TZID-C110

Intelligent positioner for PROFIBUS PA

Short manual

41/18-77 EN

Rev. 01

TZID-C110 Intelligent positioner for PROFIBUS PA

for PA Profile V3.0

Short manual

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Note:

This document is a short manual providing the essential information needed for mounting and commissioning the TZID-C110 positioner. For details on other subjects like configuration, operation and ordering details please refer to Data sheet 10/18-0.23 EN or the Operating manual (CD version) 42/18-74 EN.

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1 Safety and precautions

1.1 General

Important instructions for your safety!
Read and observe!

Proper and safe operation of the TZID-C110 positioner requires:

- proper transportation and storage
- installation and commissioning by qualified personnel
- correct operation according to the instructions in this manual
- proper use (see chapter 1.4 on page 2)
- careful maintenance

Only qualified personnel are allowed to work on the device (see chapter 1.5 on page 3).

Observe

- the present operating instructions
- the relevant safety regulations and standards for the installation and operation of electrical systems
- the standards, regulations and directives governing explosion protection, when using intrinsically safe devices

The regulations, standards and directives referred to in these operating instructions are applicable in Germany. When using the TZID-C110 positioner outside the German Federal jurisdiction, the relevant regulations, standards and directives applicable in the country where the device is used must be observed.

The TZID-C110 positioner has been designed and tested in accordance with DIN VDE 0411 Part 1.

Safety Requirements for Electronic Measuring Apparatuses

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

The present operating instructions contain warnings and cautions marked with a symbol (see chapter 1.2). The instructions given in these sections must be observed to retain the device in a safe condition and to ensure safe operation. Otherwise, persons can be endangered or the device itself or other devices or equipment may be damaged or fail.

1.2 Explanation of warning signs and notes

Important information has been marked and emphasized with the following symbols in these operating instructions:

This symbol is printed next to **warnings** indicating a direct **endangerment of a person's health or life**. Also, **major property damage** may occur.

If the **safety notes** marked with this symbol are not observed, **minor personal injuries and property damage** may result.

This symbol is printed next to **notes** containing important informationen pertaining to your TZID-C110 or its operation.

1.3 Notes on electrical and pneumatic safety

- Only qualified persons may mount, electrically and pneumatically connect, and commission the TZID-C110 positioner.
- Ensure the electrical safety of all feeding devices.
- When connecting the electrical wiring, observe the specifications according to chapter 4 "Technical data".
- For the electrical installation of ex-protected devices, observe all national regulations, DIN/VDE directives, especially VDE 0165, the directives for explosion protection, and the specifications in the EC type examination certificates (see chapter "Certificates" on page 29 of this manual).
- Do not use the internal communication interfaces LKS or X5 on the printed circuit board if the positioner is installed in the hazardous area.
- Observe the safety instructions of the pneumatic actuators when mounting and commissioning the devices. There is danger of injuries due to the high displacement forces of the actuators.

1.4 Proper use

The TZID-C110 positioner is an electro-pneumatic valve positioner for use with pneumatic linear and rotary actuators.

The device may only be used for the applications listed in these operating instructions and in the relevant data sheet (if available).

1.5 Qualified personnel

Only those persons familiar with the installation, commissioning, operation and maintenance of the TZID-C110 positioner or similar instruments and who have the required qualification are authorized to work on the device.

These persons are:

- Project specialists who are familiar with the security concepts of process automation.
- Commissioning and service personnel, i.e. persons who have been trained adequately to mount, commission, repair, and maintain the TZID-C110 positioner or similar automation instruments or who are – according to safety standards and guidelines – permitted to commission, ground, and label electrical circuitry, devices, and systems.
- Operating personnel who is familiar with handling automation equipment and with the contents of these operating instructions and the instructions in the operating manual 42/18-74 EN.

2 Manufacturer's information

2.1 Delivery

When receiving the delivery please immediately check items and scope for damages 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 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 10/18-0.23 EN.

2.2 CE compliance information

We declare that we are the manufacturer of the TZID-C110 positioner and that the product conforms with the regulations listed below and meets the following requirements of EC regulation 89/336/CEE as of May 1989:

Basic technical standards/product standards

RFI suppression	EN 55022 as of May 1995 EN 50081-1 as of March 1993
EMI/RFI shielding	EN 50082-1 as of March 1993

The TZID-C110 positioner meets the EC regulation for CE conformity.

3 Installing and commissioning

3.1 Mechanical mounting

3.1.1 General

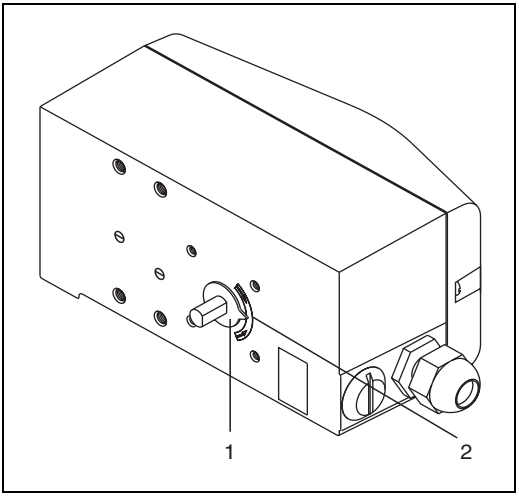


Fig. 1 Operating range

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

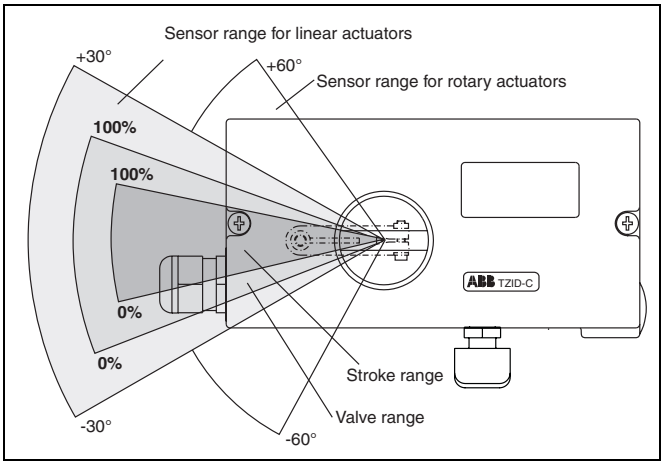


Fig. 2 Positioner ranges

When mounting, 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 range for both applications is 25°.

3.1.2 Operating conditions at the installation site

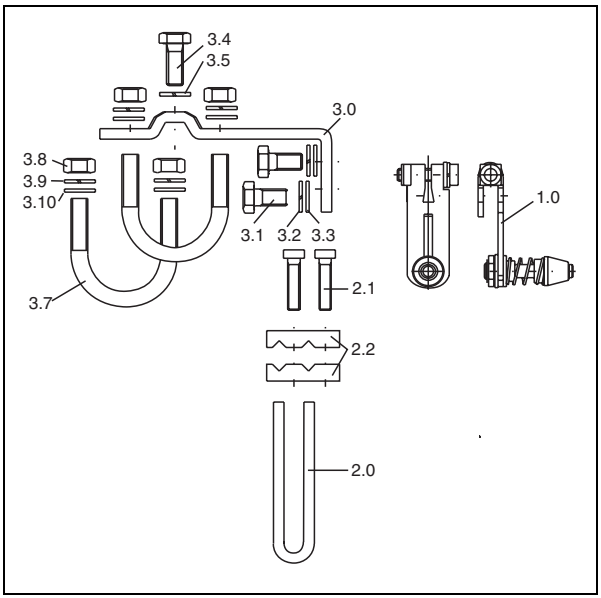
Warning

Before installing check to ensure that the specifications in terms of safety and control applicable to the TZID-C110 will not be exceeded.

Ambient temperature:	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 75% (95% for a short time), non-condensing Observe the specifications for protection class IP65 / NEMA 4X
Explosion protection:	Observe the specifications in the certificate, see section “Certificates” on page 29.
Mounting position:	any orientation allowed, provided that the splash guard cap is in place, see section “Mounting the splash guard cap” on page 15.

3.1.3 Mounting to linear actuators

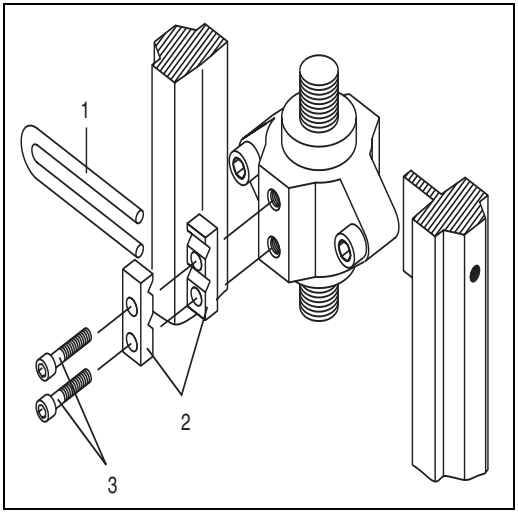
A special attachment kit is available for mounting the positioner to a linear actuator according to DIN/IEC 534 (lateral mounting to NAMUR) comprising the following parts:



- Lever (1.0) w. follower pin, for 10...35 mm or 25...90 mm actuator stroke
- Follower guide (2.0) with two screws (2.1) and clamp plates (2.2)
- Angle bracket (3.0) with two screws (3.1), two spring washers (3.2), and two plain washers (3.3)
- Screw (3.4) and plain washer (3.5) for mounting to cast iron yoke
- Two U-bolts (3.7), each with two nuts (3.8), two spring washers (3.9), and two plain washers (3.10) for mounting to columnar yoke

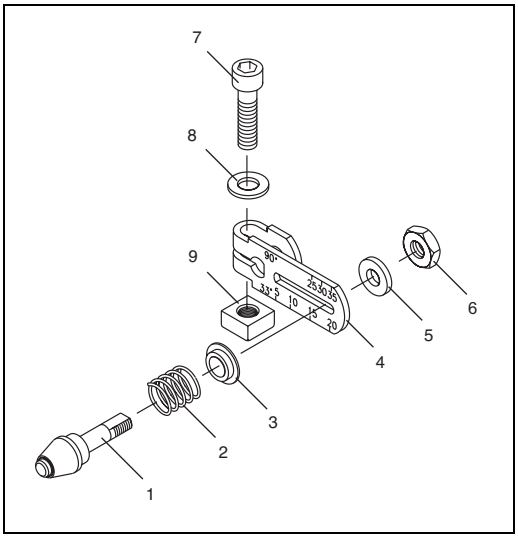
Tools required: Wrench 10 mm/13 mm
Allen key 4 mm

1. Mount the follower guide to the actuator



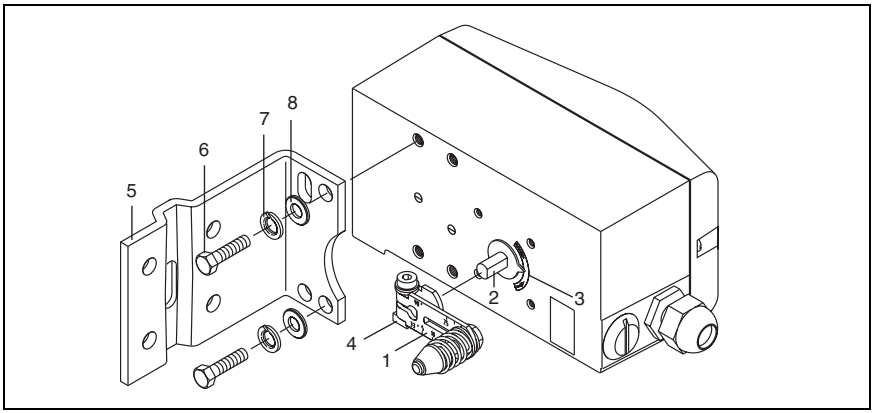
- Fasten the follower guide (1) and the clamp plates (2) with screws (3) to the spindle of the actuator; hand-tighten the screws.

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



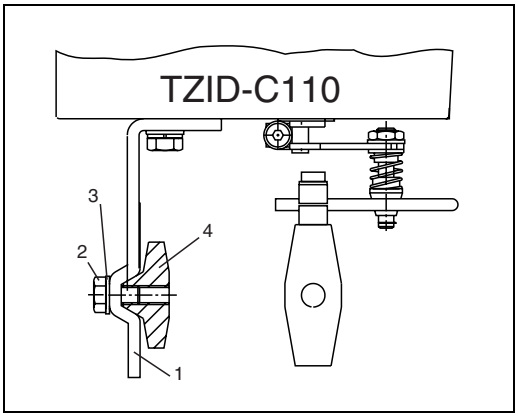
- Slip the spring (2) onto the bolt with the follower pin (1).
- Slip the plastic washer (3) onto the bolt and compress the spring with it.
- Insert the bolt with compressed spring into the oblong hole in the lever (4) and fasten it in the desired position using the plain washer (5) and nut (6) at the 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 mounting plate to the TZID-C110 positioner



- Attach the lever (1) to the feedback shaft (2) at the rear of TZID-C110 (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 counter nut (4) at the lever.
- Hold the preassembled TZID-C110 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 TZID-C110 to be used for the angle bracket.
- Fasten the angle bracket (5) with screws (6), spring washers (7), and plain washers (8) to the corresponding bore holes in the TZID-C110 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)).

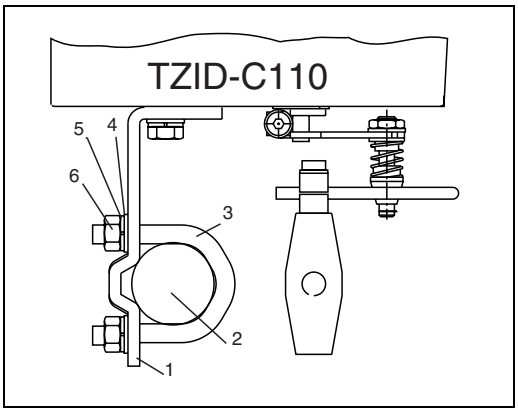
4.a Mount the positioner to a cast iron yoke



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

or

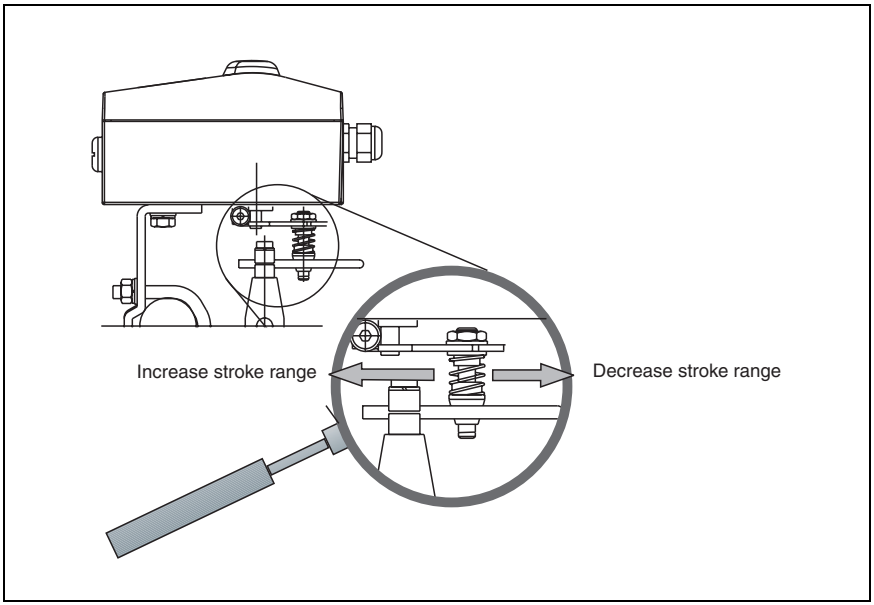
4.b Mount the positioner to a columnar yoke



- 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 thru holes in the angle bracket.
- Slip on the plain washers (4), spring washers (5), and nuts (6). Hand- tighten nuts evenly.

Adjust the height of the TZID-C110 positioner at the cast iron yoke or the columnar yoke until the lever is horizontal (at visual check) at half stroke (±0° sensor position in mode 1.3). Check for proper mounting (see chapter "Commissioning" on page 19 for details).

5. Adjust the stroke



The scale on the lever indicates the link point for the various stroke ranges.

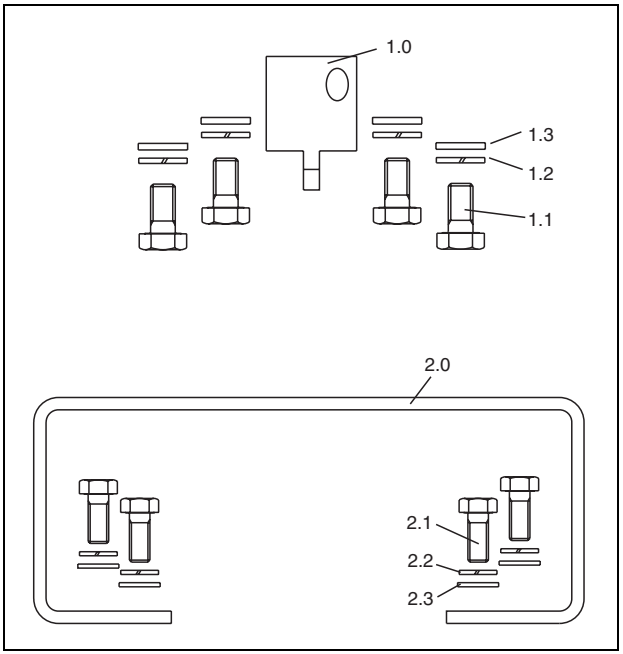
By shifting the bolt with follower pin in the oblong bore hole of the lever you can change the stroke range. If the link point is shifted to the inside, the stroke range is increased; shifting to the outside decreases the range.

The fine adjustment of the link point is done automatically later during *Autoadjust*.

After mounting, check whether the positioner operates within the lever range. Apply air to the actuator and determine whether the lever travels within the range marked by the arrows. Check for proper mounting (see chapter "Commissioning" on page 19 for details).

3.1.4 Mounting the positioner to rotary actuators

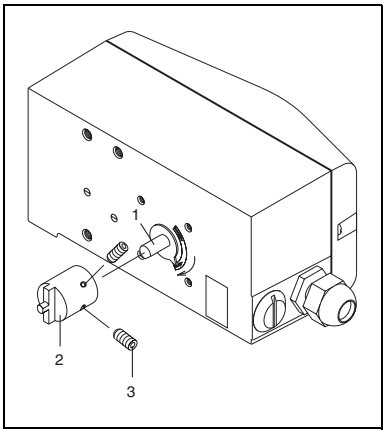
For mounting to a rotary actuator according to VDI/VDE 3845 the following mounting kit is available:



- Namur feedback shaft adapter (1.0)
- Four screws, M6 (1.1), four spring washers (1.2), and four plain washers (1.3) for fastening the mounting 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 mounting bracket to the actuator

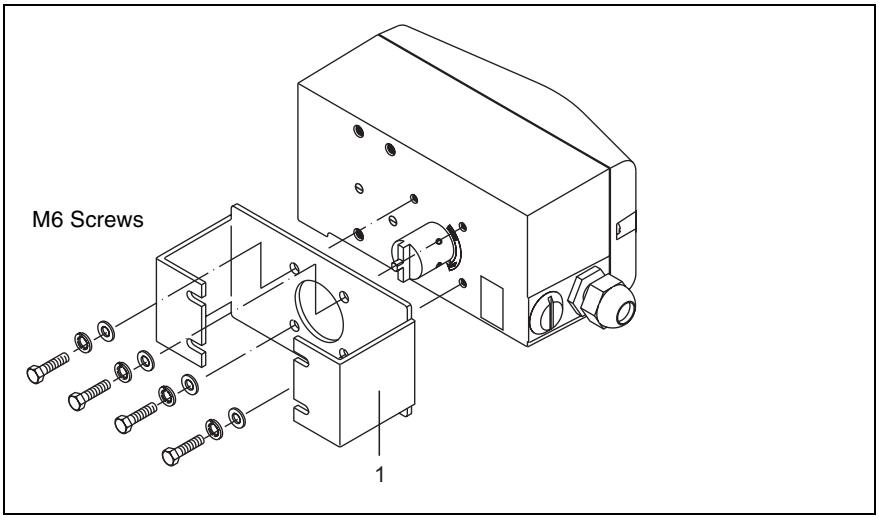
Tools required: Wrench 10 mm/13 mm
Allen key 3 mm

1. Mount the adapter to the positioner

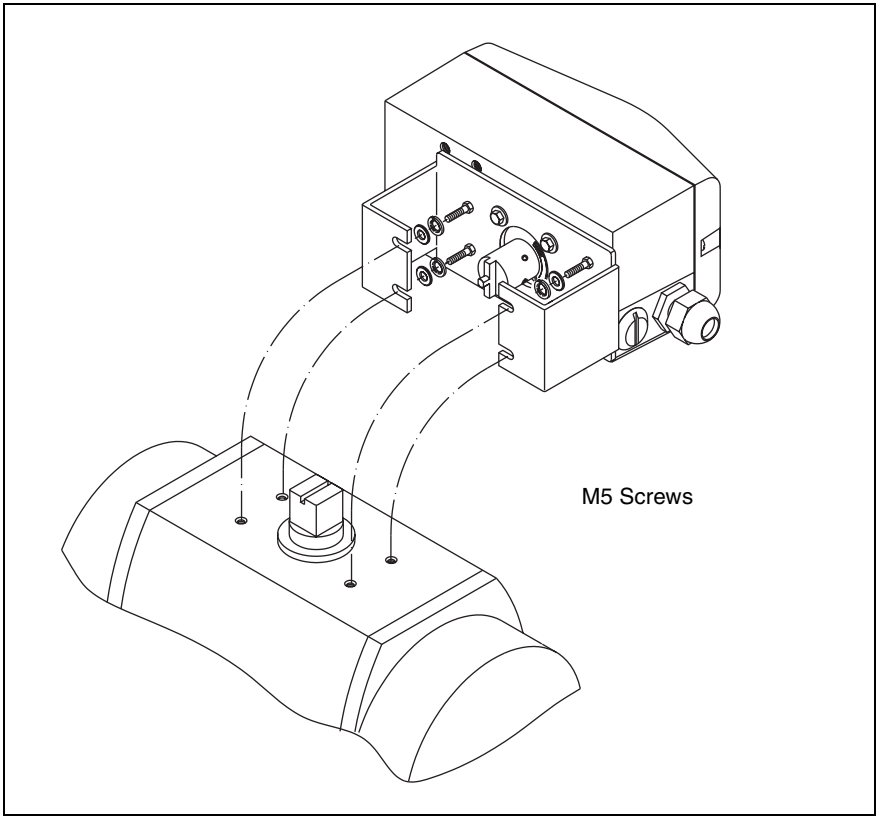


- Determine the mounting position (in parallel to the actuator or shifted by 90°).
- Determine the direction of rotation of the actuator (clockwise or counterclockwise).
- Move rotary actuator to its home position.
- On the basis of the mounting position, the home position, as well as the direction of 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 proper range (the arrow on the rear of the device must travel within the admissible range, see Fig. 1 on page 4).
- 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



3. Attach the TZID-C110 positioner to the actuator



After mounting, check whether the positioner operates within the permissible range. Apply air to the actuator and determine whether the actuator travels within the range marked by the arrows. Check for proper mounting (see chapter "Commissioning" on page 19 for details).

For mounting to control valves 23/24, 23/25 and 23/26 see the instructions in document 42/18-74 EN delivered to you on a CD-ROM.

3.2 Pneumatic connection.

3.2.1 Safety instructions

When mounting and commissioning observe the safety regulations of the pneumatic actuators and the accident prevention rules of the Employers Liability Insurance Association.

There is danger of injuries caused by the high torque forces produced by the actuators!

Take suitable measures 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 can be damaged.

Do not exceed the maximum operating pressure of the actuator.

The positioner must be supplied with instrument air that is free of 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 contents

max. concentration:	**1 mg/m^3**

Pressure dew point

Maximum value:	**10 K below operating temperature**

Before connecting the air pipes, remove dust, splinters and other particles by blowing them out.

3.2.2 Making the pneumatic connection

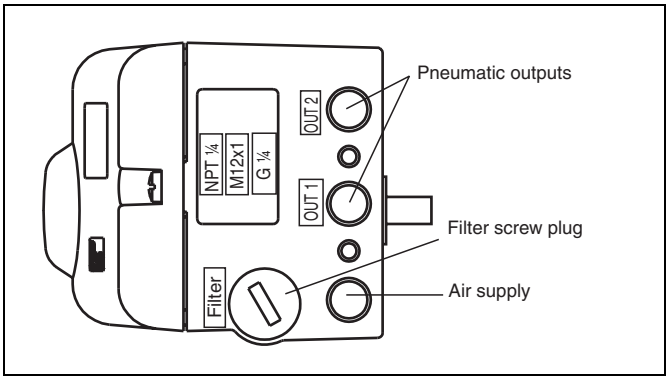


Fig. 3 Pneumatic connections

All pneumatic piping connections are located at the right-hand side of the device (see Fig. 3).

The threaded bores G 1/4 or 1/4-18 NPT, respectively, are provided. The corresponding screwed pipe connections have to be supplied by the customer. We recommend pipes with the dimension 6x1 mm for the pneumatic piping.

The amount of supply pressure has to be matched to the working pressure necessary for the actuation. The values 1.4 and 6 bar are the limit values of the positioner.

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 (for double-acting actuators)

3.2.3 Mounting the splash guard cap

Caution

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. Use a wrench to fasten the cap. Do not use a screw driver!
Make sure that the splash guard cap is always present during operation. Otherwise, protection class IP65 cannot be ensured.

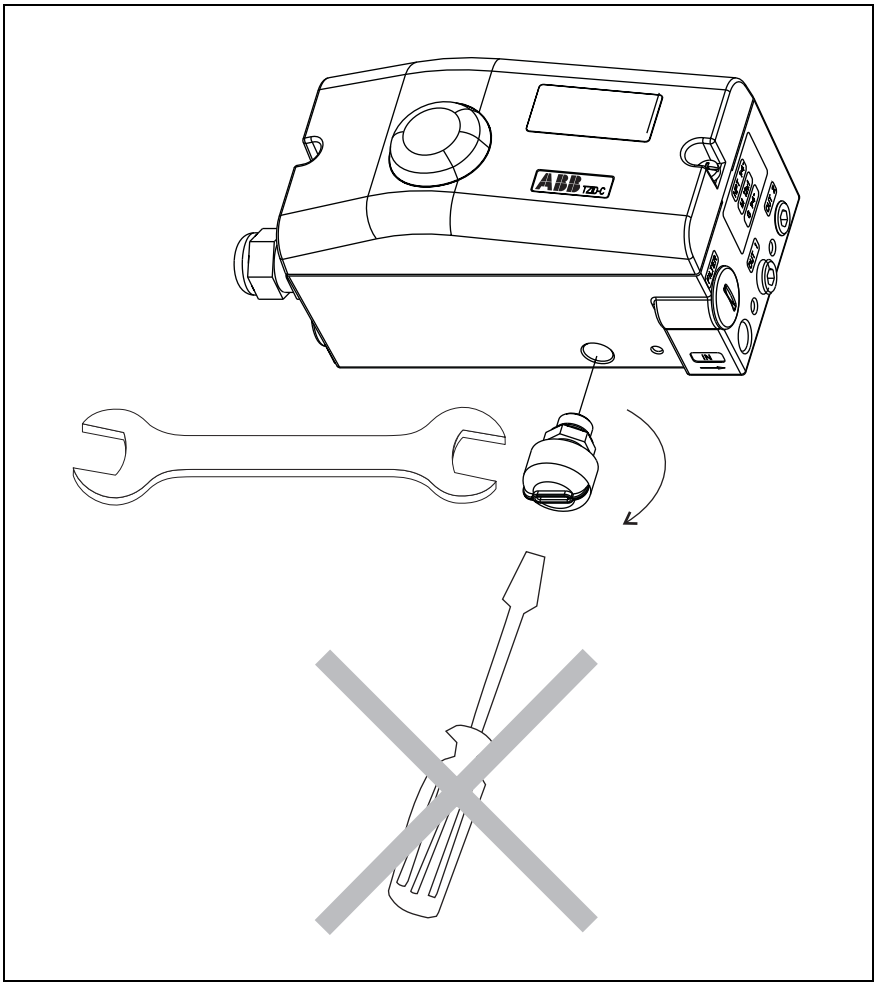


Fig. 4 Mounting the splash guard cap

3.3 Electrical connection

3.3.1 Safety instructions


Warning

During the electrical installation observe the common VDE safety regulations and the accident prevention rules of the Employers Liability Insurance Association.

Observe the common standards/safety regulations for the set-up and the operation of electrical installations.

Observe the additional standards, regulations and guidelines for the set-up and the operation of explosion-proof installations, if explosion-proof devices are used.


Caution

Exclusively connect the PROFIBUS PA line to the bus terminals +(11) and -(12). When connecting a power source for test purposes without establishing a bus communication (e.g. when executing the *Autoadjust* function), a supply voltage between 9.0 V and a maximum of 32 V may be applied.

When connecting a device make sure that the electrical limits specified in chapter 4 "Technical data" are observed.

Do not run bus/signal lines close to power lines. Power lines produce interference in their near vicinity which may affect the electrical capabilities of the bus/signal lines.

3.3.2 Overview

For the cable entry into the case two threaded holes PG 13.5, 1/2 - 14 NPT or M20 x 1.5 are available on the left side of the case (see Fig. 5). The front hole is equipped with a cable gland, in the back a dummy plug is mounted.

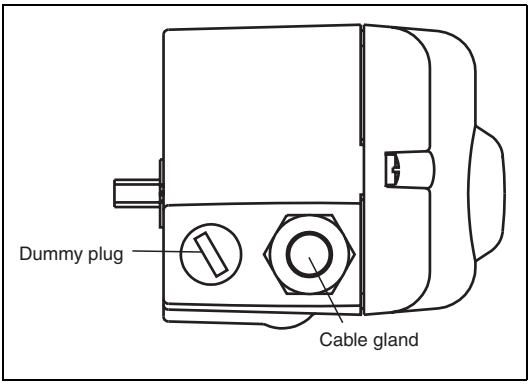


Fig. 5 Cable entry

The screw terminals inside the case are assigned as follows (see Fig. 6):

1 Not used

2 Service switch for shut-down module

3 Terminals for the plug-in module for the shutdown function

4 Kit for digital position feedback, either proximity switches or 24 V microswitch (first connector), terminals designed for wire sizes up to 1.5mm^2

5 Kit for digital position feedback, either proximity switches or 24 V microswitch (second connector), terminals designed for wire sizes up to 1.5mm^2

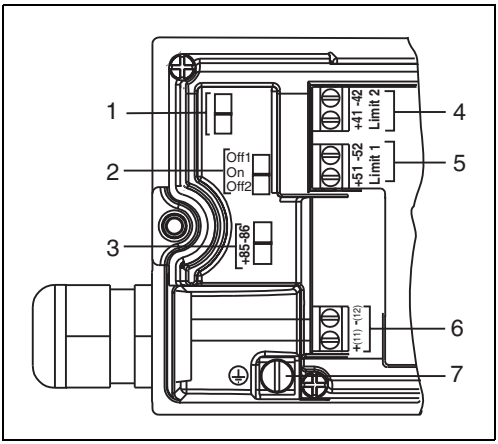


Fig. 6 Screw terminals

6 Bus terminals, designed for wire sizes up to 2.5mm^2

7 Grounding screw

3.3.3 Making the connections

Connecting the bus lines, the shutdown module and the proximity switches or microswitches:

- Remove 7-10 mm (1/4 - 3/8") of the cable insulation
- Insert the wire ends from the left into the appropriate screw terminal and hand-tighten the screws (access from above)

Connecting the plug-in module:

- Remove 7-10 mm (1/4 - 3/8") of the cable insulation
- Insert the wire ends from the top into the corresponding screw terminal and hand-tighten the screws (access from the side)

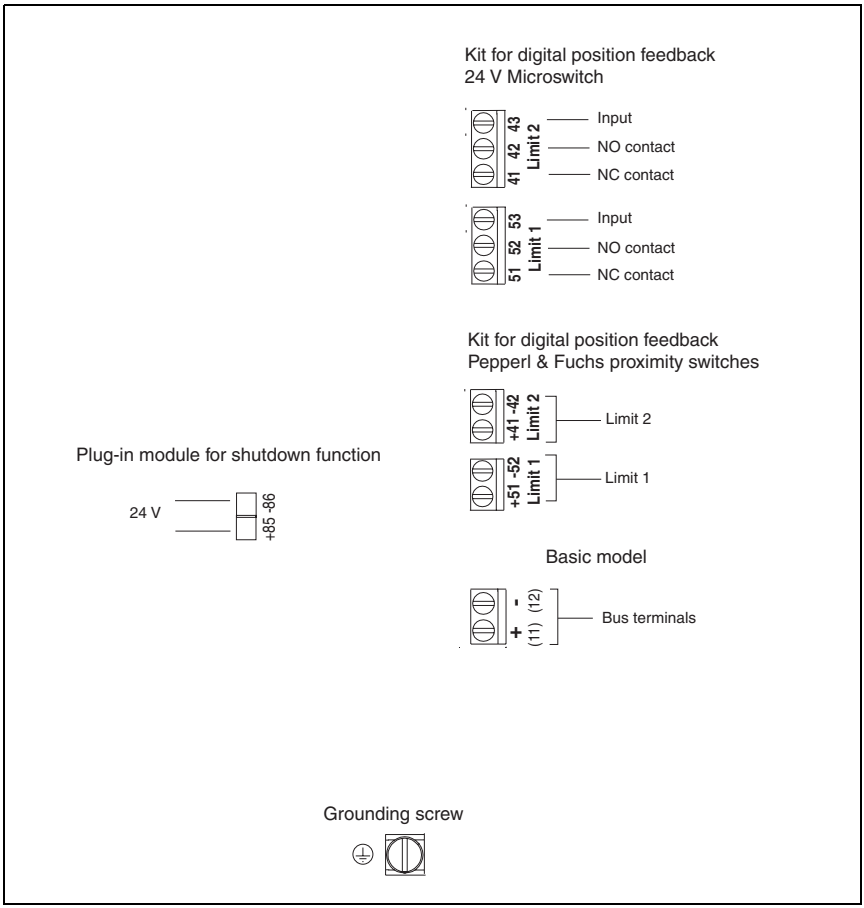


Fig. 7 Terminal assignment

3.4 Commissioning

3.4.1 Commissioning procedure

1. Turn on the air supply to the positioner.
2. Connect the bus to the bus terminals, with arbitrary polarity.
   After the device has started up, the display indicates the position in % and REMOTE.
3. Check for proper mounting:
   - Press and hold **MODE** and **ENTER** simultaneously.
   - Wait until the countdown has run down from 3 to 0.
   - Release **MODE** and **ENTER.** The operating level (mode 1.x) is reached and indicated.
   - Press and hold **MODE**.
   - Additionally briefly press ↑ or ↓ until mode **1.3** (manual adjustment within the sensor range) is displayed.
   - 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.
     Recommended range is
     between -28° and +28° for linear actuators
     between -57° and +57° for rotary actuators
     Minimum angle: 25° (in case of deviations from these values see chapter 3.1)
4. Return to the remote level.
   - Press and hold **MODE** and **ENTER**.
   - Wait until the countdown has run down from 3 to 0.
   - Release **MODE** and **ENTER**.
   - The display indicates the position in % and REMOTE.

     See Appendix A for an overview of the operation and the parameter settings.
5. Run fast *Autoadjust*.
   - Make sure that the remote level is activated.

a) For linear actuators:
   - Press and hold **MODE**.
   - Wait until the countdown has run down from 5 to 0.
   - Release **MODE**.
   - Press and hold **MODE** again until the countdown has run down from 3 to 0.
   - Release **MODE**.

Autoadjust is started automatically, and the progress is displayed as in P1.1.

b) For rotary actuators

- Press and hold **ENTER**.
- 

is displayed.
- Wait until the display has changed to


- Release **ENTER.**
- Press and hold **ENTER** again until the countdown has run down from 3 to 0.
- Release **ENTER**.

Autoadjust is started automatically, and the progress is displayed as in P1.1.

When *Autoadjust* has completed successfully, the determined parameters are saved automatically, and the remote level is activated again.

If any errors should occur during *Autoadjust*, the respective error code is displayed as in P1.1. In this case press **ENTER** to acknowledge. The operating level, mode 1.3 (MAN-SENS) will be activated automatically, then.

3.4.2 Setting the bus address

- When the positioner is on the remote level, first change over to the operating level by pressing and holding **MODE** and **ENTER** simultaneously until the countdown has run down from 3 to 0. Release **MODE** and **ENTER.** The positioner changes over to the operating level.
- Switch the positioner over to the configuration level: Press and hold ↑ and ↓ simultaneously and then additionally briefly press and release **ENTER** once. Keep ↑ and ↓ pressed until the countdown from 3 to 0 is finished (approx. 3 seconds) and only then release them. Otherwise, the change-over to the configuration level will fail.

is displayed

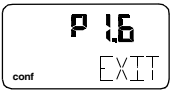
- Press and hold **MODE**. Additionally press ↑ or ↓ until

is displayed

- Release **MODE**.

is displayed (factory setting)

- Press the ↑ or ↓ button to increment or decrement the bus address.
- Press and hold **ENTER** until the countdown has run down from 3 to 0. Then release **ENTER**. The new bus address is saved.
- Press and hold **MODE**. Additionally press ↑ or ↓ until

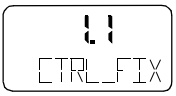


is displayed. Set the parameter to NV_SAVE by using ↑ or ↓.

- Press and hold **ENTER** until the countdown has run down from 3 to 0 to switch the positioner back to the operating level.
- To return from the operating level to the remote level, press and hold **MODE** and **ENTER** simultaneously until the countdown has run down from 3.0. Release **MODE** and **ENTER**. The positioner returns to the remote level.

3.4.3 Overview of the operating modes and how to select (from operating level)

Mode 1.1: Control

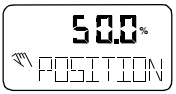
- Press and hold **MODE.**
- Additionally briefly press ↑ as often as required.
- 

is displayed.
- Release **MODE**
- 

is displayed, control is running.

Mode 1.2: Manual adjustment within the stroke range

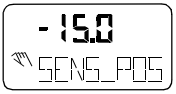
- Press and hold **MODE.**
- Additionally briefly press ↑ as often as required.
- 

is displayed.
- Release **MODE.**
- 

is displayed.
- Press ↑ or ↓ to adjust the position within the stroke range.

Mode 1.3: Manual adjustment within the sensor range

- Press and hold **MODE.**
- Additionally briefly press ↑ as often as required.
- 

is displayed.
- Release **MODE.**
- 

is displayed.
- Press ↑ or ↓ to adjust the position within the sensor range.

3.4.4 Parameter setting example:

"Changing zero position from clockwise to counter-clockwise"

Starting situation: the TZID-C is operating remote-controlled.

1. Cange over from the remote level to the operating level
   - Press and hold **MODE** and **ENTER** simultaneously.
   - Wait until the countdown has run down from 3 to 0.
   - Release **MODE** and **ENTER**. Mode 1.1 is reached and indicated.
2. Change over to the configuration level:
   - Simultaneously press and hold ↑ and ↓.
   - In addition, briefly press **ENTER.**
   - Wait until countdown from 3 to 0 has run down.
   - Release ↑ and ↓.
   - 

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

is displayed.

- Release **MODE** and **ENTER.**
- 

is displayed.

4. Select parameter 3.2 "Zero position":
   - Press and hold **MODE.**
   - In addition, 2 x briefly press ↑.
   - 

is displayed.
   - Release **MODE.**

5. Change parameter setting:
   - Briefly press ↑ to select "CTCLOCKW".
6. Change over to parameter 3.3 "EXIT" and save the new setting:
   - Press and hold **MODE.**
   - In addition, 1 x briefly press ↑.
   - 

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

The positioner saves the new settings and automatically returns to the operating level.

7. Return to the remote level.
   - Press and hold **MODE** and **ENTER.**
   - Wait until the countdown has run down from 3 to 0 .
   - Release **MODE** and **ENTER.**

The display indicates the position in % and REMOTE.

See Appendix A for an overview of the operation and the parameter settings.

4 Technical data

4.1 Basic model

Communication

Profiles
Profibus PA Profile for Process Control Devices
Electro Pneumatic Actuator V3.0

Block types
1 AO Function Block, 1 Transducer Block,1 Physical Block

Physical layer
Compliant to the standard IEC 61158-2

Communication speed
31.25 Kbit/second

Operating voltage
Bus-powered: 9.0 - 32.0 volts

Max. withstand voltage
35 V

Current consumption
10.5 mA

Fault current
15 mA (10.5 mA + 4.5 mA)

Name

Physical device tag
TZID-C110

PNO ID number
0x0639

Device ID
0X3200028xyz

Device address
Between 0 and 126, default node address 126

Output

Range
0...6 bar (0...90 psi)

Air capacity
at supply pressure of 1.4 bar (20 psi)
5.0 kg/h = 3.9 Nm^3/h = 2.3 scfm
at supply pressure of 6 bar (90 psi)
13 kg/h = 10 Nm^3/h = 6.0 scfm
(Booster, for increasing air capacity, on request)

Function
for single or double acting actuators, air is vented from actuator or actuator is blocked in case of an electrical power failure

Shut-off function
If the setpoint goes below the set value, the positioner immediately moves the actuator to the closing position. Range: 0...20% of positioning signal.

Travel

Angle of rotation

Used range	25...120 ° (rotary actuators optionally 270°) 25...60 ° (linear actuators)

Stroke time
Range 0...200 seconds, individually configurable for each direction

Dead band time limit
Range 0...200 seconds (monitoring parameter for control until the deviation is within the tolerance band)

Stroke limiting
Min. and max. limits,
freely configurable within 0...100% of total travel (> 20 %)

Air supply

Instrument air
free of oil, water and dust to DIN/ISO 8573-1
pollution and oil contents according to Class 3
(Purity: max. particle size 5 µm, max. particle density 5mg/m^3; Oil contents: max. concentration 1 mg/m^3;
Dew point at least 10 °C below operating temperature)

Supply pressure
1.4...6 bar (20...90 psi)
Caution: Do not exceed the max. operating pressure of the actuator!

Air consumption
< 0.03 kg/h (0.08 scfm) (independent of supply pressure)

Transmission data and influences

Direction (output signal or pressure in the actuator)

Increasing:	Increasing signal 0...100 % Increas. pressure OUT_1 to the actuator
Decreasing:	Increasing signal 0...100 % Decreas. pressure OUT_1 to the actuator

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 (sensitivity threshold)
0.3...10%, adjustable

Resolution (A/D conversion)
16,000 steps

Sample rate
20 ms

Influence of ambient temperature
≤ 0.5% for every 10 °C change in temperature

Influence of vibration
≤ +/-1% up to 10g and 80 Hz

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

Influence of mounting position
No effect

Meets the following requirements
EMC directive 89/336/CEE as of May 1989
EC directive for the CE conformity marking

Environmental capabilities

Ambient temperature
- 40 to + 85 °C (- 40 to + 185 °F)
for operation, storage and transport

Relative humidity
< 75% (95% for a short time), non-condensing

Case

Material/surface
Aluminum, protection IP 65 (NEMA 4x)
Bottom part of case varnished black, RAL 9005, matt,
Cover white aluminum RAL 9006

Electrical connections
Screw terminals, internal — for bus connection 2.5 mm^2
for options 1.5 mm^2

Cable entry
2 threads Pg. 13.5, 1/2-14 NPT or M20x1.5
possible cable diameter 6...12 mm
1 with cable gland and 1 with dummy plug

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

Weight:	1.7 kg
Mounting position:	any orientation allowed
Dimensions:	see dimensional drawings in data sheet 10/18-0.23 EN or manual (CD version) 42/18-74 EN

Explosion protection

FM/CSA

ATEX (applied for)

Type:	Intrins. safe equipment
Device class:	II 2G (EEx ia IIC)
Temperature class:	T4, T5, T6
Permissible ambient temperature:	T4: -40 °C ≤ T_{amb} ≤ 85 °C
	T5: -40 °C ≤ T_{amb} ≤ 50 °C
	T6: -40 °C ≤ T_{amb} ≤ 40 °C

Signal current circuit for Profibus PA, only for connection to a certified intrinsically safe circuit (e.g. FISCO power unit oder barrier) with the following max. values:

FISCO ia/ib for group IIB/IIC	FISCO ia/ib for group IIB/IIC	Barrier or power supply unit ia/ib for group IIB/IIC
Vi = 17.5 V	Vi = 17.5 V	Vi = 24 V
Ii = 360 mA	Ii = 360 mA	Ii = 250 mA
Pi = 5.32 W	Pi = 2.52 W	Pi = 1.2 W
rectangular	trapezoidal	linear

4.2 Options

Plug-in module for the shutdown function

In case of a 24 V DC power failure, the positioner can let the valve move to the safe position by depressurizing the actuator independently of the processor. To achieve this, the I/P module power supply is separated by an optocoupler. Both the communication and feedback are still active, since the positioner is powered via the bus line. The shutdown input is electrically isolated from the control signal.

Due to the shutdown function no additional solenoid valves are required. It has a safety certificate from TÜV Rheinland in accordance with AK4. The plug-in module also has an Ex certificate for use in intrinsically safe current circuits.

Kit for mechanical position indicator

Indicator disk
Cover with transparent dome
Symbol stickers
Extension for the feedback shaft

Kit for digital position feedback with proximity switches *

2 proximity switches for min. and max. position
(position adjustable within range of 0...100%)

Current circuit to DIN 19234
Supply voltage 5...11 V DC
Control current < 1 mA= switching state logical "0"
Control current > 3 mA= switching state logical "1"
(works independently of the software and the electronics of the positioner)

Direction of action (logical state):

Slot-type initiator	Position			
	< min.	> min.	< max.	> max.
SJ2-SN (NC)	0	1	1	0
SJ2-S1N (NO)	1	0	0	1

Kit for digital position feedback with 24 V microswitches*

Two 24 V DC/AC microswitches for independent position signalling.
Switching points adjustable between 0 and 100 %
Not approved for use in hazardous areas !

* The “digital position feedback“ option is directly actuated by the rotating shaft of the TZID-C110 positioner and can only be used together with the mechanical position indicator described above.

5 Certificates

(1) **EG-Baumusterprüfbescheinigung**

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen **- Richtlinie 94/9/EG**

(3) EG Baumusterprüfbescheinigungsnummer

TÜV 02 ATEX 1831 X

(4) Gerät: Stellungsregler Typ TZID-C110 bzw. TZID-C210

(5) Hersteller: ABB Automation Products GmbH

(6) Anschrift: Schillerstrasse 72
D-32425 Minden

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Der TÜV Hannover/Sachsen-Anhalt e.V., TÜV CERT-Zertifizierungsstelle, bescheinigt als benannte Stelle Nr. 0032 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht Nr. 02YEX165336 festgelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

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

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf die Konzeption und den Bau des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes.

(12) Die Kennzeichnung des Gerätes muß die folgenden Angaben enthalten:

Ex II 2 G EEx ia IIC T6

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

Der Leiter

TÜV NORD CERT

Hannover, 23.04.2002

(13) **ANLAGE**

(14) **EG-Baumusterprüfbescheinigung Nr. TÜV 02 ATEX 1831 X**

(15) Beschreibung des Gerätes

Der Stellungsregler Typ TZID-C110 bzw. TZID-C210 dient zur Steuerung bzw. Regelung von pneumatisch angetriebenen Ventilen durch ein über einen Feldbus übermittelten Sollwert. Ein integrierter Wegsensor ermittelt die aktuelle Position des Ventilantriebes.
Ein integrierter Strom/Druckwandler (I/P) wird zur Steuerung der pneumatischen Hilfsenergie verwendet.

Der zulässige Umgebungstemperaturbereich in Abhängigkeit von der Temperaturklasse ist der folgenden Tabelle zu entnehmen:

Temperaturklasse	Umgebungstemperaturbereich
T4	- 40 °C bis + 85 °C
T5	- 40 °C bis + 55 °C
T6	- 40 °C bis + 40 °C

Elektrische Daten

Signalstromkreis
(Klemme +11, –12 bzw.+, -)

in Zündschutzart Eigensicherheit EEx ia IIC
bzw. EEx ib IIC
nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis (z.B. FISCO-Speisegerät) mit Höchstwerten entsprechend der folgenden Tabelle:

	FISCO-Speisegerät ia / ib für Gruppe IIB / IIC	FISCO-Speisegerät ia / ib für Gruppe IIB / IIC	Barriere oder Speisegerät ia / ib für Gruppe IIB / IIC
Spannung	17,5 V	17,5 V	24 V
Strom	380 mA	360 mA	250 mA
Leistung	5,32 W	2,52 W	1,2 W
Kennlinie	rechteckförmig	trapezförmig	linear

L_i vernachlässigbar klein
C_i vernachlässigbar klein

Shutdown-Schalteingang
(Klemme +85 und –86)

in Zündschutzart Eigensicherheit EEx ia IIC
bzw. EEx ib IIC
nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis mit den Höchstwerten:
U_i = 30 V

C_i = 3,7 nF
L_i vernachlässigbar klein

BA 02 03 02

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Mechanische digitale Rückmeldung (Klemmen Limit1 +51, -52 bzw. Limit2 +41, -42)	Höchstwerte siehe EG-Baumusterprüfbescheinigung Nr. PTB 00 ATEX 2049 X
Lokale Kommunikations-schnittstelle (LKS) und Programmierschnittstelle (X5)	zum Anschluss an ein Programmiergerät bzw. PC außerhalb des explosionsgefährdeten Bereiches

(16) Die Prüfungsunterlagen sind im Prüfbericht Nr. 02YEX165336 aufgelistet.

(17) Besondere Bedingung

Die „Lokale Kommunikationsschnittstelle" (LKS) und die „Programmierschnittstelle (X5)" dürfen nur außerhalb des explosionsgefährdeten Bereiches betrieben werden.

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

keine zusätzlichen

BA 02.03.02

Physikalisch-Technische Bundesanstalt

PTB

Braunschweig und Berlin

(1) **EG-Baumusterprüfbescheinigung**

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 94/9/EG**

(3) EG-Baumusterprüfbescheinigungsnummer

PTB 00 ATEX 2049 X

(4) Gerät: SN-Sensoren Typen NJ... und SJ...

(5) Hersteller: Pepperl + Fuchs GmbH

(6) Anschrift: D-68307 Mannheim

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Physikalisch-Technische Bundesanstalt bescheinigt als benannte Stelle Nr. 0102 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht PTB Ex 00-29268 festgelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

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

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Bau des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes.

(12) Die Kennzeichnung des Gerätes muß die folgenden Angaben enthalten:

Ex II 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz
Im Auftrag
Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 05. Oktober 2000

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT

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(13) # Anlage

(14) ## EG-Baumusterprüfbescheinigung PTB 00 ATEX 2049 X

(15) Beschreibung des Gerätes

Die SN-Sensoren Typen NJ... und SJ... dienen zur Umformung von Wegänderungen in elektrische Signale.

Die SN-Sensoren Typen NJ... und SJ... dürfen mit eigensicheren Stromkreisen, die für die Kategorien und Explosionsgruppen [EEx ia] IIC oder IIB bzw. [EEx ib] IIC oder IIB bescheinigt sind, betrieben werden. Die Kategorie sowie die Explosionsgruppe der SN-Sensoren richtet sich nach dem angeschlossenen, speisenden eigensicheren Stromkreis.

Elektrische Daten

Auswerte- und Versorgungsstromkreis..... in Zündschutzart Eigensicherheit EEx ia IIC/IIB
bzw. EEx ib IIC/IIB

nur zum Anschluß an bescheinigte eigensichere Stromkreise
Höchstwerte:

Typ 1	Typ 2	Typ 3	Typ 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

Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der SN-Sensoren ist der Tabelle zu entnehmen:

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

Anlage zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2049 X

Typen	C_i	L_i	Typ 1			Typ 2			Typ 3			Typ 4		
			Höchstzulässige Umgebungstemperatur in °C bei Einsatz in Temperaturklasse											
	[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) Prüfbericht PTB Ex 00-29268

(17) Besondere Bedingungen

1. Beim Einsatz der SN-Sensoren Typen NJ... und SJ... im Temperaturbereich von -60°C bis -20 °C sind diese durch Einbau in ein zusätzliches Gehäuse vor Schlageinwirkung zu schützen.
2. Die Anschlußteile der SN-Sensoren Typen NJ... und SJ... sind so zu errichten, dass mindestens die Schutzart IP20 gemäß IEC-Publikation 60529:1989 erreicht wird.
3. Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der SN-Sensoren ist der Tabelle unter Punkt (15) dieser EG-Baumusterprüfbescheinigung zu entnehmen.
4. Bei Einsatz in Gruppe IIC ist bei den folgenden Typen der SN-Sensoren die unzulässige elektrostatische Aufladung der Kunststoffgehäuse zu vermeiden und ein entsprechender Warnhinweis auf dem Gerät anzubringen:

   NJ 40-FP-SN...

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Anlage zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2049 X

5. Bei den folgenden Typen der SN-Sensoren ist die unzulässige elektrostatische Aufladung der Metallgehäuseteile zu vermeiden. Gefährliche elektrostatische Aufladungen der Metallgehäuseteile können durch Erdung dieser Metallgehäuseteile vermieden werden, wobei sehr kleine Metallgehäuseteile (z.B. Schrauben) nicht geerdet werden müssen:

   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) Grundlegende Sicherheits- und Gesundheitsanforderungen

Durch vorgenannte Normen abgedeckt.

Zertifizierungsstelle Explosionsschutz
Im Auftrag

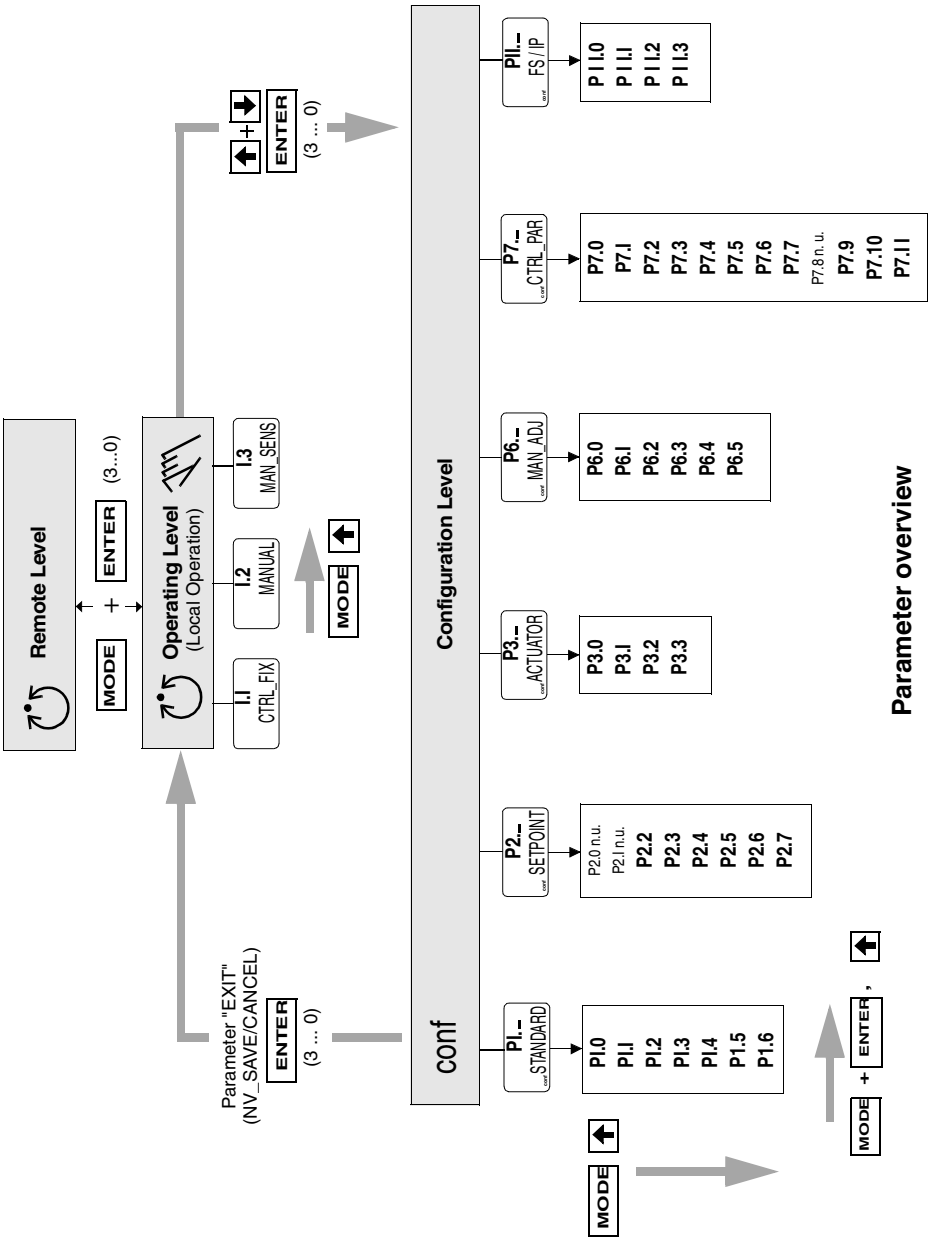
Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 05. Oktober 2000

Appendix A:Configuration overview

Par.	Display	Function	Parameter setting	Unit	Factory setting
P1._	**STANDARD**				
P1.0	**ACTUATOR**	Actuator type	LINEAR, ROTARY	-	LINEAR
P1.1	**AUTO_ADJ**	Autoadjustment	Action	-	-
P1.2	**TOL_BAND**	Tolerance band	X...Y.00	%	0.30
P1.3	**DEADBAND**	Deadband	0.10...5.00	%	0.10
P1.4	**TEST**	Test	Action	-	-
P1.5	**ADDRESS**	Bus address	1...126	-	126
P1.6	**EXIT**	Return to operat. level	Action	-	-
P2._	**SETPOINT**				
P2.0	*not used*	-			
P2.1	*not used*	-			
P2.2	**CHARACT**	Characteristic curve	LINEAR, EP 1:25, 1:50,25:1, 50:1, USERDEF,	-	LINEAR
P2.3	**ACTION**	Valve action	DIRECT, REVERSE	-	DIRECT
P2.4	**SHUT-OFF**	Shut-off value	OFF, 0.1...45.0	%	OFF
P2.5	**RAMP UP**	Setpoint ramp, up	OFF, 0.1...999.9	sec	OFF
P2.6	**RAMP DN**	Setpoint ramp, down	OFF, 0.1...999.9	sec	OFF
P2.7	**EXIT**	Return to operat. level	Action	-	-
P3._	**ACTUATOR**				
P3.0	**MIN_RGE**	Min. of stroke range	0.0...100.0	%	0.0
P3.1	**MAX_RGE**	Max. of stroke range	0.0...100.0	%	100.0
P3.2	**ZERO_POS**	Zero position	CLOCKWISE, CTCLOCKWISE	-	CTCLOCKWISE
P3.3	**EXIT**	Return to operat. level	Action	-	-
P4._ and P.5_		*not used*	*not used*		
P6._	**MAN_ADJ**				
P6.0	**MIN_VR**	Min. valve range	0.0...100.0	%	0.0
P6.1	**MAX_VR**	Max. 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**	*Autoadjust* mode	FULL, STROKE, CTRL_PAR, ZERO_POS, LOCKED	-	FULL
P6.5	**EXIT**	Return to operat. level	Action	-	-

Par.	Display	Function	Parameter setting	Unit	Factory setting
P7_	**CTRL_PAR**				
P7.0	**KP UP**	KP value, up	1.0...100.0	-	5.0
P7.1	**KP DN**	KP value, down	1.0...100.0	-	5.0
P7.2	**TV UP**	TV value, up	0...1000	msec	200
P7.3	**TV DN**	TV value, down	0...1000	msec	200
P7.4	**GOPLS UP**	Go pulse, up	0...200	msec	0
P7.5	**GOPLS DN**	Go pulse, down	0...200	msec	0
P7.6	**Y-OFS UP**	Y offset, up	Y-Min...100.0	%	24.0
P7.7	**Y-OFF DN**	Y offset, down	Y-Min...100.0	%	24.0
P7.8	*not used*	*not used*	*not used*	-	-
P7.9	**TOL_BAND**	Tolerance band	X...10.20	%	0.30
P7.10	**TEST**	Test	Action	-	-
P7.11	**EXIT**	Return to operat. level	Action	-	-
P8._ , P9._ P.10_		*not used*	*not used*		
P11._	**FS / IP**				
P11.0	**FAIL_POS**	Safe position	ACTIVE, INACTIVE	-	INACTIVE
P11.1	**FACT_SET**	Factory setting	Action	-	-
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 operat. level	Action	-	-


Remote Level
MODE + ENTER (3...0)
Operating Level
(Local Operation)
I.1 CTRL_FIX
I.2 MANUAL
I.3 MAN_SENS
MODE
ENTER (3 ... 0)
Parameter "EXIT"
(NV_SAVE/CANCEL)
ENTER (3 ... 0)
Configuration Level
conf
PI.– _STANDARD
P1.0 P1.1 P1.2 P1.3 P1.4 P1.5 P1.6
P2.– _SETPOINT
P2.0 n.u. P2.1 n.u. P2.2 P2.3 P2.4 P2.5 P2.6 P2.7
P3.– _ACTUATOR
P3.0 P3.1 P3.2 P3.3
P6.– _MAN_ADJ
P6.0 P6.1 P6.2 P6.3 P6.4 P6.5
P7.– _CTRL_PAR
P7.0 P7.1 P7.2 P7.3 P7.4 P7.5 P7.6 P7.7 P7.8 n.u. P7.9 P7.10 P7.11
PII.– _FS / IP
P I I.0 P I I.1 P I I.2 P I I.3
MODE + ENTER , MODE
Parameter overview

Subject to technical changes.

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