



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:

IECEX PTB 06.0001X

issue No.:2

Certificate history:

Issue No. 2 (2011-3-23)

Issue No. 1 (2007-2-13)

Status:

Current

Date of Issue:

2011-03-23

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Applicant:

R. STAHL Schaltgeräte GmbH
Am Bahnhof 30
74638 Waldenburg
Germany

Electrical Apparatus:
Optional accessory:

REMOTE I/O SYSTEM I.S. 1

Type of Protection:

General requirements, Flameproof enclosures "d", Increased safety "e", Intrinsic safety "i", Type of protection "n", Type of protection 'iD'

Marking:

depending on model/type

*Approved for issue on behalf of the IECEx
Certification Body:*

Dr.-Ing. U. Johannsmeyer

Position:

Department Head "Intrinsic Safety and Safety of Systems"

*Signature:
(for printed version)*

Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
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Certificate issued by:

Physikalisch-Technische Bundesanstalt (PTB)
Bundesallee 100
38116 Braunschweig
Germany





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Manufacturer: **R. STAHL Schaltgeräte GmbH**
Am Bahnhof 30
74638 Waldenburg
Germany

Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2004 Edition: 4.0	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
IEC 60079-1 : 2007-04 Edition: 6	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
IEC 60079-11 : 2006 Edition: 5	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-15 : 2005-03 Edition: 3	Electrical apparatus for explosive gas atmospheres Part 15: Construction, test and Marking of Type of Protection "n" electrical apparatus
IEC 60079-7 : 2006-07 Edition: 4	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
IEC 61241-0 : 2004 Edition: 1	Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements
IEC 61241-11 : 2005 Edition: 1	Electrical apparatus for use in the presence of combustible dusts - Part 11: Protection by intrinsic safety 'iD'

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

[DE/PTB/ExTR11.0026/00](#)

Quality Assessment Report:

[DE/BVS/QAR10.0002/01](#)



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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

- CPM Type 9440/15-**-1*
- BusRail Type 9494/**-** and optional Extension Cable Type 9491/Z0-VB
- Digital Output Module Relay Type 9477/12-0*-12 including Base Type 9490/11-3*
- Digital Output Module Relay Type 9477/15-08-12
- Digital Input Module Relay Type 9470/*2-**-11
- Digital Output Module Relay Type 9475/*2-0*-*1
- Digital Output Module Valve Type 9478/22-08-51
- Analog Input Module Type 9460/12-08-11 and Type 9461/12-08-*1 and Type 9462/12-0*-11
- Analog Output Module Type 9465/12-08-11 and Type 9466/12-08-11
- Temperature Input Module R Type 9480/12-08-11
- Temperature Input Module mV Type 9481/12-08-11

CONDITIONS OF CERTIFICATION: YES as shown below:

In Zone 1 hazardous locations the I.S. 1 system has to be installed in an enclosure certified as per IEC 60079-7.

In Zone 2 hazardous locations the I.S. 1 system has to be installed in an enclosure certified as per IEC 60079-15.



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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Minor internal changes plus review on the base of the actual standards listed above.



Applicant: R. STAHL Schaltgeräte GmbH
Am Bahnhof 30; 74638 Waldenburg, Germany

Electrical Apparatus: REMOTE I/O, Type I.S. 1

Description of equipment

System Description:

The I.S. 1 Remote I/O is a DIN rail mounted system designed to record and output process control signals between hazardous location transducers and sensors and a non-hazardous location automation system. The I.S. 1 Remote I/O consists of various electrical apparatus commonly interconnected via the BusRail.

BusRail

The BusRail Type 9494 is a passively constructed bus rail snap-mounted into a standard 35 mm DIN rail, mechanically secured by terminations at both ends. It consists of a Power bus, an internal data bus and the address lines for the interconnection of the I.S. 1 CPU & Power Module to the I/O modules. The Type 9191/ extension cable is used to interconnect separately mounted BusRail segments carrying all BusRail circuits in a multicore cable. The supply circuit is intrinsically safe as per Ex ib requirements with voltage limitation located inside the CPM, wired inside the BusRail as a non sparking circuit and current limitation provided by the I/O modules. The CPM and the I/O modules provide an intrinsically safe interface limited per Ex ib requirements allowing for systems consisting of up to 2 CPM and up to 16 I/O Modules to be connected to one BusRail.

CPU & POWER MODULES

The CPU and Power Module (CPM) is the apparatus containing the system's power supply unit for the supply of the I/O modules via the BusRail and fulfils the function of a gateway, controlling both the data exchange on the internal data bus of the I.S. 1 system and the data exchange on the fieldbus interfaces, which connect to the automation system. For redundancy purpose a second CPU and Power Module can be used in an I.S. 1 Remote I/O system.

CPM, Type 9440/15--1***

The CPM designed for installations in Zone 2 hazardous areas is directly plugged onto the BusRail and provides mechanically secured connectors for the non I.S. circuits: external supply power and the three RS485 type interfaces.

I/O MODULES with non intrinsically safe field circuits

Dependent on the variant the DOMR is designed for installation in a Zone 1 hazardous location or in a Zone 2 hazardous location. The modules provide internal galvanic separation between the BusRail circuits to their field circuits. Depending on the variant the I/O module provides 6 or 8 potential free relay circuits for use in non intrinsically safe field circuits.

DOMR for Zone 1, Type 9477/12--1***

The DOMR designed for installations in Zone 1 hazardous areas is housed in an explosion proof enclosure plugged onto a Base Type 9490/11-3* providing increased safety terminals for the non I.S. circuits. The electrical connectors between the explosion proof housing and the base provide either explosion proof or intrinsic safe Type of Protection allowing for plug and unplug of the explosion proof DOMR in Zone 1 hazardous areas.

DOMR for Zone 2, Type 9477/15--1***

The DOMR designed for installations in Zone 2 hazardous areas is directly plugged to the BusRail and provides mechanically secured connectors for the non I.S. circuits and the external power supply. A partition, snap mounted between the DOMR and any I/O Module with intrinsically safe field circuits, guarantees for sufficient distance between the I.S. and non I.S. terminals.

I/O MODULES with intrinsically safe field circuits

All modules are manufactured in a unique DIN rail mount package with the system specific connector to the Remote I/O system's BusRail. Depending on the specific type, the I/O module provides 4, 8 or 16 intrinsically safe input or output circuits. By use of an internal separation module (Type 9495) all modules provide internal galvanic separation between the BusRail circuits to their field circuits, while all circuits of one I/O module are galvanically interconnected via their common return. The separation module controls the electrical circuits connecting to the BusRail to intrinsic safe levels allowing for plug and unplug of the modules in Zone 1 hazardous areas.

I/O MODULE 9478/22-08-51 with pneumatic field circuits

The module is manufactured in a DIN rail mount package with the system specific connector to the Remote I/O system's BusRail. The 8 pneumatic output circuits have a common air intake and a common air return 8 mm plug connector. The output circuits is implemented as a 6 mm plug connector.



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System Convention:

System's internal connections are exclusively provided by means of proprietary connectors non interchangeable with general purpose ones. There is no access intended to System Internal Circuits with the exception of the circuit auxiliary power (output/secondary), which is additionally led to an external 'e' capable connector for supply of further apparatus. This external circuit has to be installed complying with System Convention's segregation properties.

All modules of the I.S. 1 System are electrically connected only via the System Internal Circuits auxiliary power (output/secondary) and an internal address and data bus; the interconnection is formed solely by the system components BusRail Type 9494/**-** and Extension Cable Type 9491/Z0-VB.

The System Internal Circuits at the whole are infallibly galvanically separated from earth and all other circuits, with respect to external intrinsically safe circuits at a level of 60 V peak and according to an U_m of 253 V concerning non intrinsically safe external circuits. This property is valid for the system components BusRail Type 9494/**-** and Extension Cable Type 9491/Z0-VB and pursued within the system modules.

In Zone 1 hazardous locations the I.S. 1 system has to be installed in an enclosure according to IEC 60079-7.

In Zone 2 hazardous locations the I.S. 1 system has to be installed in an enclosure certified as per IEC 60079-15.



Electrical data

CPM Type 9440/15--1* including BusRail Type 9494/... and optional Extension Cable Type 9491/Z0-VB**

The CPM Type 9440/15-**-1* together with the BusRail Type 9494/**** and optional Extension Cable Type 9491/Z0-VB forms an associated apparatus system for installation in Zone 2 hazardous area. The arrangement serves for data transmission and power supply of the whole system including I/O Modules. At maximum two CPM and two BusRail, the latter populated with up to 16 I/O Modules each, are permissible together in one and the same system.

The overall Type of Protection is Ex nA [ia, ib] IIC T4 for an ambient temperature range of -20°C up to +65°C.

Electrical Data

auxiliary power (input/primary) $U_n = 24 \text{ V DC (20 V ... 35 V)}$
 X5: terminals X5-C (+), X5-B (-) $I_n = 5.2 \text{ A}$
 Safety Maximum Voltage $U_m = 253 \text{ V}$

data interfaces RS 485 standard RS 485 circuits
 sub-D-connectors X1, X2 and X3 Safety Maximum Voltage $U_m = 253 \text{ V}$

auxiliary power (output/secondary) Type of Protection Intrinsic Safety Ex [ia, ib] IIC
 maximum value:
 $U_o = 26.2 \text{ V}$
 the circuit requires an external current limitation

All system internal circuits conform to the System Convention of I.S. 1.

DIGITAL OUTPUT MODULE RELAY Type 9477/12-0*-12 including Base Type 9490/11-3*

The Digital Output Module Relay Type CPM Type 9477/12-0*-12 together with the Base Type 9490/11-3* forms an explosion protected apparatus for installation in an hazardous area of Zone 1. The arrangement serves for switching by relays of up to eight non intrinsically safe external circuits.

The overall Type of Protection is Ex d e [ia, ib] IIC T4 for an ambient temperature range of -20°C up to +65°C.

Electrical Data

Type 9477/12-08-12

output circuits 1 to 8 Safety Maximum Voltage $U_m = 253 \text{ V}$
 connectors 1/2; 3/4; 5/6; 7/8; 9/10
 11/12; 13/14; 15/16
 nominal values according to the table as follows:

U_n	60 V AC	30 V DC
I_{max}	2 A	2 A
P_n	100 VA	-

The output circuits 1 to 8 are separated mutually and against earth up to a working voltage of 60 V. All system internal circuits conform to the System Convention of I.S. 1.

Type 9477/12-06-12

output circuits 1 and 2 Safety Maximum Voltage $U_m = 253 \text{ V}$
 connectors 1/3/5/7 resp. 9/11/13/15
 nominal values according to the table as follows:

U_n	250 V AC	30 V DC
I_{max}	2 A	2 A
P_n	100 VA	-

The output circuits 1 and 2 are separated mutually and against earth up to a working voltage of 250 V. All system internal circuits conform to the System Convention of I.S. 1.

Physikalisch-Technische Bundesanstalt (PTB)



DIGITAL OUTPUT MODULE RELAY Type 9477/15-08-12

The Digital Output Module Relay Type 9477/15-08-12 is an apparatus for installation in hazardous areas up to Zone 2; it serves for switching by relays of up to eight external circuits according to explosion protection type Ex nA.

The overall Type of Protection is Ex nA nC nL [ib] IIC T4 for an ambient temperature range of -20°C up to +65°C.

Electrical Data

output circuits 1 to 8
connectors 1/2; 3/4; 5/6; 7/8; 9/10
11/12; 13/14; 15/16

Safety Maximum Voltage $U_m = 253 \text{ V}$

nominal values according to the table as follows:

U_n	250 V AC	30 V DC	110 V DC	220 V DC
I_{max}	2 A	2 A	0.3 A	0.12 A
P_n	100 VA	-		

All system internal circuits conform to the System Convention of I.S. 1.

DIGITAL INPUT MODULE Type 9470/*2-**-11

The Digital Input Module Type 9470/*2-**-11 is an intrinsically safe apparatus for installation in hazardous areas up to Zone 1; it serves for input processing of up to 16 binary channels.

The overall Type of Protection is Ex ib [ia] IIC T4 AND [Ex iaD] for an ambient temperature range of -20°C up to +65°C.

Electrical Data

input circuits 1 to 16
connectors 1/2; 3/4; 5/6; 7/8; 9/10; 11/12;
(X001, X002) 13/14; 15/16; 17/18; 19/20; 21/22;
23/24; 25/26; 27/28; 29/30; 31/32

Type of Protection Intrinsic Safety Ex ia IIC/IIB, for connection to passive circuits only

maximum value:

$$U_o = 11.6 \text{ V}$$

linear characteristic

the maximum permissible external capacitances C_o and inductances L_o depend on the count of actual interconnections and are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. Fig. A.4)

	one circuit		two circuits		four circuits		eight circuits		16 circuits	
	$I_o = 22 \text{ mA}$ $P_o = 51 \text{ mW}$		$I_o = 33 \text{ mA}$ $P_o = 76 \text{ mW}$		$I_o = 55 \text{ mA}$ $P_o = 127 \text{ mW}$		$I_o = 99 \text{ mA}$ $P_o = 229 \text{ mW}$		$I_o = 176 \text{ mA}$ $P_o = 406 \text{ mW}$	
	IIC	IIB	IIC	IIB	IIC	IIB	IIC	IIB	IIC	IIB
L_o [mH]	74.5	273	34.2	126	12.0	48.0	4.09	15.3	0.672	5.19
C_o [µF]	1.39	10.6	1.39	10.6	1.39	10.6	1.39	10.6	1.39	10.6

All input circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.



DIGITAL OUTPUT MODULE Type 9475/*2-0*-*1

The Digital Output Module Type 9475/*2-0*-*1 is an intrinsically safe apparatus for installation in hazardous areas up to Zone 1; it serves for output processing of up to eight actors.

The overall Type of Protection is Ex ib [ia] IIC T4 AND [Ex iaD] for an ambient temperature range of -20°C up to +65°C.

Electrical Data

all Sub Types 9475/22-0*-*1

shut down circuit
connector X2, terminals 1/2

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to passive circuits only

maximum values:

U_o = 6.6 V
I_o = 67 mA
P_o = 110 mW

linear characteristic

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o: characteristic values acc. to IEC 60079-11, Table A.2, resp. Fig. A.4)

IIC		IIB	
L _o [mH]	C _o [μF]	L _o [mH]	C _o [μF]
8.24	22	31.4	500

The shut down circuit is galvanically connected to all output circuits via their common return conductor.

Type 9475/*2-04-11

output circuits 1 to 4
connector X1, terminals (+/-) 1/2; 5/6; 9/10; 13/14

Type of Protection Intrinsic Safety Ex ia IIC/IIB resp. Ex ib IIC for connection to passive circuits only

maximum values safety level ia:

U_o = 19.9 V
I_o = 150 mA
P_o = 742 mW

linear characteristic

maximum values safety level ib:

U_o = 19.9 V
I_o = 60 mA
P_o = 714 mW

trapezoidal characteristic

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o: characteristic values acc. to IEC 60079-11, Table A.2, resp. Fig. A.4)

IIC		IIB	
L _o [mH]	C _o [μF]	L _o [mH]	C _o [μF]
1.3	0.223	7.0	1.42

All output circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.



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Type 9475/*2-04-21

output circuits 1 to 4
connector X1, terminals (+/-) 1/2; 5/6; 9/10; 13/14

Type of Protection Intrinsic Safety Ex ia IIC/IIB resp. Ex ib IIC/IIB for connection to passive circuits only

maximum values safety level ia:

$$\begin{aligned} U_o &= 26.2 \text{ V} \\ I_o &= 110 \text{ mA} \\ P_o &= 722 \text{ mW} \end{aligned}$$

linear characteristic

maximum values safety level ib:

$$\begin{aligned} U_o &= 26.2 \text{ V} \\ I_o &= 60 \text{ mA} \\ P_o &= 722 \text{ mW} \end{aligned}$$

trapezoidal characteristic

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L_o [mH]	C_o [μ F]	L_o [mH]	C_o [μ F]
1.45	0.097	9.09	0.75

All output circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.

Type 9475/*2-04-31

output circuits 1 to 4
connector X1, terminals (+/-) 1/2; 5/6; 9/10; 13/14

Type of Protection Intrinsic Safety Ex ia IIC/IIB resp. Ex ib IIC/IIB for connection to passive circuits only

maximum values safety level ia:

$$\begin{aligned} U_o &= 26.2 \text{ V} \\ I_o &= 90 \text{ mA} \\ P_o &= 585 \text{ mW} \end{aligned}$$

linear characteristic

maximum values safety level ib:

$$\begin{aligned} U_o &= 26.2 \text{ V} \\ I_o &= 60 \text{ mA} \\ P_o &= 585 \text{ mW} \end{aligned}$$

trapezoidal characteristic

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L_o [mH]	C_o [μ F]	L_o [mH]	C_o [μ F]
2.44	0.097	14.3	0.75

All output circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.



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Type 9475/*2-08-41

output circuits 1 to 8
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8; 9/10;
11/12; 13/14; 15/16

Type of Protection Intrinsic Safety Ex ia IIC/IIB resp. Ex ib IIC/IIB for connection to passive circuits only

maximum values safety level ia:

$$\begin{aligned} U_o &= 11.5 \text{ V} \\ I_o &= 75 \text{ mA} \\ P_o &= 216 \text{ mW} \end{aligned}$$

linear characteristic

maximum values safety level ib:

$$\begin{aligned} U_o &= 11.5 \text{ V} \\ I_o &= 50 \text{ mA} \\ P_o &= 216 \text{ mW} \end{aligned}$$

trapezoidal characteristic

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. Fig. A.4)

IIC		IIB	
L_o [mH]	C_o [μ F]	L_o [mH]	C_o [μ F]
6.7	1.64	25	11.2

All output circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.

Type 9475/*2-08-51

output circuits 1 to 8
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8; 9/10;
11/12; 13/14; 15/16

Type of Protection Intrinsic Safety Ex ia IIC/IIB resp. Ex ib IIC/IIB for connection to passive circuits only

maximum values safety level ia:

$$\begin{aligned} U_o &= 19.9 \text{ V} \\ I_o &= 145 \text{ mA} \\ P_o &= 719 \text{ mW} \end{aligned}$$

linear characteristic

maximum values safety level ib:

$$\begin{aligned} U_o &= 19.9 \text{ V} \\ I_o &= 38 \text{ mA} \\ P_o &= 558 \text{ mW} \end{aligned}$$

trapezoidal characteristic

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. Fig. A.4)

IIC		IIB	
L_o [mH]	C_o [μ F]	L_o [mH]	C_o [μ F]
1.44	0.223	7.47	1.42

All output circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.



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Type 9475/*2-08-61

output circuits 1 to 8
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8; 9/10;
11/12; 13/14; 15/16

Type of Protection Intrinsic Safety Ex ia IIC/IIB resp. Ex ib IIC/IIB for connection to passive circuits only

maximum values safety level ia:

U_o = 26.2 V
I_o = 107 mA
P_o = 697 mW

linear characteristic

maximum values safety level ib:

U_o = 26.2 V
I_o = 30 mA
P_o = 565 mW

trapezoidal characteristic

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o: characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L _o [mH]	C _o [μF]	L _o [mH]	C _o [μF]
1.57	0.097	9.75	0.75

All output circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.

DIGITAL OUTPUT MODULE with VALVE Type 9478/22-08-51

The digital output module with valve, type 9478/22-08-51 is an output assembly of the I.S. 1 system. Its electrical connection to the system realized by means of a plug connector complies with the I.S. 1 convention. Deviating from the output modules known so far, there are no terminals for fieldcircuits. The output signals are transmitted by means of built-in electropneumatic valves and compressed air.

The overall Type of Protection is Ex ib IIC T4 for an ambient temperature range of -20°C up to +60°C.

Electrical Data

shut down circuit
connector X2, terminals (-/+) 1/2

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to passive circuits only

maximum values:

U_o = 6.6 V
I_o = 67 mA
P_o = 110 mW

linear characteristic

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

L _o [mH]	IIB			IIC		
	20	1	0,1	10	1	0,1
C _o [μF]	5,2	12	24	0,84	2,1	3,9

Mechanical Data

Pneumatic output circuits 1 to 8:

compressed air



ANALOG INPUT MODULE Type 9460/12-08-11 and Type 9461/12-08-*1 and Type 9462/12-0*-11

The Analog Input Modules Type 9460/12-08-11 and Type 9461/12-08-*1 are an intrinsically safe apparatus for installation in hazardous areas up to Zone 1; they serve for input processing of up to eight analog 0/4 ... 20 mA channels.

The overall Type of Protection is Ex ib [ia] IIC T4 AND [Ex iaD] for an ambient temperature range of -20 °C up to +65 °C.

Electrical Data

Type 9460/12-08-11 connected to two wire transmitters

input circuits 1 to 8
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8; 9/10;
11/12; 13/14; 15/16

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to passive circuits only

maximum values:

$U_o = 26.2 \text{ V}$
 $I_o = 86 \text{ mA}$
 $P_o = 561 \text{ mW}$

linear characteristic

the effective internal inductance L_i amounts 0.037 mH; the effective internal capacitance C_i is negligibly small

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L_o [mH]	C_o [μ F]	L_o [mH]	C_o [μ F]
2.71	0.097	15.8	0.75

effective internal inductances and capacitances are to be taken into account in a suitable manner

All input circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.

Type 9460/12-08-11 connected to three wire transmitters

input circuits 1 to 4
connector X1, terminals (+/signal+/common-)
1/2/4; 5/6/8; 9/10/12; 13/14/16

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to passive circuits only

maximum values:

$U_o = 26.2 \text{ V}$
 $I_o = 86 \text{ mA}$
 $P_o = 561 \text{ mW}$

linear characteristic

the effective internal inductance L_i amounts 0.073 mH; the effective internal capacitance C_i is negligibly small

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L_o [mH]	C_o [μ F]	L_o [mH]	C_o [μ F]
2.71	0.097	15.8	0.75

effective internal inductances and capacitances are to be taken into account in a suitable manner

All input circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.

Type 9460/12-08-11 connected to four wire transmitters

Physikalisch-Technische Bundesanstalt (PTB)

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input circuits 1 to 4
connector X1, terminals (+/-) 2/4; 6/8; 10/12; 14/16

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to passive and separated from earth circuits only

maximum values:

U_o = negligibly small
 I_o = negligibly small
 P_o = negligibly small

U_i = 28 V
 I_i = 150 mA

the effective internal inductance L_i amounts 0.074 mH; the effective internal capacitance C_i is negligibly small

All input circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.

Type 9461/12-08-11 connected to two wire transmitters

input circuits 1 to 8
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8; 9/10;
11/12; 13/14; 15/16

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to passive circuits only

maximum values:

U_o = 26.2 V
 I_o = 91 mA
 P_o = 591 mW

linear characteristic

the effective internal inductance L_i amounts 0.037 mH; the effective internal capacitance C_i is negligibly small

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L_o [mH]	C_o [μ F]	L_o [mH]	C_o [μ F]
2.38	0.097	14.0	0.75

effective internal inductances and capacitances are to be taken into account in a suitable manner

All input circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.



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Type 9461/12-08-21 connected to two wire transmitters

input circuits 1 to 4
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to passive circuits only

maximum values:

$$\begin{aligned}U_o &= 26.2 \text{ V} \\I_o &= 91 \text{ mA} \\P_o &= 597 \text{ mW}\end{aligned}$$

linear characteristic

the effective internal inductance L_i amounts 0.037 mH; the effective internal capacitance C_i is negligibly small

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L_o [mH]	C_o [μ F]	L_o [mH]	C_o [μ F]
2.38	0.097	14.0	0.75

effective internal inductances and capacitances are to be taken into account in a suitable manner

All input circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.



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Type 9461/12-08-21 connected to two wire and externally supplied four wire transmitters

input circuits 1 to 4 (two wire transmitters)
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8

Type of Protection Intrinsic Safety Ex ib IIC/IIB for connection
to circuits galvanically separated from earth only

maximum values:

$$\begin{aligned} U_o &= 28 \text{ V} \\ I_o &= 91 \text{ mA} \\ P_o &= 597 \text{ mW} \end{aligned}$$

linear characteristic

the effective internal inductance L_i amounts 0.037 mH; the effective internal capacitance C_i is negligibly small

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L_o [mH]	C_o [μ F]	L_o [mH]	C_o [μ F]
2.12	0.083	13.8	0.65

effective internal inductances and capacitances are to be taken into account in a suitable manner

input circuits 5 to 8 (ext. suppl. four wire transm.)
connector X1, terminals (+/-)
9/10; 11/12; 13/14; 15/16

Type of Protection Intrinsic Safety Ex ib IIC/IIB for connection
to circuits galvanically separated from earth only

maximum values:

$$\begin{aligned} U_o &= 28 \text{ V} \\ I_o &= 6 \text{ mA} \\ P_o &= 42 \text{ mW} \end{aligned}$$

linear characteristic

$$\begin{aligned} U_i &= 28 \text{ V} \\ I_i &= 144 \text{ mA} \end{aligned}$$

the effective internal inductance L_i amounts 0.037 mH; the effective internal capacitance C_i is negligibly small

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L_o [mH]	C_o [μ F]	L_o [mH]	C_o [μ F]
50	0.083	50	0.65

effective internal inductances and capacitances are to be taken into account in a suitable manner

All input circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.



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Type 9462/12-0*-11 connected to two wire transmitters

input circuits 1 to 8 (9462/12-08-11)
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8; 9/10;
11/12; 13/14; 15/16

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to
passive circuits only

input circuits 1 to 6 (9462/12-06-11)
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8;
9/10; 11/12;

maximum values:

$$\begin{aligned}U_o &= 26.2 \text{ V} \\I_o &= 90 \text{ mA} \\P_o &= 589 \text{ mW}\end{aligned}$$

linear characteristic

the effective internal inductance L_i and capacitance C_i are negligibly small

the maximum permissible external capacitances C_o and inductances L_o
are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L_o [mH]	C_o [μ F]	L_o [mH]	C_o [μ F]
2.1	0.097	16.0	0.75

All input circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.



TEMPERATURE INPUT MODULE Type 9480/12-08-11

The Temperature Input Module Type 9480/12-08-11 is an intrinsically safe apparatus for installation in hazardous areas up to Zone 1; it serves for input processing of up to eight resistance signals.

The overall Type of Protection is Ex ib [ia] IIC T4 AND [Ex iaD] for an ambient temperature range of -20°C up to +65°C.

Electrical Data

input circuits 1 to 8
connectors: terminals (X001; X002) 1-4; 5-8; 9-12; 13-16;
17-20; 21-24; 25-28; 29-32

Type of Protection Intrinsic Safety Ex ia IIC/IIB resp. Ex ib IIC/IIB for connection to passive circuits only

maximum values safety level ia:

$U_o = 6.51 \text{ V}$ (for the total of all terminals)
 $I_o = 26.3 \text{ mA}$ (for every four terminal arrangement)
 $P_o = 42.8 \text{ mW}$ (for every four terminal arrangement)

linear characteristic

the effective internal inductance L_i and capacitance C_i are negligibly small

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. Fig. A.4)

IIC		IIB	
L_o [mH]	C_o [μF]	L_o [mH]	C_o [μF]
52.3	25	191	570

All input circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.

TEMPERATURE INPUT MODULE Type 9481/12-08-11

The Temperature Input Module Type 9481/12-08-11 is an intrinsically safe apparatus for installation in hazardous areas up to Zone 1; it serves for input processing of up to eight mV signals.

The overall Type of Protection is Ex ib [ia] IIC T4 AND [Ex iaD] for an ambient temperature range of -20°C up to +65°C.

Electrical Data

input circuits 1 to 8
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8;
9/10; 11/12; 13/14; 15/16

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to active or passive, earthed and/or non earthed circuits

maximum values of any arbitrary combination of terminals:

$U_i = 6.5 \text{ V}$

the effective internal inductance L_i and capacitance C_i are negligibly small

the maximum permissible external capacitances C_o and inductances L_o for the total of all circuits are to be taken from the table as follows:

(C_o u. L_o : characteristic values acc. to IEC 60079-11, Table A.2, resp. Fig. A.4)

IIC		IIB	
L_o [mH]	C_o [μF]	L_o [mH]	C_o [μF]
11.8	11.1	47.2	174

or

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to passive (e.g. thermoelements) and infallibly galvanically from earth separated circuits only

any arbitrary combinations of terminals have neglectible source properties ($U_o = 1 \text{ V}$, $I_o = 8.5 \text{ mA}$, $P_o = 2.2 \text{ mW}$)

All input circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.



ANALOG OUTPUT MODULE Type 9465/12-08-11 and Type 9466/12-08-11

The Analog Output Module Type 9465/12-08-11 and Type 9466/12-08-11 are intrinsically safe apparatus for installation in hazardous areas up to Zone 1; they serve for output processing of up to eight 0/4...20 mA actors/indicators.

The overall Type of Protection is Ex ib [ia] IIC T4 AND [Ex iaD] for an ambient temperature range of -20°C up to +65°C.

Electrical Data

Type 9465/12-08-11

output circuits 1 to 8
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8;
9/10; 11/12; 13/14; 15/16

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to passive circuits only

maximum values:

U_o = 26.2 V
I_o = 80 mA
P_o = 525 mW

linear characteristic

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o: characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L _o [mH]	C _o [μF]	L _o [mH]	C _o [μF]
3.20	0.097	18.6	0.57

All output circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.

Type 9466/12-08-11

output circuits 1 to 8
connector X1, terminals (+/-) 1/2; 3/4; 5/6; 7/8;
9/10; 11/12; 13/14; 15/16

Type of Protection Intrinsic Safety Ex ia IIC/IIB for connection to passive circuits only

maximum values:

U_o = 26.2 V
I_o = 86 mA
P_o = 561 mW

linear characteristic

the maximum permissible external capacitances C_o and inductances L_o are to be taken from the table as follows:

(C_o u. L_o: characteristic values acc. to IEC 60079-11, Table A.2, resp. PTB Diagram-L)

IIC		IIB	
L _o [mH]	C _o [μF]	L _o [mH]	C _o [μF]
2.71	0.097	15.8	0.57

All output circuits are galvanically connected via their common return conductor; all system internal circuits conform to the System Convention of I.S. 1.



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Special conditions for safe use

In Zone 1 hazardous locations the I.S. 1 system has to be installed in an enclosure certified as per IEC 60079-7.
In Zone 2 hazardous locations the I.S. 1 system has to be installed in an enclosure certified as per IEC 60079-15.

See operating instructions additionally.