TZIDC-200, TZIDC-210, TZIDC-220
Digital Positioner

Introduction
The TZIDC-200, TZIDC-210, TZIDC-220 is an electronically configurable positioner with communication capabilities designed for mounting on pneumatic linear or rotary actuators. Fully automatic determination of the control parameters and adaptation to the positioner allow for considerable time savings as well as optimum control behavior.

Additional Information
Additional documentation on TZIDC-200, TZIDC-210, TZIDC-220 is available for download free of charge at www.abb.com/positioners. Alternatively simply scan this code:
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1 Safety

General information and instructions

These instructions are an important part of the product and must be retained for future reference.
Installation, commissioning, and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator accordingly. The specialist personnel must have read and understood the manual and must comply with its instructions.
For additional information or if specific problems occur that are not discussed in these instructions, contact the manufacturer.
The content of these instructions is neither part of nor an amendment to any previous or existing agreement, promise or legal relationship.
Modifications and repairs to the product may only be performed if expressly permitted by these instructions.
Information and symbols on the product must be observed.
These may not be removed and must be fully legible at all times.
The operating company must strictly observe the applicable national regulations relating to the installation, function testing, repair and maintenance of electrical products.

Warnings

The warnings in these instructions are structured as follows:

⚠️ DANGER
The signal word ‘DANGER’ indicates an imminent danger.
Failure to observe this information will result in death or severe injury.

⚠️ WARNING
The signal word ‘WARNING’ indicates an imminent danger.
Failure to observe this information may result in death or severe injury.

⚠️ CAUTION
The signal word ‘CAUTION’ indicates an imminent danger.
Failure to observe this information may result in minor or moderate injury.

NOTICE
The signal word ‘NOTICE’ indicates possible material damage.

Note

‘Note’ indicates useful or important information about the product.
1 Safety

Intended use
Positioning of pneumatically controlled actuators; designed for mounting on linear and rotary actuators. The device is designed for use exclusively within the stated values on the name plate and in the data sheet.
- The maximum operating temperature must not be exceeded.
- The maximum ambient temperature must not be exceeded.
- The housing's rating must be observed during operation.

Improper use
The following are considered to be instances of improper use of the device:
- For use as a climbing aid, for example for mounting purposes.
- For use as a bracket for external loads, for example as a support for piping, etc.
- Material application, for example by painting over the housing, name plate or welding/soldering on parts.
- Material removal, for example by spot drilling the housing.

Notes on data safety
This product is designed to be connected to and to communicate information and data via a network interface. It is operator's sole responsibility to provide and continuously ensure a secure connection between the product and your network or any other network (as the case may be). Operator shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and / or theft of data or information. ABB Automation Products GmbH and its affiliates are not liable for damages and / or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and / or theft of data or information.

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Fax: +49 571 830-1806

Customer service center
Tel: +49 180 5 222 580
Email: automation.service@de.abb.com
2 Use in potentially explosive atmospheres

General requirements

- The ABB positioner has been approved only for appropriate and intended use in standard industrial atmospheres. Any breach of this rule leads to a cancellation of warranty and manufacturer's responsibility!
- Make sure that only devices which comply with the types of protection relevant to the applicable zones and categories are installed.
- All electric equipment has to be suited for the respective intended use.

- In potentially explosive atmospheres, assembly may be conducted only in compliance with locally applicable installation regulations. The following conditions have to be observed (incomplete):
  - Assembly and maintenance may only be conducted if there is no explosion hazard in the area and you have a hot work permit.
  - The TZIDC-200, TZIDC-210, TZIDC-220 may be operated in a fully mounted and intact housing only.

Commissioning, Installation

The ABB positioner has to be mounted in a major system. Depending on the degrees of IP-protection, an interval for cleaning the equipment (dust settlement) has to be defined. Strict care has to be taken that only devices which comply with the types of protection relevant to the applicable zones and categories is installed. When installing the device, the locally applicable installation regulations, such as EN 60079-14, must be observed.

Other important facts to be observed:

- The electric circuits of the positioner must be put into operation in all zones by persons qualified in accordance with TRBS 1203. The details on the type label are mandatory for doing this.
- The device has been designed in accordance with IP 65 (optionally IP 66) and must be protected accordingly against adverse ambient conditions.
- The EC Type Examination Certificate has to be taken into account, including any special conditions defined therein.
- The device may only be used in accordance with its intended use.
- The device may only be connected when de-energized.
- The potential equalization of the system must be established in accordance with installation regulations applicable in the respective country (VDE 0100, part 540, IEC 364-5-54).
- Circulating currents must not be guided through the housing!
- Make sure that the housing is properly installed and that its IP rating has not been compromised.

Notes for operation

- The positioner must be integrated in the local potential equalization system.
- Only either intrinsically safe or non intrinsically safe circuits may be connected. A combination is not permitted.
- If the positioner is operated with non intrinsically safe circuits, later use for the intrinsic safety type of protection is not permitted.

Use, operation

The TZIDC-200, TZIDC-210, TZIDC-220 is approved for proper and intended use only. In case of non-compliance, the warranty and manufacturer's liability do no longer apply!

- Only those auxiliary components which fulfill all the requirements of European and national standards may be used in potentially explosive atmospheres.
- The ambient conditions specified in the operating instruction must be strictly followed.
- The TZIDC-200, TZIDC-210, TZIDC-220 is approved for proper and intended use in standard industrial atmospheres only. Where aggressive substances are present in the air, the manufacturer has to be consulted.
... 2 Use in potentially explosive atmospheres

Maintenance, repair

Definition of terms according to IEC 60079-17:

**Maintenance**
Defines a combination of actions performed to maintain or restore the condition of an item such that the item meets the requirements of the relevant specification and performs its required functions.

**Analyzer module without electronics module (power supply):** Defines an action which involves careful inspection of an item (either without disassembly or with partial disassembly, as required) supplemented by measurements, aimed at achieving a reliable conclusion regarding the condition of the item.

**Visual inspection**
Defines an inspection which identifies defects which are visible to the naked eye, such as missing screws, without the use of access equipment and tools.

**Close inspection**
Defines an inspection which encompasses the aspects covered by a visual inspection and in addition, identifies defects such as loose screws, which can only be detected with the use of access equipment (e.g. steps) and tools.

**Detailed inspection**
Defines an inspection which encompasses the aspects covered by a close inspection and in addition, identifies defects, such as loose connections, which can only be detected by opening the housing and / or by using tools and test devices, as needed.

- Maintenance and exchange work may be conducted by qualified specialists only, i.e., qualified personnel in accordance with TRBS 1203 or similar.
- Only those auxiliary components which fulfill all the requirements of European and national guidelines and regulations may be used in potentially explosive atmospheres.
- Maintenance works that require disassembly of the system may only be performed in non-hazardous areas. If that is not possible, however, the usual precautions have to be ensured according to local regulations.
- Components may only be replaced by original spare parts which are therefore approved for use in potentially explosive atmospheres.
- The device must be regularly cleaned when used in potentially explosive atmospheres. The intervals must be defined by the operator in compliance with the ambient conditions present at the operating location.
- After all maintenance and repair work has been completed, any barriers and plates removed for that purpose must be put back in their original place.
- The flameproof joints differ from the tables of IEC 60079-1 and may be repaired by the manufacturer only.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Visual inspection (every 3 months)</th>
<th>Close inspection (every 6 months)</th>
<th>Detailed inspection (every 12 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection of the positioner for integrity, removal of dust deposits</td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspection of electric installation for integrity and proper operation</td>
<td></td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Inspection of the entire installation</td>
<td></td>
<td></td>
<td>Responsibility of the operator</td>
</tr>
</tbody>
</table>
Preconditions for safe operation of the positioner

⚠️ DANGER

Risk of explosion due to hot parts
Hot parts inside the device pose an explosion hazard.
- Never open the device immediately after switch-off.
- A waiting time of at least four minutes should be observed before opening the device.

When using in hazardous areas, observe the following points:
- Observe the specification and special conditions applicable for the device in accordance with the relevant valid certificate.
- Manipulation of the device in any form by the user is not permitted. Only the manufacturer or an explosion protection specialist may modify the device.
- The IP 65 / NEMA 4x IP rating is only achieved if the splash guard is screwed in place. Operating the unit without splash guard cap is prohibited.
- The device may only be operated using instrument air that is free from oil, water and dust. The use of flammable gas, oxygen, or oxygen-enriched gas is not permitted.

Cable gland
Limited temperature range of the M20 × 1.5 plastic cable gland for explosion protection variants.
The permissible ambient temperature range of the cable gland is -20 to 80 °C (-4 to 176 °F). When using the cable gland, make sure that the ambient temperature is within this range. The cable gland must be installed in the housing with a tightening torque of 3.8 Nm. When installing the connection of the cable gland and cable, check for tightness to ensure that the required IP rating is met.
2 Use in potentially explosive atmospheres

TZIDC-200 – Ex relevant specification

ATEX – ‘Ex d’ type of protection

<table>
<thead>
<tr>
<th>Ex marking</th>
<th>II 2 G Ex d IIC T4/T5/T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type Examination Test Certificate</td>
<td>DMT 02 ATEX E 029 X</td>
</tr>
<tr>
<td>Type</td>
<td>TZIDC-200 Doc. 901132</td>
</tr>
<tr>
<td>Device class</td>
<td>II 2 G</td>
</tr>
<tr>
<td>Standards</td>
<td>EN 60079-0:2012</td>
</tr>
<tr>
<td></td>
<td>EN 60079-1:2014</td>
</tr>
</tbody>
</table>

Temperature Data

<table>
<thead>
<tr>
<th>Device group II 2 G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Data</td>
</tr>
<tr>
<td>Class</td>
</tr>
<tr>
<td>T4</td>
</tr>
<tr>
<td>T5</td>
</tr>
<tr>
<td>T6</td>
</tr>
</tbody>
</table>

Electrical Data

| Voltage | ≤ 30 V AC/DC |
| Current | ≤ 20 mA |

Pneumatic Data

| Supply pressure | Standard version | ≤ 6 bar |
| Marine version | ≤ 5.5 bar |

Special conditions

- Before final installation, the operator needs to decide on the use of the device, either
  A) as a device with ‘Ex i’ intrinsically safe type of protection or
  B) as a device with ‘Ex d’ type of protection and permanently mark the selected type of use on the name plate. Specific conditions of the surrounding environment, such as chemical corrosion, must be taken into account when affixing the permanent mark. Only the manufacturer must change the selected type of use following a re-examination.

- Medium strength adhesive must be used to secure the cable entries and line entries and stop them from twisting and self-loosening.

- In the case of high torsional forces, the bearing sleeves must be replaced due to wear on the shaft for the position pickoff (significant control deviation).

- If the positioner is operated at an ambient temperature above 60 °C (140 °F) or below -20 °C (-4 °F), make sure to use cable entries and lines suited for an operating temperature corresponding to the maximum ambient temperature increased by 10 K or corresponding to the minimum ambient temperature, respectively.

- The dimensions of the flameproof joint of this equipment partly exceed the minimum values required by EN 60079-1:2014 or IEC 60079-1:2014 or partly down-scale the maximum values required therein. All inquiries relating to dimensions must be directed to the manufacturer.

- Screws that comply with the minimum requirements of the A2-70, A2-80 or 10.12 quality grades must be used to close the flameproof enclosure.
ATEX – ‘Ex i’ type of protection

Ex marking

<table>
<thead>
<tr>
<th>Marking</th>
<th>II 2 G Ex ia IIC T6 or T4 Gb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>II 2 G Ex ib IIC T6 or T4 Gb</td>
</tr>
</tbody>
</table>

Type Examination Test Certificate
TÜV 04 ATEX 2702 X

Type
TZIDC-200

Device class
II 2 G

Standards
EN 60079-0
EN 60079-11

Temperature Data

Device group II 2 G

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Ambient temperature Ta</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4</td>
<td>~40 to 85 °C</td>
</tr>
<tr>
<td>T5</td>
<td>~40 to 50 °C</td>
</tr>
<tr>
<td>T6*</td>
<td>~40 to 40 °C*</td>
</tr>
</tbody>
</table>

* When using the ‘Limit Monitor’ plug-in module in temperature class T6, the maximum permissible ambient temperature range is ~40 to 35 °C (~40 to 95 °F).

Electrical Data

With the intrinsically safe Ex ib IIC / Ex ia IIC types of ignition protection, only for connection to a certified intrinsically safe circuit.

Current circuit (terminal)            Electrical information (maximum values)

| Signal circuit (+11 / −12)            | Ui = 30 V  Ci = 6.6 nF |
|                                      | Ii = 320 mA Lii = negligibly small |
| Contact input (+81 / −82)            | Ci = 4.2 nF |
|                                      | Li = negligibly small |
| Switch output (+83 / −84)            | Ui = 30 V  Ci = 4.2 nF |
|                                      | Ii = 320 mA Lii = negligibly small |
| Mechanical digital feedback * (Limit: +51 / −52), (Limit: +41 / −42) | For maximum values, see EC type examination certificate number PTB 00 ATEX 2049 X Proximity switches manuf. by Pepperl & Fuchs |
| Plug-in module for digital position feedback (Limit1: +51 / −52), (Limit2: +41 / −42) | Ui = 30 V  Ci = 3.7 nF |
|                                      | Ii = 320 mA Lii = negligibly small |
|                                      | Pi = 500 mW |

* When using the S32_S1N (NO) proximity switch, the positioner may only be used at an ambient temperature range from ~25 to 85 °C (~13 to 185 °F).

Special conditions

- Before final installation, the operator needs to decide on the use of the device, either
  A) as a device with ‘Ex i’ intrinsically safe type of protection or
  B) as a device with ‘Ex d’ type of protection and permanently mark the selected type of use on the name plate. Specific conditions of the surrounding environment, such as chemical corrosion, must be taken into account when affixing the permanent mark. Only the manufacturer must change the selected type of use following a re-examination.
- Variants that, according to declarations, also meet the requirements for the ‘flameproof enclosure’ type of protection may no longer be used as ’intrinsically safe’ if they have been previously used as a flameproof type of protection.
- The local communication interface (LCI) may only be operated at Um ≤ 30 V DC outside the hazardous area.
... 2 Use in potentially explosive atmospheres

... TZIDC-200 – Ex relevant specification

IECEx – ‘Ex d’ type of protection

<table>
<thead>
<tr>
<th>Ex marking</th>
<th>Type Examination Test Certificate</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marking</td>
<td>IECEx BVS 07.0030X</td>
<td>TZIDC-200</td>
</tr>
</tbody>
</table>

Temperature Data

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Ambient temperature Ta</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4</td>
<td>−40 to 85 °C</td>
</tr>
<tr>
<td>T5</td>
<td>−40 to 80 °C</td>
</tr>
<tr>
<td>T6</td>
<td>−40 to 65 °C</td>
</tr>
</tbody>
</table>

Electrical Data

<table>
<thead>
<tr>
<th>Voltage</th>
<th>≤ 30 V AC/DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>≤ 20 mA</td>
</tr>
</tbody>
</table>

Pneumatic data

<table>
<thead>
<tr>
<th>Supply pressure</th>
<th>Standard version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 6 bar</td>
</tr>
<tr>
<td>Marine version</td>
<td>≤ 5.5 bar</td>
</tr>
</tbody>
</table>

Special conditions

- The positioner is designed for a maximum permissible ambient temperature range of 40 to 85 °C
- Variants that, according to declarations, also meet the requirements for the ‘intrinsically safe’ type of protection may no longer be used as ‘intrinsically safe’ if they have been previously used as a flameproof type of protection
- If the positioner is operated at an ambient temperature above 60 °C (140 °F) or below −20 °C (−4 °F), make sure to use cable entries and lines suited for an operating temperature corresponding to the maximum ambient temperature increased by 10 K or corresponding to the minimum ambient temperature, respectively.

IECEx – ‘Ex i’ type of protection

<table>
<thead>
<tr>
<th>Ex marking</th>
<th>Type Examination Test Certificate</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marking</td>
<td>IECEx TUN 04.0015X</td>
<td>TCIDC-200</td>
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</table>

Temperature Data

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Ambient temperature Ta</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4</td>
<td>−40 to 85 °C</td>
</tr>
<tr>
<td>T6*</td>
<td>−40 to 40 °C*</td>
</tr>
</tbody>
</table>

* When using the ‘Limit Monitor’ plug-in module in temperature class T6, the maximum permissible ambient temperature range is −40 to 35 °C (−40 to 95 °F).

Electrical Data

In intrinsically safe explosion protection types Ex ib IIC / Ex ia IIC, only for connection to a certified intrinsically safe circuit.

<table>
<thead>
<tr>
<th>Current circuit (terminal)</th>
<th>Electrical information (maximum values)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Power (P) = 500 mW</td>
</tr>
<tr>
<td></td>
<td>Contact input</td>
</tr>
<tr>
<td></td>
<td>Ui = 30 V</td>
</tr>
<tr>
<td></td>
<td>Li = 320 mA</td>
</tr>
<tr>
<td></td>
<td>Ci = 4.2 nF</td>
</tr>
<tr>
<td></td>
<td>L1 = negligibly small</td>
</tr>
<tr>
<td></td>
<td>Switch output</td>
</tr>
<tr>
<td></td>
<td>Ui = 30 V</td>
</tr>
<tr>
<td></td>
<td>Li = 320 mA</td>
</tr>
<tr>
<td></td>
<td>Ci = 4.2 nF</td>
</tr>
<tr>
<td></td>
<td>L1 = negligibly small</td>
</tr>
<tr>
<td></td>
<td>Local communication interface (LCI)</td>
</tr>
<tr>
<td></td>
<td>Only for connection to a programming device outside the hazardous area (see special conditions).</td>
</tr>
</tbody>
</table>
The following modules may be operated as an option:

<table>
<thead>
<tr>
<th>Current circuit (terminal)</th>
<th>Electrical information (maximum values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug-in module for digital position feedback</td>
<td>( U_i = 30 , V ) ( I_i = 320 , mA ) ( P_i = 500 , mW ) ( C_i = 3.7 , nF ) ( L_i \approx \text{negligibly small} )</td>
</tr>
<tr>
<td>Plug-in module for analog position feedback</td>
<td>( U_i = 30 , V ) ( I_i = 320 , mA ) ( P_i = 1.1 , W ) ( C_i = 6.6 , nF ) ( L_i \approx \text{negligibly small} )</td>
</tr>
</tbody>
</table>

**Special conditions**

- Devices must only be connected to circuits in zone 2 if they are suitable for operation in zone 2 potentially explosive atmospheres and for the conditions prevailing at the installation location (manufacturer’s declaration or certificate from an inspection authority).
- For the ‘Limit monitor with proximity switches’ circuit, measures outside of the device must be implemented to prevent the rated voltage from being up-scaled by more than 40% due to transient disturbances.
- It is only permissible to connect, disconnect, and switch live circuits during installation or maintenance, or for the purpose of carrying out repairs. Note: It is considered very unlikely that a potentially hazardous atmosphere would be present in zone 2 at the same time that installation or maintenance or repair work was being carried out.
- Only non-flammable gases must be used for pneumatic power supply.
- Only suited cable entries must be used that meet the requirements of EN 60079-15.
- The local communication interface (LCI) for the TZIDC and the TZIDC-200 may only be operated at \( U_{in} \leq 30 \, V \) GS outside the hazardous area.
... 2 Use in potentially explosive atmospheres

**TZIDC-210 – Ex relevant specification**

**ATEX – ‘Ex d’ type of protection**

<table>
<thead>
<tr>
<th>Ex marking</th>
<th>Marking</th>
<th>Type Examination Test Certificate</th>
<th>Type</th>
<th>Device class</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>II 2 G Ex d IIC T4/T5/T6</td>
<td>DMT 02 ATEX E 029 X</td>
<td>TZIDC-210 Doc. 901132</td>
<td>II 2 G</td>
<td>EN 60079-0</td>
</tr>
</tbody>
</table>

**ATEX – ‘Ex i’ type of protection**

<table>
<thead>
<tr>
<th>Ex marking</th>
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<tbody>
<tr>
<td></td>
<td>II 2 G Ex ia IIC T6 or T4 Gb</td>
<td>TÜV 02 ATEX 1831 X</td>
<td>TZIDC-210</td>
<td>II 2 G</td>
<td>EN 60079-0</td>
</tr>
</tbody>
</table>

**Special conditions**

- Before final installation, the operator needs to decide on the use of the device, either
  A) as a device with ‘Ex i’ intrinsically safe type of protection or
  B) as a device with ‘Ex d’ type of protection
- and permanently mark the selected type of use on the name plate. Specific conditions of the surrounding environment, such as chemical corrosion, must be taken into account when affixing the permanent mark. Only the manufacturer must change the selected type of use following a re-examination
- Variants that, according to declarations, also meet the requirements for the ‘intrinsically safe’ type of protection may no longer be used as ‘intrinsically safe’ if they have been previously used as a flameproof type of protection
- Secure cable entries against twisting and loosening by using a (medium-strength) securing adhesive.
- In the case of high torsional forces, the bearing sleeves must be replaced due to wear on the shaft for the position pickoff (significant control deviation).
- If the positioner is operated at an ambient temperature above 60 °C (140 °F) or below −20 °C (−4 °F), make sure to use cable entries and lines suited for an operating temperature corresponding to the maximum ambient temperature increased by 10 K or corresponding to the minimum ambient temperature, respectively.
- Screws that comply with the minimum requirements of the A2-70, A2-80 or 10.12 quality grades must be used to close the flameproof enclosure.

**Temperature Data**

**Device group II 2 G**

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Ambient temperature Ta</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4</td>
<td>−40 to 85 °C</td>
</tr>
<tr>
<td>T5</td>
<td>−40 to 50 °C</td>
</tr>
<tr>
<td>T6*</td>
<td>−40 to 40 °C*</td>
</tr>
</tbody>
</table>

* When using the plug-in module for ‘Digital Feedback’ in Temperature Class T6, the maximum permissible ambient temperature range is −40 to 35 °C (−40 to 95 °F).

**Electrical data for ia / ib / ic for groups IIB / IIC**

With the intrinsically safe Ex i IIC type of ignition protection, only for connection to a certified FISCO power supply unit or a barrier, i.e., a power supply unit with maximum values according to the following table:

<table>
<thead>
<tr>
<th>Current circuit (terminal)</th>
<th>Electrical information (maximum values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal circuit (+11 / −12)</td>
<td>Uᵢ = 24 V</td>
</tr>
<tr>
<td></td>
<td>Cᵢ &lt; 5 nF</td>
</tr>
<tr>
<td></td>
<td>Iᵢ = 250 mA</td>
</tr>
<tr>
<td></td>
<td>Lᵢ &lt; 10 μH</td>
</tr>
<tr>
<td></td>
<td>Pᵢ = 1.2 W</td>
</tr>
<tr>
<td></td>
<td>Characteristic curve = linear</td>
</tr>
</tbody>
</table>

With the intrinsically safe Ex i IIC type of protection, only for connection to a certified intrinsically safe circuit with maximum values:

<table>
<thead>
<tr>
<th>Current circuit (terminal)</th>
<th>Electrical information (maximum values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical digital feedback (+51 / −52)</td>
<td>For maximum values, see EC type examination certificate number</td>
</tr>
<tr>
<td></td>
<td>PTB 00 ATEX 2049 X</td>
</tr>
</tbody>
</table>
**Special conditions**

- Before final installation, the operator needs to decide on the use of the device, either
  A) as a device with ‘Ex i’ intrinsically safe type of protection or
  B) as a device with ‘Ex d’ type of protection and permanently mark the selected type of use on the name plate. Specific conditions of the surrounding environment, such as chemical corrosion, must be taken into account when affixing the permanent mark. Only the manufacturer must change the selected type of use following a re-examination.
- Variants that, according to declarations, also meet the requirements for the ‘flameproof enclosure’ type of protection may no longer be used as ‘intrinsically safe’ if they have been previously used as a flameproof type of protection.

**IECEx – ‘Ex d’ type of protection**

<table>
<thead>
<tr>
<th>Ex marking</th>
<th>Ex d IIC T4/T5/T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type Examination Test Certificate</td>
<td>IECEx BVS 07.0030X, Issue No.: 0</td>
</tr>
<tr>
<td>Type</td>
<td>TZIDC-200</td>
</tr>
<tr>
<td>Standards</td>
<td>IEC 60079-0</td>
</tr>
<tr>
<td></td>
<td>IEC 60079-11</td>
</tr>
</tbody>
</table>

**Temperature Data**

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Ambient temperature Ta</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4</td>
<td>−40 to 85 °C</td>
</tr>
<tr>
<td>T5</td>
<td>−40 to 80 °C</td>
</tr>
<tr>
<td>T6</td>
<td>−40 to 65 °C</td>
</tr>
</tbody>
</table>

**IECEx – ‘Ex i’ type of protection**

<table>
<thead>
<tr>
<th>Ex marking</th>
<th>Ex ia IIC T6 or T4 Gb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type Examination Test Certificate</td>
<td>IECEx TUN 04.0015X</td>
</tr>
<tr>
<td>Shown as</td>
<td>5</td>
</tr>
<tr>
<td>Type</td>
<td>TZIDC-210</td>
</tr>
<tr>
<td>Standards</td>
<td>IEC 60079-0</td>
</tr>
<tr>
<td></td>
<td>IEC 60079-11</td>
</tr>
</tbody>
</table>

**Temperature Data**

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Ambient temperature Ta</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4</td>
<td>−40 to 85 °C</td>
</tr>
<tr>
<td>T6*</td>
<td>−40 to 40 °C*</td>
</tr>
</tbody>
</table>

* When using the plug-in module for ‘Digital Feedback’ in Temperature Class T6, the maximum permissible ambient temperature range is −40 to 35 °C (−40 to 95 °F).

**Electrical data for ia/ib/ic for groups IIB/IIC**

With the intrinsically safe Ex i IIC type of ignition protection, only for connection to a certified FISCO power supply unit or a barrier, i.e., a power supply unit with maximum values according to the following table.

<table>
<thead>
<tr>
<th>Current circuit (terminal)</th>
<th>Electrical information (maximum values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal circuit (+11 / −12)</td>
<td>$U_i = 24 \text{ V}$  \hspace{1cm} $C_i &lt; 5 \text{ nF}$  \hspace{1cm} $L_i &lt; 10 \mu\text{H}$  \hspace{1cm} $P_i = 1.2 \text{ W}$  \hspace{1cm} Characteristic curve = linear</td>
</tr>
</tbody>
</table>
... 2 Use in potentially explosive atmospheres

... TZIDC-210 – Ex relevant specification

Special conditions
- The local communication interface (LCI) may only be operated at $U_m \leq 30$ V GS outside the potentially explosive atmosphere.
- Devices must only be connected to circuits in zone 2 if they are suitable for operation in zone 2 potentially explosive atmospheres and for the conditions prevailing at the installation location (manufacturer's declaration or certificate from an inspection authority).
- For the ‘Mechanical digital feedback’ circuit, measures outside of the device must be implemented to prevent the rated voltage from being up-scaled by more than 40 % due to transient disturbances.
- It is only permissible to connect, disconnect, and switch live circuits during installation or maintenance, or for the purpose of carrying out repairs. Note: It is considered very unlikely that a potentially hazardous atmosphere would be present in zone 2 at the same time that installation or maintenance or repair work was being carried out.
- Only non-flammable gases must be used for pneumatic power supply.
- Only suited cable entries must be used that meet the requirements of EN 60079-15.

FM / CSA

FM Approvals

TZIDC-210 positioner, Model V18349-a014b3cd3ef
IS/I,II,III/1/ABCDEFG/T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C-901265 Entity, FISCO

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Type</th>
<th>Groups</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>+11 / −12</td>
<td>Entity</td>
<td>A-G</td>
<td>$U_{\text{max}} = 24$ V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$I_{\text{max}} = 250$ mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$P_{i} = 1.2$ W</td>
</tr>
<tr>
<td></td>
<td>FISCO</td>
<td>A-G</td>
<td>$U_{\text{max}} = 17.5$ V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$I_{\text{max}} = 360$ mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$P_{i} = 2.52$ W</td>
</tr>
<tr>
<td></td>
<td>FISCO</td>
<td>C-G</td>
<td>$U_{\text{max}} = 17.5$ V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$I_{\text{max}} = 380$ mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$P_{i} = 5.32$ nF</td>
</tr>
<tr>
<td>+51 / −52</td>
<td>Entity</td>
<td>A-G</td>
<td>$U_{\text{max}} = 16$ V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$I_{\text{max}} = 20$ mA</td>
</tr>
<tr>
<td></td>
<td>+41 / −42</td>
<td>A-G</td>
<td>$U_{\text{max}} = 16$ V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$I_{\text{max}} = 20$ mA</td>
</tr>
</tbody>
</table>

TZIDC-210 positioner, Model V18349-a012b3cd3ef
XP/I/2/CD/T6, T5, T4 TA = 82 °C
DIP/II, III/2/FG/T6, T5, T4 Ta = 82 °C

Enclosure type 4x
- Case/mounting – 1, 2, 3, 4, 5 or 6
- Output/safe protection – 1, 2, 3 or 4
- 0
- Optional mechanical kit for digital position feedback – 0, 1 or 2
- Design (varnish/coding) – 1 or 2
- Device identification label – 0, 1 or 2

CSA Certification 1555690
Explosion proof; enclosure 4X
Temperature range: −40 to 85 °C
T5, max. 85 °C ; T6, max. 70 °C
CL I; Div 1; Grp. C-D
CL II; Div 1; Grp. E-F-G
CL III

See also FM installation drawing No. 901265 on page 48.
### TZIDC-220 – Ex relevant specification

**ATEX – ‘Ex d’ type of protection**

<table>
<thead>
<tr>
<th>Ex marking</th>
<th>II 2 G Ex d IIC T4/T5/T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type Examination Test Certificate</td>
<td>DMT 02 ATEX E 029 X</td>
</tr>
<tr>
<td>Type</td>
<td>TZIDC-220 Doc. 901132</td>
</tr>
<tr>
<td>Device class</td>
<td>II 2 G</td>
</tr>
<tr>
<td>Standards</td>
<td>EN 60079-0</td>
</tr>
<tr>
<td></td>
<td>EN 60079-1</td>
</tr>
</tbody>
</table>

### Temperature Data

<table>
<thead>
<tr>
<th>Device group II 2 G</th>
<th>Ambient temperature Ta</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4</td>
<td>−40 to 85 °C</td>
</tr>
<tr>
<td>T5</td>
<td>−40 to 80 °C</td>
</tr>
<tr>
<td>T6</td>
<td>−40 to 65 °C</td>
</tr>
</tbody>
</table>

### Electrical Data

<table>
<thead>
<tr>
<th>Voltage</th>
<th>≤ 30 V AC/DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>≤ 20 mA</td>
</tr>
</tbody>
</table>

### Pneumatic data

<table>
<thead>
<tr>
<th>Supply pressure</th>
<th>Standard Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 6 bar</td>
</tr>
<tr>
<td>Marine version</td>
<td>≤ 5.5 bar</td>
</tr>
</tbody>
</table>

**Special conditions**

- Before final installation, the operator needs to decide on the use of the device, either
  A) as a device with 'Ex i' intrinsically safe type of protection or
  B) as a device with 'Ex d' type of protection and permanently mark the selected type of use on the name plate. Specific conditions of the surrounding environment, such as chemical corrosion, must be taken into account when affixing the permanent mark. Only the manufacturer must change the selected type of use following a re-examination
- Medium strength adhesive must be used to secure the cable entries and line entries and stop them from twisting and self-loosening
- In the case of high torsional forces, the bearing sleeves must be replaced due to wear on the shaft for the position pickoff (significant control deviation).
- If the positioner is operated at an ambient temperature above 60 °C (140 °F) or below −20 °C (−4 °F), make sure to use cable entries and lines suited for an operating temperature corresponding to the maximum ambient temperature increased by 10 K or corresponding to the minimum ambient temperature, respectively.
- The dimensions of the flameproof joint of this equipment partly exceed the minimum values required by EN 60079-1:2014 or IEC 60079-1:2014 or partly down-scale the maximum values required therein. All inquiries relating to dimensions must be directed to the manufacturer
- Screws that comply with the minimum requirements of the A2-70, A2-80 or 10.12 quality grades must be used to close the flameproof enclosure.
... 2 Use in potentially explosive atmospheres

... TZIDC-220 – Ex relevant specification

ATEX – ‘Ex i’ type of protection

Ex marking

Marking
II 2 G Ex ia IIC T6 or T4 Gb
II 2 G Ex ib IIC T6 or T4 Gb
II 3 G Ex lc IIC T6 or T4 Gc

Type Examination Test Certificate
TÜV 02 ATEX 1834 X

Type
TZIDC-220

Standards
EN 60079-0
EN 60079-11
EN 60079-27

Temperature Data

Device group II 2 G

Temperature class
Ambient temperature Ta
T4
~40 to 85 °C
T6*
~40 to 40 °C*

* When using the ‘Limit Monitor’ plug-in module in temperature class T6, the maximum permissible ambient temperature range is ~40 to 35 °C (~40 to 95°F).

Electrical Data

With the intrinsic safety Ex i IIC type of protection, only for connection to a certified FISCO power supply unit or a barrier, i.e., a power supply unit with maximum values in accordance with the following table.

<table>
<thead>
<tr>
<th>Current circuit (terminal)</th>
<th>Electrical information (maximum values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal circuit (+11/−12)</td>
<td>(U_i = 24) V (C_i = &lt; 5) nF (L_i = &lt; 10) µH (P_i = 1.2) W (C_l = &lt; 5) nF</td>
</tr>
<tr>
<td>(+11/−12)</td>
<td>(I_i = 250) mA (L_i = &lt; 10) µH (P_i = 1.2) W (C_l = &lt; 5) nF</td>
</tr>
</tbody>
</table>

IECEEx – ‘Ex d’ type of protection

Ex marking

Marking
Ex d IIC T4/T5/T6

Type Examination Test Certificate
IECEEx BVS 07.0030X, Issue No.: 0

Type
TZIDC-220

Temperature Data

Temperature class
Ambient temperature Ta
T4
~40 to 85 °C
T5
~40 to 80 °C
T6
~40 to 65 °C

Electrical Data

Voltage
\(\leq 30\) V AC/DC
Current
\(\leq 20\) mA

Pneumatic data

Supply pressure
Standard Version
\(\leq 6\) bar
Marine version
\(\leq 5.5\) bar

* When using the S32_S1N (NO) proximity switch, the positioner may only be used at an ambient temperature range from ~25 to 85 °C (~13 to 185°F).
Special conditions

- The positioner is designed for a maximum permissible ambient temperature range of 40 to 85 °C (104 to 185 °F).
- Variants that, according to declarations, also meet the requirements for the 'intrinsically safe' type of protection may no longer be used as 'intrinsically safe' if they have been previously used as a flameproof type of protection.
- If the positioner is operated at an ambient temperature above 60 °C (140 °F) or below −20 °C (−4 °F), make sure to use cable entries and lines suited for an operating temperature corresponding to the maximum ambient temperature increased by 10 K or corresponding to the minimum ambient temperature, respectively.

IECEx – ‘Ex i’ type of protection

<table>
<thead>
<tr>
<th>Ex marking</th>
<th>IECEx TUN 04.0015X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marking</td>
<td>Ex ia IIC T6 or T4 Gb</td>
</tr>
<tr>
<td>Type Examination Test Certificate</td>
<td>TZIDC-220</td>
</tr>
<tr>
<td>Type</td>
<td>TZIDC-220</td>
</tr>
<tr>
<td>Standards</td>
<td>IEC 60079-0</td>
</tr>
<tr>
<td></td>
<td>IEC 60079-11</td>
</tr>
</tbody>
</table>

Temperature Data

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Ambient temperature Ta</th>
</tr>
</thead>
<tbody>
<tr>
<td>TZIDC Ex ia IIC</td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td>−40 to 85 °C</td>
</tr>
<tr>
<td>T6*</td>
<td>−40 to 40 °C*</td>
</tr>
</tbody>
</table>

* When using the ‘Limit Monitor’ plug-in module in temperature class T6, the maximum permissible ambient temperature range is −40 to 35 °C (−40 to 95 °F).

Electric TZIDC-220 data for ia/ib/ic for groups IIB/IIC

With the intrinsic safety Ex i IIC type of protection, only for connection to a certified FISCO power supply unit or a barrier, i.e., a power supply unit with maximum values according to the following table:

<table>
<thead>
<tr>
<th>Current circuit (terminal)</th>
<th>Electrical information (maximum values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal circuit</td>
<td></td>
</tr>
<tr>
<td>(+11 / −12)</td>
<td></td>
</tr>
<tr>
<td>$U_i = 24 \text{ V}$</td>
<td></td>
</tr>
<tr>
<td>$I_i = 250 \text{ mA}$</td>
<td></td>
</tr>
<tr>
<td>$P_i = 1.2 \text{ W}$</td>
<td></td>
</tr>
<tr>
<td>Characteristic curve</td>
<td>linear</td>
</tr>
</tbody>
</table>

Special conditions

- Devices must only be connected to circuits in zone 2 if they are suitable for operation in zone 2 potentially explosive atmospheres and for the conditions prevailing at the installation location (manufacturer’s declaration or certificate from an inspection authority).
- For the ‘Limit monitor with proximity switches’ circuit, measures outside of the device must be implemented to prevent the rated voltage from being up-scaled by more than 40 % due to transient disturbances.
- It is only permissible to connect, disconnect, and switch live circuits during installation or maintenance, or for the purpose of carrying out repairs. Note: It is considered very unlikely that a potentially hazardous atmosphere would be present in zone 2 at the same time that installation or maintenance or repair work was being carried out.
- Only non-flammable gases must be used for pneumatic power supply.
- Only suited cable entries must be used that meet the requirements of EN 60079-15.
TZIDC-220 Positioner, Model V18350-a012b3cd4ef
XP/I/2/CD/T6, T5, T4 TA = 82 °C
DIP/II, III/2/FG/T6, T5, T4 Ta = 82 °C
Enclosure type 4x
a Case/mounting – 1, 2, 3, 4, 5 or 6
b Output/safe protection – 1, 2, 3 or 4
c Option modules – 0 or 5
d Optional mechanical kit for digital position feedback – 0, 1 or 2
e Design (varnish/coding) – 1 or 2
f Device identification label – 0, 1 or 2

CSA Certification 1555690
Explosion proof; enclosure 4X
Temperature range: −40 to 85 °C
T5, max. 85 °C ; T6, max. 70 °C
CL I; Div 1; Grp. C-D
CL II; Div 1; Grp. E-F-G
CL III

See FM installation drawing No. 901265 on page 48.
# 3 Product identification

## Name plate

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Full type designation</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Software revision</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Serial number</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>NL number</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Year of manufacture</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Supply air pressure</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Input</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Output</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Dead</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Options</td>
<td></td>
</tr>
</tbody>
</table>

![Name plate example](image)

**Figure 1:** Name plate (example)
4 Transport and storage

Inspection
Check the devices immediately after unpacking for possible damage that may have occurred from improper transport. Details of any damage that has occurred in transit must be recorded on the transport documents. All claims for damages must be submitted to the shipper without delay and before installation.

Transporting the device
Observe the following instructions:
- Do not expose the device to humidity during transport.
  Pack the device accordingly.
- Pack the device so that it is protected against vibrations during transport, for example, by using air-cushioned packing.

Storing the device
Bear the following points in mind when storing devices:
- Store the device in its original packaging in a dry and dust-free location. The device is also protected by a desiccant in the packaging.
- The storage temperature should be between −40 to 85 °C (−40 to 185 °F).
- Avoid storing the device in permanent direct sunlight.
- In principle, the devices may be stored for an unlimited period. However, the warranty conditions stipulated in the order confirmation of the supplier apply.

Ambient conditions
The ambient conditions for the transport and storage of the device correspond to the ambient conditions for operation of the device. Adhere to the device data sheet!

Returning devices
Use the original packaging or a secure transport container of an appropriate type if you need to return the device for repair or recalibration purposes. Fill out the return form (see Return form on page 43) and include this with the device. In accordance with the EU Directive governing hazardous materials, the owner of hazardous waste is responsible for its disposal or must observe the following regulations for shipping purposes:
- All devices delivered to ABB must be free from any hazardous materials (acids, alkalis, solvents, etc.).

Please contact Customer Center Service acc. to page 4 for nearest service location.
5 Installation

Safety instructions

⚠️ CAUTION
Risk of injury due to incorrect parameter values!
Incorrect parameter values can cause the valve to move unexpectedly. This can lead to process failures and result in injuries.

- Before recommissioning a positioner that was previously in use at another location, always reset the device to its factory settings.
- Never start automatic adjustment before restoring the factory settings!

Note
Before assembly, check whether the positioner meets the control and safety requirements for the installation location (actuator or final control element). Refer to the Specification in the data sheet.

Only qualified specialists who have been trained for these tasks are authorized to mount and adjust the unit, and to make the electrical connection.
When carrying out any work on the device, always observe the local accident prevention regulations and the regulations concerning the construction of technical installations.

Mechanical mounting

General

Figure 2: Operating range

Arrow 1 on the device feedback shaft (position feedback point) must move between the arrow marks 2.

Figure 3: Measuring and operating ranges of the positioner

Operating range for linear actuators:
The operating range for linear actuators is ±45° symmetrically to the longitudinal axis. The usable span within the operating range is at least 25° (recommended figure 40°). The usable span does not necessarily need to run symmetrically to the longitudinal axis.
5 Installation

Mechanical mounting

Operating range of rotary actuators:
The usable span is 90°, which must be entirely within the measuring range, but does not necessarily need to run symmetrically to the longitudinal axis.

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

Mounting on linear actuators
For mounting on a linear actuator in accordance with DIN / IEC 534 (lateral mounting as per NAMUR), the following attachment kit is available:

Figure 4: Components of attachment kit

1. Screw
2. Washer
3. Mounting bracket
4. Lever with follower pin (for mechanical stroke 10 to 35 mm (0.39 to 1.38 in) or 20 to 100 mm (0.79 to 3.94 in)
5. Washers
6. Screws
7. U-bolt
8. Washers
9. Nuts
10. Screws
11. Spring washers
12. Clamp plates
13. Follower guide

Figure 5: Attaching a follower guide to the actuator

1. Tighten the screws so that they are hand-tight.
2. Attach the follower guide 1 and clamp plates 2 with screws 4 and spring washers 3 to the actuator stem.

Figure 3: Assemble the lever (unless pre-assembled)

1. Insert spring 8 on bolt with follower pin 9.
2. Slip the plastic washer 7 onto the bolt and compress the spring with it.
3. Insert the bolt with compressed spring into the oblong hole in the lever 6 and fasten it in the desired position using the plain washer 5 and nut 4 at the lever. The scale on the lever indicates the link point for the stroke range.
4. Place the washer 2 on the screw 1. Insert the screw in the lever and lock with the nut 3.
1. Attach the lever 6 to the feedback shaft 5 of the positioner (can only be mounted in one position due to the cut shape of the feedback shaft).
2. Using the arrow marks 4, check whether the lever moves within the operating range (between the arrows).
3. Hand-tighten the screw 7 on the lever.
4. Hold the prepared positioner (with the mount bracket 1 still loose) on the actuator so that the follower pin for the lever enters the follower guide to determine which tap holes on the positioner must be used for the mount bracket.
5. Secure the mount bracket 1 with screws 2 and washers 3 using the relevant tap holes on the positioner housing. Tighten the screws as evenly as possible to ensure subsequent linearity. Align the mount bracket in the oblong hole to ensure that the operating range is symmetrical (lever moves between the arrow marks 4).

**Figure 4: Mounting lever and bracket on the positioner**

1. Attach the mount bracket 2 with screw 4 and washer 3 to the cast iron yoke 1.

**Figure 5: Mounting on a cast iron yoke**

or

1. Hold the mount bracket 3 in the proper position on the columnar yoke 2.
2. Insert the U-bolts 1 from the inside of the columnar yoke 2 through the holes of the mount bracket.
3. Add the washers 4 and nuts 5.
4. Tighten the nuts so that they are hand-tight.

**Figure 6: Mounting on a columnar yoke**

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

Mechanical mounting

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

Move the bolt with the follower pin in the oblong hole of the lever to adjust the stroke range of the valve to the working range for the position sensor.

Moving the link point inwards increases the rotation angle of the position sensor. Moving the link point outwards reduces the rotation angle of the position sensor.

Adjust the actuator stroke to make use of as large an angle of rotation as possible (symmetrical around the center position) on the position sensor.

Recommended range for linear actuators: -30° to 30°; minimum range: 25°

Note
After mounting, check whether the positioner is operating within the measuring range.

Position of actuator bolt
The actuator bolt for moving the potentiometer lever can be mounted permanently on the lever itself or on the valve stem. Depending on the mounting method, when the valve moves the actuator bolt performs either a circular or linear movement with reference to the center of rotation of the potentiometer lever. Select the chosen bolt position in the HMI menu in order to ensure optimum linearization. The default setting is actuator bolt on lever.
Mounting on rotary actuator

For mounting on part-turn actuators in accordance with VDI / VDE 3845, the following attachment kit is available:

- Adapter 1 with spring 5
- four M6 screws each 4, spring washers 3 and washers 2 to fasten the attachment bracket 6 to the positioner
- four M5 screws 7, Spring washers 8 and washers 9 to fasten the attachment bracket to the actuator

Figure 9: Components of attachment kit

Required tools:
- Wrench, size 8 / 10
- Allen key, size 3

1. Determine the mounting position (parallel to actuator or at 90° angle)
2. Calculate the rotational direction of the actuator (right or left).
3. Move the part-turn actuator into the home position.
4. Pre-adjust feedback shaft.
   To ensure the positioner will operate within the operating range (see chapter General on page 21), the mounting position as well as the home position and direction of rotation of the actuator must be taken into account when determining the adapter position on the feedback shaft 1.
   For this purpose, the feedback shaft can be adjusted manually so that the adapter 3 can be attached in the correct position.
5. Place the adapter in the proper position on the feedback shaft and fasten with threaded pins 2. One of the threaded pins must be locked in place on the flat side of the feedback shaft.

Figure 10: Mounting the adapter on the positioner
... 5 Installation

... Mechanical mounting

![Attachment bracket](image1.png)

Figure 11: Screwing the attachment bracket onto the positioner

6 Electrical connections

Safety instructions

**DANGER**
Risk of explosion for devices with local communication interface (LCI)
A local communication interface (LCI) may not be operated in hazardous areas.
- Never use the local communication interface (LCI) on the main board in a hazardous area!

**WARNING**
Risk of injury due to live parts!
When the housing is open, contact protection is not provided and EMC protection is limited.
- Before opening the housing, switch off the power supply.

The electrical connection may only be established by authorized specialist personnel.
Notices on electrical connection in this instruction must be observed; otherwise, electric safety and the IP-rating may be adversely affected.
Safe isolation of electric circuits which are dangerous if touched is only guaranteed when the connected devices fulfill the requirements of EN 61140 (basic requirements for secure separation).
To ensure safe isolation, install supply lines so that they are separate from electrical circuits which are dangerous if touched, or implement additional isolation measures for them.

![Positioner on actuator](image2.png)

Figure 12: Screwing the positioner onto the actuator

**Note**
After mounting, check whether the operating range of the actuator matches the measuring range of the positioner, see chapter **General** on page 21.
**TZIDC-200 terminal assignment**

![TZIDC-200 terminal assignment diagram]

**Connections for inputs and outputs**

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Function / comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>+11 / −12</td>
<td>Analog input</td>
</tr>
<tr>
<td>+81 / −82</td>
<td>Binary input DI</td>
</tr>
<tr>
<td>+83 / −84</td>
<td>Binary output DO2</td>
</tr>
<tr>
<td>+51 / −52</td>
<td>Digital feedback SW1</td>
</tr>
<tr>
<td>+41 / −42</td>
<td>Digital feedback SW2</td>
</tr>
<tr>
<td>+31 / −32</td>
<td>Analog feedback AO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Function / comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>+51 / −52</td>
<td>Limit switch Limit 1 with proximity switch</td>
</tr>
<tr>
<td></td>
<td>(Option)</td>
</tr>
<tr>
<td>+41 / −42</td>
<td>Limit switch Limit 2 with proximity switch</td>
</tr>
<tr>
<td></td>
<td>(Option)</td>
</tr>
<tr>
<td>41 / 42 / 43</td>
<td>Limit switch Limit 1 with microswitch</td>
</tr>
<tr>
<td></td>
<td>(Option)</td>
</tr>
<tr>
<td>51 / 52 / 53</td>
<td>Limit switch Limit 2 with microswitch</td>
</tr>
<tr>
<td></td>
<td>(Option)</td>
</tr>
</tbody>
</table>

**Note**

The TZIDC-200 can be fitted either with proximity switches or microswitches as limit switches. It is not possible to combine both variants.
### 6 Electrical connections

**TZIDC-210, TZIDC-220 terminal assignment**

![TZIDC-210, TZIDC-220 electrical connection](image)

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Function / comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>+11 / −12</td>
<td>Fieldbus, bus feed</td>
</tr>
<tr>
<td>+51 / −52</td>
<td>Digital feedback Limit 1 with proximity switch (optional)</td>
</tr>
<tr>
<td>+41 / −42</td>
<td>Digital feedback Limit 2 with proximity switch (optional)</td>
</tr>
<tr>
<td>41 / 42 / 43</td>
<td>Digital feedback Limit 1 with microswitch (optional)</td>
</tr>
<tr>
<td>51 / 52 / 53</td>
<td>Digital feedback Limit 2 with microswitch (optional)</td>
</tr>
</tbody>
</table>

**Note**
The TZIDC-1x0, TZIDC-210 or TZIDC-220 can be fitted either with proximity switches or microswitches as limit switches. It is not possible to combine both variants.
Electrical data for inputs and outputs

Note
When using the device in potentially explosive atmospheres, note the additional connection data in **Use in potentially explosive atmospheres** on page 5!

Analog input
Only for devices with HART® Communication.

<table>
<thead>
<tr>
<th>Set point signal analog (two-wire technology)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminals</td>
<td>+11 / −12</td>
</tr>
<tr>
<td>Nominal operating range</td>
<td>4 to 20 mA</td>
</tr>
<tr>
<td>Split range configuration between</td>
<td>20 to 100 % of the nominal operating range can be parameterized</td>
</tr>
<tr>
<td>Maximum</td>
<td>50 mA</td>
</tr>
<tr>
<td>Minimum</td>
<td>3.6 mA</td>
</tr>
<tr>
<td>Starting at</td>
<td>3.8 mA</td>
</tr>
<tr>
<td>Load voltage</td>
<td>9.7 V at 20 mA</td>
</tr>
<tr>
<td>Impedance at 20 mA</td>
<td>485 Ω</td>
</tr>
</tbody>
</table>

Fieldbus input
Only for devices with PROFIBUS PA® or FOUNDATION Fieldbus® Communication.

<table>
<thead>
<tr>
<th>Bus Connection</th>
<th>PROFIBUS PA</th>
<th>FOUNDATION fieldbus</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminals</td>
<td>+11 / −12</td>
<td>+11 / −12</td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>9 to 32 V DC</td>
<td>9 to 32 V DC</td>
<td></td>
</tr>
<tr>
<td>(Power feed from the Fieldbus)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. permissible voltage</td>
<td>35 V DC</td>
<td>35 V DC</td>
<td></td>
</tr>
<tr>
<td>Input Current</td>
<td>10.5 mA</td>
<td>11.5 mA</td>
<td></td>
</tr>
<tr>
<td>Current in the event of an error</td>
<td>15 mA</td>
<td>15 mA</td>
<td></td>
</tr>
<tr>
<td>(10.5 mA + 4.5 mA)</td>
<td></td>
<td>(11.5 mA + 3.5 mA)</td>
<td></td>
</tr>
</tbody>
</table>

Digital input
Only for devices with HART® Communication. Input for the following functions:
- no function
- move to 0 %
- move to 100 %
- Hold previous position
- block local configuration
- block local configuration and operation
- block any access (local or via PC)

Binary input DI

<table>
<thead>
<tr>
<th>Binary input DI</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminals</td>
<td>+81 / −82</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 V DC (12 to 30 V DC)</td>
</tr>
<tr>
<td>Input ‘logical 0’</td>
<td>0 to 5 V DC</td>
</tr>
<tr>
<td>Input ‘logical 1’</td>
<td>11 to 30 V DC</td>
</tr>
<tr>
<td>Input Current</td>
<td>Maximum 4 mA</td>
</tr>
</tbody>
</table>

Binary output
Only for devices with HART® Communication. Output configurable as alarm output by software.

Binary output DO

<table>
<thead>
<tr>
<th>Binary output DO</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminals</td>
<td>+83 / −84</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>5 to 11 V DC</td>
</tr>
<tr>
<td>(Control circuit in accordance with DIN 19234/NAMUR)</td>
<td></td>
</tr>
<tr>
<td>Output ‘logical 0’</td>
<td>&gt; 0.35 mA to &lt; 1.2 mA</td>
</tr>
<tr>
<td>Output ‘logical 1’</td>
<td>&gt; 2.1 mA</td>
</tr>
<tr>
<td>Direction of action</td>
<td>Configurable</td>
</tr>
<tr>
<td></td>
<td>‘logical 0’ or ‘logical 1’</td>
</tr>
</tbody>
</table>
6 Electrical connections

Electrical data for inputs and outputs

**Option modules**

**Module for analog feedback AO**

Only for devices with HART Communication.
Without any signal from the positioner (e.g. ‘no power’ or ‘initializing’) the module sets the output to > 20 mA (alarm level).

<table>
<thead>
<tr>
<th>Terminals</th>
<th>+31 / –32</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signal range</strong></td>
<td>4 to 20 mA</td>
</tr>
<tr>
<td>(Parameterization on split-ranges possible)</td>
<td></td>
</tr>
<tr>
<td><strong>in the event of an error</strong></td>
<td>&gt; 20 mA (alarm level)</td>
</tr>
<tr>
<td><strong>Supply voltage, two-wire technology</strong></td>
<td>24 V DC (11 to 30 V DC)</td>
</tr>
<tr>
<td><strong>Characteristic curve</strong></td>
<td>rising or falling (configurable)</td>
</tr>
<tr>
<td><strong>Deviation</strong></td>
<td>&lt; 1 %</td>
</tr>
</tbody>
</table>

* The module for analog feedback and the module for digital feedback have separate slots and can be used together.

**Module for digital feedback SW1, SW2**

Only for devices with HART Communication.

<table>
<thead>
<tr>
<th>Terminals</th>
<th>+41 / –42, +51 / –52</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply voltage</strong></td>
<td>5 to 11 V DC</td>
</tr>
<tr>
<td>(Control circuit in accordance with DIN 19234 / NAMUR)</td>
<td></td>
</tr>
<tr>
<td><strong>Output ‘logical 0’</strong></td>
<td>&lt; 1.2 mA</td>
</tr>
<tr>
<td><strong>Output ‘logical 1’</strong></td>
<td>&gt; 2.1 mA</td>
</tr>
<tr>
<td><strong>Direction of action</strong></td>
<td>Configurable ‘logical 0’ or ‘logical 1’</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>2 software switches for binary position feedback (position adjustable within the range of 0 to 100 %, ranges cannot overlap)</td>
</tr>
</tbody>
</table>

* The module for analog feedback and the module for digital feedback have separate slots and can be used together.

---

**Assembly kits for digital feedback**

Two proximity switches or microswitches for independent signaling of the actuator position, switching points are adjustable between 0 to 100%

**Digital feedback with proximity switches Limit 1, Limit 2**

<table>
<thead>
<tr>
<th>Terminals</th>
<th>+41 / –42, +51 / –52</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply voltage</strong></td>
<td>5 to 11 V DC</td>
</tr>
<tr>
<td>(Control circuit in accordance with DIN 19234 / NAMUR)</td>
<td></td>
</tr>
<tr>
<td><strong>Signal current &lt; 1 mA</strong></td>
<td>Switching state logical ‘0’</td>
</tr>
<tr>
<td><strong>Signal current &gt; 2 mA</strong></td>
<td>Switching state logical ‘1’</td>
</tr>
</tbody>
</table>

**Direction of action**

<table>
<thead>
<tr>
<th>Actuator position</th>
<th>Proximity switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; Limit 1</td>
<td>&gt; Limit 1</td>
</tr>
<tr>
<td>SJ2-SN (NC)</td>
<td>0</td>
</tr>
</tbody>
</table>

**Digital feedback with 24 V-proximity switches Limit 1, Limit 2**

<table>
<thead>
<tr>
<th>Terminals</th>
<th>41 / 42 / 43</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply voltage</strong></td>
<td>maximum 24 V AC/DC</td>
</tr>
<tr>
<td><strong>Load rating</strong></td>
<td>Maximum 2 A</td>
</tr>
<tr>
<td><strong>Contact surface</strong></td>
<td>10 µm Gold (AU)</td>
</tr>
</tbody>
</table>

* The proximity switches or 24 V microswitches for digital feedback are activated directly via the positioner axis and can only be used in combination with the optionally available mechanical position indicator.

**Mechanical position indicator**

Indicator disk in enclosure cover linked with device feedback shaft.

These options are also available for retrofitting by Service.
Connection on the device

Figure 15: Connection to device (example)

2 tap holes ½-14 NPT or M20 × 1.5 are provided on the left side of the housing for cable entry in the housing. One of the tap holes is fitted with a cable gland, while the other tap hole has a blind plug.

Note
The connecting terminals are delivered closed and must be unscrewed before inserting the wire.

1. Strip the wires to approximately 6 mm (0.24 in).
2. Connect the wires to the connecting terminals in line with the connection diagram.
### 6 Electrical connections

#### Connection on the device

<table>
<thead>
<tr>
<th>Wire cross-sectional areas</th>
<th>Basic device</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 to 20 mA input</td>
<td>Screw terminals max. 2.5 mm² (AWG14)</td>
</tr>
<tr>
<td>Options</td>
<td>Screw terminals max. 1.0 mm² (AWG18)</td>
</tr>
</tbody>
</table>

#### Cross section

| Rigid / flexible wires     | 0.14 to 2.5 mm² (AWG26 to AWG14) |
| Flexible with wire end sleeve | 0.25 to 2.5 mm² (AWG23 to AWG14) |
| Flexible with wire end sleeve no plastic sleeve | 0.25 to 1.5 mm² (AWG23 to AWG17) |
| Flexible with wire end sleeve with plastic sleeve | 0.14 to 0.75 mm² (AWG26 to AWG20) |

#### Multi-wire connection capacity (two wire with the same cross-section)

| Rigid / flexible wires     | 0.14 to 0.75 mm² (AWG26 to AWG20) |
| Flexible with wire end sleeve no plastic sleeve | 0.25 to 0.75 mm² (AWG23 to AWG20) |
| Flexible with wire end sleeve with plastic sleeve | 0.5 to 1 mm² (AWG21 to AWG18) |

#### Option modules

<table>
<thead>
<tr>
<th>Cross section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid / flexible wires</td>
</tr>
<tr>
<td>Flexible with wire end sleeve no plastic sleeve</td>
</tr>
<tr>
<td>Flexible with wire end sleeve with plastic sleeve</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multi-wire connection capacity (two wire with the same cross-section)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid / flexible wires</td>
</tr>
<tr>
<td>Flexible with wire end sleeve no plastic sleeve</td>
</tr>
<tr>
<td>Flexible with wire end sleeve with plastic sleeve</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Limit switch with proximity switches or 24 V microswitches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid wire</td>
</tr>
<tr>
<td>Flexible wire</td>
</tr>
<tr>
<td>Flexible with wire end sleeve no plastic sleeve</td>
</tr>
<tr>
<td>Flexible with wire end sleeve with plastic sleeve</td>
</tr>
</tbody>
</table>
7 Pneumatic Connections

Note
The positioner must only be supplied with instrument air that is free of oil, water, and dust.
The purity and oil content must meet the requirements of Class 3 in accordance with DIN/ISO 8573-1.

NOTICE
Damage to components!
Contamination on the air pipe and positioner can damage components.
• Dust, splinters, and any other particles of dirt must be blown-out before the pipe is connected.

NOTICE
Damage to components!
Pressure above 6 bar (90 psi) can damage the positioner or actuator.
• Provisions must be made (e.g. by using a pressure reducer) to make sure that the pressure does not rise above 6 bar (90 psi)*, even in the event of a fault.

* 5.5 bar (80 psi) (marine version)

Information on double-acting actuators with spring-return mechanism
On double-acting actuators with spring-return mechanism, a pressure that significantly exceeds the supply air pressure value can be generated during operation by the springs in the chamber opposite the springs.
This may damage the positioner or adversely affect control of the actuator.
To eliminate the possibility of this occurring, it is recommended to install a pressure compensation valve between the springless chamber and the supply air for these types of applications. It enables the increased pressure to be transferred back to the air inlet line.
The opening pressure of the check valve should be < 250 mbar (< 3.6 psi).

Connection on the device

Join the pipe connections according to the designation, observing the following points:
• All pneumatic piping connections are located on the right-hand side of the positioner. G ¼ or ½ 18 NPT tap holes are provided for the pneumatic connections. The positioner is labeled according to the tap holes available.
• We recommend that you use a pipe with dimensions of 12 × 1.75 mm.
• The supply air pressure required to apply the actuating force must be adjusted in line with the output pressure in the actuator. The operating range of the positioner is between 1.4 to 6 bar (20 to 90 psi)***.

*** 1.4 to 5.5 bar (20 to 80 psi) marine version
7  Pneumatic Connections

Air supply

<table>
<thead>
<tr>
<th>Instrument air*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Purity</td>
<td>Maximum particle size: 5 μm</td>
</tr>
<tr>
<td></td>
<td>Maximum particle density: 5 mg/m³</td>
</tr>
<tr>
<td>Oil content</td>
<td>Maximum concentration 1 mg/m³</td>
</tr>
<tr>
<td>Pressure dew point</td>
<td>10 K below operating temperature</td>
</tr>
<tr>
<td>Supply pressure**</td>
<td>Standard design:</td>
</tr>
<tr>
<td></td>
<td>1.4 to 6 bar (20 to 90 psi)</td>
</tr>
<tr>
<td></td>
<td>Marine version:</td>
</tr>
<tr>
<td></td>
<td>1.6 to 5.5 bar (23 to 80 psi)</td>
</tr>
<tr>
<td>Air consumption***</td>
<td>&lt; 0.03 kg/h / 0.015 scfm</td>
</tr>
</tbody>
</table>

* Free of oil, water and dust in accordance with DIN / ISO 8573-1. Pollution and oil content in accordance with Class 3

** Do not exceed the maximum output pressure of the actuator

*** Independent of supply pressure

8  Commissioning

Note
The electrical power supply and supply air pressure data indicated on the name plate must be complied with during commissioning.

⚠️ CAUTION
Risk of injury due to incorrect parameter values!
Incorrect parameter values can cause the valve to move unexpectedly. This can lead to process failures and result in injuries.
- Before recommissioning a positioner that was previously in use at another location, always reset the device to its factory settings.
- Never start automatic adjustment before restoring the factory settings!

Note
Please observe the information in Operation on page 40 to operate the device!

TZIDC-200

Commissioning the positioner:
1. Open the pneumatic power supply.
2. Power-up the electric power supply and feed in the setpoint signal 4 to 20 mA.
3. Checking mechanical mounting:
   - Press and hold MODE; in addition, press ↑ or ↓ until operating mode 1.3 (manual adjustment in the measuring range) is displayed. Release MODE.
   - Press ↑ or ↓ to move the actuator into the mechanical end position; check the end positions; rotational angle is displayed in degrees; for high-speed mode, press ↑ or ↓ simultaneously.

<table>
<thead>
<tr>
<th>Recommended rotational angle range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear actuators</td>
</tr>
<tr>
<td>Rotary actuators</td>
</tr>
<tr>
<td>Minimum angle</td>
</tr>
</tbody>
</table>

4. Perform standard automatic adjustment in accordance with Standard automatic adjustment on page 37.

Commissioning of the positioner is now complete, and the device is ready for operation.
Operating modes
Selection from the operating level
1. Press and hold down MODE.
2. Also press and release ▼ rapidly as often as required. The selected operating mode is displayed.
3. Release MODE.
The position is displayed in % or as a rotation angle.

<table>
<thead>
<tr>
<th>Operating mode</th>
<th>Mode indicator</th>
<th>Position indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>1.0</td>
<td>50.0%</td>
</tr>
<tr>
<td>Control mode* with adaptation of the control parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>1.1</td>
<td>50.0%</td>
</tr>
<tr>
<td>Control mode* without adaptation of the control parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>1.2</td>
<td>50.0%</td>
</tr>
<tr>
<td>Manual adjustment** in the operating range. Adjust*** using ▼ or ▲</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>1.3</td>
<td>-15.0°</td>
</tr>
<tr>
<td>Manual adjustment** in the measuring range. Adjust*** using ▼ or ▲</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Since self-optimization in operating mode 1.0 is subject to several factors during control operation with adaptation, incorrect adjustments could appear over an extended period.
** Positioning not active.
*** For high-speed mode, press ▼ and ▲ simultaneously.

Commissioning the positioner:
1. Open the pneumatic power supply.
2. Connect fieldbus or power supply to the bus connections. The following is now shown in the display:

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

4. Go back to the bus level:
   - Press and hold down MODE and ENTER; once the countdown has gone from 3 to 0, release MODE and ENTER. The following is now shown in the display:

5. Perform standard automatic adjustment in accordance with Standard automatic adjustment on page 37. Make sure the device is on the bus level (REMOTE).
6. Set dead zone and tolerance band. This step is only required for critical (e.g. very small) actuators. In normal cases you can skip this step.

Commissioning of the positioner is now complete, and the device is ready for operation.
... 8 Commissioning

... TZIDC-210, -220

Setting the bus address

1. Switching to the configuration level:
   - Press and hold down  and  simultaneously,
   - additionally quickly press and release ENTER,
   - Wait for the countdown to go from 3 to 0,
   - Release  and .
   The following is now shown in the display:

   ![Display showing M10906i]

2. Switch to parameter group 1.5:
   - Press and hold down MODE and ENTER simultaneously,
   - additionally, press  and .
   The following is now shown in the display:

   ![Display showing 1.5 Address]

   - Release MODE.
   The following is now shown in the display:

   ![Display showing 126 Address]

3. Setting the bus address:
   - Press  or  to set the correct value,
   - Press and hold down ENTER until the countdown goes from 3 to 0.
   - Release ENTER.
   The new bus address is saved.

4. Switch to parameter 1.6 (return to operating level) and save the new setting:
   - Press and hold down MODE,
   - additionally quickly press  2 times,
   The following is now shown in the display:

   ![Display showing 1.6 Exit]

   - Release MODE,
   - Quickly press and release  to select NV_SAVE,
   - Press and hold down ENTER until the countdown goes from 3 to 0.

The new parameter setting is saved and the positioner automatically returns to the operating level. It continues in the operating mode that was active prior to the configuration level being called up.

Request information
When the device is in bus operation, the information listed below can be called up.
Press the following control buttons to access this information:

<table>
<thead>
<tr>
<th>Control buttons</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Mode button]</td>
<td>Cyclic communication: Set point in % and the set point status is displayed.</td>
</tr>
<tr>
<td>![Address button]</td>
<td>Acyclic communication: Displays the communication status.</td>
</tr>
<tr>
<td>![Enter button]</td>
<td>Displays the bus address and operating mode.</td>
</tr>
<tr>
<td>![Enter button]</td>
<td>Displays the software revision.</td>
</tr>
</tbody>
</table>
Operating modes
Selection from the operating level:
1. Press and hold down MODE.
2. Also press and release ⇧ rapidly as often as required. The selected operating mode is displayed.
3. Release MODE.
The position is displayed in % or as a rotation angle.

<table>
<thead>
<tr>
<th>Operating mode</th>
<th>Mode indicator</th>
<th>Position indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>CTRL_FIX</td>
<td>50.0 POSITION</td>
</tr>
<tr>
<td>1.2</td>
<td>MANUAL</td>
<td>50.0 POSITION</td>
</tr>
<tr>
<td>1.3</td>
<td>MAN_SENS</td>
<td>-15.0° SENS_POS</td>
</tr>
</tbody>
</table>

1.1 Positioning with fixed set point.
Adjust set point by using ⇧ or ⇧.

1.2 Manual adjustment* in the operating range.
Adjust with ⇧ or ⇧ **

1.3 Manual adjustment* within the sensor range.
Adjust with ⇧ or ⇧ **

* Positioning not active.
** For high-speed mode, press ⇧ and ⇧ simultaneously.

Standard automatic adjustment

Note
Standard Auto Adjust does not always result in optimum control conditions.

Standard automatic adjustment for linear actuators*
1. Press and hold until ADJ_LIN is displayed.
2. MODE Press and hold until the countdown ends.
3. Release MODE; this starts Autoadjust.

Standard automatic adjustment for rotary actuators*
1. Press and hold until ADJ_ROT is displayed.
2. ENTER Press and hold until the countdown ends.
3. Release ENTER; this starts Autoadjust.

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

If an error occurs during Autoadjust, the process will be terminated with an error message.

Perform the following steps if an error occurs:
1. Press and hold down operating button ⇧ or ⇧ for approximately three seconds.
The unit will switch to the operating level, mode 1.3 (manual adjustment within the measuring range).
2. Check mechanical mounting in accordance with Mechanical mounting on page 21 and repeat the standard automatic adjustment.

* The zero position is determined automatically and saved during standard automatic adjustment, counter-clockwise (CTCLOCKW) for linear actuators and clockwise (CLOCKW) for rotary actuators.
... 8 Commissioning

Sample parameters

‘Change the zero position of the LCD display from clockwise (CLOCKW) to counter-clockwise limit stop (CTCLOCKW)’

Initial situation: the positioner is in bus operation on the operating level.

1. Switching to the configuration level:
   - Press and hold down ⬆️ and ⬇️ simultaneously,
   - additionally quickly press and release ENTER,
   - Wait for the countdown to go from 3 to 0,
   - Release ⬆️ and ⬇️.
   The following is now shown in the display:

   ![Standard Configuration](image)

2. Switching to parameter group 3.\_:
   - Press and hold down MODE and ENTER simultaneously,
   - additionally quickly press and release ⬆️ 2\x,
   The following is now shown in the display:

   ![Actuator Configuration](image)

   - Release MODE and ENTER.
   The following is now shown in the display:

   ![Configure](image)

3. Selecting parameter 3.2:
   - Press and hold down MODE,
   - additionally quickly press and release ⬆️ 2\x,
   The following is now shown in the display:

   ![Parameter 3.2](image)

   — Release MODE.

4. Changing parameter settings:
   - Quickly press and release ⬆️ to select CTCLOCKW.

5. Switching to parameter 3.3 (Return to operating level) and saving the new settings:
   - Press and hold down MODE,
   - additionally quickly press and release ⬆️ 2\x,
   The following is now shown in the display:

   ![Parameter 3.3](image)

   — Release MODE,
   - Quickly press and release ⬆️ to select NV_SAVE,
   - Press ENTER and hold down until the countdown goes from 3 to 0.
   The new parameter setting is saved and the positioner automatically returns to the operating level. It continues in the operating mode that was active prior to the configuration level being called up.

Setting the option modules

Setting the mechanical position indication

1. Loosen the screws for the housing cover and remove it.
2. Rotate the position indicator on the shaft to the desired position.
3. Attach the housing cover and screw it onto the housing.
   Tighten the screws so that they are hand-tight.
4. Attach the symbol label to mark the minimum and maximum valve positions on the housing cover.

Note
The labels are located on the inside of the housing cover.
Setting the mechanical limit switch with proximity switches
1. Loosen the screws for the housing cover and remove it.

⚠️ CAUTION
Risk of injury!
The device includes slot sensors with sharp edges.
- Adjust the metal tags using a screwdriver only!

2. Set the upper and lower switching points for binary feedback as follows:
   - Select the 'Manual Adjustment' operating mode and move the final control element by hand into the lower switching position.
   - Using a screwdriver, adjust the metal tag of proximity switch 1 (lower contact) on the axis until contact is made, i.e., just before it is inserted in the proximity switch. The slot sensor enters proximity switch 1 when the feedback shaft is rotated clockwise (as viewed from the front).
   - Move the final control element by hand into the upper switching position.
   - Using a screwdriver, adjust the metal tag of proximity switch 2 (upper contact) on the axis until contact is made, i.e., just before it is inserted in the proximity switch. The slot sensor enters proximity switch 2 when the feedback shaft is rotated counter-clockwise (as viewed from the front).
3. Attach the housing cover and screw it onto the housing.
4. Tighten the screws so that they are hand-tight.

Setting the mechanical limit switch with 24 V microswitches
1. Loosen the screws for the housing cover and remove it.
2. Select the 'Manual Adjustment' operating mode and move the final control element by hand into the desired switching position for contact 1.
3. Set maximum contact (1, lower washer).
   - Fasten the upper washer with the special adjustment retainer and rotate the lower washer manually.
4. Select the 'Manual Adjustment' operating mode and move the final control element by hand into the desired switching position for contact 2.
5. Set minimum contact (2, upper washer);
   - Fasten the lower washer with the special adjustment retainer and rotate the upper washer manually.
6. Connect the microswitch.
7. Attach the housing cover and screw it on to the housing.
8. Tighten the screws so that they are hand-tight.
9 Operation

Safety instructions

⚠️ CAUTION
Risk of injury due to incorrect parameter values!
Incorrect parameter values can cause the valve to move unexpectedly. This can lead to process failures and result in injuries.
- Before recommissioning a positioner that was previously in use at another location, always reset the device to its factory settings.
- Never start automatic adjustment before restoring the factory settings!

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

Parameterization of the device

The LCD display features operating buttons which enable the device to be operated with the housing cover open.

Menu navigation

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 also displayed.

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

Description of symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️</td>
<td>Operation or access is restricted.</td>
</tr>
<tr>
<td></td>
<td>Control loop is active.</td>
</tr>
<tr>
<td></td>
<td>The symbol is displayed when the positioner is in operating mode 1.0 CTRL_ADAP (adaptive control) or 1.1 CTRL_FIX (fixed control) at operating level. 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.</td>
</tr>
<tr>
<td>🔄</td>
<td>Manual adjustment.</td>
</tr>
<tr>
<td></td>
<td>The symbol is displayed when the positioner is in operating mode 1.2 MANUAL (manual adjustment within the stroke range) or 1.3 MAN_SENS (manual adjustment within the measuring range) at operating level. At configuration level, manual adjustment is active when setting the valve range limits (parameter group 6 MIN_VR (min. of valve range) and 6 MAX_VR (max. of valve range)). The symbol will also be displayed when these parameters are being set.</td>
</tr>
<tr>
<td>🔄</td>
<td>The configuration icon indicates that the positioner is at the configuration level. The control operation is inactive.</td>
</tr>
</tbody>
</table>

The four operating buttons ENTER, MODE, ⬆️ and ⬇️ are pressed individually or in certain combinations according to the function desired.
### Operating button functions

<table>
<thead>
<tr>
<th>Control button</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTER</td>
<td>• Acknowledge message</td>
</tr>
<tr>
<td></td>
<td>• Start an action</td>
</tr>
<tr>
<td></td>
<td>• Save in the non-volatile memory</td>
</tr>
<tr>
<td>MODE</td>
<td>• Choose operating mode (operating level)</td>
</tr>
<tr>
<td></td>
<td>• Select parameter group or parameter (configuration level)</td>
</tr>
<tr>
<td>☞</td>
<td>UP direction button</td>
</tr>
<tr>
<td>☮</td>
<td>DOWN direction button</td>
</tr>
<tr>
<td>Press and hold all four buttons for 5 s</td>
<td>Reset</td>
</tr>
</tbody>
</table>

### Menu levels

The positioner has two operating levels.

**Operating level**

On the operating level the positioner operates in one of four possible operating modes (two for automatic control and two for manual mode). Parameters cannot be changed or saved on this level.

**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 movement counter, the travel counter, and the user-defined characteristic curve.

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

### NOTICE

**Property damage**

During external configuration via a PC, the positioner no longer responds to the set point current. This may lead to process failures.

- Before any external parameterization, always move the actuator to the safety position and activate manual adjustment.

### Note

For detailed information on how to parameterize device, consult the associated operating instructions and/or configuration and parameterization instructions.
10 Maintenance

The positioner does not require any maintenance if it is used as intended under normal operating conditions.

Note
Manipulation by users shall immediately render the warranty for the device invalid.
To ensure fault-free operation, it is essential that the device is supplied with instrument air that is free of oil, water, and dust.

11 Recycling and disposal

Note
Products that are marked with the adjacent symbol may not be disposed of as unsorted municipal waste (domestic waste).
They should be disposed of through separate collection of electric and electronic devices.

This product and its packaging are manufactured from materials that can be recycled by specialist recycling companies.

Bear the following points in mind when disposing of them:
- As of 8/15/2018, this product will be under the open scope of the WEEE Directive 2012/19/EU and relevant national laws (for example, ElektroG - Electrical Equipment Act - in Germany).
- The product must be supplied to a specialist recycling company. Do not use municipal waste collection points. These may be used for privately used products only in accordance with WEEE Directive 2012/19/EU.
- If there is no possibility to dispose of the old equipment properly, our Service can take care of its pick-up and disposal for a fee.

12 Additional documents

Note
All documentation, declarations of conformity and certificates are available in ABB's download area.
www.abb.com/positioners
13 Appendix

Return form

Statement on the contamination of devices and components

Repair and/or maintenance work will only be performed on devices and components if a statement form has been completed and submitted. Otherwise, the device/component returned may be rejected. This statement form may only be completed and signed by authorized specialist personnel employed by the operator.

Customer details:
Company:
Address:
Contact person: Telephone:
Fax: Email:

Device details:
Type: Serial no.:
Reason for the return/description of the defect:

Was this device used in conjunction with substances which pose a threat or risk to health?
☐ Yes ☐ No

If yes, which type of contamination (please place an X next to the applicable items):
☐ biological ☐ corrosive / irritating ☐ combustible (highly / extremely combustible)
☐ toxic ☐ explosive ☐ other toxic substances
☐ radioactive

Which substances have come into contact with the device?
1.
2.
3.

We hereby state that the devices/components shipped have been cleaned and are free from any dangerous or poisonous substances.

Town/city, date Signature and company stamp
13 Appendix

FM installation drawing No. 901176

CONTROL DOCUMENT NO 901176

Hazardous area

Class I, Div. 1, Groups A, B, C, D
Class II, Div. 1, Groups E, F, G
Class III, Div. 1
(Note 2)

TZIDC-200
V18348-X014X300XXX

Nonhazardous area

Associated Apparatus

Control Equipment

Terminals

Entity Parameters:

Imax = 104 mA
Vmax = 30 Vdc
Ci = 6.6 nF
Pi = 1 W

Notes
1. Vcc or Vi ≤ Vmax, Isc or Ii ≤ Imax, Ca ≥ Ci+Cable, Lo ≥ Li+Cable, 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/NEPA 70).
5. The configuration of associated apparatus must be FMRC Approved/CSA Approved as required.
6. Associated apparatus manufacturers' installation drawings must be followed when installing the equipment.
7. When connecting conduit to the enclosure use conduit hubs that have 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 FM 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 LK6 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.
14. Preventing electrostatic charging

Due to the possibility of impermissible electrostatic charging of the housing occurring, the effects of high-voltage sources on the equipment must be prevented. Electrostatic charging can also occur if the device is wiped with a dry cloth or if large amounts of dust flow around the device in dusty environments. To prevent charging of this type from occurring, the device may only be cleaned using a damp cloth. Dust flowing around the device should be prevented by installing a flow restrictor or partition.
CONTROL DOCUMENT NO 901176

Hazardous area

Class I, Div. 1, Groups A, B, C, D
Class II, Div. 1, Groups E, F, G
Class III, Div. 1
(Note 2)

TZIDC-200
V18348-X0X4X300XXX

+81
Terminals

-82

(Switching Input)

Entity Parameters:

Vmax = 30 Vdc  Imax = 110 mA
Ci = 4.2 nF  Li = 0 pH
Pi = 1 W

Associated
Apparatus

(Note 9)
(Note 5)
(Note 6)

+83
Terminals

-84

(Switching Output)

Entity Parameters:

Vmax = 30 Vdc  Imax = 96 mA
Ci = 4.2 nF  Li = 0 pH
Pi = 1 W

Control
Equipment

(Note 3)

Int. Safe Gnd

Int. Safe Gnd
... 13 Appendix

... FM installation drawing No. 901176
CONTROL DOCUMENT NO 901176

Hazards area

Class I, Div. I, Group A, B, C, D
Class II, Div. I, Groups E, F, G
Class III, Div. I
(Note 2)

TZIDC-200
V18348-X0X4X301XXX
or V18348-X0X4X302XXX

Associated Apparatus

Control Equipment

Terminals Limit 1
+51
-52

(Note 5)
(Note 6)

Int. Safe Gnd

Terminals Limit 2
+41
-42

(Note 5)
(Note 6)

Int. Safe Gnd

(Mechanical Digital Feedback)

Entity Parameters:
Vmax = 15.5 V
Imax = 52 mA
C0 = 20 nF
L0 = 30 µH
P0 = 1 W

ABB Automation
... 13 Appendix

FM installation drawing No. 901265
FISCO rules
The FISCO Concept allows the interconnection of intrinsically safe apparatus not
specifically examined in such combination. The criterion for such interconnection is that the voltage (V_{max}), the
current (I_{max}) and the power (P) which intrinsically safe apparatus can receive and remain intrinsically safe,
considering faults, must be equal or greater than the voltage (U_o, V_o, V_i), the current (I_o, I_s, I_i) and the power
(P_o) which can be provided by the associated apparatus (supply unit). In addition, the maximum unprotected
residual capacitance (C_i) and inductance (L_i) of each apparatus (other than the terminators) connected to the Fieldbus
must be less than or equal to 5nF and 10 μH respectively.
In each I.S. Fieldbus segment only one active source, normally the associated apparatus, is allowed to provide the
necessary power for the Fieldbus system. The allowed voltage (U_o, V_o, V_i) of the associated apparatus used to
supply the bus must be limited to the range of 14V d.c. to 24V d.c. All other equipment connected to the bus cable
has to be passive, meaning that the apparatus is not allowed to provide energy to the system, except to a leakage
current of 50 μA for each connected device. Separately powered equipment needs a galvanic isolation to ensure that
the intrinsically safe Fieldbus circuit remains passive.
The cable used to interconnect the devices needs to comply with the following parameters:
- Loop resistance R': 15...150 Ω/km
- Inductance per unit length L': 0.4...1mH/km
- Capacitance per unit length C': 80...200 nF/km
- C' = C' line/line + 0.5C' line/screen, if both lines are floating
  or
- C' = C' line/line + C' Line/screen, if the screen is connected to one line
- Length of spur cable: max. 30m
- Length of trunk cable: max. 1km
- Length of splice: max. 1m
Terminators
At each end of the trunk cable an approved line terminator with the following parameters is suitable:
- R = 90...100 Ω
- C = 0...2.2 μF
System evaluation
The number of passive devices like transmitters, actuators, connected to a single bus segment is not limited due to
I.S. Reasons. Furthermore, if the above rules are respected, the inductance and capacitance of the cable need not to be
considered and will not impair the intrinsic safety of the installation.
Installation Notes For FISCO and Entity Concepts:
1. The Intrinsic Safety Entity concept allows the interconnection of FM/CSA Approved Intrinsically safe devices with entity parameters not specifically examined in combination as a system when:
   \[ U_0 \text{ or } V_0 \leq V_{\text{max}}, I_0 \text{ or } I_{\text{sc}} \leq I_{\text{max}}, \text{Ca or Co } \geq \frac{V_{\text{cl}} + V_{\text{c}}}{R_{\text{e}}} \text{ and } \frac{I_{\text{c}}}{R_{\text{e}}} \leq \left( \frac{L_{\text{a}}}{R_{\text{a}} \text{ or } L_{\text{c}}/R_{\text{c}}} \right) \]
   For inductance use either \[ L_{\text{a}} \text{ or } L_{\text{c}} \geq \frac{V_{\text{cl}} + V_{\text{c}}}{R_{\text{e}}} \text{ or } \frac{L_{\text{a}}}{R_{\text{a}} \text{ or } L_{\text{c}}/R_{\text{c}}} \leq \left( \frac{L_{\text{a}}}{R_{\text{a}} \text{ or } L_{\text{c}}/R_{\text{c}}} \right) \]
2. The Intrinsic Safety FISCO concept allows the interconnecting of FM/CSA Approved Intrinsically safe devices with FISCO parameters not specifically examine in combination as a system when: \[ U_0 \text{ or } V_0 \leq V_{\text{max}}, I_0 \text{ or } I_{\text{sc}} \leq I_{\text{max}}, \text{Po } \leq \text{Pi} \]
3. Control equipment connected to the Associated Apparatus must not use or generate more than 250 Vrms or Vdc.
4. Installation should be in accordance with ANSI/ISA RP12.6 (except chapter 5 for FISCO Installations) “Installation of Intrinsically Safe System for Hazardous (Classified) Locations” and the National Electrical Code® (ANSI/NFPA 70) Sections 504 and 505.
5. The configuration of associated Apparatus must be Factory Mutual Research /Canadian Standards Association approved under the associated concept.
6. Associated Apparatus manufacturer’s installation drawing must be followed when installing this equipment.
7. No revision to drawing without prior Factory Mutual Research Approval/Canadian Standards Association.
8. Special conditions for safe use
   The operation of the local communication interface (LKS) and of the programming interface (XS) is only allowed outside of the hazardous explosive area.

NONINCENDIVE, CLASS I, DIV. 2, GROUP A, B, C, D, AND FOR CLASS II AND III, DIV. 1 & 2, GROUP E, F, G
HAZARDOUS LOCATION INSTALLATION.

1. Install per National Electrical Code (NEC) using threaded metal conduit. Intrinsic safety barrier required. Max. Supply voltage 30 V. For T-code see table.

2. A dust tight seal must be used at the conduit entry when the positioner is used in a Class II & III Location.

3. WARNING: Explosion Hazard – do not disconnect equipment unless power has been switched off or the area is known to be Non-Hazardous.
   WARNING: Substitution of components may impair suitability for hazardous locations.

<table>
<thead>
<tr>
<th>Rev.</th>
<th>Date</th>
<th>Name</th>
<th>Title</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>26.06.06</td>
<td>Thier</td>
<td>FM/CSA-Control-Document</td>
<td>/</td>
</tr>
<tr>
<td>2</td>
<td>22.06.05</td>
<td>Thier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>27.03.03</td>
<td>Thier</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ABB
Automation Products

Dwg.-No. (Part-No.) 901265

Supersedes Dwg. Part Class.
Trademarks

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FOUNDATION Fieldbus is a registered trademark of FieldComm Group, Austin, Texas, USA.

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Introduction

The TZIDC-200, TZIDC-210, TZIDC-220 is an electronically configurable positioner with communication capabilities designed for mounting on pneumatic linear or rotary actuators. Fully automatic determination of the control parameters and adaptation to the positioner allow for considerable time savings as well as optimum control behavior.

Additional Information

Additional documentation on TZIDC-200, TZIDC-210, TZIDC-220 is available for download free of charge at www.abb.com/positioners. Alternatively simply scan this code:

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