Electro-Pneumatic Positioner
TZIDC

for 4 … 20 mA two-wire technology

- Low operating cost
- Compact design
- Well-proven technology
- Robust and environmentally ruggedized
- Wide operating temperature range
  -40 ... 85 °C (-40 ... 185 °F)
- Easy to commission, “single pushbutton” operating philosophy
- Mechanical position indicator
- ATEX, FM, CSA, GOST and IECEx approvals
- For SIL2 safety loops

Compact, well-proven, and flexible
Contents
1 Description ......................................................................................................................................................... 3
  1.1 Pneumatics .................................................................................................................................................. 3
  1.2 Operation .................................................................................................................................................... 3
  1.3 Communication ......................................................................................................................................... 3
  1.4 Inputs and outputs ....................................................................................................................................... 3
  1.5 Modular design .......................................................................................................................................... 3
2 Mounting versions ............................................................................................................................................. 5
  2.1 To linear actuators in accordance with the standard .................................................................................. 5
  2.2 To rotary actuators in accordance with the standard ................................................................................ 5
  2.3 Integral mounting to control valves ......................................................................................................... 5
  2.4 Special actuator-specific mounting ......................................................................................................... 5
3 Operation .......................................................................................................................................................... 7
  3.1 General ...................................................................................................................................................... 7
  3.2 Operator panel .......................................................................................................................................... 8
4 Communication .................................................................................................................................................. 9
  4.1 DTM ........................................................................................................................................................ 9
  4.2 LKS adapter (RS-232 interface converter) ................................................................................................. 9
  4.3 FSK Modem ............................................................................................................................................ 9
5 Technical data .................................................................................................................................................. 10
  5.1 Input ....................................................................................................................................................... 10
  5.2 Output .................................................................................................................................................... 10
  5.3 Travel .................................................................................................................................................. 10
  5.4 Air supply ............................................................................................................................................ 10
  5.5 Transmission data and influences ......................................................................................................... 10
  5.6 Environmental capabilities ..................................................................................................................... 11
  5.7 Housing ............................................................................................................................................... 11
  5.8 Safety Integrity Level .............................................................................................................................. 11
  5.9 Explosion protection .............................................................................................................................. 12
  5.10 Options ............................................................................................................................................ 13
  5.11 Accessories ....................................................................................................................................... 14
6 Electrical connection ...................................................................................................................................... 15
7 Dimensions ..................................................................................................................................................... 17
8 Ordering information ....................................................................................................................................... 20
  8.1 Additional ordering information ............................................................................................................. 21
  8.2 Order information, accessories 1 .......................................................................................................... 22
  8.3 Order information, accessories 2 .......................................................................................................... 23
  8.4 Order information, accessories 3 .......................................................................................................... 24
1 Description

The TZIDC is an electronically configurable positioner with communication capabilities designed for mounting to pneumatic linear or rotary actuators. It features a small and compact design, a modular construction, and an excellent cost-performance ratio. Fully automatic determination of the control parameters and adaptation to the final control element yield considerable time savings and an optimal control behavior.

1.1 Pneumatics

An I/P module with subsequent pneumatic amplifier is used to control the pneumatic actuator. The well-proven I/P module proportionally converts the permanent electrical positioning signal from the CPU into a pneumatic signal used to adjust a 3/3-way valve. The air flow for pressurizing or depressurizing the actuator is continuously adjusted. As a result, excellent control is achieved. When reaching the set point, the 3/3-way valve is closed in center position to minimize the air consumption.

Four different pneumatics versions are available: for single-acting or double-acting actuators, each with “fail-safe” or “fail-freeze” function.

1.1.1 “Fail-safe” function

If the electrical power supply fails, the positioner output 1 is depressurized, and the pneumatic actuator’s return spring moves the valve to the defined safe position. In case of a double-acting actuator the second output 2 is additionally pressurized.

1.1.2 “Fail-freeze” function

If the electrical power supply should fail, the positioner output 1 (and 2, if applicable) is closed and the pneumatic actuator stops (“freezes”) the valve in the current position. If compressed air supply should fail, the positioner depressurizes the actuator.

1.2 Operation

The positioner has a built-in operating panel providing a 2-line LCD and 4 pushbuttons for optimal local configuration, commissioning and operational monitoring. Alternatively, the appropriate configuration program and the available communication option can be used.

1.3 Communication

The standard TZIDC model has a local communication interface (LKS connector). Additionally, a “HART communication” option for communication via the 20 mA signal is available. Both communications are based on the HART Protocol.

1.4 Inputs and outputs

In addition to its input for the analog position set point the TZIDC positioner is equipped with a digital input which can be used to activate various protective functions in the device via the process control system. A digital output allows you to output collective alarms or fault messages.

1.5 Modular design

The TZIDC basic model can be enhanced at any time by retrofitting optional equipment. Option modules for analog or digital position feedback or a shutdown-module can be installed. Additionally, a mechanical position indicator, proximity switches or 24 V microswitches are available for indicating the position independently of the mother board function.
**Basic model**
1. LKS plug
2. Positioning signal 4 … 20 mA
3. Digital input
4. Digital output DO
5. Supply, 1.4 … 6 bar
6. Exhaust
7. I/P module with 3/3-way valve
8. Position sensor (optional up to 270° rotation angle)

**Optional upgrades**
9. Plug module for analog feedback (4 … 20 mA)
10. Plug-in module for safety shutdown (forced depressurization)
11. Plug module for digital feedback
12. Installation kit for mechanical position indicator
13. Installation kit for digital feedback with proximity switches
14. Installation kit for digital feedback with 24 V microswitches

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**Important**

With optional upgrades either the “Installation kit for digital feedback with proximity switches” (13) or the “Installation kit for digital feedback with microswitches 24 V” (14) can be used.

In both cases, the “mechanical position indicator” (8) must be installed.
2 Mounting versions

2.1 To linear actuators in accordance with the standard
Lateral attachment is in accordance with DIN / IEC 534 (lateral attachment to NAMUR). The required attachment kit is a complete set of attachment material, but does not include the screwed pipe connections and air pipes.

2.2 To rotary actuators in accordance with the standard
This attachment is designed for mounting according to the standard VDI/VDE 3845. The attachment kit consists of a console with mounting screws for mounting on a rotary actuator. The adapter for coupling the positioner feedback shaft to the actuator shaft has to be ordered separately. Screwed pipe connections and air pipes have to be provided on site.

2.3 Integral mounting to control valves
The TZIDC positioner featuring single acting pneumatic action is also suitable for integral mounting.
The required holes are found at the back of the device.
The benefit of this design is that the point for mechanical stroke measurement is protected and that the positioner and actuator are linked internally. No external tubing is required.

2.4 Special actuator-specific mounting
In addition to the mounting methods described above, there are special actuator-specific attachments.
Please contact us for details.
Fig. 2: Mounting options

1. Mounting to linear actuators acc. to DIN / IEC 534
2. Mounting to rotary actuators to VDI / VDE 3845
3. Integral mounting to control valves
4. Integral mounting to control valves by using an adapter panel
3 Operation

3.1 General
Microprocessor-based position control in the TZIDC provides for optimal results. The positioner features high-precision control functions and high operational reliability. Due to their elaborate structure and easy accessibility, the device parameters can be quickly adapted to the respective application.

The total range of parameters includes:
- Operating parameters
- Adjustment parameters
- Monitoring parameters
- Diagnosis parameters
- Maintenance parameters

3.1.1 Operating parameters
The following operating parameters can be set manually if required:

**Signal**
- Signal min. 4 mA, max. signal 20 mA (0 ... 100 %)
- Freely selectable for split-range operation
- Min. range 20 % (3.2 mA)
- Recommended range > 50 % (8.0 mA)

**Action (positioning signal)**
- Increasing: Signal 4 ... 20 mA = position 0 ... 100 %
- Increasing: 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 or freely configurable with 20 reference points.

**Travel limit**
The positioning travel, i.e. the stroke or angle of rotation, can be reduced as required within the full range of 0 ... 100 %, provided that a minimum value of 20 % is observed.

**Shut-off function**
This parameter can be set separately for each end position. When the respective configured limit value is exceeded, the shut-off function causes immediate travel of the actuator until reaching the set end position. When the shut-off value is set to “0”, the position is further controlled, even in the respective end position.

**Travel time prolongation**
This function can be used to increase the max. travel time for full travel. This time parameter can be set separately for each direction.

**Digital input**
For the digital input, one of the following safety options can be selected. You may use the operator’s panel or configuration program to select an option.
- No function (default)
- Move to 0 % position
- Move to 100 % position
- Hold previous position
- Disable local configuration
- Disable local configuration and operation
- Disable any access (no local or remote access via a PC)

The selected function is activated once the 24 V DC signal is no longer applied (< 11 V DC).

3.1.2 Adjustment parameters
The TZIDC positioner has a special function for automatic adjustment of the parameters. Additionally, the control parameters can be set automatically (in adaptive control mode) or manually to optimally adapt them to the process requirements.

**Tolerance band**
Upon reaching the tolerance band, the position is slowly re-adjusted until the dead band has been reached.

**Dead band (sensitivity)**
When reaching the dead band, the position is held. The factory setting for this parameter is 0,1 %.

**Actuator spring action**
Selection of the sensor shaft rotating sense (looking into the open case), if the valve is moved to the safe position by the actuator spring (actuator is depressurized via Y1/OUT1). For double-acting actuators the actuator spring action corresponds to pressurizing the pneumatic output (OUT2).

**Display 0 ... 100 %**
Adjusting the display (0 ... 100 %) according to the direction of action for opening or closing the valve.

3.1.3 Monitoring parameters
Various functions for permanent operational monitoring are implemented in the TZIDC operating program. The following states will be detected and indicated, e.g.:
- 4 ... 20 mA signal out of range
- Position out of the adjusted range
- Positioning time-out (adjustable time parameter)
- Position controller inactive
- Counter limits (settable in the diagnosis phase) exceeded

While automatic commissioning is in progress, the current state is continuously indicated on the integrated LCD. During operation, the LCD shows the most important process variables:
- Current position (in %),
- Malfunctions, alarms, messages (as code)

Access to extended monitoring parameters is possible via HART communication and the DTM.
3.1.4 Diagnosis parameters

The diagnosis parameters of the TZIDC program inform the operator about the operating conditions of the valve. From this information the operator can derive which maintenance works are required, and when. Additionally, limit values can be defined for these parameters. When they are exceeded, an alarm is reported.

The following values are e.g. determined:
- Number of movements performed by the valve
- Total travel

The diagnosis parameters and limit values can be called up, set, and reset via HART communication, using the configuration program.

3.2 Operator panel

The TZIDC positioner’s operator panel with four pushbuttons allows for:
- operational monitoring
- manual control
- configuration
- fully automatic commissioning

The operator panel is protected by a cover which avoids unauthorized access to the operating elements.

3.2.1 Single-button commissioning

Commissioning the TZIDC positioner is especially easy. The standard Autoadjust function for automatic adaptation of the device parameters can be started by simply pressing a single front panel button, and without knowing parameterization details.

Depending on the selected actuator type (linear or rotary), the displayed zero position is automatically adapted:
- for linear actuators counter-clockwise (CTCLOCKW)
- for rotary actuators clockwise (CLOCKW).

Besides this standard function, a customized “Autoadjust” function is available. The function is launched either via the operator’s panel or HART communication.

3.2.2 Display

The information indicated by the 2-line LC display is permanently updated and adapted during operation, to inform the operator in an optimal way.

During control operation (control with or without adaptation) the following TZIDC data can be called up by pressing the pushbuttons briefly:
- Up button: Current setpoint (mA)
- Down button: Temperature in device
- Up + Down buttons: Current control deviation

Fig. 3: TZIDC with removed cover, view of the operator panel

Fig. 4: TZIDC operating elements and display
4 Communication

4.1 DTM

The DTM (Device Type Manager) for TZIDC is based on the FDT/DTM technology (FDT 1.2) and can be integrated in a process control system or loaded in a PC with the DSV401 (SMART VISION) program. This allows you to work with the same user interface in the commissioning phase, during operation, and for service tasks for monitoring the device, setting parameters, and uploading data. Communication is based on the HART protocol. It occurs via a local interface connection (LKS) or in frequency-modulated mode using an FSK-modem connected at any chosen point of the 20 mA signal line. Communication has no effect on operation. Newly set parameters are saved in the non-volatile memory directly upon the download into the device, and become active immediately.

4.2 LKS adapter (RS-232 interface converter)

You can easily connect your TZIDC positioner to a PC, e.g., in the workshop or in the commissioning phase, by using the positioner's LKS adapter (LKS = local communication interface).

An RS-232 interface converter adapts the signals on the serial PC port to the level of the positioner’s LKS.

4.3 FSK Modem

The FSK modem establishes a digital frequency-modulated communication (Frequency Shift Keying) with the TZIDC positioner. Tapping is possible at any chosen point of the 20 mA signal line.

We recommend that you use an electrically isolated FSK modem. It is bus-compatible when used with isolating amplifiers. Even connecting explosion-protected field devices is possible, on condition that the FSK modem is run outside the hazardous area.
5 Technical data

5.1 Input
Output signal (two-wire technology)
Nominal range 4 ... 20 mA
Split range configuration between 20 ... 100 % of the nominal range
Max. 50 mA
Min. 3.6 mA
Starting at 3.8 mA
Load voltage at 20 mA 9.7 V
Impedance at 20 mA 485 Ω
Digital input
Control voltage 0 ... 5 V DC
logical switching state "0"
11 ... 30 V DC
logical switching state "1"
Current max. 4 mA

5.2 Output
Compressed air output
Range 0 ... 6 bar (0 ... 90 psi)
Air capacity 5.0 kg/h = 3.9 Nm³/h = 2.3 scfm
at 1.4 bar (20 psi) supply pressure
13 kg/h = 10 Nm³/h = 6.0 scfm
at 6 bar (90 psi) supply pressure
Output function For single or double-acting actuators, air is vented from actuator or actuator is blocked in case of (electrical) power failure
Shut-off values End position 0 % = 0 ... 45 %
End position 100 % = 55 ... 100 %

Digital output (control circuit to DIN 19234/NAMUR)
Supply voltage 5 ... 11 V DC
Current > 0.35 mA ... < 1.2 mA Switching state logical "0"
Current > 2.1 mA Switching state logical "1"
Effective direction (configurable) normally logical "0" or logical "1"

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

5.4 Air supply
Instrument air free of oil, water and dust acc.
to DIN / ISO 8573-1 pollution and oil content according to Class 3 (purity: max. particle size: 5 µm, max. particle density: 5 mg / m³; oil content: max. concentration: 1 mg / m³; pressure dew point: 10 K below operating temperature
Supply pressure 1.4 ... 6 bar (20 ... 90 psi)
Note: Do not exceed the max. operating pressure of the actuator!
Air consumption < 0.03 kg/h / 0.015 scfm (independent of supply pressure)

5.5 Transmission data and influences
Output Y1 Increasing Increasing output signal 0 ... 100 % Increasing pressure at output Decreasing Increasing output signal 0 ... 100 % Decreasing pressure at output
Action (output signal)
Increasing Signal 4 ... 20 mA = actuator position 0 ... 100%
Decreasing Signal 20 ... 4 mA = actuator position 0 ... 100%
Characteristic curve (travel = f (signal))
Linear, equal percentage 1:25 or 1:50 or 25:1 or 50:1 and freely configurable with 20 reference points.
Deviation ≤ 0.5 %
Tolerance band 0.3 ... 10 %, adjustable
Dead band 0.1 ... 10 %, adjustable
Resolution (A/D conversion) > 16000 steps
Sample rate 20 ms
Influence of ambient temperature ≤ 0.5 % per 10 K
Influence of vibration ≤ 1 % to 10 g and 80 Hz
Seismic vibration Meets requirements of DIN / IEC 68-3-3 Class III for strong and strongest earthquakes.
Influence of mounting orientation Not measurable.
Complies with the following directives
- EMC Directive 89 / 336 / EWG as of May 1989
- EC Directive for CE conformity marking
Communication
- HART Protocol 5.9
- Local connector for LKS (not in Ex area)
- HART communication via 20 mA signal line with (optional) FSK modem
5.6 Environmental capabilities

**Ambient temperature**
For operation, storage and transport: -40 ... 85 °C (-40 ... 185 °F)
When using proximity switches SJ2-S1N (NO): -25 ... 85 °C (-13 ... 185 °F)

**Relative humidity**
Operational (with closed housing and air supply switched on): 95 % (annual average), condensation permissible
Transport and storage: 75 % (annual average), non-condensing

5.7 Housing

**Material/Protections**
Aluminum, protection class IP 65 / NEMA 4X

**Surface/color**
Electrostatic dipping varnish with epoxy resin, stove-hardened. Case varnished black, RAL 9005, matte, housing cover Pantone 420.

**Electrical connections**
Screw terminals: Max. 1.0 mm² for options, Max. 2.5 mm² for analog signal.
Note: Do not expose the terminals to strain.
Cable entry: 2 tap holes 1/2-14 NPT or M20 x 1.5 (1 x with cable gland and 1 x with pipe plug)

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

**Weight**
1.7 kg

**Mounting orientation**
any orientation allowed

**Dimensions**
see dimensional drawings

5.8 Safety Integrity Level

**Important**
Applies to applications with single-acting and depressurizing pneumatics.

The positioner TZIDC and the emergency shutdown module for TZIDC meet the requirements regarding:
- functional safety acc. to IEC 61508
- explosion protection (depending on the model)
- electromagnetic compatibility in accordance with EN 61000

Without the input signal, the pneumatic module in the positioner vents the drive and the installed spring in it moves the valve in a predetermined end position (OPEN or CLOSED).

SIL specific safety-related characteristics:

<table>
<thead>
<tr>
<th>Device</th>
<th>SFF</th>
<th>PFDav</th>
<th>λ_{dd} + λ_{d}</th>
<th>λ_{du}</th>
</tr>
</thead>
<tbody>
<tr>
<td>TZIDC / TZIDC-200 as shutdown module</td>
<td>94 %</td>
<td>1,76 * 10⁻⁴</td>
<td>718 FIT</td>
<td>40 FIT</td>
</tr>
<tr>
<td>TZIDC / TZIDC-200 with supply current 0 mA</td>
<td>94 %</td>
<td>1,76 * 10⁻⁴</td>
<td>651 FIT</td>
<td>40 FIT</td>
</tr>
</tbody>
</table>

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

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

FM J.I. 3005029 (3610, 3611)
Intrinsically safe
Class I, Div. 1 Grp. A-B-C-D
Class II, Div. 1 Grp. E-F-G
CL III, Div. 1
Non-incendive, suitable for use in Div. 2 environment

CSA Certification 1052414
Intrinsically safe; Enclosure 4X; T4, max. 85 °C
Class I, Div. 1 Grp. A-B-C-D
Class II, Div. 1 Grp. E-F-G
CL III, Div. 1
Non-incendive; Enclosure 4X, max. 85 °C
Class I, Div. 2 Grp. A-B-C-D
Class II, Div. 2 Grp. E-F-G
CL III

ATEX / GOST Russia / GOST Ukraine
II 2G EEx ib IIC T6
Prototype test certificate: TÜV 98 ATEX 1370 X
Type: Intrinsically safe equipment
Device class: II 2G (EEx ib IIC)
Temperature class: T4, T5, T6
Permissible ambient temperature: T4: -40 °C ≤ T_{amb} ≤ 85 °C
T5: -40 °C ≤ T_{amb} ≤ 50 °C
T6: -40 °C ≤ T_{amb} ≤ 35 °C

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

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

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

<table>
<thead>
<tr>
<th>Permissible housing surface temperature</th>
<th>Permissible ambient temperature (II D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T81 °C</td>
<td>-40 … 70 °C</td>
</tr>
<tr>
<td>T61 °C</td>
<td>-40 … 50 °C</td>
</tr>
<tr>
<td>T46 °C</td>
<td>-40 … 35 °C</td>
</tr>
</tbody>
</table>

IECEx
Ex ib IIC T6
Prototype test certificate: IECEx TUN 04.0015X, Issue no.: 0
Type: Intrinsically safe
Temperature class: T4, T5, T6
Permissible ambient temperature: T4: -40 °C ≤ T_{amb} ≤ 85 °C
T5: -40 °C ≤ T_{amb} ≤ 50 °C
T6: -40 °C ≤ T_{amb} ≤ 35 °C
5.10 **Options**

**Module for analog position feedback**

- **Signal range**: 4 ... 20 mA (configurable split ranges)
- **Supply, 2-wire circuitry**: 24 V DC (10 ... 30 V DC)
- **Characteristics curve**: Rising or falling
- **Deviation**: < 1 %

**Module for digital position feedback**

- **Current circuits acc. to DIN 19234 / NAMUR**
- **Supply voltages**: 5 ... 11 V DC
- **Signal current**: < 1.2 mA Switching state logical "0"  
  > 2.1 mA Switching state logical "1"

**Module for the emergency shutdown function**

- **Supply voltage**: 24 V DC (20 ... 30 V DC) (galvanically isolated from input signal)
- **Safe position is activated when**: Voltage < 5 V
- **Explosion protection**: see certificate (operating instructions)
- **SIL**: See "Safety Integrity Level"

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

The positioner output 1 is depressurized, and the valve is moved to the safe position. In case of a double-acting actuator the second output 2 is additionally pressurized.

**Digital position feedback with proximity switches**

- **Two proximity switches for independent position signaling**
- **Switching points adjustable between 0 ... 100 %**
- **Current circuits acc. to DIN 19234 / NAMUR**
- **Supply voltage**: 5 ... 11 V DC
- **Signal current < 1.2 mA**: Switching state logical "0"  
  > 2.1 mA Switching state logical "1"

**Direction of action (logical state)**

<table>
<thead>
<tr>
<th>Position</th>
<th>&lt; Lim. 1</th>
<th>&gt; Lim. 1</th>
<th>&lt; Lim. 2</th>
<th>&gt; Lim. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SJ2-SN (NC)</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>SJ2-S1N (NO)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Digital position feedback with 24 V microswitches**

- **Two microswitches for independent position signaling**
- **Switching points adjustable between 0 ... 100 %**
- **Voltage**: max. 24 V AC / DC
- **Load rating**: max. 2 A
- **Contact surface**: 10 µm Gold (AU)

**Mechanical position indicator**

Indicator disk in enclosure cover, linked with positioner feedback shaft.

**Important**

These options are also available for retrofitting by Service.

**Important**

When using proximity switch SJ2_S1N (NO), the position TZIDC may only be used at an ambient temperature range -25 ... 85 °C (-13 ... 185 °F).

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1) **The module for analog position feedback and the module for digital position feedback plug in separate slots and can be used together.**

2) **The module for the emergency shutdown function uses the same space as the module for analog feedback and the module for analog or digital feedback and cannot be plugged in and run together with any of them.**
5.11 Accessories

Mounting material
Attachment kit for linear actuators to DIN/IEC 534 / NAMUR
Attachment kit for rotary actuators to VDI/VDE 3845
Attachment kit for integral mounting to control valves
Attachment kit for actuator-specific attachment upon request

Pressure gauge block
With pressure gauges for supply and output pressure. Pressure
gauges with housing ø 28 mm (1.10 inch), with connection block in
aluminum, black with installation material for mounting to TZIDC.

Filter regulator
All metal version in brass, varnished black, bronze filter element,
40 µm, with condensate drain.
max. pre-pressure 16 bar (232 psi), output adjustable to 1.4 ... 6 bar
(20.31 ... 87.02 psi)

Important
The filter regulator may only be installed in combination with
the pressure gauge block (accessory).

PC adapter for communication
LKS adapter f. plug conn. to TZIDC
FSK modem for HART communication
(see data sheet 63_6.71)

PC software for remote configuration and operation
DSV401 (SMART VISION) with DTM for TZIDC/TZIDC-200 available
on CD ROM (see data sheet 63_1.20)
6 Electrical connection

Fig. 7: Screw terminals, overview

1 Module for analog position feedback
2 Module for digital feedback or service switch of emergency shutdown module
3 Module for digital feedback or terminals for emergency shutdown module
4 Digital position feedback, either proximity switches or 24 V microswitches
5 Digital position feedback, either proximity switches or 24 V microswitches
6 Digital output DO
7 Digital input
8 Signal 4 ... 20 mA
9 Grounding screw
Fig. 8: Pin configuration

A Basic model
1 Analog input
2 Digital input
3 Digital output DO
4 Digital feedback
5 Analog feedback
6 Proximity switches
7 Microswitches
8 Emergency shutdown module

B Options

1 Analog input
2 Digital input
3 Digital output DO
4 Digital feedback
5 Analog feedback
6 Proximity switches
7 Microswitches
8 Emergency shutdown module
7 Dimensions

All dimensions in mm (inch)

Fig. 9: Top view

Fig. 10: Front and rear views
A Tap hole M8 (10 mm low)
B Tap hole M6 (8 mm low)
C Tap hole M5 x 0.5 (air vents for direct mount)
D Sensor shaft (larger than scale)
**Fig. 11:** side view (from left to right)

A  Pneumatic connections, NPT 1/4"-18 or G1/4"

**Mounting drawings**

**Fig. 12:**

- Mounting to linear actuators to DIN/IEC 534
- Mounting to rotary actuators to VDI/VDE 3845

*) Dimensions A and B are dependent on the rotary actuator
Fig. 13: Positioner TZIDC with pressure gauge block and filter regulator
## 8 Ordering information

<table>
<thead>
<tr>
<th>Electro-Pneumatic Positioner</th>
<th>Variant digit No.</th>
<th>1</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>Code</th>
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<tbody>
<tr>
<td>TZIDC</td>
<td>Catalog No.</td>
<td>V18345-</td>
<td>0</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**intelligent, configurable**
with indicator and operator panel

### Case / Mounting
- Case made of aluminium, varnished, protection IP 65 (NEMA 4X)
- for mounting to linear actuators acc. to DIN/IEC 534 / NAMUR
- or to rotary actuators acc. to VDI/VDE 3845
- also ready for integral mounting
- as above, but with mechanical position indicator
- for mounting to rotary actuators acc. to VDI/VDE 3845
- with extended rotation angle up to 270°
- as above, but with mechanical position indicator

**Note:**
For attachment according to standard, additional mounting material is required (see "Accessories")

### Input / communication port
- Input 4...20 mA, two-wire
  - with connector plug for LKS adapter
  - with connector plug for LKS adapter and
  - FSK module for HART communication

### Explosion protection
- without
- ATEX Ex II 2 G Ex ib II C T6
- FM/CSA
- ATEX Ex n A II T6
- IECEx Ex ib IIC T6
- IECEx Ex nA II T6
- ATEX Ex II 2 G Ex ia II C T6
- GOST Russia Ex II 2 G Ex ib II C T6
- GOST Russia Ex n A II T6

Other explosion protection certificates upon request

### Output / safe position (in case of an electrical power failure)
- Single acting,
  - fail safe
  - fail freeze
- Double acting,
  - fail safe
  - fail freeze

### Connections
- Cable: Thread 1/2-14 NPT
  - Air pipe: Thread 1/4-18 NPT
- Cable: Thread M20 x 1.5
  - Air pipe: Thread 1/4-18 NPT
- Cable: Thread M20 x 1.5
  - Air pipe: Thread G 1/4

### Option modules for analog or digital position feedback
- Plug-in module
  - analog position feedback (sign. range 4 ... 20 mA)
  - digital position feedback
  - shutdown module
  - analog position feedback (sign. range 4 ... 20 mA)
  - and digital position feedback
  - analog position feedback (sign. range 4 ... 20 mA)
  - and shutdown module
  - analog position feedback (sign. range 4 ... 20 mA / 48 V)

### Notes:
1) only for fail safe pneumatic
2) not for explosion protected version

Continued on next page
Electro-Pneumatic Positioner TZIDC
for 4 ... 20 mA two-wire technology

<table>
<thead>
<tr>
<th>Electro-Pneumatic Positioner</th>
<th>Variant digit No.</th>
<th>1</th>
<th>7</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>TZIDC</td>
<td>Catalog No.</td>
<td>V18345-</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

intelligent, configurable
with indicator and operator panel

Optional mechanical kit for digital position feedback

| without | 0 |
| Mechanical kit for digital position feedback |
| with proximity switches SJ2-SN (NC or logical 1) | 3 | 1 |
| with proximity switches SJ2-S1N (NO or logical 0) | 3 | 4 | 3 |
| with 24 V DC/AC microswitches (change-over contacts) | 2 | 3 | 5 |

Design (varnish / coding)

| Standard | 1 |
| Special version chemistry | (details on request) |
| As specified | (on request) |

8.1 Additional ordering information

<table>
<thead>
<tr>
<th>Certificates</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIL2 - Declaration of conformity</td>
<td>5) 6) CS2</td>
</tr>
<tr>
<td>Certificate of compliance with the order acc. to EN 10204-2.1 (DIN 50049-2.1)</td>
<td>CF1</td>
</tr>
<tr>
<td>Certificate of compliance with the order acc. to EN 10204-2.1 (DIN 50049-2.1) with item description</td>
<td>CF2</td>
</tr>
<tr>
<td>Test Report acc. to EN 10204-2.2 (DIN 50049-2.2)</td>
<td>CF3</td>
</tr>
<tr>
<td>Inspection certificate 3.1 acc. to EN 10204 with max. deviation</td>
<td>CBA</td>
</tr>
</tbody>
</table>

Device identification label

| Includes lettering | (plain text, max. 16 letters) |
| stainless steel | 18.5 x 65 mm MK1 |
| sticker | 41 x 32 mm MK2 |
| sticker | 11 x 25 mm MK3 |

2) not for explosion protected version
3) only for model with mechanical position indicator
4) only for ambient temperature range -25 °C to +85 °C
5) not with Explosion protection ATEX Ex II 2 G Ex ia II C T6 (code 7)
6) only for single acting and fail safe pneumatic
## 8.2 Order information, accessories 1

<table>
<thead>
<tr>
<th>TZIDC</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mounting material and cost</strong></td>
<td></td>
</tr>
<tr>
<td>Attachment kit for linear actuators</td>
<td></td>
</tr>
<tr>
<td>(lateral attachment to DIN/IEC 534 / NAMUR) stroke 10 ... 35 mm</td>
<td>7959125</td>
</tr>
<tr>
<td>stroke 20 ... 100 mm</td>
<td>7959126</td>
</tr>
<tr>
<td>Attachment kit for rotary actuators (mounting to VDI/VDE 3845) consisting of:</td>
<td></td>
</tr>
<tr>
<td>a) Adapter (shaft coupler)</td>
<td>7959110</td>
</tr>
<tr>
<td>b) Mounting bracket</td>
<td></td>
</tr>
<tr>
<td>dimension A/B = 80/20 mm</td>
<td>319603</td>
</tr>
<tr>
<td>dimension A/B = 80/30 mm</td>
<td>319604</td>
</tr>
<tr>
<td>dimension A/B = 130/30 mm</td>
<td>319605</td>
</tr>
<tr>
<td>dimension A/B = 130/50 mm</td>
<td>319606</td>
</tr>
<tr>
<td><strong>Pressure gauge block</strong></td>
<td></td>
</tr>
<tr>
<td>including attachment material</td>
<td></td>
</tr>
<tr>
<td>for single acting TZIDC with 2 pressure gauges Ø 28 mm</td>
<td></td>
</tr>
<tr>
<td>(1 x for air supply and 1 x for output pressure)</td>
<td></td>
</tr>
<tr>
<td>G 1/4 connections</td>
<td>Supply pressure range 0...10 Bar/ 0...140 psi</td>
</tr>
<tr>
<td>Output pressure range 0...4 Bar/ 0...60 psi</td>
<td>7959112</td>
</tr>
<tr>
<td>1/4-18 NPT connections</td>
<td>Supply pressure range 0...10 Bar/ 0...140 psi</td>
</tr>
<tr>
<td>Output pressure range 0...4 Bar/ 0...60 psi</td>
<td>7959114</td>
</tr>
<tr>
<td>for double acting TZIDC with 3 pressure gauges Ø 28 mm</td>
<td></td>
</tr>
<tr>
<td>(1 x for air supply and 2 x for output pressure)</td>
<td></td>
</tr>
<tr>
<td>G 1/4 connections</td>
<td>Supply pressure range 0...10 Bar/ 0...140 psi</td>
</tr>
<tr>
<td>Output pressure range 0...4 Bar/ 0...60 psi</td>
<td>7959116</td>
</tr>
<tr>
<td>1/4-18 NPT connections</td>
<td>Supply pressure range 0...10 Bar/ 0...140 psi</td>
</tr>
<tr>
<td>Output pressure range 0...4 Bar/ 0...60 psi</td>
<td>7959118</td>
</tr>
<tr>
<td>(Pressure gauge blocks are delivered as separate units for mounting by the customer)</td>
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</tr>
<tr>
<td>Filter regulator, brass incl. material for mounting to pressure gauge block connections</td>
<td>thread G 1/4</td>
</tr>
<tr>
<td>thread 1/4-18 NPT</td>
<td>7959120</td>
</tr>
<tr>
<td>(Filter regulators are delivered as separate units for mounting by the customer)</td>
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<tr>
<td><strong>Adapter and operating program for digital communication</strong></td>
<td></td>
</tr>
<tr>
<td>LKS adapter</td>
<td>see Data Sheet 10/63-6.71 EN</td>
</tr>
<tr>
<td>FSK modem</td>
<td>see Data Sheet 10/63-6.71 EN</td>
</tr>
<tr>
<td>DSV401 (SMART VISION) on CD-ROM</td>
<td>see Data Sheet 10/63-1.20 EN</td>
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### 8.3 Order information, accessories 2

<table>
<thead>
<tr>
<th>TZIDC, TZIDC-110, TZIDC-120, TZIDC-200, TZIDC-210, TZIDC-220</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attachment kit for</strong></td>
<td><strong>Manufacturer / Type</strong></td>
</tr>
<tr>
<td>Air Torque</td>
<td>SC 30</td>
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<tr>
<td>Air Torque</td>
<td>SC-P-60-4</td>
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<tr>
<td>Air Torque</td>
<td>SR 30</td>
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<tr>
<td>ARI</td>
<td>DP32, DP33, DP34</td>
</tr>
<tr>
<td>AMG</td>
<td>SAD 010 ... SAF 040</td>
</tr>
<tr>
<td>AMG</td>
<td>SAD 040 ... SAF 050</td>
</tr>
<tr>
<td>ARCA</td>
<td>812 stroke 30 mm</td>
</tr>
<tr>
<td>ARCA</td>
<td>812 stroke 60 mm</td>
</tr>
<tr>
<td>ARCA</td>
<td>813 stroke 30 mm</td>
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<tr>
<td>ARCA</td>
<td>813 stroke 60 mm</td>
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<tr>
<td>Automax</td>
<td>DA 85 ... DA150</td>
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<td>Badger Meter</td>
<td>ATC 754/755</td>
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<tr>
<td>bar</td>
<td>GTE / GTD 045 ... 127</td>
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<td>bar</td>
<td>GTE / GTD 143 ... 254</td>
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<tr>
<td>Bray</td>
<td>92 / 93 series</td>
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<tr>
<td>Conovalve</td>
<td>Series 740,000 / 750,000 / 770,000 / 795,000</td>
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<tr>
<td>El-O-Matic</td>
<td>ED / ED / PE / PD 500 ... 4004</td>
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<td>El-O-Matic</td>
<td>ED / ED / PE / PD 25 ... 350</td>
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<td>FESTO</td>
<td>DRD-4-F05 ... DRD-50F10</td>
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<td>FESTO</td>
<td>DRD-77-F10 ... DRD-255-F14</td>
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<td>Fisher</td>
<td>1051-30, 1052-30</td>
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<td>Fisher</td>
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<td>Fisher</td>
<td>471</td>
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<td>Fisher</td>
<td>585 C</td>
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<tr>
<td>Fisher</td>
<td>657 / 667 Size 10 ... 30 mm</td>
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<tr>
<td>Flow Serve</td>
<td>DA 85 ... 150</td>
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<tr>
<td>Foxboro</td>
<td>FoxPak IP127 / V725</td>
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<tr>
<td>Foxboro</td>
<td>V713 stroke 10 ... 35 mm</td>
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<td>V713 stroke 25 ... 90 mm</td>
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<tr>
<td>GEFA</td>
<td>AC 020 ... AC 1750</td>
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<td>GEFA</td>
<td>MC 063 FA</td>
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<tr>
<td>GEMÜ</td>
<td>690/25 and 50</td>
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<td>GEMÜ</td>
<td>CleanStar</td>
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<td>Gulde</td>
<td>DK</td>
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9) need additional Adapter (Shaft Coupler), Catalog No. 7959110
### 8.4 Order information, accessories

<table>
<thead>
<tr>
<th>Attachment kit for Manufacturer / Type</th>
<th>Catalog No.</th>
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</thead>
<tbody>
<tr>
<td>Honeywell 600-11, 600-15</td>
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<tr>
<td>Hytork XL26 ... XL680</td>
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<tr>
<td>Hytork XL1125, XL1370, XL2585, XL4580</td>
<td>319605</td>
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<tr>
<td>Keystone 79U/E-002(S) ... 79U/E-181(S)</td>
<td>7959147</td>
</tr>
<tr>
<td>Mapag A/F 30 ... A/F 500</td>
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<tr>
<td>Masoneilan CAMFLEX II, VARIMAX, MINITORK II</td>
<td>7959144</td>
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<tr>
<td>Masoneilan VariPak 28000 series</td>
<td>7959163</td>
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<tr>
<td>MaxFlo</td>
<td>7959140</td>
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<tr>
<td>NAF</td>
<td>7959207</td>
</tr>
<tr>
<td>NAMUR stroke 10 ... 35 mm</td>
<td>7959125</td>
</tr>
<tr>
<td>NAMUR stroke 25 ... 90 mm</td>
<td>7959126</td>
</tr>
<tr>
<td>NAMUR stroke 100 ... 170 mm</td>
<td>7959339</td>
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<tr>
<td>NELES BC6-20, B1C6-20, B1J8-20</td>
<td>7959146</td>
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<tr>
<td>Norbro 10AR40, 20BR40, 20AR40, 20ARDA40, 15AR40, 15BR40</td>
<td>319603</td>
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<tr>
<td>Norbro 25AR40, 25BR40, 35AR40, 35BR40, 33-40, 30AR40</td>
<td>319604</td>
</tr>
<tr>
<td>Norbro 45BR40, 45AR40</td>
<td>319606</td>
</tr>
<tr>
<td>Prisma PP10, PP20</td>
<td>319604</td>
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<tr>
<td>Prisma PPW</td>
<td>319603</td>
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<tr>
<td>Remote Control RCD 05-DA/SR ... RCD 60-DA/SR</td>
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<tr>
<td>Revo FD/FS 12, 25, 50</td>
<td>319603</td>
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<td>Revo FD/FS 90, 130, 180, 205, 306</td>
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<tr>
<td>Richter RA-1/2 046 ... RA-1/2 127</td>
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<td>Richter RA-1/2 185 ... RA-1/2 300</td>
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<tr>
<td>Samson 241, 271, 3271</td>
<td>7959145</td>
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<td>Samson 3277</td>
<td>7959136</td>
</tr>
<tr>
<td>Schubert&amp;Salzer GS 8020 / 8021 / 8023</td>
<td>7959200</td>
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<tr>
<td>SED SED stroke 100 mm</td>
<td>7959141</td>
</tr>
<tr>
<td>VDI / VDE 3845 80 / 20 mm</td>
<td>319603</td>
</tr>
<tr>
<td>VDI / VDE 3845 80 / 30 mm</td>
<td>319604</td>
</tr>
<tr>
<td>VDI / VDE 3845 130 / 50 mm</td>
<td>319606</td>
</tr>
</tbody>
</table>

9) need additional Adapter (Shaft Coupler), Catalog No. 7959110
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