

ABB MEASUREMENT & ANALYTICS | DATA SHEET

TZIDC-110

Digital Positioner



Compact, well-proven and flexible

For PROFIBUS PA®

Low cost of ownership

Well-proven technology

Robust and environmentally ruggedized

Wide temperature range
• -40 to 85 °C (-40 to 185 °F)

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

Mechanical position indicator

ATEX, FM, CSA, GOST and IECEx approvals

Global approval for marine applications
• DNV_GL

Brief description

The TZIDC-110 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-110 occurs via PROFIBUS PA®.

Modular design

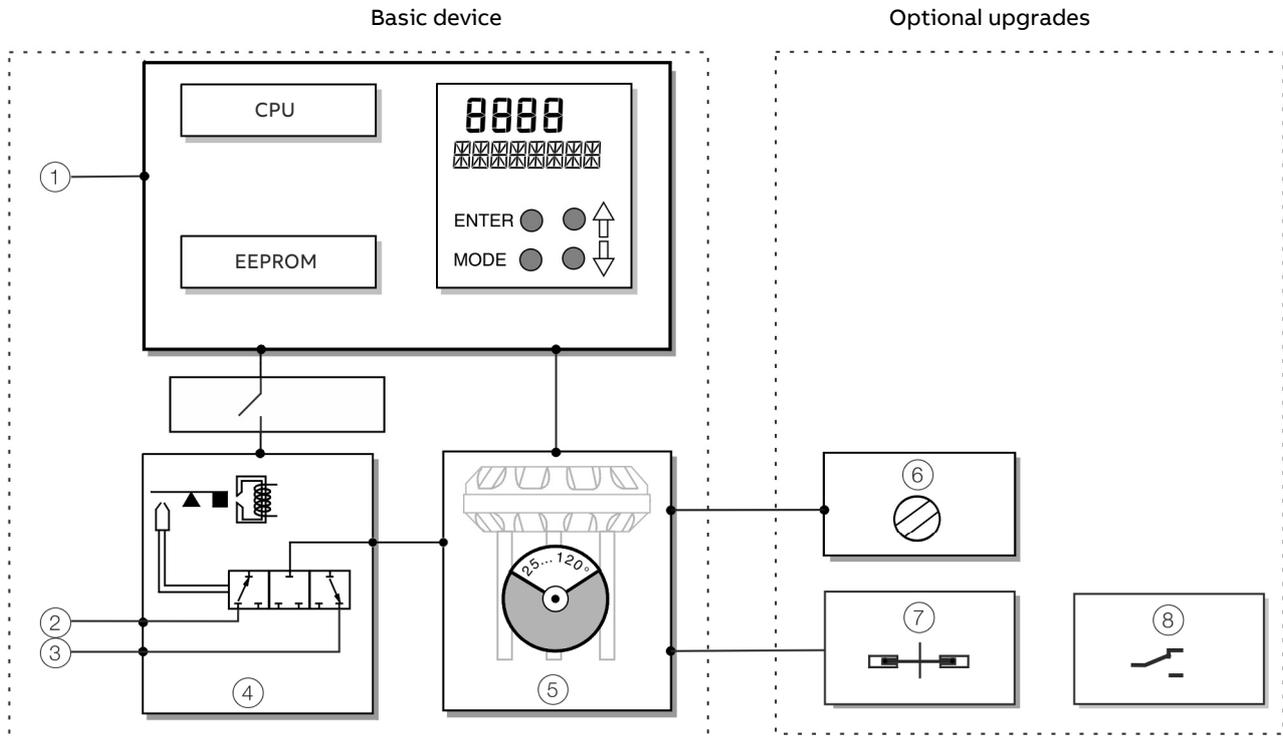
The basic model can be enhanced at any time by retrofitting optional equipment.

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

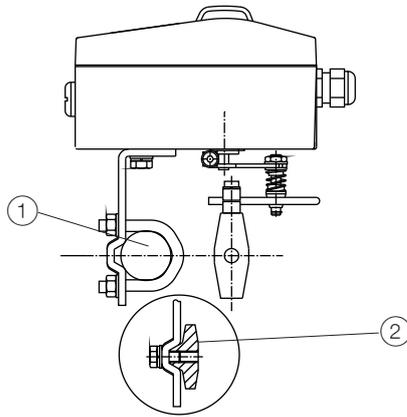
Note

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.



① Columnar yoke ② Cast iron yoke

Figure 2: Mounting on 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.

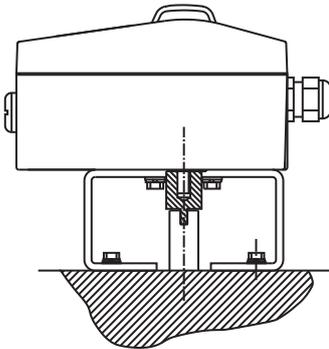


Figure 3: Mounting on rotary actuators in accordance with VDI / VDE 3845

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.

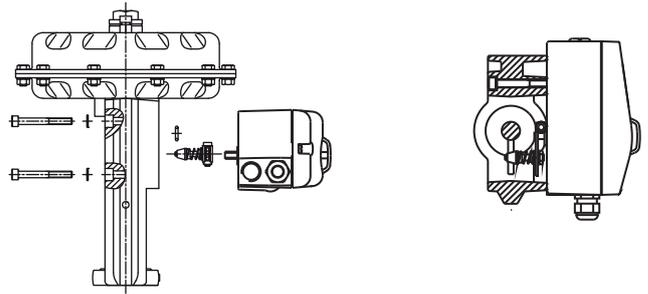


Figure 4: Integral mounting on control valves

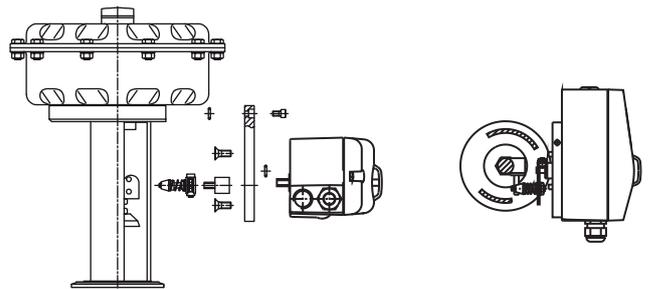


Figure 5: Integral mounting on control valves with adapter plate

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-110 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)

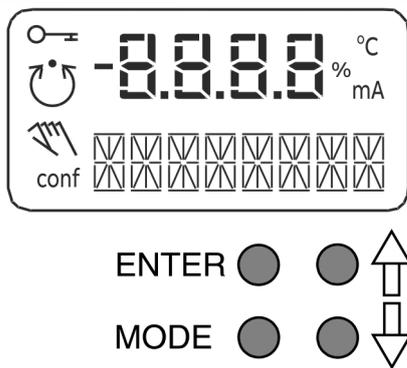


Figure 7: LCD display with operating buttons

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-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.

DTM

The DTM (Device Type Manager) for the positioner TZIDC-110 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.

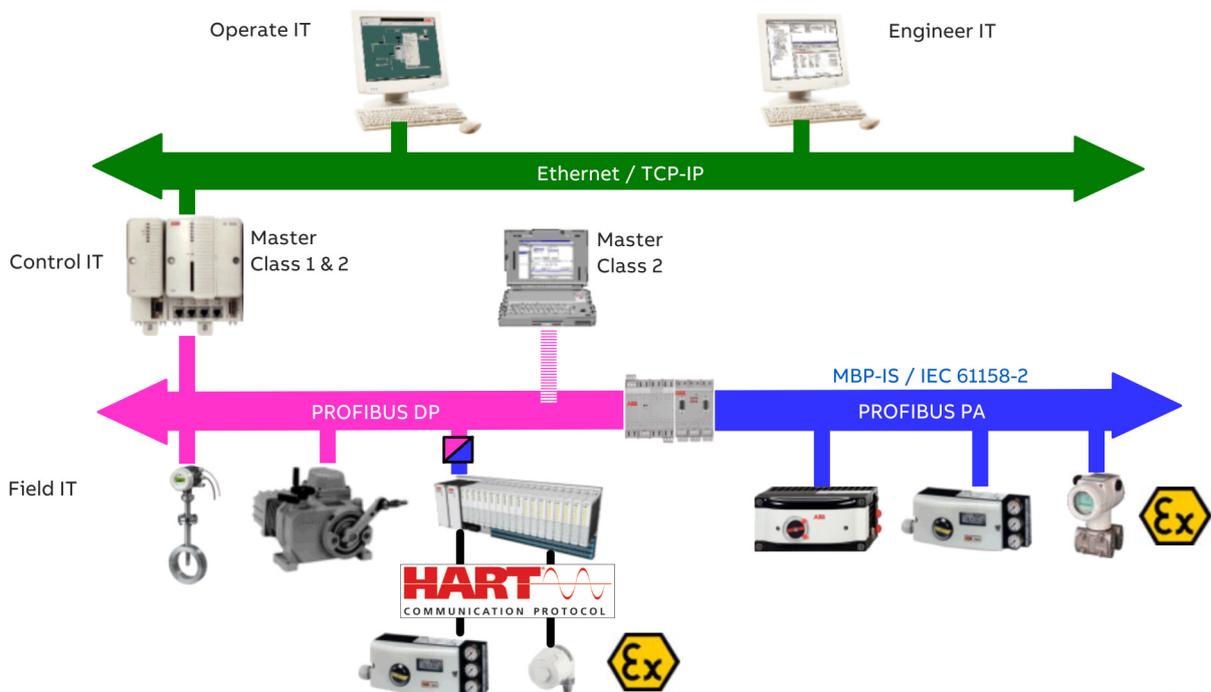


Figure 8: Communication via PROFIBUS®

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. Figure 9 on page 10)
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)

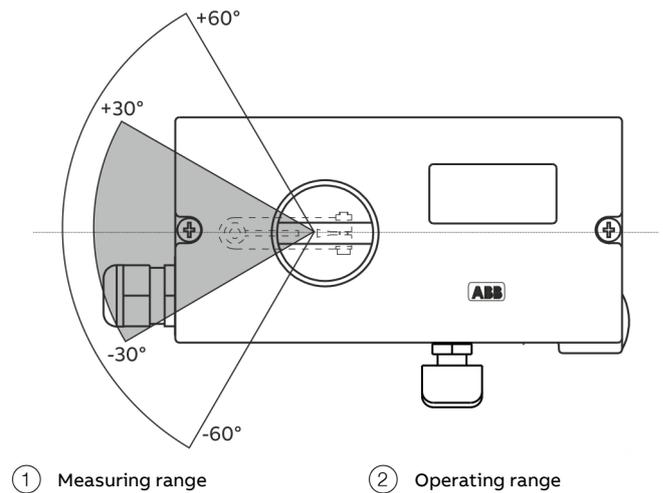


Figure 9: Measuring and operating ranges of the positioner

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 ³ /h = 2.3 scfm at 1.4 bar (20 psi) supply air pressure > 13 kg/h = 10 Nm ³ /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 ³
Oil content	Maximum concentration 1 mg/m ³
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 1.7 kg (3.75 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

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)

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)

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).

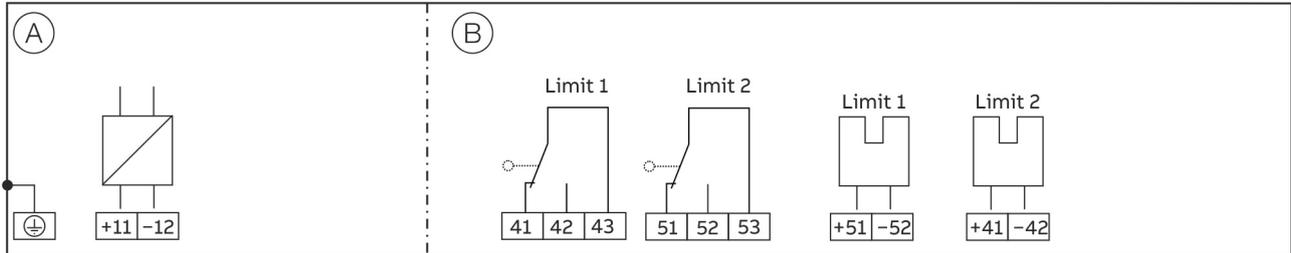
Assessment criteria A:

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-110

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-110** 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)

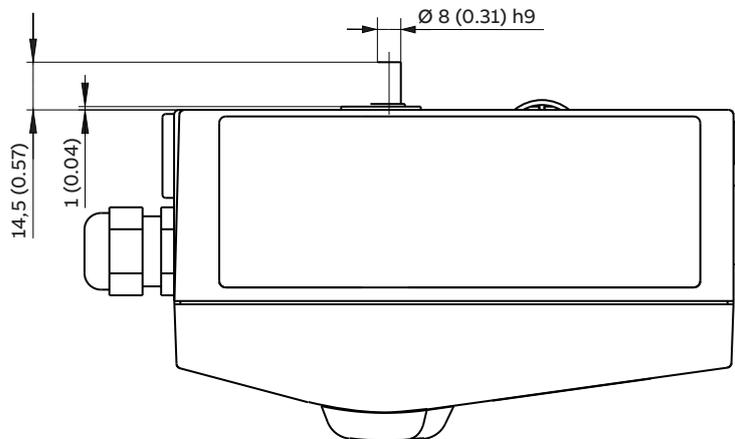
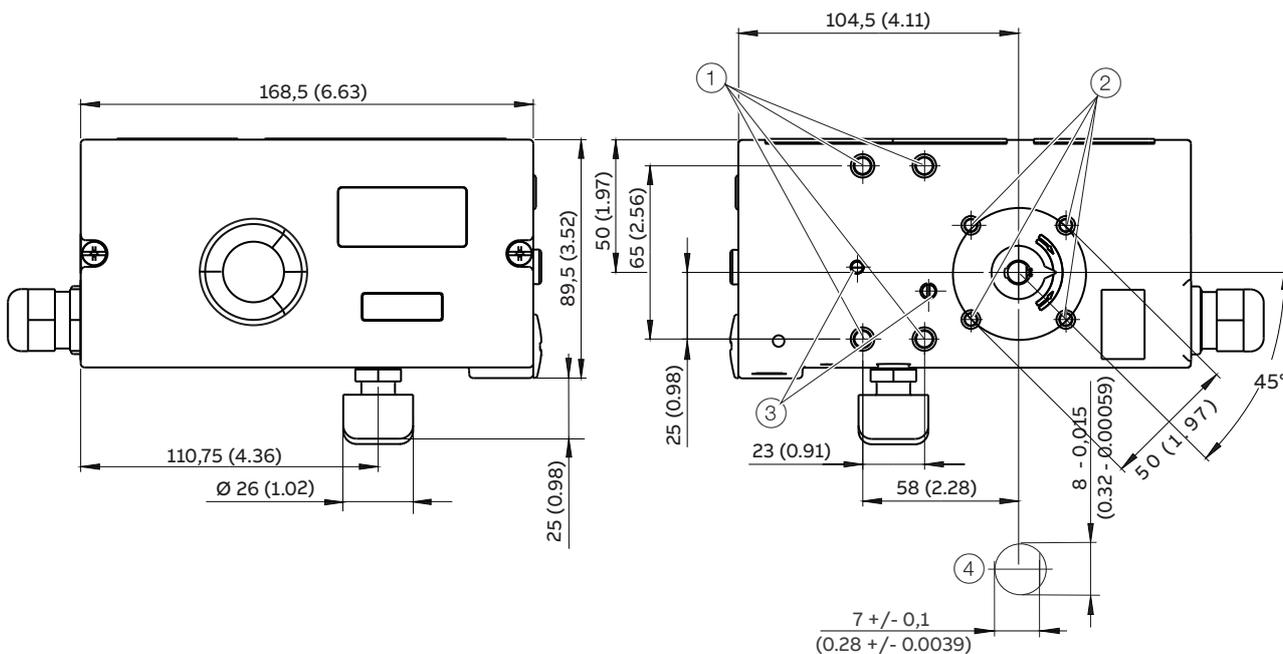
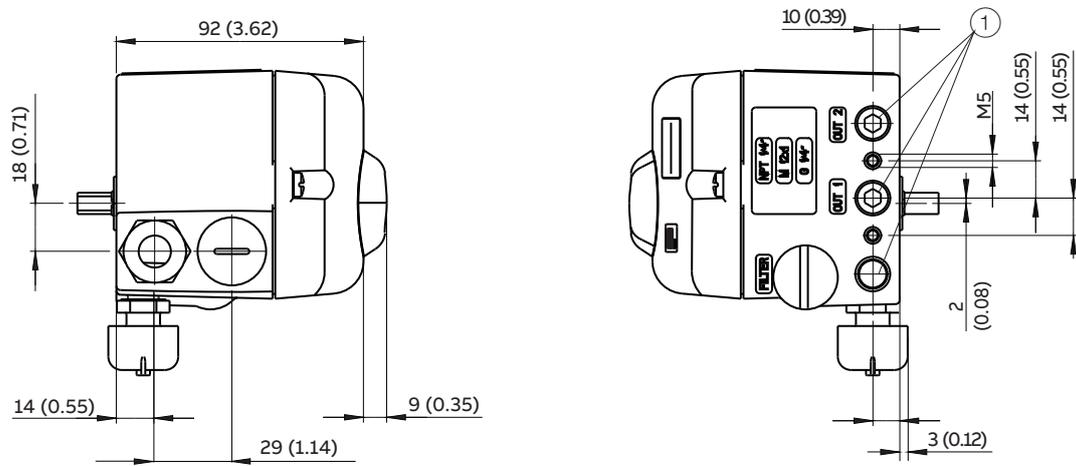


Figure 11: Top view



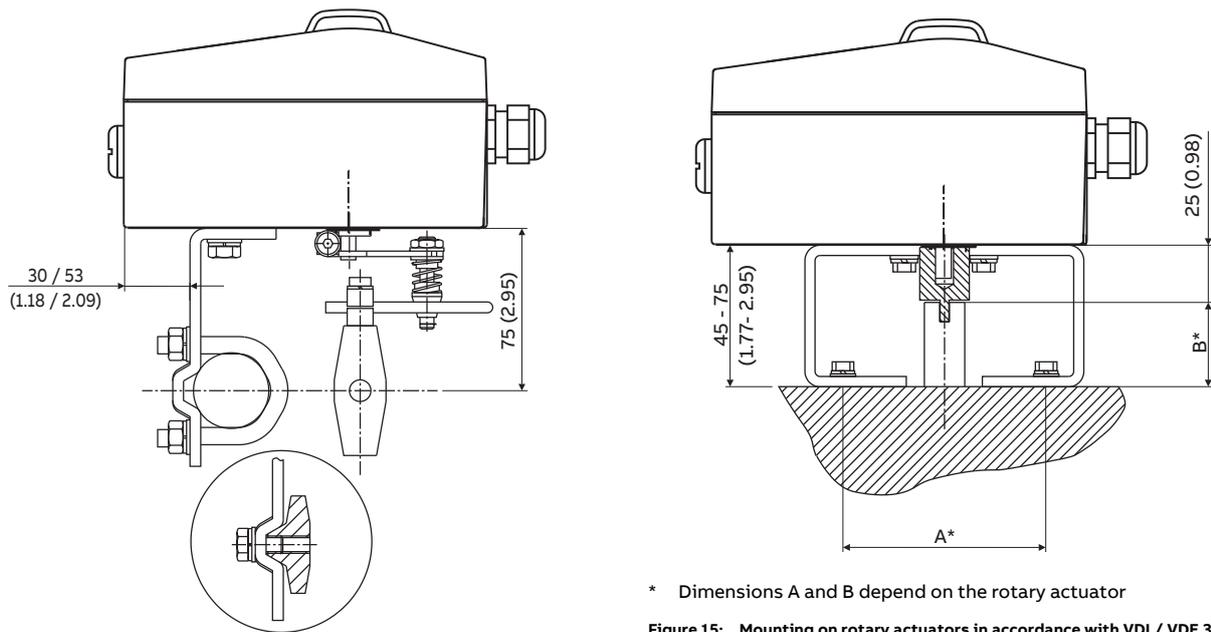
- ① Threaded hole M8 (10 mm [0.39 in] deep)
- ② Threaded hole M6 (8 mm deep [0.31 in])
- ③ Threaded hole M5 × 0.5 (air outputs for direct mount)
- ④ Sensor shaft (shown larger than scale)

Figure 12: Front and rear view



① Pneumatic connections, NPT ¼ in-18 oder G ¼

Figure 13: Side view (from left to right)



* Dimensions A and B depend on the rotary actuator

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

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

... Dimensions

All dimensions in mm (in)

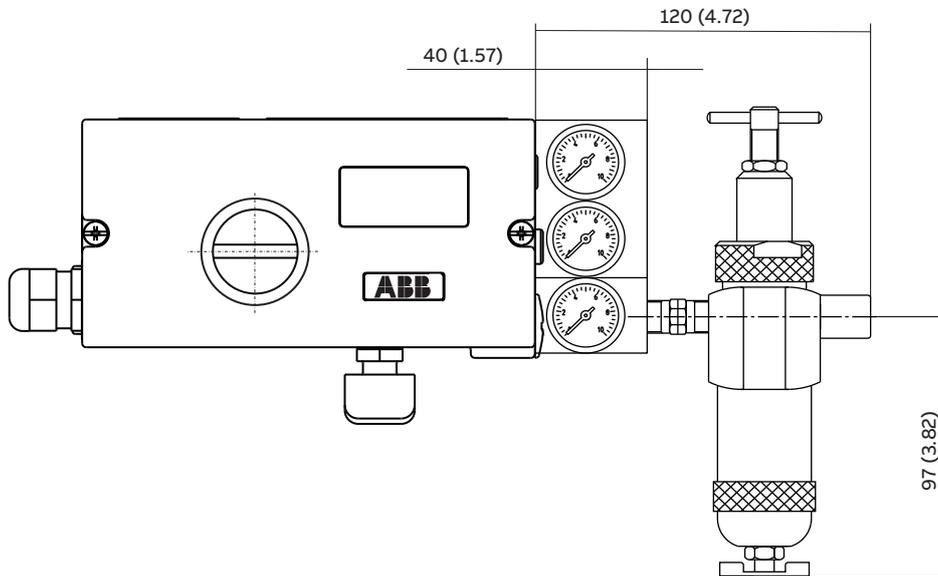


Figure 16: Positioner TZIDC-110 with mounted pressure gauge block and filter regulator

Use in potentially explosive atmospheres

ATEX / IECEx

ATEX Ex i

Ex marking	
Marking	II 2 G Ex ia 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	Intrinsically safe equipment
Standards	EN 60079-0 EN 60079-11

Temperature Data

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

Electrical Data

ia / ib / ic for Grp. 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:

Current circuit (terminal)	Electrical information (maximum values)	
Signal circuit (+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

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 (Limit1: +51 / -52) (Limit2: +41 / -42)	See EC type examination certificate PTB 00 ATEX 2049 X

ATEX Ex n

Ex marking	
Marking	II 3 G Ex nA IIC T6 or T4 Gc
Type Examination Test Certificate	TÜV 02 ATEX 1943 X
Type	'n' type of protection
Device class	II 3 G
Standards	EN 60079-15 EN 60079-0

Temperature Data

Device group II 3 G	
Temperature class	Ambient temperature Ta
T4	-40 to 85 °C
T6	-40 to 50 °C

Electrical Data

Current circuit (terminal)	System bus, computer interfaces
Signal circuit (+11 / -12)	U = 9 to 32 V DC I = 10.5 mA
Mechanical digital feedback (Limit1: +51 / -52) (Limit2: +41 / -42)	U = 5 to 11 V DC

... Use in potentially explosive atmospheres

Special conditions

- Devices must only be connected to circuits in zone 2 if they are suitable for operation in zone 2 potentially explosive atmospheres and for the conditions prevailing at the installation location (manufacturer's declaration or certificate from an inspection authority).
- For the '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 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 may be used for the pneumatic power supply
- Only suited cable entries must be used that meet the requirements of EN 60079-15.

IECEX

Ex marking	
Marking	Ex ia IIC T6 or T4 Gb
	Ex ib IIC T6 or T4 Gb
	Ex ic IIC T6 or T4 Gc
	Ex nA IIC T6 or T4 Gc
Type Examination Test Certificate	IECEX TUN 04.0015X
Shown as	5
Type	Intrinsic safety 'I' or type of protection 'n'
Standards	IEC 60079-0
	IEC 60079-11
	IEC 60079-15

Temperature Data

Temperature class	Ambient temperature Ta	
	TZIDC-110 Ex i IIC	TZIDC-110 Ex nA IIC
T4	-40 to 85 °C	-40 to 85 °C
T6	-40 to 40 °C	-40 to 50 °C

Electrical Data**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:

Current circuit (terminal)	Electrical information (maximum values)
Signal circuit	$U_i = 24 \text{ V}$
(+11 / -12) or (+ / -)	$I_i = 250 \text{ mA}$
	$P_i = 1.2 \text{ W}$
	Characteristic curve: linear

TZIDC-110 with Ex nA IIC T6 or T4 Gc marking

Current circuit (terminal)	System bus, computer interfaces
Signal circuit	$U = 9 \text{ to } 32 \text{ V DC}$
(+11 / -12)	$I = 10.5 \text{ mA}$
Mechanical digital feedback	$U = 5 \text{ to } 11 \text{ V DC}$
(Limit1: +51 / -52)	
(Limit2: +41 / -42)	

Special conditions

- Devices must only be connected to circuits in zone 2 if they are suitable for operation in zone 2 potentially explosive atmospheres and for the conditions prevailing at the installation location (manufacturer's declaration or certificate from an inspection authority).
- For the '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 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.

... Use in potentially explosive atmospheres

FM / CSA

CSA International

Certificate	
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:	

Electric data

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	$U_{max.} = 24 \text{ V}$	$C_i = 2.8 \text{ nF}$	$I_{max.} = 250 \text{ mA}$
			$L_i = 7.2 \text{ uH}$
Terminals 85 / 86	$U_{max.} = 30 \text{ V}$	$C_i = 3.8 \text{ nF}$	$I_{max.} = 50 \text{ mA}$
			$L_i = 0 \text{ uH}$
Terminals 41 / 42	$U_{max.} = 16 \text{ V}$	$C_i = 60 \text{ nF}$	$I_{max.} = 20 \text{ mA}$
			$L_i = 100 \text{ uH}$
Terminals 51 / 52	$U_{max.} = 16 \text{ V}$	$C_i = 60 \text{ nF}$	$I_{max.} = 20 \text{ mA}$
			$L_i = 100 \text{ uH}$

When installed per installation Drawing No 901265

Temperature code	T4
Max. Ambient temperature	85 °C

Note

- The 'x' in P/N denotes minor mechanical variations or optional features.
- Local communication interface (LCI) shall not be used in hazardous location.
- Each pair of conductors of each intrinsic safety circuit shall be shielded.
- See also **FM installation drawing No. 901265** on page 24.

CSA Certification Record

Certificate	
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	

Electrical data

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	$U_{max.} = 24 \text{ V}$	$C_i = 2.8 \text{ nF}$	$I_{max.} = 250 \text{ mA}$
			$L_i = 7.2 \text{ uH}$
Terminals 85 / 86	$U_{max.} = 30 \text{ V}$	$C_i = 3.8 \text{ nF}$	$I_{max.} = 50 \text{ mA}$
			$L_i = 0 \text{ uH}$
Terminals 41 / 42	$U_{max.} = 16 \text{ V}$	$C_i = 60 \text{ nF}$	$I_{max.} = 20 \text{ mA}$
			$L_i = 100 \text{ uH}$
When installed per installation Drawing No 901265			
Temperature code	T4		
Max. ambient temperature	85 °C		

Note

- The 'x' in P/N denotes minor mechanical variations or optional features.
- Local communication interface (LCI) shall not be used in hazardous location.
- Each pair of conductors of each intrinsic safety circuit shall be shielded.
- See also **FM installation drawing No. 901265** on page 24.

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

Terminals	Type	Groups	Parameters	
+11 / -12	Entity	A-G	$U_{max.} = 24 \text{ V}$ $I_{max.} = 250 \text{ mA}$ $P_i = 1.2 \text{ W}$	$C_i = 2.8 \text{ nF}$ $L_i = 7.2 \text{ }\mu\text{H}$
	FISCO	A-G	$U_{max.} = 17.5 \text{ V}$ $I_{max.} = 360 \text{ mA}$ $P_i = 2.52 \text{ W}$	$C_i = 2.8 \text{ nF}$ $L_i = 7.2 \text{ }\mu\text{H}$
	FISCO	C-G	$U_{max.} = 17.5 \text{ V}$ $I_{max.} = 380 \text{ mA}$ $P_i = 5.32 \text{ nF}$	$C_i = 2.8 \text{ nF}$ $L_i = 7.2 \text{ }\mu\text{H}$
+51 / -52	Entity	A-G	$U_{max.} = 16 \text{ V}$ $I_{max.} = 20 \text{ mA}$	$C_i = 60 \text{ nF}$ $L_i = 100 \text{ }\mu\text{H}$
+41 / -42	Entity	A-G	$U_{max.} = 16 \text{ V}$ $I_{max.} = 20 \text{ mA}$	$C_i = 60 \text{ nF}$ $L_i = 100 \text{ }\mu\text{H}$

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, 5 or 6
- b Output/safe protection – 1, 2, 4 or 5
- c Option modules – 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; non-Incendive 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:

Temperature code ratings

T6 in ambient temperatures of 40 °C

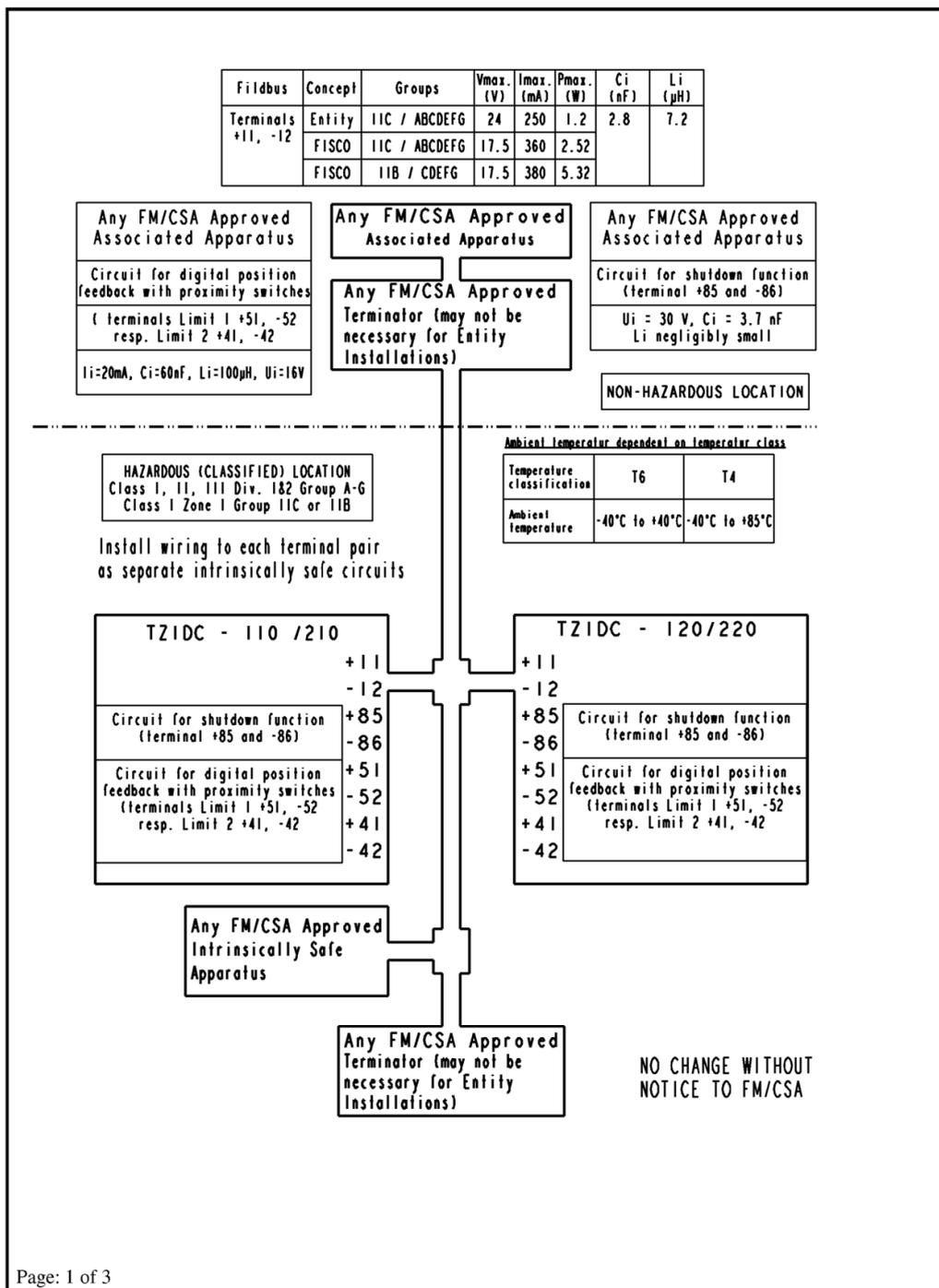
T5 in ambient temperatures of 55 °C

T4 in ambient temperatures of 85 °C

See **FM installation drawing No. 901265** on page 24 for details.

... 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.	 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:

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 (Vmax), the current (Imax) and the power (Pi) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (Uo, Voc, Vt), the current (Io, Isc, It,) and the power (Po) which can be provided by the associated apparatus (supply unit). In addition, the maximum unprotected residual capacitance (Ci) and inductance(Li) of each apparatus (other than the terminators) connected to the Fieldbus must be less than or equal to 5nF and 10 µH respectively.

In each I.S. Fieldbus segment only one active source, normally the associated apparatus, is allowed to provide the necessary power for the Fieldbus system. The allowed voltage (Uo, Voc, Vt) 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.

The cable used to interconnect the devices needs to comply with the following parameters:

Loop resistance R': 15...150 Ω/km

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

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

C' = C' line/line + 0.5C' line/screen, if both lines are floating

or

C' = C' line/line + C' Line/screen, if the screen is connected to one line

Length of spur cable: max. 30m

Length of trunk cable: max. 1km

Length of splice: max. 1m

Terminators

At each end of the trunk cable an approved line terminator with the following parameters is suitable:

R = 90...100 Ω

C = 0...2.2 µF.

System evaluation

The number of passive devices like transmitters, actuators, connected to a single bus segment is not limited due to I.S. Reasons. Furthermore, if the above rules are respected, the inductance and capacitance of the cable need not to be considered and will not impair the intrinsic safety of the installation.

-	-			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:

... Use in potentially explosive atmospheres

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 (X5) 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
					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:

Ordering Information

Main ordering information TZIDC-110

Base model	V18346	XX	X	X	X	X	X	XX	X
TZIDC-110 digital positioner, for PROFIBUS PA, intelligent, configurable, with indicator and operator panel									
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			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						
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		
ATEX II 3 G Ex ic IIC T6 resp. T4 Gc							G		
IECEX ic IIC T6 resp. T4 Gc							H		
INMETRO Ex ia IIC Gb / Ex ib IIC Gb							P		
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		

Continued see next page

... Ordering Information

TZIDC-110 digital positioner, for PROFIBUS PA	X	X	XX	X
Connections				
Cable: Thread ½-14 NPT, air pipe: Thread ¼-18 NPT	2			
Cable: Thread M20 × 1.5, air pipe: Thread ¼-18 NPT	5			
Cable: Thread M20 × 1.5, air pipe: Thread G ¼	6			
Cable: Thread G ½, air pipe: Thread Rc ¼	7			
Option Module for Shutdown Function				
Without		0		
Optional Mechanical Kit for Digital Position Feedback				
Without			00	
Mechanical kit for digital position feedback with proximity switches SJ2-SN (NC or logical 1)			10*	
Mechanical kit for digital position feedback with 24 V AC / DC microswitches (change-over contacts)			50**	
Design (Varnish / Coding)				
Standard				1
Higher Stiffness + Lower Air Capacity				H
Increased Corrosion Protection incl. Protection Class IP66				S

* Only for model with mechanical position indicator, non IECEx

** Not for explosion protected version and only for model with mechanical position indicator

Continued see next page

Additional ordering information TZIDC-110

Additional ordering information	XX	XXX	XXX	XXX	XXX	XXX
Documentation Language						
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					
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
Marine approval DNV_GL						CM1
Inspection Certificate						
Inspection certificate 3.1 acc. EN 10204						CBA
Handling of Certificates						
Send via e-mail						GHE
Send via mail						GHP
Send via mail express						GHD
Send with instrument						GHA
Only archived						GHS
Certificate preparation						
per device						GPD
per salesorder item						GPP
Device Identification Label						
Stainless steel 18.5 × 65 mm (0.73 × 2.56 in)						MK1*
Sticker 11 × 25 mm (0.43 × 0.98 in)						MK3

* Plain text, max. 16 letters

... Ordering Information

Accessories

Accessories	Order number
Mounting bracketole	
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
Montage Kit	
EDP300 / TZIDC Mounting Kit Uhde Type 4 Stroke 400 mm cropped	7959500
Attachment kit for linear actuators	
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
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 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
Filter regulator	
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
Anbausatz	
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
Anbausatz	
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

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Sales



Service



ABB Limited**Measurement & Analytics**

Howard Road, St. Neots
Cambridgeshire, PE19 8EU
UK

Tel: +44 (0)870 600 6122

Fax: +44 (0)1480 213 339

Email: enquiries.mp.uk@gb.abb.com

ABB Inc.**Measurement & Analytics**

125 E. County Line Road
Warminster, PA 18974
USA

Tel: +1 215 674 6000

Fax: +1 215 674 7183

ABB Automation Products GmbH**Measurement & Analytics**

Schillerstr. 72
32425 Minden
Germany

Tel: +49 571 830-0

Fax: +49 571 830-1806

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