

Industrial Communication



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Overview

AS-Interface: ASIsafe		Article No.	Page
ASIsafe enables the integration of safety-related components in an AS-Interface network, for example: • EMERGENCY-STOP pushbuttons • Protective door switches • Safety light arrays The simple wiring of AS-Interface, which is a major advantage, is maintained.			
 3RK3 Modular Safety System	Modular Safety System (MSS) Supplementing the service-proven concept of the safety monitors, the new 3RK3 Modular Safety System offers for example the following functions for ASIsafe: • Up to 50 enabling circuits including muting function • Expandable fail-safe and non-fail-safe inputs/outputs • Control of up to 12 ASIsafe outputs or 12 fail-safe independent switch-off groups • Memory module for parameters, e.g. for device replacement • Optional PROFIBUS interface for diagnostics and parameterization • Intuitive graphic parameterization and diagnostics software MSS ES • AS-i Power24V capability Your advantage: Easy to configure safety functions up to Category 4, PL e, SIL 3	3RK3	2/20
 Safety monitor	AS-Interface safety monitors • For monitoring safe stations and for linking AS-Interface inputs and outputs • Ensures safe disconnection • Available with one or two release circuits with two-channel configuration • All versions with removable screw terminals or spring-type terminals • All safety monitors in revised Version 3 with additional options • Filtering out of brief single-channel interruptions in the sensor circuit with the expanded safety monitor Version 3 • Expanded safety monitor with integrated safe slave for controlling a distributed safe AS-i output or for safe coupling a safe signal from one AS-i network to another AS-i network • Configuration software ASIMON V3 with graphic function diagram presentation Your advantage: Easy to configure safety functions up to Category 4, PL e, SIL 3	3RK1	2/24
 K45F  S45F SlimLine module, safe AS-i output	AS-Interface safety modules • Complete portfolio of ASIsafe modules • For connection of safety switches with contacts (e.g. position switches) as well as solid-state safety sensors (ESPE) • Degree of protection IP65/IP67 or IP20 • Very compact dimensions, from 20 mm width • Up to four safe inputs per module • Up to one safe output per module • Standard outputs are available on the module in addition • Up to Category 4, PL e, SIL 3 Your advantage: Easy integration of safe signals, be it in the control cabinet or in the field	3RK1	2/25
 Position switch	SIRIUS 3SF1, 3SF3 mechanical safety switches for AS-Interface • Plastic with degree of protection IP65 and metal with degree of protection IP66/IP67 • ASIsafe electronics integrated in the enclosure, with low power consumption < 60 mA • Available with separate actuator or interlocking Your advantage: Conventional wiring of safety functions no longer required.	3SF1, 3SF3	Ch. 12
 Cable-operated switch	SIRIUS 3SF2 cable-operated switches for AS-Interface • Degree of protection IP65 • Direct connection of cable-operated switches for detection of signals • Metal enclosures	3SF2	Ch. 12

Introduction

AS-Interface: ASIsafe (continued)



EMERGENCY-STOP for mounting on front plate

SIRIUS EMERGENCY-STOP mushroom pushbuttons for AS-Interface

- Degree of protection IP65/IP67
- EMERGENCY-STOP directly on AS-Interface using integrated modules
- Metal or plastic version

Your advantage: Easy direct connection of service-proven control elements to ASIsafe

3SF5

Ch. 13



F adapter

AS-Interface F adapters for EMERGENCY-STOP devices

- Connection of an EMERGENCY-STOP device according to ISO 13850 to AS-Interface
- Is snap-mounted from behind onto the EMERGENCY-STOP device (actuator)
- Can be used up to Category 4, PL e, SIL 3

Your advantage: Easy direct connection of service-proven control elements to ASIsafe

3SF5

Ch. 13

AS-Interface: Masters

The AS-Interface master connects SIMATIC control systems to AS-Interface. It automatically organizes the data traffic on the AS-Interface cable and sees not only to processing the signals but also to performing the parameter setting, monitoring and diagnostics functions.

Masters for SIMATIC S7

AS-Interface master connections:

- CM 1243-2 for SIMATIC S7-1200
- CP 343-2P, CP 343-2 for SIMATIC S7-300 and ET 200M
- CP 243-2 for SIMATIC S7-200

Characteristics:

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

Your advantage: Easy connection to SIMATIC controllers

3RK7

2/28

6GK7

2/30, 2/31



CM 1243-2 for SIMATIC S7-1200



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



CM AS-i Master ST for SIMATIC ET 200SP

Masters for SIMATIC ET 200

CM AS-i Master ST for SIMATIC ET 200SP

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

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

3RK7

2/33

AS-Interface: Routers

As an alternative to the CPs, it is also possible to use a link as AS-Interface master – at any position beneath the PROFIBUS DP or PROFINET IO.



DP/AS-i LINK Advanced



DP/AS-Interface Link 20E



DP/AS-i F-Link



IE/AS-i LINK PN IO

Routers

- Degree of protection IP20
 - PROFIBUS slave or PROFINET IO device and AS-Interface master (single or double master in case of DP/AS-i LINK Advanced and IE/AS-i LINK PN IO)
 - Connection of up to 62 AS-Interface slaves per AS-Interface network
 - Connection of up to 496 digital inputs and 496 outputs per AS-i network, with doubling of the project data volume for double master versions
 - Integrated ground-fault monitoring (in case of DP/AS-i LINK Advanced and IE/AS-i LINK PN IO)
 - User-friendly local diagnostics and local startup by means of a full graphic display and control keys or through a web interface with a standard browser (in case of DP/AS-i LINK Advanced and IE/AS-i LINK PN IO)
 - Integrated analog value transmission
 - Configuring and uploading of AS-Interface configuration in STEP 7 possible
 - User-friendly selection of AS-Interface slaves
 - Safety-related transition from ASIsafe to PROFIsafe also available as DP/AS-i F-Link
- Your advantage: Optimum transition to PROFIBUS or PROFINET, integrated in STEP 7

3RK3**6GK1**

2/41

2/36, 2/39, 2/45

AS-Interface: Slaves

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

I/O modules for use in the field, high degree of protection

Digital I/O modules IP67 – K60, K60R, K45 and K20

- Degree of protection IP65/IP67 or IP68/IP69K
- Modules available with up to degree of protection IP68/IP69K
- ATEX-certified modules available for Ex Zone 22
- Connection sockets in M8/M12
- Up to eight inputs and four outputs
- A/B technology available
- Contacting protected against polarity reversal
- Standard rail mounting and wall mounting possible
- Mounting of the module on the base plate using just one screw
- Diagnostics LEDs

Your advantage: Reduction of mounting and startup times by up to 40 %



K20 digital module



K45 digital module



K60 digital module

3RK1, 3RK2

2/49, 2/51, 2/53, 2/55

Introduction

AS-Interface: Slaves (continued)



K60 analog module

Analog I/O modules, IP67 – K60

- Degree of protection IP65/IP67
- Detects or transmits analog signals locally
- 2-/4-channel
- Input modules for up to four sensors with current signal, with voltage signal or with thermal resistor
- Output modules for current or voltage
- Fast analog modules available for higher access speeds

Your advantage: Easy integration of analog values

3RK1

2/57



SlimLine

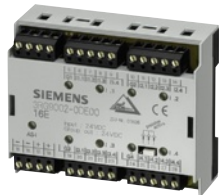
I/O modules for use in the control cabinet

- Degree of protection IP20
- No M12 plugs required for connection
- Up to 16 inputs
- Narrow design of the SlimLine modules with width from 22.5 mm
- Removable, finger-safe terminal blocks that cannot be mixed up (SlimLine)
- Flat design of the flat modules for small control cabinets and confined conditions
- Connection with screw terminals or spring-type terminals
- Standard rail mounting and wall mounting possible
- Diagnostics LEDs

Your advantage: Modules enable use in control cabinets and small local control cabinets.

3RG9, 3RK1

2/60



F90 module



Flat module

Modules with special functions: Counter modules

- Degree of protection IP20
- For evaluation of pulses
- Connection with screw terminals or spring-type terminals

Your advantage: Evaluation of pulses which exceed even the clock frequency of AS-Interface

3RK1

2/67



Counter module

Modules with special functions: Ground-fault detection modules

- Degree of protection IP20
- Display using LEDs
- Two signaling outputs

Your advantage: Automatic diagnostics of ground faults on AS-Interface

3RK1

2/68



Ground-fault detection module

Modules with special functions: Overvoltage protection modules

- Degree of protection IP67
- Discharge through ground cable with oil-proof outer sheath
- Protection at transition of lightning protection zones

Your advantage: The AS-Interface overvoltage protection module protects downstream AS-Interface devices or individual sections in AS-Interface networks from conducted overvoltages

3RK1

2/69



Overvoltage protection module

AS-Interface: Slaves (continued)

3RT20 1-1B...-0CC0
contactor**Contactors and contactor assemblies**

Power contactors for switching motors and contactor assemblies

- Notable reduction of wiring in the control circuit
- Integrated mechanical interlocking
- Prevention of wiring errors in the main circuit
- Connection to AS-Interface through function modules

Article No.

Page

**3RT2, 3RA23,
3RA24**

Ch. 3

SIRIUS 3RA2712...
function module for
AS-Interface

SIRIUS function modules for AS-Interface

- For mounting onto SIRIUS 3RT2 contactors
 - Reduction of control current wiring through plug-in design and integrated monitoring of circuit breaker/motor starter protector and contactor
 - Reduced space requirement in the control cabinet through fewer digital inputs and outputs in the control system
 - Easy configuration through operation of feeders instead of individual contactors
 - Enhanced operational reliability and quick wiring thanks to spring-type connections
 - Small number of variants by using identical modules for size S00 and S0 contactors
- Your advantage: Shortening of mounting and startup times

3RA2712

Ch. 3



3RA61 compact starter

Motor starters for use in the control cabinet

SIRIUS 3RA6 compact starters, 3RA61 direct-on-line starters, 3RA62 reversing starters

- Degree of protection IP20
- Very compact load feeders with the integrated functionality of a solid-state overload relay
- As direct-on-line or reversing starters for motors up to 15 kW/400 V
- Easy expansion into a communication-capable load feeder using AS-i add-on modules
- On-site safe disconnection also possible using AS-i add-on modules
- Standardized integration of the loads in higher-level control systems using AS-i

Your advantage: Compact solution with minimum wiring outlay for actuating direct-on-line and reversing starters in the control cabinet

3RA6

Ch. 8

SIRIUS M200D motor
starter**Motor starters for use in the field, high degree of protection**

SIRIUS M200D motor starters for AS-Interface

- High degree of protection IP65 for cabinet-free design
- As direct-on-line or reversing starters for motors up to 5.5 kW/400 V
- Mechanical or electronic switching for high switching frequencies
- Optional with manual operation and brake control
- Expanded diagnostics and parameterization possible through AS-Interface
- Easy and consistent integration in STEP 7 through AS-Interface

Your advantage: The correct solution for all simple applications in conveyor systems with spatially distributed drives

3RK1

Ch. 9



SIRIUS MCU motor starter

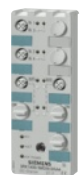
SIRIUS MCU motor starters for AS-Interface

- Degree of protection IP55
- Direct-on-line or reversing starters up to 5.5 kW at 400 V AC (50/60 Hz)
- Integrated overload and short-circuit protection with SIRIUS 3RV motor starter protectors/circuit breakers Class 10 with short-circuit breaking capacity $I_{cu} = 50$ kA at 400 V AC
- Overload protection with thermal release (bimetal)

Your advantage: Factory-wired motor starters in high degree of protection for use in the field

3RK1

Ch. 9

Motor starter for
AS-Interface, 24 V DC

Motor starters for AS-Interface, 24 V DC

- Degree of protection IP65/IP67
- Direct-on-line starters, double starters or reversing starters
- Up to 70 W
- Quick stop function

Your advantage: Simple motor starter in service-proven module design for 24 V DC motors

3RK1

Ch. 9

Introduction

AS-Interface: Slaves (continued)



Pushbutton

Commanding and signaling devices

SIRIUS 3SF5 pushbuttons and indicator lights

- Modular construction according to individual requirements
- Up to 6 signaling points
- Metal and plastic version
- Any change of equipment possible even after installation
- Indicator lights with integrated LED

Your advantage: Complete 3SB3 operating system with simple AS-Interface connection for your plant

8WD4 signaling columns

- Many optical and acoustic elements can be combined
- Up to three signaling elements can be connected using an adapter element
- With LEDs or incandescent lamps

Your advantage: Signaling columns for monitoring production sequences and for visual or acoustic warnings in emergency situations, with easy AS-Interface connection



Signaling column



Connections for LOGO!

AS-Interface connections for LOGO!

- AS-Interface slave for the connection of LOGO!
- Distributed controller functionality

Your advantage: Distributed intelligence can be used on-site and can be connected to the control system through AS-Interface

AS-Interface: Power supply units and data decoupling modules

AS-Interface power supply units generate a controlled direct voltage of 30 V DC with high stability and low residual ripple in conjunction with data decoupling. They are an integral component of the AS-Interface network and enable the simultaneous transmission of data and energy on one cable.

In conjunction with data decoupling modules, AS-Interface can also be operated with standard power supply units.



IP20, 3 A



IP20, 8 A

AS-Interface power supply units

- With wide performance spectrum from 2.6 to 8 A
- Degree of protection IP20
- Separation of data and energy by means of the integrated data decoupling
- UL/CSA approval means the power supplies can be used worldwide.
2.6 A version with output power restricted to max. 100 W
(for use in NEC Class 2 circuits)
- Certified for global use
- Integrated ground-fault and overload detection save the need for additional components and make applications reliable
- Diagnostics memory, remote signaling and remote RESET allow fast detection of faults in the system
- The ultra-wide input range enables single- and two-phase applications
(8 A version)

Your advantage: Optimum performance for each application

SITOP PSU100M,
24 V DC, 20 A**24 V power supply units**

Standard 24 V power supply units (SITOP), without data decoupling

- Performance spectrum 2.5 A to 40 A
- Overload and short-circuit proof in every performance class
- Add-on modules for signaling, redundancy, buffering and UPS
- Single-phase, two-phase and three-phase versions

Your advantage: Economical alternatives in conjunction with data decoupling modules

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3RX9	2/71
6EP	Ch. 15

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AS-Interface: Power supply units and data decoupling modules (continued)			
 PSN130S 30 V DC, 8 A	30 V power supply units Standard 30 V power supply units without data decoupling • Power spectrum 3 A, 4 A and 8 A • Overload and short-circuit proof in every performance class • Diagnostics: With output voltage > 26.5 V DC LED and signaling contact for output voltage 30V O.K. • Primary-side connection to 120 V AC / 230 V AC (1-phase) with automatic range selection Your advantage: Economical alternatives in conjunction with data decoupling modules while making full use of the maximum AS-Interface cable length	3RX9	2/72
	S22.5 data decoupling modules • Degree of protection IP20, narrow design 22.5 mm • Supply of several AS-i networks with a single power supply unit • Single and double data decoupling • Operation with 24 V DC or 30 V DC Your advantage: Cost-effective installation of AS-i networks in conjunction with standard power supply units	3RK1	2/74
	 S22.5 data decoupling module		
 DCM 1271 data decoupling module	DCM 1271 data decoupling module for SIMATIC S7-1200 • Simple data decoupling in IP 20 design • Supply of several AS-i networks with a single power supply unit • Operation with 24 V DC or 30 V DC Your advantage: Cost-effective installation of AS-i networks in conjunction with standard power supply units in the design of a SIMATIC S7-1200 module	3RK7	2/76
AS-Interface: Transmission media			
 Shaped cable	AS-Interface shaped cable for connection of network stations.		
	AS-Interface shaped cables • No polarity reversal thanks to trapezoidal shape • Cables made of optimized material for different operating conditions • Special version according to UL Class 2 available Your advantage: Fast replacement and connection to AS-Interface by piercing method	3RX9	2/78

Introduction

AS-Interface: System components and accessories

Accessories comprise tools for mounting, installation and operating as well as individual components.

Repeaters and extension plugs

- Repeaters for extending the AS-Interface cable by 100 m per repeater
- Extension plug for extending the AS-Interface segment to max. 200 m
- Parallel switching of several repeaters possible (star configuration option)
- Maximum size increases (when combined) to more than 600 m
- Easy mounting
- IP67 module enclosure

Your advantage: Lower infrastructure costs, more possibilities of use and greater freedom for plant planning



Repeater



Compact extension plug



Addressing unit for AS-Interface V 3.0



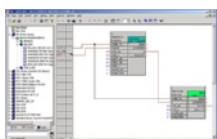
Analyzer



M12 sealing cap



Cable terminating piece

AS-Interface: Software

AS-i block library for PCS 7

AS-Interface block library for SIMATIC PCS 7

- Engineering software and runtime software
- Easy connection of AS-Interface to PCS 7
- Engineering work reduced to positioning and connecting the function blocks in the CFC
- With no additional configuring steps required for connection to the PCS 7 Maintenance Station, diagnostics for the AS-i system is optimally guaranteed

Your advantage: Easy connection of AS-Interface to PCS 7, little engineering and configuration

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3RK1, 6GK1	Repeaters: 2/79 Extension plugs: 2/80
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3RK1	2/83
3RK2, 3RG7, 3RK1, 3RX9, 3UF7, 6ES7	2/86
3ZS1	Ch. 14

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IO-Link  IO-Link family IO-Link is an open communication standard for sensors and actuators - defined by the Profibus User Organization (PNO). • Dynamic changing of sensor/actuator parameters directly by the PLC • Devices can be exchanged during operation, without a PC or programming device, through re-parameterization using the user program by means of a function block (FB) or parameter server • Fast commissioning thanks to central data storage • Consistent diagnostic information as far as the sensor/actuator level • Uniform and greatly reduced wiring of different sensors/actuators/controls Your advantage: Fast commissioning and flexible maintenance thanks to central data storage, less wiring work because no passive distributors are needed		2/89
IO-Link: Masters  CM 4x IO-Link for ET 200SP  SIRIUS 4SI electronic module for ET 200S  IO-Link master modules for ET 200eco PN	The IO-Link master modules form the heart of the IO-Link system. IO-Link master modules for ET 200SP CM 4xIO-Link electronic module • IO-Link master as serial communication module with 4 ports (channels) according to IO-Link Specification V1.1 • Module exchange with automatic data recovery without engineering for IO-Link master and device • Up to four IO-Link devices (3-wire connections) can be connected to each IO-Link master module • Data transmission rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd), automatic adjustment to the data transmission rate supported by the device Your advantage: Easy connection of IO-Link connections to distributed I/Os IO-Link master modules for ET 200S IO-Link 4SI electronic module • Up to 4 IO-Link devices (three-conductor connection) can be connected • Up to 4 standard actuators/sensors (two-conductor/three-conductor connection) can be connected SIRIUS 4SI electronic modules • Up to 16 SIRIUS controls can be connected with IO-Link (grouped) • Supports firmware update (STEP 7 V5.4 SP4 and higher) IO-Link master modules for ET 200eco PN • Up to 4 IO-Link devices (three-conductor connection) can be connected • Up to 8 standard sensors (8 DI) and up to 4 standard actuators (4 DO) can be connected in addition Your advantage: Easy connection to the control system in IP20 as well as in IP65/IP67	6ES7 2/95 6ES7 2/97 3RK1 2/98 6ES7 2/99
IO-Link: Input modules  K20 IO-Link module with four digital inputs	IO-Link input modules make full use of the potential of IO-Link and are a more attractive solution economically than a direct sensor connection. K20 IO-Link modules • Four or eight digital inputs • Degree of protection IP65/IP67 • Connection sockets in M8/M12 • Contacting protected against polarity reversal Your advantage: Reduction of mounting and startup times by up to 40 %	2/100 3RK5 2/101

Introduction

IO-Link: Industrial controls

Starters and contactor assemblies for direct-on-line, reversing and wye-delta starting can be connected to IO-Link through function modules without any additional, complicated wiring.

Contactors and contactor assemblies

Power contactors for switching motors and contactor assemblies

- Notable reduction of wiring in the control circuit
- Integrated mechanical interlocking
- Prevention of wiring errors in the main circuit

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



SIRIUS 3RA2711 function
module for IO-Link

SIRIUS function modules for IO-Link

- Connection of the communication-capable 3RT2, 3RA23, 3RA24 power contactors to IO-Link
- Reduction of control current wiring through plug-in technology, feeder groups and integrated monitoring of circuit breaker/motor starter protector and contactor
- Reduced space requirement in the control cabinet through fewer digital inputs and outputs in the control system
- Simple user program through operation of feeders instead of individual contactors
- Enhanced operational reliability and quick wiring thanks to spring-type connections
- Can be flexibly combined with many automation solutions using the open, standardized IO-Link wiring system
- Small number of variants by using identical modules for size S00 and S0 contactors

Your advantage: Shortening of mounting and startup times

Overload relays

SIRIUS 3RB24 solid-state overload relays for IO-Link

- Diagnostics and current value transmission via IO-Link
 - Current measuring modules (3RB29) for current values from 0.3 ... 630 A
 - Controlling direct-on-line, reversing and wye-delta starters via IO-Link in conjunction with contactors
 - Full motor protection through PTC connection
- Your advantage: Communication-capable overload relay enables remote diagnostics and preventative maintenance

SIRIUS 3RB24
overload relay



SIRIUS 3RA64
compact starter

Compact starter

3RA64, 3RA65 compact starters for IO-Link

- Integrated functionality of a circuit breaker, contactor and solid-state overload relay and various functions of optional mountable accessories
- Can be used for direct starting of standard induction motors up to 32 A (approx. 15 kW/400 V)
- Compact design offers enormous savings in space and wiring in the control cabinet
- Low variance of devices thanks to wide setting ranges for the rated current and wide voltage ranges

Your advantage: The diagnostics data of the process collected by the 3RA6 compact starter, e.g. short circuit, end of service life, limit position etc., are not only indicated on the compact starter itself but also transmitted to the higher-level control system through IO-Link.

Monitoring relays

3RR24 monitoring relays for IO-Link

- Monitoring relays for mounting onto 3RT2 contactors
 - Parameterization and diagnostics via the display on the device or via IO-Link
 - Adjustable warning and switch-off limit values and on/tripping delay times
 - All current measured values available in the control system
- Your advantage: Communication-capable monitoring relay enables remote diagnostics and preventative maintenance.

SIRIUS 3RR24



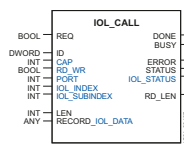
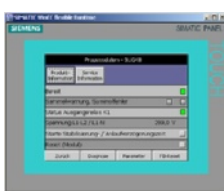
SIRIUS 3UG48

SIRIUS 3UG48 monitoring relays for stand-alone installation for IO-Link

- Monitoring of
 - Network (3UG481)
 - Current (3UG482)
 - Voltage (3UG483)
 - Power factor (3UG484)
 - Speed (3UG485)
- Parameterization and diagnostics via the display on the device or via IO-Link
- Adjustable warning and switch-off limit values and on/tripping delay times
- All current measured values available in the control system

Your advantage: Communication-capable monitoring relay enables remote diagnostics and preventative maintenance.

Article No.	Page
3RT2, 3RA23, 3RA24	Ch. 3
3RA2711	Ch. 3
3RB24	Ch. 7
3RA64, 3RA65	Ch. 8
3RR24	Ch. 10
3UG48	Ch. 10

	Article No.	Page
IO-Link: Industrial controls (continued)		
 SIRIUS 3RS14, 3RS15 temperature monitoring relays for IO-Link - Measuring the temperature of solids, liquids and gases - Use of resistance sensors (3RS14) or thermocouples (3RS15) - Parameterization and diagnostics via the display on the device or via IO-Link; adjustable warning and switch-off limit values and on/tripping delay times - All current measured values available in the control system Your advantage: Independent monitoring easily linked to the control system	3RS14, 3RS15	Ch. 10
IO-Link: RFID systems		
 SIMATIC RF200 RFID system in the HF range - SIMATIC RF210R, SIMATIC RF220R, SIMATIC RF260R products - Simple identification tasks (read-only), such as reading an ID number - No RFID-specific programming, ideal for those new to RFID - Simple connection via master modules for IO-Link, such as SIMATIC ET 200S and ET 200eco - Use with the tried and tested ISO 15693 transponders (MOBY D) RFID systems for IO-Link: SIMATIC RF210R, SIMATIC RF220R, SIMATIC RF260R (top)	6GT2	Catalog ID 10
IO-Link: IODD files		
IO-Link Device Description (IODD) files provide the device description for IO-Link - Comprehensive IODD catalog of SIEMENS IO-Link devices - Can be downloaded from http://support.automation.siemens.com/WW/view/en/29801139/133100		2/94
IO-Link: Software		
 STEP 7 PCT Engineering software for configuring the IO-Link master modules for ET 200S and ET 200eco - Available as a stand-alone version or integrated into STEP 7 (Version 5.5 SP1 or later) - Retrieval of parameter and diagnostics data from the IO-Link devices connected to the master - Monitoring of the process image of the IO-Link devices - Open interface for importing further IODDs - Free-of-charge download from http://support.automation.siemens.com/WW/view/en/37936752		Ch. 14
 IO-Link Call function block STEP 7 function block for easy acyclical data exchange in the user program Free-of-charge download from http://support.automation.siemens.com/WW/view/en/38487085		Ch. 14
 WinCC flexible template project Easy integration of IO-Link devices into the user program by using ready-made WinCC flexible templates Free-of-charge download of the project from http://support.automation.siemens.com/WW/view/en/38006560		Ch. 14

Note:

-  Screw terminals
-  Spring-type terminals
-  Combicon connectors (plug-in screw terminals)
-  FastConnect

The terminals are indicated in the selection and ordering data by orange backgrounds.

AS-Interface

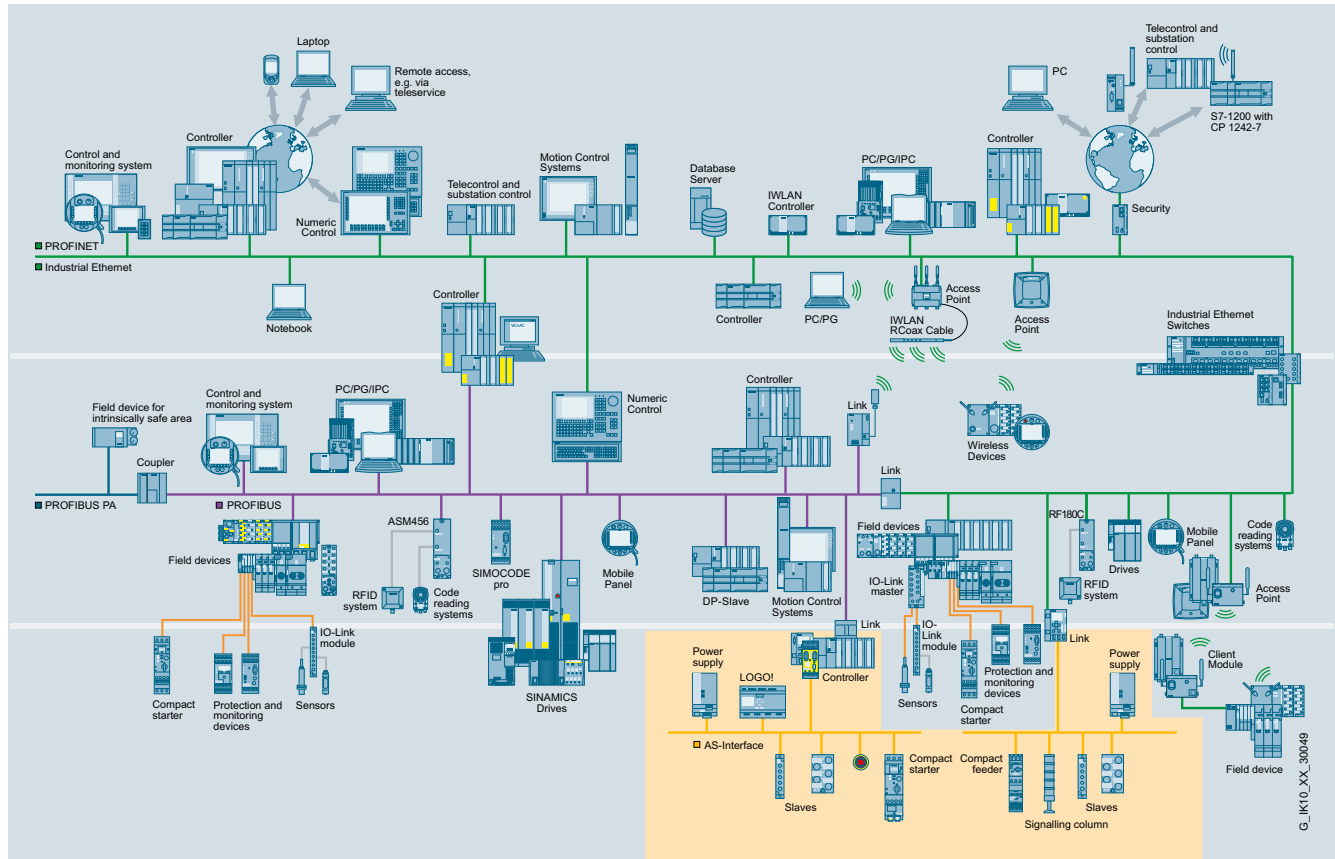
Introduction

Communication overview

Overview

AS-Interface is an open, international standard according to EN 50295 and IEC 62026-2 for process and field communication. Leading manufacturers of actuators and sensors all over the world support the AS-Interface. Interested companies are provided with the electrical and mechanical specifications by the AS-Interface Association.

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



Benefits

A key feature of AS-Interface technology is the use of a shared two-conductor cable for data transmission and the distribution of auxiliary power to the sensors/actuators. A power supply unit which meets the requirements of the AS-Interface transmission method and has an external data decoupling module if required is used for the distribution of auxiliary power. The AS-Interface cable used for the wiring is mechanically coded and hence protected against polarity reversal and can be easily contacted by the insulation piercing method.

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

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

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

Application

I/O data exchange

The AS-i master transmits automatically the inputs and outputs between the control system and the digital and analog AS-Interface slaves.

Slave diagnostics information is forwarded to the control system when required.

AS-Interface masters according to the AS-Interface Specification V2.1 or V3.0 support integrated analog value processing. This means that data exchange with analog AS-Interface slaves is just as easy as with digital slaves.

Command interface

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

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

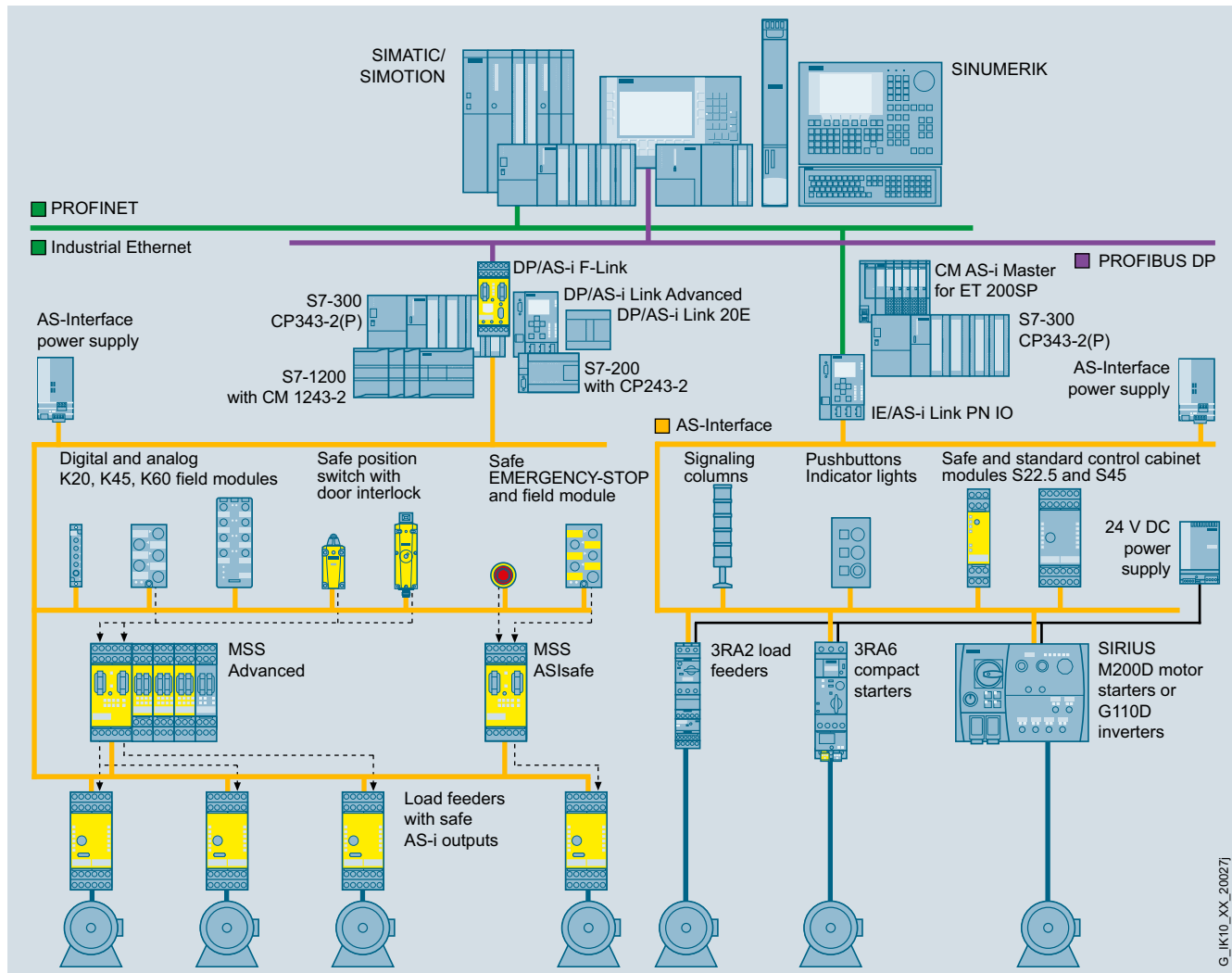
You can find more information on the Internet, [see http://support.automation.siemens.com/WW/view/en/51678777](http://support.automation.siemens.com/WW/view/en/51678777)

Overview

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

- Master interface modules for central control units such as SIMATIC S7, ET 200/ET 200SP distributed peripherals, or routers from PROFIBUS/PROFINET to AS-Interface
- Power supply units, if required in combination with a data decoupling module for the power supply to the slaves
- AS-Interface shaped cables

- Network components such as repeaters and extension plugs (cannot be used for AS-i Power24V)
- Modules for connection of standard sensors/actuators
- Actuators and sensors with integrated AS-i slave
- Safety modules for transmitting safety-related data through AS-Interface
- Addressing units for setting the slave addresses during commissioning



Example of a configuration with the system components

Features

Standard	EN 50295 / IEC 62026-2
Topology	Line, star or tree structure (same as electrical wiring)
Transmission medium	Unshielded two-wire cable (2 x 1.5 mm ²) for data and auxiliary power
Connection methods	Contacting of the AS-Interface cable by insulation piercing method
Maximum cable length	• 100 m without repeater • 200 m with extension plug • 300 m with two repeaters in series connection • 600 m with extension plugs and two repeaters connected in parallel Larger cable lengths are also possible when additional repeaters are connected in parallel

Maximum cycle time	• 5 ms in full expansion with standard addresses • 10 ms in full expansion with A/B addresses, profile-specific for Spec 3.0 slaves
Number of stations per AS-Interface line	• 31 slaves acc. to AS-Interface Spec. V2.0 • 62 slaves (A/B technology) acc. to AS-Interface Spec. V2.1 and V3.0 • Integrated analog value transmission
Number of binary sensors and actuators	• Max. 124 DI/124 DO according to Spec. V2.0 • Max. 248 DI/186 DO according to Spec. V2.1 • Max. 496 DI/496 DO according to Spec. V3.0
Access control	• Cyclic polling master/slave procedure • Cyclic data acceptance from host (PLC, PC)
Error safeguard	Identification and repetition of faulty message frames

AS-Interface

Introduction

AS-Interface specification Specification 2.0, 2.1 and 3.0

Overview

Scope of the AS-Interface specification

AS-Interface specification	Maximum number of slaves		ASIsafe	Number of digital inputs	Number of digital outputs
	Digital	Analog		DI	DO
Version 2.0	31	31	31	$31 \times 4 = 124$	$31 \times 4 = 124$
Version 2.1	62	31	31	$62 \times 4 = 248$	$62 \times 3 = 186$
Version 3.0	62	62	31	$62 \times 8 = 496$	$62 \times 8 = 496$

Basic data of AS-Interface Specification 2.0

- AS-Interface Specification 2.0 describes a fieldbus system with an AS-i master and up to 31 AS-i slaves.
- Each AS-i slave has up to 4 digital inputs and 4 digital outputs.
- With full expansion, the complete transmission of all input/output data requires max. 5 ms cycle time.

Expansions of AS-Interface Specification 2.1

AS-Interface Specification 2.1 enables the number of network stations to be doubled from 31 to 62 as follows:

- The standard slaves continue to occupy one AS-i address (1...31).
- Slaves with extended addressing divide an address into an A address (1A...31A) and a B address (1B...31B). Up to 62 A/B slaves can be connected accordingly to one AS-Interface network.
- Mixed operation of standard slaves and A/B slaves is possible without difficulty. The AS-i master identifies automatically which type of slave is connected. No special adjustments are required of the user.

Another function of the AS-Interface Specification V2.1 is the integrated analog value transmission function. Access to both analog values and digital values is possible without the need for any special function blocks.

Expansions of AS-Interface Specification 3.0

- AS-Interface Specification 3.0 enables the connection of nearly 1000 digital inputs/outputs (profile S-7.A.A: 8DI/8DO as A/B slave).
- New profiles have also enabled the option of expanded addressing for analog slaves.
- Acceleration of analog value transmission through "Fast Analog Profile".
- Variable use of analog modules: Optional parameterization of resolution (12/14 bit) and 1- and 2-channel capability.
- Asynchronous serial protocol 100 baud or 50 baud, bidirectional.

AS-Interface master for A/B slaves

To be able to operate A/B slaves on an AS-Interface network you must use master modules that meet the minimum requirements of Specification 2.1.

AS-Interface specification	Available masters
Version 2.1	CP 243-2 (S7-200)
Version 3.0	CP 343-2, 343-2P (S7-300/ET 200M), DP/AS-i Link Advanced, DP/AS-i F-Link, DP/AS-Interface Link 20E, IE/AS-i Link PN IO, CM 1243-2 (S7-1200), CM AS-i Master ST for ET 200SP NEW

The AS-Interface specification relevant for the respective slave is noted in the "Selection and ordering data".

For the exact slave profile [see AS-Interface system manual](#).

Communication cycle

AS-Interface specification	Maximum cycle time (digital signals)
Version 2.0	5 ms
Version 2.1	5 ms with 31 slaves 10 ms with 62 slaves
Version 3.0	5 ms with 31 slaves 10 ms with 62 slaves, supplementary, up to 20 ms with A/B slaves using 4DI/4DO, up to 40 ms with A/B slaves using 8DI/8DO

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

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

More information, e.g. whether an AS-Interface slave is a standard slave or an A/B slave, [can be seen in the section "Selection and ordering data" or the "AS-Interface system manual"](#).

More information

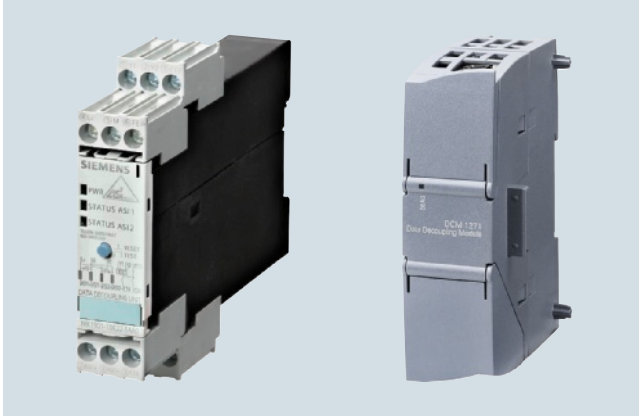
AS-Interface system manual

More information is available in the 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>

Overview



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

Parallel wiring frequently dominates, above all, in applications with very few I/Os. Although AS-Interface is similarly well suited for small applications, its use is often prevented by the cost of the 30 V AS-Interface power supply unit which is required in addition. Through the expansion of AS-Interface with AS-i Power24V and the resulting possibility of using existing standard 24 V DC power supply units in AS-i networks, AS-Interface is now also attractive for applications with a very tight budget.

Data and power in standard AS-Interface networks up to now

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

The new technology

Through the expansion of AS-Interface with AS-i Power24V it is now also possible to use 24 V standard power supply units in AS-i networks. The communication technology of AS-Interfaces works at the same high level of quality with an operating voltage of both 30 V DC and 24 V DC.

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

Requirements for operation of an AS-i Power24V network

- When 24 V power supply units are used, the maximum network range of 50 m must be observed in order to reach slaves and sensors with a sufficient level of voltage (at least 18 V).
- The power supply units must comply with the PELV (Protective Extra Low Voltage) or SELV (Safety Extra Low Voltage) 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](#).
- When used in conjunction with standard 24 V power supply units, each AS-Interface network requires Power24V-capable data decoupling with adapted ground-fault detection, [see page 2/68](#).
- For reliable operation of an AS-i network with 24 V voltage, it is important that the masters, slaves and other components are approved for AS-i Power24V. AS-i Power24V-capable AS-i components can also be used without restriction in standard 30 V AS-i networks.
- The use of repeaters or extension plugs in AS-i Power24V networks is not permitted.

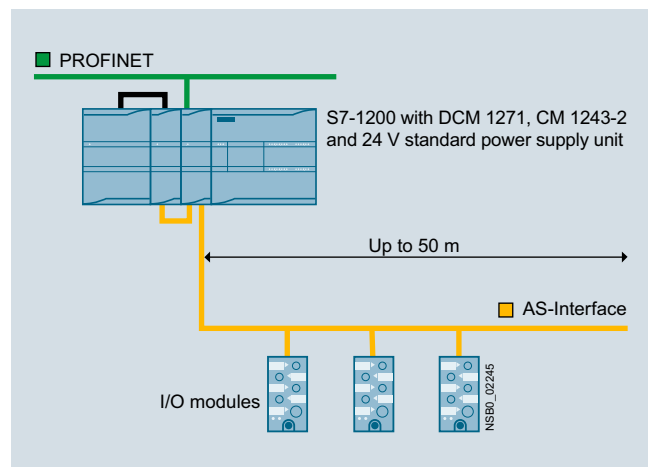
Benefits

AS-i Power24V networks incur no additional costs for an AS-Interface power supply unit because an already existing 24 V power supply unit can be used. This brings the user several benefits:

- The level of standardization of very small applications can be increased further.
- The additional advantages of a modern communication system in terms of commissioning, maintenance and diagnostics can be fully exploited.

Application

Construction of an AS-i Power24V network



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

More information

Complete overview of AS-i Power24V-capable units currently available from Siemens [see](#)
<http://support.automation.siemens.com/WW/view/en/42806066>

AS-Interface

ASIsafe

Introduction

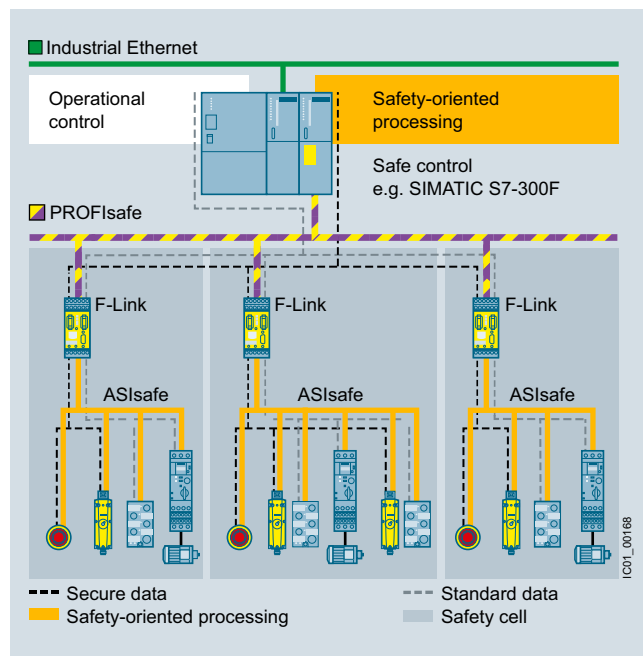
Overview

Safety is included

ASIsafe enables the integration of safety-related components, such as EMERGENCY-STOP pushbuttons, protective door switches or safety light arrays, in an AS-Interface network. These are fully compatible with the familiar AS-Interface components (masters, slaves, power supplies, repeaters, etc.) in accordance with IEC 62026-2 and are operated in conjunction with them on the yellow AS-Interface cable.

ASIsafe solutions

ASIsafe Solution PROFIsafe:
DP/AS-i F-Link



The DP/AS-i F-Link allows AS-Interface to be used with fail-safe SIMATIC or SINUMERIK controllers. As a link in bus-based safety technology it ensures that ASIsafe telegrams are converted to the PROFIsafe protocol.

The allocation of tasks is as follows:

- Identify: the safe sensors on the AS-Interface bus detect safety-related signals.
- Evaluate: the fail-safe SIMATIC or SINUMERIK control present performs the evaluation.
- Realize: the F-DO/F-RO modules (fail-safe digital/relay output modules) in the central controller or in the ET 200 fail-safe distributed peripherals react at PROFIsafe level.

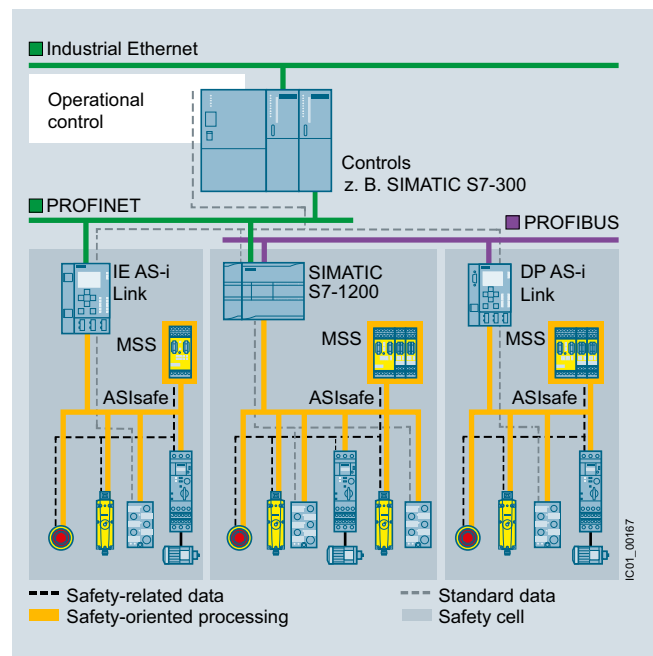
Higher-level control

In ASIsafe solutions, higher-level operational control of the nodes on the AS-Interface bus is performed by the central SIMATIC or SINUMERIK control.

Tested safety

The system was tested and approved by TÜV (Germany), NRTL (USA) and INRS (France). The transmission method for safety-related signals is configured for implementing applications up to PL e according to EN ISO 13849-1 and up to SIL 3 according to IEC 62061/IEC 61508.

ASIsafe Solution local:
3RK3 Modular Safety System



The local ASIsafe solution requires the Modular Safety System (MSS) and safe slaves. Neither fail-safe controllers nor special masters are required.

The allocation of tasks is as follows:

- Identify: the safe sensors on the AS-Interface bus detect safety-related signals.
- Evaluate: The Modular Safety System monitors safe sensors (e.g. EMERGENCY-STOP) and performs the evaluation.
- Realize: Shutdown is performed locally via ASIsafe in conjunction with safe AS-i outputs or via safe outputs integrated into the MSS.

Safe communication

The safe nodes (ASIsafe modules, EMERGENCY-STOP push-buttons, position switches with built-in ASIsafe etc.) send their information to the master in response to a master call in the same way as the standard nodes. The DP/AS-i F-Link or the Modular Safety System monitors transmissions from the safe nodes. In the event of a fault, they switch to safe condition or send a shut-down signal to one or more distributed safe AS-i outputs, which in turn switch to safe condition.

Configuring safety functions

In order to implement safe functions, the information from the safe and standard nodes must be combined logically and further parameters set. The configuration of the safety functions depends on which safety solution is being used:

- PROFIsafe ASIsafe solution:
In conjunction with the DP/AS-i F-Link as a safe master, all safety functions and combinations are configured via STEP 7 and processed in the controller.
- ASIsafe Solution local:
In conjunction with the Modular Safety System all safety functions and combinations are configured using the MSS ES software and processed in the MSS.

Benefits

- No fail-safe PLC or master is required with the Modular Safety System for the ASIsafe Solution local
- Alternatively integration in SIMATIC / SINUMERIK safety architectures with DP/AS-i F-Link (ASIsafe Solution PROFIsafe)
- Simple system structure thanks to standardized AS-Interface technique
- Safety-related and standard data on the same bus
- Existing systems can be expanded quickly and easily
- Optimum integration in TIA (Safety Diagnostics) and Safety Integrated
- Inclusion of the safety signals in the plant diagnostics, also on existing HMI panels
- Approved to PL e according to EN ISO 13849-1 or SIL 3 according to IEC 61508
- ASIsafe is certified by TÜV (Germany), NRTL (USA) and INRS (France)

Application

Integrated safety technology in the AS-Interface system is used wherever EMERGENCY-STOP pushbuttons, protective door interlocks, stop Category 0 and 1, two-hand operator controls and light arrays are installed.

More information

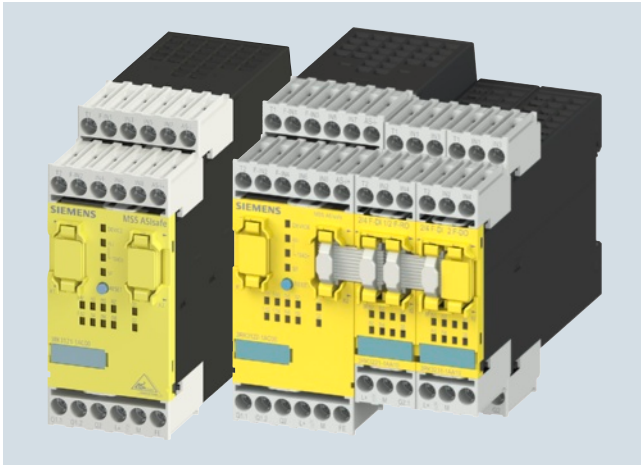
For more information and circuit examples for safety systems with the Modular Safety system and DP/AS-i F-Link, see <http://support.automation.siemens.com/WW/view/en/20208582>

AS-Interface

ASIsafe

SIRIUS 3RK3 Modular Safety System

Overview



MSS ASIsafe basic (left) and
MSS ASIsafe extended with two expansion modules (right)

The Modular Safety System (MSS) is the centerpiece of ASIsafe Solution local. It allows safety-related response to signals from the ASIsafe nodes connected in the AS-i network, such as safe input modules, EMERGENCY-STOP pushbuttons or position switches.

The MSS thus supports safety-related applications up to Category 4 according to ISO 13849-1 or SIL3 according to IEC 62061.

Safe disconnection takes place via the local safe outputs of the MSS or via the distributed safe AS-Interface outputs in the AS-Interface network.

The safety functions are configured within the MSS using the MSS ES software. The configuration can be transmitted directly in the MSS via the system interface with the aid of a PC cable or memory module. If the DP interface module is used, transmission via PROFIBUS DP is also possible.

The MSS supports a large number of different safety functions. These can be tailored to individual needs in the form of ready-made function blocks.

The safety functions supported include the following:

- EMERGENCY-STOP
- Safety shutdown mat
- Protective door monitoring
- Protective door tumbler mechanism
- Approval switches
- Two-hand operator controls
- ESPE monitoring
- Muting
- Mode selector switches

Application

All the MSS that can be used for the AS-Interface bus support the same safety functions. Differences exist in the number of inputs/outputs and expansion modules that can be connected, and hence in the number of independent enabling circuits.

Several MSS can be used on the same AS-Interface bus.

AS-Interface is available in the following versions:

MSS ASIsafe basic

- A total of up to 10 independent (2-channel) enabling circuits
 - 2 of these enabling circuits via safe outputs integrated into the central unit
 - And another 8 enabling circuits via ASIsafe, e.g. with local, safe AS-i outputs

MSS ASIsafe extended

- A total of up to 20 independent (2-channel) enabling circuits
 - 2 of these enabling circuits via safe outputs integrated into the central unit
 - In addition, up to 8 enabling circuits via a maximum of 2 expansion modules
 - And another 10 enabling circuits via ASIsafe, e.g. with local, safe AS-i outputs

MSS Advanced

- A total of up to 50 independent (2-channel) enabling circuits
 - 2 of these enabling circuits via safe outputs integrated into the central unit
 - In addition, up to 36 enabling circuits via a maximum of 9 expansion modules
 - And another 12 enabling circuits via ASIsafe, e.g. with local, safe AS-i outputs

Expandability

All versions above can be expanded by adding a DP interface module and a diagnostics module. In addition, various safety and non-safety expansion modules can be selected for the MSS, and these can be used in any combination, [see Chapter 11 "Safety Technology"](#).

Comparison of the three MSS versions

MSS 3RK3	ASIsafe basic	ASIsafe extended	Advanced
Number of independent (2-channel) enabling circuits	2 ... 10	2 ... 20	2 ... 50
Inputs	1/2 F-DI and 6 DI	2/4 F-DI and 4 DI (expandable)	4/8 F-DI (expandable)
Outputs	1 F-DO and 1 F-RO	1 F-DO and 1 F-RO (expandable)	
Number of expansion modules	--	Up to 2	Up to 9
Connection to ASIsafe			
Number of safe AS-i outputs	Up to 8	Up to 10	Up to 12
Number of safe AS-i inputs	Up to 31		

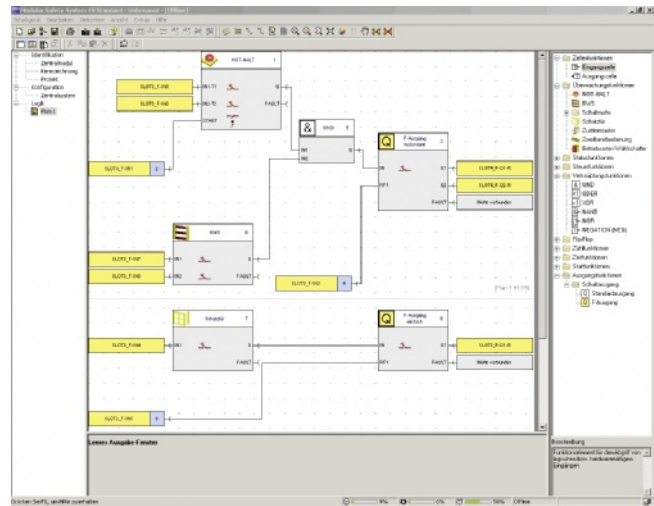
-- Not available

Software for startup, testing and diagnostics: Modular Safety System ES (MSS ES)

MSS ES is the engineering software for the configuration, startup and diagnostics of the 3RK3 Modular Safety System.

All function elements can be positioned using drag & drop. All functions – whether safety or logic functions – are available as blocks and can also be easily combined with one another.

MSS ES makes it possible to test the safety application by forcing. Outputs can be individually set in order to test in advance the reaction of the downstream safety function. In addition, the parameterization can be downloaded to the MSS via PROFIBUS. The integrated macro function allows you to compile a library of your own function elements for reuse in other projects. In addition, the parameterization software is suitable for use as a reliable diagnostics tool: the status of each element as well as the configuration as a whole can be viewed online.



MSS ES user interface showing the ISO-Plan display

Selection and ordering data

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

DT

Screw terminals



DT

Spring-type terminals



Article No.

Price
per PU

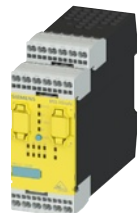
Article No.

Price
per PU

Central units



3RK3121-1AC00



3RK3121-2AC00

3RK3 ASIsafe basic

Central units for connecting to AS-Interface with safety-related inputs and outputs

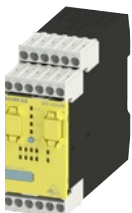
- 1/2 safe inputs
- 6 standard inputs
- 1 two-channel relay output
- 1 two-channel electronic output
- Memory module 3RK3931-0AA00 is included in the scope of supply
- No expansion modules can be connected

A

3RK3121-1AC00

A

3RK3121-2AC00



3RK3122-1AC00



3RK3122-2AC00

3RK3 ASIsafe extended

Central units for connecting to AS-Interface with safety-related inputs and outputs

- 2/4 safe inputs
- 4 standard inputs
- 1 two-channel relay output
- 1 two-channel electronic output
- Memory module 3RK3931-0AA00 is included in the scope of supply
- Max. 2 expansion modules can be connected

A

3RK3122-1AC00

A

3RK3122-2AC00



3RK3131-1AC10



3RK3131-2AC10

3RK3 Advanced

Central units for connecting to AS-Interface with safety-related inputs and outputs

- 4/8 safe inputs
- 1 two-channel relay output
- 1 two-channel electronic output
- Memory module 3RK3931-0AA00 is included in the scope of supply
- Max. 9 expansion modules can be connected

A

3RK3131-1AC10

A

3RK3131-2AC10

AS-Interface

ASIsafe

SIRIUS 3RK3 Modular Safety System

PU (UNIT, SET, M) = 1

PS* = 1 UNIT

PG = 42B

Version

DT

Screw terminals



DT

Spring-type terminals



Article No.

Price
per PU

Article No.

Price
per PU

Expansion modules



3RK3211-1AA10



3RK3211-2AA10

4/8 F-DI

Safety-related input modules

- 8 inputs

A

3RK3211-1AA10

A

3RK3211-2AA10



3RK3221-1AA10



3RK3221-2AA10

2/4 F-DI 1/2 F-RO

Safety-related input/output modules

- 4 inputs
- 2 single-channel relay outputs

A

3RK3221-1AA10

A

3RK3221-2AA10



3RK3231-1AA10



3RK3231-2AA10

2/4 F-DI 2F-DO

Safety-related input/output modules

- 4 inputs
- 2 two-channel electronic outputs

A

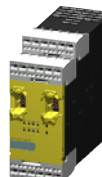
3RK3231-1AA10

A

3RK3231-2AA10



3RK3251-1AA10



3RK3251-2AA10

4/8 F-RO

Safety-related output modules

- 8 single-channel relay outputs

A

3RK3251-1AA10

A

3RK3251-2AA10



3RK3242-1AA10



3RK3242-2AA10

4 F-DO

Safety-related output modules

- 4 two-channel electronic outputs

A

3RK3242-1AA10

A

3RK3242-2AA10



3RK3321-1AA10



3RK3321-2AA10

8 DI

Standard input module

- 8 inputs

A

3RK3321-1AA10

A

3RK3321-2AA10



3RK3311-1AA10



3RK3311-2AA10

8 DO

Standard output module

- 8 electronic outputs

A

3RK3311-1AA10

A

3RK3311-2AA10

SIRIUS 3RK3 Modular Safety System

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

DT

Screw terminals



DT

Spring-type terminals



Article No.

Price
per PU

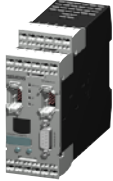
Article No.

Price
per PU

Interface modules



3RK3511-1BA10



3RK3511-2BA10

DP interface

PROFIBUS DP interface, 12 Mbit/s,
 RS 485, cyclic and acyclic data
 exchange

A

3RK3511-1BA10

A

3RK3511-2BA10

Operating and monitoring modules



3RK3611-3AA00

Diagnostics module

For direct display of errors,
 e.g. of crossover

A

3RK3611-3AA00

--

More information

For more information and technical specifications on the Modular Safety System (MSS), see [Chapter 11 "Safety Technology"](#)

For more information on the Modular Safety System ES (MSS ES) software, see [Chapter 14 "Parameterization, Configuration and Visualization with SIRIUS"](#).

Manuals for the Modular Safety System (MSS) see <http://support.automation.siemens.com/WW/view/en/26493228>

AS-Interface

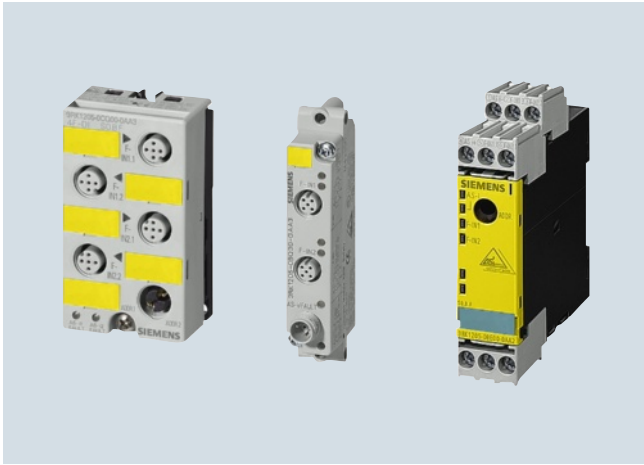
ASIsafe

AS-Interface safety monitors

Selection and ordering data

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1105-1BE04-0CA0	Basic safety monitors		Screw terminals 				
	Version 3 With screw terminals, removable terminals, width 45 mm						
	• One enabling circuit (monitor type 1)	A	3RK1105-1AE04-0CA0		1	1 unit	42C
	• Two enabling circuits (monitor type 2)	A	3RK1105-1BE04-0CA0		1	1 unit	42C
	Expanded safety monitors						
	Version 3 With screw terminals, removable terminals, width 45 mm						
	• One enabling circuit (monitor type 3)	A	3RK1105-1AE04-2CA0		1	1 unit	42C
	• Two enabling circuits (monitor type 4)	A	3RK1105-1BE04-2CA0		1	1 unit	42C
	Expanded safety monitors with integrated safe slave						
	Version 3 With screw terminals, removable terminals, width 45 mm						
	• Two enabling circuits including control of a safe AS-i output/safe coupling (monitor type 6)	A	3RK1105-1BE04-4CA0		1	1 unit	42C
	Basic safety monitors		Spring-type terminals 				
	Version 3 With spring-type terminals, removable terminals, width 45 mm						
	• One enabling circuit (monitor type 1)	A	3RK1105-1AG04-0CA0		1	1 unit	42C
	• Two enabling circuits (monitor type 2)	A	3RK1105-1BG04-0CA0		1	1 unit	42C
	Expanded safety monitors						
	Version 3 With spring-type terminals, removable terminals, width 45 mm						
	• One enabling circuit (monitor type 3)	A	3RK1105-1AG04-2CA0		1	1 unit	42C
	• Two enabling circuits (monitor type 4)	A	3RK1105-1BG04-2CA0		1	1 unit	42C
	Expanded safety monitors with integrated safe slave						
	Version 3 With spring-type terminals, removable terminals, width 45 mm						
	• Two enabling circuits including control of a safe AS-i output/safe coupling (monitor type 6)	A	3RK1105-1BG04-4CA0		1	1 unit	42C
Accessories							
 3RK1901-5AA00	ASIsafe CD ▶		3RK1802-2FB06-0GA1		1	1 unit	42C
	Included in the scope of supply:						
	• ASIMON V3 configuration software on CD ROM, for PC with the 32-bit operating systems Windows XP, Windows Vista Business/Ultimate, Windows 7						
	Cable sets ▶		3RK1901-5AA00		1	1 unit	42C
	Included in the scope of supply:						
• PC configuration cable for communication between PC (serial interface) and safety monitor, length approx. 1.50 m							
• Transfer cable between two safety monitors, length approx. 0.25 m							
Sealable covers		B	3RP1902		1	5 units	41H
For securing against unauthorized configuration of the safety monitor							
Push-in lugs		B	3RP1903		1	10 units	41H
For screw fixing							

Overview



AS-Interface safety modules: K45F (left), K20F (center) and S22.5F (right)



S45F SlimLine module, safe AS-i output

Safety modules for AS-Interface (ASIsafe modules) are available for field use in degree of protection IP67 (K20F and K45F compact modules) and for the control cabinet (S22.5F SlimLine modules) in degree of protection IP20.

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

All modules for the connection of (mechanical) switches and safety sensors with contacts feature crossover monitoring of the connected sensor line. On versions for the connection of solid-state switches and safety sensors (e.g. light arrays) the crossover monitoring must be performed by the sensor.

The following modules are available for selection:

K20F compact safety modules for use in the field

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

K45F compact safety modules for use in the field

The platform of the K45F modules covers the following variations:

- Connection of ("mechanical") switches/safety sensors with contacts:
 - K45F 2F-DI: Two safety-related inputs in operation up to Category 2 according to EN ISO 13849-1. If Category 4 is required, a two-channel input is available on the module.
 - K45F 2F-DI/2DO: There are also two standard outputs in addition to the safe inputs. Supplied from the yellow AS-i cable
 - K45F 2F-DI/2DO U_{aux} : same as K45F 2F-DI/2DO, but supplied from the black 24 V DC cable
 - K45F 4F-DI: Four safety-related inputs in operation up to Category 2, two for Category 4. Extremely compact double slave (uses two full AS-i addresses).
- Connection of solid-state switches / safety sensors (non-contact protective devices, ESPE):
 - K45F LS (light sensor): Safe input module for the connection of electronic safety sensors with testing semiconductor outputs (OSSD)

In particular non-contact protective devices such as active, optoelectronic light arrays and light curtains for Type 2 and Type 4 according to IEC 61496. Transmitters as well as receivers are supplied with power from the yellow AS-i cable. Matching sensor cables and optionally a separate transmitter supply module are available as accessories.

S22.5F SlimLine safety modules for use in control cabinets and local control cabinets

The S22.5F SlimLine safety module has two safety inputs. The safe connection of signals to ASIsafe networks in the cabinet is also possible therefore. For operation up to Category 2, both inputs can be separately assigned; if Category 4 is required, a two-channel input is available on the module.

In addition there are two S22.5F module versions which have two standard outputs in addition to the two safety inputs; power is supplied either from only the yellow AS-Interface cable or as auxiliary voltage from the black 24 V DC cable.

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

With the safe SlimLine-Module S45F, the shutdown signal, for example from the Modular Safety System, can be used through the ASIsafe for distributed safety-related disconnection.

To this end, the module has a dual-channel relay output with which an enabling circuit up to safety category 4 and Performance Level e according to EN ISO 13849-1 and SIL 3 according to EN 62061 / IEC 61508 can be deactivated safely.

As an additional possibility the module offers normal switching of the output using an AS-i standard output bit.

The module has three digital inputs and two digital outputs for the additional connection of sensors and actuators. These can be used, inter alia, for the necessary monitoring of downstream contactors of the feedback circuit.

AS-Interface

ASIsafe

AS-Interface safety modules

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
K20F compact safety modules						
I/O type	U_{aux} 24 V					
2 F-DI	--	A	3RK1205-0BQ30-0AA3	1	1 unit	42C
K45F compact safety modules						
Modules supplied without mounting plate						
I/O type	U_{aux} 24 V					
2 F-DI	--	▶	3RK1205-0BQ00-0AA3	1	1 unit	42C
4 F-DI ¹⁾	--	A	3RK1205-0CQ00-0AA3	1	1 unit	42C
2 F-DI/2 DO	--	B	3RK1405-0BQ20-0AA3	1	1 unit	42C
2 F-DI/2 DO	✓	B	3RK1405-1BQ20-0AA3	1	1 unit	42C
2 F-DI LS type 2 ²⁾	--	B	3RK1205-0BQ21-0AA3	1	1 unit	42C
2 F-DI LS type 4 ³⁾	--	B	3RK1205-0BQ24-0AA3	1	1 unit	42C
S22.5F SlimLine safety modules						
Connection	I/O type	U_{aux} 24 V				
Screw 	2 F-DI	--	A	3RK1205-0BE00-0AA2	1	1 unit 42C
	2 F-DI/2 DO	--	A	3RK1405-0BE00-0AA2	1	1 unit 42C
	2 F-DI/2 DO	✓	A	3RK1405-1BE00-0AA2	1	1 unit 42C
Spring-type 	2 F-DI	--	A	3RK1205-0BG00-0AA2	1	1 unit 42C
	2 F-DI/2 DO	--	B	3RK1405-0BG00-0AA2	1	1 unit 42C
	2 F-DI/2 DO	✓	B	3RK1405-1BG00-0AA2	1	1 unit 42C
S45F SlimLine safety modules						
Connection	I/O type	U_{aux} 24 V				
Screw 	1F-RO/3DI/2DO	✓	X	3RK1405-1SE15-0AA2	1	1 unit 42C
Spring-type 	1F-RO/3DI/2DO	✓	X	3RK1405-1SG15-0AA2	1	1 unit 42C

✓ Available or possible

-- Not available or not possible

¹⁾ Module occupies two AS-Interface addresses

²⁾ Connection of previous Siemens light curtain FS 400 3RG7843 (type 2) through socket 1/3

³⁾ Connection of previous Siemens light curtain FS 400 3RG7846 (type 4) through socket 1/3, other makes through socket 2/3

Accessories

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	
 3RK1901-2EA00	K45 mounting plates For mounting K45F - For wall mounting - For standard rail mounting						
	▶	3RK1901-2EA00		1	1 unit	42C	
	▶	3RK1901-2DA00		1	1 unit	42C	
 3RK1901-1AA00	24 V supply modules for K45F LS (light sensor) - Optional, for transmitter power supply for large protective field widths - Max. current carrying capacity 200mA - Modules supplied without mounting plate	B	3RK1901-1NP00		1	1 unit	42C
	Input bridges for K45F - Black version - Red version	A	3RK1901-1AA00		1	1 unit	42C
		D	3RK1901-1AA01		1	1 unit	42C
 3RK1901-1KA00	AS-Interface M12 sealing caps For free M12 sockets	▶	3RK1901-1KA00		100	10 units	42C
	AS-Interface M12 sealing caps, tamper-proof For free M12 sockets	A	3RK1901-1KA01		100	10 units	42C
 3RK1901-1KA01							

Overview



CM 1243-2 communication module for S7-1200

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

- Connection of up to 62 AS-Interface slaves
- Integrated analog value transmission
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- Indication of the operating state on the front of the device displayed via LED
- Display of operating mode, AS-Interface voltage faults, configuration faults and peripheral faults via LED behind the front panel
- Compact enclosure in the design of the SIMATIC S7-1200
- Suitable for AS-i power 24V: In combination with the optional DCM 1271 data decoupling module, a standard 24 V power supply unit can be used.
- Configuration and diagnostics via the TIA portal

Design

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

It has:

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

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

Function

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

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

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

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

The optional DCM 1271 data decoupling module has an integrated detection unit for detecting ground faults on the AS-Interface cable. The integrated overload protection also disconnects the AS-Interface cable if the drive power required exceeds 4 A.

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

To configure CM 1243-2, you require STEP 7 V11+ SP2 or STEP 7 V12 or higher.

For STEP 7 V11+ SP2 or higher, you require the additional Hardware Support Package for CM 1243-2, which is available via the Service & Support portal, see under <http://support.automation.siemens.com/WW/view/en/54164095>

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

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

Benefits

- More flexibility and versatility in the use of SIMATIC S7-1200 as the result of a significant increase in the number of digital and analog inputs/outputs available
- Very easy configuration and diagnostics of the AS-Interface via the TIA Portal (STEP 7 V11+ SP2 or higher)
- No need for the AS-i power supply unit with AS-i Power24V: The AS-Interface cable is supplied through an existing 24 V DC PELV power supply unit. For decoupling, the AS-i DCM 1271 data decoupling module is required, [see page 2/76](#)
- LEDs for indication of fault statuses for fast diagnostics
- Monitoring of AS-Interface voltage facilitates diagnostics

Application

The CM 1243-2 is the AS-Interface master connection for the 12xx CPUs of the SIMATIC S7-1200. Connection to the AS-Interface greatly increases the number of inputs and outputs available for S7-1200 (max. 496 DI/496 DO on the AS-Interface per CM).

The integrated analog value processing also makes the analog values available at the AS-Interface for the S7-1200 (per CM up to 31 standard analog slaves, each with up to 4 channels, or up to 62 A/B analog slaves, each with up to 2 channels).

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK7243-2AA30-0XB0		CM 1243-2 communication modules				
	A	3RK7243-2AA30-0XB0		1	1 unit	42C
		• AS-Interface masters for SIMATIC S7-1200 • Corresponds to AS-Interface Specification V3.0; • Dimensions (W × H × D / mm): 30 × 100 × 75				

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 		1	1 unit	42C
		3RK1901-3MA00				

More information

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

AS-Interface

Masters

Masters for SIMATIC S7 CP 243-2

Overview



CP 243-2

The CP 243-2 is the AS-Interface master for the SIMATIC S7-200 and has the following features:

- Connection of up to 62 AS-Interface slaves
- Integrated analog value transmission (Analog Profiles 7.3 and 7.4)
- Supports all AS-Interface master functions according to the extended AS-Interface specification V2.1
- Display of the operating state and readiness for operation of connected slaves by means of LEDs in the front panel
- Fault indications (e.g. AS-Interface voltage fault, configuration fault) by means of LEDs in the front panel
- Compact enclosure in the design of the SIMATIC S7-200

Design

The CP 243-2 is connected like an expansion module to the S7-200. It has:

- Two screw terminals for direct connection of the AS-Interface cable
- LEDs in the front panel for indicating the operating state and functional readiness of all connected slaves
- Two pushbuttons for displaying the status information of the slaves, for switching over the operating state and for adopting the existing ACTUAL configuration as the DESIRED configuration

Function

The CP 243-2 supports all specified functions of the extended AS-Interface Specification V2.1.

In the process image of the S7-200, the CP 243-2 occupies one digital input byte (status byte), one digital output byte (control byte), and 8 analog input and 8 analog output words. The CP 243-2 thus occupies two (logic) slots. The operating mode of the CP 243-2 can be set with the status byte and the control byte using the user program. Depending on the operating mode, the CP 243-2 saves either the digital or analog I/O data of the AS-Interface slaves or diagnostic values in the analog address area of the S7-200, or it enables master calls (e.g. re-addressing of the slaves).

Configuration

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

Benefits

- More flexibility and versatility in the use of SIMATIC S7-200 as the result of the distinct increase in the number of digital and analog inputs/outputs available
- Shorter startup times through simple configuration at the press of a button
- Reduction of standstill and servicing times in the event of a fault thanks to the LED indicators
- Status of the CP
 - Display of all the slaves connected and their readiness for operation
 - Monitoring of the AS-Interface mains voltage

Application

The CP 243-2 is the AS-Interface master connection for the 22x CPUs of the SIMATIC S7-200. By means of connection to AS-Interface, the number of inputs and outputs available for the S7-200 is greatly increased (max. 248 DI / 186 DO on the AS-Interface per CP).

Analog values (per CP a maximum of 31 standard analog slaves with up to 4 channels each) also become available on the AS-Interface for the S7-200 thanks to the integrated analog value processing. On the S7-200, up to two CP 243-2 communications processors can be operated simultaneously.

Selection and ordering data

Version	DT	Screw terminals	PU (UNIT, SET, M)	PS*	PG
		Article No.	Price per PU		
 6GK7243-2AX01-0XA0	▶	CP 243-2 communications processors For connection of the SIMATIC S7-200 to AS-Interface; corresponds to AS-Interface Specification V2.1; not approved for AS-I Power24V; dimensions (W x H x D / mm): 71 x 80 x 62 (dimensions without fixing lugs)			
		6GK7243-2AX01-0XA0		1	1 unit 42C

More information

The manuals are also available on the Internet at
<http://support.automation.siemens.com/WW/view/en/10805937/133300>

Overview



CP 343-2P / CP 343-2

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

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

The CP 343-2P / CP 343-2 performs the following features:

- Connection of up to 62 AS-Interface slaves
- Integrated analog value transmission (all analog profiles)
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- Status displays of operating states and indication of the readiness for operation of connected slaves by means of LEDs in the front panel
- Fault indications (e.g. AS-Interface voltage fault, configuration fault) by means of LEDs in the front panel
- Compact enclosure in the design of the SIMATIC S7-300
- Suitable for AS-i Power24V (from product version 2/firmware version 3.1) and for standard AS-i with 30 V voltage.
- With CP 343-2P additionally: Supports the configuration of the AS-Interface-network with STEP 7 V5.2 and higher

Design

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

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

Function

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

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

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

For more information see

<http://support.automation.siemens.com/WW/view/en/51678777>

Configuration

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

With CP 343-2P additionally

The CP 343-2P also supports configuring of the AS-Interface network with STEP 7 V5.2 and higher. Specifying the AS-i configuration in HW-Config facilitates the setting of slave parameters and documentation of the plant. Uploading the ACTUAL configuration of an already configured AS-Interface network is also supported. The saved configuration cannot be overwritten at the press of a button and is therefore tamper-proof.

Benefits

- Shorter startup times through simple configuration at the press of a button
- Using it in the ET 200M distributed I/O system allows flexible machine-related structures to be constructed
- Provides diagnostics of the AS-Interface network
- Well suited also for complex applications thanks to connection options for 62 slaves and integral analog value processing
- Reduction of standstill and servicing times in the event of a fault thanks to the LED indicators:
 - Status of the AS-Interface network
 - Slaves connected and their readiness for operation
 - Monitoring of the AS-Interface mains voltage
- Lower costs for stock keeping and spare parts because the CP can be used for the SIMATIC S7-300 as well as for the ET 200M
- With CP 343-2P additionally: Improved plant documentation and support for service assignments thanks to a description of the AS-Interface configuration in the STEP 7 project
- No need for the AS-i power supply unit with AS-i Power24V: The AS-Interface cable is supplied through an existing 24 V DC PELV power supply unit. An AS-i data decoupling module (e.g. 3RK1901-1DE12-1AA0) is required for the decoupling, [see page 2/76](#).
- Operation with AS-Interface power supply ([see page 2/76](#)) possible without restrictions.

AS-Interface

Masters

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

Application

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

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

With the integrated analog value processing, it is easy to transmit analog signals (per CP up to 62 A/B analog slaves with a maximum of 2 channels each or up to 31 standard analog slaves with a maximum of 4 channels each).

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

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 6GK7343-2AH11-0XA0	▶	CP 343-2P communications processors		1	1 unit	42C
		For connection of SIMATIC S7-300 and ET 200M to AS-Interface; configuration of the AS-i network using the SET key or STEP 7 (V5.2 and higher); without front connector; corresponds to AS-Interface Specification V3.0; dimensions (W x H x D / mm): 40 x 125 x 120				
 6GK7343-2AH01-0XA0	▶	CP 343-2 communications processors		1	1 unit	42C
		Basic version for connection of SIMATIC S7-300 and ET 200M to AS-Interface Configuration of the AS-i network using the SET key; without front connector; corresponds to AS-Interface Specification V3.0; dimensions (W x H x D / mm): 40 x 125 x 120				

Accessories

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Front connector, 20-pole						
• With screw terminals		A	6ES7392-1AJ00-0AA0	1	1 unit	230
• With spring-type terminals		A	6ES7392-1BJ00-0AA0	1	1 unit	230
• With FastConnect connection		A	6ES7392-1CJ00-0AA0	1	1 unit	2AP

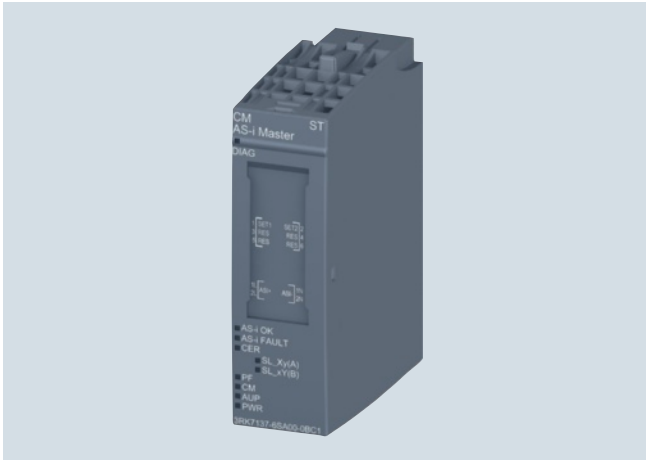
More information

The manuals are available on the Internet at
<http://support.automation.siemens.com/WW/view/en/14310380/133300>

Information about AS-i block library for PCS 7 for easy connection of AS-Interface to PCS 7 [see](#)

- Chapter 14 "Parameterization, Configuration and Visualization with SIRIUS" → "AS-Interface Block Library for SIMATIC PCS 7"
- Industry Mall: "Automation"
→ "Industrial controls"
→ "Parameterization, Configuration and Visualization with SIRIUS" → "AS-Interface Block Library for SIMATIC PCS 7"

Overview



CM AS-i Master ST for SIMATIC ET 200SP

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

- Connection of up to 62 AS-Interface slaves
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- User-friendly configuration with graphic display of the AS-i line in TIA Portal V12.0 or in other systems by using GSD
- Supply via AS-Interface cable
- Suitable for AS-i Power24V and for AS-Interface with 30 V voltage
- Integrated ground-fault monitoring for the AS-Interface cable
- Through connection to AS-Interface and in combination with ET 200SP, the number of digital inputs and outputs available for the control system is greatly increased (max. 496 DI / 496 DO on the AS-Interface per CM).
- Integrated analog value processing (all analog profiles)

Basic unit: ET 200SP distributed I/O system

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

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

For more information see "ET 200SP System Manual" at

<http://support.automation.siemens.com/WW/view/en/58649293>

Design

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

The CM AS-i Master ST has LED indicators for diagnostics, operation, AS-i voltage and AS-i slave status.

The CM AS-i Master ST offers informative front-side module inscription for

- Plain-text marking of the module type and function class
- 2D matrix code (article number and serial number)
- Circuit diagram
- Color coding of the CM module type: Blue
- Hardware and firmware version
- Complete order number

Function

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

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

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

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

Notes on safety

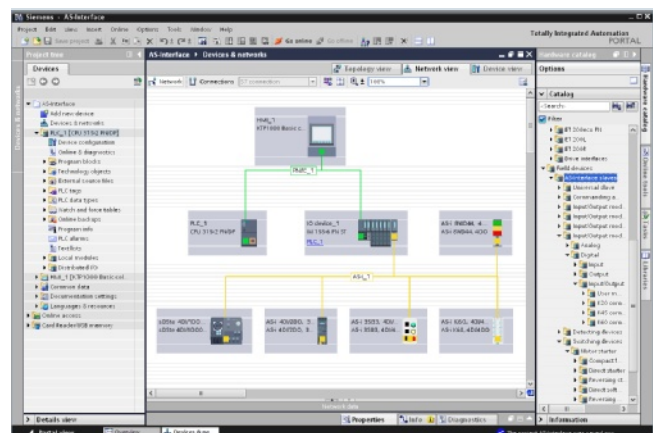
The use of this product requires suitable protective measures (e.g. network segmentation for IT security among others) in order to ensure safe plant operation, see www.siemens.com/industrialsecurity.

Configuration

Configuration of the CM AS-i Master ST requires TIA Portal V12 or the updated version of STEP 7 V5.5 SP4 or the GSD file.

The TIA Portal enables user-friendly configuration and diagnostics of the AS-i master and any connected slaves.

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



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

AS-Interface

Masters

Master for SIMATIC ET 200 CM AS-i Master for ET 200SP

Benefits

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

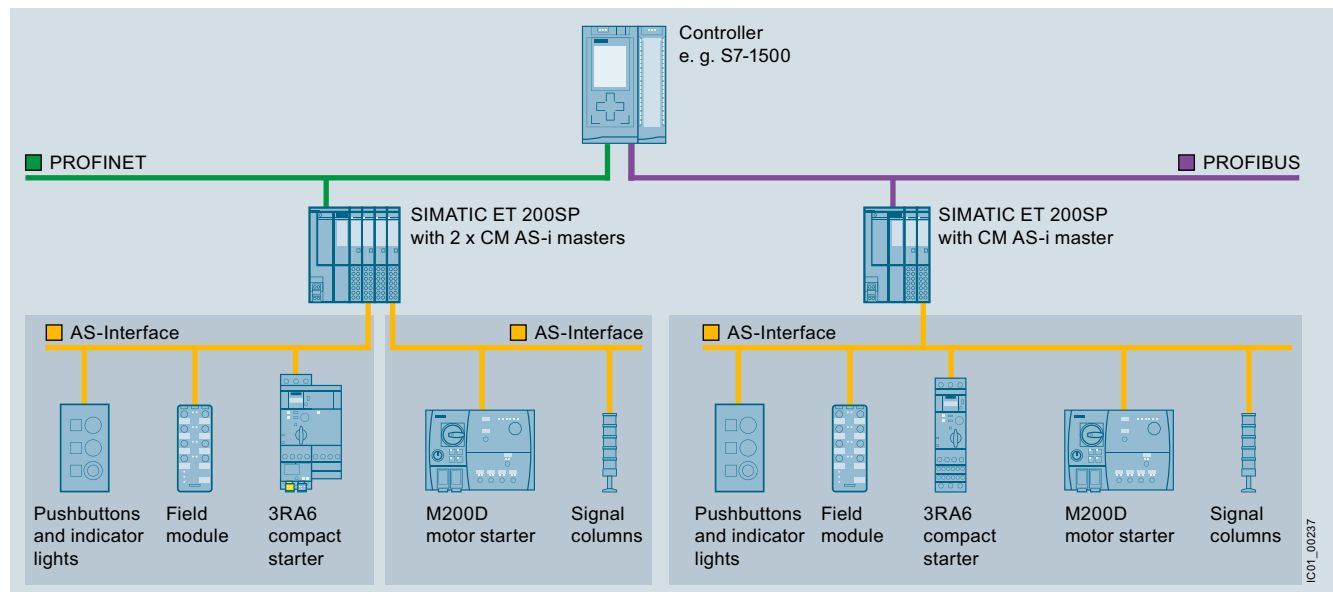
Up to eight CM AS-i masters can be plugged into one ET 200SP station with IM 155-6PN ST. The maximum configuration depends on the interface module used.

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

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

Application

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



Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK7137-6SA00-0BC1		CM AS-i Master ST communication modules				
	A	3RK7137-6SA00-0BC1		1	1 unit	42C
		- AS-Interface master for SIMATIC ET 200SP, can be plugged onto BaseUnit type C0 - Corresponds to AS-Interface Specification V3.0 - Dimensions (W × H × D / mm): 20 x 73 x 58				
 6ES7155-6AA00-0BN0		PROFINET IM 155-6PN ST interface modules				
	A	6ES7155-6AU00-0BN0		1	1 unit	255
	A	6ES7155-6AA00-0BN0		1	1 unit	255
		Including server module (bus adapter must be ordered separately) Including server module and bus adapter 2 x RJ45				

Master for SIMATIC ET 200 CM AS-i Master for ET 200SP

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
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Variable bus adapters for PROFINET

For connection of the Ethernet cable to the PROFINET IM interface module

- Connection 2 x RJ45

A **6ES7193-6AR00-0AA0** 1 1 unit 255



6ES7193-6AR00-0AA0

- Connection 2 x FC (FastConnect)

A **6ES7193-6AF00-0AA0** 1 1 unit 255



6ES7193-6AF00-0AA0

Accessories

Version	DT	Spring-type terminals 	PU (UNIT, SET, M)	PS*	PG
		Article No.	Price per PU		

BaseUnits

- BU20-P6+A2+4D BaseUnit for CM AS-i Master ST to ET 200SP
- Type C0
- For connection of AS-Interface cable to the CM AS-i master

A **6ES7193-6BP20-0DC0** 1 1 unit 255



6ES7193-6BP20-0DC0

More information

Manuals

CM AS-i Master ST manual [see](http://support.automation.siemens.com/WW/view/en/61757442/133300)
<http://support.automation.siemens.com/WW/view/en/61757442/133300>

BaseUnits manual [see](http://support.automation.siemens.com/WW/view/en/59753521)
<http://support.automation.siemens.com/WW/view/en/59753521>

ET 200SP system manual [see](http://support.automation.siemens.com/WW/view/en/58649293)
<http://support.automation.siemens.com/WW/view/en/58649293>

Industry Mall

More information
see Industry Mall at "Automation Technology"
→ "Industrial Communication" → "AS-Interface" → "Masters"
→ "Masters for SIMATIC ET 200"

AS-Interface

Routers

DP/AS-i LINK Advanced

Overview



DP/AS-i LINK Advanced

PN	DP-M	DP-S	ASi-M		
		●	●		

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

- Single and double AS-Interface master (according to AS-Interface Specification V3.0) for connection of 62 AS-Interface slaves or 124 AS-Interface slaves (with a double master)
- Integrated analog value transmission (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 PROFIBUS GSD file
- Vertical integration (standard web interface) through Industrial Ethernet
- Supply voltage from the AS-Interface shaped cable or alternatively with 24 V DC (optional)
- Suitable for AS-i Power24V (from product version 4 / firmware version 2.2) and for Standard AS-i with 30 V voltage
- Module exchange without entering the connection parameters (e.g. PROFIBUS address) using C-PLUG (optional)

Design

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

Functionality

Communications

The DP/AS-i LINK Advanced enables a PROFIBUS DP master to cyclically access the I/O data of all the slaves of a lower-level AS-Interface segment. Also supported are the expanded slave types with higher I/O data volume according to AS-i Specification V3.0.

The DP/AS-i LINK Advanced occupies the following address area:

- As a single master: 32 bytes of input data and 32 bytes of output data in which the I/O data of the connected AS-Interface slaves (standard and A/B 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 DP master. The integrated evaluation of analog signals is just as easy as access to digital values because the analog process data also lie directly in the I/O address area of the CPU.

PROFIBUS DP-V1 Masters also provide the option of triggering AS-Interface Master calls over the acyclic PROFIBUS services (e.g. write parameters, amend addresses, read diagnostic values). Using an operating display in AS-i Link it is possible to fully commission the lower-level AS-Interface line.

DP/AS-i LINK Advanced is equipped with an additional Ethernet port which enables use of the integrated web server. The web server can be called up with any standard web browser (e.g. Internet Explorer) without additional software. It allows all diagnostics information to be shown on the PC and the bus configuration and, if applicable, any adjustments, to be displayed. Firmware updates are also possible using this port. The optional C-PLUG supports module exchange without entering the connection parameters (PROFIBUS address etc.), keeping downtimes to a minimum in the event of a fault.

Diagnostics

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

- Operating state of the DP/AS-i LINK Advanced
- Status of the link as a PROFIBUS DP slave
- Diagnostics of the AS-Interface network
- Message frame statistics
- Standard diagnostics pages in the web interface for fast diagnostics access through Ethernet using a standard browser
- For the use of the web interfaces no network settings are necessary on the PC (Zeroconf procedure).
- The reporting of diagnostic events is optionally possible via 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 DP/AS-i LINK Advanced can be configured as follows:

- With STEP 7 as of V5.4: With STEP 7 the AS-Interface configuration can be uploaded in STEP 7. Furthermore, AS-Interface slaves can also be conveniently configured in HW-Config (slave selection dialog).
- By adopting the ACTUAL configuration of the AS-Interface on the display
- Alternatively DP/AS-i LINK Advanced can be integrated into the engineering tool over the PROFIBUS GSD file (e.g. STEP 7 versions below V5.4 or engineering tools from third-party software houses).

Benefits

- Short startup times through simple configuration at the press of a button and testing of the AS-Interface line using the display or web interface
- Reduction of standstill and servicing times in the event of a slave failure thanks to user-friendly diagnostics using the display or web interface and through simple module exchange with the help of the C-PLUG exchange medium
- Reduced amount of engineering work thanks to user-friendly configuration of Siemens slaves using the slave catalog in HW-Config (STEP 7)
- Costs saved by the double AS-Interface master when large volumes of project data are involved
- 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 Advanced is a PROFIBUS DP-V1 slave (according to IEC 61158/IEC 61784) and an AS-Interface master (based on AS-Interface Specification V3.0 according to IEC 62026-2). It enables transparent data access to AS-Interface from PROFIBUS DP.

Exchanging data with the PROFIBUS DP master

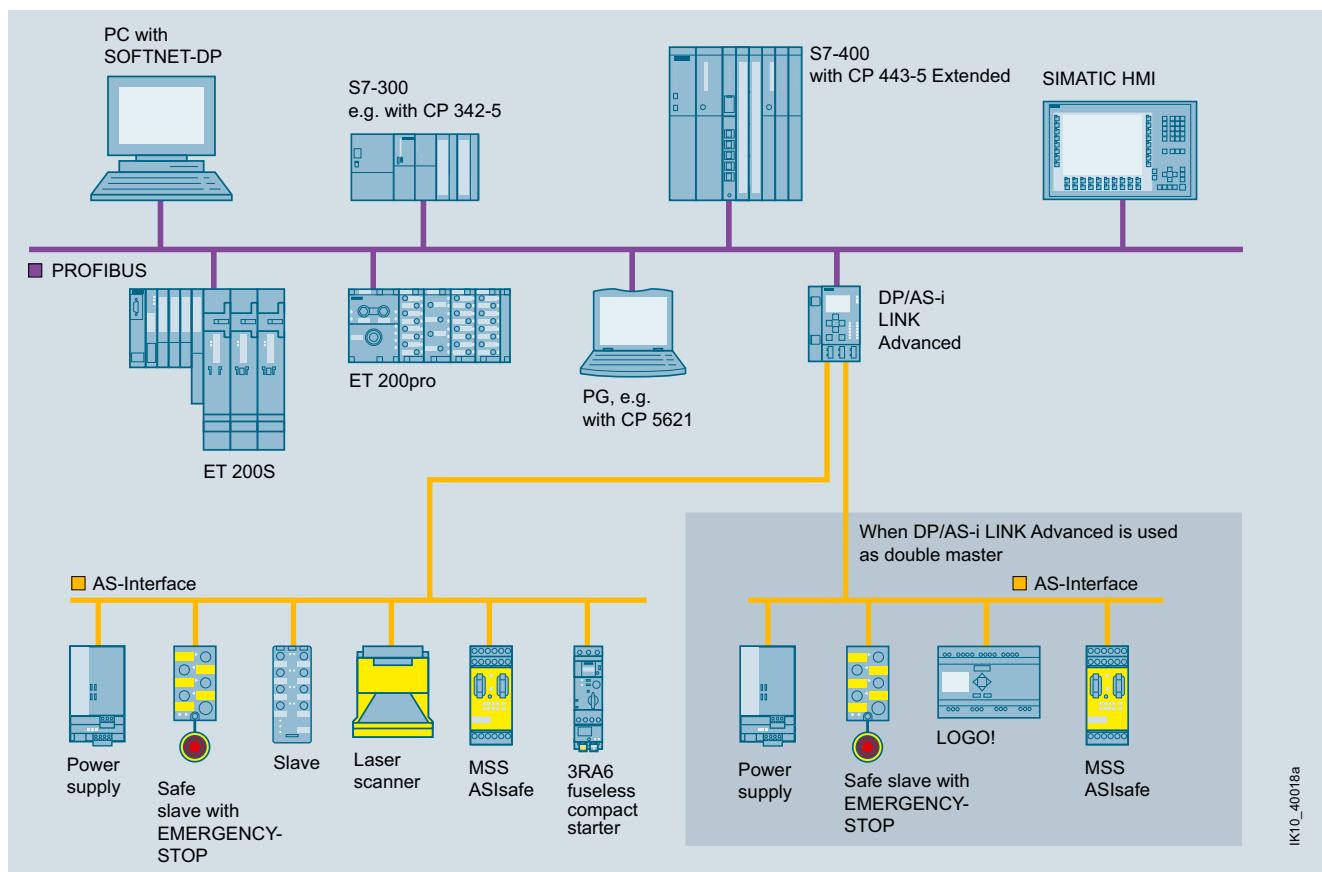
PROFIBUS DP masters (DP-V0) can exchange I/O data with AS-Interface in cyclic mode. PROFIBUS DP masters with acyclic services (DP-V1) are able in addition to initiate AS-Interface master calls (e.g. reading/writing the AS-i configuration during normal operation). As such, the DP/AS-i LINK Advanced is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

Single masters

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

Double masters

For applications with large volumes of project data, the DP/AS-i LINK Advanced is used in its version as an AS-Interface double master. In this case, twice the volume of project data can be used on two AS-Interface lines running independently of each other. The double master can operate up to 496 DI/496 DO, using 2 AS-i networks each with 62 A/B slaves with 4DI/4DO each.



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

AS-Interface

Routers

DP/AS-i LINK Advanced

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
DP/AS-i LINK Advanced						
 DP/AS-i LINK Advanced		Router between PROFIBUS DP and AS-Interface; Degree of protection IP20; including COMBICON plug-in screw terminals for connection of an AS-Interface cable (two AS-Interface cables for double masters) and the optional 24 V supply; corresponds to AS-Interface Specification 3.0; dimensions (W x H x D / mm): 90 x 132 x 88.5	Combicon connection 			
	►	• Single master with display	6GK1415-2BA10	1	1 unit	42C
	►	• Double master with display	6GK1415-2BA20	1	1 unit	42C
Accessories						
C-PLUG	A	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	6GK1900-0AB00	1	1 unit	5N3
PROFIBUS FastConnect Standard Cable GP	A	FastConnect standard type with special design for fast installation, 2-core, shielded	6XV1830-0EH10	1	1 M	5K1
PROFIBUS FastConnect RS485 bus connectors with angled cable feeder (35°)		With insulation displacement connection, the max. transmission rate is 12 Mbit/s. Activatable terminating resistor is integrated				
• Without PG connection socket	A		6ES7972-0BA60-0XA0	1	1 unit	250
• With PG connection socket	A		6ES7972-0BB60-0XA0	1	1 unit	250
PROFIBUS FastConnect Stripping Tool	A	Preset stripping tool for speedy stripping of PROFIBUS FastConnect bus cables	6GK1905-6AA00	1	1 unit	5K2
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

More information

The manuals are available on the Internet at
<http://support.automation.siemens.com/WW/view/en/28602701/133300>

AS-i block library for PCS 7 for easy connection of AS-Interface to PCS 7 [see](#)

- Chapter 14
 → "Parameterization, Configuration and Visualization with SIRIUS" → "AS-Interface Block Library for SIMATIC PCS 7"
- Industry Mall: "Automation"
 → "Industrial controls"
 → "Parameterization, Configuration and Visualization with SIRIUS" → "AS-Interface Block Library for SIMATIC PCS 7"

Overview



DP/AS-Interface Link 20E

PN	DP-M	DP-S	ASi-M		
		●	●		K10_1056

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

- PROFIBUS DP slave and AS-Interface master
- Up to 62 AS-Interface slaves, each with 4 digital inputs and 4 digital outputs as well as analog slaves can be connected
- Integrated analog value transmission (all analog profiles)
- Supports all AS-Interface master functions according to the AS-Interface Specification V3.0
- Supply from AS-Interface cable; hence no additional power supply required
- Suitable for AS-i Power24V (from product version 2 / firmware version 3.1) and for Standard AS-i with 30 V voltage
- Supports the uploading of the AS-Interface configuration in STEP 7 V5.2 and higher

Design

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

Functionality

Communications

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

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

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

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

Configuration

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

- With STEP 7 as of Version V5.1 SP2:
With STEP 7 configuring the AS-Interface configuration can be uploaded in STEP 7 V5.2 and higher. Furthermore, AS-Interface slaves from Siemens can also be conveniently configured in HW Config (slave selection dialog).
- By adopting the ACTUAL configuration of the AS-Interface by using the SET pushbutton on the front panel
- Alternatively, DP/AS-Interface Link 20E can be integrated by means of the PROFIBUS GSD file in the engineering tool (e.g. for STEP 7 V5.1 and lower or for non-Siemens engineering tools).

Benefits

- Reduction of installation costs because the power is supplied entirely via the AS-Interface cable, which means that no additional power supply is required
- Short startup times thanks to easy configuration at the touch of a button
- The LED indicators help reduce downtime and service times if a slave fails
- Easy and fast startup through reading out the AS-Interface configuration

Application

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

DP/AS-Interface Link 20E can operate up to 248 DI/248 DO when using 62 A/B slaves with 4DI/4DO each.

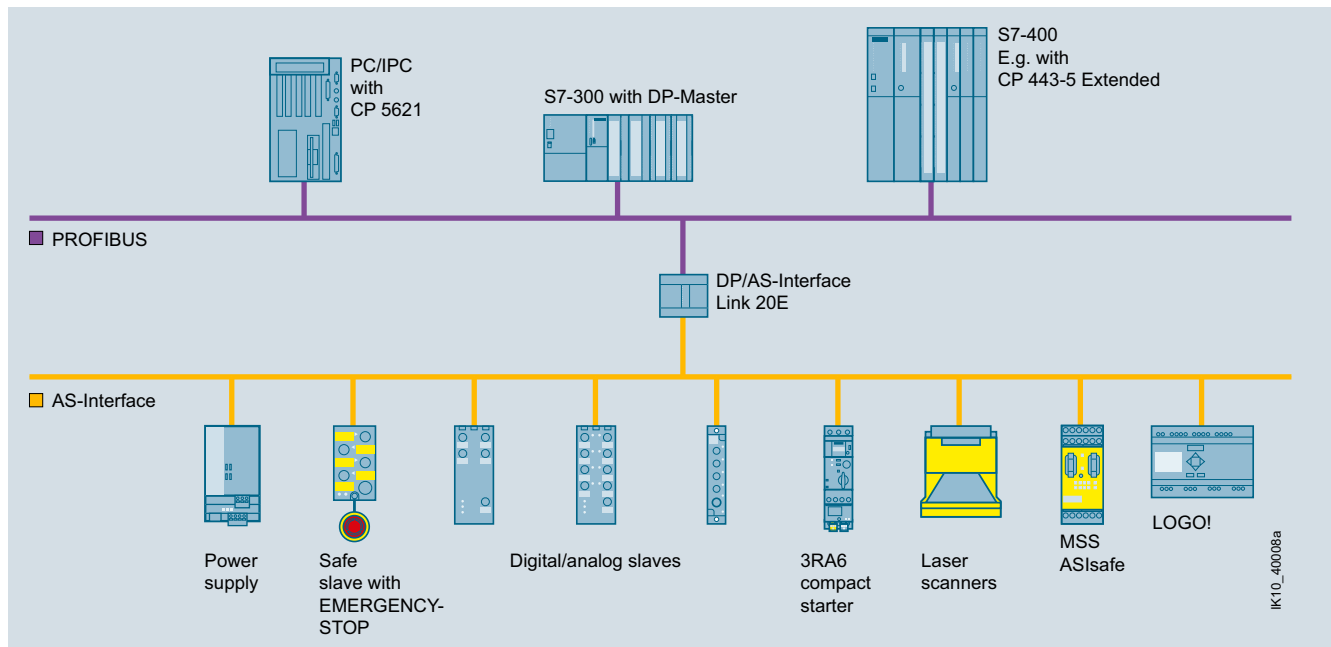
PROFIBUS DP Masters (DP-V0) can exchange digital I/O data cyclically with the AS-Interface.

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

AS-Interface

Routers

DP/AS-Interface Link 20E



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

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
DP/AS-Interface Link 20E						
 Router between PROFIBUS DP and AS-Interface in degree of protection IP20; including screw terminals for connection of the AS-Interface cable; corresponds to AS-Interface Specification V3.0; dimensions (W x H x D / mm): 90 x 80 x 60 (dimensions without fixing lugs)		Screw terminals				
	▶	6GK1415-2AA10		1	1 unit	42C
Accessories						
PROFIBUS FC Standard Cable GP FastConnect standard type with special design for fast installation, 2-core, shielded	A	6XV1830-0EH10		1	1 M	5K1
PROFIBUS FastConnect With insulation displacement connection, the max. transmission rate is 12 Mbit/s Activatable terminating resistor is integrated						
• RS485 bus connector with 90° cable feeder						
- Without PG connection socket	A	6ES7972-0BA52-0XA0		1	1 unit	250
- With PG connection socket	A	6ES7972-0BB52-0XA0		1	1 unit	250
• RS485 bus connector with angled cable feeder (35°)						
- Without PG connection socket	A	6ES7972-0BA60-0XA0		1	1 unit	250
- With PG connection socket	A	6ES7972-0BB60-0XA0		1	1 unit	250
PROFIBUS FastConnect Stripping Tool Preset stripping tool for speedy stripping of PROFIBUS FastConnect bus cables	A	6GK1905-6AA00		1	1 unit	5K2

More information

The manuals are available on the Internet at
<http://support.automation.siemens.com/WW/view/en/28602858/133300>

Overview



DP/AS-i F-Link

PN	DP-M	DP-S	ASi-M		
		●	●		

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.

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. TUV-certified function blocks for typical safety applications
- Use in machine tools under SINUMERIK 840 D (pI/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.

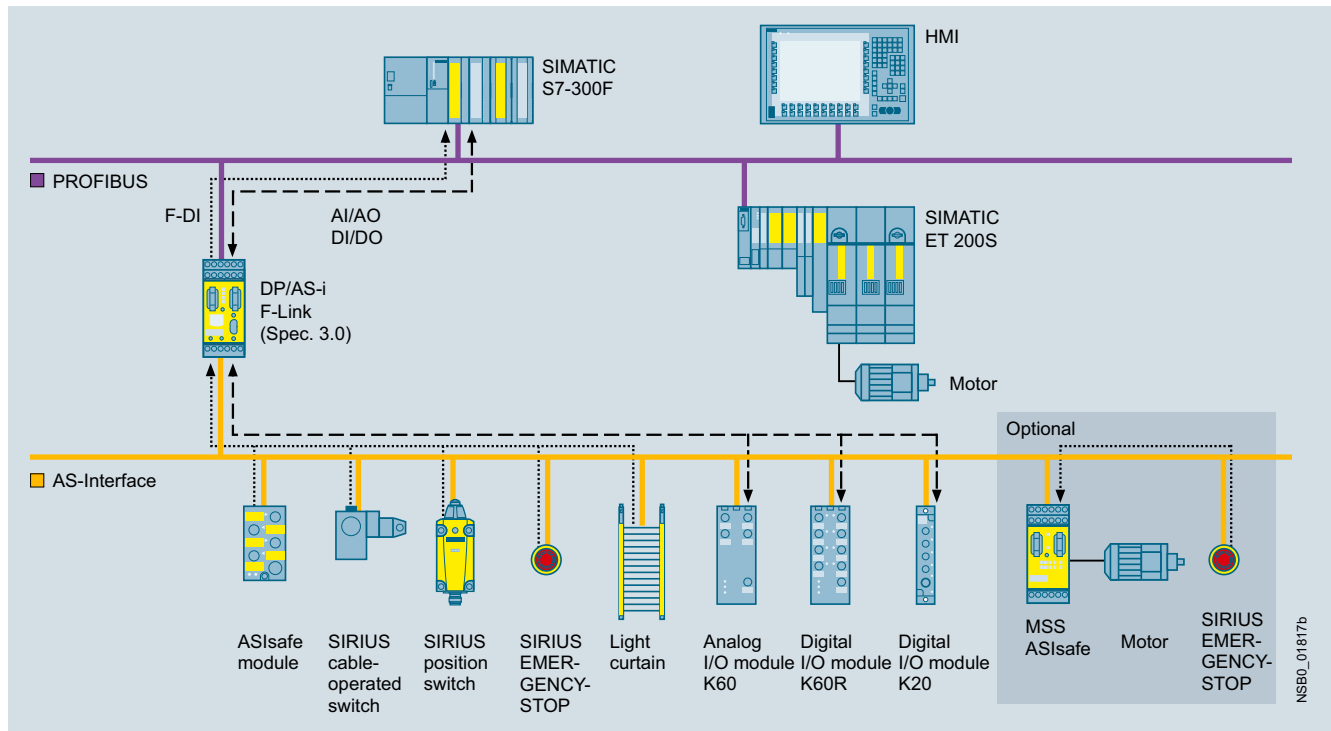
PROFIBUS DP masters according to DP-V0 or DP-V1 can exchange I/O data with lower-level AS-i slaves in cyclic mode. PROFIBUS DP masters with acyclic services according to DP-V1 are able in addition to initiate AS-i command calls (e.g. reading/writing the AS-i configuration during normal operation). In 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.

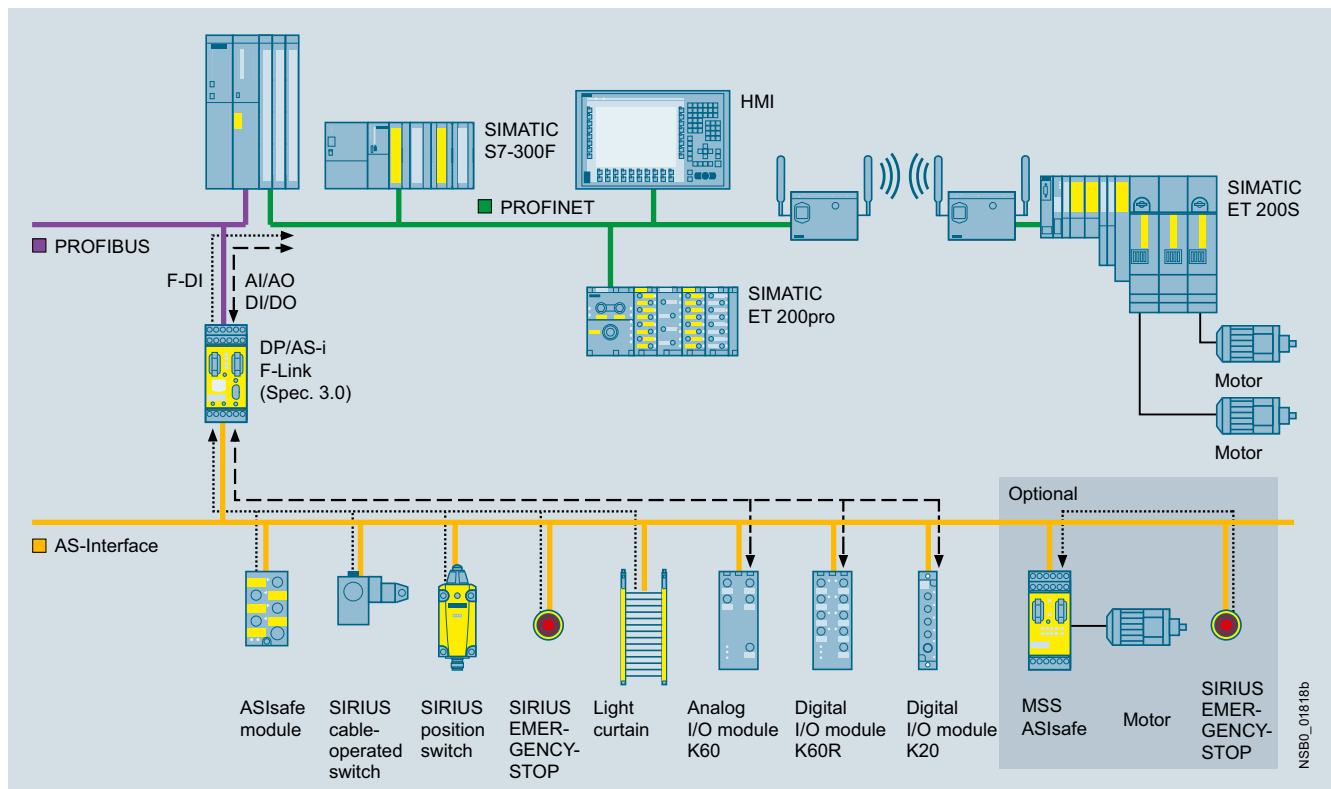
During operation, four display LEDs and the display provide detailed diagnostics information, which directly localizes the fault if required. Using the PLC user program it is possible to read out diagnostics data records and make them available to a higher-level operating and monitoring system (e.g.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

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)
<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)
<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)
<http://support.automation.siemens.com/WW/view/en/24724923>

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).

AS-Interface

Routers

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

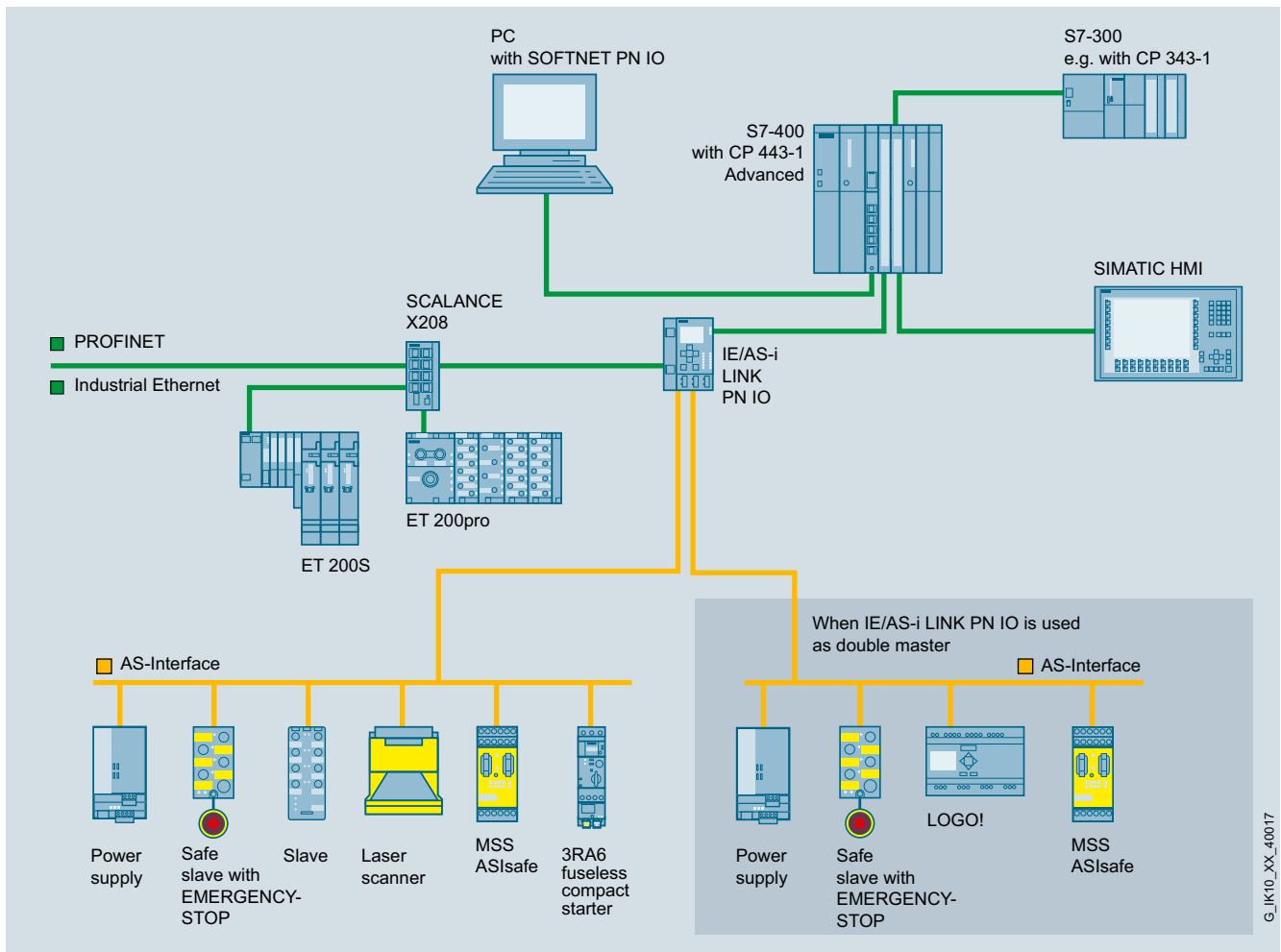
PROFINET IO controllers can exchange I/O data with AS-Interface in cyclic mode and can perform AS-i master calls in addition with acyclic services (e.g. reading/writing the AS-i configuration during normal operation). IE/AS-i LINK PN IO is, therefore, suitable for distributed configurations and for integrating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



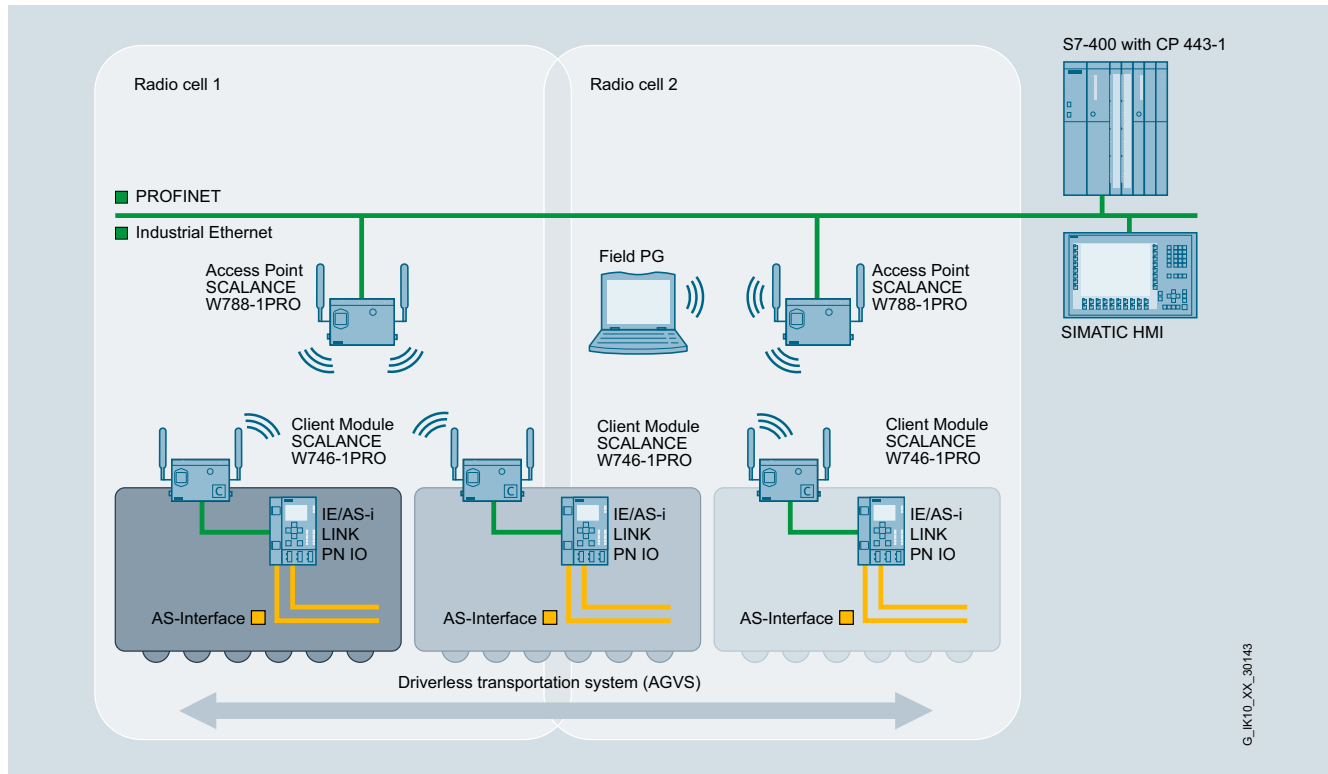
Integration of AS-Interface on PROFINET through IE/AS-i LINK PN IO as single/double master

G_K10_XX_40017

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 - Single master with display - Double master with display		Combicon connection				
		6GK1411-2AB10		1	1 unit	42C
		6GK1411-2AB20		1	1 unit	42C
Accessories						
C-PLUG	A	6GK1900-0AB00		1	1 unit	5N3
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						
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

More information

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

AS-Interface

Slaves

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

Overview



K60



K45

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.



K20

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

- 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.

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

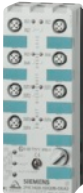
For other conditions for safe operation see <http://support.automation.siemens.com/WW/view/en/18290447>

AS-Interface

Slaves

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

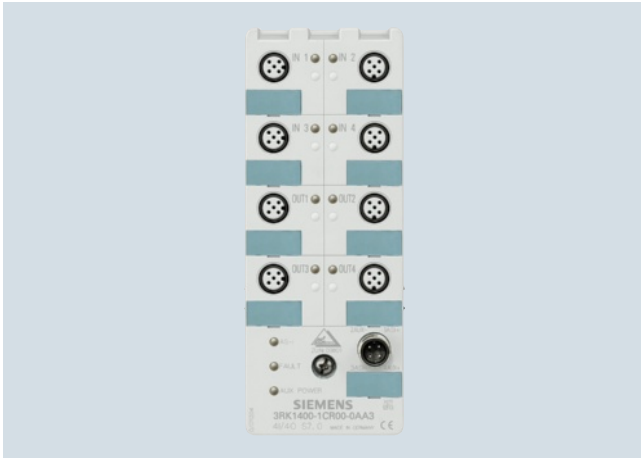
Selection and ordering data

	Version					DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1400-1DQ00-0AA3	Digital I/O modules, IP67 - K60 • PNP transistor • Width 60 mm • Connection method: M12 • Modules supplied without mounting plate										
	Type	Current carrying capacity of outputs	Slave type	Pin assignment	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	
		--	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
2 A	A/B (Spec. 3.0)		Y-II	--	A	3RK2100-1CQ00-0AA3	1	1 unit	42C		
 3RK1901-0CA00	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		
 3RK1901-1KA00	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										
 3RK1902-0AR00	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 • Standard rail mounting						▶ ▶	3RK1901-0CA00 3RK1901-0CB01	1 1	1 unit 1 unit	42C 42C
	AS-Interface M12 sealing caps For free M12 sockets						▶	3RK1901-1KA00	100	10 units	42C
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

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

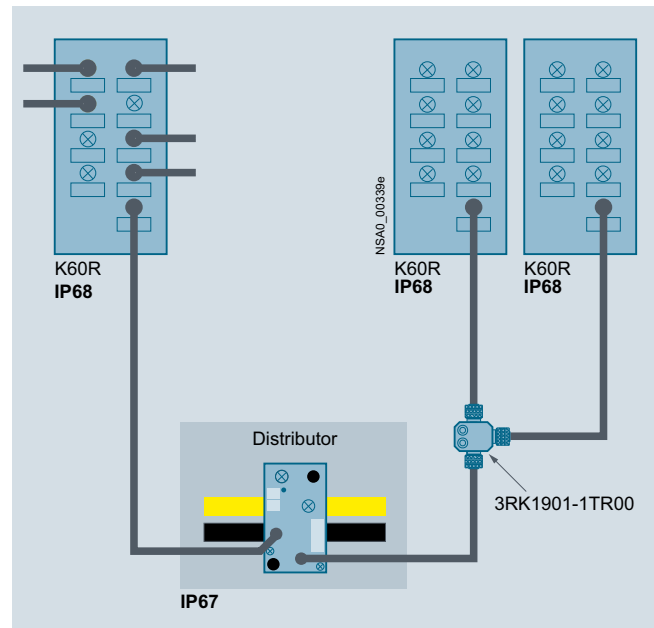
The same mounting plates are used as for the K60 modules. Instead of using flat cables, the K60R is connected using a 4-pole round cable with an M12 connection. With the K60R the mounting plate thus serves only as a fixture and ground terminal.

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 mm². 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

AS-Interface

Slaves

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

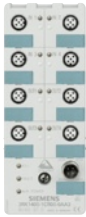
- Test with drilling emulsion: Five months at room temperature (components of the drilling emulsion: Anionic and non-ionic emulsifiers, paraffinic low-aromatic mineral oil, boric acid alkanolamines, corrosion inhibitors, oil content 40 %)
- Test in oil bath (Excelence 416 oil) with alternating oil bath 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	A	3RK1400-1CR00-0AA3		1	1 unit	42C
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						
Accessories						
 3RK1901-0CA00		K60 mounting plates Suitable for all K60 and K60R compact modules • Wall mounting ▶ 3RK1901-0CA00 • Standard rail mounting ▶ 3RK1901-0CB01		1	1 unit	42C
 3RK1901-1KA00	▶	3RK1901-1KA00		100	10 units	42C
AS-Interface M12 feeders, current carrying capacity up to 4 A						
For flat cable	For	Cable length	Cable end in feeder			
AS-i/U _{aux}	M12 socket	--	Not available	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
AS-Interface M12 feeders, 4-fold, current carrying capacity up to 4 A						
For flat cable	For	Cable length	Cable end in feeder			
AS-i/U _{aux}	4-fold M12 socket delivery includes coupling module	--	Not available	A	3RK1901-1NR04	1 1 unit 42C
 3RK1901-1TR00	C	3RK1901-1TR00		1	1 unit	42C
M12-T distributors • IP68 • 1 x M12 plug • 2 x M12 box						
 3RK1902-4PB15-3AA0	C	3RK1902-4PB15-3AA0		1	1 unit	42D
M12 connecting cables • 3-pole • For addressing AS-i slaves with M12 bus connection • Cable length 1.5 m						

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.

AS-Interface

Slaves

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

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
---------	----	-------------	--------------	-------------------	-----	----



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 assignment	U_{aux} 24 V	Connection methods				
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
- For standard rail mounting

▶	3RK1901-2EA00	1	1 unit 42C
▶	3RK1901-2DA00	1	1 unit 42C



3RK1901-1KA00

AS-Interface sealing caps

- For free M12 sockets
- For free M8 sockets

▶	3RK1901-1KA00	100	10 units 42C
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).

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

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



3RK2200-0CT30-0AA3

AS-Interface

Slaves

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
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Accessories



3RK1901-1KA00



3RK1901-1PN00

AS-Interface sealing caps

- For free M12 sockets
- For free M8 sockets

▶
A

3RK1901-1KA00
3RK1901-1PN00

100 10 units 42C
100 10 units 42C



3RK1901-1NN10

AS-Interface compact distributors, for AS-Interface flat cable

Current carrying capacity up to 8 A

A

3RK1901-1NN10

1 1 unit 42C



3RX9801-0AA00

AS-Interface M12 feeders

- Degree of protection IP67
- Current carrying capacity up to 2 A

For flat cable	For	Cable length	Cable end in feeder
AS-i	M12 socket	--	Available

▶

3RX9801-0AA00

1 1 unit 42C



3RK1901-1NR10

AS-Interface M12 feeders

- Degree of protection IP67/IP68/IP69K
- Current carrying capacity up to 4 A

For flat cable	For	Cable length	Cable end in feeder
AS-i	M12 socket	--	Not available
AS-i	M12 cable box	1 m	Not available
AS-i	M12 cable box	2 m	Not available
AS-i/U _{aux}	M12 socket	--	Not available
AS-i/U _{aux}	M12 cable box	1 m	Not available
AS-i/U _{aux}	M12 cable box	2 m	Not available

A

3RK1901-1NR10

1 1 unit 42C

A

3RK1901-1NR11

1 1 unit 42C

A

3RK1901-1NR12

1 1 unit 42C

A

3RK1901-1NR20

1 1 unit 42C

A

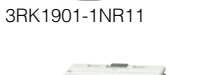
3RK1901-1NR21

1 1 unit 42C

A

3RK1901-1NR22

1 1 unit 42C



3RK1901-1NR11

AS-Interface M12 feeders, 4-fold

Current carrying capacity up to 4 A

For flat cable	For	Cable length	Cable end in feeder
AS-i/U _{aux}	4-fold M12 socket, delivery includes coupling module	--	Not available

A

3RK1901-1NR04

1 1 unit 42C



3RK1901-1NR04

M12 T distributors

- IP68
- 1 x M12 plug
- 2 x M12 box

C

3RK1901-1TR00

1 1 unit 42C



3RK1901-1TR00

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



6ES7194-1KA01-0XA0

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



3RK1902-4PB15-3AA0

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

AS-Interface

Slaves

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

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



3RK2207-2BQ50-0AA3

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

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						
K60 mounting plates						
• Wall mounting	▶	3RK1901-0CA00		1	1 unit	42C
• Standard rail mounting	▶	3RK1901-0CB01		1	1 unit	42C
M12 sealing caps						
	▶	3RK1901-1KA00		100	10 units	42C
Sealing sets						
• For mounting plate K60 and distributor	A	3RK1902-0AR00		100	5 units	42D
• Cannot be used for K45 mounting plate						
• One set contains one straight and one shaped seal						
Jumper plugs						
For changing over the 2-channel input modules	A	3RK1901-1AA00		1	1 unit	42C



3RK1901-0CA00



3RK1901-1KA00



3RK1902-0AR00



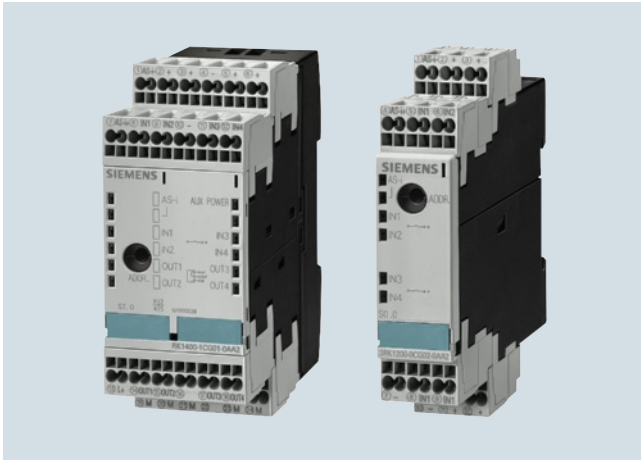
3RK1901-1AA00

AS-Interface

Slaves

I/O modules for use in the control cabinet Introduction

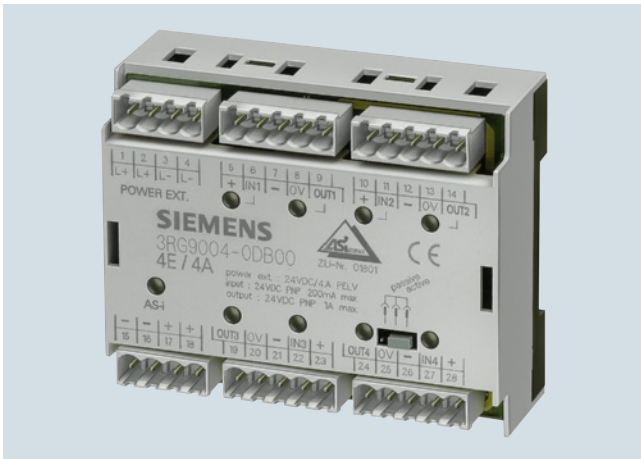
Overview



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) • Counters¹⁾ • Ground-fault detection modules¹⁾	✓	✓	--
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

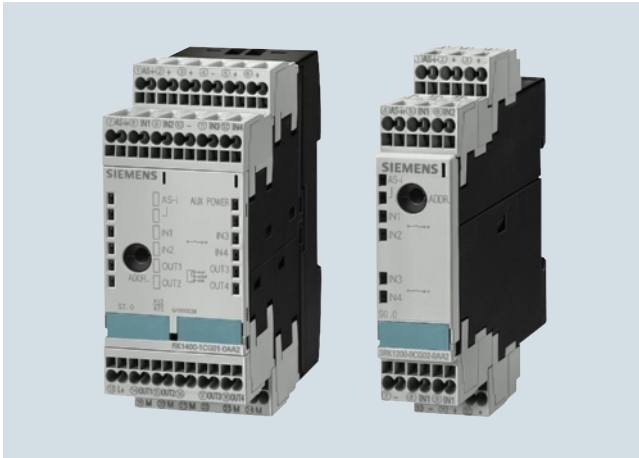
✓ Available

-- 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.

AS-Interface

Slaves

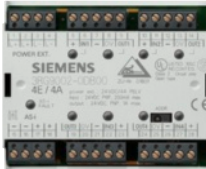
I/O modules for use in the control cabinet
SlimLine

Selection and ordering data

Version	DT					Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG								
 3RK1200-0CE00-0AA2  3RK1400-0BG00-0AA2  3RK1400-1CG00-0AA2											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									

I/O modules for use in the control cabinet F90 module

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG			
 F90 modules • Standard slave • Width 90 mm • With Combicon version: Delivery without Combicon connector									
3RG9002-0DB00	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 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					B	3RX9810-0AA00	1	1 unit	42C

AS-Interface

Slaves

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.

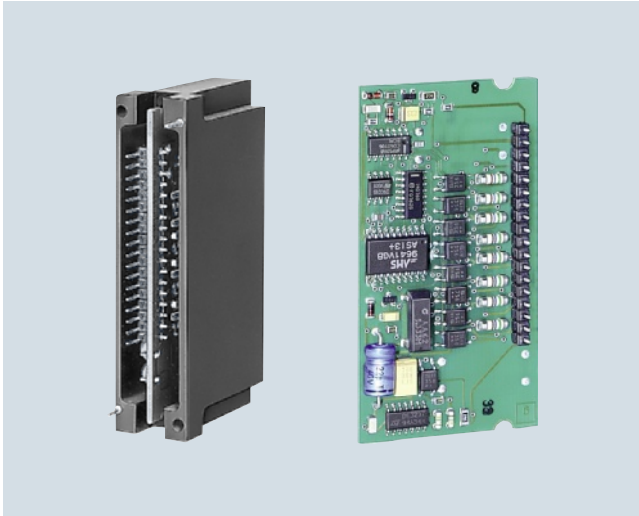
Selection and ordering data

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

3RK1400-0CE00-0AA3

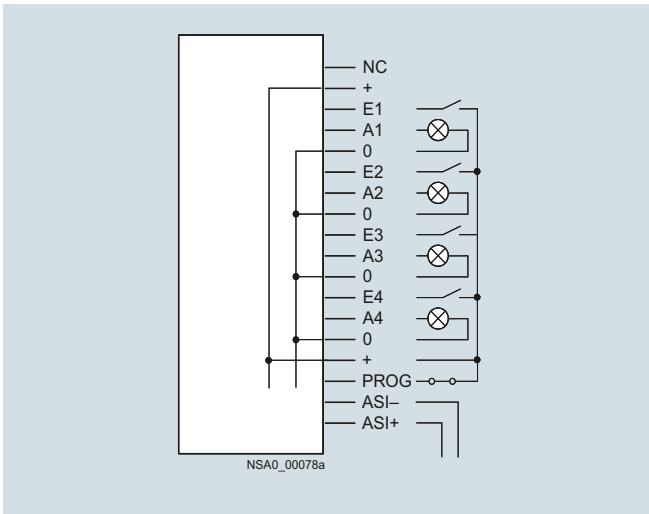
Overview

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



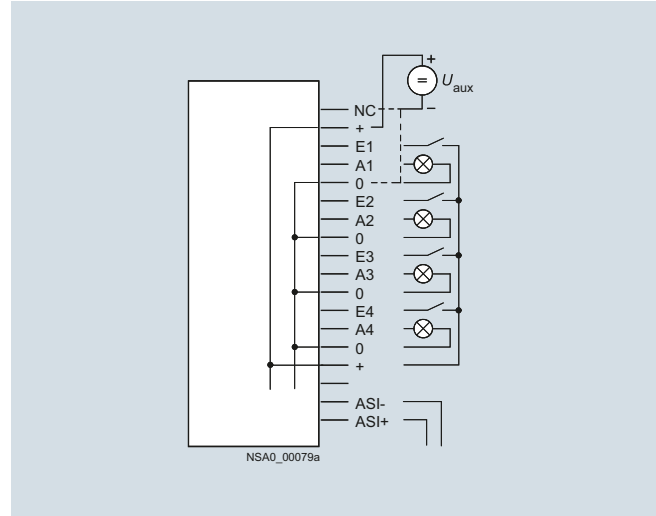
3RK1400-0CD00-0AA3

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.

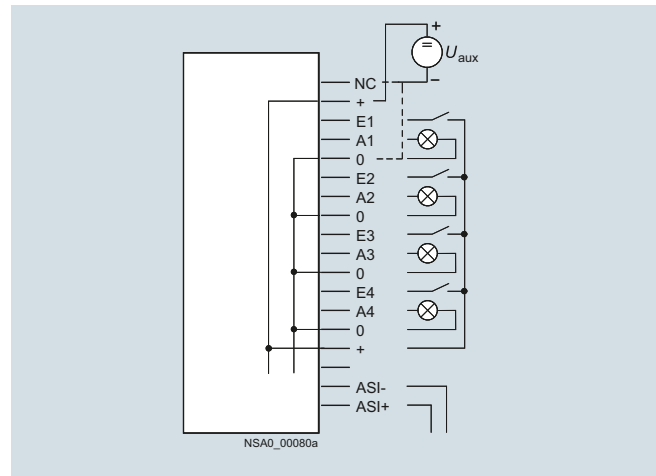
3RK1400-0CD01-0AA3 AS-Interface communication modules for printed circuit board installation



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.

AS-Interface

Slaves

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

	Version	Slave type	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG		
 3RK1400-0CD00-0AA3	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		
 3RG9005-0SA00	• 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			A/B	B	3RK2400-1FD00-0AA2		1	5 units	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									
	4 inputs			Standard	C	3RK1200-0CD00-0AA2		1	1 unit	42C
	• Printed circuit board with gold-plated direct connector for 30-pole male connector socket for simple installation with direct connector									

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:

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

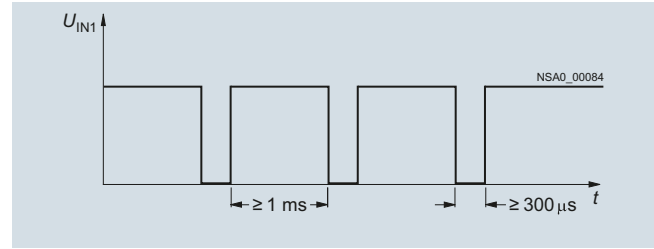
T_{max} : max. possible transmission time from the slave to the host

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

$$\text{of } f_{Zmax} = 1 / 1.3 \text{ ms} = 769 \text{ Hz}$$

independently of the control system (see figure).



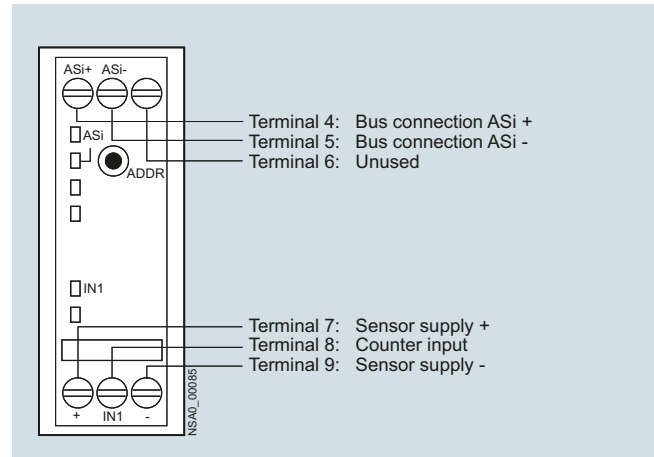
Maximum frequency for the counter module

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

- With spring-type terminals



C

3RK1200-0CE03-0AA2

1 1 unit 42C

3RK1200-0CG03-0AA2

1 1 unit 42C



3RK1200-0CE03-0AA2



3RK1200-0CG03-0AA2

AS-Interface

Slaves

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



3RK1408-8KE00-0AA2

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

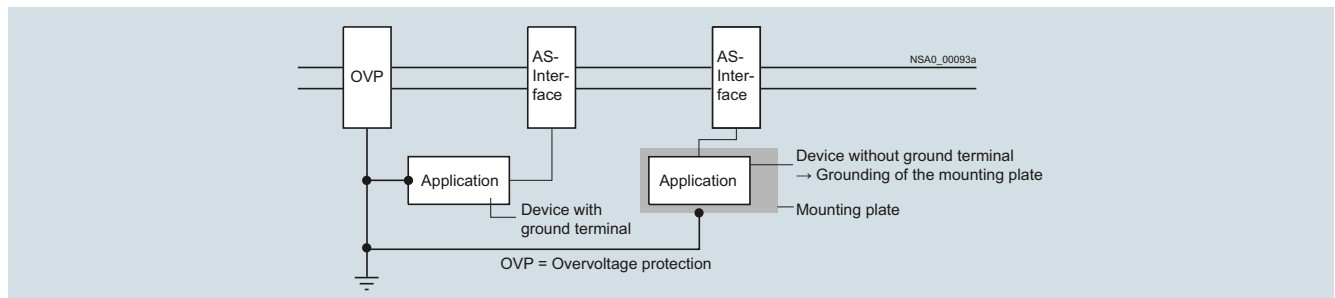
Overview



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.

Configuration guidelines



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

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.

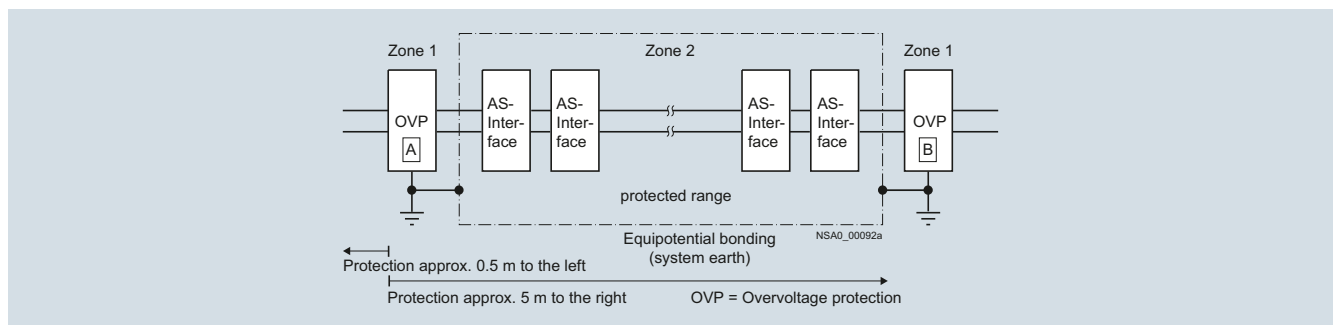
Rated discharge current I_{sn}

The rated discharge current is the peak value of a surge current of the form 8/20 μ s (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 μ s and 50 % after 20 μ s.

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.

Sample application



Selection and ordering data

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

AS-Interface

Slaves

AS-Interface connections for LOGO!

Overview

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



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.

AS-Interface connection for LOGO!

Selection and ordering data

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

AS-Interface

Power Supply Units and Data Decoupling Modules

AS-Interface power supply units

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

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG																																										
 3RX9501-0BA00  3RX9503-0BA00 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 <table><tr><th>Output current</th><th>Input voltage</th><th></th><th>Spring-type terminals</th><th></th><th></th><th></th></tr><tr><td>2.6 A/max. 100 W</td><td>120/230 V AC (selectable)</td><td>▶</td><td>3RX9501-2BA00</td><td>1</td><td>1 unit</td><td>42C</td></tr><tr><td>3 A</td><td>120/230 V AC (selectable)</td><td>▶</td><td>3RX9501-0BA00</td><td>1</td><td>1 unit</td><td>42C</td></tr><tr><td>3 A</td><td>24 V DC</td><td>▶</td><td>3RX9501-1BA00</td><td>1</td><td>1 unit</td><td>42C</td></tr><tr><td>5 A</td><td>120/230 V AC (selectable)</td><td>▶</td><td>3RX9502-0BA00</td><td>1</td><td>1 unit</td><td>42C</td></tr><tr><td>8 A</td><td>120/230 ... 500 V AC (selectable)</td><td>▶</td><td>3RX9503-0BA00</td><td>1</td><td>1 unit</td><td>42C</td></tr></table>							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
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																																										



3RX9501-0BA00



3RX9503-0BA00

AS-Interface

Power Supply Units and Data Decoupling Modules

30 V power supply units

Overview



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

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

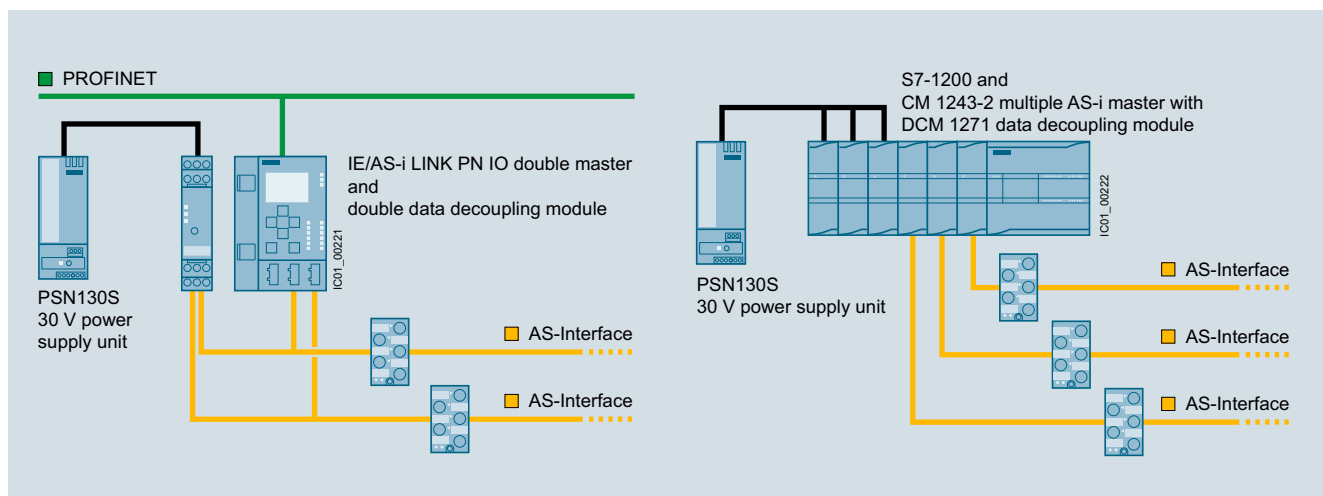
- Primary clocked power supply units for connection to a single-phase AC network
- Power for currents of 3, 4 and 8 A
- The output voltage is floating, and resistant to short-circuits and no-load operation. In the event of an overload, the output voltage will be reduced or switched off. After a short-circuit 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/AS-i 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						
 3RX9511-0AA00		Screw terminals 				
Output current	Input voltage					
3 A	120 / 230 V AC (automatic selection)					
4 A	120 / 230 V AC (automatic selection)					
8 A	120 / 230 V AC (automatic selection)					
 3RX9512-0AA00		Screw terminals 				
Output current	Input voltage					
3 A	120 / 230 V AC (automatic selection)					
4 A	120 / 230 V AC (automatic selection)					
8 A	120 / 230 V AC (automatic selection)					
 3RX9513-0AA00		Screw terminals 				
Output current	Input voltage					
3 A	120 / 230 V AC (automatic selection)					
4 A	120 / 230 V AC (automatic selection)					
8 A	120 / 230 V AC (automatic selection)					

More information

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

AS-Interface

Power Supply Units and Data Decoupling Modules

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](#).

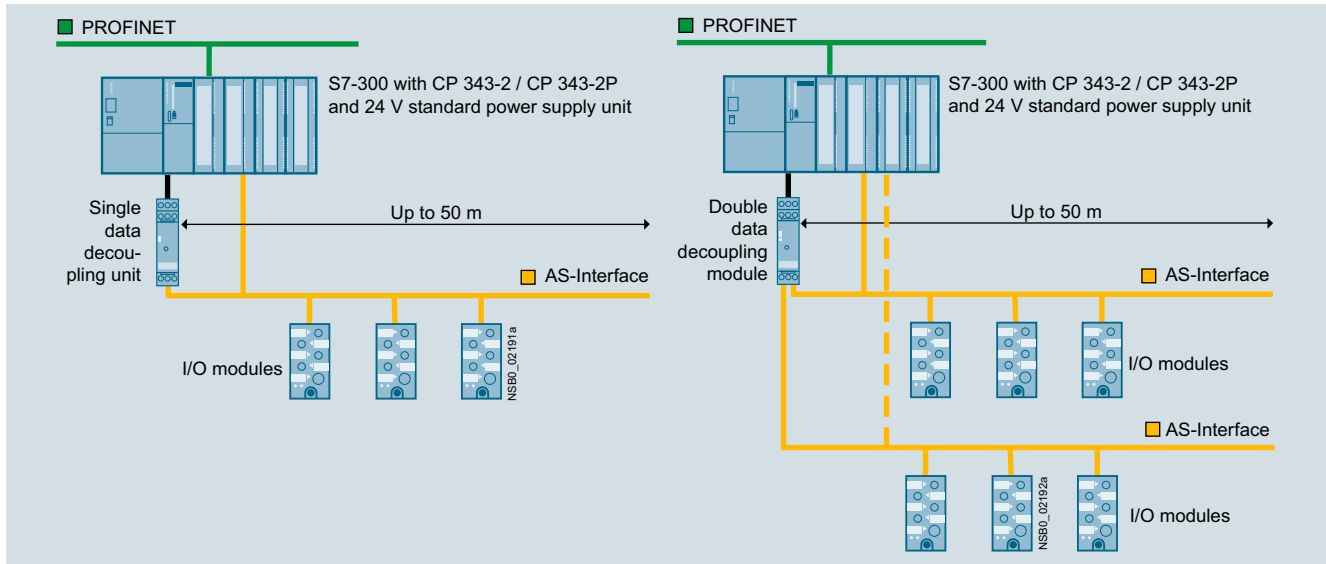
For more information on AS-i Power24V, [see "AS-Interface System Manual"](#)
<http://support.automation.siemens.com/WW/view/en/47052644>

AS-Interface

Power Supply Units and Data Decoupling Modules

S22.5 data decoupling modules

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

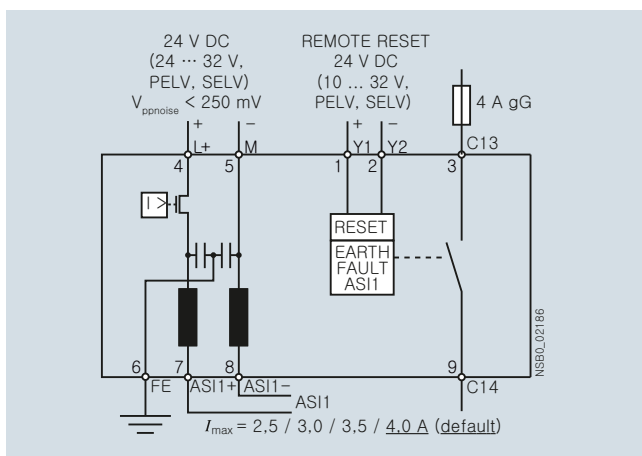


Construction of an AS-i Power24V network with an AS-Interface S22.5 data decoupling module: Left: single network, Right: multiple network

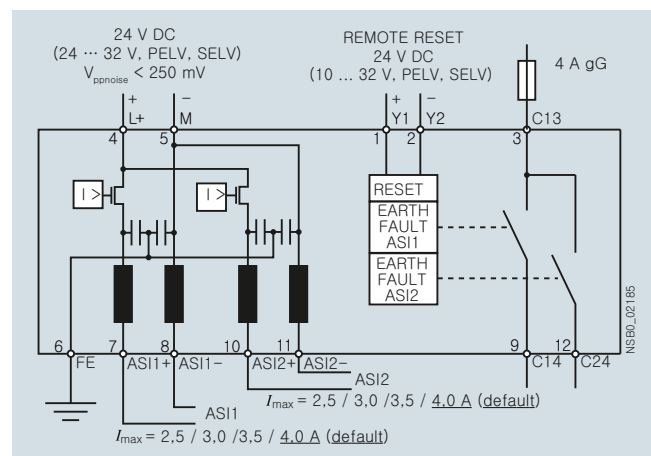
Selection and ordering data

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 - Single data decoupling module, 1 x 4 A - Double data decoupling module, 2 x 4 A		Screw terminals 			
	▶	3RK1901-1DE12-1AA0		1	1 unit	42C
	▶	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 - Single data decoupling module, 1 x 4 A - Double data decoupling module, 2 x 4 A		Spring-type terminals 			
	▶	3RK1901-1DG12-1AA0		1	1 unit	42C
	▶	3RK1901-1DG22-1AA0		1	1 unit	42C

Circuit diagrams



Single data decoupling module



Double data decoupling module

AS-Interface

Power Supply Units and Data Decoupling Modules

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 $< 250 \text{ mV}_{\text{pp}}$, 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](#).

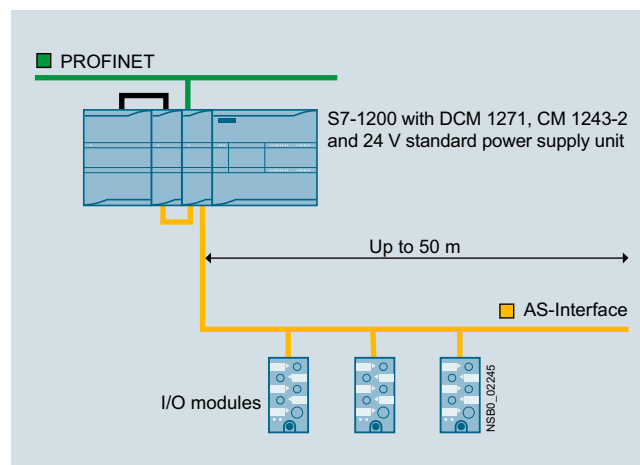
Note on AS-i Power24V:

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



Power Supply Units and Data Decoupling Modules

Data decoupling modules for S7-1200
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						
	A	3RK7271-1AA30-0AA0		1	1 unit	42C

DCM 1271 data decoupling modules

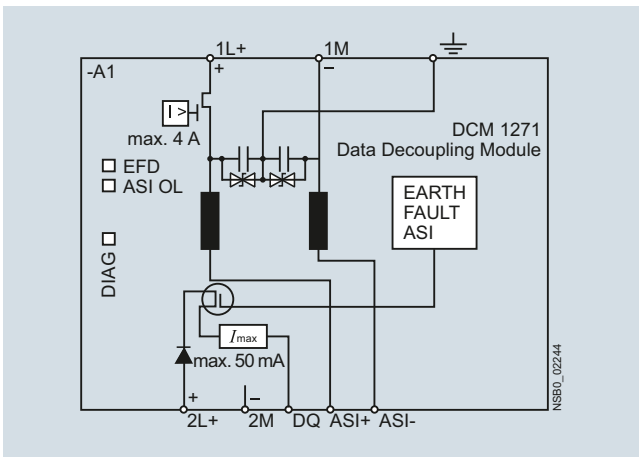
- With screw terminals, removable terminals (included in the scope of supply)
- Dimensions (W × H × D / mm): 30 × 100 × 75

3RK7271-1AA30-0AA0

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>

AS-Interface Transmission Media

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 mm² 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

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



3RX90...-0AA00

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

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

Selection and ordering data

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



6GK1 210-0SA01

Design of an AS-Interface network with repeaters

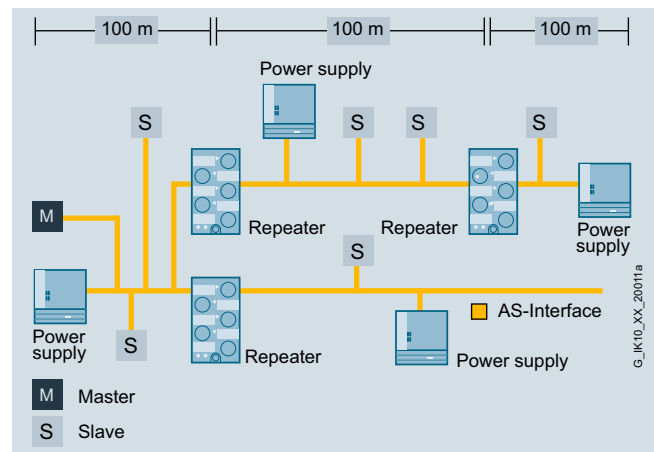
- Parallel switching of several repeaters possible (star configuration)
- Combination of series and parallel switching possible

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).

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.

AS-Interface

System Components and Accessories

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:

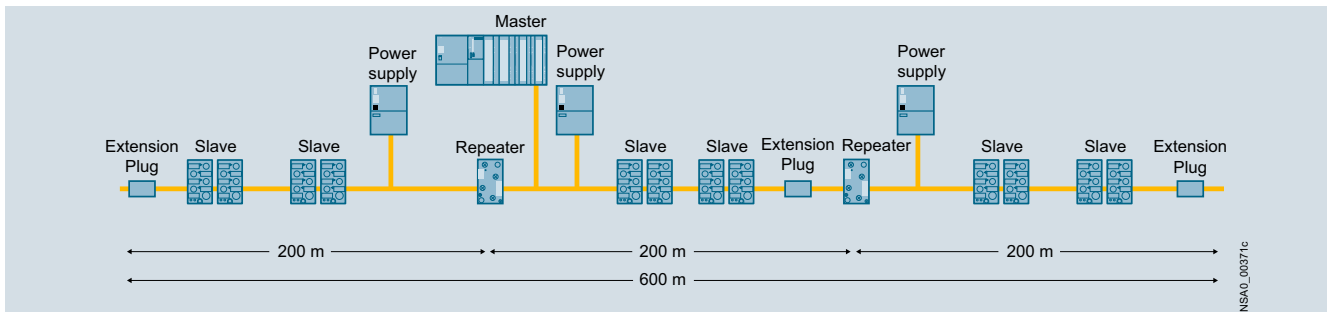
- Compact extension plug: Passive component that can be connected directly onto the AS-Interface shaped cable
- Extension plug plus: The Extension plug plus has an integrated A/B slave that enables any undervoltage supply to be signaled to the AS-Interface master. It has an M12 plug and can be connected 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

AS-Interface

System Components and Accessories

Addressing units

Overview



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

The addressing unit is used to assign an address during commissioning to each AS-Interface slave. The device detects a connected slave module or a complete AS-i network and displays the found module in the LCD display. 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

AS-Interface

System Components and Accessories

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	▶	3RK1904-2AB02		1 1 unit	42C	
Accessories						
 3RK1902-4PB15-3AA0	C	3RK1902-4PB15-3AA0		1 1 unit	42D	
 3RX9801-0AA00	▶	3RX9801-0AA00		1 1 unit	42C	
 3RK1901-1NR10	A	3RK1901-1NR10		1 1 unit	42C	
 3RK 1902-4HB50-5AA0	C	3RK1902-4HB50-5AA0		1 1 unit	42D	
 3RK1902-4BA00-5AA0	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				

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:

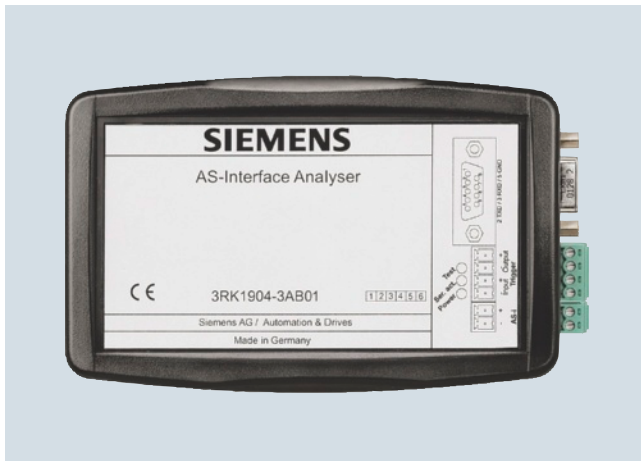
- M12 cable plug: Pin 1 / core brown ↔ M12 plug: Pin 1
- M12 cable plug: Pin 3 / core blue ↔ M12 plug: Pin 3
- Pin 2, 4, 5 not connected.

AS-Interface

System Components and Accessories

Analyzer

Overview



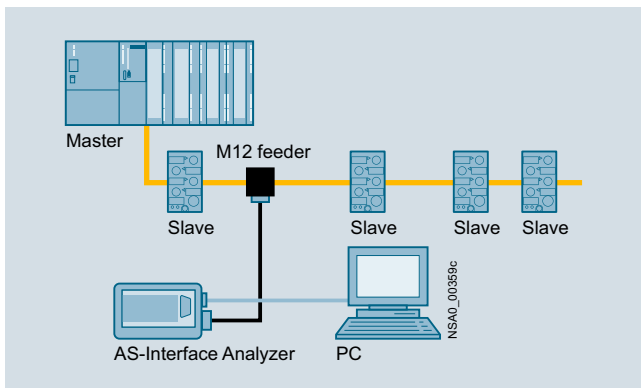
AS-Interface analyzer

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.

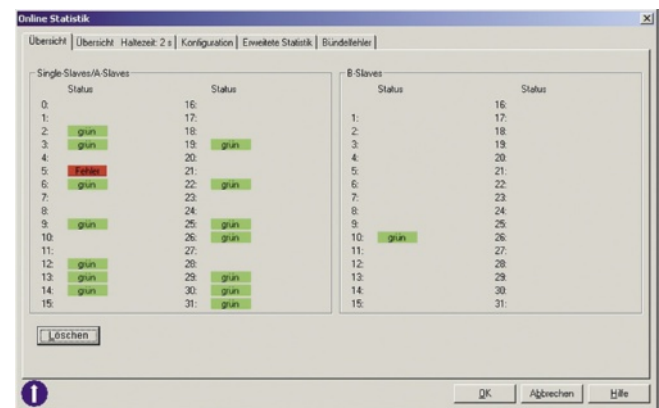
The data thus obtained are transferred through an RS 232 interface to a PC such as a notebook, for evaluation with the supplied diagnostics software.

Benefits

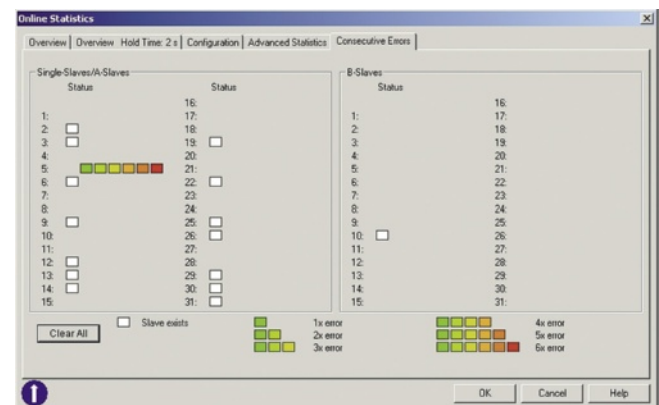
- Simple and user-friendly operation enables diagnostics of AS-Interface networks without help from specialists
- Speedy troubleshooting thanks to intuitive display in statistics mode
- Test logs provide verification of the state and quality of the installation for service and approval
- Recorded logs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

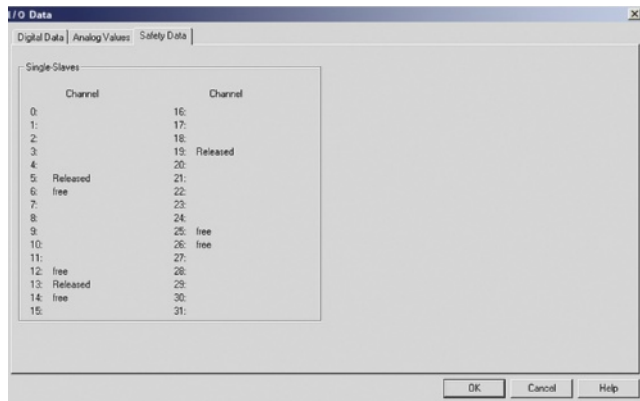
The bundle error overview shows in steps how many multiple repetitions of message frames occurred in order to enable a selective and look-ahead assessment of the transmission quality.

AS-Interface

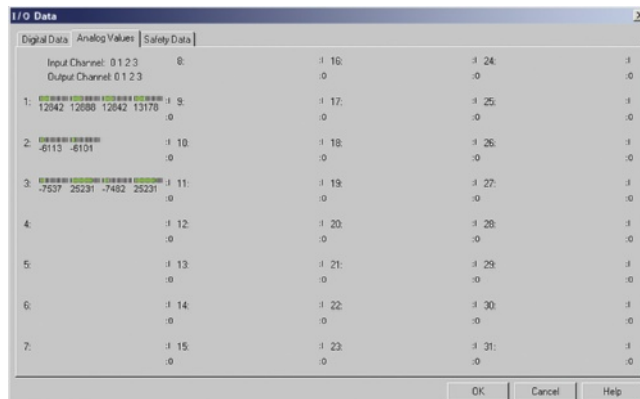
System Components and Accessories

Analyzer

Data mode



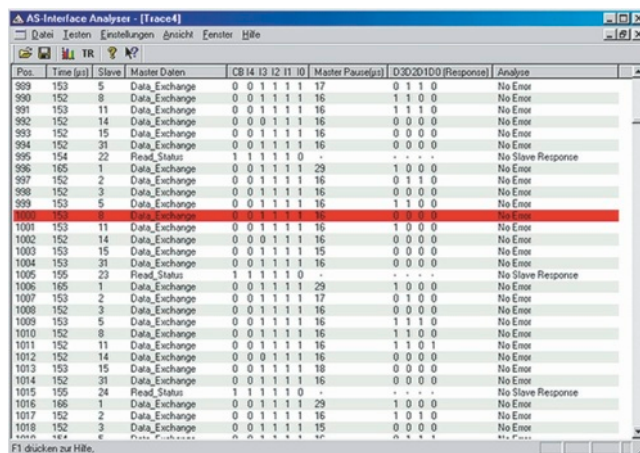
Presentation of the I/O data: Safety data



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



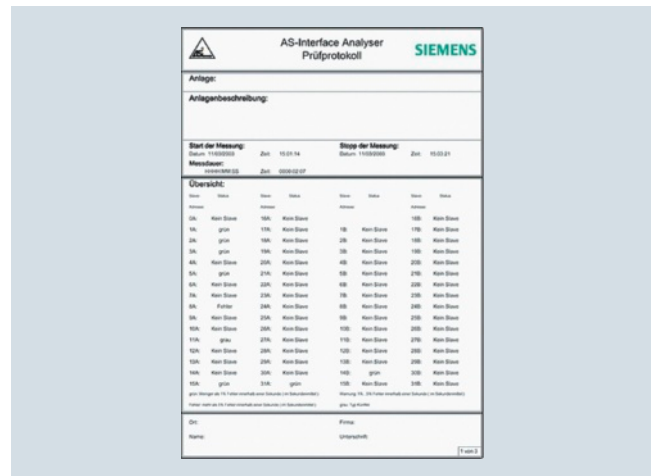
Presentation of message frames in trace mode

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:

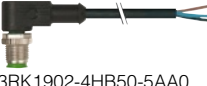
The AS-Interface analyzer is suitable for standard AS-i networks and AS-i Power24V networks (operational voltage min. 20 V).

AS-Interface

System Components and Accessories

Analyzer

Selection and ordering data

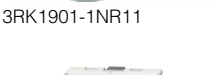
Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1904-3AB01	▶	AS-Interface analyzers		1	1 unit	42C
		• For testing AS-Interface actuator/sensor interface systems				
		• For troubleshooting and service assignments in installations and networks with AS-Interface systems				
 3RX9801-0AA00	▶	AS-Interface M12 feeders		1	1 unit	42C
		• Transition of shaped AS-Interface cable to a standard round cable				
		• Insulation piercing method for connection of AS-Interface cable				
 3RK1901-1NR10	A	AS-Interface M12 feeders		1	1 unit	42C
		• Transition of AS-Interface cable without U_{aux} , with M12 socket				
		• Insulation piercing method for connection of AS-Interface cable				
 3RK1902-4HB50-5AA0	C	M12 cable plugs		1	1 unit	42D
		• Cable: PUR, 5-pole				
		• Length: 5 m				
		• Color: Black				
		• Extruded M12 plug (angled cable feeder 90°), other cable end open				

AS-Interface

System Components and Accessories

Miscellaneous accessories

Selection and ordering data

Version		DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 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							
 3RK2703-3AB02-1AA1		A	3RK1901-1NN10		1	1 unit	42C
AS-Interface compact distributors, for AS-Interface flat cable • Current carrying capacity up to 8 A • Degree of protection IP67/IP68/IP69K							
 3RK1901-1NN10							
AS-Interface M12 feeders • Degree of protection IP67 • Current carrying capacity up to 2 A							
For flat cable For Cable length Cable end in feeder							
AS-i M12 socket -- Available ▶			3RX9801-0AA00		1	1 unit	42C
 3RX9801-0AA00							
AS-Interface M12 feeders • Degree of protection IP67/IP68/IP69K • Current carrying capacity up to 4 A							
For flat cable For Cable length Cable end in feeder							
AS-i M12 socket -- Not available A			3RK1901-1NR10		1	1 unit	42C
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
 3RK1901-1NR10							
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
 3RK1901-1NR11							
AS-Interface M12 feeders, 4-fold • Degree of protection IP67 • Current carrying capacity up to 4 A							
For flat cable For Cable length Cable end in feeder							
AS-i/U_{aux} 4-fold M12 socket, delivery includes coupling module -- Not available A			3RK1901-1NR04		1	1 unit	42C
 3RK1901-1NR04							
M12-T distributors • IP68 • 1 x M12 plug • 2 x M12 box		C	3RK1901-1TR00		1	1 unit	42C
 3RK1901-1TR00							
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
 6ES7194-1KA01-0XA0							

AS-Interface

System Components and Accessories

Miscellaneous accessories

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

AS-Interface

System Components and Accessories

Miscellaneous accessories



3RK1902-0AR00



3RK1902-4GB50-4AA0



3RK1902-4CA00-4AA0



3RK1902-4BA00-5AA0



3RK1902-4DA00-5AA0



3RK1902-4H...-5AA0



3RK1902-4PB15-3AA0

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
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
	C	3RT1900-1SB50		100	380 units	41B
	C	3RK1902-4GB50-4AA0		1	1 unit	42D
Inscription labels - For K45 and K60 compact modules 20 x 9 mm, pastel turquoise 19 frames with 20 labels each	C	3RK1902-4CA00-4AA0		1	1 unit	42D
	C	3RK1902-4CA00-4AA0		1	1 unit	42D
	C	3RK1902-4BA00-5AA0		1	1 unit	42D
M12 plug, straight For screw fixing, 5-pole screw terminals, max. 0.75 mm ² , A-coded, max. 4 A	C	3RK1902-4BA00-5AA0		1	1 unit	42D
	C	3RK1902-4DA00-5AA0		1	1 unit	42D
	C	3RK1902-4DA00-5AA0		1	1 unit	42D
M12 plug, angled For screw fixing, 5-pole screw terminals, max. 0.75 mm ² , A-coded, max. 4 A	C	3RK1902-4DA00-5AA0		1	1 unit	42D
	C	3RK1902-4HB15-5AA0		1	1 unit	42D
	C	3RK1902-4HB50-5AA0		1	1 unit	42D
Control cable, assembled at one end M12 plugs, angled, for screw fixing, 5-pole, 5 x 0.34 mm ² , A-coded, black PUR sheath, max. 4 A	C	3RK1902-4HB15-5AA0		1	1 unit	42D
	C	3RK1902-4HB50-5AA0		1	1 unit	42D
	C	3RK1902-4HC01-5AA0		1	1 unit	42D
Control cable, assembled at both ends Straight M12 plug, straight M12 socket, for screw fixing, 3-pole, 3 x 0.34 mm ² , A-coded, black PUR sheath, max. 4 A	C	3RK1902-4PB15-3AA0		1	1 unit	42D
	C	3RK1902-4PB15-3AA0		1	1 unit	42D
	C	3RK1902-4PB15-3AA0		1	1 unit	42D

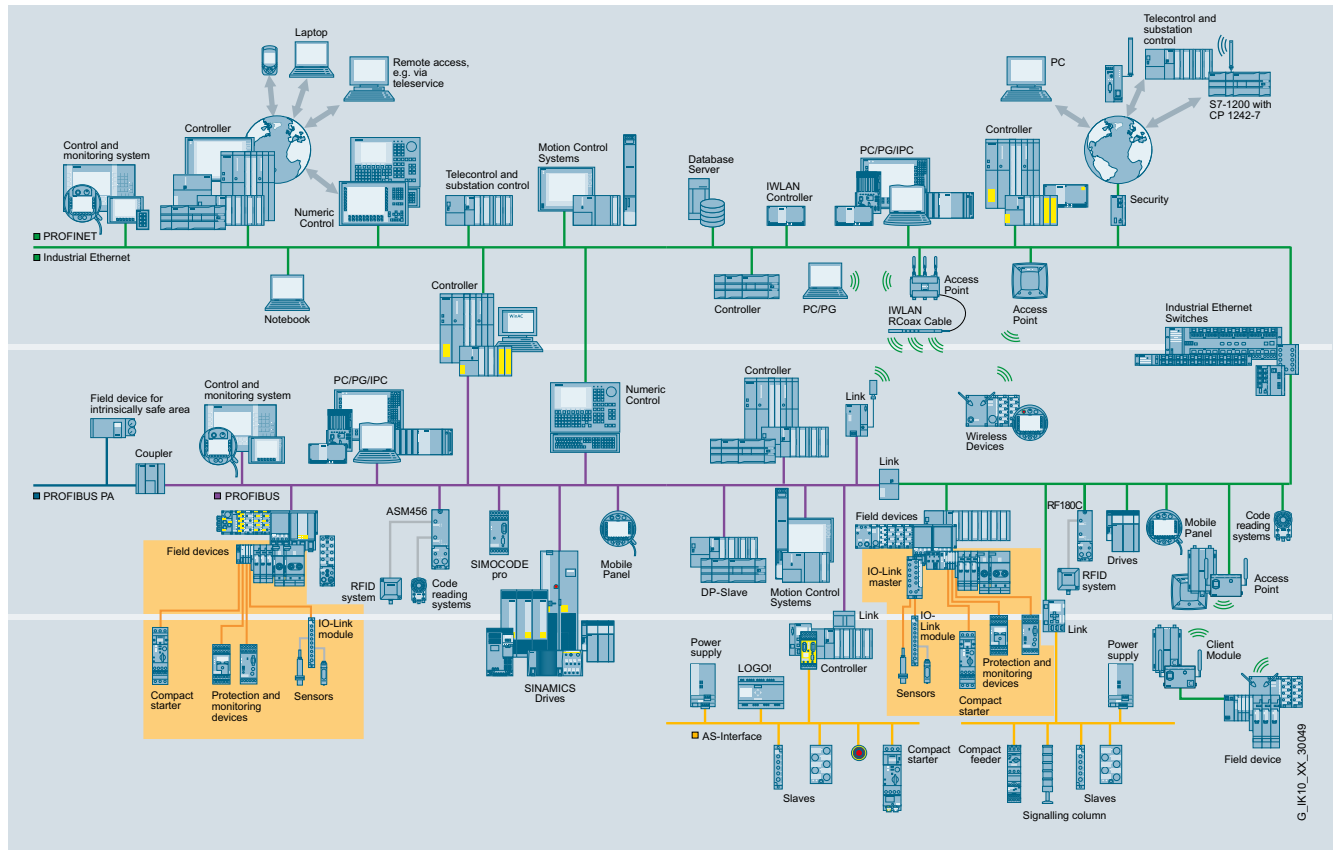
More information

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

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

IO-Link

Introduction

System components

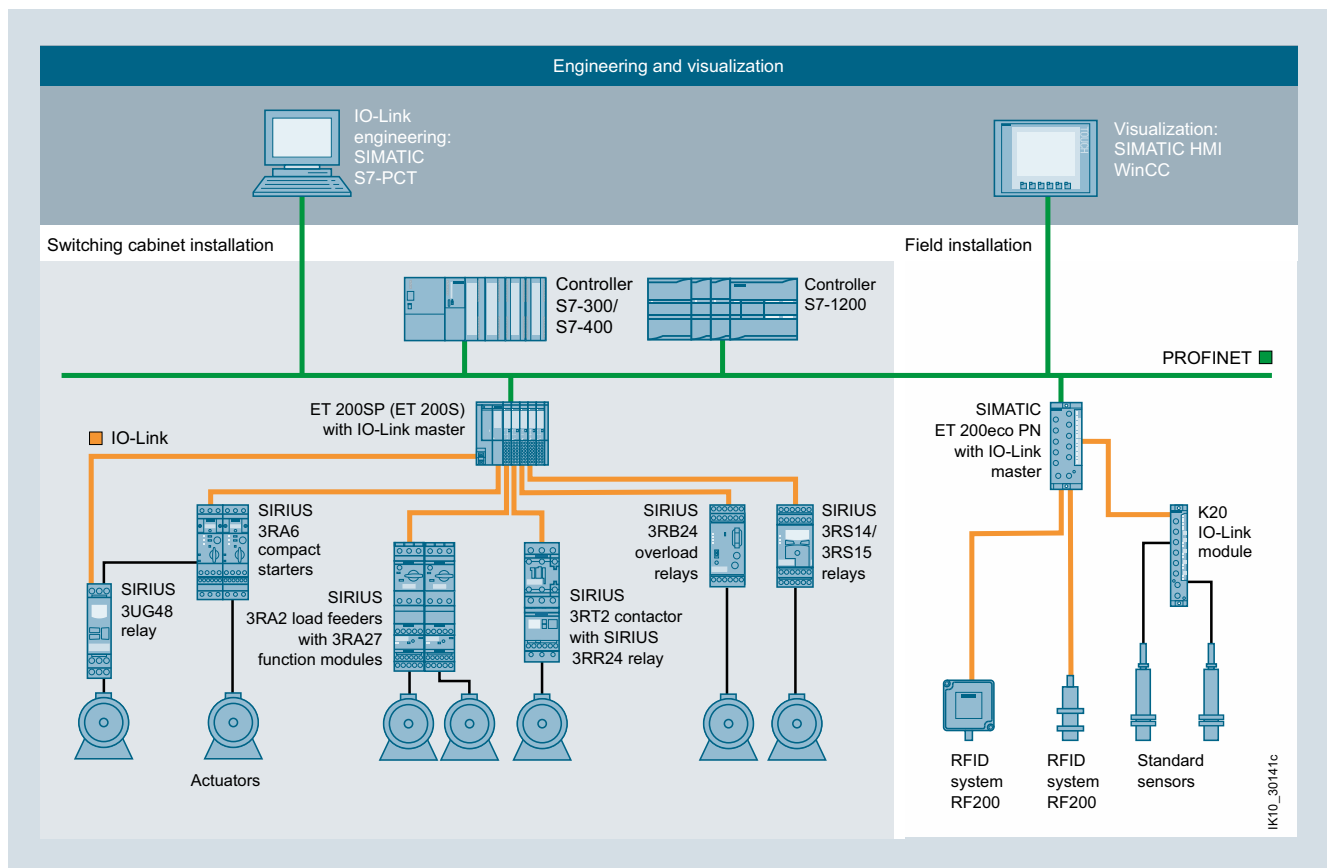
Overview



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

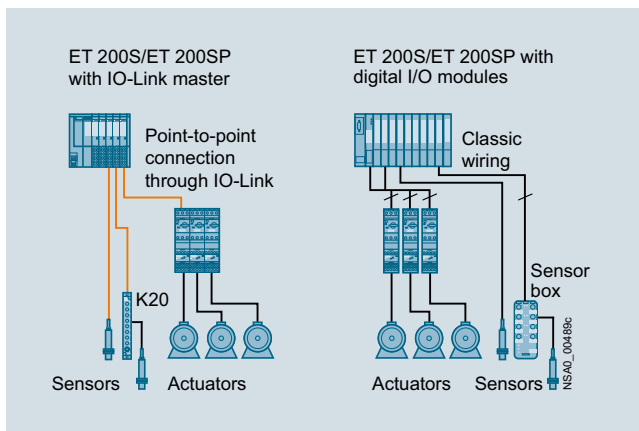
Compatibility of IO-Link

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.

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

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.

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-on-line 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.

IO-Link

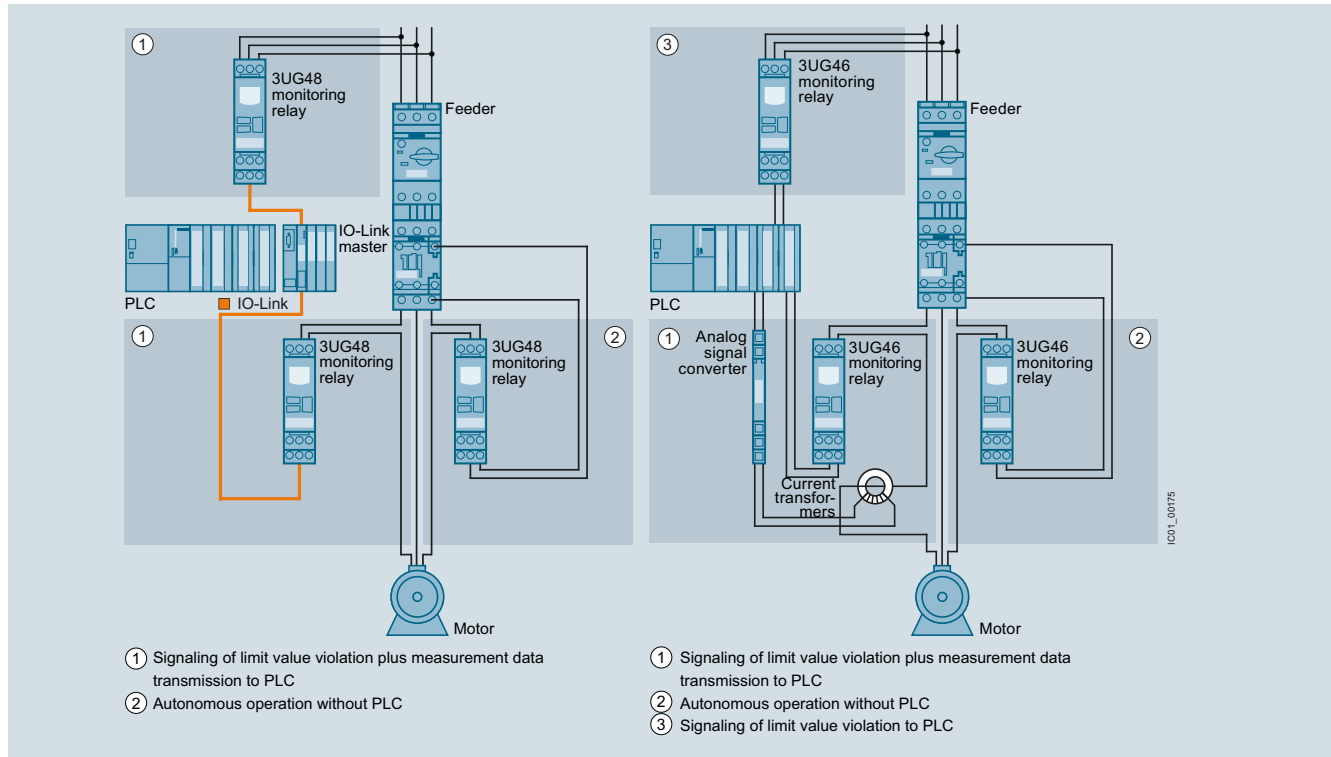
Introduction

System components

Overload and monitoring relays

By combining overload/monitoring relays with IO-Link it is now possible to send data that has already been recorded and

evaluated in the monitoring relays directly to the controller. This avoids the use of duplicated sensors.

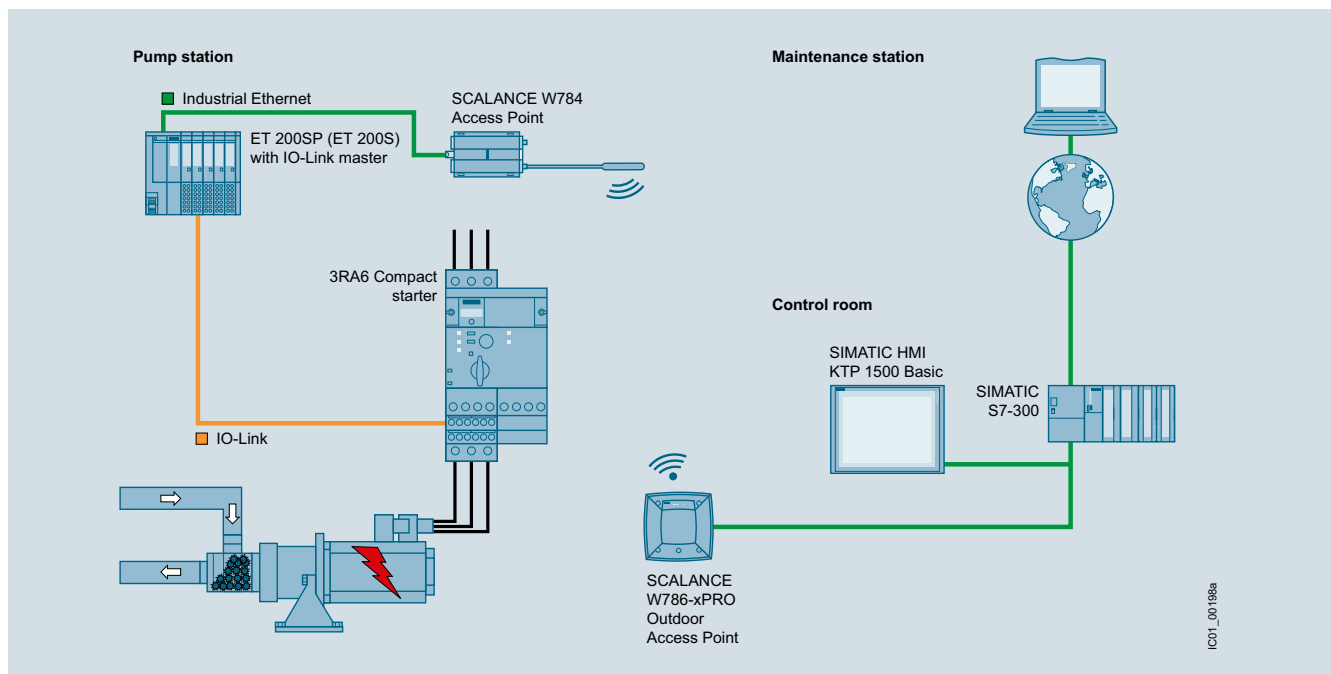


Possibilities for connecting overload relays to IO-Link or in the conventional way

Wireless communication

Using an upstream IWLAN client module, such as SCALANCE W746-1PRO, allows IO-Link to be integrated into the PROFINET world via a distributed I/O. Possible uses include acting as an alternative to fault-prone cable carrier or collector wire technology. The individual diagnostics options offered by

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



Wireless communication between Industrial Ethernet and IO-Link components

IO-Link components

IO-Link master, software, cables



CM 4x IO-Link
for ET 200SP

Masters

IO-Link master modules for ET 200SP

- CM 4xIO-Link

IO-Link master modules for ET 200S

- 4SI IO-Link electronic module
- SIRIUS 4SI electronic modules
- IO-Link master modules for ET 200eco PN

See this chapter

Software

STEP 7 PCT

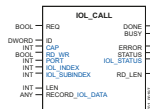


STEP 7 PCT

Engineering software for configuring the IO-Link master modules for ET 200SP, ET 200S and ET 200eco

- Available as a stand-alone version or integrated into STEP 7 (Version 5.5 SP1 or later)
- Retrieval of parameter and diagnostics data from the IO-Link devices connected to the master
- Monitoring of the process image of the IO-Link devices
- Open interface for importing further IODDs
- Freely available for download from Industry Online Support¹⁾

IO-Link Call function block



IO-Link Call
function block

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

- Freely available for download from Industry Online Support²⁾

WinCC flexible template project



WinCC flexible
template project

Easy integration of IO-Link devices into the user program by using ready-made WinCC flexible templates

- Freely available for download from Industry Online Support³⁾

IODD files

IO-Link Device Description (IODD) files provide the device description for IO-Link

- Comprehensive IODD catalog of SIEMENS IO-Link devices
- Freely available for download from Industry Online Support⁴⁾

Cable

3-wire standard cable

see for example catalog ID 10 "Industrial Identification Systems"

IO-Link devices



K20 input module

Detection with IO-Link

IO-Link input modules

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

See chapter 2 in IC 10 "Industrial Communication"

IO-Link devices (continued)



SIMATIC RF210R,
SIMATIC RF220R,
SIMATIC RF260R

IO-Link RFID systems

SIMATIC RF200 RFID system in the HF range

- SIMATIC RF210R, SIMATIC RF220R, SIMATIC RF260R products
- Simple identification tasks (read-only), such as reading an ID number
- No RFID-spec. programming, ideal for those new to RFID
- Simple connection via master modules for IO-Link, such as SIMATIC ET 200S and ET 200eco
- Use with the tried and tested ISO 15693 transponders (MOBY D)

see Catalog ID 10 "Industrial Identification Systems"

Switching with IO-Link

Contactors and contactor assemblies

Power contactors for switching motors

- SIRIUS 3RT2 contactors, 3-pole, up to 18.5 kW
- Contactor assemblies
- SIRIUS 3RA23 reversing contactor assemblies
- SIRIUS 3RA24 cont. assembl. for wye-delta starting
- SIRIUS 3RA27 function modules for IO-Link
- For direct-on-line starters, reversing starters and wye-delta starters

See Chapter 3 in IC 10 "Switching Devices – Contactors and Contactor Assemblies – for Switching Motors"

Motor starters for use in the control cabinet

SIRIUS 3RA6 compact starters

- 3RA64 direct-on-line starters
- 3RA65 reversing starters
- Infeed systems for 3RA6

See chapter 8 in IC 10 "Load Feeders and Motor Starters for Use in the Control Cabinet"



SIRIUS 3RA2711
function modules
for IO-Link



SIRIUS 3RA64
direct-on-line
starter



SIRIUS 3RB24
overload relays



SIRIUS 3UG48
monitoring relays



SIRIUS 3RS14
temperature
monitoring relays



SIRIUS 3RR24
monitoring relays

Contactors with IO-Link

Overload relays

SIRIUS 3RB24 solid-state overload relays for IO-Link

- Evaluation module
- Current measuring modules from 0.3 to 630 A
- Controlling direct-on-line, reversing and wye-delta starters via IO-Link in conjunction with contactors
- Full motor protection
- Diagnostics and current value transmission via IO-Link

See Chapter 7 in IC 10 "Protection Equipment"

Monitoring with IO-Link

Monitoring relays

SIRIUS 3UG48 monitoring relays for IO-Link

- Monitoring voltage, current, residual current, network, speed or p.f. according to device design
- On/tripping delay time can be adjusted

See chapter 10 "Monitoring and Control Devices"

SIRIUS 3RS14, 3RS15 temperature monitoring relays for IO-Link

- Temperature monitoring with connected sensors
- Two limit values, can be adjusted separately

See chapter 10 "Monitoring and Control Devices"

SIRIUS 3RR24 monitoring relays for IO-Link

- Monitoring of current, phase failure, open circuit and phase sequence
- Designed for mounting on 3RT2 contactors

See chapter 10 "Monitoring and Control Devices"

¹⁾ <http://support.automation.siemens.com/WW/view/en/37936752>

²⁾ <http://support.automation.siemens.com/WW/view/en/38487085>

³⁾ <http://support.automation.siemens.com/WW/view/en/38006560>

⁴⁾ <http://support.automation.siemens.com/WW/view/en/29801139/133100>

IO-Link

Introduction

IO-Link specification

Overview

Principles of the IO-Link specification

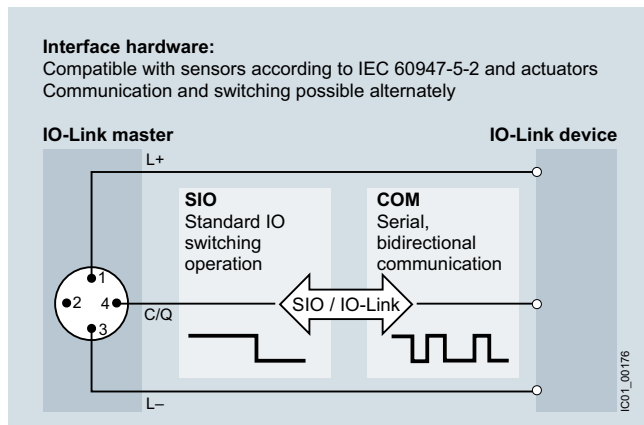
According to the IO-Link specification, communication functions as follows:

- Transmission takes place via an unshielded three-wire cable no more than 20 m long, of the kind normally used for standard sensors
- Analog values which have already been digitized are transmitted in the form of message frames, which may correspond to ± 10 V or 4 to 20 mA
- Digital communication from 0 to 24 V on the so-called C/Q cable
- Most of the values transmitted are measured values from the sensors
- The sensors and actuators are described by the IO-Link Device Description (IODD)
- While the IO-Link specification permits an infinite number of ports, an IO-Link master currently only supports four ports. Only one IO-Link device (slave) can be connected to each port (point-to-point connection)
- The transmission rates between IO-Link master and the devices are as follows:
 - via COM1: 4 800 Bd
 - via COM2: 38 400 Bd
 - via COM3: 230 400 Bd
- The average cycle time is 2 ms for the reading/writing of 16 data bits at a transmission rate of 38 400 Bd

IO-Link protocol

For the dialog between device and master, IO-Link uses a standard protocol, the standard asynchronous communication interface (UART) in "semi-duplex" mode.

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



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

Data types

In the IO-Link specification a distinction is made between the following data types:

Process data

The process data of the devices are transmitted cyclically in a data frame, provided the process data width does not exceed 2 bytes. In the case of larger process data widths up to 32 bytes, parts are transmitted one after the other in several cycles. As of Version V1.1 of the specification, up to 32 bytes of process data can be transferred in a single cycle.

Service data (SD)

With the aid of the service data, parameter values or device statuses can be read out. It is also possible to write the parameter values or transmit commands via the service data. Service data are always exchanged acyclically and in response to an inquiry from the IO-Link master.

Events

Via events it is possible to transmit device events or statuses such as contamination, overheating, short circuits etc., from the the device via the IO-Link master to the PLC or to visualize them.

The events are sent on the initiative of the devices via the "event flag", which the master evaluates. The master itself can also generate events.

Three categories of event are defined:

- Error signals (errors)
- Maintenance data (warnings)
- Device functions (notifications)

Data storage

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

The IO-Link master can contain the parameter server. The parameter server can also be implemented centrally in the PLC or in a system server. In this case the IO-link master passes on the corresponding information.

IO-Link master

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

IO-Link Device Description (IODD)

The IO-Link Device Description (IODD) has been defined to provide a full, transparent description of system characteristics as far as the IO-Link device. It is based on the open XML standard.

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

New in IO-Link Specification 1.1

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

Specification 1.1 offers the following new features compared with the previous Specification 1.0:

- Transmission of up to 32 bytes of process or service data in a single cycle.
- Data storage concept

Overview



IO-Link master CM 4xIO-Link

The CM 4xIO-Link communication module is the IO-Link master, for use in the ET 200SP distributed I/O system.

Features

- IO-Link master as serial communication module with 4 ports according to IO-Link specification V1.1
- Module exchange with automatic data recovery without engineering for IO-Link master and device
- Up to four IO-Link devices (3-wire connections) can be connected to each IO-Link master module.
- Data transmission rates COM1 (4.8 kBd), COM2 (38.4 kBd), COM3 (230.4 kBd), automatic adjustment to the transmission rate supported by the device
- Port-by-port parameterizable diagnostics
- PROFIenergy support
- Parameterization of IO-Link parameters by S7-PCT V3.0 and higher

Central data storage

If the communication module is pulled off the BaseUnit, part of the electronic coding element will remain in the BaseUnit. Stored in this part are the parameters of the CM 4xIO-Link and the parameters of the IO-Link devices. When a new (not yet parameterized) IO-Link master is plugged on, it will adopt the parameters from the electronic coding element.

Connection

All type A0 BaseUnits can be used for the CM 4xIO-Link communication module, i.e. all variants of the BaseUnit (without/with infeed, -AUX).

Configuration

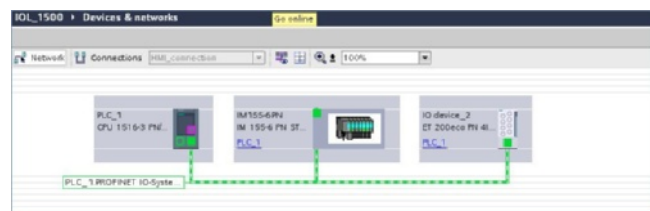
Module integration

To integrate the module you need the engineering tool STEP 7 V5.5 and higher or STEP 7 V11 TIA Portal.

Configuration

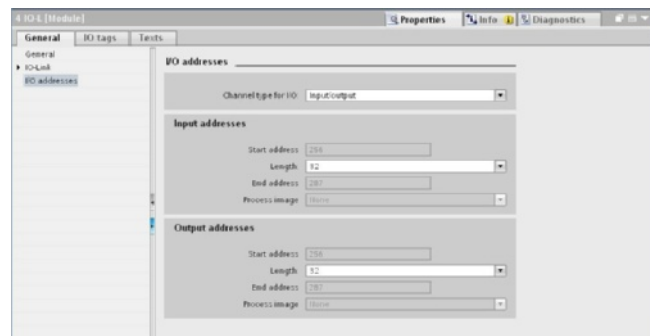
S7-PCT V3.0 and higher is required in addition for IO-Link configuration.

The following diagram shows a PROFINET configuration in which PROFINET ET 200SP and ET 200ecoPN devices are integrated with IO-Link masters.



Configuration of a PROFINET network with lower-level IO-Link masters

The address areas for exchanging the cyclic data (process values) are defined by IO-Link in the device view of the PROFINET device.



Device view with setting of the address area by IO-Link via TIA Portal

Startup

For commissioning, S7-PCT V3.0 and higher is required in addition to an engineering tool in order to parameterize the IO-Link master.

IO-Link master module for ET 200SP CM 4xIO-Link

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	A	6ES7137-6BD00-0BA0		1	1 unit	255
		CM 4xIO-Link communication modules • IO-Link master for SIMATIC ET 200SP, can be plugged onto BaseUnit A0 • Corresponds to IO-Link specification V1.1 • Dimensions (W × H × D / mm): 15 × 100 × 75				

6ES7137-6BD00-0BA0

Accessories

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	A	6ES7193-6BP20-0DA0		1	1 unit	255
		BaseUnits • BaseUnit BU15-P16+A10+2D for CM 4xIO-Link to ET 200SP • For opening a new voltage group via the plugged-in peripheral module • Current carrying capacity per process terminal max. 2 A				

6ES7193-6BP20-0DA0

More information

Manuals

Manual "SIMATIC IO-Link System" [see](http://support.automation.siemens.com/WW/view/en/65949252)
<http://support.automation.siemens.com/WW/view/en/65949252>

System manual "ET 200SP Distributed I/O System" [see](http://support.automation.siemens.com/WW/view/en/58649293)
<http://support.automation.siemens.com/WW/view/en/58649293>

Industry Mall

More information
[see Industry Mall at "Automation Technology"](#)
[→ "Industrial Communication" → "IO-Link" → "Masters"](#)
[→ "IO-Link Master Module for ET 200SP"](#)

IO-Link master modules for ET 200S 4SI IO-Link electronic modules

Overview



4SI IO-Link electronic module for ET 200S

The 4SI IO-Link electronic module is an IO-Link master and enables easy integration of sensors and actuators from different manufacturers in the SIMATIC ET 200S multifunctional, distributed I/O system at a total of four ports.

Features

- Up to four IO-Link devices (3-wire connections) can be connected to each IO-Link master module. 3RA6 compact starters or load feeders with 3RA27 function modules can even be bundled in groups of four devices on one IO-Link port. It is possible therefore to connect up to 16 load feeders to the control system at one IO-Link master module.
- Up to four standard sensors (2-wire/3-wire connection) can be connected.
- The 4SI IO-Link electronic module has a width of 15 mm and can be used with the following universal terminal modules:
 - TM-E15S26-A1 (screw terminals)
 - TM-E15C26-A1 (spring-type terminals)
 - TM-E15N26-A1 (FastConnect)
- Supports firmware update (STEP 7 V5.4 SP4 and higher).
- Corresponds to IO-Link Specification V1.0

Selection and ordering data

Version	Connection	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	4SI IO-Link electronic modules Screw terminals, spring-type terminals or FastConnect, depending on universal terminal module	A	6ES7138-4GA50-0AB0		1	1 unit	250

6ES7138-4GA50-0AB0

Accessories

Version	Connection	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Universal terminal modules for ET 200S							
Connection	Module type						
Screw 	TM-E15S26-A1	A	6ES7193-4CA40-0AA0		1	1 unit	250
Spring-type 	TM-E15C26-A1	A	6ES7193-4CA50-0AA0		1	1 unit	250
FastConnect 	TM-E15N26-A1	A	6ES7193-4CA80-0AA0		1	1 unit	250

More information

Product manual "SIMATIC ET 200S distributed I/O 4SI IO-Link electronic modules" see <http://support.automation.siemens.com/WW/view/en/29825814>

More information and technical specifications

see Industry Mall under "Automation"

→ "Industrial Communication" → "IO-Link" → "Masters"

→ "IO-Link Master Modules for ET 200S".

IO-Link Masters

IO-Link master modules for ET 200S SIRIUS 4SI electronic modules

Overview



SIRIUS 4SI electronic module for ET 200S

The SIRIUS 4SI electronic module allows the simple and cost-effective connection of SIRIUS devices with IO-Link to the multifunctional, distributed I/O system SIMATIC ET 200S at a total of four ports.

Features

- Up to 4 SIRIUS devices can be connected at the 4 ports of the SIRIUS 4SI electronic module.
3RA6 compact starters or load feeders with 3RA27 function modules can even be bundled in groups of four devices on one IO-Link port.
It is possible therefore to connect up to 16 load feeders to the control system at one IO-Link master module.
- The SIRIUS 4SI electronic module has a width of 15 mm and can be used with the following universal terminal modules:
 - TM-E15S26-A1 (screw terminals)
 - TM-E15C26-A1 (spring-type terminals)
 - TM-E15N26-A1 (FastConnect)
- Supports firmware update (STEP 7 V5.4 SP5 and higher)
- Corresponds to IO-Link Specification V1.0

Selection and ordering data

Version	Connection	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1005-00LB00-0AA00	SIRIUS 4SI electronic modules	Screw terminals, spring-type terminals or FastConnect, depending on universal terminal module	3RK1005-0LB00-0AA0		1	1 unit	42F

Accessories

Version	Connection	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Universal terminal modules for ET 200S							
Connection	Module type						
Screw		TM-E15S26-A1	A	6ES7193-4CA40-0AA0	1	1 unit	250
Spring-type		TM-E15C26-A1	A	6ES7193-4CA50-0AA0	1	1 unit	250
FastConnect		TM-E15N26-A1	A	6ES7193-4CA80-0AA0	1	1 unit	250

More information

Manual "Distributed I/O system ET 200S - 4SI SIRIUS electronic module" see
<http://support.automation.siemens.com/WW/view/en/37856470>

More information and technical specifications
 see Industry Mall under "Automation"
 → "Industrial Communication" → "IO-Link" → "Masters"
 → "IO-Link Master Modules for ET 200S".

IO-Link master modules for ET 200eco PN

Overview



IO-Link master modules for ET 200eco PN

The ET 200eco PN IO-Link master module is an IO-Link master and enables easy connection of sensors and actuators from different manufacturers to the I/Os directly in the machine's field area.

Features

- Up to four IO-Link devices (3-wire connection) can be connected to each IO-Link master module.
- Up to eight standard sensors (8 DI) and up to four standard actuators (4 DO) can be connected in addition.

Selection and ordering data

	Version	Connection	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	IO-Link master modules for ET 200eco PN Block I/Os in IP65	M12	A	6ES7148-6JA00-0AB0		1	1 unit	250

6ES7148-6JA00-0AB0

More information

Manual "SIMATIC Distributed I/O ET 200eco PN"

see

<http://support.automation.siemens.com/WW/view/en/29999018>

More information and technical specifications

see Industry Mall under "Automation"

→ "Industrial Communication" → "IO-Link" → "Masters"

→ "IO-Link Master Modules for ET 200eco PN".

IO-Link

Input modules

General data

Overview



IO-Link input modules

Using IO-Link technology, it is basically possible to connect standard sensors to IO-Link masters. However, connecting standard sensors directly to the IO-Link master does not exploit the full potential of IO-Link. The solution lies in the technology of the IO-Link modules. Their use is a more economically attractive solution in comparison with the direct connection of a sensor.

IO-Link input modules are a sensible addition to the ET 200S distributed peripherals. The IO-Link input module technology enhances IO-Link via a pure point-to-point cable connection towards decentralized structures. The maximum cable length of an IO-Link connection between an IO-Link module and an IO-Link master is 20 m. The use of sensor boxes with accordingly complex and error-prone wiring is no longer necessary.

Transmission of parameter and diagnostic signals

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

M8 and M12 terminals

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

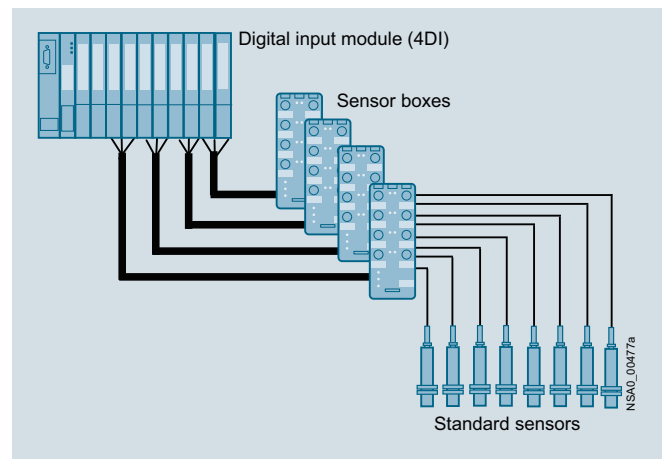
Benefits

The use of IO-Link input modules has the following benefits:

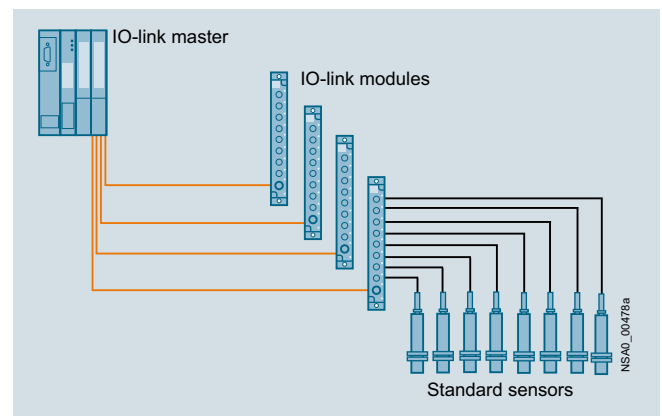
- Economical use of innovative IO-Link technology also for binary sensors
- Optimum use of all ports of the IO-Link master
- Connection of several binary sensors/actuators to one port of the IO-Link master, hence low-cost connection of also binary sensors/actuators to the control system through IO-Link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

Application

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



Former technology with sensor boxes



Technology with IO-Link input modules

K20 IO-Link modules

Selection and ordering data

Type	Pin assignment	Conne- ction methods	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK5010-0BA10-0AA0	K20 IO-Link modules							
	• 4 inputs	Y	M12	B	3RK5010-0BA10-0AA0	1	1 unit	42C
 3RK5010-0CA00-0AA0	• 8 inputs	Standard	M8	B	3RK5010-0CA00-0AA0	1	1 unit	42C

2

IO-Link

Input modules

K20 IO-Link modules

Accessories

	Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
 3RK1901-1KA00	M12 sealing caps For free M12 sockets	▶	3RK1901-1KA00		100	10 units	42C
 3RK1901-1PN00	M8 sealing caps For free M8 sockets	A	3RK1901-1PN00		100	10 units	42C
 3RK1902-4GB50-4AA0	Control cables, assembled at one end Angular M12 socket for screw fixing, 4-pole, 4 x 0.34 mm ² , A-coded, black PUR sheath, max. 4 A • Cable length 5 m	C	3RK1902-4GB50-4AA0		1	1 unit	42D
 3RK1902-4CA00-4AA0	Angular M12 sockets for screw fixing, 4-pole screw terminals, max. 0.75 mm ² , A-coded, max. 4 A	C	3RK1902-4CA00-4AA0		1	1 unit	42D
 3RK1902-4BA00-5AA0	M12 plugs, straight For screw fixing, 5-pole screw terminals, max. 0.75 mm ² , A-coded, max. 4 A	C	3RK1902-4BA00-5AA0		1	1 unit	42D
 3RK1902-4DA00-5AA0	M12 plugs, angled For screw fixing, 5-pole screw terminals, max. 0.75 mm ² , A-coded, max. 4 A	C	3RK1902-4DA00-5AA0		1	1 unit	42D
 3RK1902-4H...-5AA0	Control cables, assembled at one end M12 plugs, angled, for screw fixing, 5-pole, 5 x 0.34 mm ² , A-coded, black PUR sheath, max. 4 A • Cable length 1.5 m • Cable length 5 m • Cable length 10 m	C C C	3RK1902-4HB15-5AA0 3RK1902-4HB50-5AA0 3RK1902-4HC01-5AA0		1 1 1	1 unit 1 unit 1 unit	42D 42D 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 mm ² , A-coded, black PUR sheath, max. 4 A • Cable length 1.5 m	C	3RK1902-4PB15-3AA0		1	1 unit	42D
 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

More information

More information and technical specifications
[see Industry Mall under "Automation Technology"](#)
[→ "Industrial Communication" → "IO-Link"](#)
[→ "IO modules" → "IO-Link K20 Modules"](#).