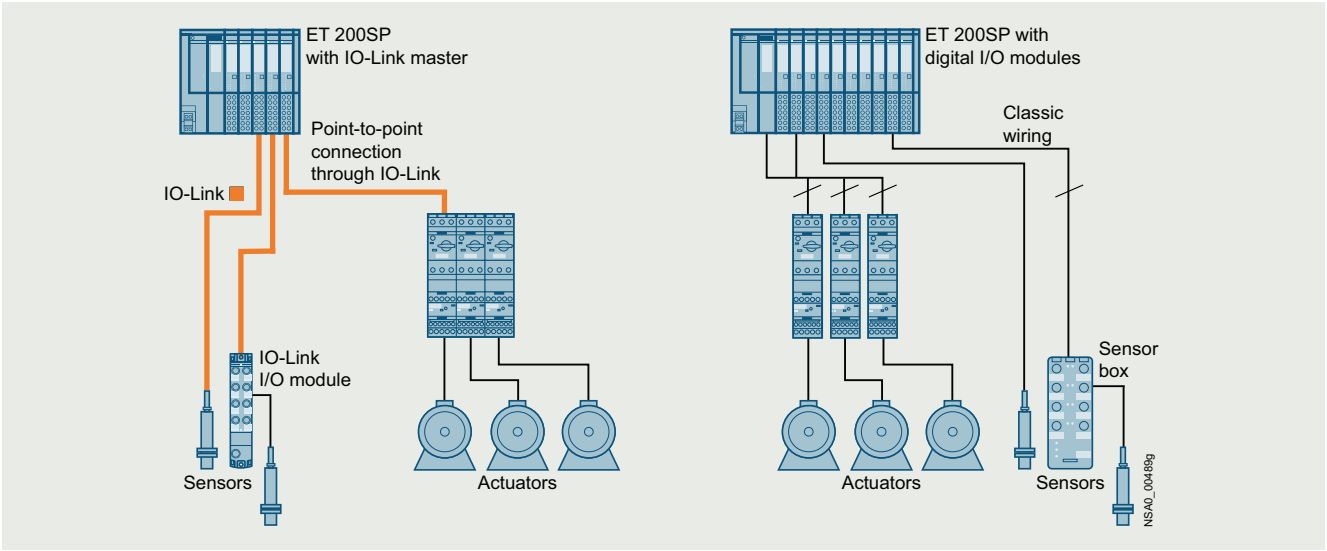
Enhancement with IO-Link input modules

IO-Link compatibility also permits connection of standard sensors/actuators, i.e. conventional sensors/actuators can also be connected to IO-Link. This is particularly cost-effective with the IO-Link input modules, which allow several sensors to be connected at one time via a cable to the controller.

System components

Load feeders and motor starters

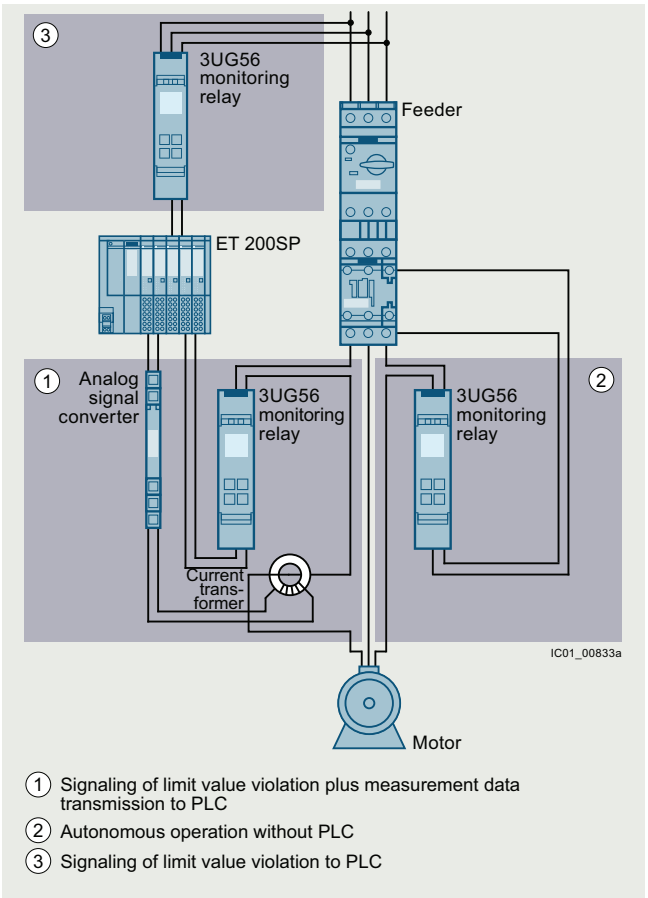
Through IO-Link it is possible to control not only sensors but also actuators in the form of load feeders and motor starters.



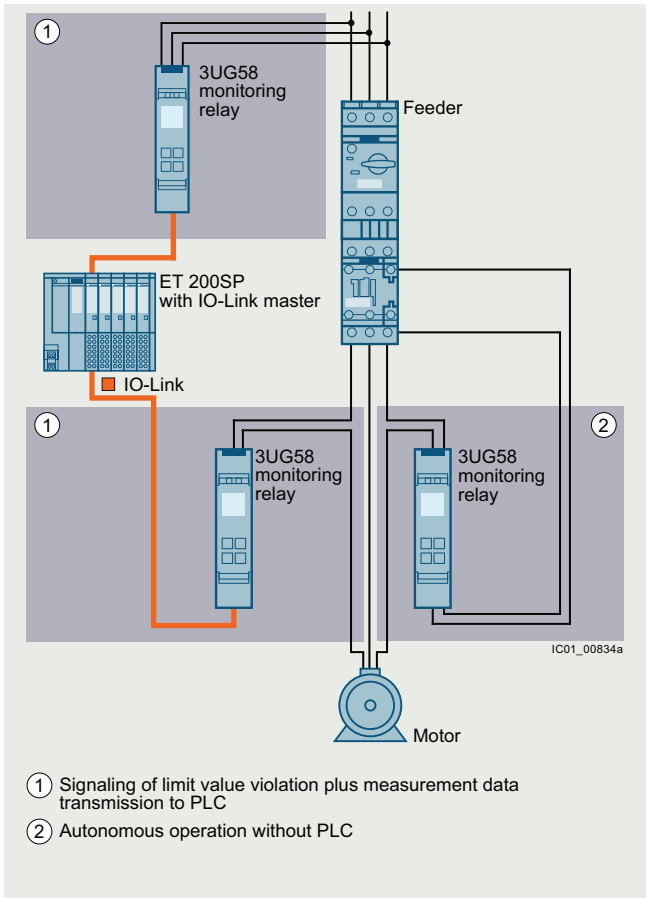
Possibilities of connecting load feeders and motor starters to IO-Link or in the conventional way

Monitoring relays

By using monitoring relays with IO-Link it is now possible to send data that has already been recorded and evaluated in the devices directly to the controller. This avoids the use of duplicated sensors.



Possibilities for interfacing conventional 3UG56 monitoring relays (in comparison with 3UG58)

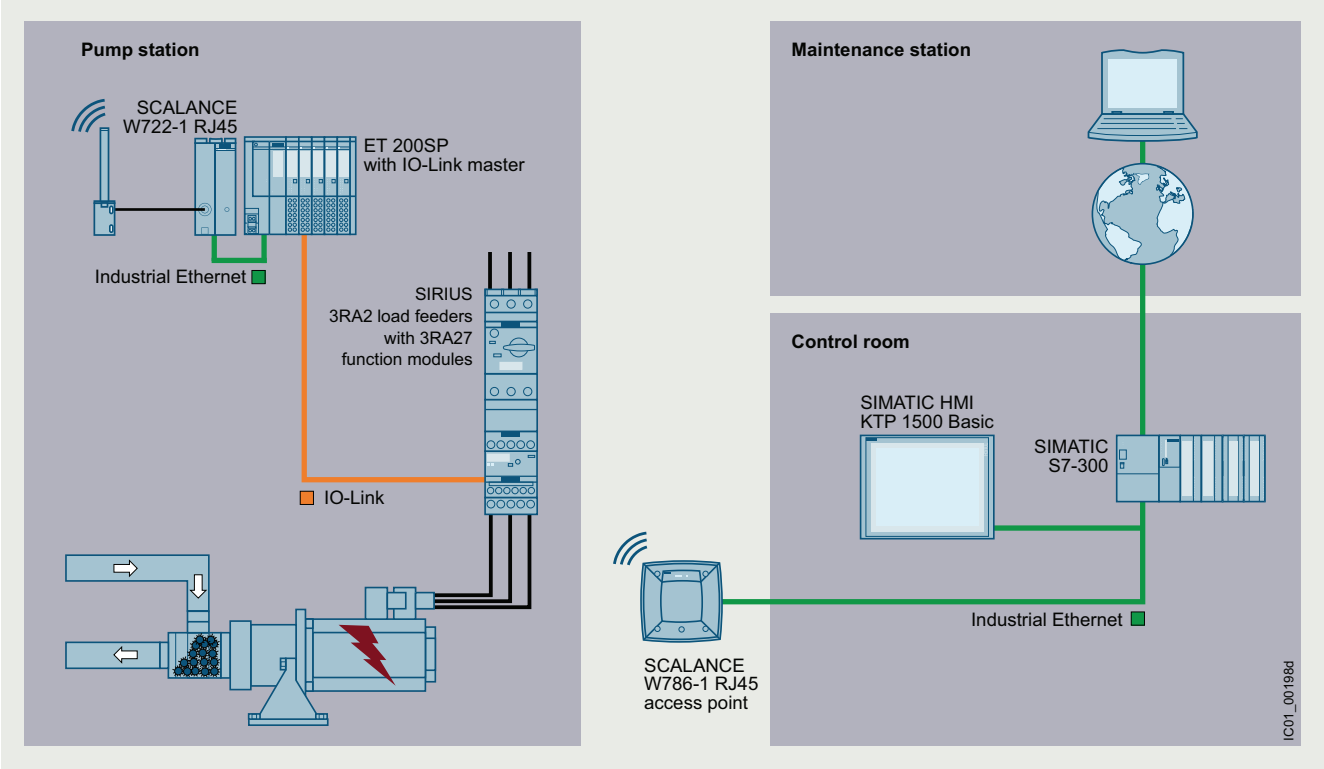


Possibilities of interfacing 3UG58 monitoring relays for IO-Link

Wireless communication

Using an upstream IWLAN client module, such as SCALANCE W722-1 RJ45, allows IO-Link to be integrated into the PROFINET world via a distributed I/O. Possible uses include acting as an alternative to fault-prone cable carrier or collector wire technology.

The individual diagnostics options offered by the various IO-Link devices provide greater transparency for the production process. Just like the parameter data for a device, these diagnostics data can be evaluated remotely using the possibilities offered by SIMATIC. This supports remote maintenance down to the lowest level in the field.



Wireless communication between Industrial Ethernet and IO-Link components

System components

IO-Link components

IO-Link master modules

CM 8xIO-Link for S7-1500

Masters

IO-Link master module for S7-1500

- CM 8xIO-Link, see page 2/97

IO-Link master module for S7-1200

- SM 1278 4xIO-Link, see page 2/98

IO-Link master module for ET 200SP

- CM 4xIO-Link V1.1 Standard, see page 2/99

IO-Link master module for ET 200pro

- 4 IO-Link HF, see page 2/100

IO-Link master module for ET 200eco PN

- IO-Link master 4 IO-L + 8 DI + 4 DO 24 V DC/1.3 A
- IO-Link master 4 IO-L
- IO-Link master 8 IO-L + 4 DI 24 V DC

see page 2/101

IO-Link master module for ET 200AL

- CM IO-Link, see page 2/103

For full product range, see Catalog ST 70.

IO-Link devices

Detection and output with IO-Link

IO-Link I/O modules

IO-Link digital modules

IO-Link I/O modules

- IO-Link, digital input modules
  - DI 8 x 24 V DC, 8 x M8
  - DI 16 x 24 V DC, 8 x M12
- IO-Link, digital output modules
  - DQ 8 x 24 V DC/2 A, 8 x M12
- IO-Link, digital input/output modules
  - DIQ 4+DQ 4 x 24 V DC/0.5 A, 8 x M8
  - DIQ 16 x 24 V DC/0.5 A, 8 x M12

see page 2/104

Switching with IO-Link

SIRIUS contactor 3RT201.-1B...-0CC0

Contactors and contactor assemblies

SIRIUS 3RT contactors, 3-pole up to 250 kW,
see page 3/18 onwards

SIRIUS 3RA23 reversing contactor assemblies, up to 55 kW,
see page 3/140 onwards

SIRIUS 3RA24 contactor assemblies for star-delta (wye-delta) starting, up to 90 kW,
see page 3/156 onwards

SIRIUS 3RA2711 function module for IO-Link

SIRIUS 3RA27 function modules

For direct-on-line, reversing, and star-delta (wye-delta) starting with IO-Link connection,
see page 3/102 onwards

Monitoring with IO-Link

SIRIUS 3RR24 monitoring relay

SIRIUS 3RR24 monitoring relays for mounting on 3RT2 contactors for IO-Link

- Monitoring of current, phase failure, open circuit and phase sequence
- Designed for mounting on 3RT2 contactors
- Terminal supports for stand-alone installation for separate mounting

see page 10/65 onwards

IO-Link devices (continued)

Monitoring with IO-Link

SIRIUS 3UG58 monitoring relay

SIRIUS 3UG58 monitoring relays for stand-alone installation for IO-Link

- depending on device version
  - Line monitoring:
    Phase failure, phase sequence, phase asymmetry, undervoltage and overvoltage, N conductor failure, and frequency
  - Current, active current, voltage, power factor, and power monitoring
  - Residual current monitoring
  - Speed monitoring
- Freely configurable delay times and RESET response

see page 10/76 onwards

SIRIUS 3RS28 temperature monitoring relay

SIRIUS 3RS28 temperature monitoring relays for IO-Link

- Digital device for temperature monitoring with connected sensors
- Two limit values, can be adjusted separately

see page 10/121 onwards

Actuating and indicating with IO-Link

SIRIUS ACT 3SU1 ID key-operated switch

SIRIUS ACT 3SU1 ID key-operated switches for IO-Link

- Access system and selection system for four authorization levels
- Authentication of groups and persons
- Five ID keys with different coding
- Option for individual coding via IO-Link
- For installation in enclosures or fastening on front plate
- Electronic module for ID key-operated switches must be ordered separately

see page 13/12

SIRIUS ACT 3SU1 electronic module

SIRIUS ACT 3SU1 electronic modules for IO-Link

- Eight digital inputs and outputs possible
- DI and DQ freely selectable (programmable)
- Input and output functions configurable
- Spring-loaded terminals (push-in)
- For fastening on front plate or for installation in enclosure

see page 13/90

8WD46 signaling column for IO-Link

Electronically configurable 8WD46 signaling columns, 70 mm diameter

Signaling columns for IO-Link, with or without audible signal

- Configuration of signaling column via IO-Link interface (IODD)
- Fast connection of signaling columns to application using 4-pole M12 plugs
- Via the IO-Link interface, the light pattern, color and brightness of the individual segments (9 to 15 segments) can be set.
- The audible signal can also be set (volume, type of sound up to 105 dB).

see page 13/166 onwards

8WD44 signaling column

8WD44 IO-Link adapter element

8WD44 signaling columns, 70 mm diameter

- Up to five signaling elements can be connected using an IO-Link adapter element
- 24 V DC, 70 mm diameter
- Connection with bayonet mechanism
- For fastening on feet, 8WD44
- Connection elements with screw or spring-loaded terminals or connection element with 5-pole M12 plug

see page 13/173 onwards

IO-Link RFID systems

RFID system for IO-Link

SIMATIC RF200 RFID system in the HF range

Products SIMATIC RF210R, SIMATIC RF220R, SIMATIC RF240R, SIMATIC RF250R, SIMATIC RF260R

- Simple identification tasks such as reading an ID number (UID)
- Reading of user data
- Writing of user data
- No RFID-specific programming, ideal for those new to RFID
- Simple connection via master modules for IO-Link, such as SIMATIC S7-1200, ET 200SP, ET 200pro, ET 200eco PN and ET 200AL
- Use with the tried and tested ISO 15693 transponders (MDS xxx)

see Catalog ID 10

IO-Link SITRANS

FM100

SITRANS FM100

Magnetic-inductive sensor with a compact design for basic applications of various process and OEM industries

- Flow rate and temperature measurement
- Proportioning function with external control
- Configurable multiparameter TFT color display

see Catalog FI 01

LCS050

SITRANS LCS050

Compact, capacitive limit switches with two-wire technology for measuring levels of water-based liquids, sludge, and foam in tight spaces.

- Low maintenance
- Easy-to-read 360° status display
- M12 plug for easy connection

see Catalog FI 01

IO-Link SITOP

SITOP PSU8400

The 3-phase SITOP PSU8400 power supply system 24 V 3 AC/40 A features an IO-Link interface which provides the user with a wide range of options for parameter setting and diagnostics information for further processing in higher-level automation systems.

- Regulated 960 W power supply with 24 V DC/40 A output
- Display with control keys on the front of the device
- Robust wide-range input 400 ... 500 V 3 AC, continuous 2-phase operation possible
- Efficiency up to 96%
- High overload capability
- Output can be switched on and off

see Catalog KT 10.1

IO-Link Device Description (IODD)

SITOP PSU8400

IODD files

These files provide the device description for IO-Link devices.

- Comprehensive IODD catalog of SIEMENS IO-Link devices
- Freely available for downloading from SiePortal, see https://support.industry.siemens.com/cs/ww/en/ps/15851

IODDfinder for IO-Link

IODDfinder

The entire world of IO-Link under one roof

The IODDfinder is a service provided by the IO-Link community. It is a central cross-vendor database for descriptive files (IODDs). In addition, the platform provides an overview of the available IO-Link devices.

For more information, see https://ioddfinder.io-link.com/#/.

IO-Link software

S7-PCT

S7-PCT (Port Configuration Tool)

Engineering software for configuring the IO-Link master modules for SIMATIC S7-1200, ET 200SP, ET 200MP, ET 200pro, ET 200eco PN and ET 200AL

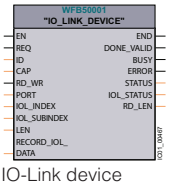
- Available as a stand-alone version or integrated into STEP 7 (V5.5 SP1 and higher) and TIA (V12 and higher)
- Engineering of the IO-Link devices connected to the master
- Monitoring of the process image of the IO-Link devices
- Open interface for importing further IODDs
- Freely available for downloading from SiePortal, see https://support.industry.siemens.com/cs/ww/en/view/32469496

Library for IO-Link (LIOLink)

Library for IO-Link (LIOLink)

This library provides blocks and PLC data types to enable communication between the SIMATIC controller and the IO-Link master module or IO-Link device.

- Freely available for downloading from SiePortal, see https://support.industry.siemens.com/cs/ww/en/view/82981502



IO-Link device function block

Application of the device-specific blocks for IO-Link

This application shows on a specific example how easy it is to connect Siemens IO-Link devices to a SIMATIC S7 CPU using the library for IO-Link (LIOLink).

- Freely available for downloading from SiePortal, see https://support.industry.siemens.com/cs/ww/en/view/90529409

IO-Link specification

Overview

Principles of the IO-Link specification

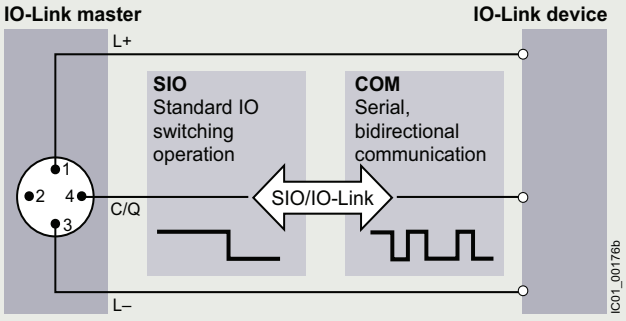
According to the IO-Link specification, communication functions as follows:

- Transmission takes place via an unshielded three-wire cable no more than 20 m long, of the kind normally used for standard sensors.
- Digital communication from 0 to 24 V on the so-called C/Q cable
- Most of the values transmitted are measured values from the sensors
- The sensors and actuators are described by the IO Device Description (IODD)
- As a matter of principle, one IO-Link device can be connected to one IO-Link port of the master (point-to-point connection)
- The transfer rates between IO-Link master module and the devices are as follows:
  - Via COM1: 4 800 Bd
  - Via COM2: 38 400 Bd
  - Via COM3: 230 400 Bd
- The average cycle time is 2 ms for the reading/writing of 16 data bits at a transfer rate of 38 400 Bd

IO-Link protocol

The IO-Link protocol supports both the Standard IO mode (SIO) and the IO-Link communications mode (COM).

Interface hardware:
• compatible with sensors according to IEC 60947-5-2 and actuators
• communication and switching possible alternately



The structure of the protocol and its message frames depends on the types of data to be transmitted.

Data types

The IO-Link specification makes a distinction between the following data types:

Process data

The process data of the devices are transferred cyclically in a data frame, with the process data width defined by the device. Process data of 0 to 32 bytes are possible per device (input and output in each case). The consistency width of the transmission is not fixed and therefore depends on the master.

Value status

Each port has a value status (PortQualifier). The value status indicates whether the process data are valid or invalid. The value status can be transferred cyclically with the process data.

Device data

Device data can be parameters, identification data and diagnostics information. Device data replacement is acyclic and in response to an inquiry from the IO-Link master module. Device data can be written into the device (Write) and also read from the device (Read).

Events

When an event occurs, the device sends a signal to the master to report that an event is active. The master then reads out the event. Events can be fault messages (e.g. short circuit) and warnings/maintenance data (e.g. contamination, overheating). Fault messages are transferred from the device via the IO-Link master module to the controller or HMI. The IO-Link master module can also transfer events and states. Events include, for example, open circuit or communication breakdown.

Device parameters and events are sent independently of the cyclic transmission of process data. The transmissions do not affect or impair each other.

Data storage

As of specification V1.1, a data storage concept has been created for IO-Link. In this concept, the IO-Link device initiates storage of its data on a higher-level parameter server. In the event that a device is replaced, the parameter server can restore the original parameterization. It is therefore possible to replace the devices without reparameterization.

The IO-Link master module contains the parameter server. The parameter server can also be implemented centrally in the PLC or in a system server. In this case the data must be downloaded to the control system by means of the function blocks provided.

IO-Link master modules

The IO-Link master module is the interface to higher-level control systems. The IO-Link master module presents itself to the fieldbus as a normal fieldbus node, and is integrated into the appropriate network configurator via the relevant device description (GSD file).

IO Device Description (IODD)

The IO Device Description (IODD) has been defined to provide a full, transparent description of system characteristics as far as the IO-Link device.

The IODD contains information on communication characteristics, device parameters, identification, process and diagnostics data, and is supplied by the manufacturer. The design of the IODD is the same for all devices from all manufacturers, and is always presented in the same way by the IODD interpreter tools. This therefore ensures that the handling is the same for all IO-Link devices, whatever the manufacturer.

New in IO-Link specification V1.1

The IO-Link specification is currently available in Version 1.1, and standardized according to IEC 61131-9.

Specification V1.1 offers the following new features compared with the previous specification V1.0:

- Transmission of up to 32 bytes of process data in one cycle
- Parameter server function

Overview

CM 8xIO-Link master

- Communications module for connecting up to 8 IO-Link devices (three-wire connection) or 8 standard sensors
- Can be used directly downstream of an S7-1500 CPU or distributed in ET 200MP via PROFINET or PROFIBUS
- Powerful diagnostics functions facilitate preventive maintenance to avoid plant standstills
- Simple replacement of sensors/actuators without time-consuming parameterization

Application

IO-Link makes it easy to change the parameters for manufacturing and processing different product versions and batches, even during CPU runtime, down to the sensor/actuator level. Easy, much more detailed diagnostics are also possible down to the sensor or actuator, including remote diagnostics.

The CM 8xIO-Link enables direct connection of up to 8 IO-Link devices directly to SIMATIC S7-1500 and ET 200MP. This makes external stations unnecessary.

This results in savings on wiring, engineering and commissioning, because everything can be configured centrally with the CPU.

Design

- Fastening to the S7-1500 mounting rail with a single screw
- 40-pole front connector, optionally with screw terminals or push-in terminals
- Front flap with expandable cable compartment

Included in the scope of supply:

- One U connector
- Front door

Function

Overview of functions

- Suitable for connecting up to 8 IO-Link devices (three-wire connection) or 8 standard sensors
- IO-Link master module according to IO-Link specification V1.1
- Data transfer rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd)
- Configurable diagnostics can be set for each channel
- Master backup with "IO_Link_MASTER_8" function block
- Replacement of the IO-Link device (for V1.1 devices only)
- Support for firmware updating of IO-Link devices
- Variable address range for I/O data with up to 240 byte inputs and 240 byte outputs;
  Expansion limits:
  - Max. 32 bytes of input data and 32 bytes of output data per port
  - Max. 240 bytes of input data and 240 bytes of output data per module
- Port Qualifier Information (PQI)
- IO-Link port configuration with S7-PCT
- IO-Link port configuration with STEP 7 or GSD (without S7-PCT)
- Standard system functions of SIMATIC ET 200MP:
  - Identification and maintenance data IM0
  - Firmware update
  - Unambiguous module inscription on the front

Configuration

The SIMATIC S7-1500 IO-Link master module of the S7-1500 can be conveniently configured using the graphical user interface in the free S7 Port Configuration Tool (S7-PCT, V3.5 and higher, SP1).

In addition to this configuration, commissioning without S7-PCT is also possible. In this case, the port is configured by means of either the TIA Portal or GSD file. The following port modes are supported:

- Operation in "IO-Link autostart" mode (default)
- Operation in "IO-Link manual" mode
- Operation as DI
- Deactivated

Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 6ES7547-1JF00-0AB0	**CM 8xIO-Link communications module** Communications module for connecting up to 8 IO-Link devices (three-wire connection) or 8 standard sensors	**6ES7547-1JF00-0AB0**		1	1 unit	219

For more information, see https://mall.industry.siemens.com/mall/en/ww/Catalog/Products/10355273.

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

IO-Link master module for S7-1200 > SM 1278 4xIO-Link master

Overview

SM 1278 4xIO-Link master

Module for connecting up to four IO-Link devices according to the IO-Link specification V1.1. The IO-Link parameters are configured by means of the Port Configuration Tool (PCT) with version V3.2 and higher.

Application

The SM 1278 module enables an exchange of data with up to four external IO-Link devices through one three-wire cable each or four standard actuators or standard encoders. Control can be flexibly adapted to the communication partners using the comprehensive parameter assignment options. Since IO-Link is compatible with standard sensors, commercially available sensors compliant with IEC 61131 Type 1 can also be operated on the IO-Link master.

Design

- Expansion limits
  - Cable length: Max. 20 m
  - Max. 32 bytes of input data and 32 bytes of output data per port
  - Max. 32 bytes of input data and 32 bytes of output data per module

LED displays

- DIAG: Operating state display (green/red) of the module
- C1..C4: Port status display (green) for ports 1, 2, 3 and 4
- Q1..Q4: Channel status display (green) for ports 1, 2, 3 and 4
- F1..F4: Port error display (red) for ports 1, 2, 3 and 4

Depending on the CPU type used, up to 8 SM 1278 units can be used on one S7-1200 CPU.

Function

Supported functions

- I&M identification data
- Firmware update
- SIO mode (standard IO mode)
- IO-Link parameter assignment with the S7-PCT interface configuration tool, TIA Portal from V13 and an S7-1200 CPU V4.0 or higher

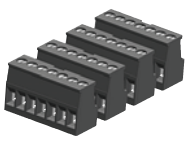
Supported data transfer rates

- COM1 (4.8 kBd)
- COM2 (38.4 kBd)
- COM3 (230.4 kBd)

Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 6ES7278-4BD32-0XB0	**SM 1278 4xIO-Link master signal module** For connecting up to four IO-Link devices according to the IO-Link specification V1.1	**6ES7278-4BD32-0XB0**		1	1 unit	212

Accessories

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 6ES7292-1AG30-0XA0	**Terminal blocks (spare part)** 7-pole, tin-plated; 4 units					
	• Screw terminals	**6ES7292-1AG30-0XA0**		1	4 units	212
	• Push-in terminals	**6ES7292-2AG30-0XA0**		1	4 units	212

For more information, see https://mall.industry.siemens.com/mall/en/ww/Catalog/Products/10231178.

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview

CM 4xIO-Link

- CM 4xIO-Link communications module
  Serial communications module for connecting up to four IO-Link devices according to the IO-Link specification V1.0 and V1.1. The IO-Link parameters are configured by means of the Port Configuration Tool (PCT) with version V3.0 and higher.
- Time-based IO
  Time-based IO ensures that signals are output with a precisely defined response time. By combination of inputs and outputs, products passing by, for example, can be measured exactly or liquids can be perfectly dosed.
- Supported data transfer rates
  - COM1 (4.8 kBd)
  - COM2 (38.4 kBd)
  - COM3 (230.4 kBd)
- Expansion limits
  - Cable length: Max. 20 m
  - Max. 32 bytes of input data and 32 bytes of output data per port
  - Max. 144 bytes of input data and 128 bytes of output data per module
- ET 200SP system functions supported
  - Exchange of IO-Link device parameters (V1.1 devices only) and of IO-Link master module parameters without a PG including automatic backup recovery without an engineering tool by means of redundant parameter storage on the e-coding element
  - Reparameterization during ongoing operation
  - I&M identification data
  - Firmware update
  - PROFIenergy
- Can be plugged onto type A0 BaseUnits (BU) with automatic e-coding
- LED displays
  - DIAG: Operating state display (green/red) of the module
  - C1..C4: Port status display (green) for ports 1, 2, 3 and 4
  - Q1..Q4: Channel status display (green) for ports 1, 2, 3 and 4
  - F1..F4: Port error display (red) for ports 1, 2, 3 and 4
  - PWR: Supply voltage display (green)
- Informative module inscription on the front
  - Plain-text marking of the module type and function class
  - 2D matrix code (Article No. and serial number)
  - Circuit diagram
  - CM module class color coding: Silver
  - Hardware and firmware version
  - Complete article number
- Optional accessories
  - Labeling strips
  - Equipment labeling plate
  - Color-coded label with color code CC04
- Optional system-integrated shield connection

Application

- The CM 4xIO-Link communications module enables an exchange of data with up to 4 external IO-Link devices through one three-wire cable each.
- Control can be flexibly adapted to the communication partners using the comprehensive parameter assignment options.
- Since IO-Link is compatible with standard sensors, commercially available sensors compliant with IEC 61131 Type 1 can also be operated on the IO-Link master.

Selection and ordering data

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 6ES7137-6BD00-0BA0					
CM 4xIO-Link V1.1 Standard communications module • Serial communications module for connecting up to 4 IO-Link devices, time-based IO, BU type A0, color code CC04	**6ES7137-6BD00-0BA0**		1	1 unit	255

For more information, see https://mall.industry.siemens.com/mall/en/ww/Catalog/Products/10205200.

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

IO-Link master module for ET 200pro > 4 IO-Link HF

Overview

4 IO-LINK HF

- 45-mm-wide 4 IO-Link HF electronic module
- 4 IO-Link ports according to IO-Link specification V1.1
- Port Class B
- The IO-Link parameters are configured using the Port Configuration Tool (S7-PCT), version V3.4 and higher

Application

The 4 IO-Link HF electronic module enables the exchange of data with up to 4 IO-Link devices.

Since IO-Link is compatible with standard sensors, commercially available sensors compliant with IEC 61131 Type 1 can also be operated on the IO-Link master.

Design

The 4 IO-Link HF electronic module is used together with the CM IO-LINK 4 X M12 P connection module. Sensors and actuators are integrated using commercially available 3- or 5-pole M12 plugs on the CM IO-Link 4 X M12 P.

IO-Link devices (e.g. sensors) with Port Class A are interconnected by means of a three-wire cable. IO-Link devices that require an additional supply voltage and have a Port Class B (e.g. actuators) are interconnected by means of a five-wire cable.

Selection and ordering data

	Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 6ES7147-4JD00-0AB0	**4 IO-Link HF electronic module** • 4 IO-Link ports according to IO-Link specification V1.1 • Port Class B • High Feature • Channel diagnostics • Including bus module • Connection module must be ordered separately	**6ES7147-4JD00-0AB0**		1	1 unit	250

Accessories

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
CM IO-LINK 4 X M12 P connection module 4 M12 sockets for connection of IO-Link devices to ET 200pro 4 IO-Link HF electronic module	**6ES7194-4CA20-0AA0**		1	1 unit	250
Module labeling plates For color coding of CM IOs in the colors white, red, blue and green; pack of 100	**6ES7194-4HA00-0AA0**		1	500 units	250
M12 sealing caps For protection of unused M12 terminals on ET 200pro	**3RX9802-0AA00**		100	10 units	42C

For more information, see https://mall.industry.siemens.com/mall/en/ww/Catalog/Products/10304039.

* You can order this quantity or a multiple thereof.
Illustrations are approximate

Overview

IO-Link master with 2 x M12-L coded power plug and 45-mm width

- IO-Link communications modules for connecting up to 8 IO-Link devices
- Versions: IO-Link master module
  - with 4 x Port Class A and 4 x Port Class B and additional 4 digital inputs,
  - with 4 x Port Class A and an additional 12 digital inputs/outputs or
  - with 8 x Port Class A and an additional 8 digital inputs/outputs
- The IO-Link specifications V1.0 and V1.1 are supported.

IO-Link master with 2 x M12-A coded power plug and 30-mm width

- IO-Link communications modules for connecting up to 4 IO-Link devices
- IO-Link master with 4 x Port Class B
- The IO-Link specifications V1.0 and V1.1 are supported.

IO-Link master with 2 x M12-A coded power plug and 60-mm width

- IO-Link communications modules for connecting up to 4 IO-Link devices
- IO-Link master with 4 x Port Class A and an additional 8 digital inputs and 4 digital outputs
- The IO-Link specification V1.0 is supported.

IO-Link master module for ET 200eco PN > IO-Link master

Application

IO-Link enables easy integration of sensors and actuators from different manufacturers. ET200eco PN IO-Link master I/O devices enable an exchange of data with up to 4 or 8 IO-Link devices.

IO-Link devices (e.g. sensors) with Port Class A are interconnected by means of a three-wire cable. IO-Link devices that require an additional supply voltage and have a Port Class B (e.g. actuators) are interconnected by means of a five-wire cable.

Since IO-Link is compatible with standard sensors, commercially available sensors compliant with IEC 61131 Type 1 can also be operated on the IO-Link master.

With a high degree of protection, ruggedness and small dimensions, the IO-Link master I/O devices are especially well-suited for use at the machine level in confined spaces. They have adjustable parameters and diagnostics functions and can therefore be flexibly adapted to individual process requirements.

Function

In addition to the general functions of the ET 200eco PN I/O system, the IO-Link masters according to the IO-Link specification V1.1 have some further functions:

- Supported data transfer rates of the IO-Link communication
  - COM1 (4.8 kBd)
  - COM2 (38.4 kBd)
  - COM3 (230.4 kBd)
- Expansion limits
  - Cable length to the IO-Link device: Max. 20 m
  - Max. 32 bytes of input data and 32 bytes of output data per IO-Link port
- Automatic backup of device parameters when the IO-Link device is replaced (V1.1 devices only)
- Reparameterization of the device during operation using a PLC function block
- Master backup using a PLC function block
- Support for firmware updates of IO-Link devices
- Configuration using a GSD file or S7-PCT

Selection and ordering data

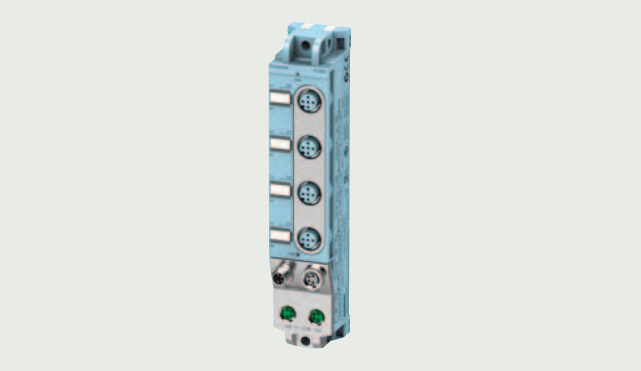
6ES7148-6J.00-0.B0

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
ET 200eco PN IO-Link masters					
• 4 IO-L + 8 DI + 4 DO, 24 V DC/1.3 A; 8 x M12, degree of protection IP67, enclosure width 60 mm; for connecting up to 4 IO-Link devices according to IO-Link specification V1.0 and Port Class A as well as an additional 8 digital inputs and 4 digital outputs	**6ES7148-6JA00-0AB0**		1	1 unit	257
• 4 IO-L; 4 x M12, degree of protection IP67, enclosure width 30 mm; for connecting up to 4 IO-Link devices according to IO-Link specifications V1.0 and V1.1 and Port Class B	**6ES7148-6JD00-0AB0**		1	1 unit	257
• 8 IO-L + 4 DI 24 V DC; 8 x M12, degree of protection IP67, enclosure width 45 mm; for connecting up to 8 IO-Link devices according to IO-Link specifications V1.0 and V1.1, 4 x Port Class A + 4 x Port Class B as well as an additional 4 digital inputs	**6ES7148-6JG00-0BB0**		1	1 unit	257
• 8 IO-L + 8 DIQ 24 V DC; 8 x M12, degree of protection IP67, enclosure width 45 mm; for connecting up to 8 IO-Link devices according to IO-Link specifications V1.0 and V1.1, 8 x Port Class A as well as an additional 8 digital inputs/outputs	**6ES7148-6JJ00-0BB0**		1	1 unit	257
• 4 IO-L + 12 DIQ 24 V DC; 8 x M12, degree of protection IP67, enclosure width 45 mm; for connecting up to 4 IO-Link devices according to IO-Link specifications V1.0 and V1.1, 4 x Port Class A as well as an additional 12 digital inputs/outputs	**6ES7148-6JE00-0BB0**		1	1 unit	257

For more information, see https://mall.industry.siemens.com/mall/en/ww/Catalog/Products/10370454.

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

Overview



CM IO-Link communications module

- CM IO-Link communications module, 30 mm wide
- For connecting up to 4 IO-Link devices according to the IO-Link specifications V1.0 and V1.1 and Port Class B
- The IO-Link parameters are configured by means of the S7-PCT Port Configuration Tool with version V3.2 and higher.

Application

The CM IO-Link communications module supports data exchange between up to four IO-Link devices. IO-Link devices (e.g. sensors) with Port Class A are interconnected by means of a three-wire cable. IO-Link devices, which require an additional supply voltage and have a Port Class B (e.g. actuators), are interconnected by means of a five-wire cable.

Since IO-Link is compatible with standard sensors, commercially available sensors compliant with IEC 61131 Type 1 can also be operated on the IO-Link master.

The 30-mm-wide I/O modules are ideally suited for use in extremely confined spaces. They have adjustable parameters and diagnostics functions and can therefore be flexibly adapted to individual process requirements.

The following IO-Link master modules are available:

- Communications module CM 4 x IO-Link, 4 x M12

Design

The I/O modules have a screw mounting hole at the front and side, and can be mounted in any position. As a result, they are extremely flexible to install on either a level surface or on aluminum mounting rails using sliding blocks.

The CM IO-Link communications module features:

- A backplane bus connection (ET connection) with M8 connection technology for connection to an interface module or other I/O modules
- A power supply connection with M8 connection technology with loop-through
- LED display for port status
- LED display for channel status in SIO mode
- LED display for module status (DIAG)
- LED display for load voltage 2L+ (PWR)
- Labeling plates for channel, module and slot identification
- Integrated cable tie holder
- Informative module inscription on the front:
  - Plain text marking of module type
  - Interface marking
  - LED label
- Informative module inscription on the side:
  - Article number, function level and FW version
  - 2D matrix code (Article No. and serial number)
  - Pin assignments of all interfaces

Labeling plates for channel, module and slot identification are supplied with the modules. These labeling plates can be inscribed using commercially available inscription machines.

Function

- IO-Link master module according to IO-Link specification V1.1
- 4 ports, Class B type
- Supported data transfer rates
  - COM1 (4.8 kBd)
  - COM2 (38.4 kBd)
  - COM3 (230.4 kBd)
- Expansion limits
  - Cable length: Max. 20 m
  - Max. 32 bytes of input data and 32 bytes of output data per port
  - Max. 32 bytes of input data and 32 bytes of output data per module
- Automatic backup of device parameters when the IO-Link device is replaced (V1.1 devices only)
- Reparameterization during ongoing operation
- Standardized display and diagnostics concept:
  - Port status display (port activated or deactivated, green LED)
  - Channel status display for signal state in SIO mode (green LED)
  - Module status display (DIAG, red/green LED)
  - Display for monitoring the load voltage 2L+ (PWR, green LED)
- Supported functions:
  - Detailed module-level diagnostics and diagnostic interrupt
  - Identification and maintenance data IM0 ... IM3
  - Firmware update
  - PROFIenergy

Selection and ordering data

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
CM IO-Link CM 4 x IO-Link, 4 x M12; for connecting up to 4 IO-Link devices according to the IO-Link specifications V1.0 and V1.1 and Port Class B	**6ES7147-5JD00-0BA0**		1	1 unit	254

6ES7147-5JD00-0BA0

For more information, see https://mall.industry.siemens.com/mall/en/ww/Catalog/Products/10233997.

*** You can order this quantity or a multiple thereof.**
Illustrations are approximate

IO-Link I/O modules

Overview

IO-Link I/O modules

The IO-Link communication standard enables and standardizes communication between machine and plant control systems on one hand and sensors, actuators and other field devices on the other.

The IO-Link I/O modules permit simple connection of binary standard sensors and actuators and the signals and power supply are transmitted via IO-Link (IO-Link master module).

The IO-Link IO modules can be connected to any IO-Link master and distributed I/O units that are independent of the fieldbus can be built. The universal deployability of the IO-Link DIQ I/O modules provides additional versatility.

With the ET 200AL IO-Link I/O modules, a rounded portfolio of digital input, digital output and digital input/output modules is available in the design and with the ET 200AL system features.

Application

IO-Link can provide advantages as a communications system, e.g. when complex sensors and actuators are to be used. These IO-Link devices can be connected via an IO-Link master and be integrated into the automation system with reduced effort, e.g. for cabling.

If such an IO-Link master is available, further binary sensor/actuator signals can be integrated in the field via the IO-Link I/O modules without great effort. IO-Link masters can be expanded with the IO-Link I/O modules to form a modular I/O station, with which distributed signals can be detected and output in the plant or machine.

The following IO-Link I/O modules are available:

- IO-Link, digital input module DI 8 x 24 V DC, 8 x M8
- IO-Link, digital input module DI 16 x 24 V DC, 8 x M12
- IO-Link, digital output module DQ 8 x 24 V DC/2 A, 8 x M12
- IO-Link, digital input/output module DIQ 4+DQ 4 x 24 V DC/0.5 A
- IO-Link, digital input/output module DIQ 16 x 24 V DC/0.5 A

Function

- Standardized display and diagnostics concept:
  - Channel status display for signal status log. "0" and log. "1" (green LED)
  - Module status display (DIAG, red/green LED)
  - Display for monitoring the load voltage 2L+ (PWR, green LED, only modules with outputs)
- Supported functions:
  - Channel-specific parameterization
  - Detailed module-level diagnostics and diagnostic interrupt
  - Safety-related tripping of digital outputs according to IEC 62061 (SILCL2) and ISO 13849-1 (Cat 3/PL d)
  - IO-Link V1.1
  - Support for the "general profile" of IO-Link
  - Firmware update

Engineering

The engineering of the IO-Link I/O modules is performed via IO-Link engineering of the relevant IO-Link master module. For this purpose, one device description file (IODD) per IO-Link I/O module is provided.

Selection and ordering data

6ES714.-5..00-0BL0

Version	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
IO-Link, digital input modules					
Degree of protection IP67					
• DI 8 x 24 V DC, 8 x M8	**6ES7141-5BF00-0BL0**		1	1 unit	250
• DI 16 x 24 V DC, 8 x M12	**6ES7141-5AH00-0BL0**		1	1 unit	250
IO-Link, digital output module					
Degree of protection IP67					
• DQ 8 x 24 V DC/2 A, 8 x M12	**6ES7142-5AF00-0BL0**		1	1 unit	250
IO-Link, digital input/output modules					
Degree of protection IP67					
• DIQ 4+DQ 4 x 24 V DC/0.5 A, 8 x M8	**6ES7143-5BF00-0BL0**		1	1 unit	250
• DIQ 16 x 24 V DC/0.5 A, 8 x M12	**6ES7143-5AH00-0BL0**		1	1 unit	250

For more information, see https://mall.industry.siemens.com/mall/en/ww/Catalog/Products/10383153.

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Illustrations are approximate

Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

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