

TEIP11, TEIP11-PS

I/P signal converter



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TEIP11
TEIP11-PS

Introduction

I/P signal converter for controlling pneumatic actuators or conventional positioners for valve positioning.

Additional Information

Additional documentation on TEIP11, TEIP11-PS is available for download free of charge at www.abb.com/positioners. Alternatively simply scan this code:



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1 Safety

General information and instructions

These instructions are an important part of the product and must be retained for future reference.

Installation, commissioning, and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator accordingly. The specialist personnel must have read and understood the manual and must comply with its instructions.

For additional information or if specific problems occur that are not discussed in these instructions, contact the manufacturer.

The content of these instructions is neither part of nor an amendment to any previous or existing agreement, promise or legal relationship.

Modifications and repairs to the product may only be performed if expressly permitted by these instructions.

Information and symbols on the product must be observed.

These may not be removed and must be fully legible at all times.

The operating company must strictly observe the applicable national regulations relating to the installation, function testing, repair and maintenance of electrical products.

Warnings

The warnings in these instructions are structured as follows:

DANGER

The signal word '**DANGER**' indicates an imminent danger. Failure to observe this information will result in death or severe injury.

WARNING

The signal word '**WARNING**' indicates an imminent danger. Failure to observe this information may result in death or severe injury.

CAUTION

The signal word '**CAUTION**' indicates an imminent danger. Failure to observe this information may result in minor or moderate injury.

NOTICE

The signal word '**NOTICE**' indicates possible material damage.

Note

'**Note**' indicates useful or important information about the product.

... 1 Safety

Intended use

I/P signal converters for standard signals TEIP11 and TEIP11-PS are used to control pneumatic actuators or pneumatic positioners for positioning valves.

The device has been designed for use exclusively within the technical limit values indicated on the name plate and in the data sheets.

Improper use

The following are considered to be instances of especially improper use of the device:

- Operation as a flexible compensating adapter in piping, for example for compensating pipe offsets, pipe vibrations, pipe expansions, etc.
- For use as a climbing aid, for example for mounting purposes.
- For use as a bracket for external loads, for example as a support for piping, etc.
- Material application, for example by painting over the housing, name plate or welding/soldering on parts.
- Material removal, for example by spot drilling the housing.

Warranty provisions

Using the device in a manner that does not fall within the scope of its intended use, disregarding this manual, using underqualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

Manufacturer's address

ABB AG

Measurement & Analytics

Schillerstr. 72

32425 Minden

Germany

Tel: +49 571 830-0

Fax: +49 571 830-1806

Service address

Customer service center

Tel: +49 180 5 222 580

Email: automation.service@de.abb.com

2 Use in potentially explosive atmospheres

DANGER

Risk of explosion when used with combustible gases

The I / P-signal converter, type Doc. 901069 must be set up outdoors as a pneumatic power supply when used with combustible gases.

- The supplied gas must be kept sufficiently free of air and oxygen to prevent the forming of a hazardous atmosphere.
- Always route the gas to the outside.

ATEX

ATEX – ‘Ex d’ flameproof enclosure type of protection

Marking	II 2G Ex d IIC T4/T5/T6 Gb
Type Examination Test Certificate	DMT 02 ATEX E 121 X
Type	DOC. 900771
Device class	II 2G
Standards	EN IEC 60079-0: 2018 (General requirements) EN 60079-1: 2014 (Flameproof enclosure ‘d’)

System bus, computer interfaces

Current	≤ 50 mA
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Pneumatic data TEIP11

Supply pressure	1.4 to 10 bar (20 to 150 psi)
Output signal	0.2 to 1 bar (3 to 15 psi)

Pneumatic data TEIP11-PS

Supply pressure	1.4 bar (20 psi) / 2.5 bar (37 psi)*
Output signal	0.2 to 1 bar (3 to 15 psi) / 0.4 to 2 bar (6 to 30 psi)*

* Valid for Option 509 only – increased input signal.

Thermal data

T4: -40 °C < Tamb < 85 °C
T5: -40 °C < Tamb < 70 °C
T6: -40 °C < Tamb < 55 °C

Special conditions

The I/P signal converter may not be installed in areas in which processes with very high electrostatic charges may occur. Versions with an intrinsically safe control head may no longer be operated as intrinsically safe if they have been previously operated with the ‘flameproof enclosure’ type of protection with a non-intrinsically safe power supply. The Ex designation of the device should be updated accordingly.

The I/P signal converter is suited for use in an ambient temperature range of -40 °C to maximum 85 °C.

If the I/P signal converter is used at an ambient temperature above 60 °C or below -20 °C, use cable entries and cables suited to an operating temperature that corresponds to the maximum ambient temperature plus 10 K or that corresponds to the minimum ambient temperature.

... 2 Use in potentially explosive atmospheres

... ATEX

ATEX – ‘Ex ia’ intrinsic safety type of protection

Marking	II 2G Ex ia IIC T6 resp. T4 Gb
Type Examination Test Certificate	TÜV 99 ATEX 1487 X
Type	TEIP11, Doc. 901068-SMDxxxx TEIP11-PS, Doc. 901068-SMDxxxx TEIP11-PS, Doc. 901069-SMDxxxx
Device class	II 2G
Standards	EN 60079-0:2009 EN 60079-11:2012

Special conditions

The I/P signal converter TEIP11-PS Doc. 901068 or TEIP11-PS Doc. 901069 must be set up outdoors as a pneumatic power supply when used with combustible gases.

The supplied gas must be kept sufficiently free of air and oxygen to prevent a potentially explosive atmosphere from forming.
The gas must always be routed to the outside.

Temperature classes for the following versions:

TEIP11 Doc. 901068-SMD and TEIP11-PS Doc. 901068-SMD and
TEIP11-PS Doc. 901069-SMD

Temperature class	Input current	Ambient temperature range
T4	120 mA	-55 to 60 °C
T4	100 mA	-55 to 85 °C
T6	60 mA	-55 to 40 °C

TEIP11 Doc. 901068 and TEIP11-PS Doc. 901068 and TEIP11-PS
Doc. 901069

Temperature class	Input current	Ambient temperature range
T6	50 mA	-55 to 60 °C
T6	60 mA	-55 to 55 °C
T5	60 mA	-55 to 70 °C
T4	60 mA	-55 to 85 °C
T5	100 mA	-55 to 55 °C
T4	100 mA	-55 to 85 °C
T5	120 mA	-55 to 45 °C
T4	120 mA	-55 to 80 °C
T4	150 mA	-55 to 70 °C

Ex limit values

L_i	U_i	P_i
50 mA	42.5 V	2.125 W
60 mA	38.8 V	2.328 W
100 mA	30 V	3.0 W
120 mA	28 V	3.36 W
150 mA	25.5 V	3.825 W

FM / CSA**⚠ DANGER****Explosion hazard**

The unit may only be used in environments where operation will not result in propagating brush discharge.

Intrinsically safe FM

FM 'intrinsically safe' (not for metal field housing units)

I.S.: CL I / Div 1 / Grp A B C D

FM 'intrinsically safe' (only for metal field housing units)

I.S.: CL I-II-II / Div 1 / Grp A B C D E F G

S.: CL II / Div 2 / Grp G

S.: CL III / Div 2

Non-incendive FM

N.I.: CL I / Div 2 / Grp A B C D (not for metal field housing units)

N.I.: CL I / Div 2 / Grp A B C (only for metal field housing units)

Intrinsically safe CSA

CSA 'intrinsically safe' (not for metal field housing units)

I.S.: CL I / Div 1 / Grp A B C D

CL I / Div 2 / Grp A B C D

CSA 'intrinsically safe' (only for metal field housing units)

I.S.: CL I / Div 1 / Grp A B C D

CL II / Div 1 / Grp E F G

CL III

CL I / Div 2 / Grp A B C D

CL II / Div 2 / Grp E F G

Non-incendive CSA

FM 'explosion proof' (only for metal field housing units)

X.P.: CL I / Div 1 / Grp B C D

D.I.P.: CL II III / Div 2 / Grp E F G

CSA 'explosion proof' (only for metal field housing units)

X.P.: CL I / Div 1 / Grp B C D

EAC TR-CU-012

Designation of the device	Constructional design	Explosion protection marking according to GOST 31610.0-2014 (IEC 60079-0:2011)
Power/pressure transducer of TEIP types TEIP 11 and TEIP 11-	Doc. 901068, Doc. 901069	1Ex ia IIC T6...T4 Gb X
PS	Doc. 900771	1Ex d IIC T6...T4 Gb X

Flameproof (enclosure) 'Ex d'

Marking	II 2G Ex d IIC T4/T5/T6 Gb
Type Examination Test Certificate	DMT 02 ATEX E 121 X
Type	DOC. 900771
Device class	II 2G
Standards	EN 60079-0: 2012 (General requirements) EN 60079-1: 2007 (Flameproof enclosure 'd')

System bus, computer interfaces

Current	≤ 50 mA
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Pneumatic data TEIP11

Supply pressure	1.4 to 10 bar (20 to 150 psi)
Output signal	0.2 to 1 bar (3 to 15 psi)

Pneumatic data TEIP11-PS

Supply pressure	1.4 bar (20 psi) / 2.5 bar (37 psi)*
Output signal	0.2 to 1 bar (3 to 15 psi) / 0.4 to 2 bar (6 to 30 psi)*

* Valid for Option 509 only – increased input signal.

... 2 Use in potentially explosive atmospheres

... EAC TR-CU-012

Special conditions

The I/P signal converter is suited for use in an ambient temperature range of $-40\text{ }^{\circ}\text{C}$ to maximum of $85\text{ }^{\circ}\text{C}$.

If the I/P signal converter is used at an ambient temperature above $60\text{ }^{\circ}\text{C}$ or below $-20\text{ }^{\circ}\text{C}$, use cable entries and cables suited to an operating temperature that corresponds to the maximum ambient temperature plus 10 K or that corresponds to the minimum ambient temperature.

Versions with an intrinsically safe control head may no longer be operated as intrinsically safe if they have been previously operated with the 'flameproof (enclosure)' type of protection with a non-intrinsically safe power supply.

The I/P signal converter TEIP11-PS Doc. 901068 or TEIP11-PS Doc. 901069 must be set up outdoors as a pneumatic power supply when used with combustible gases.

The supplied gas must be kept sufficiently free of air and oxygen to prevent a potentially explosive atmosphere from forming.

The gas must always be routed to the outside.

Temperature characteristic curves

Intrinsically safe circuit according to ATEX, IECEx and EAEU / TR CU 012/2011

Device category 1: Use in Zone 0

Device category 2: Use in Zone 1

Device category 3: Use in Zone 2

Temperature classes for the following versions:

TEIP11 Doc. 901068-SMD and TEIP11-PS Doc. 901068-SMD and TEIP11-PS Doc. 901069-SMD

Temperature class	Input current	Ambient temperature range
T4	120 mA	$-55\text{ to }60\text{ }^{\circ}\text{C}$
T4	100 mA	$-55\text{ to }85\text{ }^{\circ}\text{C}$
T6	60 mA	$-55\text{ to }40\text{ }^{\circ}\text{C}$

TEIP11 Doc. 901068 and TEIP11-PS Doc. 901068 and TEIP11-PS Doc. 901069

Temperature class	Input current	Ambient temperature range
T6	50 mA	$-55\text{ to }60\text{ }^{\circ}\text{C}$
T6	60 mA	$-55\text{ to }55\text{ }^{\circ}\text{C}$
T5	60 mA	$-55\text{ to }70\text{ }^{\circ}\text{C}$
T4	60 mA	$-55\text{ to }85\text{ }^{\circ}\text{C}$
T5	100 mA	$-55\text{ to }55\text{ }^{\circ}\text{C}$
T4	100 mA	$-55\text{ to }85\text{ }^{\circ}\text{C}$
T5	120 mA	$-55\text{ to }45\text{ }^{\circ}\text{C}$
T4	120 mA	$-55\text{ to }80\text{ }^{\circ}\text{C}$
T4	150 mA	$-55\text{ to }70\text{ }^{\circ}\text{C}$

Ex limit values

L_i	U_i	P_i
50 mA	42.5 V	2.125 W
60 mA	38.8 V	2.328 W
100 mA	30 V	3.0 W
120 mA	28 V	3.36 W
150 mA	25.5 V	3.825 W

Special conditions

The I/P signal converter TEIP11-PS Doc. 901068 or TEIP11-PS Doc. 901069 must be set up outdoors as a pneumatic power supply when used with combustible gases.

The supplied gas must be kept sufficiently free of air and oxygen to prevent a potentially explosive atmosphere from forming.

The gas must always be routed to the outside.

Operation as intrinsically safe equipment

Marking	II 2G Ex ia IIC T6 resp. T4 Gb
Type Examination Test Certificate	TÜV 99 ATEX 1487 X
Type	TEIP11, Doc. 901068-SMDxxxx TEIP11-PS, Doc. 901068-SMDxxxx TEIP11-PS, Doc. 901069-SMDxxxx
Device class	II 2G
Standards	EN 60079-0:2009 EN 60079-11:2012

Installation instructions

The installation, commissioning, maintenance and repair of devices in potentially explosive atmospheres must only be carried out by appropriately trained personnel. Works may be carried out only by persons, whose training has included instructions on different types of protection and installation techniques, concerned rules and regulations as well as general principles of zoning. The person must possess the appropriate competences for the type of work to be conducted.

When operating with combustible dusts, comply with EN 60079-31.

The safety instructions for electrical apparatus in potentially explosive areas must be in accordance with Directive 2014/34/EU (ATEX) and IEC 60079-14 (Installation of electrical equipment in potentially explosive areas).

Comply with the applicable regulations for the protection of employees to ensure safe operation.

Information about opening and closing the housing

DANGER

Risk of explosion if the device is operated with the housing or terminal box open!

Before opening the housing or the terminal box, note the following points:

- A valid fire permit must be present.
- Make sure that there is no explosion hazard.
- Switch off the power supply and wait for $t > 4$ minutes before opening.

NOTICE

Adverse effect on the type of protection

Damage to the cover thread results in loss of the 'flameproof (enclosure) (Ex d)' type of protection.

- Handle the cover with care.

... 2 Use in potentially explosive atmospheres

... Installation instructions

Requirements for operation with the 'flameproof (enclosure)' (Ex d) type of protection

Before installation, you must check if the I/P signal converter fulfills the measurement and safety requirements of the measuring point.

- When performing wiring, the parameters in the specification and the information in the explosion protection certificate must be complied with.
- The device may only be operated using instrument air that is free from oil, water and dust. Flammable gases, oxygen or oxygen-enriched gases must not be used.

Cable entries

When operating with the 'flameproof (enclosure) (Ex d)' type of protection, use only cable glands with the corresponding full 'Ex d' approval.

- Secure all cable entries against twisting and loosening by using a medium-strength securing adhesive.
- When the I / P signal converter is used at ambient temperatures above 60 °C (140 °F) or below -20 °C (-4 °F), make sure to use cable entries and cables suitable for an operating temperature of up to the maximum ambient temperature plus 10 K, or for an operating temperature down to the minimum ambient temperature.

Operating instructions

Changing the type of protection

The devices can be operated as delivered with either the "intrinsically safe (Ex ia)" or "flameproof (enclosure) (Ex d)" types of protection.

A device that has been operated with the "flameproof (enclosure) (Ex d)" type of protection must no longer be operated with the "intrinsically safe (Ex ia)" type of protection, as the electronics may have been damaged.

For this reason the devices must be permanently marked during commissioning (e.g. cross out or mask over "Ex ia").

Protection against electrostatic discharges

The painted surface of the housing and the plastic parts inside the device can store electrostatic charges.

WARNING

Risk of explosion!

The device must not be used in areas in which process-related electrostatic charging of the housing may occur.

- The device must be installed, maintained and cleaned such that any dangerous electrostatic charge is avoided.

3 Design and function

The **I/P signal converter** converts standard electrical signals, e.g. 4 to 20 mA to 0.2 to 1 bar (3 to 15 psi). It therefore forms a connecting link between electrical/electronic and pneumatic systems. The signal conversion process is similar to the patented force balance method.

Special features of the **I/P signal converter** are its relatively small dimensions and outstanding operational stability when subjected to shock and vibration. The **I/P signal converter** can be subjected to loads up to 10 g with less than 1 % effect on function.

The housings are available in a variety of designs to meet your installation requirements. For potentially explosive conditions, devices offering intrinsically safe operation or with a flameproof housing enclosure are available with international approval certificates for use worldwide.

Various ranges can be supplied on the input side and the output side for signal conversion (see **Additional documents** on page 20).

The device requires only compressed air for the power supply.

Force balancing takes place at the lever arm, which is mounted with a tension band. The coil and yoke generate a magnetic field in the air gap, which applies a force to the magnet on the lever arm. The force changes in proportion to the current (input signal) flowing through the coil.

A counterforce is applied on the other side of the lever arm, through the dynamic air pressure present at the nozzle and the flapper. The force is controlled in such a way that a balance of the two torques is achieved. If a torque imbalance occurs, the lever arm rotates. This rotation changes the air gap between the nozzle and the flapper and, thus, the dynamic air pressure. Air is permanently supplied to the nozzle through the throttle. The converter stage takes the dynamic pressure and guides it to the output as a 0.2 to 1 bar or 3 to 15 psi signal.

Supply air

During operation the pneumatic unit needs a steady supply of air in accordance with the device specifications. The zero point setting is adjusted by turning the tension band suspension, and the range setting is adjusted via the potentiometer.

Filter

The filter prevents malfunctions caused by polluted supply air. Note that the filter capacity is only sufficient for collecting dirt that occurs occasionally (e.g. residual dirt in the pipe during initial commissioning). It is no substitute for proper air conditioning.

Special features

Special features of the I/P signal converter TEIP11, TEIP11-PS include its relatively small dimensions and outstanding operational stability when subject to shock and vibration. The stability is due to the light weight (only around 100 mg) of the moving system, which consists of the lever arm with the magnet and the flapper with balancing weight.

Available versions

The available versions of the I/P signal converter and accessories can be found in the data sheets. The data sheets also indicate each item's order number.

Principle of operation

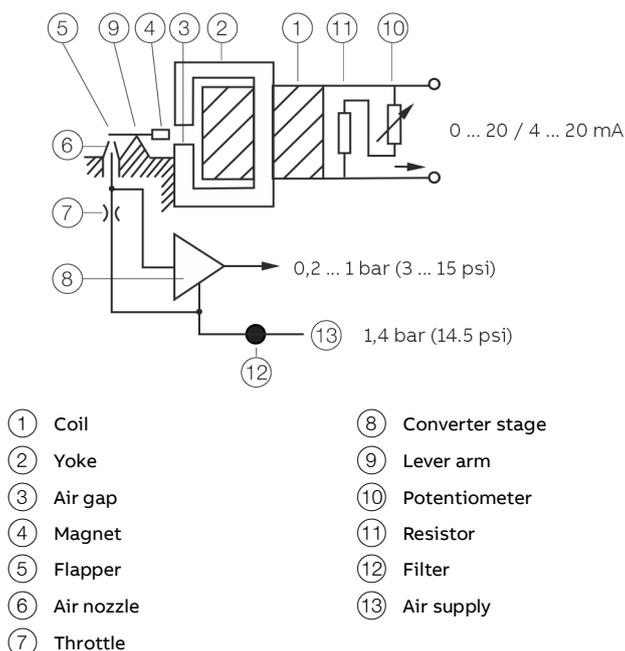


Figure 1: Schematic structure

... 3 Design and function

Designs

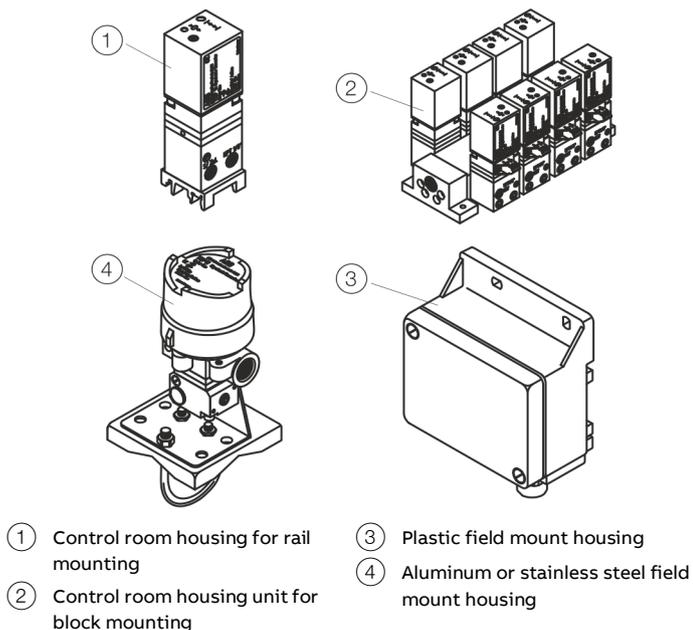


Figure 2: TEIP11-PS designs

Control room housing unit for rail mounting

The control room housing for rail mounting is the simplest and lowest priced version of the I/P signal converter.

A mounting base that is compatible with all commercially available EN rails is used for installation.

The housing unit with plastic cap has an IP 20 protection rating.

Control room housing unit for block mounting

The control room housing unit for block mounting enables you to install a number of converters in a small space. This design features central air supply via connection block and stop valves in the air connectors of the integrated signal converter.

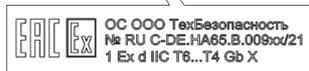
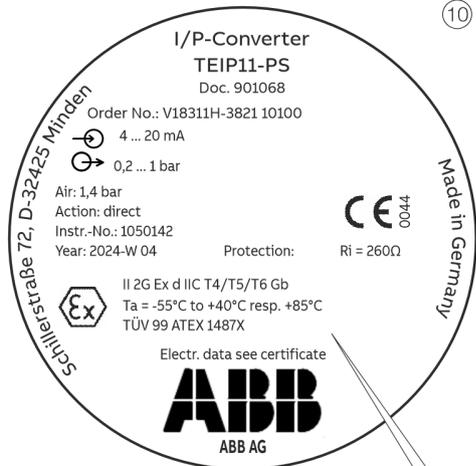
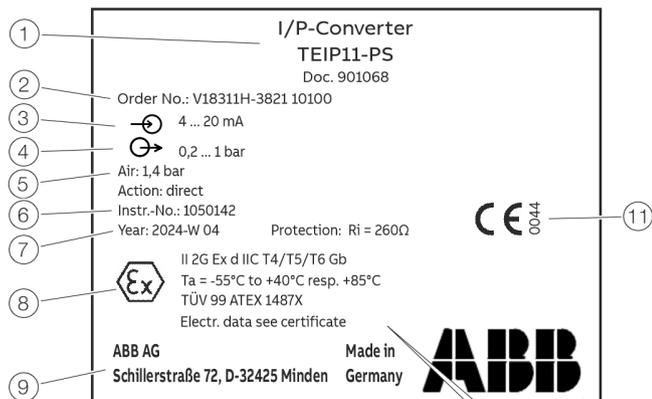
A maximum of 4 signal converters can be fitted on the connection blocks required for block mounting. If necessary, 2 or 3 (or max. 4) connection blocks can be connected to each other to create block units of 4-8-12-16 signal converters. Stop valves allow you to mount or remove individual converters during operation.

Field mount housing

The field mount housing is suited for installation on-site or in open areas. The housing can be made from plastic with IP rating IP 54, from aluminum with IP rating IP 65 and from stainless steel with IP rating IP 65. The housing is suited for wall mounting and for 2 in pipe mounting.

4 Product identification

Name plate



Scope of delivery

- Check the goods for completeness, signs of damage, design and scope of delivery immediately upon receipt.
- Check that the delivery matches your order.

Accessories

The following loose accessories are delivered with the unit as extra items:

- Aluminum or stainless steel mounting bracket for the field mount housing in two designs:
 - For wall mounting only
 - Universal for wall or 2 in pipe mounting
- Cable entry for I/P signal converter with the 'flameproof (enclosure) (Ex d)' type of protection.

- | | |
|---------------------------------------|------------------------|
| ① Type designation | ⑧ ATEX Ex marking |
| ② Ordering number | ⑨ Manufacturer address |
| ③ Input signal | ⑩ EACEx Ex marking |
| ④ Output signal | ⑪ CE mark |
| ⑤ Supply air pressure | |
| ⑥ Serial number | |
| ⑦ Year of manufacture / calendar week | |

Figure 3: Name plate (sample)

5 Transport and storage

Inspection

Check the devices immediately after unpacking for possible damage that may have occurred from improper transport. Details of any damage that has occurred in transit must be recorded on the transport documents. All claims for damages must be submitted to the shipper without delay and before installation.

Storage conditions

Bear the following points in mind when storing devices:

- Store the device in its original packaging in a dry and dust-free location.
- Observe the permitted ambient conditions for transport and storage.
- Avoid storing the device in direct sunlight.
- In principle, the devices may be stored for an unlimited period. However, the warranty conditions stipulated in the order confirmation of the supplier apply.

Ambient conditions during storage

Storage temperature	-40 to 85 °C (-40 to 185 °C)
Humidity	Store device in a dry location. The device is also protected by a desiccant included in the original packaging.

Returning devices

For the return of devices, follow the instructions in **Repair** on page 19.

6 Installation

Mounting

Note

Installation location requirements

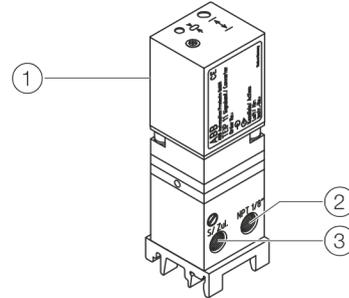
Prior to installation, check to make sure that the TEIP11 and TEIP11-PS I/P signal converters meet the measurement and safety requirements applicable at the installation location (see **Additional documents** on page 20).

Only qualified specialists who have been trained for these tasks are authorized to mount and adjust the unit, and to make the electrical connection.

When carrying out any work on the device, always observe the local accident prevention regulations and the regulations concerning the construction of technical installations.

Control room housing unit for rail mounting

This model is snap-mounted on a DIN top-hat rail.



- | | |
|---------------------------------------|-------------------------|
| ① Terminal for signal input (covered) | ② Output |
| | ③ Supply air connection |

Figure 4: Control room housing for rail mounting

Design

The TEIP11 and TEIP11-PS I/P signal converters have a special mounting base which fits all mounting rails in accordance with EN 50022 - 35 × 7.5, EN 50045 - 15 × 5, and EN 50035 - G32.

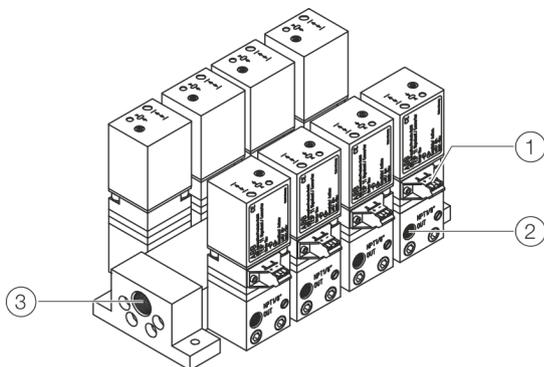
Installation instructions

For mounting rails that are mounted in a vertical position, the electrical connection for the device should preferably face to the left.

For mounting rails that are mounted in a horizontal position, the electrical connection for the device should preferably be facing up.

Control room housing unit for block mounting

For this design, a special connection block is used to mount the unit.



- | | |
|-----------------------------|-------------------------|
| ① Terminal for signal input | ② Output |
| | ③ Supply air connection |

Figure 5: Control room housing for block mounting

Design

The connection block is designed for mounting a maximum of 4 I/P signal converters. The connection blocks can be expanded to units of 2, 3 or 4 blocks to create block units of 4, 8, 12 or 16 I/P signal converters.

Installation Material

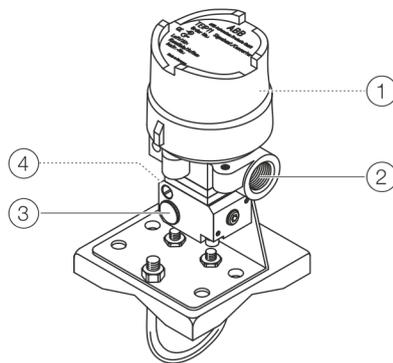
The material for forming the block units is delivered separately for self-installation; in addition to the connection blocks, it includes the necessary screws and gaskets (O-rings).

Supply air connection

The supply air connection for the connected devices is provided via a central connection block. The connection block features a non-return coupling for each individual I/P signal converter. This allows connection sites to remain unused, and individual I/P signal converters can be dismantled or mounted during operation.

Aluminum / stainless steel field mount housing

The sturdy housing unit can be installed outdoors without protection.



- | | |
|---------------------------------------|-------------------------|
| ① Terminal for signal input (covered) | ③ Supply air connection |
| ② Cable entry | ④ Output (covered) |

Figure 6: Aluminum / stainless steel field mount housing

Installation instructions

Position the housing so that the cable gland is facing downwards or sideways, to prevent humidity from penetrating the device.

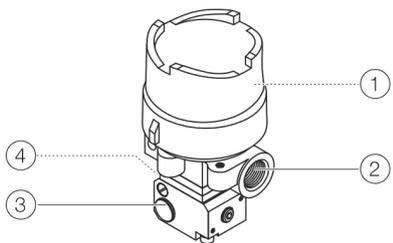
Accessories

A stainless steel mounting bracket is available as an accessory for installation.

The mounting bracket is available in two designs:

- For wall mounting only
- Universal for wall or 2 in pipe mounting

Field mount housing as a mounting module for OEM applications (TEIP11)



- | | |
|---------------------------------------|-------------------------|
| ① Terminal for signal input (covered) | ③ Supply air connection |
| ② Cable entry | ④ Output (covered) |

Figure 7: Aluminum/stainless steel field mount housing

... 6 Installation

... Mounting

Installation instructions

Position the housing so that the cable gland is facing downwards or sideways, to prevent humidity from penetrating the device.

Accessories

A stainless steel mounting bracket is available as an accessory for installation.

The mounting bracket is available in two designs:

- For wall mounting only
- Universal for wall or 2 in pipe mounting

Plastic field mount housing

The plastic housing is suitable for installation on-site.

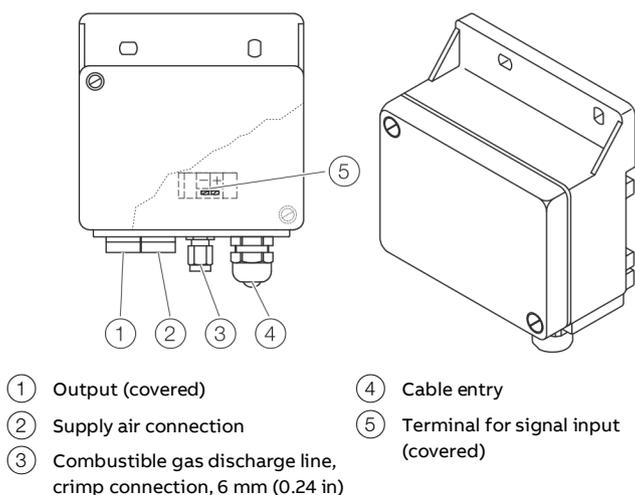


Figure 8: Plastic field mount housing

Installation instructions

Units can be mounted on walls or vertically on a 2 in pipe.

The connections for the input and output signals should face downwards, to prevent humidity from penetrating the device.

Electrical connections

WARNING

Risk of injury due to live parts!

When the housing is open, contact protection is not provided and EMC protection is limited.

- Before opening the housing, switch off the power supply.

Note

For electrical installation, the following standards, data, and documents must be complied with:

- The relevant regulations and safety standards pertaining to the installation and operation of electrical systems
- The additional regulations, standards, and directives pertaining to the installation and operation of explosion-proof systems, if explosion-proof units are used
- Values for the electrical connection (see **Electrical Data** on page 17).
- The information from explosion protection certificate, for an explosion-proof design.

NOTICE

Adverse effect on input signals

Power supply leads in the immediate vicinity of the signal lines produce interference which can impair the input signals to the devices.

- Do not install the signal line together with power supply leads.

Cable glands

The field mount housings feature a PG 11 cable entry.

Aluminum or stainless steel field mount housing

Ex Protection	Cable entry
Standard / Ex ia	Screw connection ½ in NPT
Ex d	Threaded hole M20 × 1.5
FM / CSA 'Intrinsically Safe' / 'Explosion Proof'	Threaded hole ½ in NPT

Note

The connecting terminals are delivered closed and must be unscrewed before inserting the wire.

- Strip the wires to approximately 6 mm (0.24 in).
- After stripping the cable end, fit the appropriate wire end sleeves and crimp
- Connect the wires to the connecting terminals in line with the connection diagram.
Tightening torque for the terminal screws:
0.5 to 0.6 Nm

Position of the terminals

The electrical connection is provided by 2-pin screw terminals for conductor cross-sections up to a maximum of 2.5 mm² (14 AWG). Do not reverse the polarity (+/-) when connecting the signal line.

Control room housing unit for rail and block mounting

The terminals are located on the side of the housing unit.

Plastic, aluminum, and stainless steel field mount housing

The terminals are located inside the housing unit. Therefore, the field mount housing must be opened in order to connect the cable.

Electrical Data

Signal range

0 to 20 mA or 4 to 20 mA
0 to 10 mA or 10 to 20 mA
4 to 12 mA or 12 to 20 mA
(additional ranges available upon request)

Input resistance

R_i = 260 Ω at 20 °C (68 °F), T_k + 0.4 %/K

Overpressure limit

30 mA (for Ex devices see **Use in potentially explosive atmospheres** on page 5).

Capacitance / inductance

Negligible

... 6 Installation

Pneumatic connections

Note

- The TEIP11 and TEIP11-PS I/P signal converters may only be operated with instrument air that is free of oil, water, and dust.
- If a version with a plastic housing is operated with combustible gas, an additional line must be installed to route the gas to a safe place in the open air.

NOTICE

Damage to components

Contamination on the air pipe and signal converter can damage components.

- Before connecting the pipe, it is imperative that you remove any dust, chips or other dirt particles by blowing them out.

NOTICE

Damage to components

Pressure higher than 4 bar (60 psi) can damage the signal converter or actuator.

- Precautions must be taken, by for example using a pressure reducer, to make sure that the pressure does not go over 4 bar (60 psi), even in case of a malfunction.

Threaded holes $\frac{1}{8}$, $\frac{1}{4}$ or $\frac{3}{8}$ NPT are provided for connecting the air pipes (supply air and output pipes).

The connections for the power supply (supply air) and the output are marked accordingly.

Pneumatic data TEIP11

Instrument air

Free of oil, water, and dust acc. to DIN/ISO 8573-1
Pollution and oil content according to Class 3
Pressure dew point 10 K below operating temperature

Supply pressure

1.4 to 10 bar (20 to 145 psi)

Output signal

0.2 to 1 bar (3 to 15 psi)

Air consumption

Equivalent to air capacity

Pneumatic data TEIP11-PS

Instrument air

Free of oil, water, and dust acc. to DIN/ISO 8573-1
Pollution and oil content according to Class 3
Pressure dew point 10 K below operating temperature

Supply pressure

1.4 bar (20 psi)
2.5 bar (36 psi)*

Output signal

0.2 to 1 bar (3 to 15 psi)
0.4 to 2 bar (6 to 30 psi)*

- * Valid for Option 509 only – increased input signal.

Air consumption

$\leq 0.2 \text{ kg/h} = 0.16 \text{ Nm}^3/\text{h} = 0.1 \text{ scfm}$

7 Commissioning

Once the installation is complete and the electrical and pneumatic components are connected, the I/P signal converter is ready to use. No further adjustment is required.

8 Maintenance

Note

Manipulation by users shall immediately render the warranty for the device invalid.

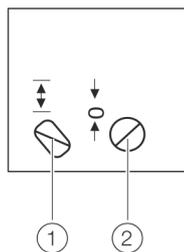
To ensure fault-free operation, it is essential that the device is supplied with instrument air that is free of oil, water, and dust.

The I/P signal converters are adjusted prior to delivery. After an extensive operating time the signal conversion may exceed the tolerance limits due to aging or drift. If the tolerance limits are exceeded, this can be corrected through adjustment.

Two adjustment screws are used for the adjustment process.

Note

When using a field mount housing first remove the cover to access the screws.



① Range

② Zero point

Figure 9: Adjusting screws

9 Repair

Repair and maintenance activities may only be performed by authorized customer service personnel.

When replacing or repairing individual components, use original spare parts.

Returning devices

Use the original packaging or a secure transport container of an appropriate type if you need to return the device for repair or recalibration purposes.

Fill out the return form (see **Return form** on page 21) and include this with the device.

In accordance with the EU Directive governing hazardous materials, the owner of hazardous waste is responsible for its disposal or must observe the following regulations for shipping purposes:

All devices delivered to ABB must be free from any hazardous materials (acids, alkalis, solvents, etc.).

Please contact Customer Center Service acc. to page 4 for nearest service location.

... 9 Repair

... Returning devices

Note



Products that are marked with the adjacent symbol may **not** be disposed of as unsorted municipal waste (domestic waste).

They should be disposed of through separate collection of electric and electronic devices.

This product and its packaging are manufactured from materials that can be recycled by specialist recycling companies.

Bear the following points in mind when disposing of them:

- As of 8/15/2018, this product will be under the open scope of the WEEE Directive 2012/19/EU and relevant national laws (for example, ElektroG - Electrical Equipment Act - in Germany).
- The product must be supplied to a specialist recycling company. Do not use municipal waste collection points. These may be used for privately used products only in accordance with WEEE Directive 2012/19/EU.
- If there is no possibility to dispose of the old equipment properly, our Service can take care of its pick-up and disposal for a fee.

10 Additional documents

Note

All documentation, declarations of conformity, approvals, certificates and additional documentation are available in the ABB download area.

www.abb.com/positioners

11 Appendix

Return form

Statement on the contamination of devices and components

Repair and/or maintenance work will only be performed on devices and components if a statement form has been completed and submitted.

Otherwise, the device/component returned may be rejected. This statement form may only be completed and signed by authorized specialist personnel employed by the operator.

Customer details:

Company:

Address:

Contact person:

Telephone:

Fax:

Email:

Device details:

Type:

Serial no.:

Reason for the return/description of the defect:

Was this device used in conjunction with substances which pose a threat or risk to health?

Yes No

If yes, which type of contamination (please place an X next to the applicable items):

biological

corrosive / irritating

combustible (highly / extremely combustible)

toxic

explosive

other toxic substances

radioactive

Which substances have come into contact with the device?

1.

2.

3.

We hereby state that the devices/components shipped have been cleaned and are free from any dangerous or poisonous substances.

Town/city, date

Signature and company stamp

... 12 Appendix

... Control Document

Connection diagram 900842 CSA

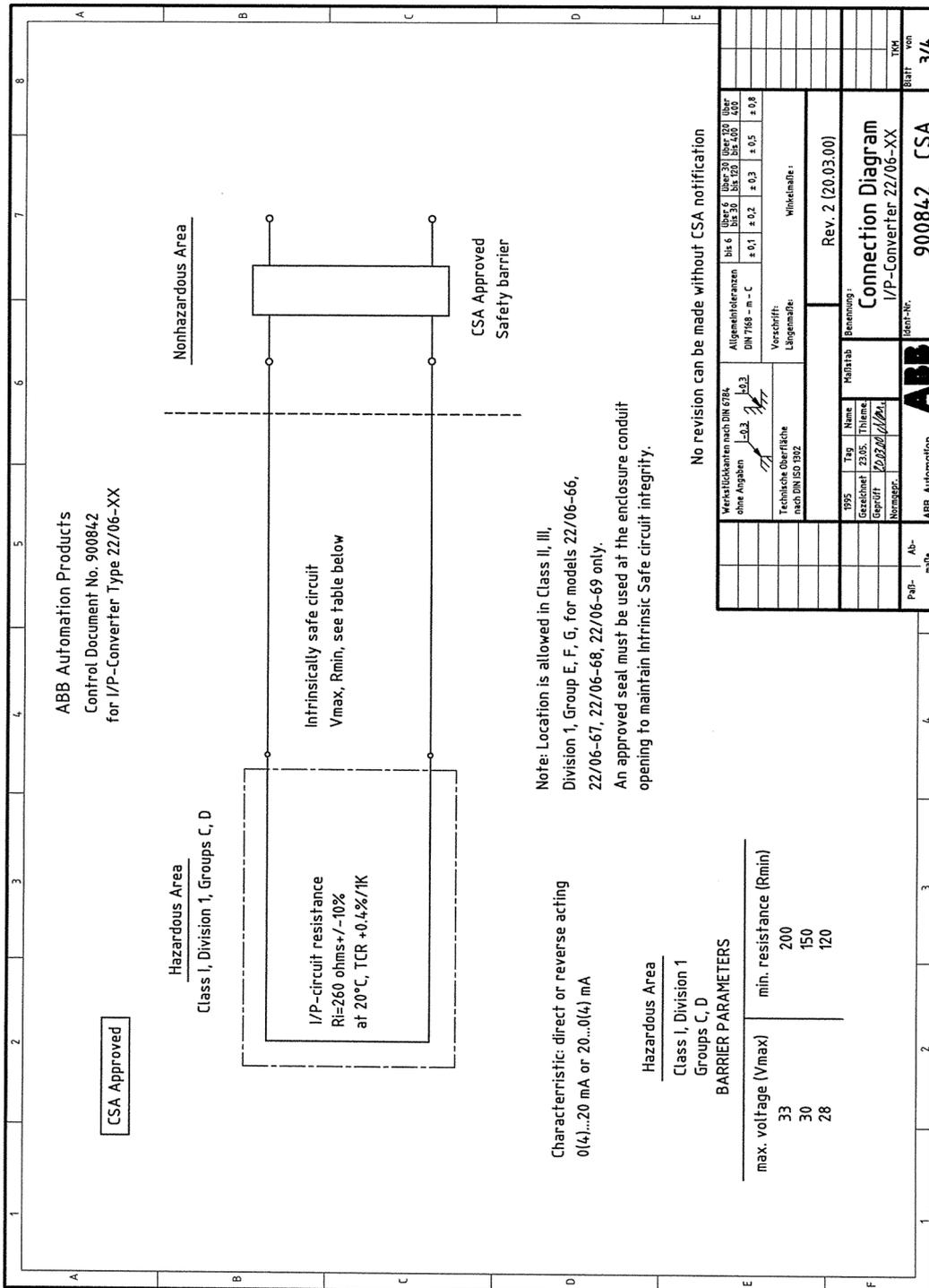


ABB Automation Products
Control Document No. 900842
for I/P-Converter Type 22/06-XX

CSA Approved

Hazardous Area
Class I, Division 1, Groups C, D

Intrinsically safe circuit
 $V_{\text{max}}, R_{\text{min}}$, see table below

Non-hazardous Area

CSA Approved
Safety barrier

Note: Location is allowed in Class II, III,
Division 1, Group E, F, G, for models 22/06-66,
22/06-67, 22/06-68, 22/06-69 only.
An approved seal must be used at the enclosure conduit
opening to maintain Intrinsic Safe circuit integrity.

Characteristic: direct or reverse acting
 $0(4)...20 \text{ mA}$ or $20...0(4) \text{ mA}$

Hazardous Area
Class I, Division 1
Groups C, D

BARRIER PARAMETERS

max. voltage (V _{max})	min. resistance (R _{min})
33	200
30	150
28	120

No revision can be made without CSA notification

Wertebereiche nach DIN 4794	bis 6	Über 6	Über 30	Über 200	Über
ohne Angaben	bis 30	bis 60	bis 100	bis 1000	L00
	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8

Technische Oberfläche	Winkelmaße:				
nach DIN ISO 1902					

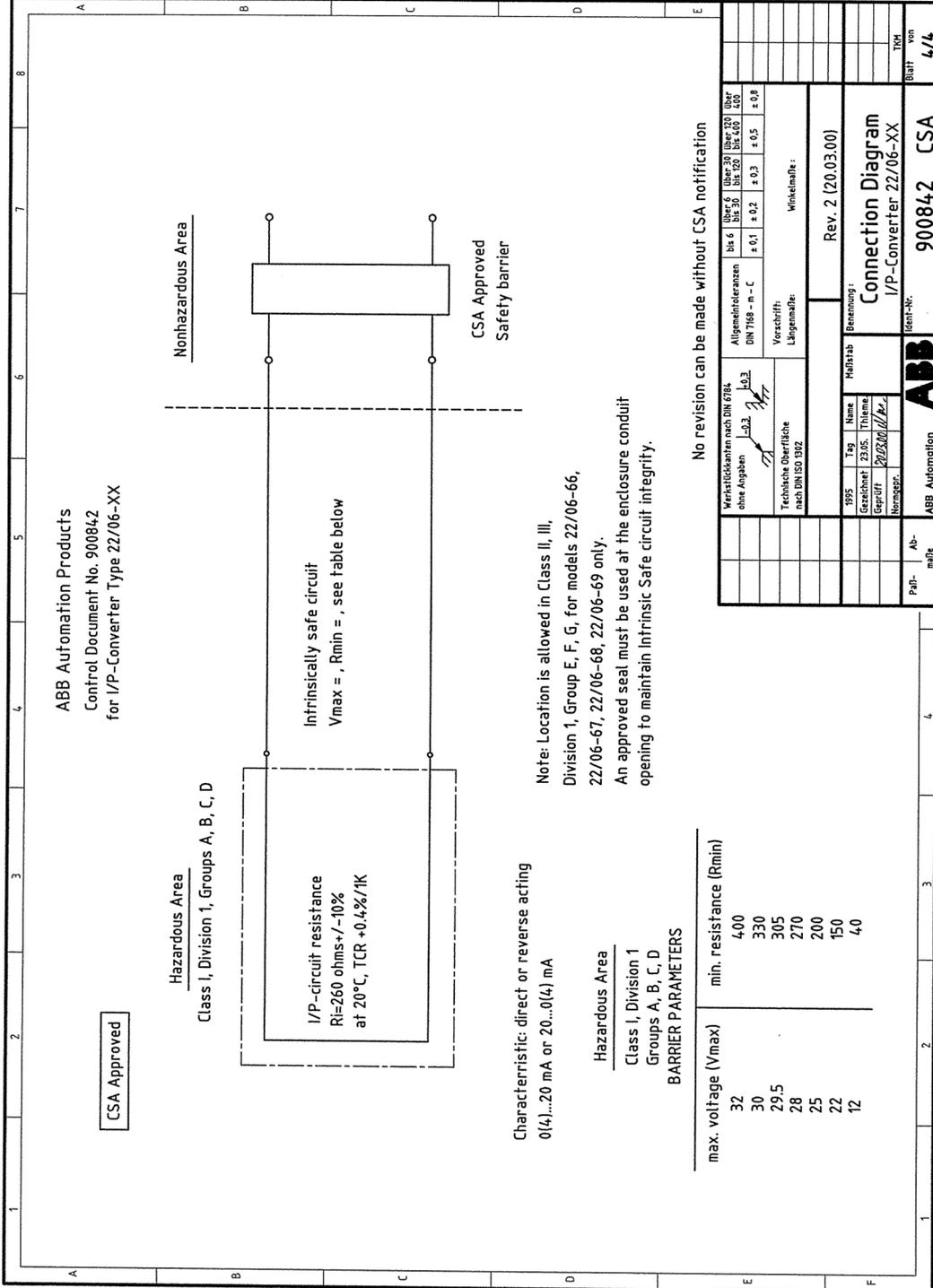
1995	Tag	Name	Multisub	Benennung:
Gezeichnet	23.05.	Thieme		
Geprüft				
Normgepr.				

Rev. 2 (20.03.00)

Connection Diagram
I/P-Converter 22/06-XX

Ident.-Nr. **ABB** 900842 CSA

Blatt 3/4



Verstärkungen nach DIN 6184		bis 6 Über 6		Über 30 Über 200 Über	
ohne Angaben		bis 30 bis 120 bis 400 400			
Allgemeintoleranzen		± 0,1 ± 0,2 ± 0,3 ± 0,5 ± 0,8			
DIN 7168 - m - C					
Technische Oberfläche		Vorschritt		Winkelmaße:	
nach DIN ISO 392		Längemaße			
		Rev. 2 (20.03.00)			
BSP. Tag Name		Maßstab		Benennung:	
Gezeichnet: 23.05. Thema				I/P-Converter 22/06-XX	
Geprüft: 23.05. / 23.05.				Techn. Zeichn.	
Abgepr.:				von	
Pap. Ab-		ABB		Blatt	
maße		900842		4/4	
		CSA			

ABB Automation

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Notes

Notes



ABB Measurement & Analytics

For your local ABB contact, visit:
www.abb.com/contacts

For more product information, visit:
www.abb.com/positioners

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