AS-interface Family

AS-i Safety at Work

AS-i Slaves

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Overview

More information

Homepage, see www.siemens.com/as-interface

Industry Mall, see www.siemens.com/product?as-interface

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 engineering	• 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 two-wire cable – 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 STEP7 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 in the Safety Evaluation Tool (TÜV-approved)
- Integration of lower-level AS-i networks into the PCS 7 process control system
- Global spare parts logistics, consulting and service

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ASIsafe			
	ASIsafe enables integration of safety-related components in an AS-Interface network, for example: • EMERGENCY STOP pushbuttons • 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 (two-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 14/32

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ASIsafe (continued)			
 3RK3 Modular Safety System	**SIRIUS 3RK3 Modular Safety System** Supplementing the service-proven concept of safety monitors, the 3RK3 Modular Safety System (MSS) offers, for example, the following functions for ASIsafe: • Up to 50 enabling circuits including muting function • Expandable fail-safe and non-fail-safe inputs/outputs • Control of up to 12 ASIsafe outputs or 12 fail-safe independent switch-off groups • Memory module for parameters, e.g. for device replacement • Optional PROFIBUS interface for diagnostics and parameterization • SIRIUS Safety ES, the intuitive graphic parameterization and diagnostics software • AS-i Power24V capability Your advantage: Easy to configure safety functions up to Category 4, PL e, SIL 3.	**3RK3**	See Catalog Section 13
 Safety monitor	**AS-Interface safety monitors** • For monitoring safe stations and for linking AS-Interface inputs and outputs • Ensures safe disconnection • Available with one or two release circuits with two-channel configuration • All versions with removable screw terminals or spring-loaded terminals • All safety monitors in revised Version 3 with additional options • Filtering out of brief single-channel interruptions in the sensor circuit with the expanded safety monitor Version 3 • Expanded safety monitor with integrated safe slave for controlling a distributed safe AS-i output or for safe coupling a safe signal from one AS-i network to another AS-i network • ASIMON V3 Configuration software with graphic function diagram presentation Your advantage: Easy to configure safety functions up to Category 4, PL e, SIL 3.	**3RK1**	14/24
 K45F  SC17.5F  S45F SlimLine module, safe AS-i output	**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 • Up to one safe output per module • Standard outputs are available on the module in addition • Up to Category 4, PL e, SIL 3 Your advantage: Easy integration of safe signals both in the switching cabinet and in the field.	**3RK1**	From 14/25
 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**	See Catalog Section 13
 EMERGENCY STOP mushroom pushbutton in enclosure	**SIRIUS ACT EMERGENCY STOP mushroom pushbuttons for AS-Interface** • Degree of protection IP66/IP67/IP69K • Metal or plastic version • Connection of an EMERGENCY STOP device according to EN ISO 13850 to AS-Interface • Safety-related AS-Interface module is snapped onto the commanding device from behind • Can be used up to PL e, SIL 3 Your advantage: Easy direct connection of control elements to ASIsafe.	**3SU14 modules** **3SU18 enclosure**	See Catalog Section 11

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Masters			
	The AS-Interface master connects SIMATIC control systems 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 1243-2 for SIMATIC S7-1200	**Masters for SIMATIC S7** AS-Interface master connections: • CM 1243-2 for SIMATIC S7-1200 • CP 343-2P, CP 343-2 for SIMATIC S7-300 and ET 200M 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.	**3RK7** **6GK7**	From 14/28 From 14/30
 CP 343-2, CP 343-2P for SIMATIC S7-300			
	Masters for SIMATIC ET 200		
 CM AS-i Master ST for SIMATIC ET 200SP	CM AS-i Master ST for SIMATIC ET 200SP • 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.	**3RK7**	From 14/32
 F-CM AS-i Safety ST for SIMATIC ET 200SP	F-CM AS-i Safety ST for SIMATIC ET 200SP • 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 61508/EN 62061)/PL e (EN 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.	**3RK7**	From 14/36

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Routers			
 DP/AS-i Link Advanced	• Degree of protection IP20 • PROFIBUS slave or PROFINET IO device and AS-Interface master (single or double master in case of DP/AS-i Link Advanced and IE/AS-i Link PN IO) • Connection of up to 62 AS-Interface slaves per AS-Interface network • Connection of up to 496 digital inputs and 496 outputs per AS-i network, with doubling of the project data volume for double master versions • Integrated ground-fault monitoring (in case of DP/AS-i Link Advanced and IE/AS-i Link PN IO) • User-friendly local diagnostics and local startup by means of a full graphic display and control keys or through a web interface with a standard browser (in case of DP/AS-i Link Advanced and IE/AS-i Link PN IO) • 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 or PROFINET. As an alternative to the IE/AS-i Link PN IO, a high-performance router 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 in an ET 200SP station (for safety-related applications), , see pages 14/34 and 14/38.	**3RK3, 6GK1**	From 14/39
 DP/AS-Interface Link 20E			
 IE/AS-i Link PN IO			
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).		
	I/O modules for use in the field, high degree of protection		
 K20 digital module	Digital I/O modules, IP67 – K60, K60R, K45 and K20 • Degree of protection IP65/IP67 or IP68/IP69K • Modules available with up to degree of protection IP68/IP69K • Connection sockets in M8/M12 • Up to eight inputs and four outputs • A/B technology available • Contacting protected against polarity reversal • Standard 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 14/50
 K45 digital module			
 K60 digital module			
 K60 analog module	Analog I/O modules, IP67 – K60 • Degree of protection IP65/IP67 • Detects or transmits analog signals locally • two-/four-channel • Input modules for up to four sensors with current signal, with voltage signal or with thermal resistor • Output modules for current or voltage • Fast analog modules available for higher access speeds Your advantage: Easy integration of analog values.	**3RK1**	From 14/60

		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 with the SlimLine Compact modules • Flat design of the flat modules for small control cabinets and confined conditions • Connection with screw terminals or spring-loaded terminals • Standard 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 14/63
 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**	14/70
 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**	14/71
 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**	14/72

		Article No.	Page
Slaves (continued)			
 SIRIUS contactor 3RT203.-1NB30-0CC0	**Contactors and contactor assemblies** SIRIUS 3RT contactors, 3-pole SIRIUS 3RA23 reversing contactor assemblies SIRIUS 3RA24 contactor assemblies for star-delta (wye-delta) starting • Notable reduction of wiring in the control circuit • Integrated mechanical interlocking • Prevention of wiring errors in the main circuit	**3RT20** **3RA23** **3RA24**	See Catalog Section 2
 SIRIUS 3RA2712 function module for AS-Interface	SIRIUS 3RA27 function modules for AS-Interface • 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 variants through use of identical modules for size S00 to S3 contactors Your advantage: Shortening of mounting and startup times.	**3RA2712**	See Catalog Section 2
 3RA61 compact starter	**Motor starters for use in the control cabinet** SIRIUS 3RA6 compact starters 3RA61 direct-on-line starters, 3RA62 reversing starters • 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 30 HP/600 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.	**3RA6** **3RA61** **3RA62**	See Catalog Section 4
 SIRIUS M200D motor starter	**Motor starters for use in the field, high degree of protection** SIRIUS M200D motor starters for AS-Interface • High degree of protection IP65 for cabinet-free design • As direct-on-line or reversing starters for motors up to 10 HP/600 V • Mechanical or electronic switching for high switching frequencies • Optional with manual operation and brake control • 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.	**3RK1**	See Catalog Section 6

		Article No.	Page
Slaves (continued)			
 SINAMICS G110M frequency inverter	**SINAMICS G110M distributed inverters** **Wide power range from 0.37 to 4 kW** • Preconfigured with SIMOGEAR • Rugged, with IP65/IP66 degree of protection, up to 55 °C ambient temperature • Local commissioning via DIP switch, standard USB interface and potentiometer or Intelligent Operator Panel (IOP) • Integrated safety functions (STO locally via F-DI or via PROFIsafe) • Integrated, specific software functionality for conveyor systems - Quick stop function for fast reaction times to sensors - Limit switch functionality, e.g. for rotary table, corner transfer unit Your advantage: The simple solution for compact drives with safety requirements in conveyor technology	**6SL3517 power modules, 6SL3544 control units**	See SINAMICS G110 Catalog
 SINAMICS G110D frequency inverter	**SINAMICS G110D distributed inverters** **High degree of protection IP65 for cabinet-free installation** • Wide power range from 0.75 to 7.5 kW (1.0 - 10 HP) • Easy commissioning and maintenance thanks to standardized plug-in connections for bus, energy and I/Os • Expanded diagnostics and parameterization through AS-Interface • Optional maintenance switch • Optional manual local operation • Same plugs used as for the M200D motor starter Your advantage: Easy, consistent implementation of distributed system concepts thanks to scaling of SINAMICS G110D, SINAMICS G120D and SIRIUS M200D products.	**6SL3511**	See SINAMICS G110 Catalog
	Commanding and signaling devices		
 AS-Interface module	SIRIUS ACT pushbuttons and indicator lights for AS-Interface • Modular configuration based on individual specifications, or as enclosure with standard components • AS-Interface modules for base mounting or mounting in enclosure • Up to six command points for standard signals or EMERGENCY STOP • Degree of protection IP66/IP67/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 connection for your plant.	**3SU14 modules** **3SU18 enclosure**	See Catalog Section 11
 Signaling column  AS-Interface adapter element	SIRIUS 8WD4 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 BA 15d base for LEDs/incandescent lamps • for fastening to connection elements (screw or spring-loaded terminals) • 24 V DC, diameters 50 mm and 70 mm • 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 connection.	**8WD4**	See Catalog Section 11

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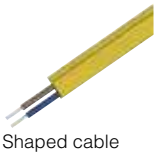
Power supply units and data decoupling modules		
AS-Interface power supply units generate a controlled direct voltage of 30 V DC with high stability and low residual ripple in conjunction with data decoupling. They are an integral component of the AS-Interface network and enable the simultaneous transmission 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  IP20, 8 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 in accordance with 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 enables single- and two-phase applications (8 A version) Your advantage: Optimum performance for each application.	**3RX9**	14/73
 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 (single-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 14/75
 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 • Single-phase, two-phase and three-phase versions Your advantage: Economical alternatives in conjunction with data decoupling modules.	**6EP**	See SITOP Catalog
 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 14/77
 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 14/79
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 piercing method.	**3RX9**	14/82

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System components and accessories			
	Accessories comprise tools for mounting, installation and operating as well as individual components.		
 Repeater  Compact extension plug	**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 switching 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**	14/83 14/84
 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 14/85
 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 14/87
 M12 sealing cap  Cable terminating piece	**Miscellaneous accessories** Individual components such as sealing caps, cable adapters, distributors, M12 plugs and cables, AS-Interface System Manual, etc.	**3RK1, 3RT1, 3RX9, 6ES7**	From 14/91

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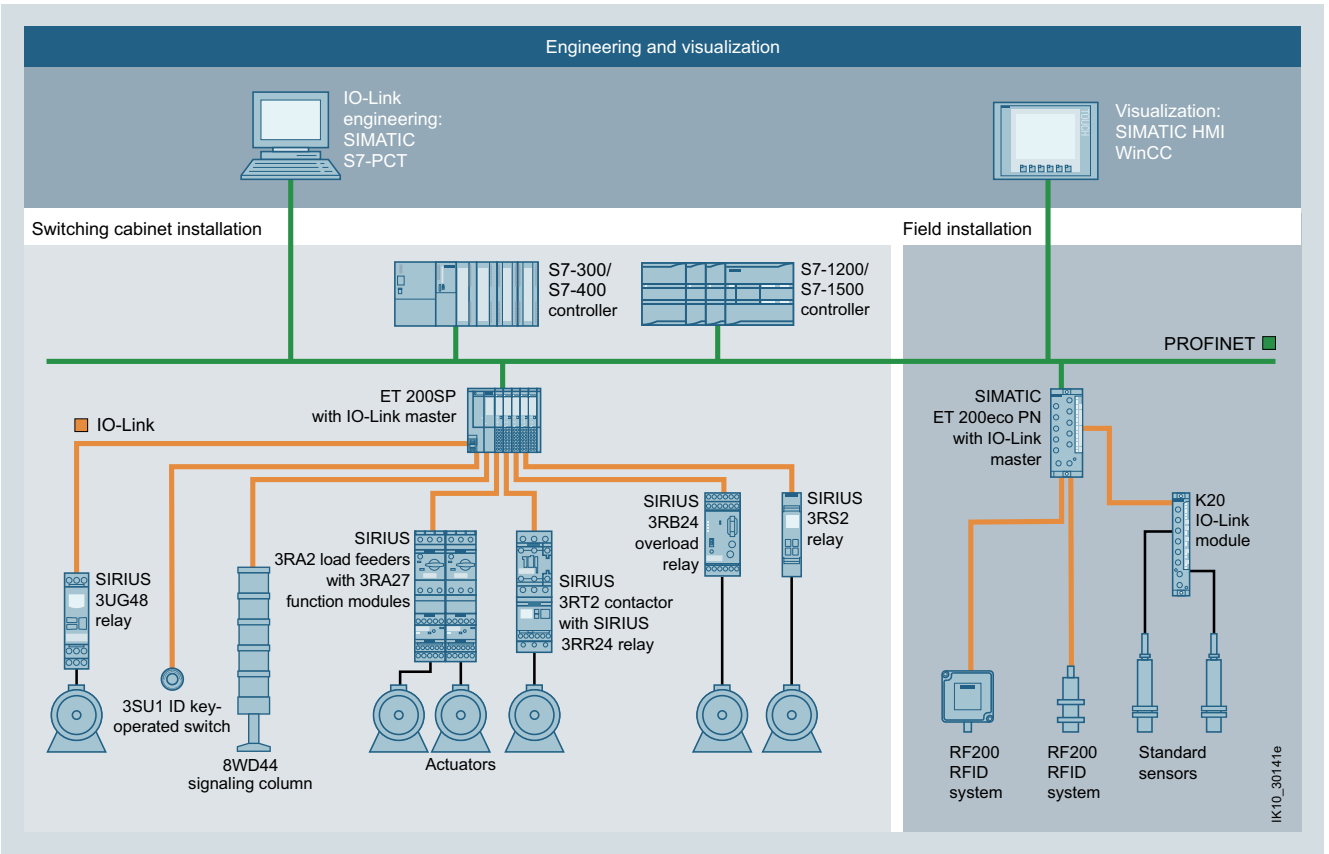
Diagnostics			
 Diagnostics for AS-Interface via HMI panels	The following diagnostics block with visualization via HMI or web browser for AS-Interface can be downloaded free of charge in the Industry Online Support Portal: Diagnostics blocks • For CM AS-i Master ST and F-CM AS-i Safety ST in ET 200SP, 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 diagnostic 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 • See Support Site for more information https://support.industry.siemens.com/cs/document/109759605 Your advantage: Easy connection of AS-Interface to PCS 7, little engineering and configuration.		

Overview

More information	
Homepage, see www.siemens.com/io-link	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 diagnostic data and measured values into the plant automation with ease. For example, the available diagnostic data allow potential errors to be detected quickly, thus avoiding lengthy plant downtimes.

As a consequence of their basic function, such as overload protection (SIRIUS 3RB24 electronic overload 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.

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Masters			
	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 communication module • Communication 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 transmission 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.	**6ES7**	14/101
 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 communication 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 (3-wire connections) can be connected to each IO-Link master module • Data transmission rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd), automatic adjustment to the data transmission rate supported by the device Your advantage: Easy connection of IO-Link connections to the SIMATIC S7-1200.	**6ES7**	14/102
 CM 4xIO-Link for ET 200SP	**IO-Link master modules for ET 200SP** CM 4xIO-Link communication module • IO-Link master as serial communication 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 (3-wire connections) can be connected to each IO-Link master module. • Data transmission rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd), automatic adjustment to the data transmission rate supported by the device Your advantage: Easy connection of IO-Link connections to distributed I/Os.	**6ES7**	From 14/103
 IO-Link master module for ET 200pro	**IO-Link master module for ET 200pro** 4 IO-Link HF electronic module • IO-Link master as serial communication 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 transmission rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd), automatic adjustment to the data transmission rate supported by the device Your advantage: Easy connection of sensors and actuators to the I/Os directly in the machine's field area.	**6ES7**	14/104
 6ES7148-6JA00-0AB0  6ES7148-6JD00-0AB0	**IO-Link master module for ET 200eco PN** ET 200eco PN IO-Link master • 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 (8 DI) and up to four standard actuators (4 DO) 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 Your advantage: Easy connection of sensors and actuators to the I/Os directly in the machine's field area.	**6ES7**	From 14/105
 CM IO-Link for ET 200AL	**IO-Link master module for ET 200AL** CM IO-Link communication module • IO-Link master as serial communication 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 transmission rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd), automatic adjustment to the data transmission rate supported by the device Your advantage: Easy connection of sensors and actuators to the I/Os directly in the machine's field area.	**6ES7**	From 14/106

Introduction

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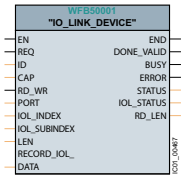
Input modules			
	IO-Link input modules make full use of the potential of IO-Link and are a more attractive solution economically than a direct sensor connection.		
 IO-Link module K20 with eight digital inputs	**K20 IO-Link modules** • Four or eight digital inputs • Degree of protection IP65/IP67 • Connection sockets in M8/M12 • Contacting protected against polarity reversal Your advantage: Reduction of mounting and startup times by up to 40%.	**3RK5**	14/107
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.		
 SIRIUS contactor 3RT201.-1B...-0CC0	**Contactors and contactor assemblies** SIRIUS 3RT contactors, 3-pole SIRIUS 3RA23 reversing contactor assemblies SIRIUS 3RA24 contactor assemblies for star-delta (wye-delta) starting • Notable reduction of wiring in the control circuit • Integrated mechanical interlocking • Prevention of wiring errors in the main circuit	**3RT20** **3RA23** **3RA24**	See Catalog Section 2
 SIRIUS 3RA2711 function module for IO-Link	SIRIUS 3RA27 function modules • 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 variants through use of identical modules for size S00 to S3 contactors Your advantage: Shortening of mounting and startup times	**3RA2711**	See Catalog Section 2
 SIRIUS 3RB24 overload relay	**Overload relays** SIRIUS 3RB24 electronic overload relays for IO-Link for high-feature applications • Diagnostics and current value transmission via IO-Link • Current measuring modules (3RB29) for current values from 0.3 to 630 A • Controlling direct-on-line, reversing and wye-delta starters via IO-Link in conjunction with contactors • Full motor protection through PTC connection Your advantage: Communication-capable overload relay enables remote diagnostics and preventative maintenance.	**3RB24**	See Catalog Section 3
 SIRIUS 3RA64 compact starter	**Motor starters for use in the control cabinet** SIRIUS 3RA64, 3RA65 compact starters for IO-Link • Integrated functionality of a circuit breaker, contactor and electronic overload relay and various functions of optional mountable accessories • Can be used for direct starting of standard induction motors up to 32 A (approx. 30 HP/600 V) • Compact design offers enormous savings in space and wiring in the control cabinet • Low variance of devices thanks to wide setting ranges for the rated current and wide voltage ranges Your advantage: The diagnostics data of the process collected by the 3RA6 compact starter, e.g. short circuit, end of service life, limit position, etc., are not only indicated on the compact starter itself but also transmitted to the higher-level control system through IO-Link.	**3RA6** **3RA64** **3RA65**	See Catalog Section 4

		Article No.	Page
Industrial controls (continued)			
 SIRIUS 3RR24 monitoring relay	**Monitoring relays** SIRIUS 3RR24 monitoring relays for mounting onto 3RT2 contactors for IO-Link • Monitoring relays for mounting onto 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 preventative maintenance.	**3RR24**	See Catalog Section 2
 SIRIUS 3UG48 monitoring relay	SIRIUS 3UG48 monitoring relays for stand-alone installation for IO-Link • Monitoring of - Network (3UG481) - Voltage (3UG483) - Current (3UG4822) - Power factor and active current (3UG484) - Fault current (3UG4825) - Speed (3UG485) • 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 preventative maintenance.	**3UG48**	See Catalog Section 12
 SIRIUS 3RS14, 3RS15 temperature monitoring relay	SIRIUS 3RS14, 3RS15 temperature monitoring relays for IO-Link • Measuring the temperature of solids, liquids and gases • Use of resistance sensors (3RS14) or thermocouples (3RS15) • 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.	**3RS14, 3RS15**	See Catalog Section 12
	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.	**3SU1**	See Catalog Section 11
 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 parameterizable • Connection method (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**	See Catalog Section 11
	SIRIUS 8WD4 signaling columns		
 Signaling column  8WD44 IO-Link adapter element	8WD44 IO-Link adapter element • Up to five signaling elements can be connected using an IO-Link adapter element • 24 V DC, diameter 70 mm • 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 Your advantage: Signaling columns for monitoring production sequences and for visual or acoustic warnings in emergency situations, with easy IO-Link connection.	**8WD44**	See Catalog Section 11

Introduction

		Article No.	Page
RFID system			
 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 - Industrial Identification Systems
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 download from Industry Online Support, see https://support.industry.siemens.com/cs/ww/en/ps/15851	--	14/99
 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/#/.	--	14/99
Software			
 STEP 7 PCT	**STEP 7 PCT (Port Configuration Tool)** Engineering software for configuring the IO-Link master modules for SIMATIC S7-1200, ET 200SP, ET 200pro, ET 200eco PN and ET 200AL • Available as a stand-alone version or integrated into STEP 7 (V5.5 SP1 or higher) and TIA (V12 or 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 download from Industry Online Support, see https://support.industry.siemens.com/cs/ww/en/view/32469496	--	14/99
 IO-Link device function block for TIA Portal	**IO-Link function blocks (IO-Link master and IO-Link device)** STEP 7 function block for easy acyclical data exchange in the user program • Freely available for download from Industry Online Support, see https://support.industry.siemens.com/cs/ww/en/view/82981502	--	14/99
 "Siemens IO-Link Devices" block library	**"Siemens IO-Link Devices" block library** This library provides function blocks and user-defined data types (UDTs) for all IO-Link devices from the Siemens portfolio. These blocks and UDTs standardize and simplify communication with IO-Link devices. • Freely available for download from Industry Online Support, see https://support.industry.siemens.com/cs/ww/en/ps/90529409	--	14/99

AS-Interface Introduction

Communication overview

Overview

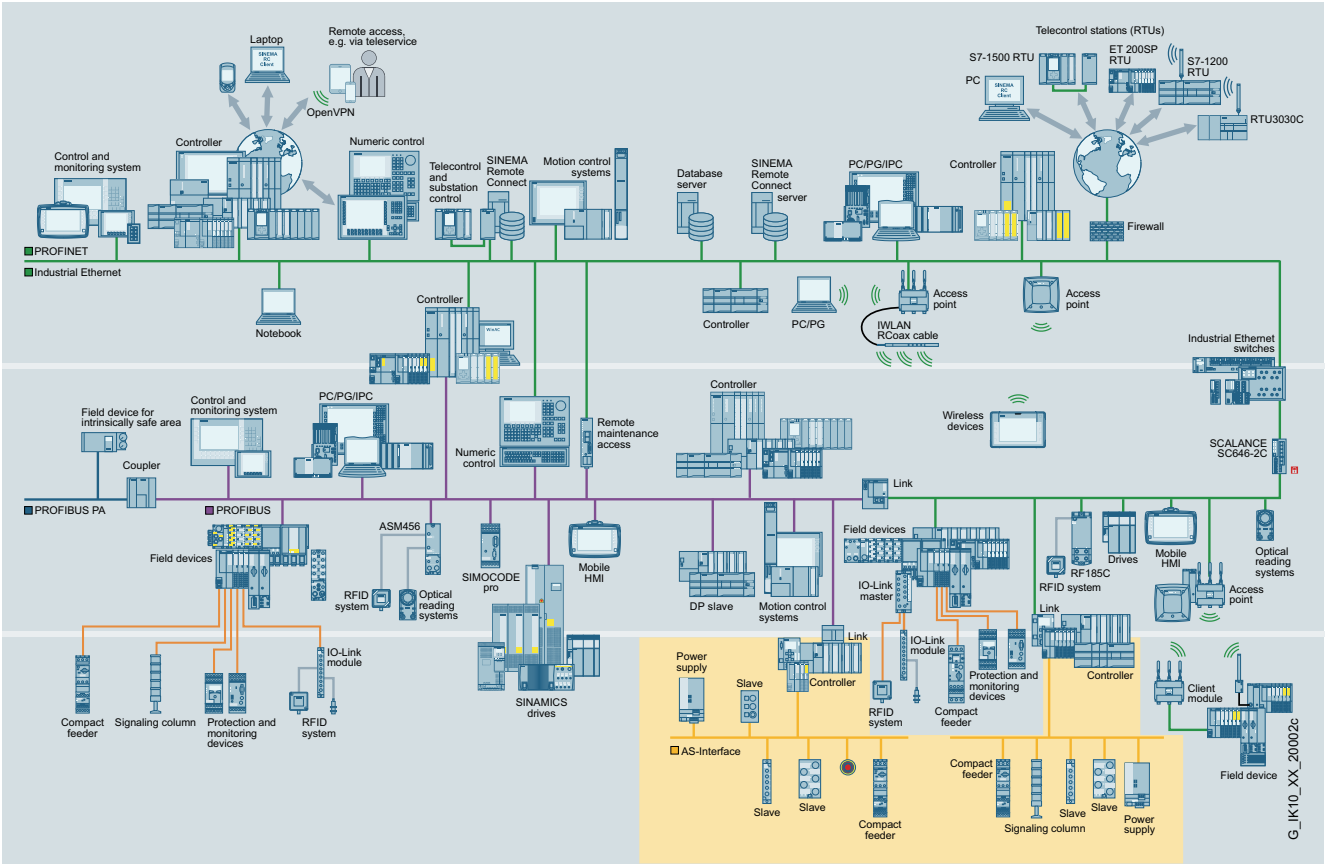
AS-Interface is an open, international standard according to IEC/EN 62026-2 for process and field communication. Leading manufacturers of actuators and sensors all over the world support the AS-Interface. Interested companies are provided with the electrical and mechanical specifications by the AS-Interface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

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

More information

Homepage, see www.siemens.com/as-interface

Industry Mall, see www.siemens.com/product?as-interface



AS-Interface in the SIMATIC NET communications landscape

Benefits

An important characteristic of the AS-Interface technology is the use of a shared two-wire cable 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

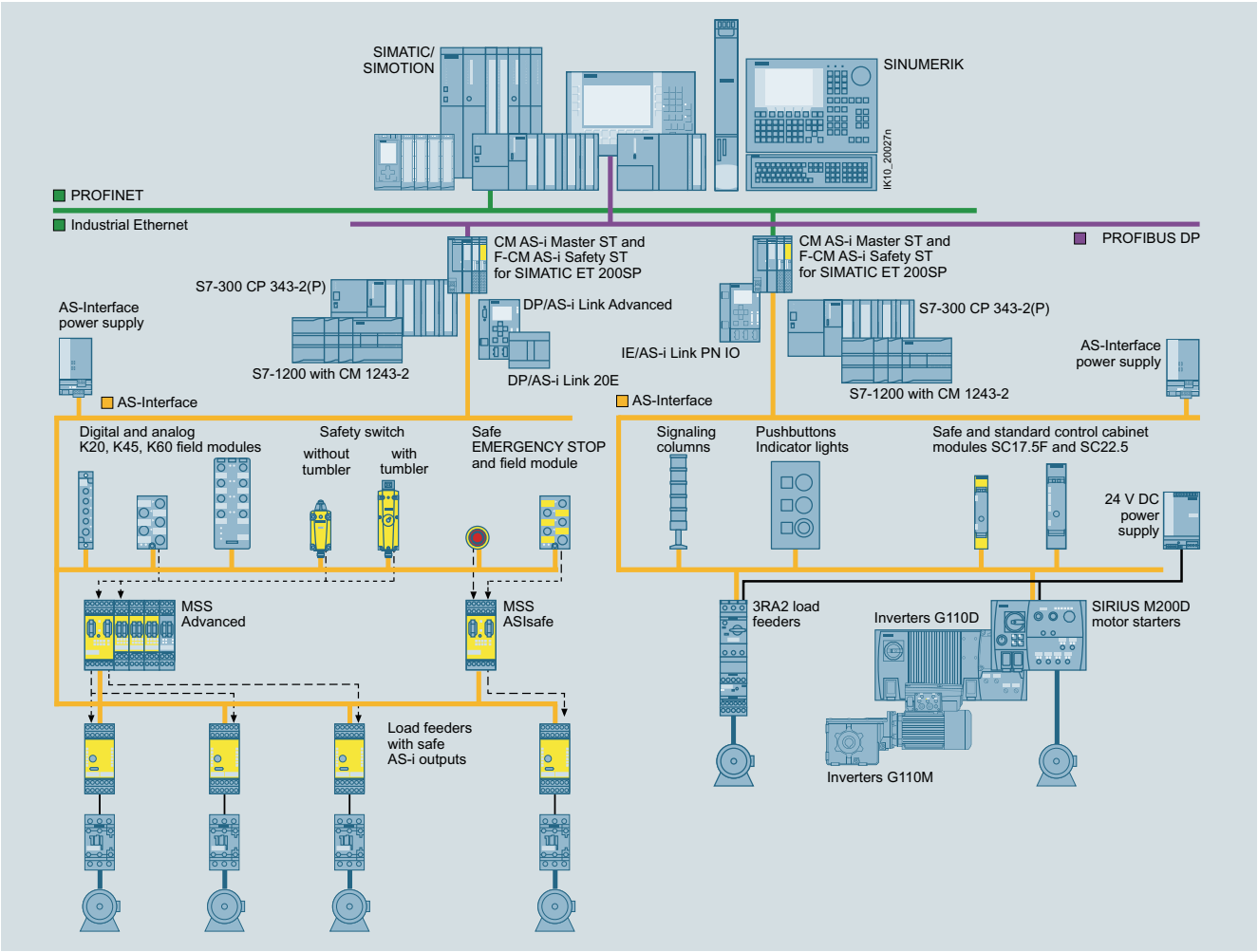
In addition to I/O data exchange with binary and analog AS-Interface slaves, the AS-Interface masters can provide a number of other functions through the command interface.

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

Overview

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

- AS-i modules for central control units such as SIMATIC S7, ET 200M/ET 200SP distributed I/Os, or network transitions from PROFIBUS or PROFINET 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/EN 62026-2
Topology	Line, star or tree structure (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 • 200 m with extension plug • 300 m with two repeaters in series connection • 600 m with extension plugs and two repeaters parallel switched Longer cable lengths also possible through parallel switching 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 × 8 = 496	62 × 8 = 496

Basic data

- AS-Interface specification 3.0 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 4 DI / 4 DQ • Up to 40 ms for slaves with A/B address 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 in accordance with 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 in accordance with 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 "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/EN 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 two-wire line.

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 communication 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-i Link Advanced, DP/AS-Interface Link 20E
- IE/AS-i Link PN IO

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 "AS-Interface" System Manual, 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 over the same unshielded two-conductor cable. 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 operating 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 PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage) standard, have a residual ripple of < 250 mVpp, and must limit the output voltage to a maximum of 40 V in the event of a fault. We recommend SITOP power supplies, see SITOP Catalog or KT10.1, 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 14/77 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.

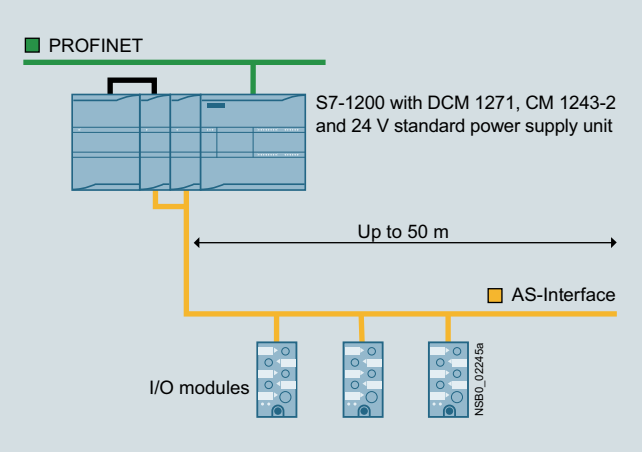
Benefits

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 communication 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)

Overview

More information

For further information and typical circuit diagrams on safety engineering, 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 pushbuttons, 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 supplies, repeaters, etc.) in accordance with IEC/EN 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 PL e according to EN ISO 13849-1 and up to SIL 3 (IEC 61508/EN 62061).

Higher-level control

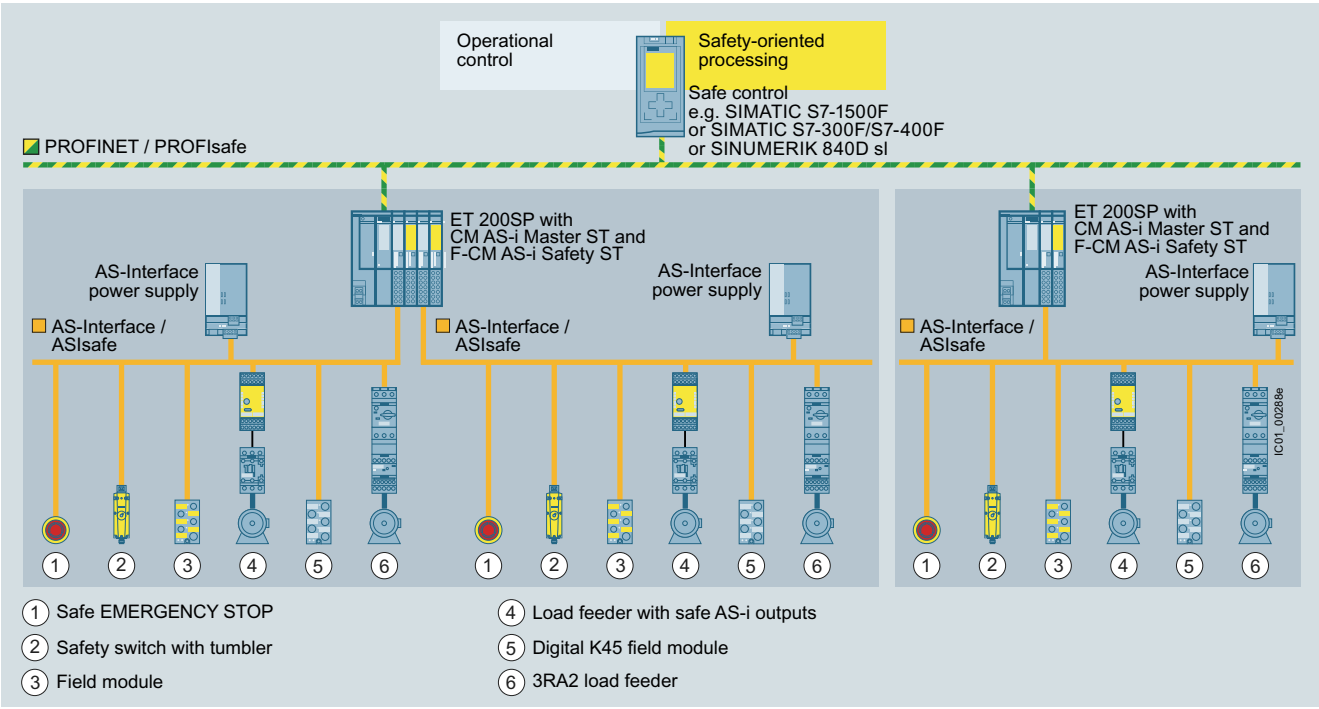
As usual, nodes on the AS-Interface bus are controlled in operation by the standard program of the higher-level SIMATIC (F) CPU or by a SINUMERIK control.

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. The configuration of the safety functions depends on which safety solution is being used:

- AS-i safety solution with F-CPU: 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 fail-safe program.
- In the case of the AS-i safety solution with local evaluation by MSS: In conjunction with the Modular Safety System all safety functions and combinations are configured using the SIRIUS Safety ES software and processed in the MSS central unit.

AS-i safety solution with F-CPU



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

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

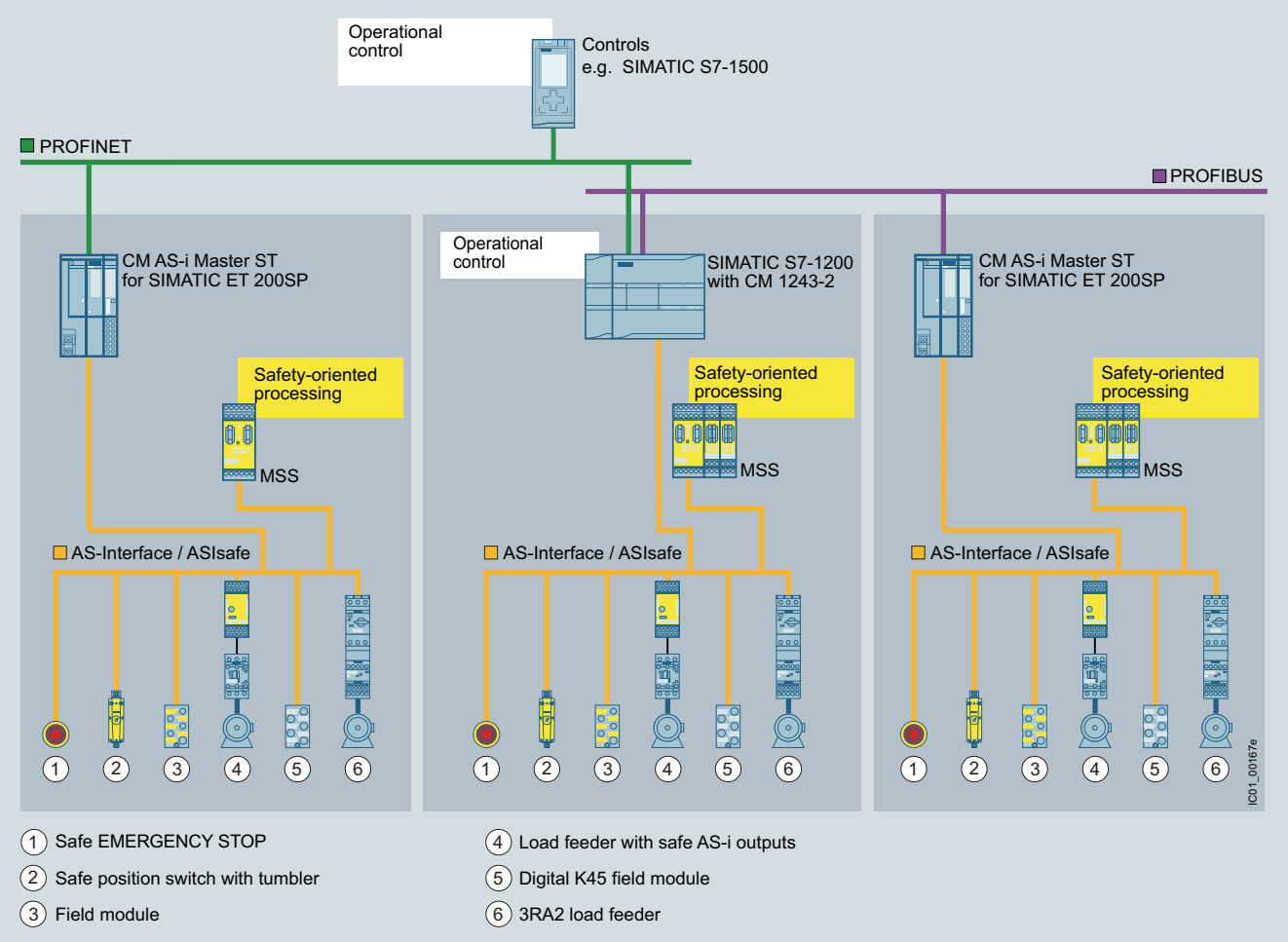
The allocation of tasks is as follows:

- Acquisition 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 safety output modules on the AS-Interface bus or other 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-oriented network transition 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 configurations for virtually any application. Besides the single AS-i master, double, triple or generally multiple masters can be realized with or without fail-safe functionality.

AS-i safety solution with local evaluation by MSS



AS-Interface design with 3RK3 Modular Safety System (MSS)

The local AS-i safety solution uses the 3RK3 Modular Safety System (MSS) for safety-related processing. In this case, one standard controller (i.e. no F-CPU) and one standard AS-i master are sufficient.

The allocation of tasks is as follows:

- Acquisition of safety-related signals via safe input slaves on the AS-Interface bus.
  Further signals can be acquired via F-DI inputs of the central unit or the expansion modules of the MSS.
- Evaluation and processing of signals via the central unit of the MSS
- Reaction via safe output modules on the AS-Interface bus or via F-DQ outputs of the central unit or expansion modules of the MSS

SIRIUS 3RK3 Modular Safety System, see Catalog Section 13

Benefits

- Simple system structure thanks to standardized AS-Interface technique
- 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 to PL e according to EN ISO 13849-1 or SIL 3 according to IEC 61508
- 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, safety gate interlocks, safety switches, light grids and two-hand operation are installed.

Selection and ordering data

	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 3RK1105-1BE04-0CA0	**Basic safety monitors** Version 3 With screw terminals, removable terminals, width 45 mm		**Screw terminals**		
	• 1 enabling circuit (monitor type 1)	2	**3RK1105-1AE04-0CA0**	1	1 unit
	• 2 enabling circuits (monitor type 2)	2	**3RK1105-1BE04-0CA0**	1	1 unit
	Expanded safety monitors Version 3 With screw terminals, removable terminals, width 45 mm				
	• 1 enabling circuit (monitor type 3)	2	**3RK1105-1AE04-2CA0**	1	1 unit
	• 2 enabling circuits (monitor type 4)	2	**3RK1105-1BE04-2CA0**	1	1 unit
	Expanded safety monitor with integrated safe slave Version 3 With screw terminals, removable terminals, width 45 mm				
	• 2 enabling circuits including control of a safe AS-i output/safe coupling (monitor type 6)	2	**3RK1105-1BE04-4CA0**	1	1 unit
	Basic safety monitors Version 3 With spring-loaded terminals, removable terminals, width 45 mm		**Spring-loaded terminals**		
	• 1 enabling circuit (monitor type 1)	2	**3RK1105-1AG04-0CA0**	1	1 unit
	• 2 enabling circuits (monitor type 2)	2	**3RK1105-1BG04-0CA0**	1	1 unit
	Expanded safety monitors Version 3 With spring-loaded terminals, removable terminals, width 45 mm				
	• 1 enabling circuit (monitor type 3)	2	**3RK1105-1AG04-2CA0**	1	1 unit
	• 2 enabling circuits (monitor type 4)	2	**3RK1105-1BG04-2CA0**	1	1 unit
	Expanded safety monitor with integrated safe slave Version 3 With spring-loaded terminals, removable terminals, width 45 mm				
	• 2 enabling circuits including control of a safe AS-i output/safe coupling (monitor type 6)	2	**3RK1105-1BG04-4CA0**	1	1 unit

Accessories

	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
	ASIsafe CD Included in the scope of supply: • ASIMON V3 configuration software on CD ROM, for PC with Windows operating system	2	**3RK1802-2FB06-0GA1**	1	1 unit
 3RK1901-5AA00	**Cable sets** Included in the scope of supply: • PC configuration cable for communication between PC (serial interface) and safety monitor, length approx. 1.50 m • Transfer cable between two safety monitors, length approx. 0.25 m	▶	**3RK1901-5AA00**	1	1 unit
	Sealable covers For securing against unauthorized configuration of the safety monitor	5	**3RP1902**	1	5 units
	Push-in lugs For screw fixing	5	**3RP1903**	1	10 units

Overview

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

S45F SlimLine module, safe AS-i output

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 crossover monitoring of the connected sensor line.

AS-Interface safety modules

The following modules are available for selection:

K20F compact safety modules for operation 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 of spaces. 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 in operation up to Category 2 according to EN ISO 13849-1. If Category 4 is required, a two-channel input is available on the module.
- K45F 2 F-DI / 2 DQ: There are also two standard outputs in addition to the safe inputs. Supplied from the yellow AS-i cable
- K45F 2 F-DI / 2 DQ U_{aux}: same as K45F 2 F-DI/2 DQ, but supplied from the black 24 V DC cable
- K45F 4 F-DI: Four safety-related inputs in operation up to Category 2, two for Category 4. Extremely compact double slave (uses two standard 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, the safe SC17.5F SlimLine Compact modules are ideal for space-saving use in a control cabinet. The modules have more than two safety inputs for connecting signals to ASIsafe networks in the control cabinet. For operation up to Category 2, both inputs can be separately assigned; if Category 4 is required, a two-channel input is available on the module.

There are also two module variants which have two standard outputs in addition to the two safety inputs. The outputs are supplied either from the yellow AS-Interface cable alone, or via auxiliary voltage from the black 24 V DC cable. The 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.

S45F SlimLine safety modules with safety outputs for the safe distributed disconnection of actuators

With the S45F SlimLine safety module, a safe output signal of the ET 200SP module F-CM AS-i Safety ST can be used for distributed safety-related disconnection via ASIsafe.

To this end, the S45F module has a safety-related two-channel relay output. As an additional possibility the module offers normal switching of the output using an AS-i standard output bit.

The module has three digital inputs and two digital outputs for the additional connection of sensors and actuators. These can be used, among other things, for the required monitoring of downstream contactors of the feedback circuit.

The S45F module can also be controlled in a safety-related manner, for example by the modular 3RK3 ASIsafe/Advanced safety system. The module contains an AS-i slave for the non-safety-related inputs/outputs.

Selection and ordering data

	Version		SD	Article No.	PU (UNIT, SET, M)	PS*
			d			
 3RK1205-0BQ30-0AA3	**K20F compact safety modules** Slave addressing type: Standard address					
	I/O type	U_{aux} 24 V				
	2 F-DI	--	2	**3RK1205-0BQ30-0AA3**	1	1 unit
 3RK1205-0BQ00-0AA3	**K45F compact safety modules** Slave addressing type: Standard address (modules supplied without mounting plate)					
	I/O type	U_{aux} 24 V				
	2 F-DI	--	▶	**3RK1205-0BQ00-0AA3**	1	1 unit
	4 F-DI[1)]	--	2	**3RK1205-0CQ00-0AA3**	1	1 unit
	2 F-DI / 2 DQ	--	5	**3RK1405-0BQ20-0AA3**	1	1 unit
	2 F-DI / 2 DQ	--	5	**3RK1405-1BQ20-0AA3**	1	1 unit
 3RK1405-0BE00-2AA2	**SC17.5F SlimLine Compact safety modules** Slave addressing type: Standard address					
	I/O type	Outputs				
				Screw terminals		
	2 F-DI	--	2	**3RK1205-0BE00-2AA2**	1	1 unit
				Spring-loaded terminals (push-in)		
	2 F-DI	--	2	**3RK1205-0BG00-2AA2**	1	1 unit
				Screw terminals		
	2 F-DI / 2 DQ	U_{ASI}/U_{aux} supply selectable	2	**3RK1405-2BE00-2AA2**	1	1 unit
				Spring-loaded terminals (push-in)		
	2 F-DI / 2 DQ	U_{ASI}/U_{aux} supply selectable	2	**3RK1405-2BG00-2AA2**	1	1 unit
 3RK1405-1SE15-0AA2	**S45F SlimLine safety module** (with safe AS-i output)					
	I/O type	U_{aux} 24 V				
				Screw terminals		
	1 F-RQ / 3 DI / 2 DQ	✓	2	**3RK1405-1SE15-0AA2**	1	1 unit
				Spring-loaded terminals (push-in)		
	1 F-RQ / 3 DI / 2 DQ	✓	2	**3RK1405-1SG15-0AA2**	1	1 unit

✓ 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 14/50 onwards
- For degree of protection IP20, see page 14/65 onwards

The existing SlimLine series of I/O modules for use in the control cabinet and local control boxes is being replaced by the new SlimLine Compact series. We recommend that these new devices are used in future.

For the conversion table, see page 14/67.

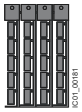
Note:

The previous SlimLine devices are still available for use as replacements in existing systems. As a result of the innovation, the new SlimLine Compact devices are not fully compatible in terms of either mechanical dimensions or electrical properties.

Accessories

More information

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

	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
Accessories for compact safety modules					
 3RK1901-2EA00	**K45 mounting plates** For mounting K45F				
	• For wall mounting	▶	**3RK1901-2EA00**	1	1 unit
	• For standard rail mounting	▶	**3RK1901-2DA00**	1	1 unit
 3RK1901-1AA00	**Input bridges for K45F**				
	• Black version	2	**3RK1901-1AA00**	1	1 unit
	• Red version	30	**3RK1901-1AA01**	1	1 unit
 3RK1901-1KA00  3RK1901-1KA01	**AS-Interface sealing caps M12** For free M12 sockets	▶	**3RK1901-1KA00**	100	10 units
	• Tamper proof	2	**3RK1901-1KA01**	100	10 units
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	2	**3RK1901-1YA00**	1	1 unit
	• Width 22.5 mm	2	**3RK1901-1YA10**	1	1 unit
	Device termination connectors Required for the last module in the network				
	• Width 17.5 mm	2	**3RK1901-1YA01**	1	1 unit
	• Width 22.5 mm	2	**3RK1901-1YA11**	1	1 unit
 3ZY1121-2BA00	**Removable terminals**		**Screw terminals**		
	• Screw terminals up to 2 x 1.5 mm² or 1 x 2.5 mm²				
	- 2-pole	2	**3ZY1121-1BA00**	1	6 units
	- 4-pole	2	**3ZY1141-1BA00**	1	6 units
			Spring-loaded terminals (push-in)		
	• Push-in terminals up to 2 x 1.5 mm²				
	- 2-pole	2	**3ZY1121-2BA00**	1	6 units
	- 4-pole	2	**3ZY1141-2BA00**	1	6 units
	**Hinged cover** Replacement for SlimLine Compact module, without terminal labeling, width 17.5 mm, yellow	2	**3ZY1450-1BA00**	1	5 units
	Push-in lugs for wall mounting Two lugs are required per device	2	**3ZY1311-0AA00**	1	10 units
 3ZY1450-1BA00	**Coding pins for removable terminals** For mechanical coding of the terminals	2	**3ZY1440-1AA00**	1	12 units
 3RT2900-1SB20	**Blank labels** Unit labeling plates				
	• 10 mm x 7 mm, titanium gray	20	**3RT2900-1SB10**	100	816 units
	• 20 mm x 7 mm, titanium gray	20	**3RT2900-1SB20**	100	340 units
 3RA2908-1A	**Tools for opening spring-loaded terminals**		**Spring-loaded terminals (push-in)**		
	Screwdriver for SIRIUS devices with spring-loaded terminals 3.0 mm x 0.5 mm, length approx. 200 mm, titanium gray/black, partially insulated	2	**3RA2908-1A**	1	1 unit

Overview

CM 1243-2 communication module for S7-1200

More information

Manuals, see https://support.industry.siemens.com/cs/ww/en/ps/15750/man
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

The CM 1243-2 communication 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 in accordance with 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 panel
- 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

Design

The CM 1243-2 communication 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 each respectively
- 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.

It is also possible to exchange all data of the AS-i master and the connected AS-i slaves with the S7-1200 via the data record interface.

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 14/29) 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 14/79.

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 security concept. Siemens products and solutions represent only one component of such a concept.

For more information about the subject of Industrial Security, see www.siemens.com/industrialsecurity.

Configuration

To configure CM 1243-2, you require STEP 7 V11 + SP2 or higher.

For STEP 7 V11 + SP2 or higher, the additional Hardware Support Package for CM 1243-2 is required. This is available via the Industry Online Support Portal, see https://support.industry.siemens.com/cs/ww/en/view/72341852.

The software enables user-friendly configuration and diagnostics of the AS-Interface master and any connected slaves.

Alternatively, you can also apply the AS-Interface ACTUAL configuration at the "touch of a button" via the control panel integrated in the TIA Portal/STEP 7.

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.

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 (STEP 7 V11+SP2 or higher)
- Simple operation with AS-Interface power supply (see page 14/73) 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 14/79.
- 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 for the 12xx CPUs 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 communication 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 "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	SD	Screw terminals	PU (UNIT, SET, M)	PS*
		d	Article No.		
 3RK7243-2AA30-0XB0	**CM 1243-2 communication module** • AS-Interface masters for SIMATIC S7-1200 • Corresponds to AS-Interface specification V3.0 • With screw terminals, removable terminals (included in the scope of supply) • Dimensions (W × H × D/mm): 30 × 100 × 75	2	**3RK7243-2AA30-0XB0**	1	1 unit

Note:

The CM 1243-2 communication module is available as a SIPLUS version under Article No. 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	SD	Screw terminals	PU (UNIT, SET, M)	PS*
		d	Article No.		
 3RK7271-1AA30-0AA0	**DCM 1271 data decoupling module** • With screw terminals, removable terminals (included in the scope of supply) • Dimensions (W × H × D/mm): 30 × 100 × 75	2	**3RK7271-1AA30-0AA0**	1	1 unit
	Screw terminals (replacement)				
	• 5-pole For AS-i master CM 1243-2 and AS-i DCM 1271 data decoupling module	5	**3RK1901-3MA00**	1	1 unit
	• 3-pole For AS-i DCM 1271 data decoupling module for connecting the power supply unit	5	**3RK1901-3MB00**	1	1 unit

Overview

CP 343-2P/CP 343-2

More information

Manuals, see https://support.industry.siemens.com/cs/ww/en/ps/15754/man

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 Catalog KT10.1 - SITOP Power Supply

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 in accordance with 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 panel
- 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-i Power24V (from product version 2 / firmware version 3.1) and for AS-Interface with 30 V voltage
- Additionally for CP 343-2P: Supports the configuration of the AS-Interface network with STEP 7 V5.2 and higher

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 support all specified functions of the AS-Interface specification V3.0.

The CP 343-2P/CP 343-2 each occupy 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 is 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:

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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 V5.2 and higher. 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 indicators:
  - 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 (see page 14/73) 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 14/77.

Application

The CP 343-2P/CP 343-2 is the AS-Interface master connection for the SIMATIC S7-300 and the 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	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 6GK7343-2AH11-0XA0	**CP 343-2P communications processors** • 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 (V5.2 and higher) • 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
 6GK7343-2AH01-0XA0	**CP 343-2 communications processors** • 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

Accessories

Version	SD	Article No.	PU (UNIT, SET, M)	PS*
	d			
Front connector, 20-pole				
• With screw terminals	1	**6ES7392-1AJ00-0AA0**	1	1 unit
• With spring-loaded terminals	1	**6ES7392-1BJ00-0AA0**	1	1 unit

Overview

CM AS-i Master ST for SIMATIC ET 200SP

More information

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 Catalog KT10.1 - SITOP Power Supply
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 communication 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 display of the AS-i line in TIA Portal V12 or higher, or via GSD in other systems
- Supply via AS-Interface cable
- Suitable for AS-i Power24V and for AS-Interface with 30 V voltage
- 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

ET 200SP distributed I/O system

The SIMATIC ET 200SP is a scalable and highly flexible distributed I/O system for connecting the process signals to a central control system via PROFIBUS or PROFINET.

Up to eight CM AS-i Master STs can be plugged into a SIMATIC ET 200SP with the IM 155-6 PN standard interface module.

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 communication module has LED indicators for diagnostics, operation, AS-i voltage and AS-i slave status and offers informative front-side module inscription for

- Plain-text marking of the module type and function class
- 2D matrix code (Article No. and serial number)
- Circuit diagram
- Color coding of the CM module type: Light gray
- Hardware and firmware version
- Complete article number

Function

The CM AS-i Master ST communication 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 (firmware V1.1 or higher) 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 control panel of the CM AS-i Master ST in STEP 7.

Expansions as from firmware version V1.1

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 set-ups 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).

Diagnostic information is accessed via automatic alarm indications, via the process image or data record reading in the user program or in the STEP 7 engineering system in a graphical overview matrix. 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.

The new functions are available with TIA Portal STEP 7 V13 SP1 or with STEP 7 V5.5 with HSP 2092 V3.0[1]. Configuration is possible with SIMATIC CPUs S7-300 up to S7-1500 and with a SINUMERIK 840D sl or other controller.

In the network view, the AS-i slaves' online diagnostics status can be displayed directly on the slaves (for S7-1500 CPUs with firmware version V2.0 or higher, with TIA Portal STEP 7 V14 or higher).

1) For HSP 2092, see https://support.industry.siemens.com/cs/ww/en/view/23183356.

Notes on security:

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For more information about the subject of Industrial Security, see www.siemens.com/industrialsecurity.

Configuration

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

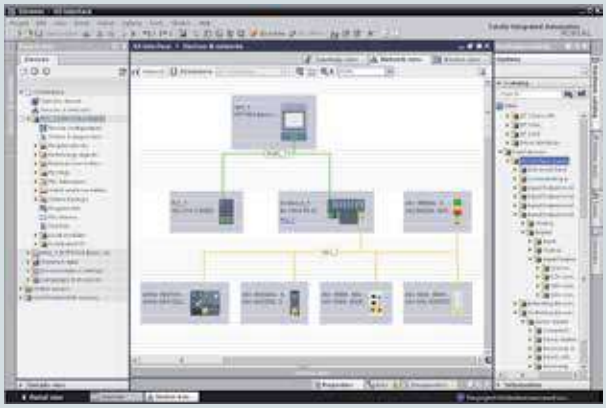
- STEP 7 (TIA Portal) V12 or higher or V13 SP1 or higher (for firmware V1.1) or
- STEP 7 (classic) V5.5 SP3 HF4 or higher with HSP 2092 or HSP 2092 V3.0 (for firmware V1.1) or
- the GSD file of the ET 200SP with STEP 7 or another engineering tool

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

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

The CM AS-i Master ST module occupies up to 288 input bytes and up to 288 output bytes in the I/O data of the ET 200SP station. The I/O assignment depends on the configuration in STEP 7.

Together with an ET 200SP CPU 1510SP/1512SP (firmware V1.8 or higher) or 1515SP PC, preprocessing of safe AS-i signals directly in the ET 200SP station and setting up of an independent AS-i Safety station without a higher-level CPU are possible (TIA Portal V13 SP1 Update 4 and higher).



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

Benefits

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

Up to eight CM AS-i Master ST units can be plugged into one ET 200SP station with IM 155-6 PN Standard. The maximum configuration depends on the interface module used.

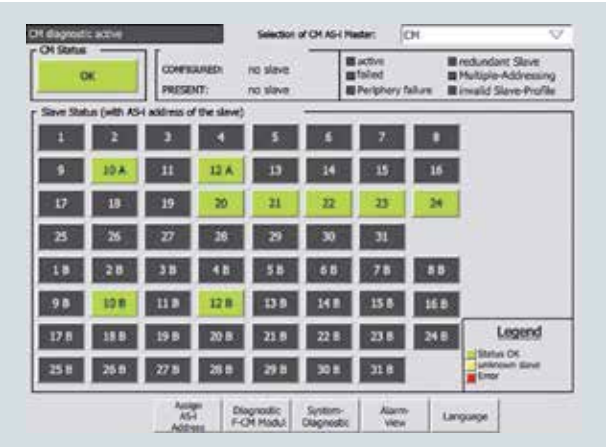
Multiple masters as well as single masters can thus be implemented in the ET 200SP depending on the number of modules.

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

Using STEP 7, the AS-i network 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.

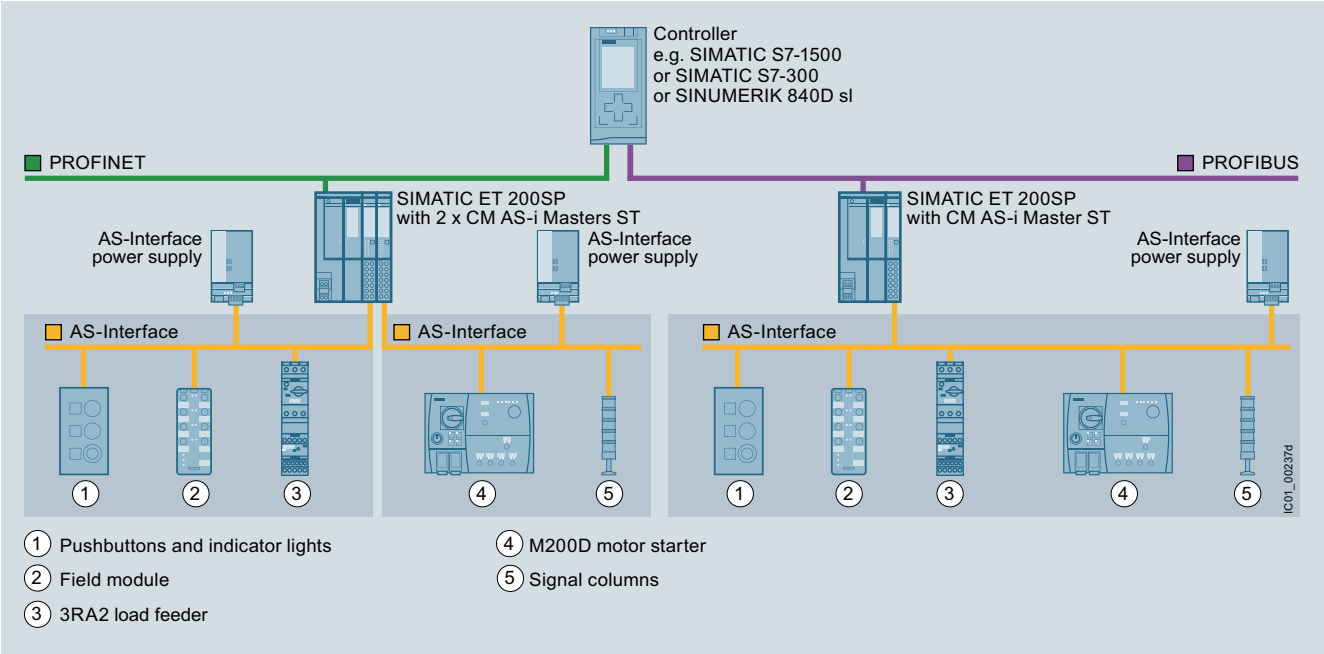
For diagnostics during ongoing operation, diagnostics blocks with clearly arranged visualization on the SIMATIC HMI panel are available or can be downloaded free of charge via a web browser, see https://support.industry.siemens.com/cs/ww/en/view/109479103.



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	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 3RK7137-6SA00-0BC1	**CM AS-i Master ST communication module** • AS-Interface master for SIMATIC ET 200SP, can be plugged onto BaseUnit type C0 • Corresponds to AS-Interface specification V3.0 • Dimensions (W × H × D/mm): 20 x 73 x 58	2	**3RK7137-6SA00-0BC1**	1	1 unit

Accessories

Version	SD	Spring-loaded terminals	PU (UNIT, SET, M)	PS*
	d	Article No.		
 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	15	**6ES7193-6BP20-0DC0**	1	1 unit

Version	SD	Article No.	PU (UNIT, SET, M)	PS*
	d			
 6ES7155-6AR00-0AN0  6ES7155-6AA01-0BN0				
PROFINET interface module IM 155-6 PN 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)	1	**6ES7155-6AR00-0AN0**	1	1 unit
PROFINET interface modules IM 155-6 PN Standard Max. 32 I/O modules, max. 256 bytes I/O data per station				
• Including server module and bus adapter 2 x RJ45 (supplied without RJ45 plug)	1	**6ES7155-6AA01-0BN0**	1	1 unit
• Including server module (bus adapter must be ordered separately, see below)	1	**6ES7155-6AU01-0BN0**	1	1 unit
 6ES7155-6AU01-0CN0				
PROFINET interface modules IM 155-6 PN High Feature Max. 64 I/O modules, max. 1 440 bytes I/O data per station				
• **IM 155-6 PN/2 High Feature** IM with a bus adapter slot including server module and optional strain relief (bus adapter must be ordered separately, see below)	15	**6ES7155-6AU01-0CN0**	1	1 unit
• **IM 155-6 PN/3 High Feature** 3-port IM with two bus adapter slots including server module and optional strain relief (bus adapter must be ordered separately, see below)	5	**6ES7155-6AU30-0CN0**	1	1 unit
 6ES7155-6AU00-0DN0				
PROFINET interface module IM 155-6 PN High Speed Max. 30 I/O modules, max. 1 440 bytes I/O data per station				
• Including server module (bus adapter must be ordered separately, see below)	1	**6ES7155-6AU00-0DN0**	1	1 unit
PROFIBUS interface module IM 155-6 DP High Feature Max. 32 I/O modules, max. 244 bytes I/O data per station				
• Including server module and PROFIBUS plug	15	**6ES7155-6BA01-0CN0**	1	1 unit
 6ES7193-6AR00-0AA0  6ES7193-6AF00-0AA0				
Bus adapters for PROFINET For connection of the Ethernet cable to the PROFINET IM 155-6 PN interface module				
• Connection 2 x RJ45 (supplied without RJ45 plug)	1	**6ES7193-6AR00-0AA0**	1	1 unit
• Connection 2 x FC (FastConnect)	1	**6ES7193-6AF00-0AA0**	1	1 unit
For more bus adapters with fiber optic cable connection, see Catalog IK PI or the Industry Mall.				

Overview

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

More information

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 communication module supplements an AS-Interface network without additional wiring to produce a safety-related AS-i network.

Important features:

- Fail-safe communication 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 61508/EN 62061), PL e (EN ISO 13849-1)
  - Parameterization conforms with other fail-safe I/O modules of the ET 200SP
- The communication 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 fail-safe versions of the ET 200SP station with ET 200SP F-CPU 1510SP F/1512SP F (firmware V1.8 or higher) 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: two-channel or 2 x single-channel
  - Integrated discrepancy evaluation in the case of two-channel signals
  - Integrated AND operation in the case of 2 x single-channel signals
  - Input delay can be parameterized
  - 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).
  - An actuator (e.g. a contactor) is interfaced via a fail-safe AS-i output module (e.g. safe SlimLine module S45F, Article No. 3RK1405-1SE15-0AA2, see page 14/36).
  - Simple fault acknowledgment via the process image
- Simple module replacement thanks to automatic importing of the safety parameters from the coding element
- Comprehensive diagnostic options
- Can be plugged onto type C1 or type C0 BaseUnits (BU)
- Informative automatic alarm indications (firmware V1.0.1 or higher)
- Supply via AS-Interface voltage
- Eight LED indicators for diagnostics, operating state, fault indication and supply voltage
- Informative front-side module inscription
  - Plain-text marking of the module type and function class
  - 2D matrix code (Article No. and serial number)
  - Circuit diagram
  - Color coding of the CM module type: Light gray
  - Hardware and firmware version
  - Complete article number
- Optional labeling accessories
  - Labeling strips
  - Reference identification label

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 communication module (Article No. 3RK7137-6SA00-0BC1) is recommended as the AS-i master for the ET 200SP, see from page 14/32 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 network transition 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 router complies precisely with customer requirements. Expansion variants for almost every application are possible thanks to the selection of standard and fail-safe 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 security concept. Siemens products and solutions represent only one component of such a concept.

For more information about the subject of Industrial Security, see www.siemens.com/industrialsecurity.

Configuration

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

- STEP 7 (TIA Portal) V13 and higher with HSP 0070[1] and Safety Advanced.
  STEP 7 V13 SP1 is required for connection to the S7-1500F.
  When configuring with STEP 7 V13 SP1, the latest version of HSP 0070 V2.0 (or higher) is an essential prerequisite.
  STEP 7 Safety V13 SP1 Update 4 and HSP 0070 V3.0 (or higher) are needed for configuration of the F-CM AS-i Safety ST module in an ET 200SP station with ET 200SP F-CPU 1510SP F/1512SP F (firmware V1.8 or higher) or 1515SP PC F.

or

- STEP 7 (classic) V5.5 SP3 HF4 or higher with HSP 2093[2] and Distributed Safety V5.4 SP5 or F-Configuration Pack SP11 or SIMATIC S7 F/FH Systems

Configuration and programming are done entirely in the STEP 7 user interface. No additional configuration software is needed for commissioning.

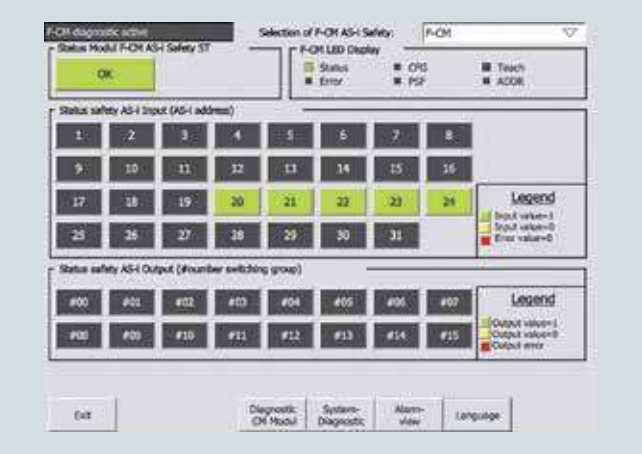
Data management – together with all other configuration data of the SIMATIC – is realized completely in the S7 project.

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

[1] For HSP 0070, see https://support.industry.siemens.com/cs/ww/en/view/72341852.

[2] For HSP 2092, see https://support.industry.siemens.com/cs/ww/en/view/23183356.

Application

Thanks to 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.

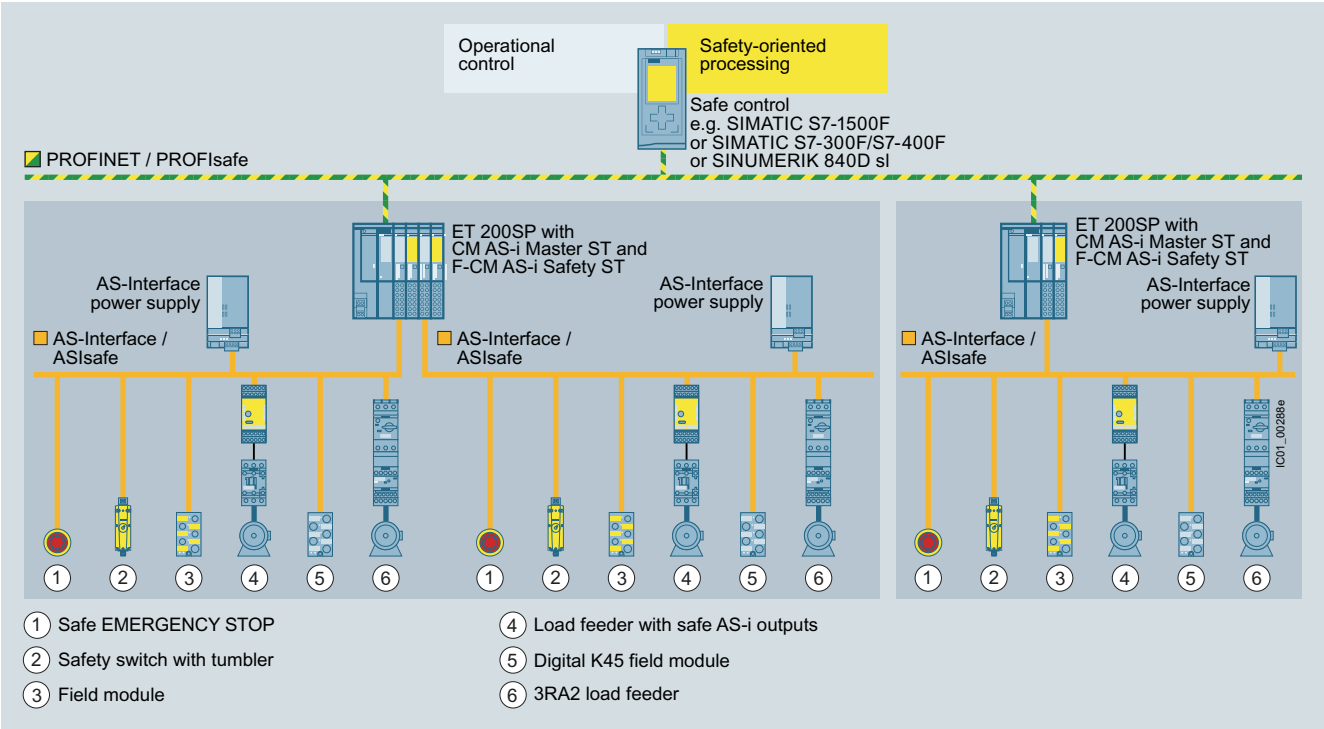
The safety application is programmed in the SIMATIC S7 F-CPU with Distributed Safety/S7 F/FH Systems/Safety Advanced. The fail-safe input signals of the ASIsafe slave modules are read via the AS-i bus line and are combined with any chosen further signals in the fail-safe program.

The fail-safe output signals can be output via safe SIMATIC output modules or also directly via AS-i – with the help of safe AS-i output modules, e.g. safe SlimLine S45F modules, Article No. 3RK1405-1SE15-0AA2 (see page 14/26). 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 (firmware V1.8 and higher) 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	SD d	Article No.	PU (UNIT, SET, M)	PS*
 3RK7136-6SC00-0BC1	**F-CM AS-i Safety ST communication 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 14/34) • Can be used up to SIL 3 (IEC 62061/IEC 61508), PL e (EN ISO 13849-1) • Coding element type H (included in scope of supply) • Dimensions (W x H x D/mm): 20 x 73 x 58	2	**3RK7136-6SC00-0BC1**	1	1 unit

Accessories

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

More accessories, see page 14/35.

Overview

DP/AS-i Link Advanced

More information

AS-Interface block library for SIMATIC PCS 7 for easy connection of AS-Interface to PCS 7, see Catalog KT10.1 - SITOP Power Supply

Manual, see https://support.industry.siemens.com/cs/ww/en/ps/24507/man

PN	DP-M	DP-S	AS-i M		
		●	●		

The DP/AS-i Link Advanced is a compact router between PROFIBUS (DP slave) and AS-Interface, with the following features:

- Single and double AS-Interface master (according to AS-Interface specification V3.0) for connection of 62 AS-Interface slaves or 124 AS-Interface slaves (with a double master)
- Integrated analog value transmission
- Integrated ground-fault monitoring for the AS-Interface cable
- User-friendly local diagnostics and startup by means of a full graphic display and control keys or through a web interface with a standard browser on the PC screen
- Vertical integration (standard web interface) through Industrial Ethernet
- Supply voltage from the AS-Interface cable or alternatively with 24 V DC (optional)
- Suitable for AS-i Power24V (from product version 4 / firmware version 2.2) and for AS-Interface with 30 V voltage
- Module exchange without entering the connection parameters (e.g. PROFIBUS address) using C-PLUG (optional)

Design

- Compact plastic enclosure in degree of protection IP20 for standard rail mounting
- COMBICON plug-in screw terminals
- Compact design:
  - Pixel graphics display in the front panel for detailed display of the operating state and readiness for operation of all connected AS-Interface slaves
  - 6 pushbuttons for starting up and testing the AS-Interface line directly on the DP/AS-i Link Advanced
  - LED indication of the operating state of PROFIBUS DP and AS-Interface
  - Integrated Ethernet port (RJ45 socket) for user-friendly startup, diagnostics and testing of DP/AS-i Link Advanced through a web interface using a standard browser
- Small mounting depth thanks to recessed plug mounting
- Operation without fans and batteries

Functionality

Communications

The DP/AS-i Link Advanced enables a PROFIBUS DP master to cyclically access the I/O data of all the slaves of a lower-level AS-Interface segment.

The DP/AS-i Link Advanced occupies the following address space:

- As a single master: 32 bytes of input data and 32 bytes of output data in which the I/O data of the connected AS-Interface slaves (standard and A/B addressing) of an AS-i line is stored.
- As double master, double the number of bytes
- Optional additional I/O bytes for data from analog slaves

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 DP master. The integrated evaluation of analog signals is just as easy as access to digital values because the analog process data also lie directly in the I/O address area of the CPU.

PROFIBUS DP-V1 Masters also provide the option of triggering AS-Interface master calls over the acyclic PROFIBUS services (e.g. write parameters, amend addresses, read diagnostic values). Using an operating display in AS-i Link it is possible to fully commission the lower-level AS-Interface line even without a CPU.

DP/AS-i Link Advanced is equipped with an additional Ethernet port, which enables use of the integrated web server. The web server can be called up with any standard web browser (e.g. Internet Explorer) without additional software. It allows all diagnostics information, the set bus configuration and parameters and, if applicable, any adjustments to be displayed on the PC. Firmware updates are also possible using this port.

The optional C-PLUG supports module exchange without entering the connection parameters (PROFIBUS address etc.), keeping downtimes to a minimum in the event of a fault.

Diagnostics

The following diagnostics is possible using LEDs, the display and control keys, web interface or STEP 7:

- Operating state of the DP/AS-i Link Advanced
- Status of the link as a PROFIBUS DP slave
- Diagnostics of the AS-Interface network
- Message frame statistics
- Standard diagnostics pages in the web interface for fast diagnostics access through Ethernet using a standard browser
- For the use of the web interfaces no network settings are necessary on the PC (Zeroconf procedure)
- The reporting of diagnostic events is optionally possible via email or SNMP Trap. The integrated diagnostic buffer saves the events including time stamp

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 security concept. Siemens products and solutions represent only one component of such a concept.

For more information about the subject of Industrial Security, see www.siemens.com/industrialsecurity.

Configuration

The DP/AS-i Link Advanced can be configured as follows:

- With STEP 7 (TIA Portal) V12 or higher or STEP 7 (classic) V5.4 or higher: In the case of STEP 7 configuration, the AS-Interface configuration can be uploaded in STEP 7. Furthermore, AS-Interface slaves can also be conveniently configured in HW-Config (slave selection dialog)
- By adopting the ACTUAL configuration of the AS-Interface on the display
- Alternatively DP/AS-i Link Advanced can be integrated into the engineering tool using the PROFIBUS GSD file (e.g. STEP 7 versions earlier than V5.4 or engineering tools from non-Siemens suppliers)

Benefits

- Short startup times through simple configuration at the press of a button and testing of the AS-Interface line using the display or web interface
- Reduction of standstill and servicing times in the event of a slave failure thanks to user-friendly diagnostics using the display or web interface and through simple module exchange with the help of the C-PLUG exchange medium
- Reduced amount of engineering work thanks to user-friendly configuration of Siemens slaves using the slave catalog in HW-Config (STEP 7)
- Costs saved by the double AS-Interface master when large volumes of project data are involved
- Simple operation with AS-Interface power supply unit (see page 14/73) possible without restrictions, no additional operating voltage is required.
- 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 14/77.
- 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/618921

Application

The DP/AS-i Link Advanced is a PROFIBUS DP-V1 slave (according to IEC 61158/IEC 61784) and an AS-Interface master (based on AS-Interface specification V3.0 according to IEC/EN 62026-2). It enables transparent data access to AS-Interface from PROFIBUS DP.

Exchanging data with the PROFIBUS DP master

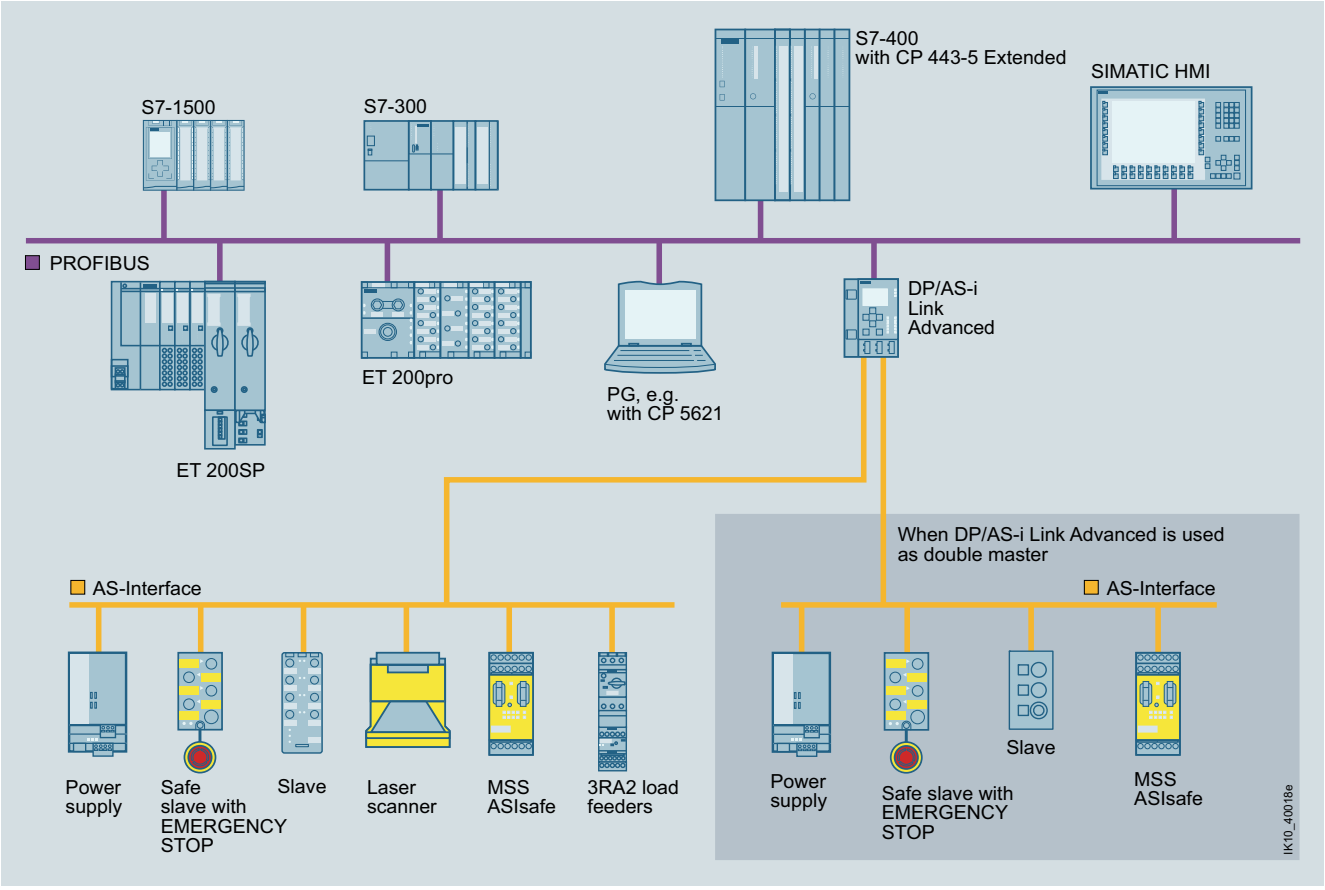
PROFIBUS DP masters (DP-V0) can exchange I/O data cyclically with the AS-Interface. DP masters with acyclic services (DP-V1) are additionally able to initiate AS-Interface master calls (e.g. reading/writing the AS-i configuration during normal operation). As such, the DP/AS-i Link Advanced is particularly well-suited for a distributed construction and for connection of a lower-level AS-Interface network.

Single master

For applications with typical volumes of project data, it is sufficient to use the DP/AS-i Link Advanced in its version as an AS-Interface single master. The single master can operate up to 248 DI / 248 DQ, using 62 A/B slaves with 4 DI / 4 DQ each.

Double master

The AS-Interface double master version of DP/AS-i Link Advanced is suitable for applications with large volumes of data. In this case, twice the volume of project data can be used on two AS-Interface lines running independently of each other. The double master can operate up to 496 DI / 496 DQ, using two AS-i networks each with 62 A/B slaves with 4 DI / 4 DQ each.



Integration of AS-Interface on PROFIBUS through DP/AS-i Link Advanced as single/double master

Selection and ordering data

	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
DP/AS-i Link Advanced					
 DP/AS-i Link Advanced	Router between PROFIBUS DP and AS-Interface; degree of protection IP20; including COMBICON plug-in screw terminals for connection of an AS-Interface cable (two AS-Interface cables for double masters) and the optional 24 V supply; corresponds to AS-Interface specification V3.0; Dimensions (W x H x D/mm): 90 x 132 x 88.5		**COMBICON connection**		
	• Single master with display	►	**6GK1415-2BA10**	1	1 unit
	• Double master with display	►	**6GK1415-2BA20**	1	1 unit

Accessories

Version	SD	Article No.	PU (UNIT, SET, M)	PS*
	d			
C-PLUG Exchange medium for the simple exchange of devices in the event of a fault; for accommodating configuration and application data; can be used in SIMATIC NET products with a C-PLUG slot	1	**6GK1900-0AB00**	1	1 unit
PROFIBUS FastConnect standard cable GP FastConnect standard type with special design for fast installation, 2-core, shielded	1	**6XV1830-0EH10**	1	1 M
PROFIBUS FastConnect RS 485 bus connector with diagonal cable outlet (35°) With insulation displacement connection, the max. transmission rate is 12 Mbps, activatable terminating resistor is integrated				
• Without PG connection socket	1	**6ES7972-0BA61-0XA0**	1	1 unit
• With PG connection socket	1	**6ES7972-0BB61-0XA0**	1	1 unit
PROFIBUS FastConnect stripping tool Preset stripping tool for speedy stripping of PROFIBUS FastConnect bus cables	1	**6GK1905-6AA00**	1	1 unit
IE FC RJ45 Plug 90 RJ45 plug-in connector for Industrial Ethernet, with robust metal enclosure and integrated insulation displacement contacts for connection of Industrial Ethernet FC installation cables; with 90° cable feeder				
• 1 pack = 1 unit	1	**6GK1901-1BB20-2AA0**	1	1 unit
• 1 pack = 10 units	1	**6GK1901-1BB20-2AB0**	1	10 units
• 1 pack = 50 units	1	**6GK1901-1BB20-2AE0**	1	50 units

Overview

DP/AS-Interface Link 20E manual

More information

Manual "DP/AS-Interface Link 20E", see https://support.industry.siemens.com/cs/ww/en/view/5281638

PN	DP-M	DP-S	AS-i M		
		●	●		

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 V5.2 and higher

Design

- Compact plastic enclosure in degree of protection IP20 for standard 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 indication 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

Communications

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 is 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) from V12 or STEP 7 (classic) from V5.1 SP2:
  In the case of STEP 7 configuration, the AS-Interface configuration can be uploaded from STEP 7 V5.2. 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 STEP 7 V5.1 and lower or 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 indicators 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

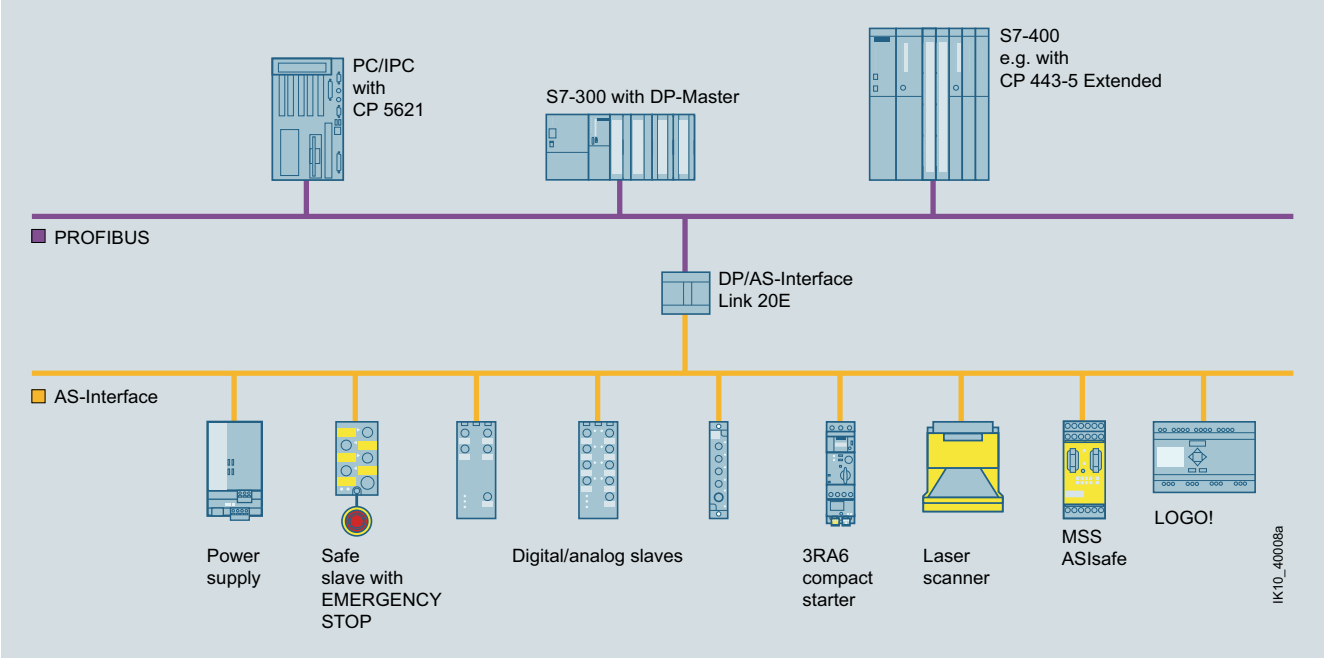
Application

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/EN 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	SD	Article No.	PU (UNIT, SET, M)	PS*
	d			
DP/AS-Interface Link 20E				
 6GK1415-2AA10		**Screw terminals**		
Router 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

Accessories

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

Overview

IE/AS-i Link PN IO
Single master (picture on left) and double master (picture on right)

More information

Manual, see https://support.industry.siemens.com/cs/ww/en/view/22712154

AS-Interface block library for SIMATIC PCS 7 for easy connection of AS-Interface to PCS 7, see Catalog KT10.1 - SITOP Power Supply

PN	DP-M	DP-S	AS-i M		
●			●		

The IE/AS-i Link PN IO is a compact router between PROFINET and AS-Interface, with the following features:

- Single and double AS-Interface master (according to AS-Interface specification V3.0) for connection of 62 or 124 AS-Interface slaves (with a double master)
- Integrated analog value transmission
- Integrated ground-fault monitoring for the AS-Interface cable
- User-friendly local diagnostics and startup by means of a full graphic display and control keys or through a web interface with a standard browser on the PC screen
- Vertical integration (standard web interface) through Industrial Ethernet
- Supply via AS-Interface cable or with 24 V DC
- Suitable for AS-i Power24V and for AS-Interface with 30 V voltage
- Module exchange without entering the PROFINET connection parameters when using the C-PLUG (optional)
- Costs saved by the double AS-Interface master when large volumes of project data are involved

Note:

As an alternative to the IE/AS-i Link PN IO, a high-performance router 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 in an ET 200SP station (for safety-related applications), see pages 14/34 and 14/38.

Design

- Compact plastic enclosure in degree of protection IP20 for standard rail mounting
- COMBICON plug-in screw terminals
- Compact design
- Pixel graphics display in the front panel for detailed display of the operating state and readiness for operation of all connected AS-Interface slaves
- Six pushbuttons for starting up and testing the AS-Interface line directly on the IE/AS-i Link PN IO
- LED display of the operating state of PROFINET IO and AS-Interface
- Integrated 2-port switch (RJ45 socket) for connection to Industrial Ethernet
- Small mounting depth thanks to recessed plug mounting
- Operation without fans and batteries

Functionality

Communications

The IE/AS-i Link PN IO enables a PROFINET IO controller to cyclically access the I/O data of all the slaves of a lower-level AS-Interface segment. Also supported are the expanded slave types with higher I/O data volume according to AS-i specification V3.0.

The IE/AS-i Link PN IO occupies the following address space:

- As a single master with full expansion: 62 bytes of input data and 62 bytes of output data in which the I/O data of the connected AS-Interface slaves (standard and A/B addressing) of an AS-i line is stored.
- As double master, double the number of bytes
- Optional additional I/O bytes for data from analog slaves

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 IO controller.

The integrated evaluation of analog signals is just as easy as access to digital values because the analog process data also lie directly in the I/O address area of the CPU.

PROFINET IO controllers are additionally able to initiate AS-Interface master calls (e.g. to write parameters, change addresses, read diagnostic values) through the acyclic PROFINET services.

Using an operating display in AS-Interface Link it is possible to fully commission the lower-level AS-i line.

The IE/AS-i Link PN IO is equipped with two Ethernet ports, which are connected by an internal switch. With the Ethernet it is possible in addition to use the integrated web server.
The web server can be called up with any standard web browser (e.g. Internet Explorer) without additional software. It enables the PC to present all diagnostics information and to display the set bus configuration and parameters as well as their adaptation where applicable. Firmware updates are also possible using this port.

The optional C-PLUG supports module replacement without manually entering the connection parameters (PROFINET device name), keeping downtimes to a minimum in the event of a fault.

Diagnostics

The following diagnostics is possible using the display and control keys, web interface or STEP 7:

- Operating state of the IE/AS-i Link PN IO
- State of the link as a PROFINET IO device
- Diagnostics of the AS-Interface network
- Message frame statistics
- Standard diagnostics pages in the web interface for fast diagnostics access through Ethernet using a standard browser
- Reporting of diagnostic events is optionally possible via e-mail or SNMP trap. The integrated diagnostic buffer saves the events including time stamp

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 security concept. Siemens products and solutions represent only one component of such a concept.

For more information about the subject of Industrial Security, see www.siemens.com/industrialsecurity.

Configuration

The IE/AS-i Link PN IO is configured as follows:

- With STEP 7 (TIA Portal) from V15 or STEP 7 (classic) from V5.4: In the case of STEP 7 configuration, the AS-Interface configuration can be uploaded from STEP 7 V5.4 SP2. Furthermore, AS-Interface slaves from Siemens can also be conveniently configured in HW-Config (slave selection dialog)
- Alternatively, IE/AS-i Link PN IO can be integrated by means of the PROFINET GSD file in the engineering tool (e.g. for TIA Portal versions earlier than V15 or for STEP 7 versions earlier than V5.4 SP2, or for non-Siemens engineering tools).

Benefits

- Short startup times through simple configuration at the press of a button and testing of the AS-Interface line using the display or web interface
- Reduction of standstill and servicing times in the event of a slave failure thanks to user-friendly diagnostics using the display or web interface
- Costs saved by the double AS-Interface master when large volumes of project data are involved
- Simple operation with AS-Interface power supply unit (see page 14/73) possible without restrictions, no additional operating voltage is required.
- 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 14/77.
- 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/618921

Application

The IE/AS-i Link PN IO is a PROFINET IO device (according to IEC 61158/IEC 61784) and an AS-Interface master (based on AS-Interface specification V3.0 according to IEC/EN 62026-2). It enables transparent data access to AS-Interface from PROFINET.

Exchanging data with PROFINET IO controllers

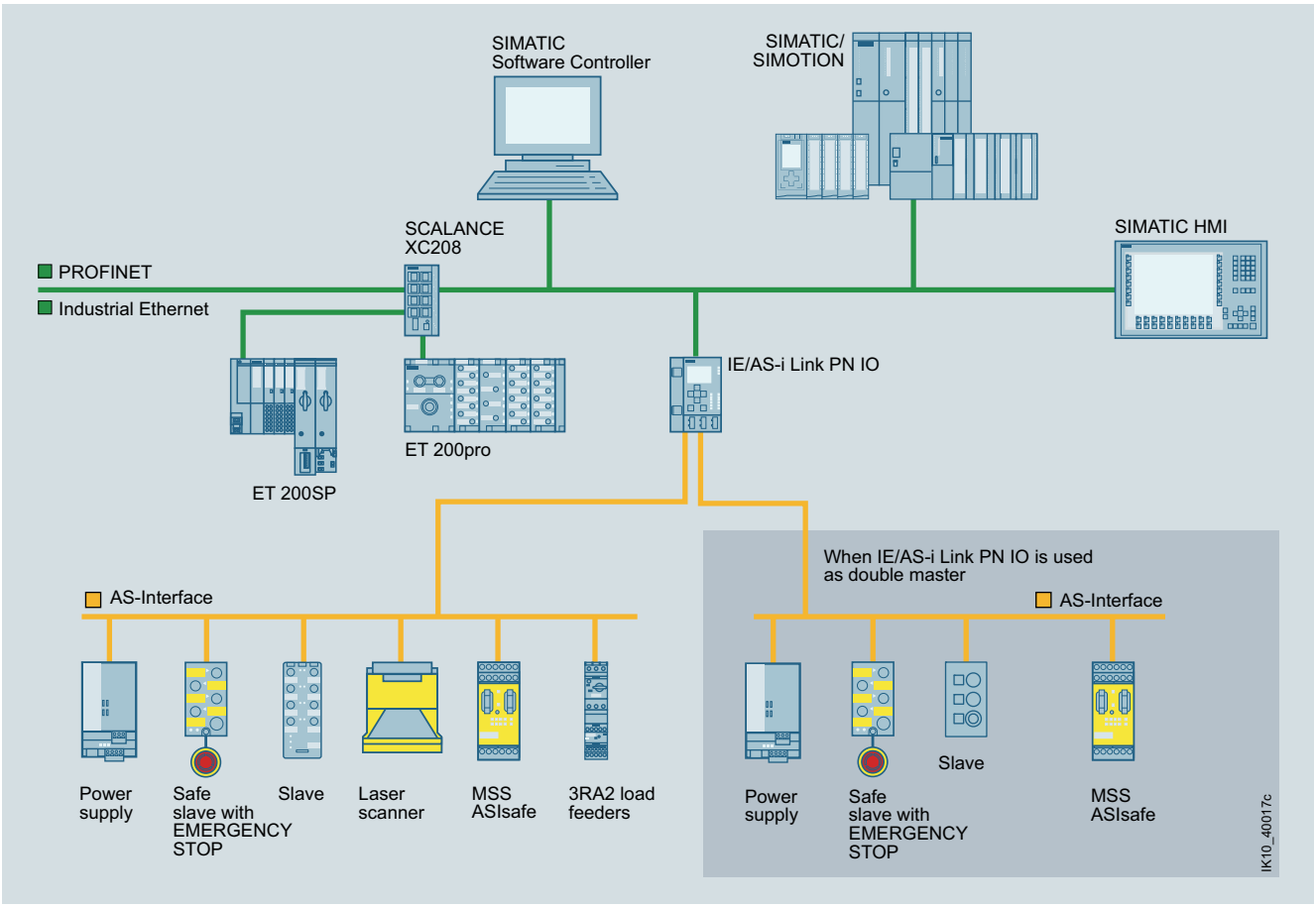
PROFINET IO controllers can exchange I/O data with AS-Interface in cyclic mode and can perform AS-i master calls in addition with acyclic services (e.g. reading/writing the AS-i configuration during normal operation). The IE/AS-i Link PN IO is therefore suitable for distributed configurations and for integrating a lower-level AS-Interface network.

Single master

The AS-i single master version of IE/AS-i i Link PN IO is suitable for applications with typical volumes of data. The single master can operate up to 248 DI / 248 DQ, using 62 A/B slaves with 4 DI / 4 DQ each.

Double master

The AS-i double master version of IE/AS-i Link PN IO is suitable for applications with large volumes of data. In this case, twice the volume of project data can be used on two AS-i lines running independently of each other. The double master can operate up to 496 DI / 496 DQ, using two AS-i networks each with 62 A/B slaves with 4 DI / 4 DQ each.

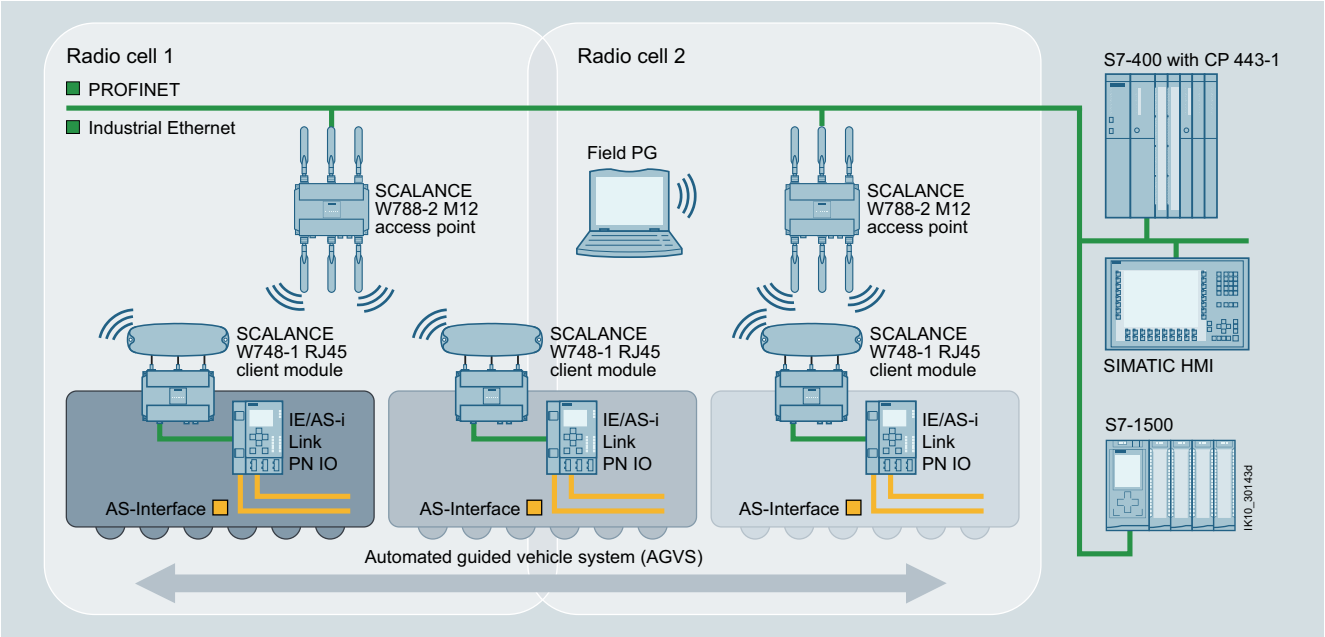


Integration of AS-Interface on PROFINET through IE/AS-i Link PN IO as single/double master

Wireless communication

Using an upstream IWLAN client module, e.g. SCALANCE W748-1 RJ45, an AS-Interface line can be integrated in the PROFINET world by wireless means.

Sample uses are applications which up to now have been performed with fault-prone tow chain or collector wire technology. Maintenance costs are thus reduced.



Wireless communication between Industrial Ethernet and AS-Interface components

Selection and ordering data

Version	SD	Article No.	PU (UNIT, SET, M)	PS*
	d			
IE/AS-i Link PN IO				
 IE/AS-i Link PN IO		**COMBICON connection**		
Router between PROFINET and AS-Interface in degree of protection IP20; including COMBICON plug-in screw terminals for connecting an AS-Interface cable (two AS-Interface cables for a double master) and the optional 24 V supply; complies with AS-Interface specification V3.0; dimensions (W x H x D / mm): 90 x 132 x 88.5				
• Single master with display	▶	**6GK1411-2AB10**	1	1 unit
• Double master with display	▶	**6GK1411-2AB20**	1	1 unit

Accessories

Version	SD	Article No.	PU (UNIT, SET, M)	PS*
	d			
C-PLUG	1	**6GK1900-0AB00**	1	1 unit
Exchange medium for simple exchange of devices in the event of a fault; for accommodating configuration and application data; can be used in SIMATIC NET products with a C-PLUG slot				
IE FC RJ45 Plug 90				
RJ45 plug-in connector for Industrial Ethernet, with robust metal enclosure and integrated insulation displacement contacts for connection of Industrial Ethernet FC installation cables; with 90° cable feeder				
• 1 pack = 1 unit	1	**6GK1901-1BB20-2AA0**	1	1 unit
• 1 pack = 10 units	1	**6GK1901-1BB20-2AB0**	1	10 units
• 1 pack = 50 units	1	**6GK1901-1BB20-2AE0**	1	50 units

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 14/52 and 14/54
  - Series K45, see page 14/57
  - Series K20, see page 14/58
- Analog modules with a high degree of protection
  - Series K60, see page 14/61

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 standard mounting 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 PIN4 while the signal for the inputs is acquired at PIN4 and PIN2. As the result, sensors can be connected directly to PIN2 and PIN4.

Y-assignment

With the Y-assignment, two sensors or two actuators can be connected to one M12 socket. In this case, both PIN4 and PIN2 are provided for one sensor signal and one actuator signal on each M12 socket.

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 PIN4 of the first socket.
  - The signal of the second sensor/actuator is connected to PIN2 of the first socket and to PIN4 of the second socket.

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

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/IP69K	IP65/IP67	IP65/IP67
Addressing type A/B address	✓	✓	✓

✓ Available

-- Not available

Safety modules for AS-Interface, see page 14/26.

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
- Standard 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

Version					SD d	Article No.	PU (UNIT, SET, M)	PS*
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				
8 inputs/ 2 outputs[1]	2 A	A/B	Special	AS-i	2	**3RK2400-1HQ00-0AA3**	1	1 unit
8 inputs[1]	--	Standard	Y-II	AS-i	▶	**3RK1200-0DQ00-0AA3**	1	1 unit
	--	A/B	Y-II	AS-i	▶	**3RK2200-0DQ00-0AA3**	1	1 unit
	--	A/B	Y-II	U_{aux}	5	**3RK2200-1DQ00-1AA3**	1	1 unit
4 inputs/ 4 outputs	2 A	Standard	Y-II	AS-i	▶	**3RK1400-1DQ00-0AA3**	1	1 unit
	2 A	Standard	Standard	AS-i	▶	**3RK1400-1CQ00-0AA3**	1	1 unit
	1 A	Standard	Y-II	AS-i	2	**3RK1400-1DQ01-0AA3**	1	1 unit
	1 A	Standard	Standard	AS-i	▶	**3RK1400-1DQ03-0AA3**	1	1 unit
	2 A	A/B (spec. V3.0)	Y-II	AS-i	2	**3RK2400-1DQ00-0AA3**	1	1 unit
	2 A	A/B (spec. V3.0)	Y-II	U_{aux}	2	**3RK2400-1DQ00-1AA3**	1	1 unit
4 inputs/ 3 outputs	2 A	A/B	Y-II	AS-i	▶	**3RK2400-1FQ03-0AA3**	1	1 unit
4 inputs/ 2 outputs	2 A	Standard	Y-II	AS-i	▶	**3RK1400-1MQ00-0AA3**	1	1 unit
4 inputs	--	Standard	Y-II	AS-i	▶	**3RK1200-0CQ00-0AA3**	1	1 unit
	--	A/B	Y-II	AS-i	2	**3RK2200-0CQ00-0AA3**	1	1 unit
2 x 2 inputs/ 2 x 2 outputs	1 A	Standard	Y	AS-i	15	**3RK1400-1DQ02-0AA3**	1	1 unit
4 outputs	2 A	Standard	Y-II	--	▶	**3RK1100-1CQ00-0AA3**	1	1 unit
	2 A	A/B (spec. V3.0)	Y-II	--	2	**3RK2100-1CQ00-0AA3**	1	1 unit
Digital I/O modules, IP67 – K60 data couplers Modules supplied without mounting plate								
Type	Current carrying capacity of outputs	Slave addressing type	Pin assignment	Sensor power supply via				
Data coupler 4 inputs/4 outputs (virtual)	--	Standard	--	--	10	**3RK1408-8SQ00-0AA3**	1	1 unit

[1] Module occupies two AS-Interface addresses

Safety modules for AS-Interface, see page 14/26 onwards.

Accessories


3RK1901-0CA00

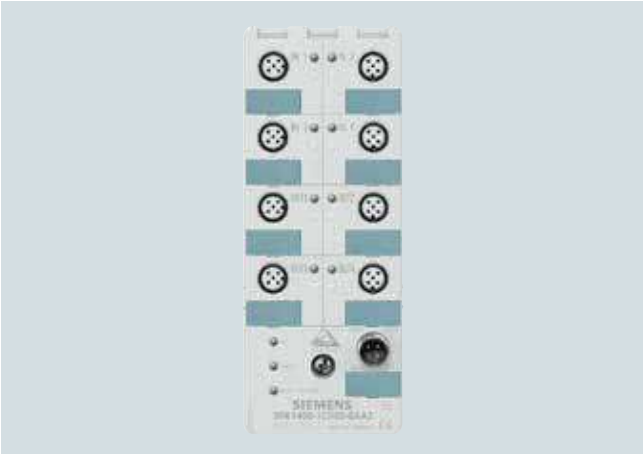

3RK1901-1KA00


3RK1902-0AR00

Version	SD d	Article No.	PU (UNIT, SET, M)	PS*
K60 mounting plates Suitable for all K60 compact modules				
• Wall mounting	▶	**3RK1901-0CA00**	1	1 unit
• Standard rail mounting	▶	**3RK1901-0CB01**	1	1 unit
AS-Interface sealing caps M12 For free M12 sockets	▶	**3RK1901-1KA00**	100	10 units
Sealing sets • For K60 mounting plate and standard distributor • Cannot be used for K45 mounting plate • One set contains one straight and one shaped seal	2	**3RK1902-0AR00**	100	5 units

Overview

Operation in particularly harsh environments



K60R module in degree of protection IP68/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/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/IP69K tests" on page 14/54.

Cleaning with high-pressure cleaners, such as is regularly performed in the food and drinks industry for instance, is possible without difficulty (IP69K).

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

Mounting

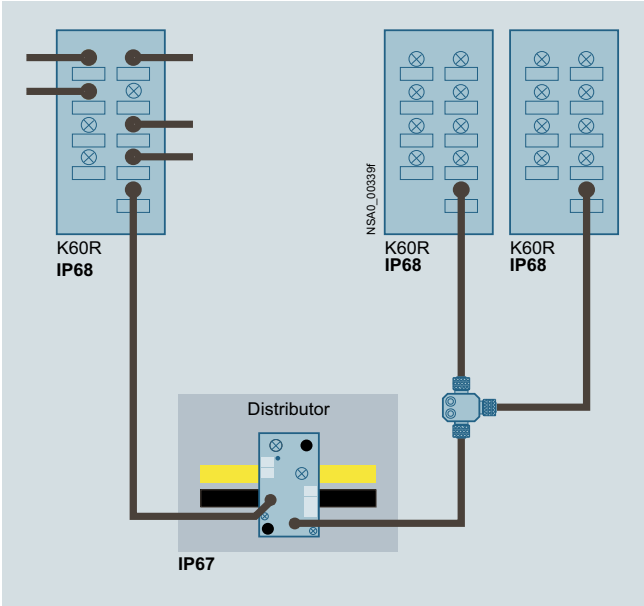
The same mounting plates are used as for the K60 modules. Instead of using flat cables, the K60R is connected using a 4-pole round cable with an M12 connection. With the K60R the mounting plate thus serves only as a fixture and ground terminal.

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/IP69K tests

K60R modules were tested with the following tests:

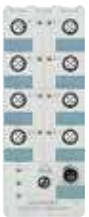
- Stricter test than IP67: 90 min at 1.8 m depth of water (IP67: 30 min at 1 m depth of water)
- Salt water test: Five months in salt water, 20 cm deep, at room temperature
- Test with particularly creepable oil: Five months completely under oil at room temperature
- Test with drilling emulsion: Five 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 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	SD d	Article No.	PU (UNIT, SET, M)	PS*
 3RK1400-1CR00-0AA3	**Digital I/O modules, IP68/IP69K – K60R** • 4 inputs/4 outputs • Width 60 mm • IP68/IP69K • Standard assignment • Current carrying capacity - 200 mA (inputs) - 2 A (outputs) • Slave addressing type: Standard address • Modules supplied without mounting plate	2	**3RK1400-1CR00-0AA3**	1	1 unit

Accessories

	Version			SD	Article No.	PU (UNIT, SET, M)	PS*
				d			
 3RK1901-0CA00	**K60 mounting plates** Suitable for all K60 and K60R compact modules						
	• Wall mounting			►	**3RK1901-0CA00**	1	1 unit
	• Standard rail mounting			►	**3RK1901-0CB01**	1	1 unit
 3RK1901-1KA00	**AS-Interface sealing caps M12** For free M12 sockets			►	**3RK1901-1KA00**	100	10 units
 3RK1901-2NR21	**AS-Interface M12 feeders, current carrying capacity up to 4 A**						
	For flat cable	For	Cable length	Cable end in feeder			
	AS-i/U_{aux}	M12 socket	--	Not available	2	**3RK1901-2NR20**	1	1 unit
	AS-i/U_{aux}	M12 cable box	1 m	Not available	2	**3RK1901-2NR21**	1	1 unit
	AS-i/U_{aux}	M12 cable box	2 m	Not available	2	**3RK1901-2NR22**	1	1 unit
 3RK1901-1NR04	**AS-Interface M12 feeders, 4-fold, current carrying capacity up to 4 A**						
	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 standard rail mounting)	--	Not available	2	**3RK1901-1NR04**	1	1 unit
 3RK1902-4PB15-3AA0	**M12 connecting cables** • 3-pole • For addressing AS-i slaves with M12 bus connection • Cable length 1.5 m			5	**3RK1902-4PB15-3AA0**	1	1 unit

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 standard 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 connectors, 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	SD d	Article No.	PU (UNIT, SET, M)	PS*
8 inputs[1]	--	A/B	Y	--	M12	2	**3RK2200-0DQ20-0AA3**	1	1 unit
4 inputs	--	Standard	Standard	--	M12	▶	**3RK1200-0CQ20-0AA3**	1	1 unit
	--	Standard	Standard	--	M8	2	**3RK1200-0CT20-0AA3**	1	1 unit
	--	A/B	Standard	--	M12	▶	**3RK2200-0CQ20-0AA3**	1	1 unit
	--	A/B	Standard	--	M8	5	**3RK2200-0CT20-0AA3**	1	1 unit
2 x 2 inputs	--	A/B	Y	--	M12	2	**3RK2200-0CQ22-0AA3**	1	1 unit
2 inputs/ 2 outputs	2 A[2]	Standard	Standard	✓	M12	▶	**3RK1400-1BQ20-0AA3**	1	1 unit
2 x (1 input/ 1 output)	0.2 A	Standard	Y	--	M12	2	**3RK1400-0GQ20-0AA3**	1	1 unit
4 x (1 input/ 1 output)	0.2 A	A/B (spec. V3.0)	Y	--	M12	5	**3RK2400-0GQ20-0AA3**	1	1 unit
	0.5 A	A/B (spec. V3.0)	Y	✓	M12	5	**3RK2400-1GQ20-1AA3**	1	1 unit
4 outputs	1 A	A/B (spec. V3.0)	Standard	✓	M12	2	**3RK2100-1CQ20-0AA3**	1	1 unit
3 outputs	1 A	A/B	Standard	✓	M12	▶	**3RK2100-1EQ20-0AA3**	1	1 unit
4 outputs	1 A	Standard	Standard	✓	M12	▶	**3RK1100-1CQ20-0AA3**	1	1 unit
2 outputs/ 2 inputs	2 A	A/B	Standard	✓	M12	2	**3RK2400-1BQ20-0AA3**	1	1 unit

✓ 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 14/26 onwards.

Accessories


3RK1901-2EA00

K45 mounting plates

	SD d	Article No.	PU (UNIT, SET, M)	PS*
• For wall mounting	▶	**3RK1901-2EA00**	1	1 unit
• For standard rail mounting	▶	**3RK1901-2DA00**	1	1 unit


3RK1901-1MN00

Cable termination pieces ▶ **3RK1901-1MN00** — 1 — 10 units

For sealing of open cable ends (shaped AS-Interface cable) in IP67


3RK1901-1KA00


3RK1901-1PN00

AS-Interface sealing caps

	SD d	Article No.	PU (UNIT, SET, M)	PS*
• For free M12 sockets	▶	**3RK1901-1KA00**	100	10 units
• For free M8 sockets	2	**3RK1901-1PN00**	100	10 units

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 energy are routed in this case in a shared round cable. This enables extremely compact installation.

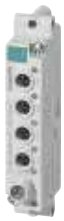
The flexibility of the round cable means that it can also be used on moving machine parts without any problems. The K20 modules are also ideal for such applications as their non-encapsulated design makes them particularly light in weight.

In applications with tow chains, 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 pushbuttons 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					SD	Article No.	PU (UNIT, SET, M)	PS*
					d			
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	2	**3RK2200-0CT30-0AA3**	1	1 unit
	--	A/B	Y	M12	5	**3RK2200-0CQ30-0AA3**	1	1 unit
2 inputs/ 2 outputs	1	A/B	Standard	M8	2	**3RK2400-1BT30-0AA3**	1	1 unit
	1	A/B	Y	M12	2	**3RK2400-1BQ30-0AA3**	1	1 unit
4 outputs	1	A/B (spec. V3.0)	Standard	M8	2	**3RK2100-1CT30-0AA3**	1	1 unit
4 inputs/ 4 outputs	1	Standard	Standard	M8	10	**3RK1400-1CT30-0AA3**	1	1 unit
	1	A/B (spec. V3.0)	Standard	M8	2	**3RK2400-1CT30-0AA3**	1	1 unit
2 safe inputs	--	Standard	Y-II	M12	2	**3RK1205-0BQ30-0AA3**	1	1 unit

Safety modules for AS-Interface, see page 14/26 onwards.

Accessories

	Version				SD	Article No.	PU (UNIT, SET, M)	PS*
					d			
 3RK1901-1KA00  3RK1901-1PN00	**AS-Interface sealing caps**							
	• For free M12 sockets				▶	**3RK1901-1KA00**	100	10 units
	• For free M8 sockets				2	**3RK1901-1PN00**	100	10 units
 3RK1901-2NN10	**AS-Interface compact distributors, for AS-Interface flat cable** Current carrying capacity up to 8 A				2	**3RK1901-2NN10**	1	1 unit
 3RX9801-0AA00	**AS-Interface M12 feeders** • Degree of protection IP67 • Current carrying capacity up to 2 A							
	For flat cable	For	Cable length	Cable end in feeder				
	AS-i	M12 socket	--	Available	▶	**3RX9801-0AA00**	1	1 unit
 3RK1901-2NR10	**AS-Interface M12 feeders** • Degree of protection IP67/IP68/IP69K • Current carrying capacity up to 4 A							
	For flat cable	For	Cable length	Cable end in feeder				
	AS-i	M12 socket	--	Not available	2	**3RK1901-2NR10**	1	1 unit
	AS-i	M12 cable box	1 m	Not available	2	**3RK1901-2NR11**	1	1 unit
	AS-i	M12 cable box	2 m	Not available	2	**3RK1901-2NR12**	1	1 unit
 3RK1901-2NR21	AS-i/U_{aux}	M12 socket	--	Not available	2	**3RK1901-2NR20**	1	1 unit
	AS-i/U_{aux}	M12 cable box	1 m	Not available	2	**3RK1901-2NR21**	1	1 unit
	AS-i/U_{aux}	M12 cable box	2 m	Not available	2	**3RK1901-2NR22**	1	1 unit
 3RK1901-1NR04	**AS-Interface M12 feeders, 4-fold** Current carrying capacity up to 4 A							
	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 standard rail mounting)	--	Not available	2	**3RK1901-1NR04**	1	1 unit
 6ES7194-1KA01-0XA0	**M12 Y-shaped coupler plugs** For connection of two sensors to one M12 socket with Y-assignment				1	**6ES7194-1KA01-0XA0**	1	1 unit
 3RK1902-4PB15-3AA0	**M12 connecting cables** • 3-pole • For addressing AS-i slaves with M12 bus connection • Cable length 1.5 m				5	**3RK1902-4PB15-3AA0**	1	1 unit

Overview

K60 analog compact module

More information

For the Manual "AS-Interface Analog Modules Profile 7.3/Profile 7.A.9", 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
  - Sensors with current sensor
  - Sensors with voltage signal
  - Sensors with thermal resistor
- 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 two-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 one or two channels.

The output modules are configured as two-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 "AS-Interface Analog Modules Profile 7.3/Profile 7.A.9", 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, see "More information" above.

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, single-channel or two-channel, selectable via the ID1 code

Selection and ordering data


3RK1207-1BQ44-0AA3


3RK2207-2BQ50-0AA3

Version			SD	Article No.	PU (UNIT, SET, M)	PS*
			d			
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)[1]	2	**3RK1207-1BQ40-0AA3**	1	1 unit
	Voltage	± 10 V or 1 ... 5 V (selectable)	2	**3RK1207-2BQ40-0AA3**	1	1 unit
	Thermal resistance	Pt100 or Ni100 or 0 ... 600 Ω (selectable)[1]	2	**3RK1207-3BQ40-0AA3**	1	1 unit
4 inputs	Current	4 ... 20 mA or ± 20 mA (selectable)	2	**3RK1207-1BQ44-0AA3**	1	1 unit
	Voltage	± 10 V or 1 ... 5 V (selectable)	10	**3RK1207-2BQ44-0AA3**	1	1 unit
	Thermal resistance	Pt100 or Ni100 or 0 ... 600 Ω (selectable)	2	**3RK1207-3BQ44-0AA3**	1	1 unit
Outputs	Type	Output range				
2 outputs	Current for 2-wire actuators	4 ... 20 mA or ± 20 mA or 0 ... 20 mA (selectable)[1]	2	**3RK1107-1BQ40-0AA3**	1	1 unit
	Voltage for 2-wire actuators	± 10 V or 0 ... 10 V or 1 ... 5 V (selectable)	2	**3RK1107-2BQ40-0AA3**	1	1 unit
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)	2	**3RK2207-1BQ50-0AA3**	1	1 unit
	Voltage	± 10 V or 1 ... 5 V (selectable)	2	**3RK2207-2BQ50-0AA3**	1	1 unit

[1] Some modules are available in the extended temperature range (from -25 to 70 °C) and for use in difficult environmental conditions (coated according to environment standard IEC 60721).

Description	SIPLUS article number	Corresponds to module
SIPLUS AS-Interface 2AA, IP67	6AG1107-1BQ40-7AA3	3RK1107-1BQ40-0AA3
SIPLUS AS-Interface 2AI, IP67	6AG1207-1BQ40-7AA3	3RK1207-1BQ40-0AA3
SIPLUS AS-Interface 2AI, IP67	6AG1207-3BQ40-7AA3	3RK1207-3BQ40-0AA3

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

Accessories

	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 3RK1901-0CA00	**K60 mounting plates**				
	• Wall mounting	▶	**3RK1901-0CA00**	1	1 unit
	• Standard rail mounting	▶	**3RK1901-0CB01**	1	1 unit
 3RK1901-1KA00	**M12 sealing caps**	▶	**3RK1901-1KA00**	100	10 units
 3RK1902-0AR00	**Sealing sets** • For K60 mounting plate and distributor • Cannot be used for K45 mounting plate • One set contains one straight and one shaped seal	2	**3RK1902-0AR00**	100	5 units
 3RK1901-1AA00	**Jumper plugs** For changing over the two channel input modules	2	**3RK1901-1AA00**	1	1 unit

Overview

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

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 method A/B address	✓	--	--
Mounting onto TH 35 standard mounting 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

SlimLine Compact module SC22.5 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 3-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 at the front enables the module to be addressed also when it is installed. Integrated adapters permit mounting onto a standard mounting 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

More information

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

Version I/O type	Width	Inputs	Outputs	SD	Screw terminals	SD	Spring-loaded terminals (push-in)
	mm			d	Article No.	d	Article No.
SC17.5 and SC22.5 digital SlimLine Compact modules							
Slave addressing type: A/B address							
4 inputs	17.5	2-wire	--	2	**3RK2200-0CE00-2AA2**	2	**3RK2200-0CG00-2AA2**
	22.5	3-wire	--	2	**3RK2200-2CE00-2AA2**	2	**3RK2200-2CG00-2AA2**
4 outputs	22.5	--	2A solid-state	2	**3RK2100-1CE00-2AA2**	2	**3RK2100-1CG00-2AA2**
4 inputs/ 2 outputs, relays	22.5	3-wire	Relay (change-over contact)	2	**3RK2402-2ME00-2AA2**	2	**3RK2402-2MG00-2AA2**
4 inputs/ 4 outputs, relays	22.5	3-wire	Relay (NO contacts)	2	**3RK2402-2CE00-2AA2**	2	**3RK2402-2CG00-2AA2**
4 inputs/ 4 outputs	22.5	3-wire	2A solid-state	2	**3RK2400-2CE00-2AA2**	2	**3RK2400-2CG00-2AA2**
Slave addressing type: Standard address							
4 inputs/ 4 outputs	22.5	3-wire	2A solid-state	2	**3RK1400-2CE00-2AA2**	2	**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)	--	2	**3RK1207-0CE00-2AA2**	2	**3RK1207-0CG00-2AA2**
		Thermal resistance (Pt100, Ni100, 0 ... 600 Ω)	--	2	**3RK1207-3CE00-2AA2**	2	**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)	2	**3RK1107-0BE00-2AA2**	2	**3RK1107-0BG00-2AA2**
SC17.5F ASIsafe SlimLine Compact modules							
Slave addressing type: Standard address							
2 safe inputs	17.5	For mechanical contacts	--	2	**3RK1205-0BE00-2AA2**	2	**3RK1205-0BG00-2AA2**
2 safe inputs/ 2 standard outputs	17.5	For mechanical contacts	Solid-state, U_{ASI}/U_{aux} supply selectable	2	**3RK1405-2BE00-2AA2**	2	**3RK1405-2BG00-2AA2**


3RK2200-0CG00-2AA2

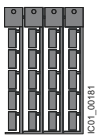

3RK2400-2CG00-2AA2


3RK1207-0CG00-2AA2


3RK1405-2BG00-2AA2

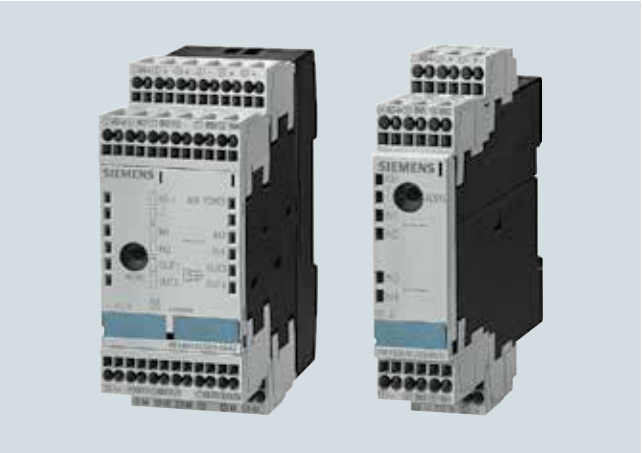
Safety modules for AS-Interface, see page 14/26 onwards.

Accessories

	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 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	2	**3RK1901-1YA00**	1	1 unit
	• Width 22.5 mm	2	**3RK1901-1YA10**	1	1 unit
 3RK1901-1YA01  3RK1901-1YA11	**Device termination connectors** Required for the last module in the network				
	• Width 17.5 mm	2	**3RK1901-1YA01**	1	1 unit
	• Width 22.5 mm	2	**3RK1901-1YA11**	1	1 unit
 3ZY1121-2BA00	**Removable terminals**		**Screw terminals**		
	• Screw terminals up to 2 x 1.5 mm² or 1 x 2.5 mm²				
	- 2-pole	2	**3ZY1121-1BA00**	1	6 units
	- 4-pole	2	**3ZY1141-1BA00**	1	6 units
			Spring-loaded terminals (push-in)		
	• Push-in terminals up to 2 x 1.5 mm²				
	- 2-pole	2	**3ZY1121-2BA00**	1	6 units
	- 4-pole	2	**3ZY1141-2BA00**	1	6 units
   3ZY1450-1BA00  3ZY1450-1AB00	**Hinged cover** Replacement for SlimLine Compact module, without terminal labeling				
	• Width 17.5 mm				
	- Titanium gray for SC17.5	2	**3ZY1450-1AA00**	1	5 units
	- Yellow for SC17.5F	2	**3ZY1450-1BA00**	1	5 units
	• Width 22.5 mm				
	- Titanium gray for SC22.5	2	**3ZY1450-1AB00**	1	5 units
 3ZY1311-0AA00	**Push-in lugs for wall mounting** Two lugs are required per device	2	**3ZY1311-0AA00**	1	10 units
 3ZY1440-1AA00	**Coding pins for removable terminals** For mechanical coding of the terminals	2	**3ZY1440-1AA00**	1	12 units
 3RT2900-1SB20	**Blank labels** Unit labeling plates[1]				
	• 10 mm x 7 mm, titanium gray	20	**3RT2900-1SB10**	100	816 units
	• 20 mm x 7 mm, titanium gray	20	**3RT2900-1SB20**	100	340 units
 3RA2908-1A	**Tools for opening spring-loaded terminals**		**Spring-loaded terminals**		
	Screwdriver for SIRIUS devices with spring-loaded terminals 3.0 mm x 0.5 mm, length approx. 200 mm, titanium gray/black, partially insulated	2	**3RA2908-1A**	1	1 unit

[1] PC labeling system for individual inscription of unit labeling plates available from: murrplastik Systemtechnik GmbH (see page 16/15).

More information



SlimLine modules S45 (picture on left) and S22.5 module (picture on right) with spring-loaded terminals

The existing SlimLine series of I/O modules for use in the control cabinet is being replaced by the new, innovative SlimLine Compact series. We recommend that these new devices are used in future.

The Cross reference table indicates the best options for replacing the existing SlimLine devices with SlimLine Compact devices.

Note:

The previous SlimLine devices are still available for use as replacements in existing systems. As a result of the innovation, the new SlimLine Compact devices are not fully compatible in terms of either mechanical dimensions or electrical properties.

The Cross reference table below links the existing S22.5, S22.5F and S45 SlimLine modules with the new SC17.5, SC17.5F and SC22.5 SlimLine Compact devices.

Cross reference table

S22.5, S22.5F and S45 SlimLine			**Comparison type: SC17.5, SC17.5F and SC22.5 SlimLine Compact**		
Screw terminals	Spring-loaded terminals	Version	Screw terminals	Spring-loaded terminals	Version
3RK1200-0CE00-0AA2	3RK1200-0CG00-0AA2	4 DI, 2-wire, standard address	3RK2200-0CE00-2AA2	3RK2200-0CG00-2AA2	4 DI, 2-wire, A/B address
3RK2200-0CE02-0AA2	3RK2200-0CG02-0AA2	4 DI, A/B address	3RK2200-2CE00-2AA2	3RK2200-2CG00-2AA2	4 DI, A/B address
3RK1200-0CE02-0AA2	3RK1200-0CG02-0AA2	4 DI, standard address			
3RK1400-0BE00-0AA2	3RK1400-0BG00-0AA2	2 DI / 2 DQ, standard address	3RK1400-2CE00-2AA2	3RK1400-2CG00-2AA2	4 DI / 4 DQ, standard address
3RK1402-0BE00-0AA2	3RK1402-0BG00-0AA2	2 DI / 2 DQ relay, standard address	3RK2402-2ME00-2AA2	3RK2402-2MG00-2AA2	4 DI / 2 DQ relay, A/B address
3RK1100-1CE00-0AA2	3RK1100-1CG00-0AA2	4 DQ, standard address	3RK2100-1CE00-2AA2	3RK2100-1CG00-2AA2	4 DQ, A/B address
3RK2400-1CE01-0AA2	3RK2400-1CG01-0AA2	4 DI / 4 DQ, A/B address	3RK2400-2CE00-2AA2	3RK2400-2CG00-2AA2	4 DI / 4 DQ, A/B address
3RK2400-1FE00-0AA2	3RK2400-1FG00-0AA2	4 DI / 3 DQ, A/B address			
3RK1400-1CE00-0AA2	3RK1400-1CG00-0AA2	4 DI / 4 DQ, 1A solid-state, standard address	3RK1400-2CE00-2AA2	3RK1400-2CG00-2AA2	4 DI / 4 DQ, 2A solid-state, standard address
3RK1400-1CE01-0AA2	3RK1400-1CG01-0AA2	4 DI / 4 DQ, 2A solid-state, standard address			
3RK1402-3CE01-0AA2	3RK1402-3CG01-0AA2	4 DI / 4 DQ (sensor supply from U_{aux}), standard address			
3RK1402-3CE00-0AA2	3RK1402-3CG00-0AA2	4 DI / 4 DQ relay, standard address	3RK2402-2CE00-2AA2	3RK2402-2CG00-2AA2	4 DI / 4 DQ relay, A/B address
3RK1205-0BE00-0AA2	3RK1205-0BG00-0AA2	2 F-DI, standard address	3RK1205-0BE00-2AA2	3RK1205-0BG00-2AA2	2 F-DI, standard address
3RK1405-0BE00-0AA2	3RK1405-0BG00-0AA2	2 F-DI / 2 DQ, standard address (outputs supplied from U_{ASI})	3RK1405-2BE00-2AA2	3RK1405-2BG00-2AA2	2 F-DI / 2 DQ, standard address (supply U_{ASI}/U_{aux} selectable)
3RK1405-1BE00-0AA2	3RK1405-1BG00-0AA2	2 F-DI / 2 DQ, standard address (outputs supplied from U_{aux})			

Selection and ordering data

3RG9002-0DB00

F90 module
- Slave addressing type: Standard address
- Width 90 mm
- With COMBICON version: Delivery without COMBICON plug

Version				SD	Article No.	PU (UNIT, SET, M)	PS*
				d			
Type	Connection	Inputs	Outputs				
4 inputs/ 4 outputs	Screw	2- and 3-wire PNP transistor	PNP transistor 1 A	5	**3RG9002-0DB00**	1	1 unit
		2- and 3-wire PNP transistor	PNP transistor 2 A	5	**3RG9002-0DA00**	1	1 unit
		2- and 3-wire PNP transistor floating	PNP transistor 2 A	5	**3RG9002-0DC00**	1	1 unit
	COMBICON[1]	2- and 3-wire PNP transistor	PNP transistor 1 A	5	**3RG9004-0DB00**	1	1 unit
		2- and 3-wire PNP transistor	PNP transistor 2 A	5	**3RG9004-0DA00**	1	1 unit
		2- and 3-wire PNP transistor floating	PNP transistor 2 A	5	**3RG9004-0DC00**	1	1 unit

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

Accessories

Version	SD	Article No.	PU (UNIT, SET, M)	PS*
	d			
COMBICON connector sets 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	5	**3RX9810-0AA00**	1	1 unit

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	SD	Screw terminals	PU (UNIT, SET, M)	PS*
			Article No.		
		d			
 3RK1400-0CE00-0AA3	**Flat module 4I/4O** Slave addressing type: Standard address • 4 inputs/4 outputs • 200 mA for all I/Os	2	**3RK1400-0CE00-0AA3**	1	1 unit

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.

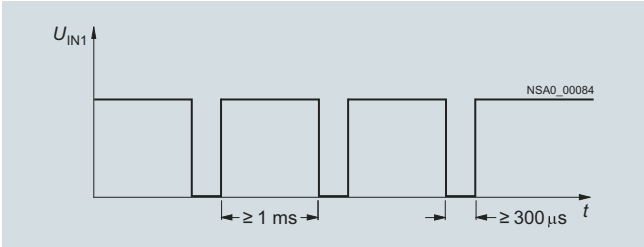
For the values sent to be unambiguous, no more than 15 count values are allowed between two host invocations or AS-Interface master invocations at terminal 8. The maximum permissible transmission frequency is calculated from these times:

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

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).



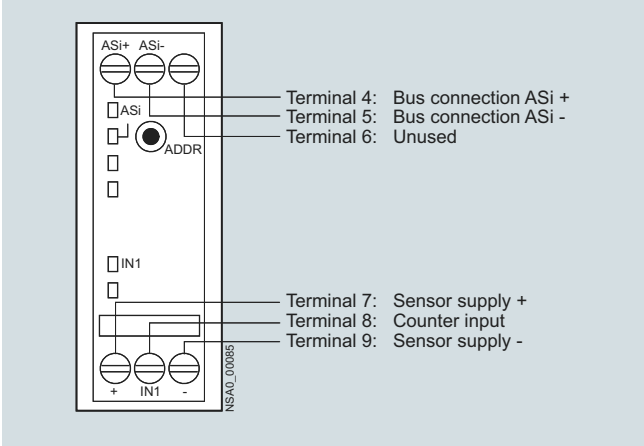
Maximum frequency for the counter module

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	SD	Article No.	PU (UNIT, SET, M)	PS*
	d			
Counter modules				
Slave addressing type: Standard address				
Width 22.5 mm				
• With screw terminals	10	**3RK1200-0CE03-0AA2**	1	1 unit
• With spring-loaded terminals	10	**3RK1200-0CG03-0AA2**	1	1 unit

3RK1200-0CG03-0AA2

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		SD	Article No.	PU (UNIT, SET, M)	PS*
			d			
 3RK1408-8KG00-0AA2	**Ground-fault detection modules**					
	Module does not require an AS-i address					
	Width 22.5 mm					
	• With screw terminals		5	**3RK1408-8KE00-0AA2**	1	1 unit
	• With spring-loaded terminals		5	**3RK1408-8KG00-0AA2**	1	1 unit

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.

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.

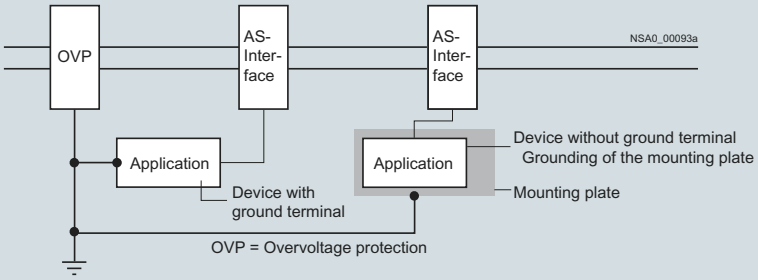
Rated discharge current I_{sn}

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 in accordance with 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.

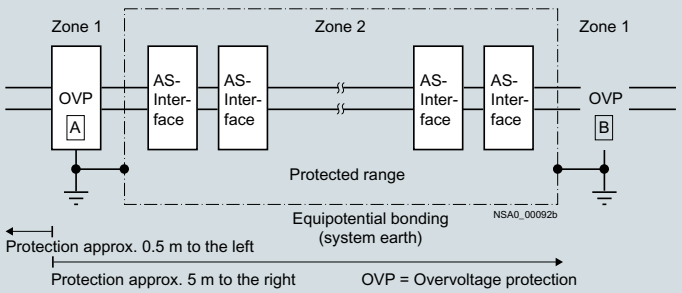
Configuration guidelines



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.

Sample application



Selection and ordering data

Version	SD d	Article No.	PU (UNIT, SET, M)	PS*
AS-Interface overvoltage protection module Module does not require an AS-i address Delivery includes mounting plate (for wall and standard rail mounting)	5	**3RK1901-1GA01**	1	1 unit

AS-Interface: Power Supply Units and Data Decoupling Modules

AS-Interface power supply units

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/en/view/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 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 locally at the power supply unit.
- Ultra-wide input range/two-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 single-phase and two-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 in accordance with NEC (National Electrical Code)

Selection and ordering data


3RX9501-0BA00


3RX9503-0BA00

Version		SD	Spring-loaded terminals	PU (UNIT, SET, M)	PS*
		d	Article No.		
AS-Interface power supply units, IP20 • AS-i single output 30 V DC • 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 in accordance with 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
5 A	120/230 V AC (selectable)	▶	**3RX9502-0BA00**	1	1 unit
8 A	120/230 ... 500 V AC (selectable)	▶	**3RX9503-0BA00**	1	1 unit
For special applications					
3 A	24 V DC	▶	**3RX9501-1BA00**	1	1 unit
2.6 A/max. 100 W	120/230 V AC (selectable)	2	**3RX9501-2BA00**	1	1 unit

AS-Interface: Power Supply Units and Data Decoupling Modules

30 V power supply units

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 supplies 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 14/77 or 14/79.

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

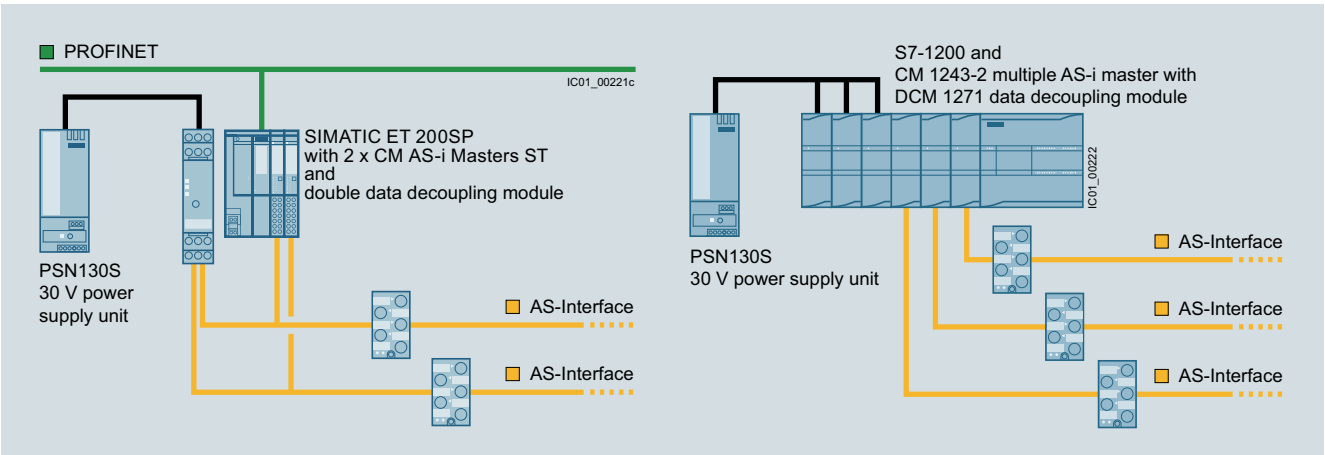
- Primary clocked power supply units for connection to a single-phase AC network
- Power for currents of 3 A, 4 A and 8 A
- The output voltage is floating, and resistant to short-circuits and no-load operation. If there is an overload, the output voltage is reduced or cut-off. After a short-circuit or 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 safety class I
- Diagnostics: With an output voltage > 26.5 V DC, the green LED (30V 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 communication processors

Technical specifications

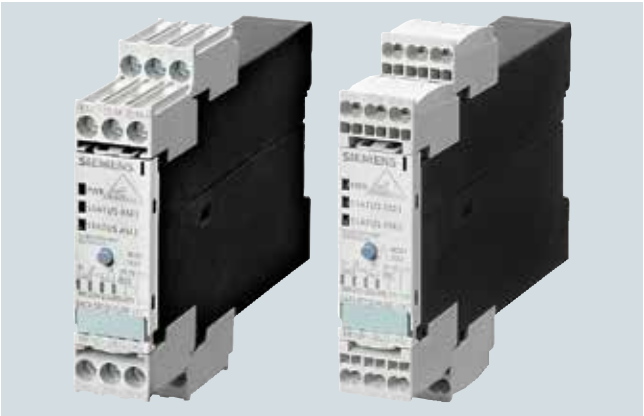
PSN130S 30 V DC power supply unit		3 A	4 A	8 A
Input data				
• Input voltage, rated value U_e	V AC	120/230 V, single-phase, automatic selection		
• Range of input voltage	V AC	85 ... 132/174 ... 264		
• Mains frequency	Hz	50/60		
• Power consumption at full load, typ.	W	103	139	270
Output data				
• 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 in rated conditions				
• Degree of efficiency	%	87	88	90
• Power loss, typ.	W	12	17	25
Protection and monitoring				
• Output overvoltage protection	V	< 37		
• Current limiting, typ.	A	4	5.5	11
Safety				
• Primary/secondary electrical separation		Output voltage PELV/SELV according to IEC 60950 and EN 50178		
• Protection class		I		
• Degree of protection		IP20		

PSN130S 30 V DC power supply unit		3 A	4 A	8 A
Approvals				
• UL		UL 508/CSA 22.2		
• Pollution degree		IEC 60950		
• Overvoltage category and electrical separation		EN 50178 and IEC 61558		
EMC				
• Emitted interference (class B)		IEC 61000-6-3		
• Line harmonics limit		IEC 61000-3-2		
• Interference immunity		IEC 61000-6-2		
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		SD	Screw terminals	PU (UNIT, SET, M)	PS*
			d	Article No.		
	PSN130S 30 V DC power supply unit (without AS-i data decoupling) • Output voltage 30 V DC • 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)	2	**3RX9511-0AA00**	1	1 unit
 3RX9512-0AA00	4 A	120/230 V AC (automatic selection)	2	**3RX9512-0AA00**	1	1 unit
 3RX9513-0AA00	8 A	120/230 V AC (automatic selection)	2	**3RX9513-0AA00**	1	1 unit

Overview



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

- 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 unit 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 PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage) standards, have a residual ripple of < 250 mV_{pp}, and in the event of a fault must limit the output voltage to a maximum of 40 V.

We recommend

- SITOP power supplies, see Catalog KT10.1
  https://support.industry.siemens.com/cs/ww/en/view/109745655
- PSN130S 30 V power supply units, see page 14/75

Note on AS-i Power24V:

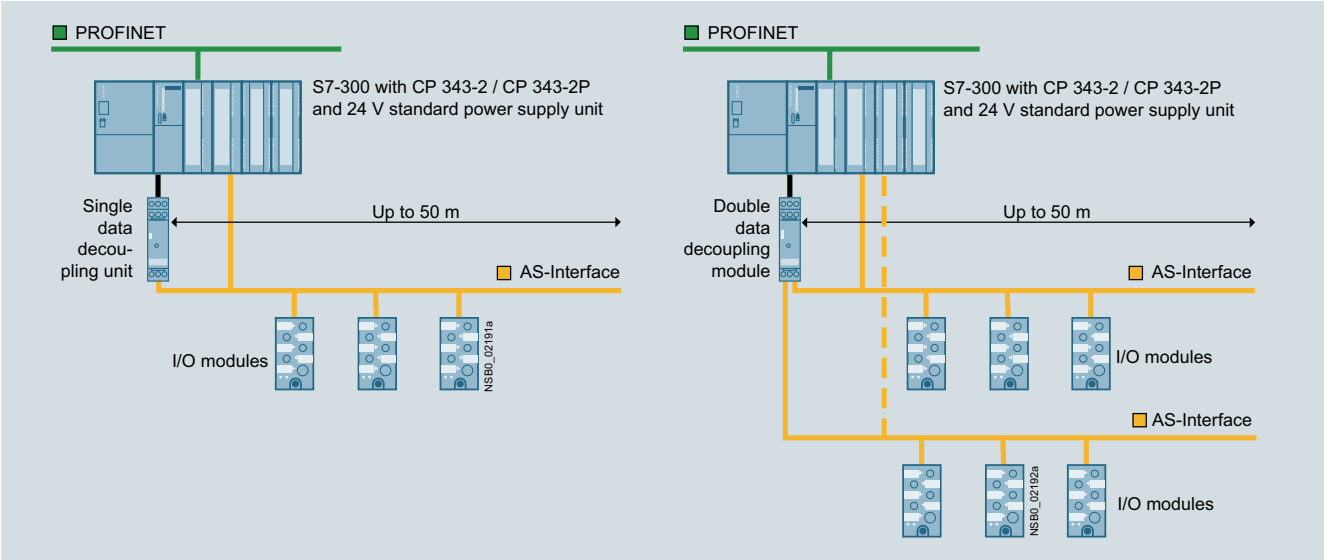
The length of an AS-i Power24V network is restricted to 50 m in order to limit the voltage drop along the cable.

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 "Extension of AS-i Power24V" for implementation of AS-i Power24V, see page 14/21.

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

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



Left: single network, right: Multiple network

Selection and ordering data

	Version	SD d	Article No.	PU (UNIT, SET, M)	PS*
 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	2	**3RK1901-1DE12-1AA0**	1	1 unit
	• Double data decoupling module, 2 x 4 A	2	**3RK1901-1DE22-1AA0**	1	1 unit
 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
	• Double data decoupling module, 2 x 4 A	▶	**3RK1901-1DG22-1AA0**	1	1 unit

Overview

DCM 1271 data decoupling module for SIMATIC S7-1200

More information

Equipment Manual AS-i Master CM 1243-2 and AS-i Data Decoupling Unit DCM 1271 for SIMATIC S7-1200, see https://support.industry.siemens.com/cs/ww/en/view/44030789

More information on AS-i Power24V, see System Manual "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 communication module when calculating the maximum configuration.

Features of the DCM 1271 data decoupling module

- Design: S7-1200, 30 mm wide, degree of protection IP20
- Detachable terminals (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 PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage) standards, have a residual ripple of < 250 mV_{pp}, and in the event of a fault must limit the output voltage to a maximum of 40 V.

We recommend

- SITOP power supplies, see Catalog KT10.1 https://support.industry.siemens.com/cs/ww/en/view/109745655
- PSN130S 30 V power supply units, see page 14/75

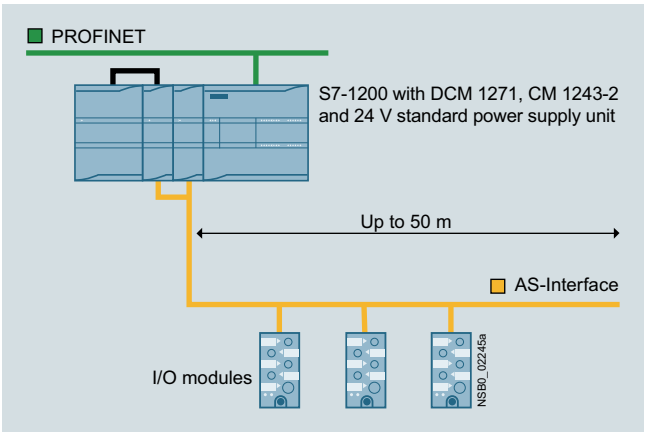
Note on AS-i Power24V:

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 AS-i Power24V, see page 14/21.

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



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

Selection and ordering data

Version	SD	Screw terminals	PU (UNIT, SET, M)	PS*
	d	Article No.		
DCM 1271 data decoupling module • With screw terminals, removable terminals (included in the scope of supply) • Max. current: 1 x 4 A • Dimensions (W × H × D/mm): 30 × 100 × 75	2	**3RK7271-1AA30-0AA0**	1	1 unit

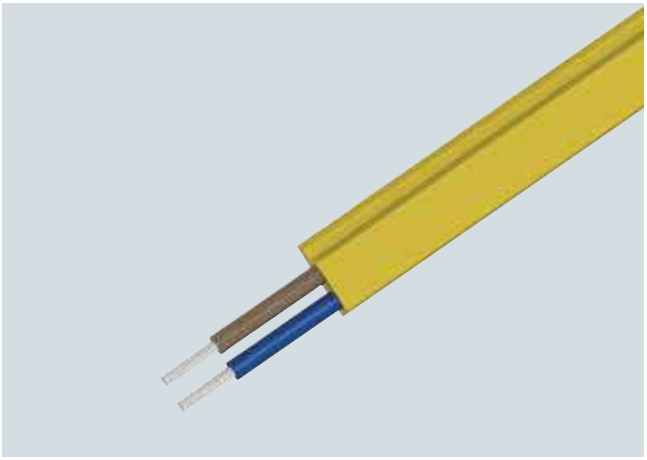

3RK7271-1AA30-0AA0

Accessories

Version	SD	Screw terminals	PU (UNIT, SET, M)	PS*
	d	Article No.		
Screw terminals (replacement)				
• 5-pole For CM 1234-2 AS-i master and AS-i DCM 1271 data decoupling module	5	**3RK1901-3MA00**	1	1 unit
• 3-pole For AS-i DCM 1271 data decoupling module for connecting the power supply unit	5	**3RK1901-3MB00**	1	1 unit
CM 1243-2 communication module • AS-Interface masters for SIMATIC S7-1200 • Corresponds to AS-Interface specification V3.0 • With screw terminals, removable terminals (included in the scope of supply) • Dimensions (W × H × D/mm): 30 × 100 × 75 See also from page 14/28 onwards	2	**3RK7243-2AA30-0XB0**	1	1 unit


3RK7243-2AA30-0XB0

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, male contacts pierce the shaped AS-Interface 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 tow chains

The use of the AS-Interface shaped cables with TPE and PUR outer sheath was checked in a tow chain 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 tow chain. No damage to the cores and core insulation could be detected.

Note:

When using a tow chain, 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 through the tow chain.

Selection and ordering data

3RX90..-0AA00

Version			SD	Article No.	PU (UNIT, SET, M)	PS*
			d			
AS-Interface shaped cables						
Material	Color	Quantity				
Rubber	Yellow (AS-Interface)	100 m roll	2	**3RX9010-0AA00**	1	1 unit
	Yellow (AS-Interface)	1 km drum	5	**3RX9012-0AA00**	1	1 unit
	Black (24 V DC)	100 m roll	2	**3RX9020-0AA00**	1	1 unit
	Black (24 V DC)	1 km drum	5	**3RX9022-0AA00**	1	1 unit
TPE	Yellow (AS-Interface)	100 m roll	2	**3RX9013-0AA00**	1	1 unit
	Yellow (AS-Interface)	1 km drum	5	**3RX9014-0AA00**	1	1 unit
	Black (24 V DC)	100 m roll	2	**3RX9023-0AA00**	1	1 unit
	Black (24 V DC)	1 km drum	5	**3RX9024-0AA00**	1	1 unit
TPE special version according to UL Class 2	Yellow (AS-Interface)	100 m roll	5	**3RX9017-0AA00**	1	1 unit
	Black (24 V DC)	100 m roll	5	**3RX9027-0AA00**	1	1 unit
PUR	Yellow (AS-Interface)	100 m roll	2	**3RX9015-0AA00**	1	1 unit
	Yellow (AS-Interface)	1 km drum	5	**3RX9016-0AA00**	1	1 unit
	Black (24 V DC)	100 m roll	2	**3RX9025-0AA00**	1	1 unit
	Black (24 V DC)	1 km drum	5	**3RX9026-0AA00**	1	1 unit

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 14/84) 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
- Electrical separation of the two AS-Interface shaped cable lines
- Slaves can be used on both sides of 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 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

Design of an AS-Interface network with repeaters

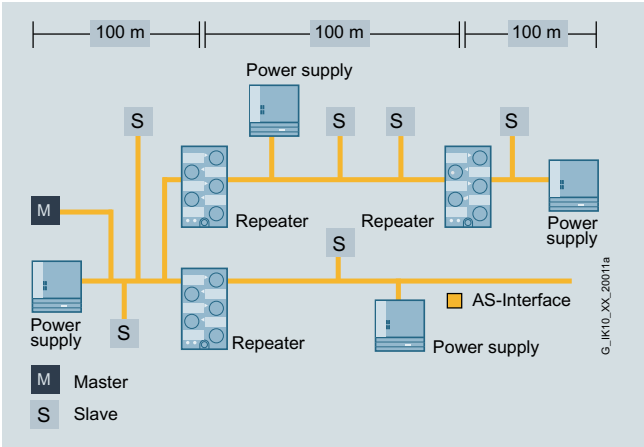
- Parallel switching of several repeaters possible (star configuration)
- Combination of series and parallel switching possible

The following conditions apply:

- 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. MSS ASIsafe Modular Safety System, 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. MSS ASIsafe Modular Safety System, F-CM AS-i Safety ST for ET 200SP) and ASIsafe input slave or safe output module.



Design of an example AS-Interface network with repeaters (without extension plug)

Note:

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).

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.

In the case of a line topology with two repeaters and three extension plugs, the maximum possible size of the AS-Interface network is 600 m, see example configuration with extension plug on page 14/84.

Selection and ordering data

	Version	SD d	Article No.	PU (UNIT, SET, M)	PS*
 6GK1210-0SA01	**Repeaters for AS-Interface** For cable extension, scope of supply includes mounting plate (for wall and standard rail mounting), module does not require an AS-i address	5	**6GK1210-0SA01**	1	1 unit

Overview

AS-Interface extension plug compact

With the extension plug it is possible to double the cable length possible in an AS-Interface segment from 100 to 200 m.

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

The extension plug compact can be installed directly onto an AS-i shaped cable. A separate M12 feeder, as was required for earlier extension plug versions, is no longer required with extension plug compact.

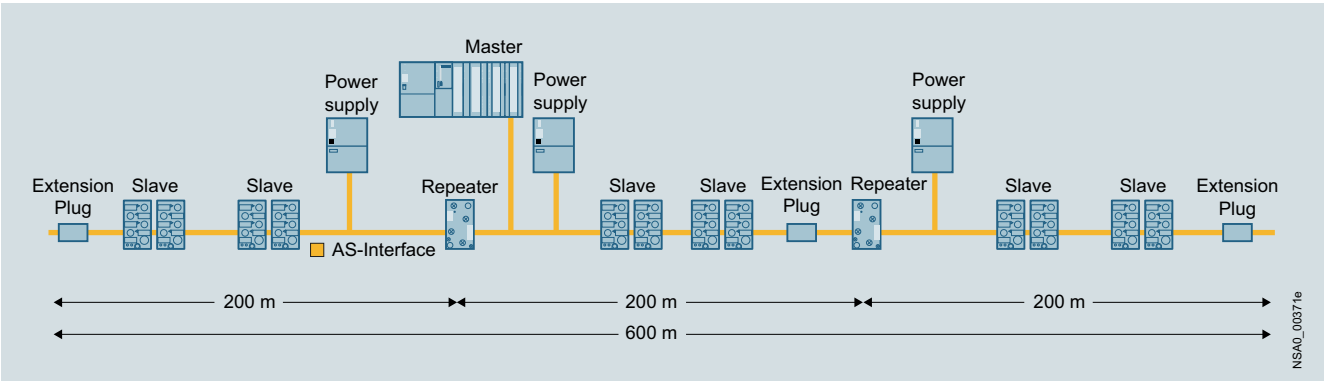
Design of an AS-Interface segment with an extension plug

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 power supply unit. The extension plug is not allowed to be used in AS-Interface networks smaller than 100 m. As with all AS-Interface networks, any network structure (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 structure.

Note:

The AS-i bus cable must not terminate in the extension plug compact. The AS-Interface shaped cable can be terminated by means of a cable terminating piece to provide degree of protection IP67 where required, see "Miscellaneous accessories" on page 14/91.

The AS-Interface extension plug is not suitable for AS-i Power24V networks.



Maximum network size with repeaters and extension plug (master at center of network)

Selection and ordering data

Version	SD	Article No.	PU (UNIT, SET, M)	PS*
	d			
AS-Interface extension plug compact • Doubling of the cable length to 200 m per AS-Interface segment • With direct connection to AS-Interface shaped cable • Module does not require an AS-i address	2	**3RK1901-1MX02**	1	1 unit

3RK1901-1MX02

Accessories

Version	SD	Article No.	PU (UNIT, SET, M)	PS*
	d			
Cable terminating piece For sealing of open cable ends (shaped AS-Interface cable) in IP67	▶	**3RK1901-1MN00**	1	10 units

3RK1901-1MN00

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 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 housing 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	SD d	Article No.	PU (UNIT, SET, M)	PS*
 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 4 batteries - Addressing cable, with M12 plug to addressing plug (hollow plug), length 1.5 m	2	**3RK1904-2AB02**	1	1 unit

Accessories

	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 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	5	**3RK1902-4PB15-3AA0**	1	1 unit
 3RX9801-0AA00	**AS-Interface M12 3RX 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	►	**3RX9801-0AA00**	1	1 unit
 3RK1901-2NR10	**AS-Interface M12 3RK 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	2	**3RK1901-2NR10**	1	1 unit
 3RK1902-4HB50-5AA0	**M12 cable plug**[2] • Extruded M12 plug (angled cable feeder 90°), other cable end open • Length: 5 m, 5-pole, color: Black	5	**3RK1902-4HB50-5AA0**	1	1 unit
 3RK1902-4BA00-5AA0	**M12 plug, straight**[2] • For screw fixing, 5-pole screw terminal, max. 0.75 mm^2 • A-coded, max. 4 A	5	**3RK1902-4BA00-5AA0**	1	1 unit

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, a connecting cable (M12 plug to M12 connector) must be produced and requires the following wiring:
- 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.

Overview

AS-Interface analyzer

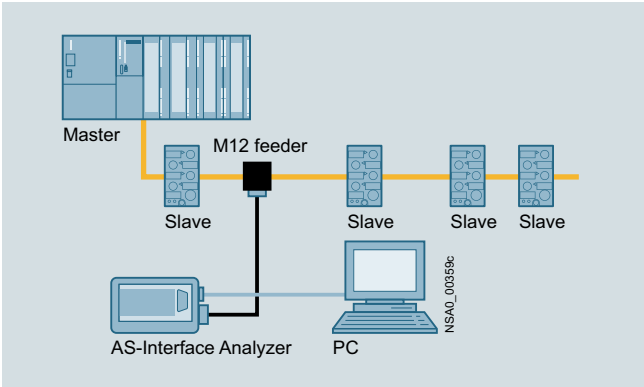
The AS-Interface analyzer is used to test AS-Interface networks.

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

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.

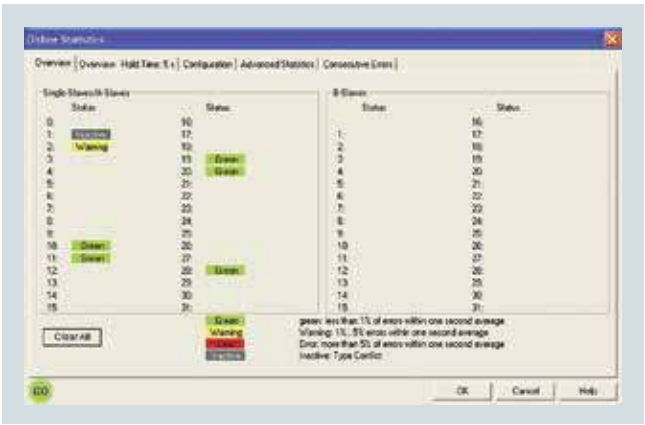
The data thus obtained is transferred through an RS 232 interface to a PC such as a notebook, for evaluation with the supplied diagnostics software.

Benefits

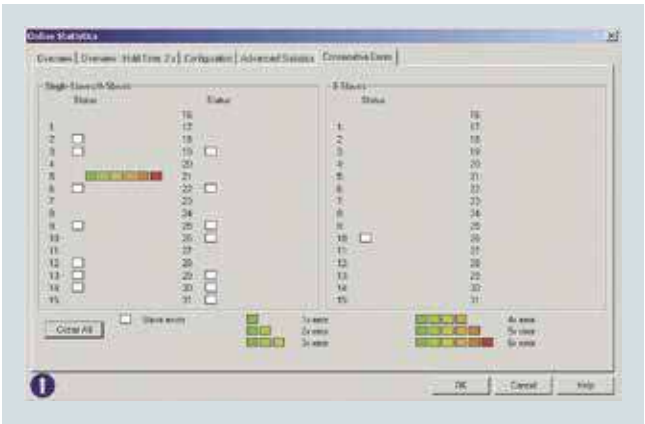
- Simple and user-friendly operation enables diagnostics of AS-Interface networks without help from specialists
- Speedy troubleshooting thanks to intuitive display in statistics mode
- Test logs provide verification of the state and quality of the installation for service and approval
- Recorded logs 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 5

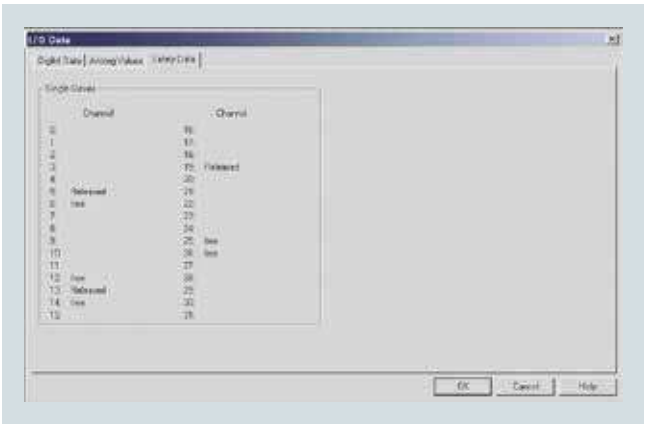
This mode provides a quick overview of the existing AS-Interface system. The error rates are displayed per slave in a traffic-light function (green, yellow, red).

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

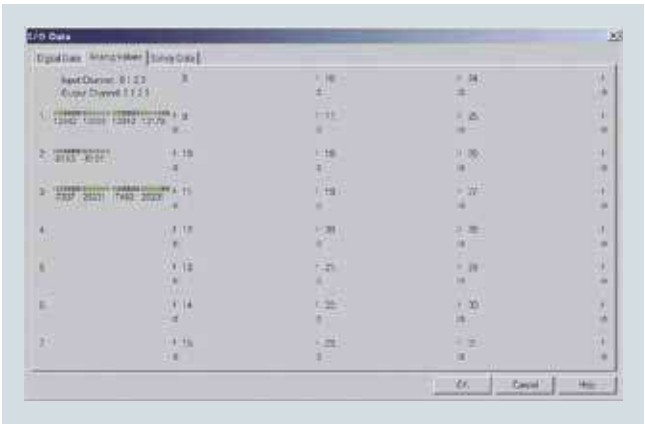
With the expanded statistics function, it is possible to determine the error rates as the number of transmitted or faulty bus message frames.

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



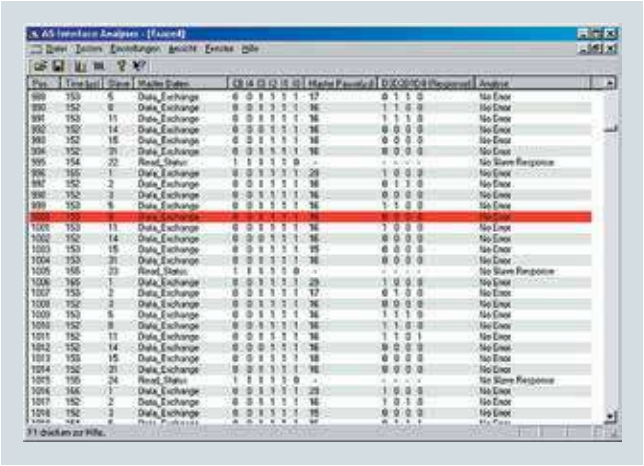
Presentation of the I/O data: Safety data



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.

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 in accordance with 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.

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. operating voltage 20 V).

Selection and ordering data

	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 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): 145 x 30 x 92 mm • 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	2	**3RK1904-3AB01**	1	1 unit

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.

Accessories

	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 3RX9801-0AA00	**AS-Interface M12 3RX feeder** • Transition of shaped 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
 3RK1901-2NR10	**AS-Interface M12 3RK 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 • Max. 4 A • Degree of protection IP67/IP68/IP69K	2	**3RK1901-2NR10**	1	1 unit
 3RK1902-4HB50-5AA0	**M12 cable plugs** • PUR cable, 5-pole • Length 5 m • Color black • Extruded M12 plug (angled cable feeder 90°), other cable end open	5	**3RK1902-4HB50-5AA0**	1	1 unit

Selection and ordering data

More information

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

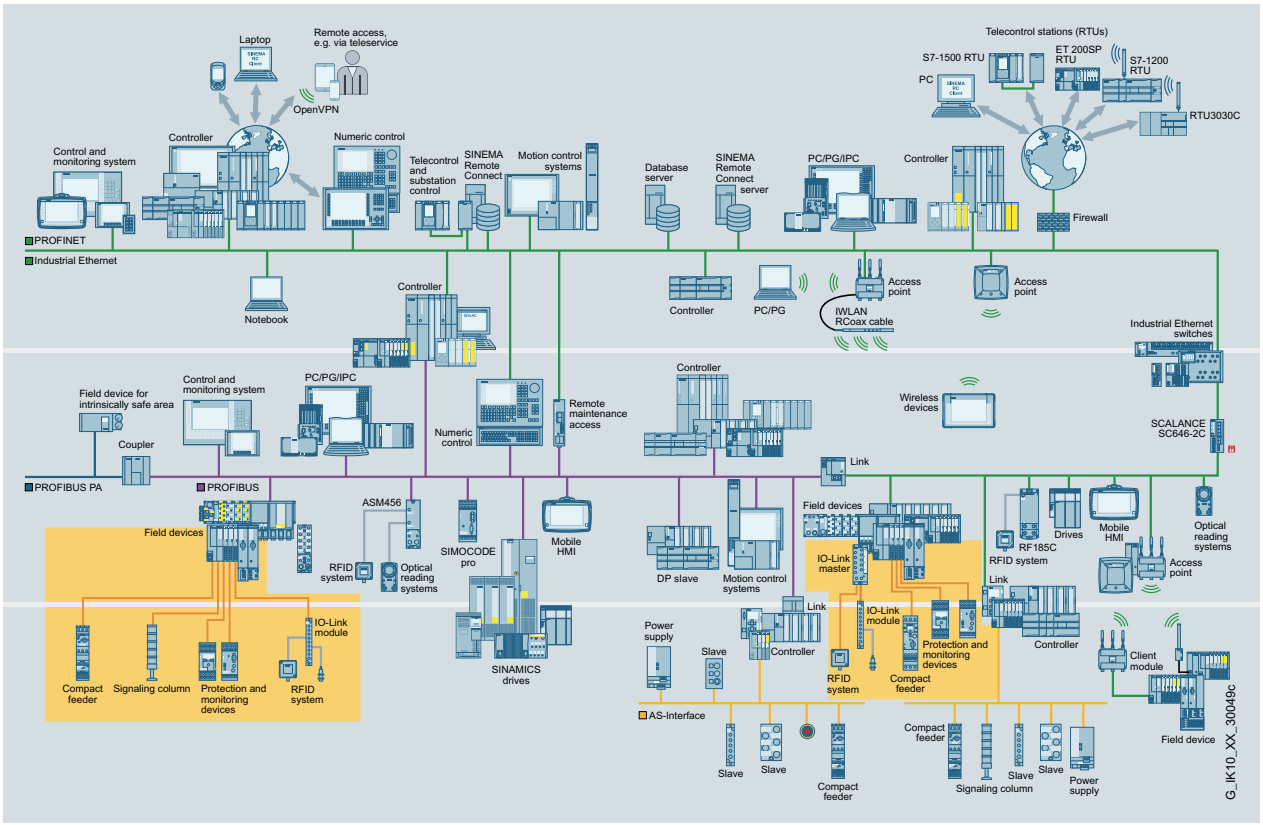
	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 3RK1901-2NN10	**AS-Interface compact distributors, for AS-Interface flat cable** • Current carrying capacity up to 8 A • Degree of protection IP67/IP68/IP69K	2	**3RK1901-2NN10**	1	1 unit
 3RX9801-0AA00	**AS-Interface M12 3RX feeder** • Degree of protection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

	Version	SD d	Article No.	PU (UNIT, SET, M)	PS*
 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	5	**3RK1901-3QM00**	1	1 unit
	- For M20 gland	5	**3RK1901-3QM10**	1	1 unit
	• Continuation using pins				
	- For M16 gland	10	**3RK1901-3QM01**	1	1 unit
	- For M20 gland	5	**3RK1901-3QM11**	1	1 unit
 3RK1901-3QA00	**Cable clip for cable adapters**	5	**3RK1901-3QA00**	100	10 units
 3RK1901-1MN00	**Cable terminating piece** For sealing of open cable ends (shaped AS-Interface cable) in IP67	►	**3RK1901-1MN00**	1	10 units
 3RK1901-2EA00 3RK1901-0CA00	**Mounting plates**				
	• K45				
	- For wall mounting	►	**3RK1901-2EA00**	1	1 unit
	- For standard rail mounting	►	**3RK1901-2DA00**	1	1 unit
	• K60, suitable for all K60 compact modules				
	- For wall mounting	►	**3RK1901-0CA00**	1	1 unit
	- For standard rail mounting	►	**3RK1901-0CB01**	1	1 unit
 3RK1902-0AR00	**Sealing set**	2	**3RK1902-0AR00**	100	5 units
	• For K60 mounting plate and standard distributor				
	• Cannot be used for K45 mounting plate				
	• One set contains one straight and one shaped seal				
 3RK1902-4GB50-4AA0	**Control cable, assembled at one end** Angular M12 plug for screw fixing, 4-pole, 4 x 0.34 mm², A-coded, black PUR sheath, max. 4 A				
	• Cable length 5 m	5	**3RK1902-4GB50-4AA0**	1	1 unit
 3RK1902-4CA00-4AA0	**M12 socket, angled** For screw fixing, 4-pole screw terminals, max. 0.75 mm², A-coded, max. 4 A	5	**3RK1902-4CA00-4AA0**	1	1 unit
 3RK1902-4BA00-5AA0	**M12 plugs** For screw fixing, 5-pole screw terminals, max. 0.75 mm², A-coded, max. 4 A				
	• Straight	5	**3RK1902-4BA00-5AA0**	1	1 unit
 3RK1902-4DA00-5AA0	• Angled	5	**3RK1902-4DA00-5AA0**	1	1 unit
 3RK1902-4H...-5AA0	**Control cable, assembled at one end** Angular M12 plug for screw fixing, 5-pole, 5 x 0.34 mm², A-coded, black PUR sheath, max. 4 A				
	• Cable length 1.5 m	5	**3RK1902-4HB15-5AA0**	1	1 unit
	• Cable length 5 m	5	**3RK1902-4HB50-5AA0**	1	1 unit
	• Cable length 10 m	5	**3RK1902-4HC01-5AA0**	1	1 unit
 3RK1902-4PB15-3AA0	**Control cable, assembled at both ends** Straight M12 plug, straight M12 socket, for screw fixing, 3-pole, 3 x 0.34 mm², A-coded, black PUR sheath, max. 4 A	5	**3RK1902-4PB15-3AA0**	1	1 unit
	• Cable length 1.5 m				
	• Also for addressing AS-i slaves with M12 bus connection (e.g. K20, K60R compact modules, M200D motor starters)				

Overview

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 power 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
- Replacement of sensor boxes for connecting binary sensors with the IO-Link input modules optimized in terms of cabling
- 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 power 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

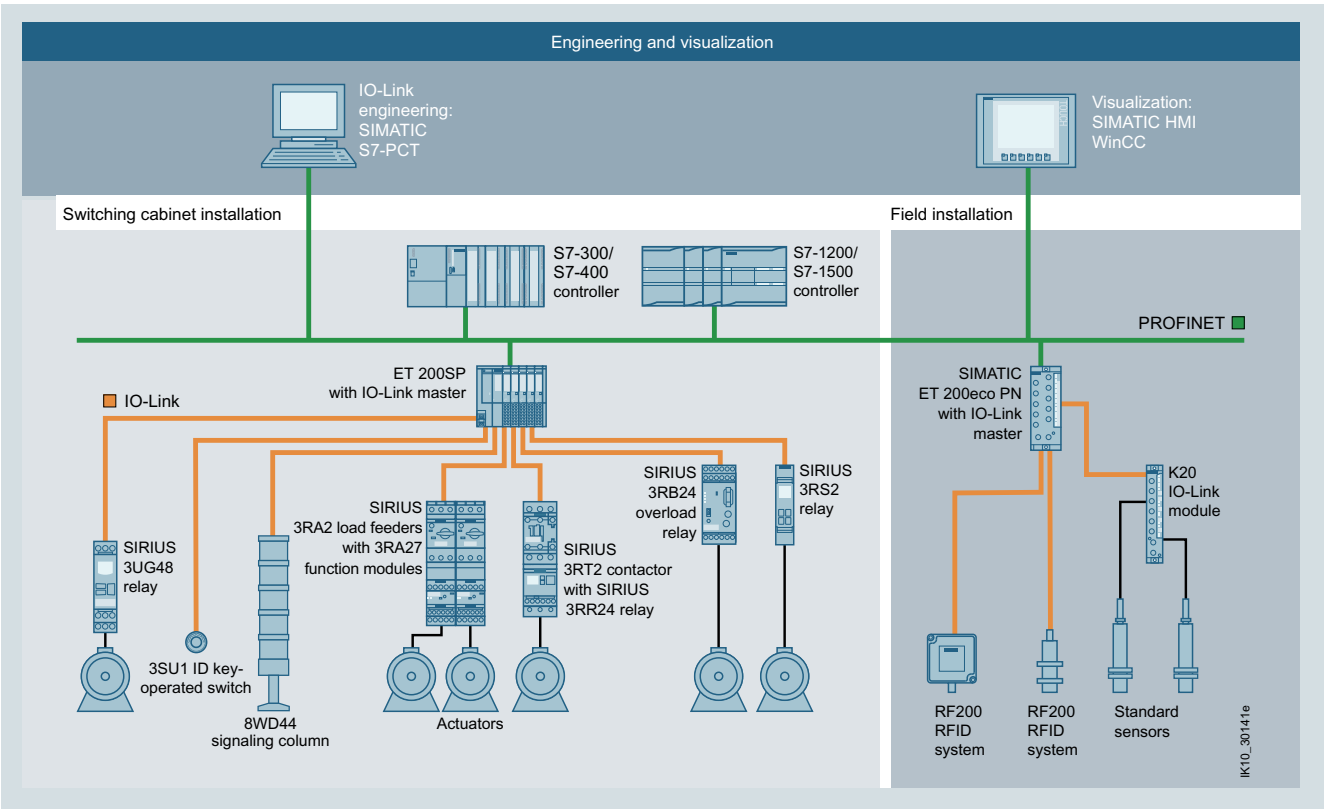
Overview

More information	
Homepage, see www.siemens.com/io-link	For important topics at a glance, see https://support.industry.siemens.com/cs/ww/en/view/109737170

IO-Link product family

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

- An IO-Link master
- One or more IO-Link devices, such as sensors (e.g. RFID systems), actuators or combinations thereof
- A standard 3-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 masters.
- 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.

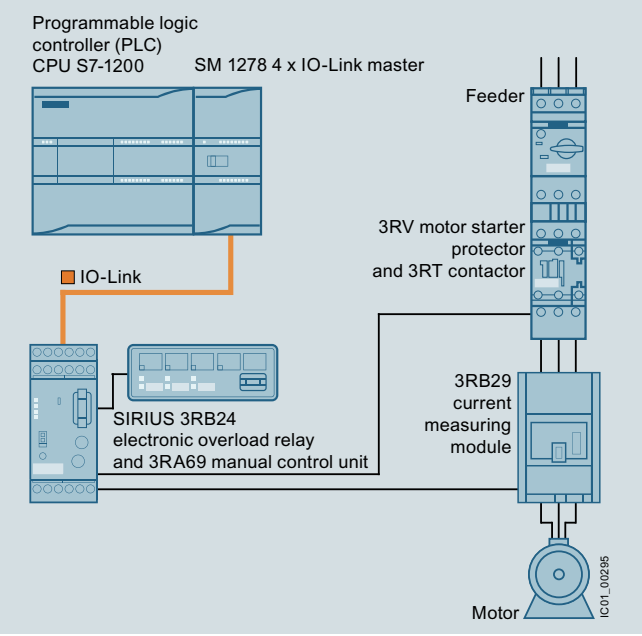
Overload relays

A starter combination, for example, consists of one or more SIRIUS 3RT contactors and one 3RB24 electronic overload relay for IO-Link plus its 3RB29 current measuring module.

3RB24 overload relays with IO-Link are basically designed to provide current-dependent protection for loads against inadmissibly high temperature rises due to overload, phase asymmetry or phase failure.

Direct-on-line starters can, therefore, as shown in the image, be connected to the control system via IO-Link without much wiring. Remote control of connected contactors, current value transmission and immediate remote fault diagnosis are just some examples of the large number of functions that can be implemented with this device.

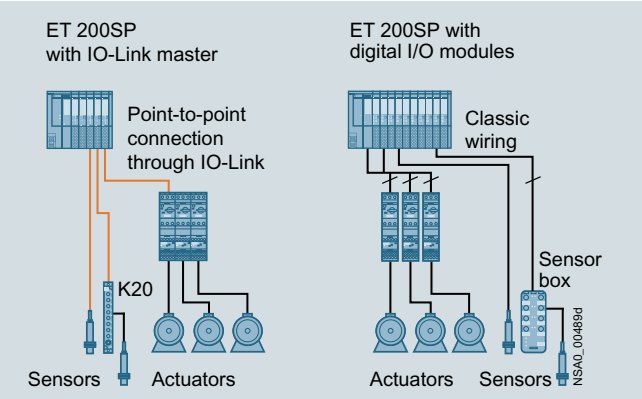
It is also possible to directly address a drive on-site via IO-Link using the optional hand-held device.



Connection of an IO-Link-capable overload relay to a SIMATIC S7-1200 controller

Load feeders and motor starters

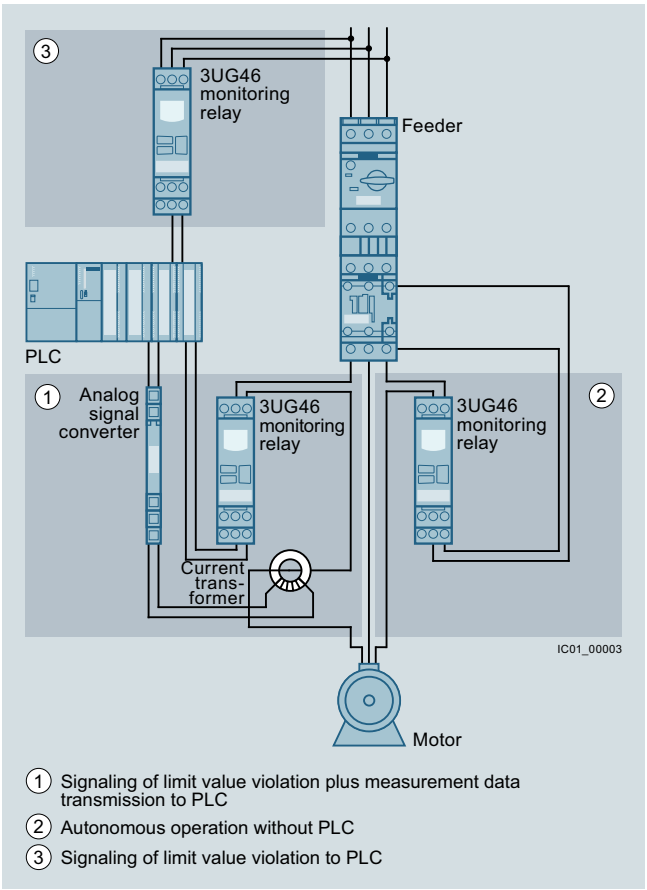
Through IO-Link it is possible to control not only sensors but also actuators in the form of load feeders and motor starters.



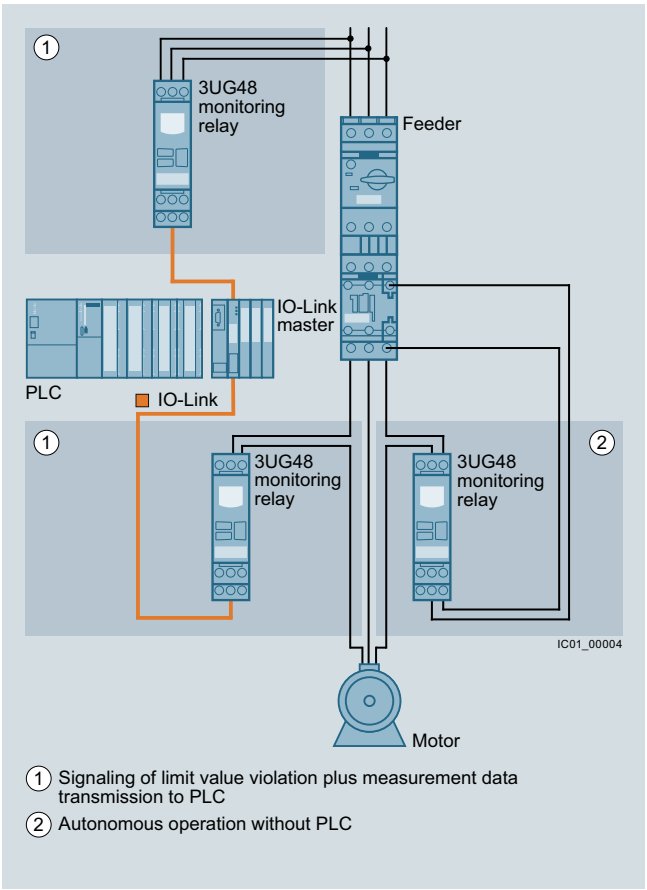
Possibilities for connecting load feeders and motor starters to IO-Link or in the conventional way

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 3UG46 monitoring relays (in comparison with 3UG48)

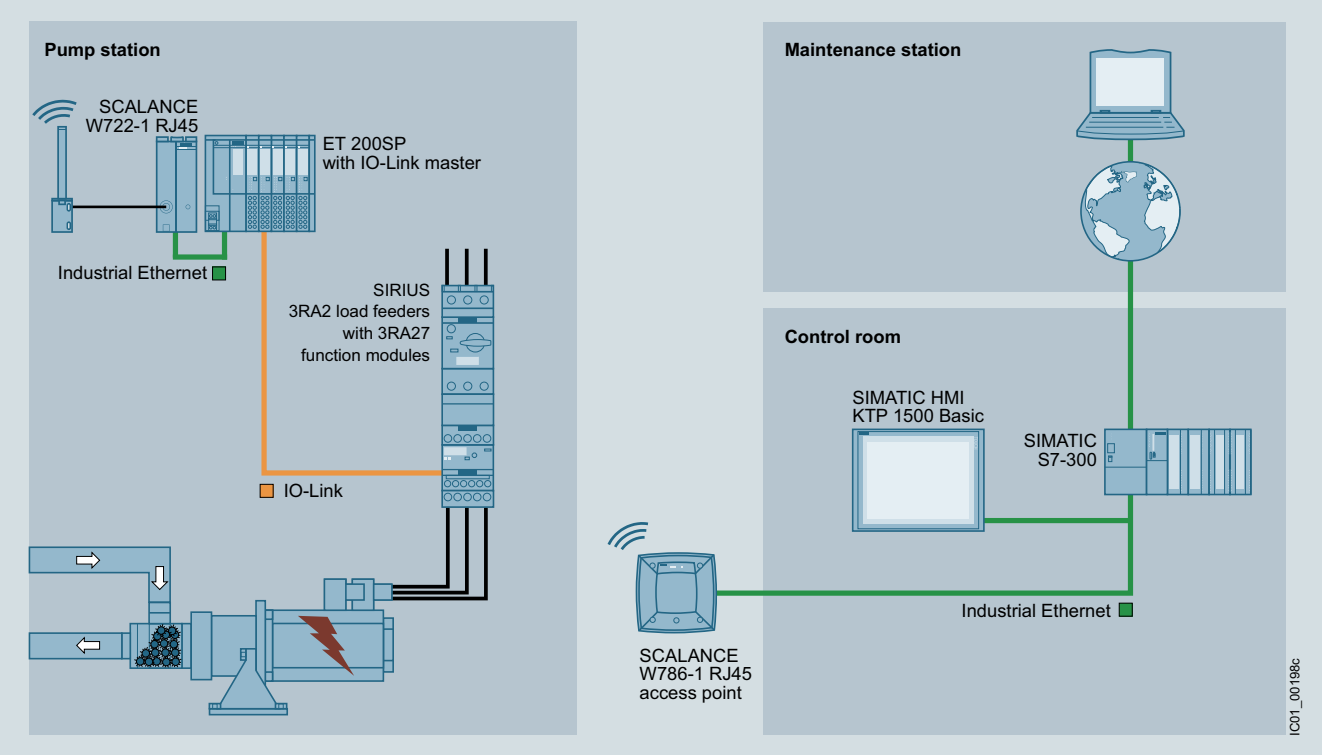


Possibilities of interfacing 3UG48 monitoring relays for IO-Link

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

IO-Link components

IO-Link masters

Masters

CM 8xIO-Link for S7-1500

IO-Link master module for S7-1500
- CM 8xIO-Link communication module, see page 14/102

IO-Link master module for S7-1200
- SM 1278 4xIO-Link signal module, see page 14/102

IO-Link master module for ET 200SP
- CM 4xIO-Link communication module, see page 14/103

IO-Link master module for ET 200pro
- 4 IO-Link HF electronic module, see page 14/104

IO-Link master module for ET 200eco PN
- IO-Link master 4 IO-L + 8DI + 4DO 24 V DC/1.3 A
- IO-Link master 4 IO-L

See page 14/105

IO-Link master module for ET 200AL
- CM IO-Link communication module, see page 14/106

For full product range, see Catalog ST 70.

IO-Link devices

Detection with IO-Link

K20 input module

IO-Link input modules

K20 input module
- 4 inputs, M12 connections
- 8 inputs, standard M8 connections

See page 14/108

Switching with IO-Link

SIRIUS 3RA2711 function module for IO-Link

Contactors and contactor assemblies
- SIRIUS 3RT contactors, 3-pole up to 250 kW
- SIRIUS 3RA23 reversing contactor assemblies, up to 55 kW
- SIRIUS 3RA24 contactor assemblies for wye-delta starting, up to 90 kW
- SIRIUS 3RA27 function modules for direct-on-line, reversing, and star-delta (wye-delta) starting

See Catalog Section 2

SIRIUS 3RA64 direct-on-line starter

Motor starters for use in the control cabinet

SIRIUS 3RA64, 3RA65 compact starters for IO-Link, infeed systems and accessories

See Catalog Section 4

Contactors with IO-Link

SIRIUS 3RB24 overload relay

Overload relays

SIRIUS 3RB24 electronic overload relays for IO-Link
- Evaluation modules
- Current measuring modules from 0.3 to 630 A
- Controlling direct-on-line, reversing and star-delta starters via IO-Link in conjunction with contactors
- Full motor protection
- Diagnostics and current value transmission via IO-Link

See Catalog Section 2

IO-Link devices (continued)

Monitoring with IO-Link

SIRIUS 3RR24 monitoring relay

SIRIUS 3RR24 monitoring relays for mounting onto 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 Catalog Section 2

SIRIUS 3UG48 monitoring relay

SIRIUS 3UG48 monitoring relays for stand-alone installation for IO-Link
- Monitoring the supply system, voltage, current, power factor and active current, residual current or speed depending on device design
- On/tripping delay time can be adjusted

See Catalog Section 12

SIRIUS 3RS14 temperature monitoring relay

SIRIUS 3RS14, 3RS15 temperature monitoring relays for IO-Link
- Temperature monitoring with connected sensors
- Two limit values, can be adjusted separately

See Catalog Section 12

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 Catalog Section 11

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 parameterizable
- Connection method (push-in)
- For fastening on front plate, see Catalog Section 11
- For installation in enclosure, see Catalog Section 11

Signaling column

8WD44 IO-Link adapter element

8WD44 IO-Link adapter element
- Up to five signaling elements can be connected using an IO-Link adapter element
- 24 V DC, diameter 70 mm
- 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 Catalog Section 11

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 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 download from Industry Online Support, 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/#/.

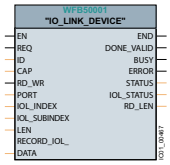
IO-Link software

STEP 7 PCT

STEP 7 PCT (Port Configuration Tool)

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

- Available as a stand-alone version or integrated into STEP 7 (V5.5 SP1 or higher) and TIA (V12 or 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 download from Industry Online Support, see https://support.industry.siemens.com/cs/ww/en/view/32469496



IO-Link device function block

IO-Link function blocks (IO-Link device and IO-Link master)

STEP 7 function block for easy acyclical data exchange in the user program

- Freely available for download from Industry Online Support, see https://support.industry.siemens.com/cs/ww/en/view/82981502

"Siemens IO-Link Devices" block library

"Siemens IO-Link Devices" block library

This library provides function blocks and user-defined data types (UDTs) for all IO-Link devices from the Siemens portfolio. These blocks and UDTs standardize and simplify communication with IO-Link devices.

- Freely available for download from Industry Online Support, see https://support.industry.siemens.com/cs/ww/en/view/90529409

Overview

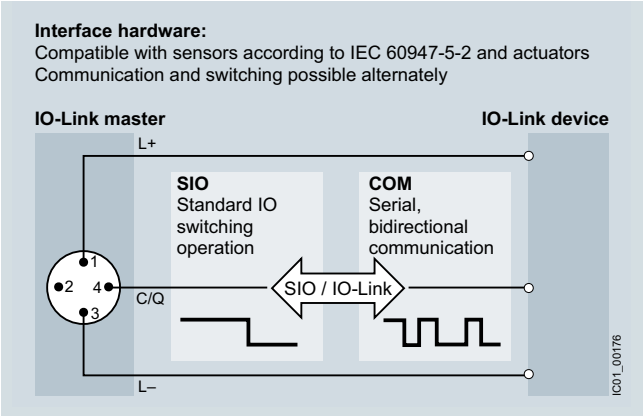
Principles of the IO-Link specification

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 transmission rates between IO-Link master 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 transmission rate of 38 400 Bd

IO-Link protocol

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



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. 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 to the controller or HMI. The IO-Link master can also transfer events and states. Events include, for example, cable break 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 re-parameterization.

The IO-Link master 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 masters

The IO-Link master is the interface to higher-level control systems. The IO-Link master 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 in accordance with 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

IO-Link master module for S7-1500 > CM 8xIO-Link NEW

Overview

CM 8xIO-Link master

- Communication 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 according to IO-Link specification V1.1
- Data transmission rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd)
- Parameterizable 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
  - Unequivocal, front-side module inscription

Configuration

The IO-Link master 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	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 6ES7547-1JF00-0AB0	**CM 8xIO-Link communication module** Communication module for connecting up to 8 IO-Link devices (three-wire connection) or 8 standard sensors	1	**6ES7547-1JF00-0AB0**	1	1 unit

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

Overview

SM 1278 4xIO-Link master

Module for connecting up to four IO-Link devices in accordance with 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

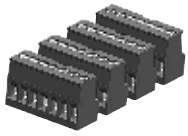
Supported data transmission rates

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

Selection and ordering data

	Version	SD d	Article No.	PU (UNIT, SET, M)	PS*
 6ES7278-4BD32-0XB0	**SM 1278 4xIO-Link master signal module** For connecting up to four IO-Link devices in accordance with the IO-Link specification V1.1	1	**6ES7278-4BD32-0XB0**	1	1 unit

Accessories

	Version	SD d	Article No.	PU (UNIT, SET, M)	PS*
 6ES7292-1AG30-0XA0	**Terminal block (spare part)** With 7 screws, zinc-plated; 4 units	1	**6ES7292-1AG30-0XA0**	1	4 units

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

Overview

CM 4xIO-Link communication module

- CM 4xIO-Link communication module
  Serial communication module for connecting up to four IO-Link devices in accordance with 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 transmission 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 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 front-side module inscription
  - 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
  - Reference identification label
  - Color-coded label with color code CC04
- Optional system-integrated shield connection

Application

- The CM 4x IO-Link communication 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	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 6ES7137-6BD00-0BA0	**CM 4xIO-Link V1.1 Standard communication module** • Serial communication module for connecting up to 4 IO-Link devices, time-based IO, BU type A0, color code CC04	1	**6ES7137-6BD00-0BA0**	1	1 unit

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

Overview

4 IO-Link HF electronic module

- 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 a class A port are interconnected by means of a 3-wire cable. IO-Link devices that require an additional supply voltage and have a class B port (e.g. actuators) are interconnected by means of a 5-wire cable.

Selection and ordering data

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

Accessories

Version	SD d	Article No.	PU (UNIT, SET, M)	PS*
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	1	**6ES7194-4CA20-0AA0**	1	1 unit
Module labeling plates For color coding of CM IOs in the colors white, red, blue and green; pack of 100	1	**6ES7194-4HA00-0AA0**	1	500 units
M12 sealing caps For protection of unused M12 terminals on ET 200pro	►	**3RX9802-0AA00**	100	10 units

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

Overview

ET 200eco PN IO-Link master modules

The ET200eco PN IO-Link master modules belong to the ET 200eco PN compact block I/O device family and are distinguished by the following features:

- Compact block I/O devices for connection of IO-Link devices and connection to the PROFINET bus system
- Design without a control cabinet in IP67 degree of protection with M12 connection technology
- Very rugged and resistant encapsulated metal enclosure
- Compact module in an enclosure width of 30 mm or 60 mm
- PROFINET connection: 2 x M12 and automatic PROFINET addressing
- 100 Mbps data transmission rate
- LLDP neighborhood detection without PG
- Supply and load voltage connection: 2 x M12
- Channel-exact diagnostics

Application

IO-Link enables easy integration of sensors and actuators from different manufacturers. ET200eco PN IO-Link master modules enable an 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.

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

The following IO-Link masters are available:

- Compact module in an enclosure width of 30 mm for connecting up to 4 IO-Link devices in accordance with the IO-Link specification V1.0 and V1.1 and port class B
- Compact module in an enclosure width of 60 mm for connecting up to 4 IO-Link devices in accordance with the IO-Link specification V1.0 and port class A and an additional 8 digital inputs and 4 digital outputs.

Design

The IO-Link master 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.

ET 200eco PN IO-Link masters are compact modules with M12 connection technology.

Two load power supplies (4 A each) are available that can be used by the compact module or also be looped through to another compact module (line topology). PROFINET is connected via an M12 connection and can be looped through to a further PROFINET device. The maximum cable length to the IO-Link device is 20 m.

Selection and ordering data

	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
	ET 200eco PN IO-Link master				
 6ES7148-6JA00-0AB0	• 4 IO-L + 8 DI + 4 DQ, 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 8 digital inputs and 4 digital outputs	1	**6ES7148-6JA00-0AB0**	1	1 unit
 6ES7148-6JD00-0AB0	• 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 specification V1.0 and V1.1 and port class B	1	**6ES7148-6JD00-0AB0**	1	1 unit

For more information, see https://mall.industry.siemens.com/mall/en/ww/Catalog/Products/10046858.

Overview

CM IO-Link communication module

- 30-mm-wide CM IO-Link communication module
- For connecting up to 4 IO-Link devices in accordance with the IO-Link specification V1.0 and V1.1 and port class B
- The IO-Link parameters are configured by means of the Port Configuration Tool S7-PCT with version V3.2 and higher.

Application

The CM IO-Link communication module supports data exchange between up to four IO-Link devices. IO-Link devices (e.g. sensors) with a class A port are interconnected by means of a 3-wire cable. IO-Link devices that require an additional supply voltage and have a class B port (e.g. actuators) are interconnected by means of a 5-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 diagnostic functions and can therefore be flexibly adapted to individual process requirements.

The following IO-Link masters are available:

- CM 4xIO-Link communication modules, 4XM12

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 communication module features:

- A backplane bus connection (Ethernet 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
- Meaningful module inscription on front panel:
  - Plain text marking of module type
  - Interface marking
  - LED label
- Meaningful module inscription on side panel:
  - 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.

Selection and ordering data

	Version	SD	Article No.	PU (UNIT, SET, M)	PS*
		d			
 6ES7147-5JD00-0BA0	**CM IO-Link** CM 4X IO-Link, 4XM12; for the connection of up to 4 IO-Link devices according to IO-Link specification V1.0 and V1.1 and port class B	1	**6ES7147-5JD00-0BA0**	1	1 unit

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

Overview

IO-Link input modules

Using IO-Link technology, it is basically possible to connect standard sensors to IO-Link masters. However, connecting standard sensors directly to the IO-Link master does not exploit the full potential of IO-Link.

The solution lies in the technology of the IO-Link modules. Their use is a more economically attractive solution in comparison to the direct connection of a sensor.

The IO-Link input module technology enhances IO-Link via a pure point-to-point cable connection towards decentralized structures. The maximum cable length of an IO-Link connection between an IO-Link module and an IO-Link master is 20 m. The use of sensor boxes with accordingly complex and error-prone wiring is no longer necessary.

Transmission of parameter and diagnostic signals

The IO-Link input modules also offer the possibility of transmitting parameters and diagnostic signals. This enables for example the inputs of modules to be parameterized as NC contacts or NO contacts through IO-Link. An overload or short-circuit in the sensor supply is signaled to the control system through the IO-Link master.

M8 and M12 terminals

M8 and M12 terminals are available for connecting the sensors. Connection to the IO-Link master is made using a standard M12 connecting cable.

Benefits

Benefits of using IO-Link input modules:

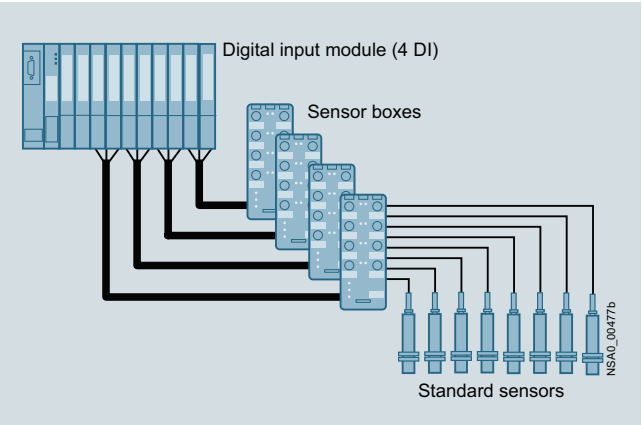
- Economical use of innovative IO-Link technology also for binary sensors
- Optimum use of all ports of the IO-Link master
- Connection of several binary sensors/actuators to one port of the IO-Link master, hence low-cost connection also of binary sensors/actuators to the control system through IO-Link
- Reduction of digital input modules in the peripheral station
- Use of parameters also for binary sensors (e.g. NC contacts, NO contacts and input delay can be parameterized)
- Reduction of cabling and hence less risk of wiring errors by dispensing with sensor boxes
- Expansion toward distributed structures using pure point-to-point wiring
- Easy and elegant integration of sensors within a radius of 20 m around an IO-Link master, e.g. in an ET 200 station
- Possibility of transmitting parameter and diagnostic signals (e.g. sensor supply overload)
- Can also be used in harsh ambient conditions thanks to a very compact design and degree of protection IP67

Application

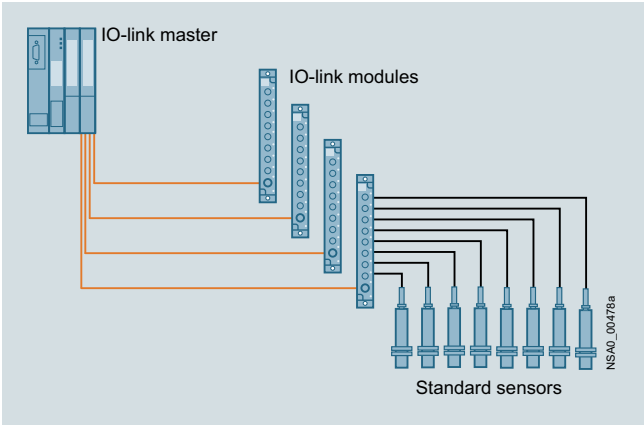
IO-Link input modules are particularly used where sensor boxes had previously been used for the connection of binary sensors.

Application example:

Replacement of sensor boxes by using IO-Link input modules



Former technology with sensor boxes



Technology with IO-Link input modules

Selection and ordering data

	Type	Pin assignment	Connection	SD d	Article No.	PU (UNIT, SET, M)	PS*
 3RK5010-0BA10-0AA0  3RK5010-0CA00-0AA0	**K20 IO-Link modules**						
	• 4 inputs	Y	M12	5	**3RK5010-0BA10-0AA0**	1	1 unit
	• 8 inputs	Standard	M8	5	**3RK5010-0CA00-0AA0**	1	1 unit

Accessories

	Version	SD d	Article No.	PU (UNIT, SET, M)	PS*
 3RK1901-1KA00  3RK1901-1PN00	**Sealing caps**				
	• M12, for free M12 sockets	▶	**3RK1901-1KA00**	100	10 units
	• M8, for free M8 sockets	2	**3RK1901-1PN00**	100	10 units
 3RK1902-4GB50-4AA0	**Control cable, assembled at one end** Angular M12 plug for screw fixing, 4-pole, 4 x 0.34 mm², A-coded, black PUR sheath, max. 4 A				
	• Cable length 5 m	5	**3RK1902-4GB50-4AA0**	1	1 unit
 3RK1902-4CA00-4AA0	**M12 socket, angled** For screw fixing, 4-pole screw terminals, max. 0.75 mm², A-coded, max. 4 A	5	**3RK1902-4CA00-4AA0**	1	1 unit
 3RK1902-4BA00-5AA0  3RK1902-4DA00-5AA0	**M12 plugs** For screw fixing, 5-pole screw terminals, max. 0.75 mm², A-coded, max. 4 A				
	• Straight	5	**3RK1902-4BA00-5AA0**	1	1 unit
	• Angled	5	**3RK1902-4DA00-5AA0**	1	1 unit
 3RK1902-4H...-5AA0	**Control cable, assembled at one end** Angular M12 plug for screw fixing, 5-pole, 5 x 0.34 mm², A-coded, black PUR sheath, max. 4 A				
	• Cable length 1.5 m	5	**3RK1902-4HB15-5AA0**	1	1 unit
	• Cable length 5 m	5	**3RK1902-4HB50-5AA0**	1	1 unit
	• Cable length 10 m	5	**3RK1902-4HC01-5AA0**	1	1 unit
 3RK1902-4PB15-3AA0	**Control cable, assembled at both ends** Straight M12 plug, straight M12 socket, for screw fixing, 3-pole, 3 x 0.34 mm², A-coded, black PUR sheath, max. 4 A				
	• Cable length 1.5 m	5	**3RK1902-4PB15-3AA0**	1	1 unit
 6ES7194-1KA01-0XA0	**M12 Y-shaped coupler plug** For connection of two sensors to one M12 socket with Y-assignment	1	**6ES7194-1KA01-0XA0**	1	1 unit