

ABB TZIDC110 Electro-Pneumatic Positioner datasheet

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The TZIDC-110 is an electronically configurable positioner with communication capabilities designed for mounting to pneumatic linear or rotary actuators. It features a small and compact design, a modular construction, and an excellent cost-performance ratio.

Fully automatic determination of the control parameters and adaptation to the final control element yield considerable time savings and an optimal control behavior.

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TZIDC-110

Electro-Pneumatic Positioner

Compact, well-proven, and flexible



For PROFIBUS PA

Low operating cost

Compact design

Well-proven technology

Robust and environmentally ruggedized

Wide operating temperature range

— -40 ... 85 °C (-40 ... 185 °F)

Easy to commission, “single pushbutton” operating philosophy

Mechanical position indicator

ATEX, FM, CSA, GOST and IECEx approvals

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1 Description

The TZIDC-110 is an electronically configurable positioner with communication capabilities designed for mounting to pneumatic linear or rotary actuators. It features a small and compact design, a modular construction, and an excellent cost-performance ratio.

Fully automatic determination of the control parameters and adaptation to the final control element yield considerable time savings and an optimal control behavior.

1.1 Pneumatics

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

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

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

1.1.1 "Fail-safe" function

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

1.1.2 "Fail-freeze" function

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

1.2 Operation

The positioner has a built-in operating panel providing a 2-line LCD and 4 pushbuttons for optimal local configuration, commissioning and operational monitoring.

Alternatively, the appropriate configuration program and the available communication option can be used.

1.3 Communication

Communication with the TZIDC-110 positioner occurs via PROFIBUS PA.

1.4 Modular design

The TZIDC-110 basic model can be enhanced at any time by retrofitting optional equipment. Option modules for analog or digital position feedback or a shutdown-module can be installed. Additionally, a mechanical position indicator, proximity switches or 24 V microswitches are available for indicating the position independently of the mother board function.

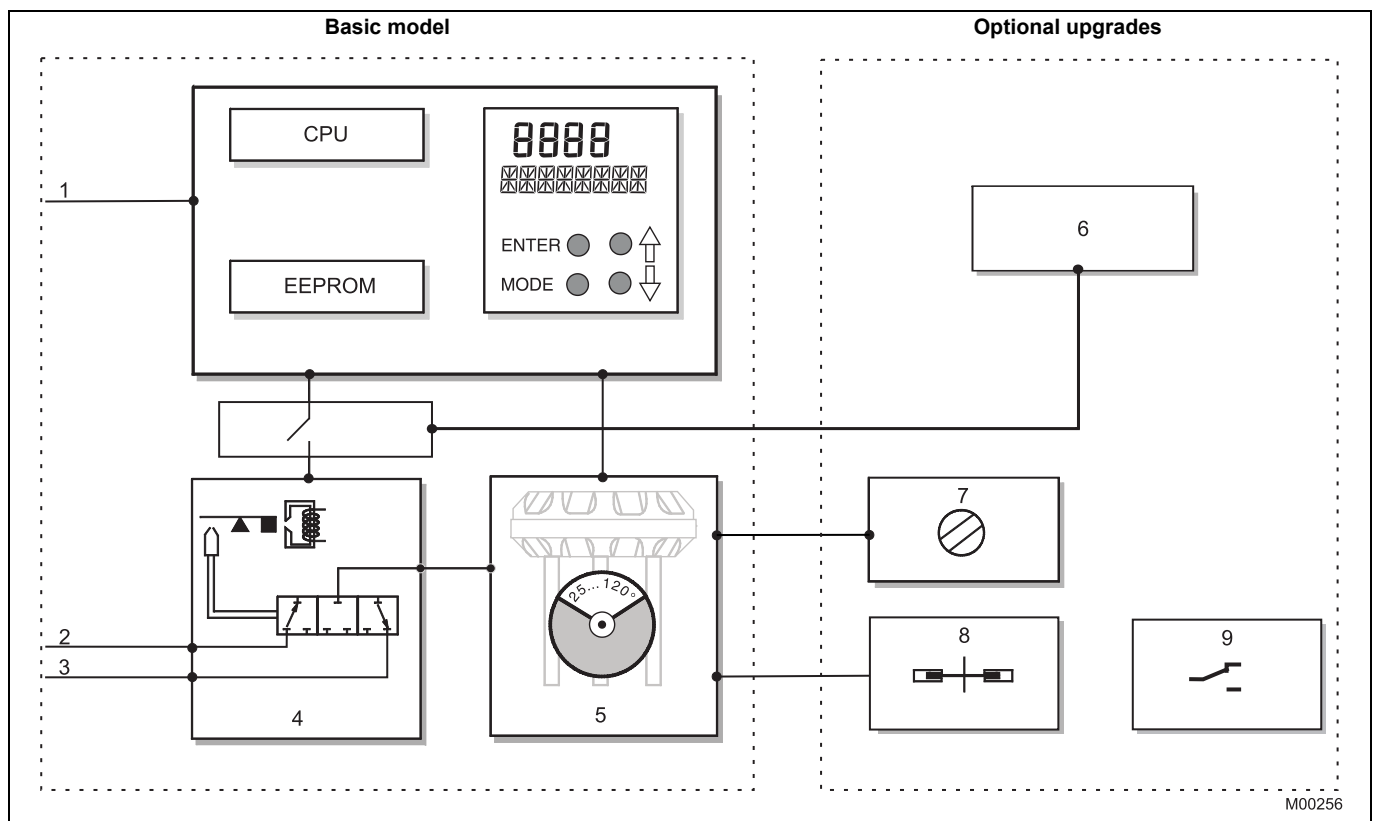


Fig. 1: TZIDC-110 schematic diagram

Basic model

- 1 Bus connector
- 2 Supply, 1.4 ... 6 bar
- 3 Exhaust
- 4 I/P module with 3/3-way valve
- 5 Position sensor (optional up to 270° rotation angle)

Optional upgrades

- 6 Plug-in module for safety shutdown (forced depressurization)
- 7 Mechanical position indicator
- 8 Mechanical feedback with proximity switches
- 9 Mechanical feedback with microswitches 24 V



Important

With optional upgrades either the “mechanical feedback with proximity switches” (8) or the “mechanical feedback with microswitches 24 V” (9) can be used.

In both cases, the “mechanical position indicator” (7) must be installed.

2 Mounting versions

2.1 To linear actuators in accordance with the standard

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

2.2 To rotary actuators in accordance with the standard

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

2.3 Integral mounting to control valves

The TZIDC-110 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 benefit of this design is that the point for mechanical stroke measurement is protected and that the positioner and actuator are linked internally. No external tubing is required.

2.4 Special actuator-specific mounting

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

Please contact us for details.

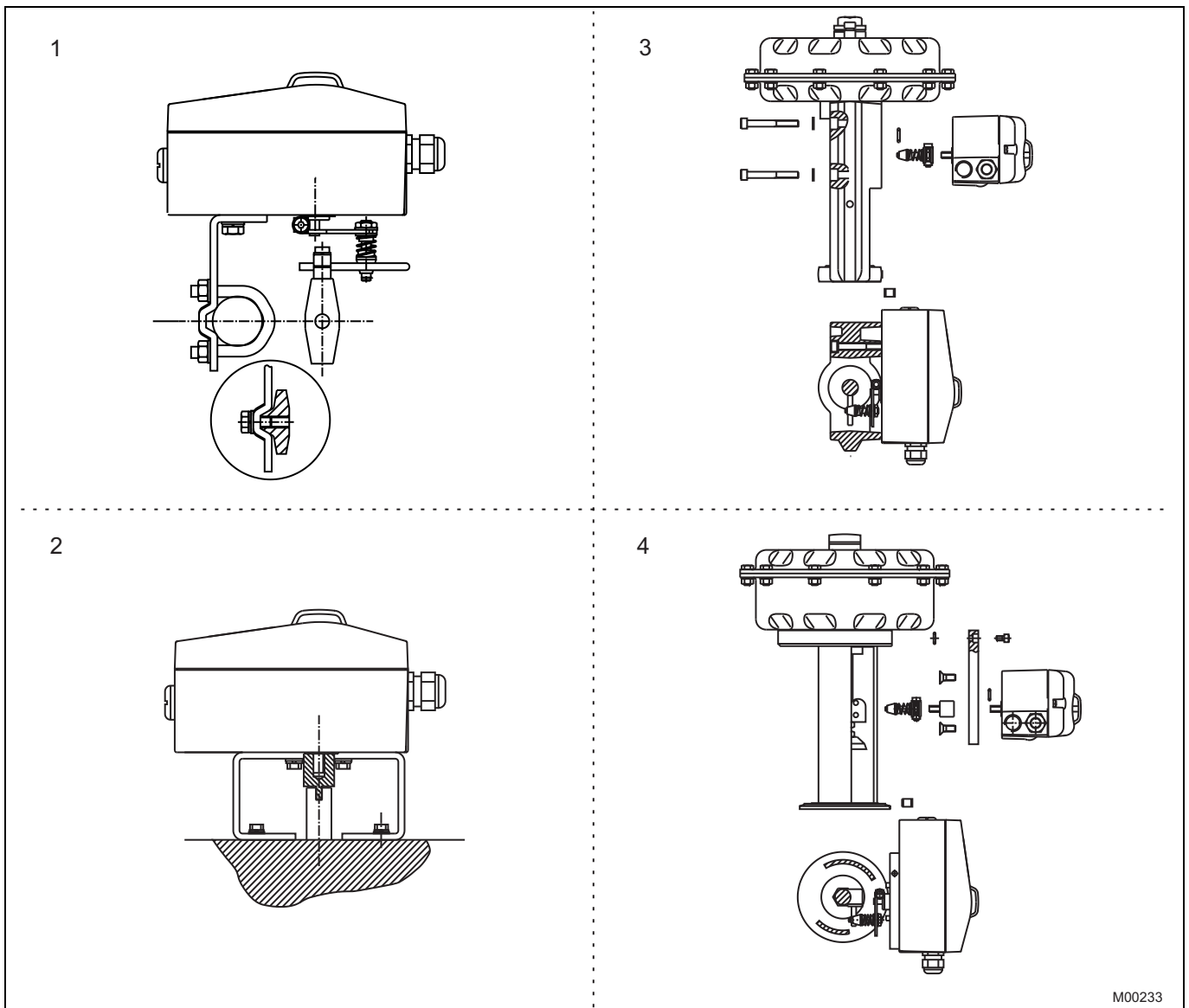


Fig. 2: Mounting options

- 1 Mounting to linear actuators acc. to DIN / IEC 534
- 2 Mounting to rotary actuators to VDI / VDE 3845

- 3 Integral mounting to control valves
- 4 Integral mounting to control valves by using an adapter panel

3 Operation

3.1 General

Microprocessor-based position control in the TZIDC-110 provides for optimal results. The positioner features high-precision control functions and high operational reliability. Due to their elaborate structure and easy accessibility, the device parameters can be quickly adapted to the respective application.

The total range of parameters includes:

- Operating parameters
- Adjustment parameters
- Monitoring parameters
- Diagnosis parameters
- Maintenance parameters

3.1.1 Operating parameters

Signal range 0 ... 100%

Subranges are configurable, min. range 20 %
Recommended range > 50 %

Action (positioning signal)

Increasing: Positioning signal 0 ... 100 % = direction 0 ... 100 %
Increasing: Positioning signal 0 ... 100 % = direction 100 ... 0 %

Characteristic curve (travel = f {signal})

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

Travel limit

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

Shut-off function

This parameter can be set separately for each end position. When the respective configured limit value is exceeded, the shut-off function causes immediate travel of the actuator until reaching the set end position.

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.

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.



Important

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

Switching points for the position

This parameter allows you to define two position limits for signaling (see option "Module for digital position feedback").

3.1.2 Adjustment parameters

The TZIDC-110 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

When reaching the tolerance band the position is considered as corrected. From this point on, the position is further slowly re-adjusted until the dead band is 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 sensor shaft rotating sense (looking into the open case), if the valve is moved to the safe position by the actuator spring (actuator is depressurized via Y1/OUT1).

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

Display 0 ... 100 %

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

3.1.3 Monitoring parameters

Various functions for permanent operational monitoring are implemented in the TZIDC-110 operating program, 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. 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 such as the positioning signal (in %), the position (in %), the control deviation (in %) as well as the status messages.

3.1.4 Diagnosis parameters

The diagnosis parameters of the TZIDC-110 program inform the operator about the operating conditions of the valve.

From this information the operator can derive which maintenance works are required, and when.

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

The following values are e.g. determined:

- Number of movements performed by the valve
- Total travel

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

3.2 Operator panel

The TZIDC-110 positioner's operator panel with four pushbuttons allows for

- operational monitoring
- manual control
- configuration
- fully automatic commissioning

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

3.2.1 Single-button commissioning

Commissioning the TZIDC-110 positioner is especially easy. The standard Autoadjust function for automatic adaptation of the device parameters can be started by simply pressing a single front panel button, and without knowing parameterization details.

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

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

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

3.2.2 Display

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

During control operation the following TZIDC-110 data can be called up by pressing the pushbuttons briefly:

Up button	Cyclic communication:
	- Setpoint (%)
	- Setpoint status
	Acyclic communication:
	- Status of communication
Down button	Operating mode on the bus and bus address
Enter	Software Version



Fig. 3: TZIDC-110 with removed cover, view of the operator panel

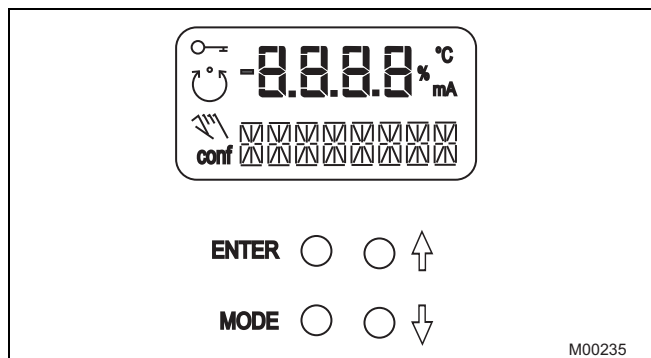


Fig. 4: TZIDC-110 operating elements and display

4 Communication

4.1 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.

4.2 PROFIBUS PA

PROFIBUS PA was developed primarily for process automation solutions.

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

4.3 Benefits of PROFIBUS communication

- Standardized device profiles ensure interoperability of devices from various manufacturers
- Acyclic access to device data (even during operation) for configuration, diagnostics and service
- 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

4.4 Positioner TZIDC-110 for PROFIBUS PA

The TZIDC-110 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.

4.5 Device management for TZIDC-110

For the TZIDC-110, a graphic user interface known as the "DTM" is available. The DTM is based on FDT/DTM technology (FDT 1.2) and can be integrated in a control system as well as a separate PC with the DVS401 configuration software (SMART VISION). The device can thus be commissioned, operated and serviced from a single user interface.

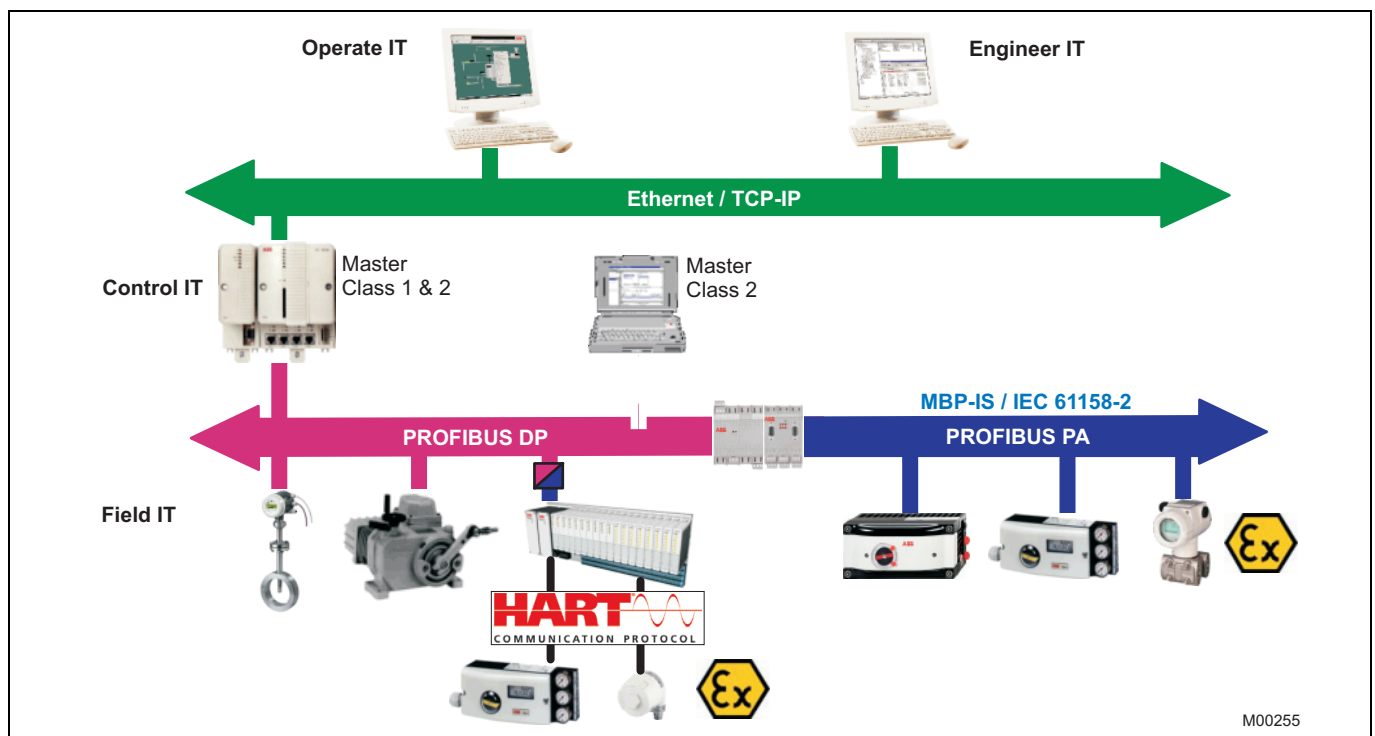


Fig. 5: Communication via PROFIBUS

5 Specifications

5.1 Communication

Profiles	Profibus PA profile for process devices
Block types	Electro-pneumatic actuators V3.0 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 ... 32.0 V DC
Max. permissible voltage	35 V DC
Power consumption	10.5 mA
Current in the event of an error	15 mA (10.5 mA + 4.5 mA)

5.2 Designation

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

5.3 Output

Range	0 ... 6 bar (0 ... 90 psi)
Air capacity	at 1.4 bar (20 psi) supply pressure 5.0 kg/h = 3.9 Nm ³ /h = 2.3 scfm at supply pressure of 6 bar (90 psi) 13 kg/h = 10 Nm ³ /h = 6.0 scfm
Output function	For single or double-acting actuators, air is vented from actuator or actuator is blocked in case of (electrical) power failure
Shut-off values	end position 0 % = 0 ... 45 % end position 100 % = 55 ... 100 %

5.4 Travel

Rotation angle	
Used range	
25 ... 120°	rotary actuators, optionally 270°
25 ... 60°	linear actuators
Travel time prolongation	
Setting range	0 ... 200 seconds, separately for each direction

5.5 Air supply

Instrument air	free of oil, water and dust to DIN/ISO 8573-1. Pollution and oil content according to Class 3 (purity: max. particle size = 5 µm, max. particle density = 5 mg / m ³ ; oil content: max. concentration = 1 mg / m ³ ; pressure dew point: 10 K below operating temperature)
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Supply pressure	1.4 ... 6 bar (20 ... 90 psi)
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i IMPORTANT (NOTE)

Do not exceed the maximum operating pressure of the actuator!

Air consumption	< 0.03 kg/h / 0.015 scfm (independent of supply pressure)
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5.6 Transmission data and influences

Output Y1	
Increasing:	Increasing output signal 0 ... 100 % Increasing pressure at output Y1
Decreasing:	Increasing output signal 0 ... 100 % Decreasing pressure at output Y1

Characteristic deviation	≤ 0,5 %
Tolerance band	0.3 ... 10 %, adjustable
Dead band	0,1 ... 10 %, adjustable
Resolution (A/D conversion)	> 16000 steps
Sample rate	20 ms
Influence of ambient temperature	≤ 0.5 % per 10 K
Influence of vibration	≤ ± 1 % to 10 g and 80 Hz

Seismic requirements

Meets requirements of DIN / IEC 68-3-3 Class III for strong and strongest earthquakes.

Influence of mounting orientation

Not measurable.

Meets the requirements of the following directives

- EMC Directive 2004/108/EC
- EC Directive for CE conformity marking

5.7 Environmental capabilities

Ambient temperature

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

Relative humidity

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

5.8 Housing

Material / Degree of protection

Aluminum with ≤ 0.1 % copper, protection class IP 65 (optional IP 66) / NEMA 4X

Surface / Color

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

Electrical connections

Screw terminals: Max. 1.0 mm² (AWG 17) for options
Max. 2.5 mm² (14 AWG) for bus connector

i IMPORTANT (NOTE)

Do not expose the terminals to strain.

Four thread combinations for cable entry and pneumatic connection

- Cable: thread 1/2-14NPT, air pipe: thread 1/4-18 NPT
- Cable: thread M20 x 1,5, air pipe: thread 1/4-18 NPT
- Cable: thread M20 x 1,5, air pipe: thread G 1/4
- Cable: thread G 1/2, air pipe: thread Rc 1/4

(Optional: With cable gland(s) and pipe plugs if necessary)

Weight

1,7 kg (3,75 lb)

Mounting orientation

Any

5.9 Options

Module for the emergency shutdown function

Supply voltage 24 V DC (20 ... 30 V DC) (galvanically isolated from input signal)

Safe position is activated when Explosion protection voltage < 5 V see certificate (operating instructions)

A separate 24 V DC signal is normally applied to the emergency shutdown module, which connects through the signal from the microprocessor to the I/P module.

When the 24 V DC signal is interrupted, the pneumatic module executes the respective safety function, depending on the mechanical construction.

The positioner output Y1 is depressurized, and the valve is moved to the safe position. In case of a double-acting actuator the second output Y2 is additionally pressurized.

i IMPORTANT (NOTE)

The emergency shutdown module can only be used with pneumatics with the safe position "fail-safe".

The emergency shutdown module works independently of the mother board, i.e. all information from the final control element is available in the supervisory process control system at any time.

Digital position feedback with proximity switches ¹⁾

Two proximity switches for independent position signaling. Switching points adjustable between 0 ... 100 %

Current circuits acc. to DIN 19234 / NAMUR

Supply voltage 5 ... 11 V DC

Signal current < 1 mA Switching state logical "0"

Signal current > 2 mA Switching state logical "1"

Direction of action (logical state)

Proximity switch	Position			
	< Lim. 1	> Lim. 1	< Lim. 2	> Lim. 2
SJ2-SN (NC)	0	1	1	0
SJ2-S1N (NO)	1	0	0	1

i IMPORTANT (NOTE)

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

Digital position feedback with 24 V microswitches ¹⁾

Two microswitches for independent position signaling. Switching points adjustable between 0 ... 100 %.

Voltage max. 24 V AC / DC

Load rating max. 2 A

Contact surface 10 µm Gold (AU)

Mechanical position indicator

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

i IMPORTANT (NOTE)

These options are also available for retrofitting by Service.

- 1) 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.

5.10 Accessories

Mounting material

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

Pressure gauge block

- With pressure gauges for supply and output pressure.
- Pressure gauges with housing ø 28 mm (1.1 inch), with connection block in aluminum, black
- Installation material for mounting on positioner

Filter regulator

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

Max. pre-pressure 16 bar (232.06 psi), output adjustable to 1.4 ... 6 bar (20 ... 90 psi)

PC software for configuration and operation

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

6 Ex relevant specifications

6.1 ATEX

6.1.1 ATEX Ex i

Marking:	II 2 G Ex ia IIC T6 resp. T4 Gb II 3 G Ex ic IIC T6 resp. T4 Gc
Type examination certificate:	TÜV 02 ATEX 1831 X
Type:	Intrinsically safe equipment
Standards:	EN 60079-0:2009 EN 60079-11:2007 EN 60079-27:2008

Temperature class	Ambient temperature range
T4	-40 ... 85 °C
T6	-40 ... 40 °C

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

With the intrinsically safe Ex i IIC type of protection, only for connection to a certified FISCO power supply unit, a barrier or a power supply unit with linear characteristic curves and the following maximum values:

Signal circuit (terminal +11 / -12 or + / -)	U _i = 24 V I _i = 250 mA P _i = 1.2 W Characteristic curve: linear L _i < 10 µH C _i < 5 nF
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With the intrinsically safe Ex i IIC type of protection, only for connection to a certified intrinsically safe circuit with maximum values:

Shutdown switch input (terminal +85 / -86)	U _i = 30 V C _i = 3.7 nF L _i negligibly small
Mechanical digital feedback (terminal Limit1 +51 / -52 or Limit2 +41 / -42)	For maximum values, see EC type examination certificate number PTB 00 ATEX 2049 X

6.1.2 ATEX Ex n

Marking:	II 3 G Ex nA IIC T6 resp. T4 Gc
Declaration of conformity:	TÜV 02 ATEX 1943 X
Type:	"n" type of protection
Device group:	II 3 G
Standards:	EN 60079-15:2010 EN 60079-0:2009

II 3 G Temperature class	Ta Ambient temperature range
T4	-40 ... 85 °C
T6	-40 ... 50 °C

Electrical data for II 3 G Ex nA IIC T6 or T4 Gc	
Signal circuit (terminal +11 / -12)	U = 9 ... 32 V DC I = 10.5 mA
Mechanical digital feedback (terminal Limit1 +51 / -52 or Limit2 +41 / -42)	U = 5 ... 11 V DC
Plug-in module for shutdown switch input (terminal +51 / -52 or +85 / -86)	U = 20 ... 30 V DC

Special requirements

- Devices may 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 "digital feedback 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 IEC 60079-15
- If the SJ2_S1N (NO) proximity switch is used, the positioner may only be operated in an ambient temperature range from -25 ... 85 °C

6.2 IECEx

Marking:	Ex ia IIC T6 resp. T4 Gb Ex ib IIC T6 resp. T4 Gb Ex ic IIC T6 resp. T4 Gc Ex nA IIC T6 resp. T4 Gc
Certificate no.:	IECEx TUN 04.0015X
Issue no.:	5
Type:	Intrinsic safety "i" or Type of protection "n"
Standards:	IEC 60079-0:2011 IEC 60079-11:2011 IEC 60079-15:2010

Type and marking	TZIDC-110 Ex i IIC	TZIDC-110 Ex nA IIC
Temperature class	Ambient temperature range	
T4	-40 ... 85 °C	-40 ... 85 °C
T6	-40 ... 40 °C	-40 ... 50 °C

6.2.1 IECEx i

Electrical data for TZIDC-110 for ia/ib/ic with "Ex i IIC T6" or "T4 Gb" marking

With the intrinsically safe Ex i IIC type of protection, only for connection to a certified FISCO power supply unit, a barrier or a power supply unit with linear characteristic curves and the following maximum values:	
Signal circuit (terminal +11 / -12 or + / -)	U _i = 24 V I _i = 250 mA P _i = 1.2 W Characteristic curve: linear

The following modules may be used as an option: Ex nA IIC T6 or T4 Gc:

With the intrinsically safe Ex ia IIC or Ex ib type of protection, only for connection to a certified intrinsically safe circuit with maximum values:	
Shutdown switch input (terminal +51 / -52 or +85 / -86)	U _i = 30 V I _i = 320 mA P _i = 1.1 W C _i = 3.7 nF L _i negligibly small

6.2.2 IECEx n

Electrical data for TZIDC-110 with "Ex nA IIC T6" or "T4 Gc" marking	
Signal circuit (terminal +11 / -12)	U = 9 ... 32 V DC I = 10.5 mA
Mechanical digital feedback (terminal Limit1 +51 / -52 or Limit2 +41 / -42)	U = 5 ... 11 V DC
Plug-in module for shutdown switch input (terminal +51 / -52 or +85 / -86)	U = 20 ... 30 V DC

Special Requirements

- Devices may 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 "digital feedback 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 IEC 60079-15
- If the SJ2_S1N (NO) proximity switch is used, the positioner may only be operated in an ambient temperature range from -25 ... 85 °C

6.3 FM/CSA

6.3.1 CSA International

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

 Class 2258 02 PROCESS CONTROL
 EQUIPMENT –
 For Hazardous Locations

Class I, Div 2, Groups A, B, C and D;
 Class II, Div 2, Groups E, F, and G,
 Class III, Enclosure Type 4X:

Model TZIDC-110, P/N V18346-x032x2xx0x Intelligent Positioner	
Input rated	32 V DC; max. 15 mA (powered by a SELV circuit)
Intrinsically safe with entity parameters of:	
Terminals 11 / 12	V max = 24 V I max = 250 mA C _i = 2.8 nF L _i = 7.2 uH
Terminals 85 / 86	U max = 30 V I max = 50 mA C _i = 3.8 nF L _i = 0 uH
Terminals 41 / 42	U max = 16 V I max = 20 mA C _i = 60 nF L _i = 100 uH
Terminals 51 / 52	U max = 16 V I max = 20 mA C _i = 60 nF L _i = 100 uH

When installed per installation Drawing No 901265	
Temperature Code	T4
Max. Ambient	85 Deg C



IMPORTANT (NOTE)

- The "x" in P/N denotes minor mechanical variations or optional features.
- Local communication interface LKS shall not be used in hazardous location.
- Each pair of conductors of each intrinsic safety circuit shall be shielded.

6.3.2 CSA Certification Record

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

Class I, Div 1, Groups A, B, C and D;
 Class II, Div 1, Groups E, F, and G,
 Class III, Div 1, Enclosure Type 4X:

Model TZIDC-110, P/N V18346-x032x2xx0x Intelligent Positioner	
Input rated	32 V DC; max. 15 mA (powered by a SELV Circuit)
Intrinsically safe with entity parameters of:	
Terminals 11 / 12	V max = 24 V I max = 250 mA C _i = 2.8 nF L _i = 7.2 uH
Terminals 85 / 86	U max = 30 V I max = 50 mA C _i = 3.8 nF L _i = 0 uH
Terminals 41 / 42	U max = 16 V I max = 20 mA C _i = 60 nF L _i = 100 uH

When installed per installation Drawing No 901265	
Temperature Code	T4
Max. Ambient	85 Deg C



IMPORTANT (NOTE)

- The "x" in P/N denotes minor mechanical variations or optional features.
- Local communication interface LKS shall not be used in hazardous location.
- Each pair of conductors of each intrinsic safety circuit shall be shielded.

6.3.3 FM Approvals

TZIDC-110 Positioner, Model V18346-a032b2cd0e
IS/I,II,III/1/ABCDEFG/T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C-901265
Entity, FISCO

Entity and FISCO Parameters							
Aerial	Type	Aerial	Parameters				
			Vmax	I _{max}	Pi	Ci	Li
+11 / -12	Entity	A-G	24 V	250 mA	1.2 W	2.8 nF	7.2 uH
+11 / -12	FISCO	A-G	17.5 V	360 mA	2.52 W	2.8 nF	7.2 uH
+11 / -12	FISCO	C-G	17.5 V	380 mA	5.32 W	2.8 nF	7.2 uH
+51 / -52	Entity	A-G	16 V	20 mA	-	60 nF	100 uH
+41 / -42	Entity	A-G	16 V	20 mA	-	60 nF	100 uH
+85 / -86	Entity	A-G	30 V	-	-	3.7 nF	< 1 uH

NII/2/ABCD/T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C
S/II,III/2/EF/G/T6,T5,T4 Ta = 40 °C, 55 °C, 85 °C

Enclosure type 4x

a = Case/mounting – 1, 2, 5 or 6

b = Output/safe protection – 1, 2, 4 or 5

c = Option modules (shutdown) – 0 or 4

d = Optional mechanical kit for digital position feedback – 0, 1 or 3

e = Design (varnish/coding) – 1 or E

Equipment Ratings:

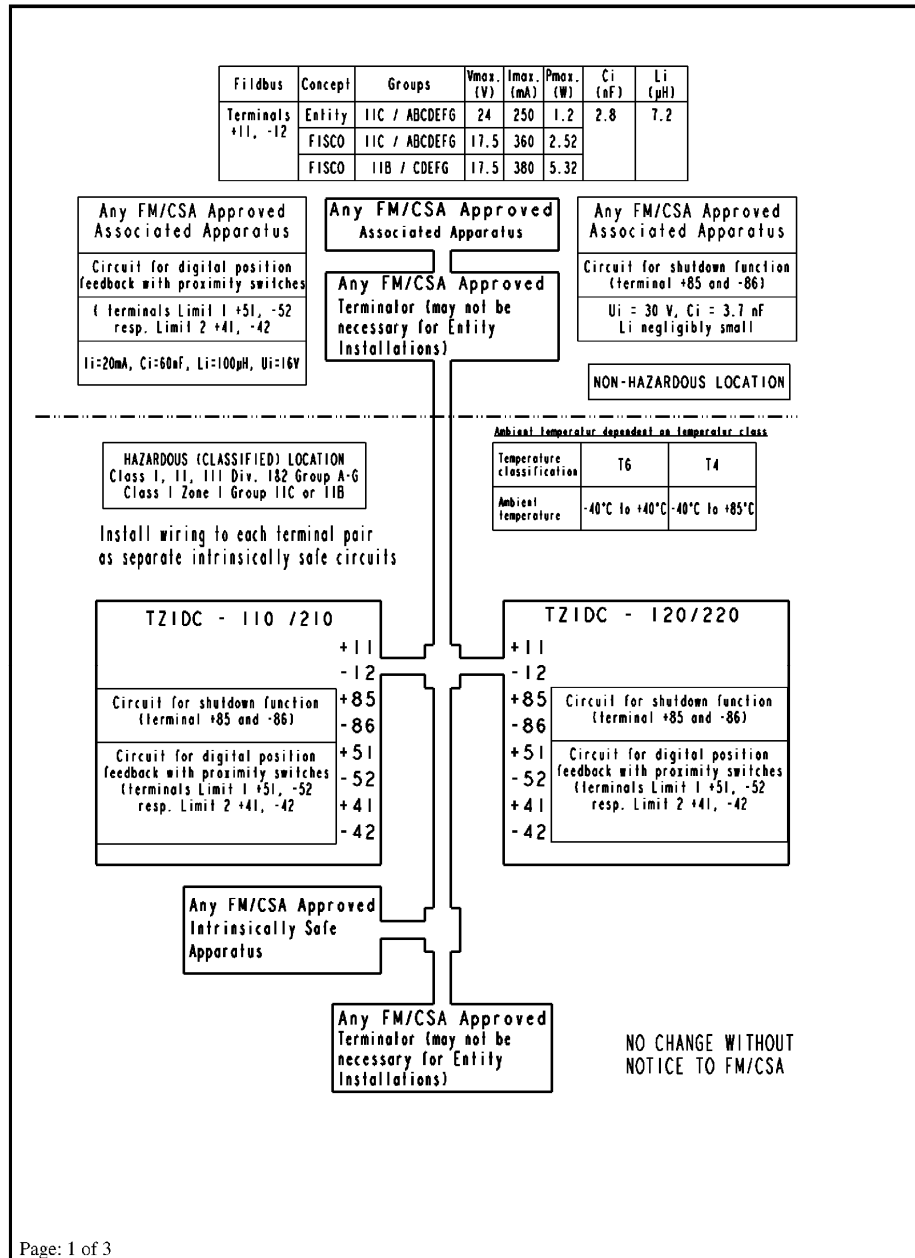
TZIDC-110

Intrinsically safe, Entity and FISCO, for Class I, II and III, Division 1,
Applicable Groups A, B, C, D, E, F, G; nonincendive for Class I,
Division 2,

Group E, F and G hazardous (classified) indoor and outdoor NEMA 4x
locations.

The following temperature code ratings were assigned for the equipment and protection methods described above:
T6 in ambient temperatures of 40 °C
T5 in ambient temperatures of 55 °C
T4 in ambient temperatures of 85 °C

6.3.4 FM Control Document



Page: 1 of 3

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

Page: 2 of 3								
FM/CSA-CONTROL-DOCUMENT_901265								
FISCO rules								
<p>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 μH respectively.</p> <p>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 μA for each connected device. Separately powered equipment needs a galvanic Isolation to insure that the intrinsically safe Fieldbus circuit remains passive.</p> <p>The cable used to interconnect the devices needs to comply with the following parameters:</p> <p>Loop resistance R': 15...150 Ω/km Inductance per unit length L': 0.4...1mH/km Capacitance per unit length C': 80...200 nF/km $C' = C' \text{ line/line} + 0.5C' \text{ line/screen}$, 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.</p>								
-	-			2003	Date	Name	Title	Scale
					27.03.03	Thiem.	FM/CSA-Control-Dokument	/
3	Rev.2	26.06.06	Thie.	ABB			Drwg.-No. (Part-No.)	
2	Rev.1	22.05.06	Thie.	Automation Products			901265	
1	Rev.0	27.03.	Thie.					
Rev.	Chang	Date	Name				Supersedes Dwg. :	Part Class:

Page: 3 of 3								
FM/CSA-CONTROL-DOCUMENT_901265								
<p>Installation Notes For FISCO and Entity Concepts:</p> <ol style="list-style-type: none"> 1. The Intrinsic Safety Entity concept allows the interconnection of FM/CSA Approved Intrinsically safe devices with entity parameters not specifically examined in combination as a system when: U_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 $L_c / R_c \leq (L_a / R_a \text{ or } L_o / R_o)$ and $L_i / R_i \leq (L_a / R_a \text{ or } L_o / R_o)$ 2. The Intrinsic Safety FISCO concept allows the interconnecting of FM/CSA Approved Intrinsically safe devices with FISCO parameters not specifically examine in combination as a system when: U_o or V_{oc} or $V_t \leq V_{max}$, I_o or I_{sc} or $I_t \leq I_{max}$, $P_o \leq P_i$. 3. Control equipment connected to the Associated Apparatus must not use or generate more than 250 Vrms or Vdc. 4. Installation should be in accordance with ANSI/ISA RP12.6 (except chapter 5 for FISCO Installations) "Installation of Intrinsically Safe System for Hazardous (Classified) Locations" and the National Electrical Code® (ANSI/NFPA 70) Sections 504 and 505. 5. The configuration of associated Apparatus must be Factory Mutual Research /Canadian Standards Association Approved under the associated concept. 6. Associated Apparatus manufacturer's installation drawing must be followed when installing this equipment. 7. No revision to drawing without prior Factory Mutual Research Approval/Canadian Standards Association. 8. Special conditions for safe use The operation of the local communication interface (LKS) and of the programming interface (XS) is only allowed outside of the Hazardous explosive area. <p>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.</p> <ol style="list-style-type: none"> 1. Install per National Electrical Code (NEC) using threaded metal conduit. Intrinsic safety barrier required. Max. Supply voltage 30 V. For T-code see table. 2. A dust tight seal must be used at the conduit entry when the positioner is used in a Class II & III Location. 3. WARNING: Explosion Hazard – do not disconnect equipment unless power has been switched off or the area is known to be Non-Hazardous. WARNING: Substitution of components may impair suitability for hazardous locations. 								
-	-			2003	Date	Name	Title	Scale
				Name	27.03.03	Thiem.	FM/CSA-Control-Document	/
				Appr.				
				Std.				
3	Rev.2	26.06.06	Thie.	ABB			Drwg.-No. (Part-No.)	
2	Rev.1	22.05.06	Thie.	Automation Products			901265	
1	Rev.0	27.03.	Thie.					
Rev.	Chang	Date	Name				Supersedes Dwg. :	Part Class:

7 Electrical connections

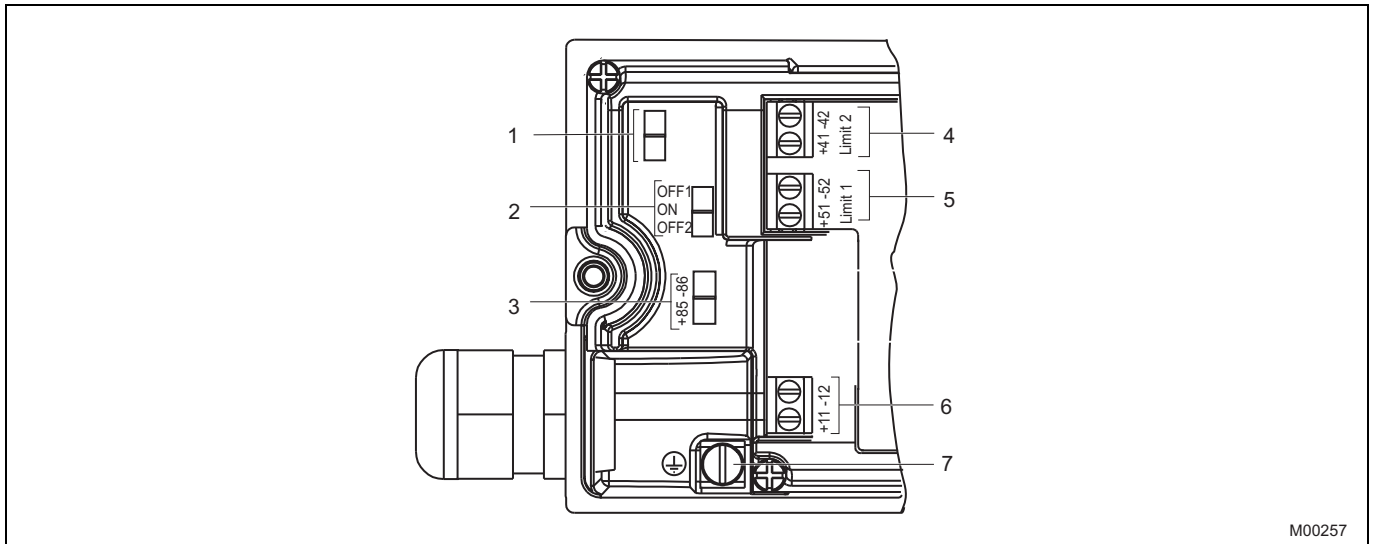
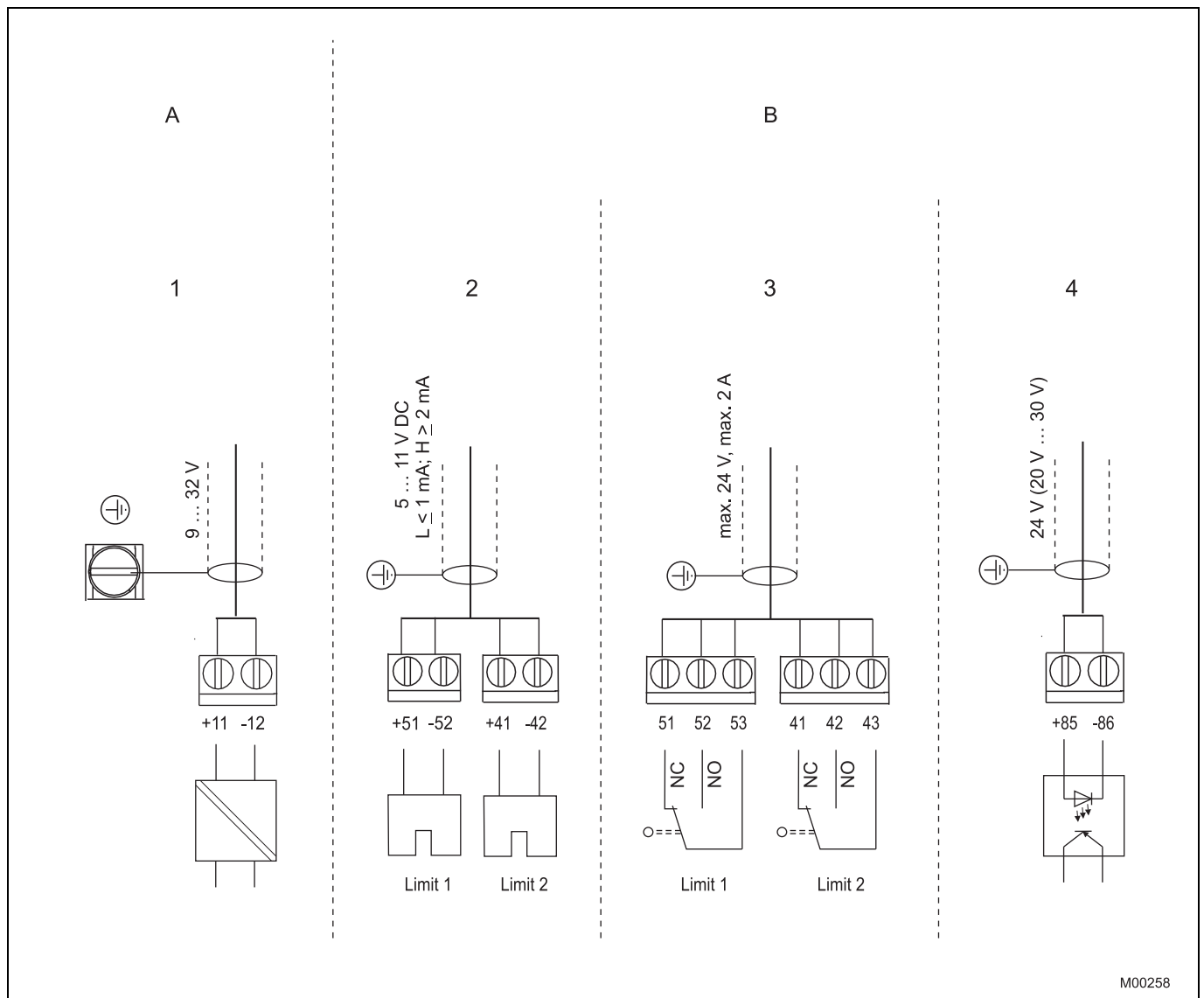


Fig. 6: Screw terminals, overview

- | | |
|--|-------------------|
| 1 Not assigned | 5 Same as 4 |
| 2 Service switch for emergency shutdown module | 6 Bus connector |
| 3 Terminals of the shutdown module | 7 Grounding screw |
| 4 Digital position feedback, either proximity switches or 24 V microswitches | |



M00258

Fig. 7: Pin configuration

- A Basic model
- B Options

- 1 Fieldbus, bus feed
- 2 Proximity switches
- 3 Microswitches
- 4 Emergency shutdown module



Important

Keep cable shields as short as possible and connect on both sides.

8 Dimensions

All dimensions in mm (inch)

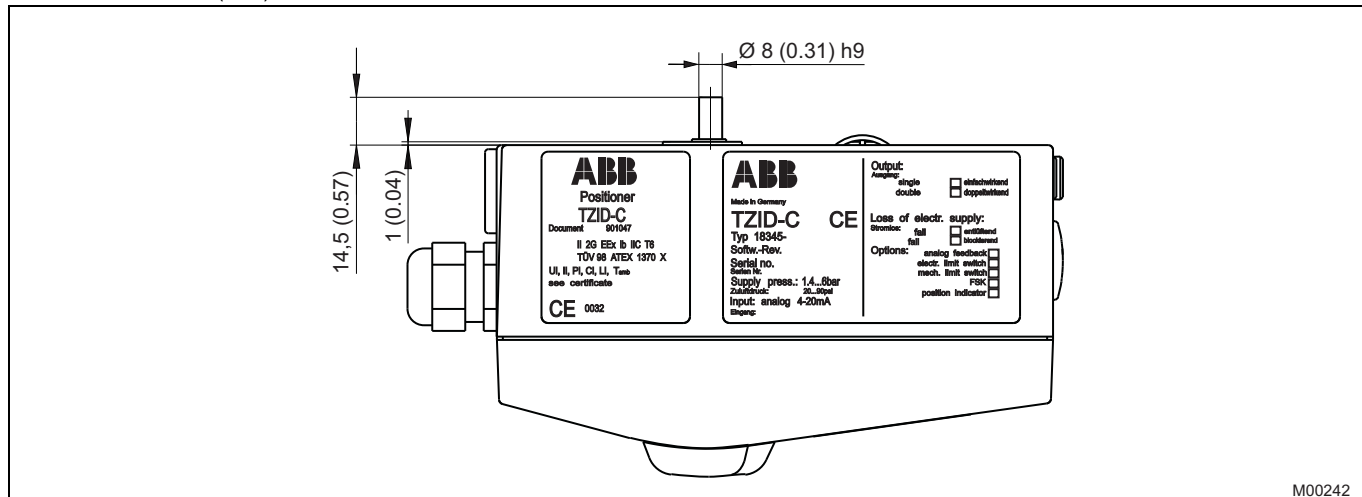


Fig. 8: Top view

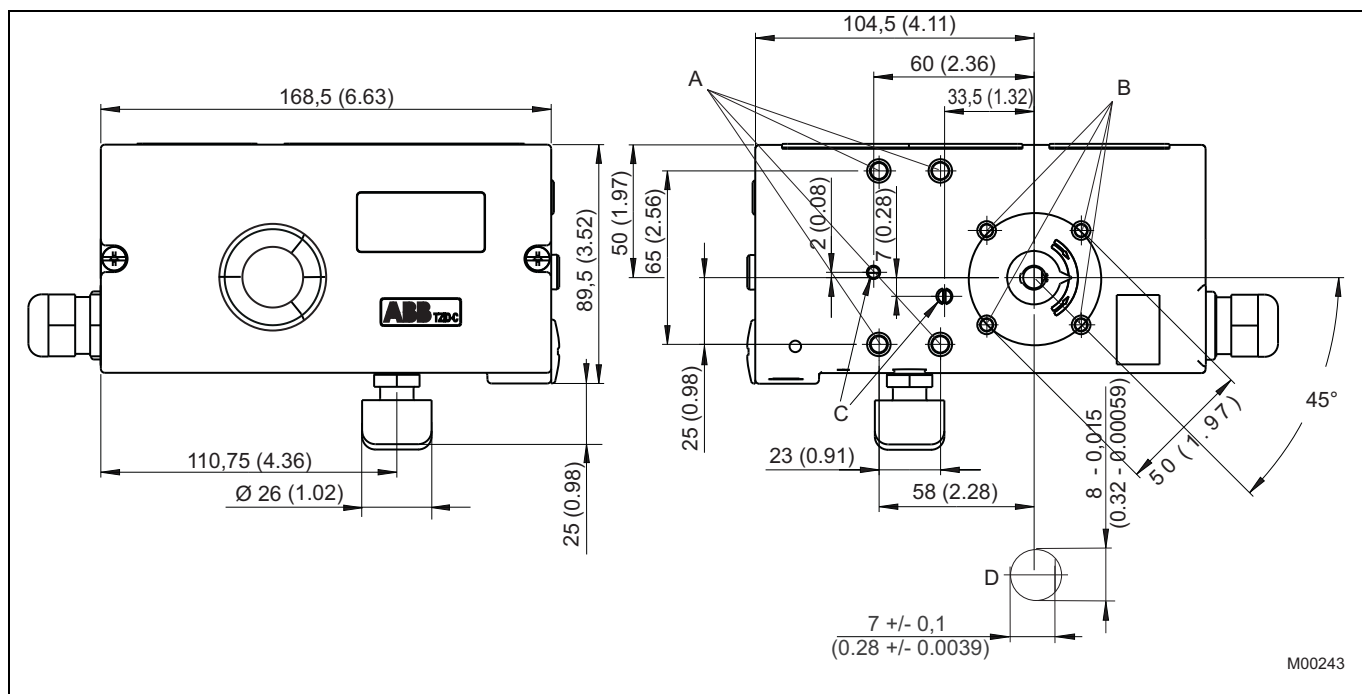


Fig. 9: Front and rear views

- A Tap hole M8 (10 mm low)
- B Tap hole M6 (8 mm low)

- C Tap hole M5 x 0.5 (air vents for direct mount)
- D Sensor shaft (larger than scale)

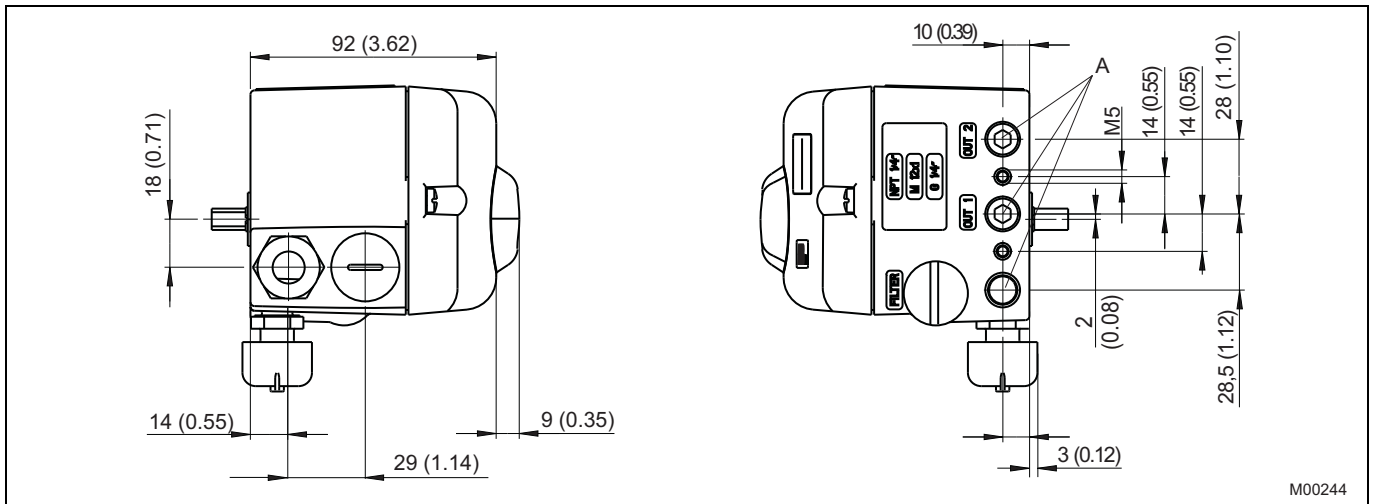


Fig. 10: side view (from left to right)
A Pneumatic connections, NPT 1/4"-18 or G1/4"

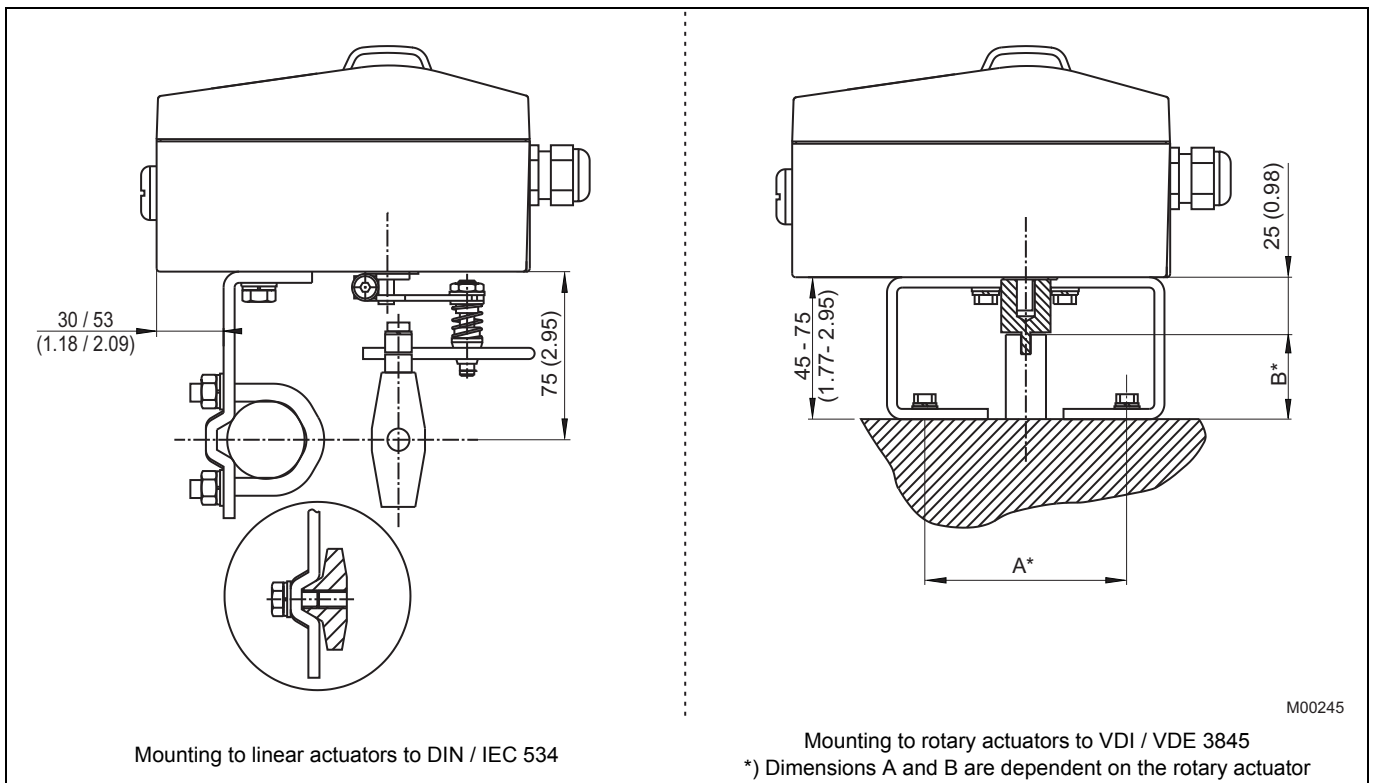


Fig. 11: Mounting drawings

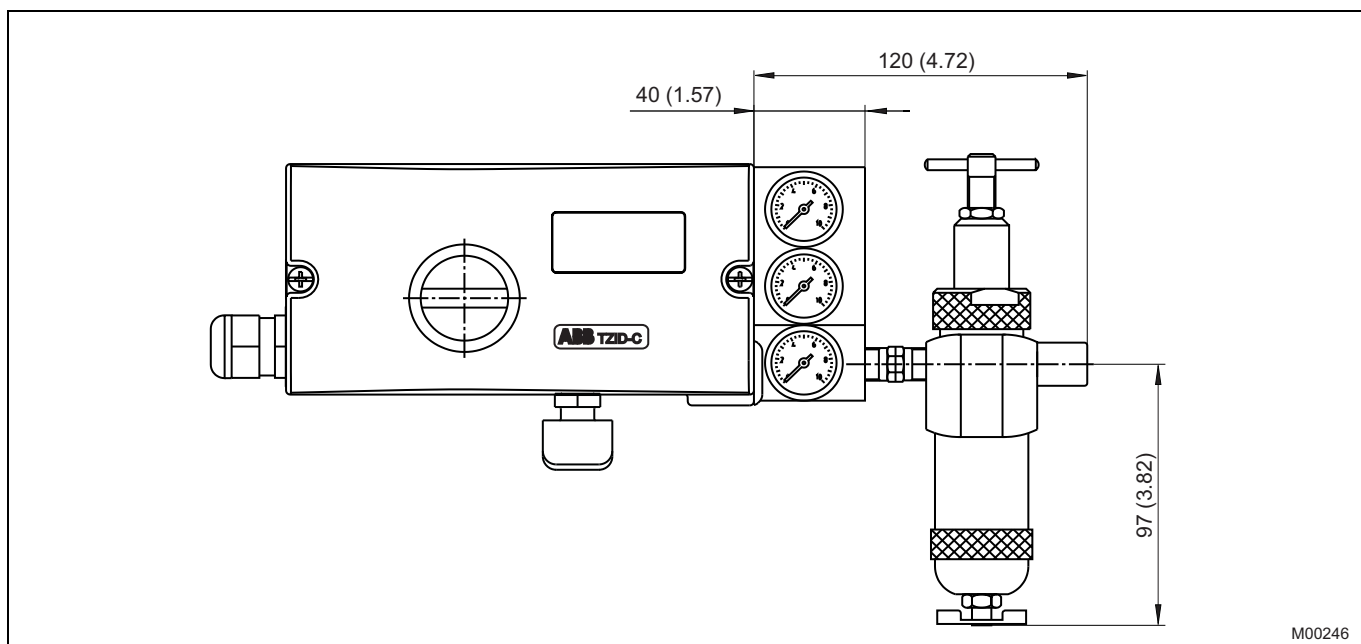


Fig. 12: Positioner TZIDC-110 with pressure gauge block and filter regulator

9 Ordering information

	Main Code											Add. Code			
	Variant digit No.	1 - 6	7	8	9	10	11	12	13	14	15		16		
TZIDC-110 Electro-Pneumatic Positioner, for PROFIBUS PA, intelligent, configurable, with indicator and operator panel	V18346	X	X	X	X	X	X	X	X	X	X	X	X	X	XX
Case / Mounting															
Case made of aluminium, varnished, for mounting to linear actuators acc. DIN / IEC 534 / NAMUR or to rotary actuators acc. VDI / VDE 3845			1	0											
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			2	0											
Case made of aluminium, varnished, for integral mounting to control valves (see dimensional drawing)			3	0											
Case made of aluminium, varnished, with mechanical position indicator, for integral mounting to control valves (see dimensional drawing)			4	0											
Case made of aluminium, varnished, for mounting to rotary actuators acc. VDI / VDE 3845 with extended rotation angle up to 270°			5	0											
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°			6	0											
Input / Communication Port															
PROFIBUS PA					3										
Explosion Protection															
Without						0									
ATEX II 2 G Ex ia IIC T6 resp. T4 Gb						1									
FM / CSA						2									
ATEX II 3 G Ex nA IIC T6 resp. T4 Gc						4									
IECEX ia IIC T6 resp. T4 Gb						5									
IECEX Ex nA IIC T6 resp. T4 Gc						6									
GOST Russland - Ex II 2 G EEx ia II C T6						A									
GOST Russland - EEx n A II T6						C									
ATEX II 3 G Ex ic IIC T6 resp. T4 Gc						G									
IECEX ic IIC T6 resp. T4 Gc						H									
Output / Safe Position (in case of an electrical power failure)															
Single acting, fail safe							1								
Single acting, fail freeze							2								
Double acting, fail safe							4								
Double acting, fail freeze							5								
Connections															
Cable: Thread 1/2-14 NPT, air pipe: Thread 1/4-18 NPT								2							
Cable: Thread M20 x 1.5, air pipe: Thread 1/4-18 NPT								5							
Cable: Thread M20 x 1.5, air pipe: Thread G 1/4								6							
Cable: Thread G 1/2, air pipe: Thread Rc 1/4								7							

Continued on next page

	Main Code											Add. Code					
	Variant digit No.	1	6	7	8	9	10	11	12	13	14	15	16	XX			
TZIDC-110 Electro-Pneumatic Positioner, for PROFIBUS PA, intelligent, configurable, with indicator and operator panel	V18346	X	X	X	X	X	X	X	X	X	X	X	X	XX			
Option Module for Shutdown Function																	
Without																	
Plug-in module for shutdown function																	
Optionale Erweiterung mit mechanischem Bausatz für digitale Rückmeldung																	
Without																	
Mechanical kit for digital position feedback with proximity switches SJ2-SN (NC or logical 1)																	
Mechanical kit for digital position feedback with proximity switches SJ2-S1N (NO or logical 0)																	
Mechanical kit for digital position feedback with 24 V AC / DC microswitches (change-over contacts)																	
Design (Varnish / Coding)																	
Standard																	
Special version for Chemical Industries																	
Arial																	
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
Latvian																	ML
Hungarian																	MM
Estonian																	MO
Bulgarian																	MP
Romanian																	MR
Slovak																	MS
Lithuanian																	MU
Slovenian																	MV
Certificate of Compliance																	
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
Inspection Certificate																	
Inspection certificate 3.1 acc. EN 10204																	CBA
Device Identification Label																	
Stainless steel 11.5 x 60 mm (0.45 x 2.36 in.)																	MK1
Sticker 11 x 25 mm (0.43 x 0.98 in.)																	MK3

- 1) Only for fail safe pneumatic
- 2) Only for model with mechanical position indicator, no IECEx
- 3) Only for model with mechanical position indicator and only for ambient temperature range -25 ... 85 °C, no IECEx
- 4) Not for explosion protected version and only for model with mechanical position indicator
- 5) Details on request

9.1 Accessories

Accessories	Order number
Mounting bracket	
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
Lever	
EDP300 / TZIDC Lever 30 mm	7959151
EDP300 / TZIDC Lever 100 mm	7959152
Adapter	
EDP300 / TZIDC Adapter (shaft coupler) for rotary actuators (mounting to VDI / VDE 3845)	7959110
EDP300 / TZIDC Form - locking shaft adapter	7959371
Pressure gauge block	
TZIDC Pressure gauge block, 0.6 MPa, single acting, G 1/4 connection	7959364
TTZIDC Pressure gauge block, 0.6 MPa, single acting, Rc 1/4 connection	7959358
TZIDC Pressure gauge block, 0.6 MPa, single acting, NPT 1/4 connection	7959360
TZIDC Pressure gauge block, 0.6 MPa, double acting, G 1/4 connection	7959365
TZIDC Pressure gauge block, 0.6 MPa, double acting, Rc 1/4 connection	7959359
TZIDC Pressure gauge block, 0.6 MPa, double acting, NPT 1/4 connection	7959361
Filter regulator	
TZIDC Filter regulator, brass, connections thread G 1/4, incl. material for mounting to pressure gauge block	7959119
TTZIDC Filter regulator, brass, connections thread 1/4-18 NPT, incl. material for mounting to pressure gauge block	7959120
Attachment kit	
EDP300 / TZIDC Attachment kit for linear actuators, stroke 10 ... 35 mm	7959125
EDP300 / TZIDC Attachment kit for linear actuators, stroke 20 ... 100 mm	7959126
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
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 ... 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 ... 170 mm	7959339
EDP300 / TZIDC Attachment kit for NELES BC6-20, B1C6-20, BJ8-20, B1J8-20	7959146
EDP300 / TZIDC Attachment kit for Valves Nuovo Pignone, lever for linear stroke, length 150 ... 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
EDP300 / TZIDC Mounting Kit Uhde Type 4 Stroke 400 mm cropped	7959500

Notes

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