MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with ABB TZIDC specifications and ordering pages; not an installation manual

TZIDC / V18345-1010221001

V18345-1010221001

ELECTROPNEUMATIC DIGITAL VALVE POSITIONER

OFFICIAL SOURCES

ABB DS/TZIDC-EN Rev F. Original specification and order-code pages; optional functions are not universally included.

ABB MEASUREMENT & ANALYTICS | DATA SHEET

TZIDC

Digital positioner



Brief description

The TZIDC 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
The positioner has a local communication interface (LCI) as standard. Additionally, a 'HART® communication' option for communication via the 20 mA signal is available. Both communications are based on the HART® Protocol.
Alternatively, HART®5 or HART®7 are available.

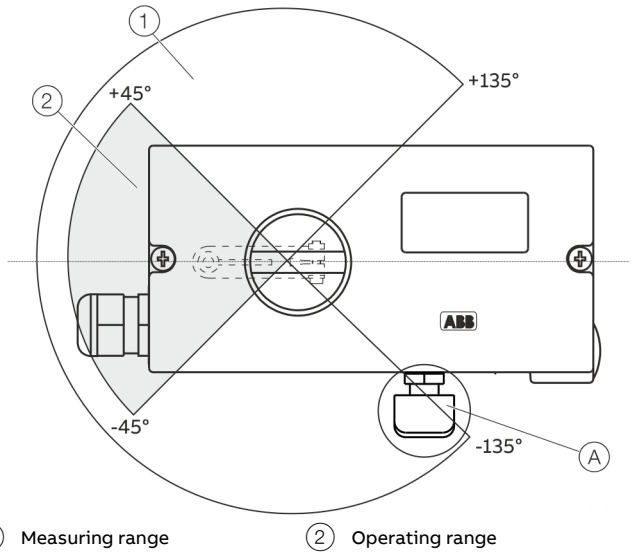
Inputs / Outputs
In addition to its input for the analog position setpoint, the positioner is equipped with a digital input which can be used to activate control system functions in the device. A digital output allows you to output collective messages (alarms / faults).

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.

Specification

Actuator travel

Rotation angle	
Measuring range	270°
Working range	Linear actuators min. 25°, max. 45° Rotary actuators min. 25°, max. <270° (cf. Figure 11)
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)



1 Measuring range 2 Operating range

Figure 11: 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 Nm3/h = 2.3 scfm at 1.4 bar (20 psi) supply air pressure > 13 kg/h = 10 Nm3/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 according to Class 3 (except for natural gas variant)

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

*** Independent of supply pressure

… Specification

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).

PC adapter for communication

- LCI adapter – USB for plug connection to positioner
- HART® – USB modem for HART communication

Control program for operation and parameterization on a PC

DAT200 Asset Vision Basic with DTM for TZIDC / TZIDC-200 on CD-ROM.

- Download DTM for TZIDC at www.abb.com/positioners.
- Download ABB Ability™ Field Information Manager (FIM) and FDI package at: solutions.abb/fieldinfo.

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

Transmission data and contributing factors

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

Action (set point signal)	
Increasing set point	4 to 20 mA = actuator position 0 to 100 %
Decreasing set point	20 to 4 mA = actuator position 0 to 100 %

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

* freely configurable with 20 reference points

Seismic vibration

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

Influence of mounting orientation

Not measurable.

Noise emissions

Max. 100 db (A)
Noise-reduced version max. 85 db (A)

Communication

- HART protocol 5.9 (standard); optionally HART®7.4
- Local connector for LCI adapter (not in explosion protection area)
- HART communication via 4 to 20 mA signal line with HART compatible modem.

Environmental conditions

Ambient temperature range	
During operation, storage, and transport	−40 to 85 °C (−40 to 185 °F)
Limit monitor with proximity switches SJ2-SN	−25 to 85 °C (−13 to 185 °F)
TZIDC remote sensor	−40 to 100 °C (−40 to 212 °F)

* Increased temperature range only with TZIDC Remote Sensor.

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

Safety Integrity Level

Applies to applications with single-acting and depressurizing pneumatics.

The positioner meets the following requirements:

- functional safety in accordance with IEC 61508
- Explosion protection (depending on the version)
- Electromagnetic compatibility in accordance with EN 61000

Without the input signal, the pneumatic module in the positioner vents the actuator and the spring installed in it moves the valve to a predetermined end position (OPEN or CLOSED).
SIL specific safety-related characteristics:

Product	**SSF**	**PFDav**	**λdd + λs**	**λdu**
TZIDC with supply current 0 mA	94 %	1.76 * 10-4	651 FIT	40 FIT

For details refer to the Management Summary in the SIL Safety Instructions 37/18-79XA.

Ordering Information

Main ordering information TZIDC

Base model **V18345**	**XX**	**X**	**X**	**X**	**X**	**X**	**XX**	**X**
TZIDC digital positioner, 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							
Remote sensor control unit	70*							
Input / Communication Port								
Input 4 to 20 mA, two-wire, with connector plug for LCI adapter		1						
Input 4 to 20 mA, two-wire, with connector plug for LCI adapter and FSK module for HART communication		2						
Explosion Protection								
Without			0					
ATEX II 2 G Ex ib IIC T6 resp. T4 Gb			1					
cFMus			2					
IECEx Ex ib IIC T6 resp. T4 Gb			5					
ATEX II 2 G Ex ia IIC T6 resp. T4 Gb			7					
EAC TR-CU-012 Ex ia IIC T6/T4 Gb			H**					
EAC TR-CU-012 Ex ib IIC T6/T4 Gb			J**					
IECEx ia IIC T6 resp. T4 Gb			K					
NEPSI Ex ia II CT4/T5/T6 Gb			U					
NEPSI Ex ib II CT4/T5/T6 Gb			V					
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***				

* With standard characteristic curve, if delivered without remote sensor

** Reduced Functionality

*** Not for for integral mounting

Continued see next page

TZIDC digital positioner, intelligent, configurable, with indicator and operator panel	**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 Modules for Analog or Digital Position Feedback				
Without		0		
Plug-in module for analog position feedback, signal range 4 bis 20 mA, two-wire		1		
Plug-in module for digital position feedback		3		
Plug-in module for analog position feedback, signal range 4 bis 20 mA, two-wire, and digital position feedback		5		
Optional mechanical digital 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***
Protection Class IP 66 / NEMA 4X				P
Increased Corrosion Protection				S

* Only for model with mechanical position indicator, no IECEx

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

*** Only with Type Double Acting

Continued see next page