TECHNICAL DESCRIPTION

AS-i Components

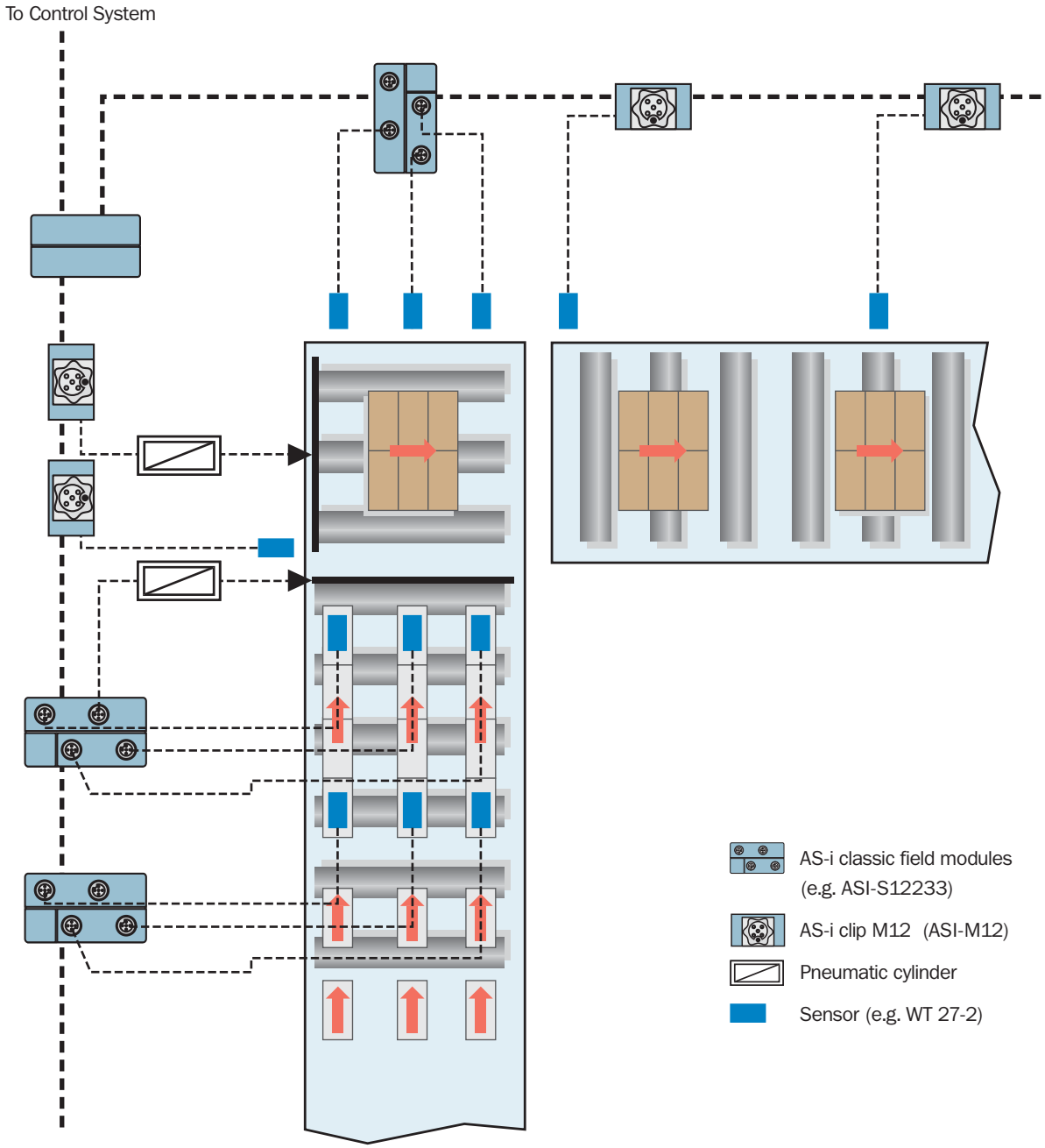
Actuator-Sensor Interface:
intelligent wiring

SAFETY AT WORK

SICK
Sensor Intelligence.

AS-i Applications

Central control of complex processes in the packaging industry with AS-i.



Contents

General

Two factors have always characterized automation technology: the economic pressure to cut costs and the availability of new technologies. On the other hand, the requirement to use more progressive system architecture puts pressure on equipment manufacturers to structure components, so that they meet the needs of the architecture.

Process signals created on site were previously transmitted via comprehensive parallel wiring and input/output modules. This means that each sensor or actuator in the field was connected via its own line with the input/output modules.

The change of structures, motivated by a high degree of cost consciousness, has pushed the architecture of automation systems strongly in the direction of decentralization over the past years. This triggered the triumphant progress of field bus technology and especially the AS interface® as the most significant standardized representative of the lowest field level: sensors and actuators.

Basic idea

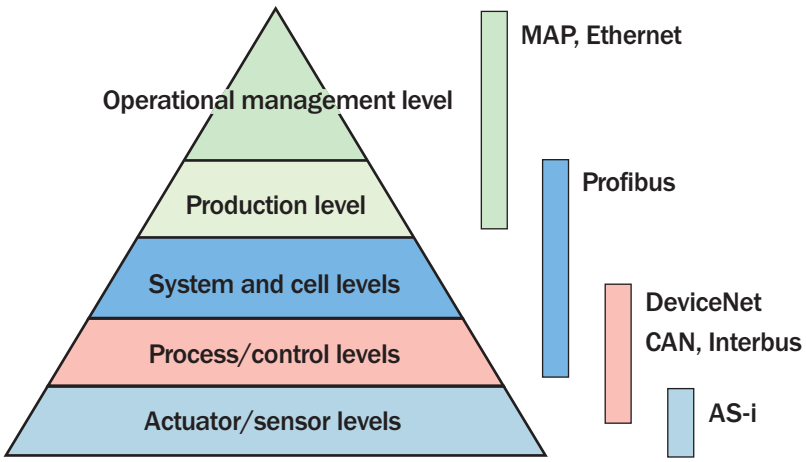
In 1991, the AS-International Association e.V, called the “Association for Promoting Bus-Capable Interfaces for Binary Sensors and Actuators”, abbreviated to “ASI Association”, was founded by eleven well known companies in automation technology including SICK AG.

The goal was to develop inexpensive networking of simple binary sensors and actuators and to promote the system as a global industrial standard.

What is AS-i

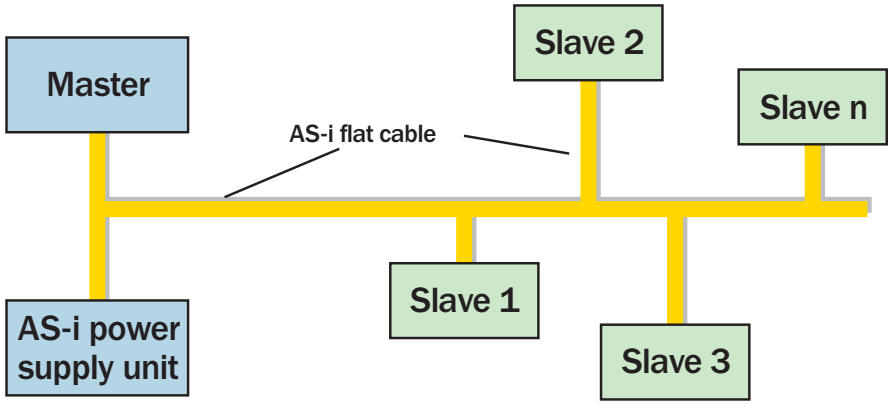
The **A**ctuator-**S**ensor **I**nterface, called **AS-Interface®** for short, is a system with which simple, binary and analog terminals – sensors, actuators and control units – can be networked via a cable on the lowest field level with the first control level.

AS-Interface® is not a conventional field bus, but instead is to be seen as an “intelligent wiring”, which was designed as a universal and “open” system to provide a manufacturer-independent solution on the lowest field level. Consequently, it handles an area, which can only be reached with difficulty or not at all.



Mode of operation

The AS-Interface is a single-master system. There is only one master per line, which controls data exchange. It calls all slaves one after another and waits for their response (polling). Each AS-Interface system requires a separate AS-i power supply unit.

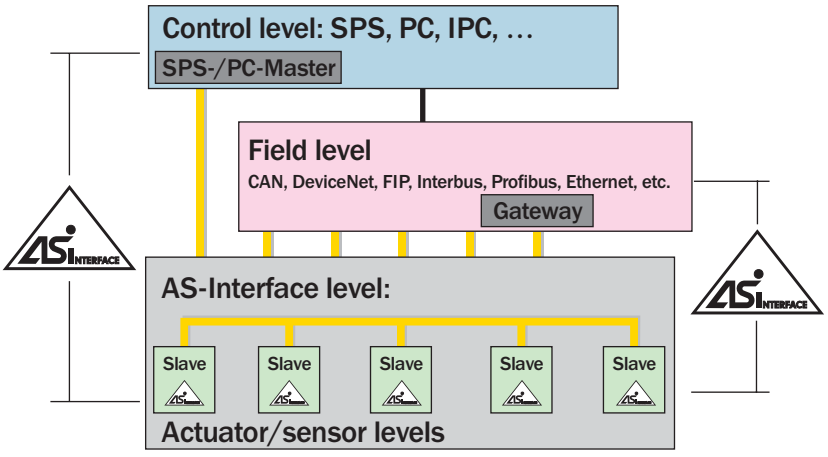


The components are connected directly to the standardized, unscreened two-wire AS-Interface® cable. This creates a line of sensors and actuators with only one central cable.

AS-i Master

The AS-Interface® Master handles complete processing of data transmission in the AS-Interface network and establishes the connection to the control or provides the control itself in smaller applications. The AS-Interface® network operates to a large extent like a cable harness for users. The actuator data are transmitted via a user program to the master instead of to an output card. There are also data for monitoring the network and diagnosing the system.

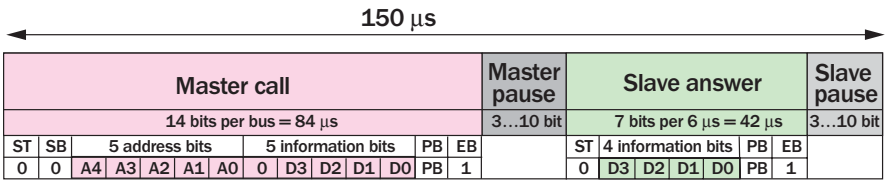
The Master is available in various forms. It is available as a separate unit, which can be addressed via an RS 232 interface or in the form of a plug-in card, which is integrated into a PC. In addition, Gateway Masters can be used for connection to a profibus DP or devicenets for further processing of the data.



Mode of operation

AS-i Log

The AS-Interface telegram format was kept very short to achieve a short cycle time. Each master call (from master to slave) is always followed by a slave answer.



ST: Start bit **SB: Control bit** **PB: Parity bit** **EB: End bit**

There are four different master calls:

- Data call:

  Cyclical call for reading and writing the inputs/outputs. This is the most important and most frequently used AS-Interface call.
- Parameter call:

  Acyclic call for parameterizing, usually with intelligent sensors. This makes it possible to control specific functions in a slave remotely.
- Address call:

  Sets a slave with the address 0 to a new value.
- Command call:

  There are various command calls, which are carried out in configuration mode.
  For example, read I/O configuration, read ID code and read status.

There are two operating modes:

- Configuration mode:

  Data are exchanged with all connected slaves in this mode. The slaves can be projected.
- Protected mode:

  This is the standard mode, in which data is exchanged with the connected and previously projected slaves.

AS-i Power Supply Unit

Data and energy are transmitted simultaneously via the AS-Interface two-wire line. Consequently, AS-Interface power supply must also handle data decoupling simultaneously with power supply of the network. Standard power supplies are not suitable for this.

For this reason, no standard power supply units may normally be used for supplying an AS-Interface network.

The AS-Interface power supply unit supplies all connected users (master and slaves) and all sensors connected to them. The power of the actuators is normally taken from a separate power supply, which should be fed via a separate line (usually a black AS-Interface flat cable).

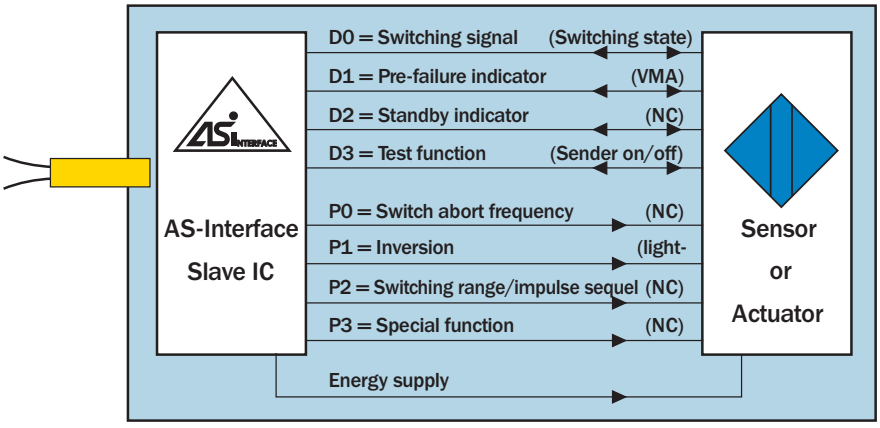
Mode of operation

AS-i Slaves

A slave requires a special interface to communicate with the master, which can evaluate and respond to the log of the master. The interface is composed of a special AS-i chip (ASIC).

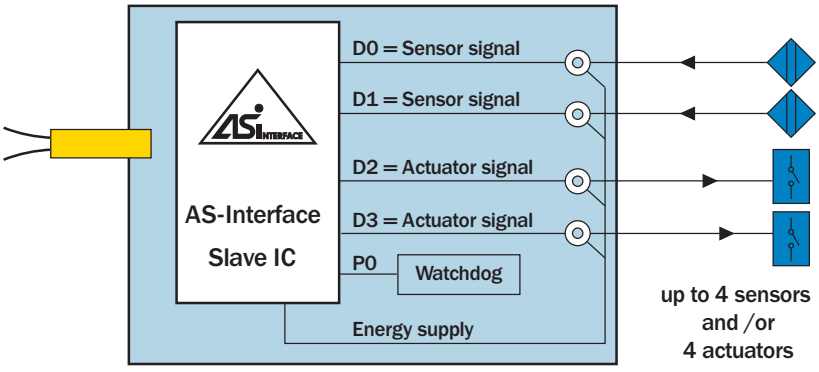
There are two types of slaves:

1. Sensors and actuators with integrated AS-i chip



D0 - D3: Data bits P0 - P3: Parameter bits

2. Modules with integrated AS-i chip to which simple binary sensors and/or actuators can be connected.



D0 - D3: Data bits P0: Parameter bits

AS-i Slave Profile

The profiles essentially control the compatibility of the AS-i components. The profile is composed of two figures, which are separated by a point. The first number shows the I/O configuration, and the second the identification code (ID code). The manufacturer stores both fixed in the slave. Four bits are available for each. These bits can be read via corresponding commands (command calls).

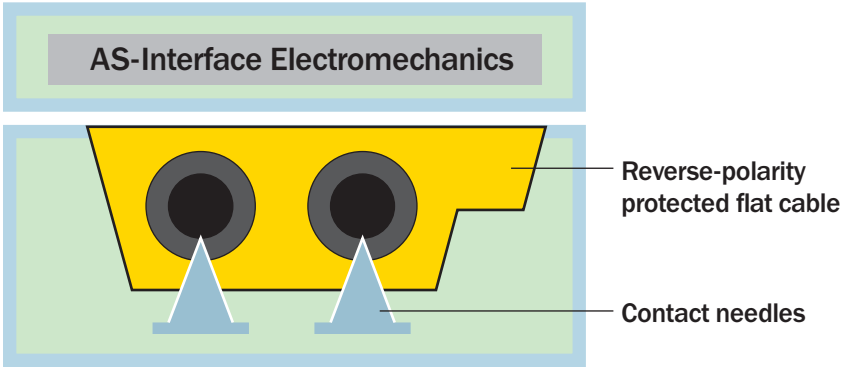
The I/O configuration describes the direction of the data bits as input, output or bi-directional.

The ID code provides more information about the slave type.

Mode of operation

AS-i Cable

The specially developed profile line is designed for the AS-Interface networking. Thanks to the mechanical profile, there is reverse-polarity protection during assembly.
The yellow AS-i cable serves for standard cabling of all AS-Interface users. The connection is made via the AS-Interface “piercing” technology.



In the “piercing” technology, the AS-i cable is inserted in one of the line baskets in the module base (FK bottom part). Two contact needles exist per cable conductor. When the top part and based are screwed together, the contact needles penetrate through the cable sheath and conductor insulation and guarantee reliable electric connection. If the connection is loosened, the opening closes watertight (self-healing).

If 24 V additional power supply is required (e.g., for actuators), this can be provided by the black AS-i flat cable. This is laid parallel to the yellow AS-i cable in the module base.

Key figures

Topology	Tree structure, line, star, ring
Medium	Unshielded two-wire cable (2 x 1.5 mm^2)
Signals	Data and energy via the same line, max. 8 A possible
Cable length	100 m extension via repeater possible
Number of slaves per cable	31 (according to specification 2.0)
Use data per slave	4 bits data (cyclic), 4 bits parameter (acyclic) > 4 bits with data log (multiplex)
Number of binary I/Os (cyclic)	124 I/O (conventional) (according to specification 2.0) 124 I + 124 O (bi-directional) (according to specification 2.0)
Analog value processing	for example, 31 x 4 channels possible via slave profile S 7.1 or S 7.2
Cycle time	Max. 5 ms (according to specification 2.0)
Access procedure	Cyclic polling, single-master system
Addressing	Fixed, unique address in slave Addressing via master or addressing device
Protection against errors	Identification and repeating of faulty telegrams

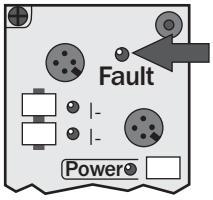
AS-i
Version 2.1

In 1999, the AS-International Association expanded the tried and tested industry standard AS-Interface by a few important features. This version 2.1 is an upgrade, which is downward compatible. This means for users that all previous users can also be used further under version 2.1. The bus physics and the transmission protocol have not been changed.

For using this new option, you need a master equipped accordingly with implemented version 2.1. The slaves also must be able to support this range of functions. The version is documented in the specifications.

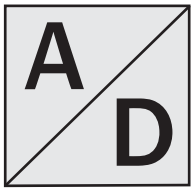
The most important new features of version 2.1:

- Qualified diagnosis options, periphery error bit
- Analog value transmission integrated in master
- Increase of the user number from 31 to 62
- Expanded ID code in slave

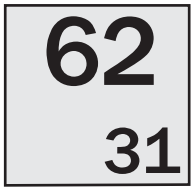


A distinction can be made in the master between configuration and periphery errors. The latter is displayed on the module by a red LED. A short-circuit on a sensor cable can be evaluated as a periphery error, for example.

Additionally, a new list is generated in the master, so that evaluation is also possible in a user program. The advantage: exact error localization and easy system maintenance are possible. Communication errors can be displayed on the slave by the blinking of the fault LED, e.g., if the slave was not addressed.

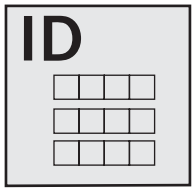


Previously, it was necessary to integrate operational (software) components into the user program, so that data could be exchanged from 12-bit wide analog signals via the 4-bit AS-i data channel, for example. This required specialist knowledge and special software for the used control environment. Another disadvantage was the slowing down of the data transmission due to the SPS cycle time. Analog value transmission is not integrated in the master.



Two slaves can share an address as A and B slaves. Then they are called 7A and 7B, for example. All A slaves are processed in the first cycle, and all B slaves in the subsequent one. Slaves can also still be used with version 2.0, e.g., with the address 8. A version 2.1 slave is programmed either via the master or the manual addressing device as A or B slave. The slave is selected in the master via an output (select) bit. Consequently, three outputs are available for a slave module.

If they are programmed as A slaves, version 2.1 slaves with extended address mode can also communicate with version 2.0 masters.



In addition to the previous slave profiles, the ID code has been expanded. Two further 4-bit registers are available in addition to the known ones. You code here whether it is a question of an A/B slave or a new analog module. The existing slave profiles are maintained. ID code 1 and ID code 2 are also new. ID code 1 is stored permanently in the slave and is not a component of the profile. The type A or B is set there for A/B slaves. This assignment can be changed with an extended addressing device. ID code 2 is a component of the profile and is used for more precise identification of the “subprofiles”.

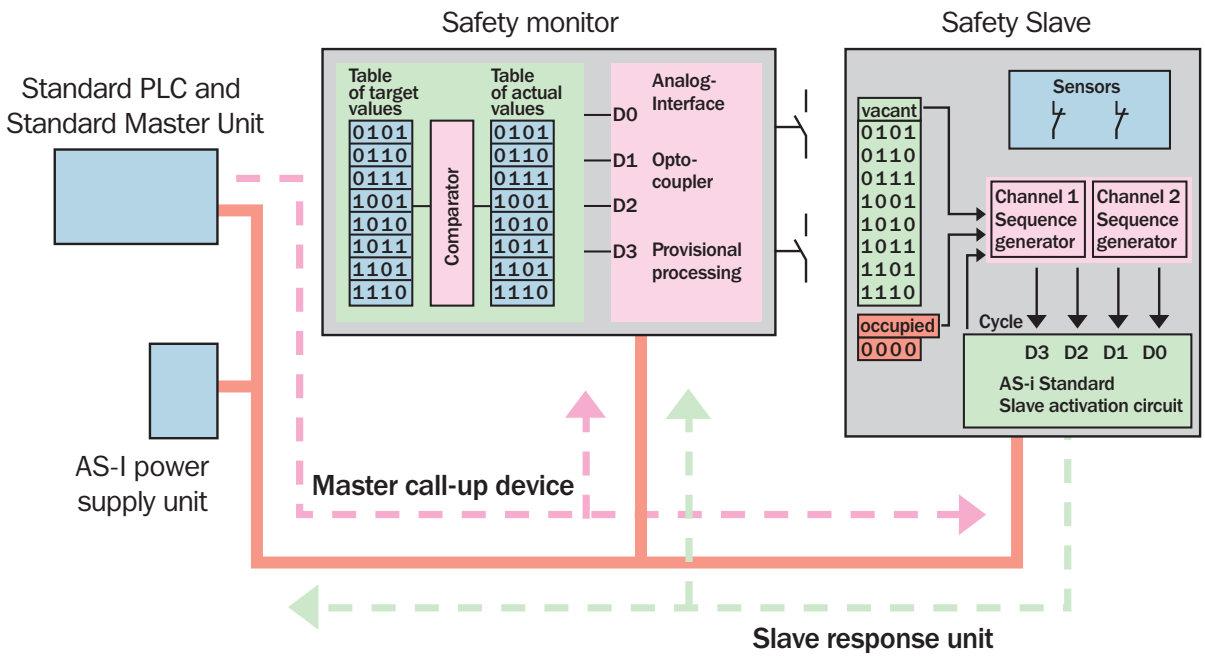
	Version 2.0	**Version 2.1 (new)**
Number of slaves	31	62
Number of digital I/O	124 I + 124 O	248 I + 186 O
Max. cycle time	max. 5 ms	max. 10 ms
Analog value transmission	with additional functional component	function integrated in master

AS-Interface Safety-at-Work

The “Safety-at-Work” AS Interface system was developed as an enhancement to the existing AS interface. The designation – “Safety-at-Work” AS interface – thereby conveys the notion of secure transmission when incorporating safety devices into an AS interface network. The components for “Safety-at-Work” are compatible with all other AS interface components, so that existing AS interface applications can be expanded in a simple manner by safety-related functions.

Safety monitor

All binary switched safety-related components, such as emergency stop buttons, safety door switches, safety light curtains or safety laser scanners are hooked up to the “Safety-at-Work” AS interface. This connection of safety-related components is effected by way of a secure AS interface module, which is monitored by an AS interface safety monitor. Similar to a switching unit in conventional technology, the transmitted data on individual safety-associated components is gathered together by this safety monitor by means of the AS interface and is processed relevant to safety requirements. The safety monitor has one or two conventional safety-associated output circuits.



Transmission system

The heart of the system for enhancing safety-associated applications is a transmission system, which enables the transfer of safety-related status data using standard AS interface mechanisms.

Operational data bits transmitted via the AS interface become dynamic in character. The safety monitor now monitors the exchange of these dynamic bits of data between the standard AS interface Master unit and the inline safety AS interface modules. In the event of deviation from the target state, be it due to scanning of one of the connected safety components or as a result of malfunction or interruption in communication, the safety mode triggers the transmission to the safety status setting. In other words, the output contacts are set to the open state in the applicable safety control circuit.

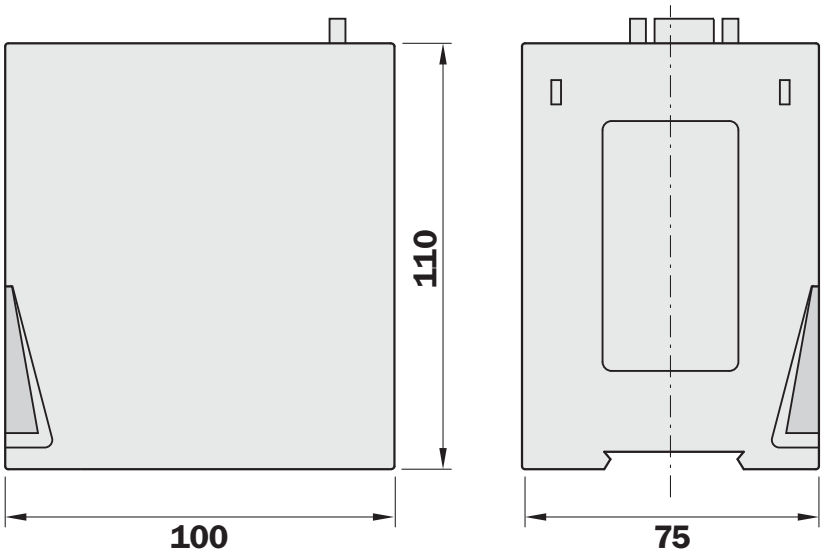
The procedure for transmission for the safety-related components of the system are designed such, that applications are effected up to Category 4 in accordance with EN 954-1.

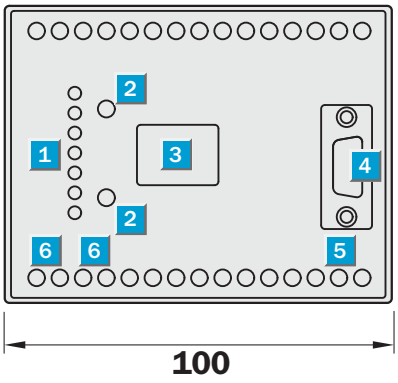
AS-i components

AS-i Master

- Serial interface
- Simple SPS “AS-i Control” II
- Advanced AS-i diagnostics
- AS-i version 2.1

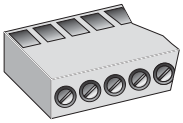
Dimensional drawing

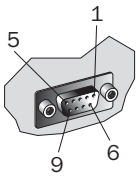




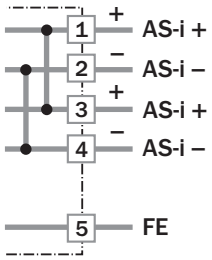
1 Status indicator LED
2 Buttons for manual operation
3 LCD display
4 RS 232C interface
5 Functional earth
6 AS-Interface® connection (power supply via AS-i cable)

Connection type

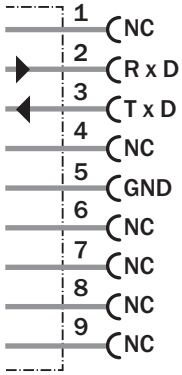




Terminals



RS 232C



Accessories

AS-i Control Tool Software
Connection cable PC – RS 232

Technical data		ASI -M 11320
Supply voltage V_S [1]	26.5 ... 31.6 V DC	
Operating current	Approx. 200 mA out of the AS-i circuit	
Interface	RS 232C	
Baud rates [2]	1200, 2400, 4800, 9600, 19,200,	
	38,400 or 57,800 Baud	
AS-i cycle time [3]	150 µs	
AS-Interface spezification	2.1	
Displays LCD	Slave addresses and error messages	
LED green (power)	Power on	
LED green (ser active) [4]	Serial interface	
LED red (config error)	Configuration error	
LED green (U ASI)	AS-i voltage “OK”	
LED green (ASI active)	AS-i normal operation	
LED green (prg enable)	Automatic slave programming enabled	
LED yellow (prj mode)	Configuration mode active	
Push-buttons	2 (mode/set)	
Voltages of insulation	500 V DC	
Product standard/EMC	EN 50295	
Ambient temperature T_A	Operation 0 ... +55 °C	
	Storage –25 ... +85 °C	
Enclosure rating to EN 60529	IP 20	
Tolerable loading impacts/vibrations [5]	Screw-mounting: b ≤ 30 g, T ≤ 11 ms	
	Spring lock-mounting: b ≤ 15 g, T ≤ 11 ms	
	Screw-mounting: f ≤ 55/s, a ≤ 1 mm	
	Spring lock-mounting: f ≤ 55/s, a ≤ 0,5 mm	
Housing	Housing with snap fastening, LDG-A-30	
Weight	420 g	

1) In accordance with AS-i spezification
2) Automatic recognition
3) Number of slaves + 1
4) Control programm active
5) Max. allowed values

Order information

Type	Part no.
ASI-M11320	6 022 373

Description of the micro programmed logic control system	
Processor	DS80C320
Programme memory (EEPROM)	600 bytes/16 Kbytes with activated AS-i Control Tool Software
Data storage capacity (bit/byte marker)	8 Kbytes
Remanent data storage capacity	128 byte marker
Clock speed (1 Kbit/1000 words)	1.8 ms/2.0 ms to 16 ms/18 ms, depending on the unit in question

Processing	
Control Command System	based on STEP5
Supplementary operations	8051 assembler, call-up from AS-i Master functions
Marker/register	8 Kbytes
Number of counters/timers	1024 in each instance
Counter/timer resolution	16 Bit
Programmable times	1 to 40950 ms
Inputs and Outputs	up to 248 E, 186 A. 124 analog values by means of AS-i slaves

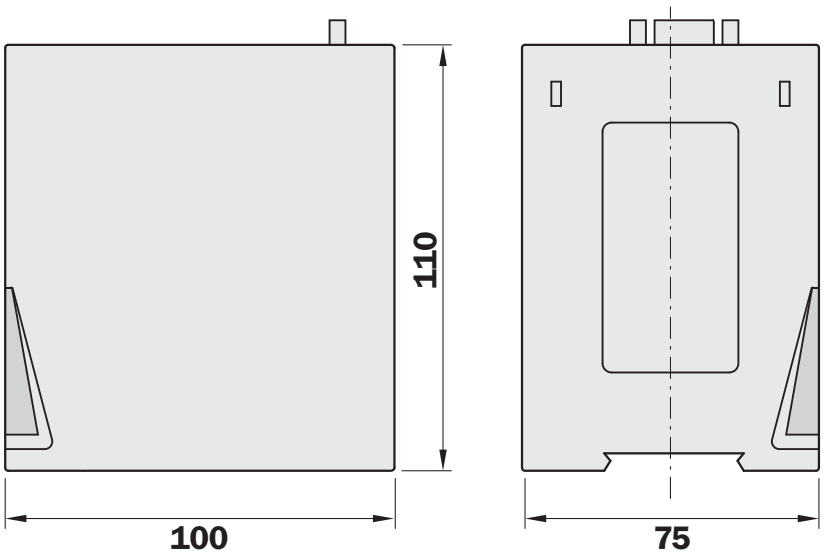
Programming	
Programming languages	Selection logic, assembler
Programming device	PC
Programming platform	DOS, MS Windows, Windows 95/98, Windows NT, Windows 2000
Programming software	AS-i control tools

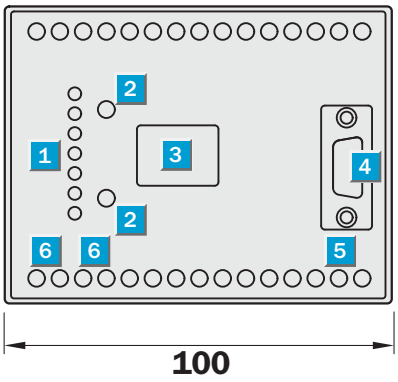
AS-i components

AS-i Profibus Gateway

- IP 20
- Advanced AS-i diagnostics
- AS-i version 2.1

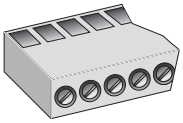
Dimensional drawing

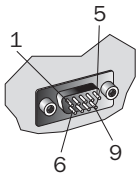




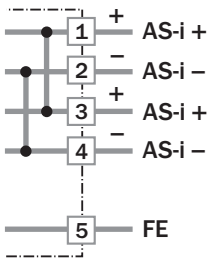
1 Status indicator LED
2 Buttons for manual operation
3 LCD display
4 Profibus interface
5 Functional earth
6 AS-Interface® connection (power supply via AS-i cable)

Connection type

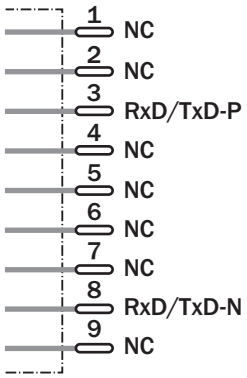




Terminals



Profibus



Accessories

AS-i Control Tool Software
Connection cable PC – RS 232
Profibus Master simulator

Technical data		ASI -M 31320
Supply voltage V_S [1]	26.5 ... 31.6 V DC	
Operating current	Approx. 200 mA out of the AS-i circuit	
Interface	Profibus, according to DIN 19245 Part 3	
Baud rates [2]	9.6 to 12,000 kBaud	
DP functions [3]	Imaging of the AS-i slaves	
AS-i cycle time [4]	150 µs	
AS-Interface spezification	2.1	
Displays LCD	Slave addresses and error messages	
LED green (power)	Power on	
LED green (ser active)	Profibus master recognized	
LED red (config error)	Configuration error	
LED green (U ASI)	AS-i voltage “OK”	
LED green (ASI active)	AS-i normal operation	
LED green (prg enable)	Automatic slave programming enabled	
LED yellow (prj mode)	Configuration mode active	
Push-buttons	2 (mode/set)	
Voltages of insulation	500 V DC	
Product standard/EMC	EN 50295	
Ambient temperature T_A	Operating 0 ... +55 °C	
	Storage –25 ... +85 °C	
Enclosure rating to EN 60529	IP 20	
Tolerable loading impacts/vibrations [5]	Screw-mounting: b ≤ 30 g, T ≤ 11 ms	
	Spring lock-mounting: b ≤ 15 g, T ≤ 11 ms	
	Screw-mounting: f ≤ 55/s, a ≤ 1 mm	
	Spring lock-mounting: f ≤ 55/s, a ≤ 0.5 mm	
Housing	Housing with snap fastening, LDG-A-30	
Weight	420 g	

1) In accordance with AS-i spezification
2) Automatic recognition
3) As I/O Data of the Profibus complete diagnosis and configuration via Profibus DP
4) Number of slaves + 1
5) Max. allowed values

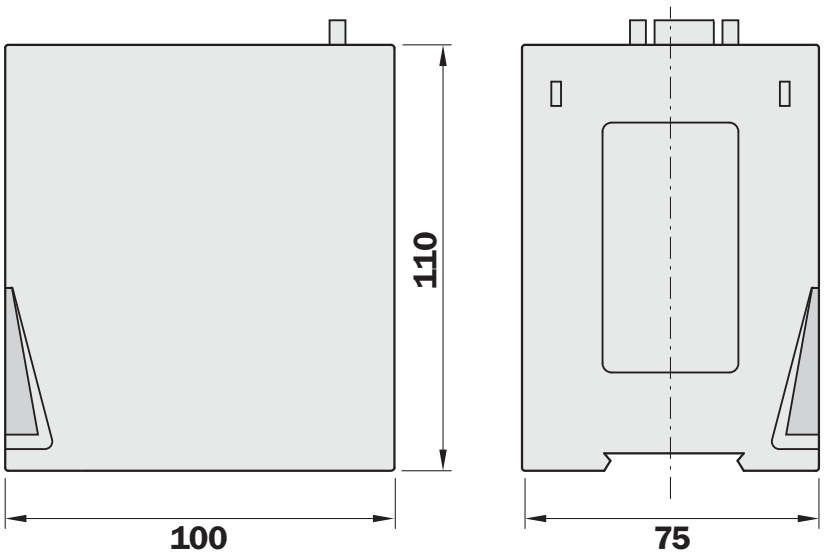
Order information	
Type	**Part no.**
ASI-M31320	6 022 376

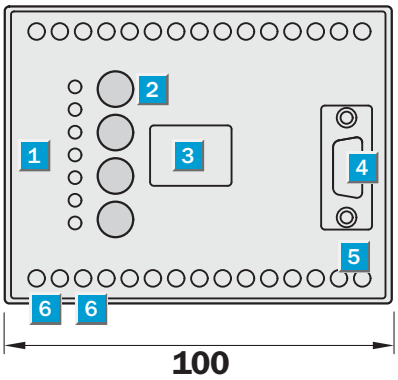
AS-i components

AS-i Profibus Gateway

- IP 20
- AS-i Control Tool
- Advanced AS-i diagnostics
- AS-i version 2.1
- On-site diagnostics with graphic display

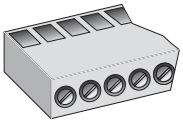
Dimensional drawing

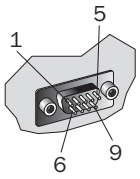




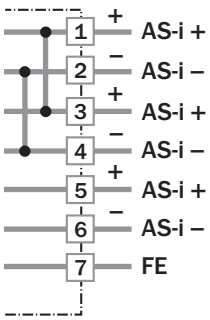
1 Status indicator LED
2 Buttons for manual operation
3 Graphic display
4 Profibus interface
5 Functional earth
6 AS-Interface® connection (power supply via AS-i cable)

Connection type

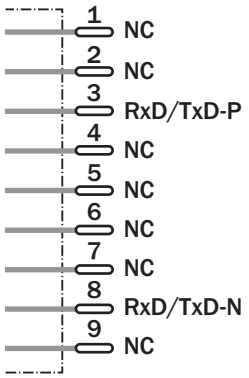




Terminals



Profibus



Zubehör

Software AS-i Control Tools
Connection cable PC – RS 232
Profibus Master simulator

Technical data		ASI -M 31321
Supply voltage V_S [1]	26.5 ... 31.6 V DC	
Operating current	Approx. 200 mA out of the AS-i circuit	
Interface	Profibus according to DIN 19245 Part 3	
Baud rates [2]	9.6 to 12,000 kBaud	
DP functions [3]	Imaging of the AS-i slaves	
AS-i cycle time [4]	150 µs	
AS-Interface spezification	2.1	
Displays Display	Menu guided display	
LED green (power)	Power on	
LED green (Profibus)	Profibus master recognized	
LED red (config error)	Configuration error	
LED green (U ASI)	AS-i voltage “OK”	
LED green (ASI active)	AS-i normal operation	
LED green (prg enable)	Automatic slave programming enabled	
LED yellow (prj mode)	Configuration mode active	
Push-buttons	4 (mode/↑; ok; ESC; set/↓)	
Voltages of insulation	500 V DC	
Product standard/EMC	EN 50295	
Ambient temperature T_A	Operating 0 ... +55 °C	
	Storage –25 ... +85 °C	
Enclosure rating to EN 60529	IP 20	
Tolerable loading impacts/vibrations [5]	Screw-mounting: b ≤ 30 g, T ≤ 11 ms	
	Spring lock-mounting: b ≤ 15 g, T ≤ 11 ms	
	Screw-mounting: f ≤ 55/s, a ≤ 1 mm	
	Spring lock-mounting: f ≤ 55/s, a ≤ 0.5 mm	
Housing	Housing with snap fastening, LDG-A-30	
Weight	420 g	

1) In accordance with AS-i spezification
2) Automatic recognition
3) As I/O Data of the Profibus complete diagnosis and configuration via Profibus DP
4) Number of slaves + 1
5) Max. allowed values

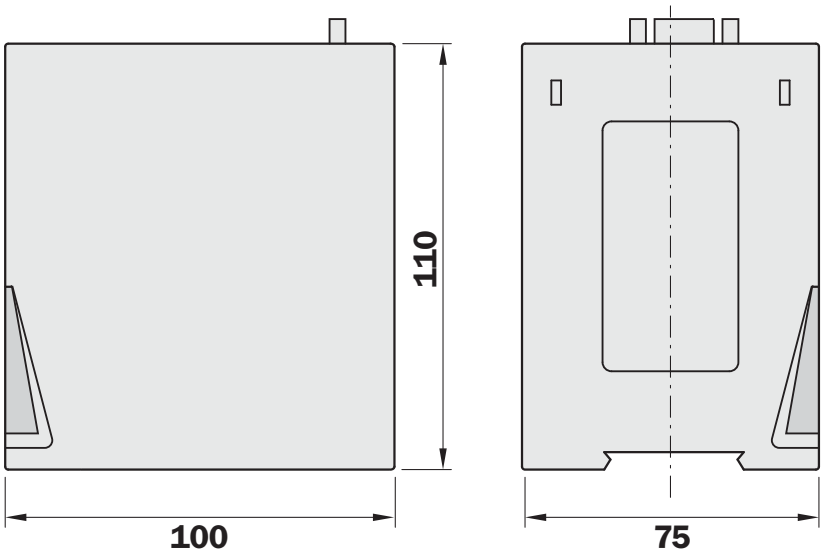
Order information	
Type	**Part no.**
ASI-M31320	6 027 500

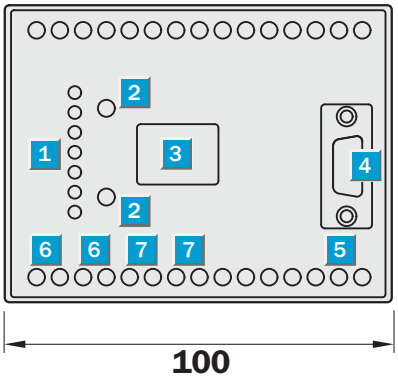
AS-i components

AS-i Profibus Gateway

- IP 20
- Advanced AS-i diagnostics
- AS-i version 2.1
- Two AS interface Master units in a single housing

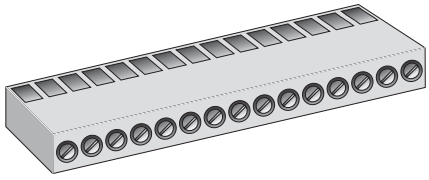
Dimensional drawing

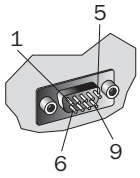




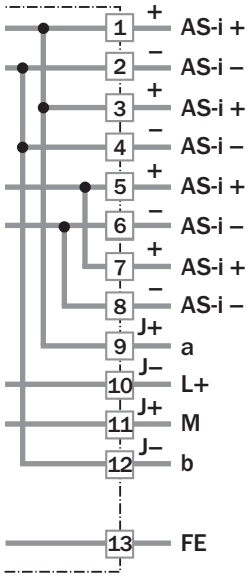
1 Status indicator LED
2 Buttons for manual operation
3 LCD display
4 Profibus interface
5 Functional earth
6 AS-Interface® connection 1 (power supply via AS-i cable)
7 AS-Interface connection 2 (power supply via AS-i cable)

Connection type

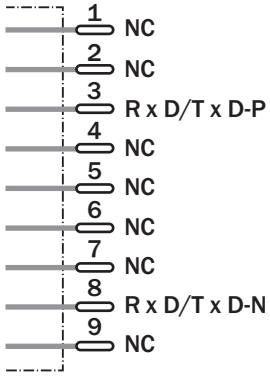




Terminals



Profibus



Accessories

AS-i Control Tool Software
Connection cable PC – RS 232
Profibus Master simulator

Technical data		ASI -M 32320
Supply voltage V_S [1]	26.5 ... 31.6 V DC	
Operating current	Approx. 200 mA out of the AS-i circuit	
Interface	Profibus, according to DIN 19245 Part 3	
Baud rates [2]	9.6 to 12,000 kBaud	
DP functions [3]	Imaging of the AS-i slaves	
AS-i cycle time [4]	150 µs	
AS-Interface spezification	2.1	
Displays LCD	Slave addresses and error messages	
LED green (AS-i 2)	AS-i 2 active	
LED green (bus active)	Profibus master recognized	
LED red (config error)	Configuration error	
LED green (power)	Power on	
LED green (U ASI)	AS-Interface voltage “OK”	
LED green (prg enable)	Automatic slave programming enabled	
LED yellow (prj mode)	Configuration mode active	
Push-buttons	2 (mode/set)	
Voltages of insulation	500 V DC	
Product standard/EMC	EN 50295	
Ambient temperature T_A	Operating 0 ... +55 °C	
	Storage –25 ... +85 °C	
Enclosure rating to EN 60529	IP 20	
Tolerable loading impacts/vibrations [5]	Screw-mounting: b ≤ 30 g, T ≤ 11 ms	
	Spring lock-mounting: b ≤ 15 g, T ≤ 11 ms	
	Screw-mounting: f ≤ 55/s, a ≤ 1 mm	
	Spring lock-mounting: f ≤ 55/s, a ≤ 0.5 mm	
Housing	Housing with snap fastening, LDG-A-30	
Weight	420 g	

1) In accordance with AS-i spezification
2) Automatic recognition
3) As I/O Data of the Profibus complete diagnosis and configuration via Profibus DP
4) Number of slaves + 1
5) Max. allowed values

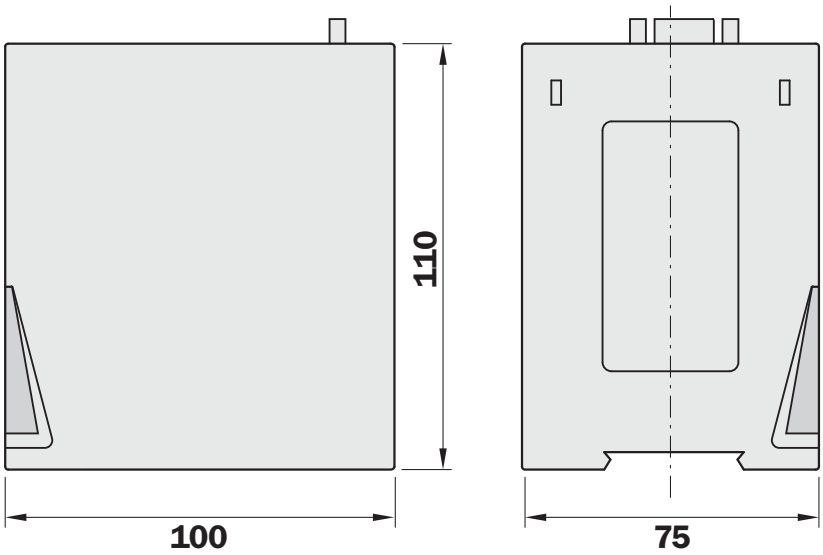
Order information	
Type	**Part no.**
ASI-M32320	6 022 377

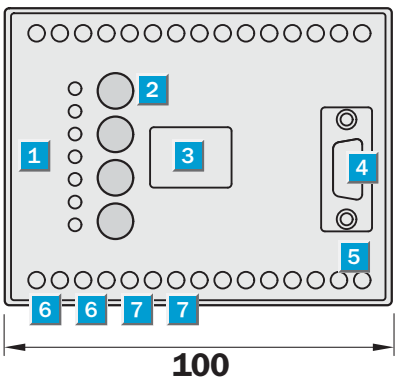
AS-i components

AS-i Profibus Gateway

- IP 20
- AS-i Control Tool
- Advanced AS-i diagnostics
- AS-i version 2.1
- Two AS interface Master units in a single housing
- On-site diagnostics with graphic display

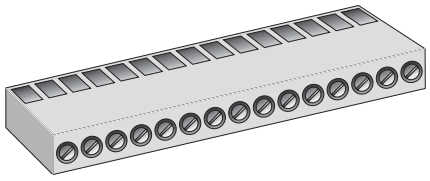
Dimensional drawing

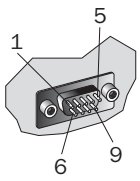




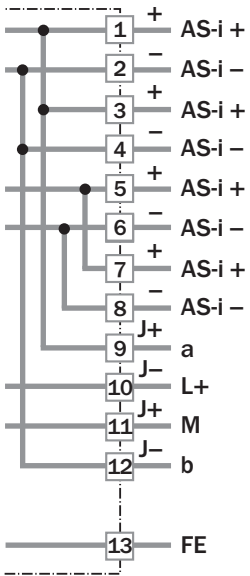
1 Status indicator LED
2 Buttons for manual operation
3 Graphic display
4 Profibus interface
5 Functional earth
6 AS-Interface® connection 1 (power supply via AS-i cable)
7 AS-Interface connection 2 (power supply via AS-i cable)

Connection type

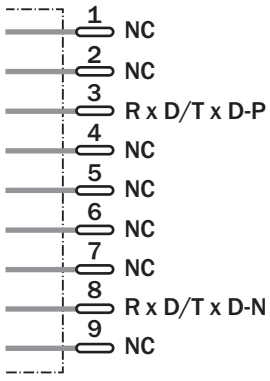




Terminals



Profibus



Accessories
AS-i Control Tool Software
Connection cable PC – RS 232
Profibus Master simulator

Technical data		ASI -M 32320
Supply voltage V_S [1]		26.5 ... 31.6 V DC
Operating current		Approx. 200 mA out of the AS-i circuit
Interface		Profibus, according to DIN 19245 Part 3
Baud rates [2]		9.6 to 12,000 kBaud
DP functions [3]		Imaging of the AS-i slaves
AS-i cycle time [4]		150 µs
AS-Interface spezification		2.1
Displays	Display	Menu guided display
	LED green (power)	Electrical supply On
	LED green (Profibus)	Profibus master recognized
	LED red (config error)	Configuration error
	LED green (U ASI)	AS-Interface voltage “OK”
	LED green (AS-i active)	AS interface operation normal
	LED green (prg enable)	Automatic slave programming enabled
	LED yellow (prj mode)	Configuration mode active
Push-buttons		4 (mode/↑; ok; ESC; set/↓)
Voltages of insulation		500 V DC
Product standard/EMC		EN 50295
Ambient temperature T_A	Operating	0 ... +55 °C
	Storage	–25 ... +85 °C
Enclosure rating to EN 60529		IP 20
Tolerable loading impacts/vibrations [5]		Screw-mounting: b ≤ 30 g, T ≤ 11 ms
		Spring lock-mounting: b ≤ 15 g, T ≤ 11 ms
		Screw-mounting: f ≤ 55/s, a ≤ 1 mm
		Spring lock-mounting: f ≤ 55/s, a ≤ 0.5 mm
Housing		Housing with snap fastening, LDG-A-30
Weight		420 g

1) In accordance with AS-i spezification
2) Automatic recognition
3) As I/O Data of the Profibus complete diagnosis and configuration via Profibus DP
4) Number of slaves + 1
5) Max. allowed values

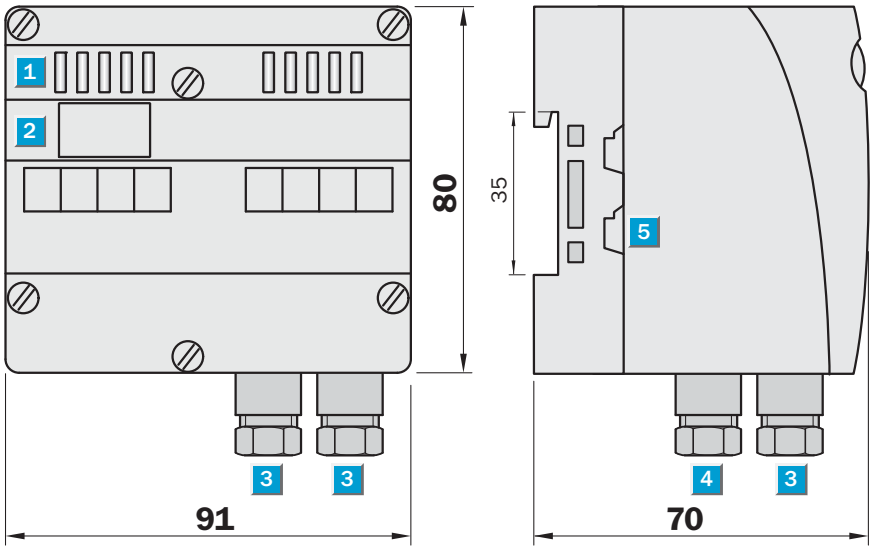
Order information	
Type	**Part no.**
ASI-M32321	6 027 501

AS-i components

AS-i Profibus Gateway

- IP 65
- Advanced AS-i diagnostics
- AS-i version 2.1

Dimensional drawing

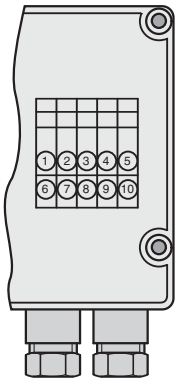


1 Status indicators LED
2 LCD display
3 Profibus interface via a Sub D data cable (PG screwed connection)
4 Functional earth (Connection via PC screwed connection in housing)
5 AS-Interface® connection (power supply via AS-i cable)

With scheduling resistances that can be switched on and off.
FK lower part not included with delivery.

Connection type

1	RxD/TxD-N (data line A)
2	RxD/TxD-P (data line B)
3	RxD/TxD-N (data line A)
4	RxD/TxD-P (data line B)
5	0 V
6	Shield
7	FE functional earth
8	FE functional earth
9	Shield
10	+ 5 V



Accessories
AS-i Control Tool Software
Cable receptacles PC RS 485
Profibus Master simulator

Technical data		ASI -M 31330
Supply voltage V_S [1]	26.5 ... 31.6 V DC	
Operating current	Approx. 200 mA out of the AS-i circuit	
Interface	Profibus, according to DIN 19245 Part 3	
Baud rates [2]	9.6 to 12,000 kBaud	
DP functions [3]	Imaging of the AS-i slaves	
AS-i cycle time [4]	150 µs	
AS-Interface spezification	2.1	
Displays LCD	Slave addresses and error messages	
LED green (power)	Power on	
LED green (ser active)	Profibus master recognized	
LED red (config error)	Configuration error	
LED green (U ASI)	AS-i voltage “OK”	
LED green (ASI active)	AS-i normal operation	
LED green (prg enable)	Automatic slave programming enabled	
LED yellow (prj mode)	Configuration mode active	
Push-buttons	2 (mode/set)	
Voltages of insulation	500 V DC	
Product standard/EMC	EN 50295	
Ambient temperature T_A	Operation 0 ... +55 °C	
	Storage –25 ... +85 °C	
Enclosure rating to EN 60529	IP 65	
Tolerable loading impacts/vibrations [5]	Screw-mounting: b ≤ 30 g, T ≤ 11 ms	
	Spring lock-mounting: b ≤ 15 g, T ≤ 11 ms	
	Screw-mounting: f ≤ 55/s, a ≤ 1 mm	
	Spring lock-mounting: f ≤ 55/s, a ≤ 0.5 mm	
Housing	Housing with snap fastening, PA	
Weight	420 g	

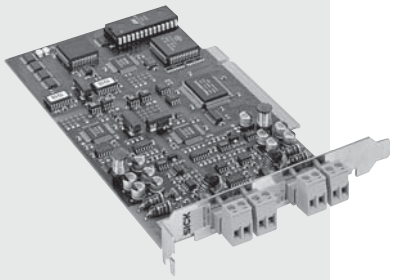
1) In accordance with AS-i spezification
2) Automatic recognition
3) As I/O Data of the Profibus complete diagnosis and configuration via Profibus DP
4) Number of slaves + 1
5) Max. allowed values

Order information	
Type	**Part no.**
ASI-M31330	6 022 378

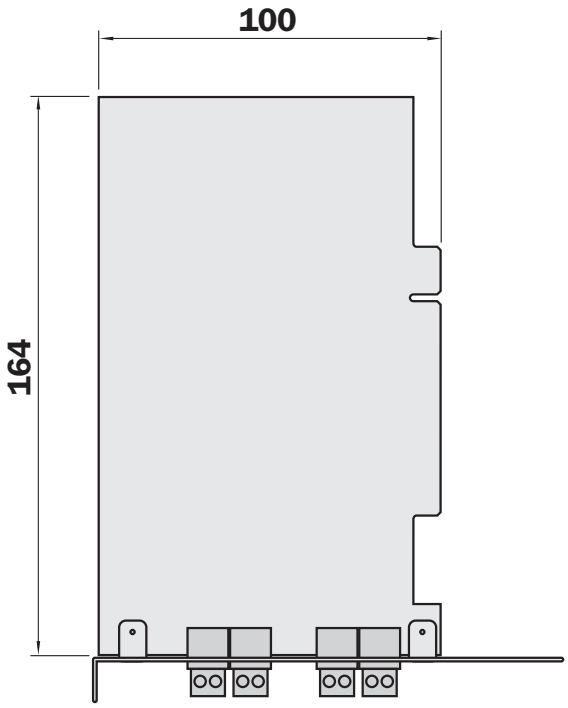
AS-i components

AS-i Master

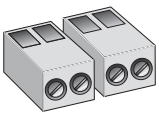
- AS-i Master Board for AT-PCs
- Two AS-i Masters on one board
- Micro PLC AS Interface Control II
- Watchdog
- Advanced AS-i diagnostics
- AS-i version 2.1



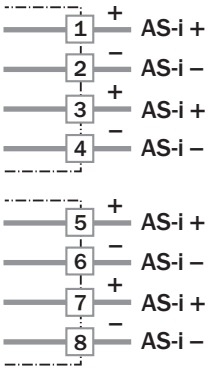
Dimensional drawing



Connection type



Terminals



Accessories

AS-i Control Tool Software

Technical data	ASI	-M 22310
Supply voltage V_S	Supply via PC and AS-i	
Operating current	Approx. 200 mA out of PC power supply	
	Approx. 70 mA from AS-i (per AS-i circuit)	
Type	PCI card	
Interface [1]	16 bit PCI bus interface	
	AS-i circuit 1	
	AS-i circuit 2	
Connection type	PC plug-in card location, Plug & Play	
ASI-cycle time [2]	150 µs	
ASI spezification	2.1	
Voltages of insulation	500 V	
Product standard/EMC	EN 50295	
Ambient temperature T_A	Operating 0 ... +55 °C	
	Storage –25 ... +70 °C	
Weight	125 g	

1) Galvanic separation from AS-i
2) Number of slaves + 1

Description of the micro programmed logic control system	
Processor	DS80C320
Programme memory (EEPROM)	600 bytes/16 Kbytes with activated AS-i Control Tool Software
Data storage capacity (bit/byte marker)	8 Kbytes
Remanent data storage capacity	128 byte marker
Clock speed (1 Kbit/1000 words)	1.8 ms/2.0 ms to 16 ms/18 ms, depending on the unit in question

Processing	
Control Command System	based on STEP5
Supplementary operations	8051 assembler, call-up from AS-i Master functions
Marker/register	8 Kbytes
Number of counters/timers	1024 in each instance
Counter/timer resolution	16 Bit
Programmable times	1 to 40950 ms
Inputs and Outputs	up to 248 E, 186 A. 124 analog values by means of AS-i slaves

Programming	
Programming languages	Selection logic, assembler
Programming device	PC
Programming platform	DOS, MS Windows, Windows 95/98, Windows NT, Windows 2000
Programming software	AS-i control tools

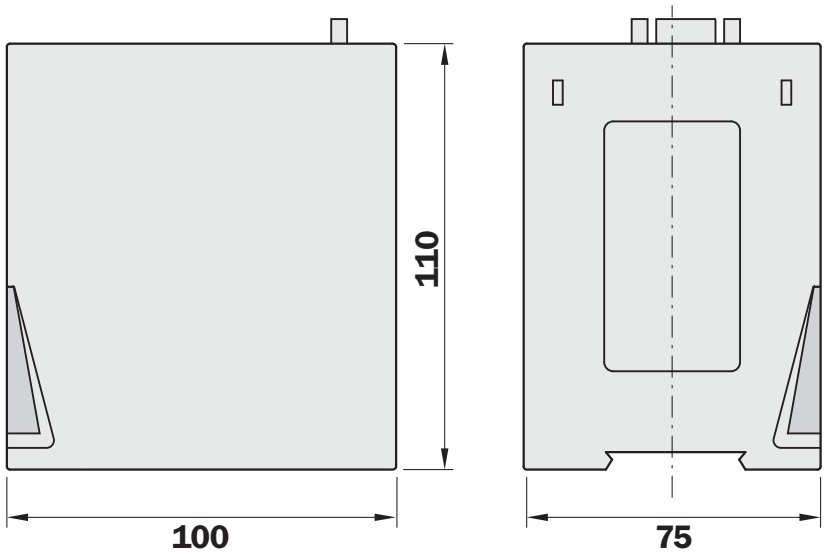
Order information	
Type	**Part no.**
ASI-M22310	6 022 380

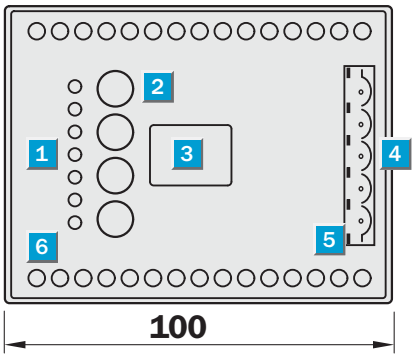
AS-i components

AS-i DeviceNet-Gateway

- IP 20
- Serial Interface
- Configuration with DeviceNet Manager Software optional
- Advanced AS-i diagnostics
- AS-i version 2.1
- On-site diagnostics with graphic display

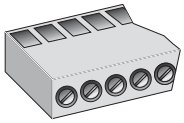
Dimensional drawing



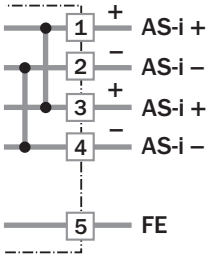


1 Status indicator LED
2 Buttons for manual operation
3 LCD display
4 DeviceNet Interface
5 Functional earth
6 AS-Interface® connection (power supply via AS-i cable)

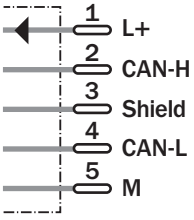
Connection type



Terminals



DeviceNet



Accessories

AS-i Control Tool Software
DeviceNet Master simulator

Technical data		ASI -M 51321
Supply voltage V_S [1]	26.5 ... 31.6 V DC	
Operating current	approx. 200 mA out of the AS-i circuit	
Interface	DeviceNet: to spezification[2]	
ASI-cycle time[3]	150 µs	
AS-Interface spezification	2.1	
Displays LCD	Slave addresses and error messages	
LED green (power)	DeviceNet voltage “OK”	
LED green/red (MNS)	Module/Net Status	
LED red (config error)	Configuration error	
LED green (U ASI)	AS-i voltage “OK”	
LED green (ASI active)	AS-i normal operation	
LED green (prg enable)	Automatic slave programming enabled	
LED yellow (prj mode)	Configuration mode active	
Push-buttons	4 (mode/↑; ok; ESC; set/↓)	
Voltages of insulation	500 V DC	
Product standard/EMC	EN 50295	
Ambient temperature T_A	Operation 0 ... +55 °C	
	Storage –25 ... +85 °C	
Enclosure rating to EN 60529	IP 20	
Tolerable loading impacts/vibrations[4]	Screw-mounting: b ≤ 30 g, T ≤ 11 ms	
	Spring lock-mounting: b ≤ 15 g, T ≤ 11 ms	
	Screw-mounting: f ≤ 55/s, a ≤ 1 mm	
	Spring lock-mounting: f ≤ 55/s, a ≤ 0,5 mm	
Housing	Housing with snap fastening, LDG-A-30	
Weight	420 g	

[1] In accordance with AS-i spezification
[2] 5-pin combicon plug
[3] Number of slaves + 1
[4] Max. allowed values

Order information	
Type	**Part no.**
ASI-M51321	6 022 379 *)

*) On request

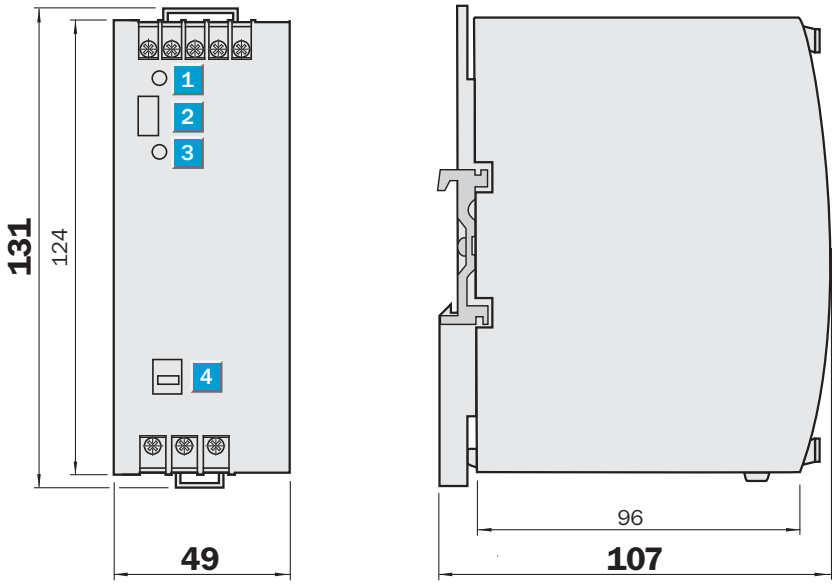
AS-i components

AS-i power supply unit

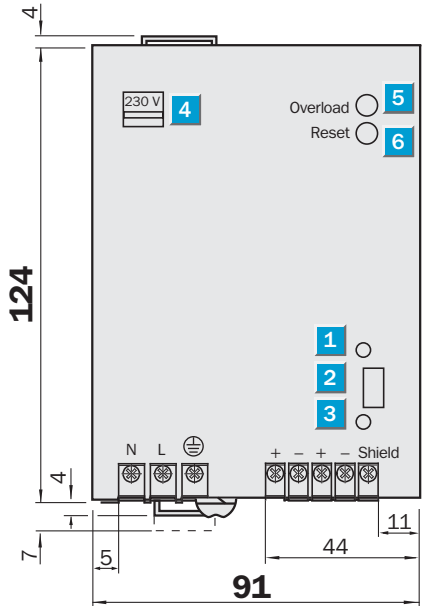
- Easy mounting on DIN rail TS 35
- Overload and short-circuit protected
- Mains power input and output indirect-coupled
- Integrated data decoupling
- Plug-in bridge for switching off AS-i communication

Dimensional drawing

HN.SL A3.100

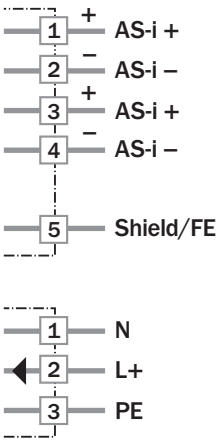


HN.SL A8.100



1 LED green, AS-i power supply OK
2 Plug-in bridge for switching off AS-i communication
3 LED red, AS-i communication interrupted
4 Switch 230 V DC/110 V DC
5 Red flashing LED in FKSE mode
6 Switch for resetting the FVSE mode

Connection type



Technische Daten		HN	SL A3. 100	SL A8. 100
Voltage rating	115/230 V AC [1]		■	■
Supply voltage V_S	85 ... 132 V AC/196 ... 264 V AC		■	■
Output current	2.8 A		■	
	8 A			■
Short-circuit protected			■	■
Overload protected			■	■
Network nominal frequency	47 ... 63/s		■	■
Efficiency factor	90.5 %		■	
	92 %			■
Output voltage [2]	29.5 ... 31.6 V DC to PELV		■	■
Standby delay time	100 ms typ.		■	
	300 ms typ.			■
Derating	2 W/k at 60 °C		■	
	6 W/k at 60 °C			■
Power outage bridging time [3]	26 ms		■	
	10 ms			■
Switch-on peak current [4]	20 A (132 V AC), 38 (264 V AC)		■	
	< 14 A (120 V AC), < 27 A (240 V AC)			■
Fuses	T3 15 A/250 V integrated		■	
	T 8 A/250 V HBC			■
Ripple	< 50 mV_{PP}		■	■
Display LED green/red	AS-i communication		■	■
Ambient temperature T_A	Operation –10 ... + 70 °C		■	■
	Storage –25 ... +85 °C		■	■
Enclosure rating	IP 20		■	■
AS-i certificate	34401		■	
	41601			■
EMC	EN 50081-1, EN 61000-6-2		■	■
LVD (low-voltage directive)	EN 60950, EN 50178		■	■
	EN 61000-3-2 (A 14), EN 61000-3-3		■	■
Product standard	EN 50295		■	■
Housing material	Aluminum, galvanized sheet steel		■	■
Weight	496 g		■	
	890 g			■

[1] 230 V AC default
[2] Output is short-circuit protected and protected against no-load and overload occurrences
[3] Load dependent
[4] Not accessible

Order information	
Type	**Part no.**
HN.SL A3.100	6 022 381
HN.SL A8.100	6 022 382

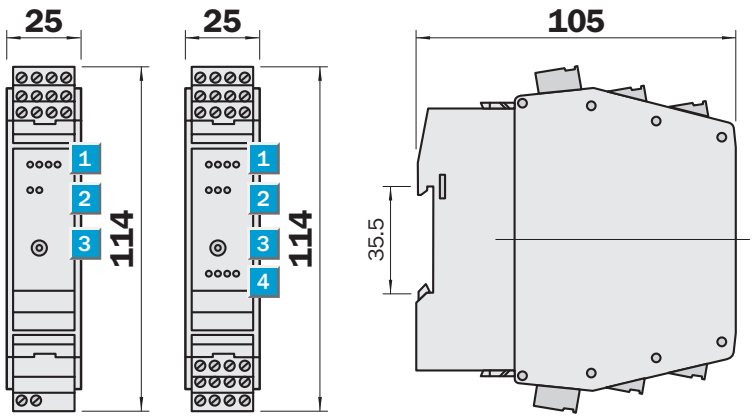
AS-i components

AS-i Smartline switch cabinet modules

- For cabinet mounting
- Digital inputs and outputs
- Sensor/actuator, connection via combicon plug
- Support rail fastening
- AS-i version 2.1
- Connection of 2-wired and 3-wired sensors

Dimensional drawing

ASI-S12320 | ASI-S24220

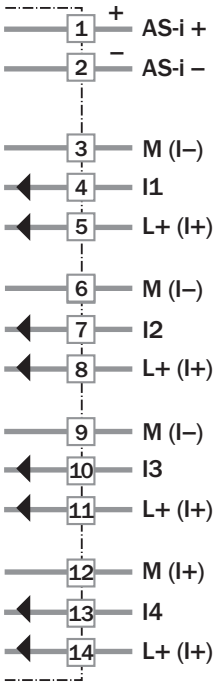


Combicon plug not included with delivery.

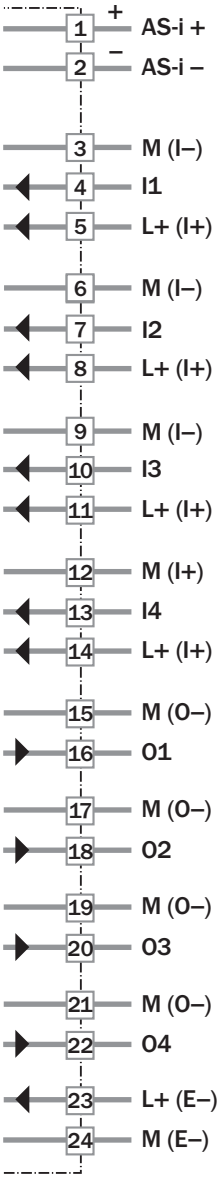
1 LED array 1
2 LED array 2
3 Addressing socket
4 LED array 3

Connection type

ASI-S12320



ASI-S24220



Accessories

AS-i address equipment
AS-i address cable
Combicon plug

Technical data		ASI	-S 12320	-S 24220
Digital inputs		**4**	■	■
Digital outputs (transistor)		**4**		■
Supply voltage V_S [1]		26.5 ... 31.6 V DC	■	■
Current consumption total		≤ 240 mA	■	■
Inputs				
Input circuit		PNP	■	■
Sensor supply via		AS-i	■	■
Voltage area		18 ... 30 V DC	■	■
Current loading [2]		200 mA	■	■
Inputs		Short-circuit protection	■	■
Switching level HIGH signal 1		≥ 10 V	■	■
Input current HIGH/LOW		≥ 6 mA/≤ 2 mA	■	■
Outputs		PNP		■
Electrically separated				■
Short-circuit protected				■
Watchdog integrated				■
Current load per output (DC 13) [3]		1 A		■
Extern supply voltage [4]		10 ... 30 V DC required		■
Current load per module		4 A		■
AS-i interface reserve-polarity prot.			■	■
AS-i profile		S-0.A.E	■	
		S-7.0.E		■
AS interface spezification		2.1	■	■
Extended address mode available			■	
AS-i certificate		40801	■	
		40701		■
Product standard/EMC		EN 50295	■	■
Enclosure rating to EN 60529		IP 20	■	■
Ambient temperature T_A		Operation –25 ... + 70 °C	■	■
		Storage –40 ... +100 °C	■	■
Display	LED green	AS-i voltage	■	■
	LED yellow	In-/output signals	■	■
	LED green	24 V supply	■	■
	LED red	Communication error [5]	■	■
Addressing via addressing socket			■	■
Housing material		PA 6.6	■	■
Weight		110 g	■	■
Connection to AS interface		Via combicon plug	■	■

1) In accordance with AS-i spezification
2) For all inputs total
3) Category of use (DC 13): On and Off switching capacity for activation of electro-solenoids is designed for use up 20 W (in accordance with IEC 609-47-5-2)
4) Via combicon plug to PELV
5) Peripherie error

Order information	
Type	**Part no.**
ASI-S12320	6 022 383
ASI-S24220	6 022 384

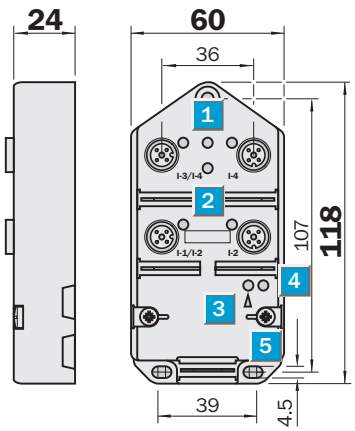
AS-i components

AS-i Compact field modules

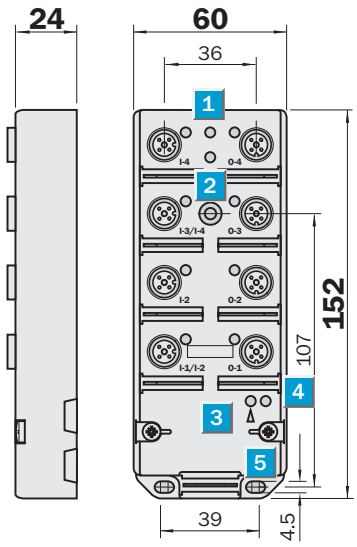
- For field applications IP 67
- Digital inputs and outputs
- External voltage supply via 24 V flat cable
- Inputs Y-circuit for connection of 3- or 4-wire sensors
- AS-i version 2.1

Dimensional drawing

ASI-S12343
ASI-S21243



ASI-S24243



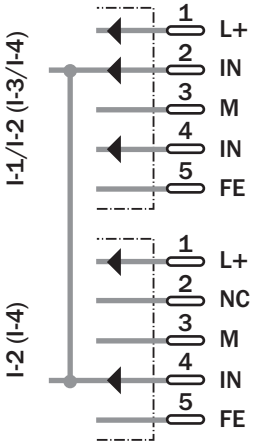
1 LED green: AS-i-Power
2 LED green: output voltage
3 LED red: FAULT
4 IR interface
5 Function ground FE

Two protection caps for M12 connectors included with delivery.

Connection type

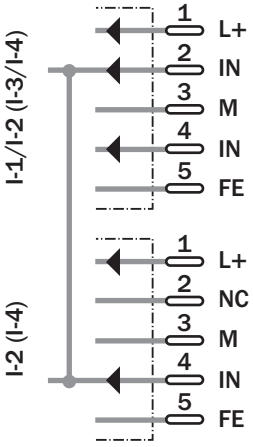
ASI-S12343

Socket 1 – 4
Input 1 – 4

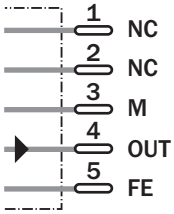


ASI-S21243
ASI-S24243

Socket 1 – 4
Input 1 – 4



Socket 1 – 4
Output 1 – 4



Accessories

- AS-i addressing unit
- AS-i address cable
- Safety cap for M12 female connector
- Connectors

Technical data		ASI -S 12343	ASI -S 21243	ASI -S 24243
Digital inputs	**2**		■	
	4	■		■
Digital outputs	**2**		■	
	4			■
Supply voltage V_S [1]	26.5 ... 31.6 V DC	■	■	■
Current consumption total	≤ 242 mA	■		■
	≤ 142 mA		■	
Inputs				
Input circuit	PNP	■	■	■
Sensor supply via	ASI	■	■	■
Voltage area	20 ... 30 V DC	■	■	■
Current loading [2]	200 mA	■		■
	100 mA		■	
Inputs	Short-circuit protection	■	■	■
Switching level HIGH signal 1	≥ 10 V	■	■	■
Input current HIGH/LOW	≥ 5 mA/≤ 1.5 mA	■	■	■
Outputs				
Electrically separated			■	■
Short-circuit protected			■	■
Watchdog integrated			■	■
Current load per output	2 A		■	■
Extern supply voltage [3]	24 V DC required		■	■
Current load per module	4 A		■	■
AS-i interface reserve-polarity prot.		■	■	■
AS-i profile	S-0.A.E	■		
	S-3.F.E		■	
	S-7.F.E			■
AS interface spezification	2.1	■	■	■
Extended address mode available		■		
Product standard/EMC	EN 50295	■	■	■
Enclosure rating to EN 60529	IP 67	■	■	■
Ambient temperature T_A	Operation –25 ... +80 °C	■	■	■
	Storage –40 ... +100 °C	■	■	■
Displays LED yellow	In-/output signals	■	■	■
LED green	AS-i voltage	■	■	■
LED red	Communication error [4]	■	■	■
Addressing via IR interface		■	■	■
Housing material	Polyurethan	■	■	■
Weight	203 g	■	■	
	301 g			■
Connection to AS interface	Via contact pins inside of the device [5]	■	■	■

1) In accordance with AS-i spezification
2) For all inputs total
3) Via AS interface ribbon cable to PELV
4) Peripherie error
5) Without separate FK lower part

Order information

Type	Part no.
ASI-S12343	6 022 387
ASI-S21243	6 022 388
ASI-S24243	6 022 389

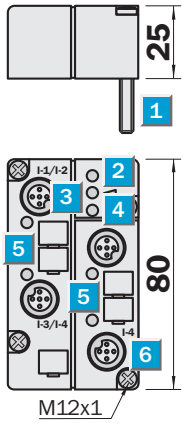
AS-i components

AS-i Classic field modules

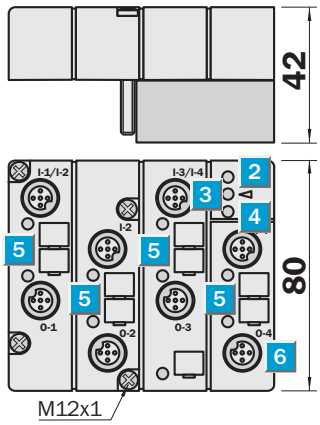
- For field applications IP 67
- AS-i interface to FK and FKE lower parts
- Extern supply voltage via 24 V flat cable
- Inputs Y-circuit for connection of 3- or 4-wire sensors
- AS-i version 2.1

Dimensional drawing

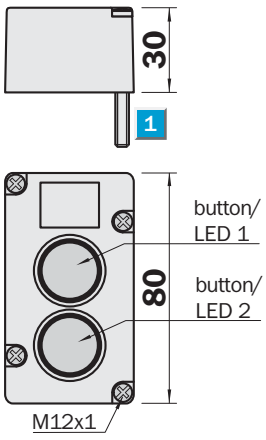
ASI-S12233
ASI-S21334



ASI-S24233



ASI-S23130

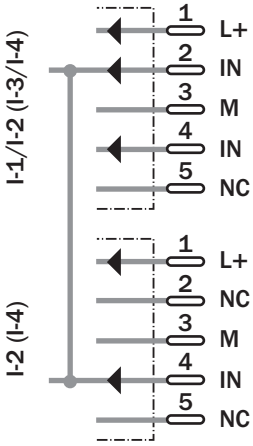


1 Screws for mounting on module lower part
2 LED red: FAULT
3 Attachment of IR adapter
4 LED green: PWR, power supply OK
5 LED yellow: status indicator
6 Connectors, M12

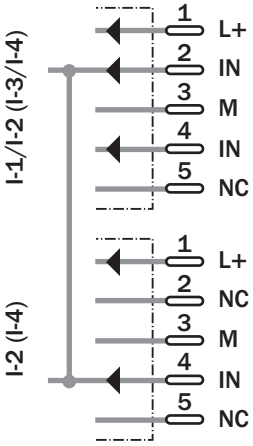
Protection cap for M12 connectors not included with delivery.
FK lower parts must be ordered separately.

Connection type

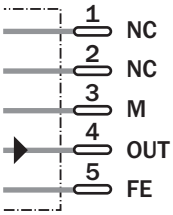
ASI-S12233
Socket 1 – 4
Input 1 – 4



ASI-S24233
Socket 1 – 4
Input 1 – 4



Socket 1 – 4
Output 1 – 4



Accessories

AS-i addressing unit
AS-i address cable
FK lower parts
Protection cap for M12 connector
Connectors

Technical data			ASI	-S 12233	-S 21334	-S 24233	-S 23130
Digital inputs			**4**	■		■	
			2		■		
Digital outputs			**4**			■	
			2		■		
Supply voltage V_S [1]			26.5 ... 31.6 V DC	■	■	■	■
Current consumption total			≤ 240 mA	■			
			≤ 250 mA			■	
			≤ 55 mA (LED ein)				■
			≤ 135 mA		■		
Inputs							
Input circuit			PNP	■	■	■	
Sensor supply via			AS-i	■	■	■	
Voltage area			20 ... 30 V DC	■	■	■	
Current loading [2]			200 mA	■		■	
			100 mA		■		
Short-circuit protected				■	■	■	
Switching level HIGH signal 1			≥ 10 V	■	■	■	
Input current HIGH/LOW			≥ 5 mA/≤ 1.5 mA	■	■	■	
Outputs							
Electrically separated					■	■	
Short-circuit protected					■	■	
Watchdog integrated					■	■	
Current load per output (DC 13) [3]			1 A		■	■	
Extern supply voltage [4]			24 V DC required		■	■	
Current load per module			2 A		■	■	
AS-i interface reserve-polarity prot.				■	■	■	■
AS-i profile			S-0.F.E	■			
			S-7.F.E			■	
			S-3.F				■
			S-B.A.E		■		
AS interface spezification			2.1	■	■	■	
			2.0				■
Extended address mode available					■		
AS-Interface Certificate			33601				■
Product standard/EMC			EN 50295	■	■	■	■
Enclosure rating to EN 60529			IP 67	■	■	■	■
Ambient temperature T_A			Operation –25 ... +80 °C	■	■	■	
			Storage –40 ... +100 °C	■	■	■	
			Operation –25 ... +60 °C				■
			Storage –40 ... +85 °C				■
Display	LED yellow		In-/output signals	■	■	■	
	LED green		Display AS-i voltage	■	■	■	
	LED red		Communication error [5]	■	■	■	
	Push-button 2		Data bit D0				■
	Push-button 1		Data bit D1, color selectable				■
	LED 2 [6]		Data bit D2				■
	LED 1 [6]		Data bit D3				■
Addressing via IR interface				■	■	■	
Housing material			PBTP (Pocan)	■	■	■	■
Weight			84 g	■	■		
			158 g			■	
			93 g				■
Connection to AS interface			Via contact pins [7]	■	■	■	■

1) In accordance with AS-i spezification
2) For all inputs total
3) Category of use (DC 13)
ON an OFF switching capacity for activation of electro-solenoids is designed for use up 20 W (in accordance with IEC 609-47-5-2)
4) Via AS interface flat cable to PELV
5) Peripherie error
6) Color is set by the supplied pressure hood corresponding to scanner 1/2
7) On FK or FKE lower parts or FK-A or FKE-A lower parts

Order information

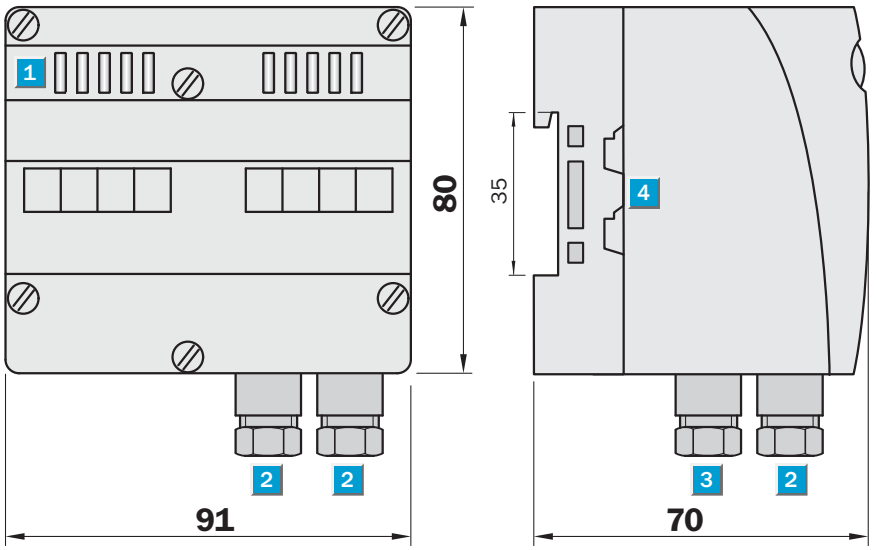
Type	Part no.
ASI-S12233	6 022 390
ASI-S21334	6 022 391
ASI-S24233	6 022 392
ASI-S23130	6 022 393

AS-i components

AS-i Analog module

- For field applications IP 65
- 2 analog inputs 4 ... 20 mA
- AS-i Version 2.1
- Sensor supply via AS-i or 24 V flat cable.

Dimensional drawing



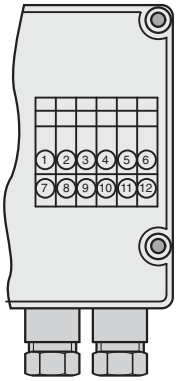
1 Status indicators LED
2 Sensor connection
3 Functional earth (via PC screwed connection in housing)
4 AS-Interface® connection (power supply via AS-i cable)

PG dummy plugs contained in package.

FK lower parts must be ordered separately.

Connection type

1	+ 24 V Output
2	Sig.+Ch2
3	GND
4	Sig.–Ch2
5	Schield
6	Shield
7	+ 24 V Output
8	Sig.+Ch1
9	GND
10	Sig.–Ch1
11	FE function ground
12	FE function ground



Accessories

- AS-i addressing unit
- FK lower parts
- AS-i address cable
- Connectors

Technical data		ASI -S 41250
Analog Inputs		**2**
Supply voltage [1]		26.5 ... 31.6 V DC
Current consumption total		< 80 mA
Sensor supply		via AS-i/ext.
Internal resistance		50 Ω
Current loading per input		40 mA
Resolution		16 Bit/1 µA
AS-i profile		7.3
AS Interface spezification		2.1
Voltages of insulation		500 V DC
ID-Code		3_{hex}
ID2-Code		D_{hex}
IO-Code		7_{hex}
Displays	LED green (analog 1)	Status of channel 1
	LED green (analog 2)	Status of channel 2
	LED green (power)	Voltage supply 24 V DC for analog module
	LED green (AS-i)	Voltage at AS-i terminals
	LED red (FAULT)	AS-i Communucation/Peripherie error
Product standard/EMC		EN 50295
Ambient temperature T_A		Operation 0 ... +70 °C
		Storage –25 ... +85 °C
Enclosure rating to EN 60529		IP 65
Housing material		PA
Weight		242 g
Connection to AS interface		Via contact pins[2]

[1] In accordance with AS-i spezification
[2] On FK/FK-A/FKE or FKE-A lower part

Order information	
Type	**Part no.**
ASI-S41250	6 022 401

AS-i components

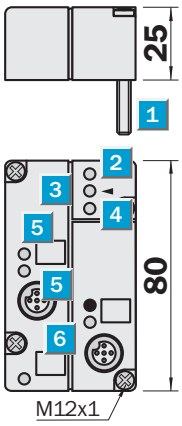
AS-i Safety-at-Work Slave

- For field applications IP 65
- AS-i interface to FK and FKE lower parts
- Extern supply voltage via 24 V flat cable

Dimensional drawing

UE 4212

UE 4215



1 Screws for mounting on module lower part
2 LED red: FAULT
3 Attachment of IR adapter
4 LED green: PWR, power supply OK
5 LED yellow: status indicator
6 Connectors, M12

FK lower parts must be ordered separately.

Connection type

UE 4212

Female connector 1		Female connector 2	
1	L+	1	I2 (n)
2	I1 (p)	2	L–
3	L–	3	NC
4	I2 (n)	4	NC
5	NC	5	NC

UE 4215

Female connector 1		Female connector 2	
1	AUX L+	1	AUX L+
2	I2	2	NC
3	AUX L–	3	AUX L–
4	I1	4	AUX L+
5	FE	5	FE

Accessories

- AS-i addressing unit
- AS-i address cable
- FK lower parts
- Protection cap for M12 connector
- Connectors

Technical data		UE	4212	4215								
Safety inputs		**1**	■	■								
Supply voltage V_S [1]		26.5 ... 31.6 V DC	■	■								
Current consumption total		60 mA	■	■								
Safety data												
Category (EN 954)		Cat. 4	■	■								
Response time		22 ms		■								
Inputs												
Input circuit		PNP		■								
		PNP/NPN	■									
Current loading [2]		200 mA		■								
Short-circuit detection			■	■								
Short-circuit protected			■	■								
Switching level HIGH signal 1		> 10 V		■								
Input current HIGH/LOW		> 5 mA/< 1.5 mA		■								
External supply												
Extern supply voltage [3]		24 V DC via ribbon cable		■								
Current load per module		1.2 A		■								
AS-i interface		Reverse-polarity protection	■	■								
AS-i profile		S-7.B.0	■									
		S-0.B.E		■								
AS-Interface spezification		2.1	■	■								
Expanded address space possible												
Product standard/EMC		EN 50295	■	■								
Enclosure rating to EN 60529		IP 65	■	■								
Ambient temperature T_A		Operation –25 ... +70 °C		■								
		Operation –25 ... +65 °C	■									
Display	LED yellow	Input signals	■	■								
	LED green	Display AS-i voltage	■	■								
	LED red	Fault	■	■								
Addressing		Via IR Interface	■	■								
Housing material		PBTP (Pocan)	■	■								
Weight		85 g		■								
		100 g	■									
Connection to AS interface		Via contact pins [4]	■	■								
Connectable safety sensors		Safety sensors fitted with contacts	■									
		Electro-sensitive protection equipment		■								
		with self-monitoring semi-conductor										
		outputs (OSSD)										

1) In accordance with AS-i spezification
2) For all inputs total
3) Via AS interface ribbon cable to PELV
4) On FK or FKE lower parts or FK-A or FKE-A lower parts

Order information

Type	Part no.
UE 4212-10CA200	1 025 814 *)
UE 4215-14CA200	1 025 687 *)

*) On request

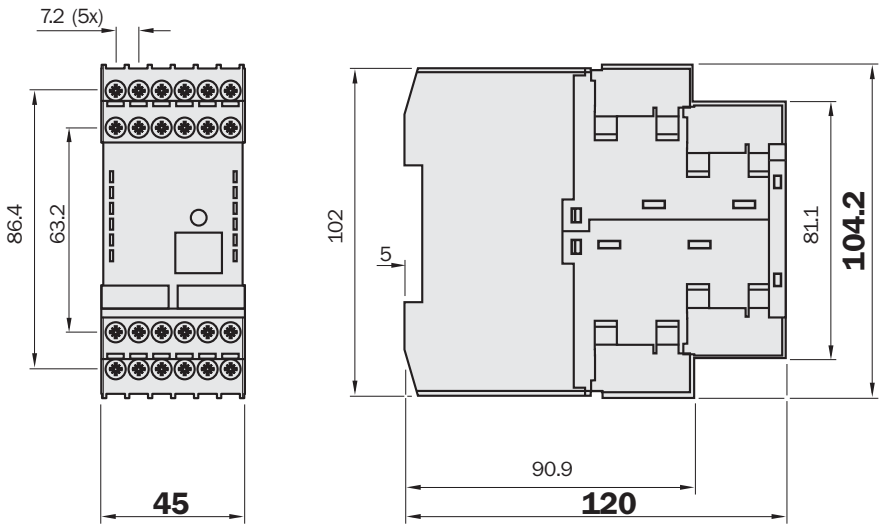
AS-i components

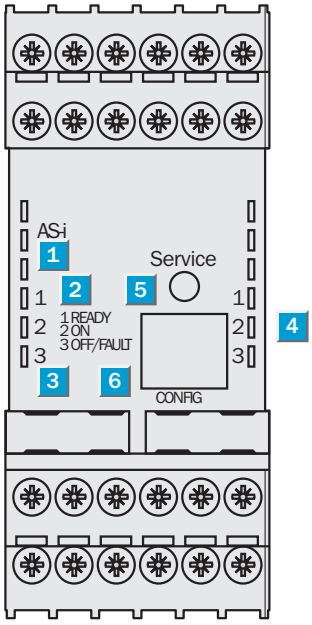
AS-i Safety-at-Work Monitor

- IP 20
- Safety outputs
- Type 4 (EN 954)

Dimensional drawing

UE 4231
UE 4232





1 AS-i supply
2 AS-i communication error
3 Status Channel 1
4 Status Channel 2
5 Service button
6 RS-232 configuration interface

Connection type

		UE 4231	UE 4232
AS-i+	Connection to AS-i-Bus		
AS-i-	Connection to AS-i-Bus		
L+	24 V DC/Supply voltage		
M	GND/reference ground		
FE	Functional earth		
1.Y1	EDM 1/input of external device, monitoring circuit, Channel 1		
1.Y2	Start 1/start input Channel 1		
1.13	Switch output 1 Channel 1		
1.14	Switch output 1 Channel 1		
1.23	Switch output 2 Channel 1		
1.24	Switch output 2 Channel 1		
1.32	Alarm output 1 “Safety On” Channel 1		
2.Y1	EDM 2/input of external device, monitoring circuit, Channel 2		
2.Y2	Start 2/start input Channel 2		
2.13	Switch output 1 Channel 2		
2.14	Switch output 1 Channel 2		
2.23	Switch output 2 Channel 2		
2.24	Switch output 2 Channel 2		
2.32	Alarm output 2 “Safety On” Channel 2		

Accessories

AS-i configuration interface cable *)
RJ45/ sub D 9 pin connection *)
Asimon communication software *)
Download cable (RJ45/RJ45 crossover) *)

*) On request

Technical data	UE	4231	4232								
Configuration Interface	RS 232	■	■								
Supply voltage V_S [1]	24 V DC +/- 15 %	■	■								
Current consumption	150 mA	■									
	200 mA		■								
Switch-on delay	< 10 s	■	■								
Safety data											
Category (EN 954)	Cat. 4	■	■								
Response time	< 40 ms	■	■								
AS-i data											
AS-i profile	Monitor 7.F	■	■								
Voltage area	18.5 … 31.6 V	■	■								
Current consumption	< 45 mA	■	■								
Safety switch outputs	Volt-free, normally open	■	■								
Release circuits	1 output pair	■									
	2 output pairs		■								
Max. contact loading	1 A DC 13 for DC 24 V	■	■								
	3 A AC 15 for DC 230 V	■	■								
Continuous residual current	3 A per output circuit	■	■								
Housing											
Enclosure rating to 60259	IP 20	■	■								
Fixing	Snap-on fixing for mounting rail	■	■								
	in accordance with EN 50022										
Weight	350 g	■									
	450 g		■								
Operation temperature	–20 … +60 °C	■	■								

Order information	
Type	**Part no.**
UE 4231-22CE010	1 025 815 *)
UE 4232-22CE020	1 025 816 *)

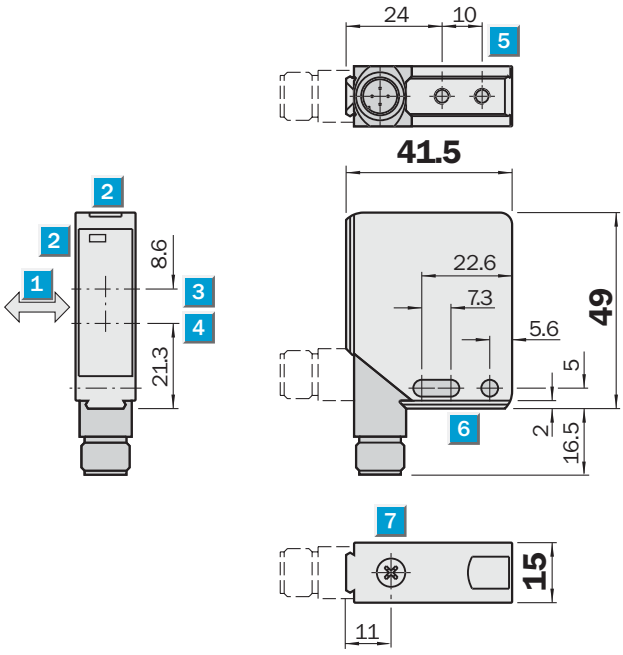
*) On request

Scanning distance 20…250 mm

Photoelectric proximity switches

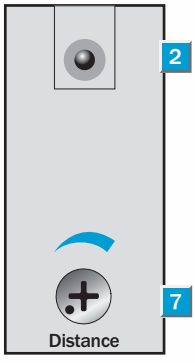
- Red light
- Insensitive to ambient light sources
- M12 plug rotatable by 90°
- With integrated AS-i chip
- Adjustable background suppression

Dimensional drawing



Adjustments possible

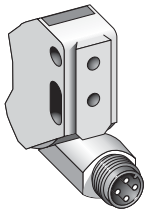
WT 12-2Z 430



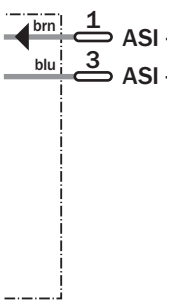
1 Standard direction of the material being scanned
2 LED signal strength indicator
3 Receiver's optical axis
4 Transmitter's optical axis
5 M4 threaded mounting hole – 4 mm deep
6 Mounting holes ⌀ 4.2 mm
7 Scanning distance adjustment

Connection type

WT 12-2Z 430



4-pin, M12



Accessories

- AS-i addressing unit
- Connectors
- Mounting systems
- Clamps*

* 2 pieces included with delivery

Technical data	WT 12-2	Z 430
Scanning distance	20…250 mm, adjustable	
Light source[1], light type	LED, red light	
Light spot diameter	10 mm at 200 mm	
Supply voltage V_S	26.5…31.5 V DC[2]	
Current consumption[3]	≤ 35 mA	
Response time[4]	≤ 330 µs	
Max. switching frequency[5]	1500/s	
Pre-failure signalling output	Alarm	
Test input "TE"		
Connection type	4-pin, M12 plug	
VDE protection class[6]	⧈	
Circuit protection[7]	A, B, C	
Enclosure rating	IP 67	
AS-i profile	S 1.1	
AS interface specification	2.0	
Ambient temperature T_A	Operation –25 °C…+60 °C	
	Storage –40 °C…+75 °C	
Weight	With plug: 120 g	
Housing material	Zinc die-cast housing	

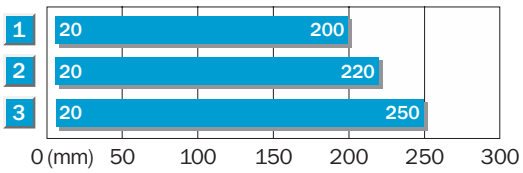
1) Average service life 100,000 h at T_A = +25 °C
2) Limit values
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
B = Output Q and $\overline{Q}$ short-circuit protected
C = Interference pulse suppression

Assignment of data bits			(Host level)
D_0	Switching state	0 If light interrupted	Input
	Mode: light-switching	1 If light received	
D_1	Alarm	0 Active	Input
		1 Inactive	
D_2	NC	0	Input
		1	
D_3	Test function	0 Sender ON	Output
		1 Sender OFF	

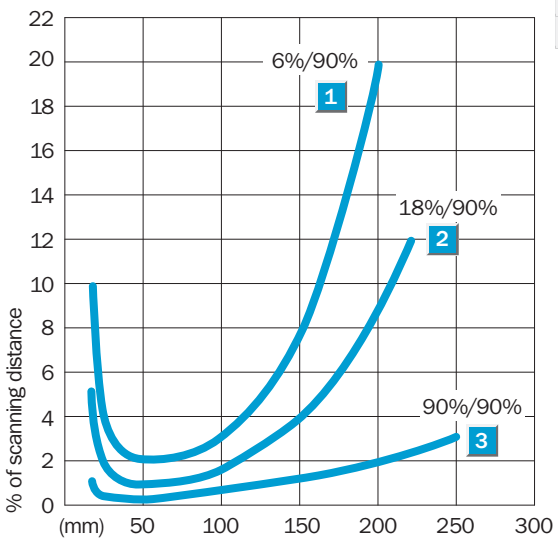
Assignment of parameter bits			(Host level)
P_0*	NC	0	Parameter
		1	
P_1*	Light-/dark-switching	0 Dark-switching	Parameter
		1 Light-switching	
P_2*	NC	0	Parameter
		1	
P_3*	NC	0	Parameter
		1	

* Default setting = 1

Scanning distance



1 Scanning distance on black, 6 % remission
2 Scanning distance on grey, 18 % remission
3 Scanning distance on white, 90 % remission



Order information

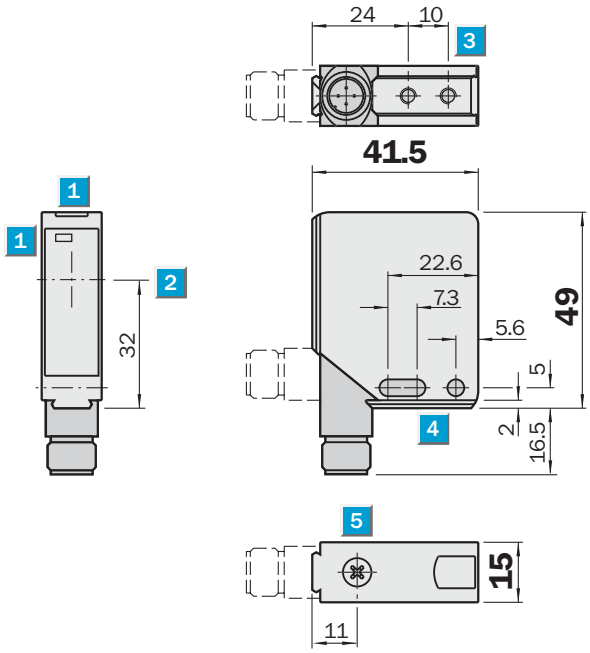
Type	Part no.
WT 12-2Z 430	1 016 136

Scanning range
7 m

Photoelectric reflex switches

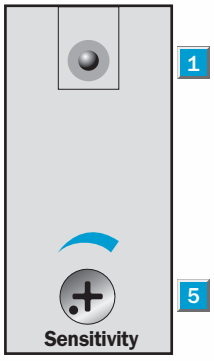
- Red light
- Insensitive to ambient light sources
- M12 plug rotatable by 90°
- Integrated AS-i chip

Dimensional drawing



Adjustments possible

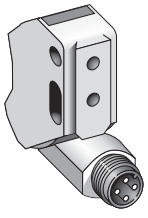
WL 12-2Z 430



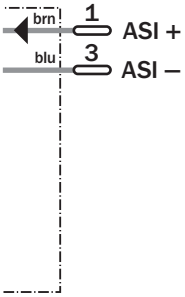
1 LED signal strength indicator
2 Centre of optical axis
3 M4 threaded mounting hole – 4 mm deep
4 Mounting holes ⌀ 4.2 mm
5 Sensitivity adjustment

Connection type

WL 12-2Z 430



4-pin, M12



Accessories

- AS-i addressing unit
- Connectors
- Mounting systems
- Clamps*
- Reflectors

* 2 pieces included with delivery

Technical data	WL 12-2	Z 430
Scanning range		
max. typical/on reflector	7 m/PL 80 A	
Sensitivity	adjustable	
Light source[1], light type	LED, red light	
Light spot diameter	80 mm at 3 m	
Supply voltage V_S	26.5…31.6 V DC[2]	
Ripple[3]	≤ 35 mA	
Response time[4]	≤ 330 µs	
Max. switching frequency[5]	1500/s	
Pre-failure signalling output	Alarm	
Test input "TE"		
Connection type	M12 plug, 4-pin	
VDE protection class[6]	⧈	
Circuit protection[7]	A, C	
Enclosure rating	IP 67	
AS-i profile	S 1.1	
AS interface specification	2.0	
Ambient temperature T_A	Operation –25 °C…+60 °C	
	Storage –40 °C…+75 °C	
Weight	With plug: 120 g	
Polarising filter		
Housing material	Zinc die-cast housing	

1) Average service life 100,000 h at T_A = +25 °C
2) Limit values
3) Without load
4) Signal transit time with resistive load
5) With light/dark ratio 1:1
6) Reference voltage 50 V DC
7) A = V_S connections reverse-polarity protected
C = Interference pulse suppression

Assignment of data bits (Host level)

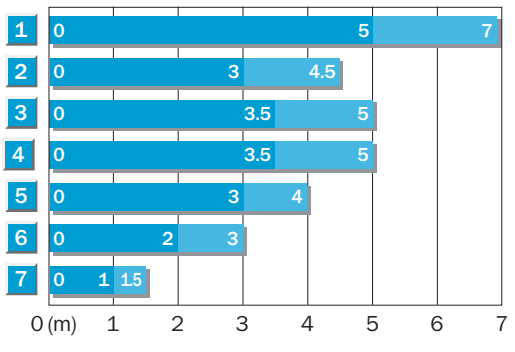
D_0	Switching state	0 If light interrupted	Input
	Mode: light-switching	1 If light received	
D_1	Alarm	0 Active	Input
		1 Inactive	
D_2	NC	0	Input
		1	
D_3	Test function	0 Sender ON	Output
		1 Sender OFF	

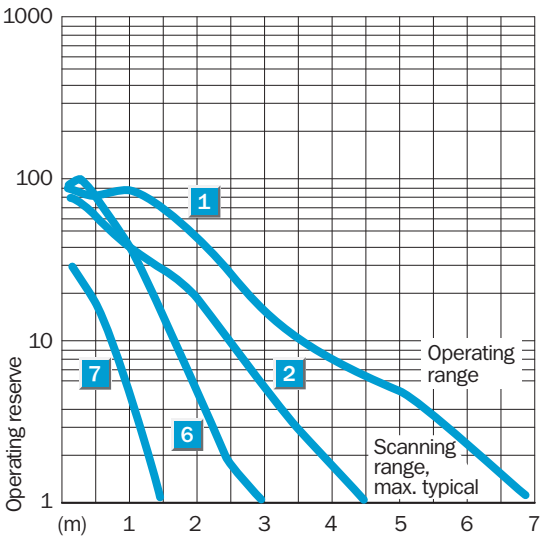
Assignment of parameter bits (Host level)

P_0*	NC	0	Parameter
		1	
P_1*	Light-/dark-switching	0 Dark-switching	Parameter
		1 Light-switching	
P_2*	NC	0	Parameter
		1	
P_3*	NC	0	Parameter
		1	

* Default setting = 1

Scanning range





	Reflector type	Operating range
1	PL 80 A	0 – 5.0 m
2	C 110	0 – 3.0 m
3	PL 50 A	0 – 3.5 m
4	PL 40 A	0 – 3.5 m
5	PL 30 A	0 – 3.0 m
6	PL 20 A	0 – 2.0 m
7	Reflective tape	0 – 1.0 m

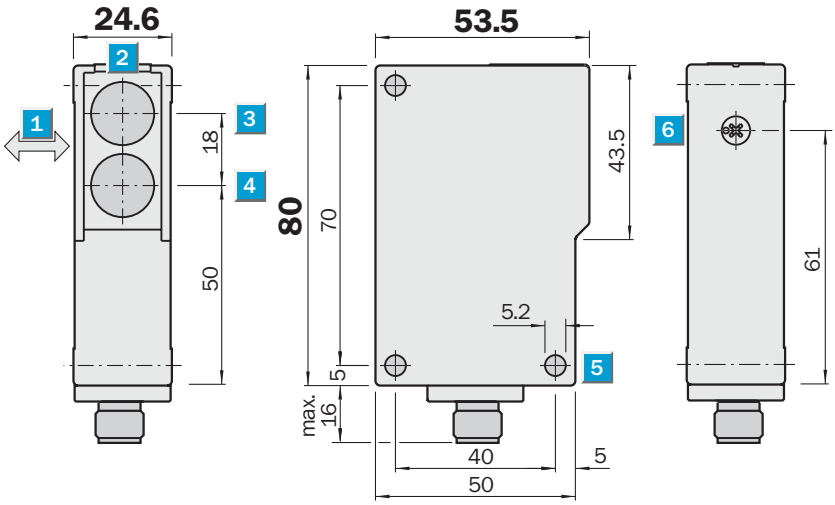
Order information

Type	Part no.
WL 12-2Z 430	1 016 108

Scanning distance 100…1000 mm	
Scanning distance 100…1500 mm	
Photoelectric proximity switches	

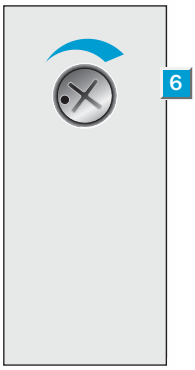
- Red/infrared light
- Adjustable background suppression
- Front screen heating, optional (only for infrared type)
- Integrated AS-i chip

Dimensional drawing



Adjustments possible

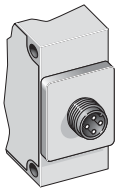
WT 27-2Z 230
WT 27-2Z 210
WT 27-2Z 240



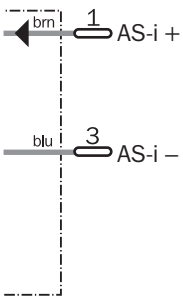
1 Standard direction of the material being scanned
2 LED signal strength indicator
3 Optical axis, sender
4 Optical axis, receiver
5 Mounting hole ⌀ 5.2 mm
6 Sensitivity adjustment

Connection type

WT 27-2Z 230
WT 27-2Z 210
WT 27-2Z 240



4-pin, M12



Accessories
AS-i addressing unit
Connectors
Mounting systems

Technical data	WT 27-2	Z 230	Z 210	Z 240
Scanning distance	100…1000 mm, adjustable	■		
	100…1500 mm, adjustable		■	■
Light source[1], light type	LED, red light	■		
	LED, infrared light		■	■
Light spot diameter	Approx. 15 mm at 500 mm	■		
	Approx. 25 mm at 800 mm		■	■
Supply voltage V_S	26.5…31.6 V DC [2]	■	■	■
Ripple[3]	≤ 5 V_{PP}	■	■	■
Current consumption[4]	≤ 30 mA	■	■	
	≤ 40 mA, front screen heating			■
Response time[5]	2 ms	■	■	■
Max. switching frequency[6]	250/s	■	■	■
Pre-failure signalling output	Alarm	■	■	■
Test input "TE"		■	■	■
Connection type	Plug	■	■	■
VDE protection class	⧈	■	■	■
Circuit protection[7]	A, C	■	■	■
Enclosure rating	IP 67	■	■	■
AS-i profile	S 1.1	■	■	■
AS interface specification	2.0	■	■	■
Ambient temperature T_A	Operation –40 °C…+60 °C	■	■	■
	Storage –40 °C…+75 °C	■	■	■
Weight	Approx. 100 g	■	■	■
Front screen heating				■
Housing material	ABS	■	■	■

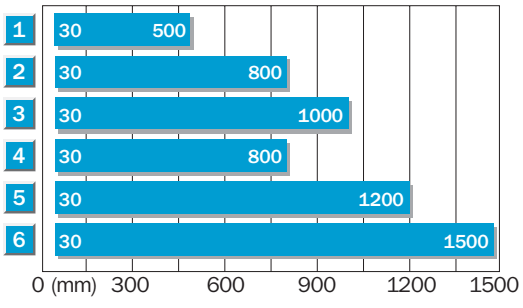
1) Average service life 100,000 h at T_A = + 25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) A = V_S connections reverse-polarity protected
C = Interference pulse suppression
8) Black = 6 % remission
Grey = 18 % remission
White = 90 % remission

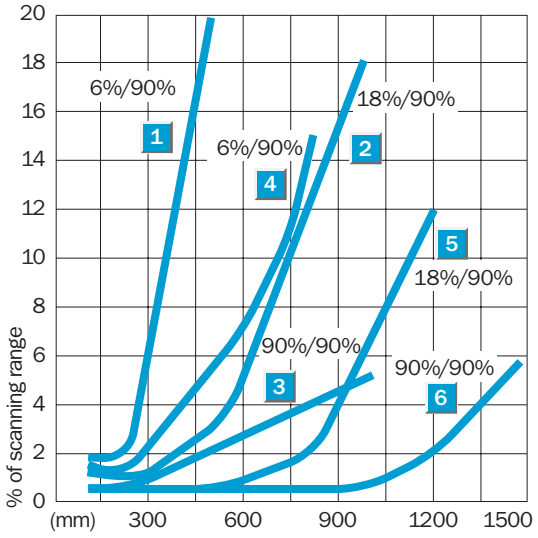
Assignment of data bits			(Host level)
D_0	Switching state	0 Light is not received	Input
	Mode: light-switching	1 Light is received	
D_1	Alarm	0 Active	Input
		1 Inactive	
D_2	NC	0	Input
		1	
D_3	Test function	0 Sender ON	Output
		1 Sender OFF	

Assignment of parameter bits			(Host level)
P_0*	NC	0	Parameter
		1	
P_1*	Light-/dark-switching	0 Dark-switching	Parameter
		1 Light-switching	
P_2*	NC	0	Parameter
		1	
P_3*	NC	0	Parameter
		1	

* Default setting = 1

Scanning distance





1	Scanning distance on black[8] red light
2	Scanning distance on grey[8] red light
3	Scanning distance on white[8] red light
4	Scanning distance on black[8] infrared light
5	Scanning distance on grey[8] infrared light
6	Scanning distance on white[8] infrared light

Order information

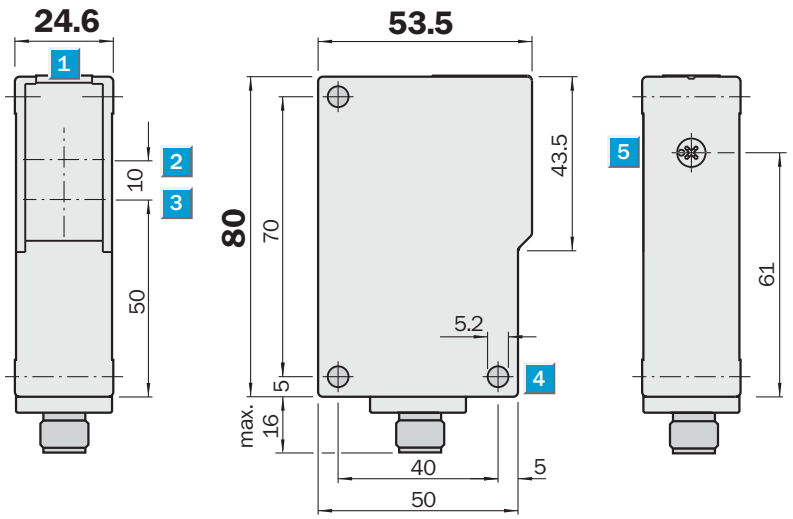
Type	Part no.
WT 27-2Z 230	1 015 099
WT 27-2Z 210	1 015 098
WT 27-2Z 240	1 015 137

Scanning range 14 m

Photoelectric reflex switches

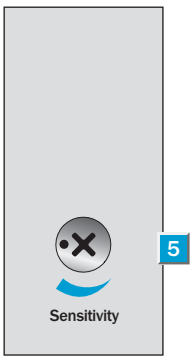
- Visible red light
- Front screen heating, optional
- With integrated AS-i chip

Dimensional drawing



Adjustments possible

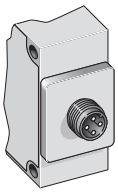
WL 27-2Z 230
WL 27-2Z 240



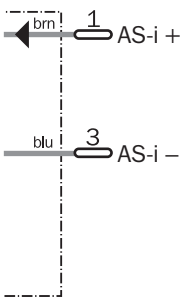
1 LED signal strength indicator
2 Optical axis, sender
3 Optical axis, receiver
4 Mounting hole ⌀ 5.2 mm
5 Sensitivity adjustment

Connection type

WL 27-2Z 230
WL 27-2Z 240



4-pin, M12



Accessories

AS-i addressing unit
Connectors
Mounting systems
Reflectors

Technical data	WL 27-2	Z 230	Z 240
Scanning range, max. typ./on reflector	14 m/PL 80 A		
Light source[1], light type	LED, red light		
Light spot diameter	220 mm at a distance of 10 mm		
Supply voltage V_S	DC 26.5…31.6 V [2]		
Ripple[3]	≤ 5 V_{PP}		
Current consumption[4]	≤ 30 mA		
	≤ 40 mA, front screen heating		
Response time[5]	500 µs		
Max. switching frequency[6]	1000/s		
Pre-failure signalling output	Alarm		
Test input "TE"			
Connection type	Plug		
VDE protection class	⧈		
Circuit protection[7]	A, C		
Enclosure rating	IP 67		
AS-i profile	S 1.1		
AS interface specification	2.0		
Ambient temperature T_A	Operation –40 °C…+60 °C		
	Storage –40 °C…+75 °C		
Weight	Approx. 100 g		
Front screen heating			
Polarising filter			
Housing material	ABS		

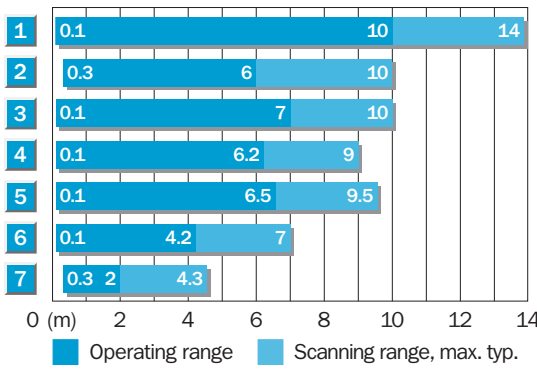
[1] Average service life 100,000 h at T_A = +25 °C
[2] Limit values
[3] May not exceed or fall short of V_S tolerances
[4] Without load
[5] Signal transit time with resistive load
[6] With light/dark ratio 1:1
[7] A = V_S connections reverse-polarity protected
C = Interference pulse suppression

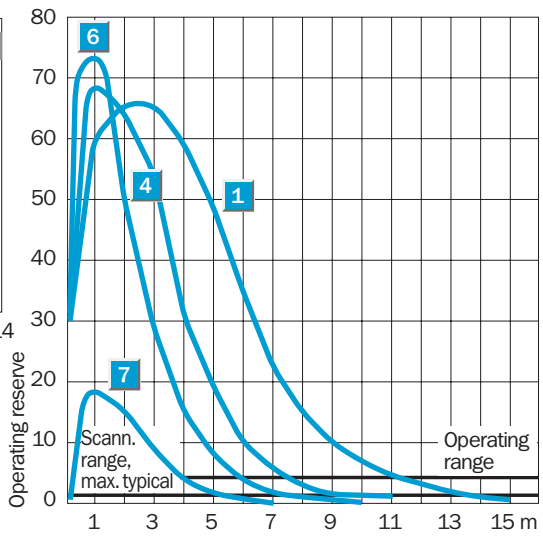
Assignment of data bits				(Host level)
D_0	Switching state	0 Light is not received	Input	
	Mode: light-switching	1 Light is received		
D_1	Alarm	0 Active	Input	
		1 Inactive		
D_2	NC	0	Input	
		1		
D_3	Test function	0 Sender ON	Output	
		1 Sender OFF		

Assignment of parameter bits			(Host level)
P_0*	NC	0	Parameter
		1	
P_1*	Light-/dark-switching	0 Dark-switching	Parameter
		1 Light-switching	
P_2*	NC	0	Parameter
		1	
P_3*	NC	0	Parameter
		1	

* Default setting = 1

Operating range and operating reserve





	Reflector type	Operating range
1	PL 80 A	0.1…10.0 m
2	C 110	0.3…6.0 m
3	PL 50 A	0.1…7.0 m
4	PL 40 A	0.1…6.2 m
5	PL 30 A	0.1…6.5 m
6	PL 20 A	0.1…4.2 m
7	Reflective tape "Diamond Grade"	0.3…2.0 m

Order information

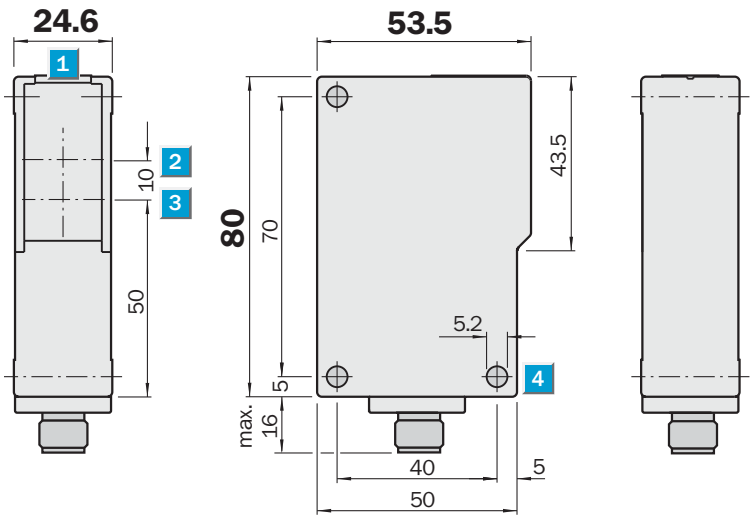
Type	Part no.
WL 27-2Z 230	1 015 112
WL 27-2Z 240	1 015 136

Scanning range 35 m

Through-beam photoelectric switches

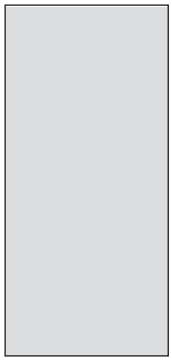
- Red light
- Selectable time delay
- With integrated AS-i chip

Dimensional drawing



Adjustments possible

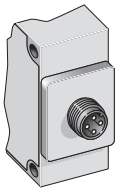
WS/WE 27-2Z 250



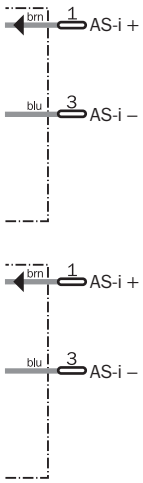
1 LED signal strength indicator
2 Optical axis, sender
3 Optical axis, receiver
4 Mounting hole ⌀ 5.2 mm

Connection type

WS/WE 27-2Z 250



4-pin, M12



Accessories

- AS-i addressing unit
- Connectors
- Mounting systems

Technical data		WS/WE 27-2	Z 250
Scanning range, max. typical		0…35 m	
Light source[1], light type		LED, red light	
Light spot diameter		Approx. 1200 mm at 25 m	
Angle of dispersion		3°	
Supply voltage V_S		26.5…31.6 V DC[2]	
Ripple[3]		≤ 5 V_{PP}	
Current consumption[4]	sender	≤ 35 mA, front screen heating	
	receiver	≤ 40 mA, front screen heating	
Response time[5]		500 µs	
Max. switching frequency[6]		1000/s	
Pre-failure signalling output		Alarm	
Test input "TE"			
Connection type		Plug	
VDE protection class[7]		⧈	
Circuit protection[8]		A, C	
Enclosure rating		IP 67	
AS-i profile WS 27-2		S D.1	
AS-i profile WE 27-2		S 1.1	
AS interface specification		2.0	
Ambient temperature T_A		Operation –40 °C…+60 °C	
		Storage –40 °C…+75 °C	
Weight		Approx. 100 g	
Front screen heating			
Housing material		ABS	

1) Average service life 100,000 h at T_A = +25 °C
2) Limit values
3) May not exceed or fall short of V_S tolerances
4) Without load
5) Signal transit time with resistive load
6) With light/dark ratio 1:1
7) Reference voltage 50 V DC
8) A = V_S connections reverse-polarity protected
C = Interference pulse suppression

WS 27-2 – Assignment of data bits (Host level)

D_0	Test function	0 Sender ON	Output
		1 Sender OFF	
D_1	NC	0	Input
		1	
D_2	NC	0	Input
		1	
D_3	NC	0	Input
		1	

WS 27-2 – Assignment of parameter bits (Host level)

P_0*	NC	0	Parameter
		1	
P_1*	NC	0	Parameter
		1	
P_2*	NC	0	Parameter
		1	
P_3*	NC	0	Parameter
		1	

WE 27-2 – Assignment of data bits (Host level)

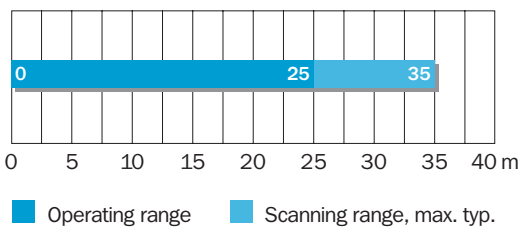
D_0	Switching state	0 Light is not received	Input
	Mode: light-switching	1 Light is received	
D_1	Alarm	0 Active	Input
		1 Inactive	
D_2	NC	0	Input
		1	
D_3	NC	0	Output
		1	

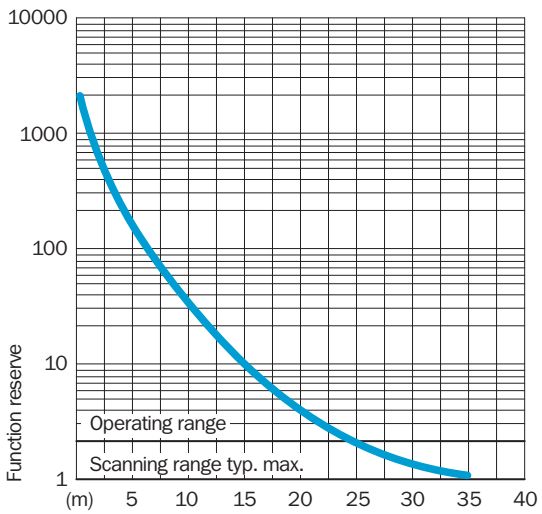
WE 27-2 – Assignment of parameter bits (Host level)

P_0*	NC	0	Parameter
		1	
P_1*	Light-/dark-switching	0 Dark-switching	Parameter
		1 Light-switching	
P_2*	NC	0	Parameter
		1	
P_3*	NC	0	Parameter
		1	

* Default setting = 1

Operating range and operating reserve





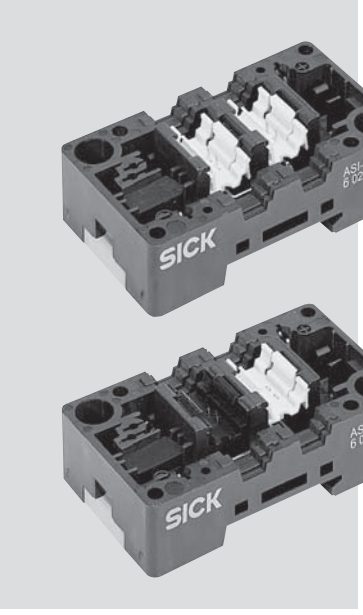
Order information

Type	Part no.
WS/WE 27-2Z 250	1 015 140

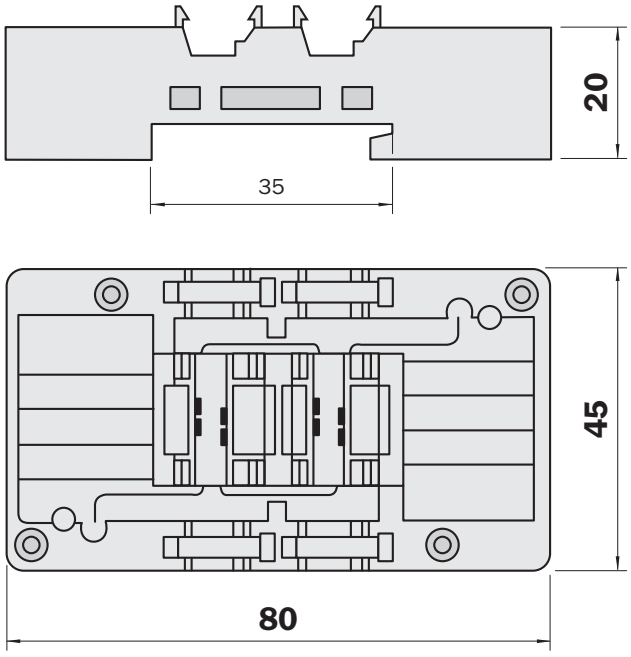
AS-i components

AS-i Modules lower parts

- AS-i modules lower parts for Classic field modules
- AS-i interface to module upper part
- Quick mounting technology for AS-i flat cable
- DIN rail and panel mounting

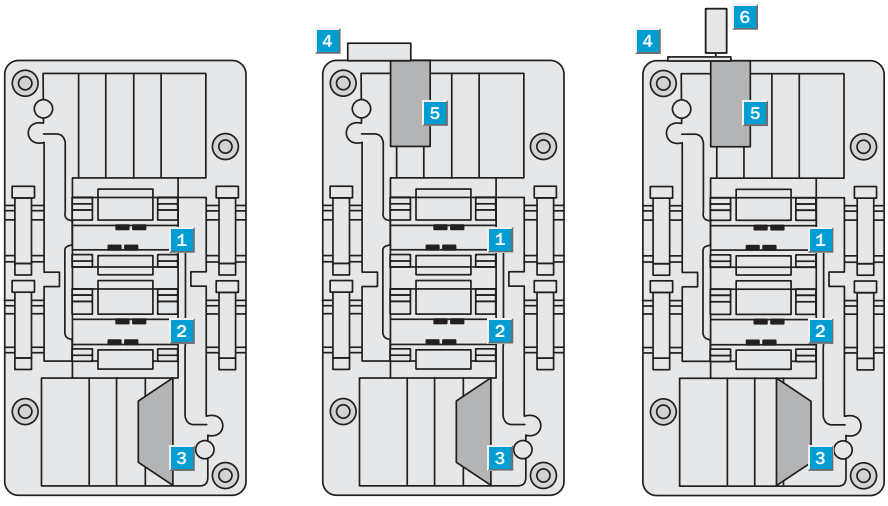


Dimensional drawing



Connection type

ASI-FK	ASI-FK-A	ASI-FKE-A-E
ASI-FKE	ASI-FKE-A	



1 AS-i flat cable (yellow)
2 24 V flat cable (black) PELV (only with ASI-FKE and ASI-FKE-A)
3 Sealings
4 Plug
5 Addressing socket
6 Connection functional earth

Technical data	ASI-	FK	FKE	FK-A	FKE-A	FKE-A-E
Operating voltage [1]	26.5 ... 31.6 V DC	■	■	■	■	■
Contact load capacity	≤ 2 A	■	■	■	■	■
Spezification	EMS	■		■		
	E-EMS		■		■	■
Data bits	Available via ASI	■	■	■	■	■
Parameter bits	Available via ASI	■	■	■	■	■
ASI-Interface	reverse-polarity protection, mechanical	■	■	■	■	■
Enclosure rating to EN 60529	IP 20/ IP 65/ IP 67 [2]	■	■	■	■	■
Ambient temperature T_A	Operation –25 ... +60 °C	■	■	■	■	■
	Storage –40 ... +85 °C	■	■	■	■	■
Housing material	PBTP	■	■	■	■	■
Weight	54 g	■	■	■	■	■
Connection type	Via penetration technique [3]	■	■	■	■	■
Addressing socket				■	■	■
Special features						
End caps [4]	3 pieces	■	■	■	■	■
FK seal	4 pieces	■	■	■	■	■
Cable shafts AS-i parallel switched [5]	2	■		■		
Cable shaft for AS-i	1		■		■	■
Cable shaft for ext. 24 V supply	1		■		■	■
Connection for functional earth						■

[1] According to ASI spezification
[2] Depending on used upper part
[3] ASI-flat cable, connection to module upper part via contact socket
[4] Unloseable supported in the module
[5] For any T and X branches

Order information	
Type	**Part no.**
ASI-FK	6 022 394
ASI-FKE	6 022 395
ASI-FK-A	6 022 396
ASI-FKE-A	6 022 397
ASI-FKE-A	6 025 058 *)

*) On request

AS-i module cover for covering the FK lower parts

Use of the lower part as junction box

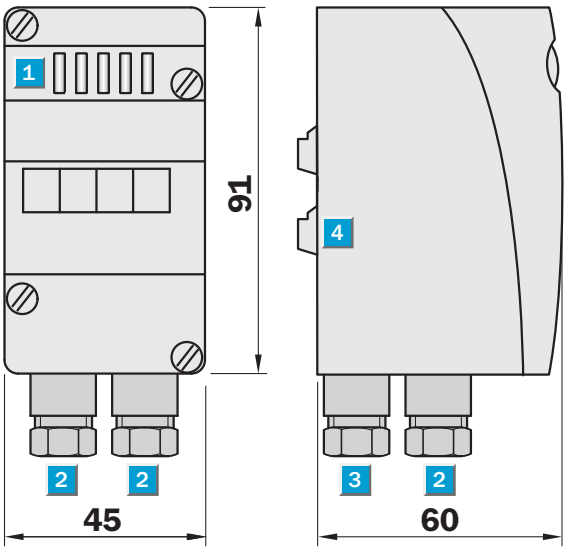
Order information	
Type	**Part no.**
ASI-FKTOP	5 308 999

AS-i components

AS-i Power Extender

- Extends distance between power supply unit and AS-i bus segment
- Can be used with repeater
- Several AS-i loops can be supplied via a power supply unit
- Does not occupy any address in AS-i network

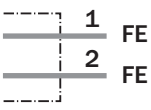
Dimensional drawing



1 Status indicators LED
2 Functional earth (FE)
(connection via PG connector in housing)
3 Functional earth (FE)
(connection via PG connector in housing)
4 AS-Interface® connection
(power supply via AS-i cable)

FKE lower part not included with delivery

Module	Connection type	
	Connection via FKE lower parts	Schield connection



Technical data	ASI-	PEXT1
Input voltage [1]	DC 30 V via external power source	
	or AS interface power pack	
Output voltage [2]	26.5 ... 31.6 V DC	
Current loading	≤ 2.8 A at 30 V	
Short-circuit limiter	Self-resetting fuse 3 A	
Voltages of insulation	500 V DC	
Displays	LED green AS-i voltage > 28 V	
	LED green AS-i voltage > 26 V	
Product standard/EMC	EN 50295	
Ambient temperature T_A	Operation 0 ... +70 °C	
	Storage –25 ... +85 °C	
Enclosure rating to EN 60529	Housing IP 65	
Housing material	PA	
Weight	120 g	
Connection to AS interface	via contact pins [3]	

1) To PELV
2) According to AS-i spezification
3) To FKE sub-unit

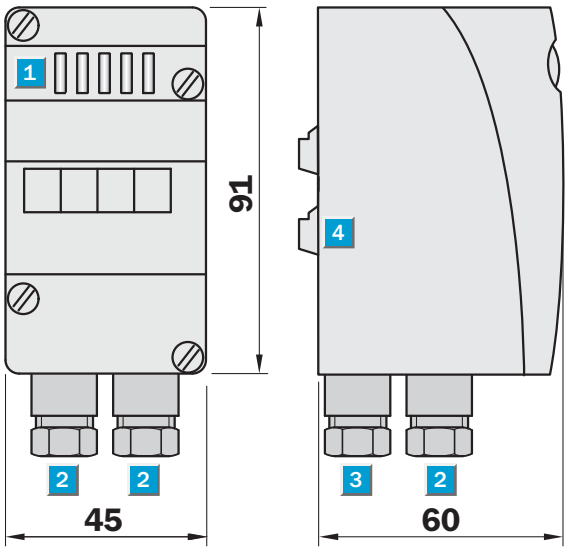
Order information	
Type	**Part no.**
ASI-PEXT1	6 022 456

AS-i components

AS-i Repeater

- Line extension of 100 m
- Galvanic separation
- Does not occupy any address in AS-i network

Dimensional drawing



1 Status indicators LED
2 NC
3 NC
4 AS-Interface® connection (power supply via AS-i cable)

Lower part included with delivery

Connection type

Connection via FK lower parts

Technical data	ASI-	RPT1
Operating voltage[1]	26.5 ... 31.6 V DC	
Current consumption	60 mA [2] (per cable segment)	
Conn. types 30 V input voltage	FK lower part for connecting AS-i cable	
Displays	4 LEDs	
U AS-i 1	AS-i power circuit 1	
FLT 1	AS-i Communication error circuit 1	
FLT 2	AS-i Communication error circuit 2	
U AS-i 2	AS-i power circuit 2	
Voltages of insulation	500 V DC	
Product standard/EMC	EN 50295	
Connection to AS interface	Via contact pins [3]	
Ambient temperature T_A	Operation –10 ... +55 °C	
	Storage –25 ... +75 °C	
Enclosure rating to EN 60529	IP 65	
Housing material	PA	
Weight	120 g	

1) According to AS-i spezification
2) One AS-i power supply unit required per segment, max. 2 repeaters in a row
3) Only by means of the supplied sub-unit

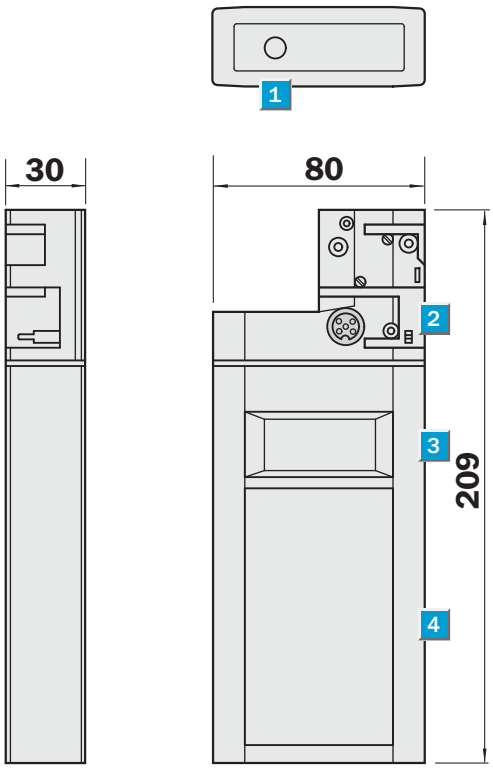
Order information	
Type	**Part no.**
ASI-RPT1	6 022 457

AS-i components

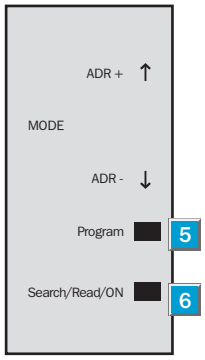
AS-i Addressing unit

- Determination of the slave address
- New addressing with check
- Slave connection short-circuit and overload protected
- LCD display
- Error evaluation

Dimensional drawing



Adjustments possible



1 Loading jack
2 Adapter for connection of the AS interface slave
3 LC display
4 Operating panel
5 PRG
6 ADR

Function table

Push-button	Function
Mode	Setting of the operation mode.
↑	Setting of the desired addressed (counting upward) or the desired data.
↓	Setting of the desired addressed (counting downward) or the desired data.
PRG	Programming of the slave address from the active to the displayed address (only in addressing mode). Writing the displayed data in the activated slave (not in addressing mode).
ADR	Switching on of the equipment. Searching for the connected AS interface slaves. Activating of the next highest address (only in addressing mode). Re-inputting the slave information from an activated slave address (not in addressing mode).

Technical data	ASI-	PM 2
Display	LCD, 13 mm digit height	
Keyboard	Film keyboard, 4 push-buttons	
Interface[1]	ASI	
Operating voltage	Battery-powered operation[2]	
Charger	Plug charger 230 V AC[3]	
Operating period	8 h/≥ 250 Writing/reading procedures	
EMC	EN 61326[4], EN 50081-1[5]	
	EN 60555-2/-3[4], EN 50082-1[5]	
LVD (Low voltage directive)	EN 61558-1[5], EN 61558-2-6[5]	
Enclosure rating to EN 60529	IP 20	
Ambient temperature T_A	Operation 0 ...+ 50 °C	
	Storage – 20 ...+ 55 °C	
Weight	approx. 550 g	

1) Short-cicuit and overload protected (slave connection)

2) Use charger (charging time approx. 14 h)

3) Included with delivery
4) Addressing unit
5) Plug-in charger

Order information	
Type	**Part no.**
ASI-PM2	6 022 426

Accessories addressing unit

Addressing cable for addressing classic modules in combination with FK lower parts with addressing socket in built-in state and modules with integrated addressing socket

Order information	
Type	**Part no.**
ASI-PM2-DSL1	6 022 464

IR addressing cable for addressing classic and compact modules with IR addressing interface

Order information	
Type	**Part no.**
ASI-PM2-DSL2	6 022 465

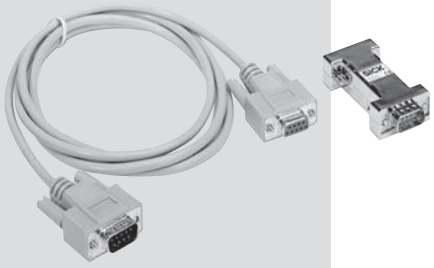
Addressing adapter for addressing the AS-i compact module with manual addressing device ASI-PM2

Order information	
Type	**Part no.**
ASI-PM2-DSL3	6 025 773

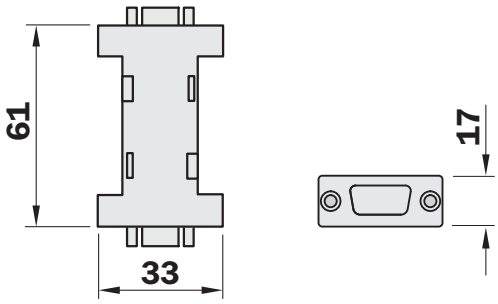
AS-i components

AS-i Profibus Master simulator

- Operation startup software for Profibus DP slaves
- With interface converter
- Universal tool for data exchange with Profibus slaves
- Sub D data cable



Dimensional drawing



Connection type

Terminals

1	NC
2	RxD
3	TxD
4	DTR
5	GND
6	NC
7	NC
8	CTS
9	NC

Profibus, Sub D

1	NC
2	NC
3	P
4	NC
5	GND
6	L+
7	NC
8	N
9	NC

Technical data		PR-	MSV0	MSV1
Operating	5 V DC[1]		■	■
Operating current	< 60 mA		■	■
Interfaces	RS 232, RS 485		■	■
Baud rates [2]	19.2 kBaud		■	■
Ambient temperature T_A	Operation	0 ... +55 °C	■	■
	Storage	–25 ... +85 °C	■	■
Cable length	RS 232 and RS 485 each max. 2 m		■	■
Profibus	DPV0		■	■
	DPV1			■
EMC	EN 50081-2, EN 61000-2			■
System requirements	IBM compatible PC from 80386		■	■
Supplied with delivery	Software:	Profibus DP	■	■
		Master simulator	■	■
	16 Bit DLL for Win 3.1x		■	■
	32 Bit DLL for Win 95/98, Win NT		■	■
	Example programs in C in source code		■	■
	Interface converter		■	■
	Sub D data cable		■	■

[1] Receives power from the RS 485 interface of the Profibus slave
[2] Automatic recognition

Order information	
Type	**Part no.**
PR-MSV0	6 022 458
PR-MSV1	6 022 459

AS-i components

AS-i Control Tools

- Operating software for SICK AS-i Master/Gateways
- Configuration of an AS-i network
- Programming of slaves
- Advanced AS-i diagnostics

ASI-CT210	
System requirements	IBM-compatible PC min. 80386
	MS Windows (min. 3.1), Windows 95/98, NT 4.0, ME, 2000, XP
Language	English/German
Application	Setup tools for AS-i
	Diagram of the AS-i network
Expanded diagnostic function	Storing of the error cause
	Log analysis (counter for transmission errors)

Order information	
Type	**Part no.**
ASI CT210	6 022 501

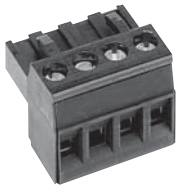
Connection cable PC RS 232	
Cable connection	D-Sub plug
	D-Sub socket
Length	1.8 m
Pin 1 on Pin 1	Connected through

Order information	
Type	**Part no.**
DSL-RS 232-02M	6 022 468

Female connector PC RS 485	
Cable connection	Prefabricated cable
	RS 485
Length	1.5 m
Connection	on Profibus
	IP 65 Gateway

Order information	
Type	**Part no.**
DSL-RS485-02M	6 022 469

Combicon plug for switch cabinet modules

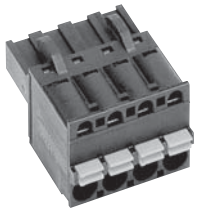


ASI-ADPS

Model	With screw terminals, 4 pin
Packaging unit	100/6 pieces
Specific insulation resistance (A= 2.5 mm²)	1.5 mΩ
Max. load current (A= 2.5 mm²)	12 A
Housing material	Current-carrying parts: Cu alloy, tin-coated

Order information

Type	Unit	Part no.
ASI-ADPS	100 pieces	6 025 327
ASI-ADPS	6 pieces	2 024 074

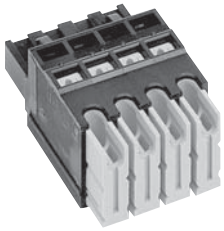


ASI-ADPK

Model	With retainer tension spring terminals 4-pin
Packaging unit	100/6 pieces
Specific insulation resistance (A= 2.5 mm²)	1.5 mΩ
Max. load current (A= 2.5 mm²)	12 A
Housing material	Current-carrying parts: Cu alloy, tin-coated

Order information

Type	Unit	Part no.
ASI-ADPK	100 pieces	6 025 328
ASI-ADPK	6 pieces	2 024 075



ASI-ADPC

Model	With QIC A insulation displacement terminals
	4-pin (0.35 ... 0.75 mm²)
Packaging unit	100/6 pieces
Specific insulation resistance (A= 0.75 mm²)	1.5 mΩ
Max. load current (A= 0.75 mm²)	9 A
Housing material	Current-carrying parts: Cu alloy, tin-coated

Order information

Type	Unit	Part no.
ASI-ADPC	100 pieces	6 025 329
ASI-ADPC	6 pieces	2 024 076

ASI-APPQ

Model	With QIC B insulation displacement terminals
	4 pin (0.35 ... 0.75 mm²)
Packaging unit	100/6 pieces
Specific insulation resistance (A= 0.75 mm²)	1.5 mΩ
Max. load current (A= 0.75 mm²)	9 A
Housing material	Current-carrying parts: Cu alloy, tin-coated

Order information

Type	Unit	Part no.
ASI-ADPQ	100 pieces	6 025 330
ASI-ADPQ	6 pieces	2 024 077

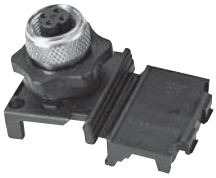
AS-i Clip

Technical data

Positive line	brown
Negative line	blue
Coating color	ASI-LTG D-MW: yellow/ASI-LTG E-MW: black
Cable material	EPDM
Enclosure rating	IP 67
Ambient temperature	Operation –30 ...+ 90 °C
Connection	2 x 1,5 mm^2

Order information

Type	Unit	Part no.
ASI-LTG D-MW	1 meter	6 022 462
ASI-LTG E-MW	1 meter	6 022 463

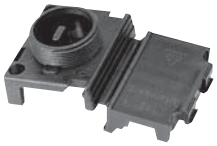


AS-i Clip M12 for connecting AS-i components directly to the AS-i flat cable

Material	PA
Enclosure rating to EN 60529	IP 67

Order information

Type	Unit	Part no.
ASI-M12	1 piece	6 022 472



Mounting clip for the AS-i flat cable

Material	PA

Order information

Type	Unit	Part no.
ASI-LTG CLIP	1 piece	5 309 051

Protecting cap for M12 connector

Order information

Type	Unit	Part no.
DOS-12SK	1 Kit /10 pieces	5 309 189

End piece for the AS-i flat cable

Order information

Type	Unit	Part no.
ASI-LTG END	1 Kit /10 pieces	5 309 052

Dimensional drawings and order information

SENSICK screw-in system M12, 3/4-pin, enclosure rating IP 67

Connection cable M 12/M12, 4-pin, straight
Cable diameter 5 mm, 4 x 0.34 mm², sheath PVC

Type	Part no.	Contacts	Cable length
DSL-1204-G0M6	6 022 565	4	0.6 m
DSL-1204-G02M	6 022 567	4	2 m
DSL-1204-G05M	6 022 569	4	5 m

Connection cable M 12/M12, 3-pin, straight
Cable diameter 5 mm, 3 x 0.34 mm², sheath PVC

Type	Part no.	Cable length
DSL-1203-G0M6	6 022 564	0.6 m
DSL-1203-G02M	6 022 566	2 m
DSL-1203-G05M	6 022 568	5 m

Connection cable M8/M12, 4-pin, straight
Cable diameter 5 mm, 4 x 0.34 mm², sheath PVC

Type	Part no.	Contacts	Cable length
DSL-8204-G0M6	6 022 571	4	0.6 m
DSL-8204-G02M	6 022 573	4	2 m

Connection cable M8/M12, 3-pin, straight
Cable diameter 5 mm, 3 x 0.34 mm², sheath PVC

Type	Part no.	Cable length
DSL-8203-G0M6	6 022 570	0.6 m
DSL-8203-G02M	6 022 572	2 m

Connection cable M8/M12, 4-pin, straight
Cable diameter 5 mm, 4 x 0.34 mm², sheath PUR halogen-free

Type	Part no.	Contacts	Cable length
DSL-8204-G0M6C	6 025 918	4	0.6 m
DSL-8204-G02MC	6 025 919	4	2 m

Connection cable M8/M12, 3-pin, straight
Cable diameter 5 mm, 3 x 0.34 mm², sheath PUR halogen-free

Type	Part no.	Contacts	Cable length
DSL-8203-G0M6C	6 025 914	3	0.6 m
DSL-8203-G02MC	6 025 915	3	2 m

Connection cable M12/M12, 4-pin, straight
Cable diameter 5 mm, 4 x 0.34 mm², sheath PUR halogen-free

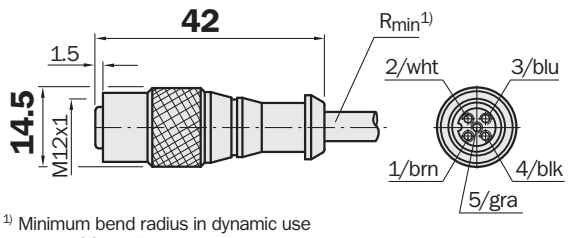
Type	Part no.	Contacts	Cable length
DSL-1204-G0M6C	6 025 926	4	0.6 m
DSL-1204-G02MC	6 025 927	4	2 m

Connection cable M12/M12, 3-pin, straight
Cable diameter 5 mm, 3 x 0.34 mm², sheath PUR halogen-free

Type	Part no.	Contacts	Cable length
DSL-1203-G0M6C	6 025 922	4/3	0.6 m
DSL-1203-G02MC	6 025 923	4/3	2 m

Female connector M 12, 4-pin, straight
Cable diameter 5/6 mm, 4/5 x 0.25 mm², sheath PVC

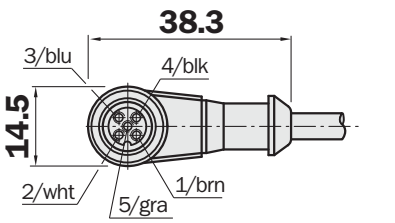
Type	Part no.	Contacts	Cable length
DOL-1204-G02M	6 009 382	4	2 m
DOL-1204-G05M	6 009 866	4	5 m
DOL-1204-G10M	6 010 543	4	10 m
DOL-1204-G15M	6 010 753	4	15 m

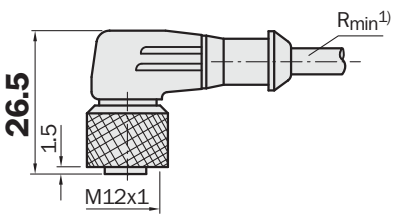


1) Minimum bend radius in dynamic use
R_{min} = 20 x cable diameter

Female connector M 12, 4-pin, right angle
Cable diameter 5/6 mm, 4/5 x 0.25 mm², sheath PVC

Type	Part no.	Contacts	Cable length
DOL-1204-W02M	6 009 383	4	2 m
DOL-1204-W05M	6 009 867	4	5 m
DOL-1204-W10M	6 010 541	4	10 m



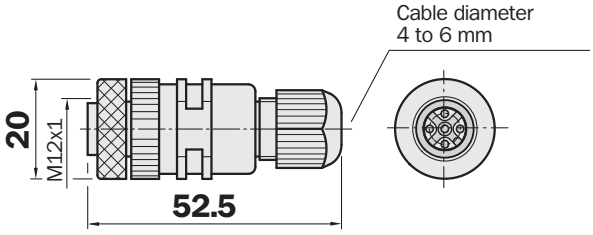


Dimensional drawings and order information

SENSICK screw-in system M12, 4-pin, enclosure rating IP 67

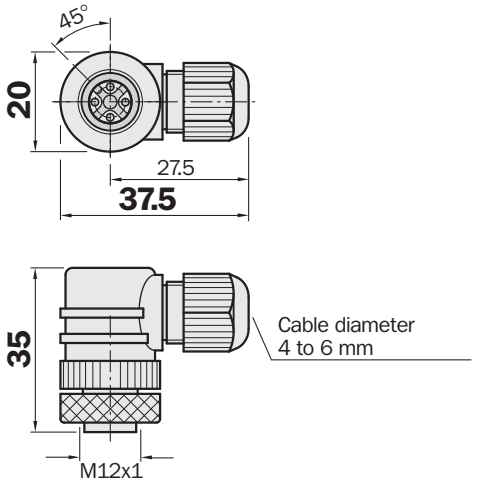
Female connectors M12, 4-pin, straight

Type	Part no.	Contacts
DOS-1204-G	6 007 302	4



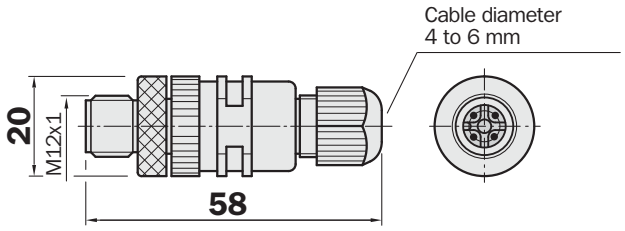
Female connectors M12, 4-pin, right angle

Type	Part no.	Contacts
DOS-1204-W	6 007 303	4



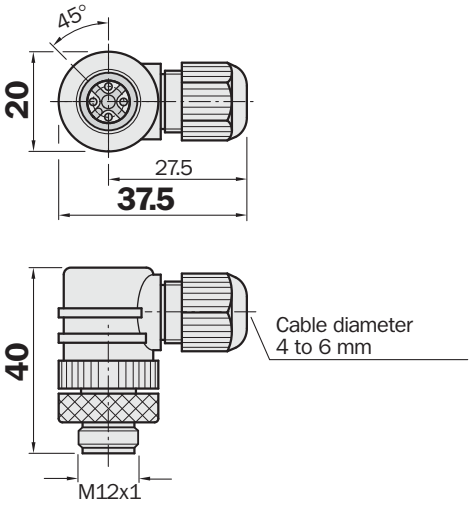
Male connector M12, 4-pin, straight

Type	Part no.
STE-1204-G	6 009 932



Male connector M12, 4-pin, right angle

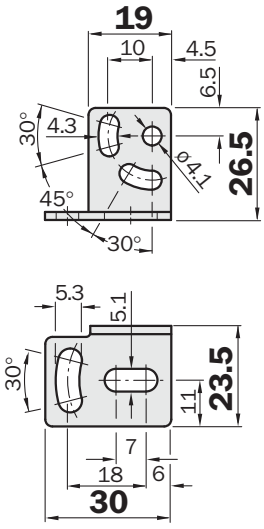
Type	Part no.
STE-1204-W	6 022 084



Dimensional drawings and order information

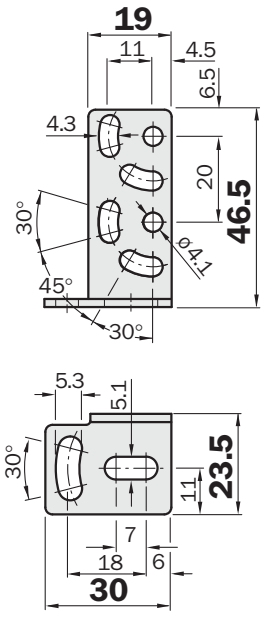
Mounting bracket, small (stainless steel) for W 12-2

Type	Part no.
BEF-WK-W12	2 012 938



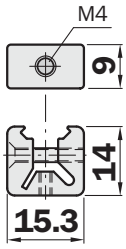
Mounting bracket, large (stainless steel) for W 12-2

Type	Part no.
BEF-WG-W12	2 013 942



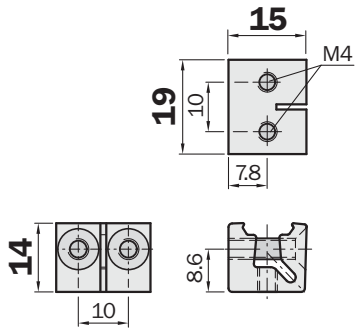
Clamp for W 12-2

Type	Part no.
BEF-KH-W12	2 013 285



Double clamp for W 12-2

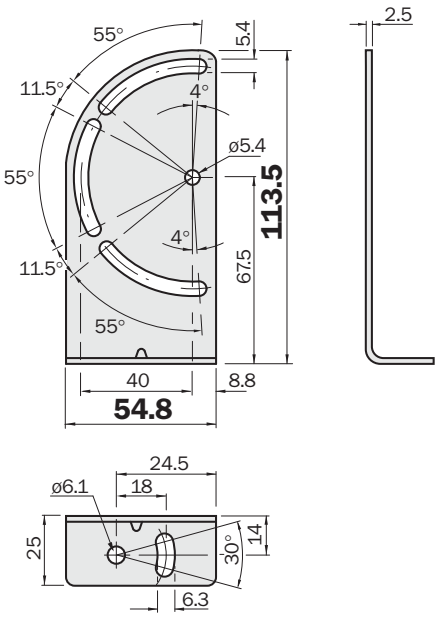
Type	Part no.
BEF-DKH-W12	2 013 947



Dimensional drawings and order information

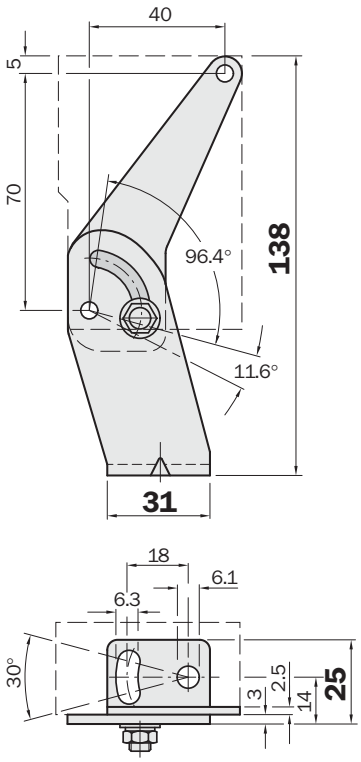
Mounting bracket for W 27-2

Type	Part no.
BEF-WN-W23	2 019 085

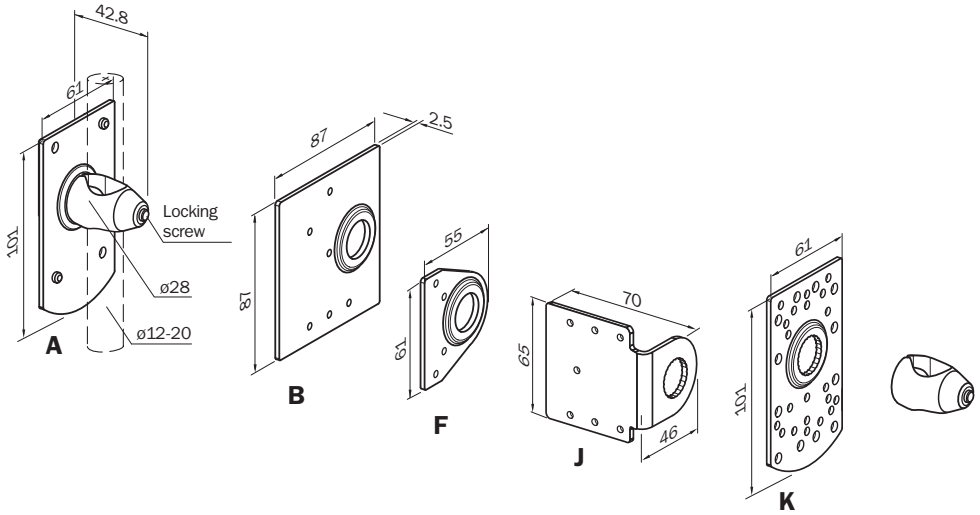


Mounting bracket for W 27-2

Type	Part no.
BEF-WN-W27	2 009 122



Universal bar clamps for sensors and reflectors



Mounting plates	Type	Part no.	for device/reflector type
A	BEF-KHS-A01	2 022 458[1) 2)]	W 23, W 27-2
B	BEF-KHS-B01	2 022 459[1) 2)]	P 250, PL 30 A, PL 40 A, PL 50 A, PL 80 A, C 110
F	BEF-KHS-F01	2 022 463[1) 2)]	W 260, PL 20 A, P 250
J	BEF-KHS-J01	2 022 719[1) 2)]	PL 20 A, PL 40 A, PL 50 A, P 250, C 110
K	BEF-KHS-K01	2 022 718[1)]	W 11, W 12-2, W 12L-2, W 14, W 18-2, W 23, W 24-2, W 27-2, W 30, W 32, W 34, W 36, KT 2, KT 5, KT 10, CS, LUT 3, DS 60, PL 20 A, PL 30 A, PL 40 A, PL 50 A, PL 80 A, P 250, C 110
	BEF-KHS-KH1	2 022 726	Clamp bracket rod mounting without attachment plate and mounting material

[1)] The part no. contains pole bracket and mounting material.

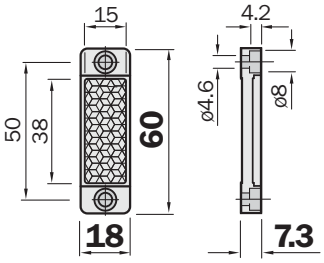
[2)] Mounting plate does not contain threads; the sensor/reflector is mounted from the sensor/reflector side with self-cutting screws.

Dimensional drawings and order information

Plastic design for temperatures up to 65 °C

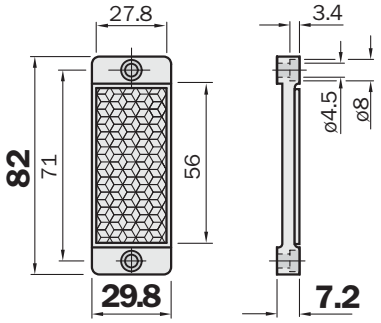
Reflector 20 x 40 mm²

Type	Part no.
PL 20 A	1 012 719



Reflector 30 x 50 mm²

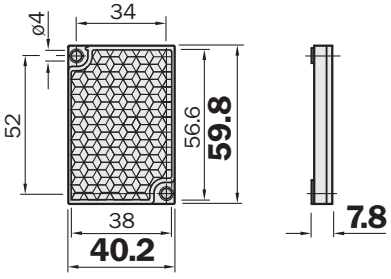
Type	Part no.
PL 30 A	1 002 314



Reflector 40 x 60 mm²

self-adhesive

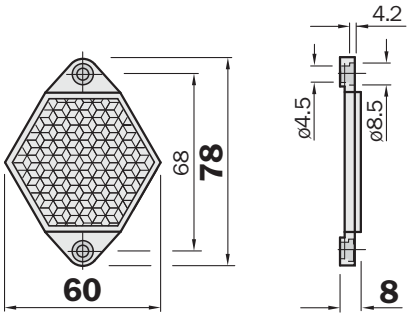
Type	Part no.
PL 40 A	1 012 720



Reflector, 6-sided

width across flats 48 mm

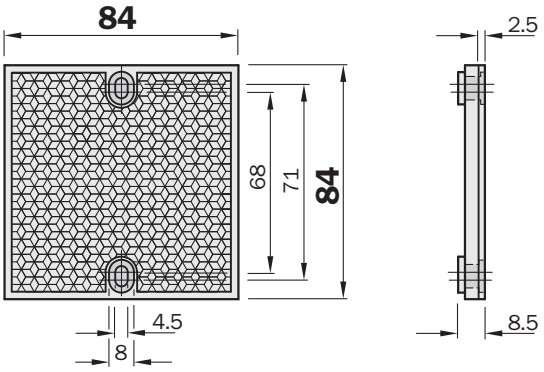
Type	Part no.
PL 50 A	1 000 132



Also available with heating:
Continuous heating: PL 50HK,
part no. 1 011 545
Regulated heating: PL 50HS,
part no. 1 009 871

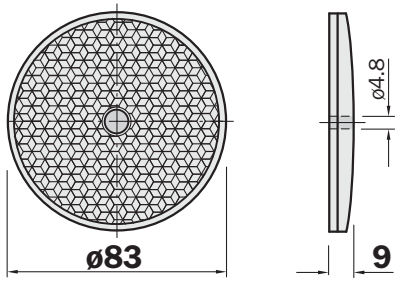
Reflector 80 x 80 mm²

Type	Part no.
PL 80 A	1 003 865



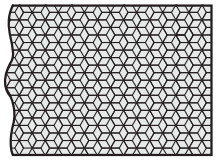
Reflector ø 83 mm, centre hole mounting

Type	Part no.
C 110	5 304 549



Reflective tape “Diamond Grade”

Type	Part no.	
REF-DG-K	4 019 634	Cut to size
REF-DG	5 304 334	Sheet 749 x 914 mm



Checklist for experienced users

1. How many inputs and outputs are required?

The number of inputs and outputs tells you how many AS-i networks you need.

2. How much power do the I/Os require?

The total power requirement of the respective modules determines which AS-i power supply unit you need. As it is not possible to connect power supply units in parallel, a power supply unit sized to the requirement must be used.

3. Are special cables required?

Any combination of profiled and round cables is possible. External conditions determine whether rubber, TPE or PUR cables should be used. Repeaters or extenders have to be used for cable lengths exceeding 100 m.

4. Have the addresses been correctly assigned?

A plan should definitely be drawn up making it clear which addresses have been assigned to which slaves. Double addressing will not be identified as an error by the master.

5. Which modules belong to which addresses?

The modules, or rather, the slaves which are addressed, should be carefully labelled.

6. When are the modules mounted?

Only when points 4 and 5 have been dealt with. Cables can be routed in any way.

7. How is it all configured?

The configuration is simply read in by entering the AS Interface profile for each slave in the master. This usually happens automatically, but can be done manually in the controller software.

8. Are the slaves detected?

First you must check whether the master has recognised all its slaves. Only then can you switch to protected operation and switch the controller to RUN.

9. How is testing done?

Input/output tests are performed by the familiar PLC method, i.e. the sensors are activated locally and then checked in the PLC.

10. How do you get it up and running?

You can either create your own controller software in the usual way, or use existing software. In latter case, you might have to adapt the symbolic assignment of addresses.

Ten valuable assembly tips

Tip 1: Power supply unit

On no account must AS Interface be earthed or grounded. Never use a normal power supply unit, only AS Interface power supply units (PELV) with integrated data de-coupling and connect ground (GND) with system ground.

Tip 2: Network extension

Without repeaters or extenders the AS Interface cable must be no longer than 100 m, including all feeders to the assembly terminals. If you want to expand the network, please note the following:

Expansion with extenders:

- The maximum cable length between the extender and the master must not exceed 100 m
- Do not connect any slaves or AS Interface network power supply unit between the master and the extender.
- Never confuse the “+” and “–” lines.

Expansion with repeaters:

- Up to two repeaters can be connected in series. This increases the cable length to maximum 300 m (i.e. 3 segments with maximum 100 m).
- An AS Interface power supply unit must be connected at every repeater.
- Under normal conditions, an extender must not be connected beyond a repeater.

Tip 3: Slaves

Each slave address is to be used only one. Only use addresses 1 to 31 or 1A to 31B in A/B technology (Spezification 2.1). Please note: modules containing the chip SAP 4.0 (Version 2.0) can be re-addressed up to 15 times [1)], thereafter they will retain the last address.

[1)] At each change of addressing, internal addressing is reset to zero.

Tip 4: Additional auxiliary power

The following applies if slaves are to be supplied with additional auxiliary power:

- at 24 V DC, a PELV power supply unit should be used and, if possible, the black profiled auxiliary power cable.

Tip 5: Routing of the cable

When laying the AS Interface cables, please note the following:

- Always use the yellow profiled AS Interface cable where possible, brown for “+” and blue for “–”.
- Even though communication along the AS Interface cable offers a high degree of EMC immunity, it should still be routed away from power cables, even in the control cabinet.
- Every AS Interface line requires its own cable. AS Interface cables must not be laid together with others in a bus cable.
- If individual cores are used (e.g. in the control cabinet), always lay parallel core pairs. In standard stranded wires, lay individual cores together or twist them.

Tip 6: Ensuring EMC immunity

Connect all inductance, e.g. contactor and relay coils, valves, brakes, with suppressor diodes, variators or RC elements. If frequency inverters are used, always use network filters, output filters and shielded motor cables.

Ten valuable assembly tips

Tip 7: Sensor and actuator power

Sensors and actuators must be supplied directly from the associated input or output of the slave. The cables should be kept as short as possible and away from energy cables, i.e. the slave modules should be as close as possible to the sensors and actuators.

Tip 8: Installing frequency converters

- Always follow the assembly guidelines in the operating instructions.
- Connect the cable shield, e.g. between filter and frequency converter and between the frequency converter and the motor, directly at both ends with a sufficient cross section (at least 4 mm^2).

Tip 9: Expanding system 2.1

Operating A/B-Slaves and “new” analog slaves is only possible with a master according to spezification 2.1.

Tip 10: Status/Diagnosis

For quick error location, the status and diagnosis bits should be evaluated in the PLC.

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