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ABB MEASUREMENT & ANALYTICS | DATA SHEET

## **TZIDC-210**

Digital Positioner



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Compact, well-proven and flexible

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For PROFIBUS PA®, flameproof (enclosure)

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Low cost of ownership

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Well-proven technology and intelligence

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Robust and environmentally ruggedized

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Wide temperature range

- -40 to 85 °C (-40 to 185 °F)

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Easy to commission thanks to the 'single-button'-operating philosophy

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Mechanical position indicator

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ATEX, FM, CSA, GOST and IECEx approvals

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Global approval for marine applications

- DNV\_GL

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## Brief description

The TZIDC-210 is an electronically configurable positioner with communication capabilities designed for mounting on pneumatic linear or rotary actuators. It features a small and compact design, a modular construction, and an excellent cost-performance ratio.

Fully automatic determination of the control parameters and adaptation to the positioner allow for considerable time savings as well as optimum control behavior.

### Pneumatics

An I/P module with subsequent pneumatic amplifier is used to control the pneumatic actuator. The well-proven I/P module proportionally converts the permanent electrical setpoint signal from the CPU into a pneumatic signal used to adjust a 3/3-way valve.

Dosing of the air flow for pressurizing or depressurizing the actuator is continuously adjusted. As a result, excellent control results are achieved. When reaching the setpoint, the 3/3-way valve is closed in center position to minimize the air consumption.

The pneumatic system can be supplied in four versions: for single acting and double acting actuators and each with the 'fail-safe' / 'fail-freeze' safety function.

#### 'Fail-safe' safety function

If the electric power supply fails, the positioner output 1 is depressurized and the return spring in the pneumatic actuator moves the valve to the safe position. In case of a 'double-acting' version, output 2 is additionally pressurized.

#### 'Fail-freeze' function

If the electric power supply fails, the positioner Output 1 (and Output 2 if applicable) is closed and the pneumatic actuator blocks the valve in the current position. If the compressed air supply power fails, the positioner depressurizes the actuator.

### Use

The positioner has a built-in operating panel providing a 2-line LCD indicator and 4 operating buttons for commissioning, configuration and monitoring during live operation.

Alternatively, the appropriate configuration program can be used via the available communication interface.

### Communication

Communication with the **TZIDC-210** occurs via PROFIBUS PA®.

### Modular design

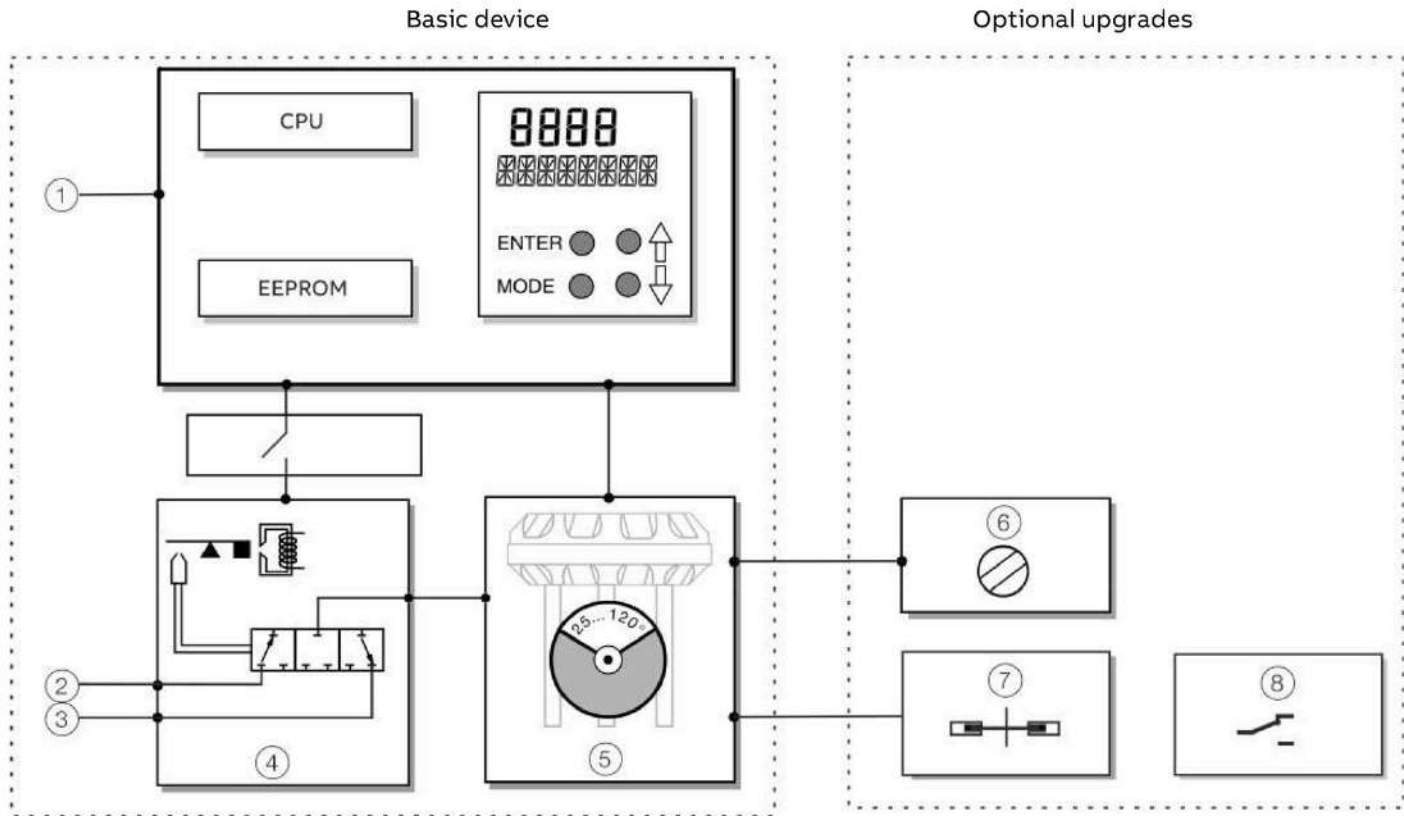
The basic model can be enhanced at any time by retrofitting optional equipment.

Option modules can be installed for analog and digital position feedback.

Additionally, a mechanical position indicator, proximity switches or 24 V microswitches are available for indicating the position independently of the mother board function.

## ... Brief description

### Schematic diagram



- ① Bus connector
- ② Supply air: 1.4 to 6 bar (20 to 90 psi)
- ③ Exhaust
- ④ I/P module with 3/3-way valve
- ⑤ Position sensor (optional up to 270° rotation angle)
- ⑥ Installation kit for mechanical position indicator
- ⑦ Mechanical feedback with proximity switches
- ⑧ Mechanical feedback with 24 V microswitches

Figure 1: Schematic diagram of the positioner

#### Note

With optional extensions, either the 'Mechanical feedback with proximity switches' ⑦ or the 'Mechanical feedback with 24 V microswitches' ⑧ can be used. In both cases though, the mechanical position indication ⑥ must be installed.

## Mounting versions

### Standardized mounting on pneumatic linear actuators

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

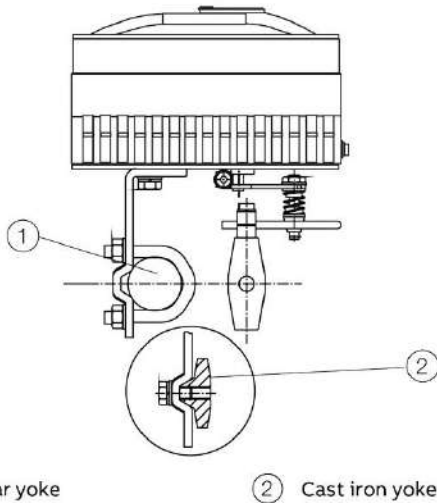


Figure 2: Mounting to linear actuators in accordance with DIN / IEC 534

### Standardized mounting on pneumatic rotary actuators

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

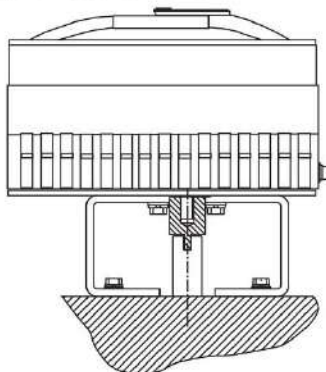


Figure 3: Mounting on rotary actuators in accordance with VDI / VDE 3845

### Integral mounting to control valves

The positioner featuring standard pneumatic action is available as an option for integral mounting. The required holes are found at the back of the device. The advantage of integrated mounting is that the point for mechanical stroke measurement is protected and that the positioner and actuator are linked internally. No external tubing is required.

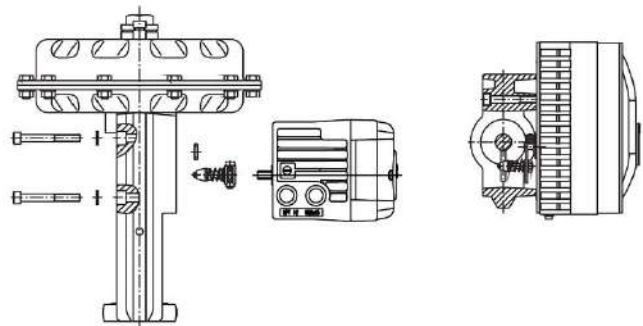


Figure 4: Integral mounting on control valves

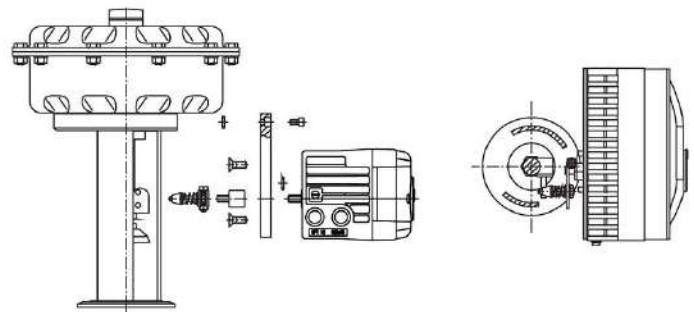


Figure 5: Integral mounting on control valves with adapter plate

### Special actuator-specific mounting versions

In addition to the mounting methods described above, there are special actuator-specific attachments.

## Device parameters

### General

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

The total range of parameters includes:

- Operating parameters
- Adjustment parameters
- Operation monitoring parameters
- Diagnosis parameters
- Maintenance parameters

### Operating parameters

The following operating parameters can be set manually if required:

#### Signal range 0 to 100 %

Subranges are configurable, min. range 20%

Recommended range > 50 %

Action (set point signal)

Increasing:

- Position value 0 to 100 % = direction 0 to 100 %

Decreasing:

- Setpoint signal 100 to 0 % = direction 0 to 100 %

Characteristic curve (actuator travel = f {set point signal})

Linear, equal percentage 1:25 or 1:50 or 25:1 or 50:1 or freely configurable with 20 reference points.

#### Actuator travel limit

The actuator travel, i.e. the stroke or angle of rotation, can be reduced as needed within the full range of 0 to 100 %, provided that a minimum value of 20 % is observed.

#### Shut-off function

This parameter can be set separately for each end position. When the associated limit value is up-scaled, the function causes immediate travel of the actuator to the selected end position.

#### End Position Behavior

Selection option for behavior when moving into the end position. Either the positioner additionally pressurizes the actuator and reaches full actuating force in the end position, or it continues to control the actuator in the end position and pressurizes the actuator only as much as is required to maintain the position.

#### Actuator travel time prolongation

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

This function can only be used with the pneumatics with the safety function 'fail-safe'.

#### Switching points for the position

You can use these parameters to define two position limit values for signaling, see option 'Module for digital position feedback'.

### Adjustment parameters

The positioner has a special function for automatic adjustment of the parameters. Additionally, the control parameters can be set manually to optimally adapt them to the process requirements.

#### Tolerance band

Upon reaching the tolerance band, the position is re-adjusted more slowly until the dead band has been reached. The factory setting for this parameter is 0,3 %.

#### Dead band (sensitivity)

When reaching the dead band, the position is held. The factory setting for this parameter is 0,1 %.

#### Actuator spring action

Selection of the direction of rotation of the sensor shaft (looking at the open housing), if the safe position is approached as a result of the spring force in the actuator (actuator is depressurized via Y1 / OUT1).

For double-acting actuators, the actuator spring action corresponds to pressurizing the pneumatic output (Y2 / OUT2).

#### Display 0 to 100 %

Adjust the display 0 to 100 % in accordance with the direction for opening or closing the final control element.

## Operations monitoring parameters

Various functions for continuous device monitoring are implemented in the operating program for the positioner. The following states will be detected and indicated, e.g.:

- Internal positioning time-out
- Sensor monitoring
- Backup monitoring

While automatic commissioning is in progress, the current state is continuously indicated on the integrated LCD indicator. Remaining messages can be retrieved via the user interface.

The fieldbus enables users to implement enhanced monitoring in the control system. A special window displays the most important process variables ONLINE, e.g. the setpoint signal (in %), the position (in %), the control deviation (in %) as well as the status messages.

## Diagnosis parameters

The diagnostics parameters in the positioner's operating program provide information about the operating conditions of the valve.

From this information the operator can derive what maintenance work is required, and when.

Additionally, limit values can be defined for these parameters. When they are exceeded, an alarm is reported.

So, for example, the following operating values are determined:

- Number of movements of the final control element
- Sum of individual actuator travel events

The diagnostic parameters and limit values can be called up, set and reset using the configuration program.

## Operator panel

The integrated operating panel of the positioner has four operating buttons which allow the device to be operated with an open housing cover. The following functions can be controlled via the function keys:

- Observe live operation
- Manual intervention during live operation
- Parameterization of the device
- Fully automatic commissioning

The operating panel has a cover to protect against unauthorized operation.



Figure 6: Open TZIDC-210 with a view of the operating panel

### 'One-button' commissioning

Commissioning the positioner is especially easy. Standard Auto Adjust is triggered by pressing a single operating button. Detailed configuration knowledge is not necessary in order to start the device.

Depending on the selected actuator type (linear or rotary actuator), the displayed zero position is automatically adapted:

- for linear actuators counter-clockwise (CTCLOCKW)
- for rotary actuators clockwise (CLOCKW).

Besides this standard function, a customized 'Autoadjust' function is available. The function is launched either via the operating panel or the configuration program.

## ... Device parameters

### LCD display

The multi-line LCD indicator is automatically updated during operation to provide the user with relevant information as necessary.

During control operation, the following data can be called up from the positioner by pressing the operating buttons briefly:

- Current set point (%), set point status (up button)
- Status of communication (up button)
- Operating mode on the bus and bus address (down button)
- Software version (ENTER)

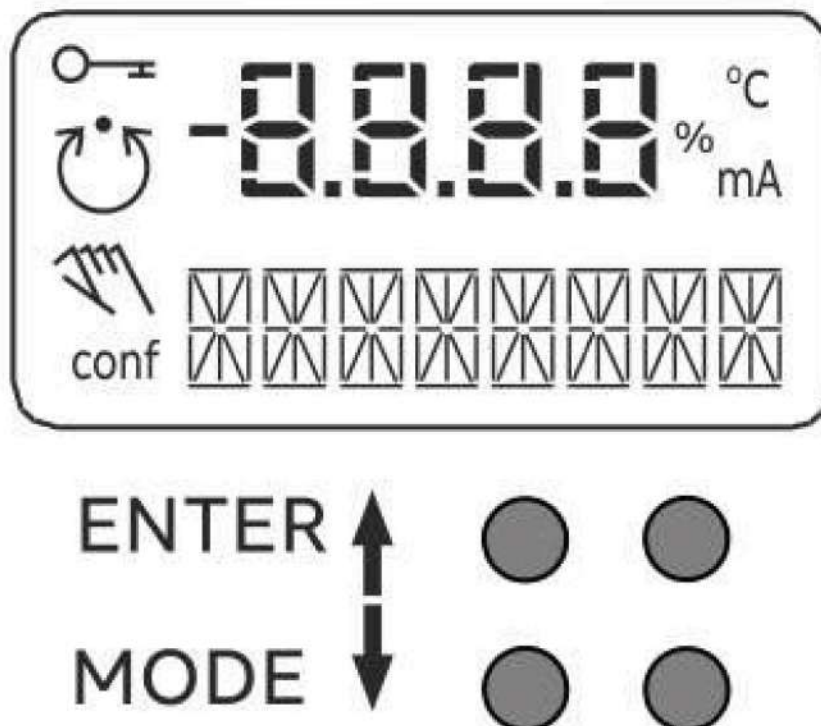


Figure 7: LCD display with operating buttons



## Communication

### General

PROFIBUS is a manufacturer-independent, open fieldbus standard for use in the manufacturing industry and process automation. It is ideally suited for time-critical applications with high transmission rates as well as for complex communication activities. The flexible structure allows the mechanical mount and transmission speed to be easily adapted to the specific application. A standard communication protocol is used on a universal basis.

### PROFIBUS PA®

PROFIBUS PA® was developed primarily for process automation solutions.

The transmission method (physical layer in ISO reference model) complies with IEC 61158. The power supply for the field devices is provided concurrently with signal transmission via the fieldbus line. PROFIBUS PA® is also suited for use in explosion-proof installations.

### Benefits of PROFIBUS® communication

- Standardized device profiles ensure interoperability of devices from various manufacturers.
- Acyclic access to device data (even during operation) for parameterization, diagnosis and maintenance.

- High system uptimes based on comprehensive device and bus diagnostics as well as default value strategies in the event of an error.
- Support for efficient facility management through provision of operating values.

The TZIDC-210 positioner complies with the PROFIBUS PA® profile for process devices 'Electro-pneumatic actuators V3.0'. This ensures interoperability in connection with third-party control systems.

In conformance with PROFIBUS® conventions, data can be output during cyclic data transfer in operating modes AUT, MAN or RCAS and can be written in operating mode O/S (out-of-service).

Newly set parameters are saved in the non-volatile memory directly upon download to the device, and become active immediately.

### DTM

The DTM (Device Type Manager) for the positioner TZIDC-210 is based on FDT / DTM technology (FDT 1.2 / 1.2.1) and can be either integrated into a control system or loaded on a PC with DVS401 (SMART VISION). This allows you to work with the same user interface in the commissioning phase, during operation, and for service tasks involving monitoring the device, setting parameters, and reading out data.

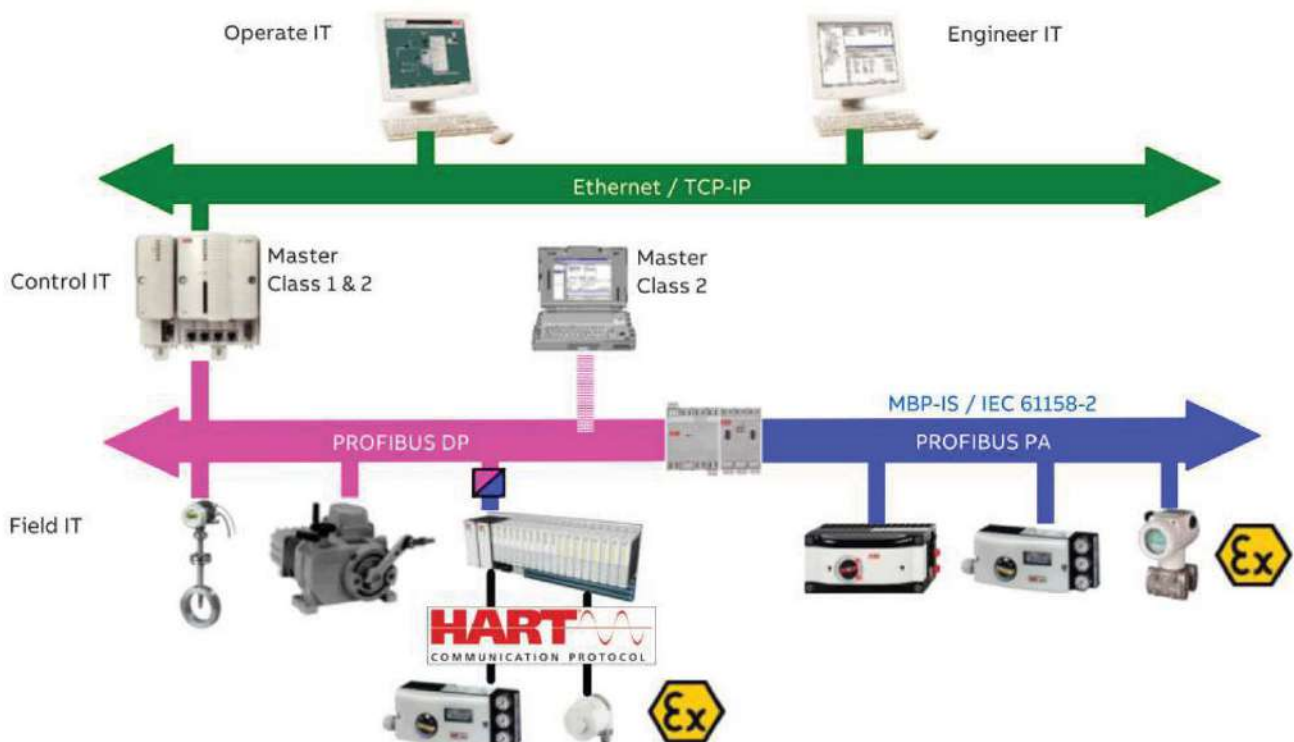


Figure 8: Communication via PROFIBUS®

## Specification

### Communication

Profiles	PROFIBUS PA® profile for process devices, electro-pneumatic actuators V3.0.
Block types	1 AO Functional block 1 transducer block 1 physical block
Physical Layer	In compliance with IEC 61158-2
Transmission rate	31.25 Kbit/s
Supply voltage	Power feed from the PA bus 9.0 to 32.0 V DC
Max. permissible voltage	35 V DC
Input Current	10.5 mA
Current in the event of an error	15 mA (10.5 mA + 4.5 mA)

### Designation

Device name	TZIDC-X10
PNO ID no.	0x0639
Device ID	0X3200028xyz
Bus address	Between 0 and 126, default address is 126

### Actuator travel

Rotation angle	
Measuring range	120° (optional 270°)
Working range	Linear actuators min. 25°, max. 60° Rotary actuators min. 25°, max. <120° (cf. <b>Figure 9</b> )
Actuator travel limit	Min. and max. limits, freely configurable in range of 0 to 100 % of total travel (min. range > 20 %)
Actuator travel time prolongation	Setting range of 0 to 200 seconds, separately for each direction
Dead band time limit	Setting range 0 to 200 seconds (monitoring parameter for the control deviation until the dead band is reached)

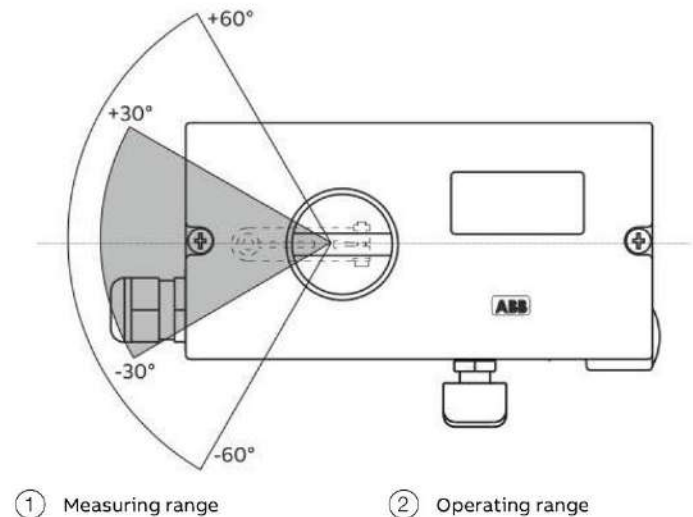


Figure 9: Measuring and operating ranges of the positioner

## Pneumatic connections

Cable	Air Pipe
Thread ½-14 NPT	Thread ¼-18 NPT
Thread M20 × 1.5	Thread ¼-18 NPT
Thread M20 × 1.5	Thread G ¼
Thread G ½	Thread Rc ¼

(Optional: with cable gland(s) and blind plugs as necessary)

### Compressed air output

Range	Standard design: 0 to 6 bar (0 to 90 psi) Marine version: 0 to 5.5 bar (0 to 80 psi)
Air capacity	> 5 kg/h = 3.9 Nm <sup>3</sup> /h = 2.3 scfm at 1.4 bar (20 psi) supply air pressure > 13 kg/h = 10 Nm <sup>3</sup> /h = 6 scfm at 6 bar (90 psi) supply air pressure
Output function	For single acting or double acting actuators Air is vented from actuator / actuator is blocked in case of (electric) power failure
Shut-off values	End position 0 % = 0 to 45 % End position 100 % = 55 to 100 %

### Instrument air\*

Purity	Maximum particle size: 5 µm Maximum particle density: 5 mg/m <sup>3</sup>
Oil content	Maximum concentration 1 mg/m <sup>3</sup>
Pressure dew point	10 K below operating temperature
Supply pressure**	Standard design: 1.4 to 6 bar (20 to 90 psi) Marine version: 1.6 to 5.5 bar (23 to 80 psi)
Air consumption***	< 0.03 kg/h / 0.015 scfm

\* 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

## Accessories

### Mounting material

- Attachment kit for linear actuators in accordance with DIN / IEC 534 / NAMUR
- Attachment kit for rotary actuators in accordance with VDI / VDE 3845
- Attachment kit for integral mounting
- Attachment kit for actuator-specific mounting

### Pressure gauge block

- With pressure gauges for supply air and output pressure. Pressure gauges with housing ø 28 mm (1.10 in), with connection block in aluminum, black
- Installation material in black for mounting on positioner

### Filter regulator

All metal version in brass, varnished black, bronze filter element (40 µm), with condensate drain.

Max. pre-pressure 16 bar (232 psi).

Output can be adjusted to:

- 1.4 to 6 bar (20 to 90 psi)

Marine version:

- 1.6 to 5.5 bar (23 to 80 psi)

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

### Control program for operation and parameterization on a PC

DSV401 (SMART VISION) with DTM available on CD-ROM.

## Housing

### Material / IP rating

Aluminum with ≤ 0.1% copper

IP rating IP 65 / NEMA 4X (NEMA 4X does not permit overhead mounting), (IP 66, optional)

### Surface / color

Dipping varnish With epoxy resin, stove-hardened

Housing varnished matt black RAL 9005

Case cover Pantone 420

### Weight

Aluminum 3.0 kg (6.61 lb)

### Mounting orientation

Any

## ... Specification

### Transmission data and contributing factors

Output Y1	
Increasing set point signal	0 to 100 %
	Increasing pressure at output
Decreasing set point signal	0 to 100 %
	Decreasing pressure at output

### Action (set point signal)

Increasing set point	4 to 20 mA
	= actuator position 0 to 100 %
Decreasing set point	20 to 4 mA
	= actuator position 0 to 100 %

### Characteristic curve (actuator travel = f {set point signal})

Linear	Equal percentage 1:25 or 1:50 or 25:1 or 50:1*
Deviation	≤ 0.5 %
Tolerance band	0.3 to 10 %, adjustable
Configurable dead zone	0.1 to 10 %, adjustable
Resolution (AD-conversion)	> 16,000 steps
Sampling frequency	20 ms
Ambient temperature effect	≤ 0.5 % per 10 K
Reference temperature	20 °C
Influence of vibration	≤ 1 % to 10 g and 80 Hz

\* freely configurable with 20 reference points

### Seismic vibration

Meets requirements of DIN / IEC 60068-3-3 Class III for strong and strongest earthquakes.

### Influence of mounting orientation

Not measurable.

### Noise emissions

Max. 100 db (A)

Noise-reduced version max. 85 db (A)

### Ambient conditions

#### Ambient temperature range

During operation, storage, and transport	-40 to 85 °C (-40 to 185 °F)
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#### Relative humidity

During operation with housing closed and air supply switched on	95 % (annual average), condensation permissible.
Transport and storage	75 % (annual average)

## Electromagnetic compatibility

Component / Connection	Disturbance variable	EMC basic standard	Test value	Assessment criteria	
				Required	Complied
Housing	Discharge of static electricity (ESD)	IEC 61000-4-2	4 kV Contact discharge	B	A
			8 kV Air discharge	B	A
	Electromagnetic fields*	IEC 61000-4-3	10 V/m (80 MHz to 1 GHz)	A	A
			3 V/m (1.4 GHz to 2 GHz)	A	A
			1 V/m (2.0 GHz to 2.7 GHz)	A	A
Supply frequency magnetic fields	IEC 61000-4-8	30 A/m (50 Hz, 60 Hz)	A	A	
Input / Output signals	Fast transients (burst)	IEC 61000-4-4	2 kV (5 / 50 ns, 5 kHz)	B	A
	Impulse voltage (surge)	IEC 61000-4-5	1 kV (wire / wire), 2 kV (wire / PE)	B	A
	Conducted HF signals	IEC 61000-4-6	10 V (150 kHz to 80 MHz)	A	A

\* The digital positioner meets the requirements of Class 3 for environments with heavy electromagnetic radiation. The distance between radio transmitters (e.g. mobile telephones) and the digital positioner, as well as its input and output signals must be at least 1 m (3.3 ft).

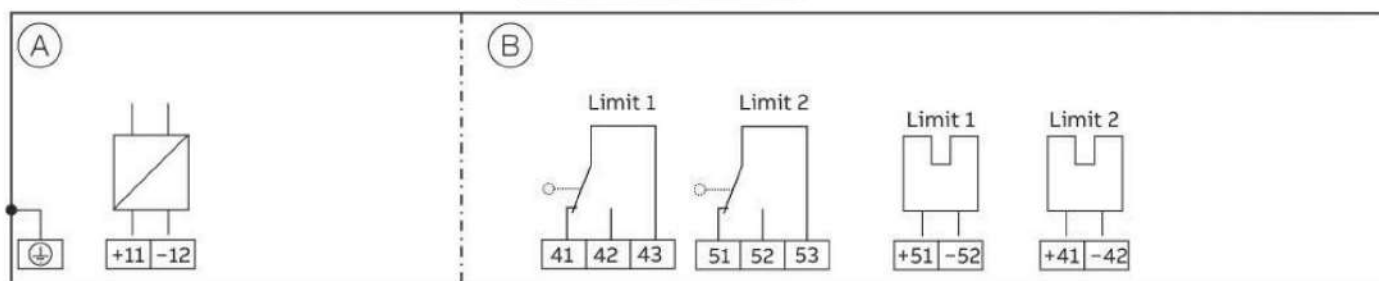
### Assessment criteria A:

The device must work as intended during and after the test.

### Assessment criteria B:

Impairment in operating performance of the device is permitted during the test. The device must continue to work as intended after the test.

## Electrical connections



(A) Basic device

(B) Options, digital feedback with proximity switches or microswitches

Figure 10: Electrical connection TZIDC-210

### Connections for inputs and outputs

Terminal	Function / comments
+11 / -12	Fieldbus, bus feed
+51 / -52	Digital feedback Limit 1 with proximity switch (optional)
+41 / -42	Digital feedback Limit 2 with proximity switch (optional)
41 / 42 / 43	Digital feedback Limit 1 with microswitch (optional)
51 / 52 / 53	Digital feedback Limit 2 with microswitch (optional)

#### Note

The TZIDC-210 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

Bus Connection	
Terminals	+11 / -12
Supply voltage	Power feed from the PA bus 9 to 32 V DC
Max. permissible voltage	35 V DC
Input Current	10.5 mA
Current in the event of an error	15 mA (10.5 mA + 4.5 mA)

### 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\*

Terminals	+41 / -42, +51 / -52
Supply voltage	5 to 11 V DC (Control circuit in accordance with DIN 19234/NAMUR)
Signal current < 1 mA	Switching state logical '0'
Signal current > 2 mA	Switching state logical '1'

#### Direction of action

Proximity switch	Actuator position			
	< Limit 1	> Limit 1	< Limit 2	> Limit 2
SJ2-SN (NC)	0	1	1	0

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

Terminals	41 / 42 / 43 51 / 52 / 53
Supply voltage	maximum 24 V AC/DC
Load rating	Maximum 2 A
Contact surface	10 μm Gold (AU)

\* 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.

## Dimensions

All dimensions in mm (in)

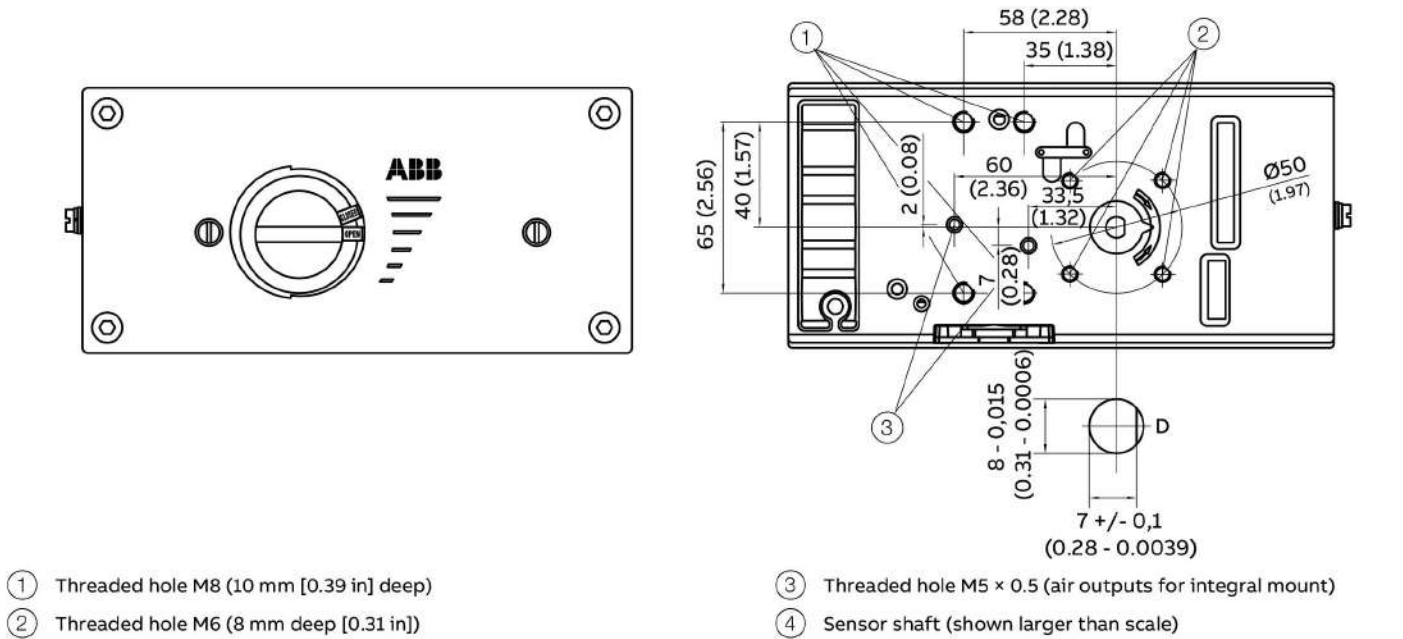


Figure 11: Front and rear view

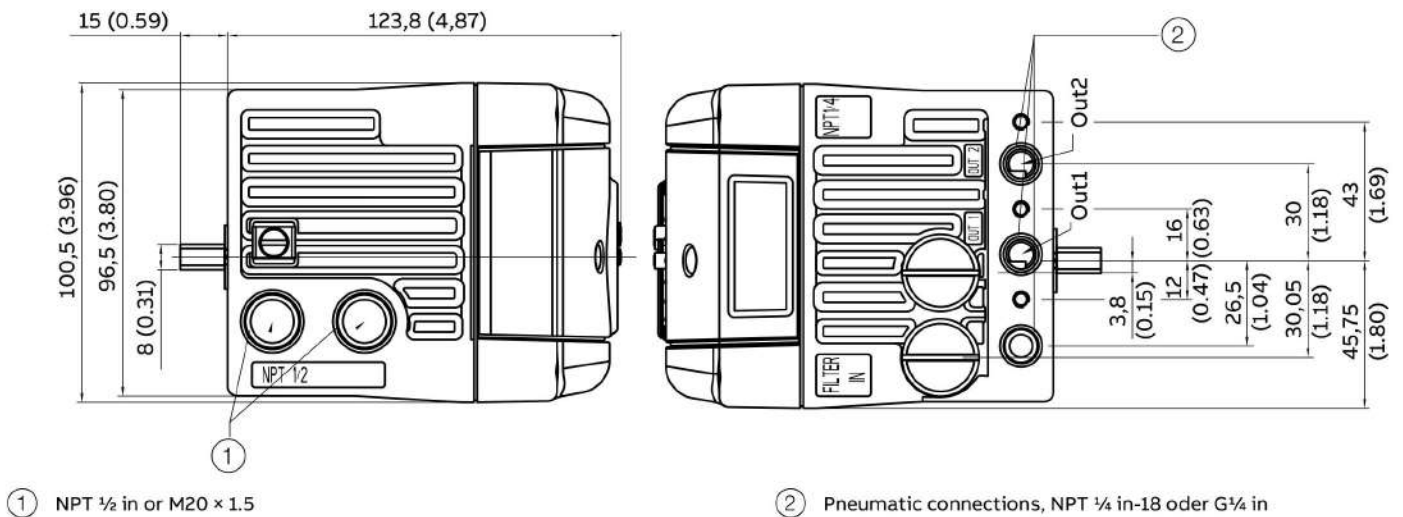


Figure 12: Side view (from left to right)



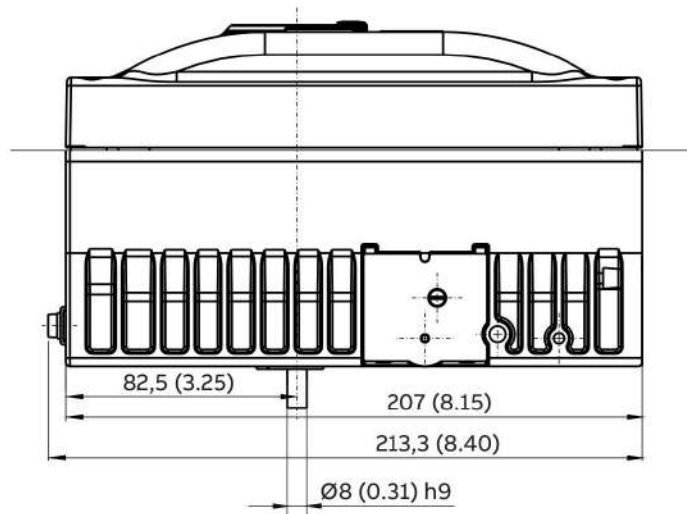


Figure 13: Bottom view

... Dimensions

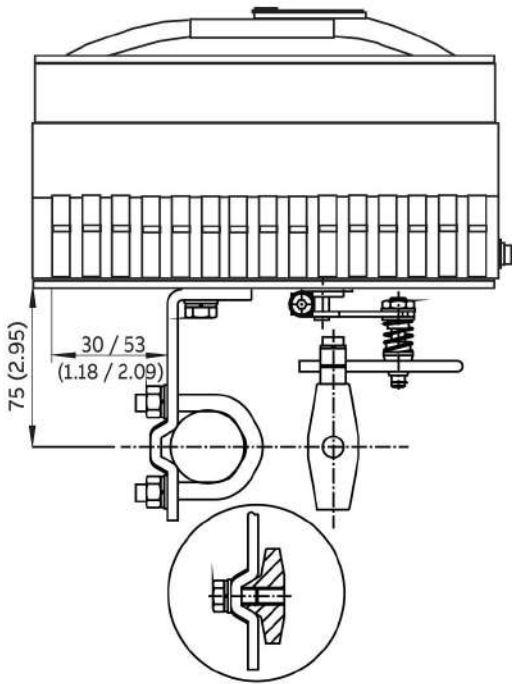
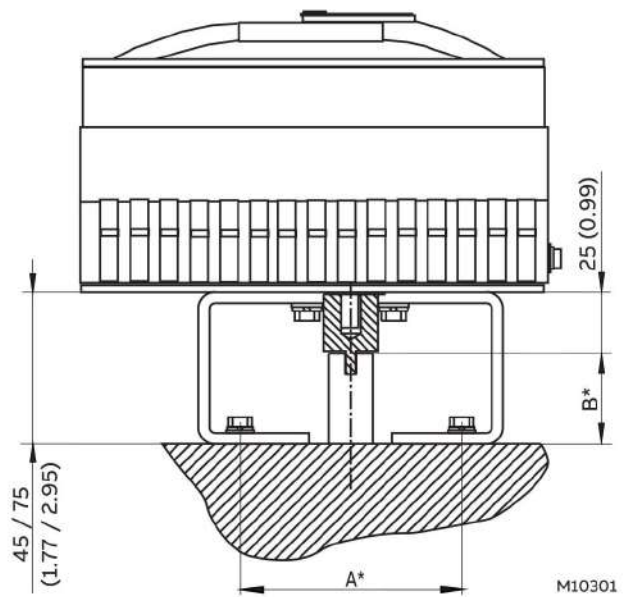


Figure 14: Mounting to linear actuators in accordance with DIN / IEC 534



\* Dimensions A and B depend on the rotary actuator

Figure 15: Mounting on rotary actuators in accordance with VDI / VDE 3845

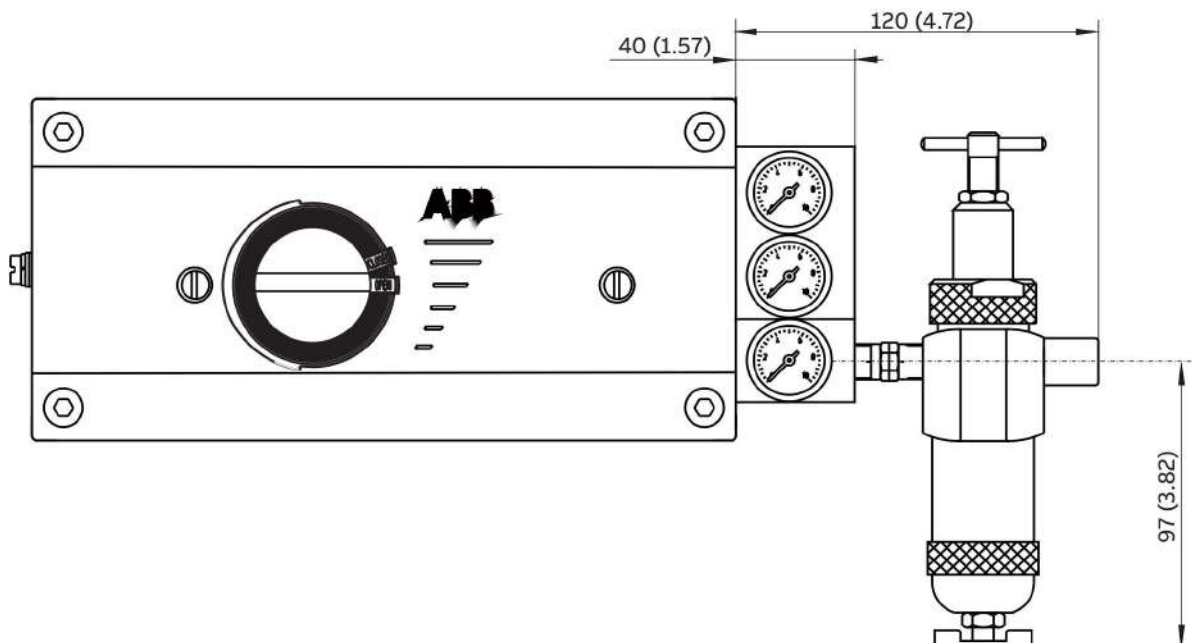


Figure 16: Positioner TZIDC-210 with mounted pressure gauge block and filter regulator

## Use in potentially explosive atmospheres

### ATEX / GOST Russia / GOST Ukraine

#### Flameproof (enclosure) 'Ex d'

Ex marking	
Marking	II 2 G Ex d IIC T4/T5/T6
Type Examination Test Certificate	DMT 02 ATEX E 029 X
Type	TZIDC-210 Doc. 901132
Device class	II 2 G
Standards	EN 60079-0 EN 60079-1

#### 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.

#### Operation as intrinsically safe equipment

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 ic IIC T6 or T4 Gc
Type Examination Test Certificate	TÜV 02 ATEX 1831 X
Type	TZIDC-210
Standards	EN 60079-0 EN 60079-11

#### Temperature Data

Device group II 2 G	
Temperature class	Ambient temperature T <sub>a</sub>
T4	-40 to 85 °C
T5	-40 to 50 °C
T6*	-40 to 40 °C*

\* 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:

Current circuit (terminal)	Electrical information (maximum values)	
Signal circuit (+11 / -12)	U <sub>i</sub> = 24 V I <sub>i</sub> = 250 mA P <sub>i</sub> = 1.2 W	C <sub>i</sub> < 5 nF L <sub>i</sub> < 10 µH Characteristic curve = linear

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

Current circuit (terminal)	Electrical information (maximum values)
Mechanical digital feedback (+51 / -52) (+41 / -42)	For maximum values, see EC type examination certificate number PTB 00 ATEX 2049 X

## ... Use in potentially explosive atmospheres

### 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

### Flameproof (enclosure) 'Ex d'

Ex marking	
Marking	Ex d IIC T4/T5/T6
Type Examination Test Certificate	IECEX BVS 07.0030X, Issue No.: 0
Type	TZIDC-200
Standards	IEC 60079-0 IEC 60079-1

### Temperature Data

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

### Operation as intrinsically safe equipment

Ex marking	
Marking	Ex ia IIC T6 or T4 Gb
Type Examination Test Certificate	IECEX TUN 04.0015X
Shown as	5
Type	TZIDC-210
Standards	IEC 60079-0 IEC 60079-11

### Temperature Data

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

- \* 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

Current circuit (terminal)	Electrical information (maximum values)	
Signal circuit (+11 / -12)	U <sub>i</sub> = 24 V I <sub>i</sub> = 250 mA P <sub>i</sub> = 1.2 W	C <sub>i</sub> < 5 nF L <sub>i</sub> < 10 μH Characteristic curve = linear

### Special conditions

- The local communication interface (LCI) may only be operated at U<sub>m</sub> ≤ 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/ABCDEFGH/T6,T5,T4

Ta = 40 °C, 55 °C, 85 °C-901265 Entity, FISCO

#### Entity and FISCO Parameters

Terminals	Type	Groups	Parameters	
+11 / -12	Entity	A-G	U <sub>max.</sub> = 24 V I <sub>max.</sub> = 250 mA P <sub>i</sub> = 1.2 W	C <sub>i</sub> = 2.8 nF L <sub>i</sub> = 7.2 μH
	FISCO	A-G	U <sub>max.</sub> = 17.5 V I <sub>max.</sub> = 360 mA P <sub>i</sub> = 2.52 W	C <sub>i</sub> = 2.8 nF L <sub>i</sub> = 7.2 μH
	FISCO	C-G	U <sub>max.</sub> = 17.5 V I <sub>max.</sub> = 380 mA P <sub>i</sub> = 5.32 nF	C <sub>i</sub> = 2.8 nF L <sub>i</sub> = 7.2 μH
+51 / -52	Entity	A-G	U <sub>max.</sub> = 16 V I <sub>max.</sub> = 20 mA	C <sub>i</sub> = 60 nF L <sub>i</sub> = 100 μH
+41 / -42	Entity	A-G	U <sub>max.</sub> = 16 V I <sub>max.</sub> = 20 mA	C <sub>i</sub> = 60 nF L <sub>i</sub> = 100 μH

NI/I/2/ABCD/T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C

S/II,III/2/EFG//T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C

Enclosure type 4x

- a Case/mounting – 1, 2, 3, 4, 5 or 6
- b Output/safe protection – 1, 2, 3 or 4
- c 0
- 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

#### 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

- a Case/mounting – 1, 2, 3, 4, 5 or 6
- b Output/safe protection – 1, 2, 3 or 4
- c 0
- 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

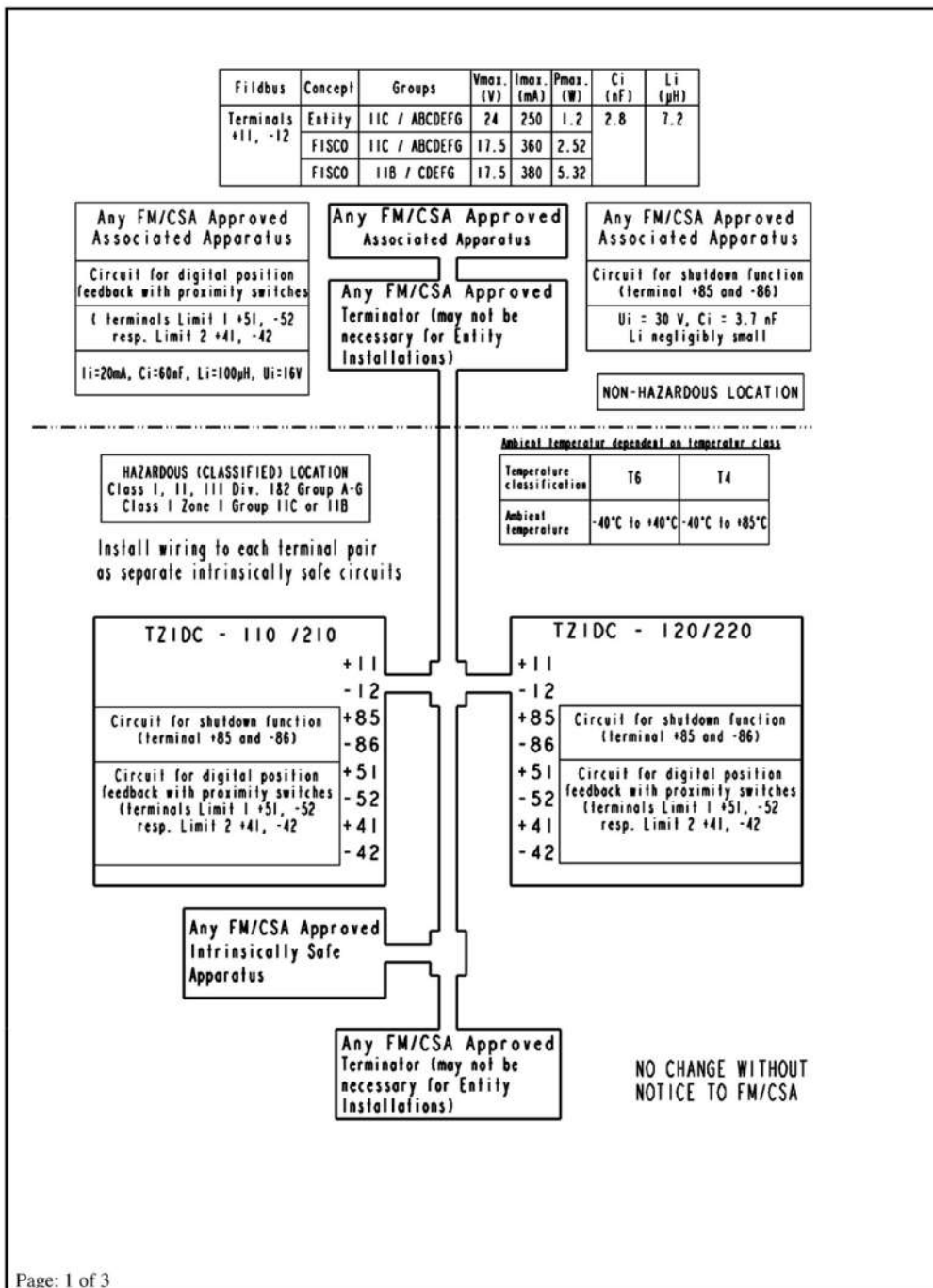
CL II; Div 1; Grp. E-F-G

CL III


See also **FM installation drawing No. 901265** on page 22.

... Use in potentially explosive atmospheres

FM installation drawing No. 901265



Page: 1 of 3

-	-			2003	Date	Name	Title	Scale	
					27.03.03	Thiem.	FM/CSA-Control-Document	/	
3	Rev.2	26.06.06	Thie.	 <b>Automation Products</b>				Drwg.-No. (Part-No.)	
2	Rev.1	22.05.06	Thie.					<b>901265</b>	
1	Rev.0	27.03.	Thie.						
Rev.	Chang	Date	Name					Supersedes Dwg. :	Part Class:

**FM/CSA-CONTROL-DOCUMENT\_901265**

**FISCO rules**

The FISCO Concept allows the interconnection of intrinsically safe apparatus to associated 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 ( $P_i$ ) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage ( $U_o, V_{oc}, V_t$ ), the current ( $I_o, I_{sc}, I_t$ ) 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  $\mu$ H 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 ( $U_o, V_{oc}, V_t$ ) 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  $\mu$ A for each connected device. Separately powered equipment needs a galvanic Isolation to insure 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  $\Omega$ /km

Inductance per unit length  $L'$ : 0.4...1mH/km

Capacitance per unit length  $C'$ :80...200 nF / km

$C' = C' \text{ line/line} + 0.5C' \text{ line/screen}$ , if both lines are floating

or

$C' = C' \text{ line/line} + C' \text{ Line/screen}$ , 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:

$R = 90...100 \Omega$

$C = 0...2.2 \mu\text{F}$ .

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.

-	-			2003	Date	Name	Title	Scale
				Name	27.03.03	Thiem.	FM/CSA-Control-Dokument	/
				Appr.				
				Std.				
3	Rev.2	26.06.06	Thie.	<b>ABB</b> Automation Products			Drwg.-No. (Part-No.)	
2	Rev.1	22.05.06	Thie.				<b>901265</b>	
1	Rev.0	27.03.	Thie.					
Rev.	Chang	Date	Name				Supersedes Dwg.:	Part Class:

... Use in potentially explosive atmospheres

Page: 3 of 3

**FM/CSA-CONTROL-DOCUMENT\_901265**

Installation Notes For FISCO and Entity Concepts:

- 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:  
 $U_o$  or  $V_{oc}$  or  $V_t \leq V_{max}$ ,  $I_o$  or  $I_{sc}$  or  $I_t \leq I_{max}$ ,  $P_o \leq P_i$ .  $C_a$  or  $C_o \geq \sum C_i + \sum C$  cable.  
 For inductance use either  $L_a$  or  $L_o \geq \sum L_i + \sum L$  cable or  $L_c / R_c \leq (L_a / R_a$  or  $L_o / R_o)$  and  $L_i / R_i \leq (L_a / R_a$  or  $L_o / R_o)$
- 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:  $U_o$  or  $V_{oc}$  or  $V_t \leq V_{max}$ ,  $I_o$  or  $I_{sc}$  or  $I_t \leq I_{max}$ ,  $P_o \leq P_i$ .
- Control equipment connected to the Associated Apparatus must not use or generate more than 250 Vrms or Vdc.
- 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.
- The configuration of associated Apparatus must be Factory Mutual Research /Canadian Standards Association Approved under the associated concept.
- Associated Apparatus manufacturer's installation drawing must be followed when installing this equipment.
- No revision to drawing without prior Factory Mutual Research Approval/Canadian Standards Association.
- Special conditions for safe use  
 The operation of the local communication interface (LKS) and of the programming interface (X5) 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.

- Install per National Electrical Code (NEC) using threaded metal conduit. Intrinsic safety barrier required. Max. Supply voltage 30 V. For T-code see table.
- A dust tight seal must be used at the conduit entry when the positioner is used in a Class II & III Location.
- 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.

-	-			2003	Date	Name	Title	Scale
				Name	27.03.03	Thiem.	FM/CSA-Control-Document	/
				Appr.				
				Std.				
3	Rev.2	26.06.06	Thie.	<b>ABB</b> Automation Products			Drwg.-No. (Part-No.)	
2	Rev.1	22.05.06	Thie.				<b>901265</b>	
1	Rev.0	27.03.	Thie.					
Rev.	Chang	Date	Name				Supersedes Dwg. :	Part Class:



# Ordering Information

## Main ordering information TZIDC-210

<b>Base model</b>	<b>V18349</b>	<b>XX</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>XX</b>	<b>X</b>	<b>X</b>
TZIDC-210 digital positioner, with flameproof enclosure, for PROFIBUS PA, intelligent, software-configurable									
<b>Case / Mounting</b>									
Case made of aluminium, varnished, for mounting to linear actuators acc. DIN / IEC 534 / NAMUR or to rotary actuators acc. VDI / VDE 3845		10							
Case made of aluminium, varnished, with mechanical position indicator, for mounting to linear actuators acc. DIN / IEC 534 / NAMUR or to rotary actuators acc. VDI / VDE 3845		20							
Case made of aluminium, varnished, for integral mounting to control valves (see dimensional drawing)		30							
Case made of aluminium, varnished, with mechanical position indicator, for integral mounting to control valves (see dimensional drawing)		40							
Case made of aluminium, varnished, for mounting to rotary actuators acc. VDI / VDE 3845 with extended rotation angle up to 270°		50							
Case made of aluminium, varnished, with mechanical position indicator, for mounting to rotary actuators acc. VDI / VDE 3845 with extended rotation angle up to 270°		60							
<b>Operation</b>									
With operator panel and display integrated in the enclosure cover						1			
<b>Explosion Protection</b>									
ATEX Ex d II C T4/T5/T6 Gb						1			
FM / CSA Class 1, Div. 1, Group C-D (Explosion-Proof)						2*			
ATEX II 2 G Ex ia IIC T6 resp. T4 Gb + Ex d						3			
FM / CSA eigensicher						4*			
IECEX ia IIC T6 resp. T4 Gb						5			
IECEX Ex d II C T4/T5/T6 Gb						6			
INMETRO Ex ia IIC Gb / Ex ib IIC Gb						P			
INMETRO Ex d IIC T6/T5/T4 Gb						S			
<b>Output / Safe Position (in case of an electrical power failure)</b>									
Single acting, fail safe							1		
Single acting, fail freeze							2		
Double acting, fail safe							3		
Double acting, fail freeze							4		

\* Only with cable connection NPT thread

Continued see next page

## ... Ordering Information

<b>TZIDC-210 digital positioner, for PROFIBUS PA</b>	<b>X</b>	<b>XX</b>	<b>X</b>	<b>X</b>
<b>Connections</b>				
Cable: Thread M20 × 1.5, air pipe: Thread G ¼	1			
Cable: Thread M20 × 1.5, air pipe: Thread ¼-18 NPT	2			
Cable: Thread ½-14 NPT, air pipe: Thread ¼-18 NPT	3			
Cable: Thread G ½, air pipe: Thread Rc ¼	7			
<b>Optional Mechanical Kit for Digital Position Feedback</b>				
Without		03		
Mechanical kit for digital position feedback with proximity switches SJ2-SN (NC or logical 1)		13*		
Mechanical kit for digital position feedback with 24 V AC / DC microswitches (change-over contacts)		33**		
<b>Design (Varnish / Coding)</b>				
Standard			1	
Higher Stiffness + Lower Air Capacity			H	
Protection Class IP 66			P	
<b>Device Identification Label</b>				
Without				0
Label including text, with separate sticker				1***
Stainless steel 18.5 × 65 mm (0.73 × 2.56 in)				2***

\* Non IECEx

\*\* Only for Ex d version

\*\*\* Plain text, max. 16 letters

Continued see next page

## Additional ordering information TZIDC-110

Additional ordering information	XX	XXX	XXX	XXX	XXX
<b>Documentation Language</b>					
German	M1				
Italian	M2				
Spanish	M3				
French	M4				
English	M5				
Swedish	M7				
Finnish	M8				
Polish	M9				
Portuguese	MA				
Russian	MB				
Czech	MC				
Dutch	MD				
Danish	MF				
Greek	MG				
Croatian	MH				
Latvian	ML				
Hungarian	MM				
Estonian	MO				
Bulgarian	MP				
Romanian	MR				
Slovak	MS				
Lithuanian	MU				
Slovenian	MV				
<b>Certificate of Compliance</b>					
Certificate of compliance with the order acc. EN 10204-2.1 (DIN 50049-2.1) with item description					CF2
Test report 2.2 acc. EN 10204 (DIN 50049-2.2)					CF3
Marine approval DNV_GL					CM1
<b>Inspection Certificate</b>					
Inspection certificate 3.1 acc. EN 10204					CBA
<b>Handling of Certificates</b>					
Send via e-mail					GHE
Send via mail					GHP
Send via mail express					GHD
Send with instrument					GHA
Only archived					GHS
<b>Certificate preparation</b>					
per device					GPD
per salesorder item					GPP

## ... Ordering Information

### Accessories

Accessories	Order number
<b>Mounting bracketole</b>	
EDP300 / TZIDC Mounting bracket for rotary actuators (mounting to VDI / VDE 3845), dimension A/B = 80/20 mm	319603
EDP300 / TZIDC Mounting bracket for rotary actuators (mounting to VDI / VDE 3845), dimension A/B = 80/30 mm	319604
EDP300 / TZIDC Mounting bracket for rotary actuators (mounting to VDI / VDE 3845), dimension A/B = 130/30 mm	319605
EDP300 / TZIDC Mounting bracket for rotary actuators (mounting to VDI / VDE 3845), dimension A/B = 130/50 mm	319606
<b>Montage Kit</b>	
EDP300 / TZIDC Mounting Kit Uhde Type 4 Stroke 400 mm cropped	7959500
<b>Attachment kit for linear actuators</b>	
EDP300 / TZIDC Attachment kit for linear actuators, stroke 10 to 35 mm	7959125
EDP300 / TZIDC Attachment kit for linear actuators, stroke 20 to 100 mm	7959126
<b>Lever</b>	
EDP300 / TZIDC Lever 30 mm	7959151
EDP300 / TZIDC Lever 100 mm	7959152
<b>Adapter</b>	
EDP300 / TZIDC Adapter (shaft coupler) for rotary actuators (mounting to VDI / VDE 3845)	7959110
EDP300 / TZIDC Form – locking shaft adapter	7959371
<b>Pressure gauge block</b>	
TZIDC Pressure gauge block, 0.6 MPa, single acting, G ¼ connection	7959364
TZIDC Pressure gauge block, 0.6 MPa, single acting, Rc ¼ connection	7959358
TZIDC Pressure gauge block, 0.6 MPa, single acting, NPT ¼ connection	7959360
TZIDC Pressure gauge block, 0.6 MPa, double acting, G ¼ connection	7959365
TZIDC Pressure gauge block, 0.6 MPa, double acting, Rc ¼ connection	7959359
TZIDC Pressure gauge block, 0.6 MPa, double acting, NPT ¼ connection	7959361
<b>Filter regulator</b>	
TZIDC Filter regulator, brass, connections thread G ¼, incl. material for mounting to pressure gauge block	7959119
TZIDC Filter regulator, brass, connections thread ¼-18 NPT, incl. material for mounting to pressure gauge block	7959120
<b>Anbausatz</b>	
EDP300 / TZIDC Attachment for remote sensor control unit (for wall or pipe mounting)	7959381
EDP300 / TZIDC Attachment kit for Fisher 1051-30, 1052-30	7959214

Accessories	Order number
<b>Anbausatz</b>	
EDP300 / TZIDC Attachment kit for Fisher 1061 size 130	7959206
EDP300 / TZIDC Attachment kit for Fisher 471	7959195
EDP300 / TZIDC Attachment kit for Fisher 657 / 667 Size 10 to 90 mm	7959177
EDP300 / TZIDC Attachment kit for Fisher Gulde 32/34	7959344
EDP300 / TZIDC Attachment kit for Gulde DK	7959161
EDP300 / TZIDC Attachment kit for Keystone 79U/E-002(S) ... 79U/E-181(S)	7959147
EDP300 / TZIDC Attachment kit for Masoneilan CAMFLEX II, VARIMAX, MINITORK II	7959144
EDP300 / TZIDC Attachment kit for Masoneilan VariPak 28000 series	7959163
EDP300 / TZIDC Attachment kit for MaxFlo MaxFlo	7959140
EDP300 / TZIDC Attachment kit for NAF 791290	7959207
EDP300 / TZIDC Attachment kit for NAMUR stroke 100 to 170 mm	7959339
EDP300 / TZIDC Attachment kit for NELES BC6-20, B1C6-20, B18-20, B1J8-20	7959146
EDP300 / TZIDC Attachment kite, lever for linear stroke, length 150 to 250 mm	7959210
EDP300 / TZIDC Attachment kit for Samson 241, 271, 3271	7959145
EDP300 / TZIDC Attachment kit for Samson 3277	7959136
EDP300 / TZIDC Attachment kit for Schubert&Salzer GS 8020 / 8021 / 8023	7959200
EDP300 / TZIDC Attachment kit for SED SED stroke 100 mm	7959141
<b>Cable gland</b>	
TZIDC-2xx 1 × Ex d cable gland M20 × 1.5, 1 pipe plug M20 × 1.5, securing adhesive	7959244
TZIDC-2xx 2 × Ex d cable glands M20 × 1.5, securing adhesive	7959245
TZIDC-2xx 1 × Ex d cable gland ½ in NPT, 1 pipe plug ½ in NPT, securing adhesive	7959246
TZIDC-2xx 2 × Ex d cable glands ½ in NPT, securing adhesive	7959247

## Trademarks

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Sales



Service

