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Efficient actuators and positioners First class valve automation control

Power and productivity
for a better world™



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More than a century of experience

To operate any process efficiently, it is essential to measure, actuate, record and control. With ABB's measurement products and solutions, you are receiving the best technology combined with the most reliable products available on the market.

ABB offers a broad range of life cycle services for optimum product performance. A global network of measurement products specialists delivers local service and support.

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ABB's measurement products portfolio:

- Analytical measurement
- Flow measurement
- Natural gas measurement
- Valve automation
- Pressure measurement
- Temperature measurement
- Recorders and controllers
- Level measurement
- Device management
- Force measurement
- Service

1 Water and waste water | 2 Power and industrial steam | 3 Chemical and petrochemical | 4 Oil and gas | 5 Pulp and paper | 6 Minerals | 7 Metals
8 Food and beverage | 9 Pharmaceuticals



Global availability

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Wherever you are, whatever you need – you can rely on ABB service

ABB's vast base of globally installed products and systems is coupled with technical and process expertise, backed up by a broad scope of services that lay the foundation for end-to-end support for your enterprise. ABB's automated monitoring and reporting products are simple and accurate, so critical information is always readily accessible.

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Device management, fieldbus and wireless from ABB



ABB actuators and positioners

Meeting your valve control needs

Valves, dampers and butterflies are essential components in the process industry. With expertise and experience built up over 100 years and countless applications worldwide, ABB provides a wide range of products to position and actuate any final control element, delivering best in class performance for every industrial process.

Meeting your valve control needs

From electrical and pneumatic actuators and state-of-the-art digital and conventional positioners to I/P Converters, ABB provides a comprehensive range of products, designed, engineered and manufactured to deliver first class performance in your process.

ABB's extensive portfolio of actuators and positioners provides highly accurate and stable positioning of your control valves, crucial to achieve your operational targets:

- Energy efficiency processes
- High production quality
- Reliable performance
- Maximized output at lowest expense

How ABB can help you?

ABB provides you everything needed to get the most out of final control elements, including:

- Continuous electrical actuators and pneumatic actuators
- Electro-pneumatic, pneumatic, and digital positioners
- I/P signal converters
- Tools to select the optimum kind of actuation technology for your process
- Technical support and service

See how you can benefit!

The following pages show some of the ways in which ABB's valve automation products are being used to bring benefits in a range of different applications. To find out more, visit www.abb.com/measurement.



Electrical actuators

Longest maintenance-free operation

Efficient control in steam boiler applications

Superheaters are widely used to help boost the temperature of steam in boiler applications. Spraywater valves control the supply of cooling water that is injected into the superheated steam in the superheater and reheater. Close control of the cooling water supply helps to achieve the optimum steam temperature inside and at the output of the superheater.

The challenge – precise mass flow control of cooling water

To achieve a process with minimum steam cooling, yet at the same time, with a maximum permissible steam temperature requires continuous and precise control of the mass flow of the injected cooling water in the superheater and the reheater. Injecting too much water will cause the steam to over-cool, reducing boiler efficiency. Injecting too little will result in excessively high steam temperatures and pressures, posing the risk of damage to the superheater, turbine and downstream components. In order to correct the smallest of changes in temperature, the smallest of changes to the water quantity must also be implemented in the valve's disproportionate zone. Any equipment used must be able to withstand the tough operating environment and high ambient temperatures associated with superheater applications.

The solution – highly precise, continuous positioning of spraywater valves

ABB's Contrac continuous electrical linear actuators provide an ideal solution for spraywater valve control applications. Capable of providing full S9-100%ED operation according to IEC 60034-1, even in ambient temperatures up to 85 °C (185 °F), Contrac actuators enable highly precise, continuous positioning of spraywater valves.

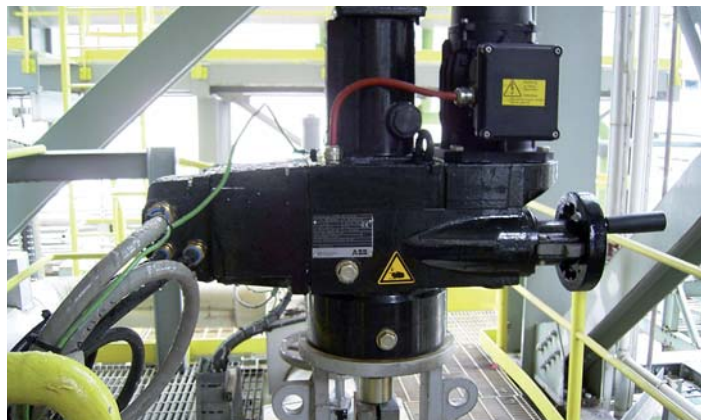
Contrac actuators feature an oil-lubricated spur gear with drive shafts supported by ball bearings. Rotary motion is converted to linear motion in the linear actuator by means of a highly efficient ball screw spindle. Contrac actuators are wear-free and are characterized by a deadband of just $\pm 0.05\%$, providing high-accuracy positioning for all valve types. With their robust design and IP66/NEMA 4X protection, Contrac actuators withstand even the most arduous operating conditions.



Actuator in high pressure desuperheater control



Actuator in a feedwater control application



Greatly reducing your actuator lifecycle cost

The issue of service and maintenance is a controversial subject within industry. Manufacturer advice and guidance on routine maintenance often tends to be overlooked and products are run until they fail. This risky approach is not an option in hazardous area applications. Failure to service and maintain an Ex product to the manufacturer's specifications will result in its certification being invalidated.

The challenge – keeping maintenance costs under control

In many cases, the maintenance intervals for electrical actuators are specified according to load, actuator size and the average number of operating cycles per hour. For control loops averaging less than 700 operating cycles per hour, maintenance is advised every seven months. When longer maintenance intervals are required, for example every two years, the permissible number of operating cycles is reduced to 125 to 250 cycles per hour. The control algorithms of many process control systems take this into account, being designed around the permissible number of operating cycles of the used actuator technology. This can cause maintenance costs to far exceed the cost of the actuator itself.

The solution – up to ten years of maintenance-free operation

Conrac electrical actuators are designed for up to ten years of maintenance-free operation, ideal for demanding applications requiring high plant availability. By using oil-lubricated spur gears rather than the worm gear pairs, where repetitive sliding movements cause greater wearing over a shorter period of time, Conrac actuators can handle more than 3600 operating cycles per hour, without significant reduction in their lifetime. Conrac offers the lowest cost of ownership of electrical actuators available on the market. Maintenance work typically requires just changing the gear oil and replacing the shaft seals and gaskets, a quick and easy process that can be performed with little cost.

Additional features & benefits:

- Self-diagnostics for optimum maintenance interval
- Choice of integrated, field or rack mounting options for power electronics units
- Part-turn and linear actuator options



Actuator in burner air control



Actuator in forced draft fan control



Digital positioners

Performance for harshest environments

The TZIDC series digital positioners provide flexible and cost-effective valve management and control. Their durability and unmatched shock and vibration immunity up to 10 g and 80 Hz means that they are suitable for use even under harsh conditions.

The challenge – handling over 100,000 strokes a year

Most control valves in many processes will rarely have to move, commonly enabling operators to opt for positioners with lifetimes of less than 100,000 strokes. However, there are some applications where valves will need to handle frequent changes in process conditions. In such applications, where 100,000 strokes may occur in a single year alone, there is a need for a positioner that can handle these changes with minimal need for maintenance.

The solution – unrivalled performance performing 1,000,000 strokes

The answer is ABB's TZIDC positioner. In a four month trial, an ABB TZIDC positioner underwent a customer durability test which saw it perform 1,000,000 strokes without any deterioration in performance or fault or interruption.

Offering remote communication via 4...20 mA HART, PROFIBUS PA or FOUNDATION fieldbus, the TZIDC sets the standard for safe and economic control of industrial processes. Its in-built intelligence enables it to adapt itself to any control valve at the push of a button, while a host of service, diagnostic and safety functions, including fail-freeze and fail-safe, help to provide a high level of operational performance.

The TZIDC/EDP300 is suitable for use with linear, part-turn and single or double-acting actuators and is protected to IP65/NEMA 4X, making it ideal for harsh environments. You can rely on the TZIDC/EDP300 to provide the highest levels of availability, enabling you to maximize the profitability of your process through improved plant uptime.



Digital positioners in a gas distribution station



TZIDC in a hygienic application



The EDP300 series digital positioners feature a high air capacity of 50 kg/h at 10 bar and are equipped with an advanced pressure-based diagnostics function.

The challenge – achieving accurate process control

In any production process, it is critical to ensure stable and constant process conditions to achieve optimum product quality and process efficiency. Any control equipment must be capable of eliminating any variations in the process variables that could cause the process to consume both more energy and consumables than normal, pushing up production costs. The stability of the downstream control loop may also be affected, impacting on both product quantity and quality. With the compressed air used by valve positioners being around ten times more expensive than electricity, accurate control is essential to minimizing plant overheads as well as eliminating potential problems in the downstream process.

The solution – accurate measurements for maximum energy efficiency

Thanks to an innovative control algorithm taken from the field of robotics, the EDP300 positioner stands out thanks to its speed and accuracy. Overshooting and recovery times are both prevented, allowing the EDP300 to significantly optimize compressed air consumption, energy efficiency and the "ecological footprint" of pneumatic control circuits. Subsequently, the EDP300 is able to help reduce costs, as compressed air is about ten times as expensive as electricity.

ABB is the only supplier able to offer customers a premium positioner that features these pneumatic properties.

Remote sensor installation

The challenge: applications where there is poor accessibility, increased vibrational loading or particularly harsh environmental conditions

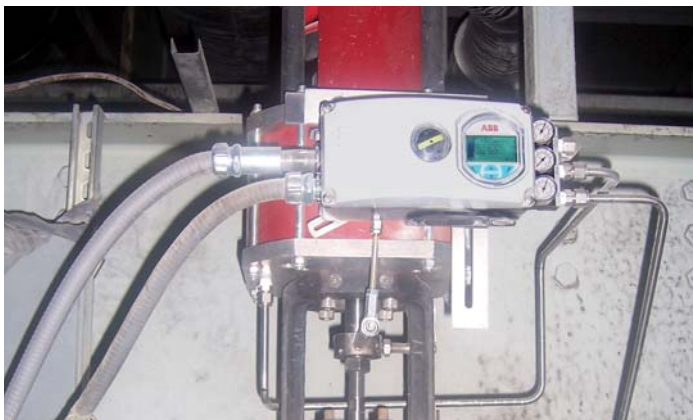
These kinds of applications often involve higher costs due to gaining access and unexpected failures.

The solution: Using TZIDC or EDP300 positioners featuring a separate position sensor housing, which can be up to 10 m away from the device

Easier and safer access to the positioner in hard-to-reach valve installations. Available as options:

- Enhanced vibration immunity up to 2 g at 300 Hz for higher frequency applications
- Advanced IP67 protection class for challenging applications
- Optional modules and mechanical feedback for the valve position
- Stainless steel housing for offshore use
- Increased temperature resistance of up to 100°C (212°F)

The EDP300 on a linear actuator



The EDP300 in a remote sensor installation



Pneumatics

Proven technology for all-round solutions

Effective control for damper applications

Boiler designs vary based on energy type and engineered technology. In all cases the combustion process requires precise and repeatable positioning of the dampers, diverters and louvers to control the air to different elevations within the furnace for efficient combustion, with the goal of producing the highest possible heat rate while maintaining lowest emissions.

The challenge – providing universal pneumatic damper actuation solutions

Damper actuation may require rotary as well as linear type actuators depending on the application and damper location. The actuators used on the combustion process have to fulfill and comply to the control loop safety of the boiler in the event of power and/or signal loss, to position the damper to either the closed, open, or last position. The dynamics of the process demands high continuous duty cycle of the damper actuators with high positioning accuracy for precise control.

The solution – UP universal pneumatic rotary and LP linear pneumatic actuators

ABB's comprehensive range of linear and rotary pneumatic damper actuators fulfills and exceeds the requirement for these challenges. For over 60 years, ABB's pneumatic actuators have established a reputation in damper drive applications for their high performance and durability.

UP series rotary actuators and LP series linear actuators are sized according to the application torque and available instrument supply pressure and incorporate all the damper control functions required by boiler applications, such as fast travel, safe control functions and manual override for the rotary actuators. These options allow boiler design engineers to select the appropriate safety control philosophy according to the combustion loop. The use of ABB's TZIDC digital positioner technology gives accurate damper positioning as well as providing advanced diagnostics to equip the user with real time positioning data with predictive maintenance information for reliable damper control.



UP4 pneumatic rotary actuator on induced draft fan damper control



LP20 linear pneumatic actuator with AV positioner on a damper



Improved process control with I/P converters

The challenge – dealing with particles blocking a valve

Certain types of enzyme production processes have traditionally posed a problem for accurate valve control where particles of a certain size can cause valves to become blocked, resulting in unplanned downtime to trace and rectify the problem.

In the enzyme production processes, problems can arise from the presence of larger cellulose particles in the process fluids. Planned downtime can arise as a result of troubleshooting and correcting the faults.

The solution – using I/P signal converters for valve position control

The solution to this problem is to use an I/P signal converter as part of an open loop control system. The converter regulates the position of a small diaphragm valve with a 15 mm (0.59055 in) stroke. The valve controls the flow over a range of 50 to 2,000 l/h (13.2086 to 528.3441 gph), with an accuracy of ± 3 to 5 l/h (± 0.7925 to 1.3209 gph).

By responding less quickly to changes on the process side of the valve, the signal converter introduces a delay in the valve response so that it effectively ignores any short term deviations caused by cellulose particles passing the valve.

This helps to prevent the valve from becoming blocked, even when it is only slightly open. The consequent reduction in unplanned plant downtime and associated production disruption help boost profitability and increase plant availability.

Key features & benefits:

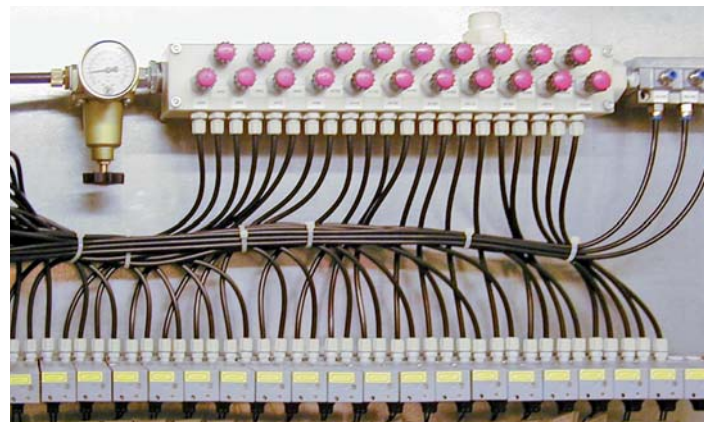
- Compact design and variable mounting positions for maximum installation flexibility
- Output signal from 0.2 to 1 bar (3 to 15 psi)
- Robust design with IP65 field housing enables use in arduous and hostile environments
- High functional stability helps maximize control accuracy



Robust field mount I/P converters for valve position control



Compact panel mount I/P converters



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Note:

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PositionMaster EDP300 Electro-Pneumatic Positioner

Compact, well-proven, and flexible



High air capacity

Diagnostics capability

Resistant to overpressure

Robust and environmentally ruggedized

Easy to commission

Approvals for explosion protection

- ATEX
- IECEx
- FM / CSA
- GOST

For SIL2 safety loop

Extended diagnostics

PositionMaster EDP300

Electro-Pneumatic Positioner

Brief description

The PositionMaster EDP300 is an electronically configurable positioner with communication capabilities designed for mounting to pneumatic linear or part-turn 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.

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.

The air flow for pressurizing or depressurizing the actuator is continuously adjusted. As a result, excellent control is achieved. When reaching the setpoint, 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.

“Fail-safe” function

If the electrical supply power 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.

“Fail-freeze” function

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

Operation

The positioner has a built-in LCD-indicator with a multi-line LCD display and 4 pushbuttons for commissioning, configuration, and monitoring during live operation. Alternatively, the appropriate DTM/EDD can be used via the available communication interface.

Communication

The positioner supports HART5 and HART7 communication.

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 alarms or fault messages.

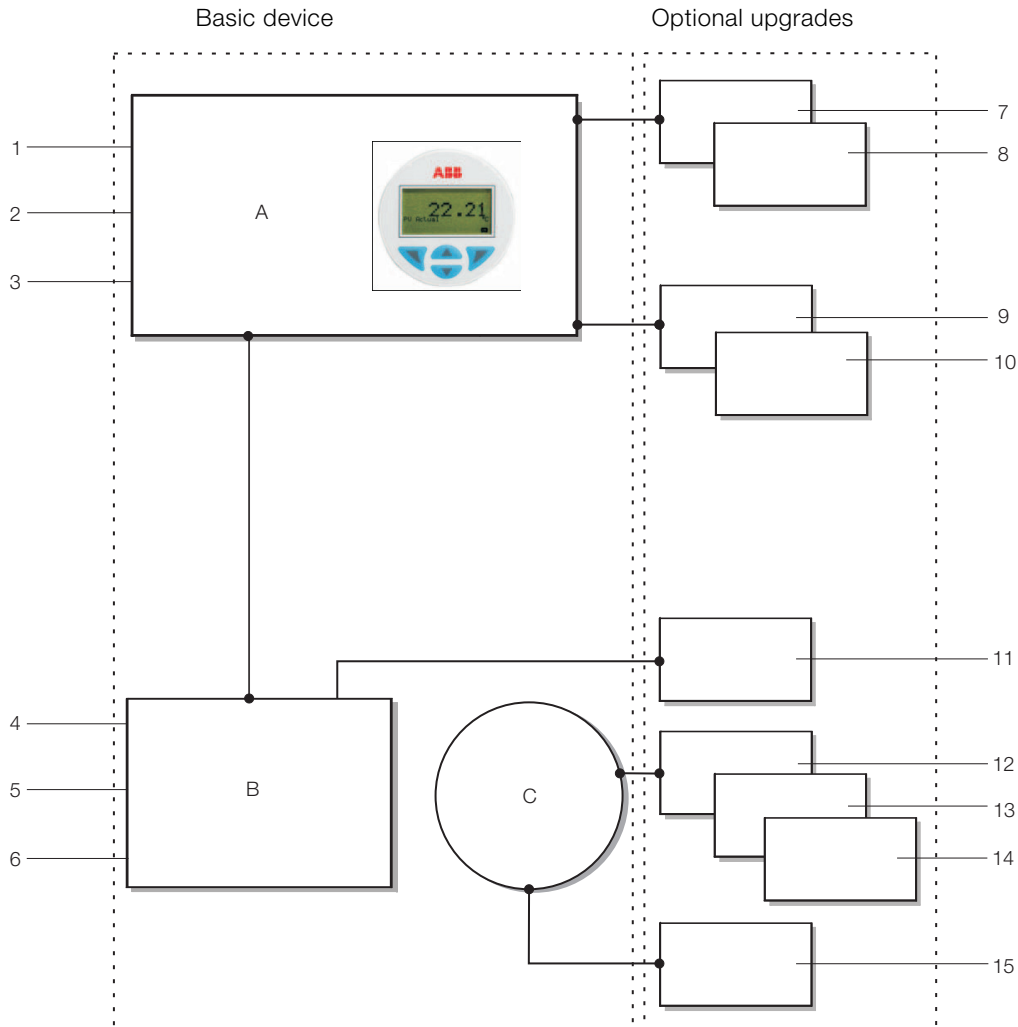
Modular design

The basic model can be enhanced at any time by retrofitting optional equipment. Option modules for analog and digital feedback, an emergency shutdown module, and pressure sensors for valve diagnostics can be installed. A module for a universal analog input can also be installed to which any device supplying a 4 ... 20 mA signal can be connected. Additionally, a mechanical position indicator, proximity switches or 24 V microswitches are available for indicating the position independently of the mother board function.

Diagnostics

The positioner has three optional pressure sensors which can be used for reliable diagnostics of the valve, the pneumatic drive, and the positioner.

Schematic representation



M10112

Fig. 1: Schematic diagram of the positioner

A Electronic | B Pneumatic | C Position sensor |

1 4 ... 20 mA / bus connection | 2 Digital input | 3 Alarm output | 4 Supply air | 5 Output 1 | 6 Output 2 |

7 Analog feedback | 8 Binary feedback | 9 Shutdown module | 10 Universal input | 11 Pressure sensor |

12 Mechanical end position switch 24 V microswitch | 13 Proximity switches (NC) | 14 Proximity switches (NO) |

15 Optical position indicator

IMPORTANT (NOTE)

With optional upgrades either the “mechanical feedback with proximity switches” (13 or 14) or the “mechanical feedback with microswitch 24 V” (12) can be used.

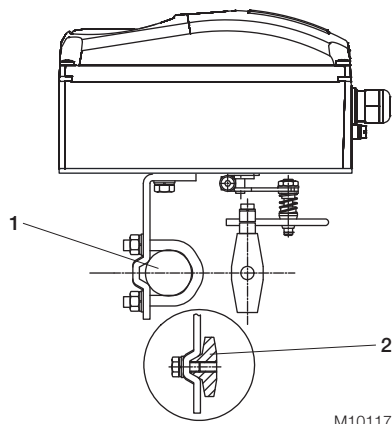
Only two different plug-in modules can ever be used.

PositionMaster EDP300 Electro-Pneumatic Positioner

Mounting versions

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.

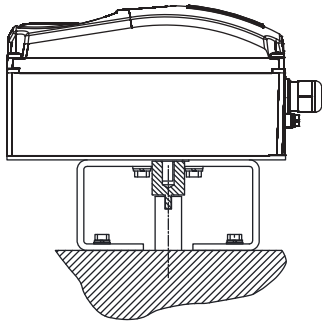


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Fig. 2: Mounting to linear actuators to DIN/IEC 534
1 Columnar yoke | 2 Cast iron yoke

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.



M10119

Fig. 3: Mounting to rotary actuators to 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 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.

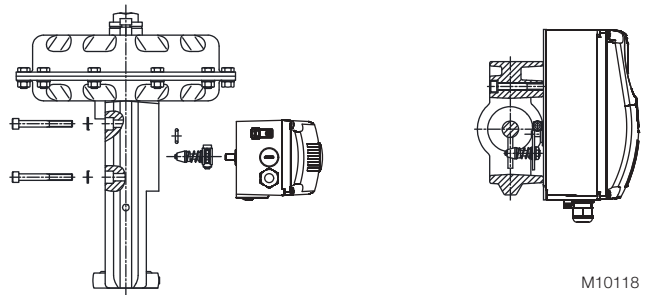


Fig. 4: Integral mounting to control valves

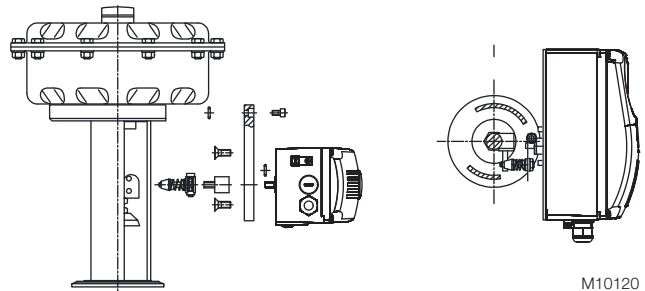


Fig. 5: Integral mounting to control valves by using an adapter panel

Special actuator-specific mounting

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

Device parameters

General remarks

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
- Monitoring parameters
- Diagnostics parameters
- Maintenance parameters

Operating parameters

The following operating parameters can be set manually if required:

Setpoint signal

0 ... 100 % freely selectable for split-range operation

For 4 ... 20 mA and HART version:

- Signal min. 4 mA, max. signal 20 mA (0 ... 100 %)
- Min. range 20 % (3.2 mA)
- Recommended range > 50 % (8.0 mA)

Action (setpoint signal)

Increasing:

Position value 0 ... 100 % = direction 0 ... 100 %

Decreasing:

Setpoint signal 100 ... 0 % = direction 0 ... 100 %

Characteristic curve (travel = f {setpoint 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.

When the shut-off value is set to "0", the position is further controlled, even in the respective end 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.

Switching points for the position

You can use these parameters to define two position limits for signaling (see option "Module for digital position feedback").

Alarm output

The alarms generated in the positioner can be polled via the digital output as a collective alarm.

The desired information can be selected via the LCD display or remotely via the configuration program.

The output can be set to "active high" or "active low", as required.

Digital input

For the digital input, one of the following safety options can be selected. You may use the LCD display or configuration program to select an option.

- No function (default)
- Move to position substitute value (freely selectable)
- Start "Partial Stroke Test"
- Ventilate output 1, evacuate output 2
- Ventilate output 2, evacuate output 1
- Service required
- Move to 0 % position
- Move to 100 % position
- Hold previous position
- Disable local configuration
- Disable local configuration and operation
- Disable all access (no local or remote access via a PC)

The selected function is activated once the 24 V DC signal is no longer applied (< 11 V DC).

PositionMaster EDP300 Electro-Pneumatic Positioner

Adjustment parameters

The positioner has a special function for automatic adjustment of the parameters. Additionally, the control parameters can be set automatically (in adaptive control mode) or manually to optimally adapt them to the process requirements.

Zone

Upon reaching this value, the position is readjusted more slowly until the dead band is reached.

Dead band (sensitivity)

When reaching the dead band, the position is held.

Display 0 ... 100 %

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

Diagnostics

Various functions for permanent operational monitoring are implemented in the PositionMaster EDP300 operating program. The following states will be detected and indicated, e. g.:

- Setpoint signal out of range 0 ... 100 % or 4 ... 20 mA
- Position out of the adjusted range
- Positioning time-out (adjustable time parameter)
- Position controller inactive
- Counter limit values exceeded (can be set via DTM/EDD)

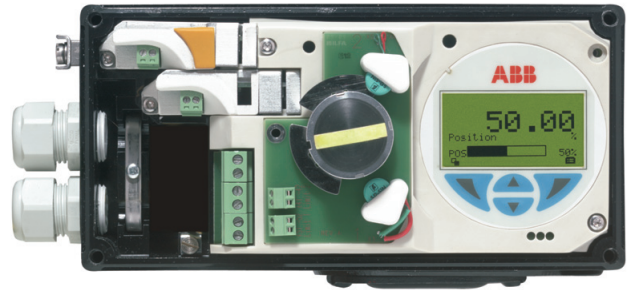
LCD display

The LCD indicator has a cover to protect against unauthorized operation.

Commissioning the positioner is especially easy. Autoadjust is triggered by pressing just a few pushbuttons. Detailed configuration knowledge is not necessary in order to start the device.

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

Besides this standard function, a customized “Autoadjust” function is available. The function is launched either via the LCD display or HART communication.



M10125

Fig. 6: Open positioner with view of LCD indicator

The built-in LCD indicator with four pushbuttons supports the following functions:

- Operational monitoring
- Manual intervention during live operation
- Device configuration
- Fully automatic commissioning
- Display of diagnostic messages



M10126

Fig. 7: LCD indicator with pushbuttons and LCD display

A menu-controlled configuration is available via the pushbuttons on the device.

The multi-line LCD indicator is permanently updated and adapted during operation to provide the user with optional information as relevant.





During control operation (control with or without adaptation) the following data can be called up by pressing the pushbuttons briefly:

- Position Pos [%]
- Position Pos [°]
- Setpoint SP [%]
- Setpoint SP [mA]
- Control deviation DEV [%]
- Electronics temperature [°C, °F, °R, K]
- Supply pressure PIN [unit]
- Pressure output 1 PY1 [unit]
- Pressure output 2 PY2 [unit]
- Differential pressure DP [unit]
- Universal input value UIN [unit]

– Malfunctions, alarms, messages
The possible reason is also displayed, along with the recommended remedial action.

In the event of an error, a message consisting of an icon and text (e.g., electronics) appears at the bottom of the process display. The text displayed provides information about the area in which the error has occurred.

The error messages are divided into four groups in accordance with the NAMUR classification scheme:

Symbol	Description
	Error / Failure
	Functional check
	Out of specification
	Maintenance required

(The group assignment can only be changed using a DTM or EDD.)

Additionally, the error messages are divided into the following areas:

Area	Description
Actuator	Diagnostics messages affecting the valve or the pneumatic actuator
Operation	Diagnostics messages affecting the operation of the positioner
Process	Diagnostics messages relating to the process and displaying problems or states
Sensor	Alarms informing of problems affecting the reading of the valve position
Electronic	Displays errors in the device electronics
Configuration	Detects if the positioner configuration is missing or faulty

Histograms recording

- Positioning time-outs
- Valve movements
- Valve strokes
- Most used valve position
- Universal input

Access to extended monitoring parameters is possible via HART communication, the DTM, and the EDD.

The diagnostics parameters in the operating program provide information about the operating conditions of the actuator.

For example:

- Dead band time limit
- Leakage detection
- Temperature monitoring
- Stiction detection
- Sliding friction detection
- Hysteresis
- Valve seat wear

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

PositionMaster EDP300 Electro-Pneumatic Positioner

Diagnostics with DTM

Access to extended monitoring parameters is possible via HART communication, in particular the DTM (reduced functions only with the EDD).

Butterfly diagnostics

The trend (which relates to a number of relevant positioner parameter values) can be used to draw conclusions about the stiction and friction of a valve with a view to enabling preventive maintenance.

If the diagnostic parameters have changed, a triangle is displayed in signal color. The color and size of this triangle represent the direction and scope of the change.

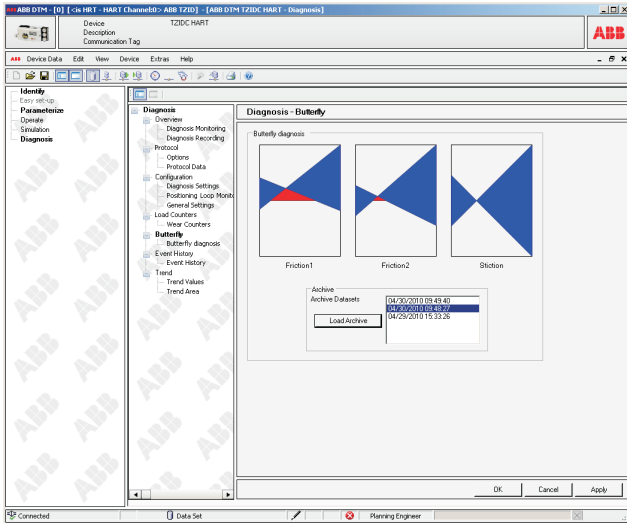
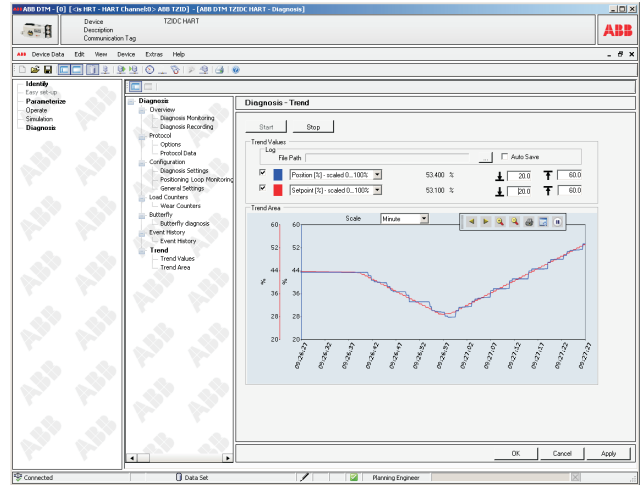


Fig. 8: Example for increased friction

Online trend archive

The online trend archive does not merely indicate the current setpoint and actual value, but also the associated patterns, which can stretch back over a matter of hours. When you start the online trend archive, the saved data is read out and transmitted at such a high transmission rate (100 ms via HART) that the latest data is displayed in next to no time.

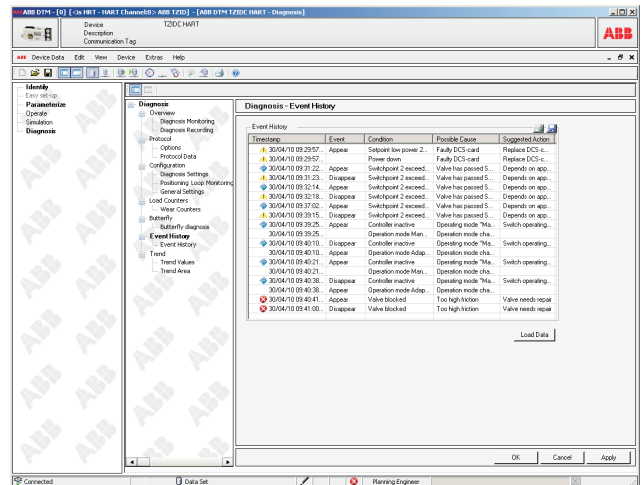


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Fig. 9: Example for online trend archive

Event history

Up to 100 events are saved in the event history in the device. The time each event occurred is also displayed, along with a suggested approach to solving the problem. The limit values for (pre-)alarms, e.g. a friction alarm, can be set.



M10116

Fig. 10: Example event history

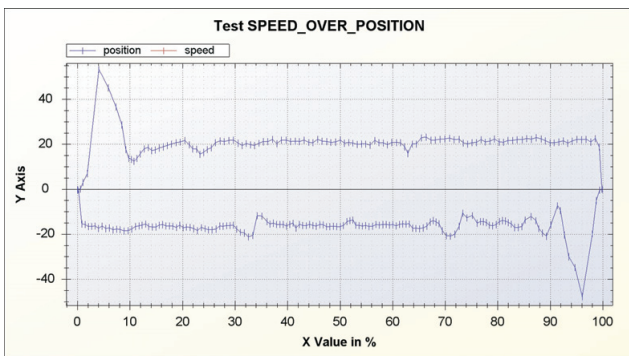
Valve signature (only with pressure option)

When the valve signature starts, the entire valve operating range is covered for the "open and closed directions". High-resolution plots are generated for the pressure patterns at the diagnostic pressure sensors. In addition, the signal waveform for the universal input is recorded. Once the signature has expired, the parameters selected by the user are loaded from the device and displayed. Depending on the quantity of data selected, it may take several minutes to transfer all the parameter values. Up to 5 valve signatures can be saved in the device; these can be compared so that valve diagnostics can be performed for the purpose of preventive maintenance.

Speed in relation to position test

When the "Speed in relation to position test" is started, the entire valve operating range is covered for the valve's "open and closed directions" in an uncontrolled manner using an adjustable degree of openness for the pneumatics. The positioning times for opening and closing the valves are displayed.

The pattern of the graph provides information about friction in the valve and actuator. Up to 5 archived graphs can be saved in the device; these can be compared so that valve diagnostics can be performed for the purpose of preventive maintenance.



M10121

Fig. 11: Example of Speed Over Position Test

Step response test

The step response allows the user to define the start position for the step change. When the start button is pressed, a setpoint step change is generated internally and a high-resolution plot is created for the valve position, pressure patterns, etc. At the end of the step response, the actuator automatically moves to the defined start position and reverts to control mode. Depending on the quantity of data selected, it may take several minutes to transfer all the parameter values and display them in the form of a graph.

The pattern of the graph provides information about friction in the valve and actuator. Up to 5 archived graphs can be saved in the device; these can be compared so that valve diagnostics can be performed for the purpose of preventive maintenance.

Valve seat test

During the valve seat test, the actuator is moved in the direction of the 0 % position with maximum force.

If the user-defined tolerance window for the 0 % position or the universal input signal is exceeded, this will be shown as an error. This error may be indicative of deposits or extreme wear of the valve seat.

If an ultrasonic sensor is used at the universal input for the purpose of measuring noise at the valve seat, even minor leakage at the valve fitting can be detected.

At the end of the test, the positioner moves the valve to the last valid position and reverts to the most recently active control mode.

Leakage test (only with pressure option)

During the leakage test, the positioner closes all pneumatic outputs. Then, if the valve position changes or there is a change in the pressure patterns at the diagnostic pressure sensors, the positioner will be able to detect leakage. It outputs a message indicating the area of the pneumatic piping or actuator that is leaking.

At the end of the test, the positioner moves the valve to the last valid position and reverts to the most recently active control mode.

PositionMaster EDP300 Electro-Pneumatic Positioner

Partial Stroke Test

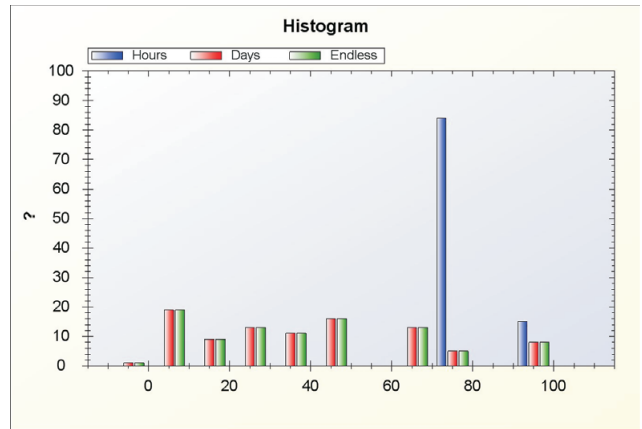
The Partial Stroke Test is used to check the function of the safe position of ESD (emergency shutdown) valves. The test can be started both locally on the device, time-controlled or using the DTM. The positioner evacuates output 1 until the position change defined in advance occurs. If this does not happen within the set time, an alarm can be output. This helps prevent unexpected failures of the valve. At the end of the test, the positioner moves the valve to the last valid position and reverts to the most recently active control mode. There are two separate parameters available for reducing the speed at which the valve moves in the corresponding direction.

Drag indicator

This diagram shows the minimum, maximum, and average values for a selectable parameter in 3 different intervals, which are offset in relation to one another. The drag indicator trend, which is plotted against time, makes it possible to plan preventive action so that a failure in terms of the valves and fittings can be avoided.

Trend histogram

This histogram shows, for example, the position range of the valve within which control is most frequently performed. The parameters to be displayed can be selected by the user. This graph can be used, for example, to determine the most commonly used valve position so that the valve design can be evaluated. The friction within a valve range can be determined on the basis of the differential pressure, dead band time limit alarms, etc.



M10122

Fig. 12: Example trend histogram

Trend diagram

This diagram indicates in which valve positioning range the greatest control deviation has occurred. This allows you to derive the valve friction, actuator size or supply air pressure.

Friction detection test (only with pressure option)

Once the function is initiated, a high-resolution plot of the differential pressure and universal input signal is generated for the valve's entire operating range.

At the end of the test, the positioner moves the valve to the last valid position and reverts to the most recently active control mode.

Limit values for the dynamic friction, stiction and universal input signal can be defined, using 11 reference points in each case. If the corresponding alarms are also activated in "Diagnostics -> Configure diagnostics", alarms can be output during operation as soon as the defined limit values are overshoot.

Further diagnostic parameters are possible with the optional pressure sensors. They include:

- Supply air pressure too low
- Supply air pressure too high
- Pressure shocks in the supply air
- Valve signature
- Leakage localization

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 actuator
- Total travel

Test cycles

Characteristic curves mapping a setpoint cyclically and internally are stored in the device. The DTM can be used to track the position of the actuator. This provides a means of checking the dynamic response of the entire actuator, for example, and determining the limit frequency automatically.

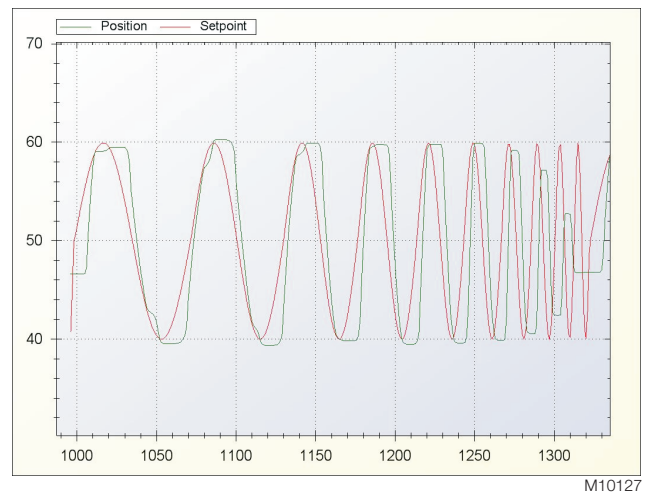


Fig. 13: Example test cycles

PositionMaster EDP300

Electro-Pneumatic Positioner

Communication

DTM

The DTM (Device Type Manager) for the positioner PositionMaster EDP300 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 DAT200 Asset Vision Basic. 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.

Communication is based on the HART protocol. Reading data out from the device has no effect on active operation.

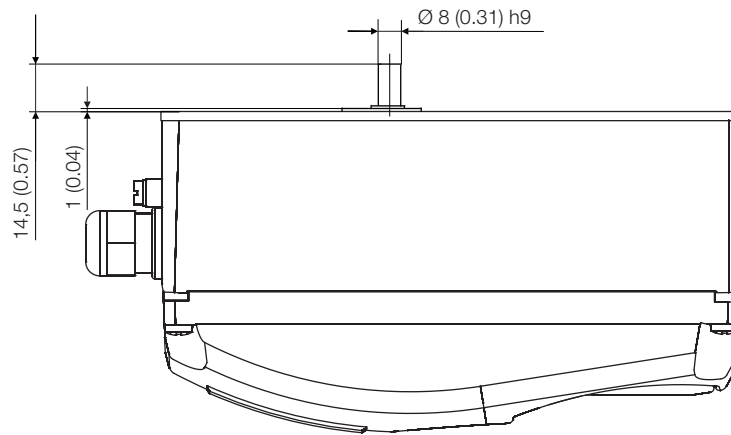
Newly set parameters are saved in the non-volatile memory directly upon download to the device, and become active immediately.

EDD

The EDD (Electronic Device Description) is used to read and modify simple device parameters on handheld terminals or in the vicinity of the system.

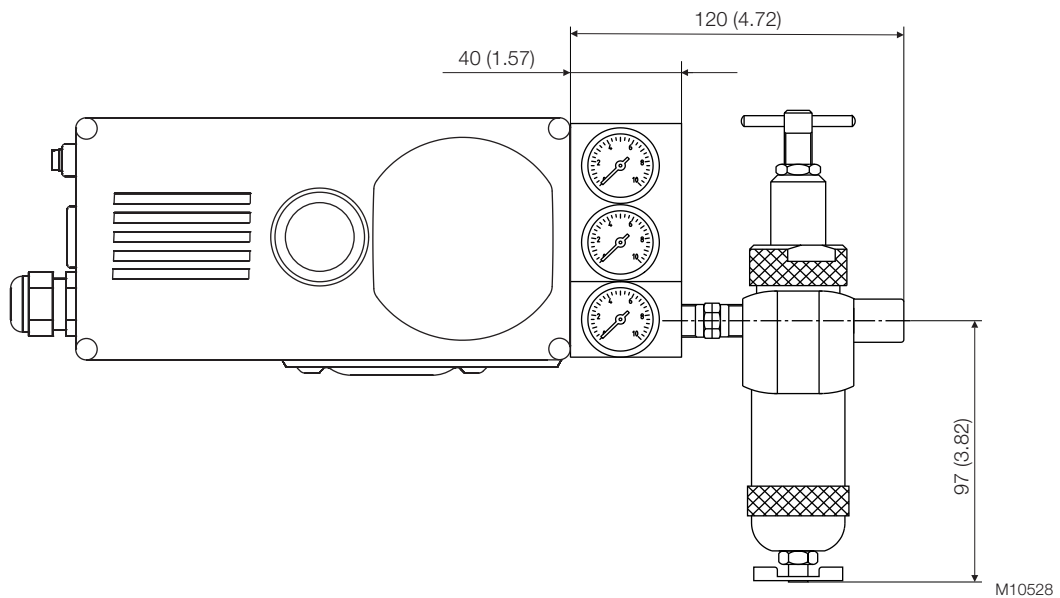
Dimensions

Mounting drawings
All dimensions in mm (inch)



M10529

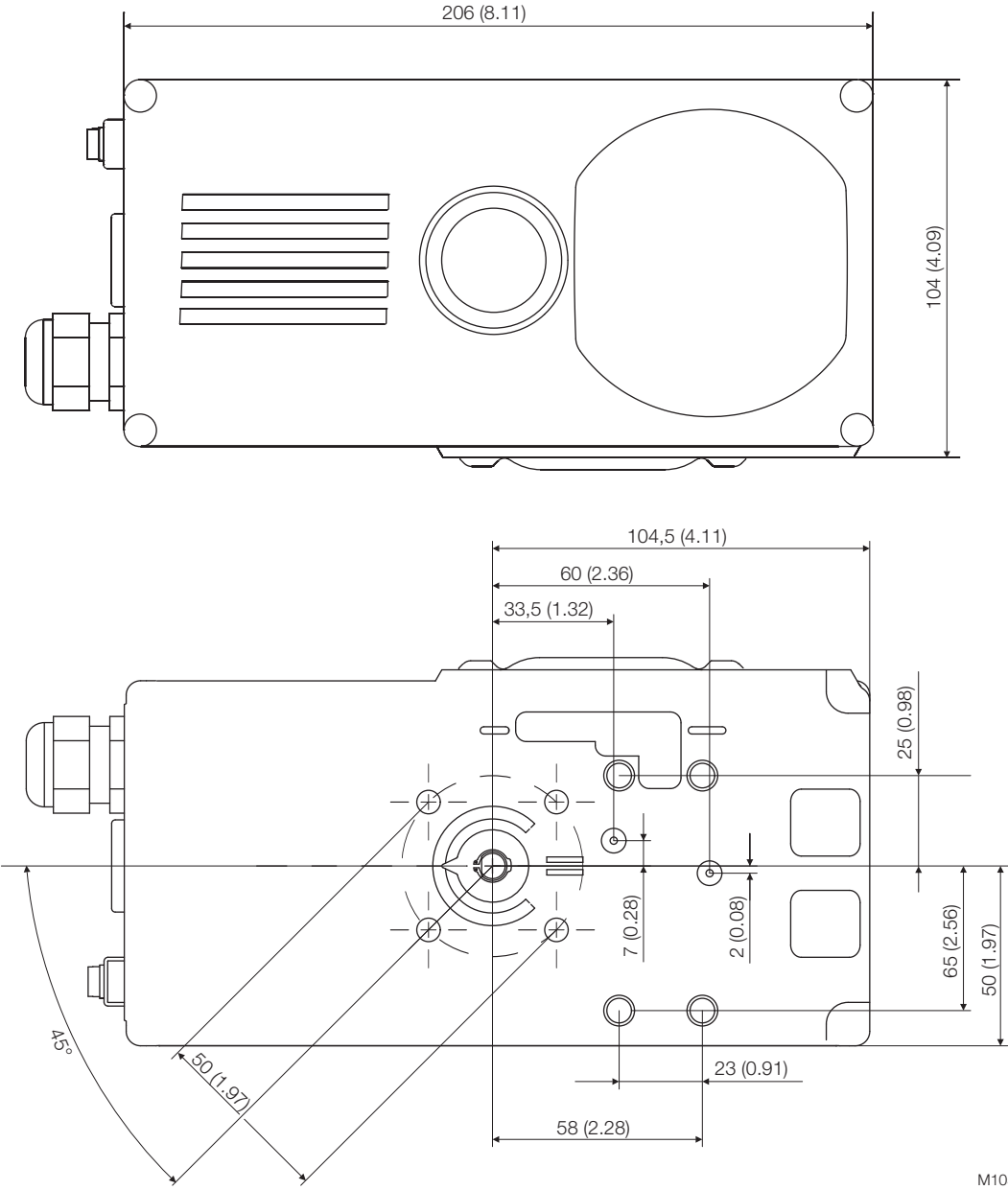
Fig. 14: Top view



M10528

Fig. 15: EDP300 positioner with pressure gauge block and filter regulator mounted

PositionMaster EDP300 Electro-Pneumatic Positioner



M10524

Fig. 16: Front and rear views

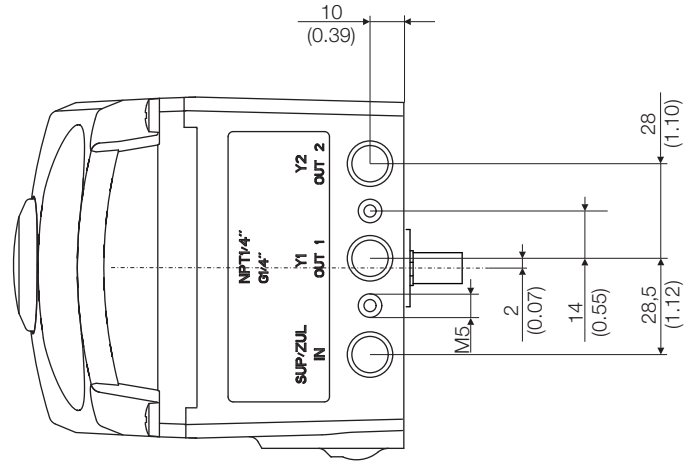
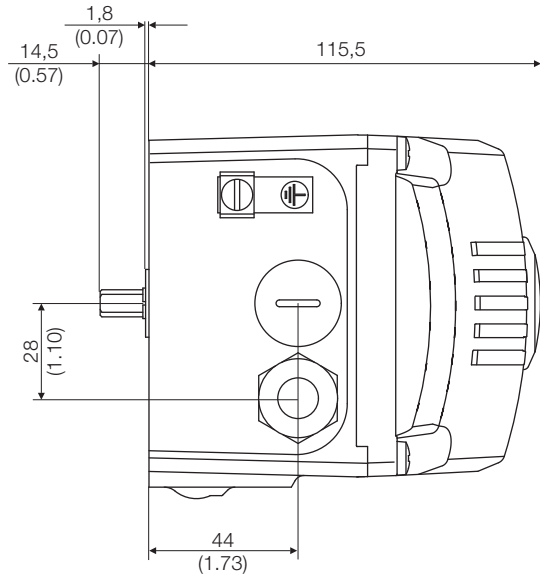
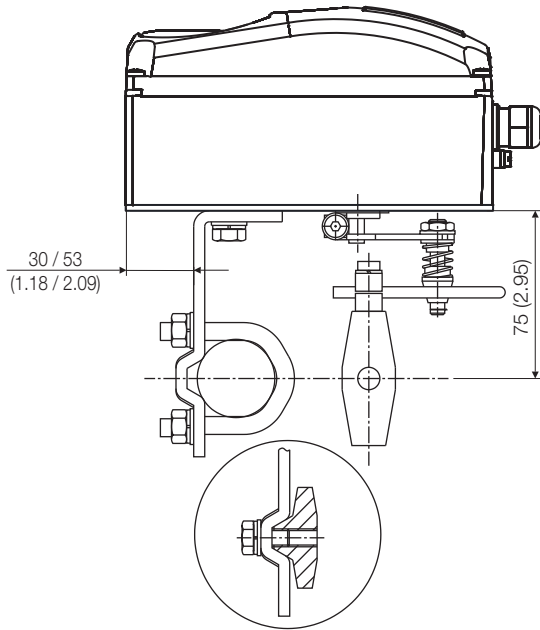


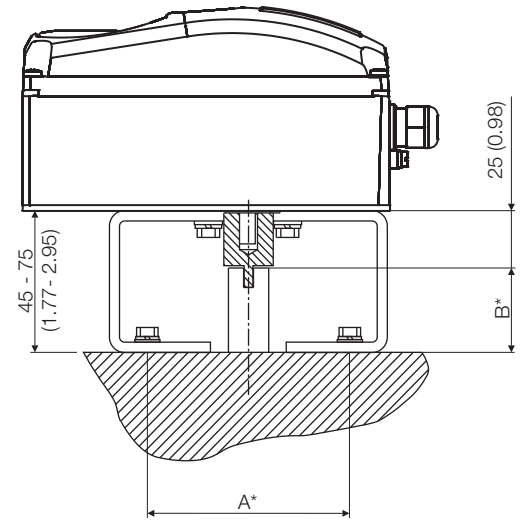
Fig. 17: Side view (from left to right)

M10530



M10134

Fig. 18: Mounting to linear actuators to DIN/IEC 534



M10135

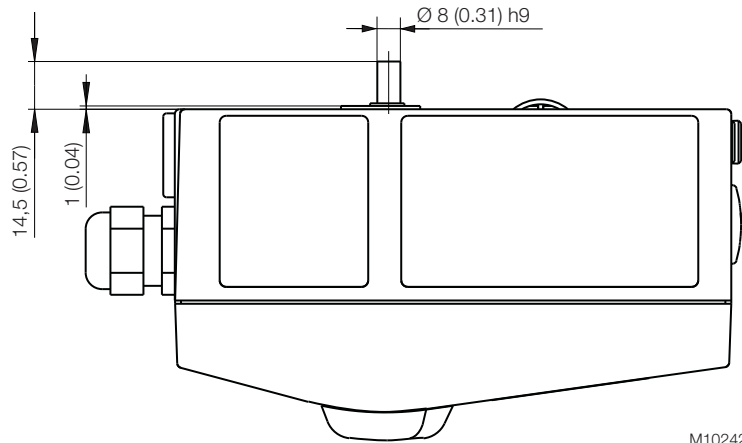
Fig. 19: Mounting to rotary actuators to VDI/VDE 3845

*) Dimensions A and B are dependent on the rotary actuator

PositionMaster EDP300 Electro-Pneumatic Positioner

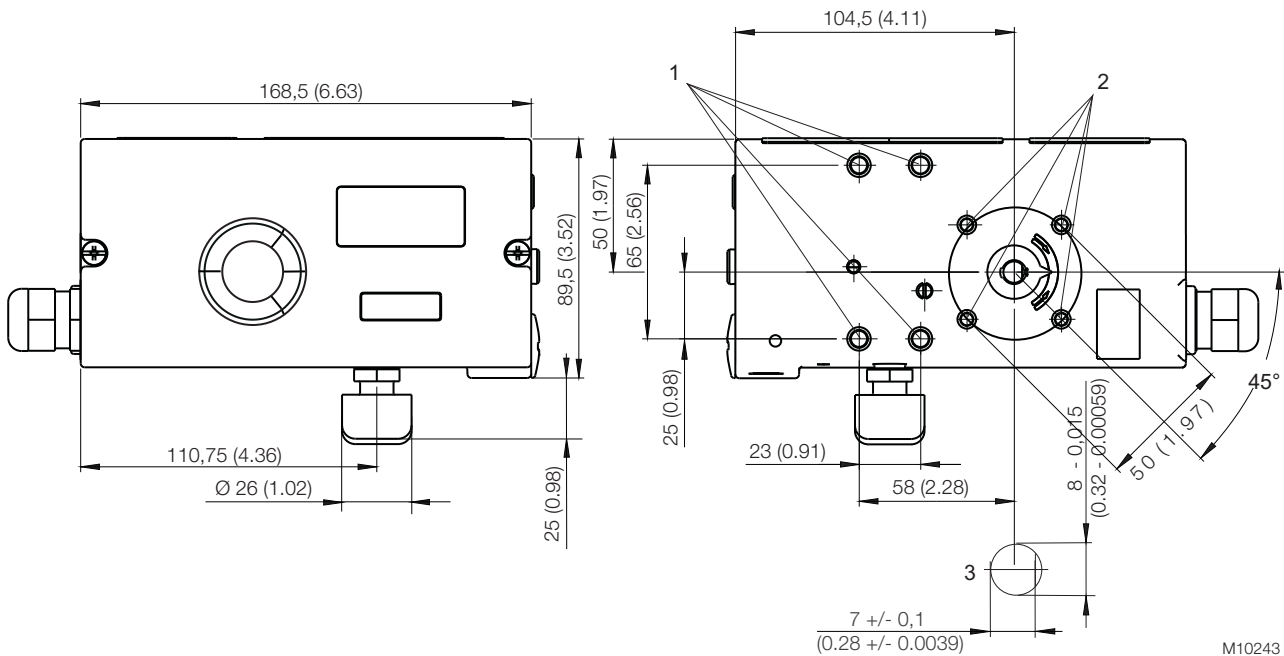
Remote sensor dimensions (aluminum housing)

All dimensions in mm (inch)



M10242

Fig. 20: Top view



M10243

Fig. 21: Front and rear views

1 Threaded hole M8 (10 mm (0.39 inch) deep) | 2 Threaded hole M6 (8 mm deep (0.31 inch)) | 3 Sensor shaft (shown enlarged)

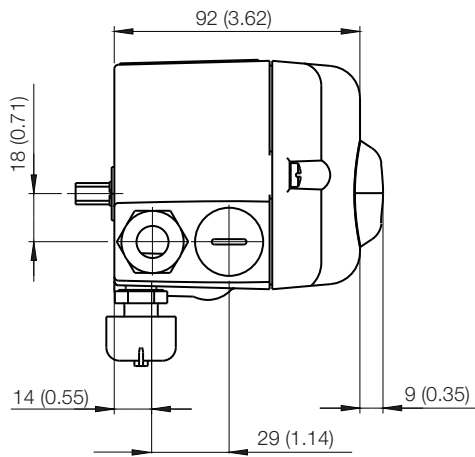
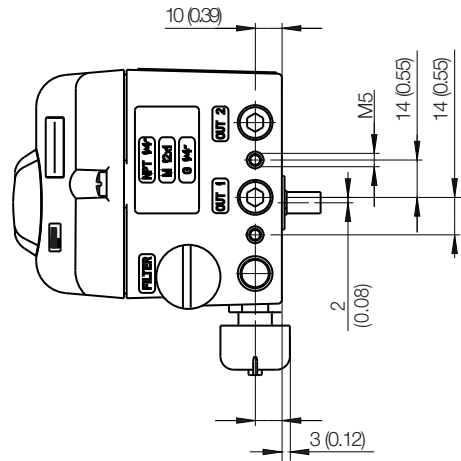
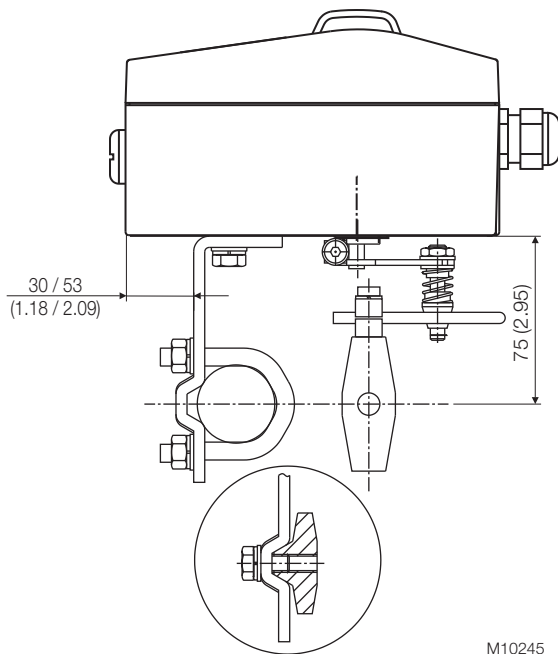


Fig. 22: Side view (from left to right)

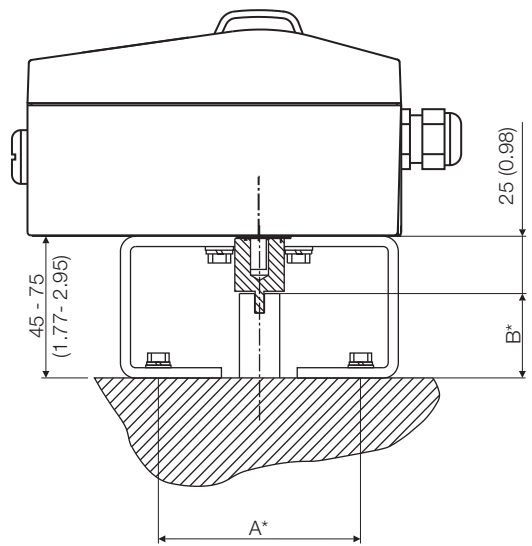


M10244



M10245

Fig. 23: Mounting to linear actuators to DIN/IEC 534



M10246

Fig. 24: Mounting to part-turn actuators to VDI/VDE 3845

*) Dimensions A and B are dependent on the part-turn actuator

PositionMaster EDP300 Electro-Pneumatic Positioner

Electrical connections

PositionMaster EDP300 with remote sensor

The PositionMaster EDP300 version with remote sensor includes an adjusted unit with two housings.

Housing 1 (EDP300 control unit) contains the electronics and pneumatics along with the following options (where applicable):

- Analog position feedback
- Digital position feedback
- Shutdown module
- Universal input

Housing 2 (EDP300 remote sensor) contains the position sensor and is suitable for mounting on linear or part-turn actuators. The following options can be installed if required:

- Optical position indicator
- Mechanical feedback contacts (proximity switch or microswitch design).

The two housings can be or are connected to a shielded 3-wire cable. The maximum cable length is 10 m.

For Housing 1 (control unit) an attachment kit is available for pipe and wall mounting (see Accessories).

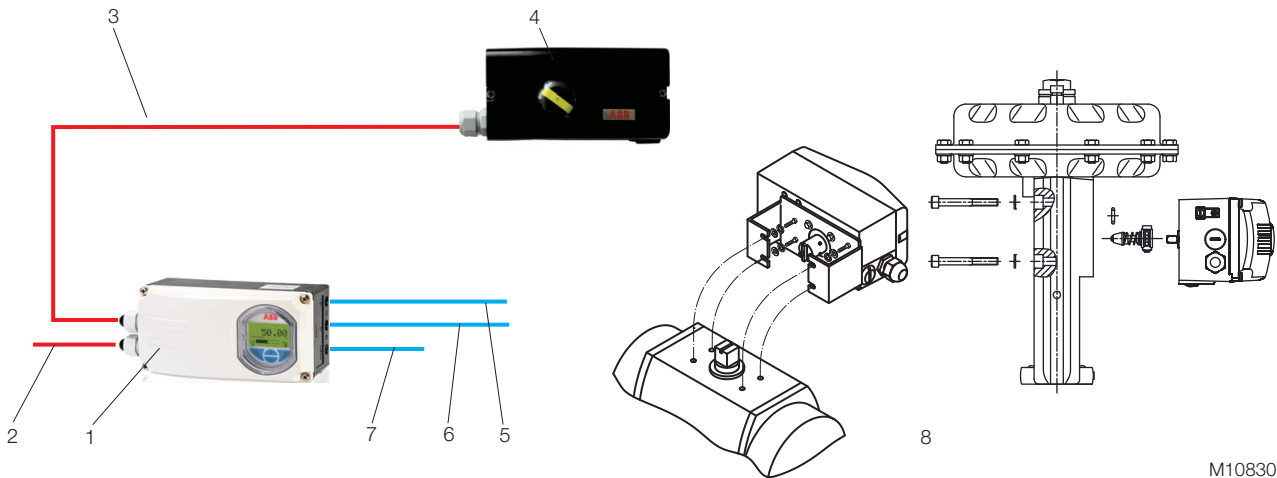


Fig. 25: EDP300 control unit with remote sensor

1 Housing 1 (control unit) | 2 Setpoint signal | 3 Connection cable | 4 Housing 2 (remote sensor) | 5 Pneumatic output 2 |
6 Pneumatic output 1 | 7 Supply air | 8 Pneumatic drive

Optionally, both housings of the “EDP300 stainless steel remote sensor” design are available in stainless steel. The housing dimensions are identical in this case - and the attachment kits are suitable for all versions.

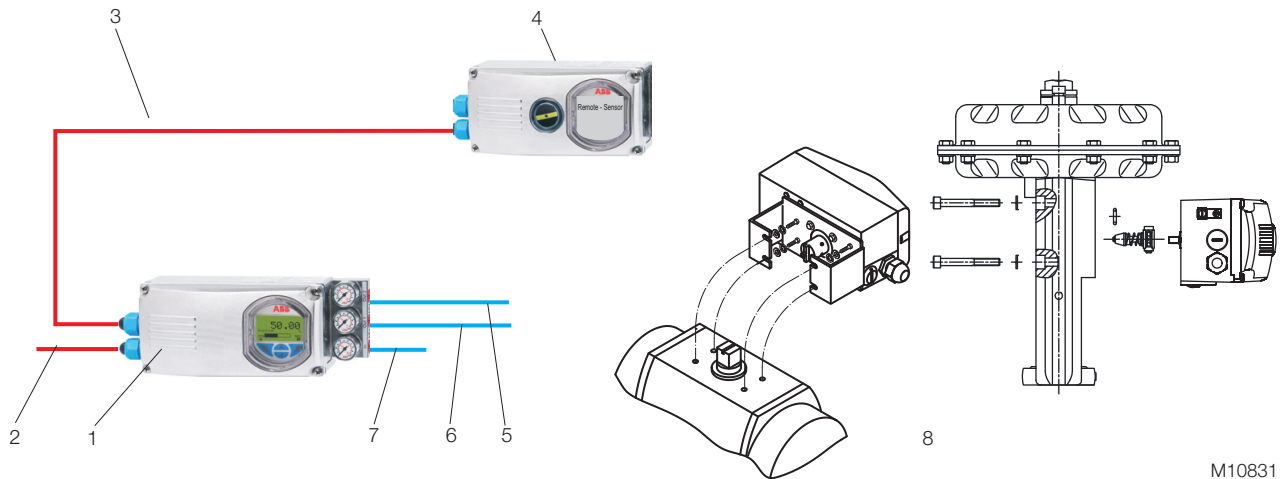


Fig. 26: EDP300 control unit made of stainless steel with EDP300 remote sensor made of stainless steel
 1 Housing 1 (control unit) | 2 Setpoint | 3 Connection cable | 4 Housing 2 (remote sensor) | 5 Pneumatic output 2 |
 6 Pneumatic output 1 | 7 Supply air | 8 Pneumatic drive

M10831

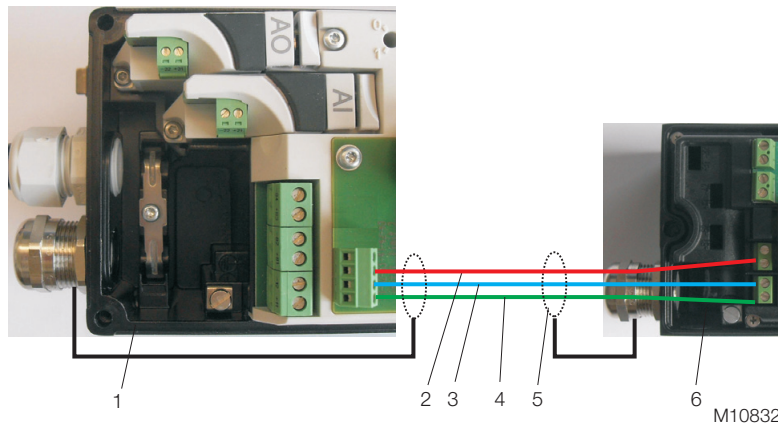


Fig. 27: Electrical connection
 1 EDP300 control unit | 2 Remote sensor connection cable no. 3 | 3 Remote sensor connection cable no. 2 |
 4 Remote sensor connection cable no. 1 | 5 Shielding | 6 EDP300 remote sensor

M10832

PositionMaster EDP300 Electro-Pneumatic Positioner

PositionMaster EDP300 for external remote sensor

In the PositionMaster EDP300 design for remote sensor, the positioner is supplied without position detection.

The housing (EDP300 control unit) contains the electronics and pneumatics along with the following options (where applicable):

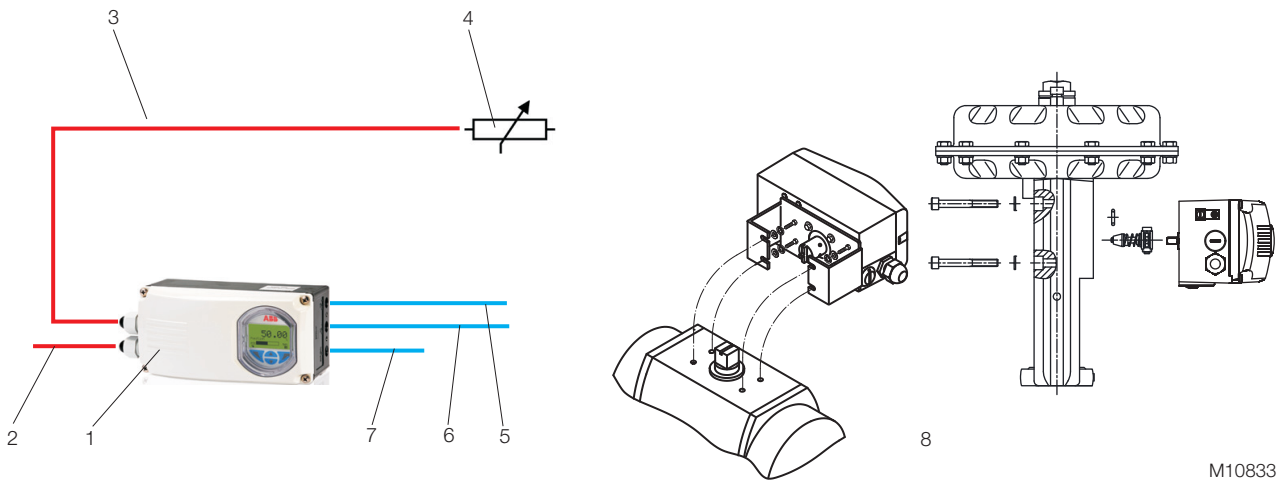
- Analog position feedback
- Digital position feedback
- Shutdown module
- Universal input

The EDP300 for remote sensor can be connected to any position sensor (4 ... 80 kohms).

The length of the shielded 3-core cable must be a maximum of 10 m.

The installation and commissioning is carried out according to the respective chapters in the operating instructions.

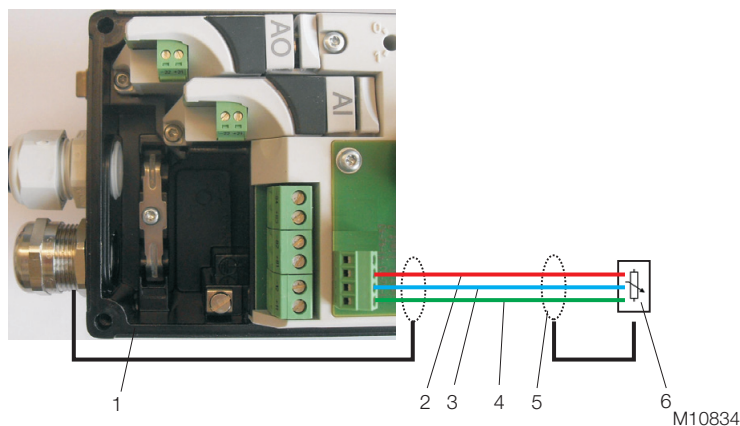
For the housing (EDP300 control unit) an attachment kit is available for pipe and wall mounting. (See Accessories).



M10833

Fig. 28: EDP300 control unit for remote sensor

1 Housing (control Unit) | 2 Setpoint signal | 3 Connection cable | 4 External remote sensor | 5 Pneumatic output 2 | 6 Pneumatic output 1 | 7 Supply air | 8 Pneumatic drive

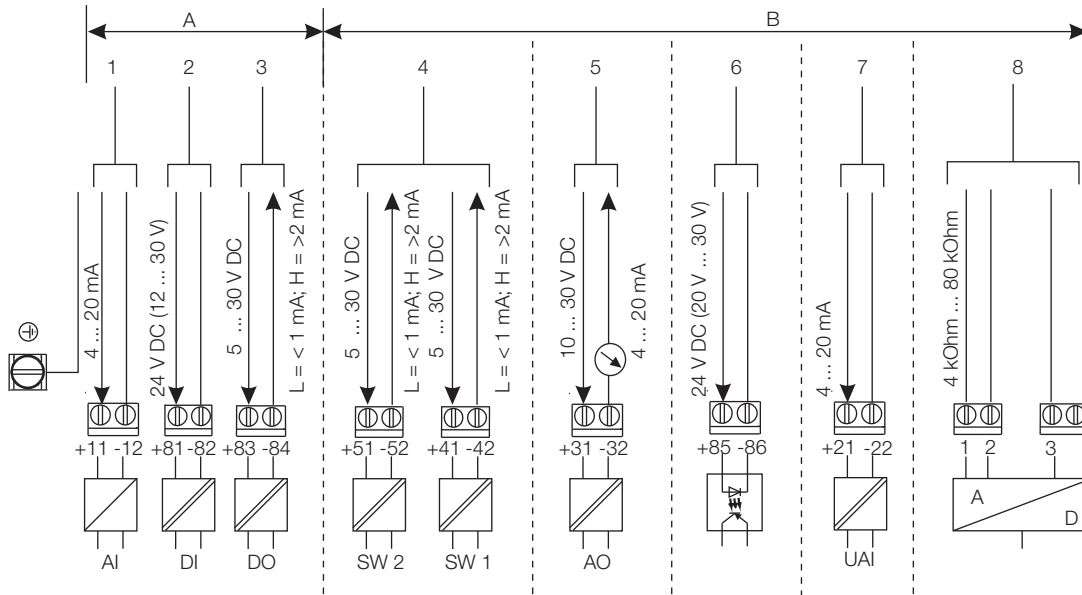


M10834

Fig. 29: Electrical connection

1 EDP300 control unit | 2 Remote sensor connection cable No. 3 | 3 Remote sensor connection cable No. 2 | 4 Remote sensor connecting cable no. 1 | 5 Shielding | 6 External remote sensor

Terminal connection diagrams

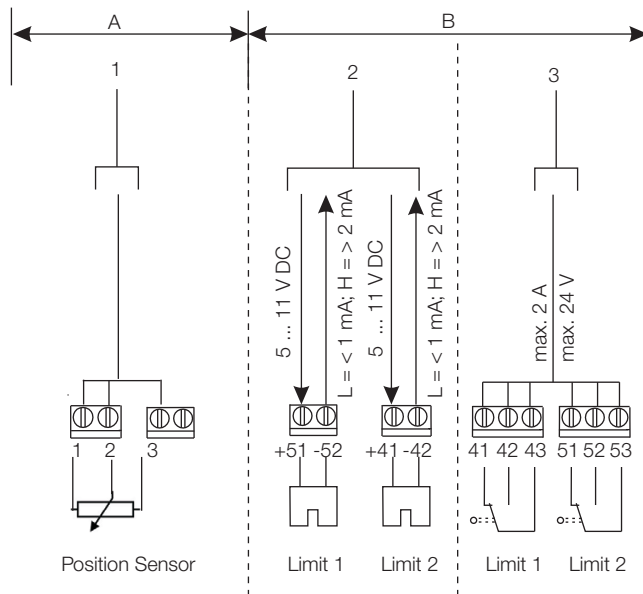


M10835

Fig. 30: Connection diagram of the EDP300 control unit

A Basic device | B Options

1 Setpoint signal | 2 Digital input | 3 Digital output | 4 Digital feedback | 5 Analog feedback |
6 Emergency shutdown module | 7 Universal input | 8 Remote sensor



M10836

Fig. 31: Connection diagram to the EDP300 remote sensor

A Basic device | B Options

1 EDP300 control unit | 2 Proximity switches | 3 Microswitch

PositionMaster EDP300

Electro-Pneumatic Positioner

Technical Data

Inputs

Two-wire technology	
Nominal range	4 ... 20 mA
Limit values	Max.: 50 mA (overload) Min.: 3.6 mA
Start	≥ 3.8 mA
Load voltage at 20 mA	9.7 V
Impedance at 20 mA	485 Ω

Digital input	
Control voltage	0 ... 5 V DC (switching state logical "0") 11 ... 30 V DC (switching state logical "1")
Current	max. 4 mA

Outputs

Digital output (control circuit to DIN 19234/NAMUR)	
Supply voltage	5 ... 30 V DC
Switching state logical	"0": Current > 0.35 mA ... < 1.2 mA "1": Current > 2.1 mA
Effective direction (configurable)	normally logical "0" or logical "1"

Cable connections

Electrical connections	
4 ... 20 mA input	Screw terminals max. 2.5 mm ² (AWG 14)
Options	Screw terminals max. 1.0 mm ² (AWG 18)
Cable entry	2 threaded bores 1/2-14 NPT/M20 x 1.5 (cable gland/pipe plug optional)

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

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

Options

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

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

Travel

Rotation angle	
Used range	25 ... 270° for rotary actuator 25 ... 60° for linear actuator
Travel limit	Min. and max. limits, freely configurable in range 0 ... 100 % of total travel (min. range > 20 %)
Travel time prolongation	Range of 0 ... 200 seconds, separately for each direction
Dead band time limit	Setting range 0 ... 200 seconds (monitoring parameter for control until the deviation reaches the dead band)

Pneumatic connections

Input / Output	
Threaded holes	G 1/4 1/4-18 NPT

Compressed air output	
Range	0 ... 10 bar (0 ... 145 psi)
Air capacity	> 7 kg/h = 5.5 Nm ³ /h = 3.2 sfc _m at 1.4 bar (20 psi) supply air pressure
	> 50 kg/h = 40 Nm ³ /h = 23 sfc _m at 10 bar (145 psi) supply air pressure
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 %

Air supply

Instrument air ¹⁾	
Purity:	
max. particle size	5 µm
Purity:	
max. particle density	5 mg/m ³
Oil contents:	
max. concentration	1 mg/m ³
Pressure dew point	10 K below operating temperature
Supply pressure	1.4 ... 10 bar (20 ... 145 psi)
Air consumption	< 0.03 kg/h / 0.015 scfm ²⁾

1) free of oil, water and dust acc. to DIN / ISO 8573-1
Pollution and oil content according to Class 3

2) Independent of supply pressure

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 mounting to control valves

Pressure gauge block (optional)

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

PC adapter for communication

USB-HART modem for HART communication (see data sheet 63-6.71)

PC software for remote configuration and operation

DAT200 Asset Vision Basic with DTM for EDP300 (see data sheet DS/DTM/DAT200)

PositionMaster EDP300

Electro-Pneumatic Positioner

Housing

Material / Degree of protection	
Aluminum with ≤ 0.1% copper	Optional stainless steel 1.4404 (316L)
Degree of protection	IP 65 / NEMA 4X (NEMA 4X does not permit overhead mounting)

Surface / color (aluminum housing only)	
Dipping varnish	With epoxy resin, stove-hardened
Housing varnished black	RAL 9005 RAL 9002

Weight	
Aluminum	2.4 kg (5.29 lb)
Stainless steel 1.4404 (316L)	5.5 kg (12.13 lb)

Mounting orientation

Any

Transmission data and influences

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

Action (setpoint signal)	
Increasing setpoint	4 ... 20 mA = actuator position 0 ... 100 %
Decreasing setpoint	20 ... 4 mA = actuator position 0 ... 100 %

Characteristic curve (travel = f {setpoint signal})	
Linear	Equal percentage 1:25 or 1:50 or 25:1 or 50:1 ¹⁾
Deviation	< 0.5 %
Configurable zone	0 ... 100 %,
Configurable dead zone	0.1 ... 10 %,
Resolution (A/D conversion)	> 16,000 steps
Sample rate	20 ms
Ambient temperature influence	< 0.5 % for each 10 K
Influence of vibration	< 1 % to 10 g and 80 Hz

1) 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)

Environmental capabilities

Ambient temperature range	
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 housing closed and air supply switched on	95 % (annual average), condensation permissible
Transport and storage	75 % (annual average)

Explosion protection

FM certificate 3043773

IS, C1. I, Div 1, Grp. A, B, C, D, T4 or T6

IS, C1. II, Div 1, Grp. E, F, G, T4 or T6

IS, C1. III, Div 1, T4 or T6

Class I Zone 0, AEx ia IIC, T4 or T6

NI,Cl. I,Div.2, Grp. A, B, C, D, T4 or T6

NI,Cl. II,Div.2, Grp. E, F, G, T4 or T6

NI,Cl. III,Div.2, T4 or T6

Class I Zone 2, IIC, T4 or T6

Enclosure type 4X

CSA Certification 2419437

Class I, Division 1, Groups A, B, C, D;

Class II, Division 1, Groups E, F, G;

Class III T4

Ex ia IIC T4

Class I, Zone =, AEx ia IIC T4

Optional upgrades

Module for analog position feedback ¹⁾

Signal range	4 ... 20 mA (configurable split ranges)
Supply, 2-wire circuitry	24 V DC (10 ... 30 V DC)
Characteristic curve (configurable)	Increasing or decreasing
Deviation	< 1 %

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

Module for binary position feedback ¹⁾

Two switches for digital position feedback (position adjustable within the range of 0 ... 100 %, ranges cannot overlap)
Current circuits acc. to DIN 19234 / NAMUR

Supply voltage	5 ... 30 V DC
Signal current	< 1.2 mA: Switching state logical "0" > 2.1 mA: Switching state logical "1"
Direction of action	normally logical "0" or logical "1" (configurable)

Module for universal input ¹⁾

Module for a 4 ... 20 mA input for universal use. The range can be scaled. It is used for advanced valve diagnostics. For example, an ultrasonic sensor can be connected to detect a faulty valve seat or a phonometer can be connected to detect cavitation. The limit values for detecting overshoot can be freely selected.

Universal input	
Nominal range	4 ... 20 mA
Load voltage at 20 mA	8 V
Impedance at 20 mA	400 Ω

Module for the emergency shutdown function ¹⁾

Supply voltage	24 V DC (20 ... 30 V DC) (electrically isolated from input signal)
Safe position active	At voltage < 5 V

Explosion protection: see certificate (operating instructions)

¹⁾ There are two slots for the option modules. Any combination of different option modules is possible. However, identical option modules cannot be combined.

A separate 24 V DC signal is applied to the emergency shutdown module; it connects the signal from the microprocessor through 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 1 is depressurized, and the valve is moved to the safe position. In case of a "double-acting" actuator the second output 2 is additionally pressurized. The emergency shutdown module works independently of the mother board, i.e., all information from the actuator is available in the control system at any time.

PositionMaster EDP300

Electro-Pneumatic Positioner

Binary position feedback with proximity switches

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	< 1.2 mA: Switching state logical "0" > 2.1 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

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

Binary position feedback with 24 V microswitches

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.

Contactless position sensor (option)

In difficult ambient conditions (constant valve movements, for example, which are transmitted to the sensor axis by the process pressure), the positioner can be fitted with a contactless position sensor.

Pressure option

The pressure option comprises 3 absolute pressure sensors which facilitate pressure-based valve diagnostics (valve signature, for example).

The supply air pressure and the output pressures can also be monitored. The zero points of the pressure sensors can be calibrated both locally on the device and using the DTM.

These options are also available for retrofitting by Service.

Ex relevant specifications

Intrinsic safety gas and dust ATEX / IECEx

ZELM 11 ATEX 0456 X (EC type examination certificate)

II 1G Ex ia IIC T6 or T4 Ga

II 1D Ex iaD IIIC T55°C or T100°C Da

Ta = -40 ° ... 40 ° or 85 °C

IECEx ZLM 11.0001 X

Ex ia IIC T6 or T4 Ga

Ex iaD IIIC T55 °C or T100°C Da

Ta = -40 ° ... 40 ° or 85 °C

Temperature class	Ambient temperature	Surface temperature
T4	-40 ... 85 °C (-40 ... 185 °F)	100 °C (212 °F)
T6	-40 ... 40 °C (-40 ... 104 °F)	55 °C (131 °F)

Electrical connections gas and dust ATEX / IECEx

Signal circuit (AI) (terminals +11 -12)

Temperature class T1 – T4	Temperature class T6
U _i = 30 V	U _i = 28 V
I _i = 320 mA	I _i = 320 mA
P _i = 1.1 W	P _i = 0.8 W
C _i = 6.5 nF without pressure option	
C _i = 8.8 nF with pressure option	
L _i = negligibly small	

Switching input (DI) (terminals +81 -82)

Temperature class T1 – T4	Temperature class T6
U _i = 30 V	U _i = 28 V
P _i = 500 mW	P _i = 400 mW
C _i = 4.2 nF	
L _i = negligibly small	

Switching output (DO) (terminals +83 -84)

Temperature class T1 – T4	Temperature class T6
U _i = 30 V	U _i = 28 V
P _i = 500 mW	P _i = 400 mW
C _i = 4.2 nF	
L _i = negligibly small	

Shutdown module (terminals +41 -42)

Temperature class T1 – T6

U_i = 30 V

P_i = 1 W

C_i = 5.3 nF

L_i = negligibly small

Analog feedback module (terminals +31 -32)

Temperature class T1 – T4

U_i = 30 V

I_i = 320 mA

P_i = 1 W

C_i = 11.3 nF

L_i = 150µH

Temperature class T6

U_i = 28 V

I_i = 320 mA

P_i = 0.8 W

Universal analog input module (terminals +21 -22)

Temperature class T1 – T4

U_i = 30 V

I_i = 320 mA

P_i = 1 W

C_i = 11.3 nF

L_i = 150µH

Temperature class T6

U_i = 28 V

I_i = 320 mA

P_i = 0.8 W

Digital feedback module

(terminals: SW 1: +41 -42, SW 2: +51 -52)

Temperature class T1 – T4

Per output:

U_i = 30 V

P_i = 0.5 W

I_i = 250 mA

C_i = 2.2 nF per output

L_i = negligibly small

Temperature class T6

Per output:

U_i = 28 V

P_i = 0.4 W

Digital output module (proximity switches)¹

(terminals limit 1: +51 -52, limit 2: +41 -42)

Temperature class T1 – T4

According to EC type examination certificate

PTB 00 ATEX 2049X

¹ No IECEx

PositionMaster EDP300

Electro-Pneumatic Positioner

Equipment in type of protection "n" or device dust ignition protection through housing "tb"

ZELM 11 ATEX 0456 X (EC type examination certificate)		
II 3G Ex nA IIC T6 or T4 Gc		
II 2D Ex tb IIIC T55 °C or T100 °C Db		
Ta = -40 ° ... 40 ° or 80		
IECEX ZLM 11.0001 X		
Ex nA IIC T6 or T4 Gc		
Ex tb IIIC T55 °C or T100 °C Db		
Ta = -40 ° ... 40 ° or 80		

Temperature class	Ambient temperature	Surface temperature
T4	-40 ... 80 °C (-40 ... 176 °F)	100 °C (212 °F)
T6	-40 ... 40 °C (-40 ... 104 °F)	55 °C (131 °F)

Electrical connections non-sparking ATEX/IECEX

Equipment in type of protection "n" or device dust ignition protection through housing "tb"

Signal circuit (AI) (terminals +11 -12):

$$I_N \leq 22 \text{ mA}$$

$$U_{\max} \leq 30 \text{ V}$$

Switching input (DI) (terminals +81 -82):

$$U_N \leq 30 \text{ V}$$

Switching output (DO) (terminals +83 -84):

$$U_N \leq 30 \text{ V}$$

Shutdown module (terminals +41 -42):

$$U_N \leq 30 \text{ V}$$

Analog feedback module (UAI) (terminals +31 -32)

$$I_N \leq 22 \text{ mA}$$

$$U_N \leq 30 \text{ V}$$

Universal analog input module (terminals +21 -22)

$$I_N \leq 22 \text{ mA}$$

$$U_{\max} \leq 30 \text{ V}$$

Digital feedback module

(terminals: SW 1: +41 -42, SW 2: +51 -52)

Per output:

$$U_N \leq 30 \text{ V}$$

Digital output module (proximity switches)

(terminals limit 1: +51 -52, limit 2: +41 -42)

Per output:

$$I_N \leq 25 \text{ mA}$$

$$U_N \leq 16 \text{ V}$$

When using proximity switch SJ2_S1N (NO), the positioner may only be used at an ambient temperature range of -25 ... 80 °C (-13 ... 176 °F).

Ordering information

Main ordering information for PositionMaster EDP300 electro-pneumatic positioner

Select one or more characters from each category and enter the complete catalog number.

Enter one or more codes for additional order information if you are purchasing optional extras for the positioner.

Base model – Characters 1 through 6	EDP300	XX	X	X	X	X	X
PositionMaster EDP300 electro-pneumatic positioner							
Explosion Protection Certification – Characters 7 through 8							
Without		Y0					
ATEX II 1G Ex ia IIC / II 1D Ex ia IIIC		A1					
ATEX II 3G Ex nA IIC / II 2D Ex tb IIIC		B1					
FM / CSA Intrinsically Safe Class I, II, III Div. 1 Groups A, B, C, D, E, F, G		F1					
IEC ExEx ia IIC Ga / Ex ia IIIC Da		M1					
IEC ExEx nA IIC Gc / Ex tb IIIC Db		N1					
GOST Russia - Ex ia IIC T4/T6 Ga X		W1					
GOST Russia - Ex nA IIC T4/T6 Ga X		W3					
NEPSI China - Ex ia II C T6		S1					
KOSHA Korea - Ex ia II C T6		S5					
CEPEL Brazil - Ex ia II C T6		J1					
Input Signal / Communication Port – Character 9							
4 ... 20 mA			A				
HART digital communication and 4 ... 20 mA			H				
Pneumatic Output Type – Character 10							
Single acting				1			
Double acting				2			
Safe Position – Character 11							
Fail-safe						S	
Fail-freeze						F	
Air Pipe Connection – Character 12							
Thread G 1/4 female							1
Thread 1/4-18 NPT female	(Note 1)						2
Cable Conduits – Character 13							
M20 x 1.5 with cable gland							A
NPT 1/2 in. with cable gland							B
Thread M20 x 1.5 female							C
Thread NPT 1/2 in. female	(Note 1)						D

PositionMaster EDP300

Electro-Pneumatic Positioner

Additional ordering information for PositionMaster EDP300 electro-pneumatic positioner

All required options have to be entered by adding a one-digit or two-digit code or codes after the main order number.

	XX	XX	XX	XX	XX	XX
Option Module Slot 1						
Analog feedback output	A1					
Digital feedback output	A2					
Analog universal input	A3					
Option Module Slot 2						
Analog feedback output		B1				
Digital feedback output		B2				
Analog universal input		B3				
Emergency shutdown module		B4				
Usage Certifications						
Inspection certificate 2.1 acc. EN 10204, Declaration of Conformity				C4		
Inspection certificate 2.1 acc. EN 10204, Declaration of Conformity, with description				CP		
Test report 2.2 acc. EN 10204				C5		
Inspection Certificate 3.1 acc. EN 10204, with maximum deviation				C6		
SIL 2 - Declaration of Conformity (Note 2)				CS		
Position Indicator						
Visual Indicator, integrated into cover					D1	
Limit Switches						
Microswitches (Note 3)						F1
Proximity switches (NC) SJ2-SN (Note 4)						F2
Proximity switches (NO) SJ2-S1N (Note 4)						F3
Housing Material						
Stainless steel						H1

Additional ordering information for PositionMaster EDP300 electro-pneumatic positioner	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Position Sensor Type										
Integrated contactless sensor	K1									
Control Unit Remote Sensor (Note 3)	K2									
Special Applications										
Operation with natural gas (Note 6)	P8									
With noise reduction	P9									
Pressure Gauge Block Type										
0 ... 1 MPa (0 ... 10 bar, 0 ... 145 psi)						R3				
Diagnosis Module										
Pressure sensors							S3			
Additional TAG Plate										
Stainless steel 18.5 mm x 65 mm (0.73 in. x 2.5 in.)							T1			
Sticker 11 mm x 25 mm (0.44 in. x 1 in.) (Note 3)							T3			
Mounting Options										
Prepared for integral mounting								V1		
Remote Sensor										
Basic unit									RS	
Remote Sensor Vibration Resistance										
Advanced vibration range 2 g @ 300 Hz										RV
Remote Sensor Protection Class										
Protection class IP 67										RP
Remote Sensor Cable										
5 m cable enclosed										R5
10 m cable enclosed										R6

- Note 1: Needed for FM / CSA certification
- Note 2: With single acting, fail safe pneumatic only
- Note 3: Not for Ex-versions
- Note 4: Not for IECEx-versions
- Note 5: Only for ambient temperature range -25 ... 85 °C, not for IECEx-versions
- Note 6: Only with Explosion protection

PositionMaster EDP300

Electro-Pneumatic Positioner

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
Mounting bracket Bar	
EDP300 / TZIDC Mounting bracket Bar integrated	7959380
Mounting 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 ... 35 mm	7959125
EDP300 / TZIDC Attachment kit for linear actuators, stroke 20 ... 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

Accessories	Order number
Attachment kit	
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 585 C	7959250
EDP300 / TZIDC Attachment kit for Fisher 657 / 667 Size 10 ... 30 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 Attachment for remote sensor control unit (for wall or pipe mounting)	7959381

PositionMaster EDP300 Electro-Pneumatic Positioner

Trademarks

™ HART is a trademark of the HART Communication Foundation

Notes

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3KXE341010R1001



Sales



Service



Software

TZIDC-200 Electro-Pneumatic Positioner

Measurement made easy

Compact, well-proven, and flexible



HART protocol

For 4 ... 20 mA two-wire technology,
Flameproof (Enclosure)

Low operating cost

Compact design

Well-proven technology and intelligence

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

For SIL2 safety loops

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1 Description

The TZIDC-200 is an electronically configurable positioner with communication capabilities, 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

The standard TZIDC-200 model has a local communication interface (LKS connector). Additionally, a "HART communication" option for communication via the 20 mA signal is available. Both communications are based on the HART Protocol.

1.4 Inputs and outputs

In addition to its input for the analog position set point the TZIDC-200 positioner is equipped with a digital input which can be used to activate various protective functions in the device via the process control system. A digital output allows you to output collective alarms or fault messages.

1.5 Modular design

The TZIDC-200 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.

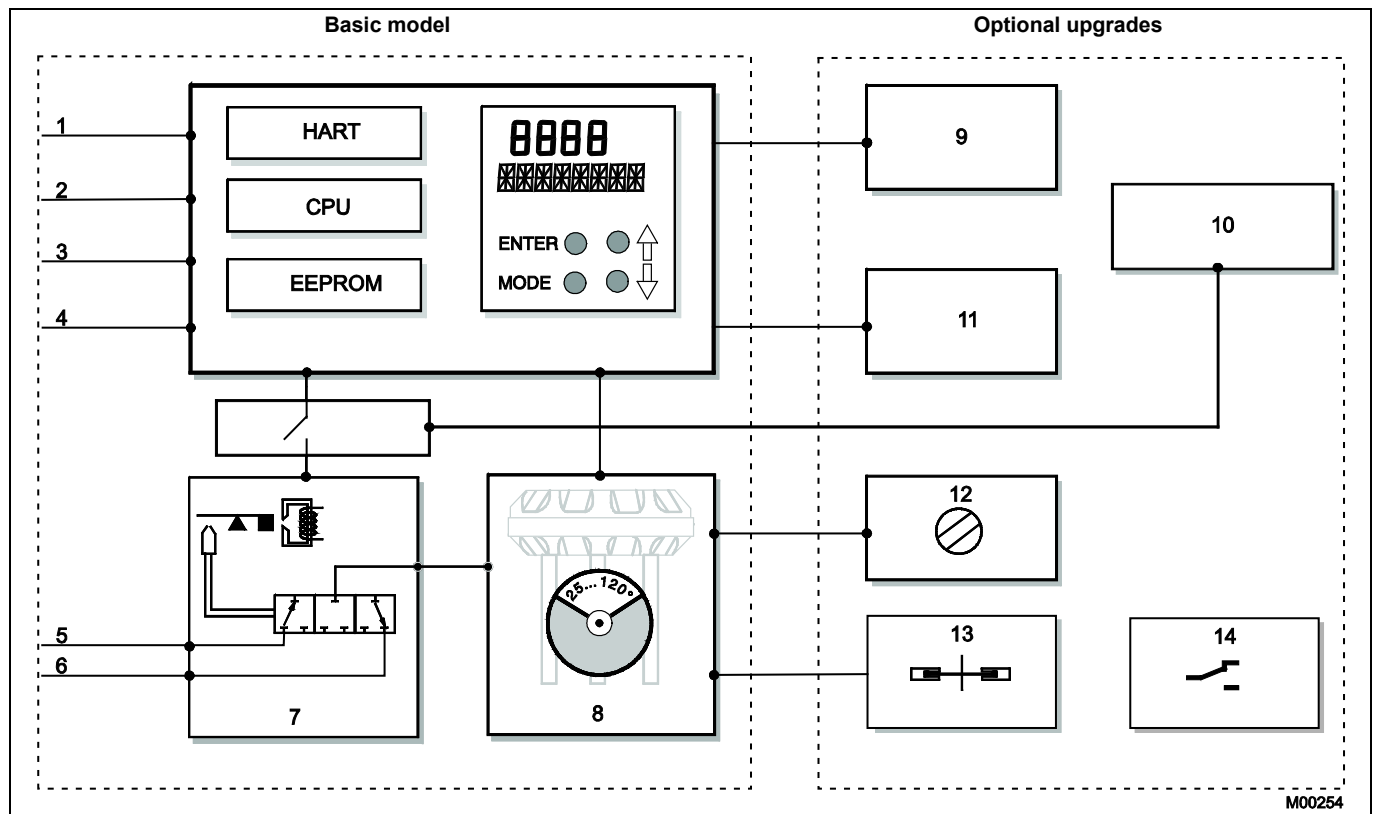


Fig. 1: TZIDC-200 schematic diagram

Basic model

- 1 LKS plug
- 2 Positioning signal 4 ... 20 mA
- 3 Digital input
- 4 Digital output DO
- 5 Supply, 1.4 ... 6 bar (20 ... 90 psi)
- 6 Exhaust
- 7 I/P module with 3/3-way valve
- 8 Position sensor (optional up to 270° rotation angle)

Optional upgrades

- 9 Plug module for analog feedback (4 ... 20 mA)
- 10 Plug-in module for safety shutdown (forced depressurization)
- 11 Plug module for digital feedback
- 12 Installation kit for mechanical position indicator
- 13 Installation kit for digital feedback with proximity switches
- 14 Installation kit for digital feedback with 24 V microswitches



Important

With optional upgrades either the "Installation kit for digital feedback with proximity switches" (13) or the "Installation kit for digital feedback with microswitches 24 V" (14) can be used.

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-200 positioner featuring standard pneumatic action is available as an option for integral mounting.

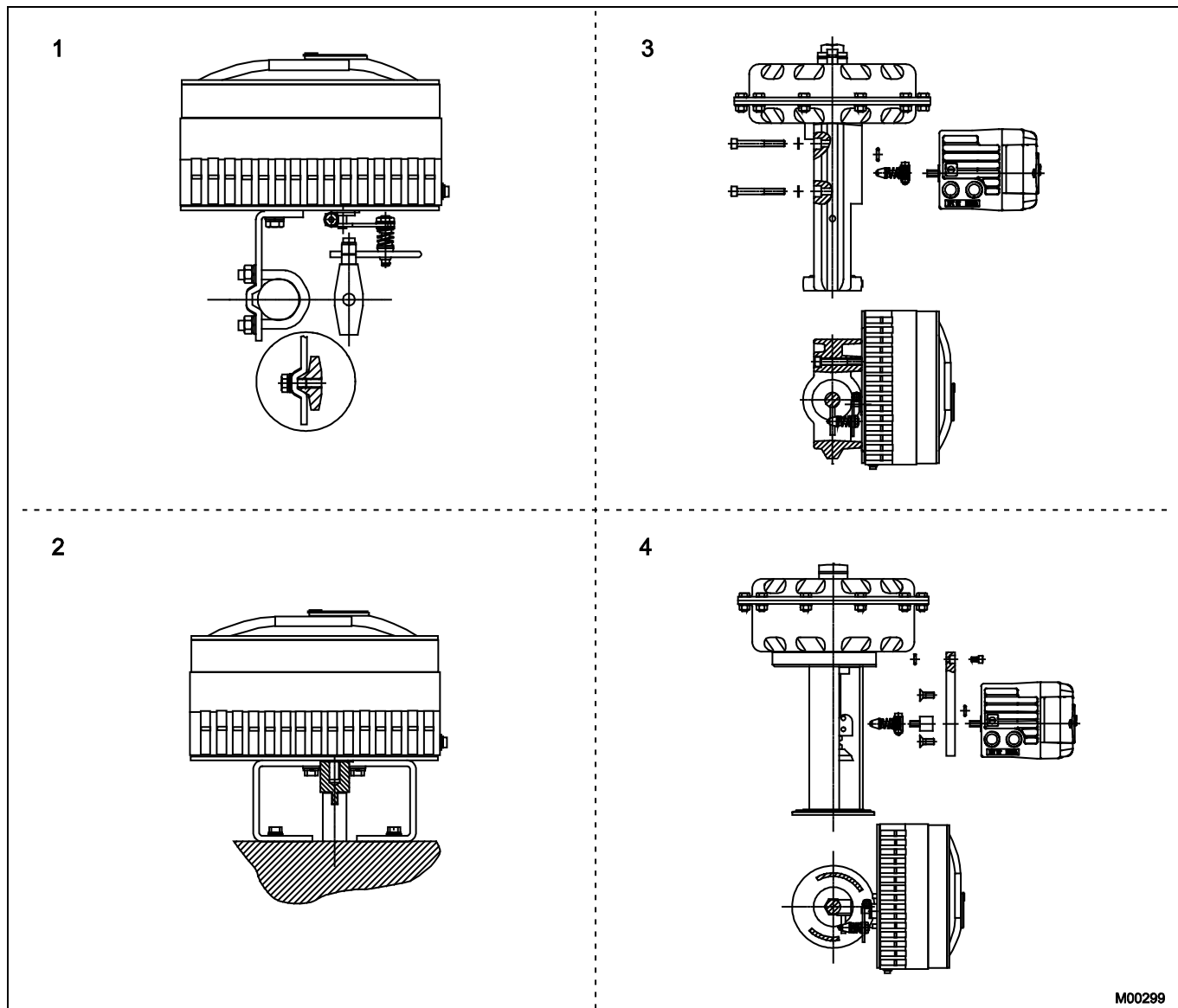
The required holes are found at the back of the device.

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.



M00299

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-200 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

The following operating parameters can be set manually if required:

Setpoint Signal

Signal min. 4 mA, max. signal 20 mA (0 ... 100 %)
freely selectable for split-range operation
min. range 20 % (3.2 mA)
recommended range > 50 % (8.0 mA)

Action (setpoint signal)

Increasing: Setpoint Signal 4 ... 20 mA = position 0 ... 100 %
Decreasing: Setpoint Signal 20 ... 4 mA = position 0 ... 100 %

Characteristic curve (travel = f {setpoint 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.

When the shut-off value is set to "0", the position is further controlled, even in the respective end 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.

i IMPORTANT (NOTE)

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").

Digital output

The alarms generated in the TZIDC-200 positioner can be polled via the digital output as a collective alarm.

The desired information can be selected via the operator panel or remotely via the configuration program.

The output can be set to "active high" or "active low", as required.

Digital input

For the digital input, one of the following safety options can be selected. You may use the operator's panel or configuration program to select an option.

- No function (default)
- Move to 0 % position
- Move to 100 % position
- Hold previous position
- disable local configuration
- Disable local configuration and operation
- Disable any access (no local or remote access via a PC)

The selected function is activated once the 24 V DC signal is no longer applied (< 11 V DC).

3.1.2 Adjustment parameters

The TZIDC-200 positioner has a special function for automatic adjustment of the parameters.

Additionally, the control parameters can be set automatically (in adaptive control mode) or manually to optimally adapt them to the process requirements.

Tolerance band

Upon reaching the tolerance band, the position is slowly re-adjusted until the dead band has been reached.

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-200 operating program. The following states will be detected and indicated, e.g.:

- 4 ... 20 mA setpoint signal out of range
- position out of the adjusted range
- positioning time-out (adjustable time parameter)
- position controller inactive
- counter limits (settable in the diagnosis phase) exceeded

While automatic commissioning is in progress, the current state is continuously indicated on the integrated LCD.

During operation, the LCD shows the most important process variables:

- current position (in %),
- malfunctions, alarms, messages (as code)

Access to extended monitoring parameters is possible via HART communication and the DTM.

3.1.4 Diagnosis parameters

The diagnosis parameters of the TZIDC-200 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 diagnosis parameters and limit values can be called up, set, and reset via HART communication, using the configuration program.

3.2 Operator panel

The TZIDC-200 positioner's operator panel with four pushbuttons allows for

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

The operator panel is protected by a hinged cover which can be opened during operation even in hazardous areas, i.e. the positioner can be locally operated any time as required.

3.2.1 Single-button commissioning

Commissioning the TZIDC-200 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 HART communication.

3.2.2 Display

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

During control operation (control with or without adaptation) the following TZIDC-200 data can be called up by pressing the pushbuttons briefly:

- Up button: Current setpoint (mA)
- Down button: Temperature in device
- Up + Down buttons: Current control deviation

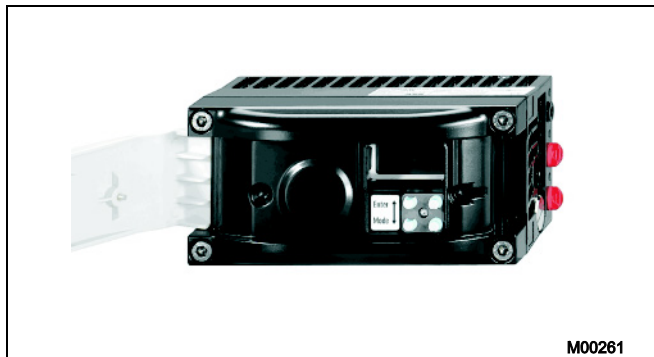


Fig. 3: TZIDC-200 with removed cover, view of the operator panel

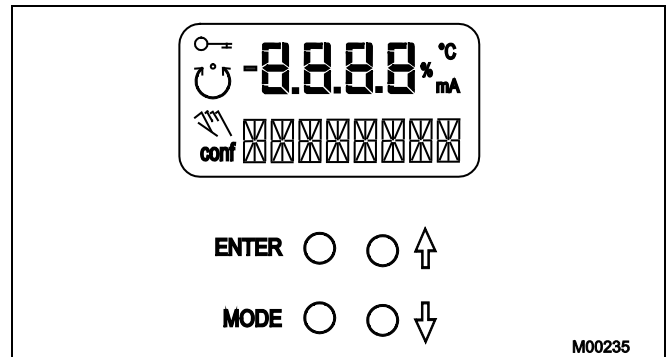


Fig. 4: TZIDC-200 operating elements and display

4 Communication

4.1 DTM

The DTM (**D**evice **T**ype **M**anager) for TZIDC-200 is based on the FDT / DTM technology (FDT 1.2) and can be integrated in a process control system or loaded in a PC with the DSV401 (SMART VISION) program. This allows you to work with the same user interface in the commissioning phase, during operation, and for service tasks for monitoring the device, setting parameters, and uploading data.

Communication is based on the HART protocol. It occurs via a local interface connection (LKS) or in frequency-modulated mode using an FSK-modem connected at any chosen point of the 20 mA signal line. Communication has no effect on operation. Newly set parameters are saved in the non-volatile memory directly upon the download into the device, and become active immediately.

4.2 LKS adapter (RS-232 interface converter)

You can easily connect your TZIDC-200 positioner to a PC, e.g., in the workshop or in the commissioning phase, by using the positioner's LKS adapter (LKS = local communication interface).

An RS-232 interface converter adapts the signals on the serial PC port to the level of the positioner's LKS.

4.3 FSK Modem

The FSK modem establishes a digital frequency-modulated communication (**F**requency **S**hift **K**eying) with the TZIDC-200 positioner.

Tapping is possible at any chosen point of the 20 mA signal line.

We recommend that you use an electrically isolated FSK modem. It is bus-compatible when used with isolating amplifiers. Even connecting explosion-protected field devices is possible, on condition that the FSK modem is run outside the hazardous area.

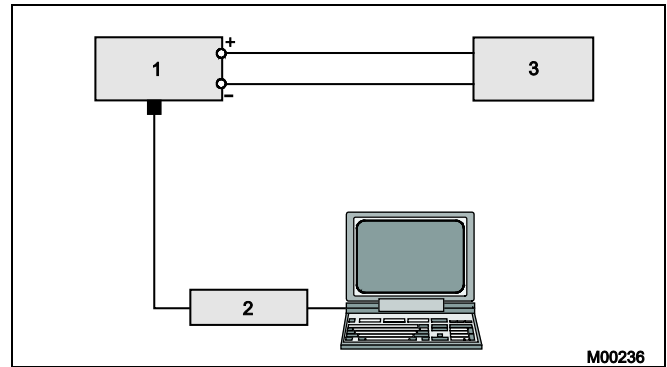


Fig. 5: Local communication via LKS adapter

- 1 TZIDC-200
- 2 LKS adapter
- 3 Controller

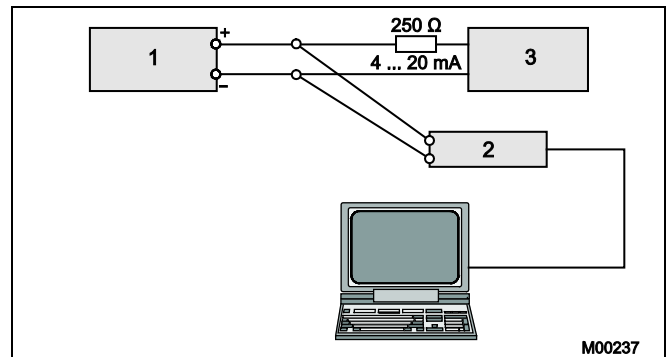


Fig. 6: HART communication with FSK modem via 20 mA signal line

- 1 TZIDC-200
- 2 FSK modem
- 3 Controller

5 Specifications

5.1 Input

Setpoint signal (two-wire technology)

Nominal range	4 ... 20 mA
Split range configuration between	20 ... 100 % of the nominal range
Max.	50 mA
Min.	3.6 mA
Starting at	3.8 mA
Load voltage at 20 mA	9.7 V
Impedance at 20 mA	485 Ω

Digital input

Control voltage	0 ... 5 V DC logical switching state "0" 11 ... 30 V DC logical switching state "1"
Current	max. 4 mA

5.2 Output

Compressed air output

Range	0 ... 6 bar (0 ... 90 psi)
Air capacity	5.0 kg/h = 3.9 Nm ³ /h = 2.3 sfc at 1.4 bar (20 psi) supply pressure 13 kg/h = 10 Nm ³ /h = 6.0 sfc at 6 bar (90 psi) supply pressure
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 %

Digital output (control circuit to DIN 19234 / NAMUR)

Supply voltage	5 ... 11 V DC
Current > 0.35 mA ... < 1.2 mA	Switching state logical "0"
Current > 2.1 mA	Switching state logical "1"
Effective direction (configurable)	normally logical "0" or logical "1"

5.3 Travel

Rotation angle

Used range	25 ... 120° (rotary actuators, optional 270°) 25 ... 60° (linear actuators)
Travel limit	Min. and max. limits, freely configurable between 0 ... 100 % of total travel (min. range > 20 %)
Travel time prolongation	Range of 0 ... 200 s, separately for each direction
Dead band time limit	Setting range 0 ... 200 s (monitoring parameter for control until the deviation reaches the dead band)

5.4 Air supply

Instrument air	free of oil, water and dust acc. 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)
Supply pressure	1.4 ... 6 bar (20 ... 90 psi)

i IMPORTANT (NOTE)

Do not exceed the maximum operating pressure of the actuator!

Air consumption	< 0.1 kg/h / 0.05 scfm (independent of supply pressure)
-----------------	---

5.5 Transmission data and influences

Output Y1

Increasing	Increasing setpoint signal 0 ... 100 % Increasing pressure at output
Decreasing	Increasing setpoint signal 0 ... 100 % Decreasing pressure at output

Action (setpoint signal)

Increasing	Signal 4 ... 20 mA = Position 0 ... 100 %
Decreasing	Signal 20 ... 4 mA = Position 0 ... 100 %

Characteristic curve (travel = f {setpoint signal})

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

Deviation	≤ 0.5 %
Tolerance band	0,3 ... 10%, adjustable
Dead band	0,1 ... 10%, adjustable
Resolution (A/D conversion)	> 16,000 steps
Sample rate	20 ms
Influence of ambient temperature	≤ 0.5% per 10 K
Reference temperature	20 °C
Influence of vibration	≤ 1 % to 10 g and 80 Hz

Seismic vibration

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

Influence of mounting orientation

Not measurable

Complies with the following directives

- EMC directive 2004/108/EC from December 2004
- EC Directive for CE conformity marking

Communication

- HART protocol 5.9
- Local connector for LKS (not in explosion protection area)
- HART communication via 20 mA signal line with (optional) FSK modem

5.6 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

5.7 Housing

Material / IP rating

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

Surface / color

Electrostatic dip painting with epoxy resin; stove-hardened. Housing painted black, RAL 9005, matte; housing cover Pantone 420.

Electrical connections

Screw terminals: Max. 1.0 mm² (AWG 17) for options
Max. 2.5 mm² (AWG 14) for 4 ... 20 mA input signal



IMPORTANT (NOTE)

Do not expose the terminals to mechanical 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 blind plugs as necessary)

Weight

3.0 kg (1.36 lb)

Mounting orientation

Any

Dimensions

See "Dimensions"

5.8 Safety Integrity Level



IMPORTANT (NOTE)

Applies to applications with single-acting and depressurizing pneumatics.

The positioner TZIDC / TZIDC-200 and the emergency shutdown module for meet the requirements regarding:

- functional safety acc. to IEC 61508
- explosion protection (depending on the model)
- electromagnetic compatibility in accordance with EN 61000

Without the input signal, the pneumatic module in the positioner vents the drive and the installed spring in it moves the valve in a predetermined end position (OPEN or CLOSED).

SIL specific safety-related characteristics:

Device	SFF	PFDav	$\lambda_{dd} + \lambda_s$	λ_{du}
TZIDC / TZIDC-200 as shutdown module	94 %	$1.76 \cdot 10^{-4}$	718 FIT	40 FIT
TZIDC / TZIDC-200 with supply current 0 mA	94 %	$1.76 \cdot 10^{-4}$	651 FIT	40 FIT

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

5.9 Options

Module for analog position feedback¹⁾

Signal range 4 ... 20 mA (configurable split ranges)
Supply, 2-wire circuitry 24 V DC (10 ... 30 V DC)
48 V DC (20 ... 48 V DC, no ignition protection)
Characteristic curve (configurable) Increasing or decreasing
Deviation < 1 %



IMPORTANT (NOTE)

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

Module for digital position feedback¹⁾

Two switches for digital position feedback (position adjustable within the range of 0 ... 100%, ranges cannot overlap)
Current circuits acc. to DIN 19234 / NAMUR
Supply voltage 5 ... 11 V DC
Signal current < 1.2 mA Switching state logical "0"
Signal current > 2.1 mA Switching state logical "1"
Direction of action normally logical "0" or logical "1" (configurable)

Module for the emergency shutdown function²⁾

Supply voltage	24 V DC (20 ... 30 V DC) (electrically isolated from input signal)
Safe position is activated when	Voltage < 5 V
Explosion protection	see certificate (operating instructions)
SIL	See "Safety Integrity Level"

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 1 is depressurized, and the valve is moved to the safe position. In case of a double-acting actuator the second output 2 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.

- 1) The module for analog position feedback and the module for digital position feedback plug in separate slots and can be used together.
- 2) The module for the emergency shutdown function uses the same space as the module for analog feedback and the module for analog or digital feedback and cannot be plugged in and run together with any of them.

Digital position feedback with proximity switches

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 < 1.2 mA	Switching state logical "0"
Signal current > 2.1 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 proximity switch SJ2_S1N (NO), the positioner may only be used at an ambient temperature range of -25 ... 85 °C (-13 ... 185 °F).

Digital position feedback with 24 V microswitches

i IMPORTANT (NOTE)
Only approved for Ex d version!

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 through magnetic coupling.

i IMPORTANT (NOTE)
These options are also available for retrofitting by Service.

5.10 Accessories

Mounting material

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

Ex d cable entry

Cable gland and pipe plug approved for Ex d, securing adhesive

Pressure gauge block

With pressure gauges for supply and output pressure. Pressure gauges with housing ø 28 mm (1.10 inch), with connection block in aluminum, black with installation material 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 adjustable to 1.4 ... 6 bar (20.31 ... 87.02 psi)

PC adapter for communication

- LKS adapter f. plug conn. to positioner
- FSK modem for HART communication
- (see data sheet 63_6.71)

PC software for remote configuration and operation

DSV401 (SMART VISION) with DTM for TZIDC / TZIDC-200 available on CD ROM (see data sheet 63_1.20)

6 Ex relevant specifications

6.1 ATEX

6.1.1 ATEX / GOST Russia / GOST Ukraine

6.1.1.1 Flameproof enclosure

Designation:	⊕ II 2 G Ex d IIC T4/T5/T6 Gb
Type examination certificate:	DMT 02 ATEX E 029 X
Type:	TZIDC-200/210/220 Doc. 901132
Device class:	II 2G
Standards:	EN 60079-0: 2009 General requirements EN 60079-1: 2007 Flameproof enclosure "d"

Special conditions for ATEX, flameproof enclosure

- Hot parts inside the housing pose a risk of explosion. Never open the device immediately after switch-off. Always wait at least four minutes before opening the device
- Prior to final installation, the operator must decide how the device is to be used, either:
 - A) as a device featuring the "Ex i" type of protection; or
 - B) as a device with the "Ex d" type of protection.The type of use that was not selected must be permanently covered on the name plate. Specific conditions of the surrounding environment, such as chemical corrosion, must be taken into account when affixing the permanent mark. Only the manufacturer may change the selected type of use following a re-examination.
- Variants that, according to declarations, also meet the requirements for the "intrinsically safe" type of protection may no longer be used as "intrinsically safe" if they have been previously used as a flameproof type of protection.
- Manipulation of the device in any form by the user is not permitted. Only the manufacturer or an explosion protection specialist may modify the device
- The IP 65 / NEMA 4x IP rating is only achieved if the splash guard is screwed in place. Devices must never be operated without the splash guard
- The device may only be operated using instrument air that is free from oil, water and dust. Flammable gases, oxygen or oxygen-enriched gases must not be used.
- Medium strength adhesive must be used to secure the cable entries and line entries and stop them from twisting and self-loosening
- In the event of high torsional forces resulting from wear to the shaft for the position pickoff (significant control deviation), the bearing sleeves must be replaced.
- If the positioner is operated at an ambient temperature of above 60 °C (140 °F) or below -20 °C (-4 °F), ensure that the cable entries and lines in use are suitable for an operating temperature that corresponds to the maximum ambient temperature increased by 10 K, or the minimum ambient temperature
- The dimensions of the ignition penetration-proof seam of this equipment partly exceed the minimum values required by EN 60079-1:2007 and IEC 60079-1:2007 and also partly fall below the maximum required values therein. All inquiries relating to dimensions must be directed to the manufacturer
- Screws that comply with the minimum requirements of the A2-70, A2-80 or 10.12 quality grades must be used to close the flameproof enclosure.
- NOTICE – damage to parts.
If the sealing surface is damaged, "Ex d" explosion protection is no longer guaranteed. Handle the housing cover carefully. Place the housing cover only on a smooth and clean surface.
- DANGER – risk of explosion (only applies to TZIDC-200)
Operating the local communication interface (LKS) in a potentially explosive atmosphere is prohibited. Never use the local communication interface (LKS) on the main board within a potentially explosive atmosphere.

6.1.2 IECEx

6.1.2.1 Flameproof enclosure

Designation:	Ex d IIC T4/T5/T6 Gb
Type examination certificate:	IECEx BVS 07.0030X, Issue No.: 0
Type:	TZIDC-200/210/220
Temperature class:	T4, T5, T6
Standards:	IEC 60079-0: 2011 General requirements IEC 60079-1: 2007 Flameproof enclosure "d"

Electrical data

Voltage: ≤ 30 V AC/DC

Amperage: ≤ 20 mA

Pneumatic data

Supply pressure: ≤ 6 bar

Thermal data

T4: $-40\text{ °C} < T_{amb} < 85\text{ °C}$

T5: $-40\text{ °C} < T_{amb} < 80\text{ °C}$

T6: $-40\text{ °C} < T_{amb} < 65\text{ °C}$

Special conditions for IECEx, flameproof enclosure

- The positioner is designed for a maximum permissible ambient temperature range of $-40\text{ ... }85\text{ °C}$
- If the positioner is operated at an ambient temperature of above 60 °C or below -20 °C , ensure that the cable entries and lines in use are suitable for an operating temperature that corresponds to the maximum ambient temperature increased by 10 K, or the minimum ambient temperature
- Variants that, according to declarations, also meet the requirements for the "intrinsically safe" type of protection may no longer be used as "intrinsically safe" if they have been previously used as a flameproof type of protection.

6.1.3 FM / CSA

FM Approval HLC 8/02 3010829

Explosion Proof; enclosure 4X; T5, max. 82 °C
CL I; Div 1; Grp. C-D

Intrinsic Safety; enclosure 4X; T5, max. 82 °C
CL I, II, III; Div 1; Grp. A-B-C-D-E-F-G

Non-Incendive; enclosure 4X ; T4, max. 85 °C
CL I; Div 2; Grp. A-B-C-D
CL II, III; Div 2; Grp. F-G

Dust-Ignition Proof; enclosure 4X; T5, max. 82 °C
CL II, III; Div 1; Grp. E-F-G

CSA Certification 1393920

Explosion Proof; enclosure 4X; T5, max. 85 °C

CL I; Div 1; Grp. C-D

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

CL III

Intrinsic Safety; enclosure 4X; T5, max. 82 °C

CL I; Div 1; Grp. A-B-C-D

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

CL III

7 Electrical connections

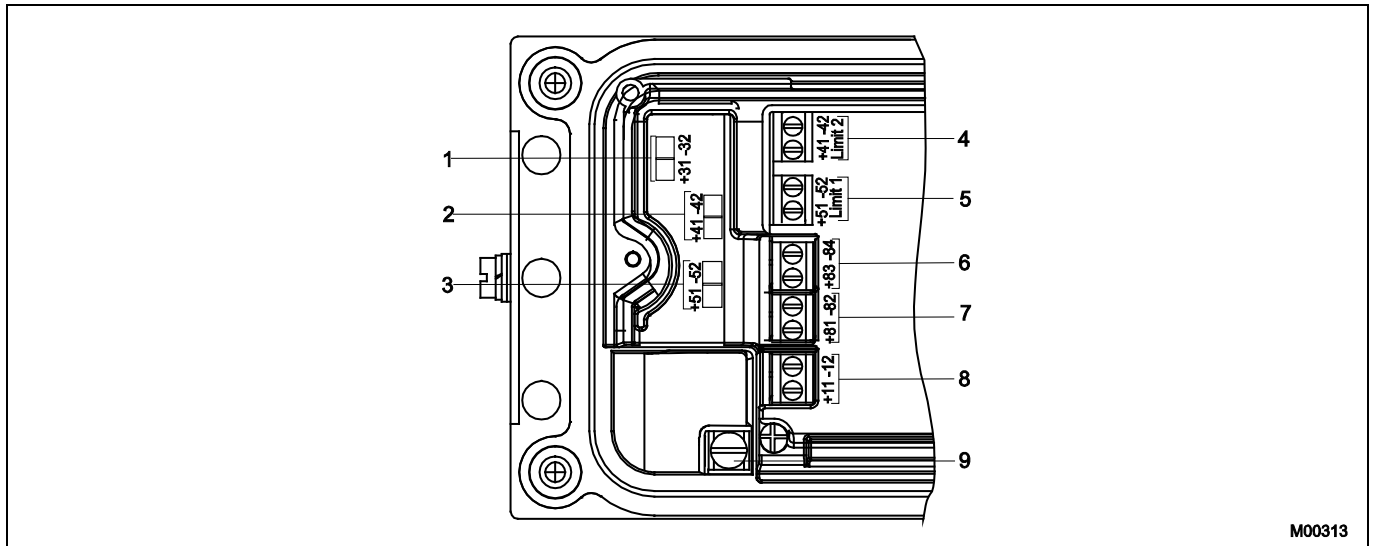


Fig. 7: Screw terminals, overview

- | | |
|--|--|
| 1 Module for analog position feedback | 5 Digital position feedback, either proximity switches or 24 V microswitches |
| 2 Module for digital feedback or service switch of emergency shutdown module | 6 Digital output DO |
| 3 Module for digital feedback or terminals for emergency shutdown module | 7 Digital input |
| 4 Digital position feedback, either proximity switches or 24 V microswitches | 8 Signal 4 ... 20 mA |
| | 9 Grounding screw |

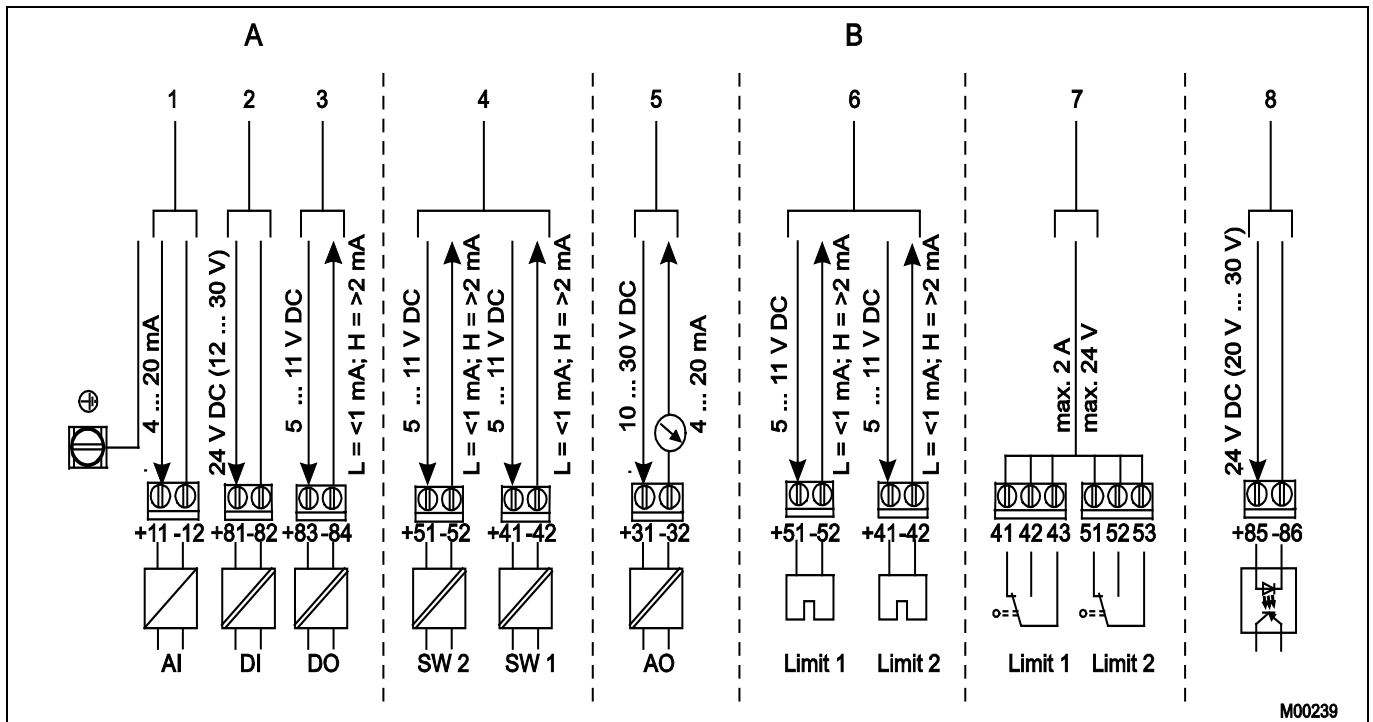


Fig. 8: Pin configuration

- | | |
|---------------|-----------------------------|
| A Basic model | 1 Analog input |
| B Options | 2 Digital input |
| | 3 Digital output DO |
| | 4 Digital feedback |
| | 5 Analog feedback |
| | 6 Proximity switches |
| | 7 Microswitches |
| | 8 Emergency shutdown module |

8 Dimensions

All dimensions in mm (inch)

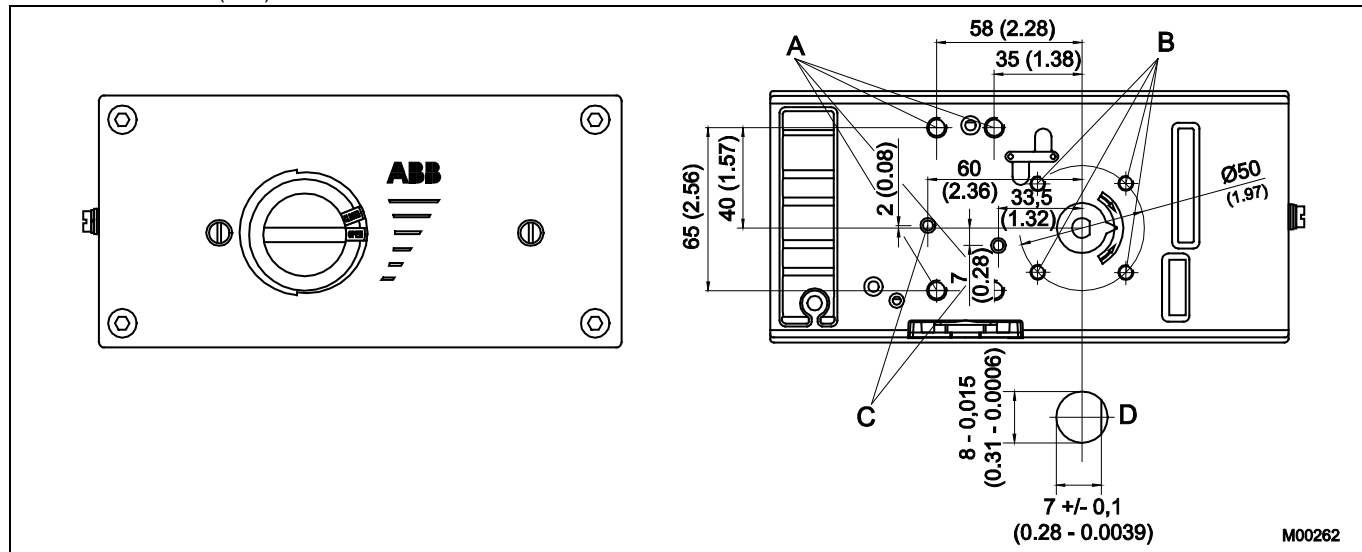


Fig. 9: Top view

- A Tap hole M8 (10 mm (0.39 inch) low)
- B Tap hole M6 (8 mm (0.32 inch) low)
- C Tap hole M5 x 0.5 (air connections in version for integral mounting)
- D Sensor shaft (larger than scale)

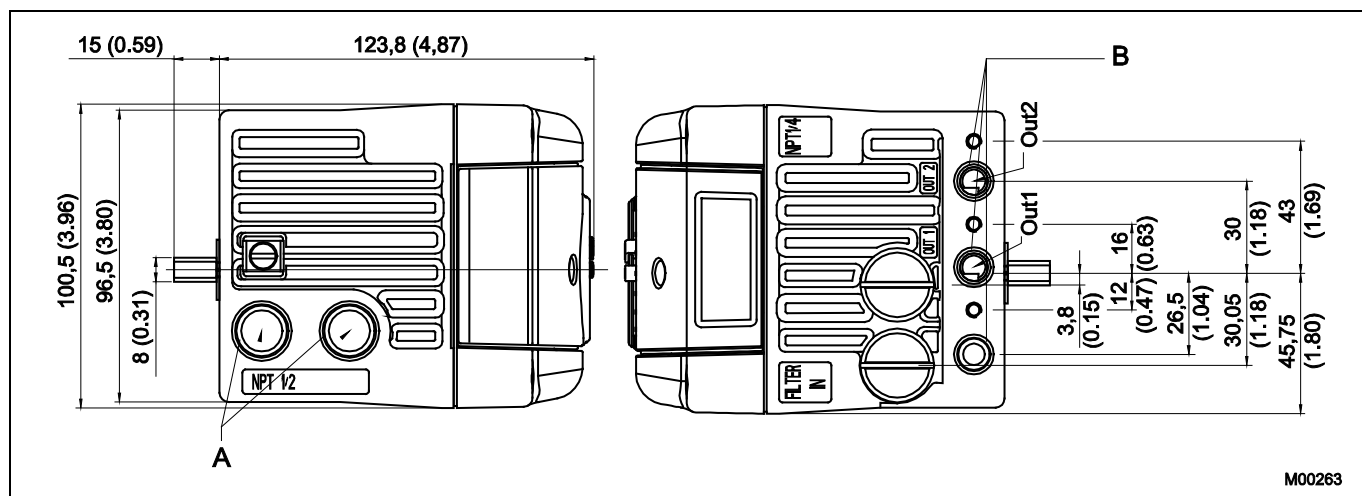


Fig. 10: Left and right side view

- A NPT 1/2" or M20 x 1.5
- B Pneumatic connections, NPT 1/4" -18 or G1/4"

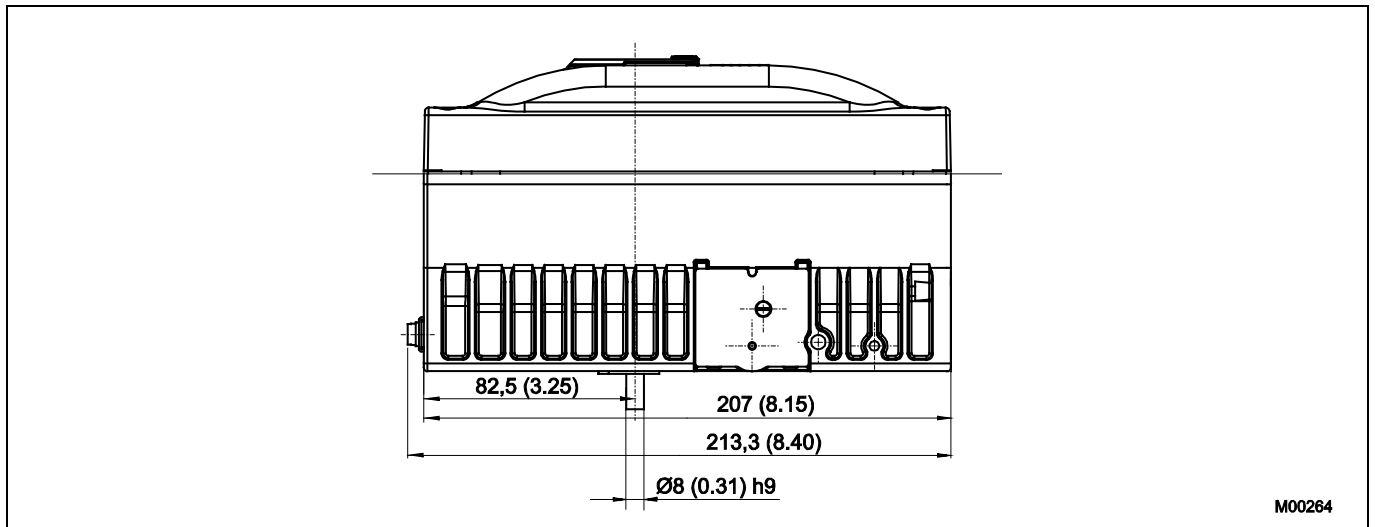
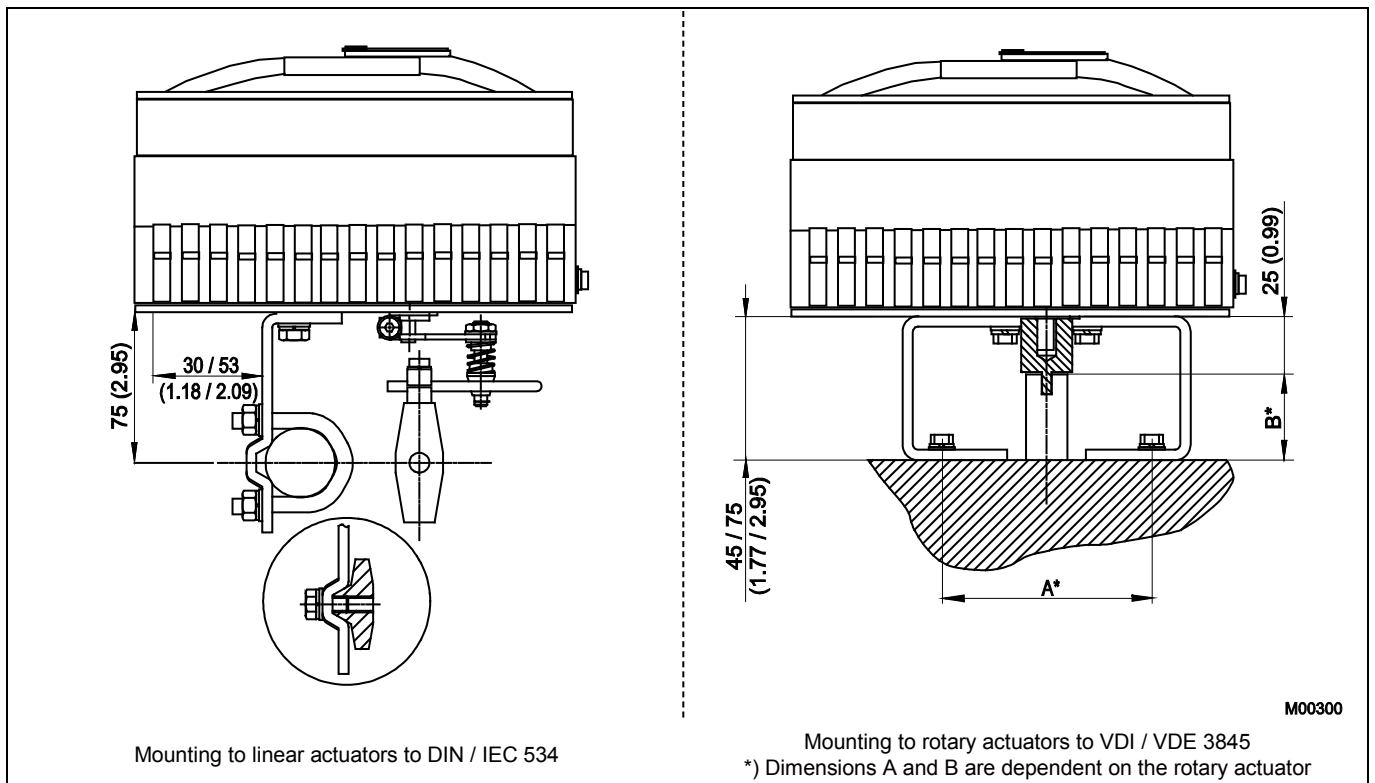


Fig. 11: Bottom view

A Pneumatic connections, NPT 1/4"-18 or G1/4"



Mounting to linear actuators to DIN / IEC 534

Mounting to rotary actuators to VDI / VDE 3845
 *) Dimensions A and B are dependent on the rotary actuator

Fig. 12: Mounting drawings

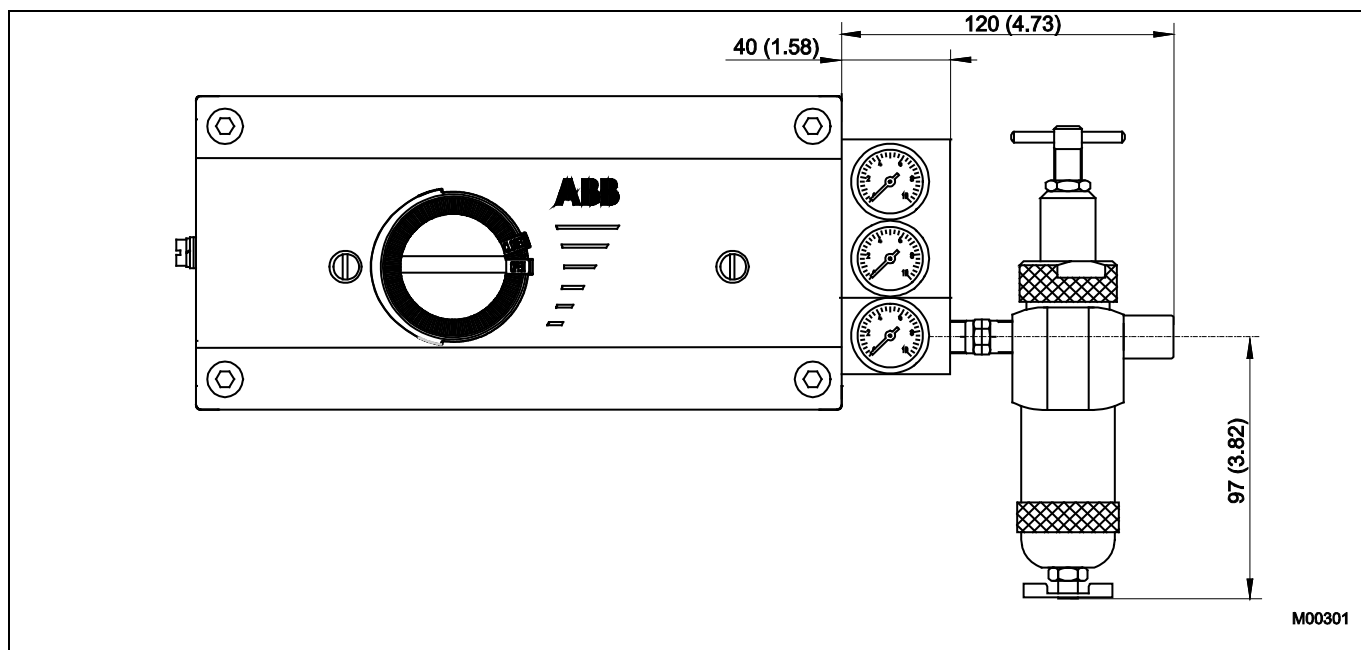


Fig. 13: Positioner TZIDC-200 with pressure gauge block and filter regulator

9 Ordering information

	Variant	Main Code															Add. Code
		1 – 6	7	8	9	10	11	12	13	14	15	16	17				
TZIDC-200 Electro-Pneumatic Positioner, with flameproof enclosure, intelligent, software-configurable with Local Communication Interface (LKS) and HART communication	V18348		X	X	X	X	X	X	X	X	X	X	X	X	X	X	XXX
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													
Operation																	
With operator panel and display integrated in the enclosure cover																	1
Explosion Protection																	
ATEX Ex d II C T4/T5/T6 Gb																	1
FM / CSA Class 1, Div. 1, Group C-D (explosion-proof)																	2
ATEX II 2 G Ex ib IIC T6 resp. T4 Gb + Ex d																	3
FM / CSA Intrinsically Safe and Explosion-proof																	4
IECEX Ex ib IIC T6 Gb																	5
IECEX Ex d II C T4/T5/T6 Gb																	6
ATEX II 2 G Ex ia IIC T6 resp. T4																	7
GOST Russia - Ex d IIC T4 / T5 / T6																	D
IECEX ia IIC T6 resp. T4 Gb																	K
Output / Safe Position (in case of an electrical power failure)																	
Single acting, fail safe																	1
Single acting, fail freeze																	2
Double acting, fail safe																	3
Double acting, fail freeze																	4
Connections																	
Cable: Thread M20 x 1.5, air pipe: Thread G 1/4																	1
Cable: Thread M20 x 1.5, air pipe: Thread 1/4-18 NPT																	2
Cable: Thread 1/2-14 NPT, air pipe: Thread 1/4-18 NPT																	3
Cable: Thread G 1/2, air pipe: Thread Rc 1/4																	7

Continued on next page

1) Only with cable connection NPT thread

Main Code														Add. Code
Variant	1 – 6	7	8	9	10	11	12	13	14	15	16	17		XXX
TZIDC-200 Electro-Pneumatic Positioner, with flameproof enclosure, intelligent, software-configurable with Local Communication Interface (LKS) and HART communication														XXX
Option Modules for Analog or Digital Position Feedback														
Without													0	
Plug-in module for analog position feedback, signal range 4 ... 20 mA, two-wire													1	
Plug-in module for digital position feedback													3	
Plug-in module for analog position feedback, signal range 4 ... 20 mA, two-wire, and digital position feedback													4	
Plug-in module for shutdown function													2) 5	
Analog feedback and shut-down													2) 6	
Optional Mechanical Kit for Digital Position Feedback														
Without														0
Mechanical kit for digital position feedback with proximity switches SJ2-SN (NC or logical 1)														3) 1
Mechanical kit for digital position feedback with proximity switches SJ2-S1N (NO or logical 0)														4) 2
Mechanical kit for digital position feedback with 24 V AC / DC microswitches (change-over contacts)														5) 3
Parameter Setting / Bus Address														
Factory setting for HART devices														1
Customer-specific parameter settings for HART devices														2
Design (Varnish / Coding)														
Standard														1
Others														2
Device Identification Label														
Without														0
Label														6) 1
Label including text, with separate stainless steel label 11.5 x 60 mm (0.45 x 2.36 in.)														6) 2
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
Latvian														ML
Hungarian														MM
Estonian														MO
Bulgarian														MP
Romanian														MR
Slovak														MS
Lithuanian														MU
Slovenian														MV

Continued on next page

- 2) Only for fail safe pneumatic. Not for FM / CSA Version
- 3) No IECEx
- 4) Only for ambient temperature range -25 ... 85 °C, no IECEx
- 5) Only for Ex d version
- 6) Plain text, max. 16 letters

	Main Code													Add. Code	
	Variant	1 – 6	7	8	9	10	11	12	13	14	15	16	17		
															XXX
TZIDC-200 Electro-Pneumatic Positioner, with flameproof enclosure, intelligent, software-configurable with Local Communication Interface (LKS) and HART communication	V18348	X	X	X	X	X	X	X	X	X	X	X	X		XXX
SIL2 - Declaration of Conformity SIL2 - Declaration of Conformity														7)	CS2
Certificate of Compliance Certificate of compliance with the order acc. EN 10204-2.1 (DIN 50049-2.1) with item description Test report 2.2 acc. EN 10204 (DIN 50049-2.2)															CF2 CF3
Inspection Certificate Inspection certificate 3.1 acc. EN 10204															CBA

7) With single acting, fail safe pneumatic only

9.2 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
TZIDC 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
TZIDC 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
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EDP300 / TZIDC Attachment kit for NAF 791290	7959207
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EDP300 / TZIDC Attachment kit for NELES BC6-20, B1C6-20, BJ8-20, B1J8-20	7959146
EDP300 / TZIDC Attachment kite, lever for linear stroke, length 150 ... 250 mm	7959210
EDP300 / TZIDC Attachment kit for Samson 241, 271, 3271	7959145
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EDP300 / TZIDC Attachment kit for Schubert&Salzer GS 8020 / 8021 / 8023	7959200
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EDP300 / TZIDC Mounting Kit Uhde Type 4 Stroke 400 mm cropped	7959500
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TZIDC-2xx 2 x Ex d cable glands M20 x 1.5, securing adhesive	7959245
TZIDC-2xx 1 x Ex d cable gland 1/2 in. NPT, 1 pipe plug 1/2 in. NPT, securing adhesive	7959246
TZIDC-2xx 2 x Ex d cable glands 1/2 in. NPT, securing adhesive	7959247

Notes

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3KXE341004R1001



Sales



Service



Software

- 2-wire, 4-20 mA transmitter
- Standard NEMA 3R weatherproof enclosure, optional NEMA 4X enclosure available
- Wide range of zero offset and span adjustments
- RFI, EMI noise immune



Type AVPT
Positioner Transmitter

Type AVPT - Positioner Transmitter

The Type AVPT Position Transmitter provides fast and accurate position indication of single or double acting actuators. It provides a 4-20 mA feedback signal that corresponds to the actual position of a pneumatic final control element. The AVPT utilizes the same housing and connecting linkage as the Type AV Positioner.

The mechanical input to the AVPT is supplied by an adjustable linkage connected to the actuator. As the actuator changes position, the linkage rotates the transmitter's drive arm and gears which provide input to the 4-20 mA Position Transmitter Assembly. This produces a 4-20 mA DC output signal proportional to the position.

Model Number

AVPT20200	Standard NEMA 3R, Part Number 680D001U01
AVPT2020N	NEMA 4X Enclosure Rating Part Number 680D011U02

Instruction Bulletin Part Number PN24951

Type AVPT Positioner Specifications

Weight	1.9 kg (4.18 lb),
Temperature limits	Operating and storage: -20°C to 82°C (-4°F to 180°F)
Humidity limits	Operating and storage: 0% to 95% noncondensing

Type AVPT Position Transmitter Specifications

Total resistance	2000 Ω , $\pm 20\%$ potentiometer
Power rating	1 W up to 70°C (158°F), 0 W at or above 125°C (257°F)
Wiper rate of change	9.9 Ω nominal per degree of cam rotation
Temperature effect	0.05% (500 ppm) per °C (0.03% (278 ppm) per °F) maximum
Maximum voltage	35 VDC or 30 VAC across the potentiometer ends

Accessories

Mounting Kits, for diaphragm actuators with yoke mounting bosses (includes mounting bracket, linkage and hardware)

- For stem size 0.375 to 0.75 inch
(9.53 - 19.1 mm), adjustable stud length
2.687 inch (68.2 mm) - Pt. #5327321_12
- For stem size 0.75 to 1.0 inch (19.2 - 25.4 mm),
adjustable stud length 3.437 inch (87.3 mm) -
Pt. #5327321_13
- For stem size 0.375 to 1.0 inch
(9.53 - 25.4 mm), adjustable stud length
3.406 inch (86.5 mm) - Fisher -
Pt. #5327321_14

Mounting Bracket, for reciprocating valves (contained in above kits) - Pt. #5400266_1

Connecting Link, adjustable length 12 inch (304.8 mm) contained in above kits - Pt. #5312449__4

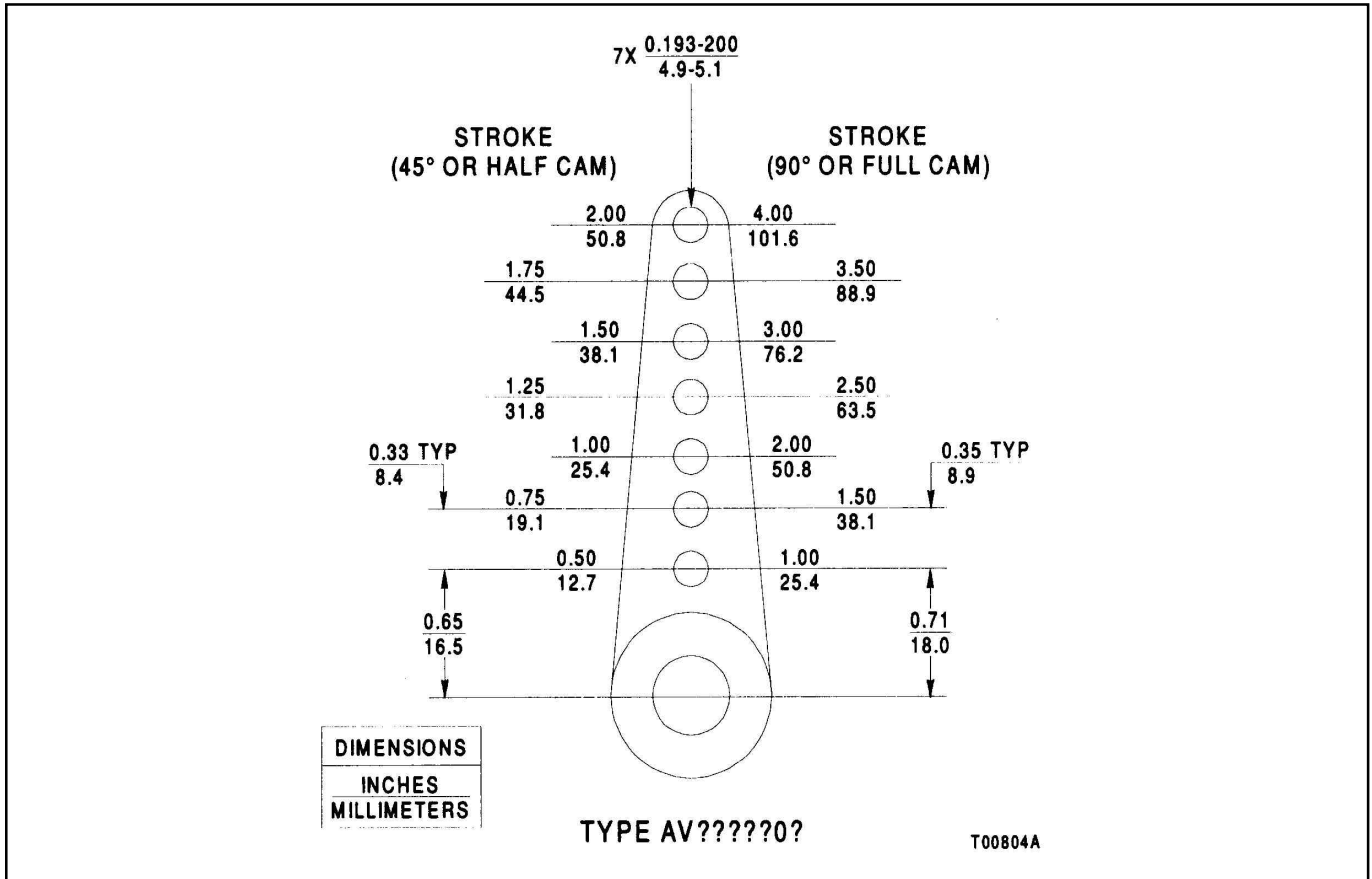


Figure 1. Drive Arm Connections

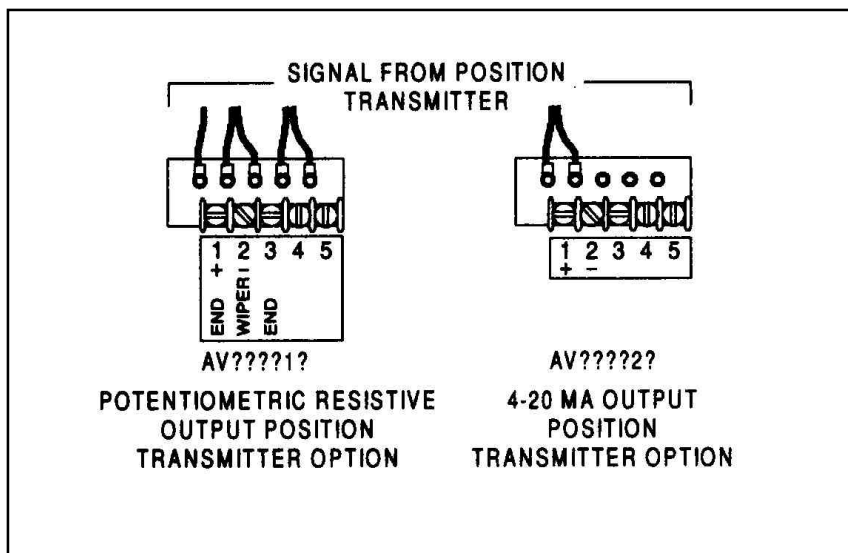


Figure 2. Electrical Connections

Table 1. Mounting Kit Number 5327321_121 - Valve Stem Diameter 0.375 to 0.750 in.

Item	Part No.	Description	Note
1	5400266_1	Positioner mounting bracket	
2	0.250-20 x 0.750	Screw, socket hd (3)	
3	0.25	Lock washer, reg spring (3)	
5	0.312-18 x 0.625	Cap screw, hex socket hd (2)	
6	0.312	Lock washer, reg spring (2)	
7	R6440-005	Type 347 stainless steel wire, 0.300 diameter, 6-in.	
8	19934_248	Spacer	2
9	0.190-32 x 1.125	Screw, pan hd machine	2
10	5312449_4	Connecting link, 12-in. (cut to fit)	
11	0.190-32 x 0.875	Screw, pan hd machine (2)	2

Item	Part No.	Description	Note
12	197120_5	Nut, elastic stop (2)	
13	5311690_1	Adjustable stud, 2.69 in.	
14	5311690_2	Adjustable stud, 3.43 in.	
21	0.375	Lock washer, med spring (3)	
22	0.375-24	Nut, hex jam	
23	5311687_2	Stem clamp, 0.375 – 0.750-in. dia	
25	5311691_1	Clamp plate, 0.375 – 0.750-in. dia.	2
27	0.375-16 x 1.50	Screw, hex skt hd cap (2)	2
28	0.375-16	Nut, hex jam (2)	
29	0.125 dia x 0.750	Groove pin, type 1	2

Notes:

1. Position transmitter mounting kits for piston actuators with linear (reciprocating) motion.
2. When fastening Item 10 to drive arm at first hole (nearest drive shaft), use Items 8 and 9 and omit 1 of Item 11.

Table 2. Mounting Kit Number 5327321_131 - Valve Stem Diameter 0.750 to 1.000 in.

Item	Part No.	Description	Note
1	5400266_1	Positioner mounting bracket	
2	0.250-20 x 0.750	Screw, socket hd (3)	
3	0.25	Lock washer, reg spring (3)	
5	0.312-18 x 0.625	Cap screw, hex socket hd (2)	
6	0.312	Lock washer, reg spring (2)	
7	R6440-005	Type 347 stainless steel wire, 0.300 diameter, 6-in.	
8	19934_248	Spacer	2
9	0.190-32 x 1.125	Screw, pan hd machine	2
10	5312449_4	Connecting link, 12-in. (cut to fit)	

Item	Part No.	Description	Note
11	0.190-32 x 0.875	Screw, pan hd machine (2)	2
12	197120_5	Nut, elastic stop (2).	
14	5311690_2	Adjustable stud, 3.43 in.	
21	0.375	Lock washer, med spring (3)	
22	0.375-24	Nut, hex jam	
24	5312483_1	Stem clamp, 0.750 – 1.00-in. dia.	
26	5312471_1	Clamp plate, 0.750 – 1.00 in. dia.	
27	0.375-16 x 1.50	Screw, hex skt hd cap (2)	2
29	0.125 dia x 0.750	Groove pin , type 1	

Notes:

1. Position transmitter mounting kits for piston actuators with linear (reciprocating) motion.
2. When fastening Item 10 to drive arm at first hole (nearest drive shaft), use Items 8 and 9 and omit 1 of Item 11.

Table 3. Mounting Kit number 5327321_14

- For Use on Fischer Actuators (note 1) Valve Stem 0.375 to 0.750 in. (See Fig. 3)

Item	Part No.	Description	Note
1	5400266_1	Positioner mounting bracket	
2	0.250-20 x 0.750	Screw, socket hd (3)	
3	0.25	Lock washer, reg spring (3)	
5	0.312-18 x 0.625	Cap screw, hex socket hd (2)	
6	0.312	Lock washer, reg spring (2)	
7	R6440-005	Type 347 stainless steel wire, 0.300 diameter, 6-in.	
8	19934_248	Spacer	2
9	0.190-32 x 1.125	Screw, pan hd machine	2
10	5312449_4	Connecting link, 12-in. (cut to fit)	

Item	Part No.	Description	Note
11	0.190-32 x 0.875	Screw, pan hd machine (2)	2
12	197120_5	Nut, elastic stop (2).	
14	5311690_2	Adjustable stud, 3.43 in.	
21	0.375	Lock washer, med spring (3)	
22	0.375-24	Nut, hex jam	
24	5312483_1	Stem clamp, 0.750 – 1.00-in. dia.	
26	5312471_1	Clamp plate, 0.750 – 1.00 in. dia.	
27	0.375-16 x 1.50	Screw, hex skt hd cap (2)	
29	0.125 dia x 0.750	Groove pin, type 1	

Notes:

1. Position transmitter mounting kits for piston actuators with linear (reciprocating) motion.
2. When fastening Item 10 to drive arm at first hole (nearest drive shaft), use Items 8 and 9 and omit 1 of Item 11.

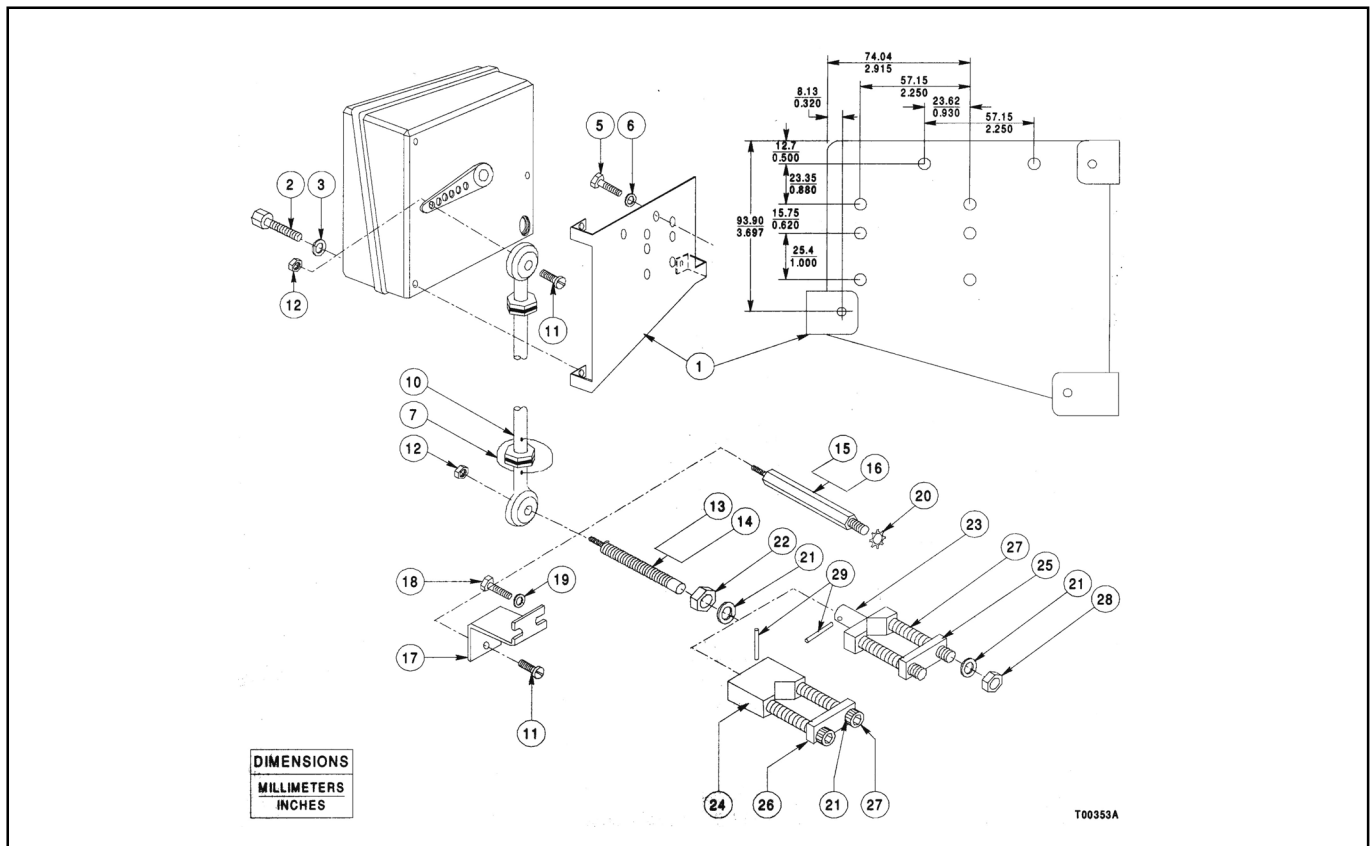


Figure 3. Mounting Kits

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TEIP11-PS

I/P signal converter for standard signals

Measurement made easy



Proven and reliable concept

Compact design

- Small dimensions, low weight

Sturdy construction and solid functionality

- Influence of shock and vibration < 1% at 10 g

Variety of signal ranges

- Input, e.g., 0 ... 20 mA or 4 ... 20 mA
- Output 0.2 ... 1 bar (3 ... 15 psi)

Complies with the following directives

- EMC Directive 89/336/EEC as of May 1989
- CE mark meets the EC directive for the CE certificate of conformity

Additional temperature range

- From -40 (optional -55) ... 85 °C
(-40 (optional -67) ... 185 °F)

Ex protection approvals

- ATEX, FM/CSA, GOST for intrinsically safe and Explosion proof operation

Several different designs

- IP 20 control room housing unit for rail mounting
- IP 20 control room housing unit for block mounting
- IP 54 plastic field housing unit
- IP 65 aluminum or stainless steel housing unit

Single module

- For OEM application (upon request)

TEIP11-PS

I/P signal converter for standard signals

Concept

The TEIP11-PS signal converter converts electrical standard signals, e.g. 4 ... 20 mA to 0.2 ... 1 bar (3 ... 15 psi). It is therefore a connecting link between electrical/electronic and pneumatic systems. The signal conversion process is similar to the patented force balance method.

Special features of the TEIP11-PS signal converter are its relatively small dimensions and outstanding operational stability when subject to shock and vibration. The converter can be subjected to loads up to 10 g with less than 1% effect on function.

Designs

Control room housing unit for rail mounting

The control room housing unit for rail mounting is the most user-friendly and lowest priced model in the signal converter line.

A mounting base that is compatible with all commercially available EN rails is used for installation.

The housing unit with plastic cap has an IP 20 protection class.

Control room housing unit for block mounting

The control room housing unit for block mounting enables you to install a number of converters in a small space. This design features central air supply via connection block and stop valves in the air connectors of the integrated signal converter. A maximum of 4 signal converters can be fitted on the connection blocks required for block mounting. If necessary, 2 or 3 (or max. 4) connection blocks can be connected to each other to create block units of 4-8-12-16 signal converters. Stop valves allow you to mount or remove individual converters during operation.

The housing units are available in a variety of models to meet your installation requirements. For potentially explosive conditions, units that offer intrinsically safe operation or pressure-resistant encapsulation are available with international approval certificates for use worldwide.

Various ranges can be supplied on the input side and the output side for signal conversion (see information in chapter **Technical Data**, page 3)

A power supply of only 1.4 bar (20 psi) of compressed air is required.

Field housing

The field housing unit is designed for installation onsite or in the field. Housing units are available in the following models (and protection classes): plastic (IP 54), aluminum (IP 65) and stainless steel (IP 65). The housing units are suitable for wall mounting and 2" pipe mounting.

A specially designed signal converter in a plastic housing unit enables the use of combustible gas as a power supply instead of the standard compressed air.

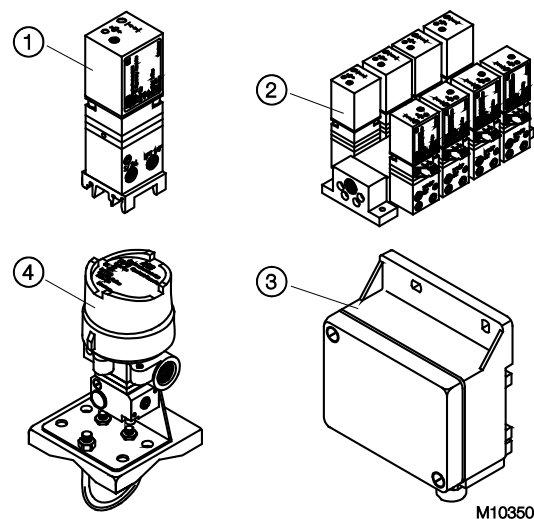


Fig. 1

- ① Control room housing unit for rail mounting
- ② Control room housing unit for block mounting
- ③ Plastic field housing unit
- ④ Aluminum or stainless steel field housing unit

Technical Data

Input (electric)

Signal range

0 ... 20 mA or 4 ... 20 mA

0 ... 10 mA or 10 ... 20 mA

4 ... 12 mA or 12 ... 20 mA

(additional ranges available upon request)

Input resistance

$R_i = 260 \Omega$ at 20 °C (68 °F), $T_k + 0.4 \text{ \%}/K$

Overload limit

30 mA (for explosion-proof devices, see the information in chapter "Ex relevant specifications" on page 6)

Capacitance/inductance

Negligible

Output (pneumatic)

Signal range

0.2 ... 1 bar (3 ... 15 psi)

Air capacity

$\geq 5 \text{ kg/h} = 4.1 \text{ Nm}^3/\text{h} = 2.4 \text{ scfm}$

Load power acc. to VDE / VDI 3520

$\geq 0.95 \text{ kg/h} = 0.9 \text{ Nm}^3/\text{h} = 0.5 \text{ scfm}$

Power supply (pneumatic)

Instrument air

Free of oil, water, and dust acc. to DIN/ISO 8573-1

Pollution and oil content according to Class 3

Pressure dew point 10 K below operating temperature

Supply pressure

$1.4 \pm 0.1 \text{ bar} (20 \pm 1.5 \text{ psi})$ (for output 1 bar (15 psi))

Air consumption

$\leq 0.2 \text{ kg/h} = 0.16 \text{ Nm}^3/\text{h} = 0.1 \text{ scfm}$

Transmission data and influences

Characteristic curve

Linear, direct, or reverse action

Deviation

$\leq 0.5 \text{ \%}$

Hysteresis

$\leq 0.3 \text{ \%}$

Dead band

$\leq 0.1 \text{ \%}$

Temperature

$\leq 1 \text{ \%} / 10 \text{ K}$ within -20 ... 85 °C (-4 ... 185 °F)

$\leq 2 \text{ \%} / 10 \text{ K}$ within -55 ... -20 °C (-67 ... -4 °F)

Power supply

$\leq 0.3 \text{ \%} / 0.1 \text{ bar} (1.5 \text{ psi})$ change in pressure

Mechanical vibration

$\leq 1 \text{ \%}$ up to 10 g and 20 ... 80 Hz

Seismic vibration

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

Mounting orientation

Zero point $\leq 0.4 \text{ \%}$ at 90° change of position

Step response

10 ... 90 % and 90 ... 10 % 0.6 s

5 ... 15 % and 15 ... 5 % 0.25 s

45 ... 55 % and 55 ... 45 % 0.2 s

85 ... 95 % and 95 ... 85 % 0.15 s

EMC

Meets the requirements of EMC Directive 89/336/EEC of May 1989 (increased interference immunity as per EN 50082-2 PR of 11/93).

CE marking

Complies with the EC directive for CE conformity

TEIP11-PS

I/P signal converter for standard signals

Operating conditions at installation site

Ambient temperature

Depending on the ordered model:

-40 ... 85 °C (-40 ... 185 °F)

-55 ... 85 °C (-67 ... 185 °F)

For Ex d:

-40 ... 85 °C (-40 ... 185 °F)

Required protection

IP 20 for control room housing unit for rail or block mounting,

IP 54 for plastic housing unit,

IP 65 for aluminum or stainless steel field housing unit

Mounting position

Any

Environmental capabilities

Climate class

GPF or FPF acc. to DIN 40040

Temperature:

-55 ... 85 °C (-67 ... 185 °F)

-45 ... 85 °C (-49 ... 185 °F)

Relative humidity for operation, storage, or transport:

75 % average, 95 % short-term,

no condensation

Design for rail mounting

Material / Degree of protection

IP 20 aluminum housing unit, with plastic cover

Assembly

Rail mounting:

EN 50022 - 35 x 7.5

EN 50035 - G 32

EN 50045 - 15 x 5

Electrical connection

2-pole screw terminal for 2.5 mm² (14 AWG)

Pneumatic connection

1/8 NPT tap hole for air supply and output

Weight

0.25 kg (0.55 lb)

Dimensions

See chapter "Dimensions".

Design for block mounting

Material/protection class

IP 20 aluminum housing unit, with plastic cover

Assembly

In block format with special connection block (accessory),
max. 4 connection blocks each with 4 signal converters

Electrical connection

2-pole screw terminal for 2.5 mm² (14 AWG)

Pneumatic connection

3/8 NPT tap hole for air supply

(main connection to connection block)

1/8 NPT tap hole for output

(on each individual signal converter)

Mounting position

Any

Weight

0.3 kg (0.66 lb)

Dimensions

See chapter "Dimensions".

Design for field housing unit (plastic)

Material / Degree of protection

Polyester housing unit, black, IP 54

Assembly

Wall or 2" pipe mounting
(2" pipe mounting for vertical pipes only)

Electrical connection

2-pole screw terminal for 2.5 mm² (14 AWG) in housing unit,
Pg 11 cable gland for cable entry

Pneumatic connection

1/8 NPT tap hole for air supply and output

Air outlet

For gas exhaust with 6 mm (0.24 inch) cut or crimp connection

Mounting position

Any

Weight

1.0 kg (2.20 lb)

Dimensions

See chapter "Dimensions".

Design for field housing unit (aluminum/stainless steel)

Material / Degree of protection

IP 65 aluminum or stainless steel housing unit

Surface

Aluminum housing,
painted with dual component coating,
lower section, black, RAL 9005,
screw-on cover, Pantone 420,
stainless steel housing unit,
electrolytically polished

Assembly

Wall or 2" pipe mounting
With stainless steel mounting bracket (accessory)

Electrical connection

2-pole screw terminal for 2.5 mm² (14 AWG) in housing unit,
NPT 1/2" cable gland for cable entry
For ATEX "intrinsically safe":
M20 x 1.5 tap hole for cable entry
For ATEX "Ex d":
(Cable gland with Ex d approval available as an accessory on request)
NPT 1/2" tap hole for cable entry with FM/CSA

Pneumatic connection

1/4" NPT tap hole for air supply and output

Weight

0.62 kg (1.37 lb) with aluminum housing unit
1.20 kg (2.65 lb) with stainless steel housing unit

Dimensions

See chapter "Dimensions".

Accessories

"Ex d" cable gland

Brass, with M20 x 1.5 thread

Stainless steel mounting bracket for wall mounting or 2"-pipe mounting

For aluminum or stainless steel field housing unit

Material for block mounting

Connection block for 4 signal converters,
panel with 3/8 NPT central air connector,
dummy panel

TEIP11-PS

I/P signal converter for standard signals

Ex relevant specifications

ATEX/GOST

Flameproof enclosure

Labelling

II 2 G Ex d IIC T4/T5/T6 Gb	
Certificate of conformity	DMT 02 ATEX E 121 X
Type	DOC. 900771
Device class	II 2G
Standards	EN 60079-0: 2012 (General requirements) EN 60079-1: 2007 (Flameproof enclosure "d")

Electrical data

Current	≤ 50 mA
---------	---------

Pneumatic data

Supply pressure	< 10 bar
Output signal	< 1 bar

Pneumatic data TEIP11-PS

Supply pressure	< 2.5 bar
Output signal	< 2 bar

Thermal data

T4: -40 °C < Tamb < 85 °C
T5: -40 °C < Tamb < 70 °C
T6: -40 °C < Tamb < 55 °C

Special Requirements

The I/P converter is suitable for use in an ambient temperature range of -40 °C to max. 85 °C.

If the I/P converter is used at an ambient temperature above 60 °C or below -20 °C, use cable entries and cables suitable for a service temperature corresponding to the maximum ambient temperature increased by 10 K or corresponding to the minimum ambient temperature.

Versions with an intrinsically safe control head may no longer be used as "intrinsically safe" if they have been previously used as a flameproof type of ignition protection with a non-intrinsically-safe power supply.

Operation as intrinsically safe equipment

Labelling

II 2G Ex ia IIC T6 resp. T4 Gb	
Certificate of conformity	TÜV 99 ATEX 1487 X
Type	TEIP11, Doc. 901068-SMDxxxx TEIP11-PS, Doc. 901068-SMDxxxx TEIP11-PS, Doc. 901069-SMDxxxx
Device class	II 2G
Standards	EN 60079-0:2009 EN 60079-11:2012

Temperature classes for the following versions:

TEIP11 Doc. 901068-SMD and TEIP11-PS Doc. 901068-SMD and TEIP11-PS Doc. 901069-SMD

Temperature class	Input current	Ambient temperature range
T4	120 mA	-55 ... 60 °C
T4	100 mA	-55 ... 85 °C
T6	60 mA	-55 ... 40 °C

TEIP11 Doc. 901068 and TEIP11-PS Doc. 901069 and TEIP11-PS Doc. 901069

Temperature class	Input current	Ambient temperature range
T6	50 mA	-55 ... 60 °C
T6	60 mA	-55 ... 55 °C
T5	60 mA	-55 ... 70 °C
T4	60 mA	-55 ... 85 °C
T5	100 mA	-55 ... 55 °C
T4	100 mA	-55 ... 85 °C
T5	120 mA	-55 ... 45 °C
T4	120 mA	-55 ... 80 °C
T4	150 mA	-55 ... 70 °C

Explosion protection ratings

I_i	U_i	P_i
50 mA	42.5 V	2.125 W
60 mA	38.8 V	2.328 W
100 mA	30 V	3.0 W
120 mA	28 V	3.36 W
150 mA	25.5 V	3.825 W

Special Requirements

The I/P converter TEIP11-PS Doc. type 901069 or Doc. 901069-SMD must be set up outdoors as a pneumatic power supply when used with combustible gases.

The supplied gas must be kept sufficiently free of air and oxygen to prevent a potentially explosive atmosphere from forming.

The gas must always be routed to the outside.

FM/CSA

Intrinsically safe FM

FM "intrinsically safe" (not for metal field housing units)
I.S.: CL I/Div 1/Grp A B C D

FM "intrinsically safe" (only for metal field housing units)
I.S.: CL I-II-II/Div 1/Grp A B C D E F G
S.: CL II/Div 2/Grp G
S.: CL III/Div 2

Non-incendive FM

N.I.: CL I/Div 2/Grp A B C D (not for metal field housing units)
N.I.: CL I/Div 2/Grp A B C (only for metal field housing units)

Intrinsically safe CSA

CSA "intrinsically safe" (not for metal field housing units)
I.S.: CL I/Div 1/Grp A B C D
CL I / Div 2 / Grp A B C D

CSA "intrinsically safe" (only for metal field housing units)
I.S.: CL I/Div 1/Grp A B C D
CL II / Div 1 / Grp E F G
CL III
CL I / Div 2 / Grp A B C D
CL II / Div 2 / Grp E F G

Non-incendive CSA

FM "explosion proof" (only for metal field housing units)
X.P.: CL I/Div 1/Grp B C D
D.I.P.: CL II III/Div 2/Grp E F G

CSA "explosion proof" (only for metal field housing units)
X.P.: CL I/Div 1/Grp B C D

TEIP11-PS

I/P signal converter for standard signals

Dimensions

Design for control room housing unit for rail mounting

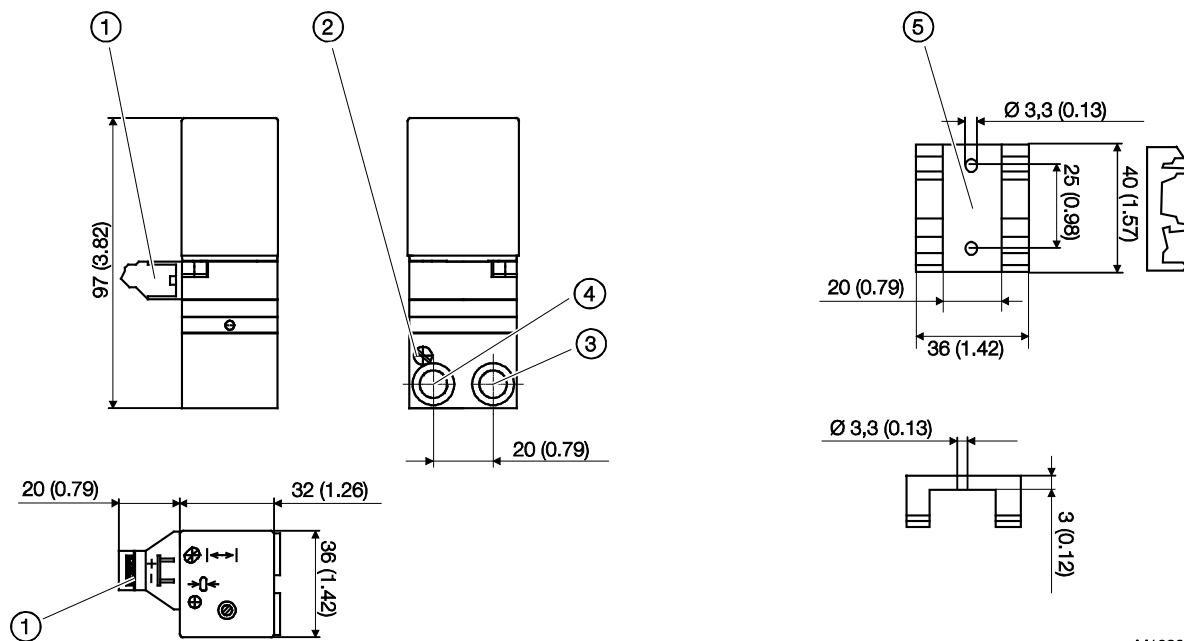
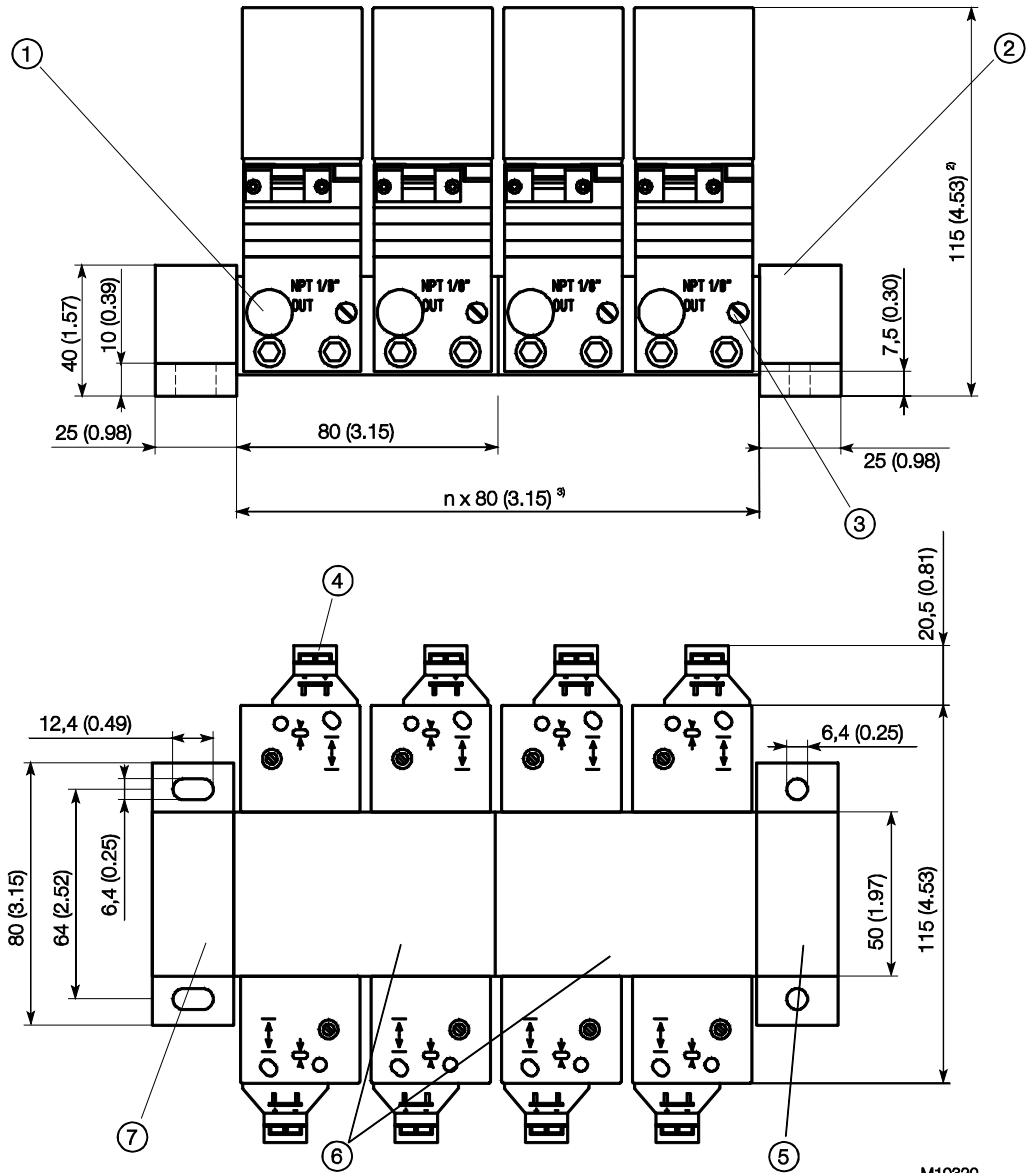


Fig. 2: Sensor side, dimensions in mm (inch)

① Electrical connections ② Filter ③ Output ④ Air supply ⑤ Mounting element for DIN rail mounting

M10323

Design for control room housing unit for block mounting



M10320

Fig. 3: Dimensions in mm (inches)

- ① Output
- ② Air supply
- ③ Filter
- ④ Electrical connections
- ⑤ Panel with central air supply connection
- ⑥ Connection blocks
- ⑦ Dummy panel

1) 0.2 ... 1 bar (2.90 ... 14.50 psi) version

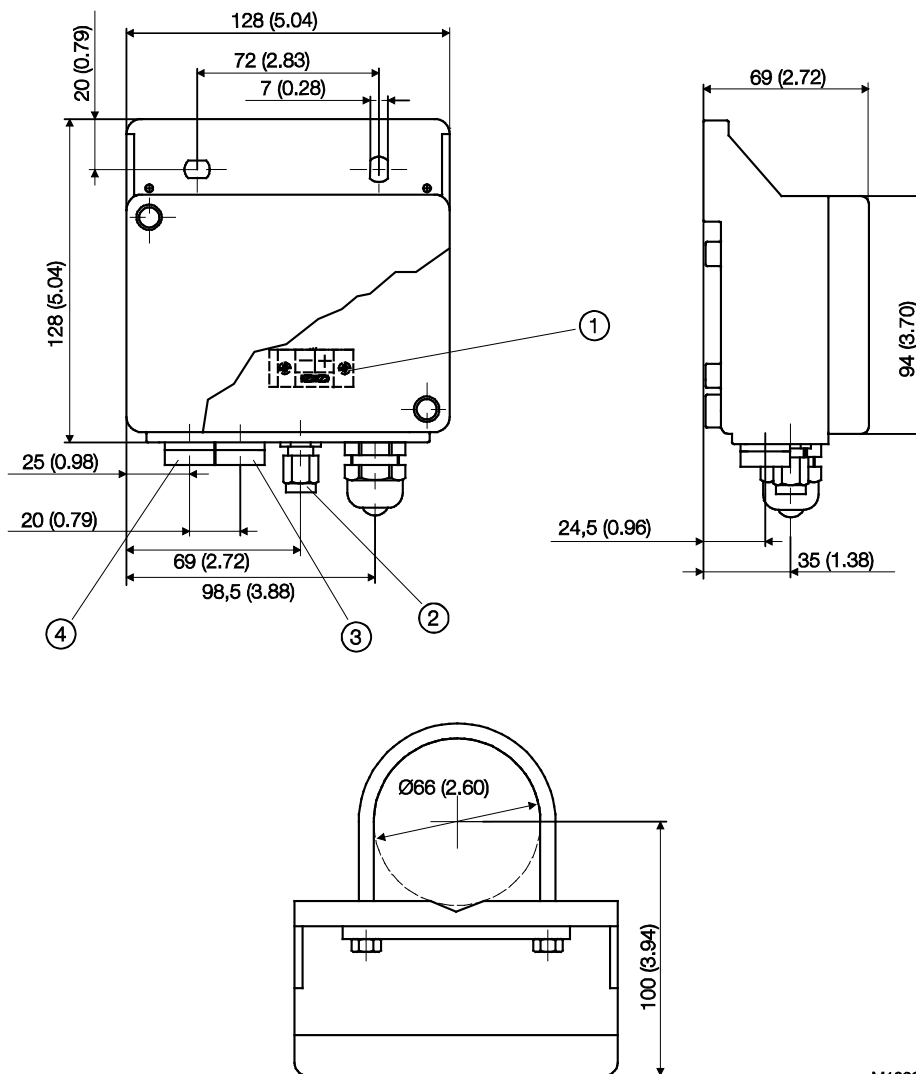
2) 0.4 ... 1 bar (5.80 ... 14.50 psi) version

3) Length 80 mm (3.15 inch) for each connection block

TEIP11-PS

I/P signal converter for standard signals

Design for plastic field housing unit



M10321

Fig. 4: Dimensions in mm (inches)

① Electrical connections ② Connection only with version for operation with combustible gas for diverting the escaping gas/6 mm (0.24) screw crimp connection ③ Air supply ④ Output ⑤ Cable gland

Design for aluminum or stainless steel field housing unit

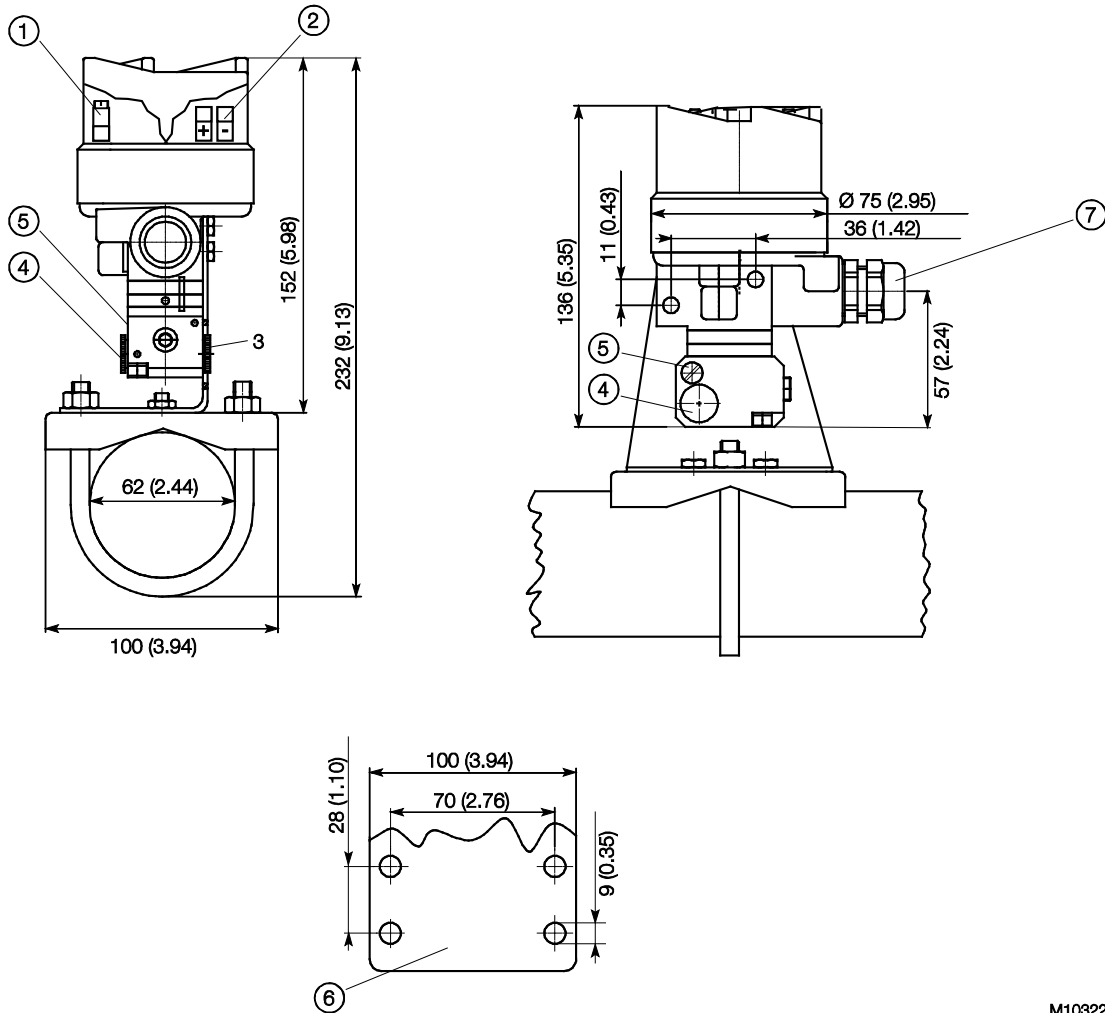


Fig. 5: Dimensions in mm (inches)

- ① Ground terminal
- ② Electrical connections
- ③ Output
- ④ Air supply
- ⑤ Filter
- ⑥ Profiled sheet for wall mounting
- ⑦ Cable gland

M10322

TEIP11-PS

I/P signal converter for standard signals

Ordering information

Main ordering information TEIP11-PS

Base model	V18311H	X	X	X	X	XX	X	0	0
TEIP11-PS I/P Converter, signal converter for standard signals, with power stage									
Explosion Protection									
Without explosion protection		1							
ATEX II 2 G Ex ia IIC T6 resp. T4 Gb		3							
ATEX II 2 G Ex d IIC T4/T5/T6 Gb		1) 4							
FM / CSA Intrinsically Safe		2) 6							
FM / CSA Intrinsically Safe and Explosion-proof		1) 7							
GOST Russia - Ex ia		1) A							
GOST Russia - Ex d		1) D							
Design									
Control room housing IP 20, for rail mounting			1						
Control room housing IP 20, for block mounting			A						
Field housing polyester, IP 54			6						
Field housing aluminium, IP 65			8						
Field housing stainless steel, IP 65			9						
Input Signal									
Input signal 0 ... 20 mA				1					
Input signal 4 ... 20 mA				2					
Airtight closed function 4 ... 20 mA				8					
Other input signal				0					
Output Signal									
Output signal 0.2 ... 1 bar					1				
Output signal 3 ... 15 psi					2				
Other output signal					0				
Characteristic									
Direct action						10			
Reverse action						20			
Ambient Temperature									
-40 ... 85 °C							1		
-55 ... 85 °C							3)	2	0 0

Additional ordering information TEIP11-PS

	XXX	XXX	XXX	XXX	XXX	XXX
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 18.5 x 65 mm (0.73 x 2.56 in.)						MK1
Sticker 11 x 25 mm (0.43 x 0.98 in.)						MK3
Operation with Inflammable Gas						
Increased climate stability						300
Operation with inflammable gas					4)	480
No special approval						999
Special Input Signal						
0 ... 10 mA						501
10 ... 20 mA						502
4 ... 12 mA						503
12 ... 20 mA						504
Specify split-range						505
Special input range						506
No special input range						999
Special Output Signal						
1 ... 18 psi						511
20 ... 100 kPa						513
0.2 ... 1 kg/cm ²						514
0.2 ... 1.8 bar					5)	515
3 ... 27 psi					6)	512
0.4 ... 2 bar					5)	508
6 ... 30 psi					6)	509
Special output signal						999

- 1) Only with aluminium or stainless steel field housing
- 2) Not with field housing
- 3) Not with explosion protection Ex d or FM / CSA explosion proof
- 4) Only for signal converter EEx ia IIC with polyester field housing
- 5) Supply pressure 2.5 bar
- 6) Supply pressure 37 psi

Accessories	Order code
TEIP11-PS Cable gland EEx d, brass, M 20 x 1.5 thread	319343
TEIP11-PS Mounting bracket, stainless steel, for wall mounting	319344
TEIP11-PS Mounting bracket, stainless steel, for wall or 2 in. pipe mounting	319345
TEIP11-PS Connection block for 4 converters	7958243
TEIP11-PS Termination block with central supply air connection 3/8 NPT	7958251
TEIP11-PS Termination block without connection	7958245

Notes

Notes

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Sales



Service