

# Electro-Pneumatic Positioner TZIDC, TZIDC-110, TZIDC-120

For 4 ... 20 mA two-wire technology,  
HART, PROFIBUS PA,  
FOUNDATION fieldbus



# Electro-Pneumatic Positioner TZIDC, TZIDC-110, TZIDC-120

## Commissioning Instruction

CI/TZIDC/110/120-EN

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Rev. B

Translation of the original instruction

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## 1 Safety

### 1.1 General information and notes for the reader

You must read these instructions carefully prior to installing and commissioning the device.

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

These instructions are intended as an overview and do not contain detailed information on all designs for this product or every possible aspect of installation, operation and maintenance.

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 any previous or existing agreement, promise or legal relationship nor is it intended to change the same.

This product is built based on state-of-the-art technology and is operationally safe. It has been tested and left the factory in perfect working order from a safety perspective. The information in the manual must be observed and followed in order to maintain this state throughout the period of operation.

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

Only by observing all of the safety instructions and all safety/warning symbols in these instructions can optimum protection of both personnel and the environment, as well as safe and fault-free operation of the device, be ensured.

Information and symbols directly on the product must be observed. They may not be removed and must be fully legible at all times.

### 1.2 Intended use

TZIDC, TZIDC-110, TZIDC-120 positioners are electro-pneumatic positioning devices for use with pneumatically controlled actuators.

The device may only be used for the applications listed in these operating instructions and in the data sheet.

- The maximum operating temperature must not be exceeded.
- The permissible operating temperature must not be exceeded.
- The housing protection type must be observed during operation.

### 1.3 Target groups and qualifications

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

Prior to using corrosive and abrasive materials for measurement purposes, the operator must check the level of resistance of all parts coming into contact with the materials to be measured. ABB Automation Products GmbH will gladly support you in selecting the materials, but cannot accept any liability in doing so.

The operators must strictly observe the applicable national regulations with regards to installation, function tests, repairs, and maintenance of electrical products.

1.4 Warranty provisions

Using the device in a manner that does not fall within the scope of its intended use, disregarding this instruction, 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.

1.5 Plates and symbols

1.5.1 Safety- / warning symbols, note symbols



**DANGER – <Serious damage to health / risk to life>**

This symbol in conjunction with the signal word "Danger" indicates an imminent danger. Failure to observe this safety information will result in death or severe injury.



**DANGER – <Serious damage to health / risk to life>**

This symbol in conjunction with the signal word "Danger" indicates an imminent electrical hazard. Failure to observe this safety information will result in death or severe injury.



**WARNING – <Bodily injury>**

This symbol in conjunction with the signal word "Warning" indicates a possibly dangerous situation. Failure to observe this safety information may result in death or severe injury.



**WARNING – <Bodily injury>**

This symbol in conjunction with the signal word "Warning" indicates a potential electrical hazard. Failure to observe this safety information may result in death or severe injury.



**CAUTION – <Minor injury>**

This symbol in conjunction with the signal word "Caution" indicates a possibly dangerous situation. Failure to observe this safety information may result in minor or moderate injury. This may also be used for property damage warnings.



**NOTICE – <Property damage>!**

The symbol indicates a potentially damaging situation.

Failure to observe this safety information may result in damage to or destruction of the product and/or other system components.



**IMPORTANT (NOTE)**

This symbol indicates operator tips, particularly useful information, or important information about the product or its further uses. It does not indicate a dangerous or damaging situation.

**1.5.2 Name plate**

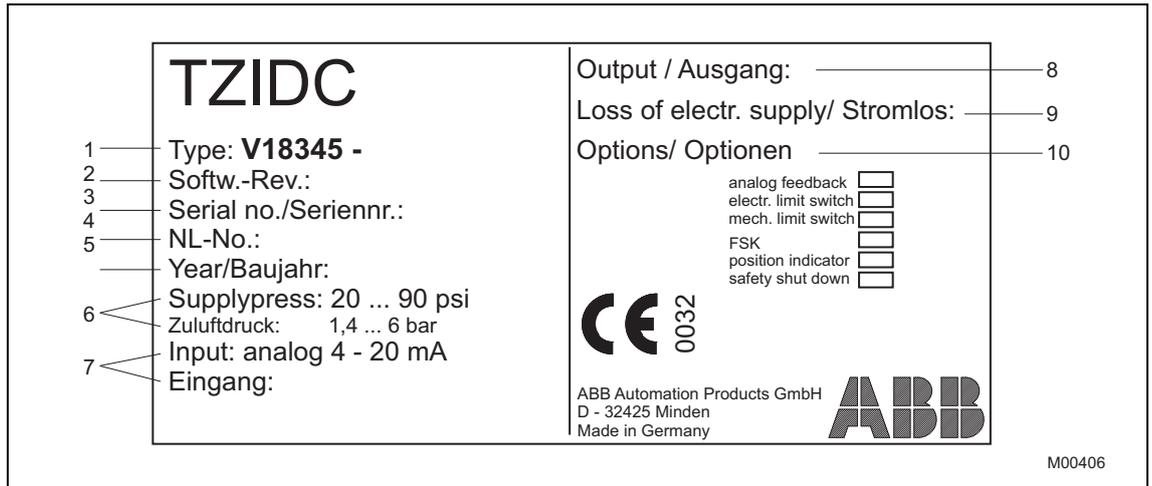


Fig. 1: Name plate

- |                       |                   |
|-----------------------|-------------------|
| 1 Complete model name | 6 Supply pressure |
| 2 Software version    | 7 Input           |
| 3 Serial number       | 8 Output          |
| 4 NL number           | 9 Dead            |
| 5 Year                | 10 Options        |

**1.6 Transport safety information**

Check the devices for possible damage that may have occurred during transport. Damages in transit must be recorded on the transport documents. All claims for damages must be claimed without delay against the shipper and before the installation.

**1.7 Storage conditions**

The unit must be stored in dry and dust-free conditions. The unit is also protected by a dessicant in the packaging.

The storage temperature should be between -40 ... 85 °C (-40 ... 185 °F).

The storage time is basically indefinite. However, the warranty conditions stipulated in the order confirmation of the supplier are valid.

## 1.8 Installation safety information



### CAUTION - Risk of injury!

Incorrect parameter values can cause the valve to move unexpectedly. This can lead to process failures and result in injuries.

Before recommissioning a TZIDC, TZIDC-110, TZIDC-120 positioner that was used at another location, the device must always be reset to factory settings. Never start Autoadjust before restoring factory settings.

- 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 working on the unit always observe the locally valid accident prevention regulations and the regulations concerning the construction of technical installations.

## 1.9 Safety information for electrical installation

- The electrical connection may only be made by authorized specialist personnel and in accordance with the electrical circuit diagrams.
- The electrical connection information in the manual must be observed; otherwise, the type of electrical protection may be adversely affected.
- Safe isolation of electrical circuits which are dangerous if touched is only guaranteed if the connected devices satisfy the requirements of DIN EN 61140 (VDE 0140 Part 1) (basic requirements for safe isolation).
- To ensure safe isolation, install supply lines so that they are separate from electrical circuits which are dangerous if touched, or implement additional isolation measures for them.

## 1.10 Operating safety information

Before switching on the unit make sure that your installation complies with the environmental conditions listed in the chapter "Technical data" or in the data sheet.

If there is a chance that safe operation is no longer possible, take the unit out of operation and secure against unintended startup.

When mounting the unit in areas that may be accessed by unauthorized persons, take the required protective measures.

Prior to installation, check the devices for any damage that may have occurred as a result of 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.

### 1.11 Returning devices

Use the original packaging or suitably secure shipping containers if you need to return the device for repair or recalibration purposes. Fill out the return form (see the Appendix) and include this with the device.

According to EC guidelines for 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 Automation Products GmbH must be free from any hazardous materials (acids, alkalis, solvents, etc.).

Please contact Customer Center Service acc. to page 2 for nearest service location.

### 1.12 Integrated management system

ABB Automation Products GmbH operates an integrated management system, consisting of:

- Quality management system to ISO 9001:2008
- Environmental management system to ISO 14001:2004
- Occupational health and safety management system to BS OHSAS 18001:2007 and
- Data and information protection management system

Environmental awareness is an important part of our company policy.

Our products and solutions are intended to have a minimal impact on the environment and on people during manufacturing, storage, transport, use, and disposal.

This includes the environmentally-friendly use of natural resources. We conduct an open dialog with the public through our publications.

### 1.13 Disposal

This product is manufactured from materials that can be reused by specialist recycling companies.

#### 1.13.1 Information on WEEE Directive 2002/96/EC (Waste Electrical and Electronic Equipment)

This product is not subject to WEEE Directive 2002/96/EC or relevant national laws (e.g., ElektroG in Germany).

The product must be disposed of at a specialist recycling facility. Do not use municipal garbage collection points. According to the WEEE Directive 2002/96/EC, only products used in private applications may be disposed of at municipal garbage facilities. Proper disposal prevents negative effects on people and the environment, and supports the reuse of valuable raw materials.

If it is not possible to dispose of old equipment properly, ABB Service can accept and dispose of returns for a fee.

### 1.13.2 RoHS Directive 2002/95/EC

With the Electrical and Electronic Equipment Act (ElektroG) in Germany, the European Directives 2002/96/EC (WEEE) and 2002/95/EC (RoHS) are translated into national law. ElektroG defines the products that are subject to regulated collection and disposal or reuse in the event of disposal or at the end of their service life. ElektroG also prohibits the marketing of electrical and electronic equipment that contains certain amounts of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) (also known as hazardous substances with restricted uses).

The products provided by ABB Automation Products GmbH do not fall within the current scope of the directive on waste from electrical and electronic equipment according to ElektroG. If the necessary components are available on the market at the right time, in the future these substances will no longer be used in new product development.

## 2 Ex relevant safety instructions

Depending on the type of explosion protection, an Ex label is attached to the left of the positioner beside the main name plate. It indicates the level of explosion protection and the device's relevant Ex certificate.

### Requirements / preconditions for safe operation of the positioner:



#### IMPORTANT (NOTE)

Observe the device's applicable technical data and special conditions in accordance with the relevant certificate.

- Manipulation of the device by users is not permitted. Modifications to the unit may only be performed by the manufacturer or an explosion protection specialist.
- The splash guard cap must be screwed in place to achieve IP 65 / NEMA 4x protection class. Operating the unit without splash guard cap is prohibited.
- The device may only be supplied with instrument air that is free of oil, water, and dust. The use of flammable gas, oxygen, or oxygen-enriched gas is not permitted.
- Exception: The version of the TZIDC that is designed for operation with flammable gas, group IIA, temperature class T1 ((see IMPORTANT (NOTE) in 7 "Ex relevant specifications" ).

**3 Mounting**



**CAUTION - Risk of injury!**

Incorrect parameter values can cause the valve to move unexpectedly. This can lead to process failures and result in injuries. Before recommissioning a TZIDC, TZIDC-110, TZIDC-120 positioner that was used at another location, the device must always be reset to factory settings. Never start Autoadjust before restoring factory settings.

**3.1 Operating conditions at installation site**



**IMPORTANT (NOTE)**

Before installation, check whether the TZIDC, TZIDC-110, TZIDC-120 positioner meets the control and safety requirements for the installation location (actuator or valve). See the „Specifications“ chapter in the operating instructions or on the data sheet.

**3.2 Mechanical mount**

**3.2.1 General information**

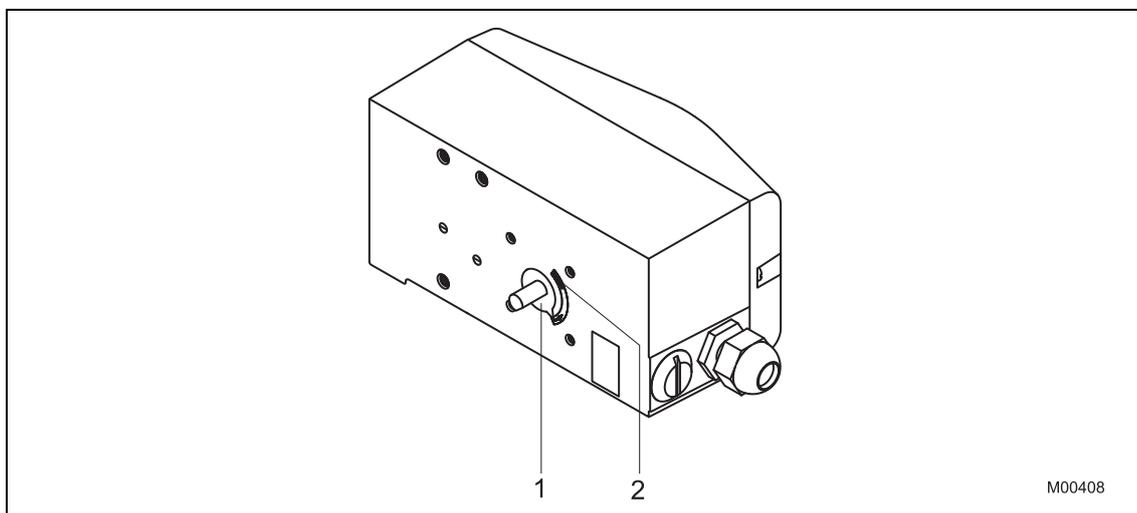


Fig. 2: Operating range

The arrow (1) on the positioner feedback shaft (and the lever) must move through the area marked by the arrows (2).

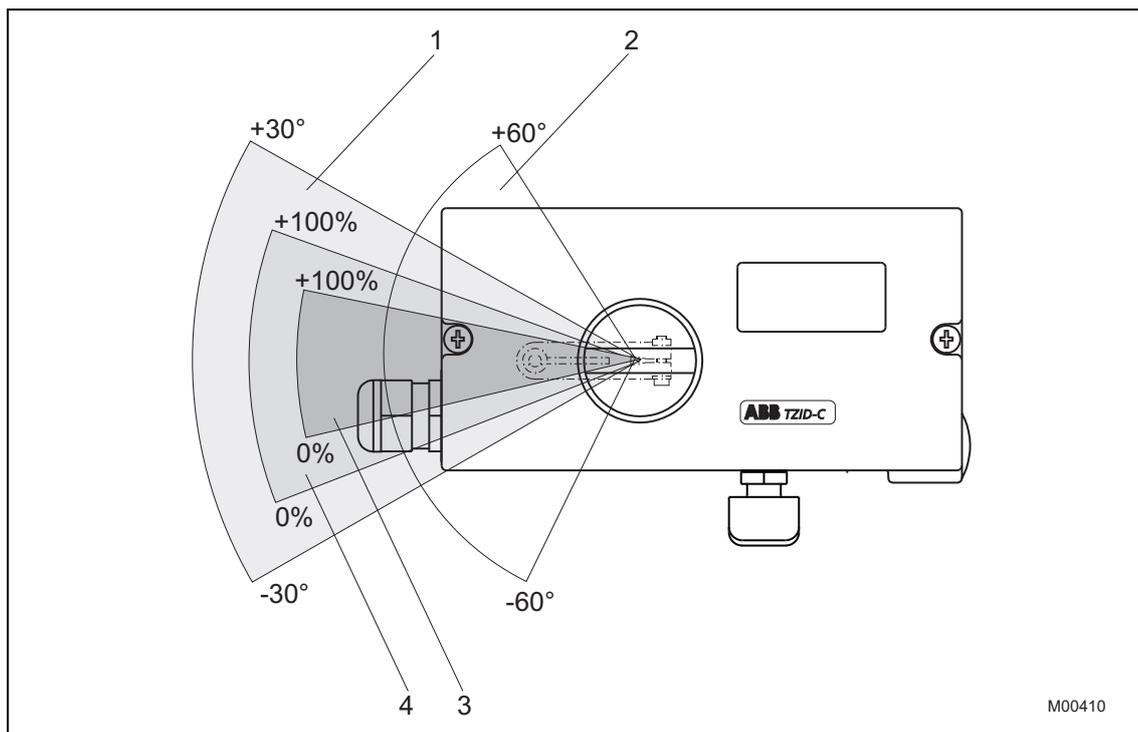


Fig. 3: Positioner range

- 1 Sensor range for linear actuators
- 2 Sensor range for part-turn actuators
- 3 Restricted working range
- 4 Working range

**i**

**IMPORTANT (NOTE)**

During installation make sure that the actuator travel or rotation angle for position feedback is implemented correctly.

The maximum rotation angle for position feedback is 60° when installed on linear actuators and 120° on part-turn actuators. The minimum angle is always 25°.

**3.2.2 Mounting on linear actuators**

For mounting on a linear actuator in accordance with DIN / IEC 534 (lateral mount per NAMUR) a complete mounting kit is available, and consists of the items in the following table:

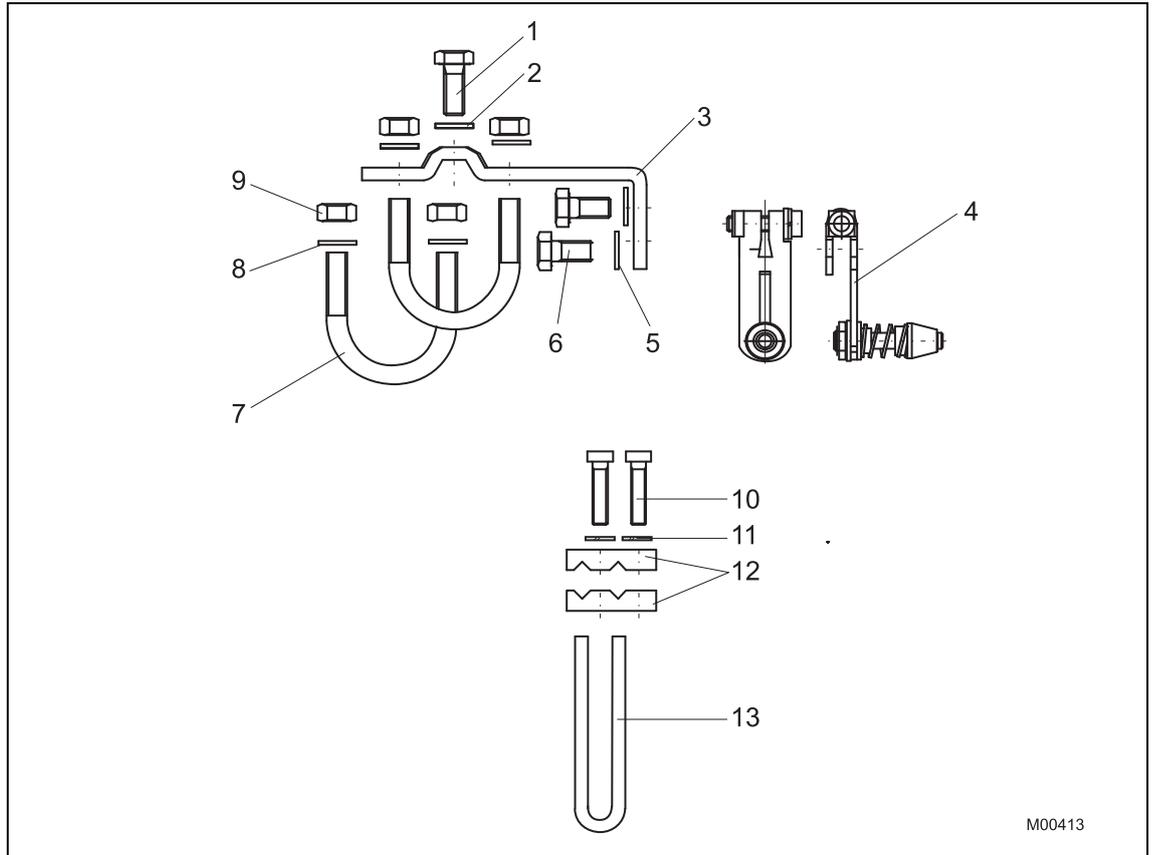


Fig. 4: Mounting kit for linear actuators

- Lever (4) with follower pin, for stroke adjustment 10 ... 35 mm (0.39 ... 1.38 inch) or 20 ... 100 mm (0.79 ... 3.94 inch)
- Follower guide (13) with two screws (10), spring washers (11) and clamp plates (12)
- Mount bracket (3) with two screws (6) and two shims (5)
- Screw (1) and shim (2) for mounting to cast iron yoke
- Two U-bolts (7) with two shims (8) and two nuts (9) for mounting to columnar yoke

Required tools:

- Wrench, size 10 / 13
- Allen key, size 4

**Procedure:**

**1. Attach follower guide to actuator**

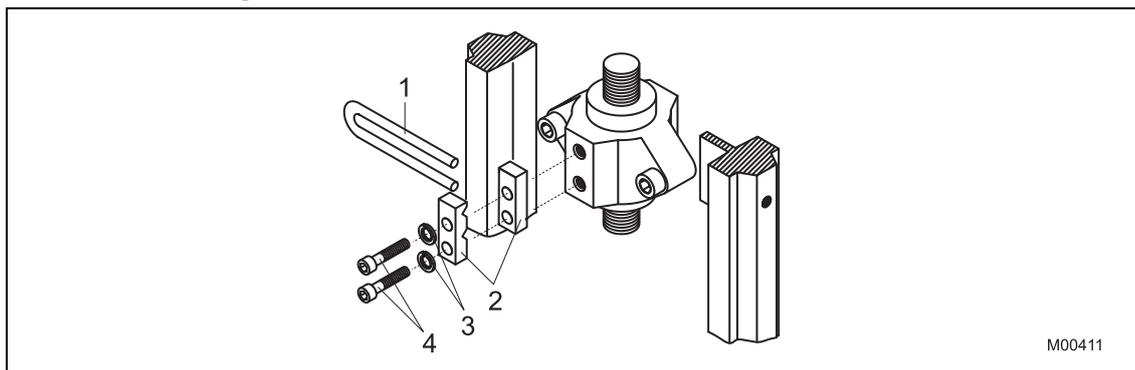


Fig. 5

**i**

**IMPORTANT (NOTE)**

Hand tighten the screws.

- Attach the follower guide (1) and clamp plates (2) with screws (4) and spring washers (3) to the actuator stem

**2. Mount the lever and bracket on the positioner**

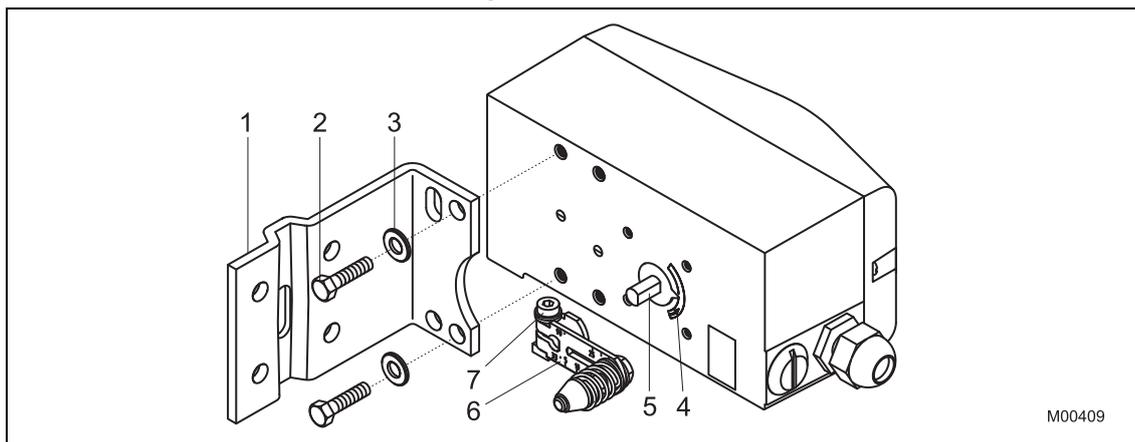


Fig. 6

- Attach the lever (6) to the feedback shaft (5) of the positioner (can only be mounted in one position due to the flat on the side of the shaft)
- Using the arrow marks (4) check whether the lever moves within the operating range (between the arrows)
- Hand-tighten the screw (7) on the lever
- Hold the prepared positioner with loose mount bracket (1) to the actuator so that the follower pin for the lever enters the follower guide to determine which holes on the positioner must be used for the mount bracket
- Attach the mount bracket (1) with screws (2) and shims (3) to the proper holes on the positioner housing. Tighten the screws as evenly as possible to ensure subsequent linearity. Align the mount bracket in the oblong hole to ensure that the operating range is symmetrical (lever moves between the arrows (4))

**3.a Mounting on cast iron yoke**

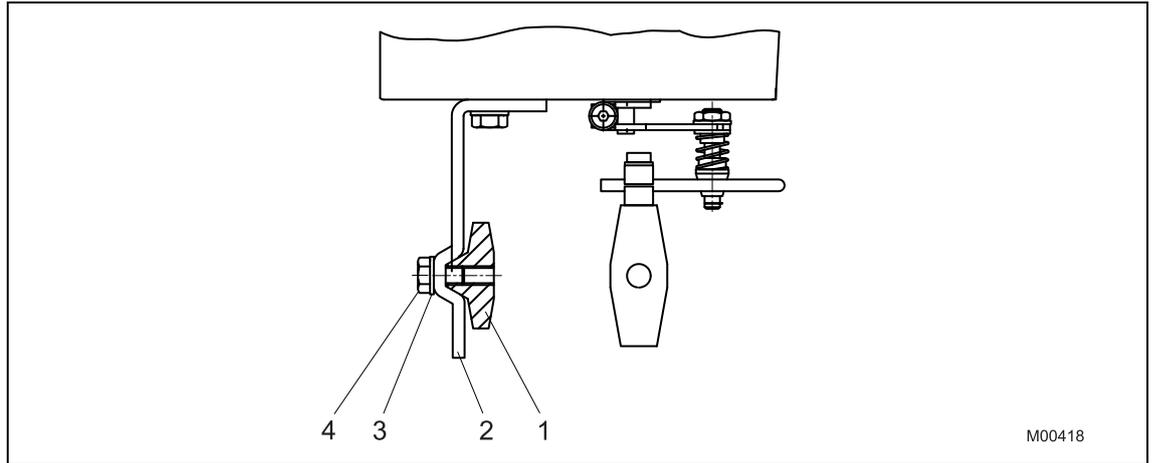


Fig. 7

- Attach the mount bracket (2) with screw (4) and shim (3) to the cast iron yoke (1)

or

**3.b Mounting on columnar yoke**

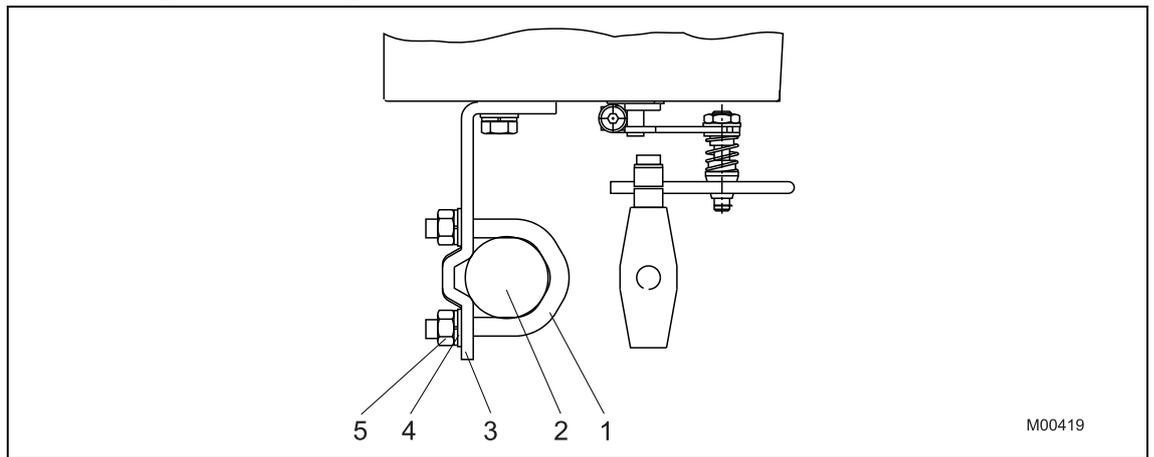


Fig. 8

- Hold the mount bracket (3) in the proper position on the columnar yoke (2)
- Insert the U-bolts (1) from the inside of the columnar yoke (2) through the holes for the mount bracket
- Add the washers (4) and nuts (5). Hand tighten the nuts



**IMPORTANT (NOTE)**

Adjust the height of the positioner on the cast iron yoke or columnar yoke until the lever is horizontal (based on visual check) at half stroke of the valve.



**3.2.3 Mounting on rotary actuators**

For mounting on rotary actuators in accordance with VDI / VDE 3845, the following mounting kit is available:

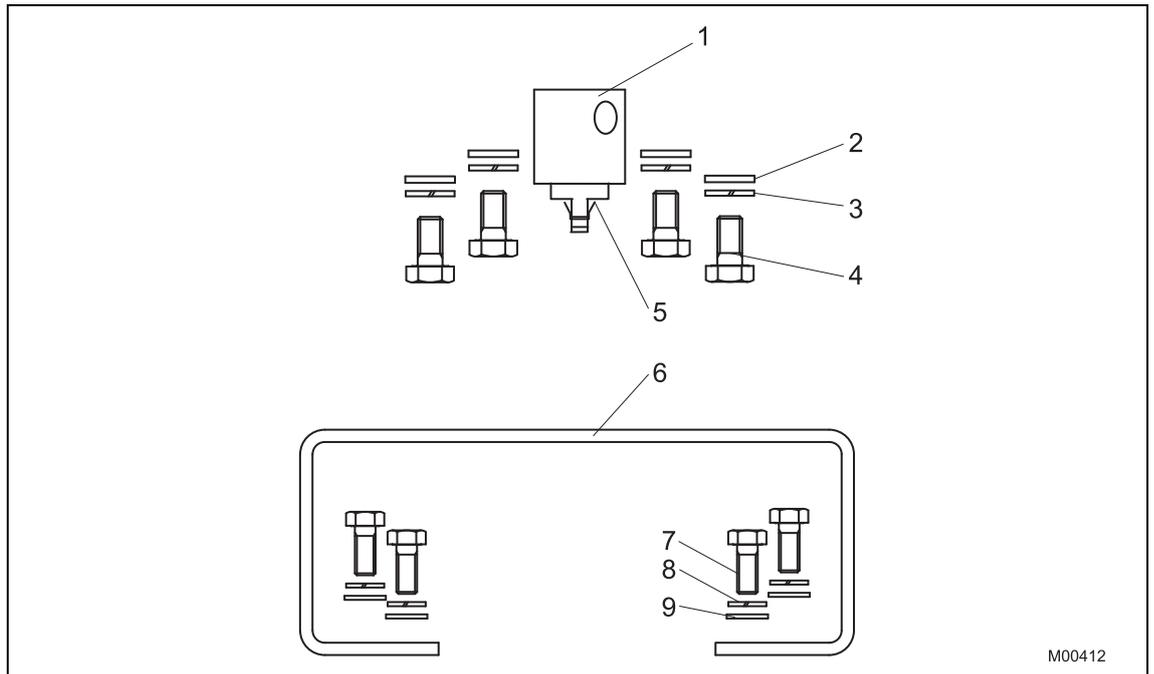


Fig. 10

- Adapter (1) with spring (5)
- each four screws M6 (4), spring washers (3) and shim (2) to attach the mounting bracket (6) on the positioner
- each four screws M5 (7), spring washers (8) and shim (9) to attach the mounting bracket on the actuator

Required tools:

- Wrench, size 10 / 13
- Allen key, size 3

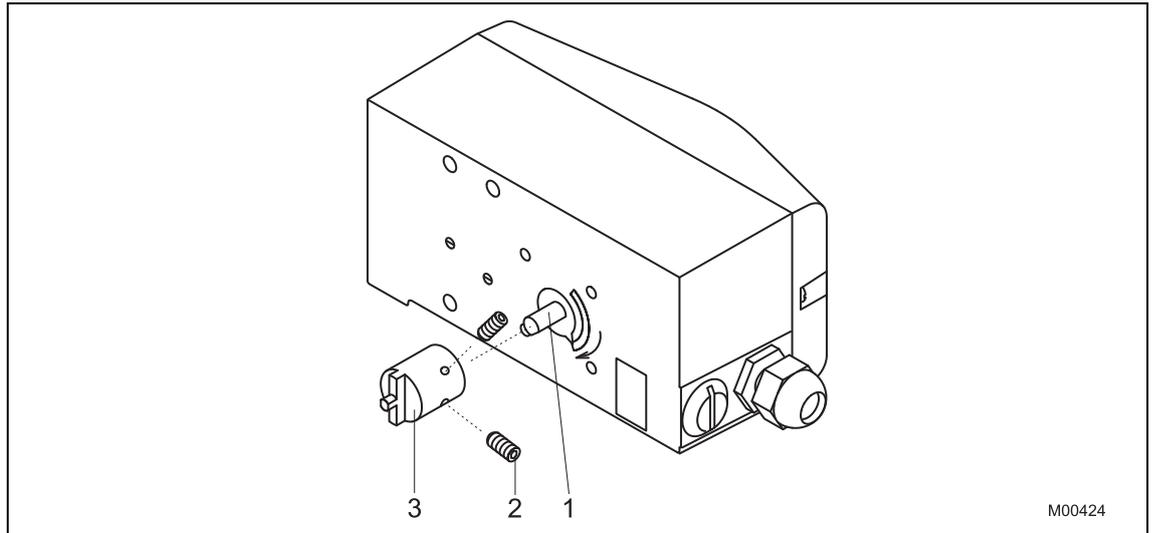
**Procedure:****1. Mounting the adapter on the positioner**

Fig. 11

- Determine the mounting position (parallel to actuator or at 90° angle)
- Calculate the rotational direction of the actuator (right or left)
- Move the rotary actuator into home position
- Based on the mounting position as well as the home position and rotational direction of the actuator, determine in which position the feedback shaft (1) for the positioner must be pre-adjusted and in which position the adapter (2) must be placed to enable the positioner to travel within the proper range (the arrow on the rear of the device must travel within the admissible range, see Fig. 2)
- Pre-adjust feedback shaft
- Place the adapter in the proper position on the feedback shaft and fasten with set screws (3). One of the set screws must be locked in place on the flat side of the feedback shaft

**2. Attach mounting bracket on the positioner**

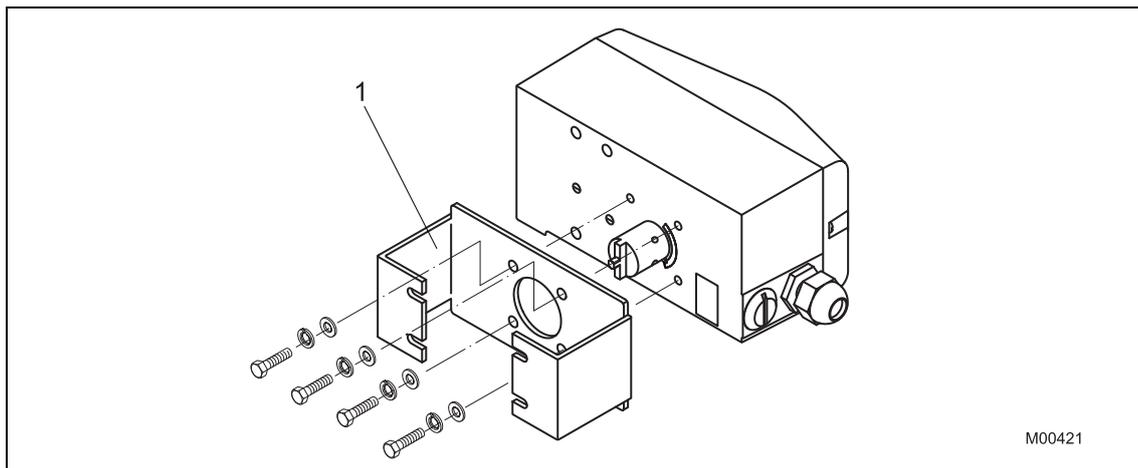


Fig. 12

1 Mounting bracket

**3. Attach positioner to the actuator**

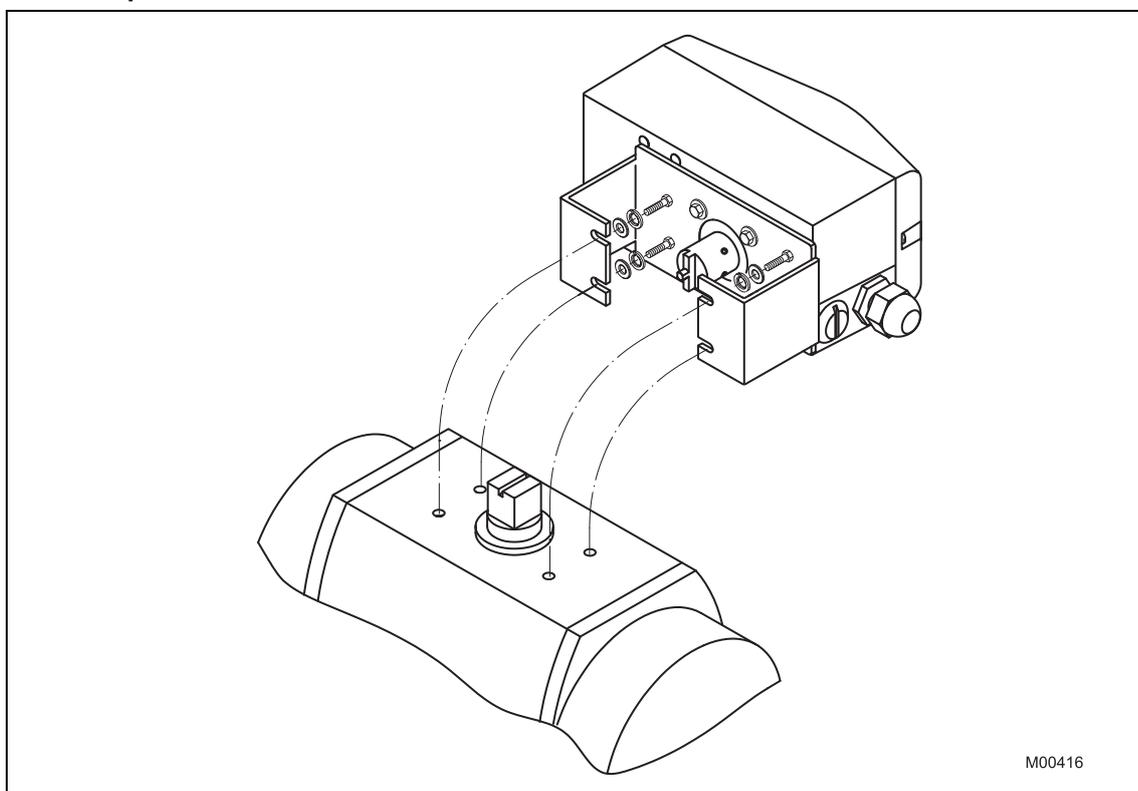


Fig. 13



**IMPORTANT (NOTE)**

After mounting the unit check whether the operating range for the actuator matches the sensor range on the positioner.

### 4 Electrical connections



**DANGER! Risk of explosion! (TZIDC only)**

It is prohibited to use the integrated communication interface (LKS) in an Ex area.

Never use the integrated communication interface (LKS) on the mainboard with a positioner that is being used in an explosion risk area.

1. Strip the wire by approx. 6 mm (0.24 inch).
2. To connect the signal lines, the emergency shutdown module and the proximity switches or micro switches, insert the wire ends from the left into the respective screw terminals and hand-tighten the screws (access from above). To connect a plug-in module, insert the wire ends from above in the appropriate screw terminals and hand-tighten the screws (access from the side).

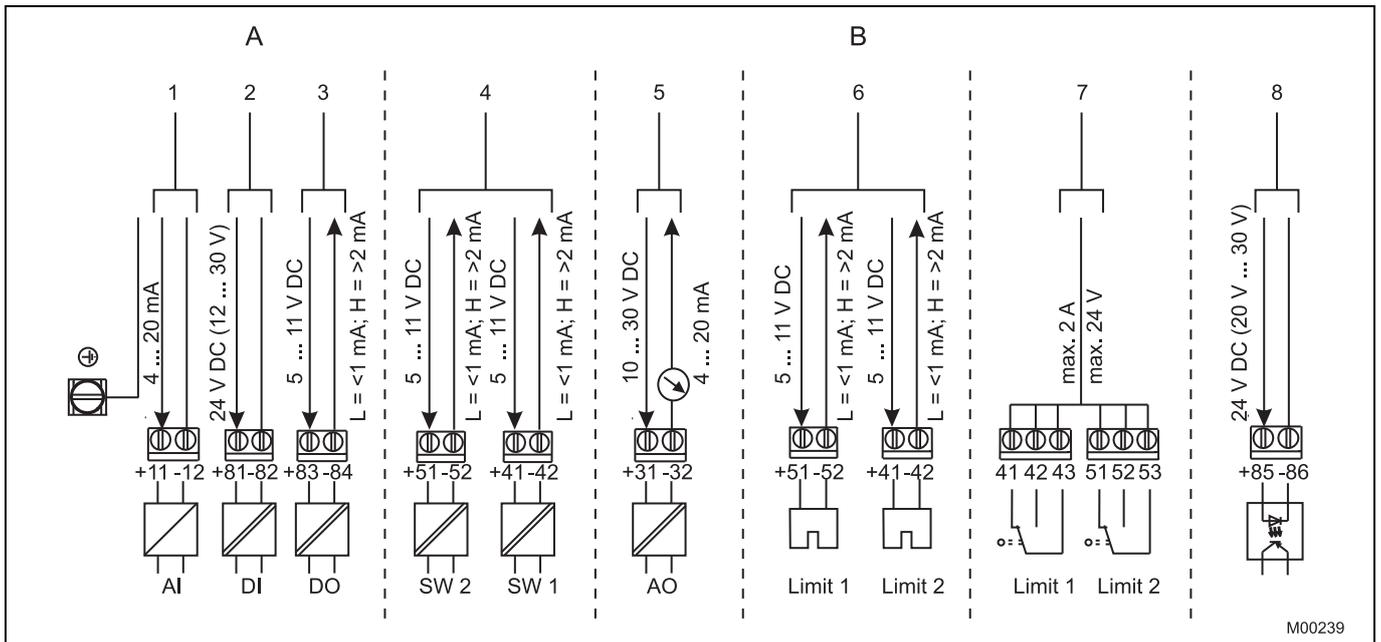


Fig. 14: Terminal connection diagram

- A Basic model
- B Options

- 1 Analog input / Bus connector
- 2 Digital input <sup>1)</sup>
- 3 Digital output <sup>1)</sup>
- 4 Digital feedback <sup>1)</sup>
- 5 Analog feedback <sup>1)</sup>
- 6 Proximity switches
- 7 Microswitches
- 8 Emergency shutdown module

1) TZIDC only



**IMPORTANT (NOTE)**

Keep cable shields as short as possible and connect on both sides.

**4.1 Screw terminal assignments**

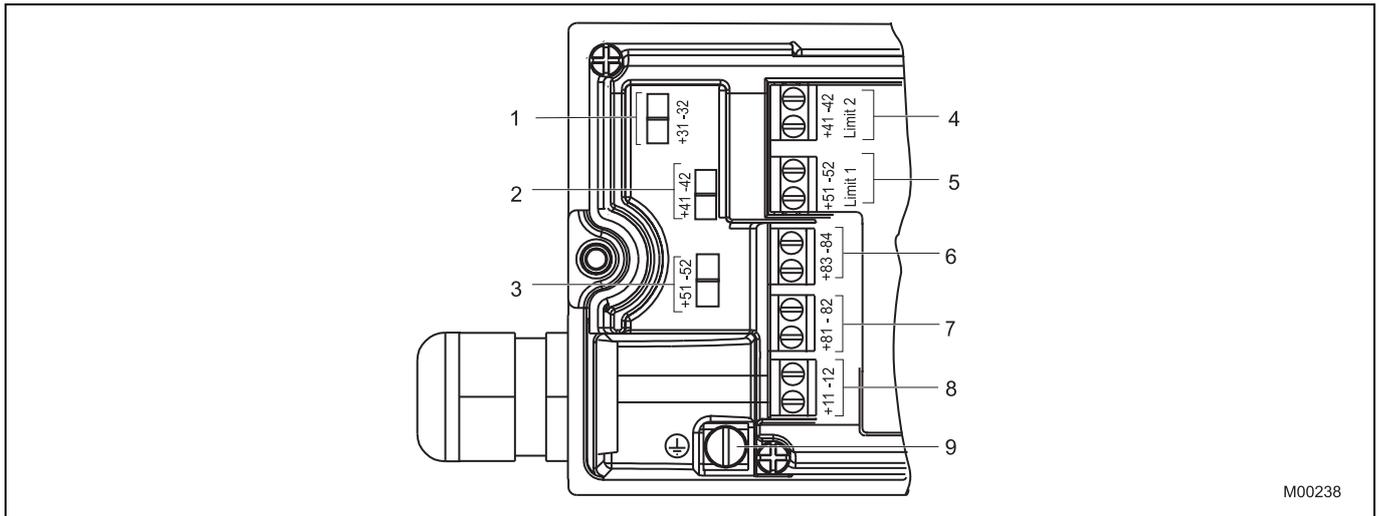


Fig. 15

- |   |                                      |
|---|--------------------------------------|
| 1 Module for analog position feedback <sup>1)</sup>   | 6 Digital output DO <sup>1)</sup>    |
| 2 Module for digital feedback <sup>1)</sup> or service switch of emergency shutdown module        | 7 Digital input DI <sup>1)</sup>     |
| 3 Module for digital position feedback <sup>1)</sup> or terminals of the shutdown module          | 8 Signal 4 ... 20 mA / Bus connector |
| 4 Installation kit for digital position feedback, either proximity switches or 24 V microswitches | 9 Grounding screw                    |
| 5 Same as 4   |                                      |

1) TZIDC only

4.2 Jumper configuration on mainboard (TZIDC-120 only)

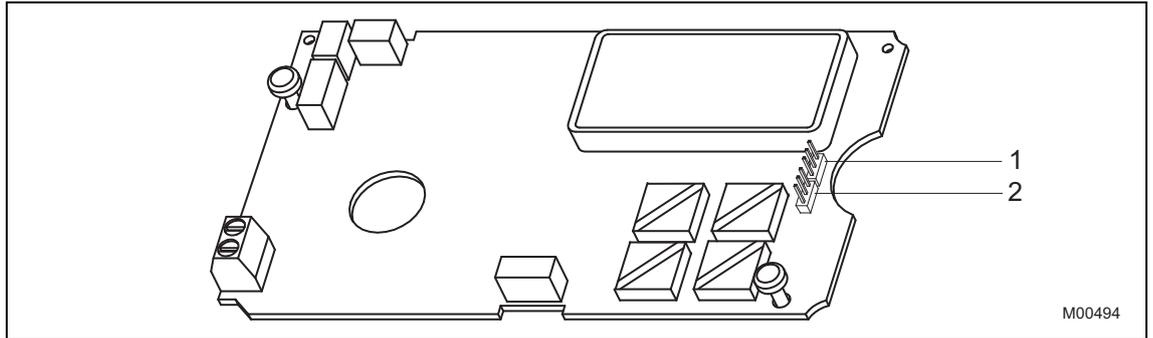


Fig. 16

- 1 Simulation
- 2 Write access

There are two jumpers on the mainboard that can be used to activate or block simulation mode and write access. Set the jumpers as shown below:

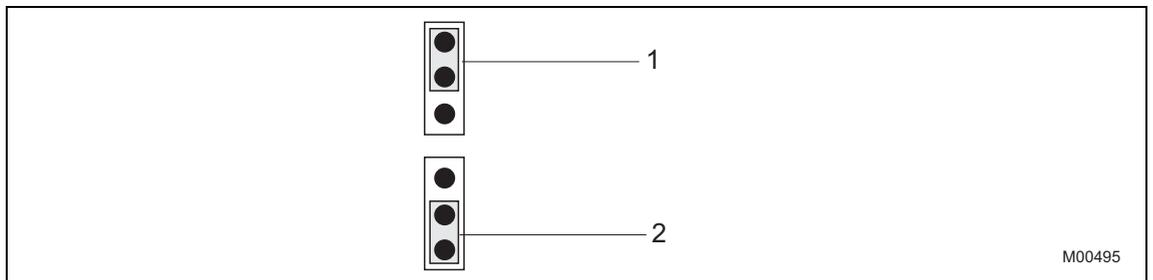


Fig. 17

- 1 Block (Simulation blocked <sup>1)</sup>)
- 2 Activate (Write access enabled <sup>1)</sup>)

1) Default setting (complies with Fieldbus Foundation standard)

### 4.3 Cable entry



#### IMPORTANT (NOTE)

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

For the cable entry into the housing, on the left-hand side of the housing there are two tap holes in four thread combinations to accommodate the cable entry and pneumatic connection.

- Cable: thread 1/2-14NPT, air pipe: thread 1/4-18 NPT
- Cable: thread M20 x 1,5, air pipe: thread 1/4-18 NPT
- Cable: thread M20 x 1,5, air pipe: thread G 1/4
- Cable: thread G 1/2, air pipe: thread Rc 1/4

As an option, one thread can be fitted with a cable gland and the other with a pipe plug if necessary.

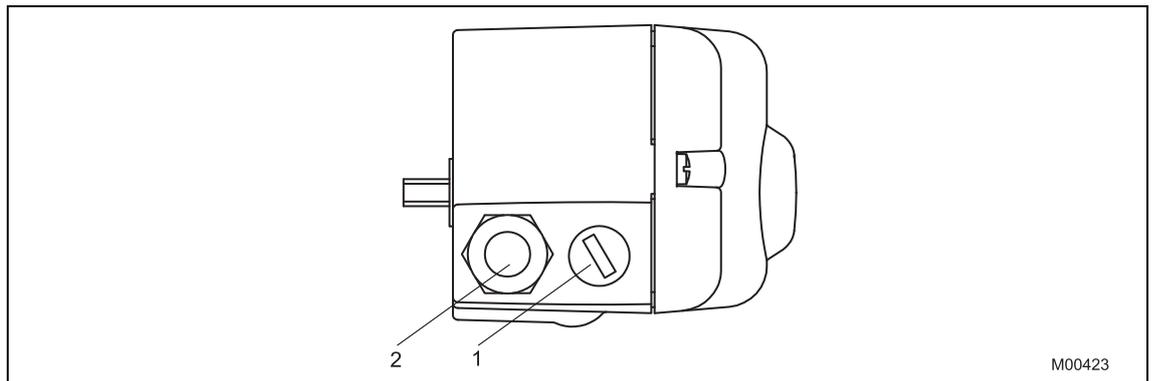


Fig. 18: Cable entry

- 1 Pipe plug
- 2 Cable gland

### 4.4 "TZIDC with remote position sensor"

In the case of the "TZIDC with remote position sensor" design, the components are supplied in two housings, which together form one harmonized unit.

Housing 1 (control unit) contains the electronics and pneumatics along with the following options (where applicable):

- Analog position feedback
- Digital position feedback
- Shutdown module

Housing 2 (remote sensor) contains the position sensor and is suitable for mounting on linear and part-turn actuators.

The following options can be installed if required:

- Optical position indicator
- Mechanical feedback contacts (proximity switch or microswitch design)

The two housings can be or are connected to a shielded 3-wire cable. The maximum cable length is 10 m.

The installation and commissioning procedures are described in 3 "Mounting", 5 "Pneumatic connection" and 6 "Commissioning".

The procedure for connecting the electronic unit (housing 1) and the options (housings 1 and 2) is described in 4 "Electrical connections".

**i**

#### IMPORTANT (NOTE)

If the device is being operated on a cylinder, for reasons associated with linearity you should run the Auto Adjust function for part-turn actuators.

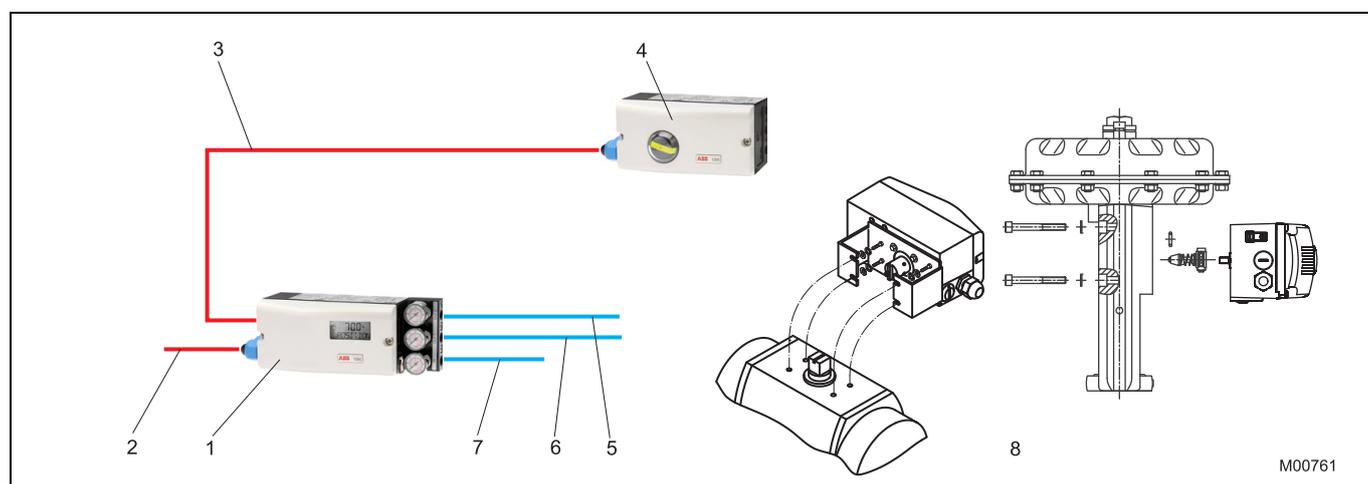


Fig. 19: TZIDC with remote position sensor

- |                             |                      |
|-----------------------------|----------------------|
| 1 Housing 1 (control unit)  | 5 Pneumatic output 2 |
| 2 Setpoint signal           | 6 Pneumatic output 1 |
| 3 Connecting cable          | 7 Air supply         |
| 4 Housing 2 (remote sensor) | 8 Pneumatic actuator |

**4.4.1 Electrical connection: "TZIDC with remote position sensor"**

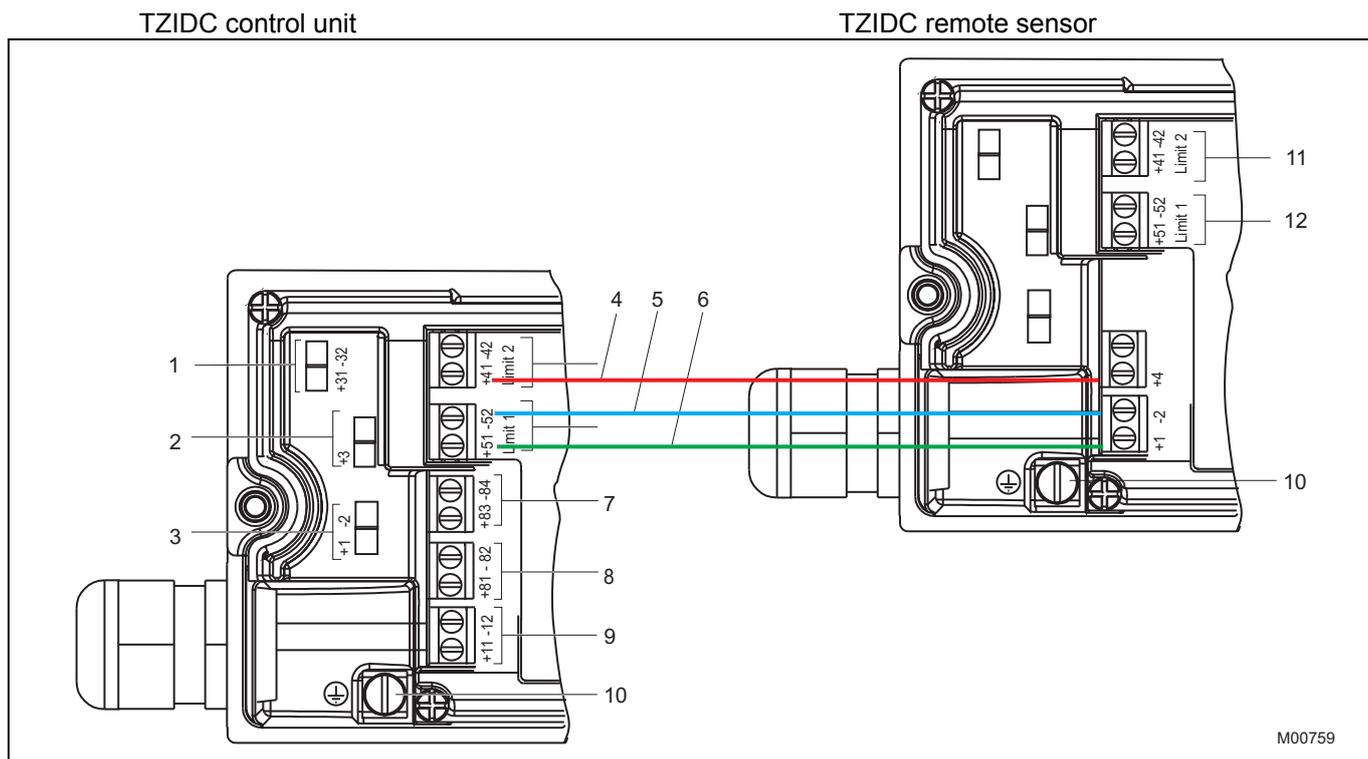


Fig. 20

- |   |  |
|---|--|
| 1 Analog position feedback                    | 7 Digital output DO                            |
| 2 Digital position feedback switch 1          | 8 Digital input                                |
| 3 Digital position feedback switch 2          | 9 Setpoint input                               |
| 4 Connecting cable for remote position sensor | 10 Grounding screw                             |
| 5 Connecting cable for remote position sensor | 11 Proximity switches / microswitches switch 1 |
| 6 Connecting cable for remote position sensor | 12 Proximity switches / microswitches switch 2 |

**i**

**IMPORTANT (NOTE)**

The sensor and the electronics have been carefully matched. Therefore, during installation, please make sure that devices are only connected if they have the same serial number.

Connect the connecting cable shield to both housings using EMC cable glands.

The pneumatic outputs must be connected to the drive using cables at least 6 mm in diameter.

If the control unit is attached so that it is non-conductive, the housing must be grounded (control unit and remote sensor housing at same electrical level); otherwise, control deviations could occur with regard to analog position feedback.

4.5 "TZIDC for remote position sensor"

In the case of the "TZIDC for remote position sensor" design, the positioner is supplied without position detection.

The housing (control unit) contains the electronics and pneumatics along with the following options (where applicable):

- Analog position feedback
- Digital position feedback
- Shutdown module

The "TZIDC for remote position sensor" can be connected to any position sensor (4 kΩ ... 80 kΩ).

The maximum length of the shielded 3-wire cable is 10 m.

The installation and commissioning procedures are described in 3 "Mounting", 5 "Pneumatic connection" and 6 "Commissioning".

The procedure for connecting the electronic unit (housing 1) and the options is described in 4 "Electrical connections".



**IMPORTANT (NOTE)**

If the device is being operated on a cylinder, for reasons associated with linearity you should run the Auto Adjust function for part-turn actuators.

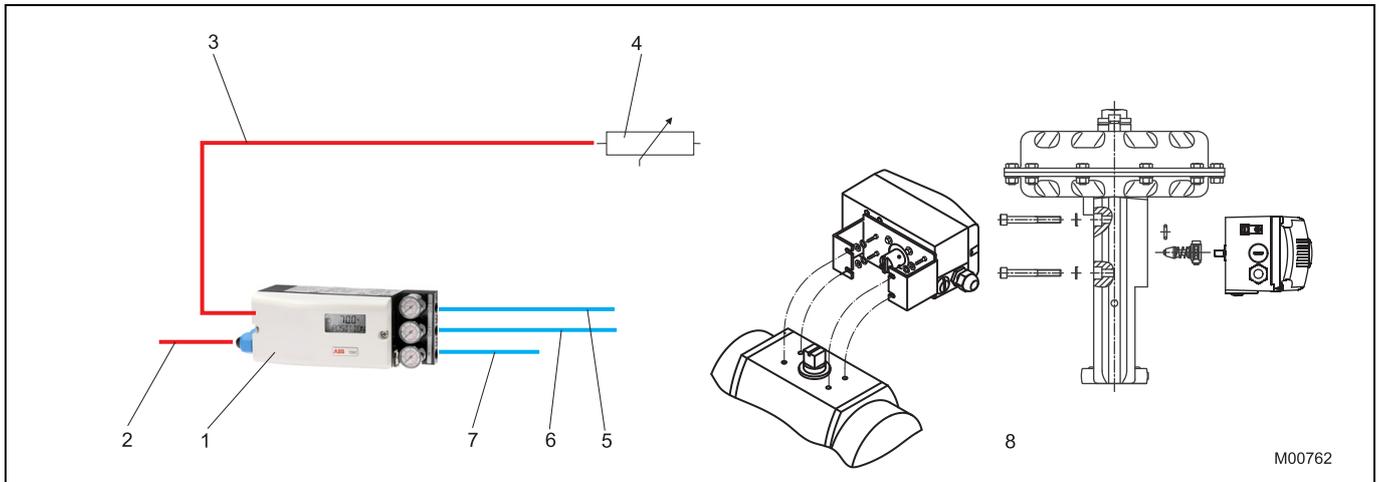


Fig. 21: TZIDC for remote position sensor

- |                          |                      |
|--------------------------|----------------------|
| 1 Housing (control unit) | 5 Pneumatic output 2 |
| 2 Setpoint signal        | 6 Pneumatic output 1 |
| 3 Connecting cable       | 7 Air supply         |
| 4 Remote position sensor | 8 Pneumatic actuator |

4.5.1 Electrical connection: "TZIDC for remote position sensor"

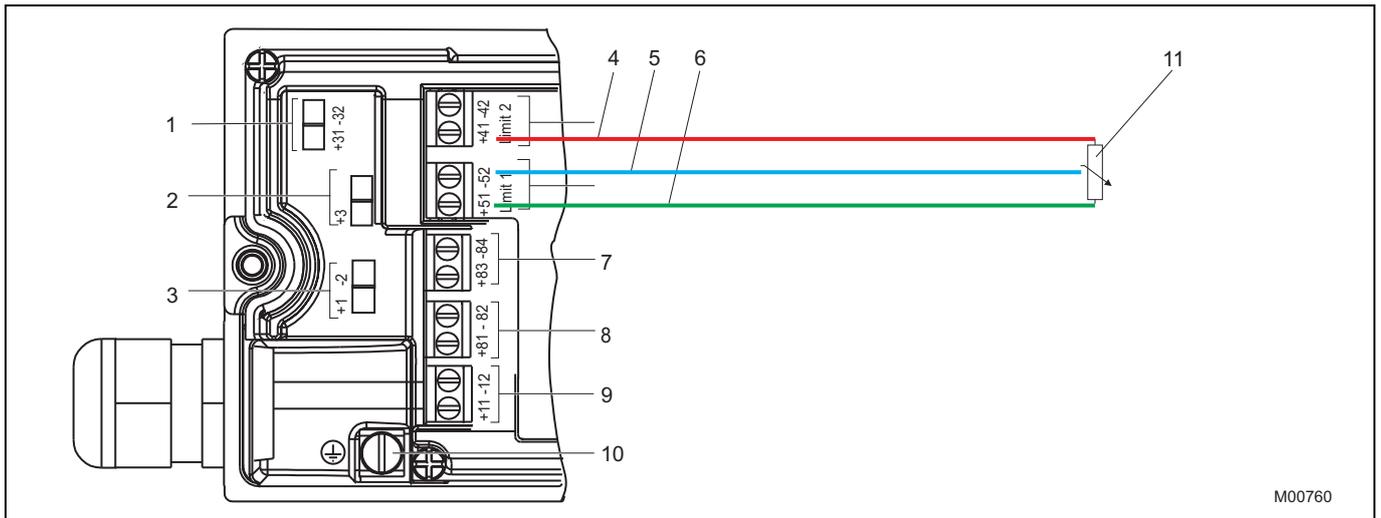


Fig. 22: TZIDC control unit

- |   |                           |
|---|---------------------------|
| 1 Analog position feedback                    | 7 Digital output DO       |
| 2 Digital position feedback switch 1          | 8 Digital input           |
| 3 Digital position feedback switch 2          | 9 Setpoint input          |
| 4 Connecting cable for remote position sensor | 10 Grounding screw        |
| 5 Connecting cable for remote position sensor | 11 Remote position sensor |
| 6 Connecting cable for remote position sensor |                           |

**i**

**IMPORTANT (NOTE)**

Connect the connecting cable shield to both housings using EMC cable glands.

If the control unit is attached so that it is non-conductive, the housing must be grounded (control unit and remote sensor housing at same electrical level); otherwise, control deviations could occur with regard to analog position feedback.

The pneumatic outputs must be connected to the drive using cables at least 6 mm in diameter.

## 5 Pneumatic connection



### IMPORTANT (NOTE)

The TZIDC, TZIDC-110, TZIDC-120 positioner must be supplied with instrument air that is free of oil, water and dust.

The purity and oil content should meet the requirements of Class 3 according to DIN/ISO 8573-1.



### NOTICE - Potential damage to parts!

Impurities on the pipe and positioner can damage components.

The recommended pipe dimension is 6 x 1 mm. Dust, splinters or any other particles must be blown off the pipe before connecting.

To connect the air pipes, G1/4 or 1/4-18 NPT tap holes are provided. We recommend that you use a line with the 6 x 1 mm dimensions.



### NOTICE - Potential damage to parts!

Pressure above 6 bar (90 psi) can damage the positioner or actuator.

Provisions should be made to ensure that in the event of an error the pressure does not rise above 6 bar (90 psi).

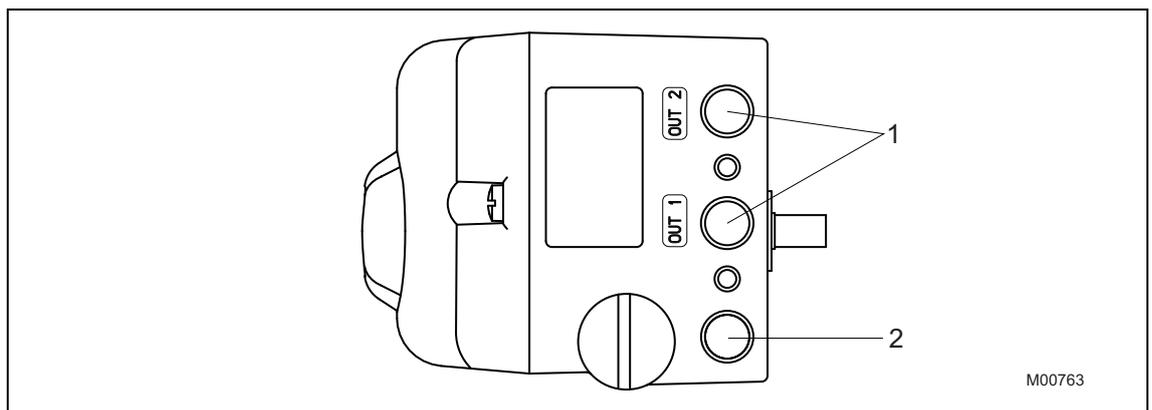


Fig. 23: Pneumatic connections

- 1 Pneumatic outputs
- 2 Supply air

All pneumatic piping connections are located on the right side of the positioner. To connect the pneumatic pipes, G1/4 or 1/4-18 NPT tap holes are provided. The positioner is labeled according to the tap holes available. The corresponding pipe connections must be included.

The level of supply pressure must be adjusted to the output pressure in the actuator required to provide increased actuating force. The operating range for the positioner is between 1.4 ... 6 bar (20 ... 90 psi).

Arrange the connections according to their marks:

<b>Designation</b>	<b>Pipe connection</b>
-	Air supply, pressure 1.4 ... 6 bar (20 ... 90 psi)
OUT1	Output pressure for actuator
OUT2	Output pressure for actuator (2nd connection with double-acting actuator)

## 6 Commissioning

### 6.1 TZIDC

1. Feed in pneumatic supply power
2. Feed in electrical supply power
  - Feed in setpoint current 4 ... 20 mA (terminals +11 / -12)
3. Check mount:
  - Press and hold **MODE**, plus **▲** or **▼** until operating mode 1.3 (manual adjustment within the sensor range) is displayed. Release **MODE**
  - Press **▲** or **▼** to move the actuator into the mechanical end position; check the end positions; rotation angle is displayed in degrees; for high-speed mode, press **▲** and **▼** simultaneously

Recommended range:

- between -28 ... 28° for linear actuators
- between -57 ... 57° for part-turn actuators

Minimum angle: 25°

4. Run Autoadjust



#### **IMPORTANT (NOTE)**

Autoadjust is available for software version 2.XX and higher.

#### **For linear actuators <sup>1)</sup>:**

- Press and hold down **MODE** until **ADJ\_LIN** is displayed; release the control button
- Press **MODE** again and hold down until the countdown ends
- Release **MODE**; this starts Autoadjust

#### **For part-turn actuators <sup>1)</sup>:**

- Press **ENTER** and hold down until **ADJ\_ROT** is displayed; release the control button
- Press **ENTER** again and hold down until the countdown ends
- Release **ENTER**; this starts Autoadjust

If Autoadjust is successful, the parameters will be stored automatically and the positioner will revert to operating mode 1.1.

If an error occurs during Autoadjust, the process will be terminated with an error message. If this happens, press and hold down **▲** or **▼** for approximately three seconds. The unit will switch to the operating level, mode 1.3 (manual adjustment within the sensor range). The mount is checked and corrected if necessary. Autoadjust then runs again.



#### **IMPORTANT (NOTE)**

Autoadjust does not always result in optimum control conditions.

- 1) The zero position is determined automatically and saved during Autoadjust (counter-clockwise (CTCLOCKW) for linear actuators and clockwise (CLOCKW) for part-turn actuators).

**6.1.1 Operating modes**

Selection from the operating level:

- Press and hold down **MODE**.
- Press and release **▲** rapidly as often as required. The selected operating mode is displayed.
- Release **MODE**.
- The position is displayed in % or as a rotation angle.

Operating mode	Mode indicator	Position indicator
1.0 Control mode <sup>1)</sup> with adaptation (the control parameter)		
1.1 Control mode <sup>1)</sup> without adaptation (the control parameter)		
1.2 Manual adjustment <sup>2)</sup> in the operating range. Adjust with <b>▲</b> or <b>▼</b> <sup>3)</sup>		
1.3 Manual adjustment <sup>2)</sup> in the sensor range. Adjust with <b>▲</b> or <b>▼</b> <sup>3)</sup>		

1) Since self-optimization in operating mode 1.0 is subject to several factors during control operation with adaptation, incorrect adjustments could be made over an extended period.

2) Position not active

3) For high-speed mode: Press **▲** and **▼** simultaneously

## 6.2 TZIDC-110 / TZIDC-120

1. Feed in pneumatic supply power
2. Connect the bus to the bus terminals with any polarity (or supply power 9 ... 32 V DC)



is displayed

3. Check mount:
  - Press and hold down **MODE** and **ENTER**; once the countdown has gone from 3 to 0, release **MODE** and **ENTER**; the unit switches to the operating level, mode 1.x
  - Press and hold down **MODE** and **ENTER**.
  - Additionally, press **▲** or **▼** until operating mode 1.3 (manual adjustment within the sensor range) is displayed. Release **MODE**
  - Press **▲** or **▼** to move the actuator into the mechanical end position; check the end positions; rotation angle is displayed in degrees (for high-speed mode, press **▲** and **▼** simultaneously)

Recommended range:

- between -28 ... 28° for linear actuators
- between -57 ... 57° for rotary actuators

Minimum angle: 25°

4. Go back to the bus level:

- Press and hold down **MODE** and **ENTER**; once the countdown has gone from 3 to 0, release **MODE** and **ENTER**



is displayed.

5. Run Autoadjust
  - Check that the unit is on the bus level ("REMOTE")

**For linear actuators** <sup>1)</sup>:

- Press and hold down **MODE** until **ADJ\_LIN** is displayed. Release the control button
- Press **MODE** again and hold down until the countdown ends
- Release **MODE**; this starts Autoadjust

**For rotary actuators** <sup>1)</sup>:

- Press and hold down **ENTER** until **ADJ\_ROT** is displayed. Release the control button
- Press **ENTER** again and hold down until the countdown ends
- Release **ENTER**; this starts Autoadjust

If Autoadjust is successful, the parameters will be stored automatically and the positioner will revert to operating mode 1.1.

If an error occurs during Autoadjust, the process will be terminated with an error message. If this happens, press and hold down  $\uparrow$  or  $\downarrow$  for approximately three seconds. The unit will switch to the operating level, mode 1.3 (manual adjustment within the sensor range). The mount is checked and corrected if necessary. Autoadjust then runs again.

6. Set potential dead band and tolerance band

This step is only required for critical (e.g., very small) actuators. It is not necessary under normal circumstances.

- 1) The zero position is determined automatically and saved during Autoadjust (counter-clockwise (CTCLOCKW) for linear actuators and clockwise (CLOCKW) for rotary actuators).

**6.2.1 Operating modes**

Selection from the operating level:

- Press and hold down **MODE**
- Press and release  $\uparrow$  as often as required to display the selected operating mode
- Release **MODE**
- The position is displayed in % or as a rotation angle

Operating mode	Mode indicator	Position indicator
1.1 Positioning with fixed setpoint Use $\uparrow$ or $\downarrow$ to adjust the setpoint		
1.2 Manual adjustment <sup>1)</sup> in the operating range Adjust with $\uparrow$ or $\downarrow$ <sup>2)</sup>		
1.3 Manual adjustment <sup>1)</sup> in the sensor range Adjust with $\uparrow$ or $\downarrow$ <sup>2)</sup>		

1) Positioning not active.

2) for high-speed mode: Press  $\uparrow$  and  $\downarrow$  simultaneously.

## 7 Ex relevant specifications



### IMPORTANT (NOTE)

The values indicated here are taken from the respective certificates. Always observe the specifications and supplements in the explosion protection certificates.

### 7.1 TZIDC

#### 7.1.1 ATEX

Designation:	II 2 G Ex ia IIC T6 resp. T4 Gb II 2 G Ex ib IIC T6 resp. T4 Gb II 2 D Ex ia IIIC T51°C resp. 70°C Db
Type-Examination Test Certificate:	TÜV 04 ATEX 2702 X
Type:	Intrinsically safe equipment
Device class:	II 2G
Standards:	EN 60079-0:2009 EN 60079-11:2007
Device class:	II 2D
Standards:	EN 60079-0:2009 EN 61241-11:2006

<b>II 2 G</b> Temperature class	<b>Ta</b> Ambient temperature range
T4	-40 ... 85 °C
T5	-40 ... 50 °C
T6 <sup>1)</sup>	-40 ... 40 °C

1) When using the "digital feedback" plug-in module in temperature class T6, the maximum permissible ambient temperature range is -40 ... 35 °C.

<b>II 2 D</b> Housing surface temperature	<b>Ta</b> Ambient temperature range (II 2 D)
T81 °C	-40 ... 70 °C
T61 °C	-40 ... 50 °C
T51 °C	-40 ... 40 °C

**Electrical data**

	In intrinsically safe explosion protection types Ex ib IIC / Ex ia IIC or Ex iaD, only for connection to a certified intrinsically safe circuit
Signal circuit (Terminal +11 / -12)	Maximum values: $U_i = 30 \text{ V}$ $I_i = 320 \text{ mA}$ $P_i = 1.1 \text{ W}$ $C_i = 6.6 \text{ nF}$ $L_i$ negligibly small
Contact input (Terminal +81 / -82)	Maximum values: $U_i = 30 \text{ V}$ $I_i = 320 \text{ mA}$ $P_i = 1.1 \text{ W}$ $C_i = 4.2 \text{ nF}$ $L_i$ negligibly small
Switch output (Terminal +83 / -84)	Maximum values: $U_i = 30 \text{ V}$ $I_i = 320 \text{ mA}$ $P_i = 500 \text{ mW}$ $C_i = 4.2 \text{ nF}$ $L_i$ negligibly small
Mechanical digital feedback (Terminals Limit1 +51 / -52 or Limit2 +41 / -42)	For max. values, see EC-type-examination test certificate number PTB 00 ATEX 2049 X Proximity switches manuf. by Pepperl & Fuchs
Plug-in module for digital position feedback (Terminal +51 / -52) or +41 / -42)	Maximum values: $U_i = 30 \text{ V}$ $I_i = 320 \text{ mA}$ $P_i = 500 \text{ mW}$ $C_i = 3.7 \text{ nF}$ $L_i$ negligibly small
Plug-in module for analog position feedback (Terminal +31 / -32)	Maximum values: $U_i = 30 \text{ V}$ $I_i = 320 \text{ mA}$ $P_i = 1.1 \text{ W}$ $C_i = 6.6 \text{ nF}$ $L_i$ negligibly small
Plug-in module for shutdown contact input (Terminal +51 / -52) or +85 / -86)	$U_i = 30 \text{ V}$ $I_i = 320 \text{ mA}$ $P_i = 1.1 \text{ W}$ $C_i = 3.7 \text{ nF}$ $L_i$ negligibly small
Local communication interface (LKS)	Only for connection to a programmer outside the potentially explosive area. (See special conditions)

**Special conditions**

- The local communication interface (LKS) may only be operated at  $U_m \leq 30$  V DC outside the potentially explosive area.
- Variants with special certification confirming that they meet the requirements for "flameproof enclosure" type of protection may no longer be used as intrinsically safe if they are used with "flameproof enclosure" type of protection.
- When used with gases from group IIA and a temperature class of T1 for auxiliary power, the TZIDC positioner may only be used outdoors or inside sufficiently ventilated buildings.
- The gas supplied must be kept sufficiently free of air and oxygen to prevent an ignitable atmosphere from forming.
- The equipment may only be used as a II 2 D type device in areas where the level of mechanical danger is "low".
- Cable and wire entries that meet the requirements of EN 61241-11 for Category II 2 D as well as the ambient temperature range must be used.
- Avoid electrostatic charging due to propagating brush discharge when the equipment is used for applications involving combustible dust.

Designation:	II 3 G Ex nA IIC T6 resp. T4 Gc
Declaration of conformity:	TÜV 02 ATEX 1943 X
Type:	Type of protection "n"
Device class:	II 3 G
Standards:	EN 60079-15:2010 EN 60079-0:2009

II 3 G Temperature class	Ta Ambient temperature range
T4	-40 ... 85 °C
T5	-40 ... 65 °C
T6	-40 ... 50 °C

Electrical data	
Signal circuit (Terminal +11 / -12)	U = 9.7 V DC I = 4 ... 20 mA, max. 21.5 mA
Contact input (Terminal +81 / -82)	U = 12 ... 24 V DC; 4 mA
Switch output (Terminal +83 / -84)	U = 11 V DC
Mechanical digital feedback (Terminals Limit1 +51 / -52 or Limit2 +41 / -42)	U = 5 ... 11 V DC
Plug-in module for digital position feedback (Terminal +51 / -52) or +41 / -42)	U = 5 ... 11 V DC
Plug-in module for analog position feedback (Terminal +31 / -32)	U = 10 ... 30 V DC I = 4 ... 20 mA, max. 21.5 mA
Plug-in module for shutdown contact input (Terminal +51 / -52) or +85 / -86)	U = 20 ... 30 V DC

**Special conditions**

- Devices may only be connected to circuits in zone 2 if they are suitable for operation in zone 2 potentially explosive atmospheres and for the conditions prevailing at the installation location (manufacturer's declaration or certificate from an inspection authority).
- For the "digital feedback with proximity switches" circuit, external measures must be implemented to prevent the rated voltage being exceeded by more than 40 % in the event of transient disturbances.
- It is only permissible to connect, disconnect, and switch live circuits during installation or maintenance, or for the purpose of carrying out repairs. Comment: It is considered very unlikely that a potentially explosive atmosphere would be present in zone 2 at the same time that installation or maintenance/repair work was being carried out.
- Only non-flammable gases may be used for the pneumatic auxiliary power.
- Only suitable cable entries which meet the requirements of IEC 60079-15 are allowed to be used.
- If the SJ2\_S1N (NO) proximity switch is used, the positioner may only be operated with an ambient temperature range from -25 ... 85 °C.

7.1.2 IECEx

Marking:	Ex ia IIC Gb Ex nA II Gc
Certificate No.:	IECEX TUN 04.0015X
Issue No.:	5
Typ:	Intrinsic safety "i", or Type of protection "n"
Standards:	IEC 60079-0:2011 IEC 60079-11:2011 IEC 60079-15:2010

Type and marking	TZIDC Ex i IIC Gb	TZIDC Ex nA IIC Gc
<b>Temperature Class</b>	<b>Ambient temperature range</b>	
T4	-40 ... 85 °C	-40 ... 85 °C
T5	-40 ... 50 °C	-40 ... 65 °C
T6 <sup>1)</sup>	-40 ... 40 °C	-40 ... 50 °C

1) When using the "digital feedback" plug-in module in temperature class T6, the maximum permissible ambient temperature range is -40 ... 35 °C.

**Electrical data for type TZIDC with marking Ex ia IIC resp. Ex ib IIC**

	In type of protection "Intrinsic Safety" Ex i IIC only for the connection to a certified intrinsically safe circuit with the following maximum values:
Signal circuit (Terminals +11 / -12)	U <sub>i</sub> = 30 V I <sub>i</sub> = 320 mA P <sub>i</sub> = 1.1 W effective internal capacitance: C <sub>i</sub> = 6.6 nF The effective internal inductance is negligibly small.
Switch input (Terminals +81 / -82)	U <sub>i</sub> = 30 V I <sub>i</sub> = 320 mA P <sub>i</sub> = 1.1 W effective internal capacitance: C <sub>i</sub> = 4.2 nF The effective internal inductance is negligibly small.
Switch output (Terminals +83 / -84)	U <sub>i</sub> = 30 V I <sub>i</sub> = 320 mA P <sub>i</sub> = 500 mW effective internal capacitance: C <sub>i</sub> = 4.2 nF The effective internal inductance is negligibly small.
Local interface for communication (LKS)	For the connection to a programmer outside of the explosiv hazardous area only. (see special conditions below)

**Optionally the following modules are allowed to be used:**

	In type of protection "Intrinsic Safety" (Ex ia IIC resp. Ex ib IIC) only for the connection to a certified intrinsically safe circuit with the following maximum values:
Plug-In module for digital feedback (Terminals +51 / -52 resp. +41 / -42)	U <sub>i</sub> = 30 V I <sub>i</sub> = 320 mA P <sub>i</sub> = 500 mW effective internal capacitance: C <sub>i</sub> = 3.7 nF The effective internal inductance is negligibly small.
Plug-In module for analogue feedback (Terminals +31 / -32)	U <sub>i</sub> = 30 V I <sub>i</sub> = 320 mA P <sub>i</sub> = 1.1 W effective internal capacitance: C <sub>i</sub> = 6.6 nF The effective internal inductance is negligibly small.
Plug-In module for shutdown-function (Terminals +51 / -52 resp. +85 / -86)	U <sub>i</sub> = 30 V I <sub>i</sub> = 320 mA P <sub>i</sub> = 1.1 W effective internal capacitance: C <sub>i</sub> = 3.7 nF The effective internal inductance is negligibly small.

**Special conditions**

The local communication interface (LKS) may only be operated at U<sub>m</sub> ≤ 30 V DC outside the potentially explosive area.

<b>Electrical data for type TZIDC with marking Ex nA IIC T6 resp. T4 Gc</b>	
Signal circuit (Terminals +11 / -12)	U = 9.7 VDC; 4 ... 20 mA, max. 21.5 mA
Switch input (Terminals +81 / -82)	U = 12 ... 24 VDC; 4 mA
Switch output (Terminals +83 / -84)	U = 11 VDC

<b>Optionally the following modules are allowed to be used with type TZIDC</b>	
Plug-In module for digital feedback (Terminals +51 / -52 resp. +41 / -42)	U = 5 ... 11 VDC
Plug-In module for analogue feedback (Terminals +31 / -32)	U = 10 ... 30 VDC; 4 ... 20 mA, max. 21.5 mA

<b>Additionally the following modules are allowed to be used with all types marked Ex nA IIC T6</b>	
Plug-In module for shutdown-function (Terminals +51 / -52 resp. +85, -86)	U = 20 ... 30 VDC
Mechanical digital feedback (Terminals Limit1 +51 / -52 resp. Limit2 +41 / -42)	U = 5 ... 11 VDC

### Special conditions

Only devices which are suitable for the operation in explosive hazardous areas declared as zone 2 and the conditions available at the place of operation are allowed to be connected to circuits in the zone 2.

The connecting and disconnecting as well as the switching of circuits under voltage are permitted during installation, for maintenance or repair purposes.

Note: The temporal coincidence of explosion hazardous atmosphere and installation, maintenance resp. repair purposes is assessed as improbably.

For the circuit "Mechanical digital feedback" measures have to be taken outside the device that the rated voltage exceeded not more than 40% by transient disturbances.

When using proximity switch SJ2\_S1N (NO), the positioner may only be used at an ambient temperature range of -25 ... 85 °C.

Only non combustible gases are allowed to be used as pneumatic auxiliary energy.

Only suitable cable entries which meet the requirements of IEC 60079-15 are allowed to be used.

7.1.3 CSA International

Certificate:	1052414
Class 2258 02	PROCESS CONTROL EQUIPMENT –For Hazardous Locations
Class 2258 04	PROCESS CONTROL EQUIPMENT – Intrinsically Safe, Entity – For Hazardous Locations

Class I, Div 2, Groups A, B, C and D;  
 Class II, Div 2, Groups E, F, and G,  
 Class III, Enclosure Type 4X:

<b>Model TZIDC, P/N V18345-x0x2x2xx0x Intelligent Positioner</b>	
Input rated	30 V DC; max. 4 ... 20 mA
Max output pressure	90 psi
Max. ambient	85 Deg C

Class I, Div 1, Groups A, B, C and D;  
 Class II, Div 1, Groups E, F and G  
 Class III, Enclosure Type 4X:

<b>Model TZIDC, P/N V18345-x0x2x2xx0x Intelligent Positioner intrinsically safe with entity parameters of:</b>	
Terminals 11 / 12	V max = 30 V I max = 104 mA C <sub>i</sub> = 6.6 nF L <sub>i</sub> = 0 uH
Terminals 81 / 82	V max = 30 V I max = 110 mA C <sub>i</sub> = 4.2 nF L <sub>i</sub> = 0 uH
Terminals 83 / 84	V max = 30 V I max = 90 mA C <sub>i</sub> = 4.2 nF L <sub>i</sub> = 0 uH
Terminals 31 / 32	V max = 30 V I max = 110 mA C <sub>i</sub> = 6.6 nF L <sub>i</sub> = 0 uH
Terminals 41 / 42 and 51 / 52	V max = 30 V I max = 96 mA C <sub>i</sub> = 3.7 nF L <sub>i</sub> = 0 uH
Terminals Limit2 41 / 42 and Limit1 51 / 52	V max = 15.5 V I max = 52 mA C <sub>i</sub> = 20 nF L <sub>i</sub> = 30 uH

When installed per installation Drawing No 901064	
Temperature Code	T4
Max. Ambient	85 Deg C



### IMPORTANT (NOTE)

- The "x" in P/N denotes minor mechanical variations or optional features.
- Do not use the local communication interface (LKS) in hazardous areas.
- Each pair of conductors for each intrinsic safety circuit must be shielded.

**7.1.4 CSA Certification Record**

Certificate:  
Class 2258 04

1649904 (LR 20312)  
PROCESS CONTROL EQUIPMENT –  
Intrinsically Safe, Entity – For Hazardous  
Locations

Class I, Div 1, Groups A, B, C and D;  
Class II, Div 1, Groups E, F, and G,  
Class III, Div 1, Enclosure Type 4X:

<b>Model TZIDC, P/N V18345-x0x2x2xx0x Intelligent Positioner</b>	
Input rated	30 V DC; max.4 ... 20 mA
Output pressure	Max. 90 psi
Intrinsically safe with entity parameters of:	
Terminals 11 / 12	V max = 30 V I max = 104 mA C <sub>i</sub> = 6.6 nF L <sub>i</sub> = 0 uH
Terminals 81 / 82	V max = 30 V I max = 110 mA C <sub>i</sub> = 3.7 nF L <sub>i</sub> = 0 uH
Terminals 83 / 84	V max = 30 V I max = 96 mA C <sub>i</sub> = 3.7 nF L <sub>i</sub> = 0 uH
Terminals 31 / 32	V max = 30 V I max = 110 mA C <sub>i</sub> = 6.6 nF L <sub>i</sub> = 0 uH
Terminals 41 / 42 and 51 / 52	V max = 30 V I max = 96 mA C <sub>i</sub> = 3.7 nF L <sub>i</sub> = 0 uH
Terminals Limit2 41 / 42 and Limit1 51 / 52	V max = 15.5 V I max = 52 mA C <sub>i</sub> = 20 nF L <sub>i</sub> = 30 uH

When installed per installation Drawing No 901064	
Temperature Code	T4
Max. Ambient	85 Deg C



**IMPORTANT (NOTE)**

- The "x" in P/N denotes minor mechanical variations or optional features.
- Do not use the local communication interface (LKS) in hazardous areas.
- Each pair of conductors for each intrinsic safety circuit must be shielded.

### 7.1.5 FM Approvals

TZIDC Positioner, Model V18345-a0b2c2de0f

IS/I,II,III/1/ABCDEFG/T4 Ta = 85 °C – 901064/7/4; Enity; NI/I/2/ABCD/T4 Ta = 85 °C;

S/II,III/2/FG/T4 Ta =85 °C; Type 4XMax Enity Parameters: Per Control Drawings

a = Case/mounting – 1, 2, 3, 4 or 9

b = Input/communication port – 1 or 2

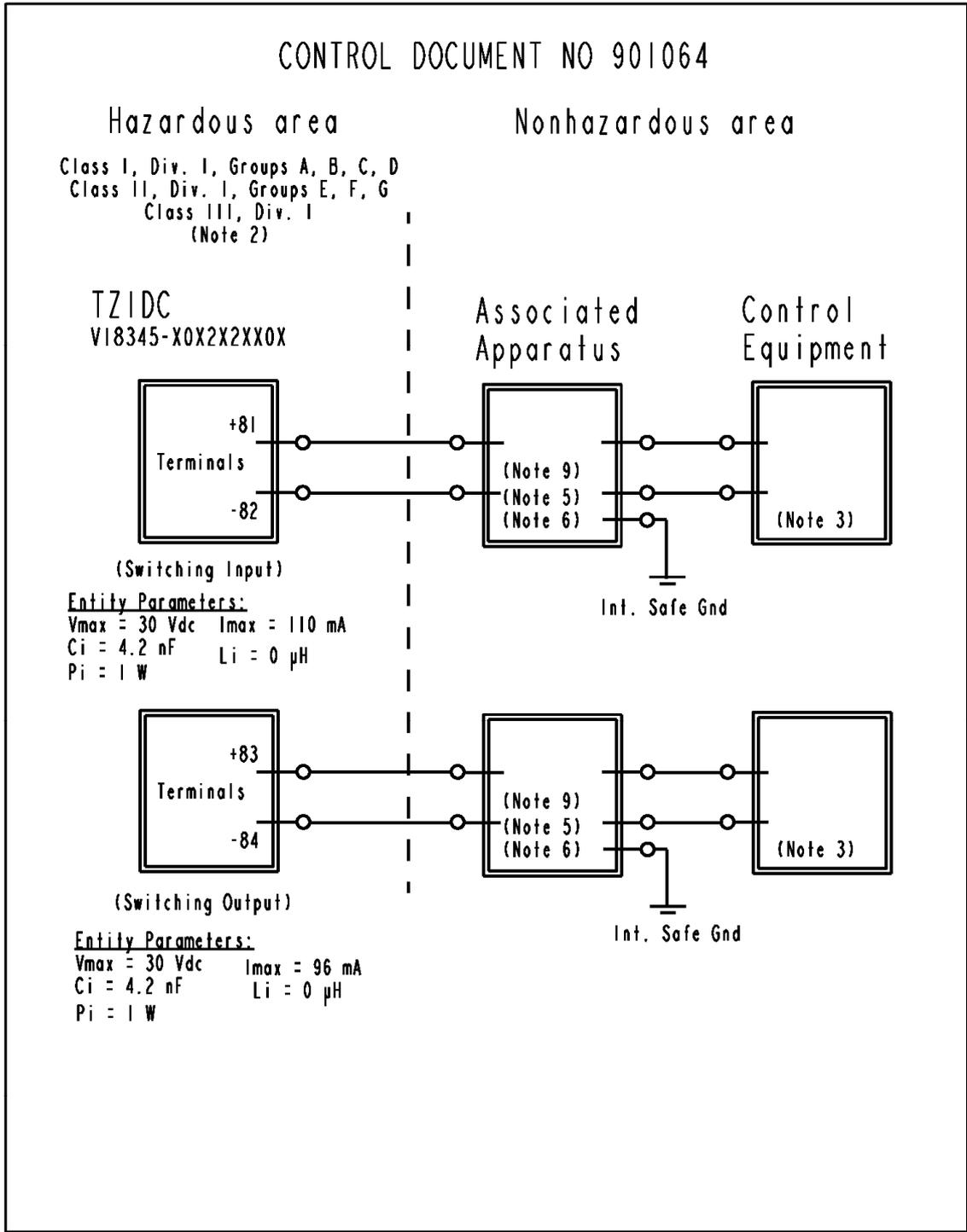
c = Output/safe protection – 1, 2, 4 or 5

d = Option modules for analog or digital position feedback – 0, 1, 3 or 5

e = Mechanical kit (proximity swiches) for digital position feedback (option) – 0, 1 or 3

f = Design (varnish/coding) – 1 or 2

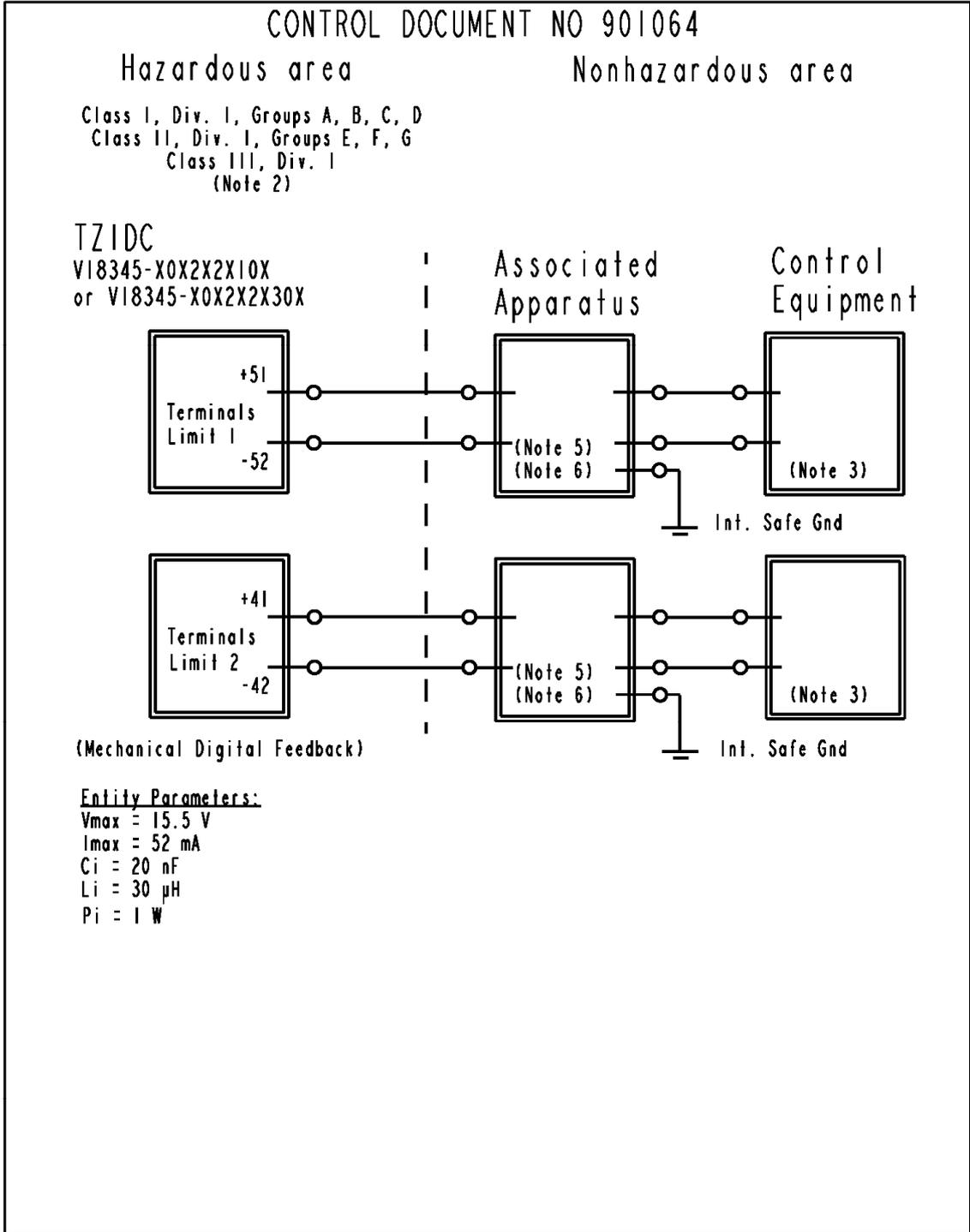




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				All Dimensions in mm		Title <b>CONTROL DOCUMENT</b>	Scale
				Date	Name		
				Drawn 08-Apr-99	Lasarzik		
				Checked			
<b>ABB</b>				<b>ABB Automation</b>		Drawing No. (Part No) <b>901064</b>	Sheet <b>2 / 4</b>
10	-	05.10.09	Lasarzik			Replacement for: -	Category: -
Rev.	Amendment	Date	Name				





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				All Dimensions in mm		Title <b>CONTROL DOCUMENT</b>	Scale
				Date	Name		
				Drawn 08-Apr-99	Lasarzik		
				Checked			
						Drawing No. (Part No) <b>901064</b>	Sheet <b>4 / 4</b>
10	-	05.10.09	Lasarzik	<b>ABB Automation</b>		Replacement for: -	Category: -
Rev.	Amendment	Date	Name				

**7.2 TZIDC-110**

**7.2.1 ATEX**

Designation: II 2 G Ex ia IIC T6 resp. T4 Gb  
 II 2 G Ex ib IIC T6 resp. T4 Gb  
 II 3 G Ex ic IIC T6 resp. T4 Gc  
 Type-Examination Test Certificate: TÜV 02 ATEX 1831 X  
 Type: Intrinsically safe equipment  
 Standards: EN 60079-0:2009  
 EN 60079-11:2007  
 EN 60079-27:2008

Temperature class	Ambient temperature range
T4	-40 ... 85 °C
T5	-40 ... 55 °C
T6	-40 ... 40 °C

**Electrical data**

Signal circuit (Terminal +11 / -12 or + / -)	With intrinsic safety type of protection Ex i IIC, only to be connected to a certified FISCO power supply unit or a barrier, i.e., a power supply unit with maximum values according to the following table:	
<b>ia / ib / ic</b>	<b>FISCO Field Device ia/ib/ic for Grp. IIB/IIC</b>	<b>Barriers or power supply ia/ib for Grp. IIB/IIC</b>
Voltage		24 V
Current		250 mA
Power		1.2 W
Characteristic curve		Linear

$L_i < 10\mu\text{H}$   
 $C_i < 5\text{nF}$

	With intrinsic safety type of protection Ex i IIC, only to be connected to a certified intrinsically-safe circuit with max. values
Shutdown contact input (Terminal +85 / -86)	$U_i = 30\text{ V}$ $C_i = 3.7\text{ nF}$ $L_i$ negligibly small
Mechanical digital feedback (Terminals Limit1 +51 / -52 or Limit2 +41 / -42)	For max. values, see EC-type-examination test certificate number PTB 00 ATEX 2049 X

Designation: II 3 G Ex nA II T6 resp. T4 Gc  
 Declaration of conformity: TÜV 02 ATEX 1943 X  
 Type: Type of protection "n"  
 Device class: II 3 G  
 Standards: EN 60079-15:2010  
 EN 60079-0:2009

II 3 G Temperature class	Ta Ambient temperature range
T4	-40 ... 85 °C
T5	-40 ... 65 °C
T6	-40 ... 50 °C

**Electrical data**

II 3 G Ex nA IIC T6 or T4 Gc	
Signal circuit (Terminal +11 / -12)	U = 9 ... 32 V DC I = 11.5 mA
Mechanical digital feedback (Terminals Limit1 +51 / -52 or Limit2 +41 / -42)	U = 5 ... 11 V DC
Plug-in module for shutdown contact input (Terminal +51 / -52 or +85 / -86)	U = 20 ... 30 V DC

**i****IMPORTANT (NOTE)**

- Devices may only be connected to circuits in zone 2 if they are suitable for operation in zone 2 potentially explosive atmospheres and for the conditions prevailing at the installation location (manufacturer's declaration or certificate from an inspection authority).
- For the "digital feedback with proximity switches" circuit, external measures must be implemented to prevent the rated voltage being exceeded by more than 40 % in the event of transient disturbances.
- It is only permissible to connect, disconnect, and switch live circuits during installation or maintenance, or for the purpose of carrying out repairs. Comment: It is considered very unlikely that a potentially explosive atmosphere would be present in zone 2 at the same time that installation or maintenance/repair work was being carried out.
- Only non-flammable gases may be used for the pneumatic auxiliary power.
- Only suitable cable entries which meet the requirements of IEC 60079-15 are allowed to be used.
- If the SJ2\_S1N (NO) proximity switch is used, the positioner may only be operated with an ambient temperature range from -25 ... 85 °C.

**7.2.2 IECEx**

Designation: Ex ia IIC T6 resp. T4 Gb  
 Ex ib IIC T6 resp. T4 Gb  
 Ex ic IIC T6 resp. T4 Gc  
 Ex nA IIC T6 resp. T4 Gc

Certificate No.: IECEx TUN 04.0015X

Issue No.: 5

Typ: Intrinsic safety "i", or Type of protection "n"

Standards: IEC 60079-0:2011  
 IEC 60079-11:2011  
 IEC 60079-15:2010

Type and marking	TZIDC-110 Ex i IIC	TZIDC-110 Ex nA IIC
<b>Temperature class</b>	<b>Ambient temperature range</b>	
T4	-40 ... 85 °C	-40 ... 85 °C
T5	-40 ... 55 °C	-40 ... 65 °C
T6	-40 ... 40 °C	-40 ... 50 °C

**Electrical data for type TZIDC-110 with marking Ex i IIC T6 resp. T4 Gb**

Input circuit (terminals +11, -12 or +, -)		In type of protection "Intrinsic Safety" only for the connection to a certified FISCO power supply or a barrier resp. power supply with the following maximum values according to the following table:
<b>ia / ib / ic</b>	<b>FISCO Field Device ia/ib/ic for group IIB/IIC</b>	<b>Barriere or power supply ia/ib for group IIB/IIC</b>
Voltage		$U_i = 24 \text{ V}$
Current		$I_i = 250 \text{ mA}$
Power		$P_i = 1.2 \text{ W}$
Characteristic line		linear

**Optionally the following modules are allowed to be used:**

	In type of protection "Intrinsic Safety" (Ex ia IIC resp. Ex ib IIC) only for the connection to a certified intrinsically safe circuit with the following maximum values:
Plug-In module for shutdown-function (terminals +51 / -52 resp. +85 / -86)	$U_i = 30 \text{ V}$ $I_i = 320 \text{ mA}$ $P_i = 1.1 \text{ W}$ effective internal capacitance: $C_i = 3.7 \text{ nF}$ The effective internal inductance is negligibly small.

<b>Electrical data for type TZIDC-110 with marking Ex nA IIC T6 resp. T4</b>	
Input circuit (terminals +11 / -12)	$U = 9 \dots 32 \text{ VDC}; 10.5 \text{ mA}$
Plug-In module for shutdown-function (terminals +51 / -52 resp. +85 / -86)	$U = 20 \dots 30 \text{ VDC}$
Mechanical digital feedback (terminals Limit1 +51 / -52 resp. Limit2 +41 / -42)	$U = 5 \dots 11 \text{ VDC}$

**Special conditions**

Only devices which are suitable for the operation in explosive hazardous areas declared as zone 2 and the conditions available at the place of operation are allowed to be connected to circuits in the zone 2.

The connecting and disconnecting as well as the switching of circuits under voltage are permitted during installation, for maintenance or repair purposes.

Note: The temporal coincidence of explosion hazardous atmosphere and installation, maintenance resp. repair purposes is assessed as improbably.

For the circuit "Mechanical digital feedback" measures have to be taken outside the device that the rated voltage exceeded not more than 40 % by transient disturbances.

Special conditions

When using proximity switch SJ2\_S1N (NO), the positioner may only be used at an ambient temperature range of  $-25 \dots 85 \text{ }^\circ\text{C}$ .

Only non combustible gases are allowed to be used as pneumatic auxiliary energy.

Only suitable cable entries which meet the requirements of IEC 60079-15 are allowed to be used.

**7.2.3 CSA International**

Certificate:	1649904 (LR 20312)
Class 2258 04	PROCESS CONTROL EQUIPMENT – Intrinsically Safe, Entity – For Hazardous Locations
Class 2258 02	PROCESS CONTROL EQUIPMENT – For Hazardous Locations

Class I, Div 2, Groups A, B, C and D;  
 Class II, Div 2, Groups E, F, and G,  
 Class III, Enclosure Type 4X:

<b>Model TZIDC-110, P/N V18346-x032x2xx0x Intelligent Positioner</b>	
Input rated	32 V DC; max. 15 mA (powered by a SELV circuit)
Intrinsically safe with entity parameters of:	
Terminals 11 / 12	V max = 24 V I max = 250 mA C <sub>i</sub> = 2.8 nF L <sub>i</sub> = 7.2 uH
Terminals 85 / 86	U max = 30 V I max = 50 mA C <sub>i</sub> = 3.8 nF L <sub>i</sub> = 0 uH
Terminals 41 / 42	U max = 16 V I max = 20 mA C <sub>i</sub> = 60 nF L <sub>i</sub> = 100 uH
Terminals 51 / 52	U max = 16 V I max = 20 mA C <sub>i</sub> = 60 nF L <sub>i</sub> = 100 uH

When installed per installation Drawing No 901265	
Temperature Code	T4
Max. Ambient	85 Deg C



**IMPORTANT (NOTE)**

- The "x" in P/N denotes minor mechanical variations or optional features.
- Do not use the local communication interface (LKS) in hazardous areas.
- Each pair of conductors for each intrinsic safety circuit must be shielded.

7.2.4 CSA Certification Record

Certificate: Class 2258 04	1649904 (LR 20312) PROCESS CONTROL EQUIPMENT – Intrinsically Safe, Entity – For Hazardous Locations
-------------------------------	--

Class I, Div 1, Groups A, B, C and D;  
 Class II, Div 1, Groups E, F, and G,  
 Class III, Div 1, Enclosure Type 4X:

Model TZIDC-110, P/N V18346-x032x2xx0x Intelligent Positioner	
Input rated	32 V DC; max. 15 mA (powered by a SELV Circuit)
Intrinsically safe with entity parameters of:	
Terminals 11 / 12	V max = 24 V I max = 250 mA C <sub>i</sub> = 2.8 nF L <sub>i</sub> = 7.2 uH
Terminals 85 / 86	U max = 30 V I max = 50 mA C <sub>i</sub> = 3.8 nF L <sub>i</sub> = 0 uH
Terminals 41 / 42	U max = 16 V I max = 20 mA C <sub>i</sub> = 60 nF L <sub>i</sub> = 100 uH

When installed per installation Drawing No 901265	
Temperature Code	T4
Max. Ambient	85 Deg C



**Notice**

- The "x" in P/N denotes minor mechanical variations or optional features.
- Do not use the local communication interface (LKS) in hazardous areas.
- Each pair of conductors for each intrinsic safety circuit must be shielded.

**7.2.5 FM Approvals**

TZIDC-110 Positioner, Model V18346-a032b2cd0e

IS/I,II,III/1/ABCDEFG/T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C-901265 Entity, FISCO

Entity and FISCO Parameters							
Terminals	Type	Groups	Parameters				
			Vmax	I <sub>max</sub>	P <sub>i</sub>	C <sub>i</sub>	L <sub>i</sub>
+11 / -12	Entity	A-G	24 V	250 mA	1.2 W	2.8 nF	7.2 uH
+11 / -12	FISCO	A-G	17.5 V	360 mA	2.52 W	2.8 nF	7.2 uH
+11 / -12	FISCO	C-G	17.5 V	380 mA	5.32 W	2.8 nF	7.2 uH
+51 / -52	Entity	A-G	16 V	20 mA	-	60 nF	100 uH
+41 / -42	Entity	A-G	16 V	20 mA	-	60 nF	100 uH
+85 / -86	Entity	A-G	30 V	-	-	3.7 nF	< 1 uH

NI/II/2/ABCD/T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C

S/II,III/2/EFG//T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C

Enclosure type 4x

a = Case/mounting – 1, 2, 5 or 6

b = Output/safe protection – 1, 2, 4 or 5

c = Option modules (shutdown) – 0 or 4

d = Optional mechanical kit for digital position feedback – 0, 1 or 3

e = Design (varnish/coding) – 1 or E

Equipment Ratings:

TZIDC-110

Intrinsically safe, Entity and FISCO, for Class I, II and III, Division 1,

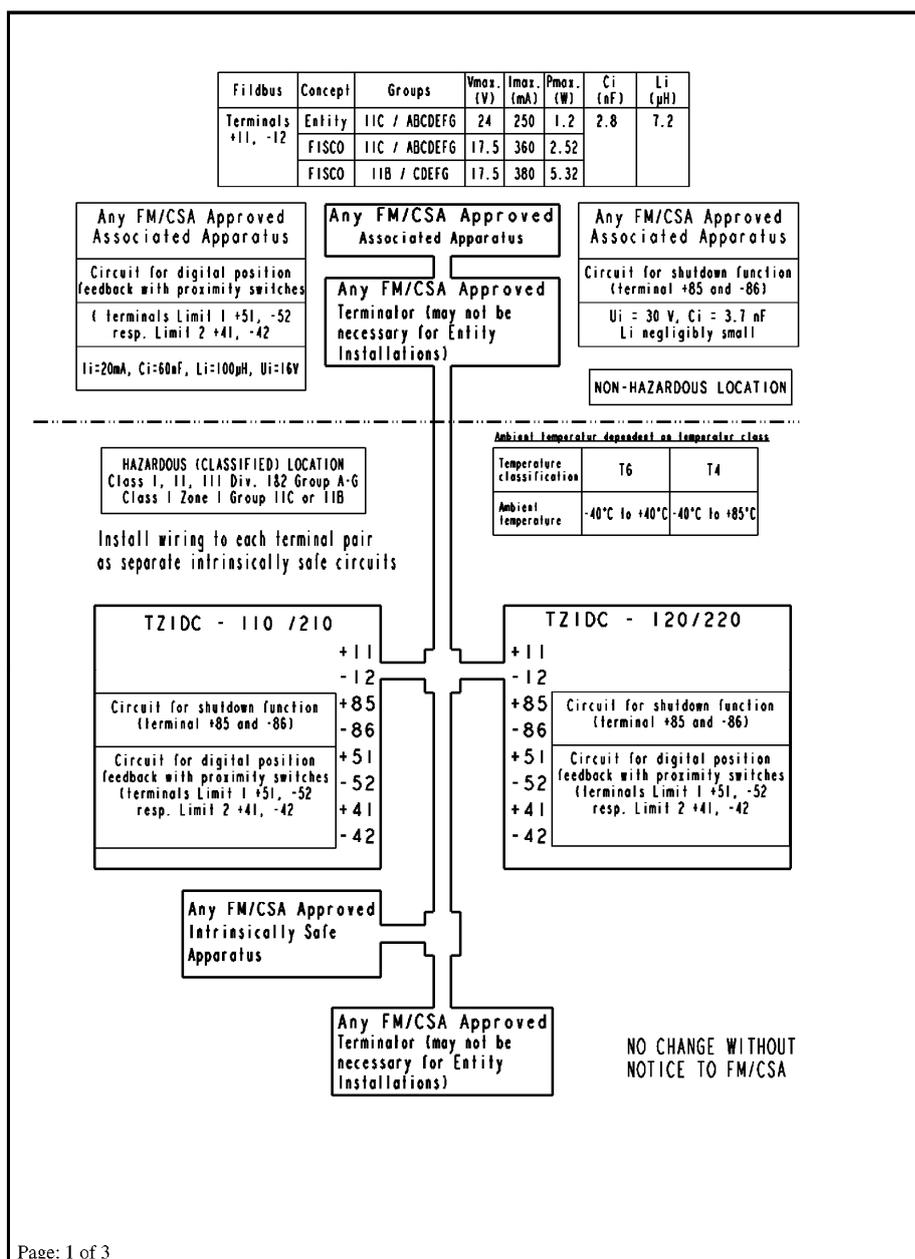
Applicable Groups A, B, C, D, E, F, G; nonincendive for Class I, Division 2,

Group E, F and G hazardous (classified) indoor and outdoor NEMA 4x locations.

The following temperature code ratings were assigned for the equipment and protection methods described above:
T6 in ambient temperatures of 40 °C
T5 in ambient temperatures of 55 °C
T4 in ambient temperatures of 85 °C

# Ex relevant specifications

## 7.2.6 FM Control Document



Page: 1 of 3

Rev.	Chang	Date	Name	2003	Date	Name	Title	Scale
-	-						FM/CSA-Control-Document	/
				Name	27.03.03	Thiem.		
				Appr.				
				Std.				
3	Rev.2	26.06.06	Thie.	 <b>Automation Products</b>			Drwg.-No. (Part-No.)	
2	Rev.1	22.05.06	Thie.				<b>901265</b>	
1	Rev.0	27.03.	Thie.					
Rev.	Chang	Date	Name				Supersedes Dwg. :	Part Class:

Page: 2 of 3									
<b>FM/CSA-CONTROL-DOCUMENT_901265</b>									
<b>FISCO rules</b>									
<p>The FISCO Concept allows the interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criterion for such interconnection is that the voltage (<math>V_{max}</math>), the current (<math>I_{max}</math>) and the power (<math>P_i</math>) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (<math>U_o, V_o, V_t</math>), the current (<math>I_o, I_{sc}, I_t</math>) and the power (<math>P_o</math>) which can be provided by the associated apparatus (supply unit). In addition, the maximum unprotected residual capacitance (<math>C_i</math>) and inductance (<math>L_i</math>) of each apparatus (other than the terminators) connected to the Fieldbus must be less than or equal to 5nF and 10 <math>\mu</math>H respectively.</p> <p>In each I.S. Fieldbus segment only one active source, normally the associated apparatus, is allowed to provide the necessary power for the Fieldbus system. The allowed voltage (<math>U_o, V_o, V_t</math>) of the associated apparatus used to supply the bus must be limited to the range of 14V d.c. to 24V d.c. All other equipment connected to the bus cable has to be passive, meaning that the apparatus is not allowed to provide energy to the system, except to a leakage current of 50 <math>\mu</math>A for each connected device. Separately powered equipment needs a galvanic Isolation to insure that the intrinsically safe Fieldbus circuit remains passive.</p> <p>The cable used to interconnect the devices needs to comply with the following parameters:</p> <p>Loop resistance <math>R'</math>: 15...150 <math>\Omega</math>/km          Inductance per unit length <math>L'</math>: 0.4...1mH/km          Capacitance per unit length <math>C'</math>: 80...200 nF / km  <math>C' = C'</math> line/line + 0.5<math>C'</math> line/screen, if both lines are floating          or  <math>C' = C'</math> line/line + <math>C'</math> Line/screen, if the screen is connected to one line          Length of spur cable: max. 30m          Length of trunk cable: max. 1km          Length of splice: max. 1m</p> <p><b>Terminators</b>          At each end of the trunk cable an approved line terminator with the following parameters is suitable:  <math>R = 90...100 \Omega</math>  <math>C = 0...2.2 \mu F</math></p> <p><b>System evaluation</b>          The number of passive devices like transmitters, actuators, connected to a single bus segment is not limited due to I.S. Reasons. Furthermore, if the above rules are respected, the inductance and capacitance of the cable need not to be considered and will not impair the intrinsic safety of the installation.</p>									
-	-			2003	Date	Name	Title	Scale	
					Name	27.03.03	Thiem.	FM/CSA-Control-Document	
					Appr.			/	
					Std.				
3	Rev.2	26.06.06	Thie.	<b>ABB</b>				Drwg.-No. (Part-No.)	
2	Rev.1	22.05.06	Thie.	<b>Automation Products</b>				<b>901265</b>	
1	Rev.0	27.03.	Thie.						
Rev.	Chang	Date	Name					Supersedes Dwg. :	Part Class:

Page: 3 of 3										
<b>FM/CSA-CONTROL-DOCUMENT_901265</b>										
<p>Installation Notes For FISCO and Entity Concepts:</p> <ol style="list-style-type: none"> <li>1. The Intrinsic Safety Entity concept allows the interconnection of FM/CSA Approved Intrinsically safe devices with entity parameters not specifically examined in combination as a system when:  <math>U_o</math> or <math>V_{oc}</math> or <math>V_t \leq V_{max}</math>, <math>I_o</math> or <math>I_{sc}</math> or <math>I_t \leq I_{max}</math>, <math>P_o \leq P_i</math>. <math>C_a</math> or <math>C_o \geq \sum C_i + \sum C_{cable}</math>.                      For inductance use either <math>L_a</math> or <math>L_o \geq \sum L_i + \sum L_{cable}</math> or <math>L_c / R_c \leq (L_a / R_a \text{ or } L_o / R_o)</math> and <math>L_i / R_i \leq (L_a / R_a \text{ or } L_o / R_o)</math></li> <li>2. The Intrinsic Safety FISCO concept allows the interconnecting of FM/CSA Approved Intrinsically safe devices with FISCO parameters not specifically examine in combination as a system when: <math>U_o</math> or <math>V_{oc}</math> or <math>V_t \leq V_{max}</math>, <math>I_o</math> or <math>I_{sc}</math> or <math>I_t \leq I_{max}</math>, <math>P_o \leq P_i</math>.</li> <li>3. Control equipment connected to the Associated Apparatus must not use or generate more than 250 <math>V_{rms}</math> or <math>V_{dc}</math>.</li> <li>4. Installation should be in accordance with ANSI/ISA RP12.6 (except chapter 5 for FISCO Installations) "Installation of Intrinsically Safe System for Hazardous (Classified) Locations" and the National Electrical Code® (ANSI/NFPA 70) Sections 504 and 505.</li> <li>5. The configuration of associated Apparatus must be Factory Mutual Research /Canadian Standards Association Approved under the associated concept.</li> <li>6. Associated Apparatus manufacturer's installation drawing must be followed when installing this equipment.</li> <li>7. No revision to drawing without prior Factory Mutual Research Approval/Canadian Standards Association.</li> <li>8. Special conditions for safe use                      The operation of the local communication interface (LKS) and of the programming interface (X5) is only allowed outside of the Hazardous explosive area.</li> </ol> <p>NONINCENDIVE, CLASS I, DIV. 2, GROUP A, B, C, D, AND FOR CLASS II AND III, DIV. 1&amp;2, GROUP E, F, G                      HAZARDOUS LOCATION INSTALLATION.</p> <ol style="list-style-type: none"> <li>1. Install per National Electrical Code (NEC) using threaded metal conduit. Intrinsic safety barrier required. Max. Supply voltage 30 V. For T-code see table.</li> <li>2. A dust tight seal must be used at the conduit entry when the positioner is used in a Class II &amp; III Location.</li> <li>3. <b>WARNING:</b> Explosion Hazard – do not disconnect equipment unless power has been switched off or the area is known to be Non-Hazardous.  <b>WARNING:</b> Substitution of components may impair suitability for hazardous locations.</li> </ol>										
-	-									
				2003	Date	Name	Title	Scale		
				Name	27.03.03	Thiem.	FM/CSA-Control-Document	/		
				Appr.						
				Std.						
3	Rev.2	26.06.06	Thie.	<b>ABB</b>			Drwg.-No. (Part-No.)			
2	Rev.1	22.05.06	Thie.	Automation Products			<b>901265</b>			
1	Rev.0	27.03.	Thie.							
Rev.	Chang	Date	Name				Supersedes Dwg. :	Part Class:		

**7.3 TZIDC-120**

**7.3.1 ATEX**

Designation: II 2 G Ex ia IIC T6 resp. T4 Gb  
 II 2 G Ex ib IIC T6 resp. T4 Gb  
 II 3 G Ex ic IIC T6 resp. T4 Gc  
 Type-Examination Test Certificate: TÜV 02 ATEX 1834 X  
 Type: Intrinsically safe equipment  
 Standards: EN 60079-0:2009  
 EN 60079-11:2007  
 EN 60079-27:2008

Temperature class	Ambient temperature range
T4	-40 ... 85 °C
T5	-40 ... 55 °C
T6	-40 ... 40 °C

**Electrical data**

Signal circuit (Terminal +11 / -12 or + / -)	With intrinsic safety type of protection Ex i IIC, only to be connected to a certified FISCO power supply unit or a barrier, i.e., a power supply unit with maximum values according to the following table:	
<b>ia / ib / ic</b>	<b>FISCO Field Device ia/ib/ic for Grp. IIB/IIC</b>	<b>Barriers or power supply ia/ib for Grp. IIB/IIC</b>
Voltage		24 V
Current		250 mA
Power		1.2 W
Characteristic curve		Linear

$L_i < 10\mu\text{H}$   
 $C_i < 5\text{nF}$

	In Intrinsic Safety types of protection Ex ia IIC or Ex ib IIC, only for connection to a certified intrinsically-safe circuit with max. values
Shutdown contact input (Terminal +85 / -86)	$U_i = 30\text{ V}$ $C_i = 3.7\text{ nF}$ $L_i$ negligibly small
Mechanical digital feedback (Terminals Limit1 +51 / -52 or Limit2 +41 / -42)	For max. values, see EC-type-examination test certificate number PTB 00 ATEX 2049 X

Designation: II 3 G Ex nA IIC T6 resp. T4 Gc  
 Declaration of conformity: TÜV 02 ATEX 1943 X  
 Type: Type of protection "n"  
 Device class: II 3 G  
 Standards: EN 60079-15:2010  
 EN 60079-0:2009

II 3 G Temperature class	Ta Ambient temperature range
T4	-40 ... 85 °C
T5	-40 ... 65 °C
T6	-40 ... 50 °C

**Electrical data**

II 3 G Ex nA IIC T6 or T4 Gc	
Signal circuit (Terminal +11 / -12)	U = 9 ... 32 V DC I = 11.5 mA
Mechanical digital feedback (Terminals Limit1 +51 / -52 or Limit2 +41 / -42)	U = 5 ... 11 V DC
Plug-in module for shutdown contact input (Terminal +51 / -52 or +85 / -86)	U = 20 ... 30 V DC

**i**

**IMPORTANT (NOTE)**

- Devices may only be connected to circuits in zone 2 if they are suitable for operation in zone 2 potentially explosive atmospheres and for the conditions prevailing at the installation location (manufacturer's declaration or certificate from an inspection authority).
- For the "digital feedback with proximity switches" circuit, external measures must be implemented to prevent the rated voltage being exceeded by more than 40 % in the event of transient disturbances.
- It is only permissible to connect, disconnect, and switch live circuits during installation or maintenance, or for the purpose of carrying out repairs. Comment: It is considered very unlikely that a potentially explosive atmosphere would be present in zone 2 at the same time that installation or maintenance/repair work was being carried out.
- Only non-flammable gases may be used for the pneumatic auxiliary power.
- Only suitable cable entries which meet the requirements of IEC 60079-15 are allowed to be used.
- If the SJ2\_S1N (NO) proximity switch is used, the positioner may only be operated with an ambient temperature range from -25 ... 85 °C.

**7.3.2 IECEx**

Marking: Ex ia IIC T6 resp. T4 Gb  
 Ex ib IIC T6 resp. T4 Gb  
 Ex ic IIC T6 resp. T4 Gc  
 Ex nA IIC T6 resp. T4 Gc

Certificate No.: IECEx TUN 04.0015X  
 Issue No.: 5  
 Typ: Intrinsic safety "i", Type of protection "n"  
 Standards: IEC 60079-0:2011  
 IEC 60079-11:2011  
 IEC 60079-15:2010

Type and marking	TZIDC-120 Ex i IIC	TZIDC-120 Ex nA IIC
<b>Temperature class</b>	<b>Ambient temperature range</b>	
T4	-40 ... 85 °C	-40 ... 85 °C
T5	-40 ... 55 °C	-40 ... 65 °C
T6	-40 ... 40 °C	-40 ... 50 °C

**Electrical data for type TZIDC-120 with marking Ex ia IIC T6 resp. Ex ib IIC T6**

Input circuit (terminals +11 / -12 or (+ / -))		In type of protection "Intrinsic Safety" only for the connection to a certified FISCO power supply or a barrier resp. power supply with the following maximum values according to the following table:
<b>ia / ib / ic</b>	<b>FISCO Field Device ia/ib/ic for group IIB/IIC</b>	<b>Barrier or power supply ia/ib for group IIB/IIC</b>
Voltage		U <sub>i</sub> = 24 V
Current		I <sub>i</sub> = 250 mA
Power		P <sub>i</sub> = 1.2 W
Characteristic line		linear

**Optionally the following modules are allowed to be used:**

	In type of protection "Intrinsic Safety" (Ex ia IIC resp. Ex ib IIC) only for the connection to a certified intrinsically safe circuit with the following maximum values:
Plug-In module for shutdown-function (terminals +51 / -52 resp. +85 / -86)	U <sub>i</sub> = 30 V I <sub>i</sub> = 320 mA P <sub>i</sub> = 1.1 W effective internal capacitance: C <sub>i</sub> = 3.7 nF The effective internal inductance is negligibly small.

Electrical data for type TZIDC-120 with marking Ex nA IIC T6 resp. T4	
Input circuit (terminals +11 / -12)	U = 9 ... 32 VDC; 11.5 mA
Plug-In module for shutdown-function (terminals +51 / -52 resp. +85 / -86)	U = 20 ... 30 VDC
Mechanical digital feedback (terminals Limit1 +51 / -52 resp. Limit2 +41 / -42)	U = 5 ... 11 VDC

### Special conditions

Devices may only be connected to circuits in zone 2 if they are suitable for operation in zone 2 potentially explosive atmospheres and for the conditions prevailing at the installation location.

It is only permissible to connect, disconnect, and switch live circuits during installation or maintenance, or for the purpose of carrying out repairs.

Comment: It is considered very unlikely that a potentially explosive atmosphere would be present in zone 2 at the same time that installation or maintenance/repair work was being carried out.

For the "digital feedback with proximity switches" circuit, external measures must be implemented to prevent the rated voltage being exceeded by more than 40 % in the event of transient disturbances.

If the SJ2\_S1N (NO) proximity switch is used, the positioner may only be operated with an ambient temperature range from -25 ... 85°C.

Only non-flammable gases may be used for the pneumatic auxiliary power.

Only suitable cable entries which meet the requirements of IEC 60079-15 are allowed to be used.

**7.3.3 CSA International**

Certificate:	1649904 (LR 20312)
Class 2258 04	PROCESS CONTROL EQUIPMENT – Intrinsically Safe, Entity – For Hazardous Locations
Class 2258 02	PROCESS CONTROL EQUIPMENT – For Hazardous Locations

Class I, Div 2, Groups A, B, C and D;  
 Class II, Div 2, Groups E, F, and G,  
 Class III, Enclosure Type 4X:

<b>Model TZIDC-120, P/N V18347-x042x2xx0x Intelligent Positioner</b>	
Input rated	32 V DC; max.15 mA (powered by a SELV circuit)
Intrinsically safe with entity parameters of:	
Terminals 11 / 12	V max = 24 V I max = 250 mA C <sub>i</sub> = 2.8 nF L <sub>i</sub> = 7.2 uH
Terminals 85 / 86	U max = 30 V I max = 50 mA C <sub>i</sub> = 3.8 nF L <sub>i</sub> = 0 uH
Terminals 41 / 42	U max = 16 V I max = 20 mA C <sub>i</sub> = 60 nF L <sub>i</sub> = 100 uH
Terminals 51 / 52	U max = 16 V I max = 20 mA C <sub>i</sub> = 60 nF L <sub>i</sub> = 100 uH

When installed per installation Drawing No 901265	
Temperature Code	T4
Max. Ambient	85 Deg C



**IMPORTANT (NOTE)**

- The "x" in P/N denotes minor mechanical variations or optional features.
- Do not use the local communication interface (LKS) in hazardous areas.
- Each pair of conductors for each intrinsic safety circuit must be shielded.

7.3.4 CSA Certification Record

Certificate: Class 2258 04	1649904 (LR 20312) PROCESS CONTROL EQUIPMENT – Intrinsically Safe, Entity – For Hazardous Locations
-------------------------------	--

Class I, Div 1, Groups A, B, C and D;  
 Class II, Div 1, Groups E, F, and G,  
 Class III, Div 1, Enclosure Type 4X:

Model TZIDC-120, P/N V18347-x042x2xx0x Intelligent Positioner	
Input rated	32 V DC; max. 15 mA (powered by a SELV Circuit)
Intrinsically safe with entity parameters of:	
Terminals 11 / 12	V max = 24 V I max = 250 mA C <sub>i</sub> = 2.8 nF L <sub>i</sub> = 7.2 uH
Terminals 85 / 86	U max = 30 V I max = 50 mA C <sub>i</sub> = 3.8 nF L <sub>i</sub> = 0 uH
Terminals 41 / 42	U max = 16 V I max = 20 mA C <sub>i</sub> = 60 nF L <sub>i</sub> = 100 uH

When installed per installation Drawing No 901265	
Temperature Code	T4
Max. Ambient	85 Deg C



**IMPORTANT (NOTE)**

- The "x" in P/N denotes minor mechanical variations or optional features.
- Do not use the local communication interface (LKS) in hazardous areas.
- Each pair of conductors for each intrinsic safety circuit must be shielded.

**7.3.5 FM Approvals**

TZIDC-120 Positioner, Model V18347-a042b2cd0e

IS/I,II,III/1/ABCDEFG/T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C-901265 Entity, FISCO

Entity and FISCO Parameters							
Terminals	Type	Groups	Parameters				
			Vmax	I <sub>max</sub>	Pi	Ci	Li
+11 / -12	Entity	A-G	24 V	250 mA	1.2 W	2.8 nF	7.2 uH
+11 / -12	FISCO	A-G	17.5 V	360 mA	2.52 W	2.8 nF	7.2 uH
+11 / -12	FISCO	C-G	17.5 V	380 mA	5.32 W	2.8 nF	7.2 uH
+51 / -52	Entity	A-G	16 V	20 mA	-	60 nF	100 uH
+41 / -42	Entity	A-G	16 V	20 mA	-	60 nF	100 uH
+85 / -86	Entity	A-G	30 V	-	-	3.7 nF	< 1 uH

NI/II/2/ABCD/T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C

S/II,III/2/EFG//T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C

Enclosure type 4x

a = Case/mounting – 1, 2, 5 or 6

b = Output/safe protection – 1, 2, 4 or 5

c = Option modules (shutdown) – 0 or 4

d = Optional mechanical kit for digital position feedback – 0, 1 or 3

e = Design (varnish/coding) – 1 or E

Equipment Ratings:

TZIDC-120 Positioners

Intrinsically safe, Entity and FISCO, for Class I, II and III, Division 1,

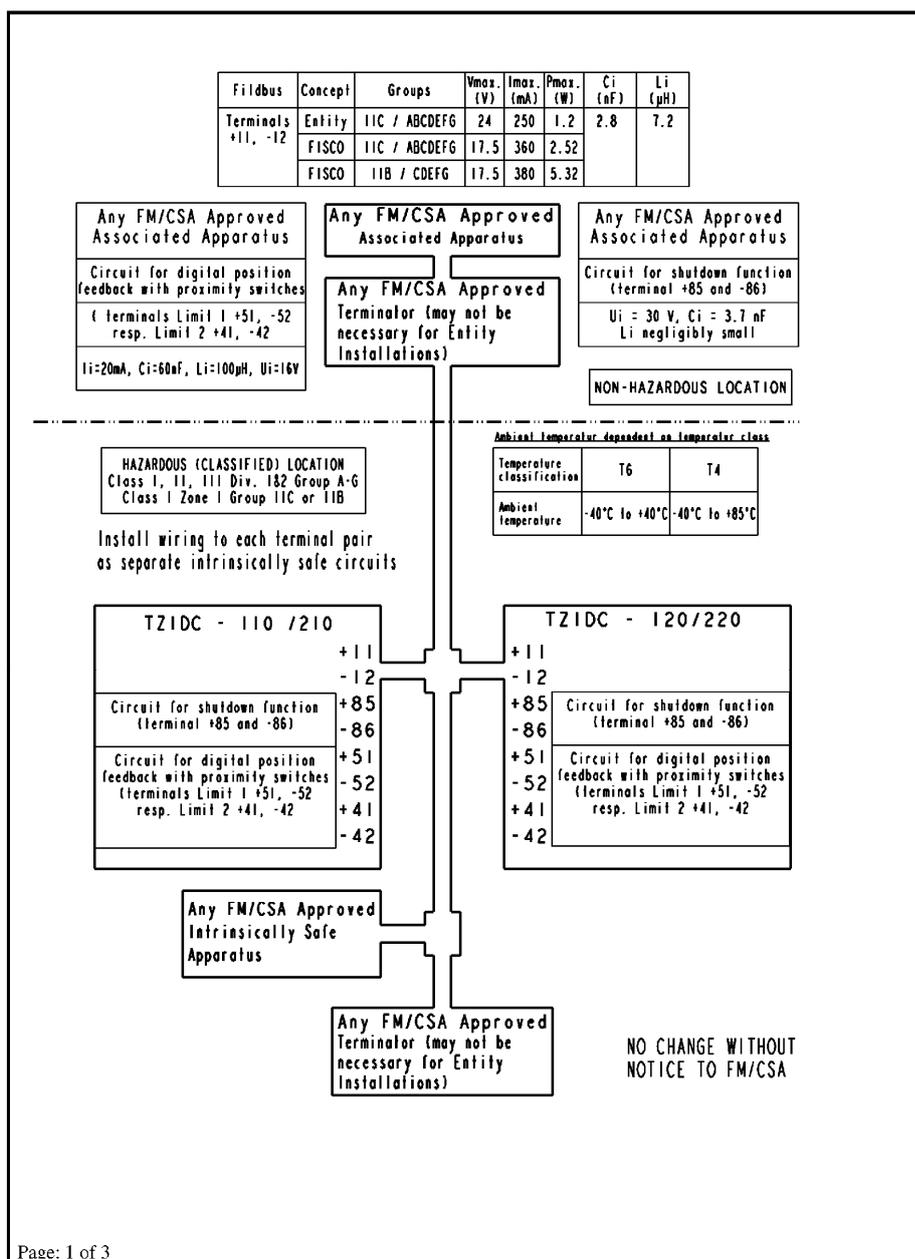
Applicable Groups A, B, C, D, E, F, G; nonincendive for Class I, Division 2,

Group E, F and G hazardous (classified) indoor and outdoor NEMA 4x locations.

The following temperature code ratings were assigned for the equipment and protection methods described above:
T6 in ambient temperatures of 40 °C
T5 in ambient temperatures of 55 °C
T4 in ambient temperatures of 85 °C

# Ex relevant specifications

## 7.3.6 FM Control Document



Page: 1 of 3

Rev.	Chang	Date	Name	2003	Date	Name	Title	Scale
-	-						FM/CSA-Control-Document	/
				Name	27.03.03	Thiem.		
				Appr.				
				Std.				
3	Rev.2	26.06.06	Thie.	<b>ABB</b> Automation Products			Drwg.-No. (Part-No.)	
2	Rev.1	22.05.06	Thie.				<b>901265</b>	
1	Rev.0	27.03.	Thie.					
Rev.	Chang	Date	Name				Supersedes Dwg. :	Part Class:

Page: 2 of 3								
<b>FM/CSA-CONTROL-DOCUMENT_901265</b>								
<b>FISCO rules</b>								
<p>The FISCO Concept allows the interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criterion for such interconnection is that the voltage (<math>V_{max}</math>), the current (<math>I_{max}</math>) and the power (<math>P_i</math>) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (<math>U_o, V_o, V_t</math>), the current (<math>I_o, I_{sc}, I_t</math>) and the power (<math>P_o</math>) which can be provided by the associated apparatus (supply unit). In addition, the maximum unprotected residual capacitance (<math>C_i</math>) and inductance (<math>L_i</math>) of each apparatus (other than the terminators) connected to the Fieldbus must be less than or equal to 5nF and 10 <math>\mu</math>H respectively.</p> <p>In each I.S. Fieldbus segment only one active source, normally the associated apparatus, is allowed to provide the necessary power for the Fieldbus system. The allowed voltage (<math>U_o, V_o, V_t</math>) of the associated apparatus used to supply the bus must be limited to the range of 14V d.c. to 24V d.c. All other equipment connected to the bus cable has to be passive, meaning that the apparatus is not allowed to provide energy to the system, except to a leakage current of 50 <math>\mu</math>A for each connected device. Separately powered equipment needs a galvanic Isolation to insure that the intrinsically safe Fieldbus circuit remains passive.</p> <p>The cable used to interconnect the devices needs to comply with the following parameters:</p> <p>Loop resistance <math>R'</math>: 15...150 <math>\Omega</math>/km          Inductance per unit length <math>L'</math>: 0.4...1mH/km          Capacitance per unit length <math>C'</math>: 80...200 nF / km  <math>C' = C'</math> line/line + 0.5<math>C'</math> line/screen, if both lines are floating          or  <math>C' = C'</math> line/line + <math>C'</math> Line/screen, if the screen is connected to one line          Length of spur cable: max. 30m          Length of trunk cable: max. 1km          Length of splice: max. 1m</p> <p><b>Terminators</b>          At each end of the trunk cable an approved line terminator with the following parameters is suitable:  <math>R = 90...100 \Omega</math>  <math>C = 0...2.2 \mu F</math></p> <p><b>System evaluation</b>          The number of passive devices like transmitters, actuators, connected to a single bus segment is not limited due to I.S. Reasons. Furthermore, if the above rules are respected, the inductance and capacitance of the cable need not to be considered and will not impair the intrinsic safety of the installation.</p>								
-	-			2003	Date	Name	Title	Scale
					27.03.03	Thiem.	FM/CSA-Control-Document	/
					Appr.			
					Std.			
3	Rev.2	26.06.06	Thie.	<b>ABB</b>			Drwg.-No. (Part-No.)	
2	Rev.1	22.05.06	Thie.	Automation Products			<b>901265</b>	
1	Rev.0	27.03.	Thie.					
Rev.	Chang	Date	Name				Supersedes Dwg. :	Part Class:



**8 Appendix**

**8.1 Approvals and certifications**

CE mark		<p>The version of the meter in your possession meets the requirements of the following European directives:</p> <ul style="list-style-type: none"> <li>- EMC directive 2004/108/EC</li> <li>- ATEX directive 94/9/EC</li> </ul>
Explosion Protection	   	<p>Identification for intended use in potentially explosive atmospheres according to:</p> <ul style="list-style-type: none"> <li>- ATEX directive (marking in addition to CE marking)</li> <li>- IEC standards</li> <li>- FM Approvals (US)</li> <li>- CSA International (Canada)</li> </ul>



**IMPORTANT (NOTE)**

All documentation, declarations of conformity and certificates are available in ABB's download area.

[www.abb.com/instrumentation](http://www.abb.com/instrumentation)



## EG-KONFORMITÄTSERKLÄRUNG

EC DECLARATION OF CONFORMITY  
ATTESTATION DE CONFORMITE C.E.

<b>Hersteller:</b>	<b>ABB Automation Products GmbH</b>
<i>Manufacturer / Fabricant:</i>	<b>Minden</b>
<b>Anschrift:</b>	<b>Schillerstraße 72</b>
<i>Address / Adresse:</i>	<b>D-32425 Minden</b>
<b>Produktbezeichnung:</b>	<b>Elektropneumatische Stellungsregler - TZIDC, TZIDC-110, TZIDC-120, TZIDC-200, TZIDC-210, TZIDC-220</b>
<i>Product name:</i>	<i>Electro-Pneumatic Positioners - TZIDC, TZIDC-110, TZIDC-120, TZIDC-200, TZIDC-210, TZIDC-220</i>
<i>Désignation du produit:</i>	<i>Positionneur Electro-Pneumatique - TZIDC, TZIDC-110, TZIDC-120, TZIDC-200, TZIDC-210, TZIDC-220</i>

### Das Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein:

*This product meets the requirements of the following European directives:*

*Les produits répondent aux exigences des Directives C.E. suivantes:*

<b>2004/108/EG</b>	<b>EMV-Richtlinie *</b>
<i>2004/108/EC</i>	<i>Electromagnetic Compatibility Directive *</i>
<i>2004/108/CE</i>	<i>Directives concernant la compatibilité électromagnétique *</i>

### Für Geräte in Ex-Ausführung gemäß Kennzeichnung auf Typschild gilt zusätzlich:

*For products in Ex design according to identification on nameplate the following is additionally applicable:*

*Pour des produits en exécution Ex selon marque sur plaque signalétique le suivant est aussi applicable:*



<b>94/9/EG</b>	<b>ATEX-Richtlinie</b>
<i>94/9/EEC</i>	<i>ATEX Directive</i>
<i>94/9/C.E.E.</i>	<i>ATEX Directive</i>

\* einschließlich Änderungen und deutscher Umsetzung durch das EMVG und Gerätesicherheitsgesetz

\* including alterations and German realization by the EMC law and the instruments safety law

\* y compris les modifications et la réalisation allemande par la loi concernant la compatibilité électromagnétique et la sécurité d'appareils

### Die Übereinstimmung mit den Vorschriften dieser Richtlinien wird nachgewiesen durch die vollständige Einhaltung folgender Normen:

*Conformity with the requirements of these Directives is proven by complete adherence to the following standards:*

*La conformité avec les exigences de ces directives est prouvée par l'observation complète des normes suivantes:*

**EN 61 000-6-1 / EN 61 000-6-2 / EN 61 000-6-3 / EN 61 000-6-4**

### Ex: Es gelten die Normen der entsprechenden EG-Baumusterprüfbescheinigungen

*The standards of the relevant type-examination certificates shall apply*

*Il convient d'appliquer les normes des certificats d'homologation CE*

**02.07.2009**

**Datum**  
*Date*  
*Date*



**Dr. Wolfgang Scholz**  
**Leiter R&D**  
*Head of R&D*  
**Responsable R&D**



**Bernhard Kruse**  
**Leiter Qualitätsmanagement**  
*Head of Quality Management*  
**Responsable Management de la Qualité**

**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: \_\_\_\_\_ E-mail: \_\_\_\_\_

**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	<input type="checkbox"/>	Corrosive / irritating	<input type="checkbox"/>	Combustible (highly / extremely combustible)	<input type="checkbox"/>
Toxic	<input type="checkbox"/>	Explosive	<input type="checkbox"/>	Other toxic substances	<input type="checkbox"/>
Radioactive	<input type="checkbox"/>				

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

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