Overview

DP/AS-i F-Link

PN	DP-M	DP-S	ASi-M		
		●	●		

IK10_10195

The DP/AS-i F-Link is a compact, safety-related router between PROFIBUS (DP Slave) and AS-Interface, with the following features:

- Monitoring the inputs of safety-related digital AS-i slaves (ASIsafe slaves) and forwarding of data through PROFIsafe. No additional safety-related components required for the AS-Interface (e.g. MSS ASIsafe Modular Safety System)
- Can be used up to PL e according to EN ISO 13849-1 and to SIL 3 according to IEC 62061/IEC 61508.
- Connection of up to 62 AS-Interface slaves
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- Typically easy transmission of non-safety-related input/output data of all AS-i slaves
- Integrated analog value transmission (all analog profiles)
- Direct integration in PROFIBUS networks.
  Optional integration in PROFINET environments through PROFINET/PROFIBUS gateway (IE/PB Link PN IO) or through SIMATIC S7-315/317/319 F PN/DP or S7-416F-3 PN/DP
- Connection to ET 200S with IM-F-CPU using DP master module is possible
- Optimum TIA integration in STEP 7 using Object Manager, integration in non-Siemens engineering tools using PROFIBUS GSD file
- Local diagnostics using LEDs and display with control keys

Design

- Rugged, slim plastic enclosure, degree of protection IP20, for standard mounting rail or wall mounting (with adapter)
- Compact design:
  - LEDs in the front panel for indicating the operating state and functional readiness of all connected slaves
  - 2 buttons on the front for startup and call-up of diagnostics information
  - 4 LEDs for display of the operating state of the device, of PROFIBUS DP and the AS-Interface network
  - Front PROFIBUS DP connection with sub D connector
  - Removable terminal blocks for connection of AS-i +/- and control supply voltage (over 24 V DC PELV power supply unit)
  - Narrow width (45 mm)
- Operation without fans and batteries
- Fast device replacement in the event of a fault

Functionality

Communication principle

The PROFIBUS DP master or the safe control communicates with the AS-Interface slaves over the DP/AS-i F-Link.
The AS-Interface process data are mapped in different data areas for non-safety-related input and output data and safety-related input data.

Diagnostics

Extensive diagnostics is possible using the four LEDs, display and control keys or SIMATIC S7. Further details can be found in the manual.

Configuration

The DP/AS-i F-Link is configured as follows:

- With STEP 7 as of Version V5.4 SP1: In particular, Siemens AS-Interface slaves can be conveniently configured via the slave selection dialog.
- Uploading the actual configuration of an already configured AS-Interface network in a STEP 7 project is possible.
- Alternatively, DP/AS-i F-Link can be integrated by means of the PROFIBUS GSD file in the engineering tool.
  As a startup aid, it is also possible to adopt the ACTUAL configuration in the appliance storage device directly on the appliance to activate the AS-interface slaves.

Programming

In contrast to the MSS ASIsafe Modular Safety System, the DP/AS-i F-Link is a pure gateway, which does not run through its own safety logic. Programming of the safety function is implemented at the level of the higher-level fail-safe PLC, e.g.:

- With Distributed Safety, Version V5.4 SP1 or higher for SIMATIC S7-300F/416F
- With the SAFETY INTEGRATED "SI-Basic" or "SI-COMFORT NCU" Software for SINUMERIK 840D pl/sl

The safety and standard range can access the digital and analog I/O data of the connected AS-Interface slaves directly through the I/O address area of the CPU.

DP/AS-i F-Link

Benefits

- Gaps in (bus-based) safety technology closed: safety-related signals (EMERGENCY-STOP, door interlock, light curtains etc.) collected with AS-i and transferred to higher-level F-PLC. This enables:
  - Quick installation, easy commissioning: Use of AS-i virtues in the field now fully consistent for Safety Integrated
  - Cost-effective solution as ASIsafe is ideally suited for the collection of "fewer but more distributed fail-safe bits"
- Price advantage: As a fully fledged AS-i master according to Specification V3.0, more inputs and outputs can be used, e.g.:
  - Up to 248 DI/248 DO when using 62 A/B slaves with 4DI/4DO each
  - Up to 62 digital or analog slaves
- Investment protection:
  - Connection to PROFIBUS networks, such as DP/AS-i LINK Advanced or DP/AS-Interface Link 20E
  - Downward compatibility to AS-Interface specification V2
  - Open for modern automation concepts with AS-i
- Teaching the code sequences of ASIsafe slaves is possible at the press of a button
- Reduced amount of engineering work thanks to user-friendly configuration of all AS-i slaves from Siemens using the slave selection dialog in HW-Config (STEP 7), including setting the F-parameter of the ASIsafe slaves modeled on PROFIsafe slaves
- Cost-savings thanks to programming of the safety logic with the familiar, powerful commands of the distributed safety packages from the fail-safe SIMATIC PLC in F-FBD or F-LAD, incl. TÜV-certified function blocks for typical safety applications
- Use in machine tools under SINUMERIK 840 D (pl/sl) possible
- Reduction of standstill and servicing times in the event of a slave failure thanks to user-friendly diagnostics using the display and through simple module exchange (only a few settings by control keys are required, without use of the configuring tool)

Application

Links between PROFIsafe and ASIsafe

The DP/AS-i F-Link is a PROFIBUS DP-V1 slave (according to IEC 61158 and IEC 61784) and an AS-Interface master (based on AS-Interface Specification V3.0 according to IEC 62026-2). It enables transparent data access to AS-Interface from PROFIBUS DP. The DP/AS-i F-Link is also an AS-i master with which safety-related input data can be passed from ASIsafe slaves via the PROFIsafe protocol to a fail-safe CPU with PROFIBUS DP master. No additional safety cabling or monitoring is required (in particular no MSS ASIsafe Modular Safety System).

The transmission of binary values or analog values is possible depending on the slave type. All slaves according to AS-Interface Specification V2.0, V2.1 or V3.0 can be used as AS-i slaves.

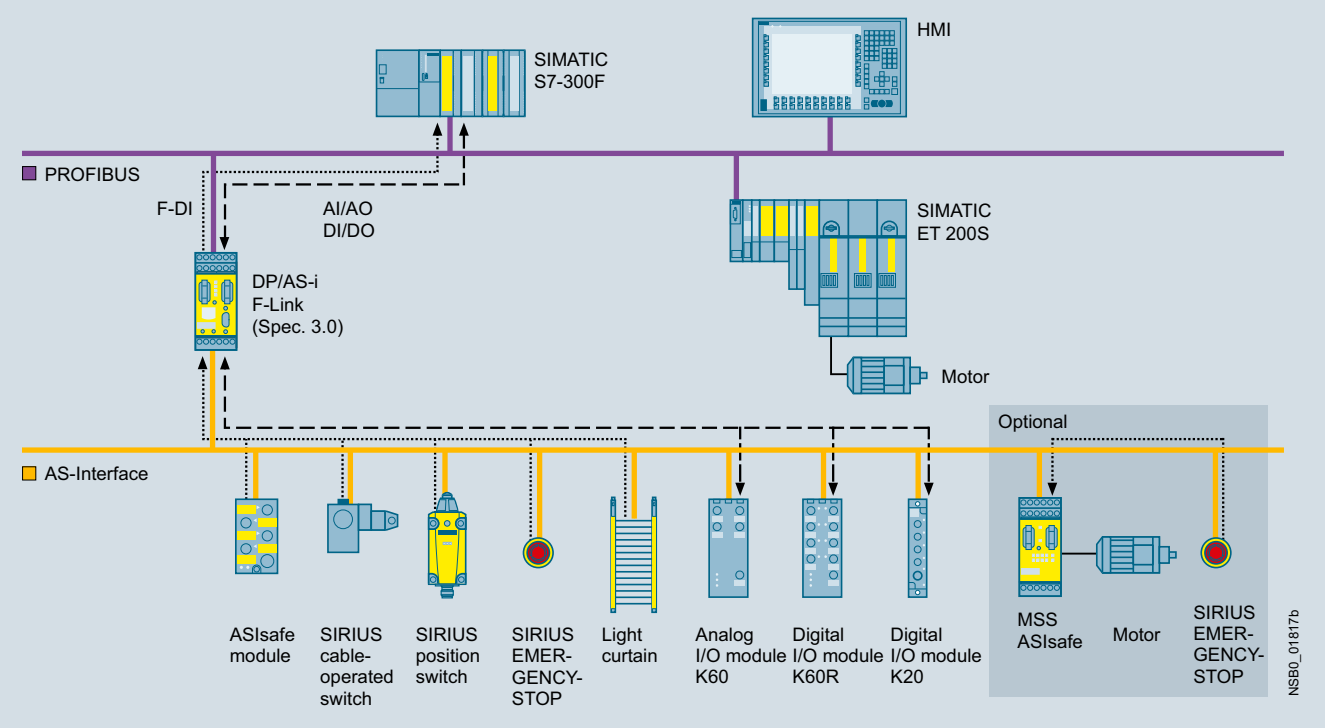
PROFIBUS DP masters according to DP-V0 or DP-V1 can exchange I/O data with lower-level AS-i slaves in cyclic mode. PROFIBUS DP masters with acyclic services according to DP-V1 are able in addition to initiate AS-i command calls (e.g. reading/writing the AS-i configuration during normal operation). In addition to digital I/O data, analog data can also be saved with high performance in the cyclic I/O of a fail-safe S7-300/ S7-416 F-CPU.

In configuring mode the DP/AS-i F-Link reads in the configuration data of the peripherals on the AS-Interface. Slave addresses can be set using the display and the control keys, and the code sequences of safe AS-i slaves can be taught.

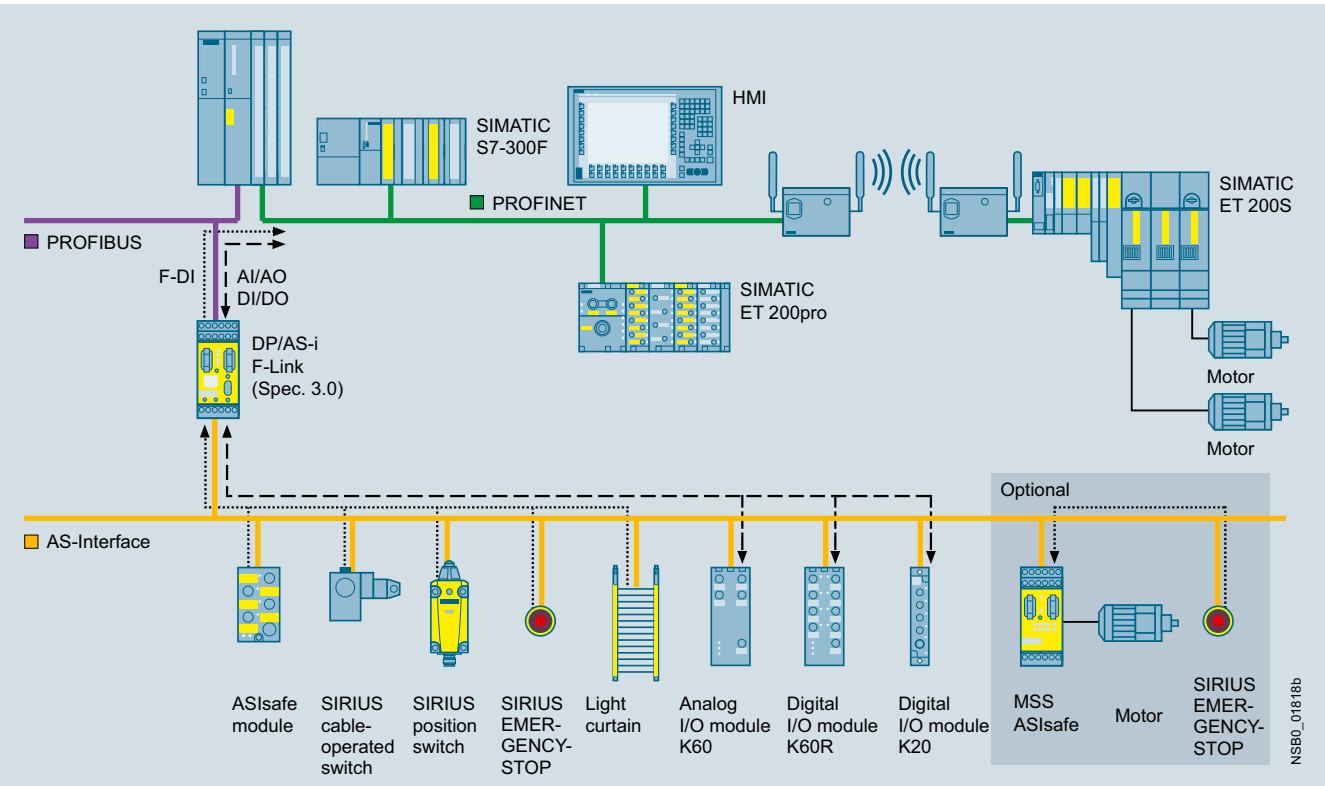
During operation, four display LEDs and the display provide detailed diagnostics information, which directly localizes the fault if required. Using the PLC user program it is possible to read out diagnostics data records and make them available to a higher-level operating and monitoring system (e.g. WinCC flexible or TRANSLINE HMI).

Network connectivity

The DP/AS-i F-Link can be used in PROFIBUS and PROFINET networks as follows:



Integration in PROFIBUS networks under SIMATIC F PLC



Integration in PROFINET networks under SIMATIC F PLC (alternatively through IE/PB Link)

DP/AS-i F-Link

Further network connectivity options

- Integration in PROFINET networks under SIMATIC F PLC through IE/PB Link
- Integration in SINUMERIK Power Line and Solution Line
- Integration under non-Siemens fail-safe control systems using PROFIBUS GSD file, see http://support.automation.siemens.com/WW/view/en/113250

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
DP/AS-i F-Link Router between PROFIBUS DP and AS-Interface for safety-related data transmission from ASIsafe to PROFIBUS DP – PROFIsafe in degree of protection IP20; corresponds to AS-Interface Specification V3.0; not approved for AS-i Power24V; dimensions (W x H x D / mm): 45 x 104 x 120						
• With screw terminals	A	**3RK3141-1CD10**		1	1 unit	42C
• With spring-type terminals	A	**3RK3141-2CD10**		1	1 unit	42C

DP/AS-i F-Link

More information

For more accessories for the PROFIBUS connection see page 2/40.

For the DP/AS-i F-Link manual see http://support.automation.siemens.com/WW/view/en/24196041

Circuit examples for safety systems with DP/AS-i F-Link see http://support.automation.siemens.com/WW/view/en/24509484

The F-Link Object Manager must be installed for configuration with STEP 7 / HW-Config see http://support.automation.siemens.com/WW/view/en/24724923

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

Overview

IE/AS-i LINK PN IO

PN	DP-M	DP-S	ASi-M		
●			●		

The IE/AS-i LINK PN IO is a compact router between PROFINET/Industrial Ethernet (PROFINET IO Device) 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 (all analog profiles)
- 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
- Optimum TIA integration using STEP 7
- Integration in non-Siemens engineering tools using the PROFINET GSD file
- Vertical integration (standard web interface) through Industrial Ethernet
- Supply via AS-Interface cable or with 24 V DC
- 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 (IP address etc.) using C-PLUG (optional)
- Costs saved by the double AS-Interface master when large volumes of project data are involved

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 area:

- 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 slaves) of an AS-i line are 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 able in addition 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 exchange without entering the connection parameters (e.g. IP address), 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
- Status 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
- The 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 safety

The use of this product requires suitable protective measures (e.g. network segmentation for IT security among others) in order to ensure safe plant operation,
see www.siemens.com/industrialsecurity.

Configuration

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

- STEP 7 V5.4 or higher is required for configuring the full functional scope of the IE/AS-i LINK PN IO. With STEP 7 configuring the AS-Interface configuration can be uploaded in STEP 7 V5.4 SP2 and higher. 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 STEP 7 V5.4 SP2 and lower, TIA portal, or for non-Siemens engineering tools).

IE/AS-i LINK PN IO

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
- Saves the need for AS-i power supply with AS-i Power24V: The AS-Interface cable assembly is fed through an existing 24 V DC PELV power supply unit. For decoupling, an AS-i data decoupling module is required, see power supply units and data decoupling modules.
- Standard mode with AS-Interface power supply (see power supply units and data decoupling modules) possible without restrictions, whereby no further operational voltage is required

Application

The DP/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 62026-2). It enables transparent data access to AS-Interface from Industrial Ethernet.

Exchanging data with PROFINET IO controllers

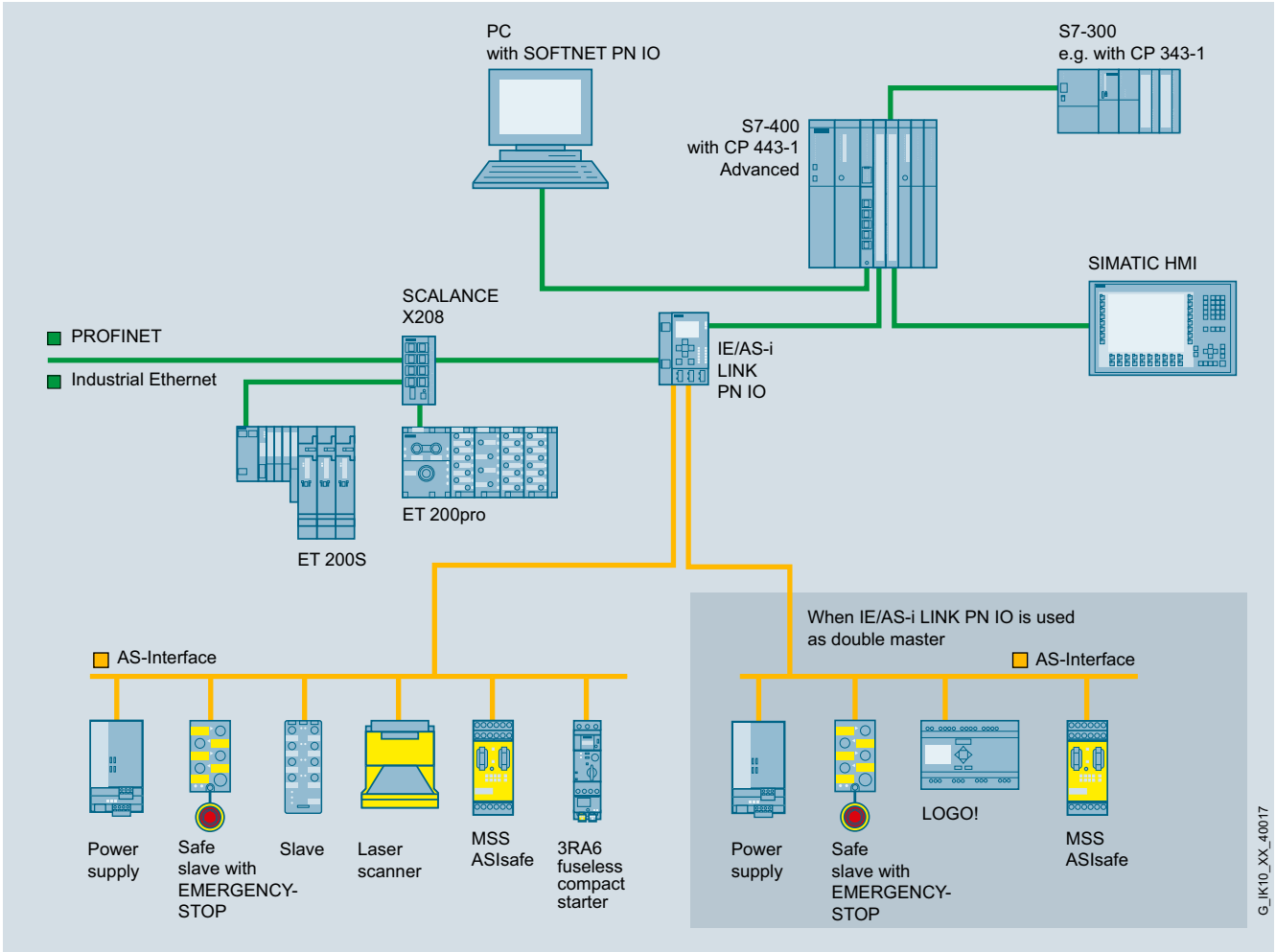
PROFINET IO controllers can exchange I/O data with AS-Interface in cyclic mode and can perform AS-i master calls in addition with acyclic services (e.g. reading/writing the AS-i configuration during normal operation). IE/AS-i LINK PN IO is, therefore, suitable for distributed configurations and for integrating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

Single masters

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

Double masters

For applications with large volumes of project data, the IE/AS-i LINK PN IO is used in its version as an AS-i double master. 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 DO, using 2 AS-i networks with 62 A/B slaves each with 4DI/4DO each.

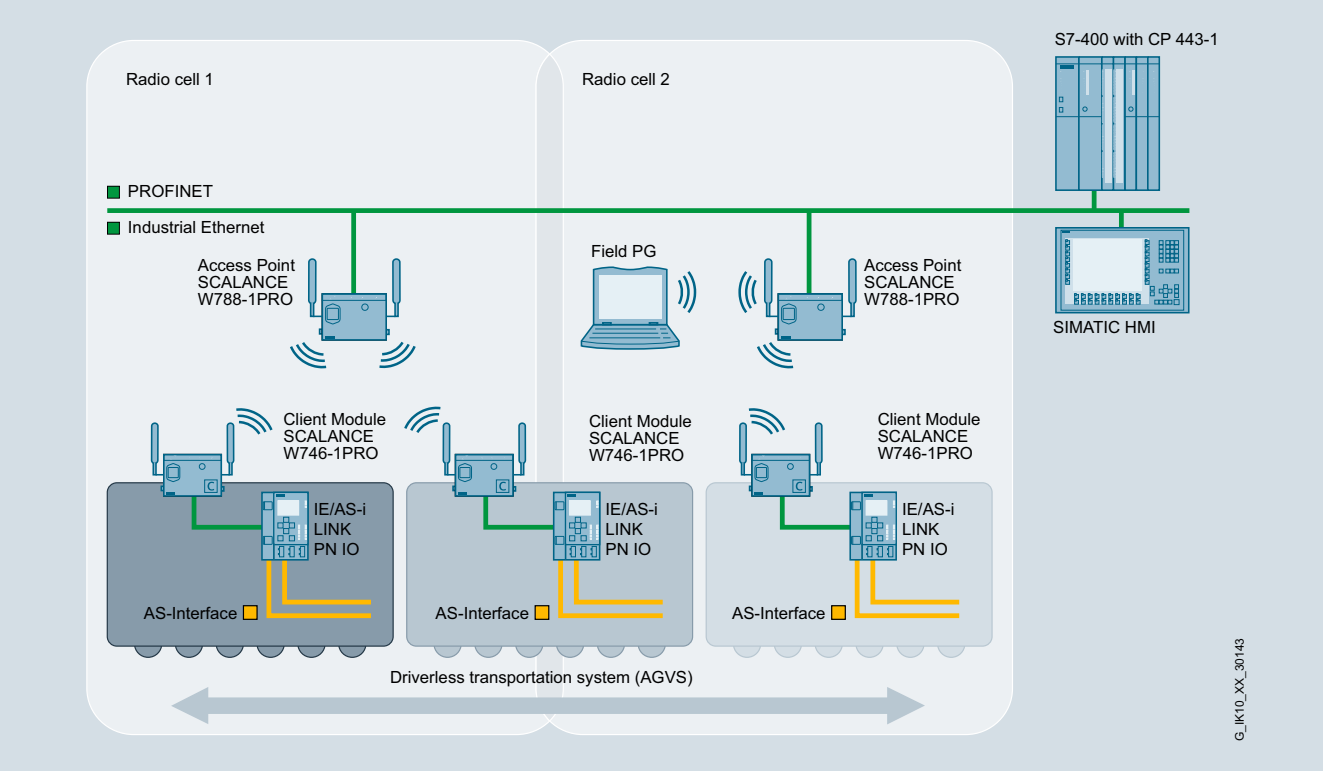


Integration of AS-Interface on PROFINET through IE/AS-i LINK PN IO as single/double master

Wireless communication

Using an upstream IWLAN client module, e.g. SCALANCE W746-1PRO, 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	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
IE/AS-i LINK PN IO						
Router between PROFINET/Industrial Ethernet and AS-Interface in 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 3.0; dimensions (W x H x D / mm): 90 x 132 x 88.5		**Combicon connection**				
• Single master with display	►	**6GK1411-2AB10**		1	1 unit	42C
• Double master with display	►	**6GK1411-2AB20**		1	1 unit	42C
Accessories						
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	A	**6GK1900-0AB00**		1	1 unit	5N3
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	A	**6GK1901-1BB20-2AA0**		1	1 unit	5K1
• 1 pack = 10 units	A	**6GK1901-1BB20-2AB0**		1	10 units	5K1
• 1 pack = 50 units	A	**6GK1901-1BB20-2AE0**		1	50 units	5K1


IE/AS-i LINK PN IO

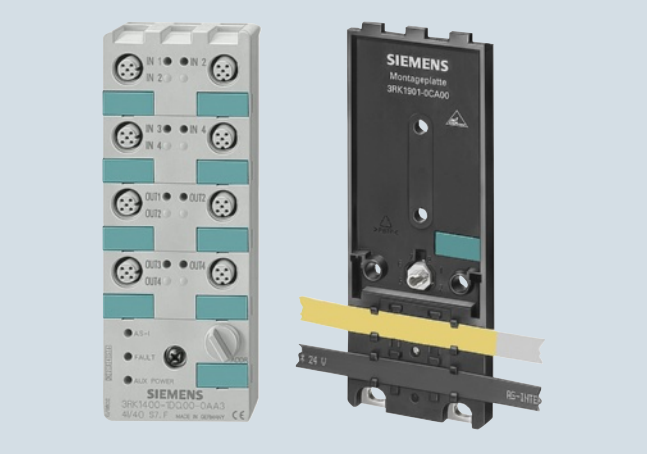
More information

Manuals see http://support.automation.siemens.com/WW/view/en/29992487/13330

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

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - Introduction

Overview



K60

K20

K45

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:

- Series K60 (digital and analog)
- Series K45 (digital)
- Series K20 (digital)

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	✓	✓ NEW	--
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
ATEX 3D (Zone 22)	✓	--	--
Extended address mode	✓	✓	✓

✓ Available

-- Not available

Overview

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 installed.

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 connectors, 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 compact modules with four digital inputs and outputs according to AS-Interface Specification 3.0

The extended address mode (A/B addresses) AS-Interface Specification 3.0 enables the connection of up to 62 slaves on one AS-Interface network. With the extended address mode, four outputs are now possible even with A/B slaves (instead of only three outputs possible up to now with Specification 2.1). Hence with full expansion of an AS-Interface network, there are now 248 inputs as well as 248 outputs available on one AS-i network.

Please note, however,

- that these modules can be used only with a master according to AS-i Specification 3.0
- that the cycle times for the outputs may be up to 20 ms.

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.

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.

K60 compact modules for use in hazardous areas (ATEX)

Two versions of the K60 modules are available for operation in Zone 22 hazardous areas according to Classification II 3D (dusty atmosphere, non-conductive dust). The version with four inputs and four outputs has the designation (Ex) II 3D Ex tD A22 IP65X T75°C and the version with four inputs has the designation (Ex) II 3D Ex tD A22 IP65X T60°C.

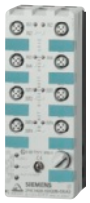
Special conditions have to be observed for the safe operation of these devices. In particular the module must be protected by suitable protective measures from mechanical damage.

More information

For other conditions for safe operation see
http://support.automation.siemens.com/WW/view/en/18290447

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - K60

Selection and ordering data



3RK1400-1DQ00-0AA3

Version					DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
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 type	Pin assign-ment	Sensor power supply off						
8 inputs/ 2 outputs[1]	2 A	A/B	Special	AS-i	A	**3RK2400-1HQ00-0AA3**		1	1 unit	42C
8 inputs[1]	--	Standard	Y-II	AS-i	▶	**3RK1200-0DQ00-0AA3**		1	1 unit	42C
	--	A/B	Y-II	AS-i	▶	**3RK2200-0DQ00-0AA3**		1	1 unit	42C
	--	A/B	Y-II	U_{aux}	A	**3RK2200-1DQ00-1AA3**		1	1 unit	42C
4 inputs/ 4 outputs	2 A	Standard	Y-II	AS-i	▶	**3RK1400-1DQ00-0AA3**		1	1 unit	42C
	2 A	Standard	Standard	AS-i	▶	**3RK1400-1CQ00-0AA3**		1	1 unit	42C
	1 A	Standard	Y-II	AS-i	A	**3RK1400-1DQ01-0AA3**		1	1 unit	42C
	1 A	Standard	Standard	AS-i	▶	**3RK1400-1DQ03-0AA3**		1	1 unit	42C
	2 A	A/B (Spec. 3.0)	Y-II	AS-i	A	**3RK2400-1DQ00-0AA3**		1	1 unit	42C
	2 A	A/B (Spec. 3.0)	Y-II	U_{aux}	A	**3RK2400-1DQ00-1AA3**		1	1 unit	42C
4 inputs/ 3 outputs	2 A	A/B	Y-II	AS-i	▶	**3RK2400-1FQ03-0AA3**		1	1 unit	42C
4 inputs/ 2 outputs	2 A	Standard	Y-II	AS-i	▶	**3RK1400-1MQ00-0AA3**		1	1 unit	42C
4 inputs	--	Standard	Y-II	AS-i	▶	**3RK1200-0CQ00-0AA3**		1	1 unit	42C
NEW	--	A/B	Y-II	AS-i	A	**3RK2200-0CQ00-0AA3**		1	1 unit	42C
2x2 inputs/ 2x2 outputs	1 A	Standard	Y	AS-i	B	**3RK1400-1DQ02-0AA3**		1	1 unit	42C
4 outputs	2 A	Standard	Y-II	--	▶	**3RK1100-1CQ00-0AA3**		1	1 unit	42C
NEW	2 A	A/B (Spec. 3.0)	Y-II	--	A	**3RK2100-1CQ00-0AA3**		1	1 unit	42C
Digital I/O modules IP67 – K60, version ATEX (Ex) II 3D Ex tD A22 IP65X T75°C/60°C • PNP transistor • Width 60 mm • Current carrying capacity of the inputs: 200 mA • Connection method: M12 • Modules supplied without mounting plate										
Type	Current carrying capacity of outputs	Slave type	Pin assignment							
4 inputs/ 4 outputs	2 A	Standard	Y-II		C	**3RK1400-1DQ05-0AA3**		1	1 unit	42C
4 inputs	--	Standard	Y-II		B	**3RK1200-0CQ05-0AA3**		1	1 unit	42C
Digital I/O modules IP67 - K60 data couplers • Modules supplied without mounting plate										
Type	Current carrying capacity of outputs	Slave type	Pin assignment							
Data coupler 4 inputs/4 outputs (virtual)	--	Standard	--		C	**3RK1408-8SQ00-0AA3**		1	1 unit	42C

Accessories

3RK1901-0CA00

K60 mounting plates Suitable for all K60 compact modules						
• Wall mounting	▶	**3RK1901-0CA00**		1	1 unit	42C
• Standard rail mounting	▶	**3RK1901-0CB01**		1	1 unit	42C

3RK1901-1KA00

AS-Interface M12 sealing caps For free M12 sockets	▶	**3RK1901-1KA00**		100	10 units	42C

3RK1902-0AR00

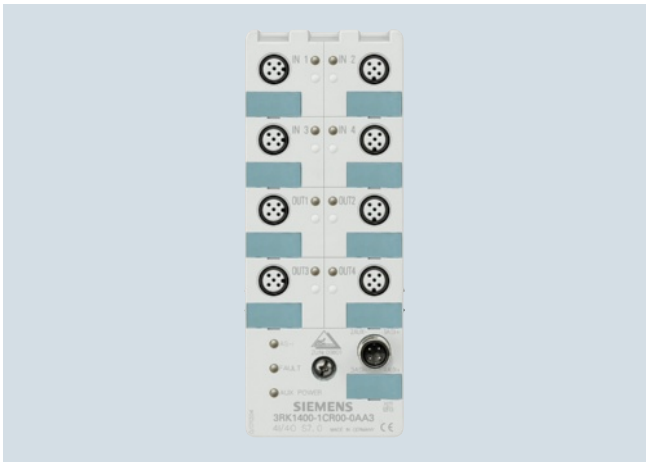
Sealing sets • For K60 mounting plate and standard distributor • Cannot be used for K45 mounting plate • One set contains one straight and one shaped seal	A	**3RK1902-0AR00**		100	5 units	42D

[1] Module occupies two AS-Interface addresses

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

Overview

Operation in particularly harsh environments



K60R module in degree of protection IP68/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 section "IP68/IP69K tests."

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

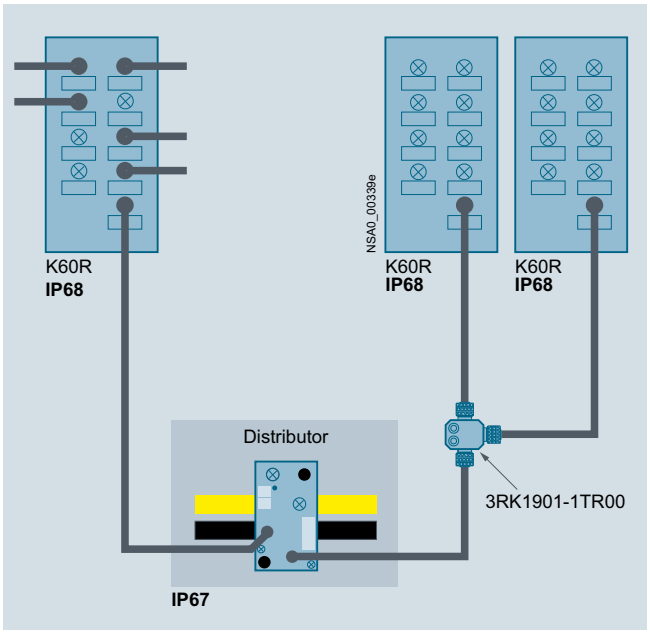
The same mounting plates are used as for the K60 modules. Instead of using flat cables, the K60R is connected using a 4-pole round cable with an M12 connection. With the K60R the mounting plate thus serves only as a fixture and ground terminal.

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 (3RK1901-1NR..). 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.

To connect more than one K60R module to one spur line, the spur line can be split again using a T distributor (3RK1901-1TR00) with degree of protection IP68.

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 amounts to 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: maximum 5 m
  - Total of all round cable segments in an AS-Interface network: maximum 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

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP68/IP69K – K60R

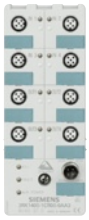
- Test with drilling emulsion: Five months at room temperature (components of the drilling emulsion: Anionic and non-ionic emulsifiers, paraffinic low-aromatic mineral oil, boric acid alkanolamines, corrosion inhibitors, oil content 40 %)
- Test in oil bath (Excelence 416 oil) with alternating oil bath 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:

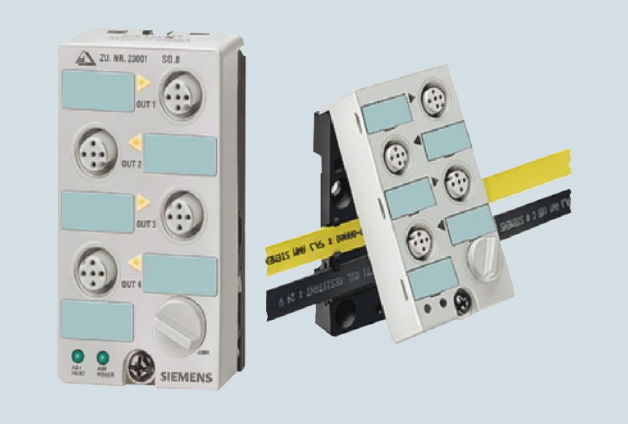
Sealing caps and M12 connections must be tightened with the correct torque.

Selection and ordering data

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 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) • Standard slave • Modules supplied without mounting plate	A	**3RK1400-1CR00-0AA3**		1	1 unit	42C
Accessories							
 3RK1901-0CA00	**K60 mounting plates** Suitable for all K60 and K60R compact modules						
	• Wall mounting	►	**3RK1901-0CA00**		1	1 unit	42C
	• Standard rail mounting	►	**3RK1901-0CB01**		1	1 unit	42C
 3RK1901-1KA00	**AS-Interface M12 sealing caps** For free M12 sockets	►	**3RK1901-1KA00**		100	10 units	42C
 3RK1901-1NR21	**AS-Interface M12 feeders, current carrying capacity up to 4 A**						
	For flat cable: AS-i/U_{aux} — For: M12 socket — Cable length: -- — Cable end in feeder: Not available	A	**3RK1901-1NR20**		1	1 unit	42C
	For flat cable: AS-i/U_{aux} — For: M12 cable box — Cable length: 1 m — Cable end in feeder: Not available	A	**3RK1901-1NR21**		1	1 unit	42C
	For flat cable: AS-i/U_{aux} — For: M12 cable box — Cable length: 2 m — Cable end in feeder: Not available	A	**3RK1901-1NR22**		1	1 unit	42C
 3RK1901-1NR04	**AS-Interface M12 feeders, 4-fold, current carrying capacity up to 4 A**						
	For flat cable: AS-i/U_{aux} — For: 4-fold M12 socket delivery includes coupling module — Cable length: -- — Cable end in feeder: Not available	A	**3RK1901-1NR04**		1	1 unit	42C
 3RK1901-1TR00	**M12-T distributors** • IP68 • 1 x M12 plug • 2 x M12 box	C	**3RK1901-1TR00**		1	1 unit	42C
 3RK1902-4PB15-3AA0	**M12 connecting cables** • 3-pole • For addressing AS-i slaves with M12 bus connection • Cable length 1.5 m	C	**3RK1902-4PB15-3AA0**		1	1 unit	42D

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

Overview



K45 compact modules

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, however, have a considerably smaller footprint and mounting depth.

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:

- The mounting plate for wall mounting 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.
- The 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 standard connectors or M8 standard connectors, a maximum of four sensors and four actuators can be connected to the compact module. Depending upon the module, the sockets can have a double assignment.
Pin assignment: Y i.e. via a socket, two sensors or one sensor/one actuator is connected.

K45 modules with a maximum of eight digital inputs

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

K45 modules with four digital inputs and outputs according to AS-i Specification 3.0

The extended address mode (A/B addresses) according to AS-Interface Specification 3.0 enables the connection of up to 62 slaves on one AS-i network. With this extended address mode, four outputs are now possible even with A/B slaves (instead of only three outputs possible up to now with Specification 2.1). Hence with full expansion of an AS-Interface network, there are now 248 inputs as well as 248 outputs available on one AS-Interface network.

Please note, however,

- that these modules can be used only with a master according to AS-i Specification 3.0
- that the cycle times for the outputs may be up to 20 ms.

Depending upon the module, the sockets can have a double assignment.
Pin assignment: Y i.e. via a socket, two sensors or one sensor/one actuator is connected.

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - K45

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 type	Pin assign-ment	U_{aux} 24 V	Connection methods	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
NEW	8 inputs[1]	--	A/B	Y	--	M12	A	**3RK2200-0DQ20-0AA3**		1	1 unit	42C
	4 inputs	--	Standard	Standard	--	M12	▶	**3RK1200-0CQ20-0AA3**		1	1 unit	42C
		--	Standard	Standard	--	M8 screw	A	**3RK1200-0CT20-0AA3**		1	1 unit	42C
		--	A/B	Standard	--	M12	▶	**3RK2200-0CQ20-0AA3**		1	1 unit	42C
		--	A/B	Standard	--	M8 screw	B	**3RK2200-0CT20-0AA3**		1	1 unit	42C
	2 x 2 inputs	--	A/B	Y	--	M12	A	**3RK2200-0CQ22-0AA3**		1	1 unit	42C
	2 inputs/ 2 outputs	2 A[2]	Standard	Standard	✓	M12	▶	**3RK1400-1BQ20-0AA3**		1	1 unit	42C
	2 x (1 input/ 1 output)	0.2 A	Standard	Y	--	M12	A	**3RK1400-0GQ20-0AA3**		1	1 unit	42C
	4 x (1 input/ 1 output)	0.2 A	A/B (Spec. 3.0)	Y	--	M12	B	**3RK2400-0GQ20-0AA3**		1	1 unit	42C
	4 x (1 input/ 1 output)	0.5 A	A/B (Spec. 3.0)	Y	✓	M12	B	**3RK2400-1GQ20-1AA3**		1	1 unit	42C
NEW	4 outputs	1 A	A/B (Spec. 3.0)	Standard	✓	M12	A	**3RK2100-1CQ20-0AA3**		1	1 unit	42C
	3 outputs	1 A	A/B	Standard	✓	M12	▶	**3RK2100-1EQ20-0AA3**		1	1 unit	42C
	4 outputs	1 A	Standard	Standard	✓	M12	▶	**3RK1100-1CQ20-0AA3**		1	1 unit	42C
	2 outputs/ 2 inputs	2 A	A/B	Standard	✓	M12	A	**3RK2400-1BQ20-0AA3**		1	1 unit	42C

Accessories

3RK1901-2EA00

K45 mounting plates

- For wall mounting ▶ **3RK1901-2EA00** 1 1 unit 42C
- For standard rail mounting ▶ **3RK1901-2DA00** 1 1 unit 42C

3RK1901-1KA00

AS-Interface sealing caps

- For free M12 sockets ▶ **3RK1901-1KA00** 100 10 units 42C
- For free M8 sockets A **3RK1901-1PN00** 100 10 units 42C

3RK1901-1PN00

✓ 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).

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

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - K20

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 a width of a mere 20 mm. 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. Instead of the AS-Interface flat cable, the K20 modules are connected to AS-Interface over 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.
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. All standard AS-Interface K20 modules support, as far as technically possible, the expanded address mode (A/B addresses) according to AS-Interface specification 2.1, which enables connection of 62 stations to an AS-Interface network. The K20 module with four inputs and four outputs works in expanded address mode according to AS-Interface specification 3.0 which, for the first time, supports four outputs with an A/B slave, thus enabling 248 inputs and 248 outputs in a fully expanded AS-Interface network.

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					DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Digital I/O modules, IP67 – K20										
Width 20 mm										
Type	Current carrying capacity of outputs	Slave type	Pin assignment	Connection methods						
4 inputs	--	A/B	Standard	M8	A	**3RK2200-0CT30-0AA3**		1	1 unit	42C
	--	A/B	Y	M12	A	**3RK2200-0CQ30-0AA3**		1	1 unit	42C
2 inputs/ 2 outputs	1	A/B	Standard	M8	A	**3RK2400-1BT30-0AA3**		1	1 unit	42C
	1	A/B	Y	M12	A	**3RK2400-1BQ30-0AA3**		1	1 unit	42C
4 outputs	1	A/B (Spec. 3.0)	Standard	M8	A	**3RK2100-1CT30-0AA3**		1	1 unit	42C
4 inputs/ 4 outputs	1	Standard	Standard	M8	C	**3RK1400-1CT30-0AA3**		1	1 unit	42C
	1	A/B (Spec. 3.0)	Standard	M8	A	**3RK2400-1CT30-0AA3**		1	1 unit	42C
2 safe inputs	--	Standard	Y-II	M12	A	**3RK1205-0BQ30-0AA3**		1	1 unit	42C

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

I/O modules for use in the field, high degree of protection: Digital I/O modules, IP67 - K20

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Accessories						
AS-Interface sealing caps						
• For free M12 sockets	►	**3RK1901-1KA00**		100	10 units	42C
• For free M8 sockets	A	**3RK1901-1PN00**		100	10 units	42C
 3RK1901-1KA00						
 3RK1901-1PN00						
AS-Interface compact distributors, for AS-Interface flat cable	A	**3RK1901-1NN10**		1	1 unit	42C
Current carrying capacity up to 8 A						
 3RK1901-1NN10						
AS-Interface M12 feeders						
• 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	42C
 3RX9801-0AA00						
AS-Interface M12 feeders						
• 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	A	**3RK1901-1NR10**		1	1 unit	42C
 3RK1901-1NR10						
For flat cable: AS-i; For: M12 cable box; Cable length: 1 m; Cable end in feeder: Not available	A	**3RK1901-1NR11**		1	1 unit	42C
 3RK1901-1NR11						
For flat cable: AS-i; For: M12 cable box; Cable length: 2 m; Cable end in feeder: Not available	A	**3RK1901-1NR12**		1	1 unit	42C
For flat cable: AS-i/U_{aux}; For: M12 socket; Cable length: --; Cable end in feeder: Not available	A	**3RK1901-1NR20**		1	1 unit	42C
For flat cable: AS-i/U_{aux}; For: M12 cable box; Cable length: 1 m; Cable end in feeder: Not available	A	**3RK1901-1NR21**		1	1 unit	42C
For flat cable: AS-i/U_{aux}; For: M12 cable box; Cable length: 2 m; Cable end in feeder: Not available	A	**3RK1901-1NR22**		1	1 unit	42C
AS-Interface M12 feeders, 4-fold						
Current carrying capacity up to 4 A						
For flat cable: AS-i/U_{aux}; For: 4-fold M12 socket, delivery includes coupling module; Cable length: --; Cable end in feeder: Not available	A	**3RK1901-1NR04**		1	1 unit	42C
 3RK1901-1NR04						
M12 T distributors	C	**3RK1901-1TR00**		1	1 unit	42C
• IP68						
• 1 x M12 plug						
• 2 x M12 box						
 3RK1901-1TR00						
M12 Y-shaped coupler plugs	A	**6ES7194-1KA01-0XA0**		1	1 unit	250
For connection of two sensors to one M12 socket with Y assignment						
 6ES7194-1KA01-0XA0						
M12 connecting cables	C	**3RK1902-4PB15-3AA0**		1	1 unit	42D
• 3-pole						
• For addressing AS-i slaves with M12 bus connection						
• Cable length 1.5 m						
 3RK1902-4PB15-3AA0						

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

I/O modules for use in the field, high degree of protection: Analog I/O modules, IP67 – K60

Overview

K60 analog compact module

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 2.1 or specification 3.0.

The analog modules are divided into the following groups:

- Input modules
  - for sensors with current signal
  - for sensors with voltage signal
  - for sensors with thermal resistor
- Output modules
  - for current actuators
  - for 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 shorter by half than 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, the modules are presented in great detail along with their technical specifications and in-depth notes on operation. Sample function blocks round off the manual.

Benefits

- Analog modules are just as easy to integrate in AS-Interface as digital modules
- Analog values can be easily detected and issued locally
- Preprocessing of the analog value transmission 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 a switchover to single-channel operation

In addition, Specification 3.0 now also offers:

- A/B technology, now also with analog modules
- On average, double fast transmission times (only 3 or 4 cycles, depending on the resolution selected)
- Variable adjustable mode: 12 bit or 14 bit resolution, 1 or 2-channel, selectable over the ID1 code
- Extra simple handling of analog value processing with masters of Specification 3.0, the DP/AS-i LINK Advanced

I/O modules for use in the field, high degree of protection: Analog I/O modules, IP67 – K60

Selection and ordering data

3RK1207-1BQ44-0AA3

3RK2207-2BQ50-0AA3

Version			DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Analog I/O modules IP67 - K60, analog profile 7.3 • Slave type: Standard • 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]	A	**3RK1207-1BQ40-0AA3**		1	1 unit	42C
	Voltage	± 10 V or 1 ... 5 V (selectable)	A	**3RK1207-2BQ40-0AA3**		1	1 unit	42C
	Thermal resistance	Pt 100 or Ni 100 or 0 ... 600 Ω (selectable)[1]	A	**3RK1207-3BQ40-0AA3**		1	1 unit	42C
4 inputs	Current	4 ... 20 mA or ±20 mA (selectable)	A	**3RK1207-1BQ44-0AA3**		1	1 unit	42C
	Voltage	± 10 V or 1 ... 5 V (selectable)	C	**3RK1207-2BQ44-0AA3**		1	1 unit	42C
	Thermal resistance	Pt 100 or Ni 100 or 0 ... 600 Ω (selectable)	A	**3RK1207-3BQ44-0AA3**		1	1 unit	42C
Outputs	Type	Output range						
2 outputs	Current for 2-wire actuators	4 ... 20 mA or ± 20 mA or 0 ... 20 mA (selectable)[1]	A	**3RK1107-1BQ40-0AA3**		1	1 unit	42C
	Voltage for 2-wire actuators	± 10 V or 0 ... 10 V or 1 ... 5 V (selectable)	A	**3RK1107-2BQ40-0AA3**		1	1 unit	42C
Analog I/O modules IP67 - K60, analog profile 7.A.9 • Slave type: A/B (Spec. 3.0) • 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)	A	**3RK2207-1BQ50-0AA3**		1	1 unit	42C
	Voltage	± 10 V or 1 ... 5 V (selectable)	A	**3RK2207-2BQ50-0AA3**		1	1 unit	42C

[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 No.	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

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

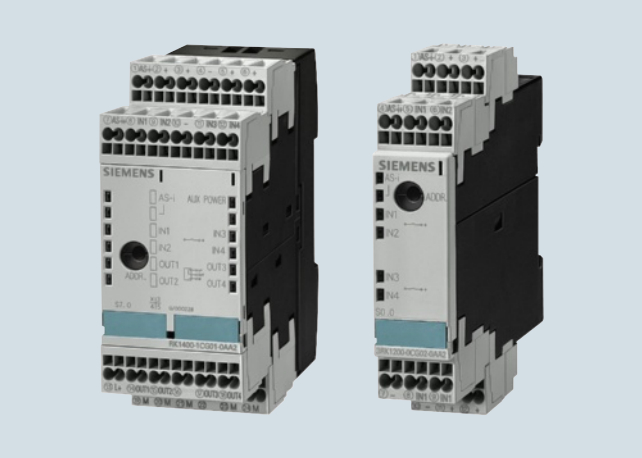
I/O modules for use in the field, high degree of protection: Analog I/O modules, IP67 – K60

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Accessories							
	Manual "AS-Interface Analog Modules K60" see http://support.automation.siemens.com/WW/view/en/6007797						
 3RK1901-0CA00	**K60 mounting plates** • Wall mounting • Standard rail mounting	 ► ►	 **3RK1901-0CA00** **3RK1901-0CB01**		 1 1	 1 unit 1 unit	 42C 42C
 3RK1901-1KA00	**M12 sealing caps**	►	**3RK1901-1KA00**		100	10 units	42C
 3RK1902-0AR00	**Sealing sets** • For mounting plate K60 and distributor • Cannot be used for K45 mounting plate • One set contains one straight and one shaped seal	A	**3RK1902-0AR00**		100	5 units	42D
 3RK1901-1AA00	**Jumper plugs** For changing over the 2-channel input modules	A	**3RK1901-1AA00**		1	1 unit	42C

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

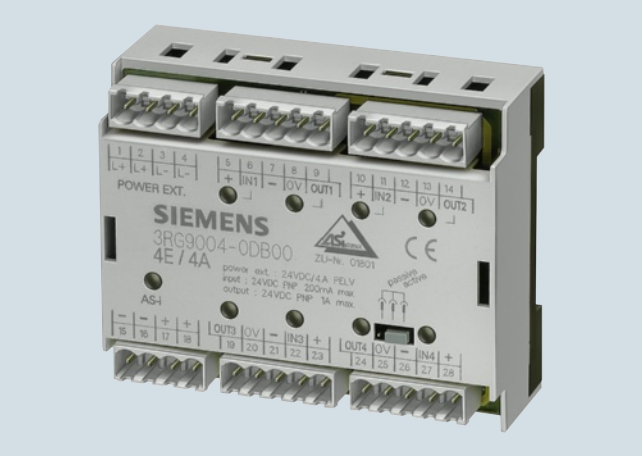
I/O modules for use in the control cabinet Introduction

Overview



SlimLine S22.5/S45

Flat module



F90 module

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

- SlimLine S22.5
- SlimLine S45
- F90 module
- Flat module

All modules of these series can be snap-mounted directly on a standard mounting rail or be fastened using screws.

AS-Interface modules in IP20 have direct terminals for the AS-Interface cables and therefore do not require a base.

Series	Spectrum	Mounting onto TH35 standard mounting rails according to IEC 60715	Wall mounting using push-in lugs (type 3RP1 903)	Other possibilities
SlimLine S22.5	• 4I (standard and A/B modules) • 4O • 2I/2O (steady-state/relay outputs) • Counters[1)] • Ground-fault detection modules[1)]	✓	✓	--
SlimLine S45	• 4I/4O (steady-state/relay outputs) • 4I/4O with floating I/Os • 4I/3O (A/B modules) • 4I/4O (A/B modules Spec. 3.0)	✓	✓	--
F90 module	• 4I/4O (screw terminals) • 4I/4O (connection using Combicon connector) • 16I	✓	--	--
Flat module	• 4I/4O (screw terminals)	--	--	Integrated lugs for screw fixing

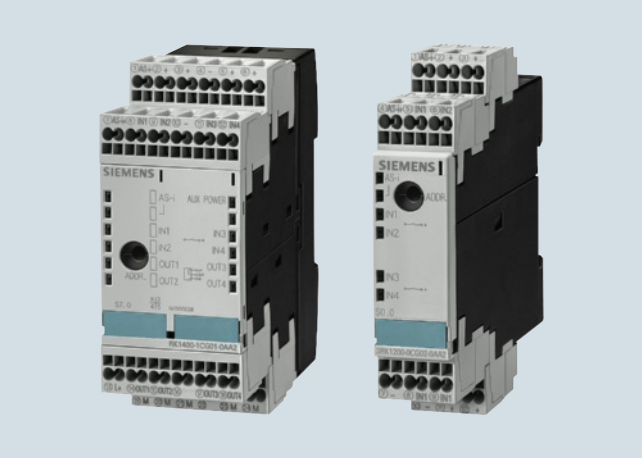
✓Available

-- Not available

[1)] For more information about these modules
see "Modules with Special Functions" from page 2/67.

Overview

SlimLine modules of the S22.5 and S45 series



SlimLine S45 module (left) and S22.5 module (right)

The AS-Interface series of modules for the "SlimLine" control cabinet with degree of protection IP20 creates space in the cabinet and in distributed local boxes.

For these modules, the priority was placed on a narrow design. They have a width of only 22.5 mm or 45 mm.

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

Integrated adapters enable mounting onto a standard mounting rail. Disassembly from the standard mounting rail is quick and easy and requires no tools.

With an additional accessory (push-in lugs), the modules can also be screwed on.

All modules are fitted at the front with LEDs which indicate the module's status.

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

In addition to the digital input/output modules, there are modules of design S22.5 with special functions. These include:

- Counter modules
- Ground-fault detection modules

For more information about these modules see

- the section "Modules with special functions" on page 2/67
- Industry Mall: Section "Automation"
→ "SIRIUS Industrial Controls"
→ "Industrial Communication"
→ "AS-Interface" → "Slaves"
→ "Modules with Special Functions"

The AS-Interface Specification 3.0 adds a number of completely new features to the AS-Interface bus system. The extended address mode (A/B addresses) enables the connection of up to 62 slaves on one AS-Interface network. With the extended address mode according to Specification 3.0, four outputs are now possible for the first time even with A/B slaves (instead of only three outputs possible up to now with Specification 2.1). Hence with full expansion of an AS-Interface network, there are now 248 inputs as well as 248 outputs available on one AS-Interface network.

Modules with four inputs and four outputs as A/B slaves according to Specification 3.0 are also available for the control cabinet as SlimLine S45 modules.

Note:

Please note that the modules according to Specification 3.0 can be used only with a new master according to AS-Interface Specification 3.0, and that the cycle times for the outputs must not exceed 20 ms.

I/O modules for use in the control cabinet SlimLine

Selection and ordering data

3RK1200-0CE00-0AA2

3RK1400-0BG00-0AA2

3RK1400-1CG00-0AA2

Version					DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
SlimLine S22.5 modules • Inputs: PNP transistor • Width 22.5 mm										
Type	Connection	Slave type	Inputs	Outputs						
4 inputs	Screw	Standard	2-wire	--	►	**3RK1200-0CE00-0AA2**		1	1 unit	42C
		Standard	2- and 3-wire	--	►	**3RK1200-0CE02-0AA2**		1	1 unit	42C
		A/B slave	2- and 3-wire	--	►	**3RK2200-0CE02-0AA2**		1	1 unit	42C
	Spring-type	Standard	2-wire	--	A	**3RK1200-0CG00-0AA2**		1	1 unit	42C
		Standard	2- and 3-wire	--	A	**3RK1200-0CG02-0AA2**		1	1 unit	42C
		A/B slave	2- and 3-wire	--	A	**3RK2200-0CG02-0AA2**		1	1 unit	42C
2 inputs/ 2 outputs	Screw	Standard	2-wire	PNP transistor 2 A	►	**3RK1400-0BE00-0AA2**		1	1 unit	42C
		Standard	2-wire	Relays	►	**3RK1402-0BE00-0AA2**		1	1 unit	42C
	Spring-type	Standard	2-wire	PNP transistor 2 A	B	**3RK1400-0BG00-0AA2**		1	1 unit	42C
		Standard	2-wire	Relays	B	**3RK1402-0BG00-0AA2**		1	1 unit	42C
4 outputs	Screw	Standard	--	PNP transistor 1 A	►	**3RK1100-1CE00-0AA2**		1	1 unit	42C
	Spring-type	Standard	--	PNP transistor 1 A	A	**3RK1100-1CG00-0AA2**		1	1 unit	42C
SlimLine S45 modules • Inputs: PNP transistor • Width 45 mm										
Type	Connection	Slave type	Inputs	Outputs						
4 inputs/ 4 outputs	Screw	Standard	2- and 3-wire	PNP transistor 1 A	►	**3RK1400-1CE00-0AA2**		1	1 unit	42C
		Standard	2- and 3-wire	PNP transistor 2 A	►	**3RK1400-1CE01-0AA2**		1	1 unit	42C
		Standard	2- and 3-wire floating	PNP transistor 1 A floating	►	**3RK1402-3CE01-0AA2**		1	1 unit	42C
		Standard	2- and 3-wire	Relays	►	**3RK1402-3CE00-0AA2**		1	1 unit	42C
		A/B (Spec. 3.0)	2- and 3-wire	PNP transistor 2 A	A	**3RK2400-1CE01-0AA2**		1	1 unit	42C
	Spring-type	Standard	2- and 3-wire	PNP transistor 1 A	A	**3RK1400-1CG00-0AA2**		1	1 unit	42C
		Standard	2- and 3-wire	PNP transistor 2 A	B	**3RK1400-1CG01-0AA2**		1	1 unit	42C
		Standard	2- and 3-wire floating	PNP transistor 1 A floating	A	**3RK1402-3CG01-0AA2**		1	1 unit	42C
		Standard	2- and 3-wire	Relays	A	**3RK1402-3CG00-0AA2**		1	1 unit	42C
		A/B (Spec. 3.0)	2- and 3-wire	PNP transistor 2 A	B	**3RK2400-1CG01-0AA2**		1	1 unit	42C
4 inputs/ 3 outputs	Screw	A/B slave	2- and 3-wire	PNP transistor 2 A	►	**3RK2400-1FE00-0AA2**		1	1 unit	42C
	Spring-type	A/B slave	2- and 3-wire	PNP transistor 2 A	A	**3RK2400-1FG00-0AA2**		1	1 unit	42C
Accessories										
Sealable covers To secure against unauthorized addressing					B	**3RP1902**		1	5 units	41H
Push-in lugs For screw fixing					B	**3RP1903**		1	10 units	41H

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

Selection and ordering data

3RG9002-0DB00

F90 modules
- Standard slave
- Width 90 mm
- With Combicon version: Delivery without Combicon connector

Version				DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Type	Connection	Inputs	Outputs						
4 inputs/ 4 outputs	Screw	2- and 3-wire PNP transistor	PNP transistor 1 A	B	**3RG9002-0DB00**		1	1 unit	42C
		2- and 3-wire PNP transistor	PNP transistor 2 A	B	**3RG9002-0DA00**		1	1 unit	42C
		2- and 3-wire PNP transistor floating	PNP transistor 2 A	B	**3RG9002-0DC00**		1	1 unit	42C
	Combicon	2- and 3-wire PNP transistor	PNP transistor 1 A	B	**3RG9004-0DB00**		1	1 unit	42C
		2- and 3-wire PNP transistor	PNP transistor 2 A	B	**3RG9004-0DA00**		1	1 unit	42C
		2- and 3-wire PNP transistor floating	PNP transistor 2 A	B	**3RG9004-0DC00**		1	1 unit	42C
16 inputs	Screw	PNP transistor	--	B	**3RG9002-0DE00**		1	1 unit	42C
	Combicon	PNP transistor	--	B	**3RG9004-0DE00**		1	1 unit	42C

Accessories

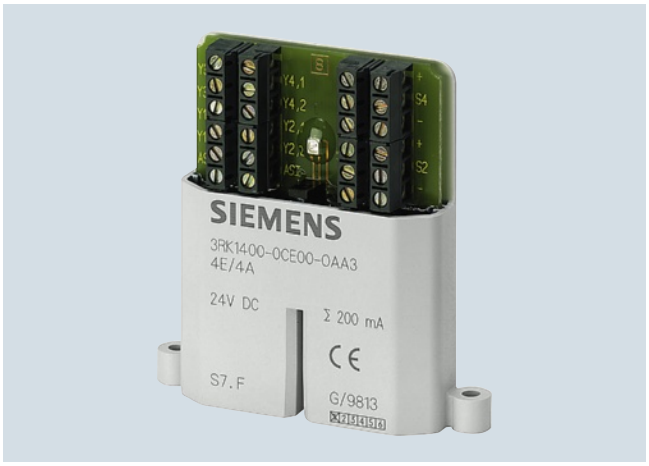
Combicon connector sets B **3RX9810-0AA00** 1 1 unit 42C

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

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

I/O modules for use in the control cabinet
Flat module

Overview



Flat module

The flat module for the control cabinet in degree of protection IP20 has 4 inputs and 4 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.

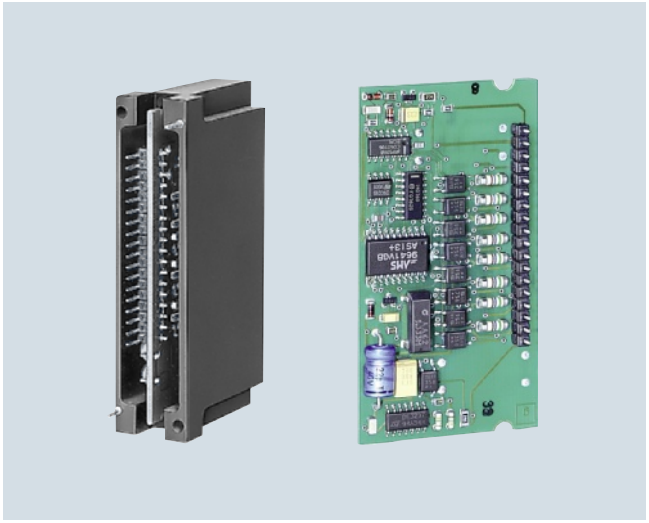
Selection and ordering data

	Version	DT	Screw terminals	PU (UNIT, SET, M)	PS*	PG
			Article No. Price per PU			
 3RK1400-0CE00-0AA3	**Flat modules** • 4 inputs/4 outputs • 200 mA for all I/Os	A	**3RK1400-0CE00-0AA3**	1	1 unit	42C

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

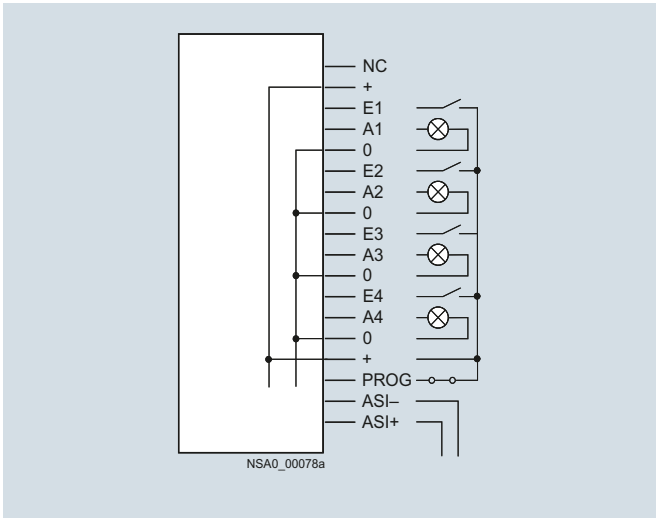
Overview

AS-Interface communication modules for printed circuit board installation



AS-Interface communication module 3RK1400-0CD00-0AA3 (left),
AS-Interface communication module 3RK2400-1FD00-0AA2 (right)

3RK1400-0CD00-0AA3 AS-Interface communication modules for printed circuit board installation



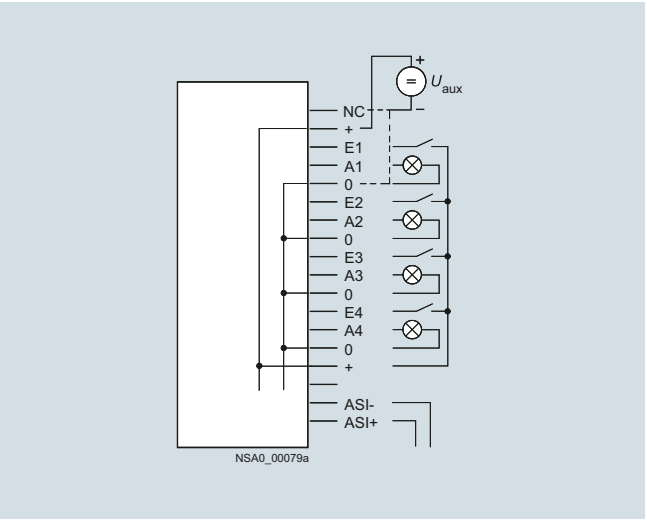
3RK1400-0CD00-0AA3

With the 4I/4O module for printed circuit board mounting, it is possible for up to four mechanical contacts to be queried or indicator lights to be operated, the necessary energy being provided by the AS-Interface system (yellow AS-Interface cable).

Note:

If the switching outputs are overloaded, the module does not respond to invoking by a master.

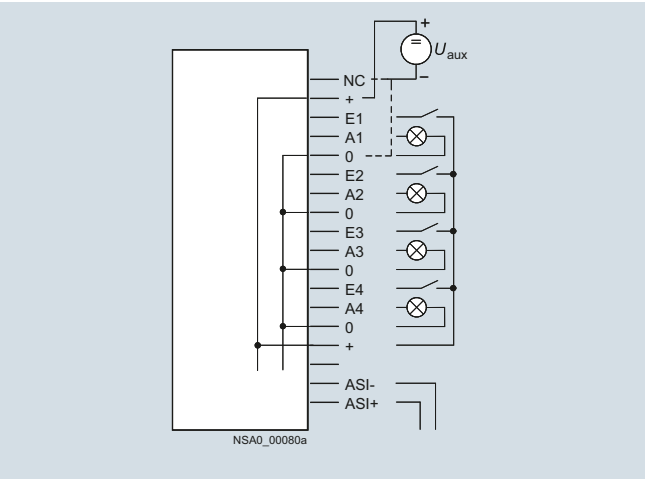
3RK1400-0CD01-0AA3 AS-Interface communication modules for printed circuit board installation



3RK1400-0CD01-0AA3

With the 4I/4O module 3RK1400-0CD01-0AA3 for printed circuit board mounting, it is possible for up to four mechanical contacts to be queried or indicator lights to be operated, the necessary energy for the inputs and outputs being provided from the auxiliary voltage (24 V PELV). If (+) is connected to U_{aux} + and (NC) to U_{aux} - , the outputs are not short-circuit and overload proof; if U_{aux} - is connected to (0), the outputs are overload and short-circuit proof (maximum summation current 200 mA). In this case, the module does not respond even to invoking by a master when the switching outputs are overloaded.

3RG9 005-0SA00 AS-Interface communication modules for printed circuit board installation



3RG9005-0SA00

With the 4I/4O module for printed circuit board mounting, it is possible for up to four mechanical contacts to be queried or indicator lights to be operated, the power for inputs and outputs being provided from an auxiliary voltage (24 V PELV). If (+) is connected to U_{aux}+ and (NC) to U_{aux}- , the outputs are not short-circuit and overload proof; if U_{aux}- is connected to (0), the outputs are overload and short-circuit proof (maximum summation current 200 mA). In this case, the module does not respond even to invoking by a master when the switching outputs are overloaded.

Special integrated solutions
AS-Interface communication modules

3RK1400-1CD00-0AA2, 3RK2400-1FD00-0AA2 AS-Interface communication modules for printed circuit board installation

Connection	Connection pad
AS-i +	27, 29
AS-i -	28, 30
Sensor+	17, 18, 23, 24
Sensor-	13, 14, 19, 20
IN1	21
IN2	22
IN3	15
IN4	16
U_{aux} + (L24+)	2, 4
U_{aux} - (M24)	1, 3
OUT1	9
OUT2	10
OUT3	5
OUT4	6 (not assigned for 3RK2400-1FD00-0AA2 4I/3O module)
OUT-	7, 8
Not assigned	11, 12, 25, 26

With the 4I/4O or 4I/3O module for printed circuit board mounting, it is possible for up to four mechanical contacts or 3-conductor sensors according to IEC 947-5-2 to be connected. Up to four indicator lights via the 4I/4O module or up to three indicator lights via the 4I/3O module can also be controlled. The power for short-circuit proof solid-state switching outputs is provided from an auxiliary voltage (24 V PELV).

Mounting is very easy using a "Card Edge Board-to-Board Connector". This connector can be ordered for vertical and horizontal mounting from the company AMP, for example:

- 180° version for vertical mounting (AMP): Type 530843-2
- 90° version for horizontal mounting (AMP): Type 650118-1

If the inputs are loaded with more than 200 mA, the module does not respond to invoking by a master.

3RK1200-0CD00-0AA2 AS-Interface communication modules for printed circuit board installation

Connection	Connection pad
AS-i +	27, 29
AS-i -	28, 30
Sensor+	17, 18, 23, 24
Sensor-	13, 14, 19, 20
IN1	21
IN2	22
IN3	15
IN4	16
Not assigned	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 25, 26

With the 4I module for printed circuit board mounting, it is possible for up to four mechanical contacts or 3-conductor sensors to be connected, the power for inputs being provided from the AS-Interface cable.

Mounting is very easy using a "Card Edge Board-to-Board Connector". This connector can be ordered for vertical and horizontal mounting from the company AMP, for example:

- 180° version for vertical mounting (AMP): Type 530843-2
- 90° version for horizontal mounting (AMP): Type 650118-1

If the inputs are loaded with more than 200 mA, the module does not respond to invoking by a master.

Selection and ordering data

3RK1400-0CD00-0AA3

3RG9005-0SA00

Version	Slave type	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
4 inputs / 4 outputs							
• Supply of I/Os using AS-Interface cable (max. 200 mA) - Printed circuit board with solder pins, protected by enclosure	Standard	X	**3RK1400-0CD00-0AA3**		1	1 unit	42C
• Supply of I/Os using external auxiliary voltage (24 V PELV) - Printed circuit board with solder pins, protected by enclosure	Standard	D	**3RK1400-0CD01-0AA3**		1	1 unit	42C
- Printed circuit board with solder pins for horizontal mounting	Standard	D	**3RG9005-0SA00**		1	1 unit	42C
• Supply of outputs using external auxiliary voltage (24 V PELV) - Printed circuit board with gold-plated direct connector for 30-pole male connector socket for simple installation with direct connector	Standard	A	**3RK1400-1CD00-0AA2**		1	5 units	42C
4 inputs / 3 outputs • Supply of outputs using external auxiliary voltage (24 V PELV) - Printed circuit board with gold-plated direct connector for 30-pole male connector socket for simple installation with direct connector	A/B	B	**3RK2400-1FD00-0AA2**		1	5 units	42C
4 inputs • Printed circuit board with gold-plated direct connector for 30-pole male connector socket for simple installation with direct connector	Standard	C	**3RK1200-0CD00-0AA2**		1	1 unit	42C

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

Overview

Counter module with spring-type terminals

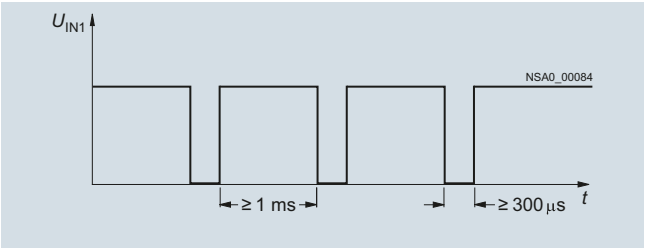
The counter module is used to send hexadecimally coded count values (LSB=D0, MSB=D3) to a higher-level controller.
The count value is increased by one for each valid count pulse at terminal 8. Beginning at 0, the module counts up to 15 and then begins again at 0. The controller adopts the current value 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).



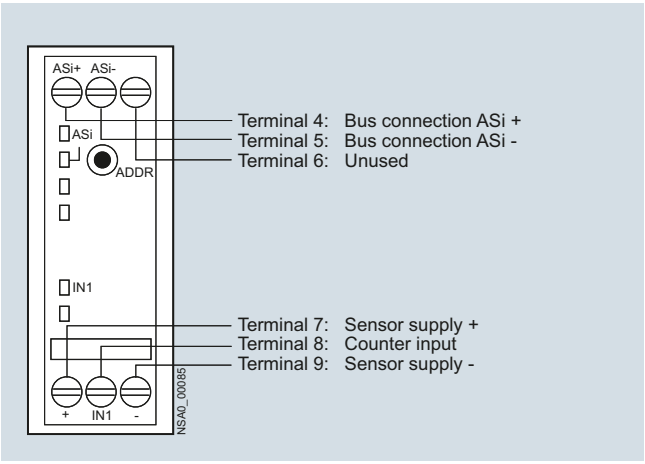
Maximum frequency for the counter module

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

3RK1200-0CE03-0AA2

3RK1200-0CG03-0AA2

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

Modules with special functions
Ground-fault detection modules

Overview

Ground-fault detection module

"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 "+"
- Ground fault from AS-i "-"
- Ground fault from sensors and actuators which are supplied from the AS-Interface voltage.

Note:

Not suitable for AS-Interface Power24V.

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Ground-fault detection modules						
Width 22.5 mm						
• With screw terminals		**3RK1408-8KE00-0AA2**		1	1 unit	42C
• With spring-type terminals		**3RK1408-8KG00-0AA2**		1	1 unit	42C

3RK1408-8KE00-0AA2

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

Overview

AS-Interface overvoltage protection module

The AS-Interface overvoltage protection module (protection module) protects downstream AS-Interface devices or individual sections in AS-i networks from conducted overvoltages which can be caused by switching operations and remote lightning strikes. The location of the protection module forms within the lightning protection zone concept the transition from zone 1 to 2/3. 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 without AS-i IC 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.

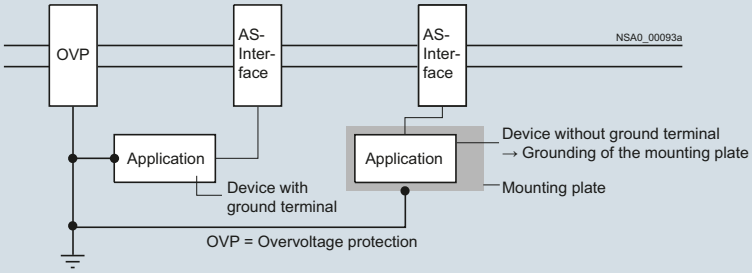
Rated discharge current I_{sn}

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 waveform 8/20, 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.

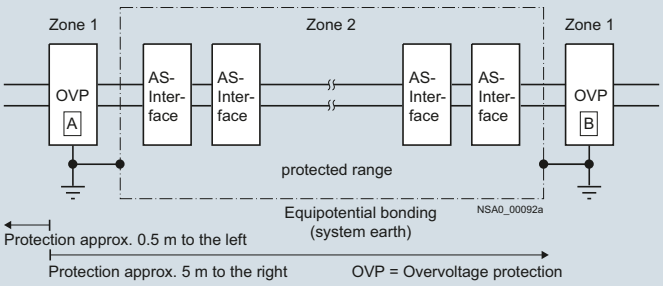
Configuration guidelines



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	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	**AS-Interface overvoltage protection module**	B	**3RK1901-1GA01**		1	1 unit	42C

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

AS-Interface connections for LOGO!

Overview

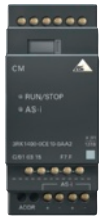
Every LOGO! can now be connected to the AS-Interface system

AS-Interface connection for LOGO!

Using the AS-Interface connection for LOGO!, an intelligent slave can be integrated in the AS-Interface system. With the modular interface, it becomes possible to integrate the different basic units in the system according to their functionality. Similarly, functionalities can be quickly and easily adapted to new requirements by exchanging the basic unit.

The interface module provides four inputs and four outputs on the system. These inputs and outputs do not actually exist in hardware terms, however, but are only virtually present through the interface on the bus.

Selection and ordering data

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1400-0CE10-0AA2	**AS-Interface connections for LOGO!** • 4 virtual inputs • 4 virtual outputs	A	**3RK1400-0CE10-0AA2**		1	1 unit	42C

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

Overview

AS-Interface power supply unit for 3 A

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 control 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 overloads 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-type connections: 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 saves 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 NEC Class 2 circuits

Selection and ordering data

3RX9501-0BA00

3RX9503-0BA00

Version		DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
AS-Interface power supply units, IP20 • AS-i single output 30 V DC • With integrated ground-fault detection • With the 2.6 A version, the output power is restricted to max. 100 W (for use in NEC Class 2 circuits) • Dimensions: Width: 50 mm (3 A/2.6 A); 70 mm (5 A), 120 mm (8 A); Height: 125 mm; Depth: 125 mm							
Output current	Input voltage		**Spring-type terminals**				
2.6 A/max. 100 W	120/230 V AC (selectable)	►	**3RX9501-2BA00**		1	1 unit	42C
3 A	120/230 V AC (selectable)	►	**3RX9501-0BA00**		1	1 unit	42C
3 A	24 V DC	►	**3RX9501-1BA00**		1	1 unit	42C
5 A	120/230 V AC (selectable)	►	**3RX9502-0BA00**		1	1 unit	42C
8 A	120/230 ... 500 V AC (selectable)	►	**3RX9503-0BA00**		1	1 unit	42C

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

30 V power supply units

Overview

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

The PSN130S 30 V power supply units feed 30 V DC into the AS-Interface cable and supply the AS-Interface components, but do not include data decoupling. Data decoupling modules are needed in addition therefore to separate communication signals and control supply voltage, see page 2/74 and 2/76.

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

Dimensions

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

Features

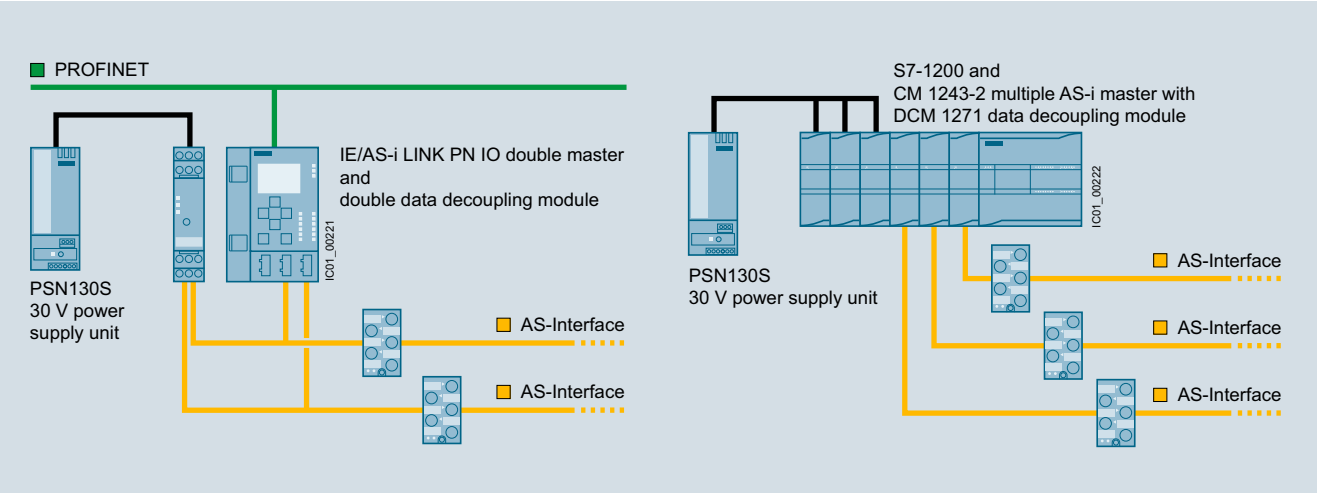
- Primary clocked power supply units for connection to a single-phase AC network
- Power for currents of 3, 4 and 8 A
- The output voltage is floating, and resistant to short-circuits and no-load operation. In the event of an overload, the output voltage will be reduced or switched off. After a short-circuit or overload the devices will 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, each 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 IE/ASi LINK PN IO double master
Right: Triple network based on the SIMATIC S7-1200 with DCM 1271 data decoupling modules and CM 1243-2 communication processors

Technical specifications

Version		3 A	4 A	8 A
Input data				
• Input voltage, rated value U_e	V AC	120 / 230 V, single-phase, automatic selection		
• Input voltage range	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_{ss}	< 150		
• Output current, rated value at -20 °C ... +60 °C	A	3	4	8
• Max. output current at +60 °C ... +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 limit, typ.	A	4	5.5	11
Safety				
• Electrical separation primary / secondary		Output voltage PELV / SELV according to EN 60950 and EN 50178		
• Safety class		I		
• Degree of protection		IP20		

Version		3 A	4 A	8 A
Approvals				
• UL		UL 508 / CSA 22.2		
• Pollution degree		EN 60950		
• Overvoltage category and electrical separation		EN 50178 and IEC 61558		
EMC				
• Emitted interference (class B)		EN 61000-6-3		
• Line harmonics limit		EN 61000-3-2		
• Interference immunity		EN 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		DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	PSN130S 30 V DC power supply units (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		**Screw terminals** ⊕				
 3RX9511-0AA00	3 A	120 / 230 V AC (automatic selection)	►	**3RX9511-0AA00**		1	1 unit	42C
 3RX9512-0AA00	4 A	120 / 230 V AC (automatic selection)	►	**3RX9512-0AA00**		1	1 unit	42C
 3RX9513-0AA00	8 A	120 / 230 V AC (automatic selection)	►	**3RX9513-0AA00**		1	1 unit	42C

More information

Operating instructions and more technical information see
http://support.automation.siemens.com/WW/view/en/64364000

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

S22.5 data decoupling modules

Overview

AS-Interface S22.5 double data decoupling modules
Left: screw terminal version, right: spring-type terminal version

With the aid of the S22.5 data decoupling module, the AS-Interface network can also be supplied with 24 V DC or 30 V DC from a standard power supply unit and the transmission of data and power can be realized along one cable.
The combination of data decoupling modules and standard power supply units is therefore a cost-efficient alternative to the service-proven AS-Interface power supply units.
The quality of the data signals and the reliable operation of the AS-i network are not negatively affected as the result.

Features of the S22.5 data decoupling module

- Degree of protection IP20
- Narrow design: 22.5 mm wide
- Version with screw or spring-type 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
- 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.

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 supply or 24 V supply (AS-iPower24V).

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 connection of SIRIUS Innovations contactors and compact starters (3RT2 contactors through 3RA27 function modules or 3RA6 compact starters through 3RA69 AS-i add-on 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 supply units, see Chapter 15 "Products for Specific Requirements" ➞ "Stabilized Power Supplies"or PSN130S 30 V power supplies, see page 2/72.

Note on AS-i Power24V:

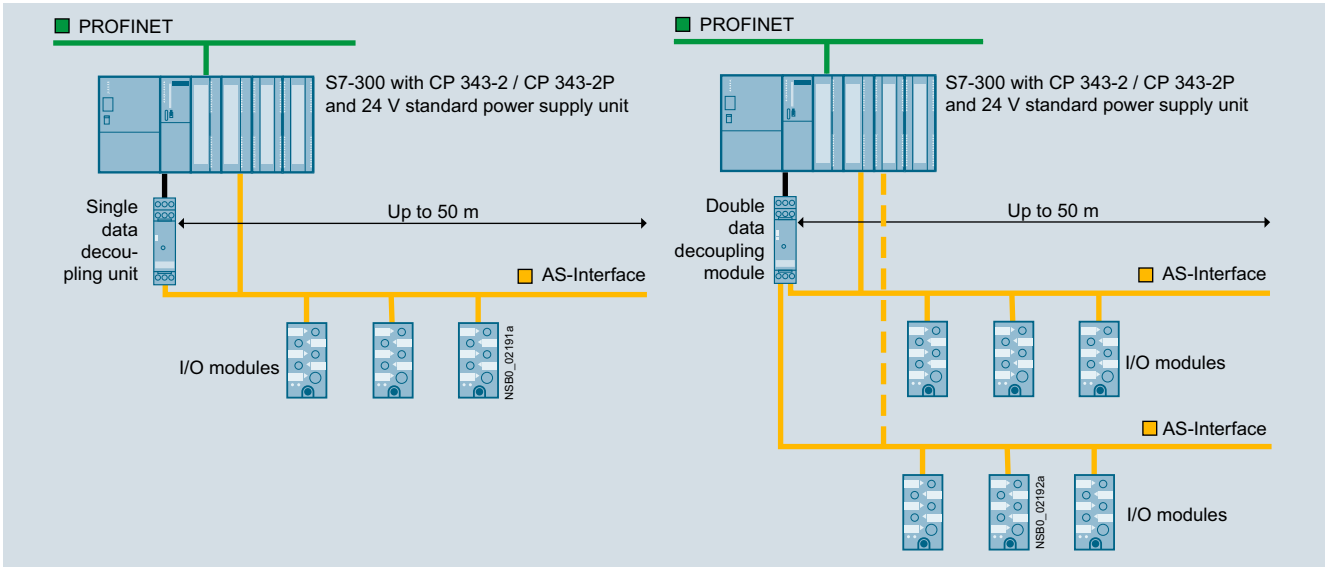
The length of an AS-i Power24V network is restricted to 50 m in order to limit the voltage drop along the cable.

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 continue to observe the requirements specified in the section "Extension of AS-i Power24V" for implementation of AS-i Power24V, see page 2/17.

For more information on AS-i Power24V,
see "AS-Interface System Manual"
http://support.automation.siemens.com/WW/view/en/47052644

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

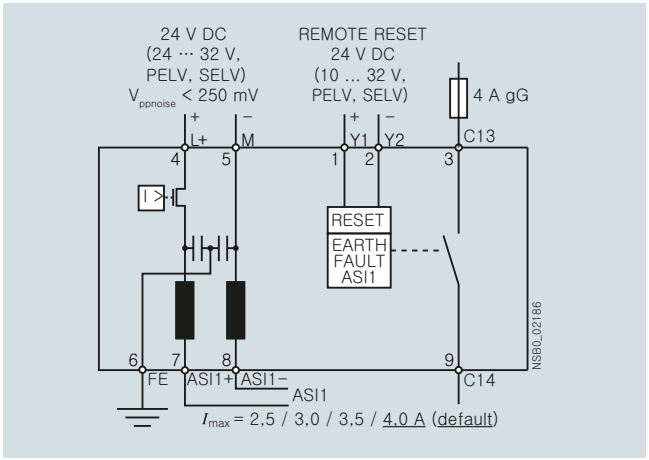


Construction of an AS-i Power24V network with an AS-Interface S22.5 data decoupling module: Left: single network, Right: multiple network

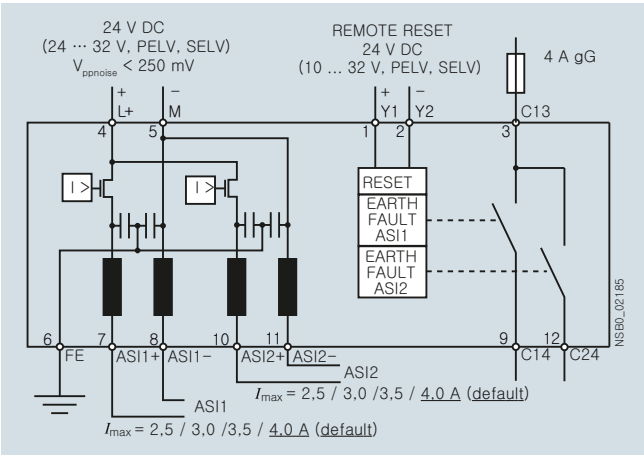
Selection and ordering data

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

Circuit diagrams



Single data decoupling module



Double data decoupling module

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

Data decoupling modules for S7-1200
DCM 1271 data decoupling module

Overview

DCM 1271 data decoupling module for SIMATIC S7-1200

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.

Features of the DCM 1271 data decoupling module

- Design: S7-1200, 30 mm wide, degree of protection IP 20
- 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 (behind 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 supply or 24 V supply (AS-Interface 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 connection of SIRIUS Innovations contactors and compact starters (3RT2 contactors through 3RA27 function modules or 3RA6 compact starters through 3RA69 AS-i add-on 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 supply units, see Chapter 15 "Products for Specific Requirements" → "Stabilized Power Supplies"or PSN130S 30 V power supplies, see page 2/72.

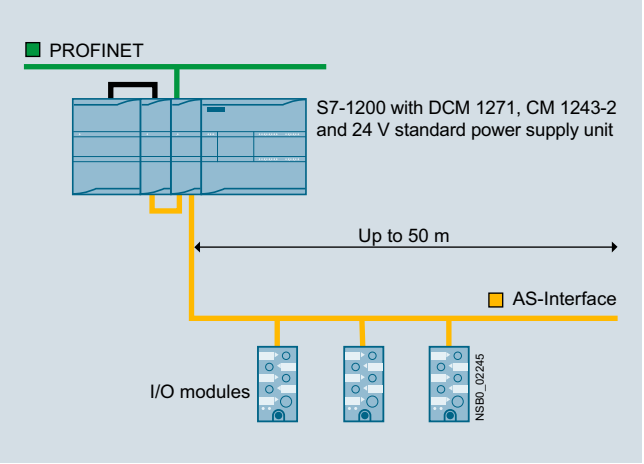
Note on AS-i Power24V:

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 continue to observe the requirements specified in the section "Extension of AS-i Power24V" for implementation of AS-i Power24V, see page 2/17.

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



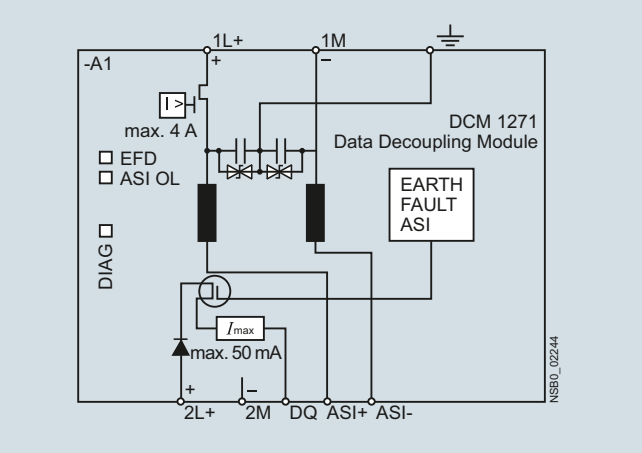
Selection and ordering data

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK7271-1AA30-0AA0	**DCM 1271 data decoupling modules** • With screw terminals, removable terminals (included in the scope of supply) • Dimensions (W × H × D / mm): 30 × 100 × 75	A	**3RK7271-1AA30-0AA0**		1	1 unit	42C

Accessories

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	5-pole screw terminals for AS-i master CM 1243-2 and AS-i DCM 1271 data decoupling module						
	• With screw terminals		**3RK1901-3MA00**		1	1 unit	42C
	3-pole screw terminal for AS-i DCM 1271 data decoupling module for connecting the power supply unit						
	• With screw terminals		**3RK1901-3MB00**		1	1 unit	42C

Circuit diagrams



DCM 1271 single data decoupling module

More information

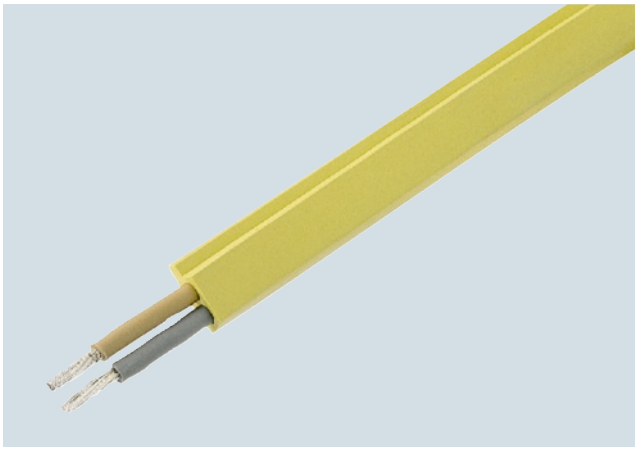
The manuals are available free of charge on the Internet, see http://support.automation.siemens.com/WW/view/en/50414115/133300

For more information on AS-i Power24V, see "AS-Interface System Manual", http://support.automation.siemens.com/WW/view/en/47052644

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

AS-Interface shaped cables

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

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

Overview

AS-Interface repeater

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

- In its basic version, an AS-i network comprises one segment with a maximum cable length of 100 m. An extension plug (see next page) 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

Design of an AS-Interface network with repeaters

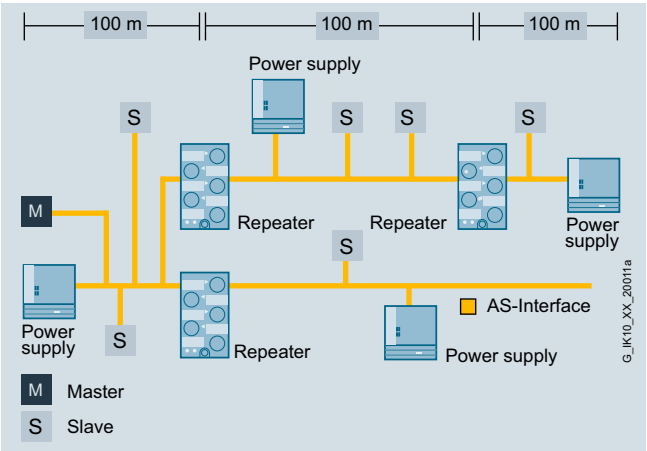
- Parallel switching of several repeaters possible (star configuration)
- Combination of series and parallel switching possible

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) and ASIsafe input slave or safe output module.
- When used with an extension plug, no more than one repeater is permitted between evaluation unit (e.g. MSS ASIsafe Modular Safety System) 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).

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

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 AS-Interface network can be extended by 600 m overall, see example design with extension plug on the next page.

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Repeaters for AS-Interface For cable extension, including mounting plate	B	**6GK1210-0SA01**		1	1 unit	42C

6GK1 210-0SA01

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

Extension plugs

Overview

AS-Interface extension plug:
left: extension plug compact, right: extension plug plus

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.

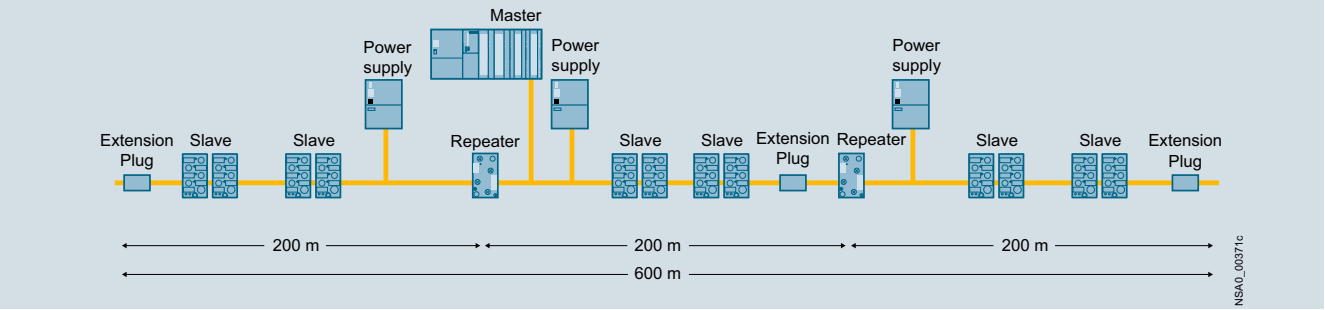
The extension plug is available in the following versions:
- Compact extension plug: Passive component that can be connected directly onto the AS-Interface shaped cable
- Extension plug plus: The Extension plug plus has an integrated A/B slave that enables any undervoltage supply to be signaled to the AS-Interface master. It has an M12 plug and can be connected to the AS-Interface M12 feeder with degree of protection IP67.

Design of an AS-Interface segment with an extension plug

With 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 approx. ± 10 m at that point of the network which 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:

With the compact extension plug and the M12 feeder 3RK1901-1NR10 (4 A), the AS-Interface shaped cable has to be terminated using the cable terminating piece, see "miscellaneous accessories".
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	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-1MX02	**AS-Interface extension plugs compact** • Doubling of the cable length to 200 m per AS-Interface segment • With direct connection to AS-Interface shaped cable	►	**3RK1901-1MX02**		1	1 unit	42C
 3RK1901-1MX01	**AS-Interface extension plugs plus** • Doubling of the cable length to 200 m per AS-Interface segment • Mounting on AS-Interface M12 feeders (to be ordered separately) • Undervoltage monitoring signal through integrated AS-Interface slave to AS-Interface master	►	**3RK1901-1MX01**		1	1 unit	42C
Accessories							
 3RX9801-0AA00	**AS-Interface M12 feeders** • Transition of shaped AS-Interface cable to a standard round cable • Current carrying capacity up to 2 A • Degree of protection IP67	►	**3RX9801-0AA00**		1	1 unit	42C
 3RK1901-1NR10	**AS-Interface M12 feeders** • Transition of AS-Interface cable without U_{aux}, with M12 socket • Max. 4 A • Degree of protection IP67/IP68/IP69K	A	**3RK1901-1NR10**		1	1 unit	42C

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

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. Via the Up/Down keys each address can be individually set. 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 (operational voltage on the AS-Interface cable min. 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 current can be addressed without external supply
- Longer operating time per battery pack
- Can be used with all types of digital and analog slaves
- Comprehensive and fast input/output test of plants, even for A/B modules with 4 DI / 4 DO 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
- Universal applicability for all AS-i networks

Addressing units

Technical specifications

		3RK1904-2AB02 AS-Interface addressing unit
Parameters		
Measuring range		
• Voltage	V	2 ... 35
• Current (for slaves)	A	0 ... 0.150
Measuring accuracy in % of the measured value		
• Voltage	%	± 3.5 + 2 digits
• Current (for slaves)	%	± 5 + 2 digits
Input resistance for voltage measurement	kΩ	300
Power supply		
Standard power supply		4 batteries 1.5 V type AA, IEC LR6 (NEDA15) or corresponding batteries (preferably NiMH)
Recommendation for current-intensive application		4 high-grade alkaline manganese batteries 1.5 V type AA
Automatic disconnection for a longer battery life		Approx. 5 minutes (or approx. 1 minute when data exchange is active) after last operation
Ambient conditions		
Ambient temperature	°C	0 ... +50
Storage temperature	°C	-20 ... +75 without batteries
Relative air humidity, max.	%	75, condensation not permitted
Altitude above sea level, max.	m	2000
Location		Only indoors
Mechanical design		
Degree of protection		IP40
Dimensions, W x H x D	mm	84 x 195 x 35
Connection		M12 socket: Pin 1: ASI+; Pin 3: ASI–; Pin 2, 4, 5: Not used
Weight with batteries	kg	0.450

Selection and ordering data

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1904-2AB02	**AS-Interface addressing unit V 3.0** • 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 standard slaves, and slaves with extended addressing mode (A/B slaves) • With input/output test function and many other commissioning functions • Battery operation with 4 batteries type AA (IEC LR6, NEDA 15) • Scope of supply: - Addressing unit with 4 batteries - Addressing cable, with M12 plug to addressing plug (hollow plug), length 1.5m	►	**3RK1904-2AB02**		1	1 unit	42C
Accessories							
 3RK1902-4PB15-3AA0	**Addressing cable, with M12 plug to M12 socket**[2] • 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 mm²	C	**3RK1902-4PB15-3AA0**		1	1 unit	42D
 3RX9801-0AA00	**AS-Interface M12 feeders** • 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	42C
 3RK1901-1NR10	**AS-Interface M12 feeders** • Transition of AS-Interface cable without U_{aux}, with M12 socket • Insulation piercing method for connection of AS-Interface cable • M12 socket for connection of standard round cable	A	**3RK1901-1NR10**		1	1 unit	42C
 3RK 1902-4HB50-5AA0	**M12 cable plug**[3] • Extruded M12 plug (angled cable feeder 90°), other cable end open • Length: 5 m, 5-pole, color: Black	C	**3RK1902-4HB50-5AA0**		1	1 unit	42D
 3RK1902-4BA00-5AA0	**M12 plug straight**[3] • For screw fixing, 5-pole screw terminal, max. 0.75 mm², • A-coded, max. 4 A	C	**3RK1902-4BA00-5AA0**		1	1 unit	42D
	Addressing cable, with M12 plug to addressing plug (hollow plug)[1] • Included in the scope of supply of the addressing unit • Length 1.5 m		**Z236A**				

[1] Can be ordered only via GMC-I Messtechnik GmbH, see Chapter 16 "Appendix" → "External partners"

[2] Not included in scope of supply of the 3RK1904-2AB02 addressing unit.

[3] 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.

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

Overview

AS-Interface analyzer

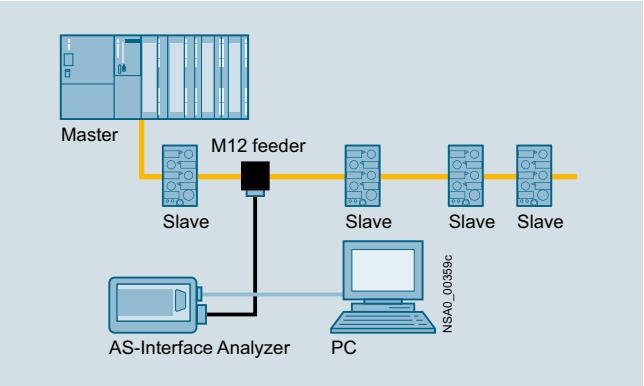
The AS-Interface analyzer is used to test AS-Interface networks.

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.

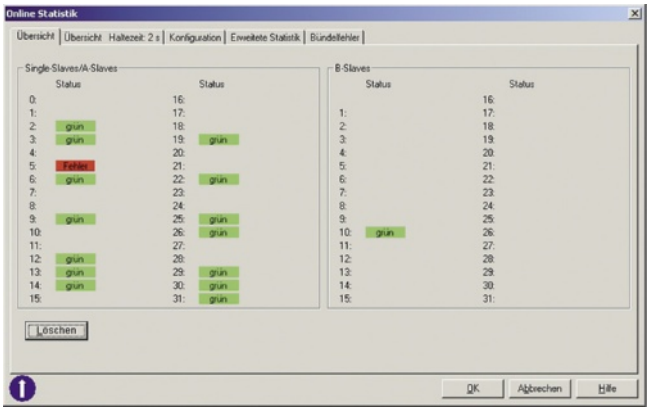
The data thus obtained are transferred through an RS 232 interface to a PC such as a notebook, for evaluation with the supplied diagnostics software.

Benefits

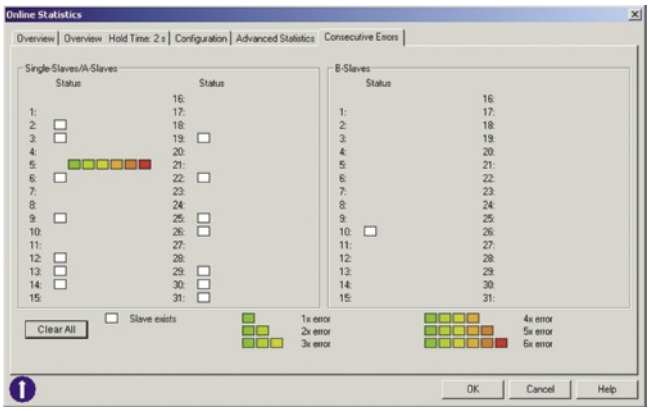
- Simple and user-friendly operation enables diagnostics of AS-Interface networks without help from specialists
- Speedy troubleshooting thanks to intuitive display in statistics mode
- Test logs provide verification of the state and quality of the installation for service and approval
- Recorded logs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

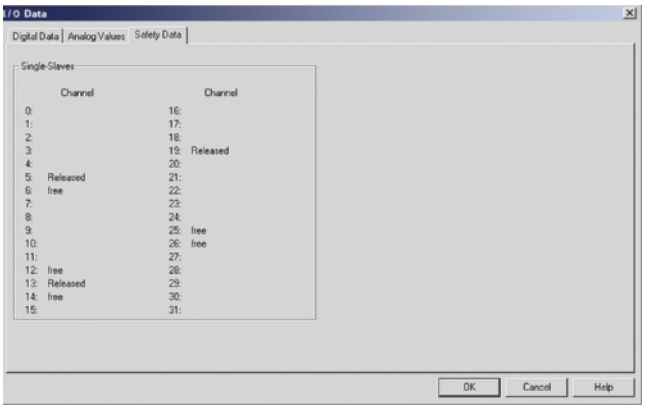
The bus configuration and the currently transmitted data of the slaves are shown in a well arranged presentation.

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

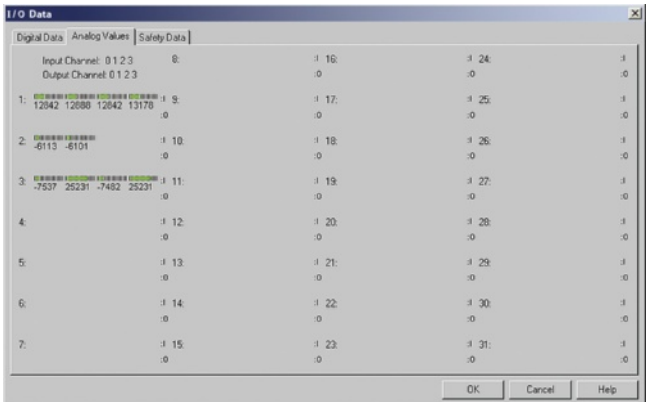
The bundle error overview shows in steps how many multiple repetitions of message frames occurred in order to enable a selective and look-ahead assessment of the transmission quality.

Analyzer

Data mode



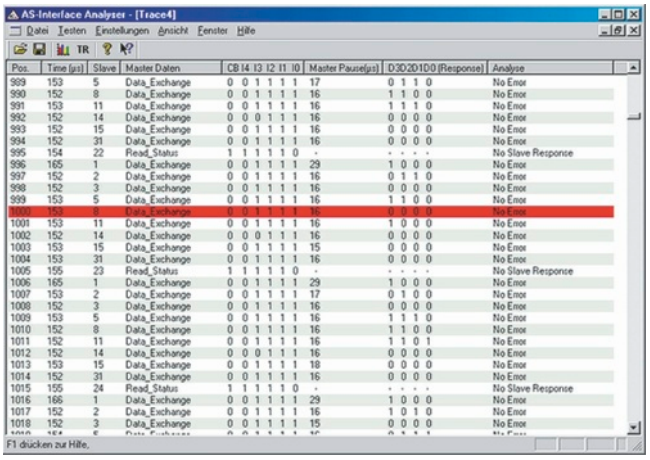
Presentation of the I/O data: Safety data



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.

Test log

Example of a test log

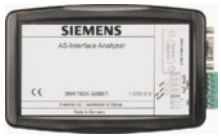
The recorded data of the online statistics are easy to output and document using a test log. Verification of the state of the plant can thus be provided for approvals or service assignments.

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 (operational voltage min. 20 V).

Selection and ordering data

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1904-3AB01	**AS-Interface analyzers** • For testing AS-Interface actuator/sensor 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 analyzers - RS 232 cable for connecting to 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 (Windows 95/98, ME, 2000, NT, XP, Vista Home Basic, Home Premium, Business, Ultimate, Windows 7)	►	**3RK1904-3AB01**		1	1 unit	42C
Accessories							
 3RX9801-0AA00	**AS-Interface M12 feeders** • 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	42C
 3RK1901-1NR10	**AS-Interface M12 feeders** • Transition of AS-Interface cable 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	A	**3RK1901-1NR10**		1	1 unit	42C
 3RK1902-4HB50-5AA0	**M12 cable plugs** • Cable: PUR, 5-pole • Length: 5 m • Color: Black • Extruded M12 plug (angled cable feeder 90°), other cable end open	C	**3RK1902-4HB50-5AA0**		1	1 unit	42D

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

Selection and ordering data

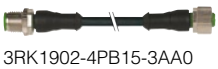
	Version	For flat cable	For	Cable length	Cable end in feeder	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK2703-3AB02-1AA1	**AS-Interface system manual** The AS-Interface system manual can be downloaded free of charge, see http://support.automation.siemens.com/WW/view/en/26250840										
 3RK1901-1NN10	**AS-Interface compact distributors, for AS-Interface flat cable** • Current carrying capacity up to 8 A • Degree of protection IP67/IP68/IP69K					A	**3RK1901-1NN10**		1	1 unit	42C
 3RX9801-0AA00	**AS-Interface M12 feeders** • Degree of protection IP67 • Current carrying capacity up to 2 A										
		AS-i	M12 socket	--	Available	►	**3RX9801-0AA00**		1	1 unit	42C
 3RK1901-1NR10	**AS-Interface M12 feeders** • Degree of protection IP67/IP68/IP69K • Current carrying capacity up to 4 A										
		AS-i	M12 socket	--	Not available	A	**3RK1901-1NR10**		1	1 unit	42C
 3RK1901-1NR11		AS-i	M12 cable box	1 m	Not available	A	**3RK1901-1NR11**		1	1 unit	42C
		AS-i	M12 cable box	2 m	Not available	A	**3RK1901-1NR12**		1	1 unit	42C
		AS-i/U_{aux}	M12 socket	--	Not available	A	**3RK1901-1NR20**		1	1 unit	42C
		AS-i/U_{aux}	M12 cable box	1 m	Not available	A	**3RK1901-1NR21**		1	1 unit	42C
		AS-i/U_{aux}	M12 cable box	2 m	Not available	A	**3RK1901-1NR22**		1	1 unit	42C
 3RK1901-1NR04	**AS-Interface M12 feeders, 4-fold** • Degree of protection IP67 • Current carrying capacity up to 4 A										
		AS-i/U_{aux}	4-fold M12 socket, delivery includes coupling module	--	Not available	A	**3RK1901-1NR04**		1	1 unit	42C
 3RK1901-1TR00	**M12-T distributors** • IP68 • 1 x M12 plug • 2 x M12 box					C	**3RK1901-1TR00**		1	1 unit	42C
 6ES7194-1KA01-0XA0	**M12 Y-shaped coupler plugs** For connection of two sensors to one M12 socket with Y assignment					A	**6ES7194-1KA01-0XA0**		1	1 unit	250

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

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-1KA00	**AS-Interface M12 sealing caps** For free M12 sockets	►	**3RK1901-1KA00**		100	10 units	42C
 3RK1901-1KA01	**AS-Interface M12 sealing caps, tamper-proof** For free M12 sockets	A	**3RK1901-1KA01**		100	10 units	42C
 3RK1901-1PN00	**AS-Interface M8 sealing caps** For free M8 sockets	A	**3RK1901-1PN00**		100	10 units	42C
 3RK1901-1MD00	**AS-Interface M20 seals** • For AS-Interface cable, shaped • For insertion in M20 glands	A	**3RK1901-1MD00**		100	10 units	42C
 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	B	**3RK1901-3QM00**		1	1 unit	42C
	- For M20 gland	B	**3RK1901-3QM10**		1	1 unit	42C
	• Continuation using pins						
	- For M16 gland	C	**3RK1901-3QM01**		1	1 unit	42C
	- For M20 gland	B	**3RK1901-3QM11**		1	1 unit	42C
 3RK1901-3QA00	**Cable clips for cable adapters**	►	**3RK1901-3QA00**		100	10 units	42C
 3RK1901-1MN00	**Cable terminating pieces** For sealing of open cable ends (shaped AS-Interface cable) in IP67	►	**3RK1901-1MN00**		1	10 units	42C
 3RK1901-2EA00	**K45 mounting plates**						
	• For wall mounting	►	**3RK1901-2EA00**		1	1 unit	42C
	• For standard rail mounting	►	**3RK1901-2DA00**		1	1 unit	42C
 3RK1901-0CA00	**K60 mounting plates**						
	Suitable for all K60 compact modules	►	**3RK1901-0CA00**		1	1 unit	42C
	• For wall mounting	►	**3RK1901-0CB01**		1	1 unit	42C
	• For standard rail mounting						

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

Miscellaneous accessories

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1902-0AR00	**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	A	**3RK1902-0AR00**		100	5 units	42D
	Inscription labels • For K45 and K60 compact modules • 20 x 9 mm, pastel turquoise • 19 frames with 20 labels each	C	**3RT1900-1SB50**		100	380 units	41B
 3RK1902-4GB50-4AA0	**Control cables, assembled at one end** Angular M12 socket for screw fixing, 4-pole, 4 x 0.34 mm², A-coded, black PUR sheath, max. 4 A						
	• Cable length 5 m	C	**3RK1902-4GB50-4AA0**		1	1 unit	42D
 3RK1902-4CA00-4AA0	**Angular M12 socket** For screw fixing, 4-pole screw terminals, max. 0.75 mm², A-coded, max. 4 A	C	**3RK1902-4CA00-4AA0**		1	1 unit	42D
 3RK1902-4BA00-5AA0	**M12 plug, straight** For screw fixing, 5-pole screw terminals, max. 0.75 mm², A-coded, max. 4 A	C	**3RK1902-4BA00-5AA0**		1	1 unit	42D
 3RK1902-4DA00-5AA0	**M12 plug, angled** For screw fixing, 5-pole screw terminals, max. 0.75 mm², A-coded, max. 4 A	C	**3RK1902-4DA00-5AA0**		1	1 unit	42D
 3RK1902-4H...-5AA0	**Control cable, assembled at one end** M12 plugs, angled, for screw fixing, 5-pole, 5 x 0.34 mm², A-coded, black PUR sheath, max. 4 A						
	• Cable length 1.5 m	C	**3RK1902-4HB15-5AA0**		1	1 unit	42D
	• Cable length 5 m	C	**3RK1902-4HB50-5AA0**		1	1 unit	42D
	• Cable length 10 m	C	**3RK1902-4HC01-5AA0**		1	1 unit	42D
 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 • Also for addressing AS-i slaves with M12 bus connection (e.g. K20, K60R compact modules, M200D motor starters)	C	**3RK1902-4PB15-3AA0**		1	1 unit	42D

More information

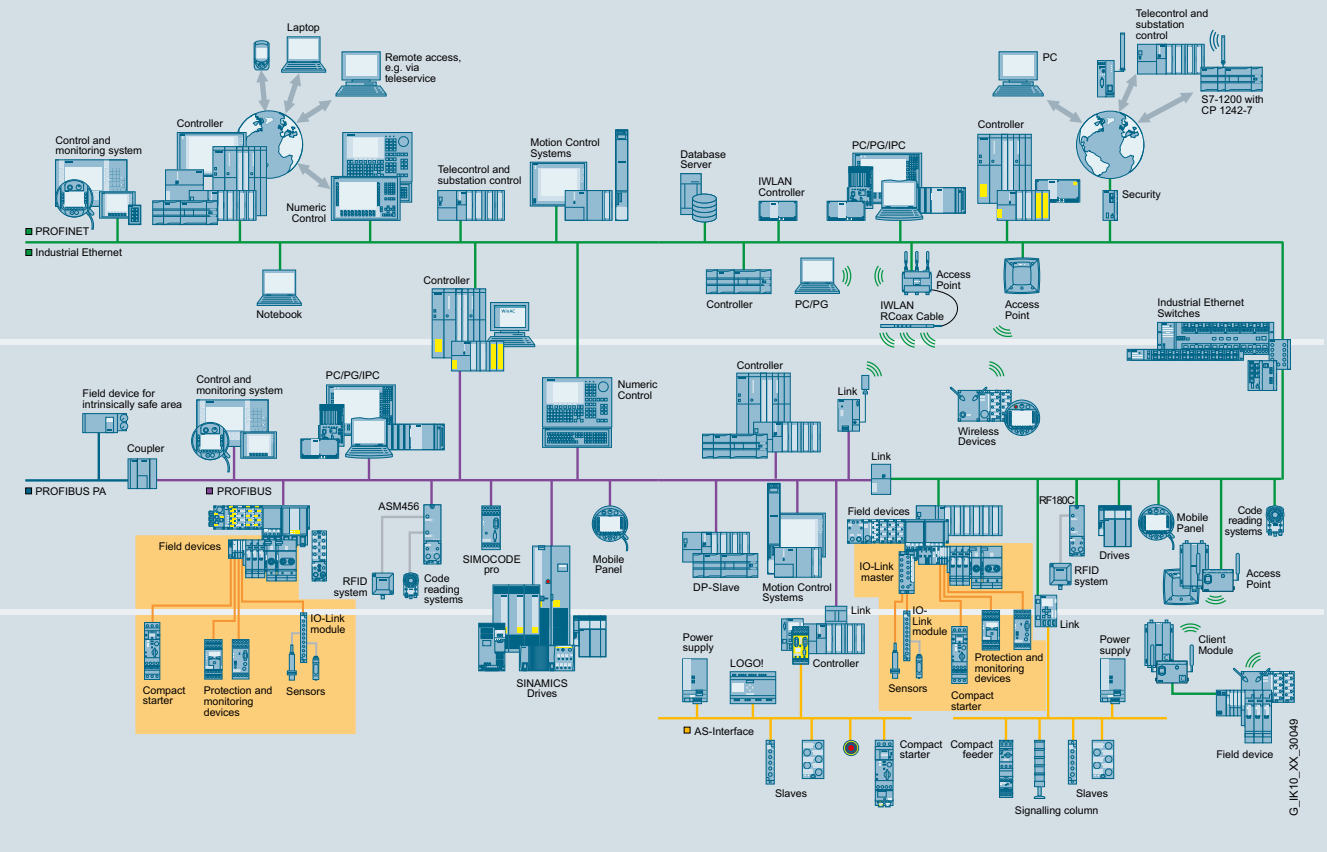
The AS-Interface system manual can be downloaded free of charge, see
http://support.automation.siemens.com/WW/view/en/26250840

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

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.



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 diagnostic 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. Central data storage means that it is possible to exchange an IO-Link sensor/actuator without a PC or programming device.

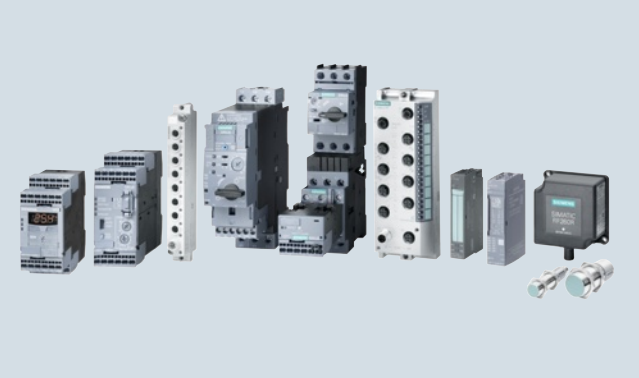
Integration in STEP 7

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

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

System components

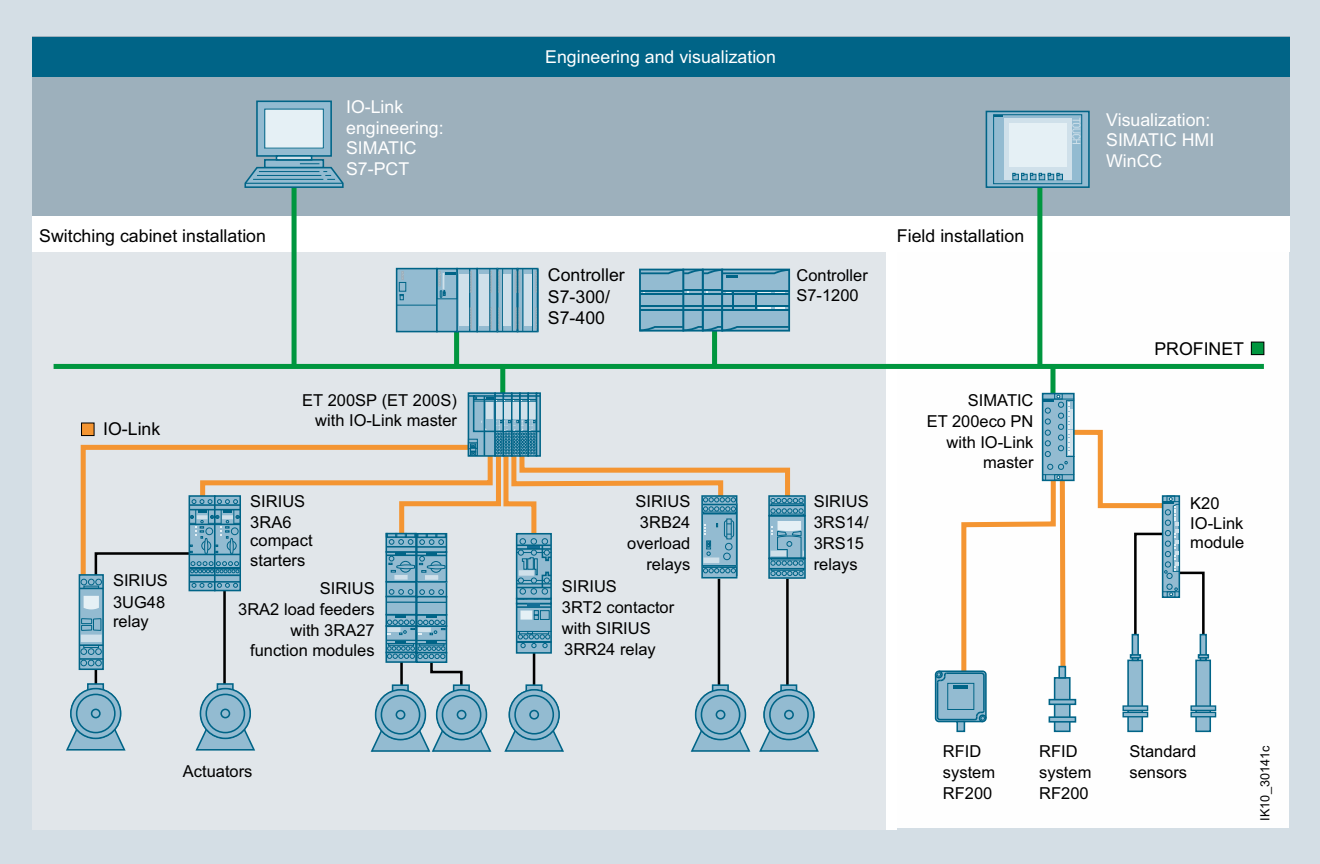
Overview



IO-Link product family

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

- An IO-Link master
- Several IO-Link devices, usually sensors (RFID systems), actuators or combinations of these
- A standard 3-wire sensor/actuator cable



Example of a configuration with the system components

Compatibility of IO-Link

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

- IO-Link sensors can 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

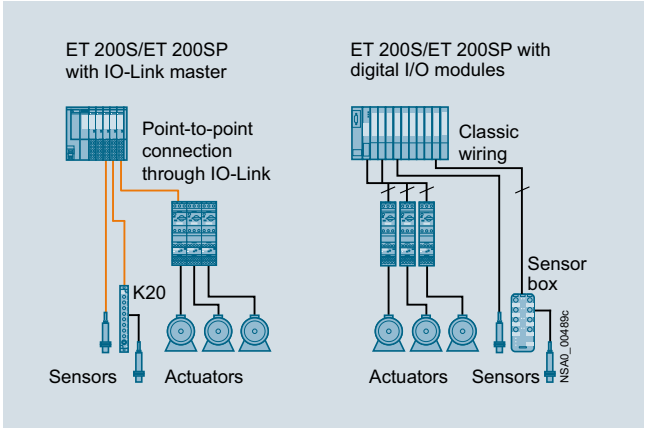
Another advantage of IO-Link technology is that analog signals are digitized already in the IO-Link sensor itself and are digitally transmitted by the IO-Link communication. As the result, faults are prevented and there is no extra cost for cable shielding.

Enhanced through 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 effective with the IO-Link input modules, which allow several sensors to be connected at one time via a cable to the 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

Grouping of motor starters

The SIRIUS controls allow four starters to be combined to form a group.

Connection of a motor starter group made up of three 3RA64 direct-online starters and a 3RA65 reversing starter

In this way up to 16 starters can be operated on a single IO-Link master. This leads to a reduction in the installation space and control wiring required.