Systems

2

1) See Catalog FS 10 "Sensor Technology"

2) See Catalog IK PI "Industrial Communication for Automation and Drives"

Introduction

Overview

		Order No.	Page
AS-Interface / ASIsafe			
	ASIsafe enables the integration of safety-oriented components in an AS-Interface network, for example: • EMERGENCY-STOP pushbuttons • Protective door switches • Safety light arrays The simple wiring of AS-Interface, which is a major advantage, is maintained.		
	**AS-Interface safety monitors** • Key element of ASIsafe • Monitors safe participants and links safety inputs • Ensures safe disconnection • Modular construction according to individual requirements • Available with one or two release circuits with 2-channel configuration • New version of "Expanded safety monitor" with expanded RAM and integrated closing and opening delay and pulse functions Your advantage: Easy to configure safety functions up to Category 4	3RK1	2/14
 K45F	**AS-Interface safety modules** • Complete portfolio of ASIsafe modules • Degree of protection IP65/IP67 or IP20 • Two inputs in Category 2 or one input in Category 4 • Two standard outputs are available on the module in addition Your advantage: Easy integration of safe signals, be it in the cabinet or in the field	3RK1	2/15
 K60F			
 S22.5F (SlimLine)			
 Position switches	**Position switches and cable-operated switches** • Degree of protection IP65 • Direct connection of position switches or rope-operated switches for detection of safe signals • Available with separate actuator and tumbler • Molded-plastic or metal enclosures Your advantage: No more conventional wiring of safety functions required	3SF2, 3SF3	Ch. 8 / Ch. 9
 Cable-operated switches			
 Light curtains and arrays	**Light curtains/arrays and laser scanners** • Degree of protection IP65 • Direct and safe connection to AS-Interface • Up to Category 3 (laser scanners) or Category 4 (light arrays/curtains) Your advantage: Direct connection of active and optical protection for persons to ASIsafe	3SF7	See Catalog FS 10 "Sensor Technology"

		Order No.	Page
 EMERGENCY-STOP front plate	**AS-Interface EMERGENCY-STOP pushbuttons** • Degree of protection IP65/IP67 • EMERGENCY-STOP directly on AS-Interface using integrated modules • Metal or plastic version Your advantage: Easy direct connection of service-proven operator controls to ASIsafe	3SF5	Ch. 9
Masters			
	The AS-Interface master creates the connection to higher-level control systems. It automatically organizes the data traffic on the AS-Interface cable and sees not only to querying the signals but also to performing the parameter setting, monitoring and diagnostics functions.		
 CP 343-2 P for SIMATIC S7-300	**Masters for SIMATIC** • Connection of up to 62 AS-Interface slaves • Integrated analog value transfer • Configuring and uploading of AS-Interface configuration in STEP 7 with S7-300 Master • No configuration required • Easy operation in the input/output address range • Monitoring of the supply voltage on the AS-Interface shaped cable Your advantage: Easy connection to SIMATIC S7-300, to SIMATIC S7-200 or to SIMATIC ET 200X	6GK7	2/17
 CP 243-2 for SIMATIC S7-200			
AS-Interface / Routers			
	As an alternative to the CPs which are plugged directly into the controller it is also possible to use a gateway/link as AS-Interface master – at any position beneath the PROFIBUS DP.		
 DP/AS-Interface Link 20E	**Routers** • Degree of protection IP20 • PROFIBUS slave and AS-Interface master • Connection of up to 62 AS-Interface slaves • No configuration of the CP for AS-Interface required • Integrated analog value transfer with LINK 20E • Configuring and uploading of AS-Interface configuration in STEP 7 with LINK 20E possible • User-friendly selection of AS-Interface slaves when using DP/AS-Interface Link 20E Your advantage: Optimum transition to PROFIBUS, integrated in STEP 7	6GK1	2/19

Introduction

		Order No.	Page
AS-Interface / Slaves			
	Slaves contain the AS-Interface electronics and connection options for sensors and actuators in the field and in the 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).		
 K45 digital module  K60 digital module	**Field modules / Digital I/O modules IP67 - K45 and K60** • Degree of protection IP65/IP67 • Modules available with degree of protection up to IP68/69K • ATEX-certified modules available for EX Zone 22 • Connection sockets in M8/M12 • Up to eight inputs and four outputs • A/B technology available • Contacting protected against polarity reversal • Standard rail mounting and wall mounting possible • Mounting of the module on the base plate using just one screw • Diagnostics LEDs Your advantage: Reduction of mounting and start-up times by up to 40 %	3RK1, 3RK2	2/22, 2/27
 K60 analog module	**Field modules / analog I/O modules IP67 - K60** • Degree of protection IP65/IP67 • Detects or transmits analog signals locally • 2/4-channel • Input modules for up to four sensors with current signal, sensors with voltage signal or sensors with thermal resistor • Output modules for current or voltage Your advantage: Easy integration of analog values	3RK1	2/30
 SlimLine  F90 module  Flat module	**Cabinet modules** • Degree of protection IP20 • No M12 connectors required for connection • Up to 16 inputs • Slim type of construction of the SlimLine modules with width from 22.5 mm • Removable, finger-safe terminal blocks that cannot be mixed up (SlimLine) • Flat type of construction of the flat modules for small control boxes and confined conditions • Connection with screw-type or spring-loaded terminals • Standard rail mounting and wall mounting possible • Diagnostics LEDs Your advantage: Modules enable use in cabinets and small local control boxes	3RG9, 3RK1	2/32
	**Modules with special functions / Counter modules** • Degree of protection IP20 • For evaluation of pulses • Connection with screw-type or spring-loaded terminals Your advantage: Evaluation of pulses which exceed even the clock frequency of AS-Interface	3RK1	2/38

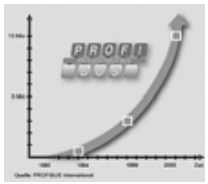
		Order No.	Page
	**Modules with special functions / Ground fault detection modules** • Degree of protection IP20 • Display using LEDs • Two signal outputs Your advantage: Automatic diagnostics of ground faults on AS-Interface	3RK1	2/39
	**Modules with special functions / Overvoltage protection modules** • Degree of protection IP67 • Discharge through ground cable with oil-proof outer sheath • Protection at transition of lightning protection zones Your advantage: The AS-Interface overvoltage protection module protects downstream AS-Interface devices or individual sections in AS-Interface networks from conducted overvoltages	3RK1	2/39
	**Motor starters / Compact starters (400 V AC)** • Degree of protection IP65/IP67 • Up to 5.5 kW at 400/500 V AC • Electromechanical or solid-state design • Optional with brake contact Your advantage: No local control boxes required thanks to completely factory-wired load feeder with degree of protection IP65	3RK1	Ch. 6
	**Motor starters / Motor starters (24 V DC)** • Degree of protection IP65/IP67 • Direct starters, double starters or reversing starters • Up to 70 W • Quick stop function Your advantage: Simple motor starter in service-proven module construction for 24 V DC motors	3RK1	Ch. 6
	**Motor starters / ECOFAST motor starters and soft starters** • Degree of protection IP65/IP67 • Standardized interfaces according to ECOFAST Specification (DESINA-conform) • Mechanical or solid-state soft switching function Your advantage: Less space required in the cabinet, the starters can be installed near the motor or be plugged on the motor	3RK1	Ch. 6
 Complete load feeder	**Motor starters / Load feeders** • Degree of protection IP20 • Available completely factory-wired or as individual components • Performance range up to max. 7.5 kW • Power bus in combination with busbar system (> 200 A) Your advantage: Completely assembled load feeders simplify applications with AS-Interface	3RK1	Ch. 6
 Pushbuttons	**Pushbuttons and indicator lights** • Modular construction according to individual requirements • Metal and plastic version • A/B technology • With LEDs or incandescent lamps Your advantage: Complete 3SB3 operating system with simple AS-Interface connection for your plant	3SB3	Ch. 9

Introduction

		Order No.	Page
	**Signaling columns** • Many optical and acoustic elements can be combined • 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 Your advantage: Signaling columns for monitoring production sequences and for visual or acoustic warnings in emergency situations, with easy AS-Interface connection	8WD4	Ch. 9
	**AS-Interface connection for LOGO!** • AS-Interface slave for the connection of LOGO! • Distributed controller functionality • Four inputs / four outputs (virtual) Your advantage: Intelligence can be used locally	3RK1	2/41
AS-Interface / Power Supply 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 power on one cable.		
 IP20, 3 A  IP20, 8 A	**Power supply units** *Power supply units with degree of protection IP20 or IP65:* • With wide performance spectrum from 2.4 to 8 A • Less space required thanks to compact dimensions • Easy and quick installation • Certified for global use *Power supply units with degree of protection IP20* • Integrated ground-fault and overload detection save the need for additional components and make applications reliable • Diagnostics memory, remote indication and remote reset allow fast detection of faults in the system • Removable terminal blocks reduce downtimes • The ultra-wide input range enables single- and two-phase applications (8 A variant) Your advantage: Optimum performance for each application.	3RX9	2/42
AS-Interface / Transmission Media			
	AS-Interface shaped cable for connection of network stations.		
	**AS-Interface shaped cables** • No polarity reversal thanks to trapezoidal shape • Cables made of optimized material for different working conditions • Special version according to UL Class 2 available Your advantage: Fast replacement and connection to AS-Interface by piercing method	3RX9	2/45

		Order No.	Page
AS-Interface / System Components and Accessories			
	Accessories comprise tools for mounting, installation and operation as well as individual components.		
 Repeater (6GK1 210-0SA00)  Extension plug	**Repeater/extender and extension plugs** • Extension of an AS-i segment to max. 200 m with an extension plug (without an additional power supply unit) • Expansion of one bus segment with an AS-i repeater • Maximum size increases (when combined) to max. 600 m Your advantage: Lower infrastructure costs, more possibilities of use and greater freedom for plant planning	3RK1, 6GK1	Repeater/extender: See Catalog IK PI "Industrial Communication for Automation and Drives" Extension plug: 2/46
	**Addressing units** • Addressing all stations of the AS-Interface network (standard and A/B slaves) • Reading out the I/O and ID codes of the slaves • Parameterization of the slaves (ID1 or analog parameters) • Measurement of AS-Interface voltage • Enables direct setting of outputs and reading in of a slave's inputs • Storage of complete plant configurations Your advantage: Easiest way to address and parameterize the slaves	3RK1	2/47
	**AS-Interface analyzers** • Diagnostics unit for completely checking the quality and function of an AS-Interface installation • Transmission of collected data through an RS232 interface to a PC, evaluation by software • Easy and user-friendly operation • Automatically generated test logs • Advanced trigger functions enable exact analysis • Process data can be monitored online • In addition to digital I/O data it is also possible to view analog values and safety slaves in data mode Your advantage: Preventative testing of an AS-Interface network is possible, recorded logs facilitate remote diagnostics	3RK1	2/48
 M12 sealing cap  Cable terminating piece	**Miscellaneous accessories** Individual components such as caps, cable adapters, distribution boards etc.	3RG7, 3RG9, 3RK1, 3RX9, 6ES7	2/51
ECOFAST System			
	• Modular construction • Flexible expansion • Graded range of motor starters and frequency converters • Diagnostics capability • Communication using standardized field bus systems • Standardized connection method • Power supply and distribution to the field device		2/53

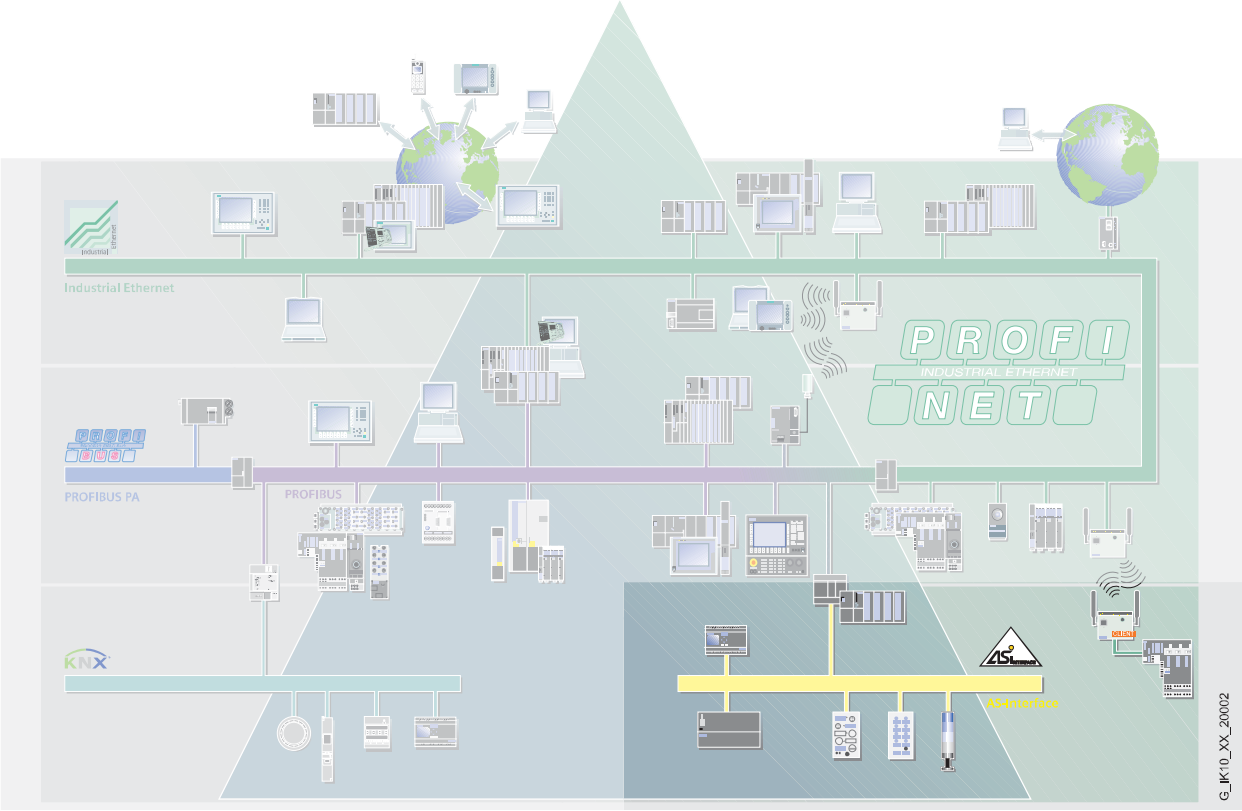
Introduction

	Order No.	Page
SIRIUS Safety Integrated		
 • Safe sensing • Safe instructing and reporting • Safe monitoring and evaluating • Starting and safe shutting down		2/56
PROFIBUS		
 • PROFIBUS is an efficient, open and robust bus system which guarantees smooth communication • The system is fully standardized, thus enabling standardized components from different manufacturers to be connected without problem • Configuring, commissioning and troubleshooting can be performed from any position; this means that the freely selectable communication relationships are very flexible, easy to implement and simple to change • Fast local assembly and commissioning using the FastConnect cabling system • Constant monitoring of the network components by means of a simple and effective signaling concept • High protection for your investment because existing systems can be expanded without repercussions • High availability thanks to ring redundance with OLM • Optimum connection of the actuator-sensor level by router to AS-Interface (DP/AS-Interface Link 20E)		2/60
SIRIUS Modular System		
 • Load feeders up to 250 kW / 400 V are easy to implement from standard devices • Modular design: Everything fits together and can be combined • Economical and flexible thanks to seven compact sizes • Optimum variety with uniform accessories • Space-saving design with small unit width and butt-mounting type of construction up to 60 °C • Fast commissioning, short setting-up times and simple wiring • Connection to AS-Interface and PROFIBUS DP possible • Extremely long life, low maintenance and reliable • Global approvals and certifications such as IEC, UL, CSA, CCC, shipbuilding • Permanently secure mounting, screw- or snap-connection • Spring-loaded terminals: Quick and secure connection, vibration-proof and maintenance-free • Short delivery periods thanks to world-wide logistics network • Environment-friendly production and materials, recycling capability, low power loss • Clear-cut, ergonomic design (winner of the iF Product Design Award)		2/70

Overview

Transmission method

A key feature of AS-Interface technology is the use of a shared two-wire 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 this purpose. The AS-Interface cable provided for the wiring is mechanically coded and hence protected against polarity reversal and can be easily contacted with piercing terminals.



Benefits

get Designed for Industry

Elaborately wired control cables in the controlgear cabinet and transposed 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.

AS-Interface is a single master system. For SIMATIC® systems there are communication processors (CPs) which control the process or field communication as masters.

With the system expansion it is now possible to operate twice as many slaves (max. 62) on the AS-Interface. Also, the analog values are now preprocessed in the master. The DP/AS-Interface Link 20E is available for the direct connection of AS-Interface to PROFIBUS DP. With this DP/AS-Interface link it is possible to use the AS-Interface as a sub-network for PROFIBUS DP.

AS-Interface is an open standard. 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.

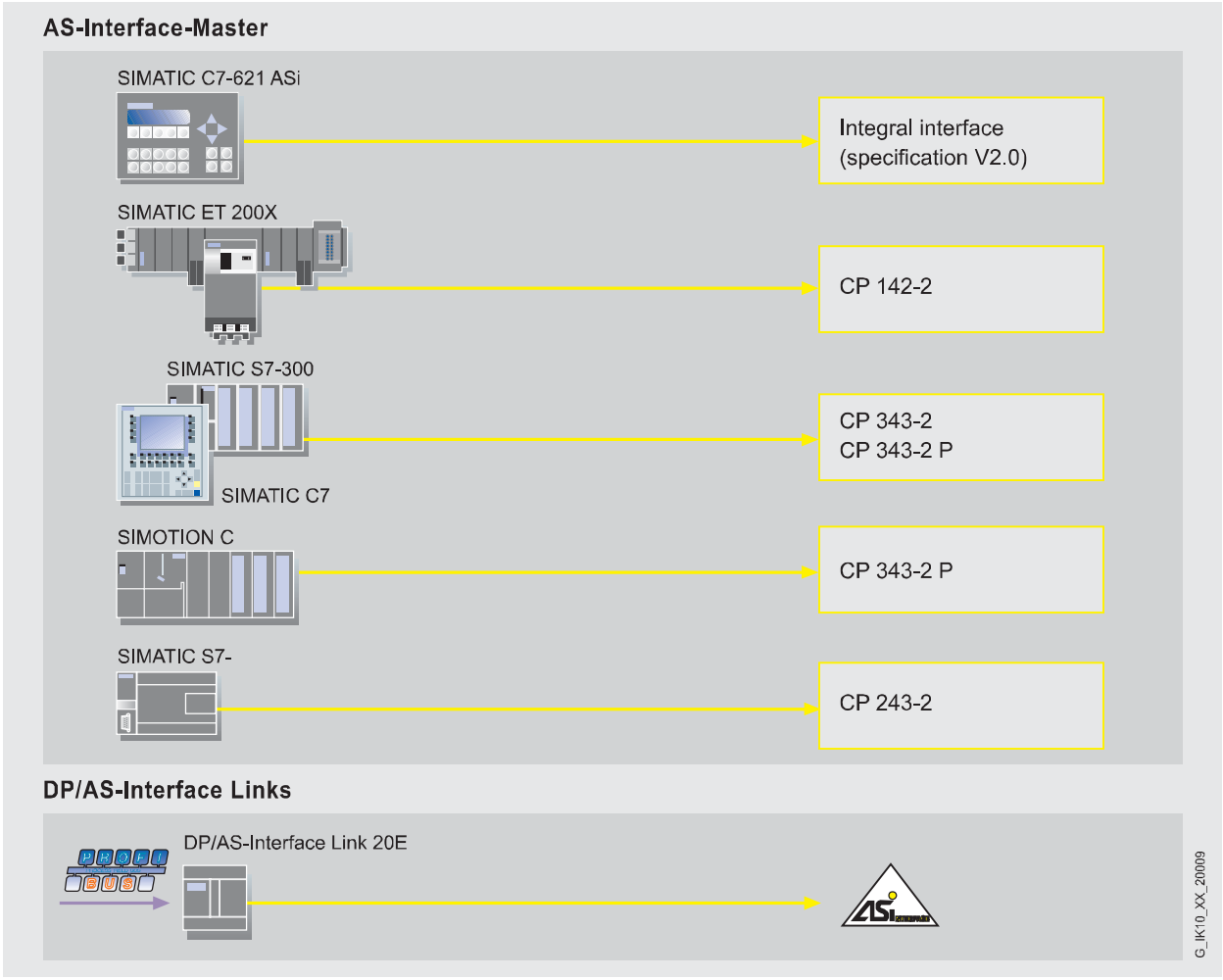
Communication overview

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/X distributed peripherals
- AS-Interface shaped cables
- Network components such as repeaters/extenders
- Power supplies for slaves, modules for connection of standard sensors/actuators
- Actuators and sensors with integrated slave ASIC
- Safe modules for transmitting safe data through AS-Interface
- Address programming units for setting the slave address



AS-Interface masters for SIMATIC

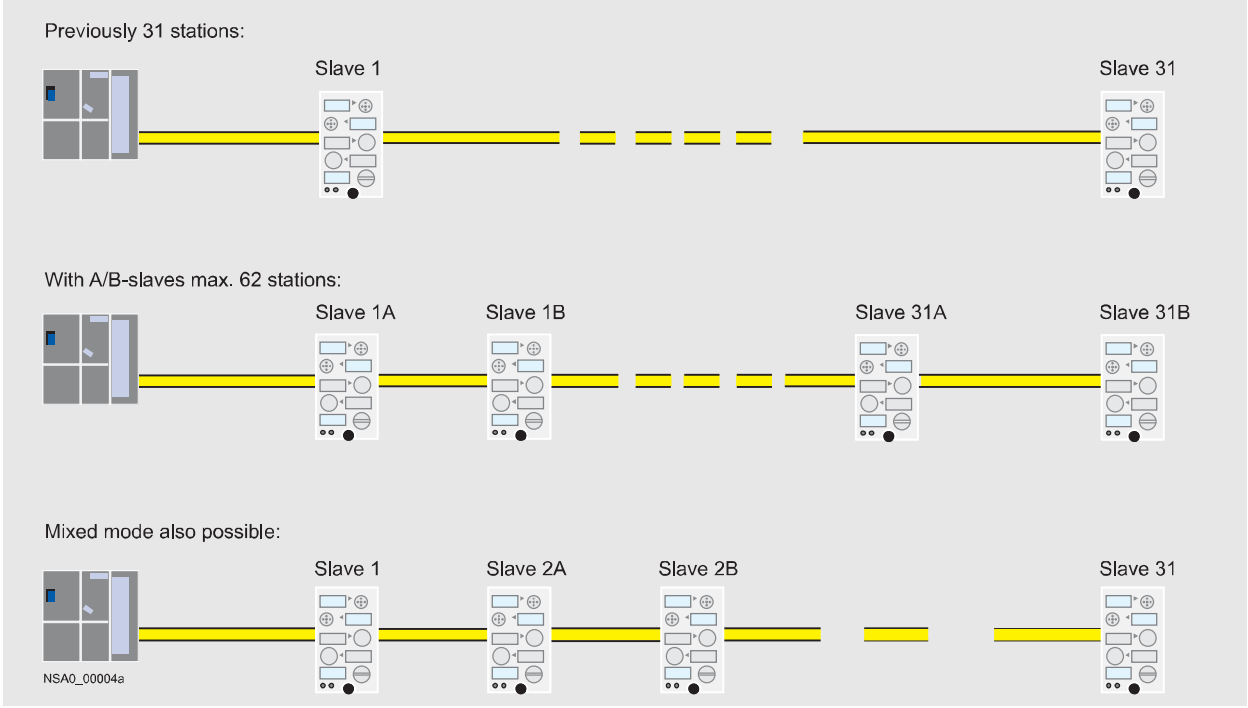
More information

For the SIMATIC NET products referred to above (order numbers 6GK..., 6XV1...) please also note the conditions of application, which can be consulted on the Internet site quoted below.

You can find more information on the Internet at:

http://www.siemens.com/simatic-net/ik-info

Overview



The concept behind A/B technology

AS-Interface Specification 2.1 enables the number of network stations to be doubled from 31 to 62: The 31 addresses which are possible in an AS-Interface network can be split into two subaddresses, e.g. 1A and 1B, which are independent of each other.

If this option is used for each of the 31 slaves, the maximum number of stations in an AS-Interface network is then 62.
The so-called A/B slaves can have a maximum of four inputs and three outputs.

Another function of the new AS-Interface Specification V2.1 is the integrated analog value transfer function. In this case "integrated" means that no special function blocks are required for accessing the analog values. It is just as easy to access the analog values as the digital values. The integrated analog value transfer function can be used with analog slaves which support the profiles 7.3 and 7.4.

	Slave type	Number of slaves	Number of inputs	Number of outputs
AS-Interface standard	Standard slave	Maximum 31	31 x 4 = 124	31 x 4 = 124
AS-Interface Version 2.1	A/B slave	Maximum 62	62 x 4 = 248	62 x 3 = 186

AS-Interface master

To be able to operate A/B slaves on an AS-Interface network you must also use master modules which work in accordance with Specification 2.1. A/B technology is supported by the masters of the SIMATIC S7 and the DP/AS-Interface links from Siemens. Only standard slaves and A slaves (= A/B slave with an A address) can be operated on masters which do not support Specification 2.1.

The subaddress of A/B slaves is set to "A" in the as-delivered state.

Masters and slaves which already work in accordance with the new specification are marked accordingly in the catalog.

Addressing of A/B slaves

A/B slaves can be addressed like standard slaves using all generally available AS-Interface addressing units which comply with the new Specification 2.1. AS-Interface addressing units which do not comply with the new Specification 2.1 can re-address A/B slaves only as A slaves.

An analog slave behaves like a standard slave with regard to its addressing. Up to 31 analog slaves can thus be operated in one AS-Interface segment. The same applies for all ASIsafe slaves.

Communication cycle

Standard slaves are queried in each cycle (max. cycle time: 5 ms). If only one A or B slave is installed at an address, this slave will be queried in each cycle (max. cycle time: 5 ms). If an A/B slave pair is installed at an address, the A slave will be queried in one cycle and the B slave in the next cycle (max. cycle time: 10 ms). If only standard and/or A slaves are installed in a network, the cycle time is identical to the standard masters (max. cycle time: 5 ms).

Whether an AS-Interface slave is a standard slave or an A/B slave is noted in the section *Selection and Ordering Data* in the column *Slave Type* and can be deduced from the section *Technical Specifications*, Catalog LV 1 T of the slave in question.

Benefits

- Reduction of master and power supply costs
- Improved decentralization in plants with numerous, widely spread signals
- Further expansion of existing AS-Interface systems is possible

Introduction

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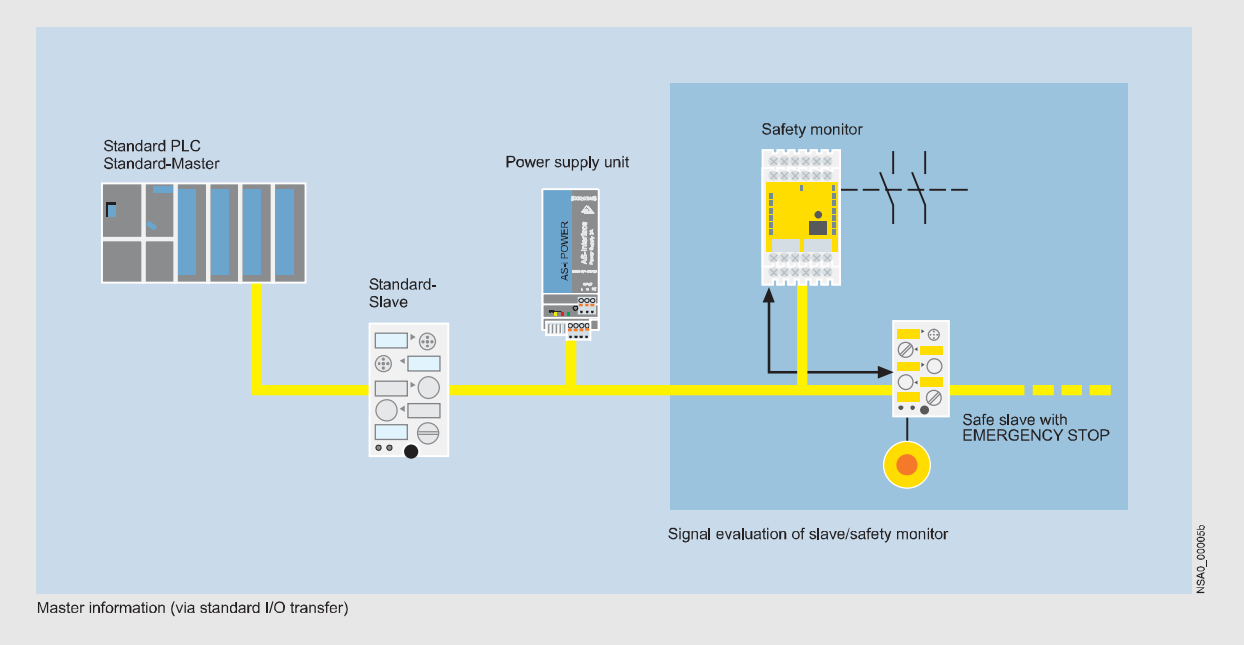
Overview



Safety is included

The ASIsafe concept supports the direct 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 suplies, repeaters, etc.) according to IEC 62061/EN 50295 and are operated in conjunction with them on the yellow AS-Interface cable.

The signals of the safety sensors are evaluated by a safety monitor which not only monitors the switching signals of the safety sensors but also continuously checks that the data transmission works correctly. The safety monitor has one or two enabling circuits which are configured with two channels and are used to switch the machine or plant to the safe state. Sensors and monitors can be connected to any points of the AS-Interface network. Also, several monitors can be used on one network.

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.

Tested safety

The system was tested and approved by TÜV (Germany), NRTL (USA) and INRS (France). The transmission method for safety-oriented signals is designed so that applications up to Category 4 according to EN 954-1 and SIL 3 according to IEC 61 508 can be realized.

Software

The safety-oriented applications can be compiled and transferred into the monitor using the configuration software. The software also enables online diagnostics.

Benefits

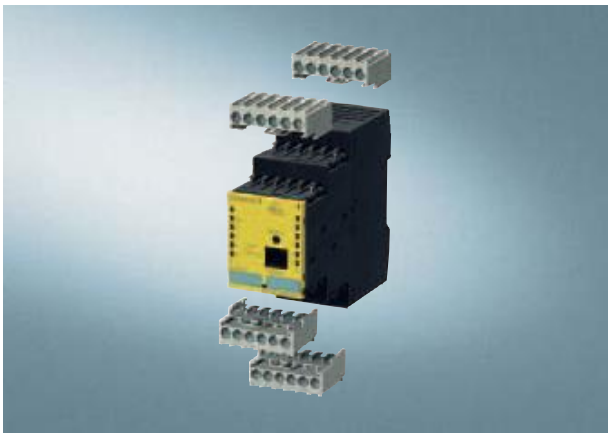
- No failsafe PLC or special master is required
- Simple system structure thanks to standardized AS-Interface technique
- Safety-related and standard data on the same bus
- Existing systems can be expanded quickly and easily
- Safe signals can be combined in groups
- Inclusion of the safety signals in the plant diagnostics
- Approved up to Category 4 according to EN 954-1 or SIL 3 according to IEC 61 508
- 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.

AS-Interface safety monitors

Overview



The safety monitor is the centerpiece of ASIsafe. A safe application is configured using a PC and the safety monitor. Various application-specific operating modes can be selected for this. They include, for example, an EMERGENCY-STOP function, 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 block for STEP7, which is included on the ASIsafe CD, the full diagnostics spectrum can be processed further in the higher-level PLC.

The monitor comes in two expansion levels:

- **Basic safety monitor** with starter set of blocks and basic functionality
- **Expanded safety monitor** with expanded features and functionality

Both expansion levels are available with one or two enabling circuits with two-channel configuration.

The safety monitor is used in an AS-Interface bus system to monitor protective devices, e.g. EMERGENCY-STOP switches. It is classified in Safety Category 4 according to EN 954-1.

According to IEC 61508 the safety monitor can be used in loops up to SIL3. The user must calculate the PFD value of the total loop.

ON period in months	Total operating time in years	PFD
3	10	$\leq 4 \times 10^{-5}$
6	10	$\leq 6 \times 10^{-5}$
9	10	$\leq 9 \times 10^{-5}$

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

Selection and ordering data

	Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RK1 105-1BE04-0CA0	**Basic safety monitors**							
	• One enabling circuit	A	**3RK1 105-1AE04-0CA0**		1	1 unit	121	0.336
	• Two enabling circuits	►	**3RK1 105-1BE04-0CA0**		1	1 unit	121	0.408
	Expanded safety monitors							
	• One enabling circuit	A	**3RK1105-1AE04-2CA0**		1	1 unit	121	0.336
	• Two enabling circuits	A	**3RK1105-1BE04-2CA0**		1	1 unit	121	0.408
	ASIsafe CD	►	**3RK1 802-2FB06-0GA0**		1	1 unit	121	0.212
	• Configurations software asimon V2							
	• Diagnostics package for STEP7 (FB102)							
 3RK1 901-5AA00	**Cable sets**	►	**3RK1 901-5AA00**		1	1 unit	121	0.054
	• PC configuration cable							
	• Transfer cable							
	Sealable covers	►	**3RP1 902**		1	5 units	101	0.004

* You can order this quantity or a multiple thereof.

Overview

Safe modules for AS-Interface (ASIsafe modules) are available in the following versions:

- *K45F compact safety modules for operation in the field*
  The K45F compact safety module is initially equipped with two "safe" inputs. For applications up to Category 2 according to EN 954-1 the two inputs can be assigned separately. If category 4 is required, a two-channel input is available on the module. *A new addition to the range is the K45F module, which has two standard outputs in addition to the two safety inputs.*
- *K60F compact safety modules for operation in the field*
  The K60F compact safety module similarly has two standard outputs in addition to two safety inputs (see K45F for categories); power is supplied from either the yellow AS-Interface cable or as auxiliary voltage from the black 24 V DC cable
- *S22.5F SlimLine safety modules for operation in controlgear cabinets and local control boxes*
  The S22.5F safe SlimLine module has two safety inputs. The safe linking of signals to ASIsafe networks in the 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. *New in the range 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.*

AS-Interface safety modules

2

Selection and ordering data

	Version		DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RK1 205-0BQ00-0AA3	**K45F compact safety modules**[1]								
	I/O type	U_{aux} 24 V							
	2 F-DI	--	▶	**3RK1 205-0BQ00-0AA3**		1	1 unit	121	0.103
	2 F-DI / 2 DO	✓		**3RK1 405-1BQ20-0AA3**					
 3RK1 901-2EA00	**K45 mounting plates**								
	• For wall mounting		▶	**3RK1 901-2EA00**		1	1 unit	121	0.027
	• For standard rail mounting		▶	**3RK1 901-2DA00**		1	1 unit	121	0.036
 3RK1 405-1BQ00-0AA3	**K60F compact safety modules**[1]								
	I/O type	U_{aux} 24 V							
	2 F-DI / 2 DO	--	▶	**3RK1 405-0BQ00-0AA3**		1	1 unit	121	0.207
		✓	▶	**3RK1 405-1BQ00-0AA3**		1	1 unit	121	0.208
 3RK1 205-0BE00-0AA2	**S22.5F SlimLine safety modules**								
	Connection	I/O type	U_{aux} 24 V						
	Screw	2 F-DI	--	▶	**3RK1 205-0BE00-0AA2**		1	1 unit	121	0.132
		2 F-DI / 2 DO	--	▶	**3RK1 405-0BE00-0AA2**		1	1 unit	121	0.180
		2 F-DI / 2 DO	✓	▶	**3RK1 405-1BE00-0AA2**		1	1 unit	121	0.180
	Spring-loaded connection	2 F-DI	--	B	**3RK1 205-0BG00-0AA2**		1	1 unit	121	0.102
		2 F-DI / 2 DO	--	B	**3RK1 405-0BG00-0AA2**		1	1 unit	121	0.170
		2 F-DI / 2 DO	✓	B	**3RK1 405-1BG00-0AA2**		1	1 unit	121	0.170
 3RK1 901-0CA00	**K60 mounting plates**								
	• For wall mounting		▶	**3RK1 901-0CA00**		1	1 unit	121	0.065
	• For standard rail mounting		▶	**3RK1 901-0CB01**		1	1 unit	121	0.095
 3RK1 901-1AA00	**Input bridges for K45/K60F**								
	• Black version		A	**3RK1 901-1AA00**		1	1 unit	121	0.012
	• Red version		D	**3RK1 901-1AA01**		1	1 unit	121	0.013
 3RK1 901-1KA01	**AS-Interface sealing caps M12, tamper-proof** for free M12 sockets		A	**3RK1 901-1KA01**		100	10 units	121	0.100

1) Modules are supplied without mounting plate.

* You can order this quantity or a multiple thereof.

Overview

The CP 243-2 is the AS-Interface master for the innovative SIMATIC S7-200 generation. This communication processor performs the following functions:

- Connection of up to 62 AS-Interface slaves and integrated analog value transmission (according to the extended AS-Interface Specification V2.1)
- Supports all AS-Interface master functions according to the extended AS-Interface Specification V2.1
- Status displays of operating states and indication of the functional readiness 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 innovative SIMATIC S7-200 generation

Benefits

get 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
- Shorter start-up times through simple configuration at the press of a button
- Reduction of downtimes 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 supply voltage

Application

The CP 243-2 is the AS-Interface master connection solely for the 22x CPUs of the innovative SIMATIC S7-200 generation. 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).

Furthermore, analog values (per CP a maximum of 31 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 communication processors can be operated simultaneously.

Selection and ordering data

Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
CP 243-2 communication processors for connection of SIMATIC S7-200 (2nd generation) to AS-Interface using a bus connector	A	**6GK7 243-2AX01-0XA0**		1	1 unit	541	0.204
Manuals for CP 243-2 including AS-Interface Basics and a floppy disk with sample programs Paper version							
• German	D	**6GK7 243-2AX00-8AA0**		1	1 unit	540	0.909
• English	D	**6GK7 243-2AX00-8BA0**		1	1 unit	540	0.891
• French	D	**6GK7 243-2AX00-8CA0**		1	1 unit	540	0.916
• Spanish	D	**6GK7 243-2AX00-8DA0**		1	1 unit	540	0.898
• Italian	D	**6GK7 243-2AX00-8EA0**		1	1 unit	540	0.895

* You can order this quantity or a multiple thereof.

CP 343-2 P

Overview

The CP 343-2 P is the AS-Interface master for the SIMATIC S7-300 programmable controller and the ET 200M distributed I/O station. The communication processor performs the following functions:

- Connection of up to 62 AS-Interface slaves and integrated analog value transmission (according to the extended AS-Interface Specification V2.1)
- Supports all AS-Interface master functions according to the extended AS-Interface Specification V2.1
- 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
- Supports the configuration of the AS-Interface-network with STEP 7 V5.2 and higher

Benefits

get Designed for Industry

- Provides diagnostics of the AS-Interface networks
- 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
- Reduction of downtimes 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 supply 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
- Well suited also for complex applications thanks to connection options for 62 slaves and integral analog value processing
- Improved plant documentation and support for service assignments thanks to documentation of the AS-Interface configuration in the STEP 7 project

Application

The CP 343-2 P is the AS-Interface master connection for the SIMATIC S7-300 and the ET 200M. By connection to AS-Interface it is possible to access max. 248 DI/186 DO per CP.

With the integrated analog value processing it is also possible to evaluate very simple analog signals (per CP on max. 31 analog slaves with four channels each).

CP 342-2 functionality was adopted unchanged for the CP 343-2 P. An old S7 user program can thus be used without restrictions with the new CP. In addition it is possible to download or upload the AS-Interface configuration with STEP 7 hardware configuration.

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

Selection and ordering data

	Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
	CP 343-2 P communication processors for connection of SIMATIC S7-300 and ET 200M to AS-Interface, without front connectors	A	**6GK7 343-2AH10-0XA0**		1	1 unit	541	0.262
	Front connectors 20-pole, with screw-type contacts	A	**6ES7 392-1AJ00-0AA0**		1	1 unit	230	0.069
	Manuals CP 343-2 and CP 343-2 P including software (FC) and examples Paper version							
	• German	D	**6GK7 343-2AH00-8AA0**		1	1 unit	540	0.839
	• English	D	**6GK7 343-2AH00-8BA0**		1	1 unit	540	0.832
	• French	B	**6GK7 343-2AH00-8CA0**		1	1 unit	540	0.813
	• Spanish	C	**6GK7 343-2AH00-8DA0**		1	1 unit	540	0.827
	• Italian	B	**6GK7 343-2AH00-8EA0**		1	1 unit	540	0.830
	Electronic manuals Communication systems, protocols, products On CD-ROM German/English	B	**6GK1 975-1AA00-3AA0**		1	1 unit	540	0.017

* You can order this quantity or a multiple thereof.

Overview

DP/AS-Interface Link 20E connects PROFIBUS DP to AS-Interface. It performs the following functions:

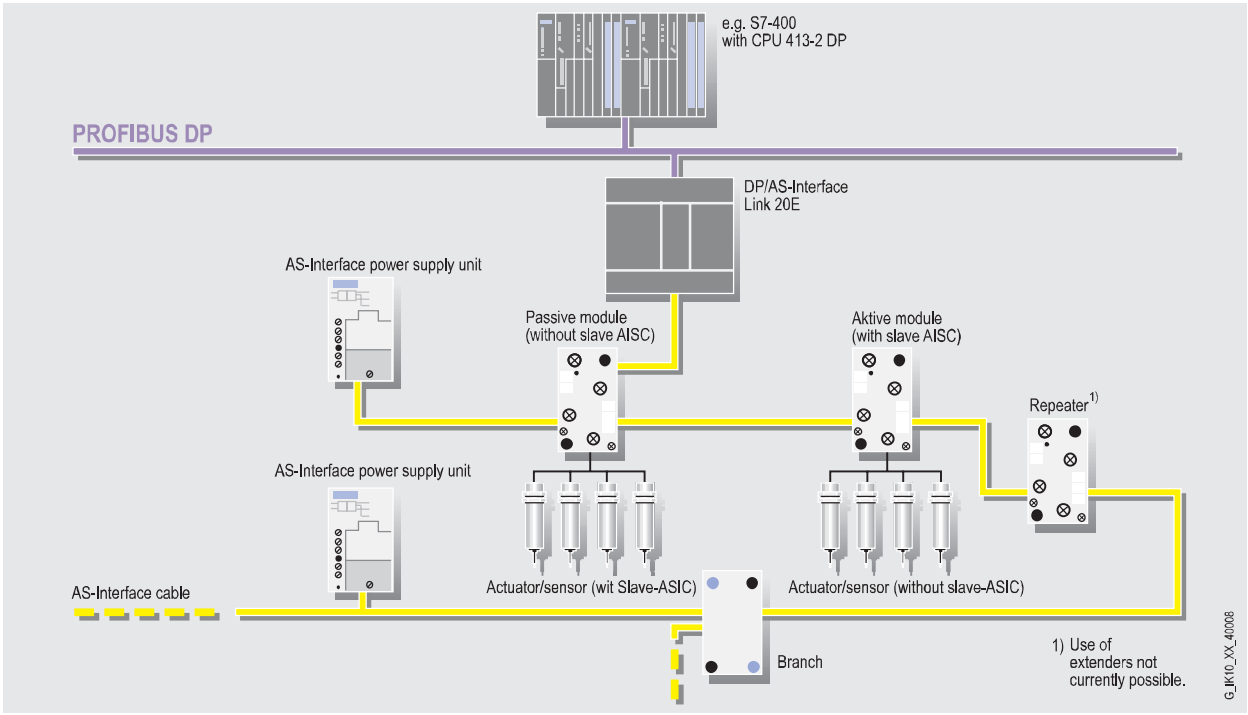
- PROFIBUS slave and AS-Interface master
- Connection of up to 62 AS-Interface slaves and integrated analog value transmission (according to the extended AS-Interface Specification V2.1)
- Supports all AS-Interface master functions according to the extended AS-Interface Specification V2.1, i.e. master class M3
- 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

Benefits

get Designed for Industry

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

- Short start-up times through simple configuration at the press of a button
- Reduction of downtimes 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 (ES03 and higher)



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

DP/AS-Interface Link 20E

Application

The DP/AS-Interface Link 20E is a PROFIBUS DP slave (according to EN 50 170) and an AS-Interface master (according to EN 50 295). It enables the AS-Interface to be operated on PROFIBUS DP.

Simple PROFIBUS masters can exchange I/O data with the AS-Interface in cyclic mode; masters with acyclic services can exchange I/O data and perform master calls. The DP/AS-Interface Link 20E cannot be used together with the extender.

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	A	**6GK1 415-2AA01**		1	1 unit	543	0.242
Manuals DP/AS-Interface Link 20E Paper version including type and GSD files							
• German	C	**6GK1 971-2DS01-0AA0**		1	1 unit	540	0.921
• English	C	**6GK1 971-2DS01-0AA1**		1	1 unit	540	0.864
• French	D	**6GK1 971-2DS01-0AA2**		1	1 unit	540	0.909
• Spanish	D	**6GK1 971-2DS01-0AA3**		1	1 unit	540	0.923
• Italian	D	**6GK1 971-2DS01-0AA4**		1	1 unit	540	0.912

* You can order this quantity or a multiple thereof.

Overview

K60

K45

The AS-Interface compact modules belong to a new generation of AS-Interface modules with a high degree of protection. There are digital and analog compact modules.

They are made up of a top part, the module, and a bottom part which is referred to as the mounting plate. The top part contains the entire electronics, connection options for sensors/actuators, an addressing socket and status/diagnostics LEDs.

The mounting plate is used to receive the AS-Interface flat cables and enables mounting on a wall or standard mounting rail.

Compact modules come in two series:

- Series K60
- Series K45

Selection and ordering data

Series	Type	Current carrying capacity of outputs	Slave type	Pin assignment	Connection technique	Order number
K60 (digital)	8 inputs / 2 outputs	2 A	A/B	Special	M12	3RK2 400-1HQ00-0AA3
	8 inputs	--	Standard	Y-II		3RK1 200-0DQ00-0AA3
			A/B			3RK2 200-0DQ00-0AA3
	4 inputs / 4 outputs	2 A	Standard			3RK1 400-1DQ00-0AA3
				Standard		3RK1 400-1CQ00-0AA3
		1 A		Y-II		3RK1 400-1DQ01-0AA3
				Standard		3RK1 400-1DQ03-0AA3
	4 inputs / 3 outputs	2 A	A/B	Y-II		3RK2 400-1FQ03-0AA3
	4 inputs / 2 outputs		Standard			3RK1 400-1MQ00-0AA3
	4 inputs	--				3RK1 200-0CQ00-0AA3
	2x2 inputs / 2x2 outputs	1 A		Y		3RK1 400-1DQ02-0AA3
	4 outputs	2 A		Y-II		3RK1 100-1CQ00-0AA3
K60 (digital) ATEX 3D X	4 inputs / 4 outputs	2 A	Standard	Y-II	M12	3RK1 400-1DQ05-0AA3
	4 inputs	--				3RK1 200-0CQ05-0AA3
K45 (digital)	4 inputs	--	Standard	Standard	M12	3RK1 200-0CQ20-0AA3
					M8 screw fitting	3RK1 200-0CT20-0AA3
					M8 snap fitting	3RK1 200-0CU20-0AA3
			A/B		M12	3RK2 200-0CQ20-0AA3
					M8 screw fitting	3RK2 200-0CT20-0AA3
					M8 snap fitting	3RK2 200-0CU20-0AA3
	2 x 2 inputs			Y	M12	3RK2 200-0CQ22-0AA3
	2 inputs / 2 outputs	2 A	Standard	Standard		3RK1 400-1BQ20-0AA3
	2 x (1 input / 1 output)	0.2 A		Y		3RK1 400-0GQ20-0AA3
	4 outputs	1 A		Standard		3RK1 100-1CQ20-0AA3
	3 outputs		A/B			3RK2 100-1EQ20-0AA3
	2 outputs / 2 inputs	2 A				3RK2 400-1BQ20-0AA3

Overview of functions and order numbers for digital compact modules

I/O modules for operation in the field
Digital I/O modules, IP67 - K60

Overview

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

AS-Interface modules from the K60 compact series are comprised of two parts:

- A mounting plate
- The compact module

The mounting plate receives the AS-Interface shaped cables and the compact module. Two versions are offered for:

- Wall mounting
- Standard rail mounting

AS-Interface modules from the compact series have a connection option for PE conductors. Addressing can also be performed in the installed state using an addressing socket integrated in the compact module.

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 connectors.

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 for use in hazardous areas (ATEX)

Two versions of the K60 modules are available for use 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 T75°C IP65X and the version with four inputs has the designation (Ex) II 3D T60°C IP65X.

Special conditions have to be observed for the safe operation of these devices. In particular the module must be protected by suitable measures from mechanical damage. Other conditions for safe operation see section *Technical Specifications*, Catalog LV 1 T.

Selection and ordering data

3RK1 400-1DQ00-0AA3

Digital I/O modules, IP67 - K60
- PNP transistor
- Current carrying capacity of the inputs: 200 mA
- Connection system: M12
- Modules supplied without mounting plate

Type	Current carrying capacity of outputs	Slave type	Pin assignment	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
8 inputs / 2 outputs	2 A	A/B	Special	A	**3RK2 400-1HQ00-0AA3**		1	1 unit	121	0.210
8 inputs	--	Standard	Y-II	►	**3RK1 200-0DQ00-0AA3**		1	1 unit	121	0.195
		A/B		►	**3RK2 200-0DQ00-0AA3**		1	1 unit	121	0.191
4 inputs / 4 outputs	2 A	Standard	Y-II	►	**3RK1 400-1DQ00-0AA3**		1	1 unit	121	0.209
			Standard	►	**3RK1 400-1CQ00-0AA3**		1	1 unit	121	0.209
	1 A		Y-II	►	**3RK1 400-1DQ01-0AA3**		1	1 unit	121	0.208
			Standard	►	**3RK1 400-1DQ03-0AA3**		1	1 unit	121	0.207
4 inputs / 3 outputs	2 A	A/B	Y-II	►	**3RK2 400-1FQ03-0AA3**		1	1 unit	121	0.212
4 inputs / 2 outputs		Standard		►	**3RK1 400-1MQ00-0AA3**		1	1 unit	121	0.206
4 inputs	--			►	**3RK1 200-0CQ00-0AA3**		1	1 unit	121	0.204
2x2 inputs / 2x2 outputs	1 A		Y	B	**3RK1 400-1DQ02-0AA3**		1	1 unit	121	0.205
4 outputs	2 A		Y-II	►	**3RK1 100-1CQ00-0AA3**		1	1 unit	121	0.204

Digital I/O modules, IP67 - K60
Version ATEX (Ex) II 3D IP65 X
- PNP transistor
- Current carrying capacity of the inputs: 200 mA
- Connection system: M12
- Modules supplied without mounting plate

Type	Current carrying capacity of outputs	Slave type	Pin assignment	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
4 inputs / 4 outputs	2 A	Standard	Y-II	C	**3RK1 400-1DQ05-0AA3**		1	1 unit	121	0.209
4 inputs	--			B	**3RK1 200-0CQ05-0AA3**		1	1 unit	121	0.204

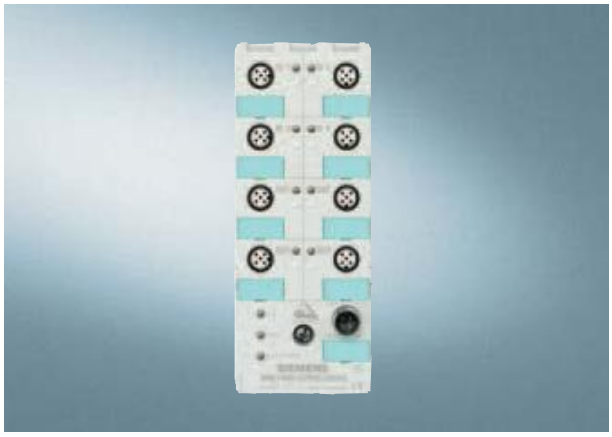
* You can order this quantity or a multiple thereof.

	Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Accessories								
 3RK1 901-0CA00	**K60 mounting plates** suitable for all K60 compact modules							
	• Wall mounting	►	**3RK1 901-0CA00**		1	1 unit	121	0.065
	• Standard rail mounting	►	**3RK1 901-0CB01**		1	1 unit	121	0.095
 3RK1 901-1KA00	**AS-Interface sealing caps M12** for free M12 sockets	►	**3RK1 901-1KA00**		100	10 units	121	0.100
 3RK1 901-1KA01	**AS-Interface sealing caps M12, tamper-proof** for free M12 sockets	A	**3RK1 901-1KA01**		100	10 units	121	0.100
 3RK1 901-1NN00	**Distribution boards**	►	**3RK1 901-1NN00**		1	1 unit	121	0.086
	• For AS-Interface flat cable							
	• Delivery includes special mounting plate for wall and standard rail mounting							
	• Seals (3RK1 902-0AR00) are required only if a cable is to be terminated in the distribution board and must be ordered separately							
 3RK1 902-0AR00	**Sealing sets**	B	**3RK1 902-0AR00**		100	5 sets	121	0.100
	• For mounting plate K60 and distribution board							
	• Cannot be used for mounting plate K45							
	• One set contains one straight and one shaped seal							

* You can order this quantity or a multiple thereof.

I/O modules for operation in the field
Digital I/O modules, IP68 / IP69K - K60R

Overview



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

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

IP68 protection permits many new applications, which were impossible with the former field modules with IP67 protection. In applications such as filling plants or machine-tools the K60R with IP68 protection 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. IP68 test conditions see section *Design / Tests IP68/IP69K*.

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.

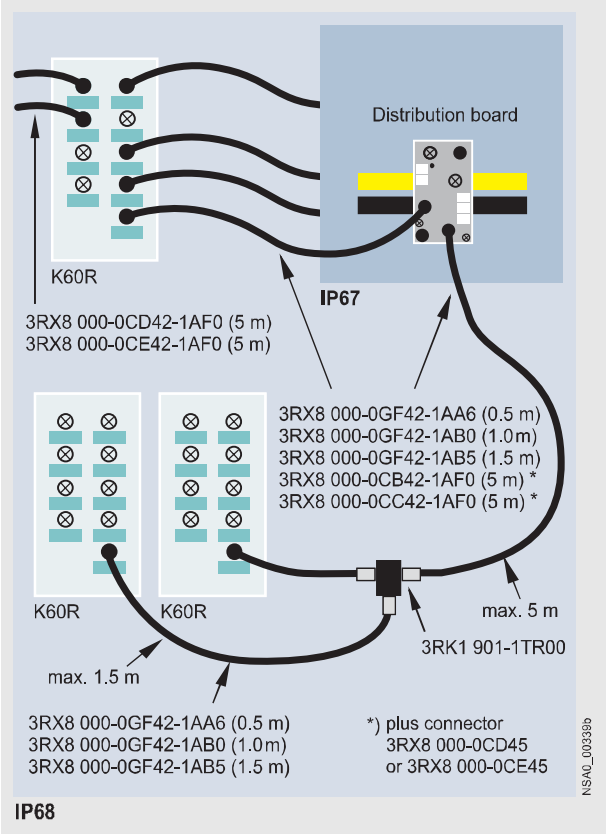
Mounting

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.

Addressing

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 line.

Connection



K60R connection options

In the IP67 environment the service-proven standard components are connected using flat cables. Spur lines are laid into the IP68 environment by means of a round cable distribution board (3RK1 901-1NR00). 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 power supply 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 connectors 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 distribution board 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 angle 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.

Please note the following boundary conditions: The configuration guidelines for AS-Interface generally apply. For all M12 connecting cables the maximum permissible current is limited to 4 A. The cross-section of these cables amounts to just 0.34 mm^2. For connection of the K60R modules the previously mentioned M12 connecting cables with a maximum length of 5 m 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. The maximum load of the round cable distribution board 3RK1 901-1NR00 amounts to 4 A in total for all four connections.

In applications with exclusively round cable wiring the AS-Interface bus cable and the 24 V DC auxiliary voltage can be routed together for up to 20 m when using a round cable of 4 x 1.5 mm^2. For greater cable lengths two separate cables with 2 x 1.5 mm^2 each are used. For these applications no round cable distribution board (3RK1 901-1NR00) is required. Distribution to the K60R modules is then performed with a terminal box and the previously mentioned M12 connecting cables.

Tests IP68/IP69K

K60R modules were tested with the following tests:

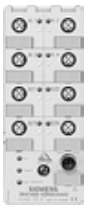
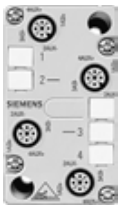
- Stricter test than IP67: 90 min at 1.8 m depth of water (IP67: 30 min at 1 m depth of water)
- Salt water test: Five months in salt water, 20 cm deep, at room temperature
- Test with particularly creepable oil: Five months completely under oil at room temperature
- Test with drilling emulsion: Five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

I/O modules for operation in the field
Digital I/O modules, IP68 / IP69K - K60R

Selection and ordering data

	Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RK1 400-1CR00-0AA3	**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	C	**3RK1 400-1CR00-0AA3**		1	1 unit	121	0.208
Accessories								
 3RK1 901-0CA00	**K60 mounting plates** suitable for all K60 and K60R compact modules							
	• Wall mounting	►	**3RK1 901-0CA00**		1	1 unit	121	0.065
	• Standard rail mounting	►	**3RK1 901-0CB01**		1	1 unit	121	0.095
 3RK1 901-1NR00	**Round cable distribution boards with IP67** • 4-fold AS-i/U_{aux} • Flat cable on 4 x M12 • Current carrying capacity: 4 A • Passive without LED • Supplied with coupling module	A	**3RK1 901-1NR00**		1	1 unit	121	0.186
 3RK1 901-1TR00	**M12-T distribution boards** • IP68 • 1 x M12 connector • 2 x M12 box	C	**3RK1 901-1TR00**		1	1 unit	121	0.038
 3RK1 901-3RA00	**M12 addressing cables** • For addressing K60R modules • Required only for addressing unit 3RK1 904-2AB00; if the latest version of the addressing unit 3RK1 904-2AB01 is used, the addressing is performed with a standard M12 cable 3RX8 000-0GF32-1AB5	C	**3RK1 901-3RA00**		1	1 unit	121	0.064

* You can order this quantity or a multiple thereof.

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 spectrum.

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 first mounting plate 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 second mounting plate comes with the hole pattern and the standard rail mounting of the user modules integrated.

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 4E module can be ordered optionally with M8 connection sockets.

Selection and ordering data

3RK1 400-0GQ20-0AA3

Digital I/O modules, IP67 – K45

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

Type	Current carrying capacity of outputs	Slave type	Pin assignment	Connections	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
4 inputs	--	Standard	Standard	M12	▶	**3RK1 200-0CQ20-0AA3**		1	1 unit	121	0.086
				M8 screw fitting	A	**3RK1 200-0CT20-0AA3**		1	1 unit	121	0.098
				M8 snap fitting	C	**3RK1 200-0CU20-0AA3**		1	1 unit	121	0.091
		A/B		M12	▶	**3RK2 200-0CQ20-0AA3**		1	1 unit	121	0.099
				M8 screw fitting	B	**3RK2 200-0CT20-0AA3**		1	1 unit	121	0.100
				M8 snap fitting	C	**3RK2 200-0CU20-0AA3**		1	1 unit	121	0.102
2 x 2 inputs	--	A/B	Y	M12	A	**3RK2 200-0CQ22-0AA3**		1	1 unit	121	0.100
2 inputs / 2 outputs	2 A[1)]	Standard	Standard		▶	**3RK1 400-1BQ20-0AA3**		1	1 unit	121	0.100
2 x (1 input / 1 output)	0.2 A		Y		A	**3RK1 400-0GQ20-0AA3**		1	1 unit	121	0.098
4 outputs	1 A		Standard		▶	**3RK1 100-1CQ20-0AA3**		1	1 unit	121	0.100
3 outputs		A/B			▶	**3RK2 100-1EQ20-0AA3**		1	1 unit	121	0.093
2 outputs / 2 inputs	2 A				A	**3RK2 400-1BQ20-0AA3**		1	1 unit	121	0.100

1) The typical current carrying capacity per output increases with version "E12" from 1.5 to 2 A (available since 07/2003).

*** You can order this quantity or a multiple thereof.**

I/O modules for operation in the field
Digital I/O modules, IP67 - K45

	Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Accessories								
 3RK1 901–2EA00	**K45 mounting plates** • For wall mounting	►	**3RK1 901–2EA00**		1	1 unit	121	0.027
	• For standard rail mounting	►	**3RK1 901–2DA00**		1	1 unit	121	0.036
 3RK1 901–1NN00	**Distribution boards** • For AS-Interface flat cable • Delivery includes special mounting plate for wall and standard rail mounting • Seals (3RK1 902-0AR00) are required only if a cable is to be terminated in the distribution board and must be ordered separately	►	**3RK1 901–1NN00**		1	1 unit	121	0.086
 3RK1 901–1KA00	**AS-Interface sealing caps** • For free M12 sockets	►	**3RK1 901–1KA00**		100	10 units	121	0.100
 3RK1 901–1PN00	• For free M8 sockets	A	**3RK1 901–1PN00**		100	10 units	121	0.100
 3RK1 901–1MN00	**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 902-0AR00	**Sealing sets** • For mounting plate K60 and distribution board • Cannot be used for mounting plate K45 • One set contains one straight and one shaped seal	B	**3RK1 902-0AR00**		100	5 sets	121	0.100

* You can order this quantity or a multiple thereof.

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.

You can find more information on the Internet at:

http://mall.ad.siemens.com

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

Conversion table for user modules --> K45

User modules		Corresponding K45 type	
Order No.	**Version**	**Order No.**	**Version**
3RG9 001-0AA00	4 inputs (100 mA)	3RK1 200-0CQ20-0AA3	4 inputs (200 mA)
3RG9 001-0AG00	4 inputs (200 mA)	3RK1 200-0CQ20-0AA3	4 inputs (200 mA)
3RG9 001-0AH00	2 x 2 inputs	3RK2 200-0CQ22-0AA3	2 x 2 inputs A/B slave
3RG9 001-0AC00	2 inputs / 2 outputs Outputs as relays	3RK1 400-1BQ20-0AA3	2 inputs / 2 outputs Outputs as solid-state
3RG9 001-0CC00	2 inputs / 2 outputs Outputs as solid-state	3RK1 400-1BQ20-0AA3	2 inputs / 2 outputs Outputs as solid-state
3RG9 001-0AM00	2 inputs / 2 outputs Outputs as solid-state U_{aux} using M12 connectors	3RK1 400-1BQ20-0AA3	2 inputs / 2 outputs Outputs as solid-state U_{aux} using black flat cable
3RG9 001-0AJ00	2 × (1 input / 1 output) I/O supply using AS-Interface cable	3RK1 400-0GQ20-0AA3	2 × (1 input / 1 output) I/O supply using AS-Interface cable
3RG9 001-0AB00	4 outputs Outputs as relays	3RK1 100-1CQ20-0AA3	4 outputs Outputs as solid-state
3RG9 001-0AL00	4 outputs U_{aux} using M12 connectors	3RK1 100-1CQ20-0AA3	4 outputs U_{aux} using black flat cable
3RG9 001-0CB00	4 outputs Outputs as solid-state	3RK1 100-1CQ20-0AA3	4 outputs Outputs as solid-state

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

I/O modules for operation in the field
Analog I/O modules, IP67 - K60

Overview

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.

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 are available with two or four input channels. It is in addition possible to convert the two-channel module to using only one input channel, thus enabling very short transmission times. The conversion is effected by means of a jumper plug at socket 3.

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

The input and output channels are electrically isolated 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
- Extremely fast transmission of analog values is possible by the new possibility of changing over to single-channel operation

Selection and ordering data

	Version			DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RK1 207-1BQ44-0AA3	**Analog I/O modules, IP67 - K60** • Slave type: Standard • Analog profile 7.3 • Modules supplied without mounting plate									
	Inputs	Type	Measuring range							
	1 or 2 inputs (selectable using jumper plug at socket 3)	Current	4 ... 20 mA or ± 20 mA (selectable)	►	**3RK1 207-1BQ40-0AA3**		1	1 unit	121	0.187
		Voltage	± 10 V, 1 ... 5 V	►	**3RK1 207-2BQ40-0AA3**		1	1 unit	121	0.188
		Thermal resistance	Pt 100 or Ni 100 or 0 ... 600 Ω (selectable)	►	**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, 1 ... 5 V	C	**3RK1 207-2BQ44-0AA3**		1	1 unit	121	0.190
		Thermal resistance	Pt 100 or Ni 100 or 0 ... 600 Ω (selectable)	A	**3RK1 207-3BQ44-0AA3**		1	1 unit	121	0.190
	Outputs	Type	Output range							
	2 outputs	Current for 2-wire actuators	4 ... 20 mA or ± 20 mA or 0 ... 20 mA (selectable)	►	**3RK1 107-1BQ40-0AA3**		1	1 unit	121	0.200
		Voltage for 2-wire actuators	± 10 V or 0 ... 10 V (selectable), 1 ... 5 V	►	**3RK1 107-2BQ40-0AA3**		1	1 unit	121	0.200
Accessories										
	Manual, German			A	**3RK1 701-2AB40-0AA0**		1	1 unit	192	0.254
 3RK1 901-0CA00	**K60 mounting plates**									
	• Wall mounting			►	**3RK1 901-0CA00**		1	1 unit	121	0.065
	• Standard rail mounting			►	**3RK1 901-0CB01**		1	1 unit	121	0.095
 3RK1 901-1KA00	**M12 sealing caps**			►	**3RK1 901-1KA00**		100	10 units	121	0.100
 3RK1 902-0AR00	**Sealing sets** • For mounting plate K60 and distribution board • Cannot be used for mounting plate K45 • One set contains one straight and one shaped seal			B	**3RK1 902-0AR00**		100	5 sets	121	0.100
 3RK1 901-1AA00	**Jumper plugs** for changing over the 2-channel input modules			A	**3RK1 901-1AA00**		1	1 unit	121	0.012

You can find more information on the Internet at:

http://mall.ad.siemens.com

Analog modules according to Profile 7.2 for replacement requirements can be ordered from this address.

The following basic types are still available and can be re-parameterized for all types according to Profile 7.2:

3RK1 207-1BQ00-0AA3, 3RK1 207-2BQ00-0AA3, 3RK1 207-3BQ00-0AA3, 3RK1 107-1BQ00-0AA3 and 3RK1 107-2BQ12-0AA3

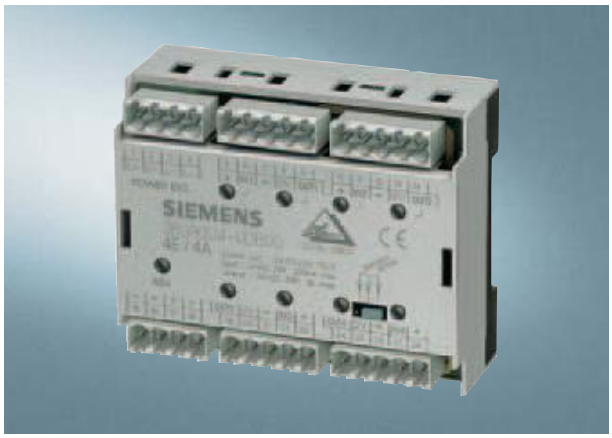
*** You can order this quantity or a multiple thereof.**

I/O modules for operation in the control cabinet, IP20, Introduction

Overview

SlimLine S22.5/S45

Flat module



F90 module

For AS-Interface applications inside 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 lower part.

Series	Spectrum	Mounting on 35 mm standard mounting rail according to DIN EN 50 022	Wall mounting using push-in lugs (Order No.: 3RP1 903)	Other possibilities
SlimLine S22.5	• 4I (standard and A/B modules) • 4O • 2I/2O (steady-state/relay outputs) • Counters[1)] • Ground fault detection module[1)]	✓	✓	--
SlimLine S45	• 4I/4O (steady-state/relay outputs) • 4I/4O with floating I/Os • 4I/3O (A/B modules)	✓	✓	--
F90 module	• 4I/4O (screw-type terminal connection) • 4I/4O (connection using Combicon connector) • 16I	✓	--	--
Flat module	• 4I/4O (screw-type terminal connection)	--	--	Integrated lugs for screw fixing

1) More information about these modules:
See Catalog LV 1 / chapter *Systems* / section *AS-Interface / Slaves / Modules with Special Functions*
See A&D Mall / section *Low-Voltage Controls / SIRIUS Industrial Controls / Systems / AS-Interface / Slaves / Modules with Special Functions*

Overview

SlimLine modules of the S22.5 and S45 series

The AS-Interface series of modules for the "SlimLine" 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 or 45 mm.

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

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

With an additional accessory, 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 construction type S22.5 with special functions. These include:

- Counter module
- Ground fault detection module

More information about these modules, see

- Catalog LV 1 / chapter *Systems* / section *AS-Interface / Slaves / Modules with Special Functions*
- A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Systems / AS-Interface / Slaves / Modules with Special Functions*

I/O modules for operation in the control cabinet, IP20, SlimLine

2

Selection and ordering data

3RK1 200-0CE00-0AA2

S22.5 SlimLine modules
Inputs: PNP transistor

Version					DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Type	Connection terminals	Slave type	Inputs	Outputs							
4 inputs	Screw	Standard	2-wire	--	▶	**3RK1 200-0CE00-0AA2**		1	1 unit	121	0.138
			2- and 3-wire		▶	**3RK1 200-0CE02-0AA2**		1	1 unit	121	0.141
		A/B slave	2- and 3-wire		▶	**3RK2 200-0CE02-0AA2**		1	1 unit	121	0.145
	Spring	Standard	2-wire	--	A	**3RK1 200-0CG00-0AA2**		1	1 unit	121	0.115
			2- and 3-wire		A	**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 transistor 2 A	▶	**3RK1 400-0BE00-0AA2**		1	1 unit	121	0.139
				Relays	▶	**3RK1 402-0BE00-0AA2**		1	1 unit	121	0.165
	Spring	Standard	2-wire	PNP transistor 2 A	B	**3RK1 400-0BG00-0AA2**		1	1 unit	121	0.112
				Relays	B	**3RK1 402-0BG00-0AA2**		1	1 unit	121	0.145
4 outputs	Screw	Standard	--	PNP transistor 1 A	▶	**3RK1 100-1CE00-0AA2**		1	1 unit	121	0.138
	Spring	Standard	--	PNP transistor 1 A	A	**3RK1 100-1CG00-0AA2**		1	1 unit	121	0.114

3RK1 400-1CE00-0AA2

S45 SlimLine modules
Inputs: PNP transistor

Type	Connection terminals	Slave type	Inputs	Outputs							
4 inputs / 4 outputs	Screw	Standard	2- and 3-wire	PNP transistor 1 A	▶	**3RK1 400-1CE00-0AA2**		1	1 unit	121	0.291
				PNP transistor 2 A	▶	**3RK1 400-1CE01-0AA2**		1	1 unit	121	0.289
			2- and 3-wire floating	PNP transistor 1 A floating	▶	**3RK1 402-3CE01-0AA2**		1	1 unit	121	0.287
			2- and 3-wire	Relays	▶	**3RK1 402-3CE00-0AA2**		1	1 unit	121	0.316
	Spring	Standard	2- and 3-wire	PNP transistor 1 A	A	**3RK1 400-1CG00-0AA2**		1	1 unit	121	0.243
				PNP transistor 2 A	B	**3RK1 400-1CG01-0AA2**		1	1 unit	121	0.241
			2- and 3-wire floating	PNP transistor 1 A floating	A	**3RK1 402-3CG01-0AA2**		1	1 unit	121	0.239
			2- and 3-wire	Relays	A	**3RK1 402-3CG00-0AA2**		1	1 unit	121	0.272
4 inputs / 3 outputs	Screw	A/B slave	2- and 3-wire	PNP transistor 2 A	▶	**3RK2 400-1FE00-0AA2**		1	1 unit	121	0.294
	Spring	A/B slave	2- and 3-wire	PNP transistor 2 A	A	**3RK2 400-1FG00-0AA2**		1	1 unit	121	0.247

Accessories

Sealable caps for securing against unauthorized addressing	▶	**3RP1 902**	1	5 units	101	0.004
Plug-in lugs for screw mounting	▶	**3RP1 903**	1	10 units	101	0.002
SlimLine opening tools • For all devices with spring-loaded terminal connections up to max. 1.5 mm^2 conductor cross-section • Partially insulated	A	**8WA2 807**	1	1 unit	041	0.023

* You can order this quantity or a multiple thereof.

I/O modules for operation in the control cabinet, IP20, F90 modules

Selection and ordering data

Version				DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RG9 002-0DB00	**F90 modules** Standard slave									
Type	Connection	Inputs	Outputs							
4 inputs / 4 outputs	Screw	2- and 3-wire PNP transistor	PNP transistor 1 A	A	**3RG9 002-0DB00**		1	1 unit	121	0.112
			PNP transistor 2A	A	**3RG9 002-0DA00**		1	1 unit	121	0.112
		2- and 3-wire PNP transistor floating		A	**3RG9 002-0DC00**		1	1 unit	121	0.111
	Combicon	2- and 3-wire PNP transistor	PNP transistor 1A	A	**3RG9 004-0DB00**		1	1 unit	121	0.090
			PNP transistor 2A	A	**3RG9 004-0DA00**		1	1 unit	121	0.090
		2- and 3-wire PNP transistor floating		A	**3RG9 004-0DC00**		1	1 unit	121	0.107
16 inputs	Screw	PNP transistor	--	A	**3RG9 002-0DE00**		1	1 unit	121	0.133
	Combicon			C	**3RG9 004-0DE00**		1	1 unit	121	0.086
Accessories										
Combicon plug sets ▶ • For 4I/4O modules with Combicon connection • One set comprises: - 4 x 5-pole plug for connection - Standard sensors/actuators - 2 x 4-pole plug for AS-Interface and external auxiliary voltage					**3RX9 810-0AA00**		1	1 unit	121	0.062

I/O modules for operation in the control cabinet, IP20, Flat modules

Selection and ordering data

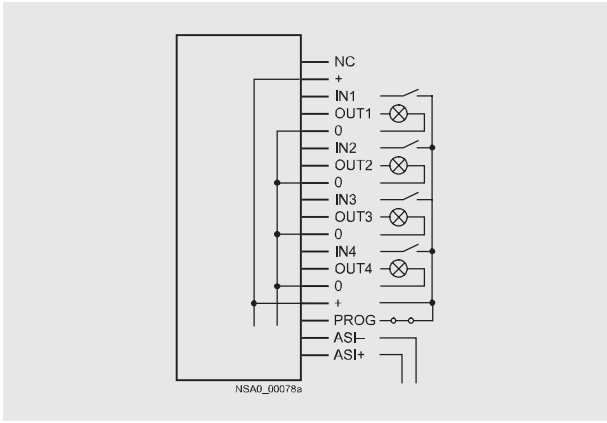
Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RK1 400-0CE00-0AA3							
Flat modules • 4 inputs / 4 outputs • 200 mA for all I/Os • Screw-type terminals	A	**3RK1 400-0CE00-0AA3**		1	1 unit	121	0.097

* You can order this quantity or a multiple thereof.

2

Overview

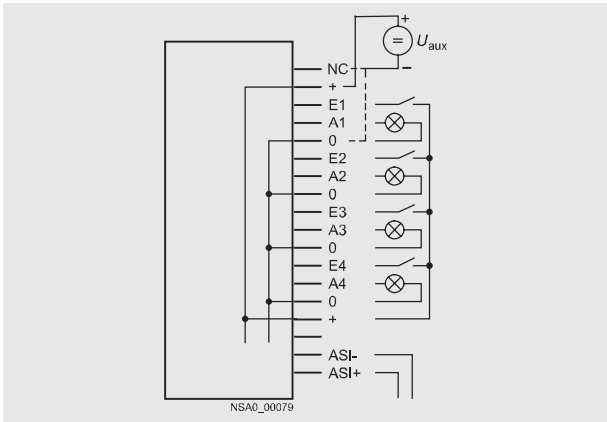
AS-Interface communications module for printed-circuit board installation 3RK1 400-0CD00-0AA3



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

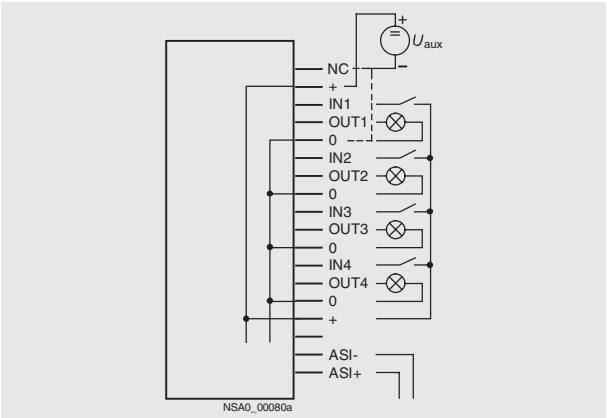
Note: If the switching outputs are overloaded, the module does not respond to invoking by a master.

AS-Interface communications module for printed-circuit board installation 3RK1 400-0CD01-0AA3



With the 4I/4O module for printed-circuit board mounting it is possible for up to four mechanical contacts to be queried or indicator lights to be operated, the necessary power 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.

AS-Interface communications module for printed-circuit board installation 3RG9 005-0SA00



With the 4I/4O module for printed-circuit board mounting it is possible for up to four mechanical contacts to be queried or indicator lights to be operated, the power for inputs and outputs being provided from an auxiliary voltage (24 V PELV). If (+) is connected to U_{Aux} + and (NC) to U_{Aux} -, the outputs are not short-circuit and overload 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.

AS-Interface communications module for printed-circuit board installation 3RK1 400-1CD00-0AA2

Connection	Connection pad[1)]
ASi+	27, 29
ASi-	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
OUT-	7, 8
Not assigned	11, 12, 25, 26

1) Note: Pad numbering, see section *Dimensional Drawings*, Catalog LV 1 T

With the 4I/4O module for printed-circuit board mounting it is possible for up to four mechanical contacts or 3-wire sensors according to IEC 947-5-2 to be connected or indicator lights to be operated, the power for the short-circuit resistant solid-state switching outputs being provided from an auxiliary voltage (24 V PELV).

Installation 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 number 530843-2
- 90° version for horizontal mounting (AMP): Order number 650118-1

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

AS-Interface communications module for printed-circuit board installation 3RK1 200-0CD00-0AA2

Connection	Connection pad[1)]
ASi+	27, 29
ASi-	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 section *Dimensional Drawings*

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

Installation 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 number 530843-2
- 90° version for horizontal mounting (AMP): Order number 650118-1

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

Selection and ordering data

	Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RK1 400-0CD00-0AA3	**4 inputs / 4 outputs**							
	• Supply of I/Os using AS-Interface cable (max. 200 mA) Printed-circuit board with solder pins, protected by enclosure	►	**3RK1 400-0CD00-0AA3**		1	1 unit	121	0.042
	• Supply of I/Os using external auxiliary voltage (24 V PELV)							
	- Printed-circuit board with solder pins, protected by enclosure	D	**3RK1 400-0CD01-0AA3**		1	1 unit	121	0.040
	- Printed-circuit board with solder pins for horizontal mounting	C	**3RG9 005-0SA00**		1	1 unit	121	0.025
 3RG9 005-0SA00	• Supply of outputs using external auxiliary voltage (24 V PELV) Printed-circuit board with gold-plated direct connector for 30-pole male connector socket for simple installation with direct connector	C	**3RK1 400-1CD00-0AA2**		1	1 unit	121	0.028
	4 inputs	C	**3RK1 200-0CD00-0AA2**		1	1 unit	121	0.025
	• Printed-circuit board with gold-plated direct connector for 30-pole male connector socket							
	• For simple installation with direct connector							

*** You can order this quantity or a multiple thereof.**

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.

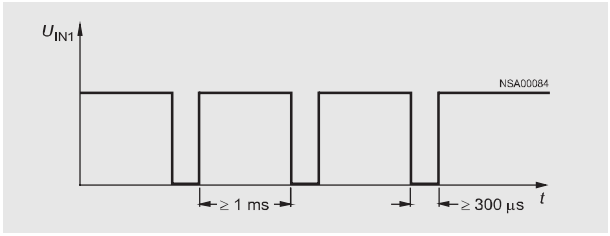
For the values sent to be unambiguous, no more than 15 count values are allowed between two host invocations or AS-Interface master invocations at terminal 8. The maximum permissible transmission frequency is calculated from these times:

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

T_{max} : maximum 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:

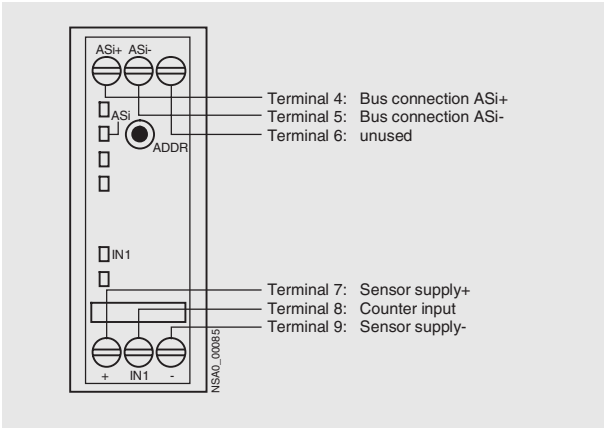
$f_{Cmax} = 1 / 1.3$ ms = 769 Hz for the counter module (see graph NSA00084).



If the time criterion stipulated in the graph NSA00084 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 modules							
• With screw-type terminal connection	A	**3RK1 200-0CE03-0AA2**		1	1 unit	121	0.104
• With spring-loaded terminal connection	B	**3RK1 200-0CG03-0AA2**		1	1 unit	121	0.091

3RK1 200-0CE03-0AA2

3RK1 200-0CG03-0AA2

* You can order this quantity or a multiple thereof.

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, Part 1 or DIN VDE 0113)".

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

The following ground faults are detected:

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

One module per AS-Interface network is required.

Selection and ordering data

Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Ground fault detection modules							
• With screw-type terminal connection	▶	**3RK1 408-8KE00-0AA2**		1	1 unit	121	0.142
• With spring-loaded terminal connection	▶	**3RK1 408-8KG00-0AA2**		1	1 unit	121	0.117

3RK1 408-8KE00-0AA2

Modules with special functions
Overvoltage protection modules

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 type of construction, 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 I_{sn}

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 accordance with a specific test program.

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

Protection level U_p

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

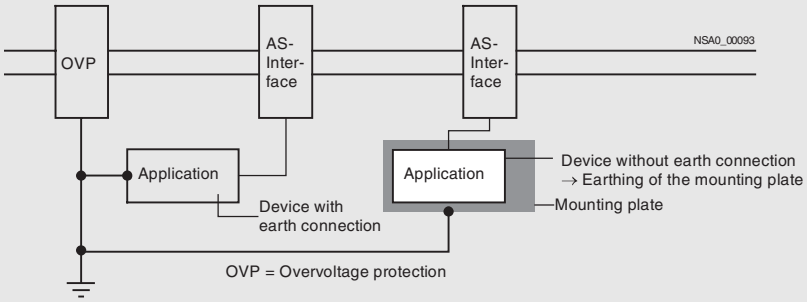
An FK-E or PG-E coupling module is required for connection of the AS-Interface cable and the auxliary power supply cable.

*** You can order this quantity or a multiple thereof.**

Modules with special functions
Overvoltage protection modules

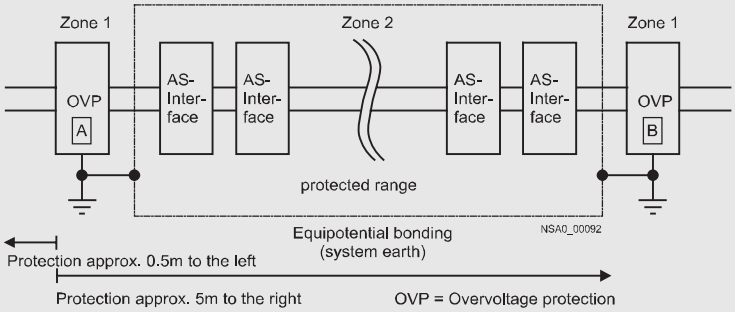
2

Configuration guidelines



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



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 modules**	B	**3RK1 901-1GA00**		1	1 unit	121	0.146

* You can order this quantity or a multiple thereof.

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 devices in the system according to their functionality. Similarly, functionalities can be quickly and easily adapted to new requirements by exchanging the basic device.

The interface module provides four inputs and four outputs on the system. These I/Os 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
 3RK1 400-0CE10-0AA2	**AS-Interface connections for LOGO!** • Four virtual inputs • Four virtual outputs	A	**3RK1 400-0CE10-0AA2**		1	1 unit	121	0.107

* You can order this quantity or a multiple thereof.

AS-Interface power supplies, IP65

Overview

AS-Interface power supplies are an essential and functionally important 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 supplies ensures the separation of data and energy, thus enabling AS-Interface to transmit data and power on a single line.

AS-Interface enables the direct connection of sensors and actuators in the field to the higher-level control system. This is made possible by the various I/O modules with a high degree of protection. To uphold this approach as far as possible there are AS-Interface masters and of course power supplies in IP65.

The spectrum of AS-Interface power supplies includes units with 24 V DC as well as 230 V AC input voltage.

Benefits

- Fewer cabinets and less construction space required in the field thanks to degree of protection IP65
- Simple expansion of AS-Interface downstream from repeaters in the field
- Robust devices with high degree of protection

Application

- For simple segment expansion of AS-Interface downstream from repeaters
- Cabinet-free construction

Selection and ordering data

Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
AS-Interface power supplies, IP65							
• Single output							
• Output current 2.4 A							
Rated input voltage in V							
AC 230	▶	**3RX9 311-0AA00**		1	1 unit	121	1.518
DC 24	A	**6EP1 632-1AL01**		1	1 unit	400	1.000

3RX9 311-0AA00

6EP1 632-1AL01

* You can order this quantity or a multiple thereof.

AS-Interface power supplies, IP20

Overview

AS-Interface power supplies are an essential and functionally important 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 supplies ensures the separation of data and energy, thus enabling AS-Interface to transmit data and power on a single line.

Benefits

- Compact dimensions save space in control cabinets or in the field
- Higher output rating enables connection of even more AS-Interface nodes
- Integrated ground-fault and overload detection ensure that applications are more reliable and save the need for additional components
- Diagnostics memory, remote indication and remote reset allow fast detection of faults in the system, thus reducing downtimes
- Fast and stable installation of devices thanks to spring-loaded connections
- Removable terminal blocks allow fast component replacement, thus reducing downtimes
- The ultra-wide input range of the 8 A version permits single-phase and 2-phase operation - so no need for connection of a neutral conductor
- UL/CSA approval means the power supply units can be used worldwide

Application

AS-Interface power supply units are always used in conjunction with AS-Interface networks.

Selection and ordering data

Version		DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
AS-Interface power supplies, IP20 • Single output IP20 • With integrated ground fault detection								
Output current	Input voltage							
3 A	115/230 V AC (selectable)	▶	**3RX9 501–0BA00**		1	1 unit	121	2.378
5 A	115/230 V AC (selectable)	▶	**3RX9 502–0BA00**		1	1 unit	121	2.378
8 A	115 / 230 ... 500 V AC (selectable)	▶	**3RX9 503–0BA00**		1	1 unit	121	2.378

3RX9 501–0BA00

3RX9 502–0BA00

3RX9 503–0BA00

Conversion table for previous devices:
See section *More Information*.

*** You can order this quantity or a multiple thereof.**

AS-Interface power supplies, IP20

More information

Conversion table

Previous type		New type		
Order No.	**Version**	**Number**	**Order No.**	**Version**
3RX9 307-0AA00	Single output IP20 2.4 A	1	3RX9 501-0BA00	Single output IP20 with ground fault detection 3 A
3RX9 310-0AA00	Single output IP20 with ground fault detection 2.4 A	1	3RX9 501-0BA00	Single output IP20 with ground fault detection 3 A
3RX9 307-1AA00	Single output IP20 4 A	1	3RX9 502-0BA00	Single output IP20 with ground fault detection 5 A
6EP1 354-1AL01	Single output IP20 7 A	1	3RX9 503-0BA00	Single output IP20 with ground fault detection 8 A
3RX9 305-1AA00	Dual output IP20 4 A / 4 A	2	3RX9 502-0BA00	Single output IP20 with ground fault detection 5 A
3RX9 306-1AA00	Combi output IP20 4 A (Asi) / 5 A (24 V)	1	3RX9 502-0BA00	Single output IP20 with ground fault detection 5 A
		1	6EP1 333-2AA01	SITOP 24 V IP20 5 A

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 technique was developed specially for AS-Interface.

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

Connection is effected by the insulation piercing method. In other words, contact pins pierce the 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 a standard round cable. With AS-Interface, data and power for the sensors (e.g. BERO proximity switches) 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.

Selection and ordering data

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
		1-km drum	B	**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
		1-km drum	B	**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
		1-km drum	B	**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
		1-km drum	B	**3RX9 024-0AA00**		1	1 unit	121	69.666
TPE special version according to UL Class 2	Yellow (AS-Interface)	100-m roll	C	**3RX9 017-0AA00**		1	1 unit	121	6.900
	Black (24 V DC)	100-m roll	C	**3RX9 027-0AA00**		1	1 unit	121	6.984
PUR[1)]	Yellow (AS-Interface)	100-m roll	▶	**3RX9 015-0AA00**		1	1 unit	121	6.131
		1-km drum	B	**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
		1-km drum	B	**3RX9 026-0AA00**		1	1 unit	121	200.000

1) Note on towability of the AS-Interface cable with PUR outer sheath: To determine its towability, the AS-Interface cable was tested in "IGUS tow chains" Type 10.2.048 and 20.2.55. For the test, the tow chain was fitted with 3 × AS-Interface cables and diverse round cables. After three million bendings (travel), no damage to the cores, strands or outer sheath were discovered (tow chain equipped to 50%).

*** You can order this quantity or a multiple thereof.**

2

Extension plug

Overview

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 / extension plug plus is a passive component which is connected to that point of the AS-Interface network that is furthest away from the power supply. It has an M12 connector 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.

The extension plug / extension plug plus has integrated undervoltage detection for monitoring the AS-Interface voltage in order to be sure that the necessary voltage still exists at the end of the bus cable. Undervoltage is signaled on the extension plug by means of a diagnostics LED. The extension plug plus is equipped with an AS-Interface slave and communicates this diagnostics information directly to the AS-Interface master.

Benefits

- Doubling of the cable length from 100 to 200 m per AS-Interface segment
- More possibilities of use and greater freedom for plant planning through doubling of the AS-Interface segment
- Notable reduction of network infrastructure costs for large networks
- Enables in combination with repeaters a maximum range of up to 600 m for AS-Interface networks (for details see section *Configuration*, in the Technical Information LV 1 T)
- Easy monitoring through integrated undervoltage detection

Selection and ordering data

	Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RK1 901-1MX00	**AS-Interface extension plugs**[1] • Doubling of the cable length to 200 m per AS-Interface segment • Undervoltage monitoring signal by means of diagnostics LED	►	**3RK1 901-1MX00**		1	1 unit	121	0.035
	AS-Interface extension plugs plus[1] • Doubling of the cable length to 200 m per AS-Interface segment • Undervoltage monitoring signal by means of integral AS-Interface slave to AS-Interface master	►	**3RK1 901-1MX01**		1	1 unit	121	0.035
	**Repeaters** Enables extension of cable by 100 m per repeater (max. 300 m)	B	**6GK1 210-0SA00**		1	1 unit	543	0.160
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

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

* You can order this quantity or a multiple thereof.

Overview

To be able to participate in data exchange with the master, all stations have to be addressed before the AS-Interface network is configured. 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 for the extended AS-Interface Specification 2.1). 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 as such is not yet included in the normal communication.

The address can be assigned at random, i.e. it makes no difference whatsoever if the slave with address 21 begins or if the first slave is actually issued with address 1.

Selection and ordering data

	Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RK1 904-2AB01	**AS-Interface addressing units** • For active AS-Interface modules, intelligent sensors and actuators • According to AS-Interface Version 2.1 • Including expanded addressing mode • Scope of delivery: - One addressing unit - One operating manual (German, English, French, Spanish, Italian) - One addressing cable (1.5 m, with jack plug)	▶	**3RK1 904-2AB01**		1	1 unit	121	0.540
Accessories								
	FK-E coupling modules, with integrated addressing socket[1] for addressing user modules	A	**3RK1 901-1MA00**		1	1 unit	121	0.057
	Addressing cables, with M12 socket[1] • For addressing[2] slaves with M12 connection (e.g. K60R) or light curtains • 1.5 m	A	**3RX8 000-0GF32-1AB5**		1	1 unit	574	0.069
	Addressing cables, with jack plug[3] • 1.5 m • Included in scope of supply of of the 3RK1 904-2AB01 addressing unit		**Z236A**					

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

2) Note: A 3-pole cable must be used because the addressing unit uses PIN 2, 4 and 5 for IR addressing.

3) Can be ordered only from the following address:
Gossen-Metrawatt GmbH, Thomas-Mann-Str. 16-20, 90471 Nürnberg, Germany
Tel.: +49 (0)911/8602-111, Fax: +49 (0)911/8602-777,
E-Mail: info@gmc-instruments.com

*** You can order this quantity or a multiple thereof.**

AS-Interface analyzers

2

Overview

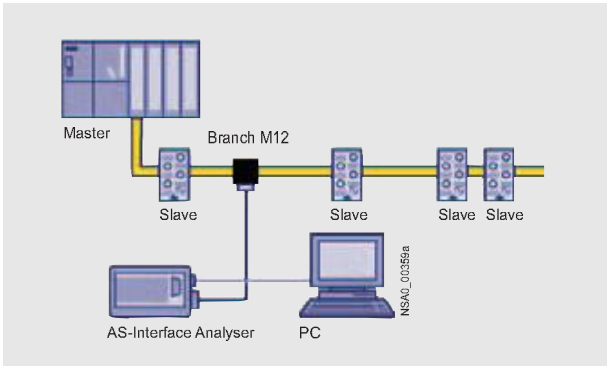
The AS-Interface analyzer is used to test AS-Interface networks. It enables systematic troubleshooting and permanent monitoring.

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.

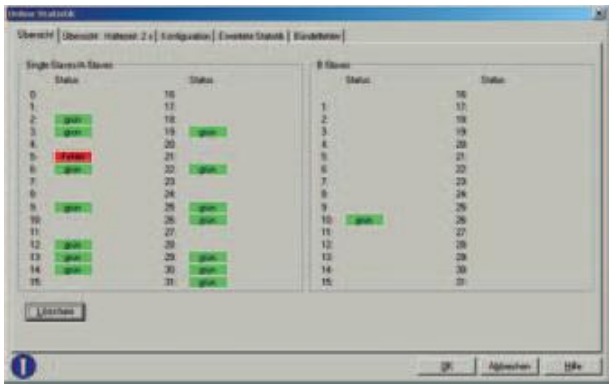
The data thus obtained are transferred through an RS232 interface to a PC such as a notebook, for evaluation with the supplied diagnostics software.

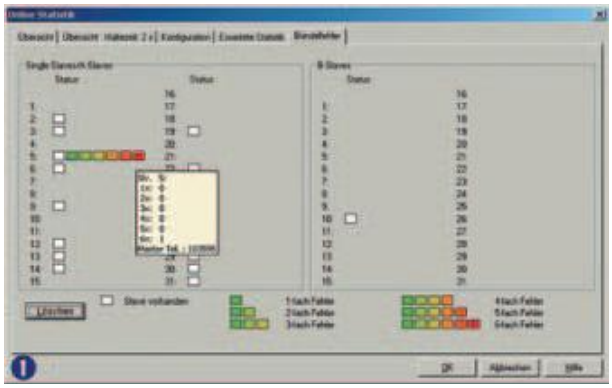
Benefits

- 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





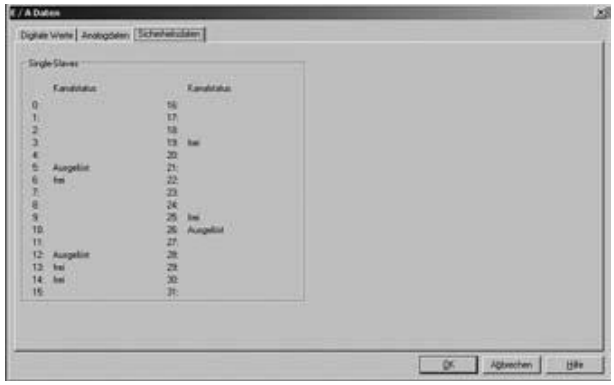
This mode provides a quick overview of the existing AS-Interface system. The error rates are presented per slave in a traffic-light function (green, yellow, red).

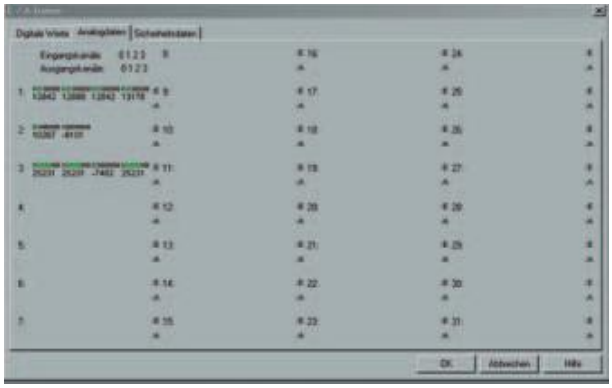
The bus configuration and the currently transmitted data of the slaves are shown in a well arranged presentation.

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.

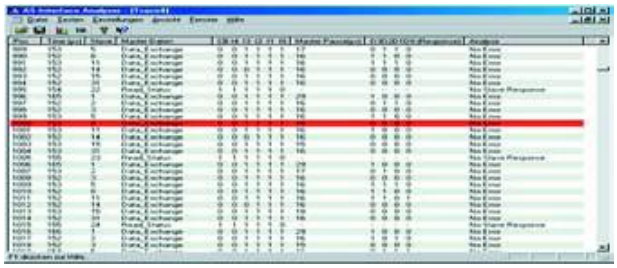
Data mode





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.

Trace mode



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.

AS-Interface analyzers

2

Selection and ordering data

	Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RK1 904-3AB01	**AS-Interface analyzers** • For testing actuator/sensor interface systems • For service assignments in installations and networks with AS-Interface systems • Scope of delivery: - AS-Interface analyzer - RS232 cable for connecting to PC - Diagnostics software (CD-ROM) for PC (Windows 95/98, ME, 2000, NT, XP)		**3RK1 904-3AB01**		1	1 unit	121	0.450
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 AS-Interface cable • M12 socket for connection of standard round cable • Degree of protection IP67	►	**3RX9 801-0AA00**		1	1 unit	121	0.029
	M12 cable plugs • Cable: PUR • Length: 5 m • Color: Black	A	**3RX8 000-0CD42-1AF0**		1	1 unit	574	0.176

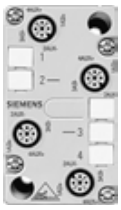
* You can order this quantity or a multiple thereof.

Selection and ordering data

	Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RX9 801-0AA00	**AS-Interface M12 feeders** • For adaptation of shaped AS-Interface cable to a standard round cable • Insulation piercing method for connection 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 901-1KA00	**AS-Interface sealing caps M12** for free M12 sockets	►	**3RK1 901-1KA00**		100	10 units	121	0.100
 3RK1 901-1KA01	**AS-Interface sealing caps M12, tamper-proof** for free M12 sockets	A	**3RK1 901-1KA01**		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
 3RX9 805-0AA00	**AS-Interface Pg 11 seals** • For AS-Interface cable, shaped • For insertion in Pg 11 glands	►	**3RX9 805-0AA00**		100	10 units	121	0.100
 3RX9 806-0AA00	**Cable adapters for flat cable/Pg** Connection of AS-Interface cable to Pg gland with insulation piercing method							
	• Continuation using standard cable							
	- For Pg 9 gland	►	**3RX9 808-0AA00**		1	1 unit	121	0.016
	- For Pg 11 gland	►	**3RX9 806-0AA00**		1	1 unit	121	0.016
	- For Pg 13.5 gland	►	**3RX9 807-0AA00**		1	1 unit	121	0.032
	• Continuation using pins							
	- For Pg 9 gland	C	**3RX9 818-0AA00**		1	1 unit	121	0.014
	- For Pg 11 gland	C	**3RX9 816-0AA00**		1	1 unit	121	0.016
	- For Pg 13.5 gland	B	**3RX9 817-0AA00**		1	1 unit	121	0.015
 3RK1 901-3QM00	**Cable adapters for flat cable** Connection of AS-Interface cable to metric gland with insulation piercing method							
	• Continuation using standard cable							
	- For M16 gland	B	**3RK1 901-3QM00**		1	1 unit	121	0.015
	- For M20 gland	B	**3RK1 901-3QM10**		1	1 unit	121	0.017
	• Continuation using pins							
	- For M16 gland	B	**3RK1 901-3QM01**		1	1 unit	121	0.015
	- For M20 gland	B	**3RK1 901-3QM11**		1	1 unit	121	0.015
 3RK1 901-3QA00	**Cable clips for cable adapter** suitable for PG cable adapter and metric version	►	**3RK1 901-3QA00**		100	10 units	121	0.100
 3RK1 901-1MN00	**Cable terminating pieces** for sealing of open cable ends (shaped AS-Interface cable) in IP67	►	**3RK1 901-1MN00**		1	10 units	121	0.085
 6ES7 194-1KA01-0XA0	**M12 Y-shaped coupler plugs** 5-pole, for connecting two sensors with a single cable	A	**6ES7 194-1KA01-0XA0**		1	1 unit	250	0.046

* You can order this quantity or a multiple thereof.

Miscellaneous accessories

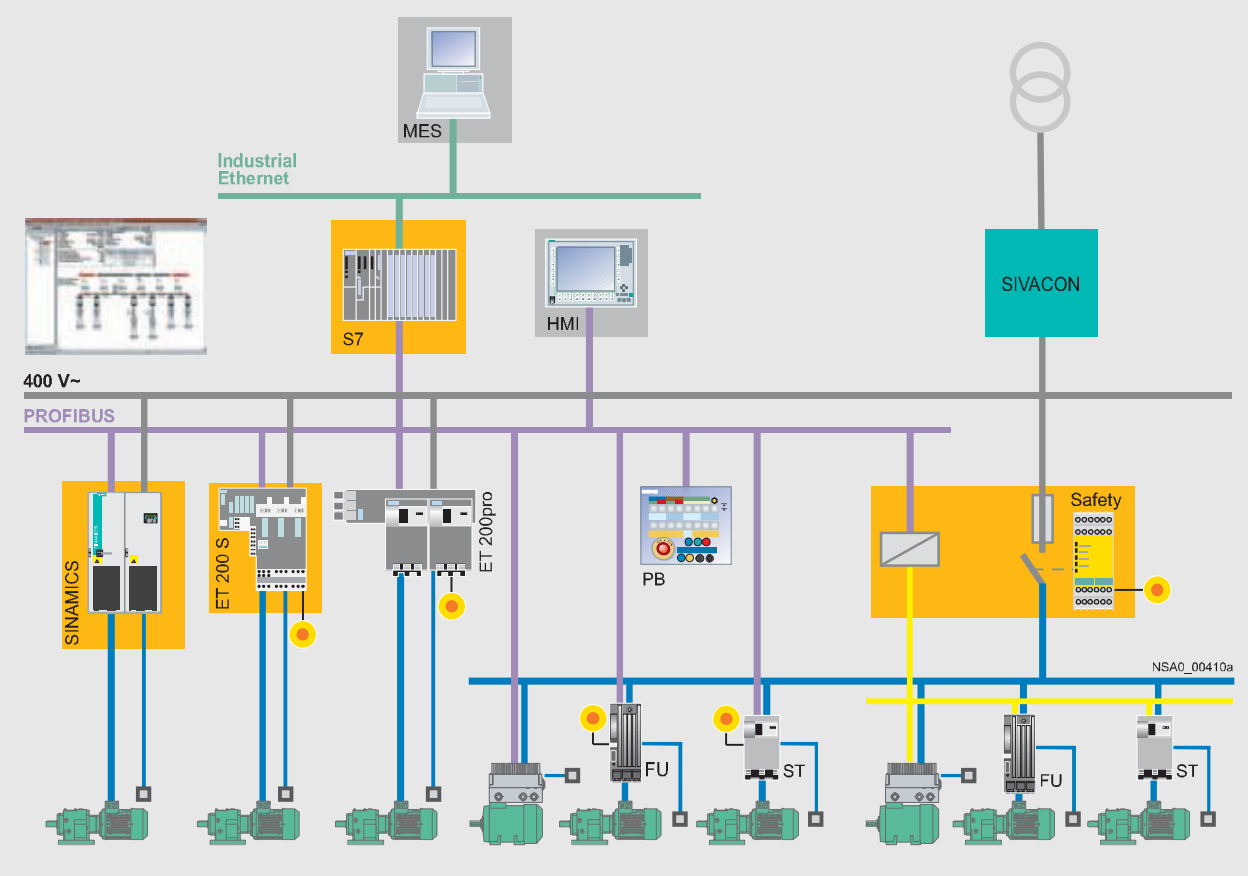
	Version	DT	Order No.	Price € per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
 3RG9 001-0AD00	**4-fold distribution boards** • 4-fold AS-Interface • Passive without LED	►	**3RG9 001–0AD00**		1	1 unit	121	0.088
 3RK1 901-1NR00	**Round cable distribution boards IP67** • 4-fold AS-i/U_{aux} • Flat cable on 4 x M12 • Current carrying capacity: 4 A • Passive without LED • Supplied with coupling module	A	**3RK1 901-1NR00**		1	1 unit	121	0.186
 3RK1 901-1NN00	**Distribution boards** • For AS-Interface flat cable Delivery includes special mounting plate for wall and standard rail mounting • Seals (3RK1 902-0AR00) are required only if a cable is to be terminated in the distribution board and must be ordered separately	►	**3RK1 901–1NN00**		1	1 unit	121	0.086
 3RG7 838-1DG	**M12 adapters** for AS-Interface and power supply	A	**3RG7 838-1DG**		1	1 unit	575	0.200

Other accessories:

- See Catalog FS 10 / chapter *Proximity Switches BERO / section Accessories / Plug Connectors*
- See A&D-Mall / section *Low-Voltage Controls / SIRIUS Industrial Controls / Sensors, Measurement and Testing Systems / Proximity Switches* BERO / *Accessories / Plug Connectors*

* You can order this quantity or a multiple thereof.

Overview



SIRIUS Drive Solutions is a system solution for the flexible and uniform distribution of drive technology in the field. It is centered on the extensive distribution and modularization of fusing, switching and control elements and safety systems, combined with comprehensive diagnostics down to the component level.

Modern field and power bus technologies open up new possibilities for machinery and plant construction. Systems of distributed design are flexible and can be adapted to the various requirements of industrial automation.

An extensive range of geared and near-motor sensors plus a large assortment of motor starters and frequency converters ensure optimum operation of the motors.

Motor starters and frequency converters are available in various versions. Compact drive trains with a high degree of protection (IP65) or modular island solutions with low or medium degree of protection (IP20 or IP65) can be implemented depending on the type of plant.

Communication with the higher control level takes place over standardized fieldbus systems (PROFIBUS/PROFINET, AS-Interface), which are used to exchange not only control information but also parameter and diagnostic data.

Full integration in TIA is realized with PROFIBUS/PROFINET.

Safety technology is also an integral component. On the device level as well as on a higher level with PROFIsafe, our concepts and matching products ensure the safe operation of your plant.

The SIVACON power bar distribution system and our ECOFAST power bus system see to the supply and distribution of power from the low-voltage transformer to the field device.

Benefits

- Modular construction
- Flexible expansion
- Graded range of motor starters and frequency converters
- Diagnostics capability
- Communication using standardized field bus systems
- Standardized connection method
- Power supply and distribution to the field device

System overview

Application

SIMATIC ET 200S: The flexible and modular system with degree of protection IP20

The SIMATIC ET 200S system for PROFIBUS DP and PROFINET offers a range of I/O modules (digital and analog), motor starters (mechanical and solid-state) and frequency converters. The SIMATIC ET 200S is suitable for central use in cabinets as well as for distributed use in local control boxes.

The advantages for the customer are:

- Creation of an optimum "package" of automation islands
- Customized implementation of random additional functions in the control box/cabinet

For the for ET 200S there is also an extensive range of safety-oriented components available for implementing both local and distributed solutions using PROFIsafe.

When installed in high-grade steel cases this solution is also suitable for use in the food and beverage sector.

SIMATIC ET 200pro: The flexible and modular system with degree of protection IP65

The SIMATIC ET 200pro is a modular I/O device with a high degree of protection for PROFIBUS DP and PROFINET. Several expansion modules can be connected to the respective basic module. The function-oriented construction of stations is possible using the technology-oriented modules.

Following items are available:

- Digital and analog I/O modules
- Motor starters in various versions
- Frequency converters (available soon)

For the ET 200pro there are also safety-oriented components available for local and distributed solutions with PROFIsafe.

ECOFAST: The system solution for cabinet-free automation

ECOFAST (Energy and Communication Field Installation System) is a system solution for distributed systems outside the control cabinet. It comprises a wide range of automation, drive and installation components with a high degree of protection. Power and information are thus distributed and transmitted in a line.

ECOFAST connects all the components of an automation system using a uniform, standardized connection method for data and power, complying with ISO 23570 specifications. This makes ECOFAST an integral component of Totally Integrated Automation and open for manufacturers and users alike.

The ECOFAST ES configuring tool supports:

- Configuration of the power bus (short-circuiting, selectivity, voltage drop)
- Validity checks of interfaces between the components selected and the documentation
- Documentation

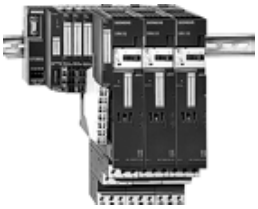
SIRIUS Safety Integrated

With SIRIUS Safety Integrated we offer the matching solution for your drive application. From the economical version with 3TK28 safety combination to the high-end solution with integrated safety technology using PROFIsafe, which can be used in conjunction with a safe control system. The graded safety concept provides maximum flexibility in all safety matters.

SIVACON

Busway systems bring the power flow economically on track. Distributed power distributions and a well arranged network topology make planning and implementation easier. Two-man assembly saves time and money compared to the costly cable installation method. A power distribution system must be adapted to actual requirements. The bar takes you quickly to your goal. Your plant can be rearranged without difficulty – cost-intensive downtimes are greatly minimized.

More information

	Product	For further information see
	**SIMATIC ET 200S**	• A&D Mall: section *Automation Systems / SIMATIC Industrial Automation Systems / Distributed Peripherals / ET 200S* • Catalog: IK PI chapter *SIMATIC ET 200 Distributed Peripherals* • Catalog: LV 1 chapter *Load Feeders, Motor Starters and Soft Starters*
	**SIMATIC ET 200pro**	• A&D Mall: section *Automation Systems / SIMATIC Industrial Automation Systems / Distributed Peripherals / ET 200pro* • Catalog: IK PI chapter *SIMATIC ET 200 Distributed Peripherals* • Catalog: LV 1 chapter *Load Feeders, Motor Starters and Soft Starters*
	**ECOFAST**	• A&D Mall: section *Low-Voltage Controls / SIRIUS Industrial Controls / Systems / ECOFAST System* • Catalog: IK PI chapter *ECOFAST System*
	**SIRIUS Safety Integrated**	• A&D Mall: section *Low-Voltage Controls / SIRIUS Industrial Controls / Systems / SIRIUS Safety Integrated*
	**SIVACON**	• A&D Mall: section *Low-Voltage Controls / Low-Voltage Power Distribution / SIVACON Power Distribution Boards, Busway and Cubicle Systems* • Catalog: LV 1 chapter *SIVACON Power Distribution Boards, Busway and Cubicle Systems*

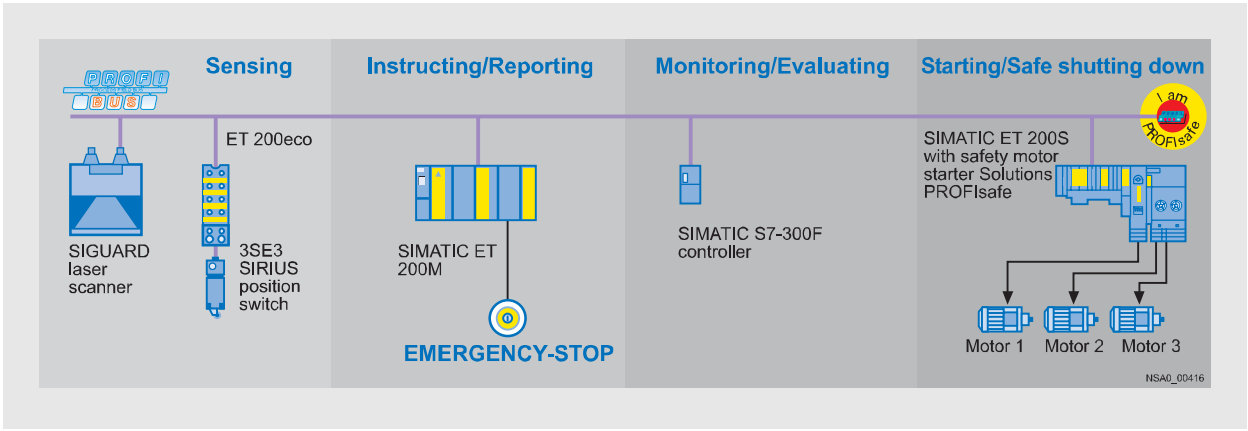
System overview

Overview

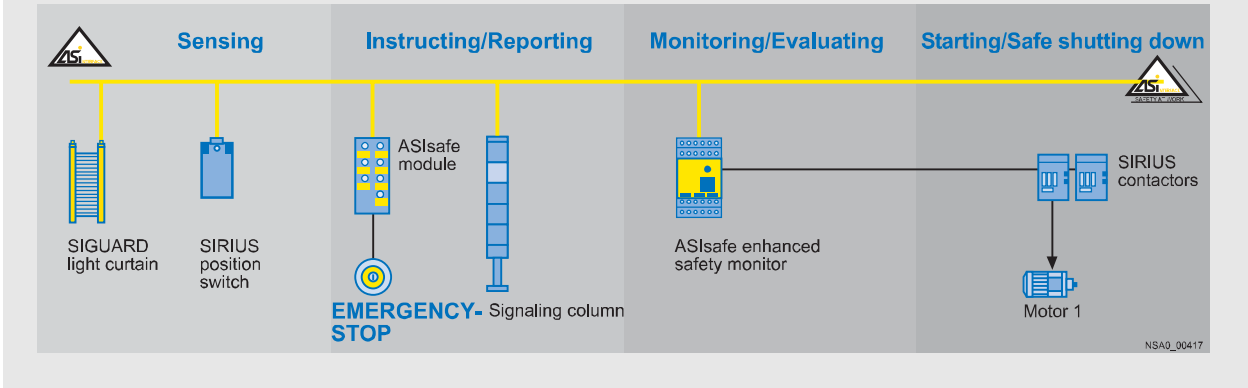
In spite of the steadily increasing complexity in industrial automation, many applications are restricted to specific areas. However simple the requirements may be, it is important to have a reliable partner for these cases too.

With our SIRIUS Safety Integrated controls we offer the optimum concept for your needs. Be it for failsafe sensing, instructing and reporting, monitoring and evaluating or starting and reliable shutting down - our safety integrated controls are expert at performing safety tasks in your plant. SIRIUS Safety Integrated combined with standard fieldbus systems such as AS-Interface and PROFIBUS can solve even networked safety tasks of greater complexity.

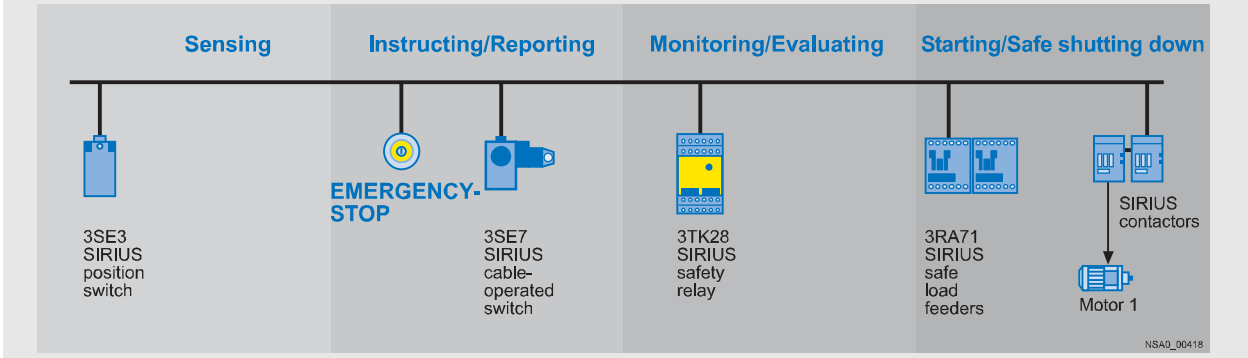
Integration in the the world of Totally Integrated Automation is thus assured.



PROFIsafe: Selective shutting down with PROFIsafe safety motor starters



ASIsafe: Fast start-up and easy configuring of the safety functions



Conventional safety systems: Simple and cost-effective safety solutions

Benefits

Integration of safety technology in standard automation means less work for you and greater cost effectiveness

Cost efficiency

- A single system for standard and safety automation reduces the diversity of equipment
- One bus and one engineering system for standard and safety technology cuts costs
- Simple reproduciblity for series machines by means of software solution

Productivity

- Shortening of downtimes through fast localization of faults plus comprehensive diagnostics functions
- Speedy restarts after essential plant modifications thanks to flexibility
- Safe, fault-tolerant systems also available for production without stoppages

Standardization

- Uniform operator interface for standard and safety technology
- Libraries increase re-usability
- Fewer control cabinet variants on machines
- Simpler installation technology in plants thanks to bus systems

Application

Safe sensing

For the sensing of signals you need devices which you can rely on: SIRIUS detecting devices. In practically every application these mechanical sensors detect movement sequences of all types and pass them on in the form of an electric signal, thus enabling machines or plants to be shut down immediately in the event of a fault. All mechanical position switches can be used for applications up to Cat. 4 according to EN 954-1 and have positively driven contacts according to IEC 60 947-5-1. Be it for the monitoring of protective devices or for the sensing of hazardous movements by machine parts - SIRIUS Safety Integrated detects to perfection every wrong movement even under the toughest conditions.

					
	Position switches without tumbler	**Position switches with tumbler**	**Hinge switches**	**Short-stroke switches**	**Magnet switches**
Description	for the mechanical monitoring of protective devices	for the mechanical monitoring of protective devices and protective door interlocks	for the mechanical monitoring of protective devices	for the mechanical monitoring of protective devices, for positional scanning of linear movements	for the non-contact monitoring of protective doors
Application	Protective door monitoring, position detection of moving machine parts	Protective door monitoring with tumbler	Protective door monitoring	Protective door monitoring	Protective door monitoring
Communication	with direct connection to ASIsafe	with direct connection to ASIsafe	--	--	--
More information	• A&D Mall: section *Low-Voltage Controls / SIRIUS Industrial Controls / Detecting Devices* • Catalog: LV 1 chapter *Detecting Devices*				

System overview

Safe instructing and reporting

When things become critical, you must be able to intervene quickly and easily in order to bring machines and plants to a safe standstill. For such moments we offer a complete range of reliable commanding and signaling devices. For example, Emergency-Stop commanding devices for the most diverse applications. Two-hand operation consoles for maximum safety on presses or punches. Effective cable-operated switches which can also be used as Emergency-Stop devices in particularly long and endangered areas. And last but not least signal lamps and integrated signal lamps. By the way: Many of our SIRIUS commanding and signaling devices can communicate through AS-Interface.

					
	EMERGENCY-STOP	**Cable-operated switches**	**Two-hand operation consoles**	**Foot switches**	**Signaling columns / Integrated signal lamps**
Description	EMERGENCY-STOP for the failsafe interruption of the safety circuit	Safe shutting down by means of a pull-cable, monitoring of particularly long, endangered areas	Manual, safe initiation of hazardous movements, directing of both hands to one position, simultaneous actuation < 0.5 s	Locking through actuation by foot	Acoustic and visual signaling devices
Application	EMERGENCY-STOP applications in the manufacturing industry	EMERGENCY-STOP applications in the manufacturing industry on long machines and plants	Safety for presses and punches	Safe actuation by foot outside the danger area	Status signaling on machines and plants
Communication	with direct connection to ASIsafe	with direct connection to ASIsafe	with direct connection to ASIsafe	--	AS-Interface connection using adapter element
More information	• A&D Mall: section *Low-Voltage Controls / SIRIUS Industrial Controls / Commanding and Signaling Devices* • Catalog: LV 1 chapter *Commanding and Signaling Devices*				

Safe monitoring and evaluating

For plants with safety requirements to run smoothly and with high availability they must be monitored. Our 3TK28 safety relays have been doing this, reliably and very cost-effectively, for many decades. The evaluation of safety-oriented data is performed by the centerpiece of ASIsafe: the ASIsafe safety monitor. Evaluation functions are performed likewise by the safety modules for ET 200S motor starters.

			
	3TK28 safety relays	**ASIsafe safety monitors**	**ET 200S safety modules**
Description	Solid-state safety relays with contacts	Centerpiece of the ASIsafe system, for monitoring and evaluating	Modules for the ET 200S safety motor starters, for monitoring and evaluating on presses and punches
Application	Monitoring of Emergency-Stop circuits, protective door monitors, non-contact protective devices, press controllers	Monitoring of Emergency-Stop circuits, protective door monitors, non-contact protective devices	Monitoring of Emergency-Stop circuits and protective door monitors
Communication	--	AS-Interface, gateway to PROFIBUS	PROFIBUS
More information	A&D Mall: - Section *Low-Voltage Controls / SIRIUS Industrial Controls / Load Feeders, Motor Starters and Soft Starters* - Section *Low-Voltage Controls / SIRIUS Industrial Controls / Monitoring and Control Devices* • Catalog: - LV 1 chapter *Load Feeders, Motor Starters and Soft Starters* - LV 1 chapter *Monitoring and Control Devices*		

Starting and safe shutting down

The new failsafe motor starters of the SIMATIC ET 200S provide failsafe stopping and shut-down for safety-oriented applications which are realized at controller level. They can be used as island solutions directly in the field, for example, or for selective shut-down in PROFIsafe applications. The safe load feeder unites the functions of a motor starter and a safety relay and is responsible for safe shutting down. It thus provides double protection: From overloading and short-circuiting of the motor and from placing operators in danger.

	Safety motor starters Solutions local	**Safety motor starters Solutions PROFIsafe**	**Safe load feeders**
Description	Motor starters for starting and safe shutting down with conventional controls	Motor starters for starting and safe shutting down with high safety through integrated self monitoring	Combination of circuit-breaker and two series-connected contactors
Application	All safety applications in the manufacturing industry	All safety applications in the manufacturing industry	All safety applications in the manufacturing industry
Communication	PROFIBUS DP and PROFIsafe	PROFIBUS DP and PROFIsafe	--
More information	• A&D Mall: - Section *Low-Voltage Controls / SIRIUS Industrial Controls / Load Feeders, Motor Starters and Soft Starters* - Section *Low-Voltage Controls / SIRIUS Industrial Controls / Monitoring and Control Devices* • Catalog: - LV 1 chapter *Load Feeders, Motor Starters and Soft Starters* - LV 1 chapter *Monitoring and Control Devices*		

More information

You can find more information on the Internet at:

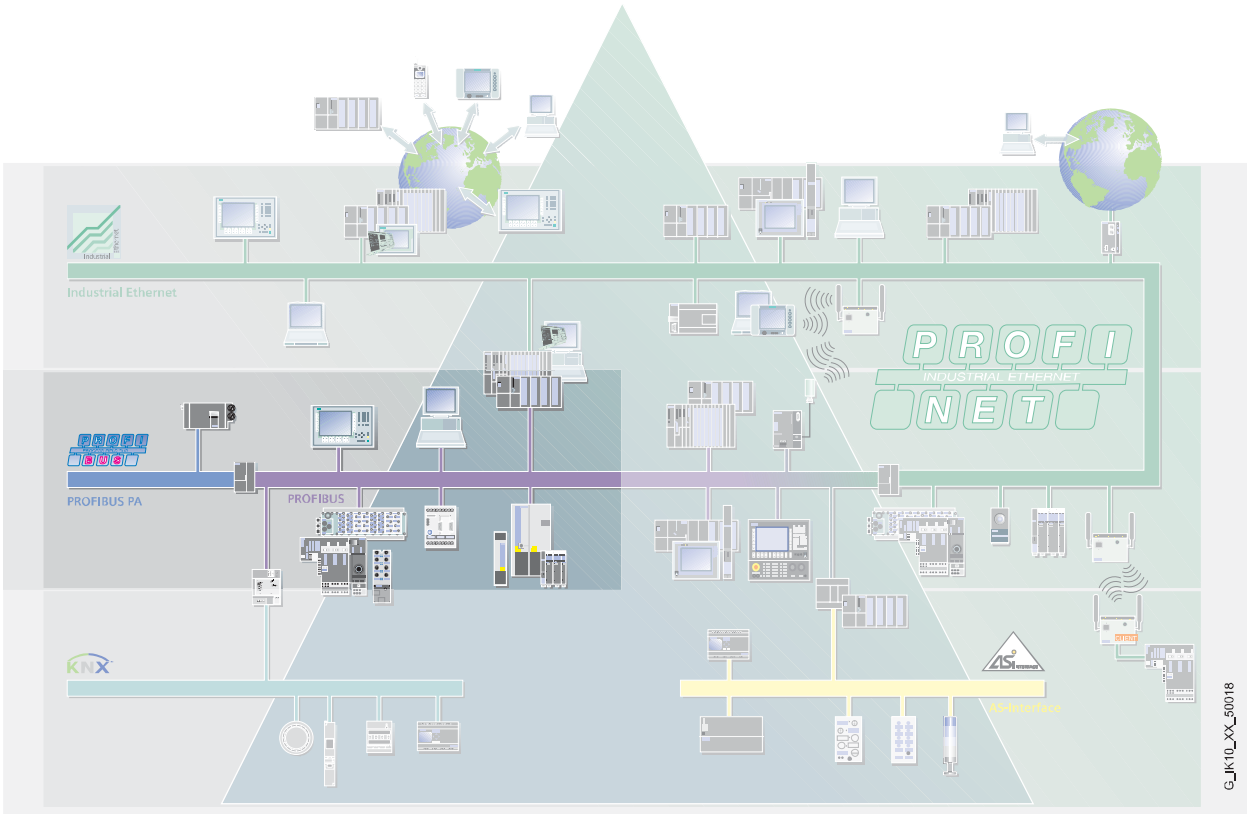
http://www.siemens.com/safety

2

Introduction

Overview

- Bus system
  - For process and field communication in cell networks with few stations and with field devices
  - For data communication according to IEC 61 158/EN 50 170
- Provides openness for connecting standard-conform components from different manufacturers
  - PROFIBUS – the fieldbus standard in production and process automation comprises:
  - Defining of standards for physical bus characteristics and access control
  - Defining of the user protocol and the user interface
- Process or field communication
  - PROFIBUS DP for fast, cyclic data transfer with field devices
  - PROFIBUS PA for applications in process automation and in the inherently safe area
- Data communication
  - PROFIBUS FMS for data communication between automation devices from different manufacturers



PROFIBUS within the automation pyramid

Benefits

get Designed for Industry

- PROFIBUS is an efficient, open and robust bus system which guarantees smooth communication.
- The system is fully standardized, thus enabling standard-conform components from different manufacturers to be connected without problem.
- Configuring, commissioning and troubleshooting can be performed from any position. This means that the freely selectable communication relationships are very flexible, easy to implement and simple to change
- Fast local assembly and commissioning using the FastConnect cabling system.
- Constant monitoring of the network components by means of a simple and effective signaling concept.
- High protection for your investment because existing systems can be expanded without repercussions.
- High availability thanks to ring redundance with OLM.

Overview

Communication functions

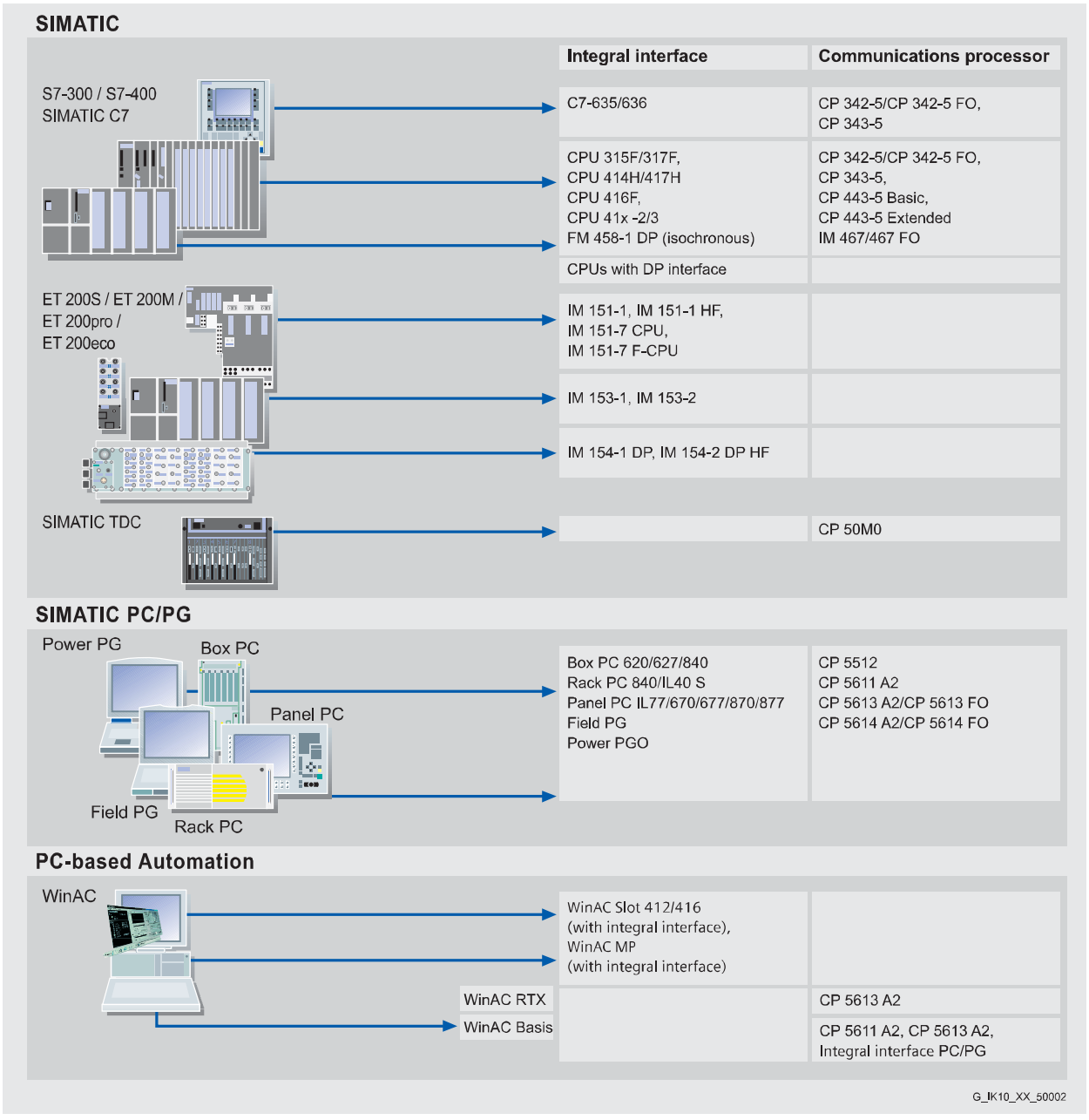
The process or field communication (PROFIBUS DP, PROFIBUS PA) is used to link field device to an automation, HMI or I&C system.

The link can be established through integrated interfaces on the CPU or using interface modules (IMs) and communication processors (CPs).

With today's powerful automation systems it is often more effective to link several PROFIBUS DP lines to one automation system not only in order to increase the number of connectable I/O stations but also to be able to handle individual production areas independently of others (segmentation).

PROFIBUS is standardized according to IEC 61158/EN 50 170. It is an efficient, open and robust fieldbus system with short response times and the following protocols:

- PROFIBUS DP
  (Distributed Peripherals) is used to connect distributed peripherals, e.g. SIMATIC ET 200 with very fast response times according to the IEC 61158/EN 50170 standard.
- PROFIBUS PA
  (Process Automation) expands PROFIBUS DP with inherently safe transmission according to the international standard IEC 61158-2.



PROFIBUS DP masters

2

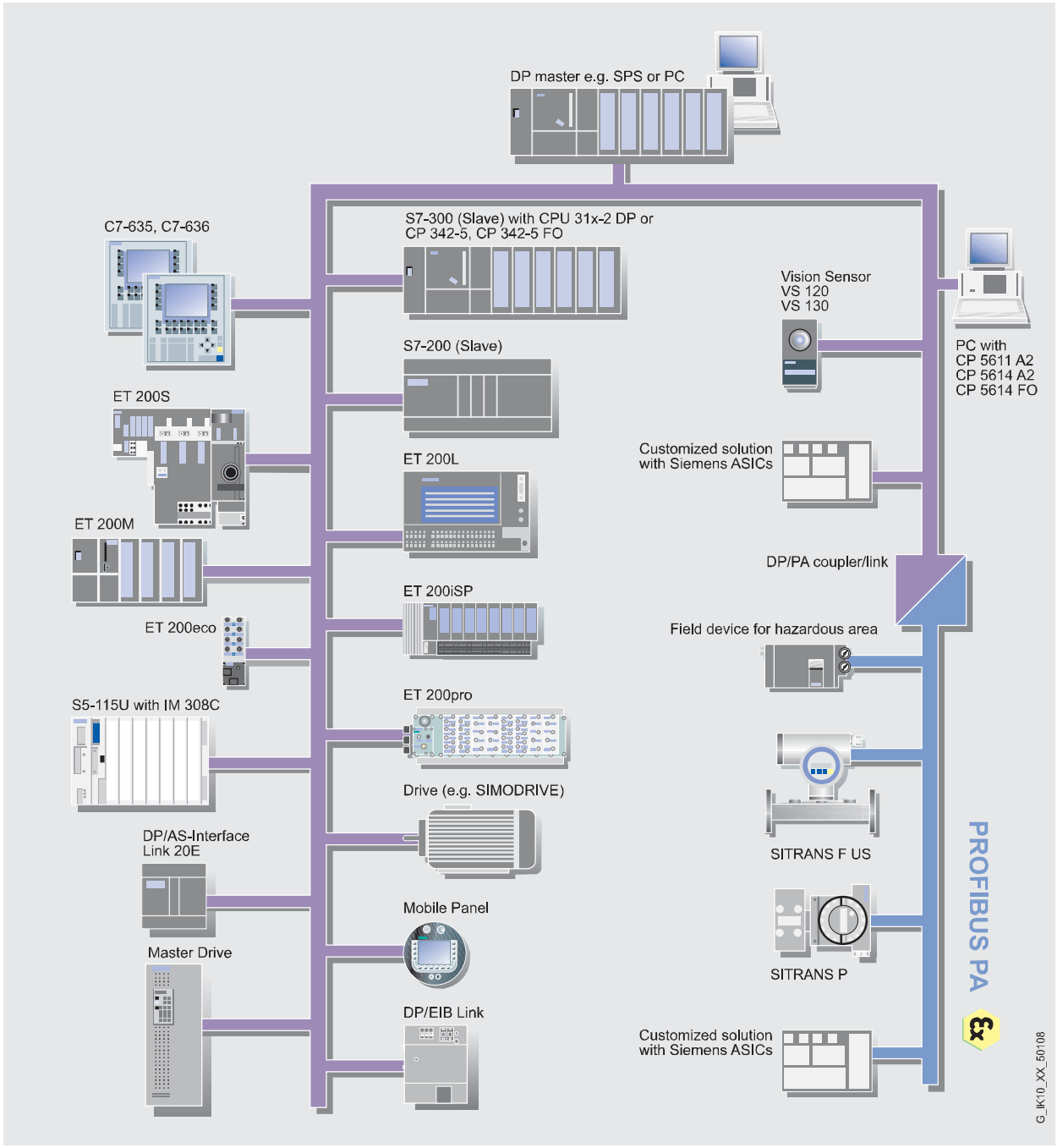
Process or field communication

PROFIBUS DP/PA is used to connect field devices such as distributed I/O stations or drives to automation systems such as SIMATIC S7 or PCs.

PROFIBUS DP/PA is selected when I/O stations on a machine or in a plant (e.g. the field level) are widely distributed and can be spatially grouped (>16 inputs/outputs) to form a station (e.g. ET 200).

In this case the actuators/sensors are connected to field devices, which are supplied with output data according to the master/slave principle and send the input data to the controller or the PC.

Powerful tools such as STEP 7 and COM PROFIBUS are available to configure and parameterize the I/O stations. With these tools, tests and start-ups are possible from every connection using PROFIBUS DP.



PROFIBUS DP slaves

DP device types

PROFIBUS DP differentiates between two different classes of master and various DP functionalities:

- DP master class 1
  The DP master class 1 is the central component of PROFIBUS DP. In a fixed, continuously recurring message cycle the central controller or PC exchanges information with distributed stations (DP slaves).
- DP master class 2
  Devices of this type (programming, configuring or operating devices) are used during start-up, for configuring the DP system or for operating the plant while it is running (diagnostics). A DP master class 2 is able, for example, to read the input data, output data, diagnostics data and configuration data of slaves.
- DP slave
  A DP slave is an I/O station which reads in input information and sends out output information to the other peripherals. The amount of input and output information varies from device to device but is limited to a maximum 244 bytes per device. The functional scope of DP masters class 1 and 2 and of DP slaves can vary. A communication processor can be accordingly efficient and versatile.
- DP-V0
  The DP master functions (DP-V0) are: Configuring, parameterizing, cyclic reading of input data and writing of outputs, and reading of diagnostics data.
- DP-V1
  The additional DP function expansions (DP-V 1) enable acyclic read and write functions and alarm acknowledgment in parallel with the cyclic data traffic. These expanded DP functions also include acyclic access to the parameters and measured values of a slave (e.g. field devices of the process automation, intelligent operating and monitoring devices). Slaves of this type must be supplied with comprehensive parameter data during start-up and while running. The acyclically transmitted data (e.g. parameterizing data) are changed only rarely compared to the cyclic measured values and are transmitted with low priority in parallel with the fast cyclic transfer of useful data. Alarm acknowledgment on the master provides for the assured transmission of alarms from DP slaves.
- DP-V2
  The DP master functions (DP-V2) are: Cycle synchronization and cross data traffic between DP slaves.
- Cycle synchronization
  Cycle synchronization is realized through the use of an equidistant cycle signal on the bus system. This cyclic, equidistant cycle is sent as a global control message frame from the master to all stations. Master and slaves can thus synchronize their applications on this signal. For typical drive applications it is necessary for the jitter of the cycle signal to be smaller than 1 µs.
- Cross data traffic between DP slaves
  The publisher/subscriber model is used to implement the cross traffic between slaves. Slaves which are declared to be publishers make available their input data (equivalent to a reply message frame to their own master) to other slaves, the subscribers, for them to read as well. The cross traffic communication takes place cyclically.

Data communication

Overview

Communication functions

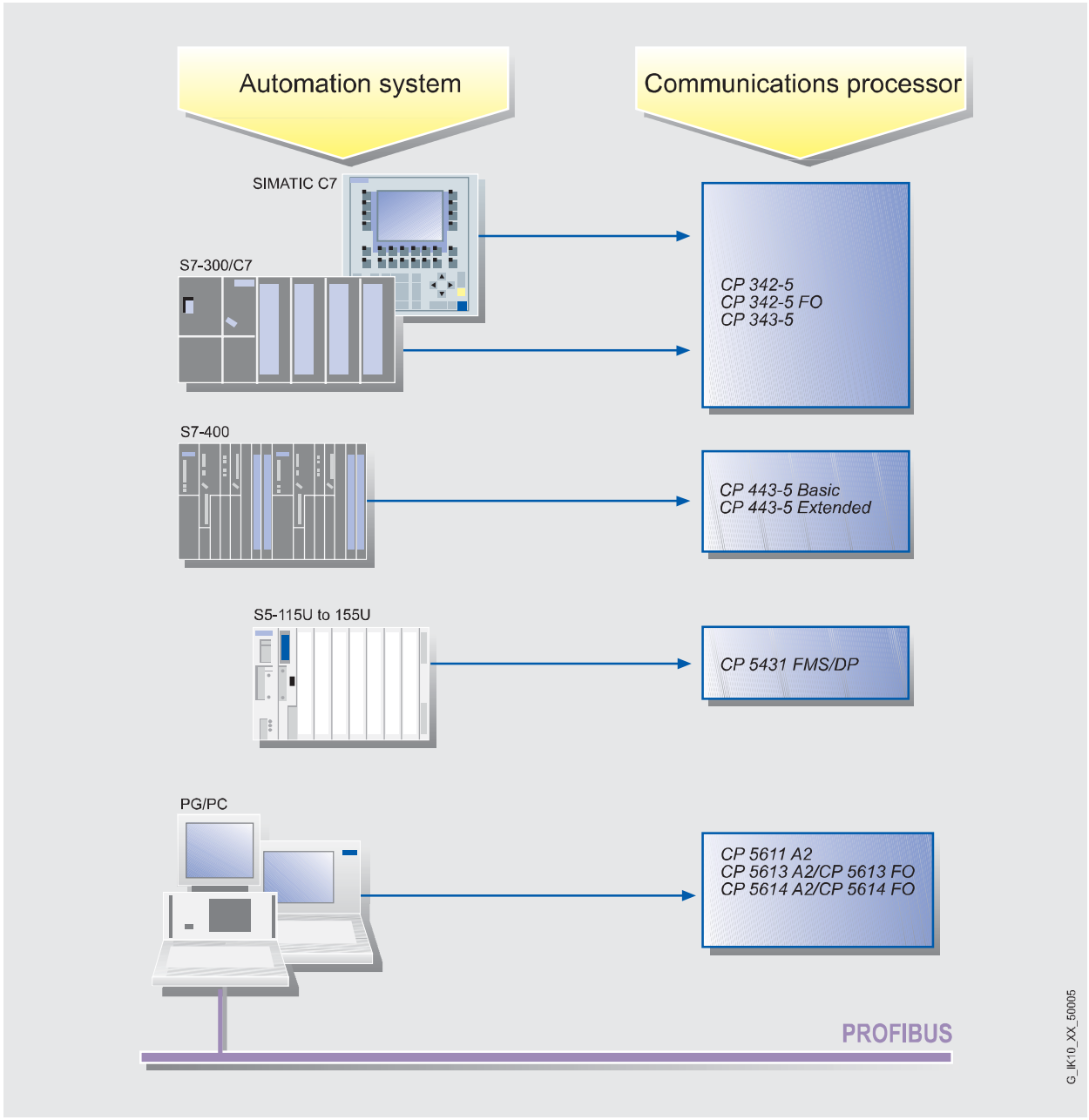
The data communication (e.g. PROFIBUS FMS) is used to exchange data between automation devices or between an automation device and intelligent partners (PC, computer, etc.).

The following communication functions are available for this purpose:

- PG/OP communication
  Includes integrated communication functions by means of which the SIMATIC automation systems can perform data communication with HMI devices (e.g. TD/OP) and SIMATIC PG (STEP 7). PG/OP communication is supported by MPI, PROFIBUS and Industrial Ethernet networks.
- S7 routing
  With the help of the S7 routing function it is possible to use PG communication on an internetwork basis.
- S7 communication
  This integrated communication function was optimized within SIMATIC S7/C7. It also enables the connection of PCs and workstations. The amount of useful data per job is 64 Kbyte. S7 communication provides simple, efficient communication services and a network-independent software interface for MPI, PROFIBUS and Industrial Ethernet networks.
- S5-compatible communication (SEND/RECEIVE)
  The SEND/RECEIVE interface (for PROFIBUS through FDL) is optimized for communication between SIMATIC S5 and S7 controllers and thus enables migration from SIMATIC S5, SIMATIC S7 controllers and PCs through PROFIBUS and Industrial Ethernet.
- Standard communication
  These are standardized protocols for data communication. PROFIBUS FMS (Fieldbus Message Specification) is ideal for the communication of different automation systems (e.g. PLC, PC) from different manufacturers within a cell area with few stations (max. 16). Communication with field devices with an FMS interface is also possible. Using the FMS services READ, WRITE and INFORMATION REPORT, one communication partner can gain reading or writing access to another communication partner's variables through the variable index or variable name or can transmit its own variable values to another communication partner. Partial access to variable values is supported. The communication is handled through acyclic connections (master/master, master/slave), through acyclic connections with slave initiative or through cyclic connections (master/slave). With the INFORMATION REPORT it is possible in addition to send a message to all stations on the network with the help of a broadcast service. The FMS services IDENTIFY (request for the partner's identification characteristics) and STATUS (request for the partner's status) can be actuated as well.
- OPC server
  The basic principle behind OPC (OLE for Process Control) is that OPC client applications communicate on a standardized, open and hence vendor-independent interface with the OPC server. IT communication can be implemented through the OPC XML DA interface. Suitable OPC servers are included in the scope of supply of the corresponding communication software.

System connections

For many terminal devices that are communication processors (CPs) which have implemented the communication functions in the firmware already and as the result relieve the terminal device of having to perform communication tasks (e.g. flow control, blocking, etc.).



Data communication for SIMATIC and PC

Topologies

2

Overview

Siemens offers an extensive range of PROFIBUS network components for electrical and optical transmission systems.

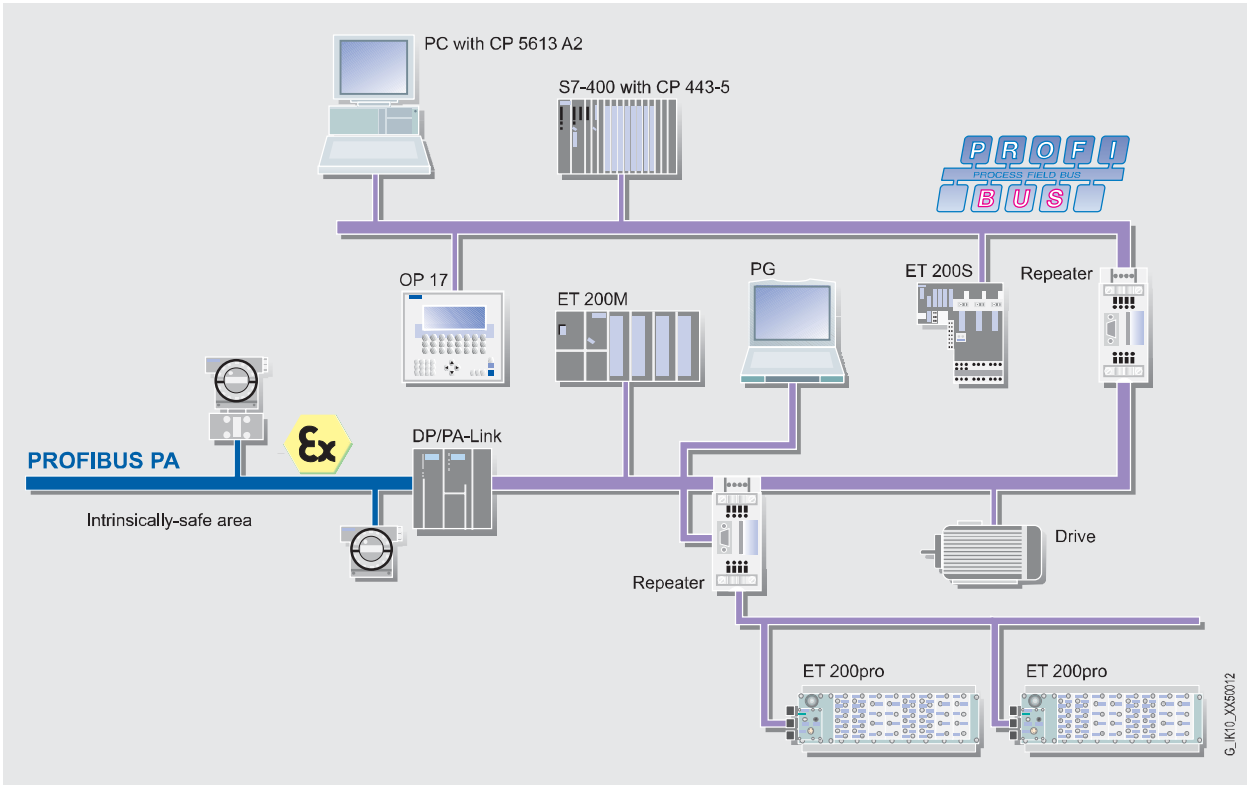
PROFIBUS is standardized in accordance with IEC 61158/ EN 50170 for universal automation (PROFIBUS FMS and PROFIBUS DP) and with IEC 61158-2 for process automation (PROFIBUS PA).

Electrical network

- The electrical network uses a shielded, twisted two-wire cable. The RS 485 interface works with voltage differences. It is less sensitive therefore to interference than a voltage or current interface. With PROFIBUS the stations are connected by means of a bus terminal or a bus connector (max. 32 stations per segment).
- The individual segments are connected through repeaters.
- The transmission rate is adjustable in steps from 9.6 kbit/s to 12 Mbit/s.
- The maximum segment length is dependent on the transmission rate.
- The electrical network can be configured as a bus or tree structure.
- The transmission technology according to IEC 61158-2 is used with PROFIBUS PA for applications in the inherently safe area. In this case the transmission rate equals 31.25 kbit/s.

Features

- High-quality bus cable
- Transmission method: RS 485 (according to EIA)
- Bus structure with bus terminals and bus connector for connecting the PROFIBUS stations
- Transmission method according to IEC 61158/EN 50170 for universal automation (PROFIBUS FMS/DP) and according to IEC 61158-2 for the inherently safe area (PROFIBUS PA)
- Conversion of DP transmission from RS 485 (bit coding through voltage difference signals) to IEC 61158-2 (bit coding through current signals) takes place through the network components (DP/PA coupler or DP/PA link)
- Simple, consistent mounting and grounding concept
- Easy installation



Network configuration as electrical PROFIBUS network

Optical network

The optical conductor variant of PROFIBUS has the following features:

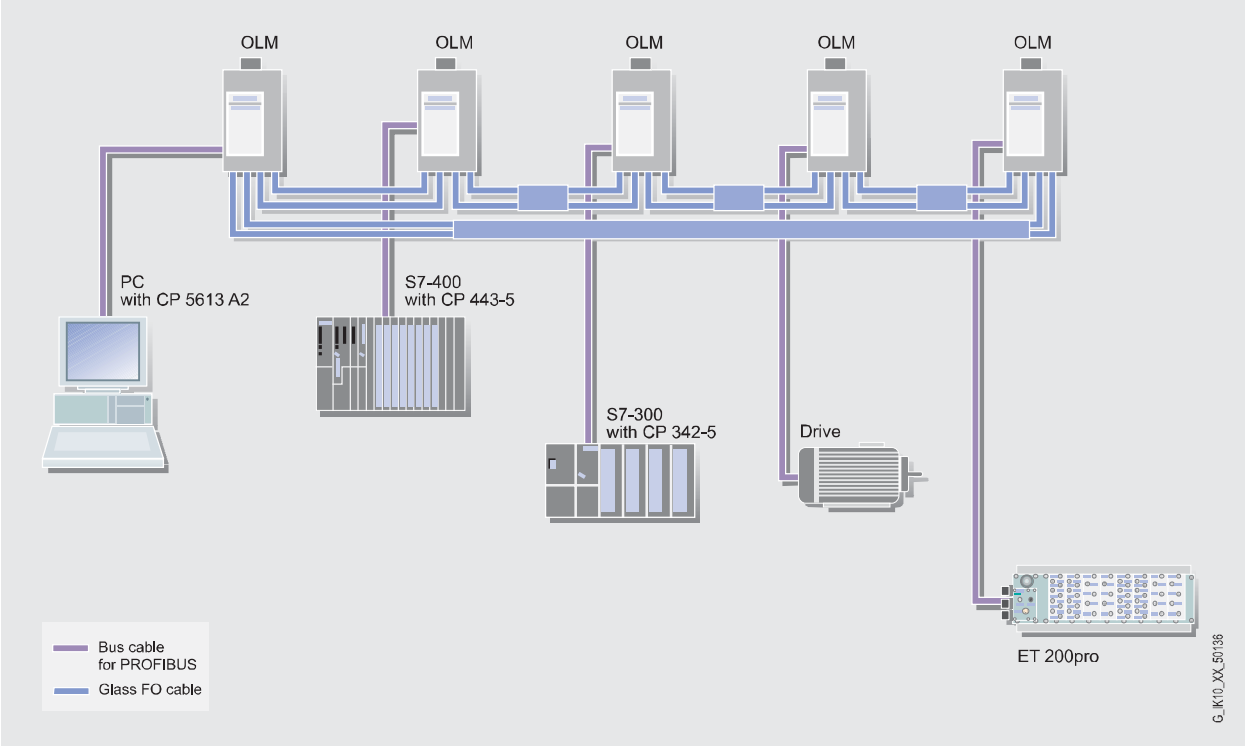
- Transmission path is insensitive to electromagnetic interference
- Suitable for long ranges
- Electrical isolation
- Uses either plastic or PCF or glass optical conductors

Optical PROFIBUS with OLMs

Using optical link modules (OLMs) it is possible to configure an optical network as a line, ring or star structure. The maximum distance between two OLMs can be 15 km. The transmission rate is adjustable in steps from 9.6 kbit/s to 12 Mbit/s.

Optical PROFIBUS with integrated interface and OLM

The optical PROFIBUS with integrated interface and OLM is configured as a line structure. A cost-optimized solution in the form of devices with an integrated optical interface is available for this purpose. Terminal devices with an RS 485 interface can be connected through an optical bus terminal (OBT). The maximum distance between two stations on a plastic optical conductor is 50 m. Special optical conductors are used to span distances of up to 300 m.



Network configuration of the optical PROFIBUS with OLMs

Topologies

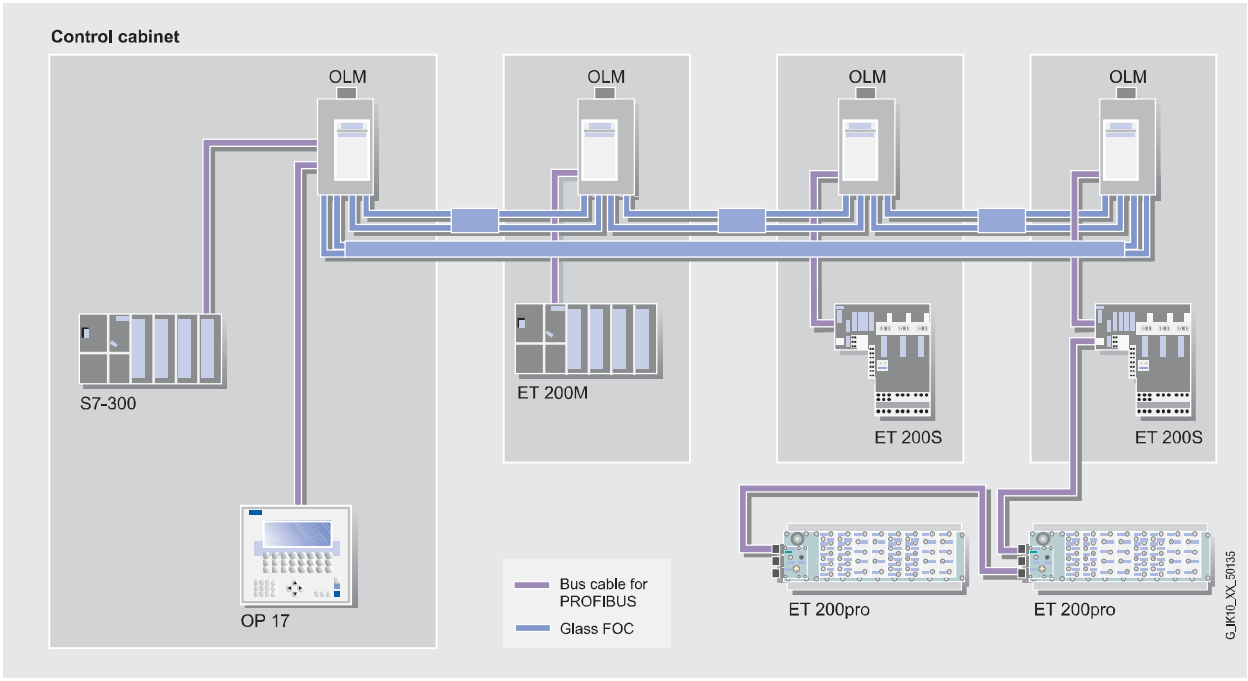
Mixed network

Mixed structures consisting of an electrical and an optical network are possible. The transition between the two media is effected by an OLM.

In the way stations on the bus communicate with each other there is no difference between two-wire technology and fiber optic technology. Up to 127 stations can be connected to one PROFIBUS network.

Optical transmission technology provides the following advantages:

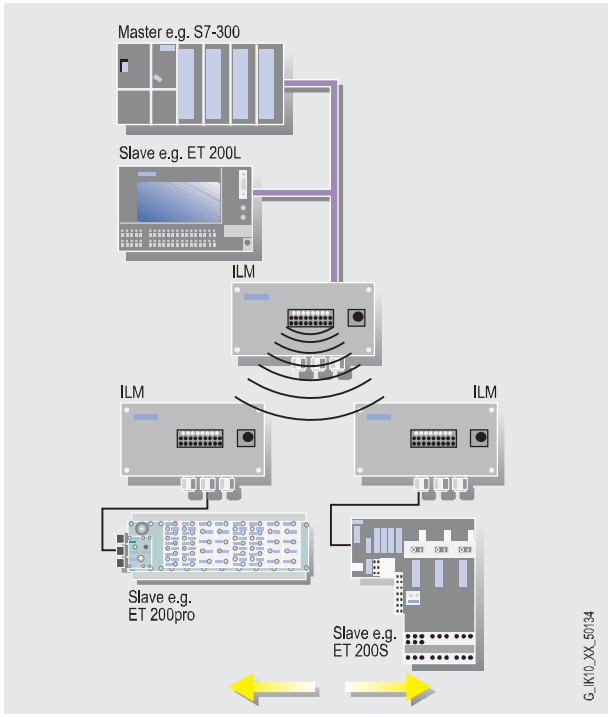
- Optical conductors made of plastic or glass are insensitive to electromagnetic radiation, hence the EMC measures required for electrical networks are superfluous
- No additional lightning protection concept is needed outdoors
- The potentials on the modules are automatically isolated thanks to the conductor characteristics
- With optical conductors it is possible to span large distances to field devices



Network configuration with an electrical and an optical PROFIBUS combined

Wireless coupling

With the help of the PROFIBUS infrared link module (ILM), one or more PROFIBUS slaves or slave segments can be coupled by wireless means. With a maximum transmission rate of 1.5 Mbit/s and a maximum range of 15 m, communication with moving parts, e.g. automatic guided vehicles (AGVs) or the replacement of wear-prone systems (sliprings or slipring leads) is possible.



Coupling with moving stations

More information

For the SIMATIC NET products referred to above (order numbers 6GK..., 6XV1...) please also note the conditions of application, which can be consulted on the Internet site quoted below.

You can find more information on the Internet at:

http://www.siemens.com/simatic-net/ik-info

More information about PROFIBUS can be found in Catalog IK PI, in the chapter *PROFIBUS according to IEC 61 158 / EN 50 170.*

System overview

Overview

A perfect team: The SIRIUS modular system for the controlgear cabinet

Building switchgear cabinets should be quick, easy, flexible and space-saving. But how can all these requirements be met simultaneously? The answer lies in the unique SIRIUS modular system, where you will find everything that you need for switching, protecting and starting motors and industrial systems.

This modular selection of standard components covers the range up to 250 kW / 400 V in just seven sizes which are optimally coordinated, can be combined with ease and use the same accessories. Control technology can be that simple.

Continuous further development and regular innovations ensure that our customers are optimally equipped with SIRIUS and benefit from efficient solutions - today and tomorrow.

All components of the SIRIUS modular system are characterized by a space-saving design and high flexibility. Configuring, installing, wiring and servicing are extremely easy and time-saving to perform.

Regardless of whether you want to build up load feeders with circuit-breakers or overload relays, contactors or soft starters, SIRIUS has the right product for every application.

SIRIUS stands for innovation

To be able to meet our customers' requirements tomorrow as well as today we are dedicated to the ongoing development of our product portfolio.

The new 3RB2 solid-state overload relays

With the newly developed SIRIUS 3RB2 solid-state overload relays for both standard and high-feature requirements it is now possible to provide motor and plant protection over the full range from 0.1 to 630 A. Thanks to the large setting range it is possible, furthermore, to cover this current range with a minimum number of variants, which compared to the "classic" bimetal relays has been reduced by up to 90 %. And this variance can be minimized further by the modular design of the devices for high-feature requirements. With these devices for full motor protection it is possible to transmit warning signals, current values and the like, e.g. for further processing in the PLC.

The SIRIUS 3RB2 solid-state overload relays are coordinated with the other components of the SIRIUS modular system with regards to their electric rating, mechanics and dimensions.

The SIRIUS 3RB2 solid-state overload relays reduce stock and product variance, simplify configuring, mounting and start-up, increase plant availability and enable customized solutions.

The new SIRIUS 3RW40 soft starters – for soft starting up to high ratings

Two new types of soft starter in compact SIRIUS design provide the answer for the starting of three-phase asynchronous motors with reduced strain on the load and the network. The new SIRIUS 3RW40 soft starter is used in demanding standard applications. The SIRIUS 3RW44 soft starter is the right choice for high functionality and for difficult starting operations.

For simple to demanding standard applications in which a star-delta starter has been used up to now, the SIRIUS 3RW40 soft starter provides the best solution for starting applications with zero torque surge. With a power range from 75 to 250 kW (at 400 V) the new SIRIUS 3RW40 soft starters supplement the existing, service-proven product segment of the 3RW30 soft starters with 2-phase control. The use of 2-phase controlled soft starters up to this high power range is unique and was made possible by a new control method which was specially developed by Siemens.

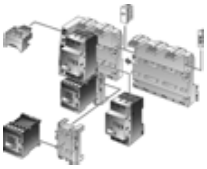
For motor starts with more exacting requirements, which up to now had to be implemented with a frequency converter for example, the SIRIUS 3RW44 soft starter provides the greatest functionality and diagnostics with user-friendly operation. For integration in the process landscape the new 3RW44 high feature soft starter can be retrofitted with an optional PROFIBUS DP module. Thanks to its new torque control the 3RW44 SIRIUS soft starter is a master of difficult starting and ramp-down operations for drives covering a performance range up to 710 kW at 400 V with an inline circuit (up to 1200 kW at 400 V with an inside-delta circuit).

Benefits

The advantages and highlights at a glance

- *Load feeders*
  Easy implementation of up to 250 kW / 400 V using standard devices
- *Modular design*
  Everything fits together and can be combined
- *Variants and sizes*
  Economical and flexible thanks to seven compact sizes
- *Accessories*
  Optimum variety with uniform accessories
- *Type of construction*
  Space-saving design with small unit width and butt-mounting type of construction up to 60 °C
- *Configuration*
  Fast start-up, short setting-up times and simple wiring
- *Communication*
  Connection to AS-interface and PROFIBUS DP possible
- *Maintenance*
  Extremely long life, low maintenance and reliable
- *Certification*
  Global approvals and certifications such as IEC, UL, CSA, CCC, shipbuilding
- *Mounting*
  Permanently secure mounting, screwed or snap-fitted
- *Spring-loaded terminals*
  Quick and secure connection, vibration-proof and maintenance-free
- *Service*
  Short delivery periods thanks to world-wide logistics network
- *Environment*
  Environment-friendly production and materials, recycling capability, low power loss
- *Design*
  Clear-cut, ergonomic design (winner of the iF Product Design Award)

More information

	Product	For further information see
	**Robust and reliable: SIRIUS 3RT contactors** Thanks to the extreme robustness and best contact reliability of our contactors, their switching is extremely precise and reliable. At the same time they enable you to build compact control cabinets with a high packing density because the auxiliary switch blocks and coil circuits are inside the contactor's contours. This facilitates expansions and saves a great deal of space in the control cabinet.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Controls / Contactors and Contactor Assemblies* • Catalog: LV 1 chapter *Controls – Contactors and Contactor Assemblies*
	**Much more than ON/OFF: the SIRIUS 3RV motor starter protectors** The SIRIUS 3RV motor starter protectors are compact, current limiting circuit-breakers. They ensure reliable shutdown in the short-circuit case and protect loads and the system from overloads. In addition they are suitable for normal switching duty with loads that have a small number of switching operations as well as for reliable isolation of the equipment from the supply system for maintenance work or modifications.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Protection Equipment / Motor Starter Protectors up to 100 A* • Catalog: LV 1 chapter *Protection Equipment*
	**Triggering when things get serious: SIRIUS 3RU and 3RB overload relays** The overload relays of the SIRIUS family are available in a thermal version as well as in a solid-state version for high-feature applications. They are responsible in the main circuit for the current-dependent overload protection of loads and the other switching and protective devices in the respective load feeder.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Protection Equipment / Overload Relays* • Catalog: LV 1 chapter *Protection Equipment*
	**Soft starting and ramp-down: SIRIUS 3RW soft starters** The 3RW soft starters offer a complete range covering all standard and high-feature motor starting applications. As the result, the advantages of soft starting and ramp-down can be used today in a wide range of applications for realizing optimum machine concepts with greater ease and lower cost.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Load Feeders, Motor Starters and Soft Starters / 3RW Soft Starters* • Catalog: LV 1 chapter *Load Feeders, Motor Starters and Soft Starters*
	**Everything ready for immediate use: With factory-wired SIRIUS load feeders** Load feeders start loads by means of a combination of protective and switching functions. This requires a wide selection of different components in order to be able to realize all starter types. To keep downtimes as short as possible, Siemens offers factory-wired starter solutions.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Load Feeders, Motor Starters and Soft Starters* • Catalog: LV 1 chapter *Load Feeders, Motor Starters and Soft Starters*
	**SIRIUS infeed system** When you want to supply current to several circuit-breakers in a group or to complete load feeders, all arguments are in favor of using the user-friendly SIRIUS infeed system. Thanks to a terminal block it is also possible to integrate single-pole, two-pole or three-pole components.	• A&D Mall: Section *Low-Voltage Controls / SIRIUS Industrial Controls / Load Feeders, Motor Starters and Soft Starters / 3RA Fuseless Load Feeders* • Catalog: LV 1 chapter *Load Feeders, Motor Starters and Soft Starters*