Operating Instructions
41/18-79 EN

# Electro-Pneumatic Positioner TZIDC

for 4...20 mA two-wire technology

Industrial IT enabled

**Software Revision 2.00**




HART FIELD COMMUNICATIONS PROTOCOL

ABB

# Electro-Pneumatic Positioner TZIDC
# Operating Instructions

Document No.: 41/18-79 EN
Issued: 06.07

## Manufacturer

**ABB Automation Products GmbH**
Schillerstr. 72
32425 Minden
Germany
Tel: +49 551 905-534
Fax: +49 551 905-555
CCC-support.deapr@de.abb.com

**Note**

More information, e.g. regarding configuration, operation and ordering details, is available on CD.

© Copyright 2007 by ABB Automation Products GmbH
Modifications reserved

This document is subject to copyright. It is intended to help the user operate the equipment safely and efficiently. The content may not be copied or reprodcued either in part or in full without the prior consent of the copyright owner.

# Table of contents

**Important information** ..... 5

**1 Safety summary** ..... 6

**1.1 General safety instructions** ..... 6

**1.2 Device-specific safety instructions** ..... 7

1.2.1 General ..... 7

1.2.2 Pneumatic safety ..... 7

1.2.3 Electrical safety ..... 8

**1.3 Explosion protection** ..... 9

**1.4 Correct use** ..... 9

**1.5 Qualified personnel** ..... 10

**2 Manufacturer's information** ..... 10

**2.1 Delivery** ..... 10

**2.2 CE compliance information** ..... 10

**3 Installing and commissioning** ..... 11

**3.1 Mechanical mounting** ..... 11

3.1.1 General ..... 11

3.1.2 Operating conditions at the installation site ..... 12

3.1.3 Mounting the positioner to linear actuators ..... 12

3.1.4 Mounting the positioner to rotary actuators ..... 17

**3.2 Pneumatic connection** ..... 20

3.2.1 Safety instructions ..... 20

3.2.2 Making the pneumatic connections ..... 20

3.2.3 Mounting the splash guard cap ..... 21

**3.3 Electrical connection** ..... 22

3.3.1 Safety instructions ..... 22

3.3.2 General installation instructions ..... 22

3.3.3 Overview ..... 23

3.3.4 Inserting the cable in the housing ..... 24

3.3.5 Make the electrical connection ..... 25

**3.4 Commissioning** ..... 26

3.4.1 Commissioning procedure ..... 26

3.4.2 Operating modes, overview and selection ..... 27

3.4.3 Parameter setting example ..... 28

**3.5 Functional test / maintenance** ..... 29

3.5.1 Functional test of the emergency shutdown module ..... 30

**4 Technical data** ..... 31

**4.1 Input** ..... 31

**4.2 Output** ..... 31

**4.3 Travel** ..... 31

**4.4 Air supply** ..... 32

**4.5 Transmission data and influences** ..... 32

**4.6 Environmental capabilities** ..... 33

**4.7 Housing** ..... 33

**4.8 Safety Integrity Level** ..... 34

**4.9 Explosion protection** ..... 35

**4.10 Options** ..... 37

**5 Certificates** ..... 39

**Appendix A: Parameter overview** ..... 73

# Important information

**Symbols**

In order that you can make the best use of this document and to ensure safety during commissioning, operation and maintenance of the equipment, please note the following explanation of the symbols used:

| Symbol | Signal Word | Definitions |
|---|---|---|
|  | **DANGER** | DANGER indicates an **imminently hazardous** situation which, if not avoided, **will result** in death or serious injury. (High level of risk.) |
|  | **WARNING** | WARNING indicates a **potentially hazardous** situation which, if not avoided, **could result** in death or serious injury. (Medium level of risk.) |
|  | **CAUTION** | CAUTION indicates a **potentially hazardous** situation which, if not avoided, **could result** in minor or moderate injury. (Low level of risk.) |
|  | **NOTICE** | NOTICE indicates a **potentially harmful** situation which, if not avoided, **may result** in damage of the product itself or of adjacent objects. (Damage to property) |
|  | **IMPORTANT** | IMPORTANT indicates useful hints or other special information which, if not observed, could lead to a decline in operating convenience or affect the functionality. (Does not indicate a dangerous or harmful situation.) |

As well as the instructions in this document, you must also follow the generally applicable accident prevention and safety regulations.

If the information in this document is insufficient in any situation, please contact our service department, who will be happy to help you.

Please read this document carefully before installation and commissioning.

# 1 Safety summary

## 1.1 General safety instructions

This chapter provides important instructions for your safety. Thoroughly read and follow these instructions.

Proper and safe operation of the TZIDC positioner requires:

- proper transportation and storage
- mounting, electrical and pneumatic installation and commissioning by qualified personnel (see chapter 1.5, page 10)
- correct operation according to the instructions in this manual
- correct use (see chapter 1.4, page 9)
- careful maintenance

The regulations, standards and directives referred to in this manual are applicable in Germany. When using the TZIDC positioner outside the German jurisdiction, the relevant regulations, standards and directives applicable in the country where the device is used must be observed.

The TZIDC positioner has been designed and tested in accordance with
DIN VDE 0411 Part 1 / EN 61 010 Part 1

"**Safety Requirements for Electronic Measuring Apparatus**"

(based on IEC Publication 348) and has been delivered in a safe condition.

In order to retain the device in a safe condition and ensure safe operation, attentively read and follow the instructions given in the sections marked with the respective symbols. (See "Important information" on page 5.) Otherwise, persons can be endangered or the device itself or other devices or equipment may be damaged or fail.

The device must be shut down and secured reliably against unintentional restart if it must be assumed that safe operation is no longer ensured. Possible reasons for this assumption can be:

- visible damage of the device
- failure of the electrical function
- exposure to a storage temperature of more than 85 °C for a longer time period
- exposure to considerable strain or wear during transport

Only the manufacturer is authorized to repair the device.

## 1.2 Device-specific safety instructions

### 1.2.1 General



**WARNING**

- Any user-made changes or manipulations of the device are prohibited! Only the manufacturer or an expert for explosion protection are authorized to modify the device.
- Before re-using a TZIDC positioner that has already been used in another installation place **always** reset the device to the factory setting. Never start the autoadjustment function before having restored the factory setting! Otherwise, hazardous situations may occur due to improper settings.
- Do not use the internal communication interface (LKS) on the motherboard when the TZIDC positioner is installed and used in the hazardous area.
- The (optional) emergency shutdown module must be subject to a functional test every two years at the latest. Follow the instructions in chapter 3.5.1.



**NOTICE**

- Protection class IP 65 / NEMA 4 X is achieved only when the splash guard cap is in place. Do not use the positioner without the cap.

### 1.2.2 Pneumatic safety



**WARNING**

- Observe the accident prevention rules of the Employers Liability Insurance Association.
- Observe the safety instructions for the pneumatic actuator used. The actuator's high actuating power may cause injuries !



**NOTICE**

- Take suitable precautions to ensure that even in case of malfunctions the positioner's max. admissible operating pressure of 6 bar (90 psi) is not exceeded. Otherwise, the positioner and/or the actuator may be damaged.
- The positioner must be supplied with instrument air exempt from oil, water and dust according to DIN/ISO 8573-1, Class 3
  - Purity: max. particle size 5 µm, max. particle density 5 mg/m$^3$
  - Oil content: max. concentration 1 mg/m$^3$
  - Pressure dew point: maximum value 10 K below operating temp.

  Before connecting the air pipes blow them out to remove dust, splinters and other particles.

### 1.2.3 Electrical safety



**WARNING**

- Observe the common VDE safety regulations and the accident prevention rules of the Employers Liability Insurance Association.
- Observe the common standards and safety regulations for the installation and operation of electrical systems.
- When connecting the device, observe all electrical specifications in these operating instructions or in the data sheet.
- For the electrical installation of explosion-protected devices, observe all standards, regulations and directives governing explosion protection and applicable for the construction and use of explosion-protected systems, especially the DIN/VDE directives, the directives for explosion protection (VDE 0165 or EN 60079), and the special requirements and specifications for your devices (see the following chapter "Explosion protection" and chapter "Certificates" starting on page 39).



**NOTICE**

**Power supply**

- Exclusively connect signal circuits with load-independent 4...20 mA current to terminals +11/-12. Direct connection of a power supply, e.g. a 24 V DC power supply unit, will damage the input.
- The maximum current must not exceed 500 mA, even in case of a malfunction or polarity reversal.



**NOTICE**

**Electromagnetic interference**

- Do not lay signal lines close to power lines. Power lines produce interference in their near vicinity, which may affect measured value transmission on the signal line.
- Keep the case closed. When the case is open the positioning action may be affected through electromagnetic interference. This may result in a permanent positioning error, especially when the autoadjustment function is run with the case open.

## 1.3 Explosion protection

One of the type plates seen below is attached to the positioner to the left of the main type plate, depending on the positioner's explosion protection. It indicates the degree of explosion protection and the certificate valid for your positioner. For details please refer to chapter "Certificates" starting on page 39.

**WARNING**

**Always** observe the specifications and special requirements for your positioner stipulated in the applicable certificate.
The "local communication interface (LKS)" may only be operated outside the potentially explosive area.

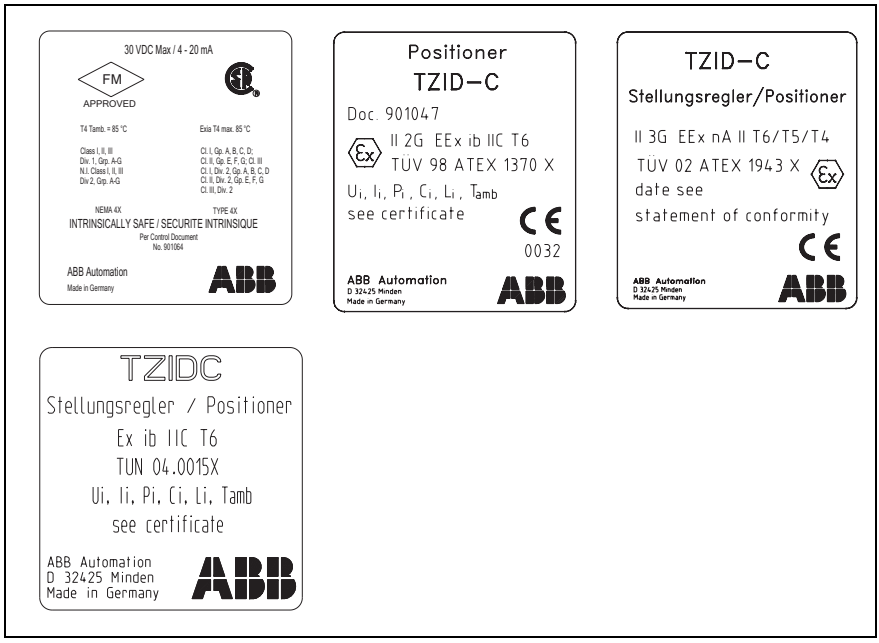



**Fig. 1 Type plates indicating the degree of explosion protection**

## 1.4 Correct use

The TZIDC positioner is an electro-pneumatic positioner for pneumatic final control elements. It is designed for being attached to linear and rotary actuators following the instructions in this manual. The positioner may be used only for the applications listed in these operating instructions or in the data sheet 18-0.22 EN. Any other use is considered as incorrect.

The signal current circuit and the input and output circuitry must meet the explosion protection requirements stipulated in the certificates (see chapter "Certificates" starting on page 39).

The maximum permissible ambient temperature range of -40 °C to +85 °C (when using proximity switches of type SJ2-S1N (NO): -25 °C to + 85 °C) must not be exceeded.

## 1.5 Qualified personnel

Only those persons familiar with the installation, commissioning, operation and maintenance of the TZIDC positioner or similar instruments who have the required qualification and have read and understood the operating instructions are authorized to work on the TZIDC positioner. These persons must be sufficiently trained and experienced and know the relevant standards and regulations to be able to judge their assigned tasks and recognize potential hazards. Only persons who are qualified or have been trained adequately and who have the required certificates are authorized to work on explosion-protected devices.

# 2 Manufacturer's information

## 2.1 Delivery

When receiving the delivery please immediately check items and scope for intactness and completeness. The scope of delivery is stated in the shipping documents. If ordered, the accessories (e.g. mounting material, pressure gauge block, filter regulator) are added to the delivery as individual items. Check items and scope of the delivery by means of the catalog numbers to see if types and quantities are in accordance with your order. If the positioner is delivered already mounted to the actuator, the positioner, accessories and actuator or final control element are considered as a common delivery item. A list of catalog numbers and details of the different versions and accessories can be found in data sheet 18-0.22 EN.

## 2.2 CE compliance information

We declare that we are the manufacturer of the TZIDC positioner and that the product conforms with the EMC Directive 89/336/CEE as of May 1989 and meets the requirements of the following standards:

- EN 55022:1998 “Information technology equipment, Radio disturbance characteristics, Limits and methods of measurement”
- EN 61000-6-2:8/2002 ”Electromagnetic compatibility (EMC) Part 6-2: Generic standards - Immunity for industrial environments
- EN 61000-6-3:3/2000 “Electromagnetic compatibility (EMC) Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

The TZIDC positioner complies with the EC directive for CE conformity certification.

# 3 Installing and commissioning

## 3.1 Mechanical mounting

### 3.1.1 General

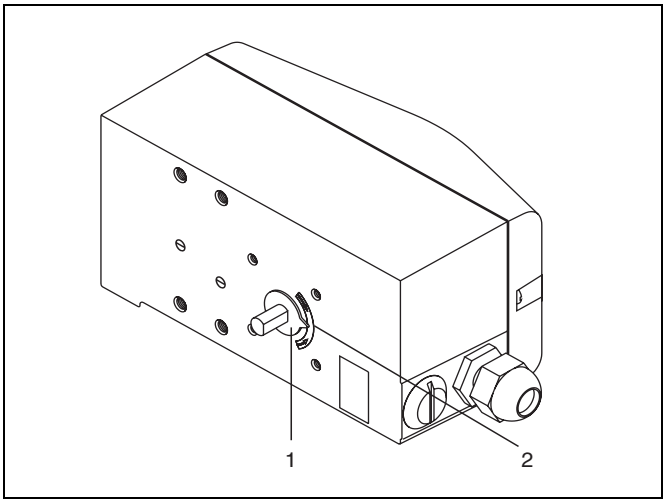



**Fig. 2 Operating range**

The arrow (1) on the feedback shaft (and thus the lever) must travel within the area marked with the small arrows (2).

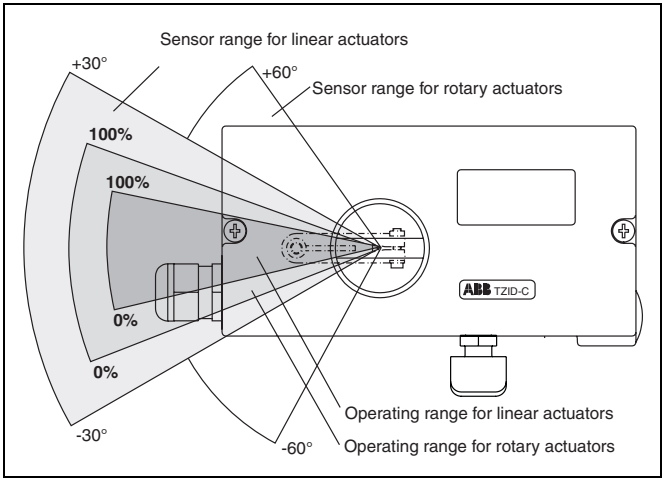



**Fig. 3 Positioner ranges**

When mounting the positioner, ensure that the transfer of the stroke or rotation angle for the position feedback is correct. The maximum rotation angle is 60° for mounting to linear actuators and 120° for mounting to rotary actuators. The minimum angle is always 25°.

### 3.1.2 Operating conditions at the installation site

**WARNING**

Before installing check to ensure that the specifications in terms of safety and control applicable to the TZIDC positioner will not be exceeded at the installation site of the actuator or final control element.

| | |
|---|---|
| Ambient temperature: | -40 °C ... +85 °C (-25 °C ... + 85 °C when using proximity switches of type SJ2-S1N (NO)) |
| Relative humidity: | 95 % (mean annual value), condensation permissible. Observe the specifications for protection class IP65 / NEMA 4X and the technical data in this manual. |
| Explosion protection: | Observe the technical data, and the specifications in the certificates (see the relevant sections of this manual). |
| Mounting orientation: | any orientation allowed |

### 3.1.3 Mounting the positioner to linear actuators

A special attachment kit is available for mounting the positioner to a linear actuator according to DIN/IEC 534 (lateral mounting to NAMUR) comprising the following parts:

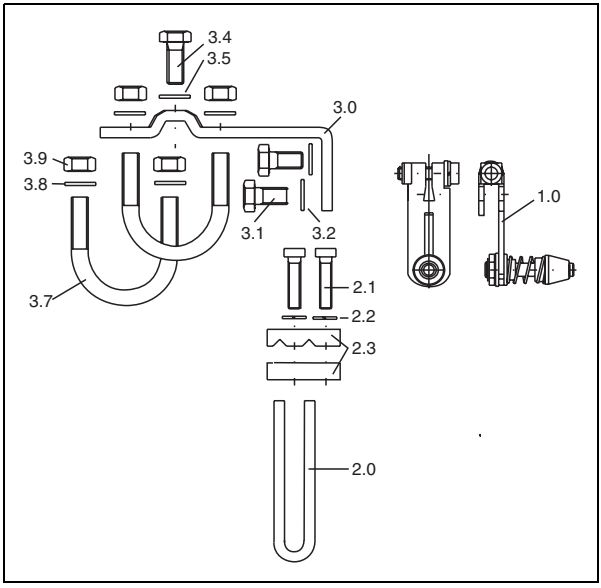



**Fig. 4 Mounting kit for linear actuators**

- Lever (1.0) with follower pin, for 10 ... 35 mm or for 20 ...100 mm actuator travel
- Follower guide (2.0) with two screws (2.1), spring washers (2.2), and clamp plates (2.3)
- Angle bracket (3.0) with two screws (3.1), and two plain washers (3.2)
- Screw (3.4) and plain washer (3.5) for mounting to cast iron yoke
- Two U-bolts (3.7), each with two plain washers (3.8), and two nuts (3.9) for mounting to columnar yoke

| | |
|---|---|
| Tools required: | Wrench 10 mm /13 mm<br>Allen key 4 mm |

**Follow the procedure (steps 1 - 5) below to attach the positioner to a linear actuator:**

### 1. Mount the follower guide to the actuator

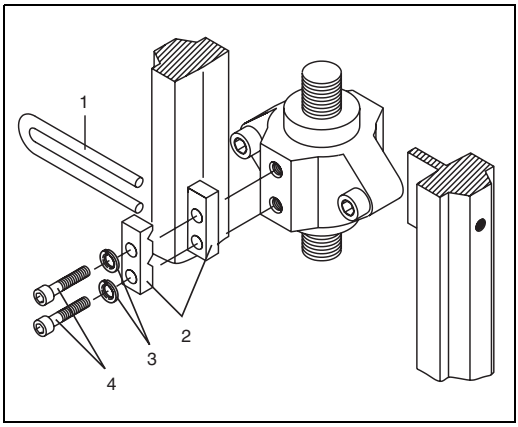



**Fig. 5 Mounting follower guide to actuator**

- Fasten the follower guide (1) and the clamp plates (2) with screws (4) and spring washers (3) to the spindle of the actuator; hand-tighten the screws.

### 2. Assemble the lever (if not yet pre-assembled)

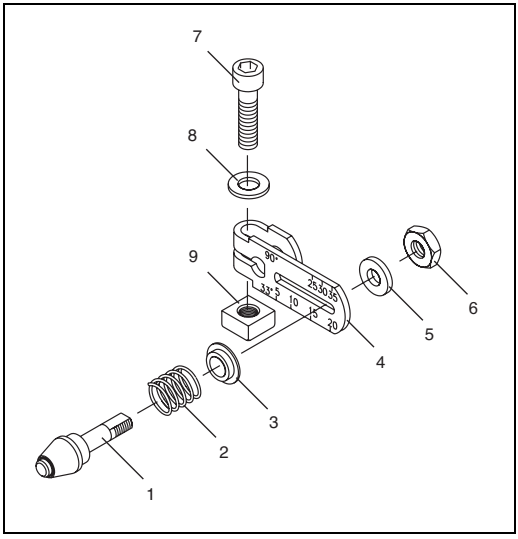



**Fig. 6 Assembling the lever**

- Slip the spring (2) onto the bolt with the follower pin (1).
- Slip the plastic washer (3) onto the bolt and compress the spring with it.
- Insert the bolt with compressed spring into the oblong hole in the lever (4) and fasten it in the desired position using the plain washer (5) and nut (6) at the lever; the scale on the lever indicates the link point for the stroke range.
- Slip the plain washer (8) onto the screw (7), insert the screw into the lever and counter with the nut (9).

### 3. Mount the lever and the angle bracket to the positioner

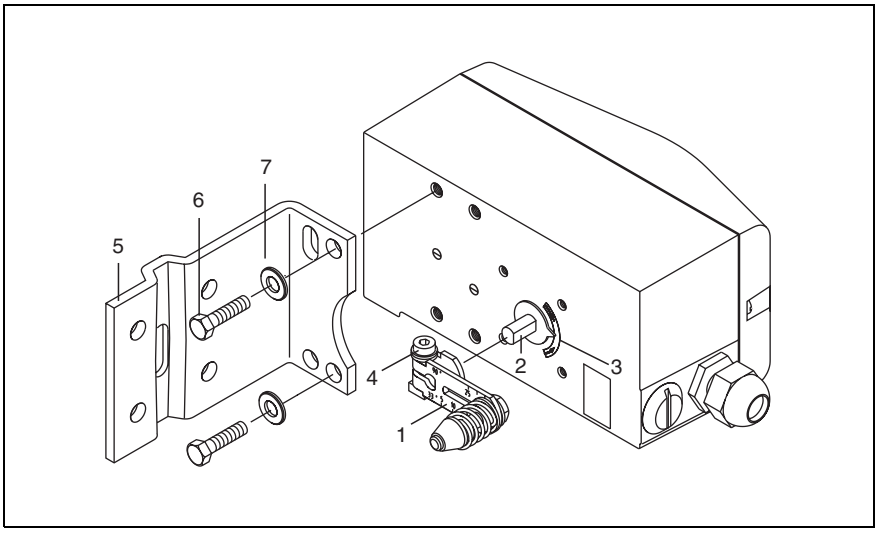
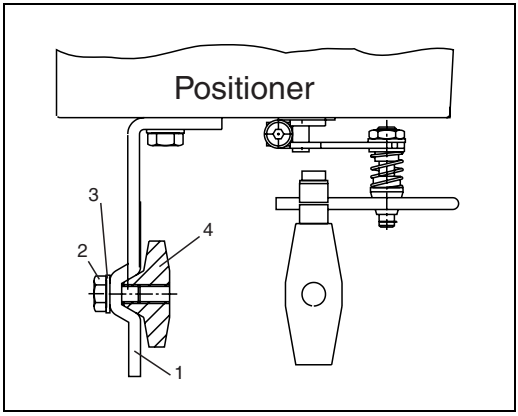



**Fig. 7 Mounting lever and angle bracket to TZIDC**

- Attach the lever (1) to the positioner's feedback shaft (2) (can only be mounted in one position due to the flat on the side of the feedback shaft).
- Check whether the lever travels within the operating range (between the arrows) by observing the arrow marks (3).
- Hand-tighten the screw (4) at the lever.
- Hold the preassembled positioner with the angle bracket (5) still loose in such a way against the actuator that the follower pin on the lever introduces into the follower guide, in order to determine the bore holes of the positioner to be used for the angle bracket.
- Fasten the angle bracket (5) with screws (6), and plain washers (7) to the corresponding bore holes in the positioner case; if possible, tighten the screws evenly to ensure linearity during operation. Align the angle bracket in the oblong hole to achieve a symmetrical operating range (between the arrow marks (3)).

### 4.a Mount the positioner to a cast iron yoke

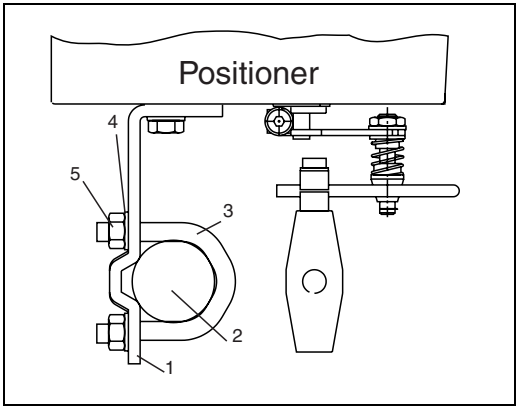



- Fasten the angle bracket (1) with screw (2), plain washer (3) to the cast iron yoke (4).

**Fig. 8 Mounting to cast iron yoke**

**or**

### 4.b Mount the positioner to a columnar yoke




- Hold the angle bracket (1) in the appropriate position against the columnar yoke (2).
- Insert the U-bolts (3) from the inner side of the columnar yoke through the holes in the angle bracket.
- Slip on the plain washers (4), and nuts (5). Hand-tighten the nuts evenly.

**Fig. 9 Mounting to columnar yoke**

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

**IMPORTANT** Check the unit for proper mounting after having made the pneumatic and electrical connection (see chapter "Commissioning" on page 26).

**5. Adjust the stroke**

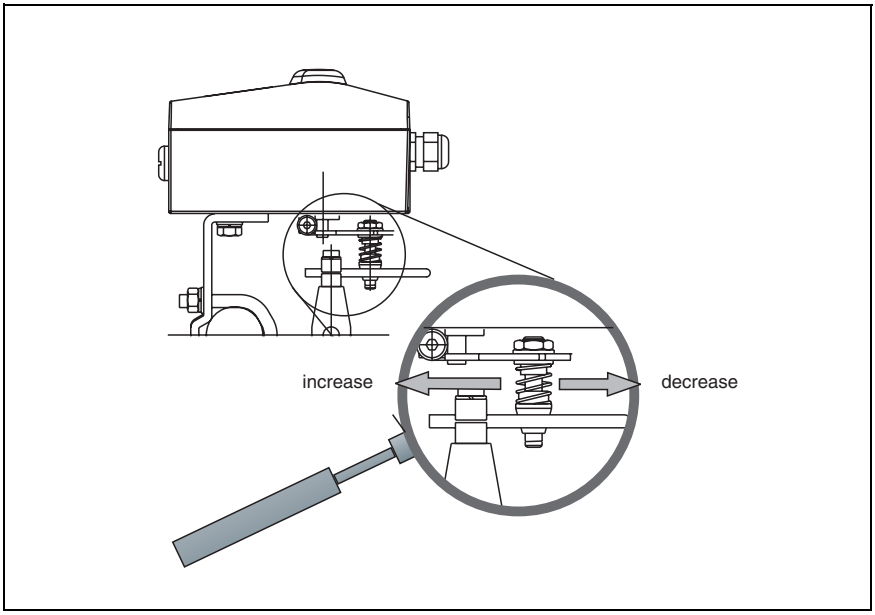



**Fig. 10 Positioner linkage**

The scale on the lever indicates the relevant points for the various valve stroke ranges.

You can adapt the valve stroke range to the operating range of the position sensor by shifting the bolt with follower pin in the oblong bore hole of the lever. When the link point is shifted to the inside, the position sensor's rotation angle is increased; shifting to the outside decreases the angle.

Set the stroke range in such a way that the used rotation angle of the position sensor is as great and as symmetrical around the center position as possible.

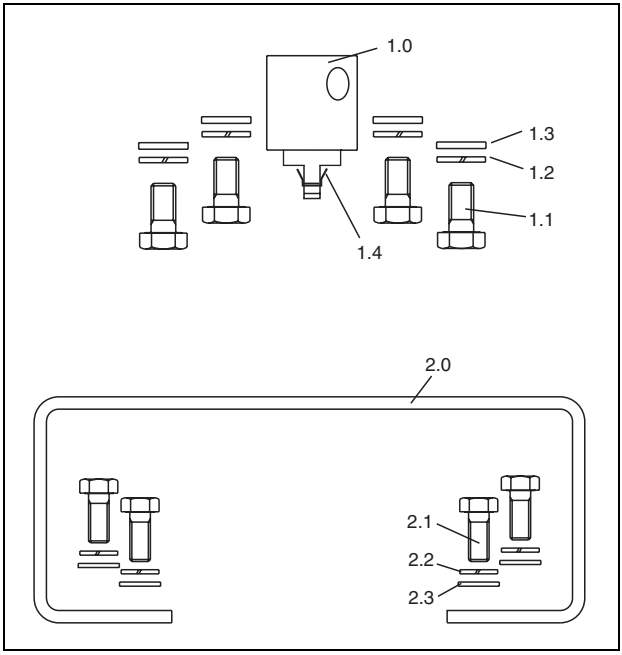
**Recommended range for linear actuators: between -28° and +28°**
**Minimum angle: 25°**

i After mounting, check whether the positioner operates within the sensor range.

**IMPORTANT** Check the unit for proper mounting after having made the pneumatic and electrical connection (see chapter "Commissioning" on page 26).

### 3.1.4 Mounting the positioner to rotary actuators

The following mounting kit is available for mounting to a rotary actuator according to VDI/ VDE 3845:




- Adapter (1.0) with spring (1.4)
- Four screws, M6 (1.1), four spring washers (1.2), and four plain washers (1.3) for fastening the bracket (2.0) to the positioner
- Mounting bracket (2.0)
- Four screws, M5 (2.1), four spring washers (2.2), and four plain washers (2.3) for fastening the bracket to the actuator

**Fig. 11 Mounting kit for rotary actuators**

Tools required: Wrench 10 mm /13 mm
Allen key 3 mm

**Follow the procedure (steps 1 - 3) below to attach the positioner to a rotary actuator:**

### 1. Mount the adapter to the positioner

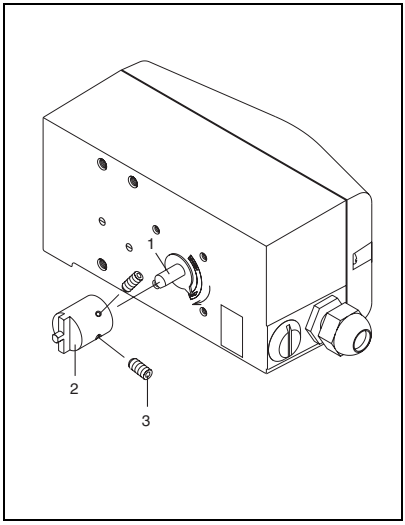



**Fig. 12 Mounting the adapter**

- Determine the mounting position (in parallel to the actuator or shifted by 90°).
- Determine the direction of rotation of the actuator (clockwise or counterclockwise).
- Move the rotary actuator to its home position.
- On the basis of the mounting position, the home position, and the direction of rotation it must be determined in which position the feedback shaft (1) of the positioner must be pre-adjusted and in which position the adapter (2) must be placed, to enable the positioner to travel within the correct range (the arrow on the rear of the device must travel within the admissible range, for details see Fig. 2 on page 11).
- Pre-adjust the feedback shaft.
- Place the adapter on the feedback shaft in the appropriate position and fix it by set-screws (3); ensure that one of the set-screws is engaged on the side of the feedback shaft with the flat.

### 2. Attach the mounting bracket (1) to the positioner

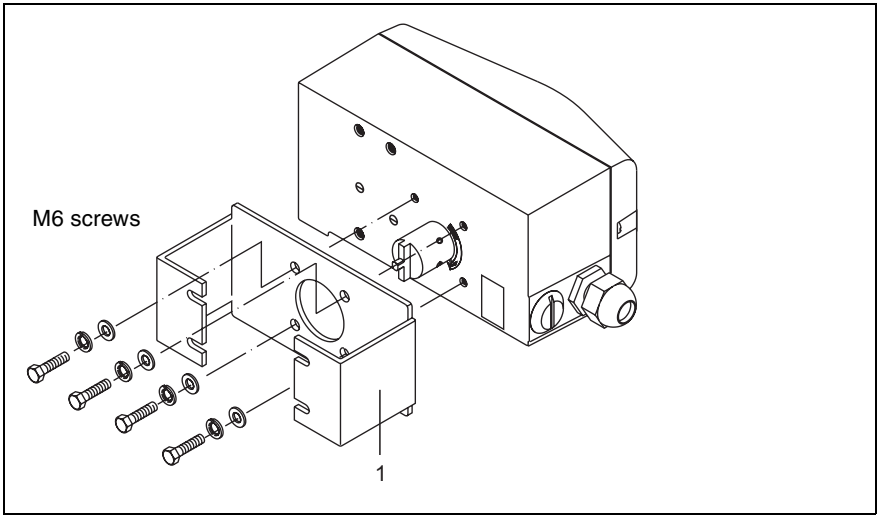



**Fig. 13 Attaching the mounting bracket to the positioner**

### 3. Attach the positioner to the actuator

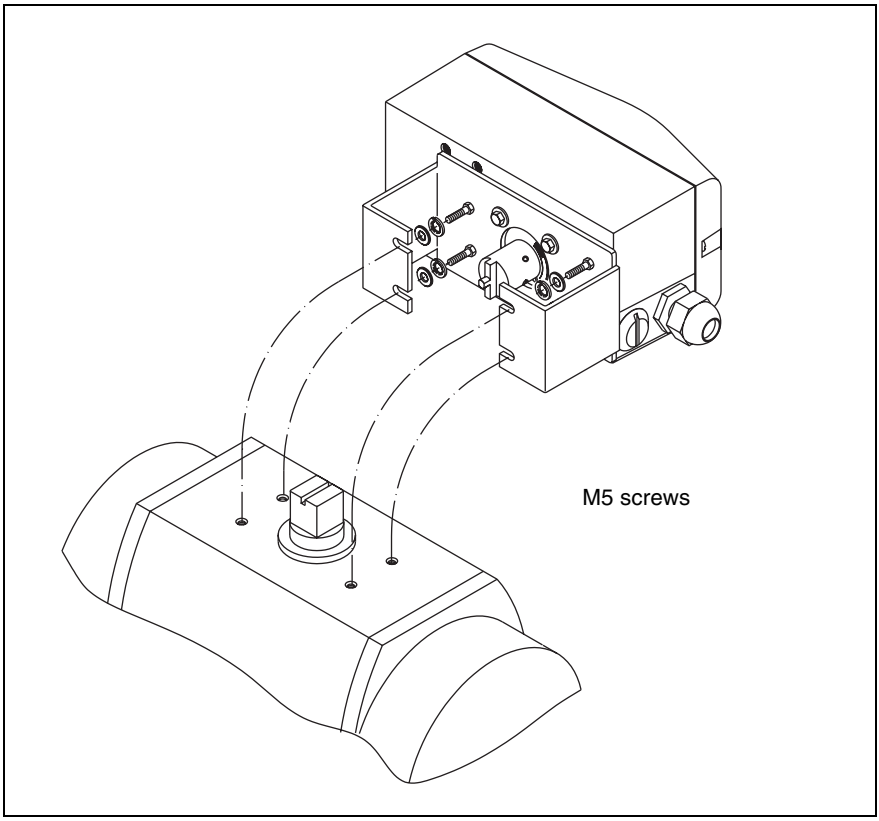



**Fig. 14 Attaching the positioner to the actuator**

After mounting, check whether the actuator's operating range is in accordance with the positioner's sensor range.

**IMPORTANT** Check the unit for proper mounting after having made the pneumatic and electrical connection (see chapter "Commissioning" on page 26).

## 3.2 Pneumatic connection

### 3.2.1 Safety instructions

**WARNING**

- Observe the accident prevention rules of the Employers Liability Insurance Association.
- Observe the safety instructions for the pneumatic actuator used. The actuator's high actuating power may cause injuries !

**NOTICE**

- Take suitable precautions to ensure that even in case of malfunctions the positioner's max. admissible operating pressure of 6 bar (90 psi) is not exceeded. Otherwise, the positioner and/or the actuator may be damaged.
- The positioner must be supplied with instrument air exempt from oil, water and dust according to DIN/ISO 8573-1, Class 3
  - Purity: max. particle size 5 µm, max. particle density 5 mg/m$^3$
  - Oil content: max. concentration 1 mg/m$^3$
  - Pressure dew point: maximum value 10 K below operating temp.

  Before connecting the air pipes blow them out to remove dust, splinters and other particles.

### 3.2.2 Making the pneumatic connections

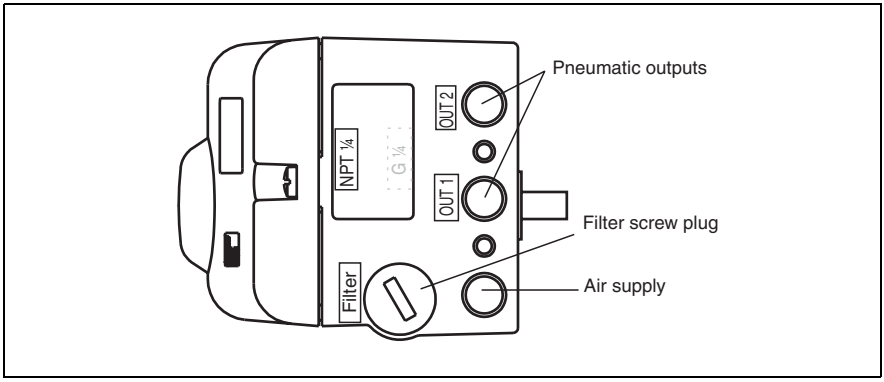



**Fig. 15 Pneumatic connections**

All pneumatic piping connections are located on the right-hand side of the positioner. Threaded bores G 1/4 or 1/4-18 NPT, respectively, are provided. The positioner is labeled according to the type of thread. The corresponding screwed pipe connections have to be supplied by the customer. We recommend pipes with the dimension 6 x 1 mm for the pneumatic piping.

The amount of supply pressure has to be matched to the working pressure necessary for the actuation. The positioner's operating range is between 1.4 and 6 bar.

The connections have to be arranged, according to their marks, in the following way:

| Mark | Connection piping |
|---|---|
| - | Air supply, pressure 1.4...6 bar (20...90 psi) |
| OUT1 | Output pressure, to actuator |
| OUT2 | Output pressure, to actuator (second output, for double-acting actuators) |

### 3.2.3 Mounting the splash guard cap

**NOTICE**

Protection class IP 65 / NEMA 4 X is achieved only when the splash guard cap is in place. Do not use the positioner without the cap.

Screw the splash guard cap delivered with your positioner into the appropriate hole in the bottom plate of the case, as seen in the illustration below. Do not use a screw driver for this purpose!

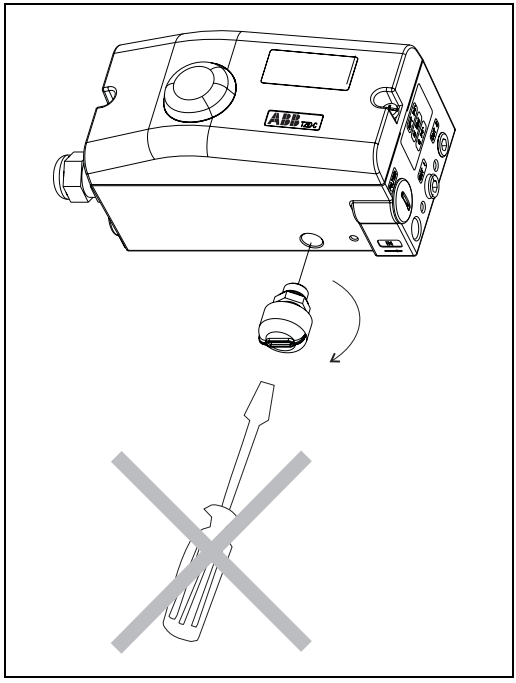


**Fig. 16 Mounting the splash guard cap**

## 3.3 Electrical connection

### 3.3.1 Safety instructions



**WARNING**

- Observe the common VDE safety regulations and the accident prevention rules of the Employers Liability Insurance Association
- Observe the common standards and safety regulations for the installation and operation of electrical systems.
- When connecting the device, observe all electrical specifications in these operating instructions or in the data sheet.
- For the electrical installation of explosion-protected devices, observe all standards, regulations and directives governing explosion protection and applicable for the construction and use of explosion-protected systems, especially the DIN/VDE directives, the directives for explosion protection (VDE 0165 or EN 60079), and the special requirements and specifications for your devices (see chapter "Certificates" starting on page 39).

### 3.3.2 General installation instructions



**NOTICE**

Observe the following instructions. They are essential to proper operation and functionality of the positioner.

**General**

- Do not expose the terminals to strain.

**Technical data**

- When connecting the device, make sure that the electrical specifications in chapter 4 "Technical data" are observed.

**Power supply**

- Exclusively connect signal circuits with load-independent 4...20 mA current to terminals +11/-12. Direct connection of a power supply, e.g. a 24 V DC power supply unit, will damage the input.
- The maximum current must not exceed 500 mA, even in case of a malfunction or polarity reversal.



**NOTICE**

**Electromagnetic interference**

- Do not lay signal lines close to power lines. Power lines produce interference in their near vicinity, which may affect measured value transmission on the signal line.
- Keep the case closed. When the case is open the positioning action may be affected through electromagnetic interference. This may result in a permanent positioning error, especially when the autoadjustment function is run with the case open.

### 3.3.3 Overview

Two threaded bore holes 1/2 - 14 NPT or M20 x 1.5 are available on the left hand side as the cable entry into the case. One is equipped with a cable gland and in the other a pipe plug is mounted.

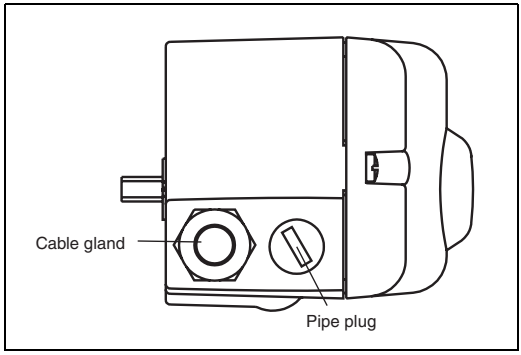



**Fig. 17 Cable entry**

The screw terminals inside the case are assigned as follows:

1 Module for analog position feedback

2 Module for digital position feedback or service switch of the emergency shutdown module

3 Module for digital position feedback or terminals of the emergency shutdown module

4 Kit for digital position feedback, either proximity switches or 24 V microswitches

5 Same as 4

6 Digital output DO

7 Digital input DI

8 4...20 mA signal

9 Grounding screw

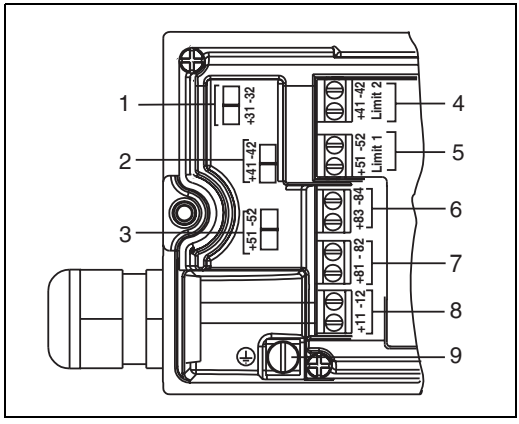



**Fig. 18 Screw terminals**

### 3.3.4 Inserting the cable in the housing

In order to provide for sufficient EMI/RFI shielding of the positioner to meet the requirements regarding electromagnetic compatibility (EMC), **all** electrical wires must be entered through a ferrite tube in the connection compartment. Proceed as described in the example below:

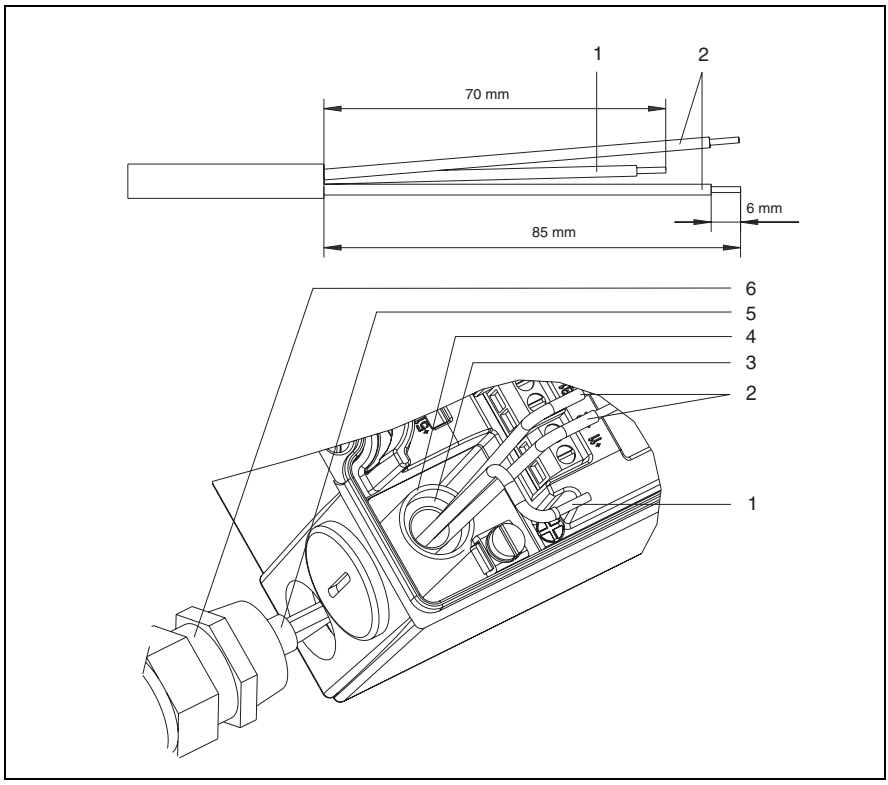



**Fig. 19 Inserting the cable**

1. Remove the cable sheath at the cable end. Cut the (green/yellow) protective ground conductor (1) and the two 4...20 mA signal lines (2) to the specified length and remove approx. 6 mm of the insulation.
2. Put the protective hose (4) on the ferrite tube (3).
3. Insert all wires through the cable gland (6) and the ferrite tube (3). Make sure that the end of the cable sheath (5) protrudes into the connection compartment. Fasten the cable gland.
4. Fasten the protective ground conductor (1) with the grounding screw and connect the 4...20 mA signal lines (2) to the signal terminals +(11)/-(12) (see Fig. 18 on page 23 and chapter 3.3.5).

### 3.3.5 Make the electrical connection

- Remove approximately 6 mm of the cable insulation.
- To connect the signal lines, the emergency shutdown module, the proximity switches or the microswitches insert the wire ends from the left into the appropriate screw terminals and hand-tighten the screws (access from above). To connect a plug-in module insert the wire ends from the top into the corresponding screw terminals and hand-tighten the screws (access from the side).

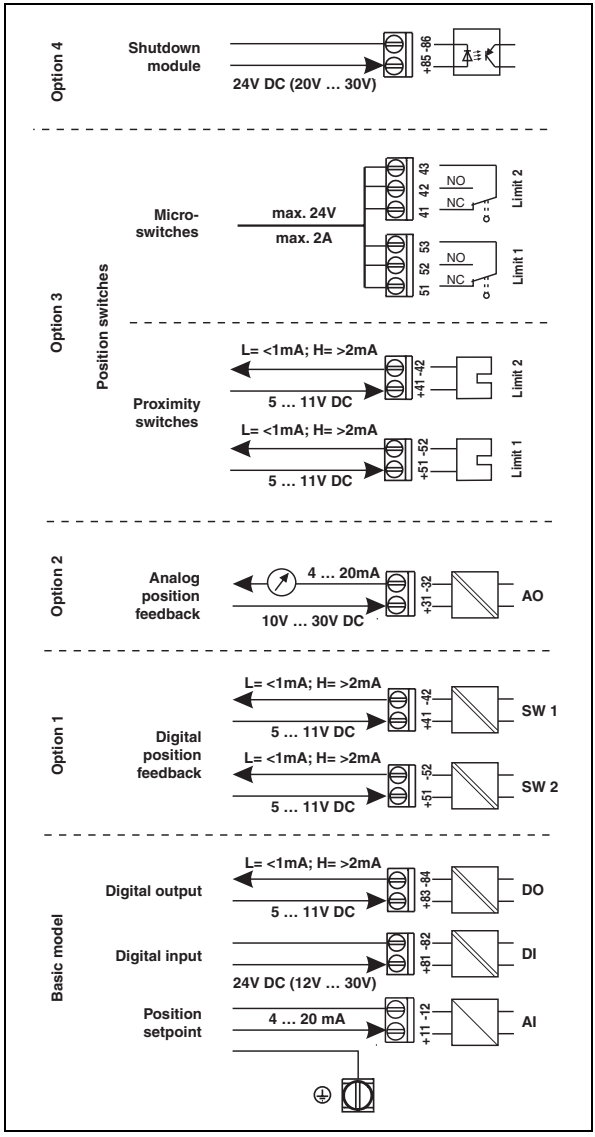



**Fig. 20 Terminal assignment**

## 3.4 Commissioning

### 3.4.1 Commissioning procedure

1. **Turn on the air supply to the positioner.**
2. **Turn on the electrical power supply to the positioner.**
   Apply the 4...20 mA signal to the analog input (terminals +11/-12).
3. **Check for proper mounting:**
   - Press and hold **MODE**; additionally briefly press ↑ or ↓ until mode **1.3** (manual adjustment within sensor range) is indicated, then release **MODE**.
   - Press ↑ or ↓ to move the actuator to its mechanical limit stops in both directions, and note the values. The angle of rotation is indicated in degrees.
     For quick motion: Press ↑ and ↓ together.
     **Recommended range:**
     between -28° and +28° for linear actuators
     between -57° and +57° for rotary actuators
     **Minimum angle: 25**°
4. **Run the standard autoadjustment function.**

*Note*: The standard autoadjustment function is only available with software revision level 2.XX and higher.

**For linear actuators:**[1]

- Press and hold **MODE** until **ADJ_LIN** is displayed, then release.
- Press **MODE** again and hold it down until the countdown is finished.
- Then release **MODE**.
  Standard autoadjustment is started.

or

**For rotary actuators:**[1]

- Press and hold **ENTER** until **ADJ_ROT** is displayed, then release.
- Press **ENTER** again and hold it down until the countdown is finished.
- Then release **ENTER**.
  Standard autoadjustment is started.

When the autoadjustment function is finished **successfully**, the parameter settings are **automatically** saved and the positioner returns to operating mode 1.1.

If standard autoadjustment should fail, the procedure is automatically interrupted, and an error code is indicated. In this case press and hold ↑ or ↓ for approx. 3 seconds. The positioner returns to mode **1.3** MAN_SENS (manual adjustment within sensor range). Check the assembly for proper mounting and, if required, readjust it. Repeat the standard autoadjustment function.

5. **If required: Adjust the dead band and tolerance band**
   This step is only necessary for critical actuators, e.g. very small ones. Usually, it can be skipped.

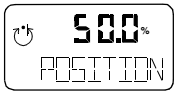
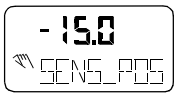
1. The zero position is automatically determined and saved by the standard autoadjustment function: turning counter-clockwise (CTCLOCKW) for linear and clockwise (CLOCKW) for rotary actuators.

### 3.4.2 Operating modes, overview and selection

**Procedure for mode selection from the operating level:**

- Press and hold **MODE**.
- Additionally briefly press ↑ as often as required.
  The selected mode is indicated.
- Release **MODE**.
- The position is indicated as a percentage or rotation angle.

**Overview**

| Mode | Mode display | Position display |
|---|---|---|
| **1.0**<br>Control*<br>with adaptation<br>(of control parameters) |  |  |
| **1.1**<br>Control<br>without adaptation<br>(of control parameters) |  |  |
| **1.2**<br>Manual adjustment** within the operating range.<br>Press ↑ or ↓ to adjust *** |  |  |
| **1.3**<br>Manual adjustment** within the sensor range.<br>Press ↑ or ↓ to adjust *** |  |  |

*) Self-optimization during "adaptive" control is subject to various influences during operation that may lead to mismatches in the long run. Therefore, it is recommended to use this operating mode for some hours only and then switch the positioner to mode 1.1 “Control without adaptation".

**) Positioning not active

***) For quick motion: Press ↑ and ↓ together.

### 3.4.3 Parameter setting example

An overview of the parameter settings that can be edited via the front panel keypad is found in Appendix A.

**IMPORTANT**

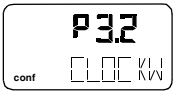
**"Changing zero position (of the LCD) from clockwise to counter-clockwise"**

Initial situation: the positioner is operating in mode 1.1.

1. Change over to the configuration level:
   - Press and hold ↑ and ↓ at the same time.
   - Additionally, briefly press **ENTER**.
   - Wait until the countdown has run down from 3 to 0.
   - Release ↑ and ↓.
   - 

is displayed.
2. Change over to parameter group 3._:
   - Simultaneously press and hold **MODE** and **ENTER**.
   - Additionally 2 x briefly press ↑.
   - 

is displayed.
   - Release **MODE** and **ENTER**.
   - 

is displayed.
3. Select parameter 3.2 "Zero position":
   - Press and hold **MODE**.
   - Additionally 2 x briefly press ↑.
   - 

is displayed.
   - Release **MODE**.
4. Change parameter setting:
   - Briefly press ↑ to select "CTCLOCKW".

5. Change over to parameter 3.3 "EXIT" and save the new setting:
   - Press and hold **MODE**.
   - Additionally 1 x briefly press ↑.
   - 

     is displayed.
   - Release **MODE**.
   - Briefly press ↑ to select "NV_SAVE".
   - Press and hold **ENTER** until the countdown has run down from 3 to 0.

The positioner saves the new settings, automatically returns to the operating level and continues operation in the same mode that was active before the configuration level has been selected.

## 3.5 Functional test / maintenance



**Do not make any changes to devices with explosion protection.**

**WARNING**



If you should modify or manipulate the electronics of a positioner without explosion protection, the positioner's warranty will expire immediately.

**IMPORTANT**

The TZIDC positioner is virtually maintenance free.

To ensure error-free and maintenance-free operation always supply the positioner with instrument air exempt from oil, water and dust according to DIN/ISO 8573-1 (purity and oil content acc. to Class 3, pressure dew point 10 K below the operating temperature).

We recommend to check the integrated air filter on a regular basis and replace it if required.

If the optionally installed filter regulator is installed, it has to be checked regularly as well.

Additionally, the control position should be checked periodically for conformity with the tolerance limit.

### 3.5.1 Functional test of the emergency shutdown module

**WARNING**

If the optional emergency shutdown module is used, it must be subject to a functional test every two years at the latest to ensure full operational reliability in compliance with DIN V 19250. Otherwise, the AK4 approval will lapse.

**Proceed as described below:**

1. Remove the cover
2. Alternately set the slide switch (1) from the "On" position in the middle to the top and bottom position ("Off1" or "Off2") and check that the actuator is depressurized properly.

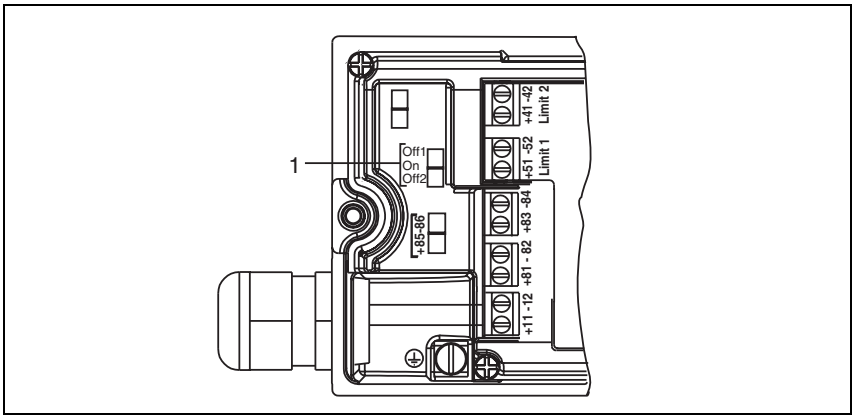



**Fig. 21 Slide switch (service switch) of the emergency shutdown module**

3. Set the slide switch to the "On" position in the middle again.
4. Replace the cover.

# 4 Technical data

## 4.1 Input

**Output signal (two-wire technology)**

| | |
|---|---|
| Nominal range | 4 ... 20 mA |
| Split range configuration between | 20 ... 100%<br>of the nominal range |
| Max. | 25 mA |
| Min. | 3.6 mA |
| Starting at | 3.8 mA |
| Load voltage at 20 mA | 9.7 V |
| Impedance at 20 mA | 485 Ω |

**Digital input**

| | |
|---|---|
| Control voltage | 0 ... 5 V DC switching state logical "0"<br>11 ... 30 V DC switching state logical "1" |
| Current | max. 4 mA |

## 4.2 Output

**Compressed air output**

| | |
|---|---|
| Range | 0 ... 6 bar (0 ... 90 psi) |
| Air capacity | 5.0 kg/h = 3.9 $Nm^3/h$ = 2.3 sfcm<br>at 1.4 bar (20 psi) supply pressure<br>13 kg/h = 10 $Nm^3/h$ = 6.0 sfcm<br>at 6 bar (90 psi) supply pressure |
| Output function | For single or double-acting actuators, air is vented from actuator or actuator is blocked in case of (electrical) power failure |
| Shut-off values | End position 0% = 0 ... 45%<br>End position 100% = 55 ... 100% |

**Digital output (control circuit to DIN 19234/NAMUR)**

| | |
|---|---|
| Supply voltage | 5 ... 11 V DC |
| Voltage > 0.35 mA ..≤ 1.2 mA | Switching state logical "0" |
| Current > 2.1 mA | Switching state logical "1" |
| Effective direction (configurable) | normally logical "0" or logical "1" |

## 4.3 Travel

**Rotation angle**

| | |
|---|---|
| Used range | 25 ...120 (rotary actuators, optionally 270°)<br>25 ... 60 ° (linear actuators) |
| Travel limit | Min.and max. limits, freely configurable between<br>0 ... 100% of total travel (min. range > 20%) |
| Travel time prolongation | Range of 0 ... 200 seconds, separately for each direction |
| Dead band time limit | Range 0 ... 200 seconds (monitoring parameter for control until the deviation reaches the tolerance band) |

## 4.4 Air supply

**Instrument air**

free of oil, water and dust to DIN/ISO 8573-1
pollution and oil content according to Class 3 (purity: max. particle size: 5 µm, max. particle density: 5 mg/$m^3$; oil content: max. concentration: 1 mg/$m^3$; pressure dew point: 10 K below operating temperature)

**Supply pressure**

1,4 ... 6 bar (20 ... 90 psi)
Note: Do not exceed the max. operating pressure of the actuator!

**Air consumption**

< 0.03 kg/h / 0.015 scfm (independent of supply pressure)

## 4.5 Transmission data and influences

**Output Y1**

| | |
|---|---|
| Increasing | Increasing output signal 0 ... 100%<br>Increasing pressure at output |
| Decreasing | Increasing output signal 0 ... 100%<br>Decreasing pressure at output |

**Action (output signal)**

| | |
|---|---|
| Increasing | Signal 4 ... 20 mA = actuator position 0 ... 100% |
| Decreasing | Signal 20 ... 4 mA = actuator position 0 ... 100% |

**Characteristic curve (travel = f {signal})**

Linear, equal percentage 1:25 or 1:50 or 25:1 or 50:1 and freely configurable with 20 reference points.

| | |
|---|---|
| Characteristic deviation | ≤ 0,5 % |
| Tolerance band | 0,3 ... 10%, adjustable |
| Dead band | 0,1 ... 10%, adjustable |
| Resolution (A/D conversion) | > 4000 steps |
| Sample rate | 20 ms |
| Influence of ambient temperature | ≤ 0.5% per 10 K |
| Influence of vibration | ≤ 1% to 10 g and 80 Hz |

**Seismic requirements**

Meets requirements of DIN/IEC 68-3-3 Class III for strong and strongest earthquakes

**Influence of mounting orientation**

Not measurable.

**Meets the requirements of the following directives**

- EMC Directive 89/336/EEC as of May 1989
- EC Directive for CE conformity marking

**Communication**

- HART Protocol 5.1
- Local connector for LKS (local communication interface) adapter
- HART communication via 20 mA signal line with (optional) FSK modem

## 4.6 Environmental capabilities

**Ambient temperature**

| | |
|---|---|
| For operation, storage and transport: | -40 ..85 °C |
| When using slot proximityswitches SJ2-S1N (NO): | 25 ..85 °C |

**Relative humidity**

| | |
|---|---|
| Operational (with closed housing and air supply switched on): | 95%(annual average), condensation permissible |
| Transport and storage: | 75%(annual average), no condensation |

## 4.7 Housing

**Material/Protections**

Aluminum, protection class IP 65 / NEMA 4X

**Surface/color**

Electrostatic dipping varnish with epoxy resin, stove-hardened. Case varnished black, RAL 9005, matt, housing cover Pantone 420.

**Electrical connections**

| | |
|---|---|
| Screw terminals: | Max. 1.0 $mm^2$ for options,<br>Max. 2.5 $mm^2$ for analog signal. |
| Note: Do not expose the terminals to strain. | |
| Cable entry: | 2 threads 1/2-14 NPT or M20 x 1.5 (1x with cable gland and 1x with pipe plug) |

**Pneumatic connections**

Threads G 1/4 or 1/4-18 NPT

**Weight**

1.7 kg

**Mounting orientation**

any orientation allowed

**Dimensions**

see dimensional drawings

## 4.8 Safety Integrity Level SIL2

Applies to applications with single-acting and depressurizing pneumatics.

**IMPORTANT**

**EXIDA report no.: ABB 03/09-13 R003, Revision R1.0**

The positioner TZIDC and the emergency shutdown module for TZIDC meet the requirements regarding:

– functional safety in accordance with IEC 61508/IEC 61511-1
– explosion protection (depending on the model)
– electromagnetic compatibility in accordance with EN 61000

In case of a failure of electrical power or compressed air supply or when a positioner malfunction occurs, the actuator is depressurized by the TZIDC, and the return spring in the actuator moves the valve to a predefined, safe end position (either OPEN or CLOSED).

SIL specific safety-related characteristics:

| | **TZIDC** | **Emergency shutdown module for TZIDC** |
|---|---|---|
| Category | SIL2 | SIL2 |
| SFF | 85% | 94% |
| PFDav | $7.52 \times 10^{-4}$ | $1.76 \times 10^{-4}$ |
| $\lambda dd + \lambda s$ | 1011 FIT | 718 FIT |
| $\lambda du$ | 172 FIT | 40 FIT |

For details refer to the Management Summary in the SIL Safety-Instructions 37/18-79XA.

## 4.9 Explosion protection

**IMPORTANT**

The values indicated here are taken from the respective approval certificates.
Always observe the specifications and supplements in the certificates (see operating instructions).

| | |
|---|---|
| **FM J.I. 3005029** | **(3610, 3611)** |
| Intrinsically safe<br>Class I, Div. 1 Grp. A-B-C-D<br>Class II, Div. 1 Grp. E-F-G<br>CL III, Div. 1 | |
| Non-incendive, suitable for use in Div. 2 environment | |
| **CSA Certification** | **1052414** |
| Intrinsically safe; Enclosure 4X; T4, max. 85°C<br>Class I, Div. 1 Grp. A-B-C-D<br>Class II, Div. 1 Grp. E-F-G<br>CL III, Div. 1 | |
| Non-incendive; Enclosure 4X, max. 85°C<br>Class I, Div. 2 Grp. A-B-C-D<br>Class II, Div. 2 Grp. E-F-G<br>CL III | |
| **ATEX / GOST Russia / GOST Ukraine** | **II 2G EEx ib IIC T6** |
| Prototype test certificate: | TÜV 98 ATEX 1370 X |
| Type: | Intrinsically safe equipment |
| Device class: | II 2G (EEx ib IIC) |
| Temperature class: | T4, T5, T6 |
| Permissable ambient temperature: | T4: -40 °C ≤ $T_{amb}$ ≤ 85 °C<br>T5: -40 °C ≤ $T_{amb}$ ≤ 50 °C<br>T6: -40 °C ≤ $T_{amb}$ ≤ 35 °C |

| | |
|---|---|
| **ATEX** | **II 2G EEx ib IIC T6**<br>**II 2G EEx ia IIC T6** |
| Prototype test certificate: | TÜV 04 ATEX 2702 X |
| Type: | Intrinsically safe equipment |
| Device class: | II 2G (EEx ib IIC)<br>II 2G (EEx ia IIC) |
| Temperature class: | T4, T5, T6 |
| Permissable ambient temperature: | T4: -40 °C ≤ $T_{amb}$ ≤ 85 °C<br>T5: -40 °C ≤ $T_{amb}$ ≤ 50 °C<br>T6: -40 °C ≤ $T_{amb}$ ≤ 35 °C |

| | |
|---|---|
| **ATEX** | **II 3G EEx n A II T6** |
| Prototype test certificate: | TÜV 02 ATEX 1943 X |
| Type: | Explosion-proof equipment (Zone 2) |
| Device class: | II 3G (EEx n A II) |
| Temperature class: | T4, T5, T6 |
| Permissable ambient temperature: | T4: -40 °C ≤ $T_{amb}$ ≤ 85 °C<br>T5: -40 °C ≤ $T_{amb}$ ≤ 65 °C<br>T6: -40 °C ≤ $T_{amb}$ ≤ 50 °C |

| | |
|---|---|
| **ATEX** | **II 2 D IP 6X T 46 °C** |
| Prototype test certificate: | TÜV 04 ATEX 2702 X |
| Type: | Intrinsically safe equipment |
| Device class: | II 2 D (IP 6X) |

| **Permissible housingsurfacetemperature** | **Permissible ambient temperature (II D)** |
|---|---|
| T81 °C | -40 ..70 °C |
| T61 °C | -40 ..50 °C |
| T46 °C | -40 ..35 °C |

| | |
|---|---|
| **IECEx** | **Ex ib IIC T6** |
| Prototype test certificate: | IECEx TUN 04.0015X, Issue No.: 0 |
| Type: | Intrinsically safe |
| Temperature class: | T4, T5, T6 |
| Permissable ambient temperature: | T4: -40 °C ≤ $T_{amb}$ ≤ 85 °C<br>T5: -40 °C ≤ $T_{amb}$ ≤ 50 °C<br>T6: -40 °C ≤ $T_{amb}$ ≤ 35 °C |

## 4.10 Options

**Module for analog position feedback**[1]

Range 4 ... 20 mA (configurable split ranges)

| | |
|---|---|
| Two-wire circuitry, power supply | 24 V DC (10...30 V DC)<br>48 V DC (20...48 V DC, no explosion protection) |

Action direct or reverse (configurable)

Characteristic deviation ≤ 1 %

**Note**: Without a signal from the positioner (e.g. no energy or initializing) the module sets the output to > 20 mA (alarm level)

**Module for digital position feedback**[1]

2 switches for position signals (position adjustable between 0 and 100%, ranges cannot overlap)

Current circuits to DIN 19234/NAMUR

| | |
|---|---|
| Supply voltage | 5...11 V DC |
| Signal current < 1.0 mA | logical “0” |
| Signal current > 2.0 mA | logical “1” |
| Effective direction: | normally logical “0” or logical “1” (configurable) |

**Module for the emergency shutdown function**[2]

| | |
|---|---|
| Supply voltage | 24 V DC (20 ... 30 V DC)<br>(electrically isolated from the input signal) |
| Safe position is activated when | voltage < 5 V |
| Explosion protection | see certificates |
| SIL | see page 34 |

A separate 24 V DC signal is normally applied to the emergency shutdown module, which connects through the signal from the microprocessor to the I/P module. When the 24 V DC signal is interrupted, the I/P module executes the respective safety function, depending on the mechanical construction.

The positioner output 1 is depressurized, and the valve moves to the safe position. In case of a double-acting actuator the second output is additionally pressurized.

**IMPORTANT**

Use of the emergency shutdown module is only possible for pneumatics with the safe position set to "depressurized".

The emergency shutdown module works independently of the mother board, i.e. all information from the final control element is available in the supervisory process control system at any time.

1. The module for analog position feedback and the module for digital position feedback plug in separate slots and can be used together.
2. The module for the emergency shutdown function uses the same space as the module for analog feedback and the module for digital feedback and cannot be plugged in and run together with any of them.

**Digital position feedback with proximity switches**

2 proximity switches for independent position signaling.
Switching points adjustable between 0 and 100 %
Current circuits to DIN 19234/NAMUR

| | |
|---|---|
| Supply voltage | 5...11 V DC |
| Signal current < 1.0 mA | logical “0” |
| Signal current > 2.0 mA | logical “1” |

Direction of action (logical state):

| Proximity switch | Position | | | |
|---|---|---|---|---|
| | < Lim. 1 | > Lim. 1 | < Lim. 2 | > Lim. 2 |
| SJ2-SN (NC) | 0 | 1 | 1 | 0 |
| SJ2-S1N (NO) | 1 | 0 | 0 | 1 |



**NOTICE**

When using proximity switch type SJ2-S1N (NO) the TZIDC positioner may be exposed to an ambient temperature of -25 °C ... +85 °C, only.

**Digital position feedback with 24 V microswitches**

Two microswitches for independent position signaling.
Switching points adjustable between 0 and 100 %

| | |
|---|---|
| Voltage | max. 24 V AC / DC |
| Current load | max. 2 A |
| Contact surface | 10 µm gold (AU) |

**Mechanical position indicator**

Indicator disk in enclosure cover, linked with positioner feedback shaft



**IMPORTANT**

The options are also available for retrofitting. Please contact our service department.

# 5 Certificates

# APPROVAL REPORT

**TZID-C POSITIONER**
**FOR**
**HAZARDOUS (CLASSIFIED) LOCATIONS**

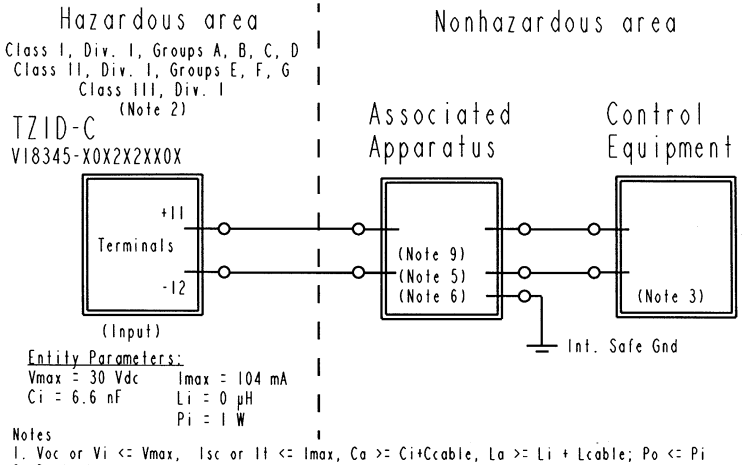
**PREPARED FOR:**

**ABB AUTOMATION PRODUCTS**
**SCHILLERSTR 72**
**32425 MINDEN, GERMANY**

**J.I. 3005029**
**3610, 3611**
**August 17, 2000**

FACTORY MUTUAL | Factory Mutual System
1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, Massachusetts 02062

# CONTROL DOCUMENT NO 901064




Entity Parameters:

| | |
|---|---|
| Vmax = 30 Vdc | Imax = 104 mA |
| Ci = 6.6 nF | Li = 0 µH |
| | Pi = 1 W |

Notes

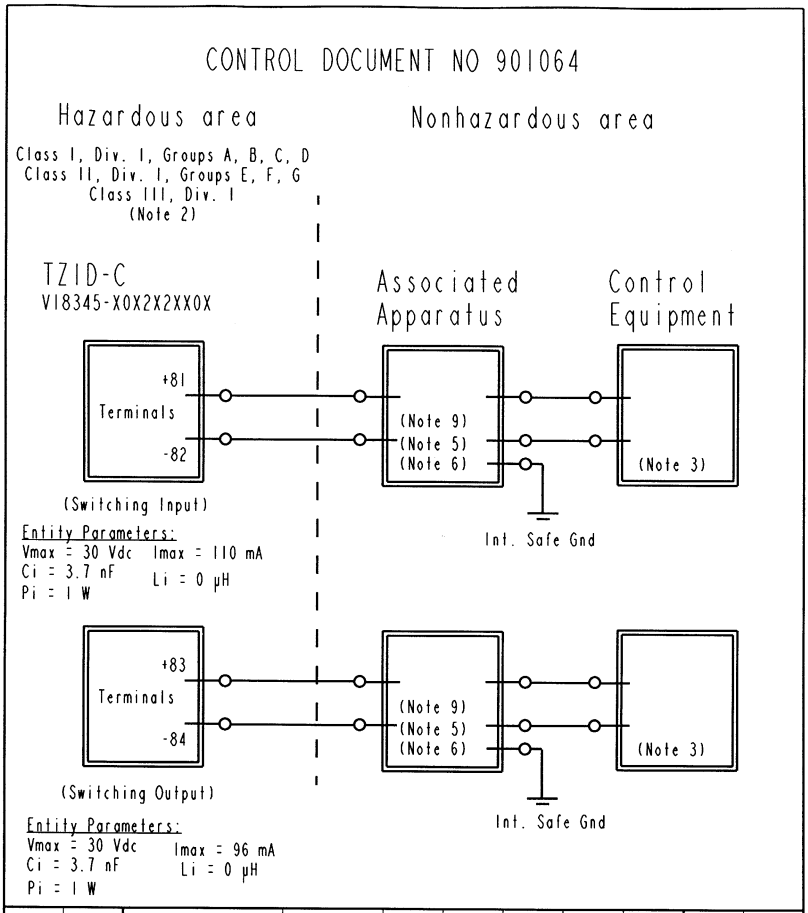
1. Voc or Vi <= Vmax, Isc or It <= Imax, Ca >= Ci+Ccable, La >= Li + Lcable; Po <= Pi
2. Dust-tight conduit seal must be used when installed in Class II and Class III environments.
3. Control equipment connected to barrier must not use or generate more than 250 Vrms or Vdc
4. Installation should be in accordance with ANSI/ISA RP12.6 "Installation of Intrinsically Safe System for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70).
5. The configuration of associated apparatus must be FMRC Approved/CSA Approved as required.
6. Associated apparatus manufacturers installation drawing must be followed when installing this equipment.
7. When connecting conduit to the enclosure use conduit hubs that have the the same environmental rating as the enclosure.
8. No revision to drawing without prior FMRC Approval/CSA Approval.
9. OUTPUT CURRENT MUST BE LIMITED BY A RESISTOR SUCH THAT THE OUTPUT VOLTAGE CURRENT PLOT IS A STRAIGHT LINE DRAWN BETWEEN OPEN CIRCUIT VOLTAGE AND SHORT CIRCUIT CURRENT.
10. Tampering and replacement with non-factory components may adversely affect the safe use of the system. Substitution of components may impair suitability for hazardous locations.
11. FOR DIV. 2 USE: Do not connect or disconnect unless the power was switched off or the area is known to be non hazardous.
12. Local communication interface LKS shall not be used in hazardous locations.
13. To maintain intrinsic safety, wiring associated with each channel must be run in separate cable shields connected to intrinsically safe (associated apparatus) ground.

| Werkstückkanten nach DIN 6784 ohne Angabe: | Allgemeintoleranzen nach DIN 7168-m-C | bis 6 | über 6 bis 30 | über 30 bis 120 | über 120 bis 400 | über 400 |
|---|---|---|---|---|---|---|
| | | ± 0,1 | ± 0,2 | ± 0,3 | ± 0,5 | ± 0,8 |
| Technische Oberfläche nach DIN ISO 1302 | nach Vorschrift | | | | | |
| | Winkelmaße nach DIN 7168 mittel | | | | | |

| | Tag: | Name: | Werkstoff: | |
|---|---|---|---|---|
| Gez. | 08-Apr-99 | Lasarzik | | ABB Automation Products GmbH |
| Gepr. | | | Halbzeug, Rohteil-Nr.: | |
| Normgepr. | | | Rev. 8 (17.08.00) | TKM |

| Maßstab: | Benennung: | |
|---|---|---|
| Paßmaß / Abmaß | CONTROL_DOCUMENT_901064 | 1/4 |

Das Urheberrecht an dieser Zeichnung verbleibt uns. Vervielfältigung und andere, rechtliche Benutzung durch Empfänger od. Dritte bei zivil- u. strafrechtliche Folgen.




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Werkstückkanten nach DIN 6784 ohne Angabe: | Allgemeintoleranzen nach DIN 7168-m-C | bis 6 | über 6 bis 30 | über 30 bis 120 | über 120 bis 400 | über 400 |
| | | ± 0,1 | ± 0,2 | ± 0,3 | ± 0,5 | ± 0,8 |
| Technische Oberfläche nach DIN ISO 1302 | nach Vorschrift | | | | | |
| | Winkelmaße nach DIN 7168 mittel | | | | | |

| | Tag: | Name: |
|---|---|---|
| Gez. | 08-Apr-99 | Lasarzik |
| Gepr. | | |
| Normgepr. | | |

Werkstoff:

Halbzeug, Rohteil-Nr.:

Rev. 8 (17.08.00)

ABB Automation Products GmbH

TKM

Maßstab:

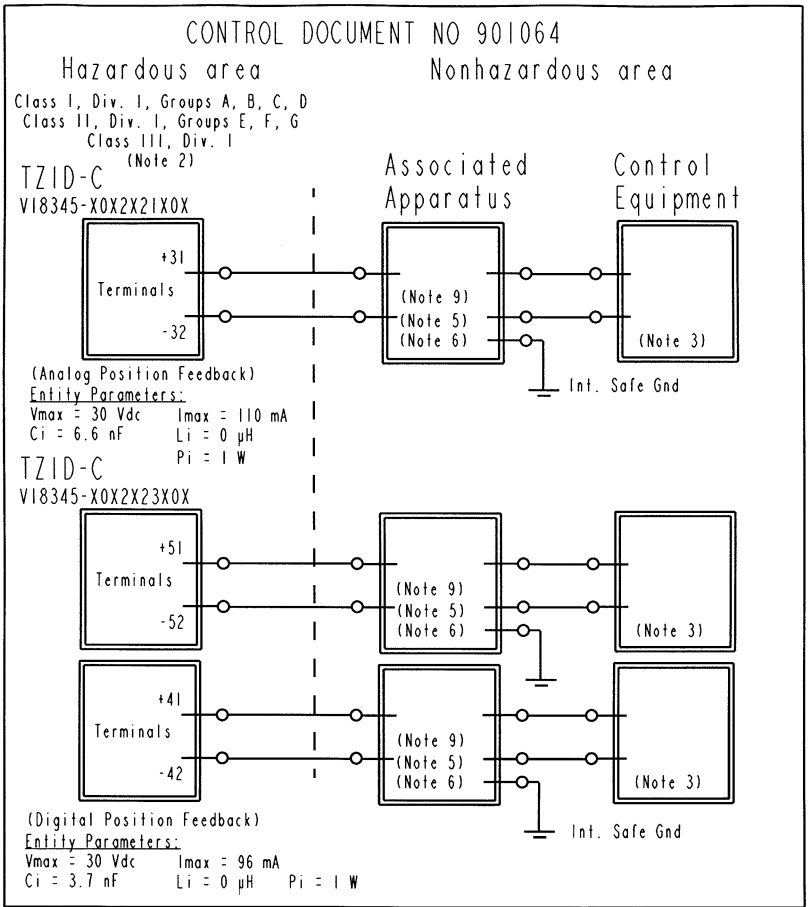
Benennung:

CONTROL_DOCUMENT_901064

Paßmaß | Abmaß

2/4

Das Urheberrecht an dieser Zeichnung verbleibt uns. Vervielfältigung und andere rechtliche Benutzung durch Empfänger od. Dritte hat zivil- u. strafrechtliche Folgen.




| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Werkstückkanten nach DIN 6784 ohne Angabe: -0,3 +0,3 | Allgemeintoleranzen nach DIN 7168-m-C | bis 6 | über 6 bis 30 | über 30 bis 120 | über 120 bis 400 | über 400 |
| | | ± 0,1 | ± 0,2 | ± 0,3 | ± 0,5 | ± 0,8 |
| Technische Oberfläche nach DIN ISO 1302 | nach Vorschrift | | | | | |
| | Winkelmaße nach DIN 7168 mittel | | | | | |

| | Tag: | Name: |
|---|---|---|
| Gez. | 08-Apr-99 | Lasarzik |
| Gepr. | | |
| Normgepr. | | |

Werkstoff:

Halbzeug, Rohteil-Nr.:

Rev. 8 (17.08.00)

ABB Automation Products GmbH

TKM

Maßstab:

Benennung:

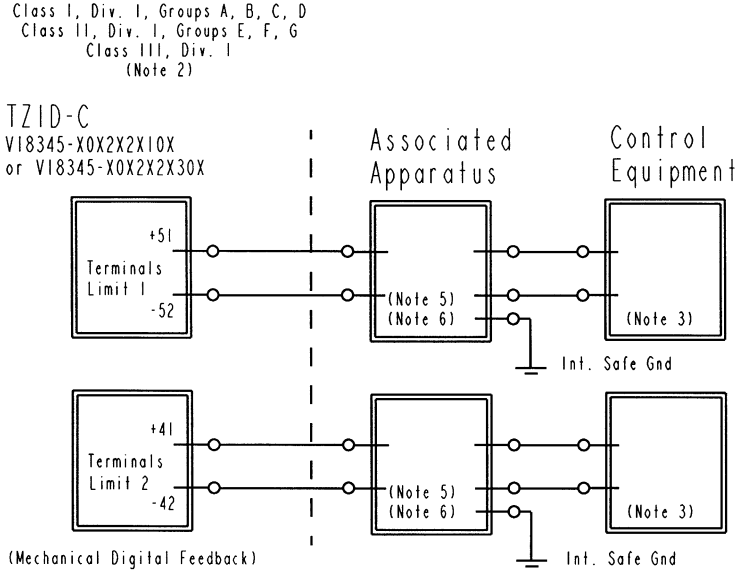
CONTROL_DOCUMENT_901064

Paßmaß | Abmaß

3/4

Das Urheberrecht an dieser Zeichnung verbleibt uns. Vervielfältigung und andere, rechtliche Benutzung durch Empfänger od. Dritte hat zivil- u. strafrechtliche Folgen.

# CONTROL DOCUMENT NO 901064




Entity Parameters:
Vmax = 15.5 V
Imax = 52 mA
Ci = 20 nF
Li = 30 µH
Pi = 1 W

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Werkstückkanten nach DIN 6784 ohne Angabe: | | Allgemeintoleranzen nach DIN 7168-m-C | bis 6 | über 6 bis 30 | über 30 bis 120 | über 120 bis 400 | über 400 | |
| | | | ± 0,1 | ± 0,2 | ± 0,3 | ± 0,5 | ± 0,8 | |
| Technische Oberfläche nach DIN ISO 1302 | | nach Vorschrift | | | | | | |
| | | Winkelmaße nach DIN 7168 mittel | | | | | | |
| | Tag: | Name: | Werkstoff: | | | ABB Automation Products GmbH | | TKM |
| Gez. | 08-Apr-99 | Lasarzik | | | | | | |
| Gepr. | | | Halbzeug, Rohteil-Nr.: | | | | | |
| Normgepr. | | | Rev. 8 (17.08.00) | | | | | |
| Maßstab: | Benennung: | | | | | | | |
| | CONTROL_DOCUMENT_901064 | | | | | | | 4/4 |
| Paßmaß | Abmaß | | | | | | | |

Das Urheberrecht an dieser Zeichnung verbleibt uns. Vervielfältigung und mider-rechtliche Benutzung durch Empfänger od. Dritte hat zivil- u. strafrechtliche Folgen.

CSA INTERNATIONAL

# Certificate of Compliance

**Certification:** 1052414 **Master Contract:** 203012

**Project:** 1052414 **Date Issued:** July 31, 2000

**Issued to:** **ABB Automation Products GmbH**
**SchillerstraBe 72**
**D-32425 Minden**
**Germany**
**Attention: Mr. Wolfgang Lasarzik**

***The products listed below are eligible to bear the CSA Mark shown***

**Issued by:** Dorin Stochitoiu

**Signature:** Stochitoiu

**PRODUCTS**

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:

Model TZID-C, P/N V18345-x0x2x2xx0x Intelligent Positioner; input rated 30V dc max, 4-20mA; max output pressure 90 psi; max ambient 85 Deg C.

CLASS 2258 04 - 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 TZID-C, P/N V18345-x0x2x2xx0x, Intelligent Positioner; input rated 30V dc max, 4-20mA; max output pressure 90 psi; intrinsically safe with entity parameters of: Terminals 11/12: V max = 30V, I max = 104mA, Ci = 6.6nF, Li = 0uH; Terminals 81/82: V max = 30V, I max = 110mA,Ci =3.7nF, Li = 0uH; Terminals 83/84: V max = 30V, I max = 96mA, Ci =3.7nF, Li =0uH; Terminals 31/32: V max = 30V, I max = 110mA, Ci =6.6nF, Li = 0uH; Terminals 41/42 and 51/52: V max = 30V, I max = 96mA, Ci =3.7nF, Li =0uH; Terminals Limit 2 41/42 and Limit 1 51/52: V max = 15.5V, I max = 52mA, Ci =20nF, Li =30uH; when installed per installation Drawing No 901064; Temperature Code T4; Max Ambient 85 Deg C.

Note 1: The "x" in P/N denotes minor mechanical variations or optional features.
Note 2: Local communication interface LKS shall not be used in hazardous location.
Note 3: Each pair of conductors of each in intrinsic safety circuit shall be shielded.

DQD 507WP 2000/04/17 Page 1

CSA INTERNATIONAL

**Certification:** 1052414 **Master Contract:** 203012

**Project:** 1052414 **Date:** July 31, 2000

**APPLICABLE REQUIREMENTS**

| | | |
|---|---|---|
| CAN/CSA-C22.2 No 94-M91 | - | Special Purpose Enclosures |
| CSA Std C22.2 No 142-M1987 | - | Process Control Equipment |
| CAN/CSA-C22.2 No 157-92 | - | Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations |
| CSA Std C22.2 No 213-M1987 | - | Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations |
| CAN/CSA-C22.2 No 25-1966 | - | Enclosures for use in Class II Groups E, F and G Hazardous Location |

**MARKINGS**

- CSA Monogram
- Company Name
- Model Number
- Serial Number
- Electrical Rating
- Hazardous Location Designation
- Entity Parameters (V max, I max, Ci, Li)
- Special Purpose Enclosure Designation, "Type 4X"
- Maximum Ambient
- The Symbol "Exia"
- The Words "INTRINSICALLY SAFE/SECURITE INTRINSEQUE"
- Reference to Installation Instructions
- A statement re: Changing Components ....
- Caution statement re: Disconnection of Circuits...
- Statement: Local Communication Interface LKS cannot be Used in Hazardous Locations.

DQD 507WP 2000/04/17 Page 2

CSA INTERNATIONAL

## *Supplement to Certificate of Compliance*

**Certificate:** 1052414 **Master Contract:** 203012

**Project:** 1052414

**Issued to:** **ABB Automation Products GmbH**
**SchillerstraBe 72**
**D-32425 Minden**
**Germany**
**Attention: Mr. Wolfgang Lasarzik**

***The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.***

**Issued By:** Dorin Stochitoiu

**Signature:** Stochitoiu

### Product Certification History

| Project | Date | Description |
|---|---|---|
| 1052414 | July 31, 2000 | Original Certification - Model TZID-C Positioner. |

DQD 507WP 2000/04/17 Page 1

Translation

(1) # EC TYPE-EXAMINATION CERTIFICATE

(2) Equipment or Protective System intended for use in potentially explosive atmospheres - **Directive 94/9/EC**

(3) EC-Type Examination Certificate Number

**TÜV 98 ATEX 1370 X**

| | | |
|---|---|---|
| (4) | Equipment or Protective System: | Positioner Type Doc. 901047 (TZID-C) |
| (5) | Manufacturer: | Hartmann und Braun GmbH & Co. KG Geschäftsbereich Gerätetechnik |
| (6) | Address: | D-30179 Hannover, Hackethalstr. 7 |

(7) This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate.

(8) The TÜV Hannover/Sachsen-Anhalt e.V., TÜV Certification Body N° 0032 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Basic Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential report N° 98/PX25180.

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

**EN 50 014 : 1997** **EN 50 020 : 1994**

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

(11) This EC-type examination certificate relates only to the design and construction of the specified equipment or protective system according to Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and placing on the market of this equipment or protective system.

(12) The marking of the equipment or protective system must include the following:

**Ex II 2 G EEx ib IIC T6**

**TÜV Hannover/Sachsen-Anhalt e.V.**
**TÜV CERT-Zertifizierungsstelle**
**Am TÜV 1**
**D-30519 Hannover**

i. A.

**Head of the Certification Body**

**Hanover, 1998-12-08**

10/01Ad TÜV Nord s DAP 5.97

**This certificate may only be reproduced without any change, schedule included. Excerpts or changes shall be allowed by the TÜV Hannover/Sachsen-Anhalt e.V.**

(13) **SCHEDULE**

(14) **EC-TYPE EXAMINATION CERTIFICATE N° TÜV 98 ATEX 1370 X**

(15) Description of equipment or protective system

The Positioner Type Doc. 901047 (TZID-C) is used for the control resp. closed loop control of pneumatic driven valves by means of a impressed signal current of 4...20 mA. A integrated distance sensor measures the current position of the valve drive. A integrated current/pressure transformer (I/P) is used for the control of the pneumatic auxiliary energy.

The permissible ambient temperature area is depending on the temperature classification and is given in the following table:

| Temperature classification | Ambient temperature area |
|---|---|
| T4 | - 40 °C to + 85 °C |
| T5 | - 40 °C to + 50 °C |
| T6 | - 40 °C to + 35 °C |

Electrical data

Signal circuit .....in type of protection "Intrinsic Safety" EEx ib IIC
Terminals 11(+), 12 (-) only for the connection to a certified intrinsically safe circuit with the maximal values of:
$U_i$ = 30 V
$I_i$ = 320 mA
$P_i$ = 1,1 W

effective internal capacitance : $C_i$ = 6,6 nF
The effective internal inductance is negligibly small.

Switch input.....in type of protection "Intrinsic Safety" EEx ib IIC
Terminals 81(+), 82 (-) only for the connection to a certified intrinsically safe circuit with the maximal values of:
$U_i$ = 30 V

effective internal capacitance : $C_i$ = 3,7 nF
The effective internal inductance is negligibly small.

Switch output.....in type of protection "Intrinsic Safety" EEx ib IIC
Terminals 83(+), 84 (-) only for the connection to a certified intrinsically safe circuit with the maximal values of:
$U_i$ = 30 V
$P_i$ = 500 mW

effective internal capacitance : $C_i$ = 3,7 nF
The effective internal inductance is negligibly small.

BA 02 11.98 1.000.000

Local Interface for Communication (LKS) ..... for the connection to a programmer outside of the explosive hazardous area

The intrinsically safe circuits themselves are safe galvanically separated up to an voltage of 60 V. The "Local Interface for Communication" (LKS) is connected with the signal circuit.

(16) Test documents are listed in the test report No. 98/PX25180.

(17) Special condition for safe use

The "Local Interface for Communication" (LKS) may only be used outside of the explosive hazardous area.

(18) Basic Health and Safety Requirements

no additional ones

BA 02 11.98 1.000.000

*Translation from the original document*

## 1st Supplement to the

# EEC Type Examination Certificate TÜV 98 ATEX 1370 X

Manufacturer: Hartmann & Braun GmbH & Co. KG
Geschäftsbereich Gerätetechnik
Hackethalstr. 7
D-30179 Hannover,

The positioner type Doc 901047 (TZID-C) may be produced in accordance with the documents compiled in the test report. Additional option cards are provided. The electrical specifications, the special requirements and further specifications of the type examination certificate continue to be valid. The electrical specifications of the new cards are listed below:

| | |
|---|---|
| Mechanical kit for digital position feedback<br>(Terminals Limit1 +51, -52<br>or Limit2 +41, -42) | refer to PTB Certificate No. Ex-95.D.2195 X<br>for the maximum values |
| Digital position feedback card<br>(Terminals +51, -52<br>or +41, -42 | Explosion protection: intrinsically safe EEx ib IIC<br>only for connection to approved intrinsically safe<br>current circuits with the following max. values:<br>$V_i$ = 30 V<br>$P_i$ = 500 mW<br><br>Effective internal capacitance $C_i$ = 3.7 nF<br>The effective internal inductance is negligible |
| Analog position feedback card<br>(Terminals +31, -32 | Explosion protection: intrinsically safe EEx ib IIC<br>only for connection to approved intrinsically safe<br>current circuits with the following max. values:<br>$V_i$ = 30 V<br>$P_i$ = 1100 mW<br><br>Effective internal capacitance $C_i$ = 6.6 nF<br>The effective internal inductance is negligible |

(16) The test documents are compiled in the Test Report No. 99/PX05990.

(17) Special Requirements:

No additional requirements

(18) Special Safety and Health Requirements

No additional requirements.

TÜV Hannover/Sachsen-Anhalt e.V.
TÜV CERT-Zertifizierungsstelle
Am TÜV 1
D-30519 Hannover

Hannover, April 9, 1999

Signature

Seite 1/2

**Important**

Only the 7th. Supplement to the certificate TÜV 98 ATEX 1370 X is shown here, since the Supplements 2 to 6 do not contain information that is relevant for these operating instructions.

**Translation**

## 7. SUPPLEMENT to

## EC TYPE-EXAMINATION CERTIFICATE No. TÜV 98 ATEX 1370 X

of the company: ABB Automation Products GmbH
Schillerstraße 72
D-32425 Minden

In the future the Positioner type Doc.901047 (TZID-C) may also be manufactured according to the test documents listed in the test report. The modifications refer to the internal construction, the enclosure as well as the "Electrical data".

Electrical data

| | |
|---|---|
| Mechanical digital feedback<br>(Terminals Limit1 +51, -52<br>resp. Limit2 +41, -42) | Maximum values see EC-Type Examination Certificate<br>No. PTB 00 ATEX 2049 X<br>(proximity switches of the company Pepperl & Fuchs) |
| Shutdown-switching input<br>(Terminals +51 and –52<br>resp. +85 and -86) | in the type of protection Intrinsic Safety EEx ib IIC<br><br>only for the connection to a certified intrinsically safe circuit with the maximum values of:<br>$U_i$ = 30 V<br>$C_i$ = 3.7 nF<br>$L_i$ negligibly small |

All other data remain unchanged.

(16) Test documents are listed in the test report N° 03 YEX 550212.

(17) Special conditions for safe use

Variants, which also comply with the type of protection „Flameproof Enclosure" according to a separate certificate, may not be operated intrinsically safe after use as apparatus in the type of protection „Flameproof Enclosure".

(18) Essential Health and Safety Requirements

no additional ones

**TÜV NORD CERT GmbH & Co. KG**
**TÜV CERT-Certification Body**
**Am TÜV 1**
**D-30519 Hannover**
**Tel.: 0511 986-1470**
**Fax: 0511 986-2555**

**Hanover, 2003-03-21**

**Head of the Certification Body**

BA 02.11.03

**page 1/1**

Translation

(1) # STATEMENT OF CONFORMITY

(2) Equipment or Protective System intended for use in potentially explosive atmospheres **- Directive 94/9/EC**

(3) Test certificate number

## TÜV 02 ATEX 1943 X

(4) Equipment: Positioner type TZID-Cxxx

(5) Manufacturer: ABB Automation Products GmbH

(6) Address: Schillerstraße 72
D–32425 Minden

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

(8) The TÜV NORD CERT GmbH & Co. KG, TÜV CERT-Certification Body, notified body number N° 0032 in accordance with Article 9 of the Council Directive 94/9/EC of March 23, 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report N° 02YEX 182036.

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

**EN 50021:1999**

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

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

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

**Ex II 3 G EEx n A II T6**

**TÜV NORD CERT GmbH & Co. KG**
**TÜV CERT-Certification Body**
**Am TÜV 1**
**D-30519 Hannover**
**Tel.: 0511 986-1470**
**Fax: 0511 986-2555**

**Hanover, 2002-10-26**

**TÜV NORD CERT**

**Head of the Certification Body**

TÜV CERT A4 07.01 10.000 Lö

**This statement of conformity may only be reproduced without any change, schedule included. Excerpts or changes shall be allowed by the TÜV NORD CERT GmbH & Co. KG**

(13) **SCHEDULE**

(14) **STATEMENT OF CONFORMITY N° TÜV 02 ATEX 1943 X**

(15) Description of equipment or protective system

The positioner type TZID-Cxxx is used for the control resp. closed loop control of pneumatically actuated valves.
The positioner type TZID-C110 resp. TZID-C110 transfers the reference value via a field bus signal.
The positioner type TZID-C transfers the reference value via a current loop of 4 ... 20 mA.
The positioner type TZID-Cxxx may be installed in explosion hazardous areas that require apparatus of the category 3.

The permissible ambient temperature range in dependence of the temperature class has to be taken from the following table:

| Temperature class | Ambient temperature range |
|---|---|
| T6 | -40°C to +50°C |
| T5 | -40°C to +65°C |
| T4 | -40°C to +85°C |

Electrical data

**Type TZID-C**
Signal circuit ..... U = 8,7 V d. c.; 4 ... 20 mA, max. 21,5 mA
(Terminals 12[-], 11[+] )

Digital input ..... U = 12 ... 24 V DC, 4mA
(Terminals 82[-], 81[+] )

Digital output ..... U = 11 V DC
(Terminals 84[-], 83[+] )

**Options for TZID-C**
Circuit for
analog position feedback .... U = 10 ...30 V d. c.; 4 ... 20 mA, max. 21,5 mA
(Terminals 32[-], 31[+] )

Circuit for
digital position feedback .....U = 5 ... 11 V d. c.
(Terminals 42[-], 41[+]
resp. 52[-], 51[+] )

**Type TZID-C110**
Input circuit ..... U = 9 ... 32 V d. c.; 10,5 mA
(Terminals 12[-], 11[+] )

**Type TZID-C120**
Input circuit ..... U = 9 ... 32 V d. c.; 11,5 mA
(Terminals 12[-], 11[+] )

**Options for all Types**
Circuit for
shutdown function..... U = 20 ... 30 V d. c.
(Terminals 86[-], 85[+] )

Circuit for digital
position feedback with
proximity switches ..... U = 5 ... 11 V d. c.
(Terminals Limit 1 52[-], 51[+]
resp. Limit 2 42[-], 41[+] )

(16) Test documents are listed in the test report no. 02YEX182036.

(17) Special conditions for safe use

1. Only devices, which are suitable for the operation in explosion hazardous areas of the zone 2 and the conditions available at the place of operation (Declaration of conformity or certificate of a testing department), are allowed to be connected to non intrinsically safe circuits in the zone 2.

2. The connecting and disconnecting as well as the switching of circuits under voltage, is only permitted during installation, for maintenance or for repair purposes.
Note: The temporal coincidence of explosion hazardous atmosphere and installation, maintenance resp. repair purposes is assessed as unlikely.

3. For the circuit "digital position feedback with proximity switches" measures have to be taken outside the device, that the rated voltage is exceeded not more than 40% by transient disturbances.

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

5. Only suitable cable entries, which meet the requirements of EN 50 021, are allowed to be used.

(18) Essential Health and Safety Requirements

no additional ones

# IECEx Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION
## IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: **IECEx TUN 04.0015X** Issue No.: **0**

Status: **Current**

Date of Issue: **2004-07-29** Page **1** of **4**

Applicant: **ABB Automation Products GmbH**
Schillerstraße 72
32425 Minden
**Germany**

Electrical Apparatus: **Positioner type TZIDC-xxx**
*Optional accessory:*

Type of Protection: **Intrinsic safety; Type of protection "n"**

Marking: **Ex ia IIC T6 resp. Ex nA II T6**

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

*Position:* Head of IECExCB

*Signature:*
*(for printed version)*

*Date:*

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

**TÜV NORD CERT GmbH & Co. KG**
**Am TUV1**
**D-30519 Hannover**
**Germany**

# IECEx Certificate of Conformity

Certificate No.: **IECEx TUN 04.0015X**

Date of Issue: **2004-07-29** Issue No.: **0**



Manufacturer: **ABB Automation Products GmbH**
Schillerstraße 72
32425 Minden
**Germany**

Manufacturing location(s):

**ABB**
Automation Products GmbH
Schillerstraße 72
32425 Minden
Germany

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

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

| | |
|---|---|
| **IEC 60079-0 : 2000**<br>Edition: 3.1 | Electrical apparatus for explosive gas atmospheres - Part 0: General requirements |
| **IEC 60079-11 : 1999**<br>Edition: 4 | Electrical apparatus for explosive gas atmospheres - Part 11: Intrinsic safety 'i' |
| **IEC 60079-15 : 2001**<br>Edition: 2 | Electrical apparatus for explosive gas atmospheres - Part 15: Type of protection 'n' |

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

**TEST & ASSESSMENT REPORTS:**
*A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in*

IECEx ATR: **DE/TUN/04/551542**

File Reference: **04 YEX 551542**

# IECEx Certificate of Conformity

Certificate No.: **IECEx TUN 04.0015X**

Date of Issue: **2004-07-29** Issue No.: **0**



## Schedule

**EQUIPMENT:**
*Equipment and systems covered by this certificate are as follows:*

The Positioner type TZIDC-xxx is used for the control resp. closed loop control of pneumatic driven valves.
The Positioner type TZIDC resp. TZIDC-200 transfers the reference value by means of an impressed signal current of 4…20 mA.
The Positioner type TZIDC-110, TZIDC-210, TZIDC-120 resp. TZIDC-220 transfers the reference value via a field bus signal.
An integrated distance sensor measures the current position of the valve drive. An integrated current/pressure transformer (I/P) is used for the pneumatic auxiliary power.

The permissible ambient temperature range in dependence on the type, the type of protection and the Temperature Classes has to be taken from the following table:

| Type and marking | TZIDC resp. TZIDC-200 Ex ib IIC | TZIDC-110/-210/ -120/-220 Ex ia IIC | TZIDC resp. TZIDC-110/-120 Ex nA II |
|---|---|---|---|
| Temperature Class | Ambient temperature range | | |
| T4 | -40°C to +85°C | -40°C to +85°C | -40°C to +85°C |
| T5 | -40°C to +50°C | -40°C to +55°C | -40°C to +65°C |
| T6 | -40°C to +35°C | -40°C to +40°C | -40°C to +50°C |

Additional technical data see EQUIPMENT (continued)

**CONDITIONS OF CERTIFICATION: YES as shown below:**

Special condition for safe use of intrinsically safe Positioners:

The operation of the local communication interface (LKS) and of the programming interface (X5) is only allowed outside of the hazardous explosive area.

Special conditions for safe use of Positioners marked Ex nA II T6:

Only devices which are suitable for the operation in explosion 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 only 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 is exceeded not more than 40% by transient disturbances.
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.

# IECEx Certificate of Conformity

Certificate No.: **IECEx TUN 04.0015X**

Date of Issue: **2004-07-29** Issue No.: **0**



**Additional information:**

| **Electrical data for type TZIDC resp. TZIDC-200 with marking Ex ib IIC T6** | |
|---|---|
| Signal circuit<br>(terminals 11(+), 12(-)) | in type of protection "Intrinsic Safety" Ex ib IIC<br>only for the connection to a certified intrinsically safe circuit with the following maximum values:<br>$U_i$ = 30 V<br>$I_i$ = 320 mA<br>$P_i$ = 1.1 W<br>effective internal capacitance: $C_i$ = 6.6 nF<br>The effective internal inductance is negligibly small. |
| Switch input<br>(terminals 81(+), 82(-)) | in type of protection "Intrinsic Safety" Ex ib IIC<br>only for the connection to a certified intrinsically safe circuit with the following maximum values:<br>$U_i$ = 30 V<br>effective internal capacitance: $C_i$ = 3.7 nF<br>The effective internal inductance is negligibly small. |
| Switch output<br>(terminals 83(+), 84(-)) | in type of protection "Intrinsic Safety" Ex ib IIC<br>only for the connection to a certified intrinsically safe circuit with the following maximum values:<br>$U_i$ = 30 V<br>$P_i$ = 500 mW<br>effective internal capacitance: $C_i$ = 3.7 nF<br>The effective internal inductance is negligibly small. |
| Local interface for communication (LKS) | For the connection to a programmer outside of the explosive hazardous area. |
| Optionally the following modules are allowed to be used: | |
| Mechanical digital feedback<br>(terminals Limit1 +51, -52<br>resp. Limit2 +41, -42) | in type of protection "Intrinsic Safety" Ex ib IIC<br>Maximum values see IEC Certificate No.<br>(proximity switches of the company Pepperl + Fuchs GmbH) |
| Digital feedback<br>(terminals +51, -52<br>resp. +41, -42) | in type of protection "Intrinsic Safety" Ex ib IIC<br>only for the connection to a certified intrinsically safe circuit with the following maximum values:<br>$U_i$ = 30 V<br>$P_i$ = 500 mW<br>effective internal capacitance: $C_i$ = 3.7 nF<br>The effective internal inductance is negligibly small. |
| Analogue feedback<br>(terminals +31, -32) | in type of protection "Intrinsic Safety" Ex ib IIC<br>only for the connection to a certified intrinsically safe circuit with the following maximum values:<br>$U_i$ = 30 V<br>$P_i$ = 1.1 W<br>effective internal capacitance: $C_i$ = 6.6 nF<br>The effective internal inductance is negligibly small. |
| Shutdown-switch-input<br>(terminals +51, -52<br>resp. +85, -86) | in type of protection "Intrinsic Safety" Ex ib IIC<br>only for the connection to a certified intrinsically safe circuit with the following maximum values:<br>$U_i$ = 30 V<br>effective internal capacitance: $C_i$ = 3.7 nF<br>The effective internal inductance is negligibly small. |
| The intrinsically safe circuits themselves are safe galvanically separated up to a voltage of 60 V. The "Local interface for communication (LKS)" is connected with the signal circuit. | |

| **Electrical data for type TZIDC-110, TZIDC-210, TZIDC-120 resp. TZIDC-220 with marking Ex ia IIC T6** | | | |
|---|---|---|---|
| Input circuit (terminals +11, -12 resp. +, -) | in type of protection “Intrinsic Safety” Ex ia IIC resp. Ex ib IIC only for the connection to a certified intrinsically safe circuit (e.g. FISCO power supply) with the maximum values according to the following table: | | |
| | FISCO power supply ia/ib for group IIB/IIC | FISCO power supply ia/ib for group IIB/IIC | Barrier or power supply ia/ib for group IIB/IIC |
| Voltage | 17.5 V | 17.5 V | 24 V |
| Current | 380 mA | 360 mA | 250 mA |
| Power | 5.32 W | 2.52 W | 1.2 W |
| Characteristic line | rectangular | Trapezoidal | linear |
| Local interface for communication (LKS) and programming interface (X5) | For the connection to a programmer resp. a PC outside of the explosive hazardous area. | | |
| Optionally the following modules are allowed to be used: | | | |
| Shutdown-switch-input (terminals +51, -52 resp. +85, -86) | 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:<br>$U_i$ = 30 V<br>effective internal capacitance: $C_i$ = 3.7 nF<br>The effective internal inductance is negligibly small. | | |
| Mechanical digital feedback (terminals Limit1 +51, -52 resp. Limit2 +41, -42) | in type of protection “Intrinsic Safety” Ex ib IIC<br>Maximum values see IEC Certificate No.<br>(proximity switches of the company Pepperl + Fuchs GmbH) | | |
| The intrinsically safe circuits themselves are safe galvanically separated up to a voltage of 60 V. The “Local interface for communication (LKS) and programming interface (X5)” is connected with the signal circuit. | | | |

| **Electrical data for type TZIDC, TZIDC-110 resp. TZIDC-120 with marking Ex nA II T6** | |
|---|---|
| **Type TZIDC resp. TZIDC-200** | |
| Signal circuit<br>(terminals 11(+), 12(-)) | U = 8.7 VDC; 4...20 mA, max. 21.5 mA |
| Switch input<br>(terminals 81(+), 82(-)) | U = 12…24 VDC; 4 mA |
| Switch output<br>(terminals 83(+), 84(-)) | U = 11 VDC |
| Optionally the following modules are allowed to be used with type TZIDC: | |
| Digital feedback<br>(terminals +51, -52<br>resp. +41, -42)) | U = 5…11 VDC |
| Analogue feedback<br>(terminals +31, -32) | U = 10…30 VDC; 4…20 mA, max. 21.5 mA |
| **Type TZIDC-110** | |
| Input circuit<br>(terminals +11, -12) | U = 9..32 VDC; 10.5 mA |
| **Type TZIDC-120** | |
| Input circuit<br>(terminals +11, -12) | U = 9..32 VDC; 11.5 mA |
| Additionally the following modules are allowed to be used with all types marked Ex nA II T6: | |
| Shutdown-switch-input<br>(terminals +51, -52<br>resp. +85, -86) | U = 20…30 VDC |
| Mechanical digital feedback<br>(terminals Limit1 +51, -52<br>resp. Limit2 +41, -42) | U = 5…11 VDC |

# Physikalisch-Technische Bundesanstalt

**Braunschweig und Berlin**

(1) # EC-TYPE-EXAMINATION CERTIFICATE

**(Translation)**

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

(3) EC-type-examination Certificate Number:

**PTB 00 ATEX 2049 X**

(4) Equipment: SN-sensors, types NJ... and SJ...

(5) Manufacturer: Pepperl + Fuchs GmbH

(6) Address: D-68307 Mannheim

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

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

The examination and test results are recorded in the confidential report PTB Ex 00-29268.

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

**EN 50014:1997** **EN 50020:1994**

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

(11) This EC-type-examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

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

**Ex II 2 G EEx ia IIC T6**

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, October 05, 2000



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

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2049 X

(15) Description of equipment

The SN-sensors, types NJ... and SJ... are used to convert displacements into electrical signals.

The SN-sensors, types NJ... and SJ... may be operated with intrinsically safe circuits certified for categories and explosion groups [EEx ia] IIC or IIB resp. [EEx ib] IIC or IIB. The category as well as the explosion group of the SN-sensors depends on the connected supplying intrinsically safe circuit.

Electrical data

Evaluation and
supply circuit..... type of protection Intrinsic Safety EEx ia IIC/IIB
resp. EEx ib IIC/IIB
only for connection to certified intrinsically safe circuits
maximum values:

| type 1 | type 2 | type 3 | type 4 |
|---|---|---|---|
| $U_i$ = 16 V | $U_i$ = 16 V | $U_i$ = 16 V | $U_i$ = 16 V |
| $I_i$ = 25 mA | $I_i$ = 25 mA | $I_i$ = 52 mA | $I_i$ = 76 mA |
| $P_i$ = 34 mW | $P_i$ = 64 mW | $P_i$ = 169 mW | $P_i$ = 242 mW |

The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of SN-sensors is shown in the following table:



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

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

| types | $C_i$ | $L_i$ | type 1 | | | type 2 | | | type 3 | | | type 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | maximum permissible ambient temperature in °C for application in temperature class | | | | | | | | | | | |
| | [nF] | [µH] | T6 | T5 | T4-T1 | T6 | T5 | T4-T1 | T6 | T5 | T4-T1 | T6 | T5 | T4-T1 |
| NJ 2-11-SN... | 50 | 150 | 73 | 88 | 100 | 66 | 81 | 100 | 45 | 60 | 89 | 30 | 45 | 74 |
| NJ 2-11-SN-G... | 50 | 150 | 76 | 91 | 100 | 73 | 88 | 100 | 62 | 77 | 81 | 54 | 63 | 63 |
| NJ 2-12GK-SN... | 50 | 150 | 73 | 88 | 100 | 69 | 84 | 100 | 51 | 66 | 80 | 39 | 54 | 61 |
| NJ 3-18GK-S1N... | 70 | 200 | 73 | 88 | 100 | 69 | 84 | 100 | 51 | 66 | 80 | 39 | 54 | 61 |
| NJ 4-12GK-SN... | 70 | 150 | 73 | 88 | 100 | 69 | 84 | 100 | 51 | 66 | 80 | 39 | 54 | 61 |
| NJ 5-18GK-SN... | 120 | 200 | 73 | 88 | 100 | 69 | 84 | 100 | 51 | 66 | 80 | 39 | 54 | 61 |
| NJ 5-30GK-S1N... | 100 | 200 | 73 | 88 | 100 | 69 | 84 | 100 | 51 | 66 | 80 | 39 | 54 | 61 |
| NJ 6-22-SN... | 110 | 150 | 73 | 88 | 100 | 69 | 84 | 100 | 51 | 66 | 80 | 39 | 54 | 61 |
| NJ 6-22-SN-G... | 110 | 150 | 76 | 91 | 100 | 73 | 88 | 100 | 62 | 77 | 81 | 54 | 63 | 63 |
| NJ 6S1+U.+N... | 180 | 150 | 73 | 88 | 100 | 69 | 84 | 100 | 51 | 66 | 80 | 39 | 54 | 61 |
| NJ 8-18GK-SN... | 120 | 200 | 73 | 88 | 100 | 69 | 84 | 100 | 51 | 66 | 80 | 39 | 54 | 61 |
| NJ 10-30GK-SN... | 120 | 150 | 73 | 88 | 100 | 69 | 84 | 100 | 51 | 66 | 80 | 39 | 54 | 61 |
| NJ 15-30GK-SN... | 120 | 180 | 73 | 88 | 100 | 69 | 84 | 100 | 51 | 66 | 80 | 39 | 54 | 61 |
| NJ 15S-U.-N... | 180 | 150 | 73 | 88 | 100 | 66 | 81 | 100 | 45 | 60 | 89 | 30 | 45 | 74 |
| NJ 20S-U.-N... | 200 | 150 | 73 | 88 | 100 | 66 | 81 | 100 | 45 | 60 | 89 | 30 | 45 | 74 |
| NJ 40-FP-SN... | 370 | 300 | 73 | 88 | 100 | 66 | 81 | 100 | 45 | 60 | 89 | 30 | 45 | 74 |
| SJ 2-SN... | 30 | 100 | 73 | 88 | 100 | 66 | 81 | 100 | 45 | 60 | 78 | 30 | 45 | 57 |
| SJ 2-S1N... | 30 | 100 | 73 | 88 | 100 | 66 | 81 | 100 | 45 | 60 | 78 | 30 | 45 | 57 |
| SJ 3,5-S1N... | 30 | 100 | 73 | 88 | 100 | 66 | 81 | 100 | 45 | 60 | 89 | 30 | 45 | 74 |
| SJ 3,5-SN... | 30 | 100 | 73 | 88 | 100 | 66 | 81 | 100 | 45 | 60 | 89 | 30 | 45 | 74 |

(16) Test report PTB Ex 00-29268

(17) Special conditions for safe use

1. For the application within a temperature range of -60 °C to -20 °C the SN-sensors, types NJ... and SJ... must be protected against damage due to impact by mounting into an additional housing.
2. The connection facilities of the SN-sensors, types NJ... and SJ... shall be installed as such that at least a degree of protection of IP20 according to IEC-publication 60529:1989 is met.
3. The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of SN-sensors is shown in the table given under item (15) of this EC-type-examination certifcate.




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

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

4. With the application in group IIC inadmissible electrostatic charge of the plastic housing has to be avoided for following types of SN-sensors (warning label on the device).:

   NJ 40-FP-SN...

5. Inadmissible electrostatic charge of parts of the metal houising has to be avoided for the following types of SN-sensors. Dangerous electrostatic charges of parts of the metal housing can be avoided by grounding of these parts whereas very small parts of the metal housing (e.g. screws) don't need to be grounded:

   NJ 2-11-SN-G...
   NJ 6-22-SN-G...
   NJ 6S1+U3+N...
   NJ 6S1+U4+N...
   NJ 15S+U3+N...
   NJ 15S+U4+N...
   NJ 20S+U3+N...
   NJ 20S+U4+N...
   NJ 40-FP-SN-P3...
   NJ 40-FP-SN-P4...

(18) Essential health and safety requirements

Met by the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, October 05, 2000



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

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

Translation

(1) # EC-TYPE EXAMINATION CERTIFICATE

(2) Equipment and protective systems intended for use in potentially explosive atmospheres **- Directive 94/9/EC**

(3) EC-Type Examination Certificate Number

**TÜV 04 ATEX 2702 X**

(4) Equipment: Positioner type TZIDC

(5) Manufacturer: ABB Automation Products GmbH

(6) Address: Schillerstrasse 72
D-32425 Minden

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

(8) The TÜV NORD CERT GmbH & Co. KG, TÜV CERT-Certification Body, notified body number N° 0032 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential report N° 04YEX551733.

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

**EN 50 014:1997+A1+A2** **EN 50 020:2002** **EN 50281-1-1:1998**

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

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

(12) The marking of the equipment or protective system must include the following:

**Ex II 2 G EEx ib IIC T6 resp. II 2 D IP 6X T 46 °C**

**TÜV NORD CERT GmbH & Co. KG**
**TÜV CERT-Certification Body**
**Am TÜV 1**
**D-30519 Hannover**
**Tel.: 0511 986-1470**
**Fax: 0511 986-2555**

**Hanover, 2004-12-21**

**TÜV NORD CERT**

**Head of the Certification Body**

TÜV CERT A4 02.04 5.000 Lö

**This certificate may only be reproduced without any change, schedule included. Excerpts or changes shall be allowed by the TÜV NORD CERT GmbH & Co. KG**

(13) **SCHEDULE**

(14) **EC-TYPE EXAMINATION CERTIFICATE N° TÜV 04 ATEX 2702 X**

(15) Description of equipment

The positioner type TZIDC is used for the control resp. closed-loop control of pneumatically driven valves using an impressed current of 4 to 20 mA. An integrated position sensor determines the actual position of the valve drive. An integrated current/pressure transducer (I/P) is used for the control of the pneumatic auxiliary power.

The permissable ambient temperature ranges in dependence of the temperature class resp. enclosure surface temperature have to be taken from the following table:

| Temperature class | Ambient temperature range (II G) |
|---|---|
| T4 | - 40 °C to + 85 °C |
| T5 | - 40 °C to + 50 °C |
| T6 | - 40 °C to + 35 °C |

| Enclosure surface temperature | Ambient temperature range (II D) |
|---|---|
| T81 °C | - 40 °C to + 70 °C |
| T61 °C | - 40 °C to + 50 °C |
| T46 °C | - 40 °C to + 35 °C |

Electrical Data

Signal circuit
(Terminal +11, –12)

in the type of protection Intrinsic Safety EEx ib IIC
only for the connection to a certified intrinsically safe circuit
Maximum values:
$U_i$ = 30 V
$I_i$ = 320 mA
$P_i$ = 1.1 W
$C_i$ = 6.6 nF
$L_i$ negligibly small

Switching input
(Terminal +81, –82)

in the type of protection Intrinsic Safety EEx ib IIC
only for the connection to a certified intrinsically safe circuit
Maximum values:
$U_i$ = 30 V
$C_i$ = 3.7 nF
$L_i$ negligibly small

BA 02 03.02

| | |
|---|---|
| Switching output<br>(Terminal +83, –84) | in the type of protection Intrinsic Safety EEx ib IIC<br>only for the connection to a certified intrinsically safe circuit<br>Maximum values:<br>$U_i$ = 30 V<br>$P_i$ = 500 mW<br>$C_i$ = 3.7 nF<br>$L_i$ negligibly small |
| Mechanical digital feed back<br>(Terminals Limit1 +51, -52<br>resp. Limit2 +41, -42) | Maximum values see EC-Type Examination Certificate No. PTB 00 ATEX 2049 X<br>(Slot-type initiators of the company Pepperl & Fuchs) |
| Cartridge for digital feed back<br>(Terminals +51, -52<br>resp. +41, -42) | in the type of protection Intrinsic Safety EEx ib IIC<br>only for the connection to a certified intrinsically safe circuit<br>Maximum values:<br>$U_i$ = 30 V<br>$P_i$ = 500 mW<br>$C_i$ = 3.7 nF<br>$L_i$ negligibly small |
| Plug-In module for<br>analogue feed back<br>(Terminals +31, -32) | in the type of protection Intrinsic Safety EEx ib IIC<br>only for the connection to a certified intrinsically safe circuit<br>Maximum values:<br>$U_i$ = 30 V<br>$P_i$ = 1.1 W<br>$C_i$ = 6.6 nF<br>$L_i$ negligibly small |
| Plug-In module for<br>shutdown-function<br>(Terminals +51 and –52<br>resp. +85 and -86) | in the type of protection Intrinsic Safety EEx ib IIC<br>only for the connection to a certified intrinsically safe circuit<br>Maximum values:<br>$U_i$ = 30 V<br>$C_i$ = 3.7 nF<br>$L_i$ negligibly small |
| Local communication<br>interface (LKS) | for connection to a programmer outside of the explosion hazardous area |

(16) Test documents are listed in the test report No.: 04YEX551733.

(17) Special conditions for safe use

The "Local communication interface (LKS)" may only be used outside of the explosion hazardous area.

For use as II 2 D apparatus the equipment may only be used in areas with low risk of mechanical danger.

Cable entries which meets the requirements of EN 50281-1-1:1998 for category 2 D as well as the ambient temperature range have to be used.

(18) Essential Health and Safety Requirements

no additional ones

TÜV NORD

Translation

## 1. SUPPLEMENT to

## EC-TYPE EXAMINATION CERTIFICATE No. TÜV 04 ATEX 2702 X

| | |
|---|---|
| Equipment: | **Positioner type TZIDC** |
| Manufacturer: | **ABB Automation Products GmbH** |
| Address: | **Schillerstrasse 72** |
| | **D-32425 Minden** |

Amentments:

In the future the positioner type TZIDC may also be manufactured according to the test documents listed in the test report. The modifications refer to the internal construction. With the modifications refer to the internal construction the requirement of the category ia are reached.
The marking of the positioner type TZIDC will be in the future also: II 2 G EEx ia IIC T6.

Electrical Data

| | |
|---|---|
| Signal circuit<br>(Terminal +11, –12) | in the type of protection Intrinsic Safety EEx ib IIC resp. EEx ia IIC only for the connection to a certified intrinsically safe circuit<br>Maximum values:<br>$U_i$ = 30 V<br>$I_i$ = 320 mA<br>$P_i$ = 1.1 W<br>$C_i$ = 6.6 nF<br>$L_i$ negligibly small |
| Switching input<br>(Terminal +81, –82) | in the type of protection Intrinsic Safety EEx ib IIC resp. EEx ia IIC only for the connection to a certified intrinsically safe circuit<br>Maximum values:<br>$U_i$ = 30 V<br>$C_i$ = 3.7 nF<br>$L_i$ negligibly small |
| Switching output<br>(Terminal +83, –84) | in the type of protection Intrinsic Safety EEx ib IIC resp. EEx ia IIC only for the connection to a certified intrinsically safe circuit<br>Maximum values:<br>$U_i$ = 30 V<br>$P_i$ = 500 mW<br>$C_i$ = 3.7 nF<br>$L_i$ negligibly small |

BA 02 01.05 1.000.000

TÜV NORD

**1. Supplement to EC-Type Examination Certificate No. TÜV 04 ATEX 2702 X**

| | |
|---|---|
| Mechanical digital feed back<br>(Terminals Limit1 +51, -52<br>resp. Limit2 +41, -42) | Maximum values see EC-Type Examination Certificate No.<br>PTB 00 ATEX 2049 X<br>(Slot-type initiators of the company Pepperl & Fuchs) |
| Cartridge for digital feed back<br>(Terminals +51, -52<br>resp. +41, -42) | in the type of protection Intrinsic Safety EEx ib IIC resp. EEx ia IIC<br>only for the connection to a certified intrinsically safe circuit<br>Maximum values:<br>$U_i$ = 30 V<br>$P_i$ = 500 mW<br>$C_i$ = 3.7 nF<br>$L_i$ negligibly small |
| Plug-In module for<br>analogue feed back<br>(Terminals +31, -32) | in the type of protection Intrinsic Safety EEx ib IIC resp. EEx ia IIC<br>only for the connection to a certified intrinsically safe circuit<br>Maximum values:<br>$U_i$ = 30 V<br>$P_i$ = 1.1 W<br>$C_i$ = 6.6 nF<br>$L_i$ negligibly small |
| Plug-In module for<br>shutdown-function<br>(Terminals +51 and –52<br>resp. +85 and -86) | in the type of protection Intrinsic Safety EEx ib IIC resp. EEx ia IIC<br>only for the connection to a certified intrinsically safe circuit<br>Maximum values:<br>$U_i$ = 30 V<br>$C_i$ = 3.7 nF<br>$L_i$ negligibly small |
| Local communicationinterface<br>(LKS) | for connection to a programmer outside of the explosion<br>hazardous area |

All other data apply unchanged for this Supplement.

The equipment according to EC-Type Examination Certificate TÜV 04 ATEX 2702 X incl. of this 1. supplement also meets the requirements of

**EN 50 014:1997+A1+A2** **EN 50 020:2002** **EN 50281-1-1:1998**

(16) The test documents are listed in the test report N° 05 YEX 552236.

(17) Special conditions for safe use

no additional ones

TÜV NORD

**1. Supplement to EC-Type Examination Certificate No. TÜV 04 ATEX 2702 X**

(18) Essential Health and Safety Requirements

no additional ones

**TÜV NORD CERT GmbH & Co. KG**
**Am TÜV 1**
**D-30519 Hannover**
**Tel.: +49 (0) 511 986-1470**
**Fax: +49 (0) 511 986-2555**

**Hannover, 2005-06-02**

**Head of the**
**Certification Body**

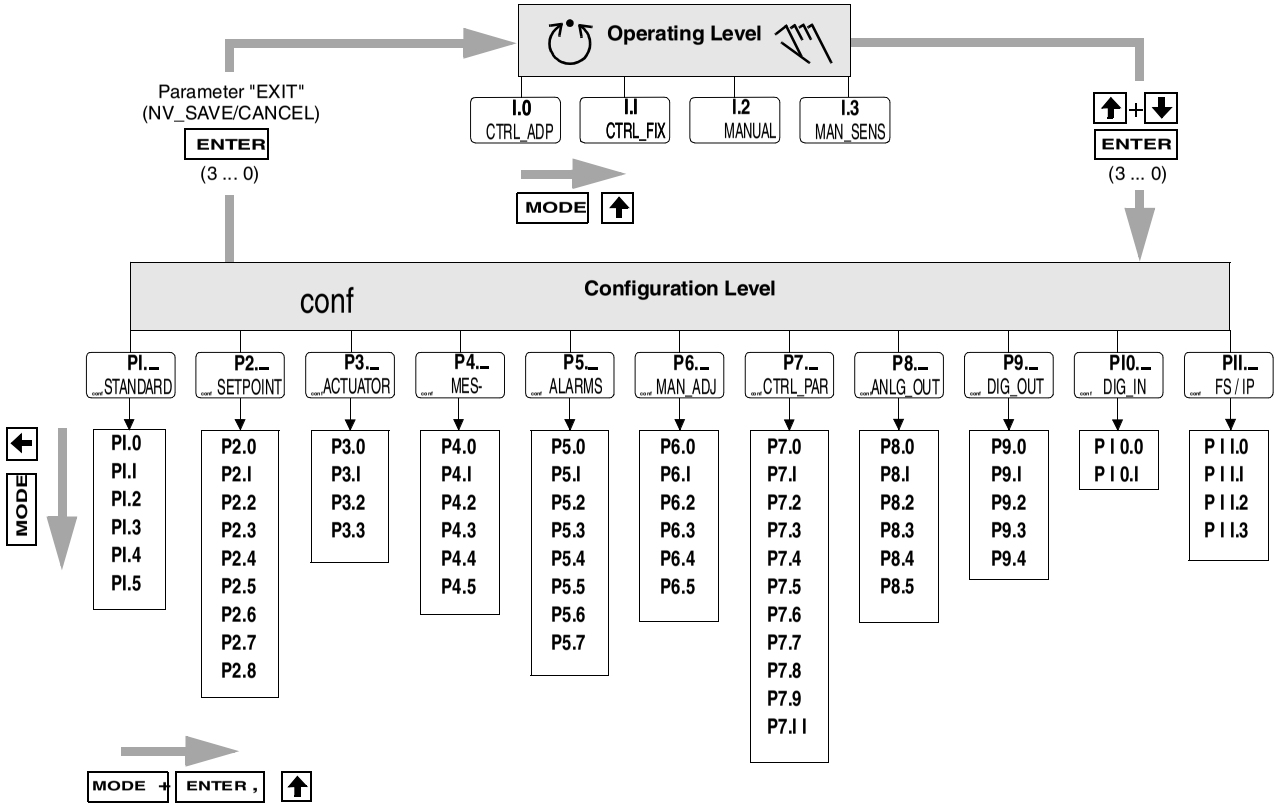
BA 02 01.05 1.000.000

# Appendix A: Parameter overview

| Param. | Display | Function | Possible parameter settings | Unit | Fact. setting |
|---|---|---|---|---|---|
| **P1._** | **STANDARD** | | | | |
| **P1.0** | **ACTUATOR** | Actuator type | LINEAR, ROTARY | - | LINEAR |
| **P1.1** | **AUTO_ADJ** | Autoadjustment | *Command/function is executed* | - | - |
| **P1.2** | **TOL_BAND** | Tolerance band | 0.3...10.0 | % | 0.3 |
| **P1.3** | **DEADBAND** | Dead band | 0.1...10.0 | % | 0.1 |
| **P1.4** | **TEST** | Test | *Command/function is executed* | - | - |
| **P1.5** | **EXIT** | Return to operating level | *Command/function is executed* | - | - |
| **P2._** | **SETPOINT** | | | | |
| **P2.0** | **MIN_RGE** | Min. of setpoint range | 4.0...20.0 | mA | 4.0 |
| **P2.1** | **MAX_RGE** | Max. of setpoint range | 4.0...20.0 | mA | 20.0 |
| **P2.2** | **CHARACT** | Characteristic curve | LINEAR, EP 1:25, 1:50, 25:1, 50:1, USERDEF, | - | LINEAR |
| **P2.3** | **ACTION** | Action of the output | DIRECT, REVERSE | - | DIRECT |
| **P2.4** | **SHUT_CLS** | Shut-off range 0% | OFF, 0.1...45.0 | % | 1.0 |
| **P2.5** | **RAMP^** | Setpoint ramp, up | OFF, 1...200 | sec | OFF |
| **P2.6** | **RAMP v** | Setpoint ramp, down | OFF, 1...200 | sec | OFF |
| **P2.7** | **SHUT_OPN** | Shut-off range 100% | OFF, 55.0...100 | | OFF |
| **P2.8** | **EXIT** | Return to operating level | *Command/function is executed* | - | - |
| **P3._** | **ACTUATOR** | | | | |
| **P3.0** | **MIN_RGE** | Min. of operating range | 0.0...100.0 | % | 0.0 |
| **P3.1** | **MAX_RGE** | Max. of operating range | 0.0...100.0 | % | 100.0 |
| **P3.2** | **ZERO_POS** | Zero position | CLOCKWISE, CTCLOCKWISE | - | CTCLOCKWISE |
| **P3.3** | **EXIT** | Return to operating level | *Command/function is executed* | - | - |
| **P4._** | **MESSAGES** | | | | |
| **P4.0** | **TIME_OUT** | Deadband time limit | OFF, 1....200 | sec | OFF |
| **P4.1** | **POS_SW1** | Switching point SW 1 | 0.0...100.0 | % | 0.0 |
| **P4.2** | **POS_SW2** | Switching point SW 2 | 0.0...100.0 | % | 100.0 |
| **P4.3** | **SW1_ACTV** | Active direction SW1 | EXCEEDED, FALL_BEL | - | FALL_BEL |
| **P4.4** | **SW2_ACTV** | Active direction SW2 | EXCEEDED, FALL_BEL | - | EXCEEDED |
| **P4.5** | **EXIT** | Return to operating level | *Command/function is executed* | - | - |

| Param. | Display | Function | Possible parameter settings | Unit | Fact. setting |
|---|---|---|---|---|---|
| **P5._** | **ALARMS** | | | | |
| **P5.0** | **LEAKAGE** | Leakage to actuator | ACTIVE, INACTIVE | - | INACTIVE |
| **P5.1** | **SP_RGE** | Outside setpoint range | ACTIVE, INACTIVE | - | INACTIVE |
| **P5.2** | **SENS_RGE** | Zero error | ACTIVE, INACTIVE | - | INACTIVE |
| **P5.3** | **CTRLER** | Controller inactive | ACTIVE, INACTIVE | - | INACTIVE |
| **P5.4** | **TIME_OUT** | Positioning time-out | ACTIVE, INACTIVE | - | INACTIVE |
| **P5.5** | **STRK_CTR** | Stroke counter | ACTIVE, INACTIVE | - | INACTIVE |
| **P5.6** | **TRAVEL** | Travel counter | ACTIVE, INACTIVE | - | INACTIVE |
| **P5.7** | **EXIT** | Return to operating level | *Command/function is executed* | - | - |
| **P6._** | **MAN_ADJ** | | | | |
| **P6.0** | **MIN_VR** | Min. of valve range | 0.0...100.0 | % | 0.0 |
| **P6.1** | **MAX_VR** | Max. of valve range | 0.0...100.0 | % | 100.0 |
| **P6.2** | **ACTUATOR** | Actuator type | LINEAR, ROTARY | - | LINEAR |
| **P6.3** | **SPRNG_Y2** | Spring action (Y2) | CLOCKWISE, CTCLOCKWISE | - | CTCLOCKWISE |
| **P6.4** | **ADJ_MODE** | Autoadjustment mode | FULL, STROKE, CTRL_PAR, ZERO_POS, LOCKED | - | FULL |
| **P6.5** | **EXIT** | Return to operating level | *Command/function is executed* | - | - |
| **P7_** | **CTRL_PAR** | | | | |
| **P7.0** | **KP ^** | KP value, up | 1.0...400.0 | - | 5.0 |
| **P7.1** | **KP v** | KP value, down | 1.0...400.0 | - | 5.0 |
| **P7.2** | **TV ^** | TV value, up | 10...800 | msec | 200 |
| **P7.3** | **TV v** | TV value, down | 10...800 | msec | 200 |
| **P7.4** | **GOPLS ^** | Go pulse, up | 0...200 | msec | 0 |
| **P7.5** | **GOPLS v** | Go pulse, down | 0...200 | msec | 0 |
| **P7.6** | **Y-OFS ^** | Output offset, up | Y-Min...100.0 | % | 48.0 |
| **P7.7** | **Y-OFF v** | Output offset, down | Y-Min...100.0 | % | 48.0 |
| **P7.8** | **SENSITIV** | Sensitivity | 0.03...0.10 | - | 0.03 |
| **P7.9** | **TOL_BAND** | Tolerance band | 0.3...10.0 | % | 0.3 |
| **P7.10** | **TEST** | Test | *Command/function is executed* | - | - |
| **P7.11** | **EXIT** | Return to operating level | *Command/function is executed* | - | - |

| Param. | Display | Function | Possible parameter settings | Unit | Fact. setting |
|---|---|---|---|---|---|
| **P8._** | **ANLG_OUT** | | | | |
| **P8.0** | **MIN_RGE** | Min. of current range | 4.0...20.0 | mA | 4.0 |
| **P8.1** | **MAX_RGE** | Max. of current range | 4.0...20.0 | mA | 20.0 |
| **P8.2** | **ACTION** | Action (charact. curve) | DIRECT/REVERSE | - | DIRECT |
| **P8.3** | **ALARM** | Alarm message | HIGH_CUR, LOW_CUR | - | HIGH_CUR |
| **P8.4** | **TEST** | Test | NONE, FAILED, ALRM, CUR, CURRENT | - | NONE |
| **P8.5** | **EXIT** | Return to operating level | *Command/function is executed* | - | - |
| **P9._** | **DIG_OUT** | | | | |
| **P9.0** | **ALRM_LOG** | Logic level alarm output | ACTIV_HI, ACTIV_LO | - | ACTIV_HI |
| **P9.1** | **SW1_LOG** | SW1 logic level | ACTIV_HI, ACTIV_LO | - | ACTIV_HI |
| **P9.2** | **SW2_LOG** | SW2 logic level | ACTIV_HI, ACTIV_LO | - | ACTIV_HI |
| **P9.3** | **TEST** | Test | ALARM_ON, SW1_ON, SW2_ON, ALL_ON, NONE | - | NONE |
| **P9.4** | **EXIT** | Return to operating level | *Command/function is executed* | - | - |
| **P10._** | **DIG_IN** | | | | |
| **P10.0** | **FUNCTION** | Function selection | NONE, POS_O%, POS_100%, POS_HOLD, CNF_LOCK, OP_LOCK, ALL_LOCK | - | NONE |
| **P10.1** | **EXIT** | Return to operating level | *Command/function is executed* | - | - |
| **P11._** | **FS / IP** | | | | |
| **P11.0** | **FAIL_POS** | Safe position | ACTIVE, INACTIVE | - | INACTIVE |
| **P11.1** | **FACT_SET** | Factory setting | *Command/function is executed* | - | - |
| **P11.2** | **IP_TYP** | I/P module type | NO_F_POS, F_SAFE_1, F_SAFE_2, F_FREEZE1, F_FREEEZE_2 | - | NO_F_POS |
| **P11.3** | **EXIT** | Return to operating level | *Command/function is executed* | - | - |




**Parameter overview**

The Industrial$^{IT}$ wordmark is a registered or pending trademark of ABB.

ABB has Sales & Customer Support expertise in over 100 countries worldwide.

www.abb.com

The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.

Printed in the Fed. Rep. of Germany (06.07)

© ABB 2007

41/18-79 EN Rev. D

**ABB Ltd.**
Salterbeck Trading Estate
Workington, Cumbria
CA14 5DS
UK
Tel: +44 (0)1946 830 611
Fax: +44 (0)1946 832 661

**ABB Inc.**
125 E. County Line Road
Warminster, PA 18974
USA
Tel: +1 215 674 6000
Fax +1 215 674 7183

**ABB Automation Products GmbH**
Schillerstr. 72
32425 Minden
Germany
Tel: +49 551 905-534
Fax: +49 551 905-555
CCC-support.deapr@de.abb.com