



(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 2028

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

(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 03-23050 .

(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 (2) G [EEx ib] IIB/IIC

Zertifizierungsstelle Explosionsschutz

Braunschweig, October 27, 2003

By order:

Dr.-Ing.

Regierungsdirektor



(13)

SCHEDULE

(14)

EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2028

(15) Description of equipment

The remote I/O-system, type S900 is a modular designed apparatus. The B-model is certified within the scope of this certificate as associated apparatus of category 2 with restriction to the basic system. The basic system consists of a module rack, type TU921B, one or two power supply modules of type SA910B and one or two communication modules of type CI920B. In accordance with its purpose the system may be supplemented by appropriate, separately certified modules for the in- and output of signals to intrinsically safe or non-intrinsically safe field circuits. In the first case the protection level of the field circuits will be upgraded to category ia.

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

Electrical data

System-external circuits (for connection by the operator)

External supply circuits
(terminals)

$U_n = 18 \dots 32 \text{ V DC}$, $P_n = 50 \text{ W}$ in total
Maximum voltage $U_m = 60 \text{ V}$

External PE circuit
(terminal)

not used internally

External PA circuit
(terminal)

not used internally

RS 485-fieldbus circuits
(Sub-D-sockets)

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 safely electrically isolated from earth and all other circuits up to a voltage peak value of 60 V.

External RS 485 fieldbus system

type of protection Intrinsic Safety SYST EEx ib IIC/IIB
Maximum value of each terminal pair:

$U_i = \pm 4.2 \text{ V}$

Maximum value of the terminal pairs in total:

$I_i = \pm 2.66 \text{ A}$

sheet 2/4

Cables	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 run of the external RS 485 fieldbus system are not permitted.
non-intrinsically safe field circuits (terminal board)	for nominal data reference is made to the accompanying operating instructions of the respective module Maximum voltage $U_m = 60 \text{ V}$
intrinsically safe field circuits (terminal board)	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 from each other up to a voltage peak value of 60 V and from earth up to 30 V. The field circuits of modules providing several intrinsically safe field circuits are electrically interconnected by an internal reference conductor.

Additional note

The specifications of the maximum permissible external inductances and capacitances on the field bus terminals of the stations of the external RS 485 field bus network are not applied within the framework of this system certificate.

System-internal circuits (Internetworking of the modules exclusively by the included system-specific module-plug-connectors and the conductors or circuit arrangements on the module rack/racks)

Internal supply circuit	$U_n = 20 \text{ V AC}, 300 \dots 314 \text{ kHz}, P_n = 45 \text{ W}$
Internal grounding circuit	for EMC, for connection to the equipotential bonding system
Primary interlocking circuit	not active
Synchronization circuits, Supply-calibration 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 category ib.

Equipment of the basic system (module rack, power supply unit, communication module)

Module rack, type TU921B (type of construction TU16R-Ex)

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

for mounting up to::

- 2 power supply units
- 2 communication modules and
- 16 I/O-modules with intrinsically safe field circuits according to 03 ATEX 2078

Power supply unit , type SA910B (type of construction PS24-B)

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

$U_n = 18 \dots 32 \text{ V DC}$, $P_n = 50 \text{ W}$ per module

Communication module, type CI920B (type of construction CIPB-Ex)

(connects external and internal communication circuits)

(16) Test report PTB Ex 03-23050

(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. Johannsmeier
Regierungsdirektor



Braunschweig, October 27, 2003



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 2029

- (3) Equipment: Remote I/O-system, type S900, B-model, basic system
- (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 03-23050 .
- (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 Explosionschutz
By order:

Braunschweig, October 27, 2003



Dr.-Ing. U. Johanns
Regierungsdirektor

Sheet 1/3

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.

(13)

SCHEDULE

(14)

CONFORMITY STATEMENT PTB 03 ATEX 2029

(15) Description of equipment

The remote I/O-system, type S900 is a modular designed apparatus. The B-model is certified within the scope of this certificate as explosion protected apparatus of category 3 with restriction to the basic system. The basic system consists of a module rack, one or two power supply modules and one or two communication modules. In accordance with its purpose the system may be supplemented by appropriate, separately certified modules for the in- and output of signals to intrinsically safe or 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 °C up to +60 °C.

Electrical data

System-external circuits (for connection by the operator)

External supply circuits
(terminals) type of protection Non-Sparking EEx nA II
 $U_n = 18 \dots 32 \text{ V DC}$, $P_n = 50 \text{ W}$ in total
Maximum voltage $U_m = 60\text{V}$

External PE circuit
(terminal) type of protection Non-Sparking EEx nA II

External PA circuit
(terminal) type of protection Non-Sparking EEx nA II

RS 485-fieldbus circuits
(Sub-D-sockets) for electrical data reference is made to EC-type
examination certificate PTB 03 ATEX 2028

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

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

Module rack, type TU921B (type of construction TU16R-Ex)

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

for mounting up to::

2 power supply units
2 communication modules and
16 I/O-modules

Power supply unit , type SA910B (type of construction PS24-B)

(generates internal supply circuits from the external supply circuits)

$U_n = 18 \dots 32 \text{ V DC}$, $P_n = 50 \text{ W}$

Sheet 2/3

Braunschweig und Berlin

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 03 ATEX 2029

Communication module, type CI920B (type of construction CIPB-Ex)
(connects external and internal communication circuits)

RS 485-fieldbus circuits

for electrical data reference is made to EC-type
examination certificate PTB 03 ATEX 2028

System-internal circuits (Internetworking of the modules exclusively by the included system-specific module-plug-connectors and the conductors or circuit arrangements on the module rack/racks. The circuits comply with type of protection Non-Sparking EEx nA II)

Internal supply circuit

$U_n = 20 \text{ V AC}$, 300 ... 314 kHz, $P_n = 45 \text{ W}$

Internal grounding circuit

for EMC, for connection to the equipotential bonding
system

Primary interlocking circuit

not active

Synchronization circuits,
Supply-calibration circuit
and adress 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 03-23050

(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. Johannshofer
Regierungsdirektor



Braunschweig, October 27, 2003



CONFORMITY STATEMENT (Translation)

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



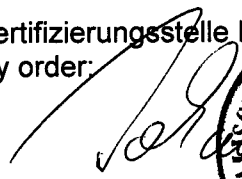
PTB 03 ATEX 2079

- (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



Sheet 1/3

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.

(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

sheet 2/8

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 (μ F)	C_o (μ 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:

$U_o = 27$ V

$I_o = 100$ mA

$P_o = 675$ mW

characteristic: linear

$C_i = 24$ 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 (μF)	C_o (μF)
2	0.10	1
1	0.10	1
0.5	0.12	1
0.2	0.15	1.17

sheet 4/8

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 (μ F)	C_o (μ 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 (μ F)	C_o (μ 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
 $R = 298$ Ω

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 μF	9.8 mH	33 μF
5 V	100 mA	2.4 mH	1.3 μF	9.8 mH	8,3 μF
10 V	100 mA	2.4 mH	358 nF	9.8 mH	2.1 μF
15 V	100 mA	2.4 mH	158 nF	9.8 mH	1.1 μF
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 μ F
5 V	100 mA	1.99 mH	300 nF	4.89 mH	1.5 μ F
10 V	90 mA	1.99 mH	200 nF	4.89 mH	1 μ 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

sheet 8/8

EC-type-examination Certificates 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.