



## CONFORMITY STATEMENT (Translation)

- (2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**
- (3) Test Certificate Number:



**PTB 04 ATEX 2094**

- (4) Equipment: Remote I/O-system, type S900-CB220B, basic system
- (5) Manufacturer: ABB Automation Products GmbH
- (6) Address: Borsigstraße 2, 63755 Alzenau, Germany
- (7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.
- (8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
- The examination and test results are recorded in the confidential report PTB Ex 04-23358 .
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
**EN 50021:1999**
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) This Conformity Statement relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.
- (12) The marking of the equipment shall include the following:

**II 3 G EEx nA II T4**

Zertifizierungsstelle Explosionsschutz  
By order:

Braunschweig, November 8, 2004

  
Dr.-Ing. U. Johannsmeyer  
Regierungsdirektor



## SCHEDULE

(13)

(14)

### CONFORMITY STATEMENT PTB 04 ATEX 2094

(15) Description of equipment

The remote I/O-system, type S900-CB220B is a modularly designed apparatus. Within the scope of this certificate it is certified as associated apparatus of category 3 with restriction to the basic system. The basic system comprises a module mounting rack, type TU4CB-B, a power supply module, type SA911B and a communication module, type CI920B which are all installed into an appropriate enclosure. The system may be supplemented by associated, separately certified modules for the input and output of signals to intrinsically safe and non-intrinsically safe field circuits. The category of the field circuits may deviate from category 3.

The maximum permissible range of the ambient temperature is  $-20\text{ }^{\circ}\text{C}$  up to  $+60\text{ }^{\circ}\text{C}$ .

#### Electrical data

**External circuits** (intended for connection by the operator)

Supply circuits, external (terminals) type of protection Non Sparking EEx nA II  
 $U_n = 18 \dots 32\text{ V DC}$ ,  $P_n = 30\text{ W}$

PA circuit, external (terminal) type of protection Non Sparking EEx nA II

RS 485-fieldbus circuits terminals A, B input  
A, B output  
AT, BT termination For electrical data reference is made to EC-type examination certificate PTB 03 ATEX 2093

Field circuits (terminal panel) For electrical data reference is made to EC-type examination certificate PTB 03 ATEX 2078

**Equipment of the basic system** (module mounting rack, power supply units, communication units. The equipment and the circuits comply with type of protection Non Sparking EEx nA II T4)

#### **Modul mounting rack, type of construction TU4CB-B**

(carries the internal circuits mentioned above and provides all external terminals intended for connection by the operator)

for installation of up to:

- 1 power supply unit
- 1 communication unit
- 4 I/O-modules

**Power supply module, type SA911B** (type of construction PS24CB-B)  
(generates the internal supply circuits from the external supply circuits)

$U_n = 18 \dots 32\text{ V DC}$ ,  $P_n = 30\text{ W}$

**Communication unit, type CI920B** (type of construction CIPB-Ex)  
(interconnects external and internal communication circuits)

RS 485 circuit

For electrical data reference is made to EC-type  
examination certificate PTB 03 ATEX 2093

The communication unit, type CI920B is already certified within the scope of the conformity statement PTB 03 ATEX 2029. It is labeled with the original marking also when used in the S900-CB220B system.

**Internal circuits** (interconnection of the modules only by means of appropriate module plug connectors specific to the system and conductors or circuitries on the module mounting rack(s). The circuits comply with type of protection Non Sparking EEx nA II).

Supply circuit, internal

$U_n = 20 \text{ V AC}, 300 \dots 314 \text{ kHz}, P_n = 25 \text{ W}$

PA-circuit, internal

for EMC purposes

Interlocking circuit, primary

not active

Synchronisation circuits,  
supply control circuit  
and address encoding

for internal purposes,  $U_n = 6 \text{ V}$

CAN-bus-circuits

for internal purposes,  $U_n = 6 \text{ V}$

(16) Test report PTB Ex 04-23358

(17) Special conditions for safe use

not required

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionsschutz  
By order:

  
Dr.-Ing. U. Johann  
Regierungsdirektor



Braunschweig, November 08, 2004



(1) **EC-TYPE-EXAMINATION CERTIFICATE**  
(Translation)

(2) Equipment and Protective Systems Intended for Use in  
Potentially Explosive Atmospheres - **Directive 94/9/EC**



(3) EC-type-examination Certificate Number:

**PTB 04 ATEX 2093**

(4) Equipment: Remote I/O-system, type S900-CB220B, basic system

(5) Manufacturer: ABB Automation Products GmbH

(6) Address: Borsigstraße 2, 63755 Alzenau, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 04-23358 .

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
**EN 50014:1997 + A1 + A2                      EN 50020:2002**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

**II (1 / 2) G [EEx ib/ia] IIB/IIC**

Zertifizierungsstelle Explosionschutz  
By order:

Braunschweig, November 08, 2004

Dr.-Ing. U. Johannsmeier  
Regierungsdirektor



## SCHEDULE

(13)

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 04 ATEX 2093**

(15) Description of equipment

The remote I/O-system, type S900-CB220B is a modularly designed apparatus. Within the scope of this certificate it is certified as associated apparatus of category (1, 2) with restriction to the basic system. The basic system comprises a module mounting rack, type TU4CB-B, a power supply module, type SA911B and a communication module, type CI920B which are all installed into an appropriate enclosure. The system may be supplemented by associated, separately certified modules for the input and output of signals to intrinsically safe and non-intrinsically safe field circuits. For the first case the protection level of the field circuits is raised to category ia.

The maximum permissible range of the ambient temperature is -20 °C up to +60 °C.

### Electrical data

**External circuits** (intended for connection by the operator)

Supply circuits, external  
(terminals)

$U_n = 18 \dots 32 \text{ V DC}$ ,  $P_n = 30 \text{ W}$   
Maximum voltage  $U_m = 60 \text{ V}$

PA circuit, external  
(terminal)

for connection to the local equipotential bonding system and for screen connection of the signal circuits

RS 485-fieldbus circuits  
terminals A, B input  
A, B output  
AT, BT termination

type of protection Intrinsic Safety EEx ib IIB/IIC  
Maximum values per circuit:

$U_o = \pm 3.72 \text{ V}$   
 $I_o = \pm 157 \text{ mA}$   
 $P_o = 146 \text{ mW}$

linear characteristic

The RS 485-circuit is infallibly electrically isolated from ground and from all other circuits up to a peak value of the voltage of 60 V.

External RS 485 fieldbus system

type of protection Intrinsic Safety SYST EEx ib IIC/IIB  
Maximum values for each pair of terminals:

$U_i = \pm 4,2 \text{ V}$

Maximum value of all terminal pairs in total:

$I_i = \pm 2,66 \text{ A}$

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Lines	Cable, type A or B according to EN 50039 with the following reactances per unit length: $L'/R' \leq 15 \mu\text{H} / \Omega$ (loop resistance) $C' \leq 250 \text{ nF} / \text{km}$ strand diameter $\geq 0,2 \text{ mm}$  Lumped inductances and capacitances in the wiring run of the external RS 485 fieldbus system are not permissible.
Field circuits, non-intrinsically safe (terminal panel)	For nominal data reference is made to the appropriate operating instructions of the respective module. Maximum voltage $U_m = 60 \text{ V}$
Field circuits, intrinsically safe (terminal panel)	type of protection Intrinsic Safety EEx ib/ia IIB/IIC For maximum values reference is made to EC-type examination certificate PTB 03 ATEX 2078

All field circuits, with the exception of those belonging to one and the same module, are safely electrically isolated up to a peak value of the voltage of 60 V from each other and up to 30 V from ground. For modules providing several intrinsically safe field circuits reference is made to EC-type examination certificate PTB 03 ATEX 2078.

#### Additional note

The specifications of the maximum permissible external inductances and capacitances at the field bus terminals of bus sharing units of the external RS 485 field bus network are not applied within the scope of this system certificate.

**Internal circuits** (interconnection of the modules only by means of appropriate module plug connectors specific to the system and conductors or circuitries on the module mounting rack(s)).

Supply circuit, internal	$U_n = 20 \text{ V AC}$ , 300 ... 314 kHz, $P_n = 25 \text{ W}$
PA-circuit, internal	for safe isolation and for EMC purposes
Interlocking circuit, primary	not active
Synchronisation circuits, supply control circuit and address encoding	for internal purposes, $U_n = 6 \text{ V}$
CAN-bus-circuits	for internal purposes, $U_n = 6 \text{ V}$

All circuits are voltage limited in accordance with the level of category ib.

**Equipment of the basic system** (module mounting rack, power supply units, communication units)

**Modul mounting rack, type of construction TU4CB-B**

(carries the internal circuits mentioned above and provides all external terminals intended for connection by the operator)

for installation of up to:

- 1 power supply unit
- 1 communication unit
- 4 I/O-modules with intrinsically safe field circuits  
according to PTB 03 ATEX 2078

**Power supply module, type SA911B** (type of construction PS24CB-B)

(generates the internal supply circuits from the external supply circuits and forms an active source for all further internal circuits)

$$U_n = 18 \dots 32 \text{ V DC}, P_n = 30 \text{ W}$$

**Communication unit, type CI920B** (type of construction CIPB-Ex)

(interconnects external and internal communication circuits)

The communication unit, type CI920B is already certified within the scope of EC-type examination certificate PTB 03 ATEX 2028. It is labeled with the original marking also when used in the S900-CB220B system.

(16) Test report PTB Ex 04-23358

(17) Special conditions for safe use

not required

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionsschutz  
By order:

Dr.-Ing. U. Johannsmeier  
Regierungsdirektor



Braunschweig, November 08, 2004



## CONFORMITY STATEMENT (Translation)

- (1) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**
- (2) Test Certificate Number:



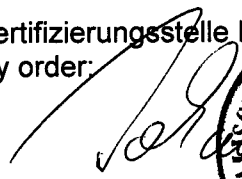
**PTB 03 ATEX 2079**

- (3) Equipment: Remote I/O-system, type S900, B-model modules with intrinsically safe field circuits
- (4) Manufacturer: ABB Automation Products GmbH
- (5) Address: 63755 Alzenau, Germany
- (6) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.
- (7) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
- The examination and test results are recorded in the confidential report PTB Ex 03-23179 .
- (8) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
**EN 50021:1999**
- (9) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.
- (10) This Conformity Statement relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.
- (11) The marking of the equipment shall include the following:

 **II 3 G EEx nA II T4**

Zertifizierungsstelle Explosionsschutz  
By order:

Braunschweig, October 27, 2003

  
Dr.-Ing. U. Johannsmeyer  
Regierungsdirektor



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Conformity Statements without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

(13)

## SCHEDULE

(14)

### CONFORMITY STATEMENT PTB 03 ATEX 2079

(15) Description of equipment

The modules specified below are category-3 apparatus and, as B-version, part of the remote I/O-system, type S900. They are intended for butt-mounting on the system module rack and for the electrical connection of the field circuits with the system-internal circuits.

The maximum permissible range of the ambient temperature is: -20 °C up to +60 °C.

#### Electrical data

**System-internal circuits** (Connection of the modules exclusively by a system-specific plug-connector designed to type of protection Non-sparking EEx nA II)

Internal supply circuit  $U_n = 20 \text{ V AC, } 300 \dots 314 \text{ kHz}$

CAN-bus-circuits  $U_n = 6 \text{ V, for internal purposes}$

Address encoding  $U_n = 6 \text{ V, only for connection to passive floating circuits}$

**Modules** (equipment in type of protection Non-sparking EEx nA II)

Function	Order code	Model
Digital in/out	DX910B	DIO8-Ex
Frequency input	DP910B	FI2-Ex
Digital output	DO910B	DO4-Ex
Analog output	AO920B	AO4I-Ex
Analog output	AO910B	AO4-Ex
Analog output	AO930B	AO4H-Ex
Temperature input	AI950B	TI4-Ex
Analog input	AI930B	AI4H-Ex
Analog input	AI931B	AI4H-Ex
Analog input	AI910B	AI4-Ex

#### Field circuits of the modules

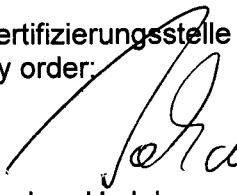
For electrical data reference is made to EC-type examination certificate PTB 03 ATEX 2078

Sheet 2/3

Conformity Statements without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

- (16) Test report PTB Ex 03-23179
- (17) Special conditions for safe use  
not necessary
- (18) Essential health and safety requirements  
met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionschutz  
By order:

  
Dr.-Ing. U. Johannsmeyer  
Regierungsdirektor



Braunschweig, October 27, 2003



## (1) EC-TYPE-EXAMINATION CERTIFICATE (Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**



(3) EC-type-examination Certificate Number:

**PTB 03 ATEX 2078**

(4) Equipment: Remote I/O-system, type S900, B-model, modules with intrinsically safe field circuits

(5) Manufacturer: ABB Automation Products GmbH

(6) Address: 63755 Alzenau, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 03-23179 .

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

**EN 50014:1997 + A1 + A2**

**EN 50020:1994**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:



**II (1) G [EEx ia] IIB/IIC**

Zertifizierungsstelle Explosionschutz  
By order:

Braunschweig, October 27, 2003

Dr.-Ing. U. Johanning  
Regierungsdirektor



## SCHEDULE

(13)

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2078**

(15) Description of equipment

The modules mentioned below are associated apparatus and, as B-version, part of the remote I/O-system, type S900. They are intended for butt-mounting on the system module rack and for the electrical connection of the field circuits with the system-internal circuits.

The maximum permissible range of the ambient temperature is: -20 °C up to +60 °C.

### Electrical data

**System-internal circuits** (Connection of the modules exclusively by a system-specific plug-connector)

Internal supply circuit

$U_n = 20 \text{ V AC, } 300 \dots 314 \text{ kHz}$

Maximum voltage  $U_m = 20 \text{ V}$  differentially or  
 $U_m = 30 \text{ V}$  to ground

CAN-bus-circuits

$U_n = 6 \text{ V}$ , for internal purposes

Maximum voltage  $U_m = 10 \text{ V}$  differentially & to ground

Address encoding

$U_n = 6 \text{ V}$ , only for connection to passive floating circuits with electrical isolation from ground according to a maximum voltage of  $U_m = 30 \text{ V}$

Each  $U_m$  of the system-internal circuits shall be voltage-limited at least in accordance with category Ib.

### Electrical data of the system-external field circuits of the modules:

(Connection of the field circuits by terminal blocks assigned to the respective modules on the module rack)

**Digital in/out, type DX910B (type of construction DIO8-Ex) and  
Frequency input, type DP910B (type of construction FI-Ex)**

Field circuits  
terminals:

type of protection Intrinsic Safety EEx ia IIC/IIB

channel 1: 11,12

maximum values per channel:

channel 2: 13,14

channel 3: 21,22

$U_o = 9.6 \text{ V}$

channel 4: 23,24

$I_o = 44 \text{ mA}$

channel 5: 31,32

$P_o = 106 \text{ mW}$

channel 6: 33,34

channel 7: 41,42

characteristic: linear

channel 8: 43,44

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$C_i$  negligibly low

$L_i$  negligibly low

maximum permissible external values for:  
(the following values comply with the calculation  
program according to PTB-report ThEx-10)

$L_o$ (mH)	IIC	IIB
	$C_o$ ( $\mu$ F)	$C_o$ ( $\mu$ F)
2	0.9	5.1
1	1.1	6.1
0.5	1.3	7.3
0.2	1.7	8.6

The field circuits are safely electrically isolated from ground and from the internal circuits up to peak value of the nominal voltage of 30 V. The field circuits are electrically connected to a common reference conductor.

### Digital output, type DO910B (type of construction DO4-Ex)

Field circuits  
terminals:

channel 1: 11,12

channel 2: 21,22

channel 3: 31,32

channel 4: 41,42

type of protection Intrinsic Safety EEx ia IIC/IIB;

maximum values per channel:

$$U_o = 27 \text{ V}$$

$$I_o = 100 \text{ mA}$$

$$P_o = 675 \text{ mW}$$

characteristic: linear

$$C_i = 24 \text{ nF}$$

$L_i$  negligibly low

maximum permissible external values for:  
(the following values comply with the calculation  
program according to PTB-report ThEx-10)

$L_o$ (mH)	IIC	IIB
	$C_o$ (nF)	$C_o$ (nF)
2	--	286
0.99	30	346
0.5	46	426
0.2	66	576

Field circuits  
terminals:  
channel 1: 13,14  
channel 2: 23,24  
channel 3: 33,34  
channel 4: 43,44

type of protection Intrinsic Safety EEx ia IIC/IIB;

maximum values per channel:

$U_o = 18.9 \text{ V}$   
 $I_o = 100 \text{ mA}$   
 $P_o = 675 \text{ mW}$

characteristic: trapezoidal

$C_i = 24 \text{ nF}$   
 $L_i$  negligibly low

maximum permissible external values for:  
(the following values comply with the calculation  
program according to PTB-report ThEx-10)

$L_o$ (mH)	IIC	IIB
	$C_o$ (nF)	$C_o$ (nF)
2	--	976
1	86	976
0.5	106	976
0.2	156	1176

The field circuits are safely electrically isolated from ground and from the internal circuits up to peak value of the nominal voltage of 30 V. The field circuits are electrically connected to a common reference conductor.

## Analog output, type AO920B (type of construction AO4I-Ex)

Field circuits  
terminals:  
channel 1: 11, 12  
channel 2: 21, 22  
channel 3: 31, 32  
channel 4: 41, 42

type of protection Intrinsic Safety EEx ia IIC/IIB

maximum values per channel:

$U_o = 18.9 \text{ V}$   
 $I_o = 80 \text{ mA}$   
 $P_o = 510 \text{ mW}$

characteristic: trapezoidal

$C_i = 25 \text{ nF}$   
 $L_i$  negligibly low

maximum permissible external values for:  
(the following values comply with the calculation  
program according to PTB-report ThEx-10)

$L_o$ (mH)	IIC	IIB
	$C_o$ ( $\mu\text{F}$ )	$C_o$ ( $\mu\text{F}$ )
2	0.10	1
1	0.10	1
0.5	0.12	1
0.2	0.15	1.17

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The field circuits are safely electrically isolated from ground and from the internal circuits up to peak value of the nominal voltage of 30 V. The field circuits are electrically connected to a common reference conductor.

### Analog output, type AO910B (type of construction AO4-Ex) and type AO930B (type of construction AO4H-Ex)

Field circuits terminals:  
channel 1: 11, 12  
channel 2: 21, 22  
channel 3: 31, 32  
channel 4: 41, 42

type of protection Intrinsic Safety  
EEx ia IIC/IIB or EEx ib IIC/IIB

maximum values per channel:

$$\begin{aligned}U_o &= 22.1 \text{ V} \\I_o &= 93 \text{ mA} \\P_o &= 640 \text{ mW}\end{aligned}$$

output characteristic: trapezoidal, with

$$\begin{aligned}U_Q &= 27.54 \text{ V} \\R &= 300 \text{ } \Omega\end{aligned}$$

effective internal capacitance:  $C_i \leq 1.1 \text{ nF}$

effective internal inductance:  $L_i \leq 0.22 \text{ mH}$

The following maximum permissible values for the external capacitance and external inductance apply with the internal values being already considered:

type of protection group	EEx ia and EEx ib	
	IIC	IIB
$L_o$	1.78 mH	1.78 mH
$C_o$	100 nF	500 nF

The field circuits are safely electrically isolated from ground and from the internal circuits up to peak value of the nominal voltage of 30 V. The field circuits electrically connected to a common reference conductor.

### Temperature input, type AI950B (type of construction TI4-Ex)

Measuring circuits terminals:  
channel 1: 11 through 14  
channel 2: 21 through 24  
channel 3: 31 through 34  
channel 4: 41 through 44

type of protection Intrinsic Safety EEx ia IIC/IIB

maximum values per channel:

$$\begin{aligned}U_o &= 5.5 \text{ V} \\I_o &= 25 \text{ mA} \\P_o &= 35 \text{ mW}\end{aligned}$$

characteristic: linear

$$\begin{aligned}C_i &= 60 \text{ nF} \\L_i &\text{ negligibly low}\end{aligned}$$

maximum permissible external values for:  
(the following values comply with the calculation  
program according to PTB-report ThEx-10)

$L_o$ (mH)	IIC	IIB
	$C_o$ ( $\mu$ F)	$C_o$ ( $\mu$ F)
2	2.6	15
1	2.9	17
0.5	3.6	21
0.2	4.5	27

maximum values per sensor for the interconnection of  
the field circuits with active sensors:

$U_o = 1.2$  V  
 $I_o = 50$  mA  
 $P_o = 60$  mW  
 $C_i$  negligibly low  
 $L_i$  negligibly low

with the above values the following maximum values  
for the connection of one channel to one sensor apply:  
(the following values comply with the calculation  
program according to PTB-report ThEx-10)

$L_o$ (mH)	IIC	IIB
	$C_o$ ( $\mu$ F)	$C_o$ ( $\mu$ F)
2	1.6	9.8
1	1.9	12
0.5	2.3	14
0.2	3.0	19

The field circuits are safely electrically isolated from ground and from the internal circuits up to peak value of the nominal voltage of 30 V. The field circuits are electrically connected to a common reference conductor.

### Analog input type AI930B (type of construction AI4H-Ex) and type AI910B (type of construction AI4-Ex)

Field circuits  
terminals:  
channel 1: +1, -3  
channel 2: +7, -9  
channel 3: +13, -15  
channel 4: +19, -21

type of protection Intrinsic Safety EEx ia IIC/IIB or  
EEx ib IIC/IIB, only for connection to passive circuits

maximum values per channel:

$U_o = 22.1$  V  
 $I_o = 93$  mA  
 $P_o = 640$  mW

output characteristic: trapezoidal, with

$U_Q = 27.54$  V  
 $R = 298$   $\Omega$

effective internal capacitance:  $C_i \leq 1.1 \text{ nF}$   
 effective internal inductance:  $L_i \leq 0.22 \text{ mH}$

The following maximum permissible values for the external capacitance and external inductance apply with the internal values being already considered:

type of protection group	EEx ia and EEx ib	
	IIC	IIB
$L_o$	1.78 mH	1.78 mH
$C_o$	100 nF	500 nF

The field circuits are safely electrically isolated from ground and from the internal circuits up to peak value of the nominal voltage of 30 V. The field circuits are electrically connected to a common reference conductor.

### Analog input Typ AI931B (type of construction AI4AH-Ex)

Field circuits  
 terminals:  
 channel 1: +4, -2  
 channel 2: +10, -8  
 channel 3: +16, -14  
 channel 4: +22, -20

type of protection Intrinsic Safety  
 EEx ia IIC/IIB or EEx ib IIC/IIB

maximum values per channel:

$U_o = 7,2 \text{ V}$   
 $I_o = 16 \text{ mA}$   
 $P_o = 29 \text{ mW}$

Ausgangskennlinie : linear

effective internal capacitance:  $C_i \leq 1.1 \text{ nF}$   
 effective internal inductance:  $L_i \leq 0.11 \text{ mH}$

The field circuits are safely electrically isolated from ground and from the internal circuits up to peak value of the nominal voltage of 30 V. The field circuits are electrically connected to a common reference conductor.

For the connection to active sensors with linear output characteristic the following maximum permissible values for the external capacitance  $C_o$  and external inductance  $L_o$  apply with the effective internal values being already considered:

maximum values for active sensors (linear output characteristic)		EEx ia IIC and EEx ib IIC		EEx ia IIB and EEx ib IIB	
$U_i$	$I_i$	$L_o$	$C_o$	$L_o$	$C_o$
2 V	100 mA	2.4 mH	4.2 $\mu\text{F}$	9.8 mH	33 $\mu\text{F}$
5 V	100 mA	2.4 mH	1.3 $\mu\text{F}$	9.8 mH	8,3 $\mu\text{F}$
10 V	100 mA	2.4 mH	358 nF	9.8 mH	2.1 $\mu\text{F}$
15 V	100 mA	2.4 mH	158 nF	9.8 mH	1.1 $\mu\text{F}$
16.5	100 mA	2.4 mH	126 nF	9.8 mH	950 nF
20 V	100 mA	2.4 mH	87 nF	9.8 mH	688 nF
22 V	100 mA	2.4 mH	71 nF	9.8 mH	594 nF

25 V	100 mA	2.0 mH	54 nF	9.0 mH	465 nF
30 V	100 mA	2.0 mH	37 nF	9.0 mH	345 nF

For the connection to active sensors with trapezoidal output characteristic the following maximum permissible values for the external capacitance  $C_o$  and external inductance  $L_o$  apply with the effective internal values being already considered:

maximum values for active sensors (trapezoidal output characteristic)		EEx ia IIC and EEx ib IIC		EEx ia IIB and EEx ib IIB	
$U_i$	$I_i$	$L_o$	$C_o$	$L_o$	$C_o$
22.1 V	93 mA	0.5 mH	60 nF	2 mH	250 nF

For the connection to active sensors with rectangular or trapezoidal output characteristic the following maximum permissible values for the external capacitance  $C_o$  and external inductance  $L_o$  apply with the effective internal values being already considered:

maximum values for active sensors (rectangular & trapezoidal output characteristic)		EEx ia IIC and EEx ib IIC		EEx ia IIB and EEx ib IIB	
$U_i$	$I_i$	$L_o$	$C_o$	$L_o$	$C_o$
2 V	100 mA	1.99 mH	500 nF	4.89 mH	3 $\mu$ F
5 V	100 mA	1.99 mH	300 nF	4.89 mH	1.5 $\mu$ F
10 V	90 mA	1.99 mH	200 nF	4.89 mH	1 $\mu$ F
15 V	56 mA	0.99 mH	100 nF	4.89 mH	500 nF
16.5 V	49 mA	0.99 mH	100 nF	4.89 mH	500 nF
20 V	35 mA	0.99 mH	70 nF	4.89 mH	300 nF
16.5 V	97 mA	-	-	1.99 mH	400 nF
20 V	80 mA	-	-	0.99 mH	300 nF
22 V	65 mA	-	-	0.99 mH	300 nF
25 V	50 mA	-	-	0.99 mH	250 nF

(16) Test report PTB Ex 03-23179

(17) Special conditions for safe use

not necessary

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionschutz  
By order:

Dr.-Ing. U. Johann  
Regierungsdirektor



Braunschweig, October 27, 2003

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