TZIDC
Digital Positioner

Power and productivity
for a better world™

ABB

Contents

1 Safety

1.1 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.

1.2 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.

> **ℹ NOTE**
>
> The signal word "NOTE" indicates useful or important information about the product.
> The signal word "NOTE" is not a signal word indicating a danger to personnel. The signal word "NOTE" can also refer to material damage.

1.3 Intended use

Positioning of pneumatically controlled actuators; designed for mounting on linear and part-turn 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 permissible ambient temperature must not be exceeded.
— The housing protection type must be observed.

1.4 Improper use

The following are considered to be instances of improper use of the device:

— For use as a climbing aid, e.g. for mounting purposes
— For use as a support for external loads, e.g. as a support for piping, etc.
— Material application, e.g. by painting over the name plate or welding/soldering on parts.
— Material removal, e.g. by spot drilling the housing.

1.5 Warranty provisions

Using the device in a manner that does not fall within the scope of its intended use, disregarding this manual, using underqualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

2 Use in potentially explosive atmospheres

2.1 General requirements
— The ABB positioner has only been approved for its appropriate and intended use in standard industrial atmospheres. Any breach of this rule leads to a cancellation of warranty and manufacturer's responsibility!
— It has to be ensured that only such equipment is installed that complies with the types of protection relevant to the applicable zones and categories!
— All electrical equipment has to be suitable for the respective intended use.

2.2 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 such equipment is installed that complies with the types of protection relevant to the applicable zones and categories. When installing the equipment, the locally applicable rules on erection, e.g. EN 60079-14, have to be observed.

Other important facts to be observed:
— In all zones, the circuits of the positioner have to be put into service by a person qualified according to TRBS 1203. The details on the type label are mandatory for doing this.
— The equipment is constructed for IP 65 (optional IP 66) and has to be protected accordingly in adverse ambient conditions.
— The EC-Type Examination Certificates have to be taken into account including any special conditions defined therein.
— The equipment shall only be used as intended.
— The equipment is only to be connected when de-energized.
— The potential equalization of the system has to be established according to the regulations of erection applicable in the respective country of use (VDE 0100, part 540; IEC 364-5-54).
— Circulating currents shall not be led via the enclosures!

— It has to be ensured that the enclosure is properly installed and that its IP protection is not impaired.
— Inside the potentially explosive atmospheres' assembly shall only be performed taking the locally applicable rules of erection into account. The following conditions have to be observed (incomplete):
    — Assembly and maintenance to be done only if atmosphere is Ex-free and a permit for hot works is in place.
    — The TZIDC is only to be operated in a fully mounted and intact enclosure.

2.3 Notes for operation
— The positioner shall be included in the local equipotential bonding system
— Either only intrinsically or non-intrinsically safe circuits shall be connected. A combination is not permitted.
— When the Positioner is operated with non-intrinsically safe circuits, the subsequent use for type of protection Intrinsic Safety is not permitted.

2.4 Use, operation
The TZIDC is only approved for intended and appropriate use. In case of non-compliance, the warranty and manufacturer's liability do no longer apply!
— In explosive atmospheres only such auxiliary components shall be used that meet all requirements of the European and the national standards.
— The ambient conditions specified in the instruction manual have to be adhered to strictly.
— The TZIDC has only been approved for its appropriate and intended use in standard industrial atmospheres. Where aggressive substances are present in the air, the manufacturer has to be consulted.

2.5 Maintenance, repair

Definition of terms according to IEC 60079-17:

Maintenance

Defines a combination of any actions carried out to retain an item in, or restore it to, conditions in which it is able to meet the requirements of the relevant specification and perform its required functions.

Inspection

Defines any action comprising careful scrutiny of an item carried out either without dismantling, or with the addition of partial dismantling as required, supplemented by means such as measurement, in order to arrive at reliable conclusion as to the condition of an item.

Visual inspection

Defines an inspection which identifies, without the use of access equipment and tools, those defects, such as missing bolts, which will be apparent to the eye.

Close inspection

Defines an inspection which encompasses those aspects covered by a visual inspection and, in addition, identifies those defects, such as loose bolts, which will be apparent only be the use of access equipment, for example steps, where necessary, and tools.

Detailed inspection

Defines an inspection which encompasses those aspects covered by a close inspection and, in addition, identifies those defects, such as loose terminations, which will only be apparent by opening the enclosure, and / or using, where necessary, tools and test equipment.

— Maintenance or replacement works are to be carried out by qualified personnel only, i.e. personnel qualified according to TRBS 1203 or similar.
— Only such auxiliary components may be used in explosive atmospheres which meet all requirements of European and national directives and legislation.
— Maintenance works that require a dismantling of the system shall only be performed if the atmosphere is Ex-free. If that is not possible, however, the usual precautions have to be ensured according to local regulations.
— Components shall only be replaced by original spare parts which are therefore approved for the use in explosive atmospheres.
— Inside the Ex-atmosphere the equipment has to be cleaned regularly. The intervals are to be defined by the user in compliance with the environmental conditions present at the place of operation.
— After maintenance and repair works have been performed, all barriers and notes removed for that purpose have to be put back in their original place.
— The flameproof joints differ from the tables of IEC 60079-1 and should only be repaired by the manufacturer.

Activity	Visual inspection (every 3 months)	Close inspection (every 6 months)	Detailed inspection (every 12 months)
Visual inspection of positioner for intactness, removal of dust settlements.	●		
Check of electrical system for intactness and functionality			●
Check of entire system	User's responsibility		

2.6 Product identification

Depending on the type of explosion protection, Ex-marking is attached to the positioner on the right, next to the main name plate.

This indicates the level of explosion protection and the device's relevant Ex certificate.

2.6.1 Marking (type label)

TÜV 04 ATEX 2702 X	TÜV 04 ATEX 2702 X
CE 0044 ⟨Ex⟩ II 2G	Ex ia IIC T6 / T4 Gb

-40 °C ≤ Ta ≤ 40 °C / 85 °C   M11061

Fig. 1

NOTE
It is essential, that the equipment is provided with a legible marking of the type of protection required for the intended field of application – before it is put into operation for the first time.

2.7 Preconditions for safe operation of the positioner

⚠ DANGER

Risk of explosion due to hot parts
Hot parts inside the housing may pose a risk of explosion. Never open the device immediately after switch-off. Always wait at least four minutes before opening the unit.

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

2.7.1 Cable gland

Limited temperature range of the M20 x 1.5 plastic cable gland for explosion protection variants.

The permissible ambient temperature range of the cable gland is -20 … 80 °C (-4 ... 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.

2.8 ATEX / EAC TR-CU-012
(limited functionality with EAC TR-CU-012)

2.8.1 ATEX Ex i

Ex-marking	
Labeling	II 2 G Ex ia IIC T6 resp. T4 Gb
	II 2 G Ex ib IIC T6 resp. T4 Gb
Type examination certificate	TÜV 04 ATEX 2702 X
Type	Intrinsically safe equipment
Device class	II 2 G
Standards	EN 60079-0:2012
	EN 60079-11:2012

Temperature Data

Device group II 2 G	
Temperature class	Ambient temperature Ta
T4	-40 … 85 °C
T5	-40 … 50 °C
T6[1]	-40 … 40 °C[1]

[1] When using the plug-in module "Limit Monitor" in Temperature Class T6, the maximum permissible ambient temperature range is -40 … 35 °C.

Electrical data

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

Current circuit (terminal)	Electrical data (maximum values)	
Signal circuit (+11 / -12)	$U_i = 30$ V $I_i = 320$ mA $P_i = 1.1$ W	$C_i = 6.6$ nF L_i = negligibly small
Contact input (+81 / -82)	$U_i = 30$ V $I_i = 320$ mA $P_i = 1.1$ W	$C_i = 4.2$ nF L_i = negligibly small
Switch output (+83 / -84)	$U_i = 30$ V $I_i = 320$ mA $P_i = 500$ mW	$C_i = 4.2$ nF L_i = negligibly small
Mechanical limit monitor, (Pepperl & Fuchs SJ2-SN) (Limit1: +51 / -52), (Limit2: +41 / -42)	$U_i = 20$ V $C_i = \leq 30$ nF $L_i = \leq 100$ µH $I_i = 25$ mA $P_i = 1.1$ W	
Plug-in module for limit monitor (+51 / -52) (+41 / -42)	$U_i = 30$ V $I_i = 320$ mA $P_i = 500$ mW	$C_i = 3.7$ nF L_i = negligibly small
Plug-in module for analog position feedback (+31 / -32)	$U_i = 30$ V $I_i = 320$ mA $P_i = 1.1$ W	$C_i = 6.6$ nF L_i = negligibly small
Interface with the TZIDC Remote Sensor (X2-2: +Uref, X3-2: GND, X3-1: signal)	$U_0 = 5.4$ V $I_0 = 74$ mA $P_0 = 100$ mW C_i = negligibly small L_i = negligibly small	Ex ia or Ex ib type of ignition protection IIC: $L_0 = 5$ mH $C_0 = 2$ µF IIB: $L_0 = 5$ mH $C_0 = 10$ µF
Local communication interface (LCI)	Only for connection to a programming device using an ABB LCI adapter ($U_m \leq 30$ V DC) outside the hazardous area.	

Special conditions
— Prevent electrostatic charging due to propagating brush discharge when the equipment is used for applications involving combustible dust.

2.9 IECEx Ex i

Ex-marking	
Labeling	Ex ia IIC T6 resp. T4 Gb
	Ex ib IIC T6 resp. T4 Gb
Type examination certificate	IECEx TUN 04.0015X
Type	Intrinsic safety "i"
Standards	IEC 60079-0:2011
	IEC 60079-11:2011

Temperature Data

Temperature class	Ambient temperature Ta	
	TZIDC Ex ia IIC	TZIDC Ex ib IIC
T4	-40 … 85 °C	-40 … 85 °C
T6[1)	-40 … 40 °C[1)	-40 ... 40 °C[1)

1) When using the plug-in module "Limit Monitor" in Temperature Class T6, the maximum permissible ambient temperature range is -40 … 35 °C.

Electrical data

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

Current circuit (terminal)	Electrical information (maximum values)	
Signal circuit (+11 / -12)	U_i = 30 V I_i = 320 mA P_i = 1.1 W	C_i = 6.6 nF L_i = negligibly small
Contact input (+81 / -82)	U_i = 30 V I_i = 320 mA P_i = 1.1 W	C_i = 4.2 nF L_i = negligibly small
Switch output (+83 / -84)	U_i = 30 V I_i = 320 mA P_i = 500 mW	C_i = 4.2 nF L_i = negligibly small
Local communication interface (LCI)	Only for connection to a programming device using an ABB LCI adapter (Um ≤ 30 V DC) outside the hazardous area.	

The following modules may be operated as an option:

Current circuit (terminal)	Electrical information (maximum values)	
Plug-in module for limit monitor (+51 / -52) (+41 / -42)	U_i = 30 V I_i = 320 mA P_i = 500 mW	Ci = 3.7 nF Li = negligibly small
Plug-in module for analog position feedback (+31 / -32)	U_i = 30 V I_i = 320 mA P_i = 1.1 W	Ci = 6.6 nF Li = negligibly small

Special Requirements

— For the "Limit monitor with proximity switches" circuit, external measures must be implemented to prevent the rated voltage from being exceeded by more than 40 % in the event of 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 explosive atmosphere would be present in zone 2 at the same time that installation or maintenance/repair work was being carried out
— Only non-flammable gases may be used for the pneumatic power supply.
— Only use suitable cable entries that meet the requirements of EN 60079-15 .

2.10 FM / CSA
(limited functionality)

2.10.1 CSA International

Certificate	
Certificate	1052414
Class 2258 02	PROCESS CONTROL EQUIPMENT – For Hazardous Locations
Class 2258 04	PROCESS CONTROL EQUIPMENT – Intrinsically Safe, Entity – For Hazardous Locations

Electrical data

Model TZIDC, P/N V18345-x0x2x2xx0x Intelligent Positioner	
For use in	Class I, Div 2, Groups A, B, C and D Class II, Div 2, Groups E, F, and G Class III, Enclosure Type 4X
Input rated	30 V DC; max. 4 ... 20 mA
Max output pressure	90 psi
Max. ambient temperature	85 °C

Model TZIDC, P/N V18345-x0x2x2xx0x Intelligent Positioner intrinsically safe with entity parameters of:		
For use in	Class I, Div 1, Groups A, B, C and D; Class II, Div 1, Groups E, F and G Class III, Enclosure Type 4X:	
Terminals 11 / 12	$V_{max} = 30$ V $I_{max} = 104$ mA	$C_i = 6.6$ nF $L_i = 0$ µH
Terminals 81 / 82	$V_{max} = 30$ V $I_{max} = 110$ mA	$C_i = 4.2$ nF $L_i = 0$ µH
Terminals 83 / 84	$V_{max} = 30$ V $I_{max} = 90$ mA	$C_i = 4.2$ nF $L_i = 0$ µH
Terminals 31 / 32	$V_{max} = 30$ V $I_{max} = 110$ mA	$C_i = 6.6$ nF $L_i = 0$ µH
Terminals 41 / 42 and 51 / 52	$V_{max} = 30$ V $I_{max} = 96$ mA	$C_i = 3.7$ nF $L_i = 0$ µH
Terminals Limit 2 41 / 42 and Limit 1 51 / 52	$V_{max} = 155$ V $I_{max} = 52$ mA	$C_i = 20$ nF $L_i = 30$ µH

Note
— The "x" in P/N denotes minor mechanical variations or optional features.
— Local communication interface (LCI) shall not be used in hazardous location.
— Each pair of conductors of each intrinsic safety circuit shall be shielded.
— See FM installation drawing No. 901064 for Details.

2.10.2 CSA Certification Record

Certificate	
Certificate	1649904 (LR 20312)
Class 2258 04	PROCESS CONTROL EQUIPMENT – Intrinsically Safe, Entity – For Hazardous Locations

Electrical data

Model TZIDC, P/N V18345-x0x2x2xx0x Intelligent Positioner		
For use in	Class I, Div 1, Groups A, B, C and D; Class II, Div 1, Groups E, F, and G, Class III, Div 1, Enclosure Type 4X	
Input rated	30 V DC; max.4 … 20 mA	
Output pressure	Max. 90 psi	
Intrinsically safe with entity parameters of:		
Terminals 11 / 12	$V\,max = 30\,V$ $I\,max = 104\,mA$	$C_i = 6.6\,nF$ $L_i = 0\,\mu H$ $P_i = 1\,W$
Terminals 81 / 82	$V\,max = 30\,V$ $I\,max = 110\,mA$	$C_i = 3.7\,nF$ $L_i = 0\,\mu H$ $P_i = 1\,W$
Terminals 83 / 84	$V\,max = 30\,V$ $I\,max = 90\,mA$	$C_i = 3.7\,nF$ $L_i = 0\,\mu H$ $P_i = 1\,W$
Terminals 31 / 32	$V\,max = 30\,V$ $I\,max = 110\,mA$	$C_i = 6.6\,nF$ $L_i = 0\,\mu H$ $P_i = 1\,W$
Terminals 41 / 42 and 51 / 52	$V\,max = 30\,V$ $I\,max = 96\,mA$	$C_i = 3.7\,nF$ $L_i = 0\,\mu H$ $P_i = 1\,W$
Terminals Limit 2 41 / 42 and Limit 1 51 / 52	$V\,max = 155\,V$ $I\,max = 52\,mA$	$C_i = 20\,nF$ $L_i = 30\,\mu H$ $P_i = 1\,W$
When installed per installation Drawing No 901064:		
Temperature Code	T4	
Max. Ambient temperature	85 °C	

Note
— The "x" in P/N denotes minor mechanical variations or optional features.
— Local communication interface LCI shall not be used in hazardous location.
— Each pair of conductors of each intrinsic safety circuit shall be shielded.
— See FM installation drawing No. 901064 for Details.

2.10.3 FM Approvals

TZIDC Positioner, Model V18345-a0b2c2de0f
IS/I,II,III/1/ABCDEFG/T4 Ta = 85 °C – 901064/7/4; Enity;
NI/I/2/ABCD/T4 Ta = 85 °C;
S/II,III/2/FG/T4 Ta =85 °C; Type 4X
Max Enity Parameters: Per Control Drawings

a   Case/mounting – 1, 2, 3, 4 or 9
b   Input/communication port – 1 or 2
c   Output/safe protection – 1, 2, 4 or 5
d   Option modules for analog or digital position feedback – 0, 1, 3 or 5
e   Mechanical kit (proximity swiches) for digital position feedback (option) – 0, 1 or 3
f   Design (varnish/coding) – 1 or 2

See FM installation drawing No. 901064 for Details.

3 Function and System Design

3.1 Schematic diagram

Basic device   Optional upgrades
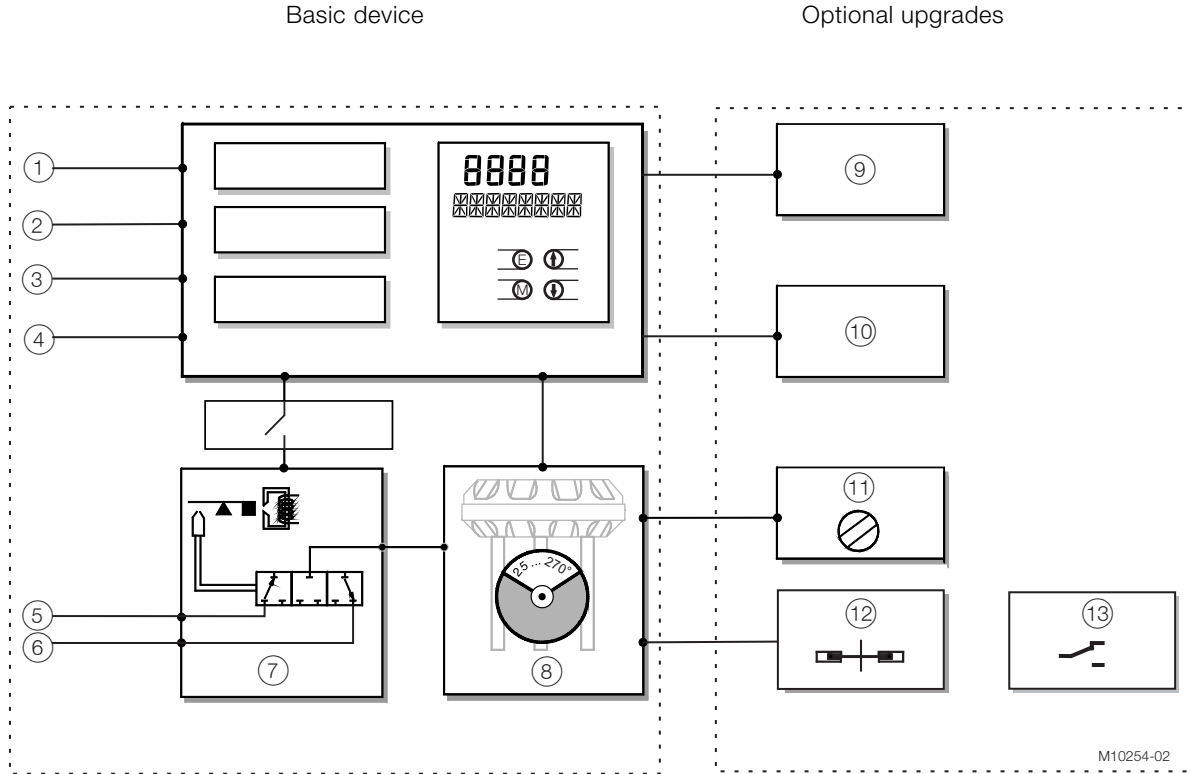
Fig. 2: Schematic diagram of the positioner

① LCI connector ② Setpoint signal 4 … 20 mA ③ Binary input ④ Binary output ⑤ Supply air: 1.4 … 6 bar (20 … 90 psi) ⑥ Exhaust air
⑦ I/P module with 3/3-way valve ⑧ Position sensor ⑨ Plug-in module analog feedback (4 … 20 mA) ⑩ Plug-in module digital feedback
⑪ Installation kit for mechanical position indication ⑫ Limit monitor with proximity switches ⑬ Limit monitor with 24 V microswitches

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ⓘ NOTE

With optional upgrades, either the "Limit monitor with proximity switches" (12) or the "Limit monitor with 24 V microswitches"
(13) can be used. In both cases, the "mechanical position indicator" (11) must be installed.

3.2 Functionality

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

4 Product identification

4.1 Name plate

Fig. 3: Name plate (example)
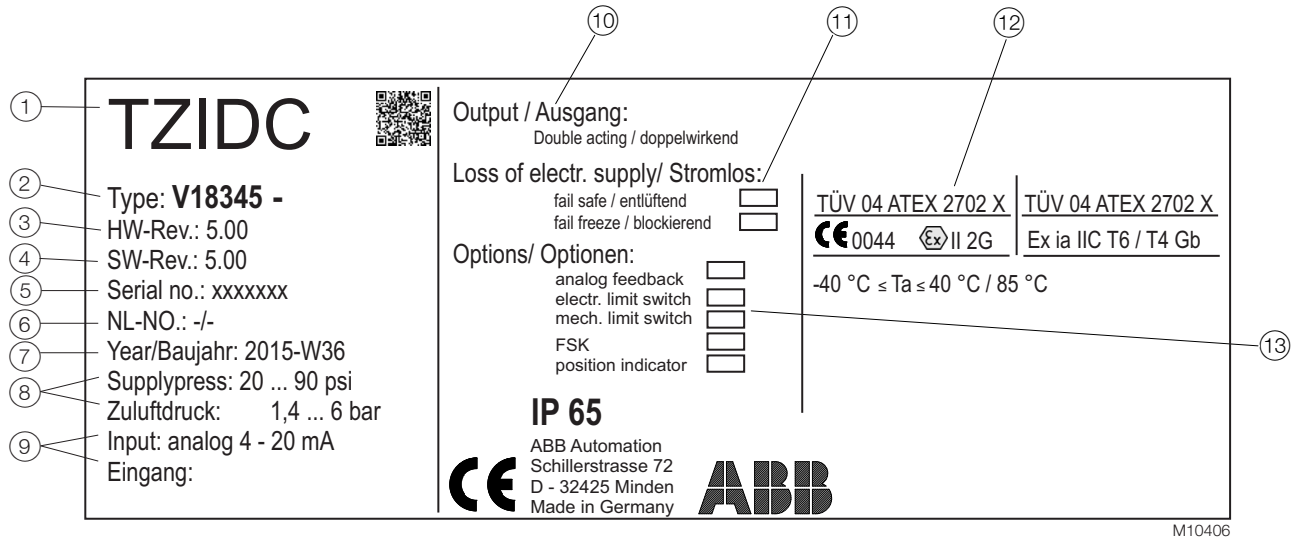
① Full type designation ② Master number ③ Hardware rev. ④ Software rev. ⑤ Serial number
⑥ Code for customer-specific version ⑦ Year of manufacture ⑧ Supply air pressure ⑨ Input signal ⑩ Mode of action of pneumatics
⑪ Response to failure of power supply ⑫ Ex-version ⑬ Additional options

5 Transport and storage

5.1 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.

5.2 Transporting the device

Observe the following instructions:
— Do not expose the device to moisture during transport. Pack the device accordingly.
— Pack the device so that it is protected against vibrations during transport, e.g., by using air-cushioned packaging.

5.3 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 ... 85 °C (-40 ... 185 °F).
— Avoid storing the device in 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.

5.3.1 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!

5.4 Returning devices

For the return of devices, follow the instructions in the chapter "Repair" on page 39.

6 Installation

6.1 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 Auto Adjust before restoring the factory settings.

> **ℹ NOTE**
>
> Before installation, check whether the positioner meets the control and safety requirements for the installation location (actuator or valve).
>
> See the "Specifications" section on 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.

6.2 External position sensors

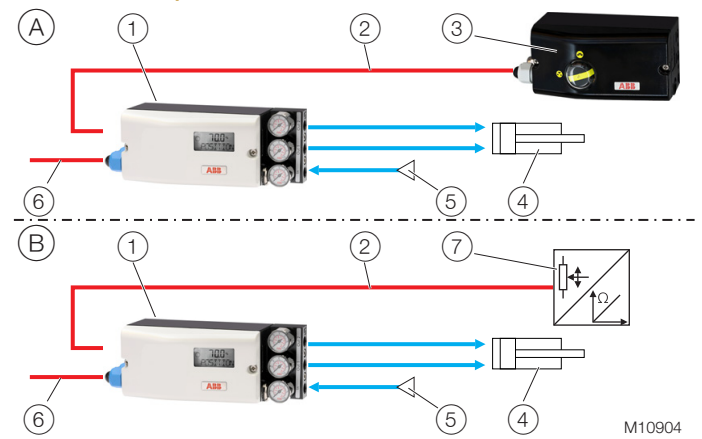Fig. 4:   TZIDC with external position sensors
① TZIDC Control Unit ② Connection cable
③ TZIDC Remote Sensor ④ Actuator ⑤ Compressed air supply
⑥ Setpoint signal ⑦ Remote position sensor

> **ℹ NOTE**
>
> If the device is being operated on a cylinder, for reasons associated with linearity you should run the Auto Adjust function for part-turn actuators (see chapter "Standard Auto Adjust for part-turn actuators" on page 28).

Ⓐ **TZIDC Control Unit with TZIDC Remote Sensor**

In this version, the components are supplied in two housings, which together form one harmonized unit.

The following points should be observed during installation:
— Housing 1 (TZIDC Control Unit) contains the electronics and pneumatics and is mounted separately from the actuator.
— Housing 2 (TZIDC Remote Sensor) contains the position sensor and is mounted on the linear and part-turn actuator. Mechanical mounting is described in chapter "Mechanical mounting" on page 15.
— Electrical connections are described in chapter "Connection on device - TZIDC Control Unit with TZIDC Remote Sensor" on page 24.

Ⓑ **TZIDC Control Unit for remote position sensor**

In this version the positioner is supplied without a position sensor.

The following points should be observed during installation:
— Housing 1 (TZIDC Control Unit) contains the electronics and pneumatics and is mounted separately from the actuator.
— The remote position sensor is mounted on the linear and part-turn actuator. Follow the operating instructions for the remote position sensor for mechanical mounting!
— Electrical connections are described in chapter "Connection on device - TZIDC Control Unit for remote position sensor" on page 25.

6.3 Mechanical mounting
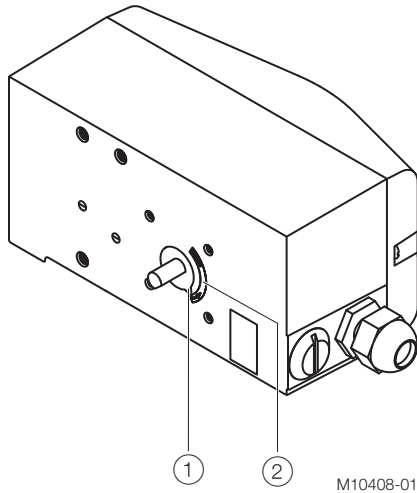
6.3.1 General information

Fig. 5:   Operating range

Arrow 1 on the device feedback shaft (position feedback point) must move between the arrow marks 2.
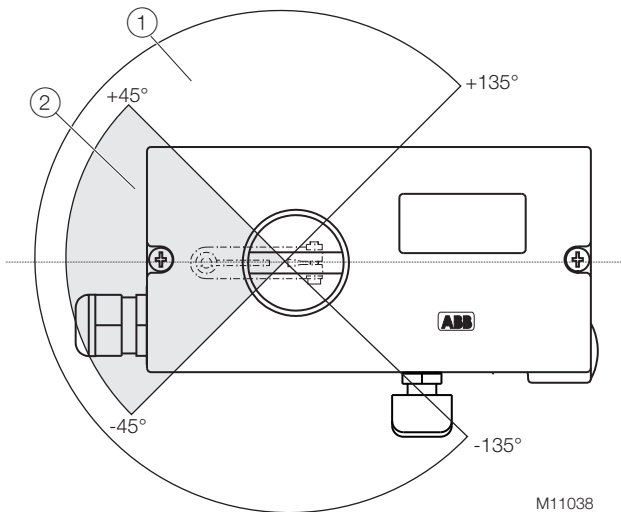
Fig. 6:   Measuring and operating ranges of the positioner
① Measuring range ② Operating range

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.

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.

ℹ NOTE

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

6.3.2 Mounting on linear actuators

For mounting on a linear actuator in accordance with DIN / IEC 534 (lateral mounting as per NAMUR), the following mounting kit is available:
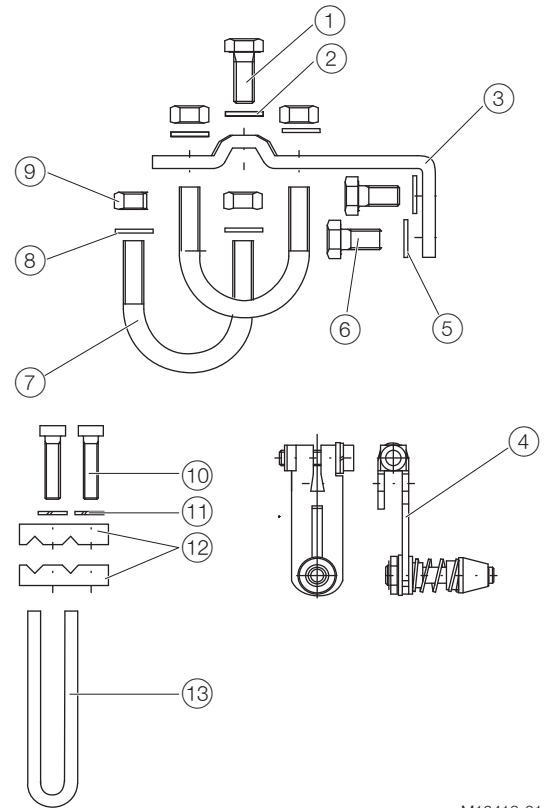
Fig. 7
① Screw ② Washer ③ Mount bracket
④ Lever with follower pin (for stroke adjustment 10 … 35 mm (0.39 … 1.38 inch) or 20 … 100 mm (0.79 … 3.94 inch)
⑤ Washers ⑥ Screws ⑦ U-bolts
⑧ Washers ⑨ Nuts ⑨ Screws ⑩ Spring washers
⑫ Clamp plates ⑬ Follower guide
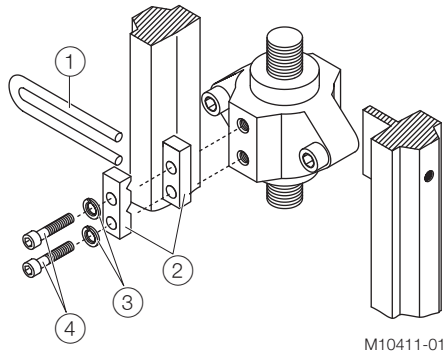
Fig. 8: Attaching a follower guide to the actuator

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.

Fig. 9: Mounting lever and bracket on positioner

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).

Fig. 10: Mounting on a cast iron yoke

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

or
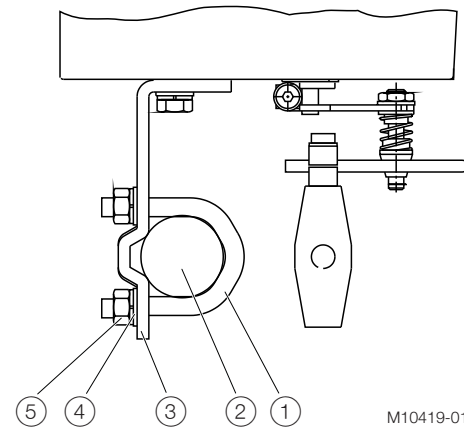
Fig. 11: Mounting on a columnar yoke

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.

ℹ 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.
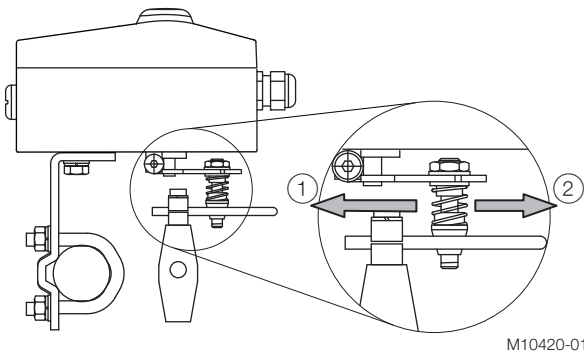
Fig. 12: Positioner linkage
① Increasing linkage ② Reducing linkage

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 sensor. Moving the link point outwards reduces the rotation angle of the 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: -28 … 28°
Minimum angle: 25°

ℹ 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 a 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.
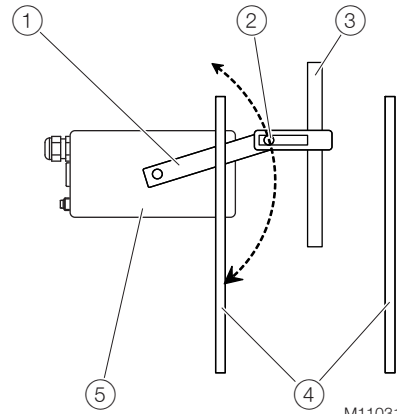
Fig. 13: Actuator bolt on lever (rear view)
① Potentiometer lever ② Actuator bolt ③ Valve stem
④ Valve yoke ⑤ Positioner
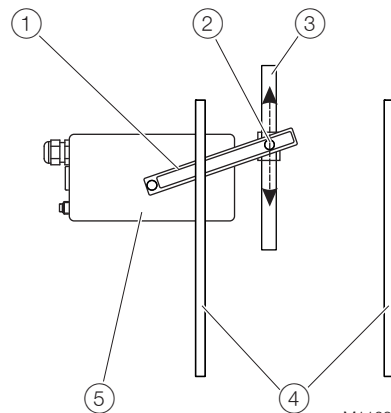
Fig. 14: Actuator bolt on valve (rear view)
① Potentiometer lever ② Actuator bolt ③ Valve stem
④ Valve yoke ⑤ Positioner

6.3.3 Mounting on part-turn actuators

For mounting on part-turn actuators in accordance with VDI / VDE 3845, the following attachment kit is available:
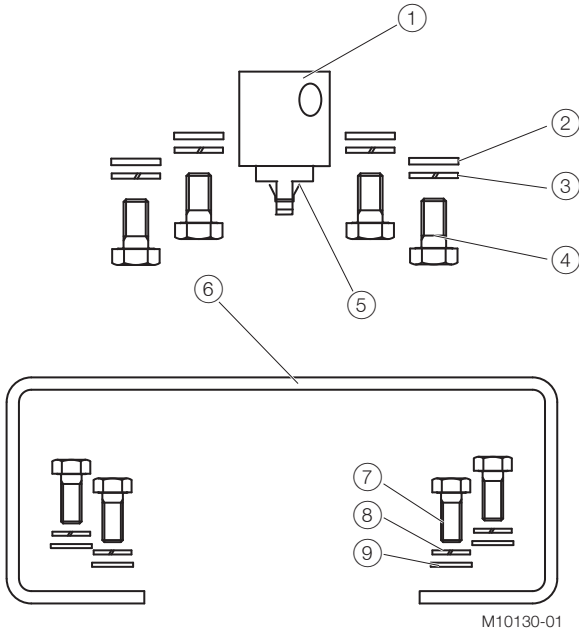
Fig. 15: Components of attachment kit

— Adapter ① with spring ⑤
— Four screws M6 ④, four spring washers ③, and four washers ② for attaching the mounting bracket ⑥ to the positioner
— Four screws M5 ⑦, four spring washers ⑧, and four washers ⑨ for attaching the mounting bracket to the actuator

Required tools:
— Wrench, size 8 / 10
— Allen key, size 3
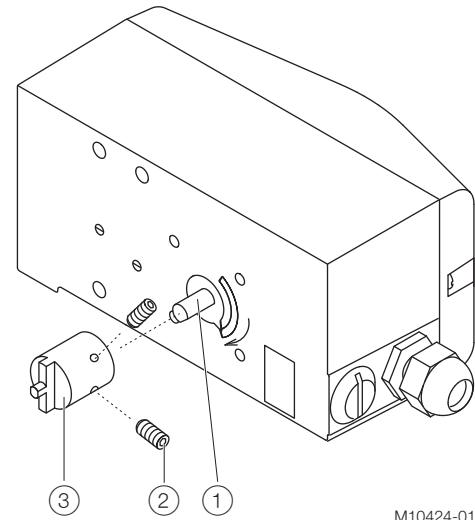
Fig. 16: Mounting the adapter on the positioner

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 rotary actuator into the home position.
4. Pre-adjust feedback shaft.
   To ensure the positioner will operate within the operating range (see chapter "General information" on page 15), 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.
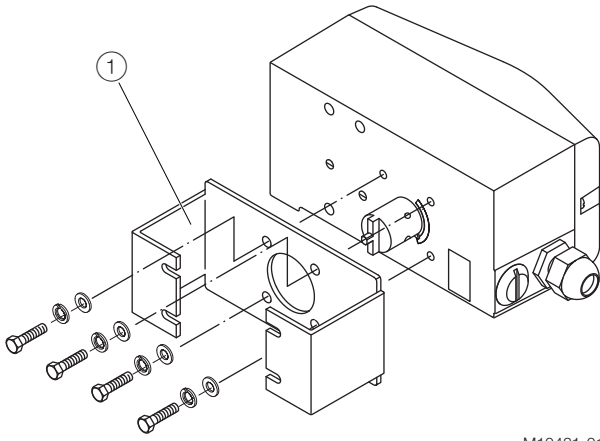
M10421-01

Fig. 17: Screwing the mounting bracket onto the positioner
① **Mounting bracket**
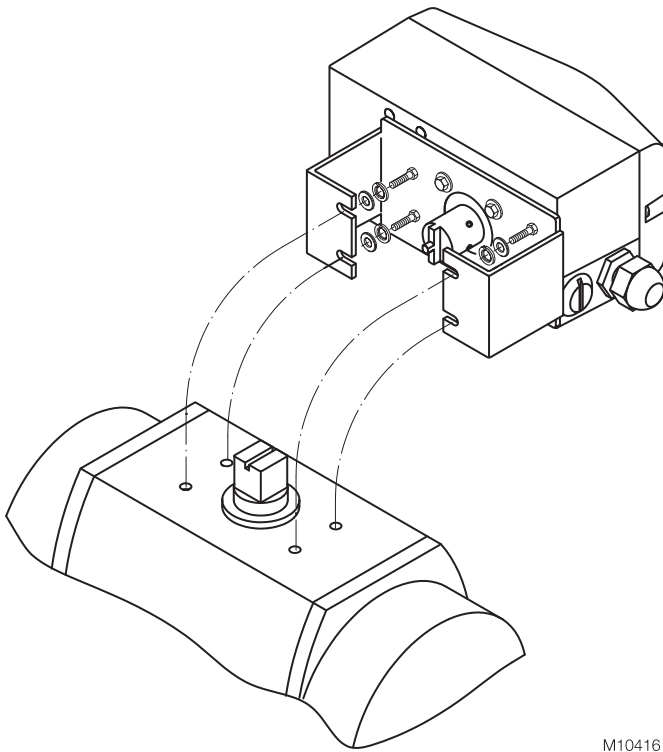
M10416

Fig. 18: Screwing the positioner onto the actuator

---

i   NOTE

After mounting, check whether the operating range for the actuator matches the measuring range for the positioner, see chapter "General information" on page 15.

6.4 Electrical connections

The electrical connection may only be established by authorized specialist personnel.

The electrical connection information in this manual must be observed; otherwise, the IP rating may be adversely affected. Safe isolation of electrical circuits which are dangerous if touched is only ensured if the connected devices satisfy the requirements of DIN EN 61140 (VDE 0140 Part 1) (basic requirements for safe isolation).

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.

6.4.1 Connection diagram for positioner / TZIDC Control Unit
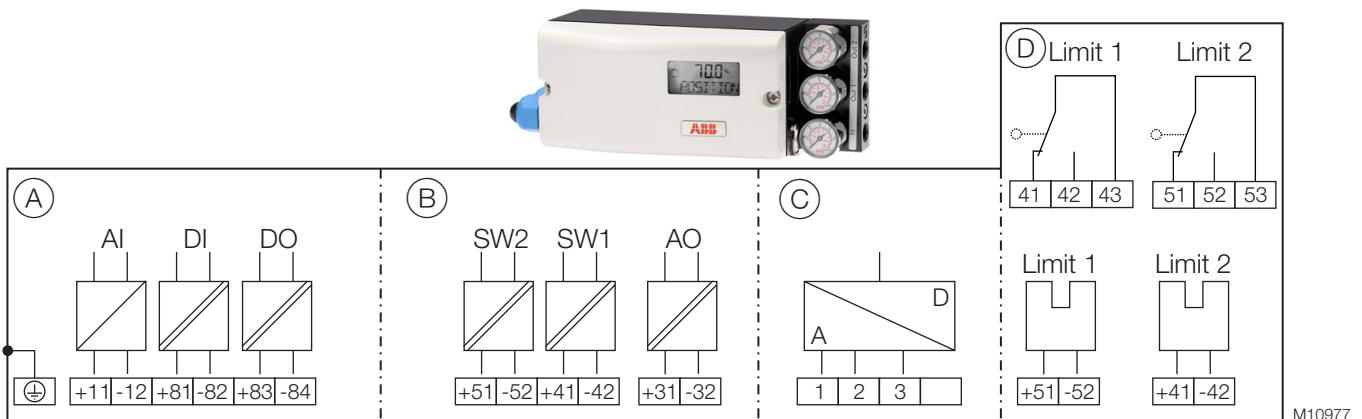
Fig. 19: TZIDC connection diagram
(A) Basic device (B) Options (C) Connection TZIDC Remote Sensor / remote position sensor (only for TZIDC Control Unit version)
(D) Options, limit monitor with proximity switches or microswitches (not for TZIDC Control Unit version)

Connections for inputs and outputs

Terminal	Function / comments
+11 / -12	**Analog input**
+81 / -82	**Binary input DI**
+83 / -84	**Binary output DO2**
+51 / -52	**Digital feedback SW1**
	(Option module)
+41 / -42	**Digital feedback SW2**
	(Option module)
+31 / -32	**Analog feedback AO**
	(Option module)
1 / 2 / 3	**TZIDC remote sensor**
	(Only for options TZIDC Remote Sensor or TZIDC for remote position sensor)

Terminal	Function / comments
+51 / -52	**Limit switch Limit 1 with proximity switch**
	(optional)
+41 / -42	**Limit switch Limit 2 with proximity switch**
	(optional)
41 / 42 / 43	**Limit switch Limit 1 with microswitch**
	(optional)
51 / 52 / 53	**Limit switch Limit 2 with microswitch**
	(optional)

ℹ **NOTE**

The TZIDC can be fitted either with proximity switches or microswitches as limit switches. It is not possible to combine both variants. For the version TZIDC Control Unit with TZIDC Remote Sensor, the limit switches are located in the TZIDC Remote Sensor.

6.4.2 Connection diagram for TZIDC Remote Sensor
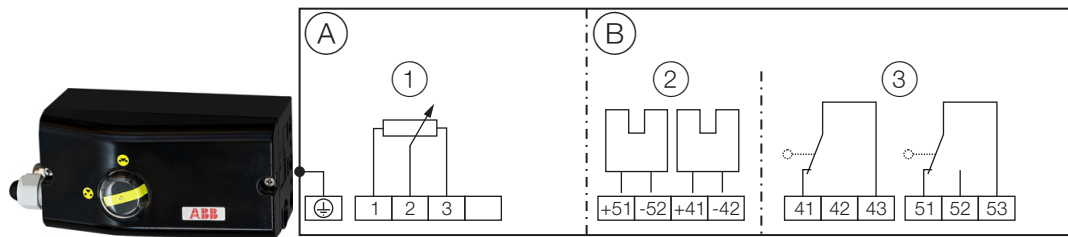
Fig. 20: TZIDC Remote Sensor connection diagram
Ⓐ Basic device Ⓑ Options
① Position sensor ② Limit monitor with proximity switches **(option)** ③ Limit monitor with microswitches **(option)**

Connections for inputs and outputs

Terminal	Function / comments
1 / 2 / 3	**TZIDC control unit**
+51 / -52	**Proximity switches Limit 1** (Option)
+41 / -42	**Proximity switches Limit 2** (Option)
41 / 42 / 43	**Microswitches Limit 1** (Option)
51 / 52 / 53	**Microswitches Limit 2** (Option)

> **i NOTE**
> The TZIDC Remote Sensor can be fitted either with proximity switches or microswitches as limit switches. It is not possible to combine both variants.

6.4.3 Electrical data for inputs and outputs

> **i NOTE**
> When using the device in hazardous areas, note the additional connection data in the chapter titled "Use in potentially explosive atmospheres" on page 5!

Analog input

Setpoint signal analog (two-wire technology)	
Terminals	+11 / -12
Nominal range	4 ... 20 mA
Split range configuration between	20 ... 100 % of the nominal operating range is configurable
Maximum	50 mA
Minimum	3.6 mA
Starting at	3.8 mA
Load voltage	9.7 V at 20 mA
Impedance at 20 mA	485 Ω

Digital input

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	
Terminals	+81 / -82
Supply voltage	24 V DC (12 ... 30 V DC)
Input "logical 0"	0 ... 5 V DC
Input "logical 1"	11...30 V DC
Power consumption	Maximum 4 mA

Binary output

Output configurable as alarm output by software.

Binary output DO	
Terminals	+83 / -84
Supply voltage	5 ... 11 V DC
	(Control circuit to DIN 19234/NAMUR)
Output "logical 0"	> 0.35 mA ... < 1.2 mA
Output "logical 1"	> 2.1 mA
Effective direction	Configurable
	"logical 0" or "logical 1"

Option modules

Module for analog feedback AO[1]

Without a signal from the positioner (e.g. "no power" or "initializing") the module sets the output to > 20 mA (alarm level).

Terminals	+31 / -32
Signal range	4 ... 20 mA (configurable split ranges)
— in the event of an error	> 20 mA (alarm level)
Supply voltage, two-wire technology	24 V DC (11 ... 30 V DC)
Characteristic curve	rising or falling (configurable)
Characteristic curve deviation	< 1 %

Module for digital feedback SW1, SW2[1]

Terminals	+41 / -42, +51 / -52
Supply voltage	5 ... 11 V DC
	(Control circuit to DIN 19234/NAMUR)
Output "logical 0"	< 1.2 mA
Output "logical 1"	> 2.1 mA
Effective direction	Configurable
	"logical 0" or "logical 1"
Description	Two software switches for binary position feedback (position adjustable within the range of 0 ... 100 %, ranges cannot overlap)

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

Assembly kits for limit monitor

Two proximity switches or microswitches for independent position signaling, switching points adjustable between 0 … 100%

Limit monitor with proximity switches Limit 1, Limit 2

Terminals	+41 / -42, +51 / -52	
Supply voltage	5 ... 11 V DC	
	(Control circuit to DIN 19234/NAMUR)	
Effective direction	Slot sensor in proximity switch	Slot sensor outside proximity switch
Type SJ2-SN (NC; log 1)	< 1.2 mA	> 2.1 mA

Limit monitor with 24 V microswitches Limit 1, Limit 2

Terminals	+41 / -42, +51 / -52
Supply voltage	maximum 24 V AC/DC
Load rating	Maximum 2 A
Contact surface	10 µm Gold (AU)

Mechanical position indicator

Indicator disk in enclosure cover linked with device feedback shaft.

These options are also available for retrofitting by Service.

6.4.4 Connection on the device
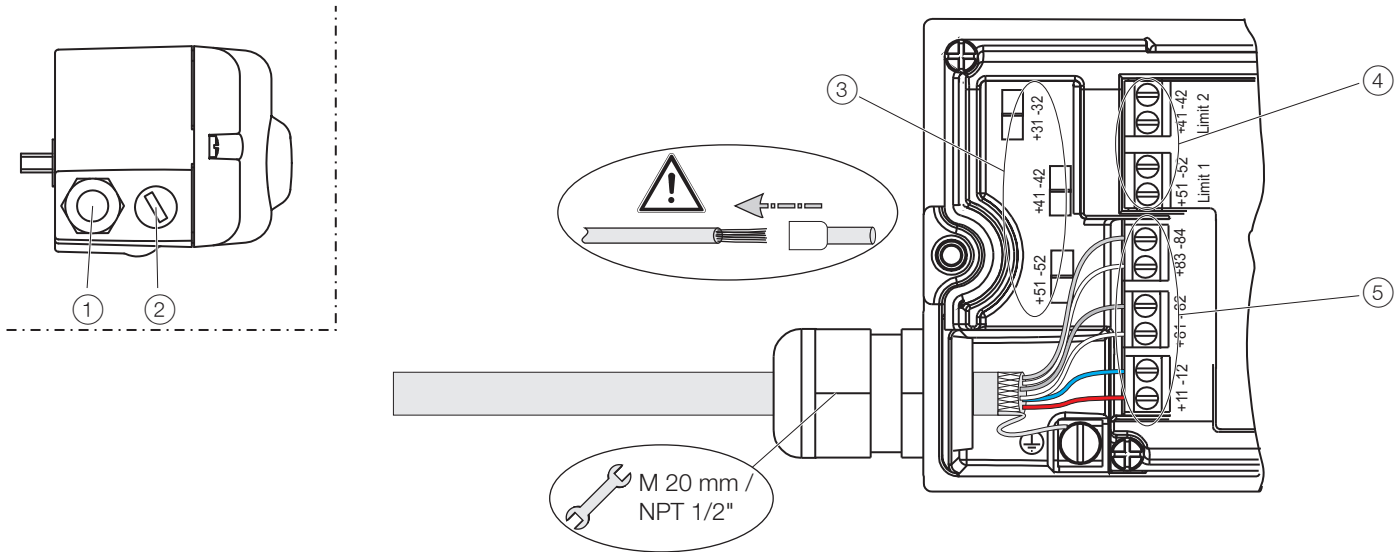
Fig. 21: Connection on device (example)
① Cable gland ② Blind plug ③ Connecting terminals for option modules
④ Connecting terminals attachment set for digital feedback ⑤ Connecting terminals basic device

For the cable entry in the housing, there are two tap holes 1/2 - 14 NPT or M20 x 1.5 on the left-hand side of the housing. One of these holes has a cable gland and the other has a blind plug.

ℹ 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 inch).
2. Connect the wires to the connecting terminals in line with the connection diagram.

Wire cross-sectional areas
Basic device

Electrical connections	
4 … 20 mA input	Screw terminals max. 2.5 mm^2 (AWG 14)
Options	Screw terminals max. 1.0 mm^2 (AWG 18)

cross section	
Rigid / flexible wires	0.14 ... 2.5 mm^2 (AWG 26 ... AWG 14)
Flexible with wire end sleeve	0.25 ... 2.5 mm^2 (AWG 23 ... AWG 14)
Flexible with wire end sleeve no plastic sleeve	0.25 ... 1.5 mm^2 (AWG 23 ... AWG 17)
Flexible with wire end sleeve with plastic sleeve	0.14 ... 0.75 mm^2 (AWG 26 ... AWG 20)

Multi-wire connection capacity (two wire with the same cross-section)	
Rigid / flexible wires	0.14 ... 0.75 mm^2 (AWG 26 ... AWG 20)
Flexible with wire end sleeve no plastic sleeve	0.25 ... 0.75 mm^2 (AWG 23 ... AWG 20)
Flexible with wire end sleeve with plastic sleeve	0.5 ... 1.5 mm^2 (AWG 21 ... AWG 17)

Option modules

Cross section	
Rigid / flexible wires	0.14 ... 1.5 mm^2 (AWG 26 ... AWG 17)
Flexible with wire end sleeve no plastic sleeve	0.25 ... 1.5 mm^2 (AWG 23 ... AWG 17)
Flexible with wire end sleeve with plastic sleeve	0.25 ... 1.5 mm^2 (AWG 23 ... AWG 17)

Multi-wire connection capacity (two wire with the same cross-section)	
Rigid / flexible wires	0.14 ... 0.75 mm^2 (AWG 26 ... AWG 20)
Flexible with wire end sleeve no plastic sleeve	0.25 ... 0.5 mm^2 (AWG 23 ... AWG 22)
Flexible with wire end sleeve with plastic sleeve	0.5 ... 1 mm^2 (AWG 21 ... AWG 18)

Limit switch with proximity switches or 24 V microswitches	
Rigid wire	0.14 ... 1.5 mm^2 (AWG 26 ... AWG 17)
Flexible wire	0.14 .... 1.0 mm^2 (AWG 26 ... AWG 18)
Flexible with wire end sleeve no plastic sleeve	0.25 ... 0.5 mm^2 (AWG 23 ... AWG 22)
Flexible with wire end sleeve with plastic sleeve	0.25 ... 0.5 mm^2 (AWG 23 ... AWG 22)

6.4.5 Connection on device - TZIDC Control Unit with TZIDC Remote Sensor

TZIDC Control Unit
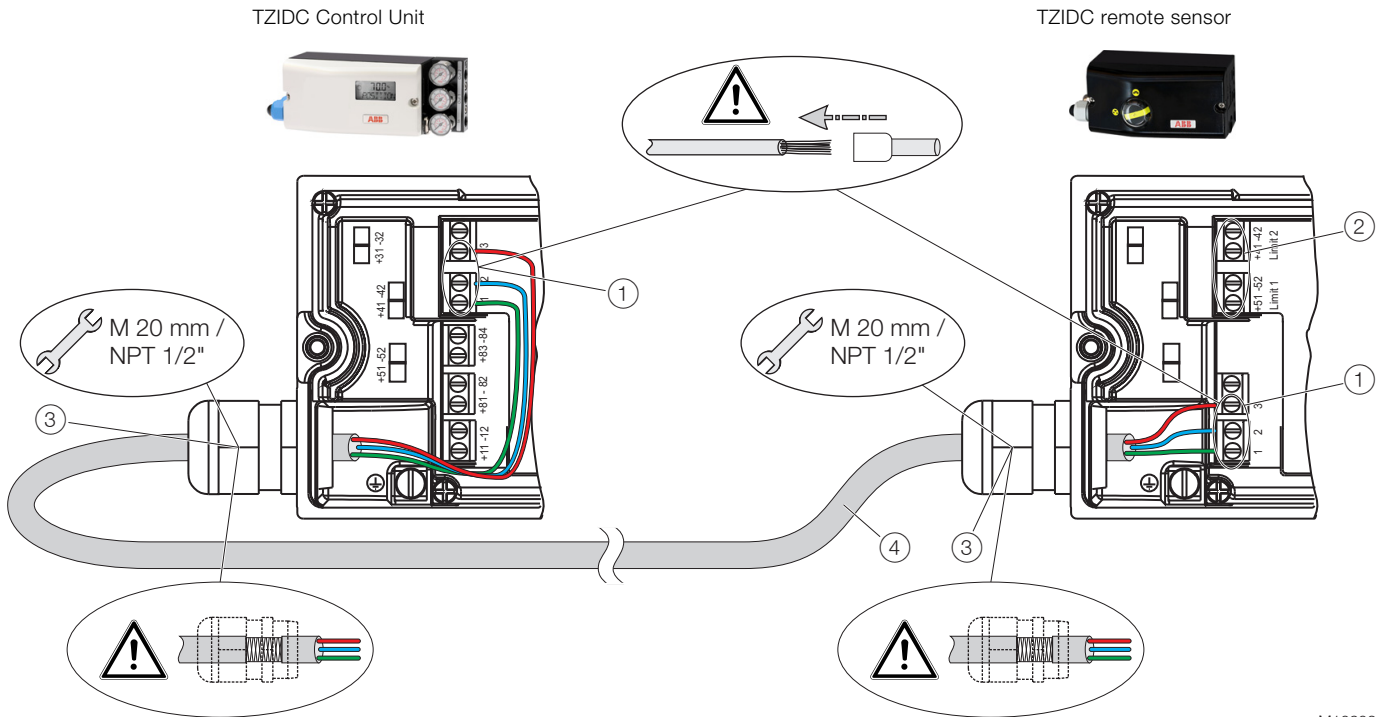
TZIDC remote sensor

M10902

Fig. 22: Connection of TZIDC Control Unit with TZIDC Remote Sensor (example)
① Connecting terminals TZIDC Remote Sensor ② Connecting terminals attachment kit for digital feedback ③ EMC cable gland
④ Shielded connection cable

In the case of the "TZIDC Control Unit with TZIDC Remote Sensor" design, the components are supplied in two housings, which together form one harmonized unit.
Housing 1 (TZIDC Control Unit) contains the electronics and pneumatics along with the following options (where applicable):
— Analog position feedback
— Digital position feedback

Housing 2 (TZIDC Remote Sensor) contains the position sensor and is suitable for mounting on linear or part-turn actuators.
The following options can be installed if required:
— Optical position indication
— Mechanical feedback contacts designed as proximity switches or microswitches.

Connect the positioner (TZIDC Control Unit, housing 1) and remote position sensor (TZIDC Remote Sensor, housing 2) while following the instructions below:
— The sensor and the electronics have been carefully matched. Ensure that only devices with the same serial number are connected.
— A shielded three-wire cable with a maximum length of 10 m (33 ft) must be used for connection purposes.
— Route the cable into the terminal compartment through the EMC cable glands. Ensure that the shielding is secured correctly in the EMC cable glands.
— Connect the cables in line with the connection diagrams and tighten the screws of the connecting terminals so that they are hand-tight.
— The electrical connections of the TZIDC Control Unit and the optional modules are described in chapter "Connection diagram for positioner / TZIDC Control Unit" on page 20.
— If the TZIDC Control Unit is attached so that it is it non-conductive, the housing must be grounded (TZIDC Control Unit and TZIDC Remote Sensor housing with the same electrical potential); otherwise control deviations could occur with regard to analog position feedback.
— Use wire end ferrules when connecting.

6.4.6 Connection on device - TZIDC Control Unit for remote position sensor
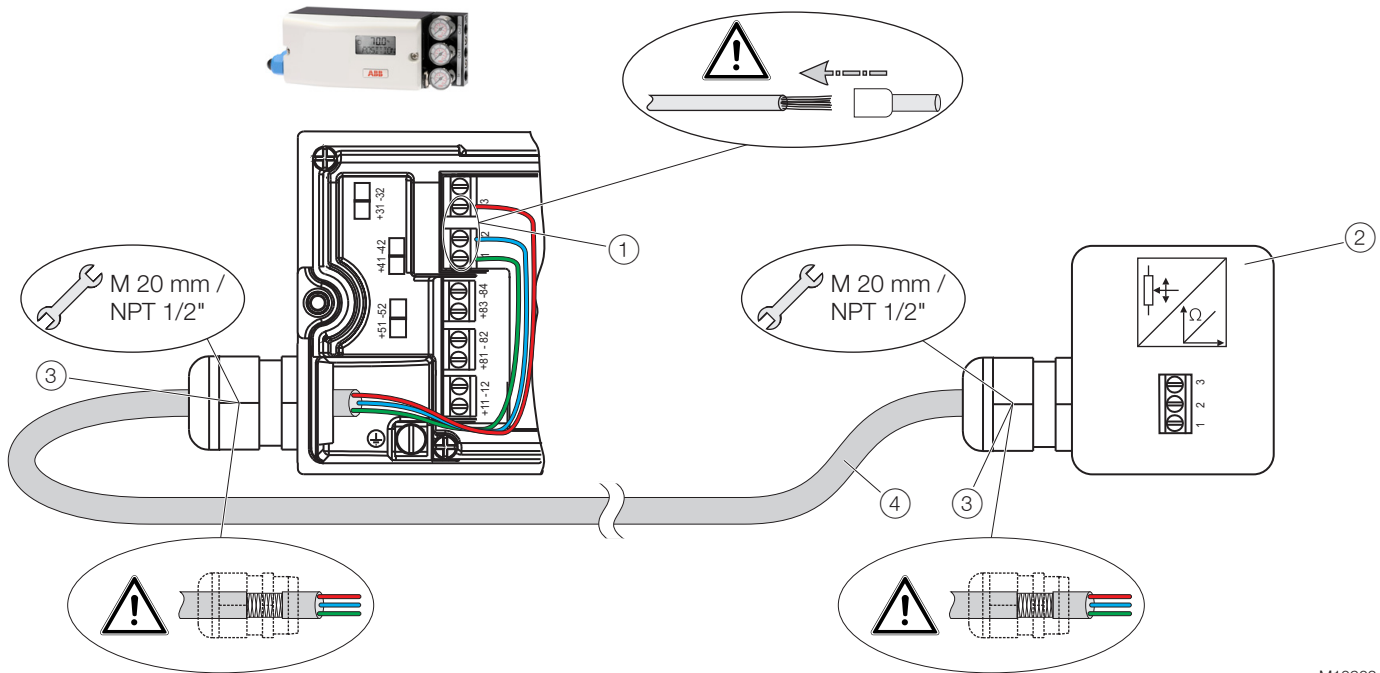
Fig. 23: Connection of TZIDC Control Unit with remote position sensor (example)
① Connecting terminals for remote position sensor ② Remote position sensor ③ EMC cable gland ④ Shielded connection cable

With the TZIDC designed for remote position sensors, the positioner is supplied without a position sensor.

The TZIDC Control Unit contains the electronics and pneumatics along with the following options (where applicable):
— Analog position feedback
— Digital position feedback

Any position sensor (4 … 30 kΩ, with open circuit detection 4 … 18 kΩ) may be connected.

Connect the positioner (TZIDC Control Unit) and remote position sensor while observing the following instructions:
— A shielded three-wire cable with a maximum length of 10 m (33 ft) must be used for connection purposes.
— Route the cable into the terminal compartment through the EMC cable glands. Ensure that the shielding is secured correctly in the EMC cable glands.
— Connect the cables in line with the connection diagrams and tighten the screws of the connecting terminals so that they are hand-tight.
— The electrical connections of the TZIDC Control Unit and the optional modules are described in chapter "Connection diagram for positioner / TZIDC Control Unit" on page 20.
— If the TZIDC Control Unit is attached so that it is it non-conductive, the housing must be grounded (TZIDC Control Unit and remote position sensor housing with the same electrical potential); otherwise control deviations could occur with regard to analog position feedback.
— Use wire end ferrules when connecting.

6.5 Pneumatic connections

> **ℹ NOTE**
>
> The positioner must only be supplied with instrument air that is free of oil, water, and dust (in gas configuration with dried natural gas).
>
> The purity and oil content must meet the requirements of Class 3 according to DIN/ISO 8573-1.

> **ℹ NOTE**
>
> **Damage to components!**
>
> Contamination on the air pipe and positioner can damage components.
>
> Dust, splinters, and any other particles of dirt must be blown off the pipe before it is connected.

> **ℹ NOTE**
>
> **Damage to components!**
>
> Pressure above 6 bar (90 psi) can damage the positioner or actuator.
>
> Provisions must be made (e.g. use of a pressure regulator) to ensure that the pressure does not rise above 6 bar (90 psi), even in the event of a fault.

6.5.1 Information on double-acting actuators with spring-return mechanism

On double-acting actuators with spring-return mechanism, a pressure that significantly exceeds the supply 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).

6.5.2 Connection on the device
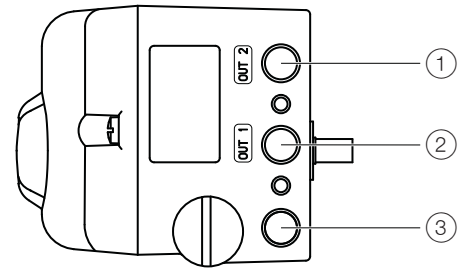
Fig. 24: Pneumatic connections
① OUT 2 ② OUT 1 ③ IN

Labeling	Pipe connection
IN	Air supply, pressure 1.4 ... 6 bar (20 ... 90 psi)
OUT1	Actuating pressure for actuator
OUT2	Actuating pressure for actuator (2. Connection with double-acting actuator)

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. G1/4 or 1/4 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 line with dimensions of 12 x 1.75 mm.

— The level of supply air pressure required to apply the actuating force must be adjusted in line with the output pressure in the actuator. The working range for the positioner is between 1.4 ... 6 bar (20 ... 90 psi).

6.5.3 Air supply

Instrument air[1]	
Purity	Maximum particle size: 5 μm
	Maximum particle density: 5 mg/m^3
Oil content	Maximum concentration 1 mg/m^3
Pressure dew point	10 K below operating temperature
Supply pressure[2]	1.4 … 6 bar (20 … 90 psi)
Air consumption[3]	< 0.03 kg/h / 0.015 scfm

1) Free of oil, water and dust in accordance with DIN / ISO 8573-1. Pollution and oil content according to Class 3
2) Do not exceed the maximum output pressure of the actuator
3) Independent of supply pressure

7 Commissioning

i 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 Auto Adjust before restoring the factory settings.

i NOTE

Please observe the information in chapter "Operation" on page 30 when operating the device.

Commissioning the positioner:

1. Open the pneumatic power supply.
2. Switch on the electrical power supply and feed in the setpoint signal 4 ... 20 mA.
3. Checking mechanical mounting:
   — Press and hold **MODE**, and press ⬆ or ⬇ until operating mode 1.3 (manual adjustment within the measuring 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.

Recommended rotational angle range	
Linear actuators	-28 ... 28°
Part-turn actuators	-57 ... 57°
Minimum angle	25°

4. Perform standard Auto Adjust in line with chapter "Standard Auto Adjust" on page 28.

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

7.1 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.

Operating mode	Mode indicator	Position indicator
1.0 Control mode[1] with adaptation of the control parameters	1.0 CTRL_ADP M10906a	⏱ 50.0% POSITION M10906f
1.1 Control mode[1] without adaptation of the control parameters	1.1 CTRL_FIX M10906b	50.0% POSITION M10906g
1.2 Manual adjustment[2] in the operating range. Adjust with ⬆ or ⬇ [3]	1.2 MANUAL M10906c	50.0% POSITION M10906g
1.3 Manual adjustment[2] in the measuring range. Adjust with ⬆ or ⬇ [3]	1.3 MAN_SENS M10906d	-15.0° SENS_POS M10906h

1) Since self-optimization in operating mode 1.0 is subject to several factors during control operation with adaptation, incorrect adjustments could be made over an extended period.
2) Positioning not active.
3) For high-speed mode, press ⬆ and ⬇ simultaneously.

7.2 Standard Auto Adjust

i NOTE

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

7.2.1 Standard Auto Adjust for linear actuators[1]
1. Press and hold down **MODE** until **ADJ_LIN** is displayed.
2. Press **MODE** and hold down until the countdown ends.
3. Release **MODE**; this starts Autoadjust.

7.2.2 Standard Auto Adjust for part-turn actuators[1]
1. Press and hold down **ENTER** until **ADJ_ROT** is displayed.
2. Press **ENTER** and hold down 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 chapter "Mechanical mounting" on page 15 and repeat Standard Auto Adjust.

---

1) The zero position is determined automatically and saved during Standard Auto Adjust (counter-clockwise (CTCLOCKW) for linear actuators and clockwise (CLOCKW) for rotary actuators).

7.3 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,
— also press and release **ENTER**,
— Wait for the countdown to go from 3 to 0,
— Release ⬆ and ⬇.
  The following is now shown in the display:

```
    P 1.0
conf STANDARD
          M10906i
```

2. Switching to parameter group 3._:
— Press and hold down **MODE** and **ENTER** simultaneously,
— Also press and release ⬆ twice,
  The following is now shown in the display:

```
    P 3._
conf ACTUATOR
          M10906j
```
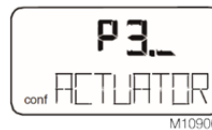
— Release **MODE** and **ENTER** .
  The following is now shown in the display:

```
    0.0 %
conf MIN_RGE
          M10906k
```

3. Selecting parameter 3.2:
— Press and hold down **MODE**,
— Also press and release ⬆ twice,
  The following is now shown in the display:

```
    P 3.2
conf CLOCKW
          M10906l
```
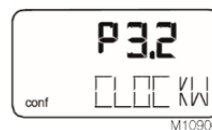
— Release **MODE**.

4. Changing parameter settings:
— 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**,
— Also press and release ⬆ twice,
  The following is now shown in the display:

P3.3
conf   EXIT
M10906m

— Release **MODE**,
— 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.

7.4 Setting the option modules

7.4.1 Setting the mechanical position indicator

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.

ℹ NOTE

The labels are located on the inside of the housing cover.

7.4.2 Setting the mechanical binary feedback 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. Only adjust the slot sensors using a screwdriver.

---

2. Set the upper and lower switching points for binary feedback as follows:
— Select "Manual Adjustment" mode and move the valve by hand into the lower switching position.
— Use a screwdriver to adjust the slot sensor for proximity switch 1 (lower contact) on the feedback shaft until it closes the contact (i.e. until shortly before entering the proximity switch). The slot sensor enters proximity switch 1 when the feedback shaft is rotated clockwise (as viewed from the front).
— Move the valve by hand into the upper switching position.
— Use a screwdriver to adjust the slot sensor for proximity switch 2 (upper contact) on the feedback shaft until it closes the contact (i.e. until shortly before entering 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.

7.4.3 Setting the mechanical binary feedback with 24 V microswitches

1. Loosen the screws for the housing cover and remove it.
2. Select "Manual Adjustment" operating mode and move the valve 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 "Manual Adjustment" operating mode and move the valve 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.

8 Operation

8.1 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 Auto Adjust 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.

8.2 Parameterization of the device

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

8.2.1 Menu navigation
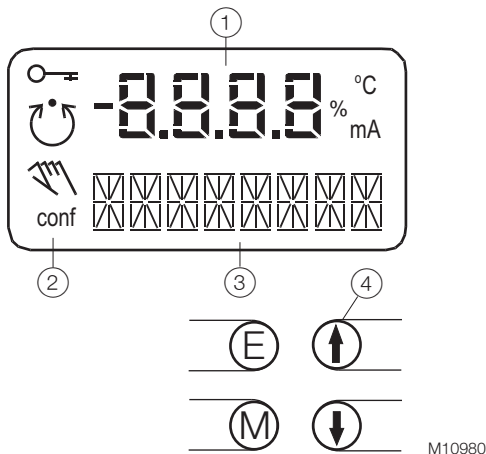
Fig. 25: LCD display with operating buttons
① Value display with unit ② Symbol display
③ Designator display ④ Operating buttons for menu navigation

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

Symbol	Description
⊶	Operation or access is restricted.
⟳	Control loop is active. The symbol is displayed when the positioner is in operating mode 1.0 CTRL_ADP (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.
✍	Manual adjustment. 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.
conf	The configuration icon indicates that the positioner is at the configuration level. The control operation is inactive.

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

Operating button functions

Control button	Meaning
ENTER	— Acknowledge message — Start an action — Save in the non-volatile memory
MODE	— Choose operating mode (operating level) — Select parameter group or parameter (configuration level)
⬆	UP direction button
⬇	DOWN direction button
Press and hold all four buttons for 5 s	Reset

8.3 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.

---

i   NOTE

Property damage

During external configuration via a PC, the positioner no longer responds to the setpoint current. This may lead to process failures. Prior to external configuration, always move the actuator to the safety position and activate manual adjustment.

8.4 HART parameter overview
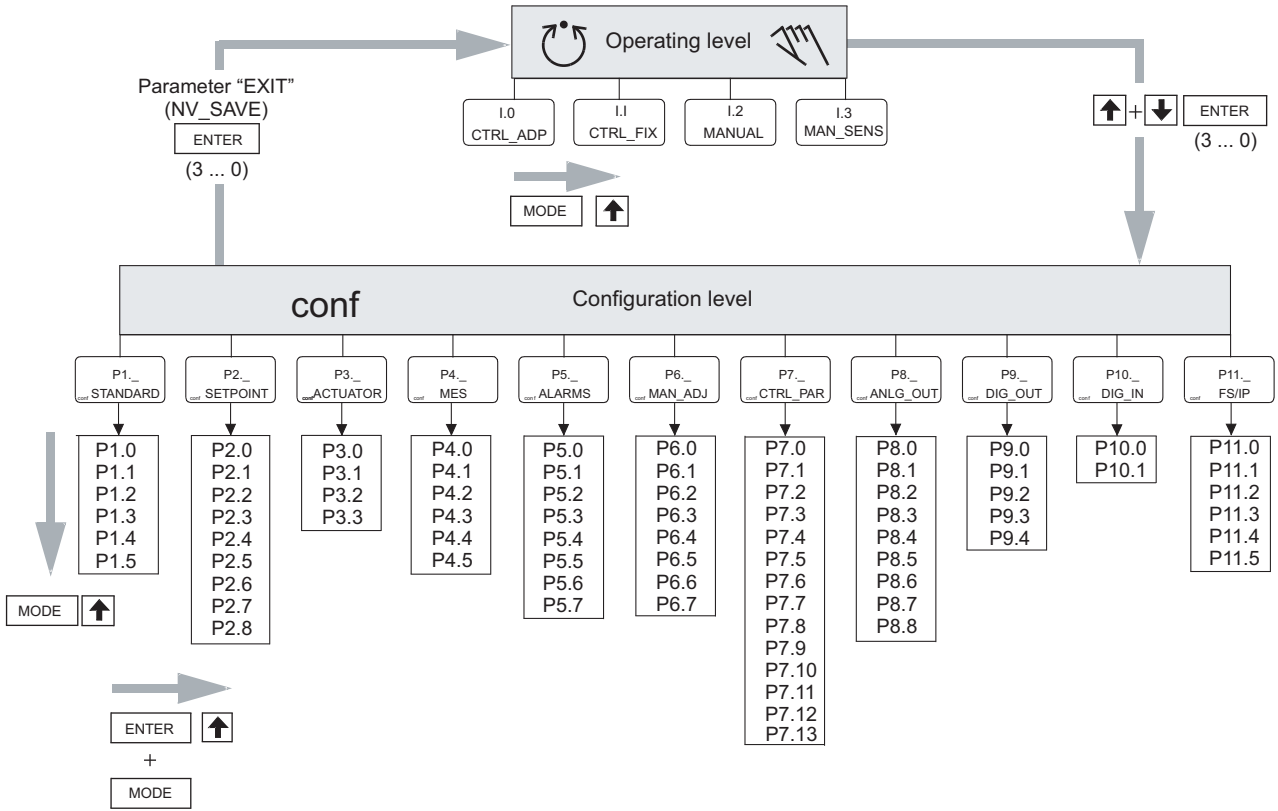
Fig. 26

8.5 HART parameter description

Parameter	Display	Function		Possible parameter setting	Unit	Factory setting
P1._	STANDARD					
P1.0	ACTUATOR	Actuator type	Actuator type	LINEAR, ROTARY	---	LINEAR
P1.1	AUTO_ADJ	Auto adjust	Autoadjust	Function	---	---
P1.2	ADJ_MODE	Auto adjust mode	Automatic adjustment mode	FULL,STROKE,CTRL_PAR, ZERO_POS, LOCKED		FULL
P1.3	TEST	Test	Test	Function	---	INACTIVE
P1.4	FIND_DEV	Find device	Find device	DISABLE, ONE TIME, CONTINOUS	---	DISABLE
P1.5	EXIT	Return	Return to operating level	Function	---	NV_SAVE
P2._	SETPOINT					
P2.0	MIN_RGE	Min setpoint range	Min. setpoint range	4.0 … 18.4	mA	4.0
P2.1	MAX_RGE	Max setpoint range	Max. setpoint range	20.0 … 5.6	mA	20.0
P2.2	CHARACT	Charact. curve	Characteristic curve	LINEAR, 1:25, 1:50, 25:1, 50:1, USERD	---	LINEAR
P2.3	ACTION	Valve action	Effective direction	DIRECT, REVERSE	---	DIRECT
P2.4	SHUT_CLS	Shut-off value 0%	Shut-off value 0 %	OFF, 0.1 … 45.0	%	1.0
P2.5	SHUT_OPN	Shut off value 100%	Shut-off value 100 %	55.0 … 100.0, OFF	%	OFF
P2.6	RAMP UP	Set point ramp, up	Setpoint ramp (up)	OFF, 0 … 200	---	OFF
P2.7	RAMP DN	Set point ramp, down	Setpoint ramp (down)	OFF, 0 … 200	---	OFF
P2.8	EXIT	Return	Return to operating level	Function	---	NV_SAVE
P3._	ACTUATOR					
P3.0	MIN_RGE	Min. of stroke range	Operating range, min.	0.0 … 90.0	%	0.0
P3.1	MAX_RGE	Max. of stroke range	Operating range, max.	100.0 … 10.0	%	100
P3.2	ZERO_POS	Zero position	Zero position	CLOCKWISE, CTCLOCKWISE	---	CTCLOCKWISE
P3.3	EXIT	Return	Return to operating level	Function	---	NV_SAVE
P4._	MESSAGES					
P4.0	TIME_OUT	Control time out	Dead band time limit	OFF, … 200	---	OFF
P4.1	POS_SW1	Position switch 1	Switching point SW1	0.0 … 100.0	%	0.0
P4.2	POS_SW2	Position switch 2	Switching point SW2	0.0 … 100.0	%	100.0
P4.3	SW1_ACTV	Switchpoint 1 enable	Active direction SW1	FALL_BEL, EXCEED	---	FALL_BEL
P4.4	SW2_ACTV	Switchpoint 2 enable	Active direction SW2	FALL_BEL, EXCEED	---	EXCEED
P4.5	EXIT	Return	Return to operating level	Function	---	NV_SAVE
P5._	ALARMS					
P5.0	LEAKAGE	Leakage detection	Leakage to actuator	ACTIVE, INACTIVE	---	INACTIVE
P5.1	SP_RGE	Setpoint rng monitor	Outside the setpoint range	ACTIVE, INACTIVE	---	INACTIVE
P5.2	SENS_RGE	Sens. range monitor	Operating range exceeded	ACTIVE, INACTIVE	---	INACTIVE
P5.3	CTRLER	Controller monitor	Controller inactive	ACTIVE, INACTIVE	---	INACTIVE
P5.4	TIME_OUT	Control time out	Dead band time limit	ACTIVE, INACTIVE	---	INACTIVE
P5.5	STRK_CTR	Stroke counter	Movement counter	ACTIVE, INACTIVE	---	INACTIVE
P5.6	TRAVEL	Travel counter	Travel counter	ACTIVE, INACTIVE	---	INACTIVE
P5.7	EXIT	Return	Return to operating level	Function	---	NV_SAVE
P6._	MAN_ADJ					
P6.0	MIN_VR	Min. valve range	Operating range, min.	0.0 … 100.0	%	0
P6.1	MAX_VR	Max. valve range	Operating range, max.	0.0 … 100.0	%	100
P6.2	ACTUATOR	Actuator type	Actuator type	LINEAR, ROTARY	---	LINEAR
P6.3	SPRNG_Y2	Spring action (Y2)	Spring action (Y2)	CLOCKWISE, CTCLOCKWISE	---	CTCLOCKWISE
P6.4	DANG_DN	Dead angle close	Dead angle 0 %	0.0 … 45.0	%	0.0
P6.5	DANG_UP	Dead angle open	Dead angle 100 %	55.0 … 100.0	%	100.0
P6.6	BOLT_POS	Bolt position	Actuator position	LEVER, STEM	---	LEVER
P6.7	EXIT	Return	Return to operating level	Function	---	NV_SAVE

Parameter	Display	Function		Possible parameter setting	Unit	Factory setting
P7._	CTRL_PAR					
P7.0	KP UP	KP value, up	KP value (up)	0.1 … 120.0	---	5.0
P7.1	KP DN	KP value, down	KP value (down)	0.1 … 120.0	---	5.0
P7.2	TV UP	TV value, up	TV value (up)	10 … 450	---	200
P7.3	TV DN	TV value, down	TV value (down)	10 … 450	---	200
P7.4	Y-OFS UP	Y offset, up	Y offset (up)	0.0 … 100.0	%	48.0
P7.5	Y-OFS DN	Y offset, down	Y offset (down)	0.0 … 100.0	%	48.0
P7.6	TOL_BAND	Tolerance band (zone)	Tolerance band (zone)	0.3 … 10.0	%	1.5
P7.7	DEADBAND	Deadband	Dead band	0.10 … 10.00	%	0.10
P7.8	DB_APPR	Deadband Approach	Dead-band approach	SLOW, MEDIUM, FAST		
P7.9	TEST	Test	Test	Function	---	INACTIVE
P7.10	DB_CALC	Deadband calculat.	Dead-band determination	ON, OFF	---	ON
P7.11	LEAK_SEN	Leakage sensivity	Leakage sensitivity	1 … 7200	S	30
P7.12	CLOSE_UP	Pos. time out	Position monitoring	0.0 … 100.0	%	30.0
P7.13	EXIT	Return	Return to operating level	Function	---	NV_SAVE
P8._	ANLG_OUT					
P8.0	MIN_RGE	Min. range	Min. current range	4.0 … 18.4	mA	4.0
P8.1	MAX_RGE	Max. range	Max. current range	20.0 … 5.7	mA	20.0
P8.2	ACTION	Action	Direction of action of characteristic curve	DIRECT, REVERSE	---	DIRECT
P8.3	ALARM	Alarm current	Alarm message	HIGH_CUR, LOW_CUR	---	HIGH_CUR
P8.4	RB_CHAR	Readback character.	Converted characters	DIRECT, RECALC		DIRECT
P8.5	TEST	Test	Test	Function	---	NONE
P8.6	ALR_ENAB	Alarm function enabled	Alarm via analog output	ON, OFF	---	ON
P8.7	CLIPPING	Current signal Signal clipping range	Extension of signal output to 3.8 … 20.5 mA	4.0 … 20.0; 3.8 … 20.5 mA	mA	4.0 … 20.5
P8.8	EXIT	Return	Return to operating level	Function	---	---
P9._	DIG_OUT					
P9.0	ALRM_LOG	Alarm logic	Alarm output logic	ACTIVE_HI, ACTIVE_LO	---	ACTIVE_HI
P9.1	SW1_LOG	Switchpoint 1 logic	Logic SW1	ACTIVE_HI, ACTIVE_LO	---	ACTIVE_HI
P9.2	SW2_LOG	Switchpoint 2 logic	Logic SW2	ACTIVE_HI, ACTIVE_LO	---	ACTIVE_HI
P9.3	TEST	Test	Test	Function	---	NONE
P9.4	EXIT	Return	Return to operating level	Function	---	NV_SAVE
P10._	DIG_IN					
P10.0	FUNCTION	Function select	Function selection	NONE, POS_0 %, POS_100 %, POS_HOLD	---	NONE
P10.1	EXIT	Return	Return to operating level	Function	---	---
P11._	FS / IP					
P11.0	FAIL_POS	Save position	Safe position	ACTIVE, INACTIVE	---	INACTIVE
P11.1	FACT_SET	Factory setting	Factory Setting	Function	---	START
P11.2	IP-TYP	I/P module type	Type of I/P module	NO_F_POS,F_SAFE_1,F_SAFE_2, F_FREEZE1, F_FREEZE2	---	[CUSTOM]
P11.3[1]	IP_COMP	IP compensation	IP compensation	ON, OFF	---	ON
P11.4	HART_REV	HART revision	HART Revision	5; 7	---	5
P11.5	EXIT	Return	Return to operating level	Function	---	NV_SAVE

1) Activation only by ABB Service

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i NOTE

For detailed information on the parameterization of the device, consult the associated configuration and parameterization instructions.

9 Diagnosis / error messages

9.1 Error codes

Error code	Possible cause	Impact	Troubleshooting the Instrument
ERROR 10	The supply voltage was interrupted for at least 20 ms. (This error is displayed after resetting the device to indicate the reason for the reset.)	-	Check the power source and the wiring.
ERROR 11	The supply voltage has fallen below the minimum voltage.	The actuator is moved to the safe position. After approx. 5 seconds, the positioner is automatically reset and starts up again with the message **ERROR 10**. If a local communication interface (LCI) is plugged in, the device will enter the operating mode LCI supply.	Check the power source and the wiring.
ERROR 12	The position is outside the measuring range. Possible reason is a malfunction in the position sensor.	**In control mode:** The actuator is moved to the safe position. **On the configuration level:** The output is set to neutral until a button is pressed. After approx. 5 seconds the positioner is automatically reset in control mode and on the configuration level.	Check the mounting.
ERROR 13	Invalid input current. This display indicates when the setpoint signal is overridden. The actuator is moved to the safe position.	-	Check the power source and the wiring.
ERROR 20	No access possible to the data in the EEPROM.	The actuator is moved to the safe position. After approx. 5 seconds, the positioner is automatically reset. Attempts are made to restore the data. This compensates for intermittent errors in the communication environment with the EEPROM.	If there is still no access to the EEPROM data after resetting the device, load the factory settings. If the error still persists, the device must be returned for repair to the manufacturer.

Error code	Possible cause	Impact	Troubleshooting the Instrument
ERROR 21	Error while processing the measured values, pointing to an error in the working data (RAM).	The actuator is moved to the safe position. After approx. 5 seconds, the positioner is automatically reset and the RAM is reinitialized.	If the error persists even after the positioner has been reset, the device will need to be returned to the manufacturer for repair.
ERROR 22	Error during the table processing, pointing to an error in the working data (RAM).	The actuator is moved to the safe position. After approx. 5 seconds, the positioner is automatically reset and the RAM is reinitialized.	If the error persists even after the positioner has been reset, the device will need to be returned to the manufacturer for repair.
ERROR 23	Error when verifying the checksum of the configuration data (RAM).	The actuator is moved to the safe position. After approx. 5 seconds, the positioner is automatically reset and the RAM is reinitialized.	If the error persists even after the positioner has been reset, the device will need to be returned to the manufacturer for repair.
ERROR 24	Error in the processor function registers (RAM).	The actuator is moved to the safe position. After approx. 5 seconds, the positioner is automatically reset and the RAM is reinitialized.	If the error persists even after the positioner has been reset, the device will need to be returned to the manufacturer for repair.
ERROR 50 ⋮ ERROR 99	Internal error.	The actuator is moved to the safe position. After approx. 5 seconds, the positioner is automatically reset.	If the error can be reproduced and occurs in the same position after resetting, the device must be returned for repair to the manufacturer.

9.2 Alarm codes

Alarm code	Possible cause	Impact	Troubleshooting the Instrument
ALARM 1	Leakage between positioner and actuator	Depending on how well the leakage can be compensated, small control actions are required at regular intervals.	Check the piping.
ALARM 2	The setpoint current is outside the permissible range, i.e. it is < 3.8 mA or > 20.5 mA.	-	Check the power source.
ALARM 3	Alarm of the zero monitor. The zero position has shifted by more than 4%.	- In control mode, a position outside the valve range can only be reached by driving to the limit stops, as the setpoint is limited to 0 ... 100%.	Correct the mounting.
ALARM 4	Controlling is inactive, because the device does not operate in control mode or the binary input is active.	The controller does not follow the setpoint.	Switch to control mode or switch off the binary input.
ALARM 5	Positioning timed out. The settling time needed exceeds the configured stroke time.	None, or adaptive control is performed (in adaptive mode).	Ensure that — the actuator is not blocked. — the supply air pressure is adequate. — the given time limit is higher than 1.5 times the longest stroke time of the actuator. If adaption cannot run uninterruptedly for an actuator, adaption should be switched on until the alarm does not occur anymore during controlling actions.
ALARM 6	The defined limit value for the stroke counter has been exceeded.	-	Reset the counter (only possible via a connected PC with suitable software).
ALARM 7	The specified limit value for the travel counter has been exceeded.	-	Reset the counter (only possible via a connected PC with suitable software).

9.3 Message codes

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

10 Maintenance

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

> **i 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 Repair

Repair and maintenance activities may only be performed by authorized customer service personnel.
When replacing or repairing individual components, use original spare parts.

11.1 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 the Appendix) and include this with the device.
According to 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 2 for nearest service location.

12 Recycling and disposal

12.1 Disposal

ⓘ NOTE

Products that are marked with this symbol may not be disposed of through municipal garbage collection points.

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:
— This product is not subject to WEEE Directive 2002/96/EC or relevant national laws (e.g. ElektroG in Germany).
— The product must be surrendered to a specialist recycling company. Do not use municipal garbage collection points. According to WEEE Directive 2002/96/EC, only products used in private applications may be disposed of at municipal garbage collection points.
— If it is not possible to dispose of old equipment properly, ABB Service can take receipt of and dispose of returns for a fee.

12.2 Information on ROHS Directive 2011/65/EC

The products provided by ABB Automation Products GmbH do not fall within the current scope of regulations on hazardous substances with restricted uses or the directive on waste electrical and electronic equipment according to ElektroG.
If the necessary components are available on the market at the right time, in the future these substances will no longer be used in new product development.

13 Spare parts, consumables and accessories

Repair and maintenance activities may only be performed by authorized customer service personnel.
When replacing or repairing individual components, use original spare parts.

14 Specifications

ⓘ NOTE

The detailed device data sheet is available in the download area at www.abb.com/positioners.

Trademarks

® HART is a registered trademark of FieldComm Group, Austin, Texas, USA

15 Appendix

15.1 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:	E-Mail:

Device details:

Typ:	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	☐	Explosiv	☐	Other toxic substances	☐
Radioactive	☐				

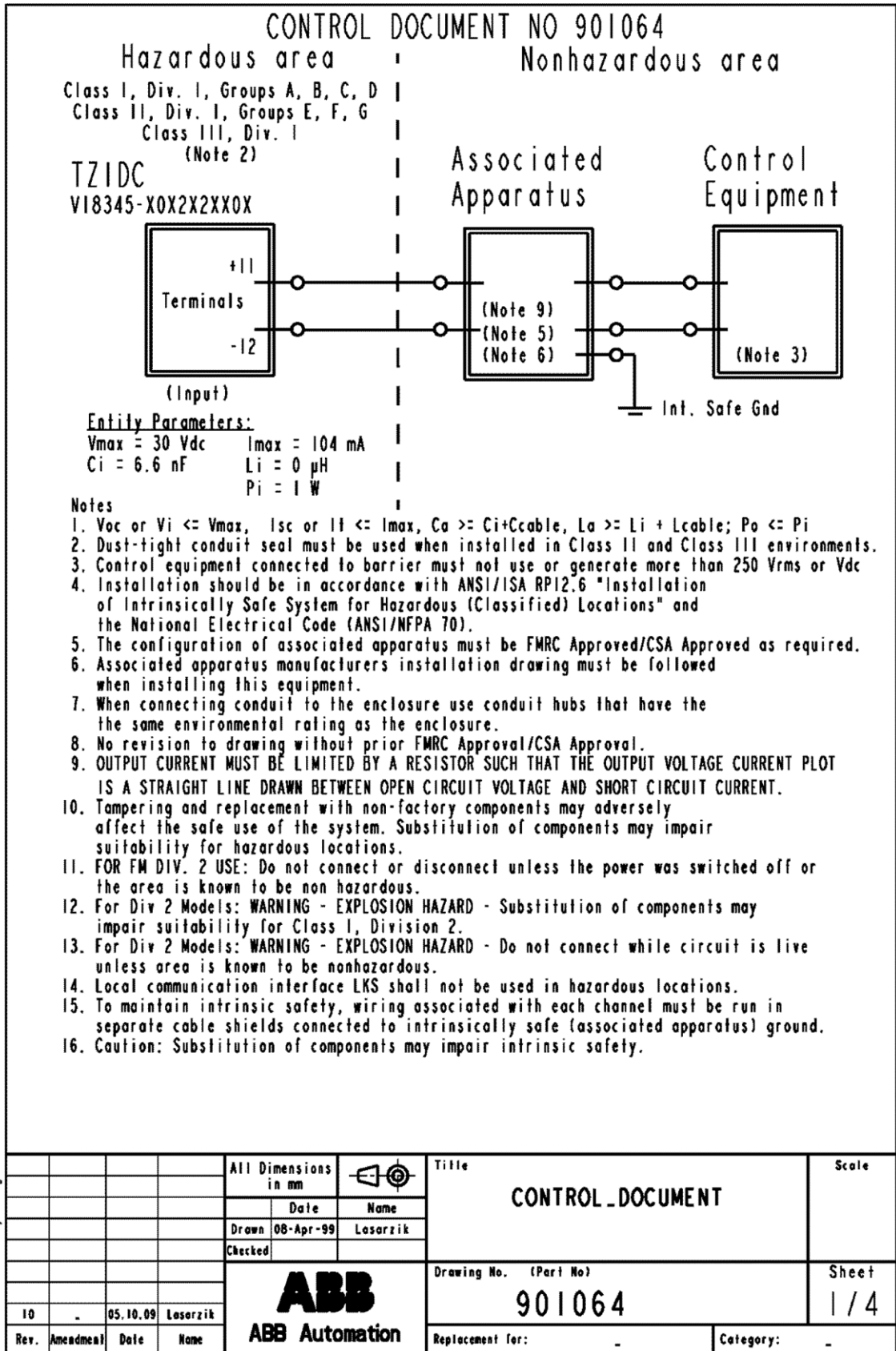Which substances have come into contact with the device?

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

15.2 Declarations of conformity

ℹ **NOTE**

All documentation, declarations of conformity, and certificates are available in ABB's download area.
www.abb.com/positioners
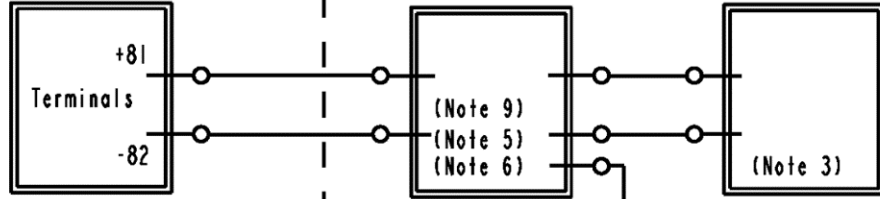
CONTROL DOCUMENT NO 901064

Hazardous area | Nonhazardous area

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

TZIDC
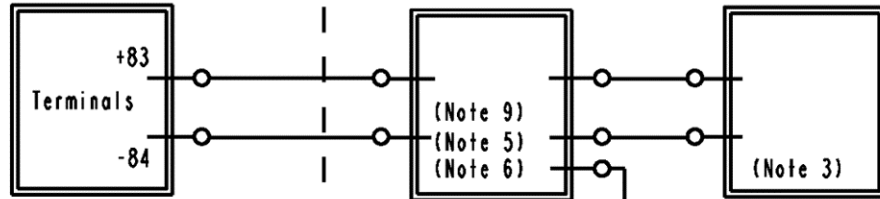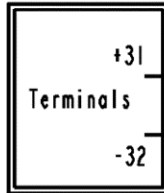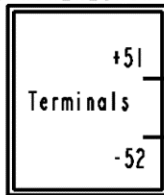VI8345-X0X2X2XX0X

Associated Apparatus

Control Equipment

+11
Terminals
-12

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

(Note 3)

(Input)

Int. Safe Gnd

Entity Parameters:
Vmax = 30 Vdc   Imax = 104 mA
Ci = 6.6 nF   Li = 0 µH
                   Pi = 1 W

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

All Dimensions in mm	⊲⊙⊙	Title		Scale
Date	Name	CONTROL_DOCUMENT		
Drawn	08-Apr-99	Losorzik		
Checked				

Rev.	Amendment	Date	Name		
10	-	05.10.09	Losorzik		

ABB Automation

Drawing No. (Part No)		Sheet
901064		1/4
Replacement for: -	Category: -	

CONTROL DOCUMENT NO 901064

Hazardous area

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

Nonhazardous area

TZIDC
VI8345-X0X2X2XX0X

Associated Apparatus

Control Equipment

+81
Terminals
-82

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

(Note 3)

Int. Safe Gnd

(Switching Input)

__Entity Parameters:__
Vmax = 30 Vdc   Imax = 110 mA
Ci = 4.2 nF   Li = 0 µH
Pi = I W

+83
Terminals
-84

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

(Note 3)

Int. Safe Gnd

(Switching Output)

__Entity Parameters:__
Vmax = 30 Vdc   Imax = 96 mA
Ci = 4.2 nF   Li = 0 µH
Pi = I W

			All Dimensions in mm	◁⊙	Title		Scale
			Date	Name	CONTROL_DOCUMENT		
			Drawn 08-Apr-99	Lasarzik			
			Checked				
					Drawing No. (Part No)		Sheet
IO	-	05.10.09	Lasarzik		901064		2/4
Rev.	Amendment	Date	Name		Replacement for: -		Category: -

ABB Automation

CONTROL DOCUMENT NO 901064

Hazardous area

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

Nonhazardous area

TZIDC
VI8345-X0X2X2IX0X

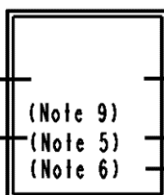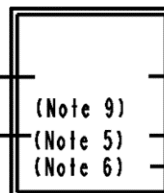| | Associated Apparatus | Control Equipment |

+31
Terminals
-32

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

(Note 3)

Int. Safe Gnd

(Analog Position Feedback)
Entity Parameters:
Vmax = 30 Vdc   Imax = 110 mA
Ci = 6.6 nF   Li = 0 µH
Pi = I W

TZIDC
VI8345-X0X2X23X0X

+5I
Terminals
-52

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

(Note 3)

+4I
Terminals
-42

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

(Note 3)

(Digital Position Feedback)
Entity Parameters:
Vmax = 30 Vdc   Imax = 96 mA
Ci = 3.7 nF   Li = 0 µH   Pi = I W

Int. Safe Gnd

All Dimensions in mm		Title	CONTROL_DOCUMENT	Scale
	Date	Name		
Drawn	08-Apr-99	Lasarzik		
Checked				

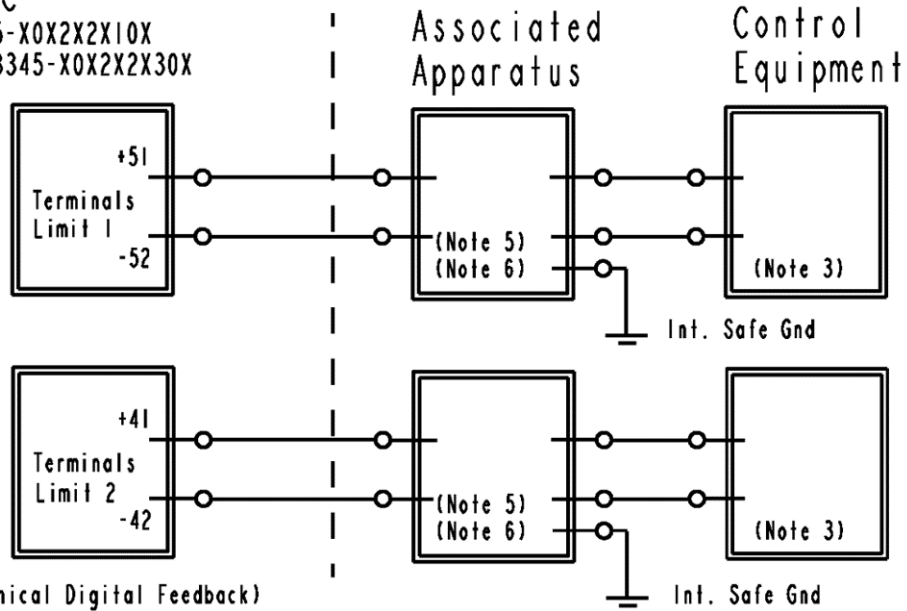|				Drawing No. (Part No)	Sheet
			ABB	901064	3/4
IO	-	05.10.09	Lasarzik	ABB Automation	
Rev.	Amendment	Date	Name	Replacement for: -	Category: -

CONTROL DOCUMENT NO 901064

Hazardous area   **Nonhazardous area**

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

TZIDC
V18345-X0X2X2X10X
or V18345-X0X2X2X30X

Associated Apparatus   **Control Equipment**

+51
Terminals
Limit 1
-52

(Note 5)
(Note 6)

(Note 3)

Int. Safe Gnd

+41
Terminals
Limit 2
-42

(Note 5)
(Note 6)

(Note 3)

Int. Safe Gnd

(Mechanical Digital Feedback)

Entity Parameters:
V_{max} = 15.5 V
I_{max} = 52 mA
C_i = 20 nF
L_i = 30 µH
P_i = 1 W

		All Dimensions in mm		Title		Scale
		Date	Name	CONTROL_DOCUMENT		
		Drawn 08-Apr-99	Lasarzik			
		Checked				
				Drawing No. (Part No)		Sheet
10	-	05.10.09 Lasarzik		**901064**		4/4
Rev.	Amendment	Date	Name	ABB Automation	Replacement for: -	Category: -

Notes

Notes

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