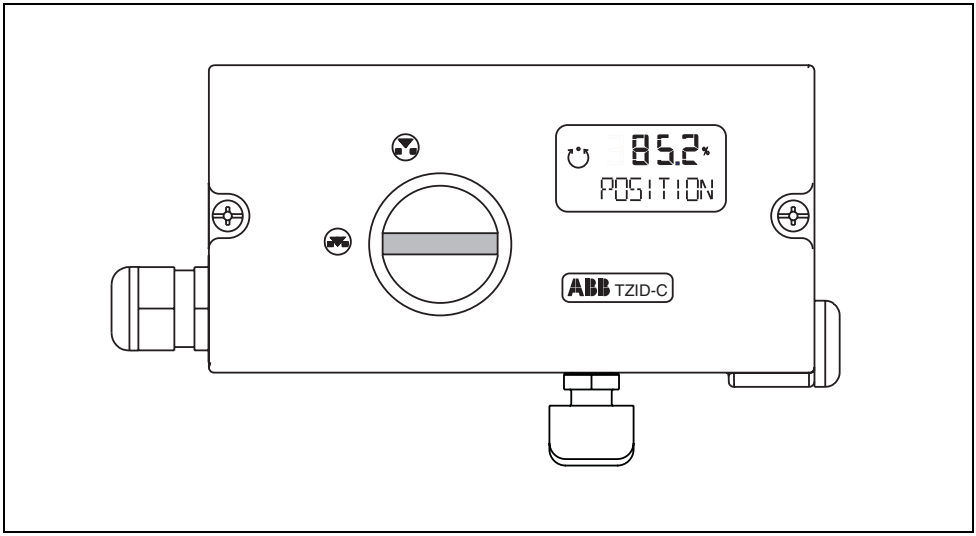
TZID-C

Intelligent Positioner

Operating Instructions 42/18-64 EN Rev. 4.0



Mounting to linear actuators

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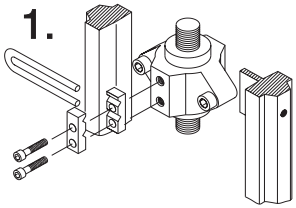

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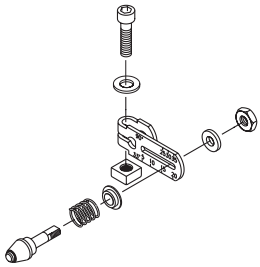

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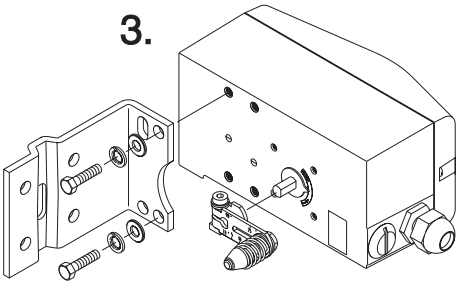

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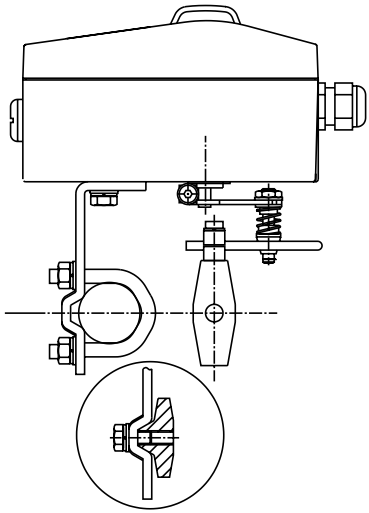
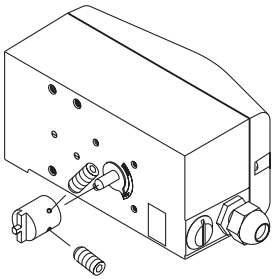


Mounting to rotary actuators

1.



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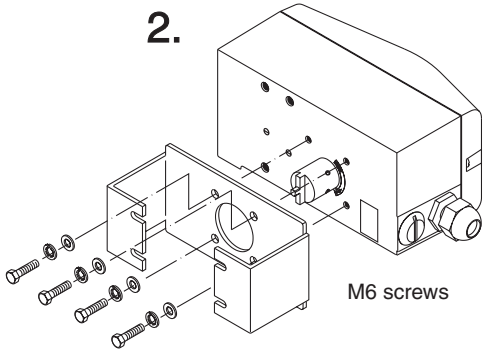

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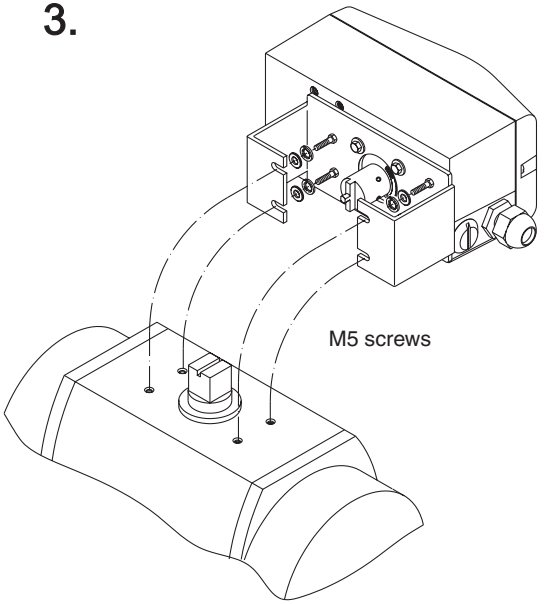

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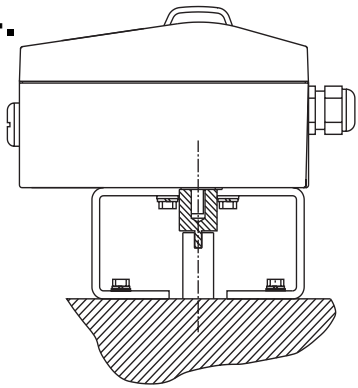


0 Brief operating instructions

Caution **Read and observe the safety instructions in chapter 1 of these operating instructions.**

Mechanical mounting

see fold-out drawing

Pneumatic connection

- Connect the air supply to the in port. Air supply range must be between 1.4 and 6 bar (20 to 90 psi).

  Caution: Do not exceed the max. pressure of the actuator!

- Connect the actuator supply to the OUT1 port (and OUT2 port for double acting actuators).

Electrical connection

- Make the electrical connections according to the following terminal designation:

+11/-12	Analog input, 4...20 mA signal
+31/-32	Analog output, position feedback, 4...20 mA signal*
+41/-42	Digital position feedback, SW1 *
+51/-52	Digital position feedback, SW2 *
+81/-82	Digital input
+83/-84	Digital output, alarm contact

+41/-42	Kit for digital position feedback, Limit 2*
+51/-52	Kit for digital position feedback, Limit 1*

+41/-42	Shutdown module*

41	Kit for digital position feedback, 24 V microswitch, Limit 1, NC contact *
42	Kit for digital position feedback, 24 V microswitch, Limit 1, NO contact*
43	Kit for digital position feedback, 24 V microswitch, Limit 1, input*
51	Kit for digital position feedback, 24 V microswitch, Limit 2, NC contact*
52	Kit for digital position feedback, 24 V microswitch, Limit 2, NO contact*
53	Kit for digital position feedback, 24 V microswitch, Limit 2, input*

* Option

Commissioning

1. Turn on the air supply to the positioner.

2. Apply the 4...20 mA analog input signal to the positioner.

3. Check for proper mounting:
   - 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 positions of limit stops:
   > -28° and < +28° for linear actuators
   > -57° and < +57° for rotary actuators
   Minimum angle: 25°

4. Switch to the configuration level:
   - Press and hold ↑ and ↓ simultaneously.
   - Additionally briefly press **ENTER.**
   - Wait until the countdown from 3 to 0 is completed.
   - Release ↑ and ↓.

   The device will automatically go to parameter group P1.

5. Select the actuator type (parameter P1); select **ROTARY** or **LINEAR** using ↑ or ↓ .

   Caution

   This step must be performed prior to *Autoadjust* (step 6).

6. Start *Autoadjust:*
   - Press and hold **MODE.**
   - Additionally briefly press ↑; until "P1.1" is indicated.
   - Release **MODE.**
   - Press **ENTER** and keep it pressed until the countdown is finished.
   - Release **ENTER**.
     Autoadjust is started.
   - If the message "COMPLETE" is displayed to indicate successful *Autoadjust*, briefly press **ENTER** to acknowledge.

     It is also possible that *Autoadjust* is automatically cancelled due to troubles, and an error message is displayed. See “P 1.1 Autoadjust” on page 53 for details.

7. Adjust the tolerance band (only necessary for critical actuators, e.g. especially small ones). See “P1.2 Tolerance band” on page 55. Usually, this step is not required.

8. If required test the settings. See “P1.3 Test” on page 56 for details.

9. Save the settings:
   - Press and hold **MODE.**
   - In addition, briefly press ↑ until P1.4 is indicated.
   - Release **MODE.**
   - Select **NV_SAVE** using ↑ or ↓.
   - Press and hold **ENTER** until the countdown is completed, then release **ENTER.**

   The settings are saved in the non-volatile memory, and the positioner returns to the operating level. The last previous operating mode is activated again.

Selecting operating mode

Mode 1.0: Adaptive control

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

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

is displayed, adaptive control is running.

Mode 1.1: Fixed control

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

is displayed.
- Release **MODE**
- 

is displayed, fixed control is running.

Mode 1.2: Manual adjustment within the stroke range

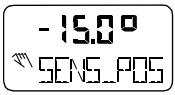
- Press and hold **MODE.**
- Additionally briefly press ↑ as often as required.
- 

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.

See Appendix A for an overview on the configuration level.

Parameter setting example:

"Changing valve action from direct to reverse"

Starting situation: the TZID-C is operating on the operating level in an arbitrary mode.

1. 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 **ENTER.**
   - 

is displayed.

2. Change over to parameter group 2._ (See “Parameter group 2: Setpoint” on page 57):
   - Simultaneously press and hold **MODE** and **ENTER.**
   - In addition briefly press ↑ once.
   - 

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

is displayed.

3. Select parameter 2.3 "Valve action:
   - Press and hold **MODE.**
   - In addition, 3 x briefly press ↑.
   - 

is displayed.
   - Release **MODE.**

4. Change parameter setting:
   - Briefly press ↑ to select "REVERSE".

5. Change over to parameter 2.7 "EXIT" and save the new setting:
   - Press and hold **MODE.**
   - In addition, 4 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 setting and automatically returns to the operating level.

Table of Contents

1 Safety and precautions

1.1 General

Important instructions for your safety!
Read and observe!

Proper and safe operation of the TZID-C 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 2).

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-C 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-C 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 damages** may occur.

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

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

1.3 Notes on electrical and pneumatic safety

- Only qualified persons may mount, electrically and pneumatically connect, and commission the TZID-C positioner.
- Ensure the electrical safety of all feeding devices.
- When connecting the electrical wiring, observe the specifications according to chapter 8 "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 ex-certificate of the device.
- 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-C 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 data sheet 18-0.22 EN.

1.5 Qualified personnel

Only those persons familiar with the installation, commissioning, operation and maintenance of the TZID-C 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-C 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, especially the information and notes in chapter 6 "Local operation".

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 the data sheet 18-0.22 EN.

2.2 CE compliance information

We declare that we are the manufacturer of the TZID-C 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-C positioner meets the EC regulation for CE conformity.

3 Application and brief description

The TZID-C is an electro-pneumatic valve positioner. It can be mounted to either linear pneumatic actuators in accordance with DIN/IEC 534 or rotary pneumatic actuators according to VDI/VDE 3845. Special integral mounting to control valves 23/24, 23/25 and 23/26 is also possible.

Actuation can be single-acting (spring return) or double-acting (air to open and close).

The positioner is a two-wire instrument. The supply voltage is derived from the 4...20 mA input signal.

Construction

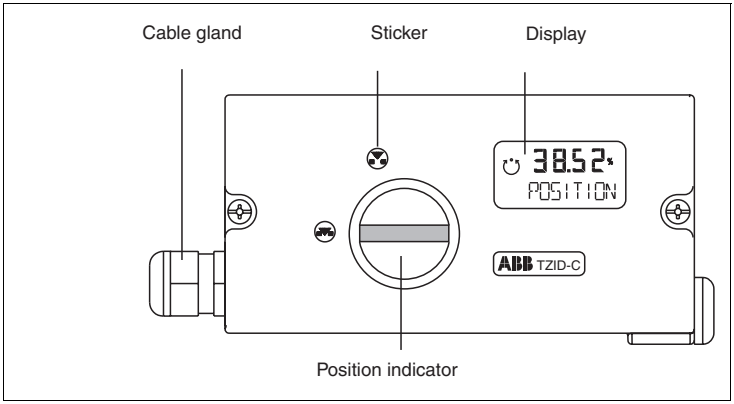


Fig. 1 TZID-C positioner, closed

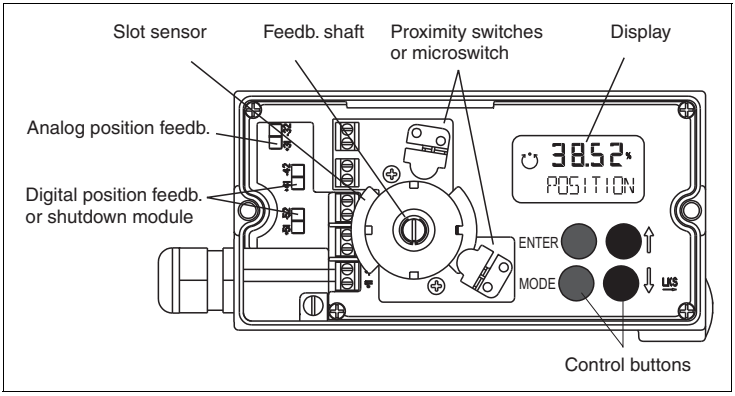


Fig. 2 TZID-C positioner, open

Fig. 1 and Fig. 2 show a fully equipped TZID-C with the following options:

- Mechanical position indicator (special cover with transparent dome, symbol sticker for marking the min. and max. valve positions, mechanical position indicator for mounting to the feedback shaft).
- Kit for digital position feedback, consisting of:
  - two Pepperl & Fuchs proximity switches with slot sensors

    or
  - two microswitches 24 V DC/AC

  for plugging onto the feedback shaft; to be used with mechanical position indicator, only
- Plug-in module for analog position feedback
- Plug-in module for safety shutdown (Shutdown module)
- Plug-in module for digital position feedback

Functional description

The movement of the actuator is coupled to the feedback shaft of the TZID-C positioner, detected by a position sensor, and converted to an electrical signal.

The input (position demand of the 4...20 mA canal) and the actual position are transferred to the electronics (CPU) via an A/D converter.

Using these values the microprocessor calculates the control deviation and – through a P/D control algorithm – a positioning signal that is used to activate an I/P module via an A/D converter (see Fig. 3).

The I/P module is the pneumatic output unit of the positioner. It consists of a pilot stage and an analog 3/3-way valve that is used as the booster stage. The pilot stage converts the electrical signal – via a system of coil/magnet and nozzle/flapper – into a supply pressure that actuates the power stage.

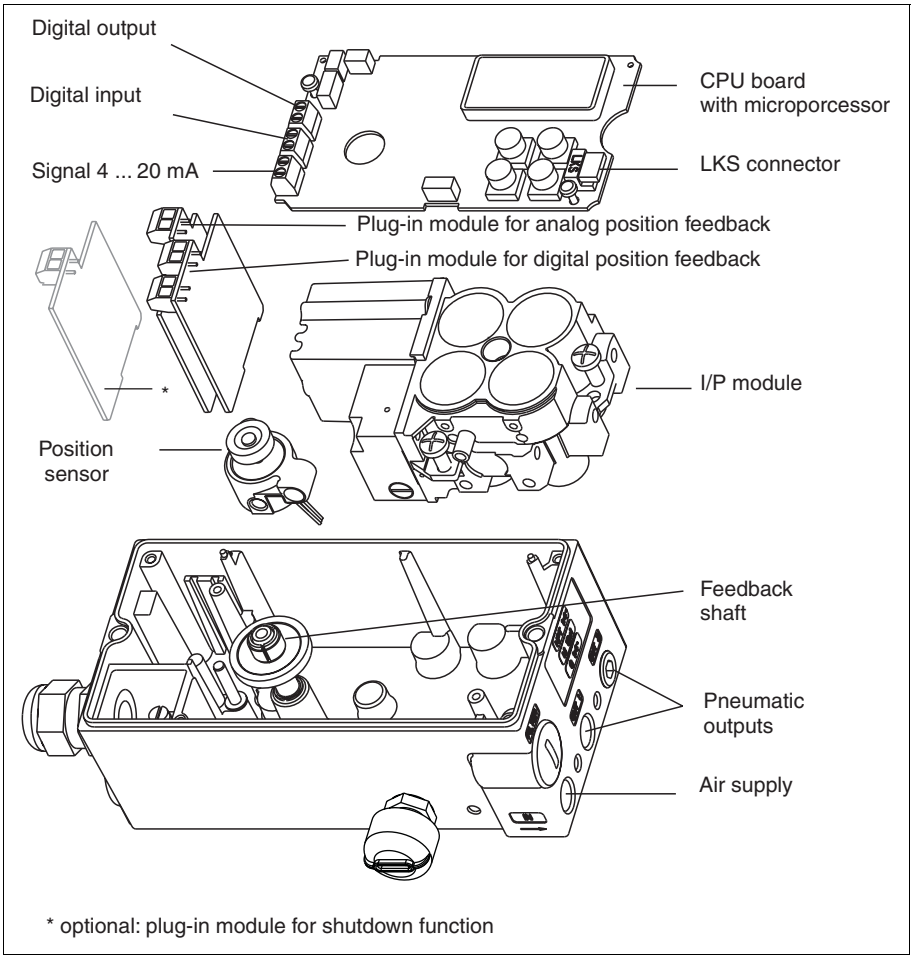


Fig. 3 Overview of the TZID-C assembly groups and connectors

Positioner range

The TZID-C positioner can detect an angle of rotation of 60 degrees for linear actuators and of 120 degrees for rotary actuators (optionally 270°).
There are three different ranges (see Fig. 4):

- Sensor range
- Valve range
- Stroke range

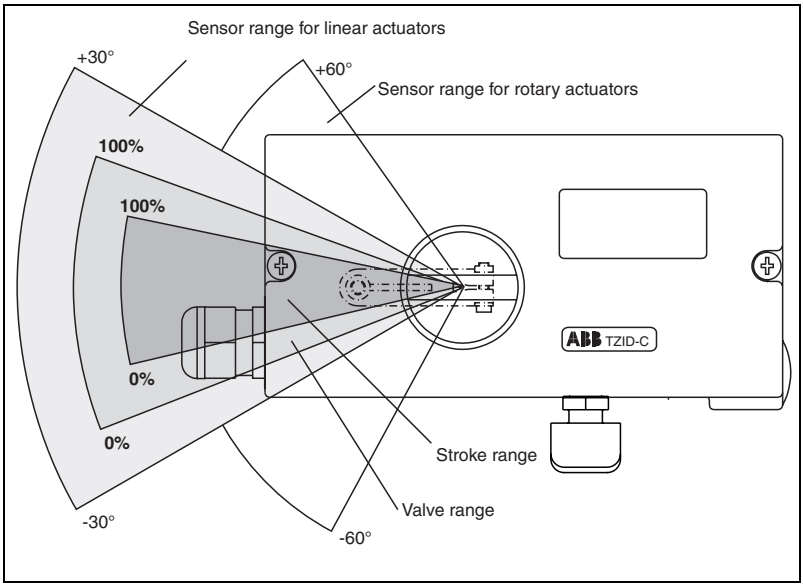


Fig. 4 Positioner range

The **sensor range** is the maximum range in which the movement of the rotary feedback shaft can be measured.

The **valve range** is the maximum range in which the TZID-C positioner can position an attached valve. The limits of the valve range depend on the valve and the respective mechanical mounting. Normally the limits are determined by *Autoadjust* but can also be determined by local or external parameter settings.

The **stroke range** is the user-defined range that limits the valve travel within the valve range. The stroke range value is stated as a percentage of the valve range. If a new valve range is determined (e.g. by *Autoadjust*), the stroke range is recalculated according to the new valve range. The percent value set for the stroke range is maintained. **The set-point range always relates to the stroke range.**

HART® communication

The TZID-C positioner contains a communication connection that enables the positioner to be operated, monitored, and configured via a PC. The communication is executed via an LKS adapter or an FSK modem and based on the HART® protocol. The following equipment is required for communication (see Fig. 5 and Fig. 6):

- LKS adapter or FSK modem
- PC
- Configuration program, e.g. SMART VISION®

For further information consult the separate user manuals for SMART VISION®.

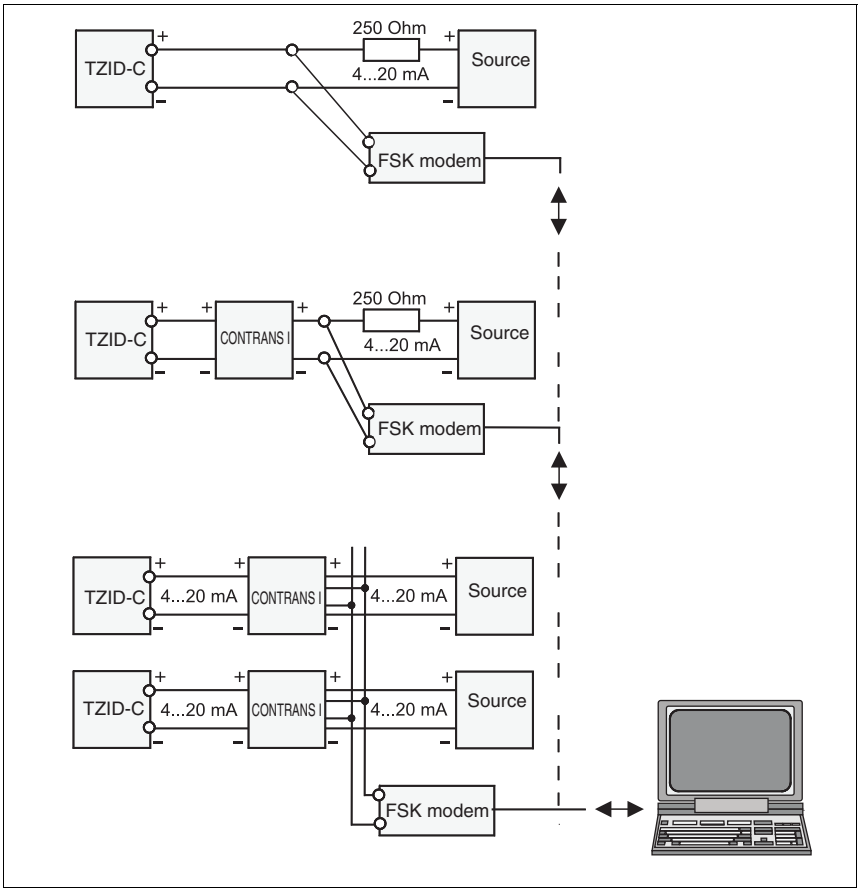


Fig. 5 Communication via FSK Modem

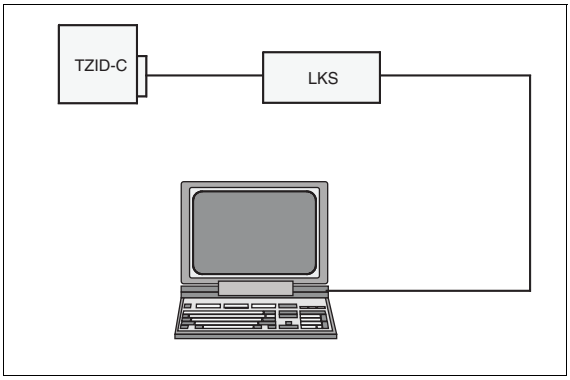


Fig. 6 Communication via LKS adapter

4 Installing and commissioning

4.1 Mechanical mounting

4.1.1 General

These operating instructions explain the mounting to linear actuators according to DIN/IEC 534 (lateral attachment according to Namur), to rotary actuators according to VDI/VDE 3845, and to control valves 23/24, 23/25 and 23/26. Instructions for special actuator-specific attachment are available separately.

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 (see Fig. 4 on page 7).

The arrow (1) on the feedback shaft (and thus the lever) must travel within the area marked with the small arrows (2) (see Fig. 7).

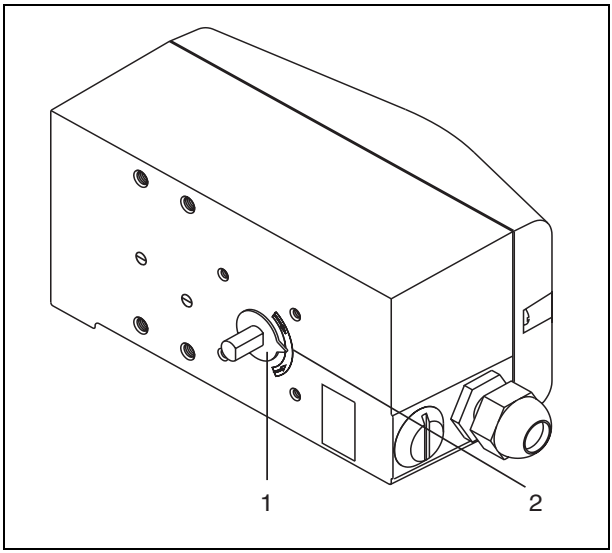


Fig. 7 Operating range

To enable you to use a big range, the lever should be positioned in the center between the arrows at half stroke ($\pm$ 0° sensor position).

During mounting, a rough adjustment of the actually used rotation angle range is sufficient. The fine adjustment is automatically performed during *Autoadjust*.

The total rotational angle must be at least **25°.**The position of the segment within the range is arbitrary.

For difficult controlling tasks with high friction or short positioning times it is advantageous to provide a rotation angle range as wide as possible.

For safety reasons the practically used rotation angle range should be kept at a minimum distance of 2° (for linear actuators) or 3° (for rotary actuators) from the final positions of the sensor range.

4.1.2 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-C will not be exceeded.

Ambient temperature:	-30 ... +85 °C
Protection:	IP 65 (type 4X)
Exposion protection:	II 2G EEx ib II C T6
Mounting position:	any orientation allowed, provided that the splash guard cap is in place

4.1.3 Mounting to linear actuator

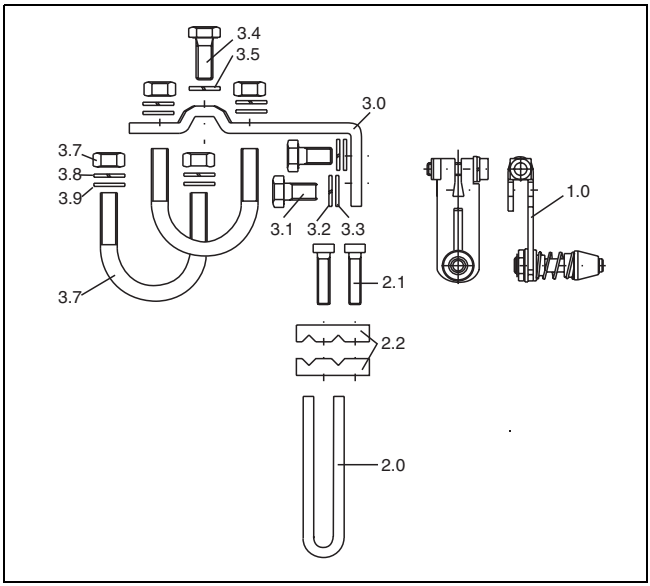


Fig. 8 Mounting kit for linear actuators

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

- Lever (1.0) with 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. Mounting the follower guide to the actuator

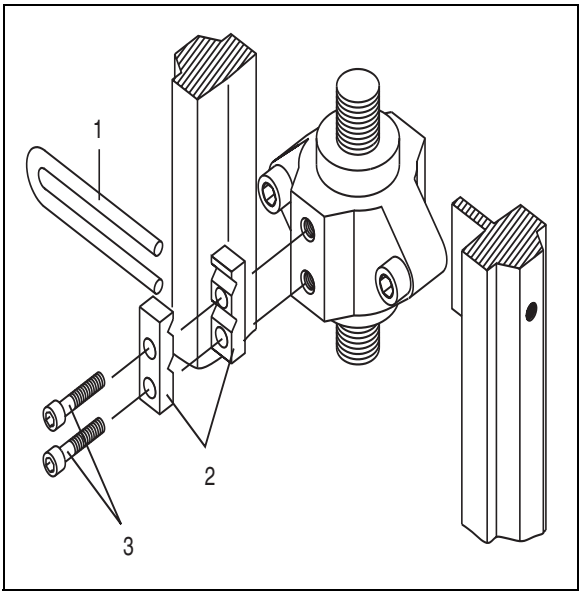


Fig. 9 Mounting follower guide to actuator

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

2. Assembling lever (if not yet pre-assembled))

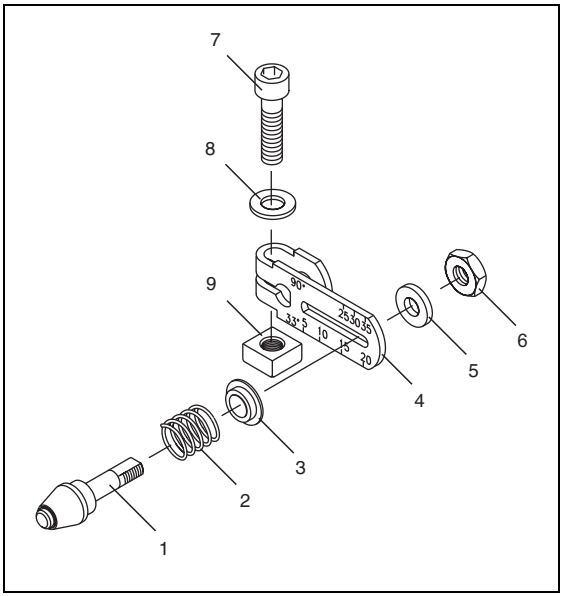


Fig. 10 Assembling lever

- 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 (see Fig. 14 on page 17).
- Slip the plain washer (8) onto the screw (7), insert the screw into the lever and counter with the nut (9).

3. Mounting lever and mounting plate to TZID-CI

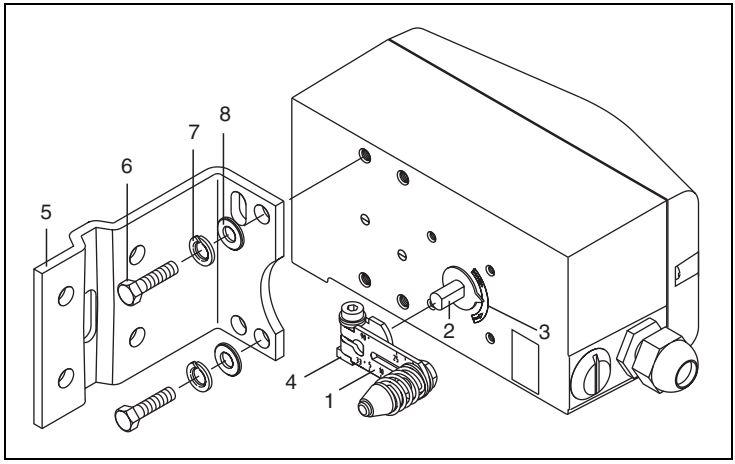


Fig. 11 Mounting lever and angle bracket to TZID-C

- Attach the lever (1) to the feedback shaft (2) at the rear of TZID-C (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-C 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-C 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-C case; if possible, tighten the screws evenly to ensure linearity during operation.

4.a Mounting to cast iron yoke

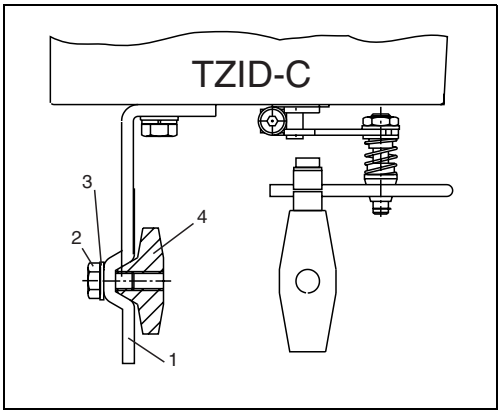


Fig. 12 Mounting to cast iron yoke

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

4.b Mounting to columnar yoke

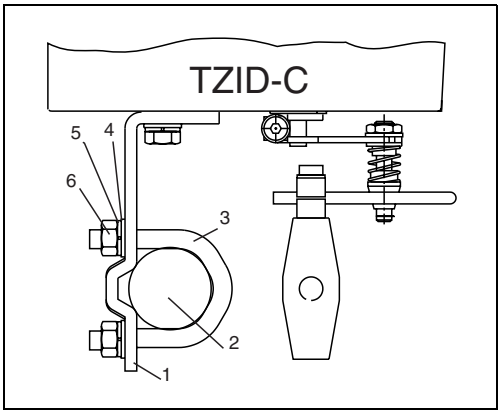


Fig. 13 Mounting to columnar yoke

- 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-C 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). This is especially recommended for mounting to a columnar yoke, as there is no standard bore hole for the mounting, as opposed to the cast iron yoke.

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.

5. Stroke adjustment

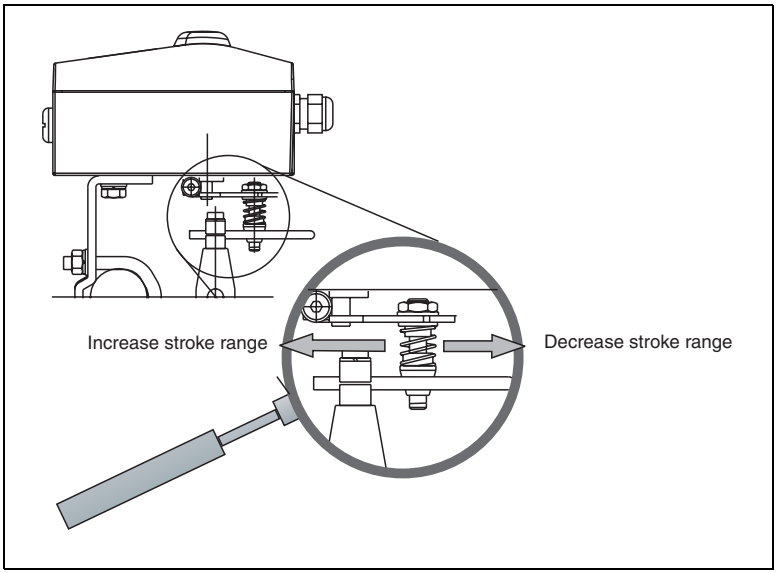


Fig. 14 Stroke adjustmentt

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 (see Fig. 14). 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*.

4.1.4 Mounting to rotary actuator

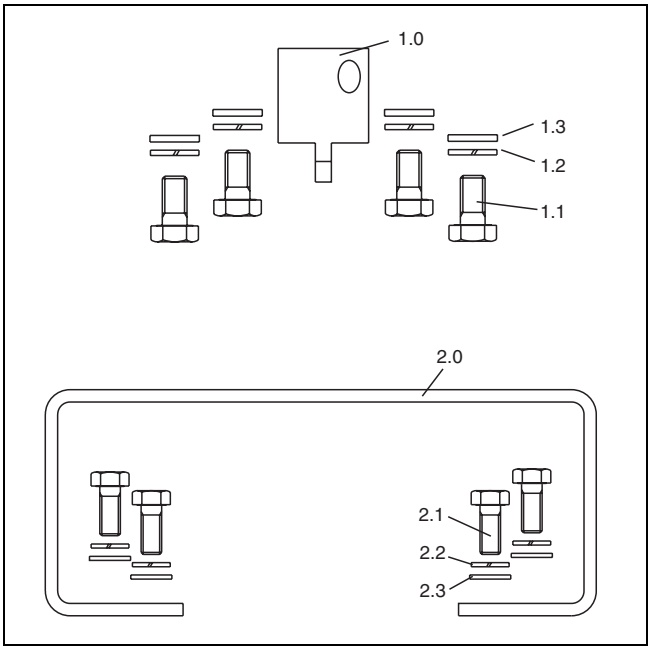


Fig. 15 Mounting kit for rotary actuators

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. Mounting adapter to positioner

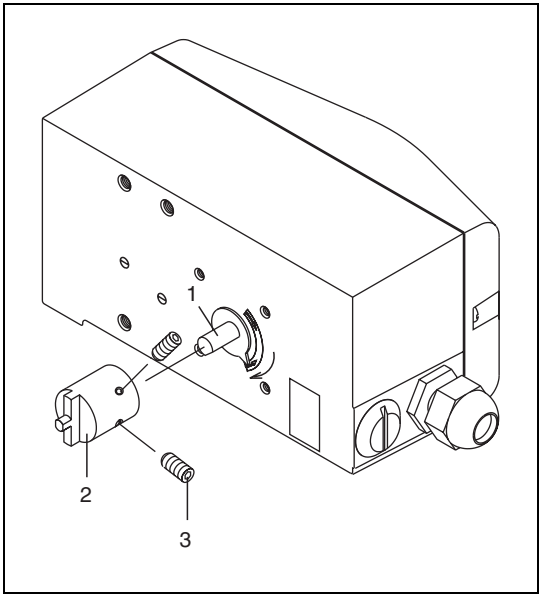


Fig. 16 Mounting adapter to positioner

- 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. 7 on page 10**).
- Pre-adjust the feedback shaft.
- Place the adapter on the feedback shaft in the appropriate position and fix it by setscrews (3); ensure that one of the setscrews is engaged on the side of the feedback shaft with the flat.

2. 2. Mounting positioner with mounting bracket

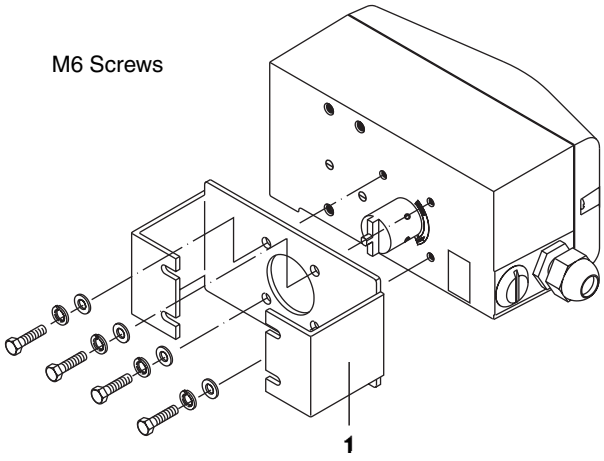


Fig. 17 **Attach mounting bracket (1) to TZID-C**

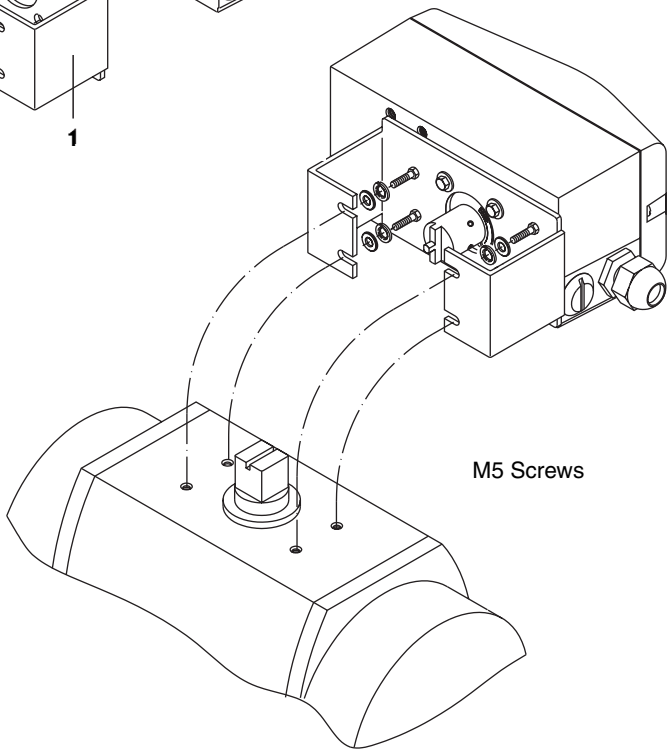


Fig. 18 **Attach TZID-C to actuator**

4.1.5 Mounting to control valves 23/24, 23/25

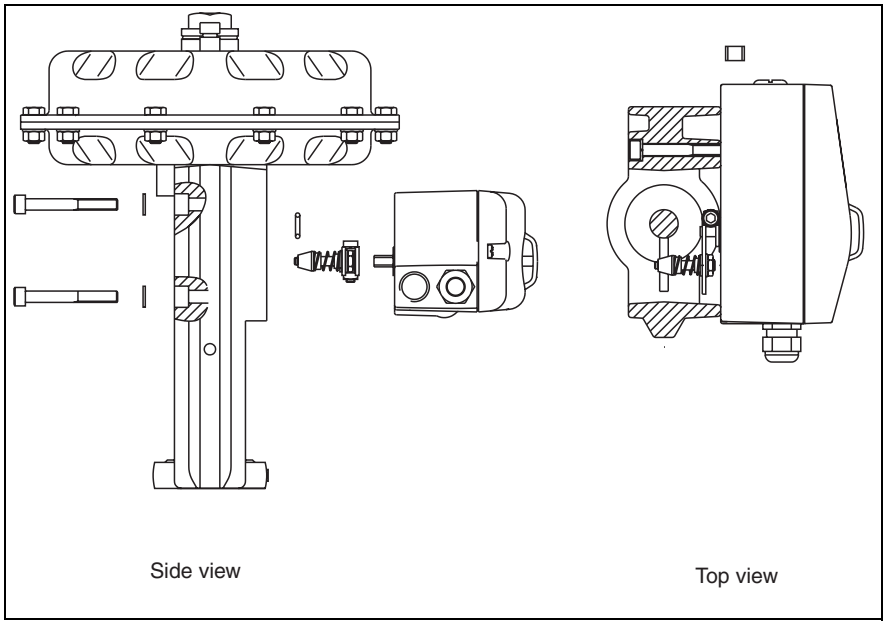


Fig. 19 Integral mounting to valve 23/24, 23/25

- Remove the screw plug and the inserted O-ring at the rear of the TZID-C positioner. Store these parts carefully, as you will need them if you want to mount this positioner to a linear or rotary actuator at a later time.
- Close the pneumatic connection marked OUT 1 by means of the screw plug.
  The common external piping is dropped, except for the control valve 23/24 and 23/25 with the effective direction "air to close/spring force to open".
- Mount the lever with the follower pin to the rear feedback shaft of the positioner; the flat on the side of the positioner feedback shaft assures a correct positioning.
- Match the position of the follower pin in the oblong hole of the lever to the actuator stroke using the scale.
- Mount the positioner with two screws and two spring washers to the actuator. During mounting, ensure that the follower pin is introduced between the two studs at the spindle which serve for the pick-up of the actuator value.

4.1.6 Mounting to control valve 23/26

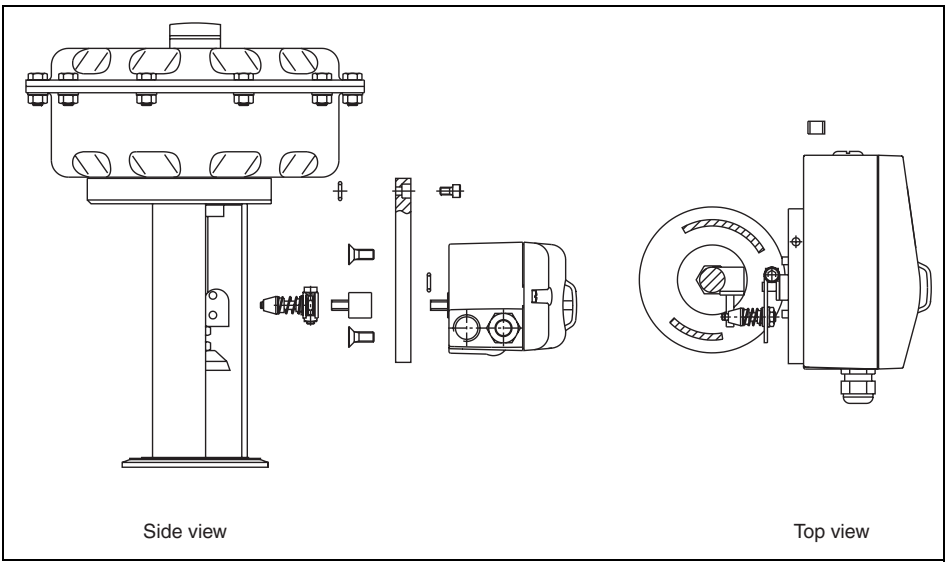


Fig. 20 Integral mounting to valve 23/26

- Remove the screw plug and the inserted O-ring at the rear of the TZID-C positioner. Store these parts carefully, as you will need them if you want to mount this positioner to a linear or rotary actuator at a later time.
- Close the pneumatic connection marked OUT 1 by means of the screw plug. The common external piping is dropped.
- First mount the plate with the screws to the positioner and put on the adapter for a prolongation of the feedback shaft.
- Mount the lever with the follower pin to the rear feedback shaft of the positioner; the flat on the side of the positioner feedback shaft assures a correct positioning.
- Match the position of the follower pin in the oblong hole of the lever to the actuator stroke using the scale.
- Mount the positioner with two screws to the actuator. During mounting, ensure that the follower pin is introduced between the two studs at the spindle which serve for the pick-up of the actuator value.

4.2 Pneumatic connection.

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.

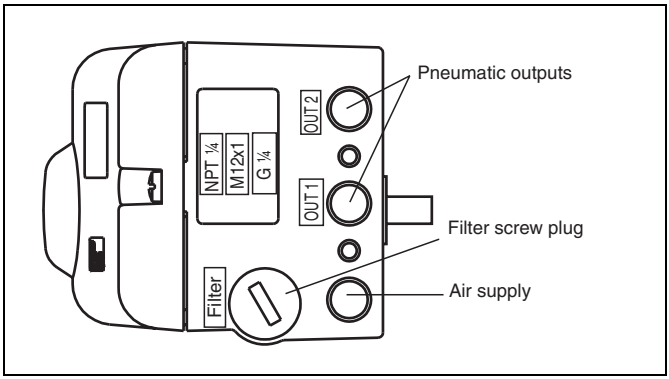


Fig. 21 Pneumatic connections

All pneumatic piping connections are located at the right-hand side of the device (see Fig. 21).

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)

4.3 Electrical connection

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

Only connect signal lines from controlled current sources such as mA outputs from controllers or calibrators to terminals +11/-12.

Connecting directly to a 24 VDC power supply will destroy the input circuitry.

The maximum current during a fault must not exceed 500 mA (even if polarity is reversed).

During installation please observe the specifications in chapter 8 "Technical data".

Do not run signal cables close to power lines. Power lines produce interference in their near vicinity which impairs the signals transmitted on the line.

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. 22). The front hole is equipped with a cable gland, in the back one a dummy plug is mounted..

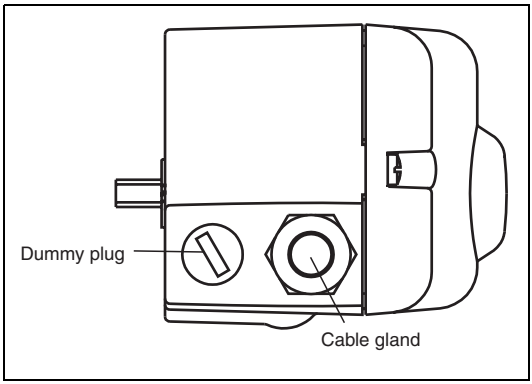


Fig. 22 Cable entry

The screw terminals for wire sizes up to 2.5 mm^2 inside the case are assigned as follows (siehe Fig. 23):

1. Plug-in module for analog position feedback
2. Plug-in module for digital position feedback (first connector)
   or
   plug-in module for shutdown function
3. Plug-in module for digital position feedback (second connector)
4. Kit for digital position feedback, either proximity switches or
   24 V microswitch (first connector)
5. Kit for digital position feedback, either proximity switches or
   24 V microswitch (second connector)
6. Digital input DI
7. Digital output DO
8. Signal 4...20 mA
9. Enclosure ground

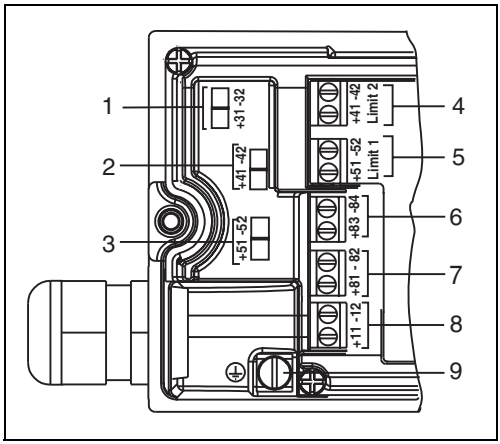


Fig. 23 Screw terminals

Making the connections

Connecting the 4...20 mA signal, the digital signal, 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 modules:

- 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)

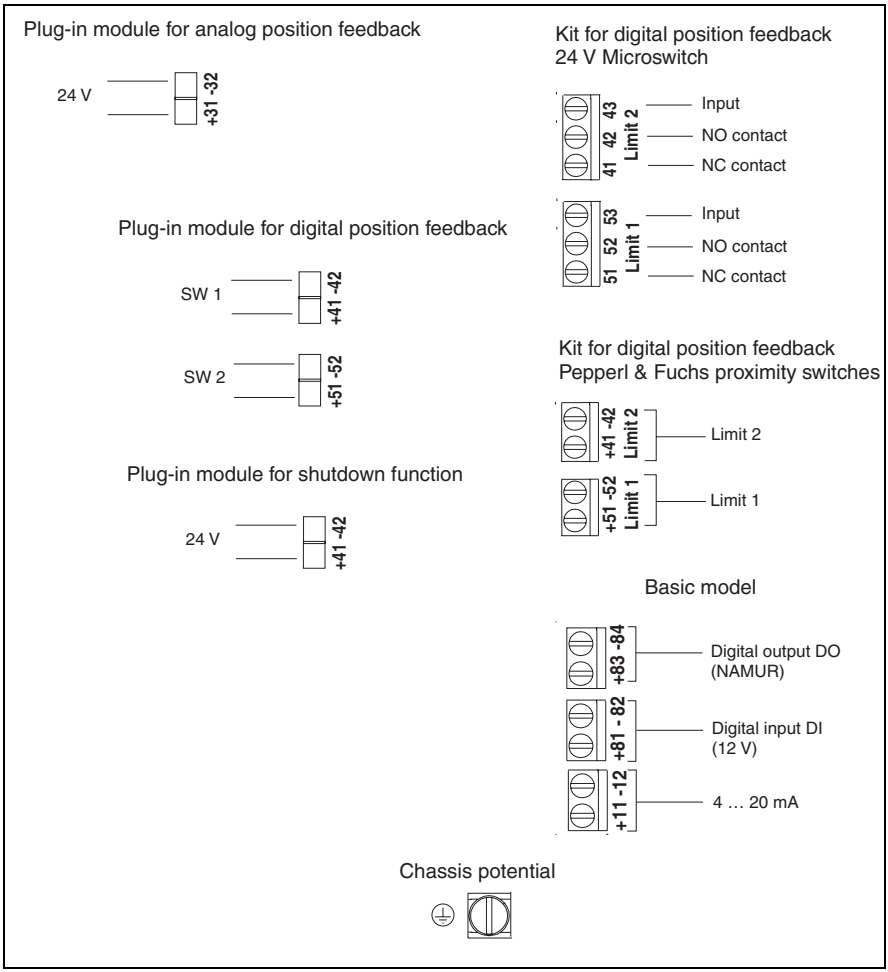


Fig. 24 Terminal assignment

4.4 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. Make sure that the splash guard cap is always present during operation. Otherwise, protection class IP65 cannot be ensured.

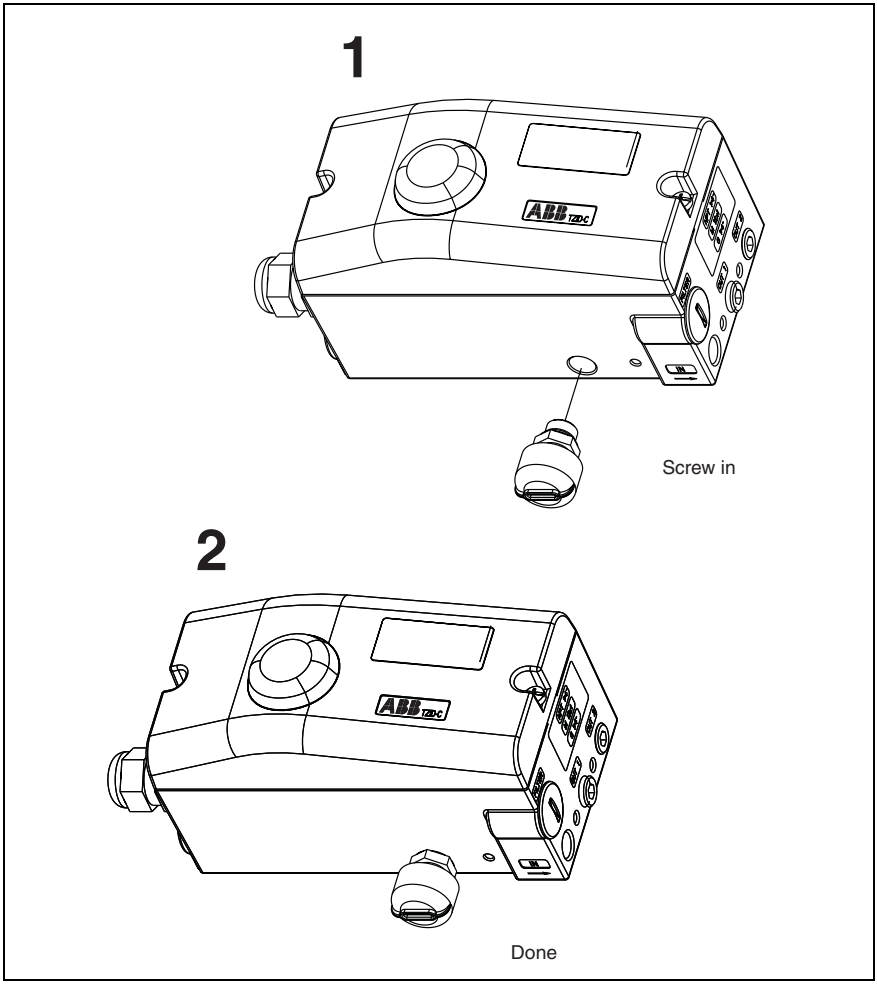


Fig. 25 Mounting the splash guard cap

4.5 Commissioning

After mounting the TZID-C positioner and making the electrical and pneumatic connections you can put the device into operation. First check the mounting and subsequently adjust the TZID-C electronically to the operating data of the actuator or valve

- via a **PC** with the operating program "SMART VISION ®" (via communication connection and LKS adapter or FSK modem, see corresponding user manuals) or
- **locally** using the local TZID-C keypad

These operating instructions only describe the local operation and setting of parameters.

Devices that have previously been in operation in another installation should be defaulted to the factory settings prior to commissioning (see page 92).

4.5.1 Checking the mounting

- Supply compressed air between 1.4 and 6 bar (20 and 90 psi) and a current signal between 4 and 20 mA to the TZID-C.

Caution

- Observe the maximum allowable operating pressure of the actuator.

- Observe the sequence described above. First supply compressed air and only then turn on the 4 ... 20 mA current signal.

With the factory setting, the device will start up in mode 1.3 "Manual adjustment in the sensor range". Devices that have previously been in operation start up in the operating mode used last.

- Perform the following steps to switch to operating mode 1.3 "Manual adjustment in the sensor range" (more detailed descriptions of the operating elements, operating modes, and operating levels are to be found in chapter 6):
  - Press and hold **MODE**
  - In addition, press ↑ or ↓ until "1.3, MAN_SENS" is indicated on the display; then, release all buttons to activate the operating mode.

    The display indicates the **rotation angle in degrees** (SENS_POS).
- Press ↑ or ↓ to drive the valve manually to the limit stops.

  If the second arrow button is also pressed, the device switches to fast travel.

  The limit stops should be within the following range (see Fig. 4 on page 7):

  Sensor range

- 28 ° to + 28 ° for linear actuators
- 57 ° to + 57° for rotary actuators
Minimum angle: 25° (does not apply to special versions)

If the limit stops are outside this range, the mechanical transfer of the actuator range to the rotation angle must be corrected. Otherwise, the *Autoadjust* function started later will stop due to a position error message.

All parameters required for the basic configuration are combined in parameter group P1._ (STANDARD). Proceed as described below to change over to the configuration level:

- Simultaneously press and hold ↑ and ↓.
- In addition, briefly press **ENTER.**
  The display indicates a countdown.
  Press and hold the direction buttons until the countdown to zero is finished; otherwise switch-over is not executed.
- Release ↑ and ↓.
  You go directly to parameter group P1._ , parameter 1.0 "ACTUATOR".

After this, use the steps described in chapter 4.5.2 through 4.5.6 to match the positioner to the actuator and the operating conditions. For more detailed information of the operating elements, operating modes, and operating levels refer to chapter 6.

4.5.2 Determining the actuator type

Configure the TZID-C positioner for the corresponding actuator. Press ↑ or ↓ to select the desired actuator type (LINEAR or ROTARY).

4.5.3 Running *Autoadjust*

- Press and hold **MODE.**
- In addition, briefly press ↑, release the buttons.
  The display switches to parameter 1.1 "AUTO_ADJ" (*Autoadjust*), setting "START"
- Press and hold **ENTER.**
  A countdown from 3 to 0 is indicated.
  Continue to hold **ENTER** until the countdown has run down, then release **ENTER**.
  The positioner starts *Autoadjust* (see page 53 for details).
- If *Autoadjust* is successful, the message "COMPLETE" pops up. Confirm with **ENTER**.

  In case of troubles *Autoadjust* may be cancelled or aborted, and an error messages is shown in the display. Refer to page 53 for details.
- If required, continue with setting the tolerance band (see chapter 4.5.4); normally, you can directly change over to parameter P1.3 or P1.4.
- To save the autoadjustment results, selet P1.4 (with **MODE** and ↑), then confirm with **ENTER** (wait until countdown from 3 to 0 has run down).

4.5.4 Setting the tolerance band

During *Autoadjust* the smallest possible value of the tolerance band is determined and adaptively checked and corrected, if necessary, during the ongoing controlling operation. Only in some special cases (e.g. with very small actuators) you should set a bigger value for the tolerance band (see page 55).

- Press and hold **MODE.**
- In addition, briefly press ↑, release the buttons.
  The display switches to parameter 1.2 "TOL_BAND" (tolerance band). The value is indicated as a percentage of the valve range (see page 55)
- Press ↑ or ↓ to change the value.
- If required, continue with testing the settings (see chapter 4.5.5), otherwise save (see chapter 4.5.6).

4.5.5 Testing the settings

With this test the controller is activated. You can check the effects of the changes you made. Proceed as described below:

- Press and hold **MODE.**
- In addition, briefly press ↑, release the buttons.
  The display switches to parameter 1.3 "TEST".
- Press and hold **ENTER.**
  A countdown from 3 to 0 is indicated.
  Continue to hold **ENTER** until the countdown has run down, then release **ENTER**.
  The positioner activates the test mode (see page 56).

The test is automatically stopped after two minutes and can also be cancelled by pressing any button.

4.5.6 Saving the settings

- Press and hold **MODE.**
- In addition, briefly press ↑, release the buttons.
  The display switches to parameter 1.4 "EXIT" (back to operating level).
- Press ↑ or ↓ to save in the non-volatile memory ("NV_SAVE" is seen in the display).
- Press and hold **ENTER.**
  Continue to hold **ENTER** until the countdown from 3 to 0 has run down, then release **ENTER**. The positioner saves the data and returns to the last previous operating mode on the operating level (see page 56).

This completes the commissioning procedure.

5 Installation of option cards

Options can either be ordered together with the device - in that case they are delivered already mounted - or they can be installed later. In the latter case proceed as follows:

5.1 Mechanical position indicator

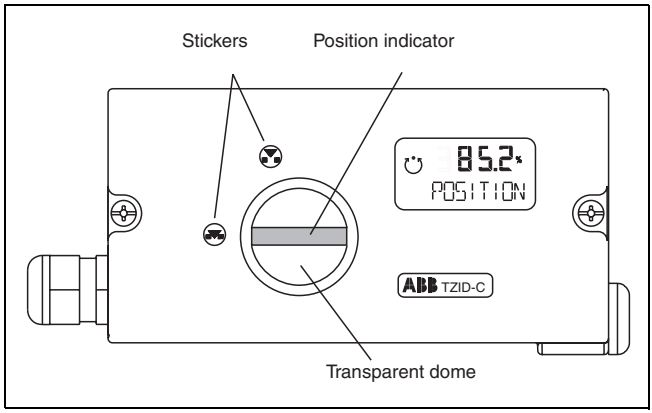


Fig. 26 TZID-C with mechanical position indicator

- Loosen both screws at the case cover and remove the cover.
- Install the long feedback shaft.
- Slip the position indicator onto the feedback shaft.
- Mount the special cover with the transparent dome and fasten to the case.
- Attach the stickers for marking the minimum and maximum valve stroke on the cover.

5.2 Plug-in module for analog position feedback

Caution

Installation of the plug-in module for analog position feedback should only be done under shop conditions and when the TZID-C is not powered. Otherwise the sensitive electronics of the device may be damaged.

- Turn off the power supply (4...20 mA signal).
- Turn off the compressed air supply.
- Loosen both screws at the case cover and remove the cover.
- Remove the electrical wiring.
- Remove the position indicator from the feedback shaft (if applicable).

- If the mechanical kit for digital position feedback is installed with the corresponding slot sensors, remove the feedback shaft.
- Take ESD (electrostatic discharge) precautions (i.e. ESD wrist-band).

  Caution **Avoid electrostatic discharge to the electronic circuitry that is exposed during the next step. Not taking ESD precautions could result in damage to the electronics.**

- Loosen the screws (four) that hold the plastic cover to the case and remove the cover.
- Insert the plug-in module for analog position feedback into the left slot into the case (see Fig. 27 on page 33); ensure that the board engages into the case guides and that the flat cable with the connector is on the right-hand side.
- Connect the plug-in module to the mother-board (see Fig. 27).

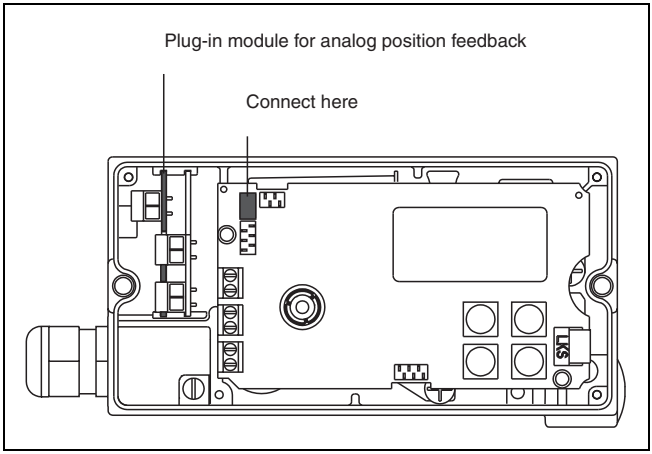


Fig. 27 Installing plug-in module for analog pos. feedb.

- Replace the plastic cover and fasten to the case.
- Screw on the feedback shaft with slot sensors (if applicable).
- Slip the position indicator onto the feedback shaft (if applicable).
- Connect all electrical inputs and outputs, also the new analog output (see chapter 8.2 "Options").
- Turn on the compressed air supply.
- Turn on the 4...20 mA position demand signal.
- Set parameters for analog position feedback, if required:
  - Switch to the configuration level (see page 46).
  - Select parameter group P8.0 (see page 84) and adjust parameters P8.0...P8.3 .
- Replace the case cover; hand-tighten the screws.

5.3 Plug-in module for digital position feedback

Caution **Installation of the plug-in module for digital position feedback should only be done under shop conditions and when the TZID-C is not powered. Otherwise the sensitive electronics of the device may be damaged.**

- Turn off the power supply (4...20 mA signal).
- Turn off the compressed air supply.
- Loosen both screws at the case cover and remove the cover.
- Remove the electrical wiring.
- Remove the position indicator from the feedback shaft (if applicable).
- If the mechanical kit for digital position feedback is installed with the corresponding slot sensors, remove the feedback shaft.
- Take ESD (electrostatic discharge) precautions (i.e. ESD wrist-band).

Caution **Avoid electrostatic discharge to the electronic circuitry that is exposed during the next step. Not taking ESD precautions could result in damage to the electronics.**

- Loosen the screws (four) that hold the plastic cover to the case and remove the cover.
- Insert the plug-in module for digital position feedback into the right-hand slot into the case (see Fig. 28); ensure that the board engages into the case guides and that the flat cable with the connector is on the right-hand side.
- Connect the plug-in module to the mother-board (see Fig. 28).

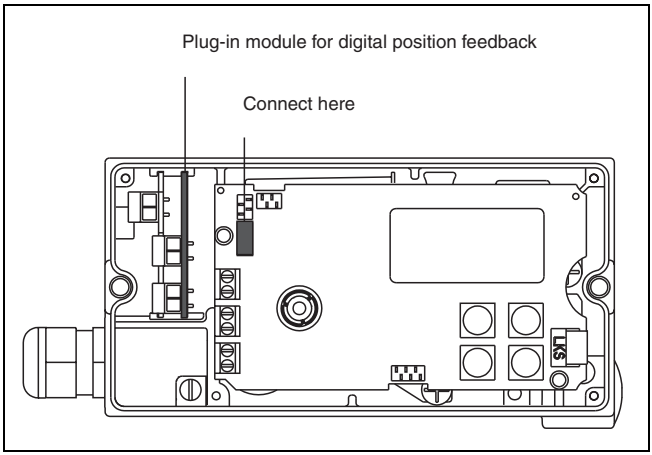


Fig. 28 Installing plug-in module for digital pos. feedb.

- Replace the plastic cover and fasten to the case.
- Screw on the feedback shaft with slot sensors (if applicable).

- Slip the position indicator onto the feedback shaft (if applicable).
- Connect all electrical inputs and outputs, also the new digital output (see chapter 8.2 "Options").
- Turn on the compressed air supply.
- Turn on the 4...20 mA position demand signal.
- Run *Autoadjust* (s. page 53)
- If necessary, adjust upper and lower switching point for the digital position feedback as follows:
- Switch to configuration level (see page 46).
  - Select parameter P4.1 (see page 47) and adjust lower switching point (see page 47/page 64).
  - Select parameter P4.2 and adjust upper switching point (see page 47/page 64).
- Replace the case cover; hand-tighten the screws.

5.4 Plug-in module for the shutdown function

Caution **Installation of the plug-in module for the shutdown function should only be done under shop conditions and when the TZID-C is not powered. Otherwise the sensitive electronics of the device may be damaged.**

- Turn off the power supply (4...20 mA signal).
- Turn off the compressed air supply.
- Loosen both screws at the case cover and remove the cover.
- Remove the electrical wiring.
- Remove the position indicator from the feedback shaft (if applicable).
- If the mechanical kit for digital position feedback is installed with the corresponding slot sensors, remove the feedback shaft.
- Take ESD (electrostatic discharge) precautions (i.e. ESD wrist-band).

  Caution **Avoid electrostatic discharge to the electronic circuitry that is exposed during the next step. Not taking ESD precautions could result in damage to the electronics.**

- Loosen the screws (four) that hold the plastic cover to the case and remove the cover.
- Insert the plug-in module for the shutdown function into the right-hand slot into the case (see Fig. 29); ensure that the board engages into the case guides and that the flat cable with the connector is on the right-hand side.

- Disconnect the I/P module cable from the motherboard and pass it under the motherboard such that it ends up to the right of the shutdown module. Then plug the shutdown module connector into the free socket on the motherboard (see Fig. 29).
- Plug the I/P module connector onto the shutdown module as seen in Fig. 29.

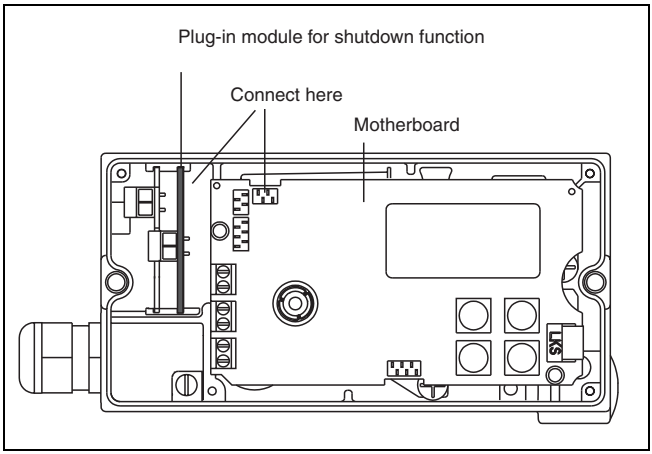


Fig. 29 Installing plug-in module for shutdown function

- Replace the plastic cover and fasten to the case.
- Screw on the feedback shaft with slot sensors (if applicable).
- Slip the position indicator onto the feedback shaft (if applicable).
- Connect all electrical inputs and outputs, also the new digital output (see chapter 8.2 "Options").
- Turn on the compressed air supply.
- Turn on the 4...20 mA position demand signal.

5.5 Mechanical kit for digital position feedback using proximity switches

The mechanical kit for digital position feedback can only be installed in a device with mechanical position indicator. Only the special cover with transparent dome delivered with this option provides sufficient space for the long feedback shaft and the two slot sensors.

- Turn off the power supply (4...20 mA signal).
- Turn off the compressed air supply.
- Loosen both screws at the case cover and remove the cover.
- Remove the position indicator from the feedback shaft.
- Remove the feedback shaft.

Caution **Danger of injuries. The slot sensors are sharp.**

- Fasten board with proximity switches to the case, hand-tighten the screws. At the same time mount the special feedback shaft with the two slot sensors and screw it in carefully.
- Replace the position indicator to the feedback shaft.
- Connect the proximity switches (see Fig. 30).

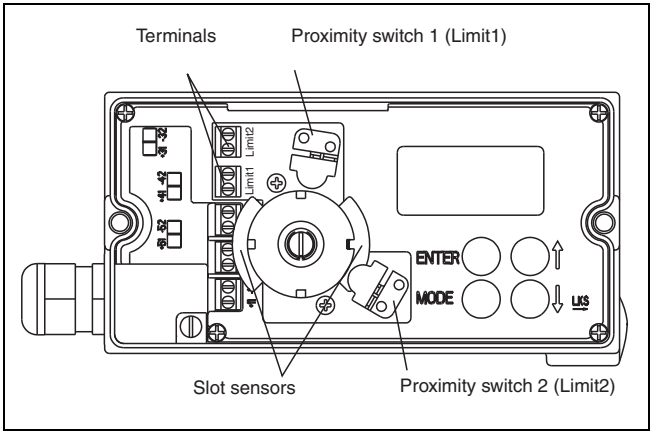


Fig. 30 Mechanical kit for digital position feedback using proximity switches

- Turn on the compressed air supply.
- Turn on the 4...20 mA position demand signal.
- If required, adjust the lower and upper switching points for the digital position feedback as follows:
  - Select operating mode 1.2 (see page 45) and move the actuator manually to the lower switching position (see page 49).
  - Use a screwdriver to adjust the slot sensor of proximity switch 1 on the feedback shaft (lower contact, see Fig. 30) until it closes the contact (i.e. just before introducing into the proximity switch); **the slot sensor introduces into proximity switch 1 when turning the feedback shaft clockwise (as seen from the front).**
  - Move the actuator manually to the upper switching position.
  - Use a screwdriver to adjust the slot sensor of proximity switch 2 on the feedback shaft (upper contact, see Fig. 30) until it closes the contact (i.e. just before introducing into the proximity switch); **the slot sensor introduces into proximity switch 2 when turning the feedback shaft counterclockwise (as seen from the front).**
- Replace the case cover; hand-tighten the screws.

5.6 Mechanical kit for digital position feedback using proximity switches

The mechanical kit for digital position feedback can only be installed in a device with mechanical position indicator.

Only the special cover with transparent dome delivered with this option provides sufficient space for the long feedback shaft and the two slot sensors.

- Turn off the power supply (4...20 mA signal).
- Turn off the compressed air supply.
- Loosen both screws at the case cover and remove the cover.
- Remove the position indicator from the feedback shaft.
- Remove the feedback shaft.
- Fasten board with microswitches to the case, hand-tighten the screws.
- Adjust max. contact (1, lower disk)
- Adjust min. contact (2, upper disk); fasten lower disk with special adjustment retainers and turn upper disk manually to adjust.
- Replace the position indicator to the feedback shaft.
- Connect the proximity switches.
- Turn on the compressed air supply.
- Turn on the 4...20 mA position demand signal.
- Replace the case cover, hand-tighten the screws.

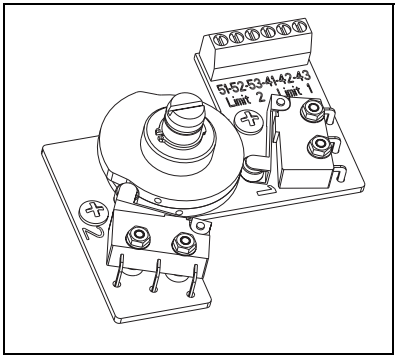


Fig. 31 Mech. kit for digital pos. feedback using microswitches

5.7 Pressure gage block and filter regulator

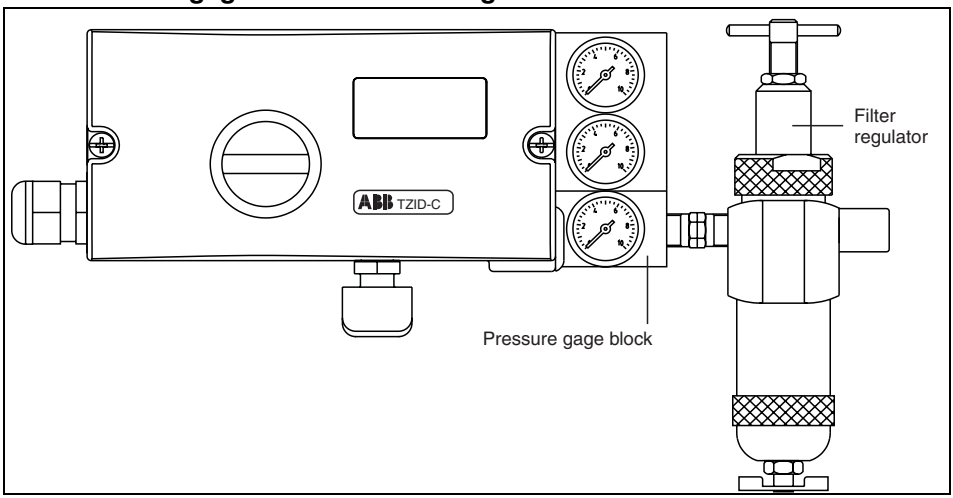


Fig. 32 Pressure gage block with filter regulator

- Remove the plug for output OUT2 for single-acting actuators (pressure gage block contains plug).
- Mount the pressure gage block with the supplied screws on the right hand side of the TZID-C; ensure the correct seating of the O-rings.
- Mount the filter regulator with the filter housing vertically such that condensed water can run off freely.
- Adjust the supply pressure for the TZID-C at the filter regulator; do not exceed max. pressure of 16 bar (235 psi) at the input side of the filter regulator.

5.8 Replacing the I/P module

Replacing the I/P module (pneumatic output unit of the TZID-C positioner) may be necessary when

- changing the output
  from single-acting to double-acting
- changing the safety position
  from fail/safe to fail/freeze and v.v.
- dirt or oil has accumulated due to poorly conditioned supply air.

Caution **Replacing the I/P module should only be done under shop conditions and when the TZID-C is not powered. Otherwise the sensitive electronics of the device may be damaged.**

Procedure:

- Turn off the power supply (4...20 mA signal).
- Turn off the compressed air supply.
- Loosen both screws at the case cover and remove the cover.
- Remove the electrical wiring.
- Remove position indicator from feedback shaft (if applicable).
- If the mechanical kit for digital position feedback is installed with the corresponding slot sensors, remove the feedback shaft.
- Take ESD (electrostatic discharge) precautions (i.e. ESD wrist-band).

  Caution **Avoid electrostatic discharge to the electronic circuitry that is exposed during the next step. Not taking ESD precautions could result in damage to the electronics.**

- Loosen the screws (four) that hold the plastic cover to the case and remove the cover.
- Disconnect the following connectors from the motherboard:
  - I/Pmodule (1)
  - Analog pos. feedback(2) (if present)
  - Digitale position feedback (3) (if present)
  - Position sensor (4)
- Loosen the torx screws (5) of size T10 that hold the motherboard to the case; use special screwdriver.

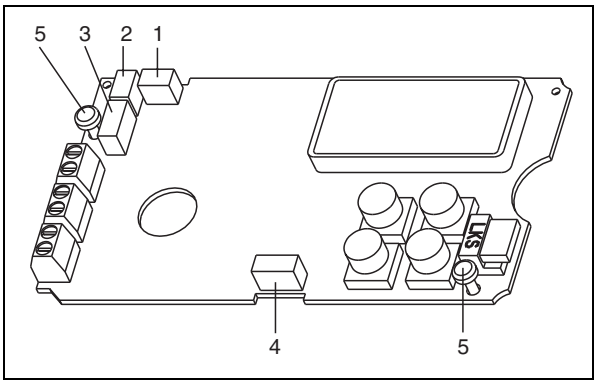


Fig. 33 Motherboard

- Take out the motherboard.

  Caution **Only touch the motherboard at the edges and avoid direct contact with the components, strip conductors, and soldering joints.**

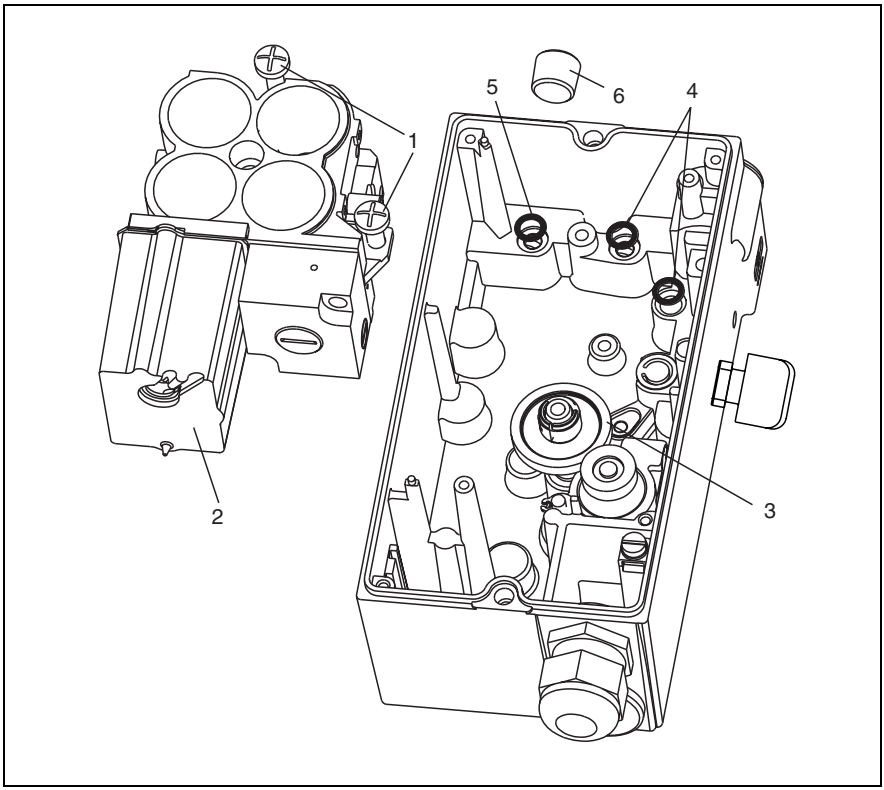


Fig. 34 Replacing the I/P module

- Loosen both screws (1) at the I/P-module (2), slightly tilt the I/P module and remove it from under the gear on the feedback shaft (3).

O rings (4, 5) may stick to the I/P module; remove carefully.

It is recommended to replace the O-rings, as a preventive maintenance action.

- When converting from single- to double-acting, insert an additional O-ring (5) before the pneumatic output OUT2 and remove the plug (6).
- When converting from double- to single-acting, close the output OUT2 with the plug (6).

- Insert new I/P module; slightly tilt I/P module and fit under the gear on the feedback shaft.

Caution

Observe correct seating of the O-rings (4, 5).

- Fasten I/P module with both screws (1) in the case; **torque the fasteners to 350 Ncm (31 in-lbs.**
- Replace the motherboard and fasten with the two torx screws in the case.
- Connect all connectors on the motherboard (see Fig. 33 on page 40); ensure that all connectors snap in correctly.
- Replace the plastic cover and fasten to the case.
- Replace the board with the proximity switches and fasten with screws (if applicable).
- Replace the feedback shaft and fasten with screws.
- Replace the position indicator to the feedback shaft (if applicable).
- Reconnect all electrical inputs and outputs (see chapter 4.3 "Electrical connection").

- When converting from single- to double-acting make the corresponding connection at output OUT2 (see chapter 4.2).
- Feed in the 4...20 mA position demand signal.

Warning

After changing the I/P module type (single-acting <-> double-acting or fail/safe <-> fail/freeze) the TZID-C must be adapted to the module type as described below. Otherwise the actuator can drive the valve at full speed to the mechanical limit stops.
Danger of injuries!

- Adjust the TZID-C to the new I/P module type.
  - Switch to the configuration level (see page 46).
  - Select parameter group P11._ (FS / IP) (see page 46 and page 91).
  - Select parameter 11.0 "SAFE_POS" (safe position) and set to "ACTIVE" (see page 47 and page 91).
  - Select parameter 11.2 "I/P type" (see page 93) and set accordingly.
- Turn on the compressed air supply.
- Run *Autoadjust* (see page 53).
- Replace the case cover; hand-tighten the screws.

6 Local operation

6.1 General

The TZID-C positioner has two **levels**:

- **Operating level**
  On the operating level the TZID-C positioner is operating in one of four possible operating modes (two for automatic control and two for manual adjustment). Parameters cannot be changed or saved on this level. See chapter 6.4 for further information
- **Configuration level**
  On this level most of the parameters of the positioner can be changed locally. The PC is required to change the limit values for the stroke counter, the travel counter, and the user-defined characteristic curve.

During external configuration via a PC the TZID-C does no longer respond to the position demand signal. Prior to external configuration always move the actuator to the safe position and activate manual adjustment.

To simplify the operation, the parameters have been categorized in parameter groups through which you can navigate by means of the push buttons (see chapter 6.2.2).

On the configuration level the active operating mode is deactivated. The I/P module is in neutral position, and the controlling operation is inactive.

See chapter 6.5 for a detailed description of the individual parameter groups.

6.2 Operating elements

6.2.1 Description

The TZID-C positioner can be operated locally by means of a liquid crystal display and four push buttons.

Liquid crystal display

The liquid crystal display with 160 segments has been specially designed for the TZID-C positioner.

The display has been designed for a temperature range of -25 °C to +80 °C (-13 °F to +176 °F).

At temperatures outside this range the display is too sluggish and will be switched off.

The display (see Fig. 35) is divided into:

- the symbol display
- the value display with unit
- the designator display

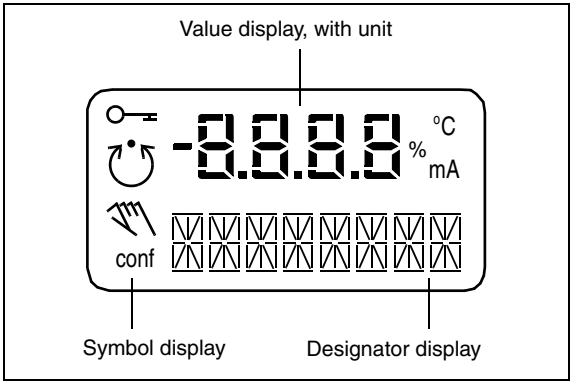


Fig. 35 Liquid crystal display

Symbol display:

The operating modes of the positioner are indicated by four symbols.

The **key symbol** indicates that operation or access is inhibited.

The **control loop symbol** indicates that the control loop is active. The symbol is displayed when the positioner is normally in operating mode 1.0 "CTRL_ADP" (adaptive control) or 1.1 "CTRL_FIX" (fixed control). On the configuration level there are test functions for which the controller will be active as well. The control loop symbol will also be displayed when these functions are active.

The **hand symbol** indicates manual adjustment. The symbol is displayed when the positioner is operating on the operating level in operating mode 1.2 "MANUAL" (manual adjustment within the stroke range) or 1.3 "MAN_SENS" (manual adjustment within the sensor range). On the configuration level, manual adjustment is active when setting the valve range limits (parameter P6.0 "MIN_VR" (min. of valve range) and P6.1 "MAX_VR" (max. of valve range). The symbol will also be displayed when these parameters are being set.

conf

The **configuration symbol** indicates that the TZID-C positioner is operating on the configuration level. The control operation is inactive.

Value display with unit

This 7-segment display with four digits indicates parameter values or parameter reference numbers. For values the physical unit (°C, %, mA) is displayed too.

Designator display

This 14-segment display with eight digits indicates the designators of the parameters and their status, of the parameter groups, and of the operating modes.

Push buttons

The four push buttons **ENTER**, **MODE**, ↑ and ↓ are pressed individually or in certain combinations according to the function desired.

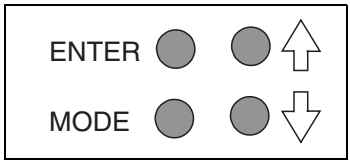


Fig. 36 Push buttons

Basic functions:

ENTER	• Acknowledge message • Start action • Save in the non-volatile memory
MODE	• Choose operating mode (operating level) • Select parameter group or parameter (configuration level)
↑	UP direction button
↓	DOWN direction button

6.2.2 Using the operating elements

Changing the mode (operating level)

- Press and hold **MODE**.

  The reference number (top) and the designator (bottom) of the active mode are displayed.
- Additionally press ↑ or ↓ until the reference number and the designator of the desired mode are indicated in the display.
- Release the buttons

The desired mode is only activated and saved in the non-volatile memory after releasing the MODE button.

Adjusting the contrast (operating level)

- Press and hold **ENTER**.

  After approx. 1.5 seconds the display switches to the contrast value.
- Additionally press ↑ or ↓ to change the contrast.

  The value selected is active immediately so that you can check the contrast in the display.
- Release the buttons.

  After releasing the **ENTER** button the value is saved in the non-volatile memory.

Switching to the configuration level

- Press and hold ↑ and ↓ simultaneously.
- Briefly press and release **ENTER** once;
  Keep ↑ and ↓ pressed until the countdown from 3 to 0 is finished.
  (Length: appr. 3 seconds)

  If you release the direction buttons before the countdown is finished the configuration level is not activated.
- Release ↑ and ↓.

  You enter the configuration level now. The first parameter (P1.0) of group 1 "STANDARD" is displayed. Furthermore, the display indicates the configuration symbol.

Switching to another parameter group

- Press and hold **MODE** and **ENTER** simultaneously

  The display indicates the reference number (top) and the designator (bottom) of the current parameter group.
- Additionally press ↑ or ↓ until the reference number and the designator of the desired parameter group are displayed
- Release all buttons

  The first parameter of the newly selected parameter group is displayed. You can now adjust the desired parameter within the group.

Selecting a parameter within a group

- Press and hold **MODE**

  The display indicates the reference number (top) and the designator (bottom) of the current parameter.
- Additionally press ↑ or ↓ until the reference number and the designator of the desired parameter are displayed
- Release all buttons

  The display indicates the value of the selected parameter (top). At the bottom the designator is still shown. For parameters that can assume different states (e.g. ACTIVE or INACTIVE) the reference number is displayed at the top and the state at the bottom. You can change the value/state of the parameter.

Changing a parameter

- Press ↑ or ↓ until the desired value or state is shown

  When keeping the respective direction button pressed, parameters with values are changed dynamically. The change rate is increased every second until the limit value of the parameter is reached.

Saving data and exiting the configuration level

- Select the "EXIT" parameter of the respective parameter group and set it to one of the two possible states using ↑ or ↓:

NV_SAVE	Changes will be activated and saved in the non-volatile memory. You return to the operating level.
CANCEL	Changes are ignored. You return to the operating level

  - **The parameters are only saved in the non-volatile memory when leaving the configuration level with EXIT -> SAVE**
  - **It is possible to change several parameters in different groups sequentially. When leaving the last parameter group with EXIT -> SAVE all previously made modifications are saved and applied.**

- Press and hold **ENTER** until the displayed countdown from 3 to 0 is finished
- Release **ENTER**

  Depending on the selection the data is saved in the non-volatile memory or discarded. During the save operation a plausibility check is performed. If an error occurs during the check or when data is being saved, an error message is displayed (see chapter 10).

Starting an action

- Press and hold **ENTER** until the displayed countdown from 3 to 0 is finished
- Release **ENTER**

The selected action is started.

If you release ENTER before the countdown is finished the action is not started.

To acknowledge a message

In the course of some actions (e.g. *Autoadjust*) messages are displayed that have to be acknowledged. Messages that must be acknowledged are identified by the value display (top line) being empty (see adjacent example).

Acknowledgement required

- press **ENTER** briefly

The TZID-C positioner continues with the action respectively finishes the procedure.

No acknowledgement

To cancel an action

- Press **ENTER** briefly

The TZID-C positioner cancels the action in progress (e.g. *Autoadjust*)

6.3 Inhibiting operation

Configuration changes to the program in the TZID-C positioner can be inhibited completely or partially via the digital input and the parameter 10.0 "FUNCTION" in parameter group "DIG_IN" (digital input, see page 89). This allows the user to prevent or restrict operating actions of unauthorized personnel as desired. When operation is disabled in this way, the key symbol is indicated in the display.

The following levels of configuration locks are possible:

- **Inhibiting the local setting of parameters**
  Local operation on the operating level and remote operation and setting of parameters via a PC are still possible.
- **Inhibiting all local operating functions**
  No local operating actions can be executed. Both the operating level and the configuration level are locked. Remote operation and setting of parameters via a PC is still possible.
- **Inhibiting local operation and remote setting of parameters**
  The TZID-C positioner can neither be operated locally nor can parameters be set remotely from a PC.

This lock can only be activated when a voltage of 12 ... 24 V is applied to the digital input of the TZID-C positioner (See "P10.0 Function selection" on page 89).

6.4 Operation on the operating level

On the operating level, the TZID-C positioner is operating in one of the following modes:

- **1.0** **CTRL_ADP** (Adaptive control)
- **1.1** **CRTL_FIX** (Fixed control without adaptation)
- **1.2** **MANUAL** (Manual adjustment within the stroke range)
- **1.3** **MAN_SENS** (Manual adjustment within the sensor range)

For details regarding switching between the modes see page 45.

When the 4 ... 20 mA signal is fed in the positioner automatically starts up in the previously active mode. Devices from the factory start up in operating mode 1.2. This also applies to devices that have been reset to the factory setting.

In both manual modes the valve can be adjusted manually by pressing ↑ or ↓.

The two automatic control modes are indicated by the control loop symbol in the display. For the manual modes the hand symbol is shown in the display.

6.5 Setting parameters

Operating mode 1.0: Adaptive control

Controlling operation with automatic adaptation of the control parameters

The internal control parameters are adaptively adjusted. You should only use this operating mode, if fixed control does not yield acceptable results.

The valve position in indicated as a percentage of the stroke range (from 0...100%). The assignment of the limit positions is adjustable between 0% and 100%.

Operating mode 1.1: Fixed control

Controlling operation with fixed parameters

The settings determined during *Autoadjust* are not adaptively adjusted. This is the normal recommended operating mode

The valve position is indicated as a percentage of the stroke range (from 0...100%). The assignment of the limit positions is adjustable between 0% and 100%. The display in this operating mode is identical to operating mode 1.0.

Caution

No leakage monitoring.

In both control modes 1.0 and 1.1 several values can be displayed besides the actuator position:

Setpoint display:

- Press and hold ↑

  The setpoint is displayed

In addition, briefly press **ENTER**

The setpoint display is toggled between the setpoint current at the input terminals in mA and the setpoint as a percentage of the stroke range.

Temperature display:

- Press and hold ↓

  The temperature inside the case is displayed.
- In addition, briefly press **ENTER**

  The temperature display is toggled between °C and °F.

Display of control deviation:

- Press and hold ↑ and ↓.

  The control deviation is displayed as a percentage of the stroke range

Operating mode 1.2: Manual adjustment within stroke range

The valve stroke is adjusted manually using the direction buttons ↑ and ↓.

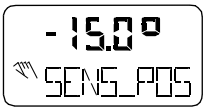
- Press and hold the button for the desired positioning direction
- To activate the high speed mode in the manual mode, press the second arrow buttonll

Caution **If air escapes due to a leakage and the actuator position changes, the positioner will not automatically restore the setpoint. Configured stroke limit positions and stroke times are not effective in the manual mode.**

In this operating mode the valve position is indicated as a percentage of the stroke range.

Operating mode 1.3: Manual adjustment within sensor range

see operating mode 1.2



Unlike step 1.2, this operating mode is used to determine whether the available detection range of the position sensor is used correctly after mounting the positioner to the actuator. In this mode, the valve position is indicated in angular degrees with respect to the sensor range (i.e. 0...140°).

Most parameters of the TZID-C positioner can be set locally, so that configuring via the communication interface (LKS) or FSK modem and a PC or hand-held terminal is only necessary occasionally.

You may also disable local modification and saving of parameters by denying or restricting access to the configuration level (see chapter 6.3 and page 89)

To simplify the process, the different parameters have been grouped as follows:

ID	Designator	Name	see
P1._	STANDARD	Standard	page 53
P2._	SETPOINT	Setpoint	page 57
P3._	ACTUATOR	Actuator	page 61
P4._	MESSAGES	Messages	page 64
P5._	ALARMS	Alarms	page 67
P6._	MAN_ADJ	Man. adjustment	page 70
P7._	CTRL_PAR	Controlparameters	page 74
P8._	ANLG_OUT	Analog output	page 84
P9._	DIG_OUT	Digital output	page 87
P10._	DIG_IN	Digital input	page 89
P11._	FS / IP	Factory settings, I/P type	page 91

Please refer to Appendix A for an overview of the overall structure of the parameters and the parameter groups.

Parameter group 1: Standard

P1.0 Actuator type

With this parameter you can configure the TZID-C positioner for operation on a linear actuator (sensor range +/-30°) or on a rotary actuator (sensor range +/-60°). No mechanical changes at the device are required.

Autoadjust must be executed after setting the actuator type.Selecting the wrong actuator will result in a non-linearity error.

Selection:

LINEAR	Linear actuator
ROTARY	Rotary actuator

Factory setting: **LINEAR**

P 1.1 *Autoadjust*

The following values are determined by *Autoadjust*:

- Direction of the actuator
- Stroking distance of the actuator
- Stroke time for both directions
- Control parameters
- Offset for the I/P module

To start *Autoadjust*, press and hold **ENTER** until the countdown displayed has run down from 3 to 0. During the countdown, the *Autoadjust* mode selected with parameter P6.4 is displayed. While *Autoadjust* is running, the control loop symbol flashes in the display, and the current state of *Autoadjust* is indicated with the messages listed below.

The *Autoadjust* mode can be set with parameter 6.4.

Parameter group 1: Standard

All messages except "RUN" must be acknowledged with ENTER.

RUN	*Autoadjust* is running.
CALC_ERR	Plausibility check has not been passed.
COMPLETE	*Autoadjust* completed successfully.
BREAK	*Autoadjust* has been stopped by the operator. This can be done locally by pressing **ENTER**.
OUTOFRNG	Sensor range of the positioner has been exceeded; *Autoadjust* was stopped.
NO-SCALE	Valve range limits have not yet been determined; therefore, partial *Autoadjust* cannot be completed.
RNG_ERR	Less than 10 % of the sensor range are used.
TIMEOUT	Time-out; parameter could not be determined within 2 minutes. *Autoadjust* was stopped.
SPR_ERR	The actual spring action does not match the configured direction.

No acknowledgement

Acknowledgement required

When *Autoadjust* is completed without error the device displays the message "RUN" in the bottom line and a code number in the top line, indicating the currently executed step:

10	Air is completely evacuated from actuator (OUT1).
11	Fully evacuated position is saved.
12	Resolution (A/D conversion) is determined and saved.
20	Actuator (OUT1) is completely filled with air.
21	Fully pressurized position is saved.
22 - 30	Determining of stroke time is prepared.
31	Actuator travels from 100% to 0%, stroke time is measured and saved.
32	Actuator travels from 0% to 100%, stroke time is measured and saved.

Parameter group 1: Standard

40 Tolerance band ist determined and saved (minimum value). PD parameters for fast control > tolerance band is determined and saved.

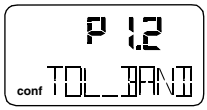
50 - 120 PID control parameters for fine adjustment of control deviation < tolerance band are determined and saved.

200 *Autoadjust* is complete.

When a partial run of *Autoadjust* has been selected (see Parameter P6.4), the following code numbers are shown:

- Stops only: steps **10 - 32** and step **200**
- Parameters only: steps **40 - 120** and step **200**
- Zero only:
  10 actuator is driven to closed position
  11 closed position is saved
  12 resolution (A/D-conversion) is determined and saved
  13 zero adjustment takes place
  200 *Autoadjust* is complete (-> save!)

P1.2 Tolerance band



With this function you can define the tolerance band for control.

During *Autoadjust* the positioner determines a minimum tolerance band that cannot be fallen below. You can adjust the tolerance band upward from this minimum to a maximum value of 10%.

The tolerance band defines a +/- range around the setpoint. When the valve position reaches this range, the parameter set of the controller is toggled to a fixed PID- algorithm that is used to continue with slow controlling action.

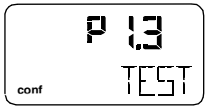
Only when reaching the sensitivity range the system is considered as balanced. (see “P7.8 Sensitivity” on page 82).

Input value: **0.30...10.00%**
in steps of 0.01%

Factory setting: **0.30%**

Parameter group 1: Standard

P1.3 Test



With this test the controller is activated, and you can check the effects of the changes to this parameter group, e.g. by introducing setpoint changes or setpoint ramps using a current source.

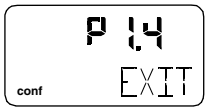
Normally, **INACTIVE** is shown on the display. To start the test press and hold **ENTER** until the countdown from 3 to 0 is finished.

The test is activated. The display shows the control loop symbol and a flashing message.

The test is automatically stopped after two minutes and can also be stopped by pressing any button.

- **You cannot start the test when the safe position is active (see parameter 11.0). Instead, the message "FAIL_POS" is displayed.**

P1.4 Return to operating level



With this parameter you can leave the configuration level and return to the operating level. Here you can either save data in the non-volatile memory or discard all previously made changes (also the changes in other parameter groups).

To leave the configuration level (with or without saving), press and hold **ENTER** until the countdown from 3 to 0 is finished.

The active saving process is indicated by the message "NV_SAVE". After saving a plausibility check is executed.

If an error occurs during the check or while saving, the data cannot be saved; an error message is displayed instead (see chapter 10).

Selection:

NV_SAVE Saves the settings in the non-volatile memory

CANCEL Discards **all** changes made since the last permanent save operation

Parameter group 2: Setpoint

P2.0 Min. of setpoint range

The setpoint range is the input current range for which the valve travels 100% of the full positioning range.

The adjusted setpoint range must not be smaller than 10% (1.6 mA).

With parameter 2.0 you determine the **low** limit of the setpoint range. You can enter a value within the admissible value range of 4...20 mA, with one decimal.

Input value: **4.0...20.0 mA**

Factory setting: **4.0 mA**

P2.1 Max. of setpoint range

The setpoint range is the input current range for which the valve travels 100% of the full positioning range.

The adjusted setpoint range must not be smaller than 10% (1.6 mA).

With parameter 2.0 you determine the **high** limit of the setpoint range. You can enter a value within the admissible value range of 4...20 mA, with one decimal.

nput value: **4.0...20.0 mA**

Factory setting: **20.0 mA**

Setting examples:

Setpoint range: Min.=8.3 mA, Max.=15.6 mA

Split range: Min.=4.0 mA, Max.=12.0 mA

Parameter group 2: Setpoint

P2.2 Characteristic curve

With this parameter you can select the characteristic curve of the setpoint channel. The setpoint characteristic curve transforms the input setpoint according to a predetermined course for the controller.

Besides five predefined curves you can also select a user-configurable curve, which can be defined via a PC with the appropriate configuration software.

Selection:

LINEAR	linear
EP 1/25	equal percentage 1:25
EP 1/50	equal percentage 1:50
EP 25/1	equal percentage 25:1
EP 50/1	equal percentage 50:1
USERDEF	user-configurable
Factory setting:	**LINEAR** **USERDEF: linear**

P2.3 Valve action

The valve action describes the relation between setpoint and travel direction of the valve, i.e. the assignment of the limits of setpoint range and stroke range.

With direct action the valve travels with an increasing setpoint towards 100%. Thus, the low setpoint limit is assigned to the low stroke limit and the high setpoint limit to the high stroke limit.

With reverse action the valve travels with an increasing setpoint towards 0%. Thus, the low setpoint limit is assigned to the high stroke limit and the high setpoint limit to the low stroke limit.

The assignments are independent from the effective direction of the valve, i.e. from the assignment of supply air and direction of travel of the valve.

Parameter group 2: Setpoint

P2.3 Valve action (continued)

Selection:

DIRECT Signal 4...20 mA
= Position 0...100%

REVERSE Signal 20...4 mA
= Position 0...100%

Factory setting: **DIRECT**

2.4 Shut-off value

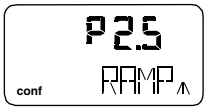
The shut-off value defines a percentage of the setpoint (with one decimal place) from which on the valve is driven to its zero position. If the setpoint reaches the shut-off range, the valve is immediately driven to the 0% stroke limit.

This parameter is only active in control mode. When limiting the stroke range at its low limit, the valve is not driven to its mechanical stop by totally filling it with air or evacuating the air completely.

Input value: **OFF...0.1...20.0%**

Factory setting: **OFF**

P2.5 Setpoint ramp (up)



Here the stroke time for the actuator can be increased. A setpoint change is not directly transferred to the controller but with reduced speed (100% of the set time). The set value should always be greater than the stroke time determined during *Autoadjust*.

Input value: **OFF...1...200 seconds**

Factory setting: **OFF**

- **In manual mode, with active safe position, and after errors, parameter 2.5 is disabled.**
- **When pressing and holding ENTER, the stroke time is shown (UP stroke time).**

Parameter group 2: Setpoint

P2.6 Setpoint ramp (down)

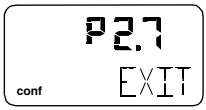
Here the stroke time for the actuator can be increased. A setpoint change is not directly transferred to the controller but with reduced speed (100% of the set time). The set value should always be greater than the stroke time determined during *Autoadjust*.

Input value: **OFF...1...200 seconds**

Factory setting: **OFF**..

- **In manual mode, with active safe position, and after errors, parameter 2.6 is disabled.**
- **When pressing and holding ENTER, the stroke time is shown (DOWN stroke time for parameter 2.6).**

P2.7 Return to operating level



With this parameter you can leave the configuration level and return to the operating level. Here you can either save data in the non-volatile memory or discard all previously made changes (also the changes in other parameter groups).

To leave the configuration level (with or without saving), press and hold **ENTER** until the countdown from 3 to 0 is finished.

The active saving process is indicated by the message “NV_SAVE”. After saving a plausibility check is executed.

If an error occurs during the check or while saving, the data cannot be saved; an error message is displayed instead (see chapter 10).

Selection:

NV_SAVE Saves the settings in the non-volatile memory

CANCEL Discards **all** changes made since the last permanent save operation

Parameter group 3: Actuator

3.0 Min. of stroke range

You can configure the stroke range to be smaller than the actual mechanical valve stops. The setpoint range always refers to the stroke range. With this parameter you determine the **low** stroke range limit.

Caution **If the stroke range changes, the absolute positions of the switching points with respect to the valve position are changed, too. When reducing the stroke range (<100%), the mechanical stops can no longer be reached by completely filling with air or evacuating the air.**

A stroke range reduction is only effective in control mode. In manual mode the full mechanical valve stroke can be reached. If power fails and a fail-safe I/P module is used, the valve is automatically set to the mechanical stop.

The product of stroke range and valve range must be greater than 10% of the sensor range.

Input value: **0.0...100.0%**

Factory setting: **0.0%**

The display of the TZID-C positioner in operating modes 1.0 through 1.2 always refers to the stroke range configured and indicates the position in %. An exception is operating mode 1.3.

Parameter group 3: Actuator

P3.1 Max. of stroke range

You can configure the stroke range to be smaller than the actual mechanical valve stops. The setpoint range always refers to the stroke range. With this parameter you determine the **high** stroke range limit.

Caution

If the stroke range changes, the absolute positions of the switching points with respect to the valve position are changed, too. When reducing the stroke range (<100%), the mechanical stops can no longer be reached by completely filling with air or evacuating the air.

A stroke range reduction is only effective in control mode. In manual mode the full mechanical valve stroke can be reached. If power fails and a fail-safe I/P module is used, the valve is automatically set to the mechanical stop.

The product of stroke range and valve range must be greater than 10% of the sensor range.

Input value: **0.0...100.0%**

Factory setting: **100.0%**

The display of the TZID-C positioner in operating modes 1.0 through 1.2 always refers to the stroke range configured and indicates the position in %. An exception is operating mode 1.3.

Parameter group 3: Actuator

P3.2 Zero position

With this parameter you can assign the zero position of the display to the stop which the lever shaft (for rotary actuators the rotating shaft) reaches when rotating clockwise or counterclockwise (looking into the open case).

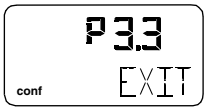
The zero point position is not determined during *Autoadjust* and must be set by the operator.

Selection:

CLOCKW	Stop reached turning clockwise
CTCLOCKW	Stop reached turning ctclockw.

Factory setting: **CTCLOCKW**

3.3 Return to operating level



With this parameter you can leave the configuration level and return to the operating level. Here you can either save data in the non-volatile memory or discard all previously made changes (also the changes in other parameter groups).

To leave the configuration level (with or without saving), press and hold **ENTER** until the countdown from 3 to 0 is finished.

The active saving process is indicated by the message “NV_SAVE”. After saving a plausibility check is executed.

If an error occurs during the check or while saving, the data cannot be saved; an error message is displayed instead (see chapter 10).

Selection:

NV_SAVE	Saves the settings in the non-volatile memory
CANCEL	Discards all changes made since the last permanent save operation

Parameter group 4: Messages

P4.0 Deadband time limit

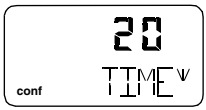
With this parameter you can monitor the valve stroke time in control mode. As soon as the valve position is outside the tolerance band, it is monitored if the setpoint is reached within the set time. Otherwise, an alarm is signalled, provided that this has been enabled (see parameter 5.4).

Caution

With active shutdown function there is no alarm message.

After reaching the setpoint the alarm is automatically reset. Always choose the dead band time limit greater than the time determined by *Autoadjust*.

When pressing and holding **ENTER**, the stroke time is shown. By pressing **ENTER** briefly again you can toggle between UP stroke time and DOWN stroke time.



Input value: **OFF...1...200 seconds**

Factory setting: **OFF**

P4.1 Switching point SW1

With this parameter you can define the switching point SW1 as a percentage of the stroke range.

If the valve position exceeds or falls below SW1, the corresponding signal output on the plug-in module is activated (see also parameter group P9._)

Changing the stroke range also changes the absolute positions of the switching points with respect to the valve position.

Input value: **0.0...100.0%**

Factory setting: **0.0%**

Parameter group 4: Messages

P4.2 Switching point SW2

With this parameter you can define the switching point SW2 as a percentage of the stroke range.

If the valve position exceeds or falls below SW1, the corresponding signal output on the plug-in module is activated (see also parameter group P9._.

Changing the stroke range also changes the absolute positions of the switching points with respect to the valve position.

Input value: **0.0...100.0%**
Factory setting: 100%

P4.3 Active direction SW1

With this parameter you determine the switching point activation for SW1, i.e. you define whether the message is to be triggered for exceeding or falling below switching point SW1.

EXCEED Message when exceeding switching point SW1
FALL_BEL Message when falling below switching point SW1
Factory setting: **FALL_BEL**

P4.4 Active direction SW2

With this parameter you determine the switching point activation for SW2, i.e. you define whether the message is to be triggered for exceeding or falling below switching point SW2.

EXCEED Message when exceeding switching point SW2
FALL_BEL Message when falling below switching point SW2
Factory setting: **EXCEED**

Parameter group 4: Messages

P4.5 Return to operating level

With this parameter you can leave the configuration level and return to the operating level. Here you can either save data in the non-volatile memory or discard all previously made changes (also the changes in other parameter groups).

To leave the configuration level (with or without saving), press and hold **ENTER** until the countdown from 3 to 0 is finished.

The active saving process is indicated by the message “NV_SAVE”. After saving a plausibility check is executed.

If an error occurs during the check or while saving, the data cannot be saved; an error message is displayed instead (see chapter 10).

Selection:

NV_SAVE Saves the settings in the non-volatile memory

CANCEL Discards **all** changes made since the last permanent save operation

Parameter group 5: Alarms*

P5.0 Leakage to actuator

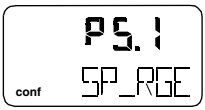
With this parameter you can determine that an air leakage int the pipe to/from the actuator is recognized as an alarm (can be enabled for adaptive control, only).

ACTIVE Leakage to the actuator is activated as an alarm source.

INACTIVE Condition is **not** activated as an alarm source

Factory setting: **INACTIVE**

P5.1 Outside setpoint range



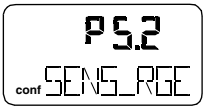
With this parameter you can determine that a corresponding alarm is signalled when falling below or exceeding the setpoint range (below 3.8 mA or above 20.5 mA).

ACTIVE Falling below or exceeding the setpoint range is activated as an alarm source.

INACTIVE Condition is **not** activated as an alarm source.

Factory setting: **INACTIVE**

P5.2 Zero error



With this parameter you can determine that a corresponding alarm is signalled when the zero position of the valve range changes by more than 4%. This indicates improperly adjusted mounting.

ACTIVE Zero error is activated as an alarm source.

INACTIVE Condition is **not** activated as an alarm source.

Factory setting: **INACTIVE**

** Active alarms are signalled at the digital output and through the optional modules for digital or analog feedback.*

Parameter group 5: Alarms*

P5.3 Controller inactive

With this parameter you can determine that a corresponding alarm is signalled when the controller is not active, i.e. control is interrupted by another operating mode or by configuration.

ACTIVE Inactive controller is activated as an alarm source.

INACTIVE Condition is **not** activated as an alarm source.

Factory setting: **INACTIVE**

P5.4 Positioning time-out

With this parameter you can determine that a corresponding alarm is signalled if the setpoint is not reached within the predefined stroke time while in control mode. (See also “P4.0 Deadband time limit” on page 64).

ACTIVE Positioning time-out is activated as an alarm source.

INACTIVE Condition is **not** activated as an alarm source.

Factory setting: **INACTIVE**

P5.5 Stroke counter

With this parameter you can determine that a corresponding alarm is indicated when the stroke counter exceeds the predefined limit value. The limit value is edited externally via a PC.

ACTIVE Exceeding the stroke counter limit is activated as an alarm source.

INACTIVE Condition is **not** activated as an alarm source.

Factory setting: **INACTIVE**

** Active alarms are signalled at the digital output and through the optional modules for digital or analog feedback.*

Parameter group 5: Alarms*

P5.6 Travel counter

With this parameter you can determine that a corresponding alarm is signalled when the travel counter exceeds the predefined limit value. The limit value is edited remotely via a PC.

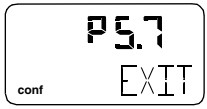
Conditions:

ACTIVE Exceeding the limit of the travel counter is activated as an alarm source.

INACTIVE Condition is **not** activated as an alarm source.

Factory setting: **INACTIVE**

P5.7 Return to operating level



With this parameter you can leave the configuration level and return to the operating level. Here you can either save data in the non-volatile memory or discard all previously made changes (also the changes in other parameter groups).

To leave the configuration level (with or without saving), press and hold **ENTER** until the countdown from 3 to 0 is finished.

The active saving process is indicated by the message “NV_SAVE”. After saving a plausibility check is executed.

If an error occurs during the check or while saving, the data cannot be saved; an error message is displayed instead (see chapter 10).

Selection:

NV_SAVE Saves the settings in the non-volatile memory

CANCEL Discards **all** changes made since the last permanent save operation

** Active alarms are signalled at the digital output and through the optional modules for digital or analog feedback.*

Parameter group 6: Manual adjustment

P6.0 Minimum valve range

Normally the valve range is determined automatically during *Autoadjust*. A partial run of *Autoadjust* that is limited to the control parameters (CTRL_PAR, see parameter P6.4, page 73), however, requires manual adjustment of the valve range. A partial run of *Autoadjust* is required if the actuator does not have mechanical stops or the valve cannot be driven to the stops for any reason.

When this parameter is being set, the manual mode is active and the hand symbol flashes in the display.

You can manually position the valve and use this position as the limit value..

Warning

After manual adjustment of the end position it is mandatory to limit the stroke range to >0.1 und < 99.9. Otherwise, the valve may be driven at full speed to an end position.

Danger of injuries!

The range between high and low valve range limit must be at least 10% of the full range. Otherwise, the message "VR<10%" is displayed.

Observe the stroke range. It is recommended to use as wide a span as possible. This parameter is not active when the safe position is active. The display then shows the message “FAIL_POS”.

With P6.0 you can define the **low** valve range limit as follows:

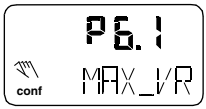
- Press ↑ or ↓ in order to travel to the desired position.
- Press and hold **ENTER** until the countdown is finished (MIN_SET). The position is taken over as min. limit value.
- Briefly press **ENTER**.
  The set limit value is displayed for 2 seconds.
  (MIN_SAVE)

Adjustable value: **0.0...100.0% in sensor range**

Factory setting: **0.0%**

Parameter group 6: Manual adjustment

P6.1 Max. of valve range



Normally the valve range is determined automatically during *Autoadjust*. A partial run of *Autoadjust* that is limited to the control parameters (CTRL_PAR, see parameter P6.4, page 73), however, requires manual adjustment of the valve range. A partial run of *Autoadjust* is required if the actuator does not have mechanical stops or the valve cannot be driven to the stops for any reason.

When this parameter is being set, the manual mode is active and the hand symbol flashes in the display.

You can manually position the valve and use this position as the limit value..

Warning

After manual adjustment of the end position it is mandatory to limit the stroke range to >0.1 und < 99.9. Otherwise, the valve may be driven at full speed to an end position.

Danger of injuries!

The range between high and low valve range limit must be at least 10% of the full range. Otherwise, the message "VR<10%" is displayed.

Observe the stroke range. It is recommended to use as wide a span as possible. This parameter is not active when the safe position is active. The display then shows the message “FAIL_POS”.

With P6.0 you can define the **high** valve range limit as follows:

- Press ↑ or ↓ in order to travel to the desired position.
- Press and hold **ENTER** until the countdown is finished (MIN_SET). The position is taken over as min. limit value.
- Briefly press **ENTER**.
  The set limit value is displayed for 2 seconds.
  (MIN_SAVE)

Adjustable value: **0.0...100.0% in sensor range**

Factory setting: **100.0%**

Parameter group 6: Manual adjustment

P6.2 Actuator type

With this parameter you can configure the TZID-C positioner for manual adjustment when operating it at a linear or rotary actuator (see P1.0 on page 53).

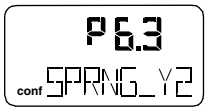
Selection:

LINEAR Linear actuator

ROTARY Rotary actuator

Factory setting: **LINEAR**

P6.3 Spring action (Y2)



Incorrect inputs may result in the actuator travelling to a mechanical stop at full speed.

Danger of injuries

This parameter defines the stop to which the valve is set by spring action with a single-acting actuator (vented). This position is determined by *Autoadjust* by means of the valve stops. *Autoadjust* limited to the control parameters (CTRL_PAR, see parameter P6.4, page 73), however, requires manual adjustment of the spring action.

The parameter defines whether the shaft (lever or rotating, depending on actuator type) is set to the stop by spring action (with evacuated valve chamber) when rotating clockwise or counterclockwise. For double-acting actuators the spring action corresponds to filling with air through pneumatic output OUT2.

CLOCKW Stop reached turning clockw.

CTCLOCKW Stop reached turning ctclockw.

Factory setting: **CTCLOCKW**

Parameter group 6: Manual adjustment

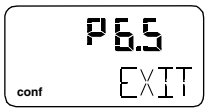
P6.4 *Autoadjust* mode

With this parameter you determine the mode or scope of the *Autoadjust* function.

FULL	Full *Autoadjust*
STROKE	Stops only
CTRL_PAR	Control parameters only
ZERO_POS	Zero position only (parameterized stops required)
LOCKED	No *Autoadjust*

Factory setting: **FULL**

P6.5 Return to operating level



With this parameter you can leave the configuration level and return to the operating level. Here you can either save data in the non-volatile memory or discard all previously made changes (also the changes in other parameter groups).

To leave the configuration level (with or without saving), press and hold **ENTER** until the countdown from 3 to 0 is finished.

The active saving process is indicated by the message “NV_SAVE”. After saving a plausibility check is executed.

If an error occurs during the check or while saving, the data cannot be saved; an error message is displayed instead (see chapter 10).

Selection:

NV_SAVE	Saves the settings in the non-volatile memory
CANCEL	Discards **all** changes made since the last permanent save operation

Parameter group 7: Control parameters

P7.0 KP value (up)

All control parameters are determined in an optimum way for most actuators during *Autoadjust*. Changes should only be made when *Autoadjust* cannot be executed or control stability cannot be achieved.

The KP value is the gain of the PD controller and results, for example, in a positioning signal of 100% for KP=1 and a control deviation of 100%. The controlling speed and stability are influenced by the KP value. With higher KP values the controlling speed increases.

The control precision is not affected by the KP value.

To compensate for existing dissymmetries in the controlled system, the KP value is to be set separately for both directions (up/down).

For most actuators sufficient control action can be achieved with a KP value between 2.0 and 10.0. Choosing a KP value smaller than 5.0 can – despite go pulse – result in starting times longer than 400 ms.

In such a case you can shorten the starting time without impairing the stability of the control loop by proportionally increasing the KP and TV value.

If the control loop continues to show instable behavior, even if the KP value has been decreased, a too high offset has been chosen for the output value or other parameters are highly unbalanced.

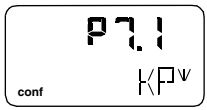
With parameter P7.0 you can adjust the KP value for the positioning direction **up (towards 100%)**.

Input value: **1.0...400.0**

Factory setting: **5.0**

Parameter group 7: Control parameters

P7.1 KP value (down)



All control parameters are determined in an optimum way for most actuators during *Autoadjust*. Changes should only be made when *Autoadjust* cannot be executed or control stability cannot be achieved.

The KP value is the gain of the PD controller and results, for example, in a positioning signal of 100% for KP=1 and a control deviation of 100%. The controlling speed and stability are influenced by the KP value. With higher KP values the controlling speed increases.

The control precision is not affected by the KP value.

To compensate for existing dissymmetries in the controlled system, the KP value is to be set separately for both directions (up/down).

For most actuators sufficient control action can be achieved with a KP value between 2.0 and 10.0. Choosing a KP value smaller than 5.0 can – despite go pulse – result in starting times longer than 400 ms.

In such a case you can shorten the starting time without impairing the stability of the control loop by proportionally increasing the KP and TV value.

If the control loop continues to show instable behavior, even if the KP value has been decreased, a too high offset has been chosen for the output value or other parameters are highly unbalanced.

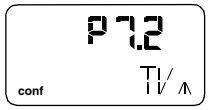
With parameter P7.1 the KP value for positioning direction **down** (towards 0%) is adjusted.

Input value: **1.0...400.0**

Factory setting: **5.0**

Parameter group 7: Control parameters

P7.2 TV value (up)



All control parameters are determined in an optimum way for most actuators during *Autoadjust*. Changes should only be made when *Autoadjust* cannot be executed or control stability cannot be achieved.

The TV value is the derivative time of the PD controller and results, for example, in an output signal of 100% for TV=100 ms in balanced condition, together with KP=1 for a dynamic control deviation of 100%/100 ms.

Speed and stability are affected by the TV value in such a way that it counteracts dynamically to the KP value. The speed of the control action decreases for an increasing TV value.

To compensate for existing dissymmetries in the controlled system, the TV value is to be set separately for both directions (up/down).

For most actuators satisfactory control action is achieved with a TV value between 20 and 200 ms. In manual configuration choose a TV value of approximately

8 ... 10 X KP value [ms].

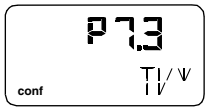
With parameter P7.2 you set the TV value for the positioning direction **up** (towards 100%).

Input value: **10...800 ms**

Factory setting: **200 ms**

Parameter group 7: Control parameters

P7.3 TV value (down)



The TV value is the derivative time of the PD controller and results, for example, in an output signal of 100% for TV=100 ms in balanced condition, together with KP=1 for a dynamic control deviation of 100%/100 ms.

Speed and stability are affected by the TV value in such a way that it counteracts dynamically to the KP value. The speed of the control action decreases for an increasing TV value.

To compensate for existing dissymmetries in the controlled system, the TV value is to be set separately for both directions (up/down).

For most actuators satisfactory control action is achieved with a TV value between 20 and 200 ms. In manual configuration choose a TV value of approximately

8 ... 10 X KP value [ms].

With parameter P7.3 you can set the TV value for the positioning direction down (towards 0%).

Input value: 10...800 msec

Factory setting: **200 msec**

Parameter group 7: Control parameters

P7.4 Go pulse (up)

All control parameters are determined in an optimum way for most actuators during *Autoadjust*. Changes should only be made when *Autoadjust* cannot be executed or control stability cannot be achieved.

The controller issues an amplified positioning signal for the defined pulse length and with the actuator not moving, in order to achieve accelerated starting of the actuator.

In this way the time required to build the pressure needed to begin moving the actuator is reduced.

To compensate for existing dissymmetries in the controlled system, the go pulse is to be set separately for both directions (up/down).

The value determined by *Autoadjust* should not be increased, as this may result in overshooting! If the actuator consistently overshoots the setpoint, decrease the go pulse. For small and fast actuators it may be necessary to set the go pulse to 0, even if *Autoadjust* has determined a higher value.

With P7.4 the go pulse for positioning direction **up** (towards 100%) is set.

Input value: **0...200 ms,**
in steps of 20 ms

Factory setting: **0 ms**

Parameter group 7: Control parameters

P7.5 Go pulse (down)

All control parameters are determined in an optimum way for most actuators during *Autoadjust*. Changes should only be made when *Autoadjust* cannot be executed or control stability cannot be achieved.

The controller issues an amplified positioning signal for the defined pulse length and with the actuator not moving, in order to achieve accelerated starting of the actuator.

In this way the time required to build the pressure needed to begin moving the actuator is reduced.

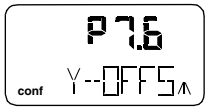
To compensate for existing dissymmetries in the controlled system, the go pulse is to be set separately for both directions (up/down).

The value determined by *Autoadjust* should not be increased, as this may result in overshooting! If the actuator consistently overshoots the setpoint, decrease the go pulse. For small and fast actuators it may be necessary to set the go pulse to 0, even if *Autoadjust* has determined a higher value.

With P7.5 the go pulse for positioning direction **down** (towards 0%) is set.

Parameter group 7: Control parameters

P7.6 Y offset (up)



All control parameters are determined in an optimum way for most actuators during *Autoadjust*. Changes should only be made when *Autoadjust* cannot be executed or control stability cannot be achieved.

The "offset for the output signal" linearizes the behavior of the I/P module used and enables fast control even for small control deviations. The value is limited a the low end by a minimum value (neutral zone)

The offset substantially affects the controlling speed for control deviations smaller than 5%. In manual mode the offset values are issued for fine adjustment to the I/P module.

To compensate for existing dissymmetries in the controlled system, the offset is to be set separately for both directions (up/down).

For most actuators satisfactory control is achieved with offset values between 40 and 80%. If the valve overshoots, both offset values should decreased.

Both offset values should be increased when the actuator stops outside the tolerance band. For larger, slower actuators *Autoadjust* may determine values higher than 80%. In these cases there will be no noticeable difference between fine and coarse adjustment while in manual mode.

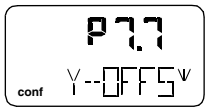
With parameter P7.6 the Y offset for positioning direction **up** (towards 100%) is set.

Input value: **Y min...100.0%**

Factory setting: **24.0%**

Parameter group 7: Control parameters

P7.7 Y offset (down)



All control parameters are determined in an optimum way for most actuators during *Autoadjust*. Changes should only be made when *Autoadjust* cannot be executed or control stability cannot be achieved.

The "offset for the output signal" linearizes the behavior of the I/P module used and enables fast control even for small control deviations. The value is limited a the low end by a minimum value (neutral zone)

The offset substantially affects the controlling speed for control deviations smaller than 5%. In manual mode the offset values are issued for fine adjustment to the I/P module.

To compensate for existing dissymmetries in the controlled system, the offset is to be set separately for both directions (up/down).

For most actuators satisfactory control is achieved with offset values between 40 and 80%. If the valve overshoots, both offset values should decreased.

Both offset values should be increased when the actuator stops outside the tolerance band. For larger, slower actuators *Autoadjust* may determine values higher than 80%. In these cases there will be no noticeable difference between fine and coarse adjustment while in manual mode.

With parameter P7.7 the Y offset for positioning direction **down** (towards 0%) is set.

Input value: **Y min...100.0%**
Factory setting: **24.0%**

Parameter group 7: Control parameters

P7.8 Sensitivity

All control parameters are determined in an optimum way for most actuators during *Autoadjust*. Changes should only be made when *Autoadjust* cannot be executed or control stability cannot be achieved.

The sensitivity determines the smallest position change that can be detected in the sensor range. This value is dependent on the quality of the position measurement and on external disturbances.

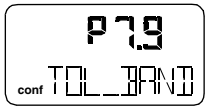
The triple sensitivity defines the achievable control precision. Furthermore, the sensitivity determines the smallest step change recognizable by the PD controller.

Normally it is not necessary to choose sensitivity values higher than 0.03%.

Input value: **0.03...0.10%,**
with respect to the sensor range

Factory setting: **0.03%**

P7.9 Tolerance band



With this function you can define the tolerance band for control. During *Autoadjust* the positioner determines a minimum tolerance band that cannot be fallen below. You can adjust the tolerance band upward from this minimum to a maximum value of 10%.

The tolerance band defines a +/- range around the setpoint. When the valve position reaches this range, the parameter set of the controller is toggled to a fixed PID- algorithm that is used to continue with slow controlling action.

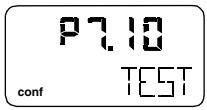
Only when reaching the sensitivity range the system is considered as balanced (see also P1.2 (page 55).

Input value: **0.30...10.00%**
in steps of 0.01%

Factory setting: **0.30%**

Parameter group 7: Control parameters

P7.10 Test



With this test the controller is activated, and you can check the effects of the changes to this parameter group, e.g. by introducing setpoint changes or setpoint ramps using a current source.

Normally, **INACTIVE** is shown on the display. To start the test press and hold **ENTER** until the countdown from 3 to 0 is finished.

The test is activated. The display shows the control loop symbol and a flashing message. (see also P1.3, page 56).

The test is automatically stopped after two minutes and can also be stopped by pressing any button.

You cannot start the test when the safe position is active (see parameter 11.0). Instead, the message "FAIL_POS" is displayed.

P7.11 Return to operating level

With this parameter you can leave the configuration level and return to the operating level. Here you can either save data in the non-volatile memory or discard all previously made changes (also the changes in other parameter groups).

To leave the configuration level (with or without saving), press and hold **ENTER** until the countdown from 3 to 0 is finished.

The active saving process is indicated by the message "NV_SAVE". After saving a plausibility check is executed.

If an error occurs during the check or while saving, the data cannot be saved; an error message is displayed instead (see chapter 10).

Selection:

NV_SAVE	Saves the settings in the non-volatile memory
CANCEL	Discards **all** changes made since the last permanent save operation

Parameter group 8: Analog output*

P8.0 Minimum of current range

With this parameter you determine the low current range limit for the analog position feedback. The current range corresponds to the configured stroke range.

The current range limits can be freely configured between 4 and 20 mA. However, the current range must not be smaller than 10% (1.6 mA) of the range.

Input value: **4.0...20.0 mA**

Factory setting: **4.0 mA**

P8.1 Maximum of current range

With this parameter you determine the high current range limit for the analog position feedback.

The current range limits can be freely configured between 4 and 20 mA. However, the current range must not be smaller than 10% (1.6 mA) of the range.

Input value: **4.0...20.0 mA**

Factory setting: **20.0 mA**

P8.2 Valve action

With this parameter you determine the valve action for the analog feedback. With direct action the plug-in module for analog position feedback delivers a current that is proportional to the stroke. With reverse action the current is inversely proportional to the stroke.

DIRECT Signal 4...20 mA
= Position 0...100%

REVERSE Signal 20...4 mA
= Position 0...100%

Factory setting: **DIRECT**

*on the plug-in module for digital position feedback

Parameter group 8: Analog output*

P8.3 Alarm message

With this parameter you can define the alarm current for the analog output.

HIGH_CUR Alarm current I > 20.5 mA

LOW_CUR Alarm current I < 3.8 mA

Factory setting: **HIGH_CUR**

P8.4 Test

This test is used to force the analog position signal to a defined value during commissioning, without affecting the normal process.

The test is automatically stopped after two minutes. While the test is running, the corresponding message (see below) flashes in the display.

NONE No function

FAILED Simulation of position feedback failure (CPU)
I > 20.5 mA (default setting) or
I < 3.8 mA (only adjustable in factory upon special request)

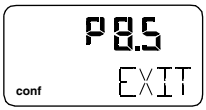
ALRM_CUR Simulation of an alarm current
I < 3.8 mA or I > 20.5 mA resp.

CURRENT Output of the actual current value (setpoint current = analog output) under consideration of all parameters of the setpoint channel and of the analog output.

** on the plug-in module for analog feedback*

Parameter group 8: Analog output*

P8.5 Return to operating level



With this parameter you can leave the configuration level and return to the operating level. Here you can either save data in the non-volatile memory or discard all previously made changes (also the changes in other parameter groups).

To leave the configuration level (with or without saving), press and hold **ENTER** until the countdown from 3 to 0 is finished.

The active saving process is indicated by the message “NV_SAVE”. After saving a plausibility check is executed.

If an error occurs during the check or while saving, the data cannot be saved; an error message is displayed instead (see chapter 10).

Selection:

NV_SAVE Saves the settings in the non-volatile memory

CANCEL Discards **all** changes made since the last permanent save operation

** on the plug-in module for analog feedback*

Parameter group 9: Digital output

P9.0 Alarm output logic level

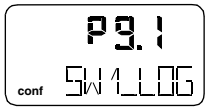
With this parameter you can determine the logic level of the alarm output.

Selection:

ACTIV_HI Alarm with I > 2 mA

ACTIV_LO Alarm with I < 1 mA

P9.1 SW 1 logic level



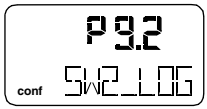
With this parameter you can determine the active level for switching output SW1*.

Selection:

ACTIV_HI active with current I > 2 mA

ACTIV_LO active with current I < 1 mA

P9.2 SW 2 logic level



With this parameter you can determine the active level for switching output SW2*.

Selection:

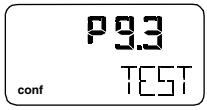
ACTIV_HI active with current I > 2 mA

ACTIV_LO active with current I < 1 mA

*SW1 and SW2 are on the plug-in module for digital feedback

Parameter group 9: Digital output

P9.3 Test



Test is for simulation for the digital output

The test is automatically stopped after two minutes and can be aborted by pressing any button.

While the test is running, the corresponding message (see below) flashes in the display.

Selection:

NONE	No function
ALRM_ON	Alarm is simulated (DO active)
SW1_ON	Reaching switching point 1 is simulated (SW1 active)
SW2_ON	Reaching switching point 2 is simulated (SW2 active)
ALL_ON	Alarm and switching points are simulated (all DOs active)

P9.4 Return to operating level

With this parameter you can leave the configuration level and return to the operating level. Here you can either save data in the non-volatile memory or discard all previously made changes (also the changes in other parameter groups).

To leave the configuration level (with or without saving), press and hold **ENTER** until the countdown from 3 to 0 is finished.

The active saving process is indicated by the message “NV_SAVE”. After saving a plausibility check is executed.

If an error occurs during the check or while saving, the data cannot be saved; an error message is displayed instead (see chapter 10).

Selection:

NV_SAVE	Saves the settings in the non-volatile memory
CANCEL	Discards **all** changes made since the last permanent save operation

Parameter group 10: Digital input

P10.0 Function selection

The digital input defines six functions in the TZID-C positioner that can be selected via local operation.

The functions **POS_0%**, **POS_ 100%**, and **POS_HOLD** are executed on the operating level in the two control modes. If the respective function has been selected in parameter P10.0, a defined setpoint is given for the controller, when a voltage < 10 V is applied to the digital input. The actuator is then driven to the position defined in P10.0 considering all parameters (setpoint ramp, stroke range, etc.). When the binary setpoint is active, the message "BIN_CTRL" is shown.

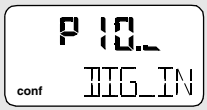
When a voltage > 12 V is applied to the digital input, the positioner is working in the selected operating mode.

NONE	No function
POS_0%	The actuator is moved to the 0% position when a voltage < 10 V is applied to the digital input.
POS_ 100%	The actuator is moved to the 100% position when a voltage < 10 V is applied to the digital input.
POS_HOLD	The actuator holds the last position, when a voltage < 10 V is applied to the digital input.

The operating locks that can be configured with **CNF_LOCK**, **OP_LOCK**, and **ALL_LOCK** can only be selected locally with this parameter after activating the digital input by applying a voltage of 12...24 V prior to entering the configuration level. Thus the accidental activation of a lock is prevented. When a lock is selected, the key symbol starts flashing, to indicate, that the lock will become active upon the next save. If a lock has been activated and saved and no 12...24 V voltage is applied, the key will be permanently displayed. Active locks can be released on the operating level by applying a voltage of 12...24 V to the digital input.

CNF_LOCK	Local access to the configuration level is inhibited. However, local operation on the operating level is possible. The TZID-C can be configured externally (via LKS/modem and PC).

Parameter group 10: Digital input



When the operator tries to activate the configuration level, the text “CNF_LOCK” is indicated for appr. 5 seconds in the display.

OP_LOCK Local operation is completely locked, i.e. local access to the configuration level and to the operating level is inhibited. For every operator attempt to execute operating steps the text “OP_LOCK” is indicated for appr. 5 seconds in the display.

ALL_LOCK Both local operation (operating level and configuration level) and external configuration via LKS/ modem and PC are inhibited. For every local attempt to execute operating steps the text “ALL_LOCK” is indicated for approx. 5 seconds on the display.

P10.1 Return to operating level

With this parameter you can leave the configuration level and return to the operating level. Here you can either save data in the non-volatile memory or discard all previously made changes (also the changes in other parameter groups).

To leave the configuration level (with or without saving), press and hold **ENTER** until the countdown from 3 to 0 is finished.

The active saving process is indicated by the message “NV_SAVE”. After saving a plausibility check is executed.

If an error occurs during the check or while saving, the data cannot be saved; an error message is displayed instead (see chapter 10).

Selection:

NV_SAVE Saves the settings in the non-volatile memory

CANCEL Discards **all** changes made since the last permanent save operation

Parameter group 11: Factory setting/IP-Type

P11.0 Safe position

Use this parameter to activate the safe position prior to loading the factory settings (parameter P11.1) or change the I/P module type (parameter P11.2). Note that this step is mandatory. After setting parameters P11.1 and P11.2 as required, you have to deactivate the safe position again by setting parameter P11.0 again.

Which safe position is activated - fail safe or fail freeze - can be defined with parameter P11.2. It depends on the I/P-module installed.

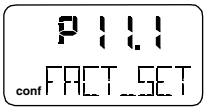
Activating/deactivating the safe position:

- Press and hold **ENTER** until the countdown from 3 to one is finished, then release **ENTER**.

  The safe position is activated or deactivated, respectively.

Parameter group 11: Factory setting/IP-Type

P11.1 Factory settings



With this parameter you can reset the TZID-C positioner to the factory settings. This is recommended, for example, when an already configured positioner has been mounted to a different actuator

Warning

Make sure that the I/P module type parameter corresponds to the actual I/P module type of the device after loading the factory settings. Otherwise, a dangerous situation may occur during controlling operation. It may happen that the actuator is driven at full speed to the end position.

Danger of injuries!

You can only load the factory settings when the actuator is in safe position (parameter P11.0). Otherwise the action is inhibited, and the message "NO_F_POS" is indicated in the display. If you save the settings in the non-volatile memory after loading the factory setting, operating mode 1.3 is automatically activated on the operating level.

Proceed as follows to load the factory settings:

- Press and hold **ENTER** until the countdown from 3 to 0 has been completed.

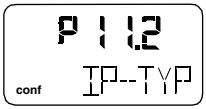
  The TZID-C positioner is reset to the factory settings. The message "**COMPLETE**" is displayed
- Press **ENTER** to acknowledge the message.

Selection:

FS_LOAD Loads the factory settings

Parameter group 11:
Factory setting/IP-Type

P11.2 I/P module type



With this parameter the TZID-C software is adapted to the installed I/P-module. Setting of this parameter is mandatory upon installation of another I/P module type .

Warning

Make sure that the I/P module type parameter corresponds to the actual I/P module type of the device. Otherwise dangerous situations may occur during controlling operation. It may happen that the actuator is driven at full speed to the end position.

Danger of injuries!

Warning

For safety reasons this parameter must be checked for correct setting after restoring the factory settings.

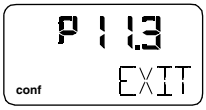
You can only set the I/P module type when the actuator is in safe position (parameter P11.0). Otherwise the action is inhibited and the message "NO_F_POS" is indicated in the display.

Selection:

F_SAFE_1	fail safe, single-acting
F_SAFE_2	fail safe, double-acting
F_FREEZ1	fail freeze, single-acting
F_FREEZ2	fail freeze, double-acting

Parameter group 11: Factory setting/IP-Type

P11.3 Return to operating level



With this parameter you can leave the configuration level and return to the operating level. Here you can either save data in the non-volatile memory or discard all previously made changes (also the changes in other parameter groups).

To leave the configuration level (with or without saving), press and hold **ENTER** until the countdown from 3 to 0 is finished.

The active saving process is indicated by the message “NV_SAVE”. After saving a plausibility check is executed.

If an error occurs during the check or while saving, the data cannot be saved; an error message is displayed instead (see chapter 10).

Selection:

NV_SAVE Saves the settings in the non-volatile memory

CANCEL Discards **all** changes made since the last permanent save operation

7 Maintenance

The TZID-C positioner is virtually maintenance-free.

The device electronics do not contain any adjustable components. User actions of any kind at the electronics are not permissible and not required.

Manipulation of the electronics by the user will invalidate the warranty.

To ensure error-free operation, the positioner must only be operated with instrument air that is free of oil, water and dust according to DIN/ISO 8573-1 (purity and oil content should meet the requirements according to class 3, pressure dew point 10 K below the operating temperature).

We recommend to check the integrated air filter and to replace if it becomes plugged with dirt (see chapter 7.1).

If dirt or oil has accumulated due to poorly conditioned supply air, the filter in the I/P module may need to be replaced (see chapter see chapter 7.2 on page 97). In some cases it may even be necessary to replace the I/P module itself. See chapter 5.8 (page 39) for further information.

If the optional filter regulator has been installed, this filter and water trap should be inspected (see chapter 7.3 on page 99)

Furthermore, the control position should be checked regularly for conformity of the tolerance limit (see chapter 7.4 on page 99).

7.1 Checking the air filter in the positioner

The TZID-C positioner has been equipped with a plastic filter that can collect small amounts of dirt for short periods of time. The filter prevents the sensitive throttles and the air nozzle from being clogged with dirt or damaged. Note that despite the filter the correct conditioning of the supply air according to DIN/ISO 8573-1 is still required.

If the air is excessively polluted the filter element can become clogged and must be replaced. To do this, proceed as described below:

- **Switch off supply air and vent positioner!**

Warning

Filter screw is under pressure with air supply switched on.

Danger of injuries!

- Loosen the filter screw with a screwdriver.
- Take out the filter segment with tweezers, check for pollution and replace, if necessary (insert with the truncated end first).
- Screw in and hand-tighten the screw plug.
- Switch on the supply air again.

Immediately after inserting the new filter the positioner is operational. No further measures are required.

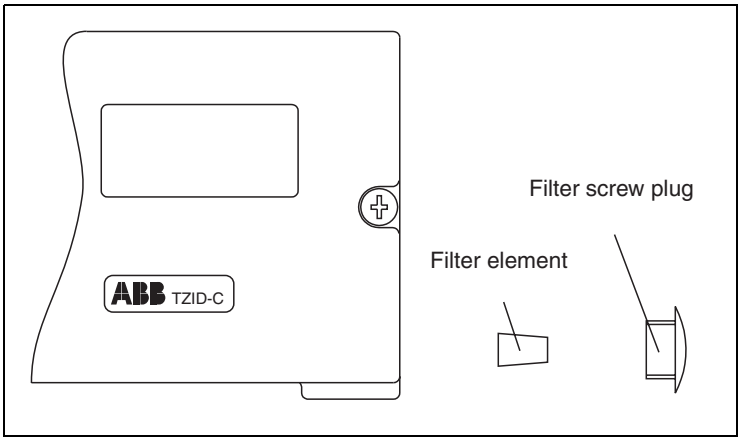


Fig. 37 Filter screw plug (right side of case)

7.2 Replacing the air filter in the I/P module

Deinstall the I/P module to be able to access this air filter. Follow the instructions below:

- Turn off the power supply (4...20 mA signal).
- Turn off the compressed air supply.
- Loosen both screws at the case cover and remove the cover.
- Remove the electrical wiring.
- Remove position indicator from feedback shaft (if applicable).
- If the mechanical kit for digital position feedback is installed with the corresponding slot sensors, remove the feedback shaft.
- Take ESD (electrostatic discharge) precautions (i.e. ESD wrist-band).

Caution

Avoid electrostatic discharge to the electronic circuitry that is exposed during the next step.

Not taking ESD precautions could result in damage to the electronics.

- Undo the screws (four) that hold the plastic cover to the case and remove the cover.
  - I/Pmodule (1)
  - Analog pos. feedback(2) (if present)
  - Digitale position feedback (3) (if present)
  - Position sensor (4)
- Loosen the torx screws (5) of size T10 that hold the motherboard to the case; use special screwdriver.

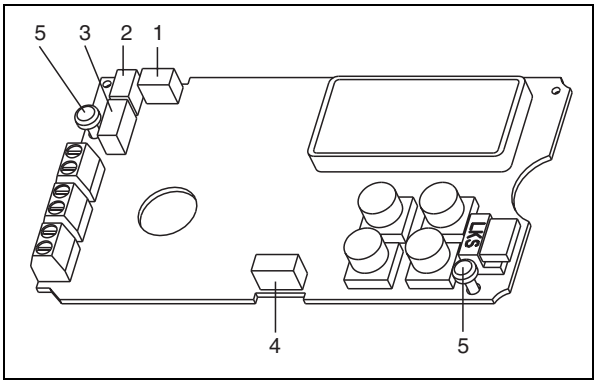


Fig. 38 Motherboard

- Take out the motherboard.

Caution

Only touch the motherboard at the edges and avoid direct contact with the components, strip conductors, and soldering joints.

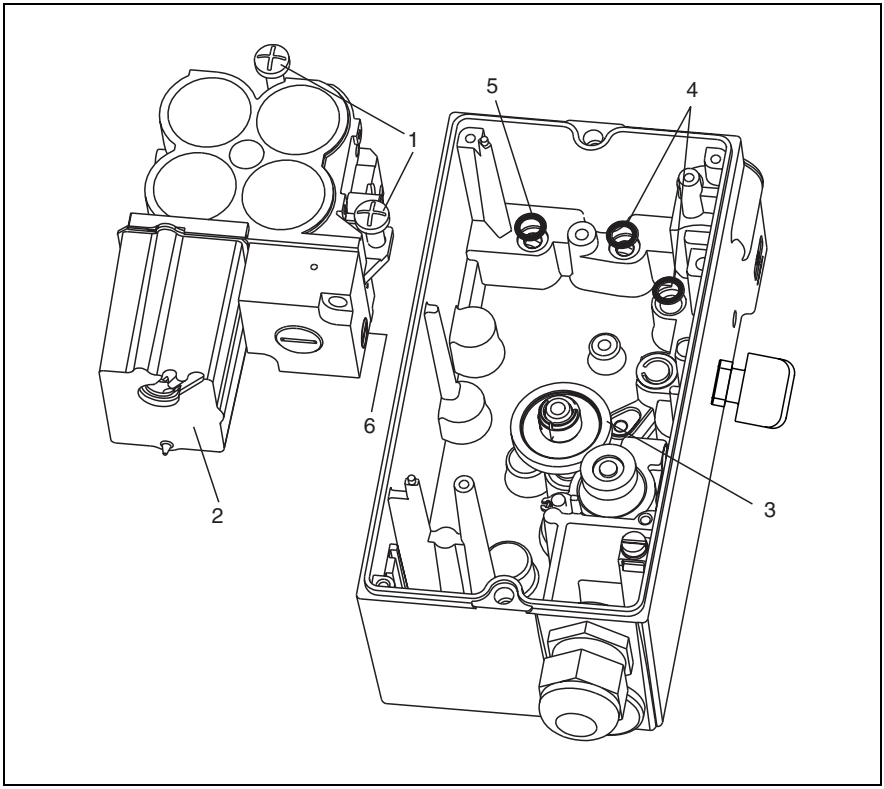


Fig. 39 Filter element in I/P module

- Loosen both screws (1) at the I/P module (2), slightly tilt the I/P module and remove it from under the gear on the feedback shaft (3)

O-rings (4, 5) may stick to the I/P module; remove carefully.

It is recommended to replace the O-rings in this step, as a preventive maintenance action.

- Undo the filter screw on the I/P module (6) using a screw driver.
- Remove the filter element using tweezer. Insert a new filter element.
- Fasten the filter screw again.
- Replace the I/P module. Slightly tilt the I/P module and fit under the gear on the feedback shaft

Caution

Observe correct seating of the O-rings (4, 5)

- Fasten I/P module with both screws (1) in the case; **torque the fasteners to 350 Ncm (31 in-lbs.**
- Replace the motherboard and fasten with the two torx screws in the case.
- Connect all connectors on the motherboard (see Fig. 38 on page 97); ensure that all connectors snap in correctly.
- Replace the plastic cover and fasten to the case.
- Replace the board with the proximity switches and fasten with screws (if applicable).
- Replace the feedback shaft and fasten with screws.
- Replace the position indicator to the feedback shaft (if applicable).
- Reconnect all electrical inputs and outputs (see chapter 4.3 "Electrical connection")
- Feed in the 4...20 mA position demand signal.
- Turn on the compressed air supply.
- Replace the case cover; hand-tighten the screws.

7.3 Checking the filter regulator

Regularly open the drain screw on the air filter regulator housing in order to drain condensed water that may accumulate during operation.

Furthermore, the filter element (bronze sinter) should be checked for dirt. If necessary clean and replace the filter element.

7.4 Functional test/re-adjustment

Check the zero point during operation and adjust, if required (see page 63).

During a plant shutdown, run *Autoadjust* in order to update the operational settings (see page 53).

8 Technical data

8.1 Basic model

Input

Signal range

Nominal range 4...20 mA, split range configurable between 20...100% of nominal range

Two-wire circuitry

Supply voltage	8.7 V DC, without explosion protection 9.7 V DC for intrinsically safe device
Resistance	435 ohms at 20 mA and 8.7 V DC 485 ohms at 20 mA and 9.7 V DC

Digital input

Control voltage	12 ... 24 V DC
Current	max. 4 mA

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 value

Range 0...20% of positioning signal (if the value falls below the set value, the positioner immediately moves the actuator to the closing position)

Digital output (control current circuit to DIN 19234)

Supply voltage	5 ... 11 VDC
Current < 1.2 mA	Logical "0"
Current > 2.1 mA	Logical "1"
Effective direction:	Normally logical "0" or logical "1" (configurable)

Travel

Angle of rotation

Used range	25 ... 120 ° (rotary actuators) 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 (> 10 %)

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 4...20 mA
	Increas. pressure OUT_1 in the actuator
Decreasing:	Increasing signal 4...20 mA
	Decreas. pressure OUT_1 in the actuator

Valve action

Direct:	Signal 4...20 mA = position 0...100%
Reverse:	Signal 20...4 mA = 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 (sensitivity threshold)
0.3...10%, adjustable

Resolution (A/D conversion)
> 4000 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

Communication
HART® protocol

Communication link via
Connector for LKS adapter (standard)
FSK modem for frequency-modulated tapping (optional)

Environmental capabilities

Ambient temperature
-30 to +85 °C
for operation, storage and transport

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

Explosion protection

II 2G EEx ib II C T6
EC type approval certificate TÜV 98 ATEX 1370

EEx ia under preparation

FM/CSA

Case

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

Electrical connections
Screw terminals, internal, for CSA of 2.5 mm^2

Cable entry
2 threads Pg. 13.5, 1/2-14 NPT or M20x1.5
1 with cable gland and 1 with pipe 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

8.2 Options

Plug-in module for analog position feedback

Signal range 4 ... 20 mA (split ranges configurable)

Two-wire circuitry, power supply 10...30 V DC
(or 48 V DC without explosion protection)

Valve action direct or reverse (configurable)
Characteristic deviation $\leq$ 1%

(The module can be configured for alarm reporting through modulation of the output signal to < 4 mA or > 20 mA.)

Plug-in module for digital position feedback

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

Current circuits to DIN 19234
Supply voltage 5 ... 11 V DC
Control current < 1.2 mA= switching state logical "0"
Control current > 2.1 mA= switching state logical "1"

Effective direction: normally logical "0" or logical "1"
(configurable)

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 4 ... 20 mA 2-wire cable.
The shutdown input is electrically isolated from the 4 ... 20 mA signal.

* The plug-in modules for analog and for digital position feedback are plugged in different slots and, thus, can be installed together.
The plug-in module for the shutdown function, however, plugs into the same slot as the module for digital position feedback, so that these two modules cannot be used together.

Kit for mechanical position indicator

Indicator disk
Special cover with transparent dome
Symbol stickers
Special feedback shaft (prolongated)

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

[1]) The "digital position feedback" option is directly actuated by the feedback shaft of the TZID-C and can only be used together with the mechanical position indicator described above.

Kit for digital position feedback with 24 V microswitches**

Two 24 V DC/AC microswitches for the min. and max. position.
Switching points adjustable between 0 and 100 %

Not approved for use in the hazardous areas !

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

8.3 Accessories

Mounting material

Attachment kit for linear actuators to DIN/IEC 534
(lateral attachment to Namur)

Attachment kit for rotary actuators to VDI/VDE 3845

Kit for integral mounting to 23/24, 23/25 and 23/26 valves

Attachment kit for actuator-specific attachment on request

Pressure gauge block

With pressure gauges for supply and output pressure,
Pressure gauges with plastic case ý 28 mm,
with connection block made of aluminum, varnished black
inclusive of mounting material for attachment to TZID-C.

Filter regulator

All metal version, brass varnished black
Bronze filter element, 40 µm, with condensate drain
Max. pre-pressure 16 bar, output adjustable to 1.4...6 bar

Spare parts kit

Contains the following spare parts:

No.	Designation	Description
5	Filter	Filter element (housing)
5	Filter	Filter element (I/P module)
1	Sealing ring	Sealing ring for cap
2	Screws	Screws for cap
1	Dust cap	Dust cap IP65
1	Filter screw plug	Filter screw plug for filter element (housing)
1	Sealing ring	Sealing ring washer for filter screw plug
1	Optical position indicator	Optical position indicator
1	Sticker	Sticker for optical position indicator
1	Hinging bolt	Hinging bolt with plastic cone
5	Spring	Spring on hinging bolt
1	Brief operat. instructions	Brief operating instructions

PC adapter for communication

LKS adapter for connector on TZID-C

FSK modem for frequency-shift-keying

PC software for remote configuration and operation

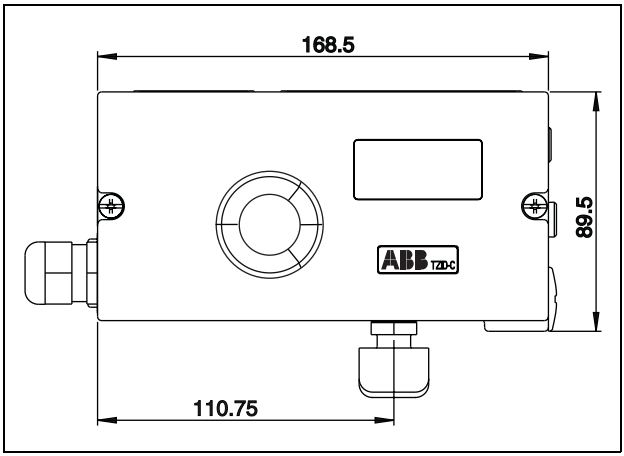
SMART VISION® (Standard) as CD-ROM

Isolating amplifier for signal range 0/4...20 mA

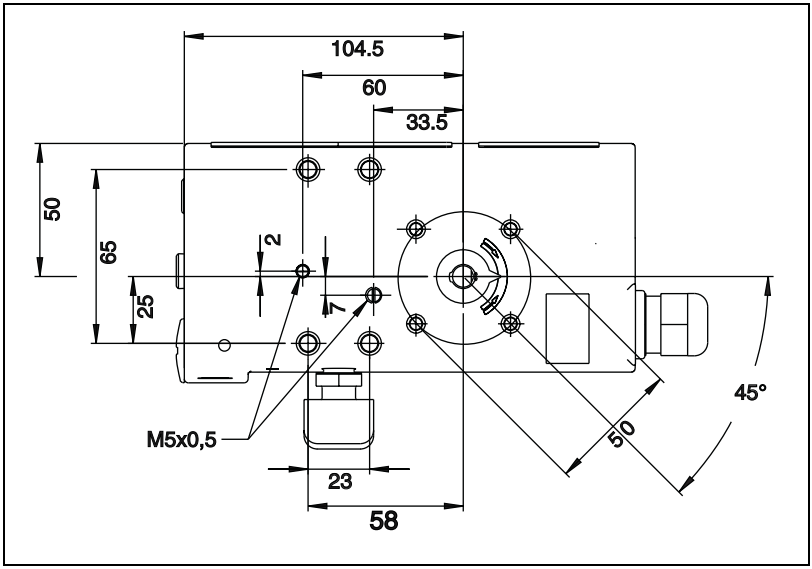
Contrans I or Contrans I_remote
(see separate data sheets for details)

9 Dimensional drawings

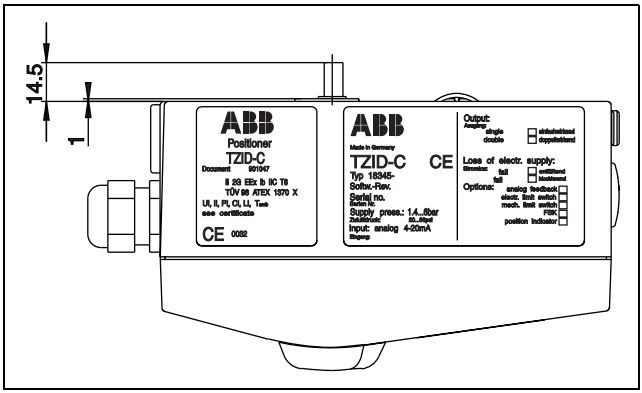
All dimensions in mm



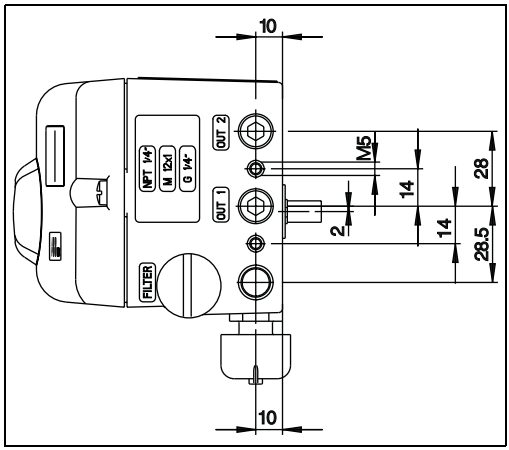
Front view



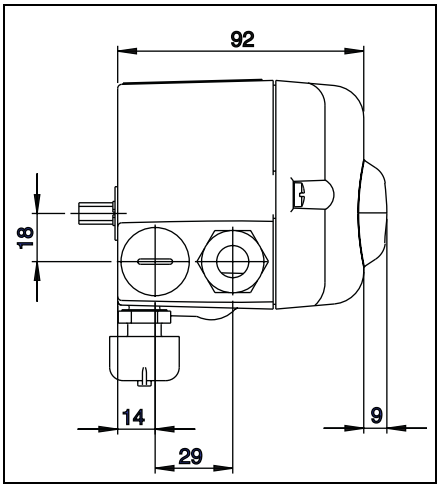
Rear view



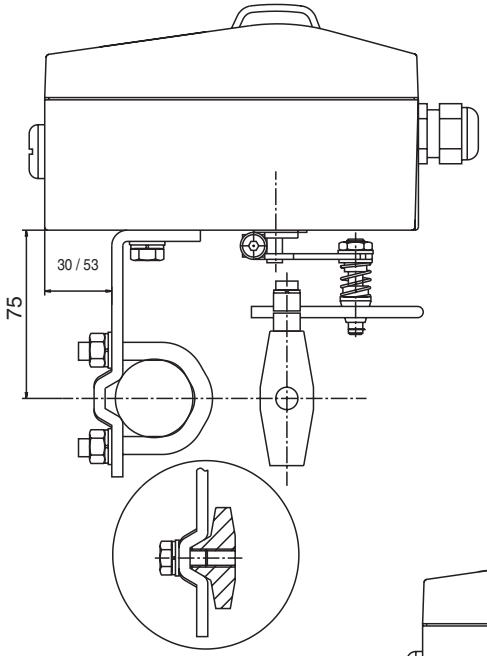
Top view



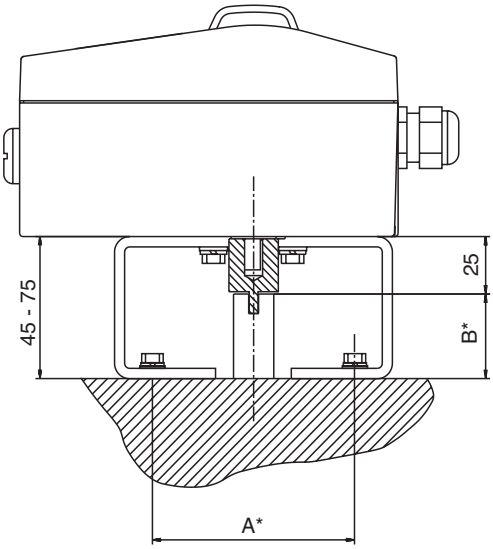
Side view (right)



Side view (left)

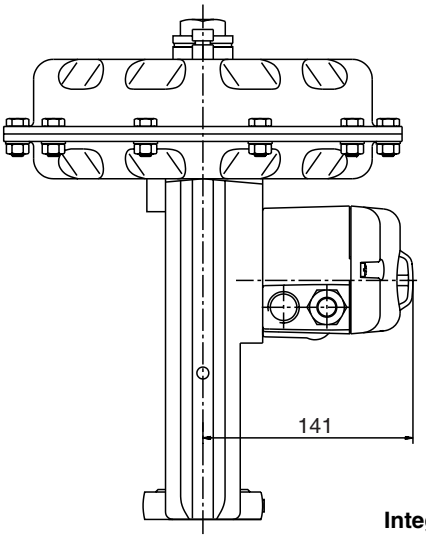


Mounting to linear actuators to DIN/IEC 534 / Namur

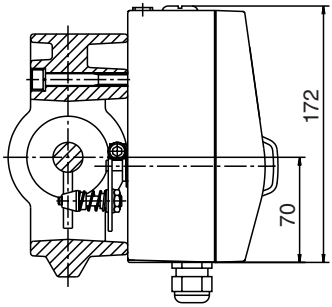


*) Dimensions A and B depend on rotary actuator size

Mounting to rotary actuators to VDI/VDE 3845

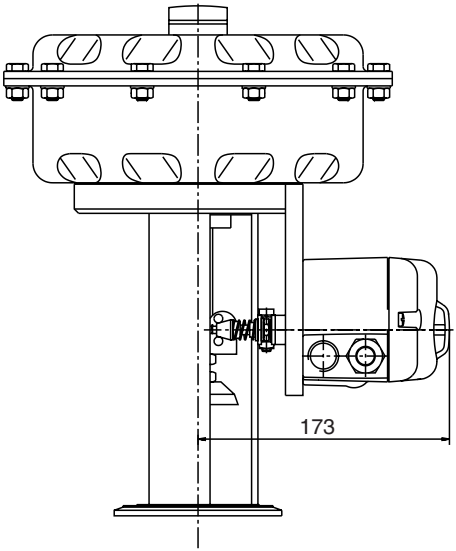


Side view

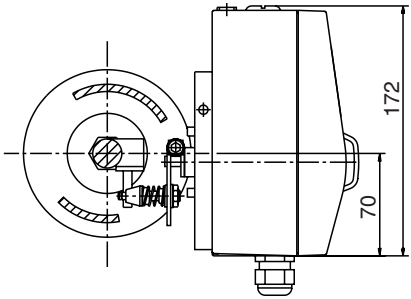


Top view

Integral mounting to valves 23/24 and 23/25

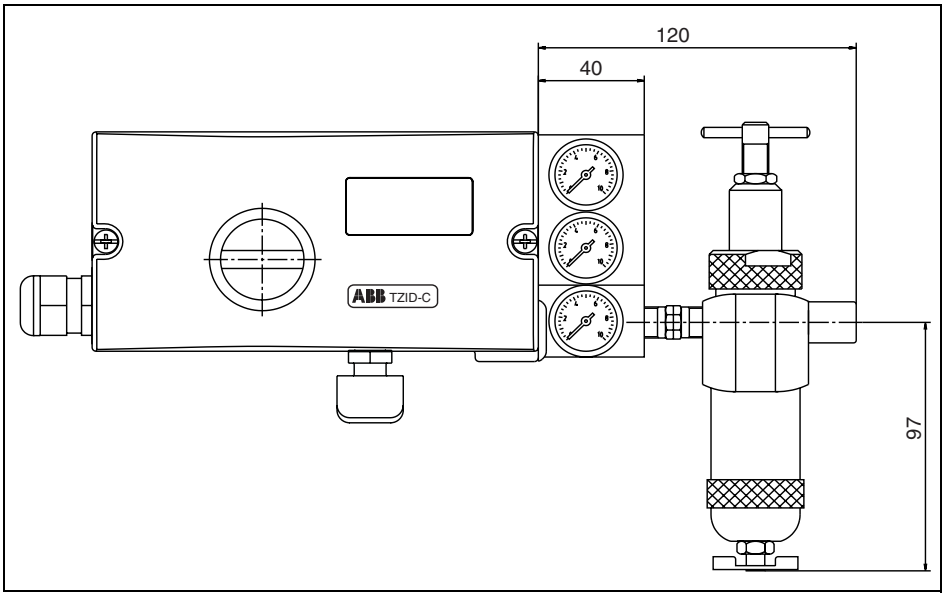


Side view



Top view

Integral mounting to valve 23/26



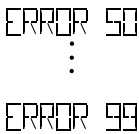
Pressure gauge block with filter regulator

10 Error codes, alarms, messages

10.1 Error codes

Error description	Code
Explanation: The supply voltage was interrupted or low for more than 20 milliseconds. This error is displayed after resetting the device to indicate the reason for the reset. **Measure(s):** Check the power source and the wiring.	ERROR 10
Explanation: The supply voltage has fallen below the minimum voltage. **Impact:** The actuator is moved to the safe position. After appr. 5 seconds the TZID-C positioner is automatically reset and starts up again with "ERROR 10". If a local communication interface (LKS) is connected, the device will go to operating mode "LKS Supply". **Measure(s):** Check the power source and the wiring.	ERROR 11
Explanation: The position is outside the sensor range. Possible reason is a malfunction in the position sensor. **Impact:** In control mode: The actuator is moved to the safe position. On the configuration level: The output is set to neutral until a button is pressed. After appr. 5 seconds the TZID-C positioner is automatically reset in control mode and on configuration level. **Measure(s):** Check the mounting.	ERROR 12

Error description	Code
Explanation: No access possible to the data in the EEPROM. **Impact:** The actuator is moved to the safe position. After appr. 5 seconds the TZID-C positioner is automatically reset. Attempts are made to restore the data. This compensates for intermittent errors in the communication environment with the EEPROM. **Measure(s):** If there is still no access to the EEPROM data after resetting the device, load the factory settings (see page 92). If the error still persists, return the device for repair to the manufacturer.	ERROR 20
Explanation: Error during processing the measured values, pointing to an error in the working data (RAM). **Impact:** The actuator is moved to the safe position. After appr. 5 seconds the TZID-C positioner is automatically reset and the RAM is initialized. **Measure(s):** If the error still persists after resetting the TZID-C positioner, return the device for repair to the manufacturer.	ERROR 21
Explanation: Error during the table processing, pointing to an error in the working data (RAM). **Impact:** The actuator is moved to the safe position. After appr. 5 seconds the TZID-C positioner is automatically reset and the RAM is initialized. **Measure(s):** If the error still persists after resetting the TZID-C positioner, return the device for repair to the manufacturer.	ERROR 22

Error description	Code
Explanation: Error when verifying the checksum of the configuration data (RAM). **Impact:** The actuator is moved to the safe position. After appr. 5 seconds the TZID-C positioner is automatically reset and the RAM is initialized. **Measure(s):** If the error still persists after resetting the TZID-C positioner, return the device for repair to the manufacturer.	
Explanation: Error in the processor function registers (RAM). **Impact:** The actuator is moved to the safe position. After appr. 5 seconds the TZID-C positioner is automatically reset and the RAM is initialized. **Measure(s):** If the error still persists after resetting the TZID-C positioner, return the device for repair to the manufacturer.	
Explanation: Internal error. **Impact:** The actuator is moved to the safe position. After appr. 5 seconds the TZID-C positioner is automatically reset. **Measure(s):** If the error can be reproduced and occurs in the same position after resetting, return the device for repair to the manufacturer.	

10.2 Alarms

Alarm description	Code
Explanation: Leakage between TZID-C positioner and actuator. **Impact:** Depending on how well the leakage can be compensated there are small control action in regular intervals. **Measure(s):** Check the piping.	ALARM 1
Explanation: The setpoint current is outside the admissible range, i.e. it is < 3.8 mA or > 20.5 mA. **Impact:** None **Measure(s):** Check the current source.	ALARM 2
Explanation: Alarm of the zero monitor. The zero has shifted by more than 4%. **Impact:** None In control mode a position outside the valve range can only be reached by driving to the limit stops, as the setpoint is limited to 0...100%. **Measure(s):** Correct the mounting.	ALARM 3
Explanation: Controlling is inactive, because the device does not operate in controlling mode or the digital input is switched. **Impact:** The controller does not follow the setpoint. **Measure(s):** Switch to control mode or switch off the digital input.	ALARM 4

Alarm description	Code
Explanation: Positioning timed out. The settling time needed exceeds the configured stroke time. **Impact:** None, or adaptive control is performed (in adaptive mode). **Measure(s):** Make sure that - the actuator is not blocked - the supply air pressure is adequate - the given time limit is higher than 1.5 times the longest stroke time of the actuator. When the adaption cannot run uninterruptedly for an actuator you should switch on the adaption until the alarm does not occur anymore during controlling actions.	ALARM 5
Explanation: The defined limit value for the stroke counter has been exceeded. **Impact:** None **Measure(s):** Reset the counter (only possible via a connected PC with SMART VISION®).	ALARM 6
Explanation: The defined limit value for the travel counter has been exceeded. **Impact:** None **Measure(s):** Reset the counter (only possible via a connected PC with SMART VISION®).	ALARM 7

10.3 Messages

Message description	Code
Action stopped by operator	BREAK
Error during plausibility check	CALC_ERR
Action completed, acknowledgement required	COMPLETE
Memory error, data could not be saved	EEPR_ERR
Safe position is active, action cannot be executed	FAIL_POS
Safe position required, but not active	NO_F_POS
Valve range limits have not yet been determined; therefore, partial *Autoadjust* cannot be run	NO_SCALE
Data is saved in the non-volatile memory	NV_SAVE
Sensor range is exceeded, *Autoadjust* was automatically stopped	OUTOFRNG
Data (factory settings) are being loaded	LOAD
Less than 10 % of the sensor range are used	RNG_ERR
Action running	RUN
Simulation has been started externally from a PC via HART® Protocol; switching outputs, alarm output and analog position feedback are no longer influenced by the process	SIMUL
Actual spring action is different from the adjusted one	SPR_ERR
Time-out; parameter could not be determined within two minutes; *Autoadjust* was automatically stopped	TIMEOUT

11 Approvals/Certificates

(1) **EG-Baumusterprüfbescheinigung**

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

(3) **TÜV 98 ATEX 1370 X**

(4) Gerät: Stellungsregler Typ Doc. 901047 (TZID-C)

(5) Hersteller: Hartmann & Braun GmbH & Co. KG
Geschäftsbereich Gerätetechnik

(6) Anschrift: D-30179 Hannover, Hackethalstr. 7

(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. 98/PX25180 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. Weitere Anforderungen dieser Richtlinie sind für die Herstellung und das Inverkehrbringen dieser Geräte zu erfüllen.

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

II 2 G EEx ib IIC T6

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

Hannover, 08.12.1998

Der Leiter

10.01d TÜV Nord n. DAR 5.97

Diese EG-Baumusterprüfbescheinigung darf nur unverändert weiterverbreitet werden.
Auszüge oder Änderungen bedürfen der Genehmigung des TÜV Hannover/Sachsen-Anhalt e.V.

Seite 1/3

(13) **ANLAGE**

(14) **EG-Baumusterprüfbescheinigung Nr. TÜV 98 ATEX 1370 X**

(15) Beschreibung des Gerätes

Der Stellungsregler Typ Doc. 901047 (TZID-C) dient zur Steuerung bzw. Regelung von pneumatisch angetriebenen Ventilen durch einen eingeprägten Signalstrom von 4 ... 20 mA. 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 +50°C
T6	-40°C bis +35°C

Elektrische Daten

Signalstromkreis
Klemme 11(+), 12(-)

in Zündschutzart Eigensicherheit EEx ib IIC
nur zum Anschluß an einen bescheinigten eigensicheren Stromkreis mit den Höchstwerten:
U_i = 30 V
I_i = 320 mA
P_i = 1,1 W

wirksame innere Kapazität C_i = 6,6 nF
Die wirksame innere Induktivität ist vernachlässigbar klein.

Schalteingang
Klemme 81(+), 82(-)

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

wirksame innere Kapazität C_i = 3,7 nF
Die wirksame innere Induktivität ist vernachlässigbar klein.

Schaltausgang
Klemme 83(+), 84(-)

in Zündschutzart Eigensicherheit EEx ib IIC
nur zum Anschluß an einen bescheinigten eigensicheren Stromkreis mit den Höchstwerten:
U_i = 30 V
P_i = 500 mW

wirksame innere Kapazität C_i = 3,7 nF
Die wirksame innere Induktivität ist vernachlässigbar klein.

BA 02 11.97 600.000

Anlage zur EG-Baumusterprüfbescheinigung TÜV 98 ATEX 1370 X

Lokale Kommunikations-schnittstelle (LKS)	zum Anschluß an ein Programmiergerät außerhalb des explosionsgefährdeten Bereiches

Die eigensicheren Stromkreise sind untereinander bis 60 V sicher galvanisch getrennt. Die lokale Kommunikationsschnittstelle (LKS) ist mit dem Signalstromkreis verbunden.

(16) Prüfungsunterlagen sind im Prüfbericht Nr.: 98/PX25180 aufgelistet.

(17) Besondere Bedingung

Die „Lokale Kommunikationsschnittstelle" (LKS) darf nur außerhalb des explosionsgefährdeten Bereiches betrieben werden.

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

keine zusätzlichen

BA 02 11.97 600.000

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.

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.

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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.

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APPROVAL REPORT

TZID-C POSITIONER
FOR
HAZARDOUS (CLASSIFIED) LOCATIONS

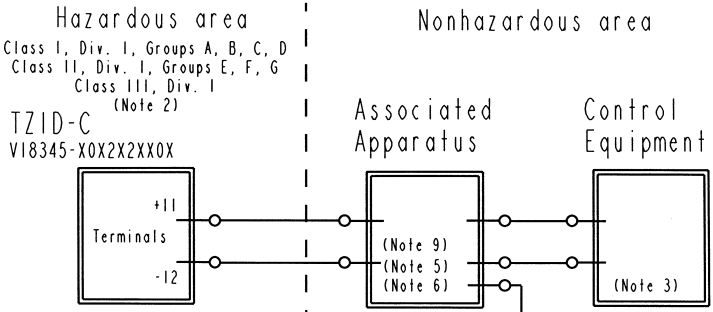
PREPARED FOR:

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

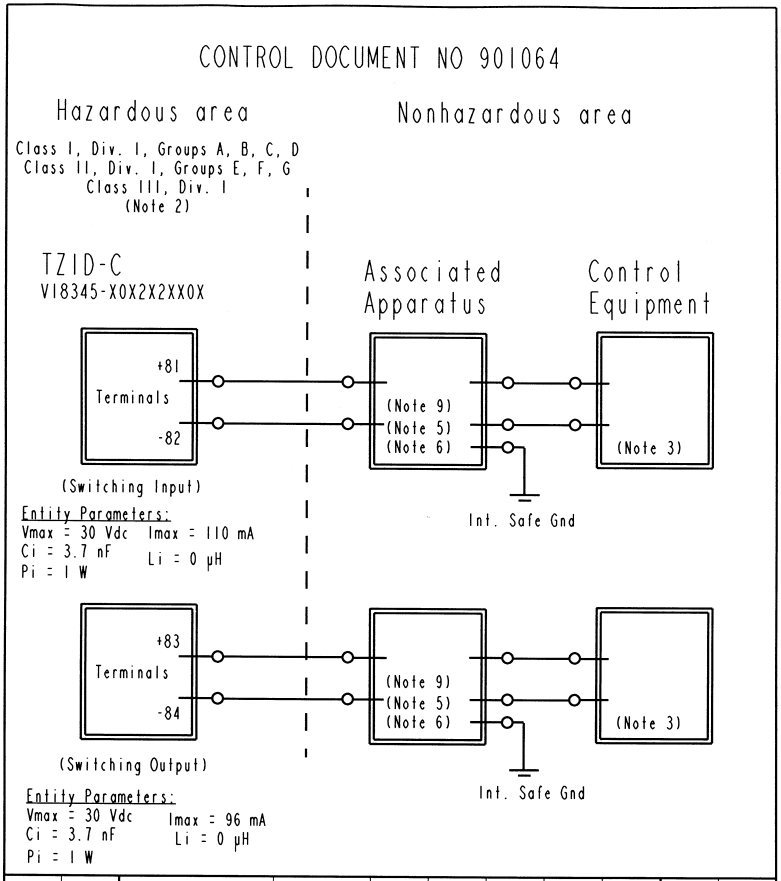
1. Voc or Vi <= Vmax, Isc or It <= Imax, Ca >= Ci+Ccable, La >= Li + Lcable; Po <= Pi
2. Dust-tight conduit seal must be used when installed in Class II and Class III environments.
3. Control equipment connected to barrier must not use or generate more than 250 Vrms or Vdc
4. Installation should be in 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.

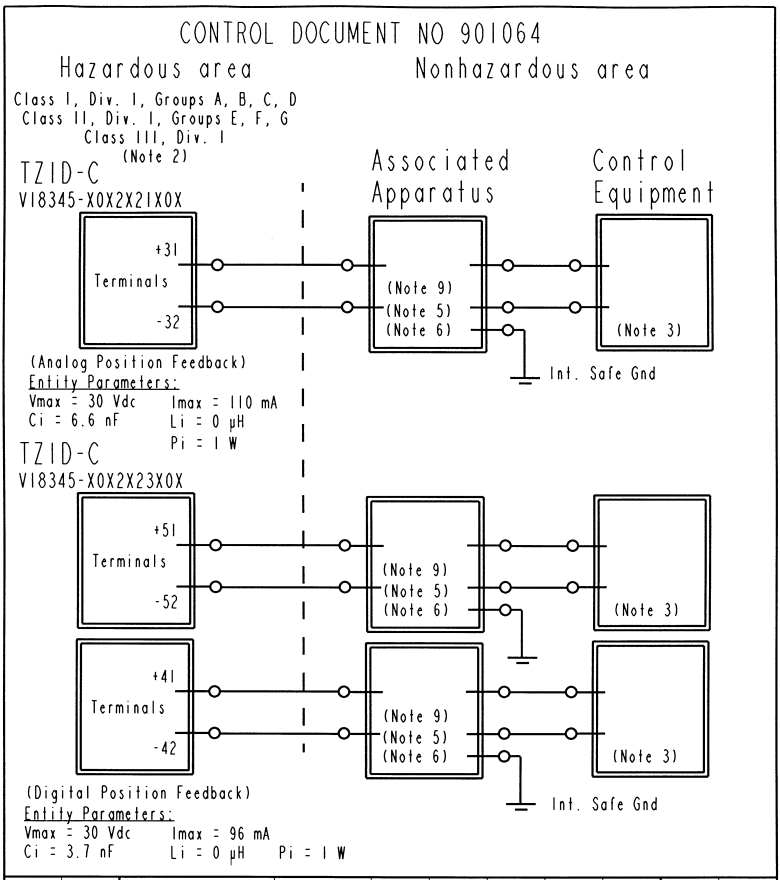
Werkstückkanten nach DIN 6784 ±0,3 ±0,3 ohne Angabe:	Allgemeintoleranzen nach DIN 7168-m-C	bis 6	über 6 bis 30	über 30 bis 120	über 120 bis 400	über 400		
		± 0,1	± 0,2	± 0,3	± 0,5	± 0,8		
Technische Oberfläche nach DIN ISO 1302	nach Vorschrift							
	Winkelmaße nach DIN 7168 mittel							

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

Maßstab:	Benennung:	
	CONTROL_DOCUMENT_901064	1/4

Paßmaß | Abmaß


CONTROL DOCUMENT NO 901064
Hazardous area
Nonhazardous area
Class I, Div. I, Groups A, B, C, D
Class II, Div. I, Groups E, F, G
Class III, Div. I
(Note 2)
TZID-C
VI8345-X0X2X2XX0X
Associated Apparatus
Control Equipment
+81
Terminals
-82
(Note 9)
(Note 5)
(Note 6)
(Note 3)
(Switching Input)
Int. Safe Gnd
Entity Parameters:
Vmax = 30 Vdc Imax = 110 mA
Ci = 3.7 nF Li = 0 µH
Pi = 1 W
+83
Terminals
-84
(Note 9)
(Note 5)
(Note 6)
(Note 3)
(Switching Output)
Int. Safe Gnd
Entity Parameters:
Vmax = 30 Vdc Imax = 96 mA
Ci = 3.7 nF Li = 0 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
Werkstoff:
Tag:
Name:
Gez.
08-Apr-99
Losarzik
Gepr.
Normgepr.
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 widerrechtliche Benutzung durch Empfänger od. Dritte hat zivil- u. strafrechtliche Folgen.



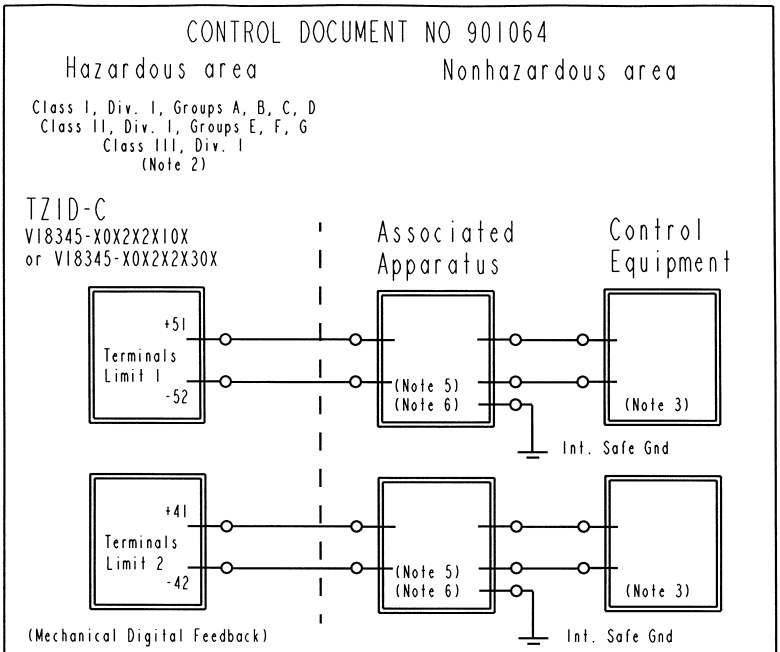
Werkstückkanten nach DIN 6784 ±0,3 ±0,3 ohne Angabe:	Allgemeintoleranzen nach DIN 7168-m-C	bis 6	über 6 bis 30	über 30 bis 120	über 120 bis 400	über 400		
		± 0,1	± 0,2	± 0,3	± 0,5	± 0,8		
Technische Oberfläche nach DIN ISO 1302	nach Vorschrift							
	Winkelmaße nach DIN 7168 mittel							

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

Maßstab:	Benennung:	
	CONTROL_DOCUMENT_901064	3/4

Paßmaß | Abmaß

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: +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							

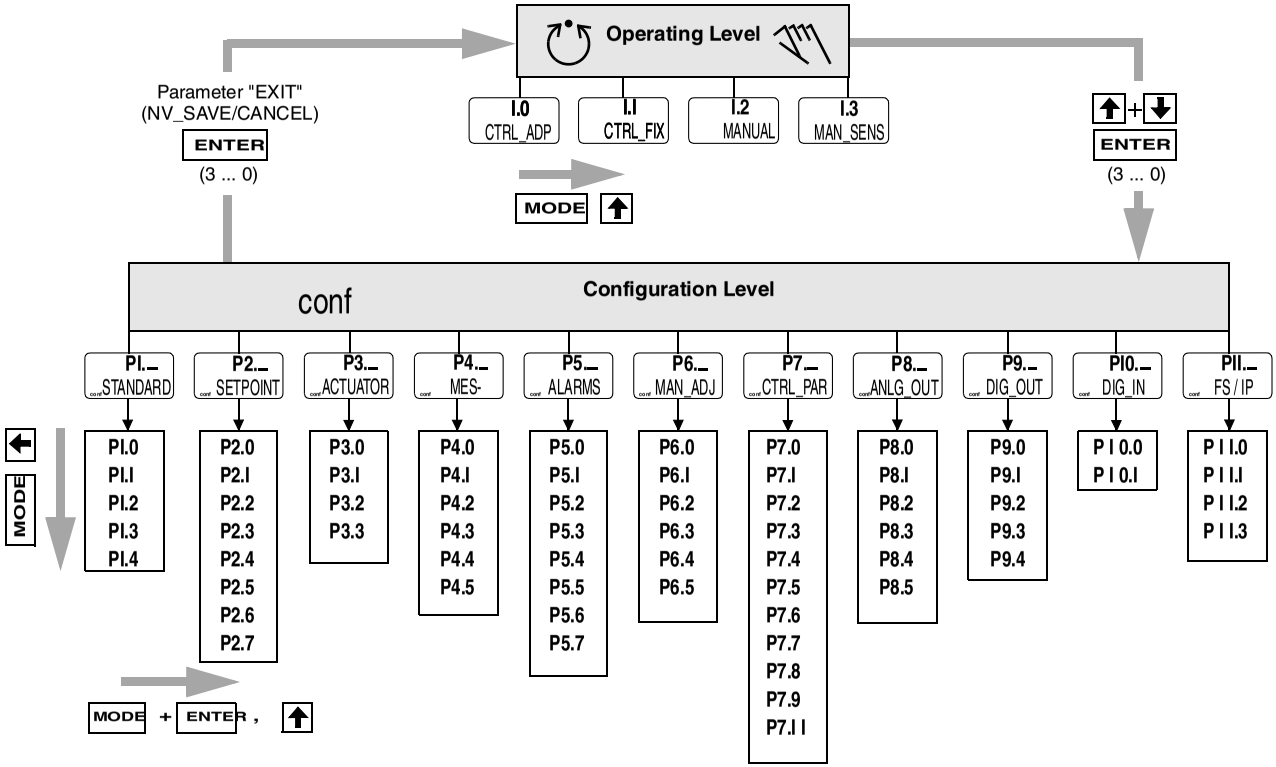
	Tag:	Name:	Werkstoff:		
Gez.	08-Apr-99	Lasarzik		ABB Automation Products GmbH	
Gepr.			Halbzeug, Rohteil-Nr.:		
Normgepr.			Rev. 8 (17.08.00)		TKM
Maßstab:	Benennung:				
	CONTROL_DOCUMENT_901064				4/4

Paßmaß | Abmaß

Appendix A: Parameter overview

ID	Designator	Name	see
P1._	**STANDARD**		
P1.0	**ACTUATOR**	Actuator type	page 53
P1.1	**AUTO_ADJ**	*Autoadjust*	page 53
P1.2	**TOL_BAND**	Tolerance band	page 55
P1.3	**TEST**	Test	page 56
P1.4	**EXIT**	Return to operat. level	page 56
P2._	**SETPOINT**		
P2.0	**MIN_RGE**	Min. of setpoint range	page 57
P2.1	**MAX_RGE**	Max. of setpoint range	page 57
P2.2	**CHARACT**	Characteristic curve	page 58
P2.3	**ACTION**	Valve action	page 58
P2.4	**SHUT-OFF**	Shut-off value	page 59
P2.5	**RAMP$\wedge$**	Setpoint ramp, up	page 59
P2.6	**RAMP$\vee$**	Setpoint ramp, down	page 60
P2.7	**EXIT**	Return to operat. level	page 60
P3._	**ACTUATOR**		
P3.0	**MIN_RGE**	Min. of stroke range	page 61
P3.1	**MAX_RGE**	Max. of stroke range	page 62
P3.2	**ZERO_POS**	Zero position	page 63
P3.3	**EXIT**	Return to operat. level	page 63
P4._	**MESSAGES**		
P4.0	**TIME_OUT**	Deadband time limit	page 64
P4.1	**POS_SW1**	Switching point SW1	page 64
P4.2	**POS_SW2**	Switching point SW2	page 65
P4.3	**SW1_ACTV**	Active direction SW1	page 65
P4.4	**SW2_ACTV**	Active direction SW2	page 65
P4.5	**EXIT**	Return to operat. level	page 66
P5._	**ALARMS**		
P5.0	**LEAKAGE**	Leakage to actuator	page 67
P5.1	**SP_RGE**	Outside setpoint range	page 67
P5.2	**SENS_RGE**	Zero error	page 67
P5.3	**CTRLER**	Controller inactive	page 68
P5.4	**TIME-OUT**	Positioning time-out	page 68
P5.5	**STRK_CTR**	Stroke counter	page 68
P5.6	**TRAVEL**	Travel counter	page 69
P5.7	**EXIT**	Return to operat. level	page 69

ID	Designator	Name	see
P6._	**MAN_ADJ**		
P6.0	**MIN_VR**	Min. valve range	page 70
P6.1	**MAX_VR**	Max. valve range	page 71
P6.2	**ACTUATOR**	Actuator type	page 72
P6.3	**SPRNG_Y2**	Spring action (Y2)	page 72
P6.4	**ADJ_MODE**	*Autoadjust* mode	page 73
P6.5	**EXIT**	Return to operat. level	page 73
P7_	**CTRL_PAR**		
P7.0	**KP∧**	KP value, up	page 74
P7.1	**KP∨**	KP value, down	page 75
P7.2	**TV∧**	TV value, up	page 76
P7.3	**TV∨**	TV value, down	page 77
P7.4	**GOPULSE∧**	Go pulse, up	page 78
P7.5	**GOPULSE∨**	Go pulse, down	page 79
P7.6	**Y-OFFSET∧**	Y offset, up	page 80
P7.7	**Y-OFFSET∨**	Y offset, down	page 81
P7.8	**SENSITIV**	Sensitivity	page 82
P7.9	**TOL_BAND**	Tolerance band	page 82
P7.10	**TEST**	Test	page 83
P7.11	**EXIT**	Return to operat. level	page 83
P8._	**ANLG_OUT**		
P8.0	**MIN_RGE**	Min. of current range	page 84
P8.1	**MAX_RGE**	Max. of current range	page 84
P8.2	**ACTION**	Valve action	page 84
P8.3	**ALARM**	Alarm message	page 85
P8.4	**TEST**	Test	page 85
P8.5	**EXIT**	Return to operat. level	page 86
P9._	**DIG_OUT**		
P9.0	**ALRM_LOG**	Alarm output logic level	page 87
P9.1	**SW1_LOG**	SW1 logic level	page 87
P9.2	**SW2_LOG**	SW2 logic level	page 87
P9.3	**TEST**	Test	page 88
P9.4	**EXIT**	Return to operat. level	page 88
P10._	**DIG_IN**		
P10.0	**FUNCTION**	Function selection	page 89
P10.1	**EXIT**	Return to operat. level	page 90
P11._	**FS / IP**		
P11.0	**FAIL_POS**	Safe position	page 91
P11.1	**FACT_SET**	Factory setting	page 91
P11.2	**IP_TYP**	I/P module type	page 93
P11.3	**EXIT**	Return to operat. level	page 94



Parameter overview

Subject to technical changes.

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Subject to technical changes
Printed in the Fed. Rep. of Germany
42/18-64 EN Rev. 4.0
Issue 06.01