2

Industrial Communication



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	- Motor starters for operation in the control
EQ 101	Cabinet, Sinius Shad compact leeders
1010	
	www.siemens.com/industrial-controls/
	support
	under Product List: - Technical Specifications
	under Entry List:
	- Updates
	- Downloads - FAO
	- Manuals/Operating instructions
	- Characteristic curves
	and at www.siemens.com/industrial-controls/
	configurators
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-13	
(1	See Catalog FS 10 "Sensor Technology".

Introduction

		Order No	Page
AS-Interface/ASIsafe		Order No.	Page
NO-Internace/Aoisare	ASIsafe enables the integration of safety-oriented components in an AS-Interface net-		
	work, for example:		
	EMERGENCY-STOP pushbuttons		
	Protective door switches		
	Safety light arrays		
	The simple wiring of AS-Interface, which is a major advantage, is maintained.		
	AS-Interface safety monitors	3RK1	2/16
200000	Key element of ASIsafe		
00000	 Monitors safe participants and links safe inputs 		
	Ensures safe disconnection		
	 Modular construction according to individual requirements 		
	 Available with one or two release circuits with 2-channel configuration 		
	 All versions also with removable screw terminals or spring-type terminals 		
fety monitors	 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 		
	New configuration software ASIMON V3 with graphic function diagram presentation		
	Your advantage: Easy to configure safety functions up to Category 4. PL e. SIL 3.		
	AS-Interface safety modules	3BK1	2/19
	Complete portfolio of ASIsafe modules	onnen	2,10
	 For connection of safety switches with contacts (position switches etc.) as well as solid-state safety sensors (BWS) 		
	Degree of protection IP65/IP67 or IP20		
45F	 Very compact dimensions, from 20 mm width 		
000	Up to 4 safe inputs per module		
0	Standard outputs are available on the module in addition		
	• Up to Category 4, PL e, SIL 3.		
1	Your advantage: Easy integration of safe signals, be it in the control cabinet or in the field		
22.5F (SlimLine)			
	Position switches	3SF1	Ch. 8
<u> </u>	 Plastic with degree of protection IP65 and metal with degree of protection IP66/IP67 		0111 0
	 ASIsafe electronics integrated in the enclosure, with low power consumption < 60 mA 		
179	Available with senarate actuator or solenoid interlocking		
and a second sec	Your advantage: Conventional wiring of safety safety functions required no longer		
	required.		
		38F2	Ch Q
SITION SWITCH	Cable-operated switches	0012	011. 9
	Degree of protection IP65		
	 Direct connection of cable-operated switches for detection of signals 		
	Metal enclosures		
(A	SIMATIC FS400 light curtains and light arrays and SIMATIC FS600 laser scanners	3SF7	See Catalog FS 10
	Degree of protection IP65	3RG7 84	Sensor rechnology
	Connection to AS-Interface either direct or through safe solid-state input module		
	• Up to Category 4, PL e, SIL 3 (light curtains/arrays)		
	or Galegory 3, PL 0, SIL 2 (laser scanners)		
	Your advantage: Direct connection of active and optical protection for persons to ASIsafe.		
gnt curtain and array		0055	
		3SF5	Ch. 9
	Degree of protection IP65/IP67		
	EIVIERGENCY-STOP directly on AS-Interface using integrated modules		
	Metal or plastic version		
MERGENCY-STOP for	rour advantage: Easy direct connection of service-proven control elements to ASIsafe.		
nounting on front plates			

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Introduction



2

Introduction

		Order No	Page
AS-Interface/Slaves			i uge
	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)		
145	Field modules: Digital I/O modules IP67 - K60, K60R, K45 and K20	3RK1, 3RK2	2/37, 2/39, 2/42,
	Degree of protection IP65/IP67 or IP68/69K	,	2/44
•	 Modules available with up to degree of protection IP68/69K 		
	ATEX-certified modules available for Ex Zone 22		
	Connection sockets in M8/M12		
61	Up to eight inputs and four outputs A/B technology available		
K20 digital module	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 start-up times by up to 40 %.		
K45 digital module			
R45 digital module			
O			
QQ			
00			
@::			
SEE METERS IF			
K60 digital module			
(TTD)	Field modules: Analog I/O modules IP67 - K60	3RK1	2/48
0.00	Degree of protection IP65/IP67 Detecte or transmite applies signals leavely		
00	Detects of transmits analog signals locally 2/4_channel		
	 Input modules for up to four sensors with current signal, sensors with voltage signal or 		
B	sensors with thermal resistor		
	Output modules for current or voltage		
K60 analog module	Your advantage: Easy integration of analog values.		
	Cabinet modules	3RG9, 3RK1	2/51
000000 131313	Degree of protection IP20		
COLUMN ST	 No M12 plugs required for connection 		
•	Up to 16 inputs		
	Narrow design of the SlimLine modules with width from 22.5 mm Barayable, finger asfe terminal blocks that eacher the mixed up (SlimLine)		
14.	Removable, linger-sale terminal blocks that cannot be mixed up (Similine) Flat design of the flat modules for small control cabinets and confined conditions		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Connection with screw-type or spring-type terminals		
SlimLine	Standard rail mounting and wall mounting possible		
* *-* *-* -	Diagnostics LEDs		
	Your advantage: Modules enable use in cabinets and small local control cabinets.		
SIEMENS			
TEE THE AND AND CE			
1011日日 - 北京市市市市 - 小山市市市市市			
F90 module			
202			
SIEMENS			
24V DC			
C€			
Elat modula			
i ial IIIUuule			

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Introduction

		Order No.	Page
17.10	Modules with special functions: Counter modules	3RK1	2/57
020200	Degree of protection IP20		
SIEMENS	For evaluation of pulses		
	Connection with screw-type or spring-type terminals		
	Your advantage: Evaluation of pulses which exceed even the clock frequency of AS-		
HP Carese			
000000			
Counter module			
all the second s	Modules with special functions: Ground-fault detection modules	3RK1	2/58
000	Degree of protection IP20		
000	Display using LEDs		
G	Two signaling outputs		
	Your advantage: Automatic diagnostics of ground faults on AS-Interface.		
000			
Ground fault detection			
module			
	Modules with special functions: Overvoltage protection modules	3RK1	2/58
	Degree of protection IP67		
- • AS-1	 Discharge through ground cable with oil-proof outer sheath 		
	Protection at transition of lightning protection zones		
ALK. POMER*	Your advantage: The AS-Interface overvoltage protection module protects downstream AS-Interface devices or individual sections in AS-Interface networks from conducted		
	overvoltages.		
H			
module			
and the second s	Compact feeders	3RA6	Ch. 6
ccc	3RA61 direct-on-line starters, 3RA62 reversing starters		
Aman	Degree of protection IP20		
	• Up to 15 kW/400 V		
** @ 4 §	Wide setting range		
	• Weld-free		
-1.1	Removable terminals Optional AS i add an madula		
access of A	Optional AS-I add-on module		
3RA61 compact feeder	connection to AS-Interface.		
84 24	Motor starters/compact starters (400 V AC)	3RK1	Ch. 6
and an	Degree of protection IP65/IP67		
	• Up to 5.5 kW at 400/500 V AC		
	Electromechanical or solid-state design		
	Optional with brake contact		
1 martin 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Your advantage: No local control cabinets required thanks to completely factory-wired load feeder with IP65 protection		
Compact starter			
	Motor starters/ECOFAST motor starters and soft starters	3RK1	Ch. 6
	Degree of protection IP65/IP67		
	• Standardized interfaces according to ECOFAST Specification (complies with DESINA)		
2666	 Mechanical or solid-state soft switching function 		
	Your advantage: Less space required in the control cabinet, the starters can be		
See and the second	installed near the motor or be plugged on the motor.		
ECOFAST motor starter			
@:···)	Motor starters/motor starters (24 V DC)	3RK1	Ch. 6
A	Degree of protection IP65/IP6/ Direct on line starters, double starters or successing starters		
	Direct-on-line starters, double starters or reversing starters		
00			
	Your advantage: Simple motor starter in service-proven module construction for		
:	24 V DC motors.		
Generation SELECTION INFORMATION FORMATION			
Motor starter			

Introduction

		Order No.	Page
A	Pushbuttons and indicator lights	3SF58	Ch. 9
	 Modular construction according to individual requirements 		
	Metal and plastic version		
O	 Available with standard or A/B slaves and ASIsafe slave 		
	With LEDs		
	Your advantage: Complete 3SF58 operating system with simple AS-Interface connec-		
	tion for your plant.		
0			
Pushbutton		01/17 /	
		8WD4	Ch. 9
	Many optical and acoustic elements can be combined		
	Also as A/B slaves according to AS-Interface Specification 2.1		
	Up to three signaling elements can be connected using an adapter element		
	With LEDs or incandescent lamps		
T	or acoustic warnings in emergency situations, with easy AS-Interface connection.		
1			
Signaling column			
olghaing column			
	AS-Interface connections for LOGO!	3RK1	2/60
	 AS-Interface slave for the connection of LOGO! 		
см 🔺	Distributed controller functionality		
+ HUNUSTOP + AS-i	 Four inputs/four outputs (virtual) 		
processories and 50	Your advantage: Intelligence can be used locally.		
0.00-00-00-00			
Connections for LOGO!			
AS-Interface/Power s	upply units		
	AS-Interface power supply units generate a controlled direct voltage of 30 V DC with high stability and low residual ripple, working according to the principle of a primary		
	switchgear. They are an integral component of the AS-Interface network and enable the		
	simultaneous transmission of data and energy on one cable.		
//	Power supply units	3RX9	2/61
UIDALISE	Power supply units with protection class IP20:		
	 With wide performance spectrum from 2.6 to 8 A 		
DWER	UL/CSA approval means the power supplies can be used worldwide The 2.6 A version is approved eccerding to NEC Class 2.		
N	The 2.6 A version is approved according to NEC Class 2		
No. of the second se	Less space required tranks to compact dimensions Easy and quick installation		
IP20 3 A	Certified for global use Integrated ground fault and everlead detection save the need for additional compo		
II 20, 0 A	nents and makes applications reliable		
////	• Diagnostics memory, remote indication and remote reset allow fast detection of faults		
SIEMENS	in the system		
<u>م</u>	 Removable terminal blocks reduce downtimes 		
OWE	The ultra-wide input range enables single- and two-phase applications (9.4 varian)		
Still	(o A version)		
	Tour advantage. Optimum performance for each application.		
IP20 8 A			
AS-Interface/Transmi	ssion media		
	AS-Interface shaped cable for connection of network stations.		
	AS-Interface shaped cables	3RX9	2/62
	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.		

Shaped cables

Introduction

		Order No.	Page
AS-Interface/System	components and accessories		1 490
	Accessories comprise tools for mounting, installation and operating as well as individ- ual components.		
	Bepeaters and extension plugs	3BK1, 6GK1	Repeater 2/63
man and an a	Repeaters for extending the AS-Interface cable by 100 m per repeater		Extension pluas:
	• Extension plug for extending the AS-Interface segment to max. 200 m		2/64
	Maximum two repeaters and one extension plug in series (max. 300 m)		
-01	Parallel switching of several repeaters possible (star configuration option)		
2	Maximum size increases (when combined) to more than 600 m		
·· Fu	Easy mounting		
Repeater	IP67 module enclosure		
	Your advantage: Lower infrastructure costs, more possibilities of use and greater free-		
All and function	dom for plant planning.		
Extension plug	Addressing units	2 DK 1	2/65
	Addressing all stations of the AS-Interface network (standard and A/R slaves)	JIKI	2,00
557 • • •	Reading out the slave profile (I/O ID ID2 and ID1 code)		
	Setting the ID1 code and temporary setting of the slave parameters		
	(e. g. for testing of analog slaves)		
	Measurement of AS-Interface voltage		
	 Enables direct setting of outputs and reading in of a slave's inputs 		
\++	Storage of complete system configurations		
Addressing unit	Your advantage: Easiest way to address and parameterize the slaves.		
CIEMENIC	AS-Interface analyzers	3RK1	2/66
AS-Interface Analysee	 Diagnostics units for completely checking the quality and function of an AS-Interface installation 		
	Transmission of collected data through an RS 232 interface to a PC, evaluation by software		
And the second s	Easy and user-friendly operation		
Analyzers	Automatically generated test logs		
	Advanced trigger functions enable exact analysis		
	Process data can be monitored online		
	• In addition to digital I/O data it is also possible to view analog values and safety slaves		
	in data mode		
	logs facilitate remote diagnostics.		
	Miscellaneous accessories	3RK2, 3RG7, 3RG9,	2/69
	AS-Interface system manual, individual components such as sealing caps, cable adapters, distributors etc.	3RK1, 3RX9, 6ES7	
wir∠ seaing cap			
102010-0440			
Cable terminating pieces			
AS-Interface / softwar	e		
	AS-i function block library for PCS 7	3ZS1	2/72
	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		
AS-i function block library for PCS 7	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 con- figuration		

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Introduction

N

			Order No.	Page
IO-Link				
	IO-Link is a new communication standard for sensors Profibus User Organization (PNO).	and actuators - defined by the		
	Dynamic changing of sensor/actuator parameters di	irectly by the PLC		2/73
. 🛋 🗐	 Storage of parameters enables devices to be exchan or programming device, through re-parameterization 	ged during operation, without a PC n via the user program		
	Fast commissioning thanks to central data storage			
🖌 🛛 🖓 💶 🖓 📳	Consistent diagnostic information as far as the sense	or/actuator level		
	• Uniform and greatly reduced wiring of different sens	ors/actuators/controls		
IO-Link family	Your advantage: Fast commissioning and flexible main	ntenance thanks to central data		
	storage, less wiring work because no passive distributors are r	peeded		
IO-Link / IO-Link mast	er modules			
	The IO-Link master modules form the heart of the IO-L	ink system.		2/74
	ET 200S 4SI IO-Link solid-state modules	······ • • • • • • • • • • • • • • • •	6ES7. 3RK1	2/74
	• Up to 4 IO-Link devices (three-conductor connection	n) can be connected	, -	
	• Up to 4 standard actuators/sensors (two-conductor/	three-conductor connection) can		
	be connected			
	SIRIUS ET 200S 4SI solid-state modules			
	 Up to 16 SIRIUS controls can be connected with IO- 	Link (grouped)		
an i pan Tantan	Supports firmware update (STEP 7 V5.4 SP4 and high second se	gher).		
SIRIUS ET 200S 4SI	ET 200eco PN block I/Os			
solid-state module	Up to 4 IO-Link devices (three-conductor connection	n) can be connected		
	 Up to 8 standard sensors (8 DI) and up to 4 standard ed in addition 	d actuators (4 DO) can be connect-		
	Your advantage: Easy connection to SIMATIC S7-300	or FT200S		
IO-Link / I/O modules				
	IO-Link I/O modules make full use of the potential of IC more attractive solution than a direct sensor/actuator	D-Link and economically are a connection.		2/75
(m),	IO-Link K20 modules		3RK5	2/76
(e)	 Four or eight digital inputs 			
0	Degree of protection IP65/IP67			
0	Connection sockets in M8/M12			
	 Contacting protected against polarity reversal 			
IO Link K20 modulo with	Your advantage: Reduction of mounting and start-up t	imes by up to 40 %.		
four digital inputs				
IO-Link / industrial co	ntrols			
	Up to four 3RA64/65 compact feeders (direct-on-line s connected together and conveniently linked to the IO- ized IO-Link connection.	starters/reversing starters) can be Link master through a standard-		
and the second se	Load feeders and motor starters /		3RA64, 3RA65	Ch. 6
	for use in the control cabinet / SIRIUS 3RA6 compa	act feeders		
A BALL	3RA64 direct-on-line starters, 3RA65 reversing starters	S		
	Degree of protection IP20			
	• Up to 15 kW/400 V			
	Wide setting range			
in the second second	Weld-tree			
access 6	Removable terminals	a server as a server a		
SIRIUS 3RA64	Your advantage: detailed diagnostics data and a high range	density of information in the local		
IO-Link / sensors	5			
	The product portfolio of IO-Link devices also covers u optical sensors with IO-Link interface	Itrasonic sensors and		
~	Ultrasonic: Ontical:		6GR6, 6GR1	Catalog FS 10
A line	M18 design 5 colors	can be detected		"Sensor Technology"
C Mar	Object scanning at a distance of 10 cm to 100 cm	nanagement		
Sonar SIMATIC PXS310C	 Switchable operating modes 			
M18 proximity switches	Your advantage: Dynamic parameterization of measur	ing range limits (ultrasonic),		
	dynamic change of color detection (optical)			
Note:				
		The terminale are in	diantad in the sel	laction and ar
Screw termin	als	dering data by orar	nge backarounds.	ection and or-
00		J	0 0 0 0 0 0	

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Spring-type terminals

Combicon connection

 $\overset{\infty}{\square}$

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AS-Interface Introduction

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) and routers (links) which control the process or field communication as masters, and actuators and sensors which 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. An AS-Interface power supply unit that meets the requirements of the AS-Interface transmission method 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

Operating modes

Generally, master interfaces have the following operating modes:

I/O data exchange

In this operating mode the inputs and outputs of the binary AS-Interface slaves are read and written.

Analog value transmission

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 (according to Analog Profile 7.3 or 7.4) 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 diagnostics information read out from user programs.

AS-Interface Introduction

Configuration examples

Overview

Process or field communication

AS-Interface is used where individual actuators and sensors are spaced apart over a machine (e. g. a bottle filling line, production line, etc.).

It replaces complicated cable harnesses and connects binary and analog actuators and sensors such as proximity switches, valves and indicator lights to a controller, e.g. a SIMATIC or PC. In practice this means: Installation is straightforward because data and energy are conveyed together over one cable. No special know-how for installation and commissioning is required. And thanks to the simple laying of the cable, its clear-cut structure and special version there is not only far less risk of errors but also less effort during maintenance and servicing.



Example of a system configuration

AS-Interface Introduction

Communication overview

Overview

System components

Numerous system components are offered for implementing the communication. The key elements of a system installation are:

- Master interface modules for central control units such as SIMATIC S5 and SIMATIC S7, ET 200 M distributed peripherals or routers from PROFIBUS/PROFINET to AS-Interface
- AS-Interface shaped cables
- Network components such as repeaters and extension plugs
- · Power supplies for the slaves
- Modules for connection of standard sensors/actuators
- Actuators and sensors with integrated AS-i slave
- Safety modules for transmitting safety-oriented data through AS-Interface
- Addressing units for setting the slave addresses during commissioning





AS-Interface masters and AS-Interface links (see Routers)

reatures	
Standard	EN 50295 / IEC 61158
Тороlоду	Line, star or tree structure (same as electrical wiring)
Transmission medium	Unshielded two-conductor cable (2 x 1.5 mm ²) for data and auxiliary power
Connection method	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 in parallel switching Longer cable lengths also possible through paral- lel switching of more repeaters
Maximum cycle time	5 ms with full expansion using standard addresses, 10 ms with full expansion using A/B addresses, profile-specific for Spec. 3.0 slaves
Number of stations per AS-Interface line	31 slaves according to AS-Interface Spec. V2.0; 62 slaves (A/B technology) according 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. 3.0
Access control	Cyclic polling master slave method, cyclic data transfer by host (PLC, PC)
Error safeguard	Identification and repetition of faulty message frames

More information

For the modules referred to above please also note the conditions of application and the additional information.

AS-Interface system manual

More information about AS-Interface is available in the AS-Interface system manual.

The German-language AS-Interface System Manual can be downloaded free from the Internet at: support.automation.siemens.com/WW/view/de/26250840

The English-language AS-Interface System Manual can be downloaded free from the Internet at: support.automation.siemens.com/WW/view/en/26250840

A print version of the AS-Interface System Manual is also available in both English and German, see page 2/69.

Internet

You can find more information on the Internet at: support.automation.siemens.com/WW/view/en/10805888/130000

AS-Interface specification



Technology development of the AS-Interface

System limitations of AS-Interface specification

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

AS-Interface masters

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.

A/B technology is supported by all current AS-i master modules and AS-i links from Siemens.

The AS-i masters for S7-300 / ET200M and all DP/AS-i links and IE/AS-i links comply with AS-Interface Specification 3.0 and support all new and previous slaves.

AS-Interface specification	Available masters
Version 2.1	CP 243-2 (\$7-200)
Version 3.0	CP 343-2, 343-2P (S7-300 / ET200M), DP/AS-i Link Advanced, DP/AS-i F-Link, DP/AS-Interface Link 20E, IE/AS-i Link PN IO

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

The exact slave profile can be found in the 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.

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.

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

Benefits

- Reduction of master and power supply costs thanks to a higher number of slaves and I/Os per AS-Interface line
- Improved decentralization in plants with numerous, widely spread signals
- Further expansion of existing AS-Interface systems is possible

More information

More information about AS-Interface is available in the AS-Interface system manual.

The German-language AS-Interface System Manual can be downloaded free from the Internet at: support.automation.siemens.com/WW/view/de/26250840

The English-language AS-Interface System Manual can be downloaded free from the Internet at: support.automation.siemens.com/WW/view/en/26250840

A print version of the AS-Interface System Manual is also available in both English and German, see page 2/69.

Introduction

Overview



Secure communication and standard communication on AS-Interface

Safety is included

The ASIsafe concept supports the integration of safety-related components, such as EMERGENCY-STOP switches, protective door switches or safety light arrays, in the AS-Interface network. These are fully compatible with the familiar AS-Interface components (masters, slaves, power supplies, repeaters, etc.) in according to IEC 62062/EN 50295 and are operated in conjunction with them on the yellow AS-Interface cable.

A failsafe controller or a special master is not required. The master regards safety slaves like all other slaves and receives the safety data solely for information purposes. Hence it is also possible to expand all existing AS-Interface networks.

ASIsafe ensures a maximum response time of 40 ms. This is the time between the signal being applied to the input of the safe slave and the output on the safety monitor being switched off.



The system was tested and approved by TÜV (Germany), NRTL (USA) and INRS (France). The transmission procedure for safety-oriented signals is configured for implementing applications up to Category 4 according to EN 954-1, up to PL e according to EN ISO 13849-1 and up to SIL 3 according to IEC 61508.

Design

The design of the safety systems is identical to the wiring of AS-Interface as it is known today.

The family of safe AS-Interface products comprises the safety monitor which monitors the safe stations. The range of safe stations comprises the safety modules and the safety-related sensors with integrated interface.

Sensors and monitors can be connected to any points of the AS-Interface network. Also, several monitors can be used on one network.



The ASIsafe components and their signal flows

Function

Like the standard stations, the safe stations send their information to the master after master calls. The safety monitor monitors this transmission from the safe stations to the master and switches into the safe state.

The safety monitor provides OR logic, AND logic, timer functions, buffer storage, etc.

Software

With the ASIMON configuration software you can configure safety-oriented applications and transfer them into the monitor. The configuration comprises the input signals of the safe stations and the internal functions of the safety monitor.

The software also enables online diagnostics.

Integration

The existing infrastructure such as the master and the power supply unit can be used as before for integrating the safety systems in AS-Interface. For the safety systems the safety monitor is integrated as monitoring element and the safe stations as interface between the safe sensors and the system. The safe sensors can be used as before.

Integration within TIA is performed using function blocks which are offered on the ASIsafe CD-ROM for S7-200 and S7-300. These function blocks enable detailed diagnostics of all parameterized modules. This requires an AS-i address to be issued to the safety monitor by means of the configuration software. Evaluation is performed by means of function blocks in the PLC. With the help of prefabricated WinCC flexible modules this evaluation can then be visualized system-wide on existing HMI devices (OP/TP 270 and higher).

- Ma	Anw	ahl A Stat	SI Ma	nitor:		Pe	erma r 2	ane	nt Fe	en	ste	· (H	ead	er)						
Mon LED LED	itor: Kreis Kreis	1: g 2: g	chutzi rün, e rün, e	betrie inges inges	b, all chalt chalt	les ok et et					Kre	is 2.	Dev	ice St	tatus					
32	33	34	35	36	37	38	39	40	41	Ш	32	33	34	35	36	37	38	39	40	41
42	43	44	45	46	47	48	49	50	51	1	42	43	44	45	46	47	48	49	50	51
52	53	54	55	56	57	58	59	60	61	1	52	53	54	55	56	57	58	59	60	61
62	63	64	65	66	67	68	69	70	71	1	52	63	64	65	66	67	68	69	70	71
72	73	74	75	76	77	78	79			Ш	72	73	74	75	76	77	78	79		
XX XX XX	einge einge bere	escha escha it, wa	iltet iltet, A arte ai	\bsch uf Qui	alttim	ner läi ung	uft	XX XX XX	Test (ausge Fehler	(aut isch	s->ei naltet	n) er	forde	rlich		kei Kor	ne Ko Ifiguri Dekan	mmur ations nt / n	hikati betri icht b	on eb ienutz
AS Diag	6-I nose																		Ha	upt- enü

Diagnostics interface for ASIsafe components via S7-200 or S7-300

Benefits

- No failsafe PLC or special master is required for the ASIsafe Solution local (safety monitor)
- Alternatively integration in SIMATIC / SINUMERIK safety architectures with the help of 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
- · Safe signals can be combined in groups
- Inclusion of the safety signals in the plant diagnostics, also on existing HMI panels
- Approved to Category 4 according to EN 954-1 or 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 now installed.

More information

More information and circuit examples for safety systems with AS-Interface Safety Monitor and DP/AS-i F-Link can be found on the Internet at

support.automation.siemens.com/WW/view/en/24509484

AS-Interface safety monitors

Overview



Safety monitor with screw terminals (removable terminals)

The safety monitor is the centerpiece of ASIsafe Solution local. It enables safety-orientated responding to signals from the ASIsafe (input) slaves on the same AS-i network and has 1-2 enabling circuits. A safe application is configured using a PC. Various application-specific operating modes can be selected for this. They include, for example, an EMERGENCY-STOP function, door tumbler and selection of stop Category 0 or Category 1.

To be able to make full use of the AS-Interface diagnostics options, the monitor can also be operated with an

AS interface address if required. With the help of the diagnostics module for STEP 7, which is included on the ASIsafe CD, the full diagnostics spectrum can be processed further in the higherlevel PLC.

The AS-Interface safety monitor is currently offered in the latest Version 3 (Firmware V3.x) and is available in three expansion levels.

Both basic/expanded expansion levels are available with one or two-channeled configured enabling circuits.

The expanded safety monitor is also available as a version with integrated safe slave which can be used for the control of a safe AS-i output or for safe coupling of a switch signal on another safety monitor or F-Link.

The safety monitor is used in an AS-Interface bus system to monitor protective devices, e. g. protective doors, EMÉRGENCY-STOP switches, etc.

The safety monitor can be used up to Category 4 according to EN 954-1, to PL e according to EN ISO 13849-1 and to SIL 3 according to IEC 61508.

The safety characteristics for a maximum service life (T1) of 20 vears are:

- PFD: 7.2 x 10⁻⁵ for monitor type 1, 2.3, 4 or 6.1 x 10⁻⁵ for monitor type 6
- PFH D: 6.1 x 10⁻⁵ for all monitor types

The user must calculate the PFD value of the total loop.

Note:

Depending on the choice of safety components used, the complete safety system may also be classified in a lower safety category.

The safety monitor is mounted on the standard mounting rail. Disassembly from the standard mounting rail is guick and easy and requires no tools. With an additional accessory (push-in lugs), the safety monitor can also be screwed on.

Application

The safety monitor acts as a "bus-based safety relay". It provides a user-friendly introduction to safety-orientated communication over fieldbuses thanks to its simple configuration using the graphic PC software ASIMON. The standard infrastructure of the AS-i network (AS-i master under standard PLC, AS-i power supply unit) can still be used without restriction.

The monitor comes in three expansion levels:

- · Basic safety monitor with starter set of modules and basic functionality
- Expanded safety monitor with expanded features and functionality
- The expanded safety monitor is also available as a version with integrated safe slave which can be used for the control of a distributed safe AS-i output or for safe coupling of a switch signal on another safety monitor or F-Link.

Basic safety monitor versus expanded safety monitor

	Basic	Expanded
Number of monitoring modules	32	48
Number of OR gates (inputs)	2	6
Number of AND gates (inputs)		6
Wildcards for monitoring modules	3	3
Deactivating of monitoring modules	3	3
Fault release	3	3
Diagnostics hold	3	3
A/B slaves for acknowledgment	3	3
Safe time functions		3
"Button" function		3
Debouncing of contacts		3
Filtering out of brief disconnections		3 (as of Version 3)
Control of safe AS-i output/safe coupling		 ✓ (in version with integrated safe slave)

✓ Available

-- Not available

Number of monitoring modules

The number of devices which the safety monitor can process is increased with the expanded safety monitor from 32 to 48. Applications of greater complexity and size can thus be simulated in the safety monitor.

Logic OR operation

At the logic operation level two elements can be linked by OR operations in the basic version and up to six in the expanded version

Logic AND operation

In addition to the standard AND operation in the main path of an enabling circuit, an AND operation can also be inserted in an OR operation on the expanded safety monitor. More than two elements can be linked in this AND.



Features of the basic safety monitor

- Wildcards and deactivating of monitoring modules Wildcards are available for the configuration. They are integrated in the configuration and diagnostics and can be easily activated if required. User-friendly configuring is thus possible even when system configurations change.
- · Fault release:

If a module detects a fault, the AS-Interface safety monitor goes into fault status. A differentiated fault release (reset) is now possible for this scenario. The fault release can be activated by an AS-Interface standard slave, e.g. a pushbutton, and is effective only on module level. The great advantage of this is that the entire safety monitor is no longer reset but only the module which is locked in the fault.

 Diagnostics hold: Disconnections can be "frozen" until an acknowledgment comes through a standard slave. This function provides valuable help in the event of short-time causes of disconnection.

 Also from Version 3 upwards: The standard output data bits of safe input slaves can be processed for acknowledgment, fault release and other nonsafety-oriented signals.

Additional features of the expanded safety monitor

The following additional features are provided by only the expanded safety monitor:

- Safe time functions:
 - Timers with the following functions are available: ON-delay
 - OFF-delay and
- Pulse
- "Button" function:
- Additional acknowledgment option for restarting the system using an additional button. The button function can be assigned to any input or output signal of a standard slave through configuration in the ASIMON software.
- Debouncing of contacts: For debouncing the contacts it is possible to set a bounce time after which a system restart takes place.
- Also from Version 3 upwards: Filtering out of brief single-channel interruptions in the sensor circuit. A tolerance time can be set during which the brief opening of a safety-oriented input contact is ignored in order to increase plant availability.

AS-Interface safety monitors

Additional features of the expanded safety monitor with integrated safe slave

This new safety monitor type offers the additional features of the expanded safety monitor plus the following features:

- Filtering out of brief single-channel interruptions in the sensor circuit.
- Actuating a safe distributed actuator (safe output module of e. g. safe valves or motor starters) parallel to the 2nd enabling circuit.
- Alternatively: Use as a "safe coupler" between two ASIsafe networks. A safe input signal on network 1 can thus act on an enabling circuit of network 2. A detour via a hard-wired safe input module on network 2 is not required in this case.

Configuration software ASIMON V3: New features

- Multi-window system
- Creation of the safety logic in graphic function diagram form, with changeover to former tree presentation possible
- · No "preprocessing" of the safety logic
- · Management of user-specific modules
- Downward compatibility:
 - Existing ASIMON V2 projects can be loaded
 - Can also be used on all former versions of the safety monitor - with the corresponding scope of functions
- · Graphic printout of the safety logic
- Easier system start-up:

. [0] ×

- Teaching the code sequences of safe AS-i Slaves step-bystep
- Manual input of code sequences also possible in addition
 Selectable number of simulated slaves
- Simpler diagnostics using AS-Interface through assignment of a diagnostics index to the software function block
- Signaling the switching state of the signaling and relay outputs to higher-level PLCs using a simulated AS-Interface slave
- New functions for filtering out brief interruptions and for controlling a safe AS-i output or for safe coupling of two AS-i networks



Interface of the configuration software ASIMON V3

AS-Interface safety monitors

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
	Basic safety monitors		Screw terminals					ку
ann	Version 3			Ð				
500000	With screw terminals, removable terminals	•			_		101	0.000
000000	One enabling circuit (monitor type 1)	A	3RK1 105-1AE04-0CA0		1	1 unit	121	0.336
	I wo enabling circuits (monitor type 2)	А	3RK1 105-1BE04-0CA0		1	1 unit	121	0.408
	Version 3							
000000 0	With screw terminals, removable terminals							
3RK1 105-1BE04-0CA0	 One enabling circuit (monitor type 3) 	А	3RK1 105-1AE04-2CA0		1	1 unit	121	0.336
	 Two enabling circuits (monitor type 4) 	А	3RK1 105-1BE04-2CA0		1	1 unit	121	0.408
	Expanded safety monitor with integrated safe slave Version 3							
	• Two opphiling circuits including control of a cofe	٨	20K1 105 10504 4CA0		-	1 unit	101	0.450
	AS-i output/safe coupling (monitor type 6)	A	3HK1 103-18E04-4CA0		I	i unit	121	0.450
	Basic safety monitors		Spring-type terminals	00				
	Version 3 With spring-type terminals, removable terminals							
	One enabling circuit (monitor type 1)	А	3BK1 105-1AG04-0CA0		1	1 unit	121	0.300
	Two enabling circuits (monitor type 2)	A	3RK1 105-1BG04-0CA0		1	1 unit	121	0.368
	Expanded safety monitors							
	Version 3							
	Ope apphling circuit (manifer type 2)	٨	2BK1 105 14C04 2C40		1	1 unit	101	0 200
	Two enabling circuits (monitor type 3)	Δ	3RK1 105-18G04-2CA0		1	1 unit	121	0.300
	Expanded safety monitor	~	511KT 105-16004-20A0		1	i unit	121	0.000
	with integrated safe slave							
	Version 3 With spring-type terminals, removable terminals							
	Two enabling circuits including control of a safe	А	3RK1 105-1BG04-4CA0		1	1 unit	121	0.450
	AS-i output/safe coupling (monitor type 6)							
Accessories								
	ASIsafe CD		3RK1 802-2FB06-0GA1		1	1 unit	121	0.212
	Included in the scope of supply:							
	 ASIMON V3 conliguration software on CD ROM, for PC (Windows 95/98, ME, 2000, NT, XP, Vista Business/Ultimate 32) 							
	 Diagnostics package for STEP 7 including ready-to-use HMI templates for WinCC floxible 							
	Extensive documentation (manuals and certificates)							
	Cable sets		3RK1 901-5AA00		1	1 unit	121	0.054
	Included in the scope of supply:							
(PC configuration cable for communication be- tween PC (serial interface) and safety monitor, length approx. 1.50 m 							
3RK1 901-5AA00	Transfer cable between two safety monitors, length approx. 0.25 m							
	USB/serial adapters	В	3UF7 946-0AA00-0		1	1 unit	131	0.150
	To connect a serial PC cable (for connection to serial PC interface/RS 232) to the USB port of a PC, recommended for use in conjunction with AS-i safety monitor							
	Sealable covers For securing against unauthorized configuration of the safety monitor		3RP1 902		1	5 units	101	0.004
	Push-in lugs for screw fixing		3RP1 903		1	10 units	101	0.002

Overview



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

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

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

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

Following modules are available for selection:

K20F compact safety modules for operation in the field

Being only 20 mm wide, the K20F module is particularly well suited for applications where modules need to be arranged in the most confined 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 operation 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-oriented inputs in operation up to Category 2 according to EN ISO 13849-1. If Category 4 is reguired, 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-oriented 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):
- K45F LS (light sensor): safe input module for connection of solid-state 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/EN 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 operation 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 control cabinet is also possible therefore. For operation up to Category 2, both inputs can be assigned separately; 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.

ASIsafe

AS-Interface safety modules

Selection and orde	ring data										
	Version				DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
infa	K20F com	pact safety m	odules								
9° 9°	I/O type 2 F-DI		U _{aux} 24 V 		A	3RK1 205-0BQ30-0AA3		1	1 unit	121	0.075
3RK1 205-0BQ30-0AA3											
and in	K45F com	pact safety m	odules								
	I/O type	ipplied withou	t mounting pla	ate							
() ()	2 F-DI				►	3RK1 205-0BQ00-0AA3		1	1 unit	121	0.103
	4 F-DI				А	3RK1 205-0CQ00-0AA3		1	1 unit	121	0.110
3RK1 205-0BQ00-0AA3	2 F-DI/2 DC)			В	3RK1 405-0BQ20-0AA3		1	1 unit	121	0.110
	2 F-DI/2 DC)	✓		B	3RK1 405-1BQ20-0AA3		1	1 unit	121	0.110
	2 F-DILS ty	/pe 2 ¹⁷			A	3RK1 205-0BQ21-0AA3		1	1 unit	121	0.108
	2 F-DI LS ty 1) Conr 3RG	nection of Sier 7843 (type 2)	 nens light curt through socke	ain FS 400 et 1/3	A	3RK1 203-0DQ24-0AA3		I	i unit	121	0.108
	2) Conr 3RG make	nection of Sien 7846 (type 4) es through soo	nens light curt through socke cket 2/3	ain FS 400 et 1/3, other							
800 2	S22.5F Slir	mLine safety	modules								
000	Connection	I/O type		U _{aux} 24 V	•					101	0.400
•	Screw	2 F-DI			A	3RK1 205-0BE00-0AA2		1	1 unit	121	0.132
		2 F-DI/2 DO		 ✓	A	3RK1 405-1BE00-0AA2		1	1 unit	121	0.180
200	Spring	2 F-DI			A	3RK1 205-0BG00-0AA2		1	1 unit	121	0.102
3RK1 205-0BE00-0AA2	ΩΩ ¹	2 F-DI/2 DO			В	3RK1 405-0BG00-0AA2		1	1 unit	121	0.170
		2 F-DI/2 DO		✓	В	3RK1 405-1BG00-0AA2		1	1 unit	121	0.170
Accessories	K45										
	For mountin	ng K45F									
0	• For wall m	nounting				3RK1 901-2EA00		1	1 unit	121	0.027
	 For stand 	ard rail mount	ing			3RK1 901-2DA00		1	1 unit	121	0.036
3RK1 901-2EA00											
	Connecting For transmi	g cables for H	C45F LS (light both ends with	t sensor) M12 plug							
	 Straight, p 	plug/box, leng	ith 5 m	ninz plug	С	3RG7848-3EA		1	1 unit	575	0.259
	 Straight/a Straight, p 	ingled, plug/b plug/box, lenc	ox, length 5 m ith 10 m	1	C C	3RG7848-3EB 3RG7848-3EC		1	1 unit 1 unit	575 575	0.271 0.485
	 Straight/a 	ingled, plug/b	ox, length 10 r	m	Ċ	3RG7848-3ED		1	1 unit	575	0.052
	 Straight, p Straight/a 	ngled, plug/box, ieng	ox, length 15 r	m	C	3RG7848-3EE 3RG7848-3EF		1	1 unit 1 unit	575 575	0.702
	For transmi	tters, 8-pole, I	ooth ends with	n M12 plug							
	 Straight, p Straight/a 	plug/box, leng inaled. plua/b	jth 5 m ox. lenath 5 m	1	C C	3RG7848-3CA 3RG7848-3CB		1	1 unit 1 unit	575 575	0.306
	Straight, p	plug/box, leng	th 10 m		Č	3RG7848-3CC		1	1 unit	575	0.580
	 Straight/a Straight, p 	ngiea, piug/b plug/box, leng	ox, length 10 r ith 15 m	m	C	3RG7848-3CD 3RG7848-3CE		1	1 unit 1 unit	575 575	0.052
	Straight/a	ingled, plug/b	ox, length 15 r	m	С	3RG7848-3CF		1	1 unit	575	0.859
	24 V suppl K45F LS (li	y modules fo ight sensor)	r								
	Optional, fo tive field wi Modules su	or transmitter s dths upplied withou	supply with larg	ge protec- ate	A	3RK1 901-1NP00		1	1 unit	121	0.075
	Input bridg	ges for K45F									
3RK1 901-1AA00	Black ver	sion			А	3RK1 901-1AA00		1	1 unit	121	0.012
	Red versi	ion			D	3RK1 901-1AA01		1	1 unit	121	0.013
	AS-Interfact For free M1	ce sealing ca 2 sockets	ps M12			3RK1 901-1KA00		100	10 units	121	0.100
3RK1 901-1KA00									10		
3BK1 901-1KA01	AS-Interfact tamper-pro For free M1	ce sealing ca oof 2 sockets	рs м12,		A	3HK1 901-1KA01		100	10 units	121	0.100

AS-Interface Masters

Masters for SIMATIC S7 CP 243-2

S

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
- Indication 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 SIMATIC S7-200 design

Benefits

Designed for Industry

 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

Design

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

- Two terminal connections 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 indicating 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-address-ing 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.

- Shorter start-up 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
- Indication 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.Through connection to AS-Interface the number of inputs and outputs available for 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

get

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg
CP 243-2 communications processors For connection of the SIMATIC S7-200 to AS-Interface; corresponds to AS-Interface Specification V2.1; dimensions (W x H x D / mm): 71 x 80 x 62 (without fixing lugs)	A	6GK7 243-2AX01-0XA0		1	1 unit	121	0.204

More information

The manuals are available on the Internet at support.automation.siemens.com/WW/view/en/10805937/133300

Masters

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

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 same module.

The CP343-2P / CP 343-2 has 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
- Extra with the CP343-2P: Supports detailed configuration of the AS-Interface-network with STEP 7 V5.2 and higher

Benefits



- Shorter start-up times through simple configuration at the press of a button
- Construction of flexible distributed structures by use in the DP slave ET 200M
- · Provides diagnostics of the AS-Interface networks
- Well suited also for complex applications thanks to connection options for 62 slaves and integral analog value processing

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 two channels each or up to 31 A/B analog slaves with a maximum of 4 channels each).

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 343-2 / CP 343-2P 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.

If required, master calls can be performed with the command interface FC ASI_3422, e. g. read/write parameters, read/write configuration. The FC including a STEP7 sample program can be downloaded from the Internet at support.automation.siemens.com/WW/view/en/5581657.

Configuration

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

Additional features of the CP 343-2P

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

- 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
- Extra with the CP 343-2P: Improved plant documentation and support for service assignments thanks to a description of the AS-Interface configuration in the STEP 7 project

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.

AS-Interface Masters

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

Selection and ordering data

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg
CP 343-2P communications processors	А	6GK7 343-2AH11-0XA0		1	1 unit	121	0.050
For connection of SIMATIC S7-300 and ET 200M to AS-Interface; configuration of the AS-Interface network using the SET key or STEP 7 (V5.2 and higher); including manual on CD-ROM (English, French, German, Italian, Spanish); without front connector; corresponds to AS-Interface Specification V3.0; dimensions (W x H x D / mm): 40 x 125 x 120							
CP 343-2 communications processors	А	6GK7 343-2AH01-0XA0		1	1 unit	121	0.050
Basic version for connection of SIMATIC S7-300 and ET 200M to AS-Interface Configuration of the AS-i network using the SET key; including manual on CD-ROM (English, French, German, Italian, Spanish); without front connector; corresponds to AS-Interface Specification V3.0; dimensions (W x H x D / mm): 40 x 125 x 120							
Front connectors	А	6ES7 392-1AJ00-0AA0		1	1 unit	230	0.069
20-pole, with screw-type contacts							
Front connectors	А	6ES7 392-1BJ00-0AA0		1	1 unit	230	0.059
20-pole, with spring-type terminals							

More information

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

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 start-up by means of a full graphic display and control keys or through a web interface with a standard browser
- 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)
- Module exchange without entering the connection parameters (PROFIBUS address etc) using C-PLUG (optional)

Design

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

Function

Communication

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.
- A double master occupies twice the number of bytes.

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 are able in addition to initiate AS-Interface master calls (e. g. to write parameters, change addresses, read diagnostic values) through the acyclic PROFIBUS services.

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 enable use of the integrated web server. Firmware updates are also possible without difficulty using this port.

The optional C-PLUG supports module exchange without entering the connection parameters (IP 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

Configuration

DP/AS-i LINK Advanced can be configured either by means of STEP 7 version V5.4 and higher or simply by adopting the AS-Interface actual configuration on the display.

With STEP 7 configuring the AS-Interface configuration can be uploaded in STEP 7 V5.4 and higher. User-friendly configuring of Siemens AS-i slaves in HW-Config is also possible in this case (slave selection dialog).

Alternatively, DP/AS-i LINK Advanced can be integrated by means of the PROFIBUS GSD file in the engineering tool (e.g. for STEP 7 V5.4 and lower or for non-Siemens engineering tools).

AS-Interface Routers

DP/AS-i LINK Advanced

Benefits

Get Designed for Industry

- Short start-up 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

Application

The DP/AS-i LINK Advanced is a PROFIBUS DP-V1 slave (according to EN 50170) and an AS-Interface master (based on AS-Interface Specification V3.0 according to EN 50295). 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 decentral construction and for connection of a lower-level AS-Interface network.

- Reduction of installation costs because the power supply comes completely from the AS-Interface cable, making an additional power supply superfluous
- 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

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 4DI/4DO each.

Double masters

For applications with large volumes of project data the DP/AS-i LINK Advanced in its version as an AS-Interface double master is used. 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 with 62 A/B slaves each with 4DI/4DO each.



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

Routers

DP/AS-i LINK Advanced

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
	DP/AS-i LINK Advanced							kg
	Router between PROFIBUS DP and AS-Interface Degree of protection IP20; including manual on CD-ROM (English, French, German, Italian, Spanish); corresponds to AS-Interface Specification 3.0; dimensions (W x H x D / mm): 90 x 132 x 88.5	. ,						
	 Single master with display 	А	6GK1 415-2BA10		1	1 unit	121	0.380
	 Double master with display 	А	6GK1 415-2BA20		1	1 unit	121	0.380
Accessories								
	C-PLUG Exchange medium for the simple exchange of devices in the event of a fault; for accommodat- ing configuration and application data; can be used in SIMATIC NET products with a C-PLUG slot	A	6GK1 900-0AB00		1	1 unit	5N3	0.030
	PROFIBUS FC Standard Cable GP Standard type with special design for fast installation, 2-core, shielded	A	6XV1 830-0EH10		1	1 M	5K2	0.082
	PROFIBUS FastConnect RS485 bus connectors with angled cable feeder (35°) With insulation displacement connection the							
	max. transmission rate is 12 Mbit/s							0.045
	Without PG interface	A	6ES7 972-0BA60-0XA0		1	1 unit	250	0.045
	With PG interface	A	6ES7 972-0BB60-0XA0		1	1 unit	250	0.050
	PROFIBUS FastConnect Stripping loo I Preset stripping tool for speedy stripping of PROFIBUS FastConnect bus cables	A	6GK1 905-6AA00		1	1 unit	5K2	0.065
	IE FC RJ45 Plug 90							
	RJ45 plug-in connector for Industrial Ethernet, with robust metal enclosure and integrated cut- ting and clamping contacts for connection of Industrial Ethernet FC installation cables; with 90° cable feeder							
	 1 pack = 1 unit 	А	6GK1 901-1BB20-2AA0		1	1 unit	5K2	0.030
	 1 pack = 10 units 	А	6GK1 901-1BB20-2AB0		1	1 unit	5K2	0.300
	 1 pack = 50 units 	А	6GK1 901-1BB20-2AE0		1	1 unit	5K2	1.500

More information

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

Overview



DP/AS-Interface Link 20E

PN	DP-M	DP-S	ASI-M

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

- PROFIBUS DP slave and AS-Interface master
- Up to 62 AS-Interface slaves, each with 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
- 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 option for PROFIBUS DP address 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

Function

Communication

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

DP/AS-Interface Link 20E occupies as 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 record.

Configuration

DP/AS-Interface Link 20E can be configured either by means of STEP 7 version V5.1 SP2 and higher or simply by adopting the AS-Interface actual configuration using the SET pushbutton on the front panel.

With STEP 7 configuring the AS-Interface configuration can be uploaded in STEP 7 V5.2 and higher.

User-friendly configuring of Siemens AS-i slaves in HW-Config is also possible in this case (slave selection dialog).

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 supply comes completely from the AS-Interface cable, making an additional power supply superfluous

Application

The DP/AS-Interface Link 20E is a PROFIBUS DP slave (according to EN 50170) and an AS-Interface master (according to EN 50295). 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.

- Short start-up times through simple configuration at the press of a button
- Reduction of standstill and servicing times in the event of a slave failure thanks to the LED indicators
- Easy and fast start-up through reading out the AS-Interface configuration

 $\mathsf{PROFIBUS}\ \mathsf{DP}\ \mathsf{masters}\ (\mathsf{DP-V0})\ \mathsf{can}\ \mathsf{exchange}\ \mathsf{I/O}\ \mathsf{data}\ \mathsf{with}\ \mathsf{AS-Interface}\ \mathsf{in}\ \mathsf{cyclic}\ \mathsf{mode}.$

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).

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	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		_						kg
	DP/AS-Interface Link 20E Router between PROFIBUS DP and AS-Interface in degree of protection IP20; including manual on CD-ROM (English, French, German, Italian, Spanish); corresponds to AS-Interface Specification V3.0; dimensions (W x H x D / mm): 90 x 80 x 60 (without fixing lugs)	A	6GK1 415-2AA10		1	1 unit	121	0.200
Accessories								
	PROFIBUS FC Standard Cable GP Standard type with special design for fast installation, 2-core, shielded	A	6XV1 830-0EH10		1	1 M	5K2	0.082
	PROFIBUS FastConnect RS485 bus connectors with 90° cable feeder With insulation displacement connection the max. transmission rate is 12 Mbit/s							
	Without PG interface	А	6ES7 972-0BA52-0XA0		1	1 unit	250	0.044
	With PG interface	А	6ES7 972-0BB52-0XA0		1	1 unit	250	0.049
	PROFIBUS FastConnect RS485 bus connectors with angled cable feeder (35°) With insulation displacement connection the max. transmission rate is 12 Mbit/s							
	 Without PG interface 	А	6ES7 972-0BA60-0XA0		1	1 unit	250	0.045
	With PG interface	А	6ES7 972-0BB60-0XA0		1	1 unit	250	0.050
	PROFIBUS FastConnect RS485 Plug 180 bus connectors With insulation displacement connection the max. transmission rate is 12 Mbit/s Cable feeder 180°							
	Without PG interface	А	6GK1 500-0FC10		1	1 unit	5N3	0.047
	PROFIBUS FastConnect Stripping Tool Preset stripping tool for speedy stripping of PROFIBUS FastConnect bus cables	A	6GK1 905-6AA00		1	1 unit	5K2	0.065

More information

The manuals are also available on the Internet at support.automation.siemens.com/WW/view/en/28602858/133300

AS-Interface Routers

Overview



DP/AS-i F-Link

PN	DP-M	DP-S	ASi-M

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

- Monitoring the inputs of safety-oriented digital AS-i slaves (ASIsafe slaves) and forwarding of data through PROFIsafe. No additional safety-oriented components required for the AS-Interface (e. g. safety monitor)
- 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-oriented 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 rail mounting 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 start-up and call up of diagnostics information
 - 4 LEDs for indication 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 (using 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

Function

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-oriented input and output data and safety-oriented 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 can be configured by means of STEP 7 Version V5.4 SP1 and higher. In particular the user-friendly parameterizing of Siemens AS-Interface slaves using the slave selection dialog is possible. Uploading the ACTUAL configuration of an already configured AS-Interface network is also supported.

Alternatively, DP/AS-i F-Link can be integrated in the engineering tool using the PROFIBUS GSD file. As a startup aid the actual configuration for activating the AS-Interface slaves can also be adopted directly on the device.

Programming

In contrast to the AS-Interface safety monitor, the DP/AS-i F-Link functions solely as a gateway, and does not process its own safety logic. Programming of the safety function is implemented at the level of the higher-level failsafe 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 range and the 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.

Routers

DP/AS-i F-Link

Benefits

Get Designed for Industry

- Gaps in (bus-based) safety technology closed: safety-oriented signals (EMERGENCY-STOP, door tumbler, 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 failsafe bits".
- Price advantage: As a fully fledged AS-i master according to Specification V3.0, more input 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

Application

Links between PROFIsafe and ASIsafe

The DP/AS-i F-Link is a PROFIBUS DP-V1 slave (according to EN 50170) and an AS-Interface master (based on AS-Interface Specification V3.0 according to EN 50295). It enables transparent data access to AS-Interface from PROFIBUS DP. The DP/AS-i F-Link is also the only AS-i master with which safety-oriented input data can be passed from ASIsafe slaves via the PROFIsafe protocol to a failsafe CPU with PROFIBUS DP master. No additional safety cabling or monitoring is required (in particular no AS-Interface safety monitor). 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.

- 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 failsafe SIMATIC PLC in F-FUP or F-FOP, incl. TUV-certified function blocks for typical safety applications
- Use in machine-tools under SINUMERIK 840 D (pl/sl) possible
- Reduction of standstill and servicing times in the event of a slave failure thanks to user-friendly diagnostics using the display and through simple module exchange (only a few settings by control keys are required, without use of the configuring tool)

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 performantly in the cyclic periphery of a failsafe 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 higherlevel operating and monitoring system (e. g. WinCC Flexible or TRANSLINE HMI).

AS-Interface Routers

DP/AS-i F-Link

Network connectivity

The DP/AS-i F-Link can be used in a variety of constellations.



Constellation 1: integration in PROFIBUS networks under SIMATIC F PLC



Constellation 2: integration in PROFINET networks under SIMATIC F PLC

Routers

S

DP/AS-i F-Link



Constellation 3: alternatively integration in PROFINET networks under SIMATIC F PLC through IE/PB Link

Further network connectivity options:

- Integration in SINUMERIK Power Line and Solution Line
- Integration under non-Siemens failsafe control systems using PROFIBUS GSD file, available on the Internet at support.automation.siemens.com/WW/view/en/113250

Selection and ordering data

	-								
	Version		DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
									kg
	DP/AS-	i F-Link							
	Router AS-Inte sion fro in degre corresp dimens	between PROFIBUS DP and rface for safety-oriented data transmis- m ASIsafe to PROFIBUS DP – PROFIsafe ee of protection IP20; oonds to AS-Interface Specification V3.0; ions (W x H x D / mm): 45 x 104 x 120	9						
20 8	\oplus	•Screw terminals	А	3RK3 141-1CD10		1	1 unit	121	0.300
		•Spring-type terminals	А	3RK3 141-2CD10		1	1 unit	121	0.300

More information

More accessories for the PROFIBUS connection can be found on page 2/28.

The DP/AS-i F-Link manual is available on the Internet at support.automation.siemens.com/WW/view/en/24196041

Circuit examples for safety systems with DP/AS-i F-Link are available on the Internet at

support.automation.siemens.com/WW/view/en/24509484

The F-Link Object Manager must be installed for configuring HW-Config (STEP 7). The Object Manager can be downloaded free of charge from the Internet at support.automation.siemens.com/WW/view/en/24724923.

More presales information can be found at www.siemens.com/as-interface/master.

IE/AS-i LINK PN IO

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 start-up by means of a full graphic display and control keys or through a web interface with a standard browser
- 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 voltage from the AS-Interface shaped cable or alternatively with 24 V DC
- 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
- Compact design:
 - Pixel graphics display in the front panel for detailed indication 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 indication of the operating state of PROFINET IO and AS-Interface
- Integrated 2-port switch (RJ45 socket) for connection to Industrial Ethernet supports the line topology with an external switch
- Small mounting depth thanks to recessed plug mounting
- Operation without fans and batteries

Function

Communication

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 or IO controller 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.
- A double master occupies twice the number of bytes.

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.

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. Firmware updates are also possible without difficulty using this port.

The optional C-PLUG supports module exchange without entering the connection parameters (IP address etc.), 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 E/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

Configuration

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.

User-friendly configuring of Siemens AS-i slaves in HW-Config is also possible in this case (slave selection dialog).

Alternatively, E/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 or for non-Siemens engineering tools).

Routers

IE/AS-i LINK PN IO

Benefits

S

get Designed for Industry

- Short start-up 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

Application

The DP/AS-i LINK PN IO is a PROFINET IO device (according to IEC 61158) and an AS-Interface master (based on AS-Interface Specification V3.0 according to EN 50 295). 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). As such, the IE/AS-i LINK PN IO is particularly well suited for a decentral construction and for connection of a lower-level AS-Interface network.

- Reduction of installation costs because the power supply comes completely from the AS-Interface cable, making an additional power supply superfluous
- Reduced amount of engineering work thanks to user-friendly configuration of Siemens slaves by Drag&Drop in HW Config (STEP 7)

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 in its version as an AS-i double master is used. 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

AS-Interface Routers

IE/AS-i LINK PN IO

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	Order No. Pri per I	ce ⊃U	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
	IE/AS-i LINK PN IO Router between PROFINET/Industrial Ethernet and AS-Interface in degree of protection IP20; including manual on CD-ROM (English, French, German, Italian, Spanish); corresponds to AS-Interface Specification 3.0; dimensions (W x H x D / mm): 90 x 132 x 88.5							3
	 Single master with display 	А	6GK1 411-2AB10		1	1 unit	121	0.380
	 Double master with display 	А	6GK1 411-2AB20		1	1 unit	121	0.380
Accessories								
	C-PLUG Exchange medium for the simple exchange of devices in the event of a fault; for accommodat- ing configuration and application data; can be used in SIMATIC NET products with a C-PLUG slot	A	6GK1 900-0AB00		1	1 unit	5N3	0.030
	 IE FC RJ45 Plug 90 RJ45 plug-in connector for Industrial Ethernet, with robust metal enclosure and integrated cutting and clamping contacts for connection of Industrial Ethernet FC installation cables; with 90° cable feeder 1 pack = 1 unit 1 pack = 10 units 1 pack = 50 units 	A A A	6GK1 901-1BB20-2AA0 6GK1 901-1BB20-2AB0 6GK1 901-1BB20-2AE0		1 1 1	1 unit 1 unit 1 unit	5K2 5K2 5K2	0.030 0.300 1.500

More information

The manuals are available on the Internet at support.automation.siemens.com/WW/view/en/29992487/133300

Slaves

I/O modules for operation in the field, high degree of protection 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 at PIN4 while the signal for the inputs is detected 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 respectively one sensor/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 respectively 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 secket and to PIN4 of the second secket
 - 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 operation 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 receive the AS-Interface flat cables and enables mounting on a wall or standard mounting rail.

The 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	1			
4 inputs/4 outputs	1	1	1	
4 inputs/3 outputs	1			
4 inputs/2 outputs	1			
4 inputs	1	1	1	
2 inputs/2 outputs		1	1	
4 outputs	1	1	1	
3 outputs		1		
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	1	1	1	

✓ Available.

-- Not available.
I/O modules for operation in the field, high degree of protection Digital I/O modules, IP67 - K60

Overview

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

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

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 compact modules with a maximum of four digital inputs and outputs

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

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.

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. As with every compact module, the addressing can be performed through a double addressing socket.

K60 compact modules with a four digital inputs and outputs according to AS-Interface Specification 3.0

The new AS-i 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-i network. With the extended address mode according to specification 3.0, 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-i network, there are now 248 inputs as well as 248 outputs available on one AS-i system. Modules with four inputs and four outputs as A/B slaves according to Specification 3.0 are also available as K60 compact modules.

Please note that these modules can be used only with a new master according to AS-i Specification 3.0 (e.g. the new DP/AS-i LINK Advanced or IE/AS-i LINK PN IO) and that the cycle times for the outputs can extend to max. 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 4 data bits between two AS-i networks is thus possible in a simple and cost-effective manner. The data coupler need 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 safe 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. For other conditions for safe operation see notes on Technical Information on page 2/1.

Slaves

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

N

Selection and order	ring data											
	Version					DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
												kg
00	 Digital I/O n PNP transi Connection Modules s 	nodules, IP stor n method: N upplied with	7 67 - K60 M12 hout mountir	ng plate								
00 00 :0	Туре	Current carrying capacity of outputs	Slave type	Pin assign- ment	Sensor power supply off							
3RK1 400-1DQ00-0AA3	8 inputs/ 2 outputs	2 A	A/B	Special	AS-i	A	3RK2 400-1HQ00-0AA3		1	1 unit	121	0.210
	8 inputs		Standard	Y-II	AS-i	•	3RK1 200-0DQ00-0AA3		1	1 unit	121	0.195
			A/B A/B	Y-11 Y-11	AS-i		3RK2 200-0DQ00-0AA3		1	1 unit	121	0.191
	1 innute/	0.4	Ctandard		U _{aux}	A	3RK2 200-1DQ00-1AA3		1	1 unit	121	0.191
	4 inputs/ 4 outputs	2 A 2 A	Standard	Y-II Standard	AS-I		3RK1 400-1DQ00-0AA3		1	1 unit	121	0.209
		2 Λ 1 Δ	Standard	Y_II	ΔS-i	Δ	3RK1 400-10001-0443		1	1 unit	121	0.203
		1 A	Standard	Standard	AS-i		3BK1 400-1DQ03-0AA3		1	1 unit	121	0.200
		2 A	A/B slave (Spec. 3.0)	Y-II	AS-i	A	3RK2 400-1DQ00-0AA3		1	1 unit	121	0.212
		2 A	A/B slave (Spec. 3.0)	Y-II	U _{aux}	A	3RK2 400-1DQ00-1AA3		1	1 unit	121	0.212
	4 inputs/ 3 outputs	2 A	A/B	Y-II	AS-i		3RK2 400-1FQ03-0AA3		1	1 unit	121	0.212
	4 inputs/ 2 outputs	2 A	Standard	Y-II	AS-i	•	3RK1 400-1MQ00- 0AA3		1	1 unit	121	0.206
	4 inputs		Standard	Y-II	AS-i		3RK1 200-0CQ00-0AA3		1	1 unit	121	0.204
	2x2 inputs/ 2x2 outputs	1 A	Standard	Y	AS-i	В	3RK1 400-1DQ02-0AA3		1	1 unit	121	0.205
	• PNP transi • Current ca • Connection • Modules s Type	rrying capa n method: N upplied with Current ca capacity	acity of the ir M12 hout mountir arrying	nputs: 200 r ng plate Slave type	Pin assign-							
	4 inputs/ 4 outputs	2 A	•	Standard	Y-II	С	3RK1 400-1DQ05-0AA3		1	1 unit	121	0.209
	4 inputs			Standard	Y-II	в	3RK1 200-0CQ05-0AA3		1	1 unit	121	0.204
	Digital I/O modules IP67 - K60 data couplers Modules supplied without mounting plate											
	Туре	Current ca capacity of outputs	arrying	Slave type	Pin assign- ment							
	Data coupler 4 inputs/ 4 outputs (virtual)	·		Standard		С	3RK1 408-8SQ00-0AA3		1	1 unit	121	0.200
Accessories												
1	K60 mounti	ng plates	nact module	20								
	Wall moun	tina					3RK1 901-0CA00		1	1 unit	121	0.065
	Standard r	ail mountin	g				3RK1 901-0CB01		1	1 unit	121	0.095
3RK1 901-0CA00												
	AS-Interface For free M12	e sealing c sockets	aps M12				3RK1 901-1KA00		100	10 units	121	0.100
	AS-Interface tamper-proc	e sealing c of	aps M12,			A	3RK1 901-1KA01		100	10 units	121	0.100
_	Sealing sets	S ounting pla	to and store	lard distribution	tor	А	3RK1 902-0AR00		100	5 units	121	0.100

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

Connection

AS-Interface Slaves

I/O modules for operation in the field, high degree of protection Digital I/O modules, IP68/IP69K - K60R

Overview



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 voltage supply are routed in this case in a shared round cable.

Degree of protection IP68 permits many new applications, which were impossible with the former field modules with degree of protection IP67. In applications such as filling plants or machinetools 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. The IP68 test conditions can be found in the section "IP68/IP69K tests" on page 2/40.

Cleaning with high-pressure cleaners, such as is regularly performed in the food 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 there is a round cable connection 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.

Addressina

Addressing is performed using the same socket as for the bus connection. Connecting the module to the 3RK1 904-2AB01 addressing unit is performed using a standard M12 cable (e.g. 3RX8 000-0GF32-1AB5). If the older version of the 3RK1 904-2AB00 addressing unit is used, a special addressing cable (3RK1 901-3RA00) is required. 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.



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 (3RK1 901-1NR..). 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. These cables are available preassembled as an M12 cable plug/cable box version:

- 3RX8 000-0GF42-1AA6: 0.5 m long
- 3RX8 000-0GF42-1AB0: 1.0 m long
- 3RX8 000-0GF42-1AB5: 1.5 m long

To connect the distributor and the K60R module over long distances it is also possible to use freely configurable cables with an M12 cable box and an open cable end, which are fitted with an M12 plug (straight version:

3RX8 000-0CD45, angle plug 3RX8 000-0CE45) and connected to the distribution board. This cable is available in two versions:

- 3RX8 000-0CB42-1AF0: 5 m long, with M12 cable box
- 3RX8 000-0CC42-1AF0: 5 m long, with M12 angular cable box

To connect more than one K60R module to one spur line, the spur line can be split again using a T distributor (3RK1 901-1TR00) with IP68 protection.

Slaves

I/O modules for operation in the field, high degree of protection Digital I/O modules, IP68/IP69K - K60R

Please note the following boundary 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

Tests IP68/IP69K

K60R modules were tested with the following tests:

- Stricter test than IP67: 90 min in 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 temperatureTest with particularly creepable oil:
- Five months completely under oil at room temperature
 Test with drilling emulsion:
- Five months at room temperature (components of the drilling emulsion: Anionic and non-ionic emulsifiers, paraffinic low-aromatic mineral oil, boric acid alkanolamines, corrosion inhibitors, oil content 40 %)
- Test in oil bath (Excelence 416 oil) with alternating oil bath temperature:

130 cycles of 15 °C to 55 °C, two months

 Cleaning with a high-pressure cleaner according to IP69K: 80 to 100 bar, 10 cm to 15 cm distance, time per side
 > 30 sec, 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 3RK1 901-1KA00 sealing caps.

Note:

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

	•							
	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
								kg
	Digital I/O modules IP68/IP69K - K60R • 4 inputs/4 outputs • IP68/IP69K • Standard assignment • Current carrying capacity: - 200 mA (inputs) - 2 A (outputs) • Standard slave • Modules supplied without mounting plate	A	3RK1 400-1CR00-0AA3		1	1 unit	121	0.275
3PK1 400 10P00 0443	· Modules supplied without mounting plate							
Accessories								
	 K60 mounting plates Suitable for all K60 and K60R compact modules Wall mounting Standard rail mounting 	* *	3RK1 901-0CA00 3RK1 901-0CB01		1	1 unit 1 unit	121 121	0.065 0.095
3RK1 901-0CA00								
	AS-Interface sealing caps M12 For free M12 sockets		3RK1 901-1KA00		100	10 units	121	0.100
3KK I 901-1KAUU								

Selection and ordering data

AS-Interface Slaves

I/O modules for operation in the field, high degree of protection Digital I/O modules, IP68/IP69K - K60R

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3RK1 901-1NR21



3RK1 901-1NR00



3RX8 000-0GF32-1AB5

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3RK1 901-3RA00

Can be ordered only from the following address: GMC-I Messtechnik GmbH, Thomas-Mann-Str. 16-20, 90471 Nürnberg, Germany Tel.: +49 (0) 911/8602-111, Fax: +49 (0) 911/8602-777, E-mail: info@gossenmetrawatt.com, www.gossenmetrawatt.com

Version				DT	Order No. Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
AS-Interface I	M12 feeders								0
For flat cable	For	Cable length	Cable end in feeder						
AS-i / U _{aux}	M12 socket		Not available	A	3RK1 901-1NR20	1	1 unit	121	0.060
AS-i / U _{aux}	M12 cable box	1 m	Not available	A	3RK1 901-1NR21	1	1 unit	121	0.070
AS-i / U _{aux}	M12 cable box	2 m	Not available	A	3RK1 901-1NR22	1	1 unit	121	0.100
AS-Interface I	M12 feeders, 4	-fold							
For flat cable	For	Cable length	Cable end in feeder						
AS-i / U _{aux}	4-fold M12 socket delivery includes cou- pling module		Available	A	3RK1 901-1NR00	1	1 unit	121	0.186
				_					
M12-I distribu	utors			С	3RK1 901-11R00	1	1 unit	121	0.038
• 1700									
• 2 x M12 box	J								
Addressing c	able, with M12	2 plua to	M12	A	3RX8 000-0GF32-1AB5	1	1 unit	574	0.066
socket									
For addressi e. g. K20 or l	ng slaves with K60R modules	M12 con or light c	nection, curtains						
When using 904-2AB01 a	the current ver addressing unit	sion of th	e 3RK1						
• Length 1.5 m	n, 3-pole								
Addressing call ing plug (holl	able, with M12 ow plug) ¹⁾	2 plug to	address-		Z236A				
 Included in s 2AB01 addre 	cope of supply	/ of of the	3RK1 904-						
• Length 1.5 m	1								
Addressing c	able, with ban	ana plug	to M12	С	3RK1 901-3RA00	1	1 unit	121	0.064
For addressi	ng slaves with	M12 con	nection,						
Only when u	sing the older v	version of	f the 3RK1						
904-2AB00 a	addressing unit								

Slaves

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

Overview

The K45 compact modules are the ideal supplement to the K60 large compact modules, which have proven their worth 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 far smaller K45 modules. Their footprint is the same as that of the user modules. However, they have a mounting depth which is only two-thirds of the user module and hence an exact match for the compact module family.

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 flat cables can be inserted in the recesses of the mounting plates where they cause no hindrance.
- The mounting plate for standard rail mounting has a hole pattern that is identical to that of the user modules.

Mounting the flat cables is now easier than ever. The yellow and black AS-Interface flat 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 always guaranteed.

Sensors/actuators are connected using M12 sockets. The 4I module can be ordered optionally with M8 connection sockets.

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

Selection and	d ordering	data										
	Version					DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
												kg
	Digital I/O r	nodules, IP6	67 - K45									
DETAIL STOLEN	PNP trans	istor										
	Current ca	arrying capao	city of the ir	nputs: 200 i	mA							
· Jin	• Modules s	Supplied with		ng plate	Connection							
	туре	carrying capacity of outputs	type	assign- ment	methods							
SIEMENS	4 inputs		Standard	Standard	M12		3RK1 200-0CQ20-0AA3		1	1 unit	121	0.086
3RK1 400-0GQ20- 0AA3			Standard	Standard	M8 screw	А	3RK1 200-0CT20-0AA3		1	1 unit	121	0.098
			Standard	Standard	M8 snap	С	3RK1 200-0CU20-0AA3		1	1 unit	121	0.091
			A/B	Standard	M12		3RK2 200-0CQ20-0AA3		1	1 unit	121	0.099
			A/B	Standard	M8 screw	В	3RK2 200-0CT20-0AA3		1	1 unit	121	0.100
			A/B	Standard	M8 snap	С	3RK2 200-0CU20-0AA3		1	1 unit	121	0.102
	2 x 2 inputs	1)	A/B	Y	M12	A	3RK2 200-0CQ22-0AA3		1	1 unit	121	0.100
	2 inputs/2 outputs	2 A ¹⁾	Standard	Standard	M12		3RK1 400-1BQ20-0AA3		1	1 unit	121	0.100
	2 x (1 input/1 out- put)	0.2 A	Standard	Y	M12	A	3RK1 400-0GQ20-0AA3		1	1 unit	121	0.098
	4 x (1 input/1 out- put)	0.2 A	A/B (Spec. 3.0)	Y	M12	D	3RK2 400-0GQ20-0AA3		1	1 unit	121	0.100
	3 outputs	1 A	A/B	Standard	M12		3RK2 100-1EQ20-0AA3		1	1 unit	121	0.093
	4 outputs	1 A	Standard	Standard	M12		3RK1 100-1CQ20-0AA3		1	1 unit	121	0.100
	2 outputs/ 2 inputs	2 A	A/B	Standard	M12	A	3RK2 400-1BQ20-0AA3		1	1 unit	121	0.100
Accessories												
	K45 mount	ing plates										
	For wall m	iounting					3RK1 901-2EA00		1	1 unit	121	0.027
3RK1 901-2EA00	• FOI Stanua	aru raii moun	ung				3NKT 901-20400		1	T UTIL	121	0.030
	AS-Interfac	e sealing ca	ps									
	• For free N	112 sockets					3RK1 901-1KA00		100	10 units	121	0.100
	 For free N 	18 sockets				А	3RK1 901-1PN00		100	10 units	121	0.100
3RK1 901-1KA00												
3RK1 901-1PN00												
and the	Cable term For sealing (shaped AS	inating piece of open cable Interface ca	es e ends ble) in IP67	7			3RK1 901-1MN00		1	10 units	121	0.085

3RK1 901-1MN00

 $^{1)}\,$ The typical current carrying capacity per output increases with version "E12" from 1.5 to 2 A (available since approx. 07/2003).

Slaves

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

Overview



The K20 compact module range 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 failsafe 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.

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

Selection and ordering data

	Version					DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
												kg
	Digital I/O	modules,	IP67 – K20									
	Туре	Current carrying capacity of outputs	Slave type	Pin assign- ment	Connec- tion method							
	4 inputs		A/B	Standard	M8	А	3RK2 200-0CT30-0AA3		1	1 unit	121	0.075
			A/B	Y	M12	А	3RK2 200-0CQ30-0AA3		1	1 unit	121	0.075
	2 inputs/	1	A/B	Standard	M8	А	3RK2 400-1BT30-0AA3		1	1 unit	121	0.075
	2 outputs	1	A/B	Y	M12	А	3RK2 400-1BQ30-0AA3		1	1 unit	121	0.075
3RK2 200-0CT30-0AA3	4 outputs	1	A/B (Spec. 3.0)	Standard	M8	A	3RK2 100-1CT30-0AA3		1	1 unit	121	0.075
	4 inputs/	1	Standard	Standard	M8	А	3RK1 400-1CT30-0AA3		1	1 unit	121	0.110
	4 outputs	1	A/B (Spec. 3.0)	Standard	M8	A	3RK2 400-1CT30-0AA3		1	1 unit	121	0.110
	2 safe inputs		Standard	Y-II	M12	A	3RK1 205-0BQ30-0AA3		1	1 unit	121	0.075

Accessories

SET, M)	
	kg
AS-Interface sealing caps	
For free M12 sockets SRK1 901-1KA00 100 10 units 1	21 0.100
• For free M8 sockets A 3RK1 901-1PN00 100 10 units 1	21 0.100
3RK1 901-1KA00	
3HK1 901-1PN00	
AS-Interface compact distributors, A 3RK1 901-1NN10 1 1 unit 1	21 0.040
Current carrying capacity up to 8 A	

2

Slaves

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

ve	5151011									Woight
						per PL	(UNIT,	10	1 G	per PU
							M)			appiox.
	S-Interface M	12 foodors								kg
Fo	or flat cable	For	Cable length	Cable end in feeder						
3BX9 801-0AA00 AS	S-i	M12 socket		Available	►	3RX9 801-0AA00	1	1 unit	121	0.029
AS	S-Interface M	12 feeders								
Fo	or flat cable	For	Cable length	Cable end in feeder						
3RK1 901-1NR10 AS	S-i	M12 socket		Not available	А	3RK1 901-1NR10	1	1 unit	121	0.060
AS	S-i	M12 cable box	1 m	Not available	А	3RK1 901-1NR11	1	1 unit	121	0.070
AS	S-i	M12	2 m	Not	А	3RK1 901-1NR12	1	1 unit	121	0.100
		cable box		available						
AS	S-i / U _{aux}	M12 socket		Not	A	3RK1 901-1NR20	1	1 unit	121	0.060
		MIO	1	available	^	2DK1 001 1ND01	-	1 unit	101	0.070
AS	S-I / U _{aux}	cable box	Im	available	A	3RK1 901-1NR21		i unit	121	0.070
AS	S-i / U _{aux}	M12 cable box	2 m	Not available	A	3RK1 901-1NR22	1	1 unit	121	0.100
3RK1 901-1NR21										
AS	S-Interface M	12 feeders, 4-fe	old Cable	Cable end						
		101	length	in feeder						
AS	S-i / U _{aux}	4-fold M12 socket delivery includes cou- pling module		Available	A	3RK1 901-1NR00	1	1 unit	121	0.186
M1	12-T distribut	ors			С	3RK1 901-1TR00	1	1 unit	121	0.038
•	IP68									
3RK1 901-1TR00	1 x M12 plug 2 x M12 box									
M1	12 Y-shaped	coupler plugs			А	6ES7 194-1KA01-0XA0	1	1 unit	250	0.046
For wit	or connection of the technology of technolog	of two sensors f r	to one M1	2 socket						
6ES7 194-1KA01-0XA0										
	12 addressing Standard M12	g cables to M1	2 Assing els	wee with	A	3RX8 000-0GF32-1AB5	1	1 unit	574	0.066
	M12 connection	on, e. g. K20 m	odules	wes with						
3RX8 000-0GF32-1AB5 • V	When using th 2AB01 addres	e current versions in a unit	on of the 3	3RK1 904-						
• 1	1.5 m	<u> </u>								
Ad	ddressing cal	oles, with bana	ina plug,	to M12	С	3RK1 901-3RA00	1	1 unit	121	0.064
	 For addressing slaves with M12 connection, e. g K20 modules 									
•••	When using th 2AB00 addres	e older version sing unit	of the 3R	K1 904-						
3RK1 901-3RA00										

For plug-in connectors and cables, see Catalog FS 10 --> "Proximity Switches / Accessories / Plug-in Connectors" or look on the Internet at <u>www.siemens.com/as-interface</u>



I/O modules for operation in the field, high degree of protection Digital I/O modules, IP67 - user modules

Overview

The AS-Interface user modules are the first module generation for AS-Interface. Today, innovated and further improved modules are available in the form of the K45 and K60 series of compact modules. We recommend replacing the user modules in future with the K45 compact module series. However, the user modules are still available for existing systems and replacement requirements.

More information can be found in the Industry Mall.

Advantages of the K45 compact modules

The K45 compact modules provide extra advantages in addition to the functionality of the user modules:

- An integrated addressing socket enables the module to be addressed in the installed state
- Time is saved when mounting the module: Mounting with only one screw thanks to hinge system
- Extensive diagnostics by LED on the module (e.g. display of zero address, no communication with master, overload)
- Random insertion of the AS-Interface flat cable irrespective of the position of the profiled lug
- Smaller dimensions
- Versions with M12 and M8 connection sockets enable the direct connection of all sensors
- Modules in A/B technology enable up to 62 slaves on one AS-Interface network

User modules		Corresponding K45 type
Order No.	Version	Order No.
3RG9 001-0AA00	4 inputs (100 mA)	3RK1 200-0CQ20-0AA3
3RG9 001-0AG00	4 inputs (200 mA)	3RK1 200-0CQ20-0AA3
3RG9 001-0AH00	2 x 2 inputs	3RK2 200-0CQ22-0AA3
3RG9 001-0AC00	2 inputs/2 outputs relay outputs	3RK1 400-1BQ20-0AA3
3RG9 001-0CC00	2 inputs/2 outputs solid-state outputs	3RK1 400-1BQ20-0AA3
0000 001 041400		001/1 100 10000 0110

Conversion table for user modules --> K45

Version	Order No.	Version
4 inputs (100 mA)	3RK1 200-0CQ20-0AA3	4 inputs (200 mA)
4 inputs (200 mA)	3RK1 200-0CQ20-0AA3	4 inputs (200 mA)
2 x 2 inputs	3RK2 200-0CQ22-0AA3	2 x 2 inputs A/B slave
2 inputs/2 outputs relay outputs	3RK1 400-1BQ20-0AA3	2 inputs/2 outputs solid-state outputs
2 inputs/2 outputs solid-state outputs	3RK1 400-1BQ20-0AA3	2 inputs/2 outputs solid-state outputs
2 inputs/2 outputs solid-state outputs U _{Aux} using M12 plug	3RK1 400-1BQ20-0AA3	2 inputs/2 outputs solid-state outputs U _{Aux} using black flat cable
2 x (1 input/1 output) supply of I/O from AS-Interface cable	3RK1 400-0GQ20-0AA3	2 x (1 input/1 output) supply of I/O from AS-Interface cable
4 outputs relay outputs	3RK1 100-1CQ20-0AA3	4 inputs solid-state outputs
4 outputs U_{Aux} using M12 plug	3RK1 100-1CQ20-0AA3	4 outputs U_{Aux} using black flat cable
4 inputs solid-state outputs	3RK1 100-1CQ20-0AA3	4 inputs solid-state outputs
	Version 4 inputs (100 mA) 4 inputs (200 mA) 2 x 2 inputs 2 inputs/2 outputs relay outputs 3 olid-state outputs 3 olid-state outputs 3 olid-state outputs 4 outputs 5 olid-state outputs 5 o	VersionOrder No.4 inputs (100 mA)3RK1 200-0CQ20-0AA34 inputs (200 mA)3RK1 200-0CQ20-0AA32 x 2 inputs3RK2 200-0CQ22-0AA32 inputs/2 outputs3RK1 400-1BQ20-0AA32 inputs/2 outputs3RK1 100-1CQ20-0AA34 outputs3RK1 100-1CQ20-0AA34 outputs3RK1 100-1CQ20-0AA34 inputs3RK1 100-1CQ20-0AA35 olid-state outputs3RK1 100-1CQ20-0AA3

Note:

To use the K45 modules you require the 3RK1 901-2EA00 (wall mounting) or 3RK1 901-2DA00 (standard rail mounting) K45 mounting plates instead of the 3RG9 010-0AA00 and 3RG9 030-0AA00 coupling modules.

Slaves

I/O modules for operation in the field, high degree of protection Analog I/O modules, IP67 - K60

Overview



K60 analog compact module

AS-Interface analog modules from the K60 compact series detect or issue analog signals locally. These modules are linked to the higher-level controller through an AS-Interface master according to specification 2.1 or specification 3.0.

The analog modules are divided into five groups:

- · Input module for sensors with current signal
- Input module for sensors with voltage signal
- Input module for sensors with thermal resistor
- · Output module for current actuators
- · Output module 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 changing over 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 2channel, selectable over the ID1 code
- Extra simple handling of analog processing with masters of Specification 3.0, the DP/AS-i LINK Advanced

I/O modules for operation in the field, high degree of protection Analog I/O modules, IP67 - K60



3RK1 207-1BQ44-0AA3

Selection and ordering data

Version			DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
									kg
Analog I/O mo analog profile	dules IP67 - K60 7.3),							
Slave type: S	tandard								
Modules supp	plied without mou	inting plate							
Inputs	Туре	Measuring range							
1 or 2 inputs (selectable using jumper	Current	4 20 mA or ± 20 mA (selectable)	A	3RK1 207-1BQ40-0AA3		1	1 unit	121	0.187
plug at socket 3)	Voltage	±10 V or 1 5 V (selectable)	A	3RK1 207-2BQ40-0AA3		1	1 unit	121	0.188
	Thermal resis- tance	Pt 100 or Ni 100 or 0 600 Ω (selectable)	A	3RK1 207-3BQ40-0AA3		1	1 unit	121	0.183
4 inputs	Current	4 20 mA or ±20 mA (selectable)	A	3RK1 207-1BQ44-0AA3		1	1 unit	121	0.190
	Voltage	±10 V or 1 5 V (selectable)	С	3RK1 207-2BQ44-0AA3		1	1 unit	121	0.190
	Thermal resis- tance	Pt 100 or Ni 100 or 0 600 Ω (selectable)	A	3RK1 207-3BQ44-0AA3		1	1 unit	121	0.190
Outputs	Туре	Output range							
	Current for 2-wire actu- ators	4 20 mA or ±20 mA or 0 20 mA (selectable)	A	3RK1 107-1BQ40-0AA3		1	1 unit	121	0.200
2 outputs	Voltage for 2-wire actu- ators	±10 V or 0 10 V or 1 5 V (selectable)	A	3RK1 107-2BQ40-0AA3		1	1 unit	121	0.200
Analog I/O mo	dules IP67 - K60	Ι,							
Slave type: A	1.A.9 /B (Spec 3.0)								
Modules supplements	plied without mou	inting plate							
Inputs	Туре	Measuring range							
1 or 2 inputs (variably adjustable)	Current	4 20 mA or ±20 mA (selectable)	A	3RK2 207-1BQ50-0AA3		1	1 unit	121	0.187
	Voltage	±10 V or 1 5 V (selectable)	A	3RK2 207-2BQ50-0AA3		1	1 unit	121	0.187

PREMANDING PRESERVED AND PRESE

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3RK2 207-2BQ50-0AA3

Slaves

I/O modules for operation in the field, high degree of protection Analog I/O modules, IP67 - K60

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
								kg
Accessories								
	Manuals							
	Only available to download on the Internet: www.siemens.com/automation/manuals							
The second se	K60 mounting plates							
SIEMENS Manufacture manufacture	Wall mounting		3RK1 901-0CA00		1	1 unit	121	0.065
3RK1 901-0CA00	Standard rail mounting	•	3RK1 901-0CB01		1	1 unit	121	0.095
3RK1 901-1KA00	M12 sealing caps		3KK1 901-1KAUU		100	10 units	121	0.100
	Sealing sets	А	3RK1 902-0AR00		100	5 units	121	0.100
	 For mounting plate K60 and distributor 							
	 Cannot be used for K45 mounting plate 							
3RK1 902-0AR00	 One set contains one straight and one shaped seal 							
3RK1 901-1AA00	Jumper plugs For changing over the 2-channel input modules	A	3RK1 901-1AA00		1	1 unit	121	0.012

More information can be found in the Industry Mall.

I/O modules for operation in the control cabinet Introduction

Overview



SlimLine S22.5/S45



F90 module



Flat 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 on 35 mm standard mounting rail acc. to EN 50022	Wall mounting using push-in lugs (Order No.: 3RP1 903)	Other possibilities
SlimLine S22.5	 4I (standard and A/B modules) 	✓	✓	
	• 40			
	 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) 			
	• 161			
Flat module	 4I/4O (screw terminals) 			Integrated lugs for screw fixing

¹⁾ For more information about these modules

see "Modules with Special Functions" from page 2/57

✓ Available.

-- Not available.

Slaves

I/O modules for operation in the control cabinet SlimLine

Overview

SlimLine modules of the S22.5 and S45 series

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 type of construction. 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-type 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 module
- Ground-fault detection module

The new AS-Interface Specification 3.0 adds a number of completely new features to 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 system.

Modules with four inputs and four outputs as A/B slaves according to specification 3.0 are also available as SlimLine modules S45.

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 (e. g. the new DP/AS-i LINK Advanced or IE/AS-i LINK PN IO) and that the cycle times for the outputs can extend to max. 20 ms.

I/O modules for operation in the control cabinet SlimLine

Selection and ordering data

	Version					DT	Order No.	Price per PU	PU (UNIT, SET,	PS*	PG	Weight per PU approx.
									IVI)			ka
and -	S22.5 Slim	Line modul	les									3
COO	Type	Connec- tion termi- nals	Slave type	Inputs	Outputs							
	4 inputs	Screw	Standard	2-wire		►	3RK1 200-0CE00-0AA2		1	1 unit	121	0.138
		Ð	Standard	2- and 3-wire		•	3RK1 200-0CE02-0AA2		1	1 unit	121	0.141
3RK1 200-			A/B slave	2- and 3-wire		•	3RK2 200-0CE02-0AA2		1	1 unit	121	0.145
0CE00-0AA2		Spring	Standard	2-wire		A	3RK1 200-0CG00-0AA2		1	1 unit	121	0.115
			Standard	2- and 3-wire		А	3RK1 200-0CG02-0AA2		1	1 unit	121	0.117
			A/B slave	2- and 3-wire		A	3RK2 200-0CG02-0AA2		1	1 unit	121	0.122
	2 inputs/2 outputs	Screw	Standard	2-wire	PNP tran- sistor 2 A	•	3RK1 400-0BE00-0AA2		1	1 unit	121	0.139
			Standard	2-wire	Relays		3RK1 402-0BE00-0AA2		1	1 unit	121	0.165
			Standard	2-wire	PNP tran- sistor 2 A	в	3RK1 400-0BG00-0AA2		1	1 unit	121	0.112
	4 outputs	Screw	Standard		PNP tran-		3RK1 100-1CE00-0AA2		1	1 unit	121	0.143
		Ð			sistor 1 A							
		Spring	Standard		PNP tran- sistor 1 A	A	3RK1 100-1CG00-0AA2		1	1 unit	121	0.114
	S45 SlimLi Inputs: PNF	i ne module : ^{>} transistor	S									
	Туре	Connec- tion termi- nals	Slave type	Inputs	Outputs							
	4 inputs/4 outputs	Screw	Standard	2- and 3-wire	PNP tran- sistor 1 A		3RK1 400-1CE00-0AA2		1	1 unit	121	0.291
	. (Standard	2- and 3-wire	PNP tran- sistor 2 A	•	3RK1 400-1CE01-0AA2		1	1 unit	121	0.289
3RK1 400- 1CE00-0AA2			Standard	2- and 3-wire floating	PNP tran- sistor 1 A float- ing	•	3RK1 402-3CE01-0AA2		1	1 unit	121	0.287
			Standard	2- and 3-wire	Relays	•	3RK1 402-3CE00-0AA2		1	1 unit	121	0.316
			A/B (Spec. 3.0)	2- and 3-wire	PNP tran- sistor 2 A	A	3RK2 400-1CE01-0AA2		1	1 unit	121	0.289
		Spring	Standard	2- and 3-wire	PNP tran- sistor 1 A	A	3RK1 400-1CG00-0AA2		1	1 unit	121	0.243
			Standard	2- and 3-wire	PNP tran- sistor 2 A	В	3RK1 400-1CG01-0AA2		1	1 unit	121	0.241
			Standard	2- and 3-wire floating	PNP tran- sistor 1 A floating	A	3RK1 402-3CG01-0AA2		1	1 unit	121	0.239
			Standard	2- and 3-wire	Relays	A	3RK1 402-3CG00-0AA2		1	1 unit	121	0.272
			A/B (Spec. 3.0)	2- and 3-wire	PNP tran- sistor 2 A	В	3RK2 400-1CG01-0AA2		1	1 unit	121	0.241
	4 inputs/3 outputs	Screw	A/B slave	2- and 3-wire	PNP tran- sistor 2 A	•	3RK2 400-1FE00-0AA2		1	1 unit	121	0.294
		Spring	A/B slave	2- and 3-wire	PNP tran- sistor 2 A	A	3RK2 400-1FG00-0AA2		1	1 unit	121	0.247
Accessories												
	Sealable c	overs	ithorized ad	dressing			3RP1 902		1	5 units	101	0.004
	Push-in lu For screw f	ganst undt gs ixing	amonzeu au	aressing			3RP1 903		1	10 units	101	0.002

2

Slaves

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

Selection and ordering	ng data										
	Version				DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
	E00 modul										kg
****	Standard sl	ave									
	Туре	Connec- tion termi- nals	Inputs	Outputs							
3RG9 002-0DB00	4 inputs/4 outputs	Screw	2- and 3-wire PNP tran- sistor	PNP tran- sistor 1A	A	3RG9 002-0DB00		1	1 unit	121	0.112
			2- and 3-wire PNP tran- sistor	PNP tran- sistor 2A	A	3RG9 002-0DA00		1	1 unit	121	0.112
			2- and 3-wire PNP tran- sistor floating	PNP tran- sistor 2A	A	3RG9 002-0DC00		1	1 unit	121	0.111
			2- and 3-wire PNP tran- sistor	PNP tran- sistor 1A	A	3RG9 004-0DB00		1	1 unit	121	0.090
			2- and 3-wire PNP tran- sistor	PNP tran- sistor 2A	A	3RG9 004-0DA00		1	1 unit	121	0.090
			2- and 3-wire PNP tran- sistor floating	PNP tran- sistor 2A	A	3RG9 004-0DC00		1	1 unit	121	0.107
	16 inputs	Screw	PNP tran- sistor		A	3RG9 002-0DE00		1	1 unit	121	0.133
		Combicon	PNP tran- sistor		A	3RG9 004-0DE00		1	1 unit	121	0.086
Accessories											
	Combicon • For 4I/4O One set con • 4 x 5-pole • Standard • 2 x 4-pole auxiliary v	connector s modules wit mprises: e plug for cor sensors/actu e plug for AS voltage	sets h Combicon nnection uators -Interface an	connection d external	A	3RX9 810-0AA00		1	1 unit	121	0.062
I/O modules for op <u>eratio</u> r	n in the cor	ntrol cabin	et								

Flat module

Selection and ordering data

Version	DT	Screw terminals	+	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		Order No.	Price per PU				kg
Flat module • 4 inputs/4 outputs • 200 mA for all I/Os • Screw terminals	A	3RK1 400-0CE00-0AA3		1	1 unit	121	0.097

Special integrated solutions <u>AS-Interface communication modules</u>

Overview

3RK1 400-0CD00-0AA3 AS-Interface communication modules for printed circuit board installation



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.

3RK1 400-0CD01-0AA3 AS-Interface communication modules for printed circuit board installation



With the 4l/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 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 resistant; if U_{aux} - is connected to (0), the outputs are overload and short-circuit resistant (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



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 resistant; if U_{aux} - is connected to (0), the outputs are overload and short-circuit resistant (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.

2

Slaves

Special integrated solutions AS-Interface communication modules

3RK1 400-1CD00-0AA2. 3RK2 400-1FD00-0AA2 AS-Interface communication modules for printed circuit board installation

Connection	Connection pad ¹⁾
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 3RK2 400-1FD00-0AA2 4I/30 module)
OUT-	7, 8
Not assigned	11, 12, 25, 26

¹⁾ Note: Pad numbering, see notes on Technical Information on page 2/1.

With the 4E/4A or 4E/3A 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 41/30 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): Order No. 530843-2
- 90° version for horizontal mounting (AMP): Order No. 650118-1

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

3RK1 200-0CD00-0AA2 AS-Interface communication modules for printed circuit board installation

Connection	Connection pad ¹⁾
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

¹⁾ Note: Pad numbering see notes on Technical Information on page 2/1.

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 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): Order No. 530843-2

90° version for horizontal mounting (AMP): Order No. 650118-1

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

	Version	Slave type	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	4 inputs/4 outputs	Standard		3BK1 400-0CD00-0AA3		1	1 unit	121
	 (max. 200 mA) Printed circuit board with solder pins, protected by enclosure 	Standard		SINCE 400-00 D00-0445		I	1 unit	121
	 Supply of I/Os using external auxiliary volt- age (24 V PELV) 							
	 Printed circuit board with solder pins, protected by enclosure 	Standard	D	3RK1 400-0CD01-0AA3		1	1 unit	121
3RK1 400-0CD00-0AA3	 Printed circuit board with solder pins for horizontal mounting 	Standard	D	3RG9 005-0SA00		1	1 unit	121
	 Supply of outputs using external auxiliary voltage (24 V PELV) Printed circuit board with gold-plated di- rect connector for 30-pole male connector socket for simple installation with direct connector 	Standard	В	3RK1 400-1CD00-0AA2		1	5 units	121
	4 inputs/3 outputs	A/B	С	3RK2 400-1FD00-0AA2		1	1 unit	121
3RG9 005-0SA00	 Supply of outputs using external auxiliary voltage (24 V PELV) Printed circuit board with gold-plated di- rect connector for 30-pole male connector socket for simple installation with direct connector 							
	4 inputs	Standard	С	3RK1 200-0CD00-0AA2		1	1 unit	121
	 Printed circuit board with gold-plated direct connector for 30-pole male connector socket for simple installation with direct connector 							

Selection and ordering data

Modules with special functions Counter modules

Overview

This 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:

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

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

Another condition for the maximum frequency is the pulse shaped required. 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 controller-independent maximum frequency of

 $f_{Cmax} = 1/1.3 \text{ ms} = 769 \text{ Hz}$ for the counter module (see following figure).



If the time criterion stipulated in the graphic 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.



Connection options

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
								kg
-	Counter module							
	With screw terminals	₽ A	3RK1 200-0CE03-0AA2		1	1 unit	121	0.104
1	With spring-type terminals		3RK1 200-0CG03-0AA2		1	1 unit	121	0.091

3RK1 200-0CE03-0AA2



000

3RK1 200-0CG03-0AA2

Slaves

Modules with special functions Ground-fault detection modules

Overview

"... Ground faults in control circuits must not result in a machine's unintentional starting or hazardous movements, nor must they prevent it from stopping (EN 60204-1 or VDE 0113 Part 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.

Version

Selection and ordering data

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.

Price

per PU (UNIT,

PU

PS*

PG

Weight per PU

One module per AS-Interface network is required.

808 Mars 1		
0	10	
888		

		M)			approx.
					kg
Ground-fault detection module					
With screw terminals	3RK1 408-8KE00-0AA2	1	1 unit	121	0.142
With spring-type terminals	3RK1 408-8KG00-0AA2	1	1 unit	121	0.117

Order No.

DT

3RK1 408-8KE00-0AA2

Modules with special functions Overvoltage protection module

Overview

The AS-Interface overvoltage protection module protects downstream AS-Interface devices or individual sections in AS-Interface networks from conducted overvoltages which can be caused by switching operations and remote lightning strikes.

The location of the overvoltage protection module forms within the lightning protection zone concept the transition from zone 1 to 2/3. Direct lightning strikes must be coped with using additional protective measures at the transitions from lightning protection zone 0A to 1.

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

The module has the same design, connection and degree of protection (IP67) as the AS-Interface user modules. It is a passive module without AS-i IC and as such does not need its own address on the AS-Interface network.

Connection to an AS-Interface system is effected through the FK-E or PG-E coupling module. Through use of the EEMS interface, the AS-Interface cable and the auxiliary voltage cable can be protected 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 Isn

The rated discharge current is the peak value of a surge current with waveform 8/20 microseconds, for which the overvoltage protection module is rated in according to a specific test program.

With waveform 8/20, 100 % of the value is achieved after 8 microseconds and 50 % after 20 microseconds.

Protection level Up

The protection level of an overvoltage protection module is the highest momentary value of the voltage at the terminals, established in individual tests.

The protection level characterizes the capability of an overvoltage protection module to limit overvoltages to a residual level.

Accessories

An FK-E (3RG9030-0AA00) or PG-E (3RG9240-0AA00) coupling module is required for connection of the AS-Interface cable and the auxiliary power supply cable.

Modules with special functions Overvoltage protection modules



Configuration guidelines for overvoltage protection modules

The grounding of protection modules and the units to be protected must be effected through a shared grounding point (equipotential bonding). If insulated devices are protected, their mounts must be included in the grounding points.

Sample application



Sample application for overvoltage protection modules

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
								kg
3RK1 901-1GA00	Overvoltage protection module	В	3RK1 901-1GA00		1	1 unit	121	0.146

Slaves

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.

Selection and ordering data

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
								kg
	AS-Interface connections for LOGO!	А	3RK1 400-0CE10-0AA2		1	1 unit	121	0.107
	 Four virtual inputs 							
	 Four virtual outputs 							
0-0442								

3RK1 400-0CE10-0AA2

AS-Interface power supply units, IP20

Overview



AS-Interface power supply unit for 3A

AS-Interface power supply units are an essential part of an AS-Interface network. They supply the electronics of the network (AS-Interface modules and AS-Interface masters) and the connected sensor technology. Furthermore, the integrated data decoupling of AS-Interface power supply units separates data and energy, thus enabling AS-Interface to transmit data and power on a single cable.

Design

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.

Benefits

- · 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 (relay signaling contacts) and remote reset

Function

- Higher rating: The power supply units deliver currents of 3 to 8 A.
- Integrated ground-fault detection: The power supply units ensure the reliable detection and signaling of ground faults according to EN 60204-1. The AS-Interface voltage can be switched off 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.
- Two-phase connection / ultra-wide input range for 8 A version: 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 variant 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 terminals.
- 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 e. g. to UL/CSA approval - for the 2.6 A version the output power is limited to max. 100 W (acc. to UL/CSA approval)
- · Also available as 3 A version with direct voltage input

Selection and ordering data

	Version		DT	Order No.	Price per PU	PU (UNIT, SET,	PS*	PG	Weight per PU approx.
						IVI)			kg
3RX9 501–0BA00	AS-Interface power su • Single output IP20 • With integrated groun • 2.6 A version with limi max. 100 W • Dimensions: • Width: 50 mm (3 A; 70 mm (5 A), 120 mm (8 A) • Height: 125 mm • Depth: 125 mm	pplie units, IP20 d-fault detection tation of output power to 2.6 A),							
////	Output current	Input voltage							
STEMENS	2.6 A / max. 100 W	120/230 V AC (selectable)	•	3RX9 501-2BA00		1	1 unit	121	0.550
POWER therface	3 A	120/230 V AC (selectable)	•	3RX9 501-0BA00		1	1 unit	121	0.550
ASH	3 A	24 V DC		3RX9 501-1BA00		1	1 unit	121	0.570
	5 A	120/230 V AC (selectable)	•	3RX9 502-0BA00		1	1 unit	121	0.710
3RX9 503-0BA00	8 A	120/230 500 V AC (selectable)		3RX9 503-0BA00		1	1 unit	121	1.310

* You can order this quantity or a multiple thereof.

AS-Interface Transmission Media

Overview



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 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 2x 1.5 mm² according to AS-i Specification. With AS-Interface, data and energy for the sensors (e. g. proximity switches BERO) and actuators (e. g. indicator lights) are transmitted over the yellow AS-Interface cable.

The black 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 free from tensile forces. On no account may the cables be twisted, but must be routed flat through the tow chain.

Selection and ordering data

1

	Version			DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
										kg
	AS-Interface	shaped cables								
	Material	Color	Quantity							
	Rubber	Yellow (AS-Interface)	100-m roll		3RX9 010-0AA00		1	1 unit	121	7.148
		Yellow (AS-Interface)	1-km drum	В	3RX9 012-0AA00		1	1 unit	121	80.000
		Black (24 V DC)	100-m roll		3RX9 020-0AA00		1	1 unit	121	7.092
-		Black (24 V DC)	1-km drum	В	3RX9 022-0AA00		1	1 unit	121	80.000
	TPE	Yellow (AS-Interface)	100-m roll		3RX9 013-0AA00		1	1 unit	121	6.627
		Yellow (AS-Interface)	1-km drum	В	3RX9 014-0AA00		1	1 unit	121	78.000
		Black (24 V DC)	100-m roll		3RX9 023-0AA00		1	1 unit	121	6.459
		Black (24 V DC)	1-km drum	В	3RX9 024-0AA00		1	1 unit	121	69.666
	TPE special	Yellow (AS-Interface)	100-m roll	С	3RX9 017-0AA00		1	1 unit	121	6.900
	version acc. to UL Class 2	Black (24 V DC)	100-m roll	С	3RX9 027-0AA00		1	1 unit	121	6.984
	PUR	Yellow (AS-Interface)	100-m roll		3RX9 015-0AA00		1	1 unit	121	6.131
		Yellow (AS-Interface)	1-km drum	В	3RX9 016-0AA00		1	1 unit	121	69.100
		Black (24 V DC)	100-m roll		3RX9 025-0AA00		1	1 unit	121	6.323
		Black (24 V DC)	1-km drum	В	3RX9 026-0AA00		1	1 unit	121	200.000

Repeaters

Overview



AS-Interface repeater

AS-Interface repeaters are used for extending the AS-Interface cable by 100 m per repeater and have the following features:

- · Maximum two repeaters in series
- Parallel switching of several repeaters possible (star configuration option)
- Maximum size increase of an AS-Interface network to up to 500 m is thus possible
- Easy mounting
- IP67 module enclosure

Design of an AS-Interface network with repeaters

- Slaves can be used on both sides of the repeater
- · AS-Interface power supply is required on both sides
- Electrical separation of the two AS-Interface shaped cable lines
- Installed in K45 module enclosure with mounting plate
- Separate indication of the correct AS-Interface voltage for each side
- Maximum two repeaters in series (max. cable length 300 m)
- Parallel switching of several repeaters possible (star configuration)
- Combination of series and parallel switching possible (max. range 500 m)

Selection and ordering data





Design of an AS-Interface network with repeaters (example)

Benefits

get

- Designed for Industry
- More possibilities of use and greater freedom for plant planning through extension of the AS-Interface network
- Reduced standstill and servicing times in the event of a fault thanks to separate indication of the correct AS-Interface voltage for each side

Application

The repeater is used to lengthen the AS-Interface segment by 100 m. In this case there are AS-Interface slaves and one AS-Interface power supply on each side of the repeater.

Extension plugs

Overview



Extension plug (on AS-Interface M12 feeder)

With the extension plug/extension plug plus it is possible to double the cable length possible in an AS-Interface segment from

100 to 200 m. The extension plug is a passive component, the extension plug plus is equipped in addition with an A/B slave.

The extension plug / extension plug plus has an M12 plug for quick connection to the AS-Interface M12 feeder with degree of protection IP67. Only one power supply unit is needed to supply power to the slaves on the up to 200 m long segment.

Design of an AS-Interface segment with an extension plug

To construct an AS-Interface segment with a cable length of more than 100 m and up to a maximum of 200 m, the extension plug/extension plug plus is installed at that point of the network which in a range of approx. ± 10 m is furthest from the AS-Interface power supply unit. The extension plug is not allowed to be used in AS-i networks smaller than 100 m.

As with all AS-i networks, any network structure (line, tree, star) is possible when using the extension plug/extension plug plus. Only one extension plug/extension plug plus is required per 200 m segment even with a tree or star structure.



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

Selection and ordering data

	Version	DT	Order No. pe	Price er PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
	AS-Interface extension plugs ¹⁾	•	3BK1 901-1MX00		1	1 unit	121	0.035
A A A A A A A A A A A A A A A A A A A	 Doubling of the cable length to 200 m per AS-Interface segment Undervoltage monitoring signal by means of di- agnostics LED 				I	1 drift	121	0.000
3BK1 901-1MX00	 AS-Interface extension plugs plus¹) Doubling of the cable length to 200 m per AS-Interface segment Undervoltage monitoring signal through inte- grated AS-Interface slave to AS-Interface mas- ter 	•	3RK1 901-1MX01		1	1 unit	121	0.035
Accessories								
3RX9 801-0AA00	 AS-Interface M12 feeders For adaptation of shaped AS-Interface cable to a standard round cable Insulation piercing method for connection of AS-Interface cable M12 socket for connection of standard round cable Degree of protection IP67 	•	3RX9 801-0AA00		1	1 unit	121	0.029
3RK1 901-1NR10	AS-Interface M12 feeders • Transition of AS-Interface cable without U _{aux} , with M12 socket • Insulation piercing method for connection of AS-Interface cable • M12 socket for connection of standard round cable • Max. 4 A • Degree of protection IP67/IP68/IP69K	A	3RK1 901-1NR10		1	1 unit	121	0.060

¹⁾ For connection to the AS-Interface flat cable you need the AS-Interface M12 feeder, which must be ordered separately, see section "Accessories"

change I/O data.

Specification V3.0)

Function

more than once in an AS-i network.

 Reading out the slave profile (IO, ID, ID2) · Reading out and adjusting the ID1 code

(measuring range from 0 to 35 V)

slaves) as addressing aid

Input/output test when commissioning the slaves:

• Measuring the voltage on the AS-Interface cable

AS-Interface System Components and Accessories

A new slave that has not yet been addressed has the address 0. It is recognized accordingly by the master as a new slave that has not yet been addressed and is unable in this state to ex-

The assignment of the address is independent of the position of the slave on the AS-i cable. An address is not allowed to occur

· Reading out and adjusting the slave address 0 to 31 or 1A to 31A, 1B to 31B (also for slave types according to AS-Interface

Reading input signals and writing outputs in case of digital and

analog slaves according to AS-Interface Specification V2.1

· Indication of the operational current in case of direct connec-

tion of an AS-i slave (measuring range from 0 to 100 mA)

Storage of complete network configurations (profiles of all

Addressing units

Overview



Addressing unit for AS-Interface

To be able to participate in data exchange with the master, every AS-i slave must be assigned an address (not zero) before commissioning. This can be done

- Offline by means of an addressing unit or
- Online using the master of the AS-Interface system.

The addresses themselves are the values 1 to 31 (or 1A to 31A and 1B to 31B in case of extended addressing, so-called A/B slaves).

Selection and ordering data

Order No. Weight per PU Version DT Price PU PS* PG per PU (UNIT, SET approx. M) kg AS-Interface addressing unitsFor AS-Interface modules and sensors and actua-3RK1 904-2AB01 0 540 1 1 unit 121 tors with integrated AS-Interface Including extended addressing mode for A/B slaves • For setting the AS-i address of standard slaves and A/B slaves (also for slaves according to AS-Interface Version 3.0) • Battery operation with 4 batteries type AA (IEC LR6, NEDA 15) · Scope of supply: Addressing unit, operating manual (English, 3RK1 904-2AB01 French, German, Italian, Spanish), addressing cable (1.5 m with addressing plug) Accessories FK-E coupling modules, with integrated address- A 3RK1 901-1MA00 1 1 unit 121 0.057 ing socket (for hollow plug) For addressing the older module generation of the user module type 3RX8 000-0GF32-1AB5 Addressing cable, with M12 plug to M12 socket¹⁾ A 1 1 unit 574 0.066 For addressing slaves with M12 connection, e. g. K20 or K60R modules or light curtains • When using the current version of the 3RK1 904-2AB01 addressing unit 3RX8 000-0GF32-1AB5 Length 1.5 m, 3-pole Addressing cable, with M12 plug to addressing plug (hollow plug) ²⁾ Z236A Included in scope of supply of of the 3RK1 904-2AB01 addressing unit. • Length 1.5 m Addressing cable, with banana plug to M12 3RK1 901-3RA00 121 0.064 С 1 unit 1 socket For addressing slaves with M12 connection, e. g. K20 or K60R modules or light curtains Only when using the older version of the 3RK1 904-2AB00 addressing unit 3RK1 901-3RA00

¹⁾ Not included in scope of supply of of the 3RK1 904-2AB01 addressing unit

Tel.: +49 (0)911/8602-111, Fax: +49 (0)911/8602-777, E-mail: info@gossenmetrawatt.com, www.gossenmetrawatt.com

²⁾ Can be ordered only from the following address: GMC-I Messtechnik GmbH, Thomas-Mann-Str. 16-20, D-90471 Nürnberg, Germany

Analyzers

Overview



The AS-Interface analyzer is used to test AS-Interface networks. It enables systematic troubleshooting and permanent monitoring.

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 start-ups and service assignments.

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

Connection



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

Status 16: 17: 18: 19: 20:	Status 1: 2: 3:	Status 16: 17: 18:
16: 17: 18: 19: grun	1: 2 3	16: 17: 18:
17: 18: 19: grün	1: 2: 3:	17: 18:
18: 19: grün	2 3	18.
19: grün	3:	
20		19:
E0.	4	20.
21:	5:	21:
22: grün	6:	22.
23:	7:	23.
24:	8:	24:
25: grün	9:	25
26: grün	10: grün	26
27:	11:	27:
28:	12	28.
29: grün	13:	29.
30: grün	14:	30.
31: grün	15:	31:
	22. guin 23. 24. 25. guin 26. guin 27. 28. 29. guin 30. guin 31. guin	22 guin 6 24 8 9 24 9 9 25 guin 10 guin 27 11 12 28 28 guin 12 28 30 29 12 13 30 guin 14 31: guin 15: 15: 15: 15:



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

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

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

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

Data mode



' A Daten				
ligitale Weste Analogdaten Sici	herheitsdaten			
Eingangskanäle: 0123	8:	i≡ 16.	:E 24:	:E
Ausgangskanäle: 0123		A	A:	A:
12842 12888 12842 13178	1:E 9:	:€ 17:	:E 25:	:E
12012 12000 12042 13170	A:	A:	A:	:A
10260888 0808880	:# 10:	:€ 18:	:# 26:	
10267 -0101	A:	A:	A:	:A
000000 000000 00000 00000	.€ 11:	:€ 19.	:E 27:	:E
20201 20201 +/402 20201	A:	A:	A:	A:
	:€ 12:	:€ 20:	:E 28:	:E
	A:	:A:	A:	:A
	:€ 13:	:E 21:	.E 29.	:6
	A:	A:	:A	4
	:E 14:	:# 22.	:6 30	:6
	A:	:A	:A	

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

Abbrechen

Hife

0K

Trace mode

AS-	Interface /	Inalyse	r - [Trace4]											
<u>⊐</u> ₽₀	tei <u>I</u> esten	Einste	lungen Ansicht Ee	inster	Hy	0								_6×
6	A ML TR	8	K ?											
Pos.	Time (µs)	Slave	Master Daten	CE	814	13	21	1 10	Master Pause(µs)) D.	3020	1D0 (Response)	Analyse	
989	153	5	Data_Exchange	0	0	1	1	1 1	17	0	1 1	1 0	No Error	
990	152	8	Data_Exchange	0	0	1	1	1 1	16	1	1 (0 0	No Error	
991	153	11	Data_Exchange	0	0	1	1	1 1	16	1	1 1	1 0	No Error	
992	152	14	Data_Exchange	0	0	0	1	1 1	16	0	0 0	0 0	No Error	-
993	152	15	Data_Exchange	0	0	1	1	1 1	16	0	0 0	0 0	No Error	
994	152	31	Data Exchange	0	0	1	1	1 1	16	0	0 0	0 0	No Error	
995	154	22	Read_Status	1	1	1	1	1 0					No Slave Response	
996	165	1	Data_Exchange	0	0	1	1	1 1	29	1	0 0	0 0	No Error	
997	152	2	Data Exchange	0	0	1	1	1 1	16	0	1 1	0	No Error	
998	152	3	Data_Exchange	0	0	1	1	1 1	16	0	0 0	0 0	No Error	
999	153	5	Data_Exchange	0	0	1	1	1 1	16	1	1 0	0 0	No Error	
1000	153	8	Data_Exchange	0	0	1	1	1 1	16	0	0 0	3 0	No Error	
1001	153	11	Data_Exchange	0	0	1	1	1 1	16	1	0 0	0 0	No Error	
1002	152	14	Data_Exchange	0	0	0	1	1 1	16	0	0 0	0 0	No Error	
1003	153	15	Data_Exchange	0	0	1	1	1 1	15	0	0 0	0 0	No Error	
1004	153	31	Data_Exchange	0	0	1	1	1 1	16	0	0 0	0 0	No Error	
1005	155	23	Read_Status	1	1	1	1	1 0					No Slave Response	
1006	165	1	Data_Exchange	0	0	1	1	1 1	29	1	0 0	0 0	No Error	
1007	153	2	Data_Exchange	0	0	1	1	1 1	17	0	1 (0 0	No Error	
1008	152	3	Data_Exchange	0	0	1	1	1 1	16	0	0 0	0 0	No Error	
1009	153	5	Data_Exchange	0	0	1	1	1 1	16	1	1 1	0	No Error	
1010	152	8	Data_Exchange	0	0	1	1	1 1	16	1	1 0	0 0	No Error	
1011	152	11	Data_Exchange	0	0	1	1	1 1	16	1	1 0	0 1	No Error	
1012	152	14	Data Exchange	0	0	0	1	1 1	16	0	0 0	0 0	No Error	
1013	153	15	Data Exchange	0	0	1	1	1 1	18	0	0 0	0 0	No Error	
1014	152	31	Data_Exchange	0	0	1	1	1 1	16	0	0 0	0 0	No Error	
1015	155	24	Read_Status	1	1	1	1	1 0					No Slave Response	
1016	166	1	Data_Exchange	0	0	1	1	1 1	29	1	0 0	0 0	No Error	
1017	152	2	Data Exchange	0	0	1	1	1 1	16	1	0 1	1 0	No Error	
1018	152	3	Data_Exchange	0	0	1	1	1 1	15	0	0 0	0 0	No Error	
1010	16.4	e	Data Frishanas	0	0	٠	٠	• •	40	0			M. P	

The presentation of message frames in the style of a classic field bus 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 safety monitor applications, changes of status in the code tables of safety slaves are identified and assessed.

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 new measurement assistant records the bus signals for an adjustable period, automating the creation of the test log. A standardized quality test of AS-i plants is thus possible.

Analyzers

Selection and ordering data

	Version	DT	Order No. Pric per P	e PU J (UNIT, SET, M)	PS*	PG	Weight per PU approx.
						101	kg
SIEMENS	AS-interface analyzers		3RK1 904-3AB01	1	1 unit	121	0.450
AS-Interface Analyser	For testing actuator/sensor interface systems Ear convice contents in installations and not						
CE BREID-SARET CHINAS	 For service assignments in installations and net- works with AS-Interface systems 						
3RK1 904-3AB01	 Scope of supply: AS-Interface analyzer RS 232 cable for connecting to PC USB/serial adapter / RS 232 adapter Screwdriver Magnetic adhesive tape for fastening the analyzer to metal surfaces Service case with foam insert, dimensions (W x H x D / mm): approx. 260 x 70 x 200 Diagnostics software (CD-ROM) for PC (Windows 95/98, ME, 2000, NT, XP, Vista Home Basic, Home Premium, Business, Ultimate, Windows 7) 						
Accessories							
	USB/serial adapters	В	3UF7 946-0AA00-0	1	1 unit	131	0.150
	For connection to a USB port of a PC						
	AS-Interface M12 feeders		3RX9 801-0AA00	1	1 unit	121	0.029
	to a standard round cable						
3RX9 801-0AA00	Insulation piercing method for connection of AS-Interface cable						
	 M12 socket for connection of standard round cable 						
	Degree of protection IP67						
SPECIFIC SPREAM DECEMBER	AS-Interface M12 feeders	А	3RK1 901-1NR10	1	1 unit	121	0.060
	 Transition of AS-Interface cable without U_{aux}, with M12 socket 						
3RK1 901-1NR10	 Insulation piercing method for connection of AS-Interface cable 						
	M12 socket for connection of standard round cable						
	• Max. 4 A						
	Degree of protection IP67/IP68/IP69K						
	M12 cable plugs	А	3RX8 000-0CD42-1AF0	1	1 unit	574	0.174
	Cable: PUR, 4-pole						
	• Length: 5 m						
	Color: Black						
	• Extruded M12 plug (straight cable feeder), other cable end open						

Miscellaneous accessories

Selection and ordering data

	Version				DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
											kg
A State As a state of the state	AS-Interface s Technical infor Interface prod approx. 600 p	system manua mation and over uct range from ages	I erview of Siemens	the AS- , scope:							
	 German edit paper versio 	ion, n (black&white	print) ¹⁾		В	3RK2 703-3AB02-1AA1		1	1 unit	121	1.500
as-interface	 English edition paper version 	on, n (black&white	print) ²⁾		В	3RK2 703-3BB02-1AA1		1	1 unit	121	1.500
3RK2 703-3AB02-1AA1	AS-Interface	compact distri	butors		Δ	3BK1 901-1NN10		1	1 unit	121	0.040
ELEMENT In the second and the secon	for AS-Interfa	ce flat cable				•••••		·	i unit		0.010
	 Current carry 	ying capacity u	p to 8 A								
3RK1 901-1NN10	 Degree of pr 	otection IP67/I	P68/IP69	K							
	AS-Interface I	M12 feeders									
2.0	Degree of pr	otection IP67									
3RX9 801-0AA00	For flat cable	For	Cable length	Cable end in feeder							
	AS-i	M12 socket		Available		3RX9 801-0AA00		1	1 unit	121	0.029
Services Street Million	AS-Interface I	M12 feeders									
- Q .	 Degree of pr 	otection IP67/I	P68/IP69	K							
3RK1 901-1NR10	For flat cable	For	Cable length	Cable end in feeder							
	AS-i	M12 socket		Not available	A	3RK1 901-1NR10		1	1 unit	121	0.060
	AS-i	M12 cable box	1 m	Not available	A	3RK1 901-1NR11		1	1 unit	121	0.070
	AS-i	M12 cable box	2 m	Not available	A	3RK1 901-1NR12		1	1 unit	121	0.100
	AS-i / U _{aux}	M12 socket		Not available	A	3RK1 901-1NR20		1	1 unit	121	0.060
3RK1 901-1NR11	AS-I / U _{aux}	M12 cable box	1 m	Not available	A	3RK1 901-1NR21		1	1 unit	121	0.070
	AS-Interface	cable box	∠ m	available	A	3RK1 901-1NR22		I	T UNIL	121	0.100
° 💮 🔎	Degree of prot	tection IP67	-1010								
	For flat cable	For	Cable length	Cable end in feeder							
00 00 00 00 00 00 00 00 00 00 00 00 00	AS-i / U _{aux}	4-fold M12 socket delivery includes cou- pling module	-	Available	A	3RK1 901-1NR00		1	1 unit	121	0.186
¹⁾ Free-of-charge dow support.automation	vnload from the l	nternet at W/view/de/26	<u>250840</u>								
²⁾ Free-of-charge dow <u>support.automation</u>	vnload from the l	nternet at W/view/en/262	250840								

Miscellaneous accessories

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
	M12-T distributors	C	2DK1 001-1TD00		1	1 unit	101	kg
3BK1 901-1TB00	 IP68 1 x M12 plug 2 x M12 box 	U	511(1 301-11100			1 drift	121	0.000
	M12 Y-shaped coupler plugs For connection of two sensors to one M12 socket with Y connector	A	6ES7 194-1KA01-0XA0		1	1 unit	250	0.046
6ES7 194-1KA01-0XA0	Addressing cable, with M12 plug to M12	A	3RX8 000-0GF32-1AB5		1	1 unit	574	0.066
3RX8 000-0GF32-1AB5	 Socket For addressing slaves with M12 connection, e. g. K20 or K60R modules or light curtains When using the current version of the 3RK1 904-2AB01 addressing unit Length 1.5 m, 3-pole 							
	Addressing cable, with M12 plug to address- ing plug (hollow plug) ¹⁾ • Included in scope of supply of of the 3RK1 904-2AB01 addressing unit. • Length 1.5 m		Z236A					
\frown	Addressing cable, with banana plug to M12 socket	С	3RK1 901-3RA00		1	1 unit	121	0.064
Ŷ	 For addressing slaves with M12 connection, e. g. K20 or K60R modules or light curtains Only when using the older version of the 3RK1 904-2AB00 addressing unit 							
3RK1 901-3RA00								
	AS-Interface sealing caps M12 For free M12 sockets		3RK1 901-1KA00		100	10 units	121	0.100
3RK1 901-1KA00								
	AS-interface sealing caps M12, tamper-proof For free M12 sockets	A	3HK1 901-1KA01		100	10 units	121	0.100
	AS-Interface sealing caps M8 For free M8 sockets	A	3RK1 901-1PN00		100	10 units	121	0.100
3RK1 901-1PN00								
0	 AS-Interface seals M20 For AS-Interface cable, shaped For insertion in M20 glands 	A	3RK1 901-1MD00		100	10 units	121	0.100
3RK1 901-1MD00	Cable adapters for flat cables							
Ţ	Connection of AS-Interface cable to metric gland with insulation piercing method • Continuation using standard cable							
	- For M16 gland	В	3RK1 901-3QM00		1	1 unit	121	0.015
3RK1 901-3QM00	For M20 glandContinuation using pins	В	3RK1 901-3QM10		1	1 unit	121	0.017
	- For M16 gland	В	3RK1 901-3QM01		1	1 unit	121	0.015
	- For M20 gland	B	3RK1 901-3QM11		100	1 unit	121	0.015
	Cable clips for cable adapters		3HKI 901-3QA00		100	IU UNITS	121	0.100
SHK 1 901-3QA00	Cable terminating pieces For sealing of open cable ends (shaped AS-Interface cable) in IP67	•	3RK1 901-1MN00		1	10 units	121	0.085

3RK1 901-1MN00

¹⁾ Can be ordered only from the following address: GMC-I Messtechnik GmbH, Thomas-Mann-Str. 16-20, 90471 Nürnberg, Germany

Tel.: +49 (0)911/8602-111, Fax: +49 (0)911/8602-777, E-mail: info@gossenmetrawatt.com, <u>www.gossenmetrawatt.com</u>

Miscellaneous accessories



3RK1 901-0CA00



3RK1 902-0AR00

Version	DT	Order No. Price per PL	e PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
K45 mounting plates					101	0.007
 For wall mounting For standard rail mounting 	A A	3HK1 901-2EA00 3RK1 901-2DA00	1	1 unit 1 unit	121 121	0.027
K60 mounting plates Suitable for all K60 compact modules • For wall mounting • For standard rail mounting	• •	3RK1 901-0CA00 3RK1 901-0CB01	1	1 unit 1 unit	121 121	0.065 0.095
Sealing sets For K60 mounting plate and standard distributor 	A	3RK1 902-0AR00	100	5 units	121	0.100
 Oannot be used for K45 mounting plate One set contains one straight and one shaped seal 						
 Inscription labels For K45 and K60 compact modules 20 x 9 mm pastel turquoise 19 frames with 20 labels each 	D	3RT1 900-1SB50	100	380 units	101	0.100

Other accessories:

- See Catalog FS 10, section "Proximity Switches" --> "Accessories" --> "Plug-in Connectors"
- See Industry Mall, section "Sensors, Measurement and Testing Systems" --> "Proximity Switches", "Accessories" --> "Plug-in Connectors"

AS-Interface Software

AS-i function block library for PCS 7

Overview



AS-i function block library for PCS 7: User interfaces

The AS-i function block library for PCS 7 is integrated in the SIMATIC PCS 7 process control system and expands it for integration of the AS-Interface system.

As the result, the advantages of AS-i such as the considerable reduction of wiring outlay for distributed actuators/sensors and very simple installation can also be used in a system based on PCS 7.

Benefits

Use of the AS-i function block library offers the following advantages:

- Easy connection of AS-Interface to PCS 7 is guaranteed
- 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

The library contains modules for accessing the I/O data of AS-i slaves, modules for diagnostics of the AS-i system, and a face-plate for the PCS 7 Maintenance Station.

The AS-i CP 343-2 / CP 343-2P masters are supported within an ET 200M station connected through PROFIBUS.

On the AS-i master it is possible to operate both digital AS-i standard slaves and digital A/B slaves (according to AS-Interface Specification V3.0).

Hardware and software requirements

The library requires PCS 7 Version 6.1 or V7.0+SP1.

Types of delivery and license

The AS-i function block library supplied on CD-ROM allows the user to run the required engineering software on the engineering station (single license) including the runtime software for executing the AS modules in an automation system (single license).

If the AS modules are to be used in additional automation systems, the corresponding number of runtime licenses are required which are supplied without a data carrier.

Application

The AS-i function block library for PCS 7 is used in systems based on PCS 7 where the actuators and sensors are to be connected using AS-Interface.

Selection and ordering data

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
							kg
AS-i function block library for PCS 7	А	3ZS1 635-1XX00-0YA0		1	1 unit	121	0.240
Engineering software for an engineering station (single license), contains:							
Runtime software for execution of the AS module in an automation system (single license)							
 AS modules and faceplate for integrating AS-Inter- face into the PCS 7 process control system, for PCS 7 version V6.1 and 7.0 							
Digital AS-i slaves supported at the AS-i CP 343-2 and CP 343-2P master							
Operating language German/English selectable							
 • Type of delivery: CD incl. electronic documentation	I						
Runtime license for AS-i PCS 7 library	А	3ZS1 635-2XX00-0YB0		1	1 unit	121	0.001
Runtime software for execution of the AS module in an automation system (single license), contains:							
AS modules for integrating AS-Interface into the PCS 7 process control system Version 6.1 / 7.0							
 Type of delivery: License certificate (without software and documentation) 							
IO-l ink System Overview

General data

Overview



IO-Link product family

IO-Link is a new 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. Extensive parameter and diagnostics data are transmitted in addition to the cyclic operating data for the connected sensor/actuators. The simple, unshielded three-wire cable customary for standard sensors is used for this purpose.

Components of an IO-Link system

IO-Link is comprised of 2 components: IO-Link masters and IO-Link devices. They are available as listed below:

IO-Link masters

	IO-Link master modules					
	IO-Link master modules and IO-Link SIRIUS modules					
	 ET 200S 4SI IO-Link solid-state modules 					
	 SIRIUS ET 200S 4SI solid-state modules 					
100m	ET 200eco PN block I/Os					
e y par Lindhar	See page 2/74					
SIRIUS ET 200S 4SI solid-state modules						
IO-Link devices						
· • •	I/O modules					
101	IO Link K00 medules					

IO-Link K20 modules For IO-Link I/O modules see page 2/75, for IO-Link K20 modules see page 2/76

IO-Link K20 modules with four inputs



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SIRIUS 3RA64 direct-online starters



Sonar SIMATIC PXS310C See Catalog FS 10 "Sensor Technology" M18 proximity switches

Industrial controls **IO-Link starting controls**

SIRIUS 3RA6 compact feeders

- 3RA64 direct-on-line starters
- 3RA65 reversing starters

See Chapter 6

--> Load Feeders and Motor Starters --> for Use in the Control Cabinet --> SIRIUS 3RA6 Compact Feeders

Sensors

- IO-Link sensors, e. g.
- SIMATIC PXS310C M18

SIMATIC PXO560C C50

Compatibility of IO-Link

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

- IO-Link sensors/actuators can be operated on IO-Link modules (master) as well as on standard I/O 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.

Expansion through IO-Link I/O 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 done particularly economically with IO-Link I/O modules which enable several sensors/actuators to be connected to the control system simultaneously over one cable.

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.

Integration in STEP 7

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

- Easy and guick engineering
- Consistent data storage
- Speedy locating and rectifying of faults

Benefits

The IO-Link system offers decisive advantages for connecting complex (intelligent) sensors/actuators:

- Dynamic changing of sensor/actuator parameters directly by the PLC
- Consistent storage of parameters enables devices to be exchanged during operation, without a PC or programming device, through re-parameterization from the PLC
- 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
- Integrated communication: Transmission of process data and service data to the control system
- Uniform and transparent configuring and programming through use of a parameterization tool integrated in SIMATIC STEP 7 (Port Configurator Tool, PCT)
- Transparent representation of all parameter and diagnostics data

Application

IO-Link can be used in the following applications:

- Easy connection of complex IO-Link sensors/actuators with a large number of parameters and diagnostic data to the control system
- Wiring-optimized replacement of sensor boxes for the connection of binary sensors through IO-Link I/O modules

In both 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.

N

IO-Link IO-Link Master Modules

IO-Link master modules and IO-Link SIRIUS modules

Overview



IO-Link master modules from left to right: ET 200S 4SI IO-Link solid-state module, SIRIUS ET 200S 4SI solid-state module, ET 200eco PN block I/Os

IO-Link master module for SIMATIC ET 200S

The ET 200S 4SI IO-Link solid-state 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

To each IO-Link master module it is possible to connected

- Up to 4 IO-Link devices (three-conductor connection)
- Up to 4 standard actuators/sensors (two-wire/three-wire connection)

Selection and ordering data

SIRIUS IO-Link modules for SIMATIC ET 200S

The SIRIUS ET 200S 4SI solid-state module enables the easy and cost-effect connection of SIRIUS controls to IO-Link.

Features

- Up to 16 SIRIUS controls with IO-Link (grouped) can be connected to each SIRIUS IO-Link module
- The ET 200S 4SI IO-Link and SIRIUS ET 200S 4SI solid-state modules have 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 (Fast Connect)
- Supports firmware updating (STEP 7 V5.4 SP4 and higher)

IO-Link master modules for SIMATIC ET 200eco

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

	Version	Connection methods	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
	ET 200S 4SI IO-Link solid-state modules IO-Link masters for ET200S	Screw terminals, spring-type ter- minals or Fast Connect	A	6ES7 138-4GA50-0AB0		1	1 unit	250	0.057
6ES7 138-4GA50-0AB0									
3RK1 005-00LB00-0AA00	ET 200S 4SI SIRIUS solid-state modules IO-Link masters for SIRIUS controls for ET 200S	Screw terminals, spring-type ter- minals or Fast Connect	A	3RK1 005-0LB00-0AA0		1	1 unit	121	0.057
	ET 200eco PN block I/Os O-Link masters in degree of protection IP67	M12	A	6ES7 148-6JA00-0AB0		1	1 unit	250	0,900
6ES7 148-6JA00-0AB0									

More information

Further information and technical specifications are available in the Industry Mall at:

"Automation" --> "Industrical Communication " -->"IO-Link" --> "IO-Link Master Modules"

C



General data

Overview



IO-Link I/O modules

Using IO-Link technology it is also 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. The use of this technology represents a more attractive solution in terms of cost than the direct connection of sensors/actuators.

IO-Link I/O modules are a useful addition to ET 200S distributed peripherals.

The technology of the IO-Link I/O modules expands IO-Link from a pure point-to-point wiring method in the direction of distributed 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

With IO-Link I/O modules it is possible in addition to transmit parameter 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 I/O modules offers the following advantages:

- 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
- 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-topoint wiring
- Easy and elegant integration of sensors within a radius of 20 m around an ET200S station
- Possibility of transmitting parameter and diagnostic signals (e. g. sensor supply overload)
- Can also be used in harsh conditions thanks to the very compact design and degree of protection IP67

Application

IO-Link I/O modules are used in particular where sensor boxes were used up to now for the connection of binary sensors.

Application example: replacement of sensor boxes through the use of IO-Link I/O modules



Former technology with sensor boxes



Technology with IO-Link I/O modules

IO-Link I/O Modules

IO-Link K20 modules

Selection and ordering data

	Version			DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
										kg
	IO-Link K20 modules									
	Туре	Pin assign- ment	Connec- tion method							
0	4 inputs	Y	M12	А	3RK5 010-0BA10-0AA0		1	1 unit	121	0.075
0	8 inputs	Standard	M8	A	3RK5 010-0CA00-0AA0		1	1 unit	121	0.110
3RK5 010-0BA10-0AA0										

Accessories

	Version	DT	Order No. Pr per	ice PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
3RK1 901-1KA00	AS-Interface sealing caps M12 For free M12 sockets	•	3RK1 901-1KA00		100	10 units	121	0.100
3RK1 901-1PN00	AS-Interface sealing caps M8 For free M8 sockets	A	3RK1 901-1PN00		100	10 units	121	0.100

Other accessories:

- See Catalog FS 10, section "Proximity Switches" --> "Accessories" --> "Plug-in Connectors"
- See Industry Mall, section "Sensors, Measurement and Testing Systems" --> "Proximity Switches" --> "Accessories" --> "Plugin Connectors"