

- Distributed I/O system for zone 1 and zone 2 applications
- Modular design, with hot-pluggable modules
- Redundancy in power supply, communication interface and internal bus
- HART pass through, access to parameter settings and variables
- Configuration, communication and diagnosis via PROFIBUS DP
- FDT/DTM system integration or import of GSD file



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## System description

S900 provides all input and output modules needed for intrinsically safe field signal connection. The field signals are amplified in every S900 functional module, electrically isolated, and then output via an internal serial bus. A communication interface converts the digitized signals to adapt them to the standardized PROFIBUS DPV1 fieldbus protocol. Supervisory process control systems, DCS or SCADA systems use an intrinsically safe fieldbus to communicate with the communication interface.

A single fieldbus network suffices for configuring the individual fieldbus nodes, for cyclic data exchange, for all acyclic services, and for communication with HART<sup>®</sup>-compatible field instruments. All functional modules can be replaced easily and quickly in the installation or maintenance phase. The functional modules and the – optionally redundant – communication interfaces of systems placed in Zone 1 can be removed and plugged in while operation is running, without affecting the communication of the remaining modules. Only the primary power for the plug-in type power supply modules requires increased safety EEx-e.

Integrated encapsulated switch-off mechanisms allow for hot-swapping, i.e. the power supply units can be replaced without interrupting the primary power. Due to its little space requirements and robust design and its environmentally ruggedized case, the I/O system S900 is the best, cost-saving solution for use on site, in hazardous Zone 1 or Zone 2 areas.

## Various installation solutions for different tasks

The S900 components are arranged in a passive termination unit, for mounting on DIN rails or for direct mounting in a junction box. The termination unit contains the internal communication bus and all connectors for the field circuitry, communication and primary power. The functional modules are plugged in the appropriate slot of the termination unit.

Two termination unit versions are available: a redundant one with two slots for power supplies and the communication interface and 16 slots for the different functional modules, and a non-redundant one with a maximum of 4 slots. Digital functional modules are designed for up to 8 channels, and analog functional modules for up to 4 channels. Thus, up to 128 digital or up to 64 analog channels are possible for each fieldbus node when using a redundant termination unit. It is also possible to combine different functional modules. Up to 125 fieldbus nodes can be connected to a single fieldbus network. This means that up to 10,000 inputs and outputs can be handled by single S900 network. Extensions beyond this scope depend upon the fieldbus type used.

## No external signal adaptation or routing required

S900 provides various input and output modules: Analog input modules with or without integral transmitter supply, or with direct temperature measuring input for 2-, 3- or 4-wire resistance thermometers or thermocouples with internal cold junction compen-

sation. Analog output modules for direct positioner or actuator control. Valve control units or initiator inputs for intrinsically safe and short-circuit-proof power supply of digital field instruments.

Additionally, options are available for critical applications, allowing for channel-wise electrical isolation of the inputs and outputs. S900 permits direct connection of the entire field level through only 2 wires. As no separate routing, power supply or protection is needed, the installation cost is reduced considerably.

## Consistent configuration

Just like local I/O modules, the individual S900 Process I/O stations can be configured directly, using the engineering tool integrated in the Distributed Control System (DCS). A special Device Type Manager (DTM) exactly “knows” the functionality and parameters of the individual functional modules. Besides the module configuration, the DTM also provides for forcing (simulation) of the inputs and outputs and for display of the diagnosis messages.

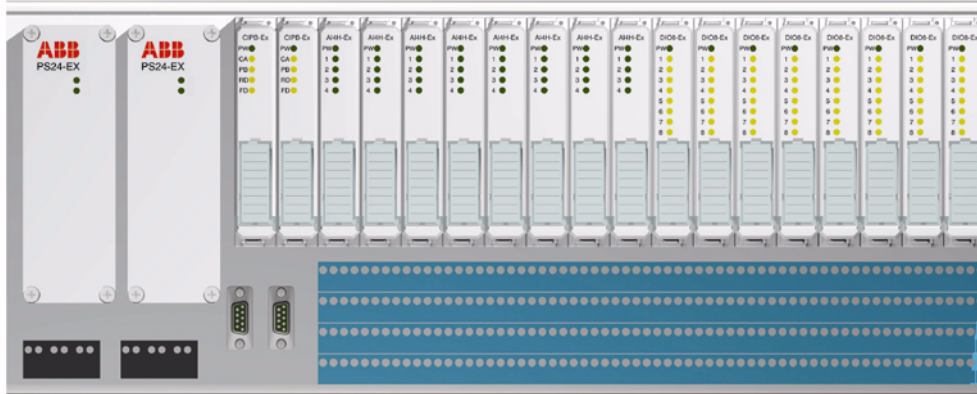
Due to the standardized FDT/DTM interface the DTM can be easily integrated in the configuration tool of the DCS. Since the DTM belongs to the instrument and not to the DCS, the user has to get familiar with the operating procedure only once. The complete configuration and all parameters are automatically loaded into the S900 stations when the bus network is starting up or upon replacement of a hardware component. So, this is a real “plug & play” system.

In consequence, there is no local service interface for the communication interface, since it is no longer needed. The configuration and parameter data is exclusively visualized and updated by the DTM. The data is stored in the central database of the engineering tool. Thus, system-wide data consistency is ensured. The applications needed for commissioning and trouble-shooting are reduced to the minimum. A putting into operation is also possible via using a GSD file.

## System features

I/O system S900 is a I/O system for use in hazardous areas. It provides bus-compatible local inputs and outputs (protection class IP20) for connection of digital and analog field instruments. Due to its degree of explosion protection it can be mounted in both hazardous areas (zone 1 and zone 2) and safe areas.

The system consists of a mounting termination unit accommodating the power supply units, the communication interfaces, and the I/O modules. The passive mounting termination unit ensures power distribution and data transfer, and also provides the connection platform. The power supply units reliably power the entire system. One power supply unit is sufficient for normal operation. A second (redundant) power supply unit can be added, to improve the system availability. The communication interface controls all data traffic between the I/O modules and the distributed control system (DCS) or the programmable logical controller (PLC). The communication interfaces can also be used in redundancy mode (line redundancy and module redundancy)



I/O system S900 with a redundant power supply unit, a redundant communication interface, and 16 I/O modules (front view)

The mounting termination unit is accommodated in a suitable field housing (junction box) to protect it from environmental exposure. When mounting the unit in a hazardous area you only have to use a field housing with increased safety (Ex-e). Appropriate ready-made S900 field housings are available. I/O system S900 is powered/connected via sufficiently protected terminals on the mounting termination unit, with increased safety Ex-e. The power supply units, the communication interfaces, and the I/O modules are plugged into the mounting termination unit and locked automatically. The power supply modules have a built-in shut-off mechanism with automatic locking and can be plugged/removed under power in zone 1, although the Ex-e supply in the primary circuit is still active in this case. As a result, the I/O system S900 does not require an explosion-proof or pressurized housing and, therefore, is easy to handle.

The mounting termination unit and the power supply unit(s) ensure intrinsically safe power supply of the communication interfaces and up to 16 I/O modules. The mounting termination unit provides all internal connections. Thus, only the peripheral units need to be connected by the user. Also, hot swapping of the communication interfaces and I/O modules is possible, i.e. these units can be connected or removed during operation. This ensures easy replaceability of all active components, and a high degree of flexibility and user-friendliness.

Field instruments complying with protection class Ex ia IIC can be connected to the I/O modules. At present, up to 16 I/O modules can be run on the same mounting termination unit. Each I/O module is designed for connecting 2, 4 or 8 field instruments, depending on the respective model. The I/O modules and the underlying field instrument level are powered via the mounting termination unit. All intrinsically safe modules are self-feeding and short-circuit proof. No separate routing level with additional power supply and individual fusing is required.

HART® communication in the field with all analog S900 I/O modules is possible via a PC or a hand-held terminal. In addition, the special HART® variants allow for a consistent HART® communication up to the distributed control system (DCS). Cyclic transmission of all secondary HART® variables, HART® diagnosis, and (acyclic) configuration of all HART® devices are possible.

The S900 I/O modules are slot-addressed and, therefore, do not require any settings on the modules themselves. The PROFIBUS address is either set via three coding switches.

The S900 communication module, the I/O modules, and the connected HART® devices are configured and parameterized via a fieldbus network. No additional network is required. The communication interface and the I/O modules have built-in LEDs allowing for "on site" diagnostics. All diagnostic and status indicator LEDs comply with DIN EN 60073 and NAMUR NE44. In addition, PROFIBUS diagnosis down to channel-specific error messages is possible via the communication bus.

## Required S900 components

The I/O system S900 for hazardous areas in its minimum hardware configuration consists of the following components:

Type TU16R-Ex	Termination Unit
Catalog No.	TU921S
Type PS24-Ex	Power Supply 24 V DC
Catalog No.	SA910S
Accessories	Power Conditioner
Catalog No.	BP901S
Type CIPB-Ex	Communication Interface
Catalog No.	CI920S
Type SD9	Sub D connector Ex i
Catalog No.	BP910S
Type DIO8-Ex	Digital I/O Module
Catalog No.	DX910S
Type XXX	Fieldbus isolating repeater
Catalog No.	(see accessories on page 32)

If required, a 230 V AC / 24 V DC power supply unit must be provided by the customer to ensure 24 V DC supply of the I/O system S900.

## Requirements on PLC/DCS master systems

S900 Process I/O can be connected to all systems with a PROFIBUS DP master.

The PROFIBUS DPV0 services provide the following S900 Process I/O functions:

- Configuring/ setting parameters of the S900 Process I/O station by restarting all slaves.
- S900 diagnosis messages
- Reading HART<sup>®</sup> secondary variables from the connected field instruments
- Reading HART<sup>®</sup> diagnosis from the connected field instruments through PROFIBUS diagnosis messages.

To be able to use the full range of functions provided by the I/O system S900, the master has to support additional functions. Modern, state of the art master systems support PROFIBUS DPV1 services, and are capable to (re)load userdefined and configuration parameters while the system is running, without affecting other slaves or requiring to restart the network.

PROFIBUS DPV1 services allow you to

- simulate (force) the S900 inputs and outputs
- configure HART<sup>®</sup> field instruments connected to the system

You can select special user-defined and configuration parameters and (re)load them while the system is running to

- change the parameters of the communication module or of individual I/O modules
- add more S900 Process I/O groups
- add, remove or replace S 900 I/O modules .

All I/O modules not involved in these changes continue cyclic communication. The S900 outputs hold their values/states while the master is downloading the parameters.

Modern master systems meeting the requirements stated above are, for example

- ABB AC800F / AC800M
- ABB CMC60 / CMC70
- other systems

## System features

### Number of PROFIBUS nodes

With PROFIBUS DP a maximum of 32 nodes (including the master and the class 2 configuration tool, if applicable) can be connected to a segment. When using repeaters, you can connect up to 126 nodes to a DP master.

The specified transmission rate and the max. permissible cable length of the segments (see operating instructions) must be observed. For example, a cable length of 400 m (1314 ft) is permissible for a network with a transmission rate of 500 Kbauds. Longer cables are possible when using FO cables (see operating instructions).

### Number of I/O modules

In accordance with the PROFIBUS standard up to 240 user parameters are available for configuring the S900 system. The system uses one byte per module in Mode 1, and six bytes per module in Mode 2 for the module configuration. This does not mean that there are any limitations. The 16 slots can be assigned as required.

The total quantity of I/O data must not exceed 216 bytes. If no HART<sup>®</sup> variables are to be transmitted, no system limitations result from this, since the max. possible I/O data quantity is 128 bytes, with up to 8 bytes per module and a maximum of 16 modules. Thus, an S900 Process I/O Station can be equipped with up to 16 I/O modules.

However, the max. number of transferable HART<sup>®</sup> secondary variables is limited, since the maximum quantity of usable data is 240 bytes. The max. number of HART<sup>®</sup> variables can be derived from the table below. If the system is configured using a configuration tool based on the FDT/DTM technology, the DTM will monitor the system limits.

Modules	I/O modules		HART devices
	Out bytes	In/status bytes	In bytes
CI920 <sup>1)</sup>	0	0	0
AI930 <sup>1)</sup>	0	8	0/4/16/32 <sup>2)</sup>
AO930 <sup>1)</sup>	8	0	0/4/16/32 <sup>2)</sup>
AI950 <sup>1)</sup>	0	8	0
DX910 <sup>1)</sup>	1	1	0
DI910 <sup>1)</sup> with status	1	2	0
DO910 <sup>1)</sup>	1	0	0
DP910 <sup>1)</sup>	2	8	0

### Usable data of various I/O modules

<sup>1)</sup> stands for S (Ex modules) and N (non-Ex modules)

<sup>2)</sup> 0...8 (0/4/16/32) HART variables per channel can be selected here

Calculation of the total I/O data set in Mode 1, example

Modules: 1 x CI920, 6 x AI930, 4 x AO930, 6 x DX910 with status

Total of out bytes = 6 x 0 + 4 x 8 + 6 x 1 = 38

Total of in/status bytes = 6 x 8 + 4 x 0 + 6 x 2 = 60

Total of I/O bytes = 38 + 60 = 98

Number of still available bytes = 216 - 98 = 118

Number of possible HART<sup>®</sup> variables = 118 / 4 = 29

### Cycle time

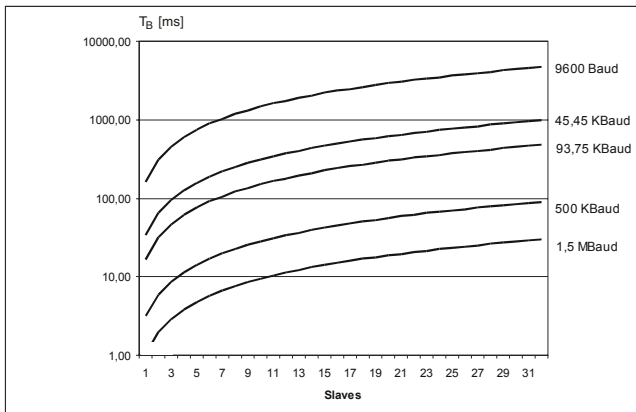
The PROFIBUS master defines the transmission rate used in the system. The internal cycle time is 5 ms for processing 128 digital signals and 20 ms for processing 64 analog signals. The response time of the entire system depends on the total I/O data quantity of all PROFIBUS nodes and the processing speed of the supervisory system.

The S900 output data are synchronized with the higher-level bus. Therefore, the internal cycle time only needs to be considered once.

The following approximation formula is valid:  $T_R = T_i + 2 \times T_B + T_S$

- $T_R$  = response time
- $T_i$  = internal cycle time
- $T_B$  = cycle time of the higher-level bus
- $T_S$  = cycle time of the DCS

With a bus cycle time of 5 ms and a DCS cycle time of 5 ms, a response time of  $T_R = 5 + 2 \times 5 + 5 = 20$  ms results from this for the 128 digital signals.



## PROFIBUS DP cycle time

For every S900 slave: 80 bytes input, 20 bytes output (corresponding to 32 digital output, 48 digital input with status, 16 analog input, 8 analog output, 12 secondary HART variables)

## I/O module power supply

The S900 power supplies are designed for two communication modules and up to 16 I/O modules of any type. No system limitations result from the selection of typical combinations of the module types DIO8, AI4H, TI4 and DO4. The power supply dimension on the secondary side can cause a reduction of the possible number of I/O modules, if:

- the type DO4 is used to power valves which support less than 1500 Ω input impedance
- just the types AO4I and AI4I are used.

In these cases, it has to be ensured that the total power loss of all Ex modules in the termination unit is less than 45 Watt. (For non-Ex modules a total power loss of less than 60 Watt must be observed).

When using redundant mounting termination units (e.g. TU16R-Ex), a redundant slot can be left free for the power supply unit if required. The power supply units are designed to power the entire S900 group.

## Various functions keep your plant “up and running”

I/O system S900 is tailored to applications in the field of process engineering. It provides a variety of functions which make the system robust, fault-tolerant and easy to diagnose. The main features of the system are its compact design, the redundant bus architecture, and the direct access to the configuration data of the connected HART®-compatible instruments via the fieldbus network.

I/O system S900 is the economic extension of your sensors and actors which can be directly contacted via the standardized fieldbus protocol. Due to the FDT/DTM technology both simple digital field instruments or temperature sensors and the well-proven basis of the intelligent HART® instruments can be integrated easily into the fieldbus system.

As a result, S900 provides a considerable cost-saving potential for all applications in the field of process engineering.

# I/O system S900 for hazardous areas

## General Data

### Power supply

Material	Aluminium anodized
Colour	RAL 9002 + black
External dimensions (W x H x D)	45 x 135 x 105 mm
Weight	1 kg

### I/O modules and communication interface

Material	PC
Fire protection class	V2, UL 94 (DIN IEC 707)
Colour (light grey)	RAL 9002
External dimensions (W x H x D)	20 x 104 x 104 mm
Weight	0,15 kg
Test voltage (fieldbus, PS, I/O)	1500 V
Test voltage (fieldbus -> I/O)	500 V ( intrinsically safe Profibus)
Test voltage (I/O -> I/O)	500 V (in case of isolation)

### Termination unit

Material	Aluminium chromatised
Colour	Aluminium chromatised
External dimensions (W x H x D)	498 x 274 x 134 mm
Weight	3 kg

### Mounting

	Zone1/Zone 2 (modules ...S only)
Operating temperature	
horizontal mounting	-20 °C...60 °C
vertical mounting	not allowed
Storage temperature	-40 °C...85 °C

### Standards

Transport / shock	30 g (IEC 68-2-27)
Function / Vibration	2 g (IEC 68-2-6)
Reference conditions	IEC 770
EMC	EN 61326 / 55822
Humidity	IEC 60654, T 1-4
Relative humidity condensation	< 85% (average) short duration, commissioning or temperature transient
Corrosive gases	ANSI/ISA-S71.04 Class G2

## System architecture

I/O modules per station	16 (extended MTU)
No. of channels	2, 4 and 8 channel
No. of grouped channels	1, 4 or 8

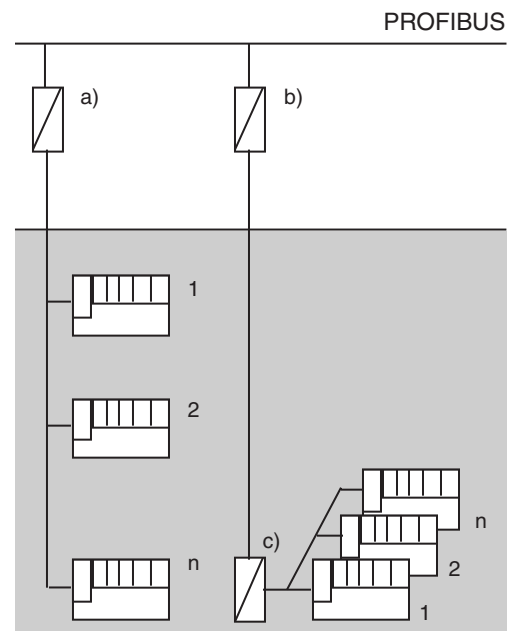
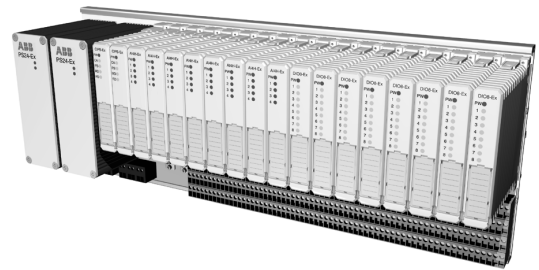
### Field instruments in Zone 1 (IS fieldbus via IS barrier)

S900 mounting options	safe area, Zone 2, Zone 1
S900 stations / barrier	max. 10
S900 components with	order number ... S

### Field instruments in safe area (standard fieldbus)

S900 mounting options	safe area
S900 stations on a bus line	31 (124 with repeater)
S900 components with	order number ... N

Bus length (copper)	200 m (1,5 MBaud)
	400 m (0,5 MBaud)
Bus length (fibre optic)	10 km



- a) Repeater or I.S. barrier
- b) Fibre optic converter
- c) Fibre optic converter for Zone 1

- **Stainless steel field housing for extended termination unit**
- **Prepared for wall mounting**
- **Optional isolated shielding bar or terminals**
- **Mounting in Zone 1 or Zone 2**

**Technical Data**

**Explosion protection (type ...S) PTB 01 ATEX**  
 Type of protection

**General Data FH660S, FH662S**

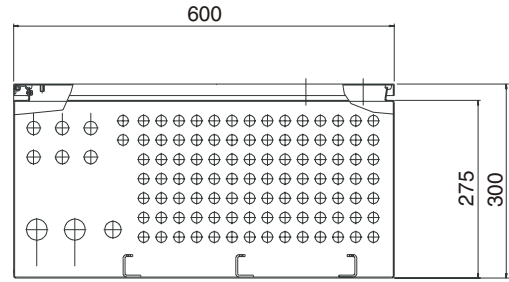
External dimensions (W x H x D)	600 x 600 x 300 mm
Protection degree	IP 66 (EN 60529)
Drain plug/breather	M25, IP 66
Door hinges	left hand side
Material	M6, stainless steel 1.4301
Cable gland	Brass
- for central power cable diameter	6 x M20 / 2 x M32 (black) 8.5...10.5 mm / 17.5...21.5 mm
- for field signals and fieldbus cable diameter	100 x M16 or 60 x M16 (blue) 6...9 mm
External earth	M6, stainless steel 1.4301
Weight	
- without S900 Process I/O	approx. 24 kg
- fully equipped	approx. 33 kg

Type FH660S	Cable gland (100 x M16)
Type FH662S	Cable gland (60 x M16)

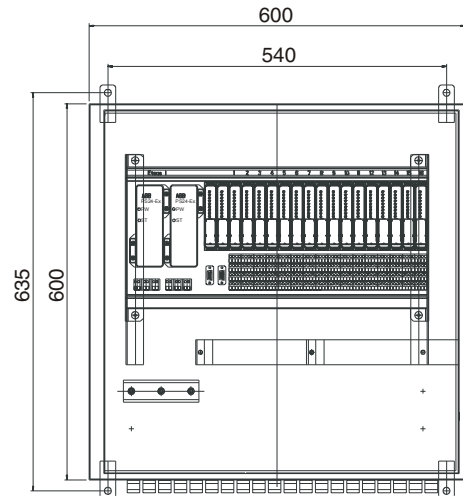
**General Data FH680S, FH682S**

External dimensions (W x H x D)	600 x 800 x 300 mm
Protection degree	IP 66 (EN 60529)
Drain plug/breather	M25, IP 66
Door hinges	left hand side
Material	M6, stainless steel 1.4301
Cable gland	Brass
- for central power cable diameter	6 x M20 / 2 x M32 (black) 8.5...10.5 mm / 17.5...21.5 mm
- for field signals and fieldbus cable diameter	100 x M16 or 60 x M16 (blue) 6...9 mm
External earth	M6, stainless steel 1.4301
Weight	
- without S900 Process I/O	approx. 30 kg
- fully equipped	approx. 39 kg

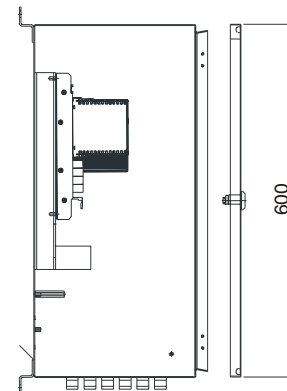
Type FH680S	Cable gland (100 x M16)
Type FH682S	Cable gland (60 x M16)



Bottom view FH660S



Front view FH660S



Side view FH660S



- Mounting termination unit for up to 16 I/O modules
- Prepared for redundant system power and communication
- Up to 4 terminals per channel
- Preselection of fieldbus address
- Prepared for certified field housing
- Mounting in Zone 1 or Zone 2 possible

### Technical Data

#### Field Terminals

Rated supply voltage (PS)	depending on power supply
System power terminals	EEx e
Rated terminal cross section	0,5... 2,5 mm <sup>2</sup>
Fieldbus plug contact	SUB D, 9 pins
Preselection of bus address	1...126 (switch)
I/O Terminals (type TU921N)	black
I/O Terminals (type TU921S)	EEx i (blue)
Rated terminal cross section	0,08 mm <sup>2</sup> ...2,5 mm <sup>2</sup>
Connection	Spring loaded/Screw terminals

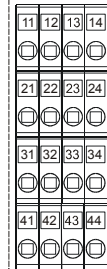
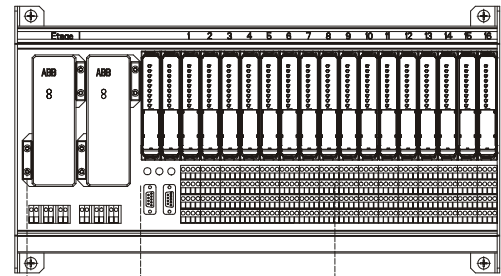
#### Explosion protection (type ...S) PTB 00 ATEX 2156 U

Ex-protection for:

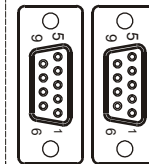
- Power supply	II 2 G EEx m [ib] e IIC T4
- Communication interface	II 2 G SYST EEx ib IIC T4
- I/O modules	II 2(1) G EEx ib [ia] IIC T4
- Termination unit	II 2(1) G EEx e ib [ia] IIC

#### General Data

Protection class	
I/O Terminals	IP 20
System power terminals	IP 30
Protection class	EN 61010
Explosion protection	EN 50020, EN 50019
Mounting in a junction box	Zone 1
Required protection degree	IP 54 or better
External dimensions (W x H x D)	498 x 274 x 136 mm
Weight	3 kg



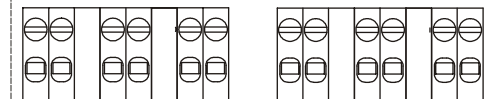
I/O terminals



Fieldbus connector

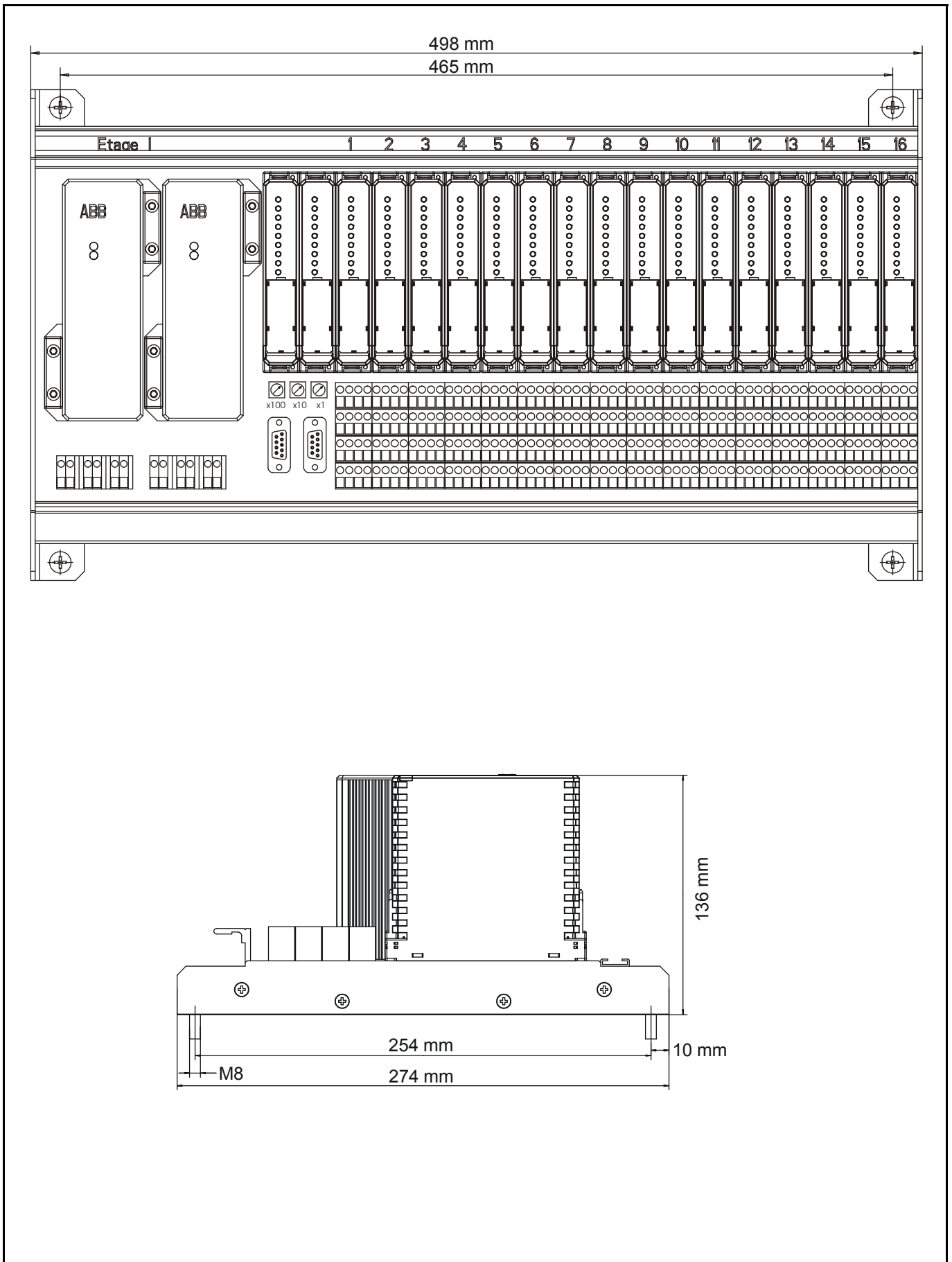
#### PROFIBUS

- 8 A-Line
- 3 B-Line
- 5 GND
- 6 +5 V



DC+ DC- PE DC+ DC- PE  
1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 2.4 2.5 2.6

System power terminals



- **Powering of communication interfaces and I/O modules**
- **Hot swap capability**
- **Redundant power for bumpless exchange**
- **Alarm in case of supply power loss (in case of redundancy)**

**Technical Data**

**Input**

Power supply (PS)	24 V DC (19,2...32 V)
Power load	< 2,7 A / 24 V; < 3,4 A / 19,2 V
Total power loss	< 65 Watt

**Output**

Available power for modules	< 60 Watt
Number of powered modules	16 I/O modules + 2 x CI920N * < 16 I/O modules + 2 x CI920N ** e.g. 9 x DO910N + 2 x CI920N ***

- \* for any I/O module with power loss < 3.4 W
- \*\* for I/O modules with power loss > 3.4 W
- \*\*\* DO910N with power loss > 2.2 W (for valves <1500 Ohm)

**Diagnosis**

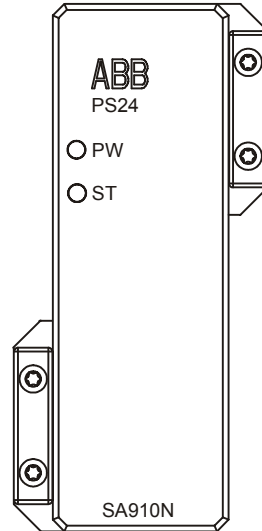
System / Modul power on	LED green / green
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**Test voltage**

Power supply	
- for module supply	1500 V AC
- for Exi current circuits	1500 V AC
- for PA/PE	500 V AC
Exi current circuits	
- for module supply	500 V AC

**General Data**

External dimensions (W x H x D)	45 x 135 x 105 mm
Weight	0.8 kg



Observe the order of installation for PS24:

1. Connect supply lines to backplane
2. Push the PS24 to the backplane
3. Switch on primary supply

Don't connect alive supply lines to backplane, if enabled PS24 is pushed to backplane.

For redundancy operation of PS24, use independent primary circuits with a peak power (10 ms) > 170 W only for backplane !  
For single operation of PS24, use primary circuits with a peak power (10 ms) > 70 W only !

- **Powering of communication interfaces and I/O modules**
- **Hot swap capability in Zone 1 or Zone 2**
- **Redundant power for bumpless exchange**
- **Alarm in case of supply power loss (in case of redundancy)**
- **Switching On by tighten the 4 mounting screws**
- **Connect power conditioner BP901S between primary supply and backplane, if supply cables > 3m or non-break power supply (UPS) are in use.**

**Technical Data**

**Input**

Power supply (PS)	24 V DC (19,2...32 V)
Power load	< 2,1 A / 24 V; < 2,6 A / 19,2 V
Total power loss	< 50 Watt

**Output**

Available power for modules	< 45 Watt
Number of powered modules	16 I/O modules + 2 x CI920S * < 16 I/O modules + 2 x CI920S ** e.g. 7 x DO910S + 2 x CI920S *** e.g. 12 x AO920S + 2 x CI920S

- \* for any I/O module with power loss < 2.5 W
- \*\* for I/O modules with power loss > 2.5 W
- \*\*\* DO910S with power loss > 2.2 W (for valves <1500 Ohm)

**Explosion protection (type ...S) PTB 00 ATEX 2199**

Type of protection II 2 G EEx m [ib] e IIC T4

**Diagnosis**

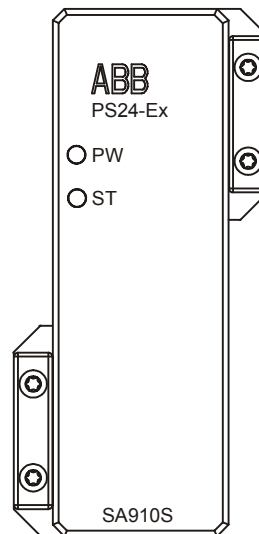
System / Modul power on	LED green / green
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**Test voltage**

Power supply	
- for module supply	1500 V AC
- for Exi current circuits	1500 V AC
- for PA/PE	500 V AC
Exi current circuits	
- for module supply	500 V AC

**General Data**

External dimensions (W x H x D)	45 x 135 x 105 mm
Weight	1.0 kg



Observe the order of installation for PS24-Ex:

1. Connect supply lines to backplane
2. Push the PS24-Ex to the backplane
3. Switch on primary supply
4. Tighten the mounting screws, PS24-Ex starts

Don't connect alive supply lines to backplane, if enabled PS24-Ex (with tighten mounting screws) is pushed to backplane.

For redundancy operation of PS24-Ex, use independent primary circuits with a peak power (10 ms) > 170 W only for backplane !  
For single operation of PS24-Ex, use primary circuits with a peak power (10 ms) > 60 W only !

- Power supply filter with increased safety
- Zone 1 mounting inside approved field housings
- Operation on 24 V DC power supply lines
- Connect power conditioner between primary supply and backplane, if supply cables > 3 m or non-break power supply (UPS) are in use.

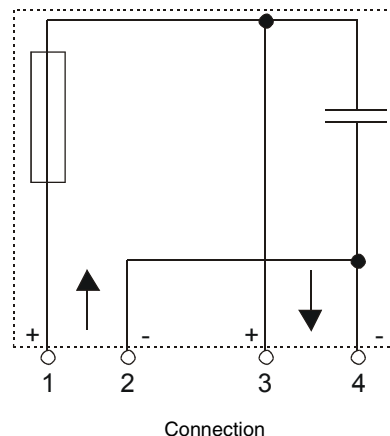
**Technical Data**

Nominal voltage  $U_N = 24 \text{ V DC}$   
 Voltage range 19.2...33 V DC  
 Nominal current  $I_N = 4 \text{ A}$   
 Integrated capacitance  $C = 470 \mu\text{F}$

**Explosion protection (type ...S) PTB 97 ATEX 1068 U**  
 Type of protection II 2 G EEx de IIC I M 2 EEx de I T4

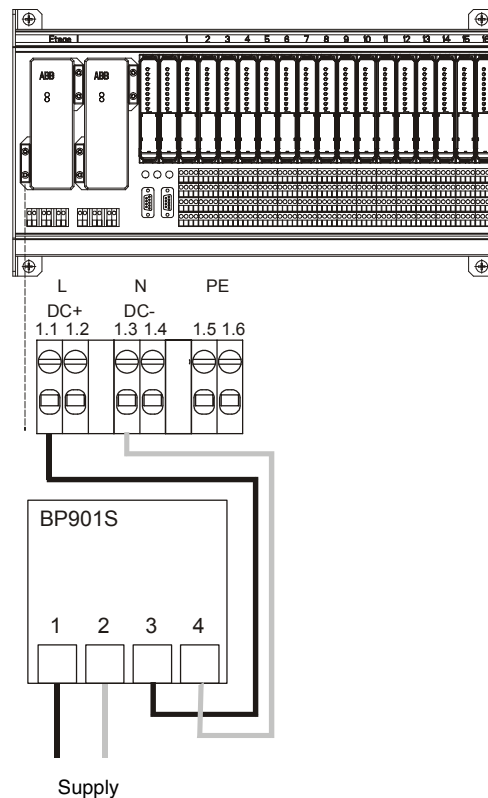
**General Data**

Mounting Zone 1  
 Mounting type on top hat rail NS35 according to EN 50022  
 Protection class IP 20  
 Mounting orientation any  
 Storage temperature  $-40 \dots +60 \text{ }^\circ\text{C}$   
 Operating temperature  $-20 \dots +60 \text{ }^\circ\text{C}$   
 Relative humidity < 85 %  
 Material Thermoplast  
 External dimensions (W x H x D) 30 mm x 91 mm x 94 mm  
 Weight approx. 0.27 kg



Connection

Example of application



- Fieldbus protocol PROFIBUS DPV1 (EN 50170)
- Coupling of the internal CAN bus to external PROFIBUS
- HART protocol on PROFIBUS DPV1
- Line or media redundancy via two coupling modules
- Electrical isolation between field bus, power
- Diagnosis, configuration and parameterisation via PROFIBUS
- PNO Certified

**Technical Data**

**Internal bus**

Internal bus protocol	CAN Open
Cycle time for digital I/O's	< 5 ms
Cycle time for analog I/O's	< 20 ms

**Fieldbus**

	PROFIBUS DPV1, C1+C2 (EN 50170) intrinsically safe (CI920S) Set-Failsafe Sync and Freeze
DP cyclus	0.1 ms
I.S.Voltage for bus termination	Hot Configuration in Run (HCIR) 5 V

**Explosion protection (type ...S) PTB00 ATEX 2201**

Type of protection II 2 G SYST EEx ib IIC T4

**Diagnosis**

System / Modul power on	LED green / red
PROFIBUS communication	LED yellow / red
Internal communication	LED yellow / red
Aktiv status	LED yellow
Configuration error	LED red

**Via fieldbus**

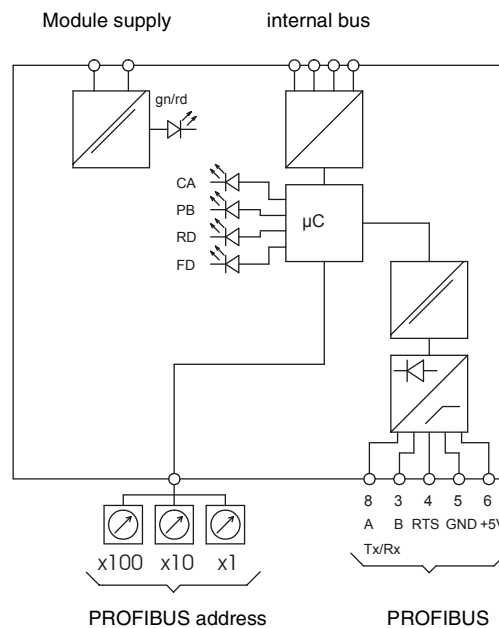
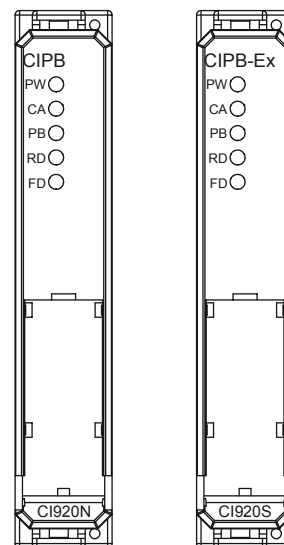
Power or communication loss  
Internal module temperature  
Redundancy mode

**Configuration and Parameterization**

DTM  
GSD File

**General Data**

Total power loss approx. 2.5 W



- Input for dry contacts or proximity switches (NAMUR)
- Output for low power intrinsically safe valves
- Short and break detection
- Electrical isolation between input / bus and input / power
- Common return for all inputs / outputs
- Configurable as a mixture of inputs and outputs
- 8 I/O channel, EEx ia II C

#### Technical Data

##### Input

No-load voltage	8 V DC
Short-circuit current	3 mA...4 mA
Switching point in range	1,4...1,8 mA
Switching hysteresis	0,2 mA
Switching frequency	< 100 Hz
Short-circuit detection	< 367 Ohm
Line-break detection	< 0,2 mA

##### Explosion protection (type ...S) PTB 00 ATEX 2180

Type of protection II 2(1) G EEx ib [ia] IIC T4

##### Input or Output

Max. short-circuit current	$I_o = 44 \text{ mA}$
Voltage	$U_o = 9,6 \text{ V}$
Performance	$P_o = 106 \text{ mW}$
External inductance	$L_o = 1 \text{ mH}$
External capacitance	$C_o = 1100 \text{ nF}$

##### Output

No-load voltage	< 8 V DC
Effective current	< 4 mA
Internal resistance	320 Ohm
Switching frequency	< 100 Hz
Short-circuit detection	< 1 kOhm
Line-break detection	< 0,2 mA

##### Diagnosis

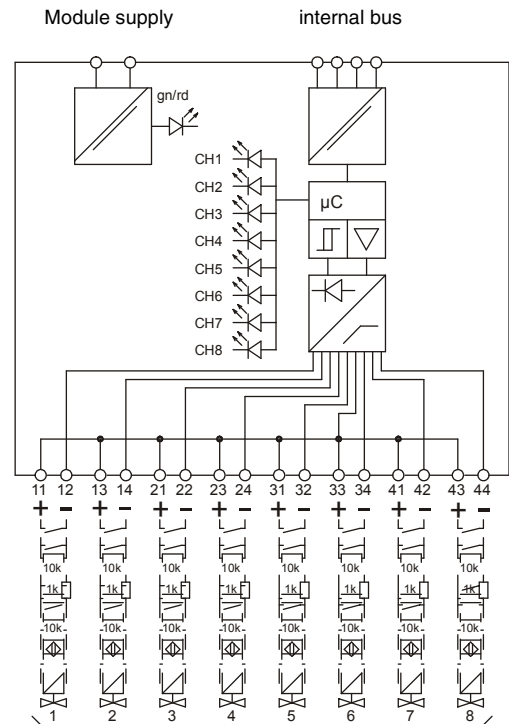
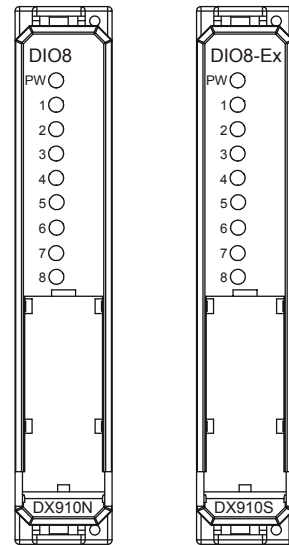
System / Modul power on	LED green / red
Open (off) / closed (on)	LED 1...8, off / yellow
Line break or short circuit	LED 1...8, red

##### Via fieldbus

Break, short	channelwise
Simulation	channelwise
Via fieldbus	for each I/O module

##### Characteristics at rated conditions

De-bounce filter	2...100 ms
Total power loss	< 1.1 W



##### Inputs for:

Dry contacts, NAMUR proximity switches

##### Output for valves from e.g.:

Samson (all standard valves with 6 V coil)  
Hoerbiger (only Piezo valve)  
Asco-Joucomatic (only Piezo valve)

- Output for intrinsically safe valves or alarms
- Integrated driving power
- Short and break detection
- Electrical isolation between output / bus and output / power
- Electrical isolation channel to channel
- 4 channel, EEx ia II C

**Technical Data**

Output	high voltage (low voltage)
Supply voltage and current	21 V / 8 mA (Curve A) 18 V / 20 mA (Curve A) 15 V / 30 mA (Curve B) 12 V / 40 mA (Curve B)
No-load voltage	24 V DC (16 V DC)
Internal resistance	300 Ohm
Switching frequency	< 100 Hz
Short-circuit detection	< 5 V
Line-break detection	< 1 mA

**Explosion protection (type ...S) PTB 01 ATEX 2048**

Type of protection	II 2(1) G EEx ib [ia] IIC T4
Max. short-circuit current	$I_o = 100 \text{ mA}$
Voltage	$U_o = 27 \text{ V (18,9 V)}$
Performance	$P_o = 675 \text{ mW}$
External inductance	$L_o = 0,5 \text{ mH}$
External capacitance	$C_o = 46 \text{ nF}$

**Diagnosis**

System / Modul power on	LED green / red
Output on	LED 1...4, yellow
Line break or short circuit	LED 1...4, red

**Via fieldbus**

Break, short	channelwise
Simulation	channelwise
Communication, hardware	for each I/O module

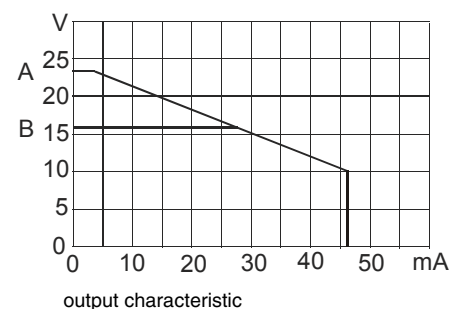
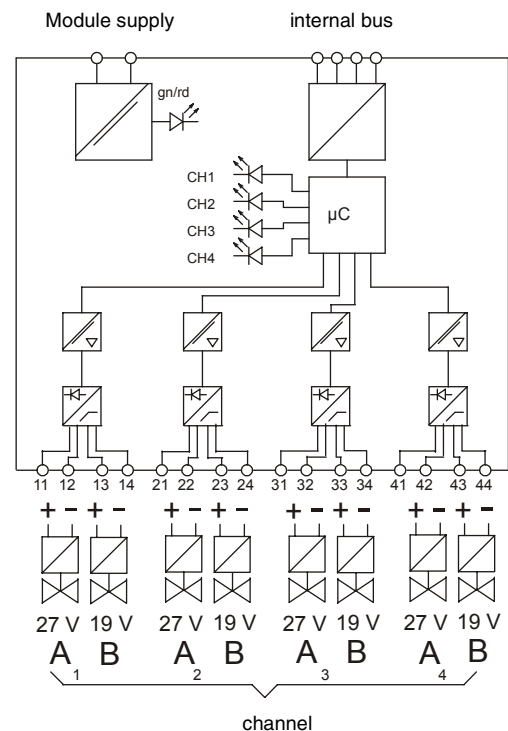
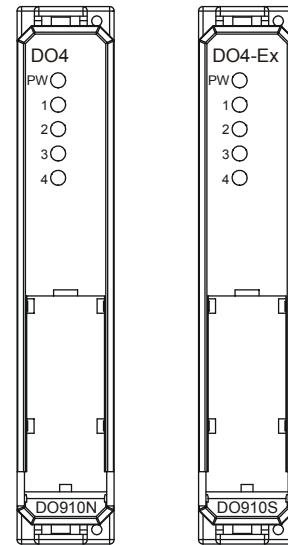
**Characteristics at rated conditions**

Total power loss	< 2.2 W (for valves >1500 Ohm) < 5.6 W (for valves > 275 Ohm)
------------------	--

Valves with input resistance < 270 Ohm must not be connected !

**Output for valves from e.g.:** Asco-Joucomatic  
Bürkert  
Eugen Seitz e.g. PV12F73  
Norgren-Herion  
Parker-Lucifer  
Samsomatic

We advise pilotvalves >1500 Ohm input impedance





- Frequency input for dry contacts or proximity switches
- Short and break detection
- Electrical isolation between input / bus and input / power
- Frequency measurement or counting applications
- 2 Function blocks
- Reset via Fieldbus or control input
- Status outputs / Direction recognition

**Technical Data**

**Input**

No-load voltage	8 V DC
Short-circuit current	3...4 mA
Switching point in range	1.4...1.8 mA
Switching hysteresis	0.2 mA
Short-circuit detection	< 367 Ohm
Line-break detection	< 0.2 mA
Input Frequency	4 kHz
Counter	1,25 kHz w. direction recognition 30 bit (29 bit and digit sign)

**Explosion protection (type ...S) PTB 01 ATEX**

Type of protection	
Max. short-circuit current	$I_o = 44 \text{ mA}$
Voltage	$U_o = 9,6 \text{ V}$
Performance	$P_o = 106 \text{ mW}$
External inductance	$L_o = 1 \text{ mH}$
External capacitance	$C_o = 1100 \text{ nF}$

**Diagnosis**

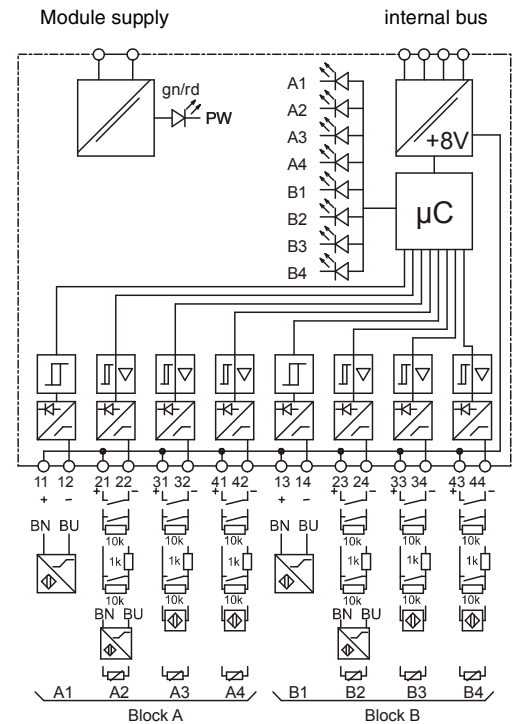
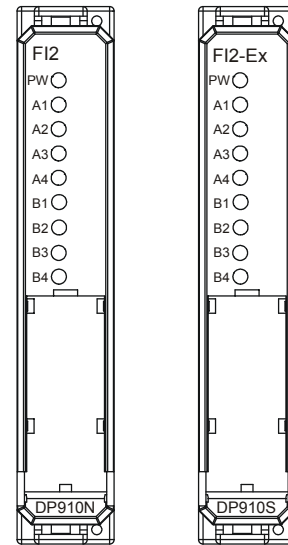
System / Modul power on	LED green / red
Open (off)/ closed (on)	LED 1...8, off / yellow
Line break or short circuit	LED 1...8, red

**Via fieldbus**

Break, short	channelwise
Simulation	blockwise
Alarm, counter over/underflow	blockwise
Communication, hardware	for each I/O module

**Characteristics at rated conditions**

De-bounce filter	0...100 ms
Total power loss	< 1.1 W
Accuracy for frequency measurement	0.1 % / 1 %, depending on time window



- Power supply for 4...20 mA loop powered transmitter
- Short and break detection
- Electrical isolation between input / bus and input / power
- Common return for all inputs
- 4 channel, EEx ia II C

### Technical Data

#### Input

Input current	4...20 mA
Range	0...24 mA
Transmitter supply	> 15 V (20 mA)
Internal current limitation	24...26 mA
Input impedance	240 Ohm
Residual ripple	< 100 mV
Short-circuit detection	< 5 V
Line-break detection	< 2 mA

#### Explosion protection (type ...S) PTB 00 ATEX 2058 X

Type of protection	II 2(1)G EEx [ia]ib IIC T4
Max. short-circuit current	$I_o = 93 \text{ mA}$
Voltage	$U_o = 22,1 \text{ V}$
Performance	$P_o = 403 \text{ mW}$
External inductance	$L_o = 1,78 \text{ mH}$
External capacitance	$C_o = 100 \text{ nF}$

#### Diagnosis

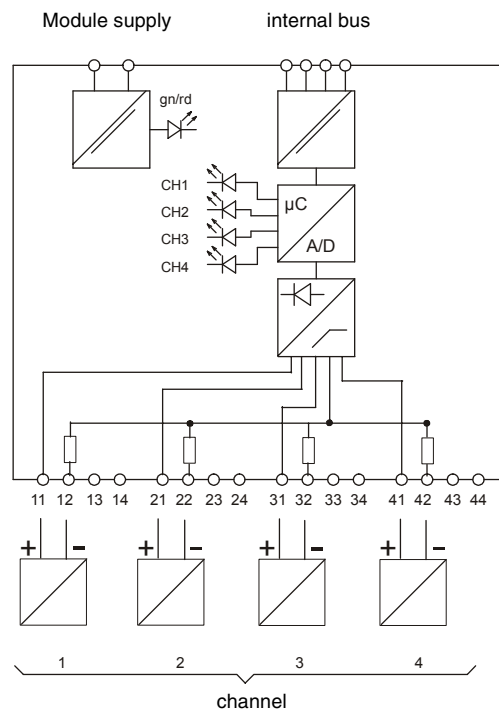
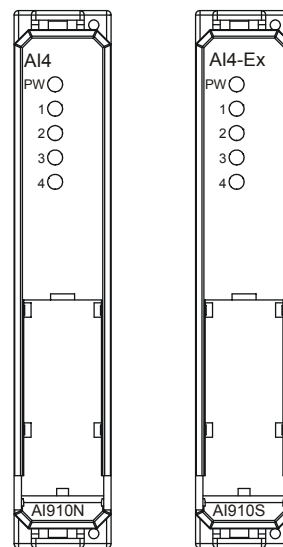
System / Modul power on	LED green / red
Line break or short circuit	LED 1...4, red

#### Via fieldbus

Break, short	channelwise
Over-/underrange	channelwise
Simulation	channelwise
Communication, hardware	for each I/O module

#### Characteristics at rated conditions

Accuracy incl. nonlinearity	< 0,1 %
Digital Accuracy	14 bit
Linearity	< 0,05 %
Temperature effect	< 0,05 % / 10 K
Response time	50 ms (10% -> 90%)
50/60 Hz filter	> 30 dB
Damping per software	PT1
Total power loss	< 2,5 W (20 mA)



- Power supply for 4...20 mA loop powered transmitter
- Short and break detection
- Electrical isolation between input / bus and input / power
- Electrical isolation channel to channel
- 4 channel, EEx ia II C

**Technical Data**

**Input**

Input current	4...20 mA
Range	0...24 mA
Transmitter supply	> 15 V (20 mA)
Internal current limitation	24...26 mA
Input impedance	240 Ohm
Residual ripple	< 100 mV
Short-circuit detection	> 24 mA
Line-break detection	< 2 mA

**Explosion protection (type ...S) PTB 01 ATEX**

Type of protection	
Max. short-circuit current	$I_o = 93 \text{ mA}$
Voltage	$U_o = 18,9 \text{ V}$
Performance	$P_o = 500 \text{ mW}$
External inductance	$L_o = 1,78 \text{ mH}$
External capacitance	$C_o = 100 \text{ nF}$

**Diagnosis**

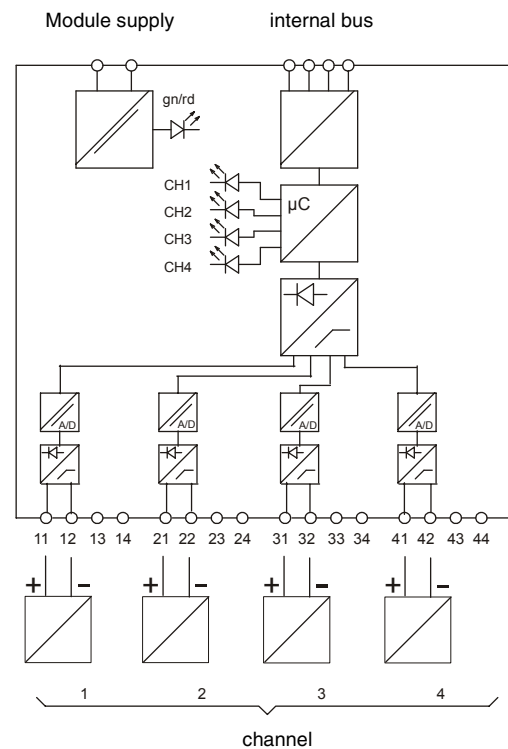
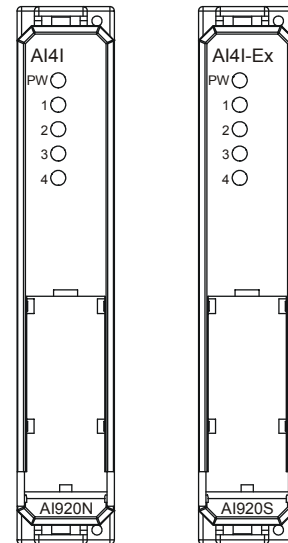
System / Modul power on	LED green / red
Line break or short circuit	LED 1...4, red

**Via fieldbus**

Break, short	channelwise
Over-/underrange	channelwise
Simulation	channelwise
Communication, hardware	for each I/O module

**Characteristics at rated conditions**

Accuracy incl. nonlinearly	< 0,1 %
Digital Accuracy	14 bit
Linearity	< 0,05 %
Temperature effect	< 0,05 % / 10 K
Response time	50 ms (10% -> 90%)
50/60 Hz filter	> 30 dB
Damping per software	PT1
Total power loss	< 3 W (20 mA)



- Power supply for 4...20 mA loop powered transmitter
- Short and break detection
- Electrical isolation between input / bus and input / power
- Common return for all inputs
- 4 channel, EEx ia II C
- Transmission of HART frames

### Technical Data

#### Input

Input current	4...20 mA
Transmitter supply	> 15 V (20 mA)
Internal current limitation	24...26 mA
Input impedance	240 Ohm
Residual ripple	< 100 mV
Short-circuit detection	< 5 V
Line-break detection	< 2 mA

#### Explosion protection (type ...S) PTB 00 ATEX 2058 X

Type of protection	II 2(1)G EEx [ia]ib IIC T4
Max. short-circuit current	$I_o = 93 \text{ mA}$
Voltage	$U_o = 22,1 \text{ V}$
Performance	$P_o = 403 \text{ mW}$
External inductance	$L_o = 1,78 \text{ mH}$
External capacitance	$C_o = 100 \text{ nF}$

#### Diagnosis

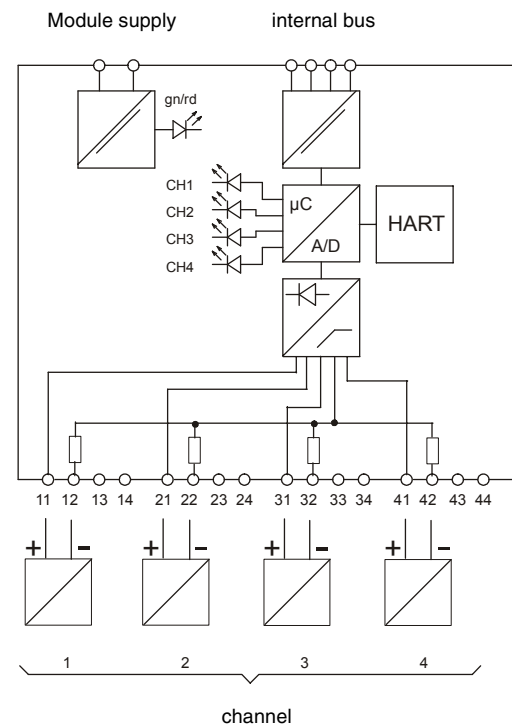
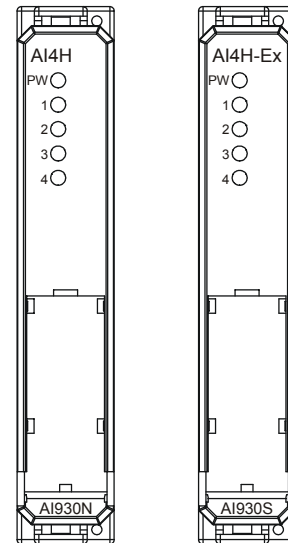
System / Modul power on	LED green / red
Line break or short circuit	LED 1...4, red

#### Via fieldbus

Break, short	channelwise
Over-/underrange	channelwise
Simulation	channelwise
Communication, hardware	for each I/O module

#### Characteristics at rated conditions

Accuracy incl. nonlinearly	< 0,1 %
Digital Accuracy	14 bit
Linearity	< 0,05 %
Temperature effect	< 0,05 % / 10 K
Response time	50 ms (10% -> 90%)
50/60 Hz filter	> 30 dB
Damping per software	PT1
Total power loss	< 2,5 W (20 mA)



- Passive inputs for 0/4...20 mA
- Short and break detection
- Electrical isolation between input / bus and input / power
- Common return for all inputs
- 4 channel, EEx ia II C
- Transmission of HART frames

### Technical Data

#### Input

Input current	0/4...20 mA
Input impedance	240 Ohm
Line-break / short circuit det.	< 2 mA (4...20 mA)

#### Explosion protection (type ...S) PTB 00 ATEX 2058 X

Type of protection	II 2(1)G EEx [ia]ib IIC T4
Max. short-circuit current	$I_o = 16 \text{ mA}$
Voltage	$U_o = 7,2 \text{ V}$
Performance	$P_o = 29 \text{ mW}$

#### Diagnosis

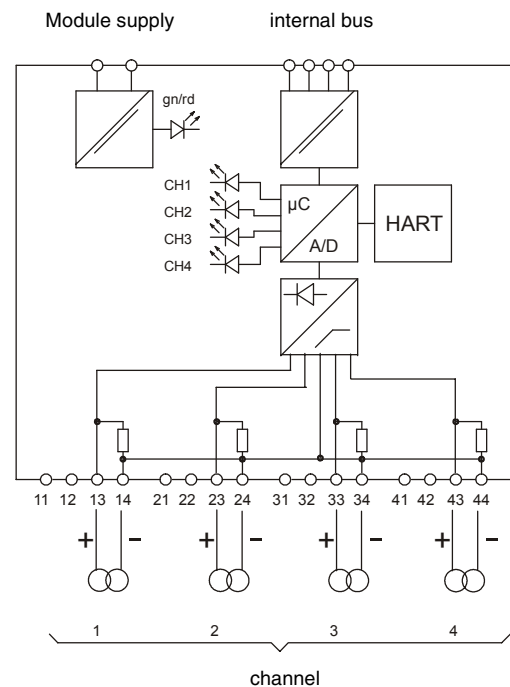
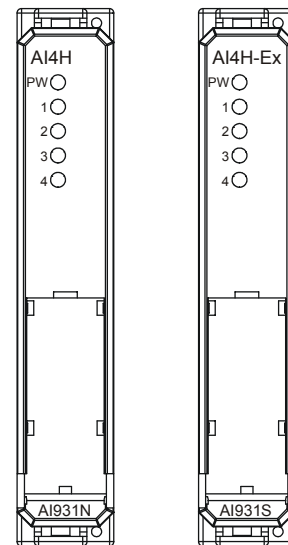
System / Modul power on	LED green / red
Line break or short circuit	LED 1...4, red

#### Via fieldbus

line-break or short-circuit	channelwise
Over-/underrange	channelwise
Simulation	channelwise
Communication, hardware	for each I/O module

#### Characteristics at rated conditions

Accuracy incl. nonlinearly	< 0,1 %
Digital Accuracy	14 bit
Linearity	< 0,05 %
Temperature effect	< 0,05 % / 10 K
Response time	50 ms (10% -> 90%)
50/60 Hz filter	> 30 dB
Damping per software	PT1
Total power loss	< 0,5 W



- Pt 100, Pt 1000, Ni 100, 0...3 kOhm in 2/3/4 wire technique
- Thermocouple Type B, E, J, K, L, N, R, S, T, U, mV
- Internal cold junction compensation
- Short and break detection
- Electrical isolation between input / bus and input / power
- Electrical isolation channel to channel
- 4 channel, EEx ia II C

**Technical Data**

**Input**

**Input (Pt 100, Pt 1000)**

Wire resistance (4 wire)	< 50 Ohm for each wire
Wire resistance (3 wire)	0...10 Ohm symmetric
Wire resistance (2 wire)	< 10 Ohm
Short-circuit detection	< 5 Ohm
Sensor, line-break detection	> 10 kOhm

**Input (Thermocouple)**

Line-break detection	< 100 nA, > 150 mV
----------------------	--------------------

**Explosion protection (type ...S) PTB 00 ATEX 2182**

Type of protection	II 2(1) G EEx ib [ia] IIC T4
Max. short-circuit current	$I_o = 25 \text{ mA}$
Voltage	$U_o = 5,5 \text{ V}$
Performance	$P_o = 35 \text{ mW}$
External inductance	$L_o = 2 \text{ mH}$
External capacitance	$C_o = 1600 \text{ nF}$

**Diagnosis**

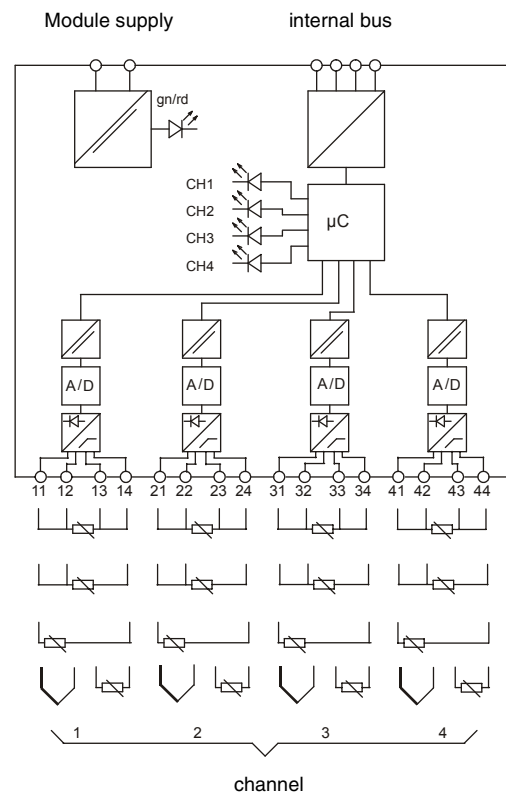
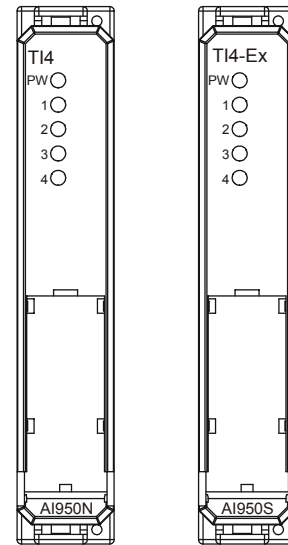
System / Modul power on	LED green / red
Line break or short circuit	LED 1...4, red

**Via fieldbus**

Break, short	channelwise
Over-/underrange	channelwise
Simulation	channelwise
Communication, hardware	for each I/O module

**Characteristics at rated conditions**

Calibrated accuracy	< 0,2K, < 80 mOhm, < 0,01 mV
Digital Accuracy	16 bit
Linearity	< 0,05 %
Temperature effect	< 0,05 % / 10 K
Response time	1 s (10% -> 90%)
50/60 Hz filter	> 40 dB
Damping per software	PT1
Total power loss	< 0,7 W



- Output signal 0/4...20 mA for actuators
- Short and break detection
- Electrical isolation between output / bus and output / power
- Output with common ground
- 4 channel, EEx ia II C

### Technical Data

#### Output

Output current	0/4...20 mA
Range	0...24 mA
Load	700 Ohm (20 mA)
Short-circuit detection	< 30 Ohm ( $I_a > 2$ mA)
Line-break detection	> 15 V

#### Explosion protection (type ...S) PTB 01 ATEX

Type of protection	
Max. short-circuit current	$I_o = 93$ mA
Voltage	$U_o = 22,1$ V
Performance	$P_o = 406$ mW
External inductance	$L_o = 1,78$ mH
External capacitance	$C_o = 100$ nF

#### Diagnosis

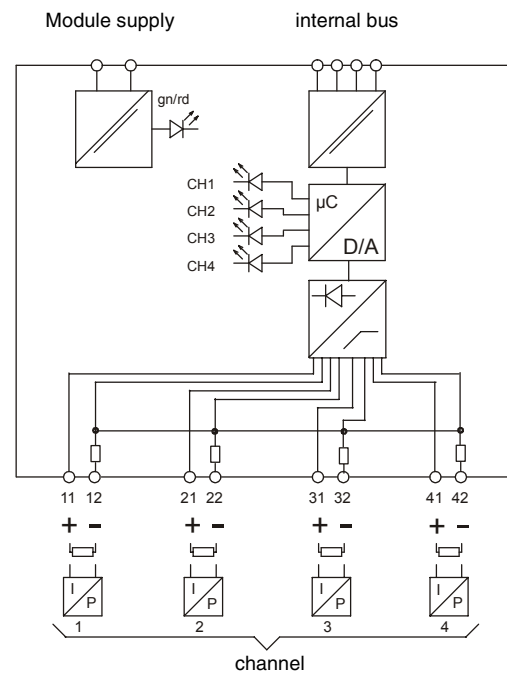
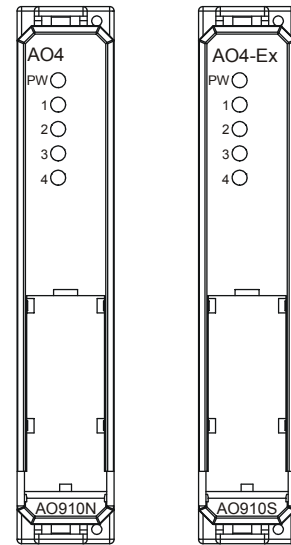
System / Modul power on	LED green / red
Line break or short circuit	LED 1...4, red

#### Via fieldbus

Break, short	channelwise
Simulation	channelwise
Communication, hardware	for each I/O module

#### Characteristics at rated conditions

Accuracy incl. nonlinearly	< 0,1 %
Digital Accuracy	13 bit
Linearity	< 0,05 %
Temperature effect	< 0,05 % / 10 K
Response time	50 ms (10% -> 90%)
Total power loss	< 2,5 W (20 mA)



- Output signal 0/4...20 mA for actuators
- Short and break detection
- Electrical isolation between output / bus and output / power
- Electrical isolation channel to channel
- 4 channel, EEx ia II C

**Technical Data**

**Output**

Output current	0/4...20 mA
Range	0...24 mA
Load	700 Ohm (20 mA)
Short-circuit detection	< 100 Ohm
Line-break detection	< 2 mA

**Explosion protection (type ...S) PTB 00 ATEX 2200**

Type of protection	II 2 (1) G EEx e ib [ia] II C T4
Max. short-circuit current	$I_o = 80 \text{ mA}$
Voltage	$U_o = 18,9 \text{ V}$
Performance	$P_o = 510 \text{ mW}$
External inductance	$L_o = 2 \text{ mH}$
External capacitance	$C_o = 100 \text{ nF}$

**Diagnosis**

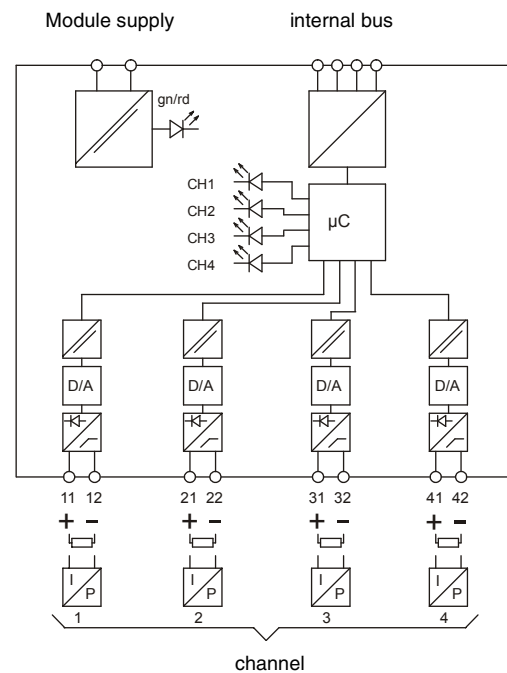
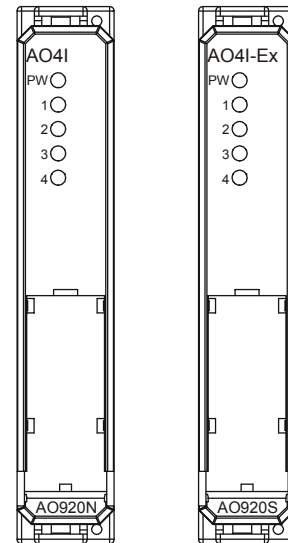
System / Modul power on	LED green / red
Line break or short circuit	LED 1...4, red

**Via fieldbus**

Break, short	channelwise
Simulation	channelwise
Communication, hardware	for each I/O module

**Characteristics at rated conditions**

Accuracy incl. nonlinearly	< 0,1 %
Digital Accuracy	13 bit
Linearity	< 0,05 %
Temperature effect	< 0,05 % / 10 K
Response time	50 ms (10% -> 90%)
Total power loss	< 3,3 W





- Output signal 0/4...20 mA for actuators
- Short and break detection
- Electrical isolation between output / bus and output / power
- Output with common ground
- 4 channel, EEx ia II C
- Transmission of HART frames

### Technical Data

#### Output

Output current	0/4...20 mA
Range	0...24 mA
Load	700 Ohm (20 mA)
Short-circuit detection	< 30 Ohm ( $I_a > 2$ mA)
Line-break detection	> 15 V

#### Explosion protection (type ...S) PTB 01 ATEX

Type of protection	
Max. short-circuit current	$I_o = 93$ mA
Voltage	$U_o = 22,1$ V
Performance	$P_o = 406$ mW
External inductance	$L_o = 1,78$ mH
External capacitance	$C_o = 100$ nF

#### Diagnosis

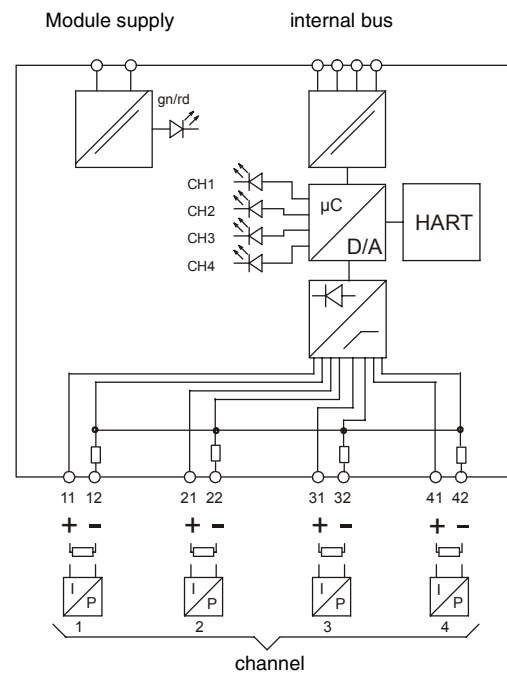
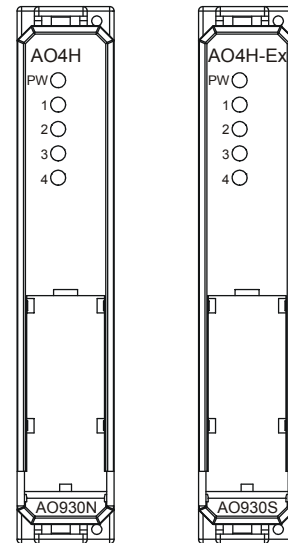
System / Modul power on	LED green / red
Line break or short circuit	LED 1...4, red

#### Via fieldbus

Break, short	channelwise
Simulation	channelwise
Communication, hardware	for each I/O module

#### Characteristics at rated conditions

Accuracy incl. nonlinearly	< 0,1 %
Digital Accuracy	13 bit
Linearity	< 0,05 %
Temperature effect	< 0,05 % / 10 K
Response time	50 ms (10% -> 90%) 200 ms (for HART)
Total power loss	2,5 W (20 mA)



## Ordering information

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Ex devices	Page 30
Safe area devices	Page 31
Accessories	Page 32

## Ordering information

Ordering information				
Ex Devices		Catalog No.		
Type	Designation			
<b>TU16R-Ex</b>	<b>Redundant Termination Unit</b> for 16 I/O modules redundant communication and power	<b>TU921S</b>		
<b>PS24-Ex</b>	<b>Power Supply</b> for 24 V DC the power supply filter, type BP901S, is required	<b>SA910S</b>		
<b>CIPB-Ex</b>	<b>Communication Interface</b> for PROFIBUS-DP V1	<b>CI920S</b>		
<b>DIO8-Ex</b>	<b>Digital Input or Output</b> input for dry contact or NAMUR initiator output for low power I.S. valves	<b>DX910S</b>		
<b>DO4-Ex</b>	<b>Digital Output</b> output for I.S. valves	<b>DO910S</b>		
<b>FI2-Ex</b>	<b>Frequency Input</b> input for dry contact or NAMUR initiator	<b>DP910S</b>		
<b>AI4-Ex</b>	<b>Analog Input</b> transmitter power supply, 4...20 mA	<b>AI910S</b>		
<b>AI4H-Ex</b>	<b>Analog Input, HART</b> transmitter power supply, 4...20 mA	<b>AI930S</b>		
<b>AI4H-Ex</b>	<b>Analog Input, HART</b> passive input, 0/4...20 mA	<b>AI931S</b>		
<b>TI4-Ex</b>	<b>Temperature</b> Pt100, Pt1000, Ni100 in 2-/3-/4-wire technology thermocouples type B, E, J, K, L, N, R, S T isolated inputs channel by channel	<b>AI950S</b>		
<b>AO4-Ex</b>	<b>Analog Output</b> output 0/4...20 mA	<b>AO910S</b>		
<b>AO4I-Ex</b>	<b>Analog Output, isolated</b> output 0/4...20 mA isolated outputs channel by channel	<b>AO920S</b>		
<b>AO4H-Ex</b>	<b>Analog Output, HART</b> output 0/4...20 mA	<b>AO930S</b>		
<b>FH660-Ex</b>	<b>Field Housing, stainless steel (1.43.01)</b>	<b>FH660S</b>		
<b>FH662-Ex</b>	<b>Field Housing, stainless steel (1.43.01)</b>	<b>FH662S</b>		
<b>FH680-Ex</b>	<b>Field Housing, stainless steel (1.43.01)</b>	<b>FH680S</b>		

## Ordering information

Ordering information				
Safe area devices		Catalog No.		
Type	Designation			
<b>TU16R</b>	<b>Redundant Termination Unit</b> for 16 I/O modules redundant communication and power	<b>TU921N</b>		
<b>TU4</b>	<b>Termination Unit</b> for 4 I/O modules redundant communication	<b>TU923N</b>		
<b>PS24</b>	<b>Power Supply</b> for 24 V DC	<b>SA910N</b>		
<b>CIPB</b>	<b>Communication Interface</b> for PROFIBUS-DP V1	<b>CI920N</b>		
<b>DIO8</b>	<b>Digital Input or Output</b> input for dry contact or NAMUR initiator output for low power solenoid valves	<b>DX910N</b>		
<b>DO4</b>	<b>Digital Output</b> output for solenoid valves (< 0.5 W)	<b>DO910N</b>		
<b>FI2</b>	<b>Frequency Input</b> input for dry contact or NAMUR initiator	<b>DP910N</b>		
<b>AI4</b>	<b>Analog Input</b> transmitter power supply, 4...20 mA	<b>AI910N</b>		
<b>AI4H</b>	<b>Analog Input, HART</b> transmitter power supply, 4...20 mA	<b>AI930N</b>		
<b>AI4H</b>	<b>Analog Input, HART</b> passive input, 0/4...20 mA	<b>AI931N</b>		
<b>TI4</b>	<b>Temperature</b> Pt100, Pt1000, Ni100 in 2-/3-/4-wire technology thermocouples type B, E, J, K, L, N, R, S T isolated inputs channel by channel	<b>AI950N</b>		
<b>AO4</b>	<b>Analog Output</b> output 0/4...20 mA	<b>AO910N</b>		
<b>AO4I</b>	<b>Analog Output, isolated</b> output 0/4...20 mA isolated inputs channel by channel	<b>AO920N</b>		
<b>AO4H</b>	<b>Analog Output, HART</b> output 0/4...20 mA	<b>AO930N</b>		

## Ordering information

Ordering information			
Accessoires	Catalog No.		
<b>Fieldbus isolating repeater</b> seperates an intrinsically safe RS485 fieldbus from a non intrinsically safe RS485 fieldbus / Stahl separator mounted in DIN railmounted housing with IP20 protection	<b>BI911S</b>		
<b>Fieldbus isolating repeater</b> seperates an intrinsically safe RS485 fieldbus from a non intrinsically safe RS485 fieldbus without bus termination mounted in DIN railmounted housing with IP20 protection	<b>BI912S</b>		
<b>Fieldbus isolating repeater</b> seperates an intrinsically safe RS485 fieldbus from a non intrinsically safe RS485 fieldbus with bus termination mounted in DIN railmounted housing with IP20 protection	<b>BI913S</b>		
<b>Fieldbus isolating repeater RS485 / intrinsically safe fibre optic port</b> seperates an intrinsically safe fibre optic port from a non intrinsically safe RS485 fieldbus	<b>BI921S</b>		
<b>Fieldbus isolating repeater RS485 / intrinsically safe fibre optic ring</b> seperates an intrinsically safe fibre optic ring from a non intrinsically safe RS485 fieldbus	<b>BI923S</b>		
<b>Fieldbus isolating repeater intrinsically safe RS485 / intrinsically safe fibre optic port</b> seperates an intrinsically safe fibre optic port from an intrinsically safe RS485 fieldbus mounted in separate field housing	<b>BI931S1</b>		
<b>Fieldbus isolating repeater intrinsically safe RS485 / two intrinsically safe fibre optic ports</b> seperates an intrinsically safe fibre optic ports from an intrinsically safe RS485 fieldbus mounted in separate field housing	<b>BI932S1</b>		
<b>Fieldbus isolating repeater intrinsically safe RS485 / intrinsically safe fibre optic ring</b> seperates an intrinsically safe fibre optic ring from an intrinsically safe RS485 fieldbus mounted in separate field housing	<b>BI933S1</b>		
<b>Intrinsically safe PROFIBUS-DP Connector</b> Connector for operating the intrinsically safe PROFIBUS-DP	<b>BP910S</b>		
<b>Power Supply Filter</b> One power supply filter is necessary for power supply with the Catalog No. SA910S	<b>BP901S</b>		
<b>Module Housing</b> IP20 protection for empty slots on the termination unit	<b>IP920S</b>		
<b>Insert Labels</b> 320 pcs.	<b>IL910</b>		
<b>Update Gateway CI920S and CI920 N</b> Basic price for every update order Update price per Gateway (CI920X)	<b>UP920</b> <b>UP921</b>		
<b>Additional Software</b> CD-ROM / S900 Software tools/documentation CD-ROM / DTM for fieldbus devices                      see list 63 CD-ROM / SMART VISION                                      see list 63 CD-ROM / Fieldbus project tool                              see list 63	<b>CD910</b>		
<b>Additional Hardware</b> PROFIBUS DP PC board                                      see list 63 Fieldbus cables    see list 63 Fieldbus connectors    see list 63 Fieldbus junction box    see list 63 Fieldbus adapter    see list 63			

## Mounting and installation instructions

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Coding	page 34
Mounting in hazardous areas	page 35
Safety and precautions	page 35

## Coding propose

### Propose 1 (Ex / non-Ex)

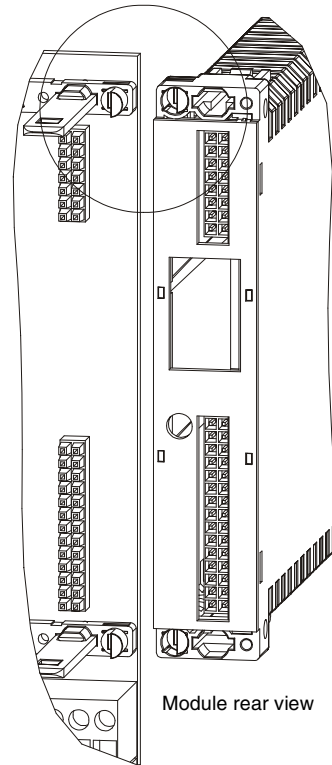
Ex module	Position 1
non-Ex module	Position 4

### Propose 2 (Type of module)

AI active	Position 1
AI passive	Position 2
AO	Position 3
DIO/FI	Position 4
DO	Position 5
TI	Position 6

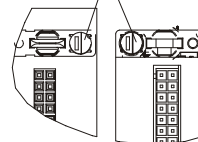
The setting of coding is free by user between the shown 6 position possibilities.

Termination unit  
front view

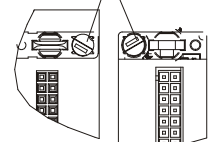


Module rear view

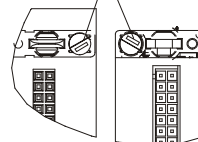
Position 1



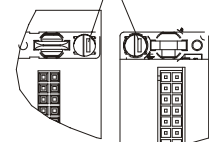
Position 2



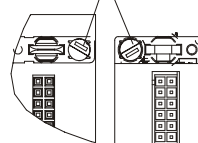
Position 3



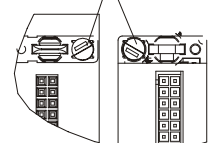
Position 4



Position 5



Position 6



## Mounting in hazardous areas

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The I/O system S900 can be mounted in safe and in hazardous areas (zone 1 and zone 2). Observe the general regulations and directives for electrical apparatus used in hazardous areas according to EN 50014 (VDE 0170/0171 Part 2).

On the customer side, explosion protection classes "e" (increased safety) and "i" (intrinsic safety) are applicable for the I/O system S900.

The power supply circuits on the S900 termination unit must meet the requirements of explosion protection class "e". Observe the directives and regulations specified in EN 60079-14 (VDE 0165 Part 1), especially Section 11 (Special requirements for explosion protection class "e" – Increased safety).

The field current circuits on the S900 termination unit must meet the requirements of explosion protection class "i". Observe the directives and regulations specified in EN 60079-14 (VDE 0165 Part 1), especially Section 12 (Special requirements for explosion protection class "i" – Intrinsic safety).

## Safety and precautions

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Safe and proper operation of the I/O system S900 requires proper transportation and storage, installation and commissioning by qualified personnel, proper use and careful maintenance.

The I/O system S900 components have been designed, produced and tested in accordance with IEC 61010-1 (corresponding to DIN/EN 61010-1 or VDE 0411, Part 1 "Safety Requirements for Electrical Measuring, Control and Laboratory Apparatus), have a CE certificate, and have been supplied in a safe condition.

When using the device (i.e. transporting, storing, installing, commissioning, operating or maintaining it or putting it out of operation) observe the operating instructions (42/17-510 EN) and the instructions given on the type plates, labels and safety notes attached to the device in order to retain the device in a safe condition and to ensure safe operation. Otherwise, persons may be injured, or the device itself or other devices or installations may be damaged or fail.

The regulations, standards and directives referred to in this product catalog and in the operating instructions (42/17-510 EN) are applicable in Germany. When using the device in any other countries, the relevant regulations, standards and directives applicable in the country where the device is used must be observed.

The connected devices must meet the requirements of VDE 0106 T.101 (basic requirements of protective separation) to achieve protective separation of live current circuits. To ensure protective separation, always lay feed cables separately from live current circuits or provide an additional insulation.

Prior to switching on the device make sure that the ambient conditions are in accordance with the device's environmental capabilities specified under "Technical data", and that the mains voltage is identical with the specified Process I/O System voltage.

If you are in doubt whether the device is still working safely or safe operation can no longer be ensured, immediately put the device out of operation and secure it against accidental operation.



Observe the instructions given in this product catalog. Additionally observe

- the relevant safety regulations, directives and standards for the installation and operation of electrical systems
- the regulations, directives and standards related to explosion protection
- the conformity compliance information of the individual S900 system components used in hazardous areas
- the installation and commissioning instructions in the S900 operating instructions (42/17-510 EN)

If you should need any information which is not contained in this product catalog or in the relevant operating instructions (42/17-510 EN, see chapter about installation and commissioning) please contact the vendor. Refer to the back side of this catalog for the vendor addresses.



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