Spraytech®
Systems (India) Pvt. Ltd.
The Flow Technologists

Analog Position Transmitter

Analog Position Transmitter
Version :- Exproof, Intrinsically safe, Weather proof, NEMA4X

Spraytech Systems have gone ahead with its endeavor of optimizing in process control instruments, in adding control elements in its range of manufacture. We at Spraytech Systems have globe control valves till 16" and up to 2500#RF for applications from minus 196 deg cent till 550 deg cent , Electro pneumatic Positioner, Pneumatic Positioner, Positioner Transmitter.

Applications in flow element control lead to control of flow through a globe control valve affecting control of flow, pressure and temperature thus a playing a vide role in the control element of the plant, used in either

- Isolation of plants
- In field of linear level and temperature control
- In field of fasting acting parameter of pressure and differential pressure and flow control through PID controllers

Spraytech System's Globe valve provides a flow rangeability of 50:1 and carries the effect in controlling cavitation, flashing and the choking concept of the media. With its level of control the affect of start up conditions of the plant where shearing off the internal closing member in form of plug and seat of the trim section take place, Spraytech Systems own high density flow control plug which carries the special design to take care of all such critical start up and cavitation effect of the media help you solve a major cost effectiveness and reduce your major man hour usage and maintenance cost of the plan.

Following are the main features of Spraytech Systems Globe control valve

- The energy conservation of the plant
- High flow control rangeability
- High flow recovery and controllability factor
- Low maintenance driven design
- Usage from minus 196 deg cent till plus 550 deg cent application
- High density valve sealing gasket design for high and low temperature
- Used for special chemical sealing design concept in plant for all critical applications
- Modular concept thus introducing major plant design concept feasibility with reduce cost of manpower, maintenance
- Highly efficient build up design

Spraytech Systems 1" 300# Globe Control Valve

Spraytech Systems Flow control effectively uses the closing member of plug falling or closing in on seat of the trim section of the valve and thus with its contour of

- Linear
- Modified equal percentage
- Equal percentage
- Quick opening

Enables a perfect control of the media effectively to the tune of desired level as per your requirements. Spraytech Systems Manufactures pneumatic actuator with multiple springs and a rolling diaphragm which helps in

- Linear hysteresis of control
- High life cycle of the diaphragm
- Less tension on spring and diaphragm
- Most linear travel record of plug movement

Analog Position Transmitter

Fig. 1 Position Transmitter

The position transmitter picks up the travel of pneumatic or elec tric control valves and converts it into a continuous output signal between 4 and 20 mA. If this signal is, for example, supplied to an indicating unit, the current valve stem position can be moni-tored.

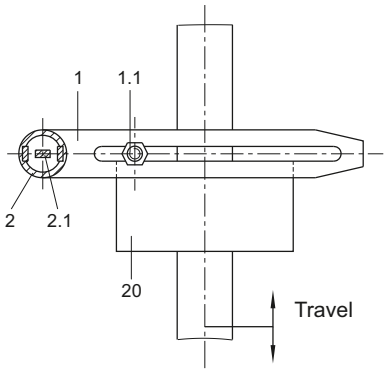
Attachment to actuators with cast yokes (NAMUR) or rod-type yokes according to IEC 60534 as well as with Electropneumatic Positionr or Pneumatic Positioners.

Special features

- Extensive travel range
- Reversible operating direction
- Any mounting position possible
- Extremely insensitive to vibrations
- Small hysteresis
- Two-wire circuit connection

Versions in type of protection "Intrinsic safety" EEx ia IIC T6 are also available for hazardous areas.

Analog Position Transmitter



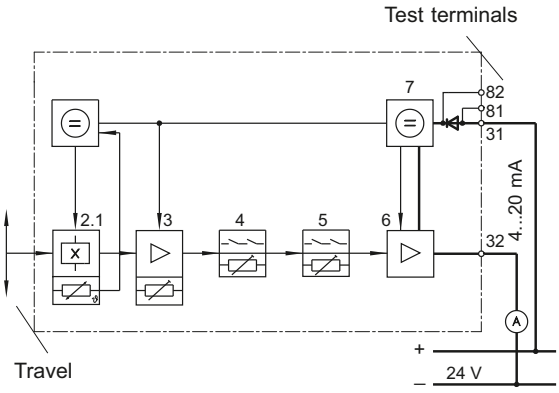


Fig. 2 · Functional diagram

Principle of operation(Fig. 2)

The travel of the control valve is either transmitted directly to the pin (1.1) and the lever (1) over the plate (20) or, when attached to the positioner, via a coupling pin. The lever (1) moves in a ro tary motion which is transmitted to the solenoid system (2). This causes a change in the magnetic field as well as the voltage in the sensor (2.1) operating according to the Hall effect. The con nected electronics unit converts the voltage into a load-inde pendent 4 to 20 mA DC current signal.

Depending on the travel range of the control valve, two different levers (1) are provided for the position transmitter:

Lever I for a travel between 7 and 60 mm
Lever II for a travel between 60 and 103 mm

A special lever is always used to attach the transmitter to a positioner, regardless of the travel.

Adjusting the position transmitter

Theoperating direction of the output signal is selected depending on the location of a 7-pole connector. The symbols direct action >> or reverse action <> indicate the operating-di rection.
With direct operating direction (>>), the travel corresponds to zero at a signal of 4 mA and corresponds to the rated travel at 20 mA. Whereas, with the reverse operating direction (<>), the travel corresponds to zero at a signal of 20 mA and to the rated travel at 4 mA.

ZERO is set with switches 3 and 4, and can be finely adjusted using the ZERO potentiometer. It is always based on the 4 mA signal.

SPAN and the upper range value are set with switches 1 and 2, and are finely adjusted using the SPAN potentiometer. This setting is always based on the 20 mA signal.

Legend for Fig. 2

1	Lever for valve travel
1.1	Coupling pin
2	Solenoid system
2.1	Sensor with temperature resistor
3	Measuring amplifier
4	Switches and potentiometer for coarse and fine ZERO adjustment
5	Switches and potentiometer for coarse and fine SPAN adjustment
6	Output stage
7	Constant-voltage source
8	Constant-current source
20	Plate for attachment to actuator or to plug stem of valve

Table 1 · Technical data

Output	Two-wire circuit 4 to 20 mA	
Permissible load	$R_B \quad \frac{U_S - 12V}{20\ mA}$	
Output circuit (Versions)	non Intrinsically safe	Intrinsically safe
Auxiliary power	Two-wire network 24 V	
	Voltage range 12 to 45 V	For connection to intrinsically safe circuits with maximum values U_o= 25 V, Ik= 100 mA, P = 0.8 W (effective internal inductance and capacitance are negligibly small)[1)]
Characteristic	Characteristic: Output linear to input Deviation from terminal-based conformity:≤1 %	
Hysteresis	≤ 0.6 %	
Response	≤ 0.1 %	
Influence on auxiliary power	≤ 0.1 % on span changes within the specified limits	
HF effect	≤ 1 %, f = 150 MHz, 1 Watt transmission power, 0.5 m distance	
Effect of vibration	No effect between 10 and 150 Hz and 4 g	
Load influence	≤	
Permissible ambient temperature	–20 to +70 °C · The limits specified in the EC Type Examination Certificate additionally apply for explosion-protected devices.	
Effect of ambient temperature	≤0.3 %/10 K on lower measuring range value and span	
Ripple of the output signal	≤ 0.3 %	
Materials	Housing: Die-cast aluminum, plastic coated External parts: SS316, black anodized aluminum	
Degree of protection	With direct attachment: IP 65	

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Electropneumatic Positioner With Smart Communication With Highway Addressable Remote Transducer

Application

Single-acting or double-acting positioner for attachment to pneumatic control valves. Self-calibrating, automatic adaptation to valve and actuator.

Set point	**4 to 20 mA**
Valve travel	**3.6 to 300 mm**
Opening angle	**24 to 100°**

Spraytech Systems have gone ahead with its endeavor of optimizing in process control instruments, in adding control elements in its range of manufacture. We at Spraytech Systems have Pneumatic, Electropneumatic & Smart Positioners in our range of manufacture.

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Fig. 1:Spraytech Positioner, attachment to NAMUR mouting

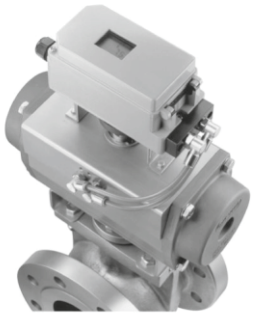


Fig. 2: Spraytech Positioner, attachment according to VDI/ VDE 3845

The positioner ensures a predetermined assignment of the valve position (controlled variable x) to the input signal (set point w). It compares the input signal received from a control system to the travel or rotational angle of the control valve and issues a corresponding output signal pressure (output variable y).

Special features

- Simple attachment to all common linear and rotary actuators
  SPRAYTECH SYSTEMS direct attachment
  NAMUR rib
  Attachment to rod-type yokes acc. to IEC 60534
  Attachment according to VDI/VDE 3847
  Rotary actuator attachment
- Any desired mounting position of the positioner
- Simple single-knob, menu-driven operation
- LCD easy to read in any mounted position due to selectable reading direction
- Conigurable with a PC over the SSP interface using the up to SSP software
- Variable, automatic start-up with four different initialization modes
- Preset parameters - only values deviating from the standard need to be adjusted
- Calibrated travel sensor without gears susceptible to wear
- Sub initialization mode (substitution) allows the positioner to be started up in case of emergency whilst the plant is running without the valve moving through the whole travel range.
- Permanent storage of all parameters in EEPROM (protected against power failure)
- Two-wire system with a small electrical load of 410 Ω
- Adjustable output pressure limitation
- Activatable tight-closing function
- Continuous monitoring of zero point
- Integrated temperature sensor and operating hours counter
- Two standard programmable position alarms
- Self-diagnostics; alarms as condensed state conforming to NAMUR Recommendation NE 107, issued over a fault alarm contact or optional analog position transmitter

Electropneumatic Positioner With Smart Communication With Highway Addressable Remote Transducer

Additional options

- Inductive limit contact with proximity switches
- Analog position transmitter with two-wire transmitter
- Forced venting function with solenoid valve
- Binary input
- External position sensor
- Analog input x
- Stainless steel housing
- Leakage sensor to monitor the seat leakage

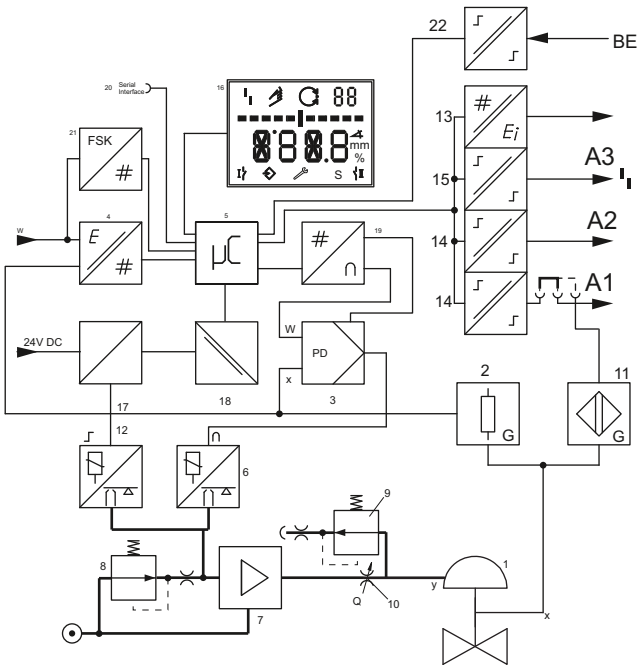
Principle of operation

The positioner is mounted on pneumatic control valves and is used to assign the valve position (controlled variable x) to the control signal (set point w). The positioner compares the electric control signal of a control system to the travel or rotational angle of the control valve and issues a signal pressure (output variable y) for the pneumatic actuator.
The positioner mainly consists of an electric travel sensor system (2), an analog i/p module with a downstream air capacity booster and the electronics with the microcontroller (5).
When a set point deviation occurs, the actuator is either vented or illed with air. If necessary, the signal pressure change can be slowed down with a volume restriction that can be connected as necessary. The signal pressure to the actuator can be limited by software to 1.4, 2.4 or 3.7 bar.

A constant air stream with a ixed set point to the atmosphere is created by low regulator (9) with a ixed set point. The i/p module (6) is supplied with a constant upstream pressure by the pressure regulator (8) to compensate for any luctuations in the supply pressure.

Operation

The positioner is operated with a user-friendly rotary pushbutton. The parameters are selected by turning the knob, pushing it activates the required setting. In the menu, all parameters are listed in one level, eliminating the need to search in submenus. All parameters can be checked and changed on site.
All values are displayed on the LCD. The reading direction of the LCD can be rotated by 180°.
The closing direction of the control valve is indicated to the positioner by setting the slide switch "Air to open/Air to close". It assigns the CLOSED position of the control valve to the 0 % reading.
The INIT key activates initialization which is started according to the ready adjusted parameters (autotune). After initialization is completed, the positioner immediately starts closed-loop operation.



1 Control valve
2 Travel sensor
3 Controller
4 A/D converter
5 Microcontroller
6 i/p module
7 Booster
8 Pressure regulator
9 Flow regulator
10 Volume restriction
11 Inductive limit contact (option)
12 Solenoid valve (option)
13 Position transmitter or binary input (option)
14 Software limit contacts
15 Fault alarm output
16 Display
17 Actuation of solenoid valve
18 Galvanic isolation (option)
19 D/A converter
20 Communication interface
21 Connection
22 Binary input BE (option)

Fig. 3: Functional diagram of Spraytech with Smart Positioner

Electropneumatic Positioner With Smart Communication With Highway Addressable Remote Transducer

Table 1:Technical data Spraytech Systems with Smart Positioner

Smart Positioner		Technical data in test certiicates additionally apply to explosion-protected devices
Valve travel	Adjustable	Attachment according to IEC 60534-6 (NAMUR) 3.6 to 300 mm Attachment according to VDI/VDE 3847 3.6 to 300 mm Attachment to rotary actuators (VDI/VDE 3845) 24 to 100° opening angle
Travel range	Adjustable	Adjustable within the initialized travel/angle of rotation of the valve; travel can be restricted to 1/5 at the maximum.
Set point w	Signal range	4 to 20 mA · Two-wire device, reverse polarity protection Minimum span 4 mA
	Static destruction limit	100 mA
Minimum current		3.6 mA for display · 3.8 mA for operation
Load impedance		≤ 8.2 V (corresponds to 410 Ω at 20 mA)
Supply air	Supply pressure	1.4 to 7 bar (20 to 105 psi)
	Air quality acc. to ISO 8573-1	Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected
Signal pressure (output)		0 bar up to the capacity of the supply pressure · Can be limited to 1.4 bar/2.4 bar/3.7 bar ± 0.2 bar by software
Characteristic	Adjustable	Linear/equal percentage/reverse equal percentage User-deined (over operating software and communication) Butterly valve, rotary plug valve and segmented ball valve: linear/equal percentage
	Deviation	≤1 %
Hysteresis		≤0.3 %
Sensitivity		≤0.1 %
Transit time		Venting or illing with air adjustable separately up to 240 s by software
Direction of action		Reversible
Air consumption, steady state		Independent of supply air approx. 110_nl /h
Air output capacity	Actuator illed with air	At Δp = 6 bar: 8.5 m^3_n/h · At Δp = 1.4 bar: 3.0 m^3_n/h · $K_{Vmax\ (20\ °C)}$ = 0.09
	Actuator vented	At Δp = 6 bar: 14.0 m^3_n/h · At Δp = 1.4 bar: 4.5 m^3_n/h · $KV_{max(20\ °C)}$ = 0.15
Permissible ambient temperature		–20 to +80 °C (all versions) · –45 to +80 °C with metal cable gland –25 to +80 °C with inductive limit contact (SJ2-S1N) and metal cable gland Observe the limits in the test certiicate for explosion-protected versions.
Influences	Temperature	≤0.15 %/10 K
	Supply air	None
	Effect of vibration	≤0.25 % up to 2000 Hz and 4 g according to IEC 770
Electromagnetic compatibility		Complying with EN 61000-6-2, EN 61000-6-3, EN 61326-1 and NAMUR Recommendation NE 21
Electrical connections		One M20x1.5 cable gland for 6 to 12 mm clamping range Second M20x1.5 threaded connection additionally available Screw terminals for 0.2 to 2.5 mm² wire cross-section
Degree of protection		IP 66/NEMA 4X

Electropneumatic Positioner With Smart Communication With Highway Addressable Remote Transducer

Binary contacts			
Two software limit contacts, reverse polarity protection, loating, conigurable switching characteristics (default settings in table below)			
Signal state	Version	No explosion protection	Ex
	No response	Effectively non-conducting	≤1.0 mA
	Response	Conductive (R = 348 Ω)	≥2.2 mA
One fault alarm contact			
Signal state	Version	No explosion protection	Ex
	No fault alarm	Conductive (R = 348 Ω)	≥2.2 mA
	Fault alarm	Effectively non-conducting	≤1.0 mA
Materials			
Housing		Die-cast aluminum · Chromated and powder paint coated · Special version: stainless steel 1.4581	
External parts		Stainless steel	
Cable gland		M20 x 1.5, black polyamide	
Weight		Approx. 1.0 kg	

Table2: Options for Spraytech with Smart Positioner

Solenoid valve · Approval acc. to IEC 61508/SIL	
Input	24 V DC · Galvanically isolated and reverse polarity protection · Static destruction limit 40 V Current consumption $I = \frac{U - 5.7\ V}{3840\ \Omega}$ (corresponding to 4.8 mA at 24 V/114 mW)
Signal '0' (no response)	<12 V (emergency venting at 0 V)
Signal '1' (response)	>19 V
Service life	>5 x 10^6 switching cycles
$K_v$coeficient	0.15
Analog position transmitter	Two-wire transmitter · Galvanically isolated
Supply air	12 to 30 V DC · Reverse polarity protection · Static destruction limit 40 V
Output signal	4 to 20 mA
Operating direction	Reversible
Operating range	–10 to +114 %
Characteristic	Linear
Hysteresis	Same as positioner
High-frequency inluence	Same as positioner
Other inluences	Same as positioner
Fault alarm	Issued as status current 2.4 ±0.1 mA or 21.6 ±0.1 mA
Inductive limit contact	For connection to switching ampliier according to EN 60947-5-6. Can be used in combination with a software limit contact.
SJ2-SN proximity switch	NAMUR NC contact
SJ2-S1N proximity switch	NAMUR NO contact
External position sensor	
Valve travel	Same as positioner
Cable	10 m · Flexible and durable · With M12x1 connector · Flame-retardant acc. to VDE 0472 Resistant to oils, lubricants and coolants as well as other aggressive media
Permissible ambient temperature	–60 to +105 °C · The limits in the test certiicate additionally apply for explosion-protected versions
Immunity to vibration	Up to 10 g in the range of 10 to 2000 Hz
Degree of protection	IP 67
Leakage sensor · Suitable for operation in hazardous areas	
Temperature range	–40 to +130 °C
Tightening torque	20 ±5 Nm

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Electro Pneumatic Positioner ,Pneumatic Positioner For Both Rotary & Linear Actuator

Spraytech System Manufactured positioners ensure a predetermined assignment of the valve position (controlled variable x) to the input signal (reference variable w). They compare the input signal received from a control system to the travel of the control valve and issue a corresponding output signal pressure p_{st} (output variable y).

Special features

- Compact, low-maintenance design
- Any mounting position possible
- Insusceptible to mechanical vibrations
- Reversible operating direction
- Excellent dynamic behavior
- Suitable for normal or split-range operation
- Adjustable proportional band (P-band)
- Adjustable air output capacity
- Low air consumption

Attachment to valves with cast yokes or rod-type yokes according to IEC 60534-6

Optionally available with two pressure gauges to monitor supply air and signal pressure. Stainless steel pressure gauge housing with connections either nickel-plated or made of stainless steel.

A Pneumatic Positioner can be upgraded to a Electropneumatic Positioner [1].

Fig. 1: Electro pneumatic & Pneumatic Positioner

Fig. 2: i/p Converter, opened housing

Fig. 3: NAMUR Mounting on forged control valve

Principle of operation

The only difference between the Pneumatic Positioner and the Electropneumatic Positioner is the electropneumatic (i/p) converter unit in the electropneumatic positioner to convert the electric signal from the controller into a proportional pneumatic signal.
The positioners use a lapper/nozzle system which operates according to the force-balance principle. They can be applied for both normal and split-range operation.

Operating direction

When the reference variable increases, the signal pressure can be selected to be increasing/increasing (direct action >>) or increasing/decreasing (reverse action <>). The operating direction depends on the position of the nozzle assembly that can be turned by 180°. The visible marking (>> or <>) indicates which operating direction is effective. On changing the operating direction or the fail-safe position, note that the positioner must also be mounted in a different position (Fig. 5 to Fig. 8).

Attachment according to IEC 60534-6 and NAMUR

The various ways in which the positioner can be attached to the actuator meet the requirements of IEC 60534-6 and NAMUR recommendation. Positioners may be attached to valves with either cast yokes or
rod-type yokes.
Each type of attachment requires special mounting parts.

Assignment of the positioner and the actuator

Fig. 5 to Fig. 8 schematically illustrate the arrangement of the actuator, the mounting position of the positioner, the reference variable and the operating direction.

Fail-safe action

SpraytechPneumatic Actuators are available with the following fail-safe actions:

Actuator stem extends (Fig. 5 and Fig. 6)
The compression springs in the actuator force the actuator stem to extend when the pressure acting on the diaphragm decreases or upon air supply failure.

Actuator stem retracts (Fig. 7 and Fig. 8)
The compression springs in the actuator force the actuator stem to retract when the pressure acting on the diaphragm decreases or upon air supply failure.

Figs. 5 to 8 illustrate the different operating directions and the mounting positions of the positioner. Right and left attachment apply when looking onto the lever (1) and plate (2).

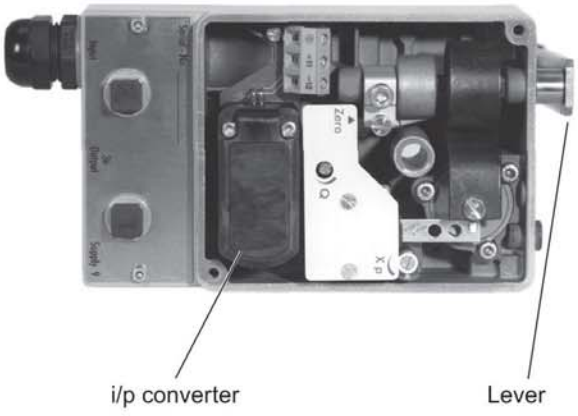


Fig. 4: Electropneumatic Positioner

Actuator stem extends

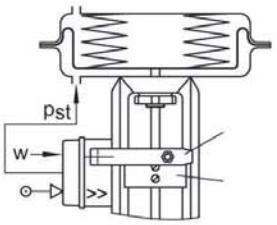


Fig. 5: Operating direction >>
Left attachment

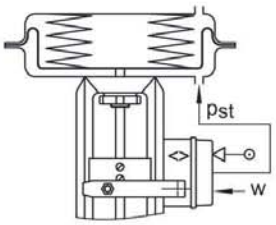


Fig. 6: Operating direction <>
Right attachment

Actuator stem retracts

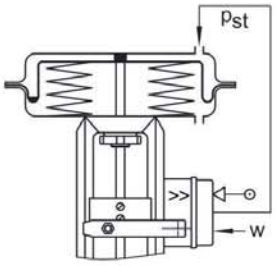


Fig. 7: Operating direction >>
Left attachment

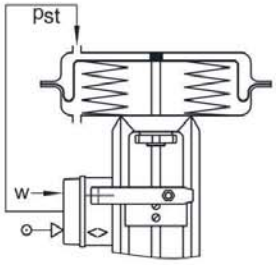


Fig. 8: Operating direction <>
Right attachment

Electro Pneumatic Positioner ,Pneumatic Positioner For Both Rotary & Linear Actuator

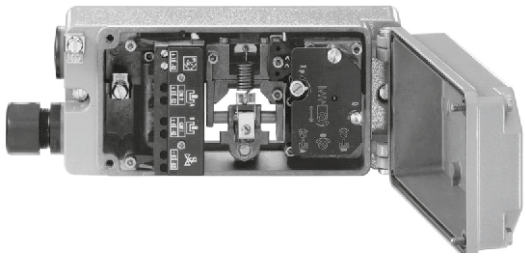


Fig. 9 · Spraytech Electropneumatic Positioner for Rotary Actuator

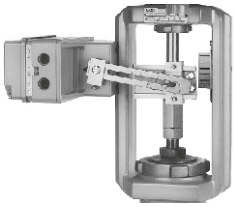


Fig. 10 · Attachment acc. to IEC 60534 (NAMUR)

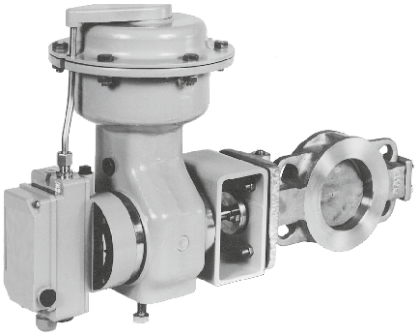


Fig. 11 · Attachment to Rotary Actuator

The positioners ensure a fixed assignment between the valve stem position (controlled variable x) and the pneumatic or electric input signal (reference variable w). They compare the input signal received from the control unit with the travel of the control valve and, issue the corresponding output signal pressure pst (Output)variable y). A reversing amplifier for double-acting actuators produces two opposed signal pressures.

Special features

- Arbitrary mounting position; suitable for normal or split-range operation; excellent dynamic response; negligibly small influence of supply air; adjustable proportional band (P-band); adjustable air output capacity; low air supply consumption; very insensitive to mechanical vibrations; low-maintenance compact design
- Versions for hazardous areas in type of protection "Intrinsic Safety" Ⓔx II 2G Ex ia IIC T6 or Ⓔx II 3G Ex nA II T6 for Zone 2
- Special version with SS housing available
- Attachment to actuators according to IEC 60534-6 (Fig. 10)
- Attachment to rotary actuators acc. to VDI/VDE 3845 (Fig. 11)

Electro Pneumatic Positioner ,Pneumatic Positioner For Both Rotary & Linear Actuator

Principle of operation(Figs. 12 to 14)

The only difference between the two positioners is an i/p con verter unit (E) in the electropneumatic positioner. Both positioners function according to the force-balance principle.

In the Type Electropneumatic Positioner, the control signal (i) flows through the plunger coil (E2) in the field of a permanent magnet (E1). The force, proportional to the DC current i, is bal anced against the force of the backpressure at the balance beam (E3) which is created at the flapper plate (E7) by the jet stream leaving the nozzle (E6). Any changes in the signal cause a proportional change in the pressure p_e supplied to the pneu matic control system.

The pressure p_e creates a force at the measuring diaphragm (5) which is compared to the force of the range spring (4). If the control signal causes the pneumatic input pressure (p_e) or the position of the lever (1) to change, the diaphragm lever (3) func tioning as a flapper plate varies the distance to the nozzle (2.1 or 2.2). The position of the internal turnboard for the operating direction (7) determines which nozzle is effective.

The pneumatic booster (10) and the pressure regulator (9) are provided with supply air. The controlled supply flows against the diaphragm lever (3) over the Xp restriction (8) and the noz zle (2.1 or 2.2). Any changes in the control signal or the posi tion of the lever (1) cause a variation of pressure both upstream and downstream of the booster (10). The output signal pressure p_{st} issued by the booster flows over the volume restriction (11) to the actuator and positions the valve to match the input signal.

The travel is transmitted to the pick-up lever (1) via the pin (1.1) in globe valves. Whereas, in rotary valves (Fig. 14), a cam follower roll (20) is attached to the front end of the pick-up lever (1) which follows the rotary motion of a cam disk (22) on the ac tuator shaft (21). The force of the range spring (4) is changed by the linear motion of pick-up lever.

The positioner must be fitted with a reversing amplifier for at-tachment to double-acting actuators, which generates two op-posed signal pressures(p_{st1} and p_{st2}).

The adjustable restrictions Xp (8) and Q (11) are used to opti-mize the control loop. Two adjusting screws (6.1 and 6.2) allow the adaptation of the control valve to the signal pressure. ZERO and SPAN of the reference variable can be adjusted for different operating modes, such as split-range operation.

Operating direction: As the reference variable (P_e) increases, the out put signal pressure (p_{st}) can either be increasing (direct >>) or decreasing (reverse <>). The operating direction is deter mined by the position of the turnboard (7) and can be changed subsequently.

Legend for Figs. 12 to 14			
1	Lever	E	i/p converter unit
1.1	Pin	E1	Permanent magnet
1.2	Rotary shaft	E2	Plunger coil
2.1	Nozzle (>>)	E3	Balance beam
2.2	Nozzle (<>)	E4	Universal joint
3	Diaphragm lever (flapper)	E5	Spring
4	Range spring	E6	Nozzle
5	Measuring diaphragm	E7	Flapper plate
6.1	Adusting screw (SPAN)	E8	Restriction
6.2	Adusting screw (ZERO)	E9	Damping
7	Turnboard for op. direction	E10	Protective diode
8	Xp restriction (gain)		
9	Pressure regulator		
10	Booster	20	Cam follower roll
11	Volume restriction Q	21	Actuator shaft
12	Solenoid valve (optional)	22	Cam disk

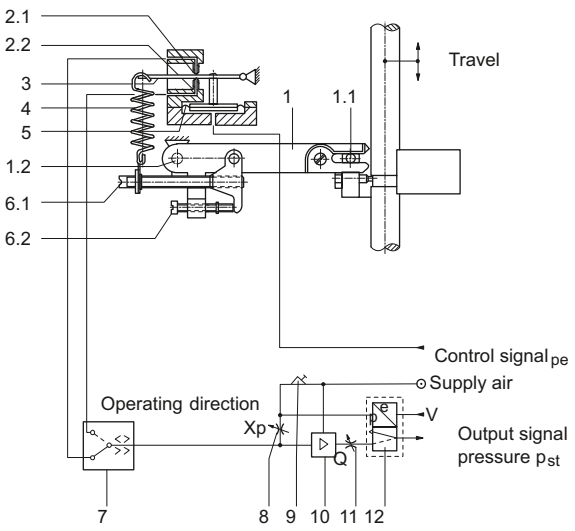


Fig. 12 · Functional diagram of Pneumatic Positioner

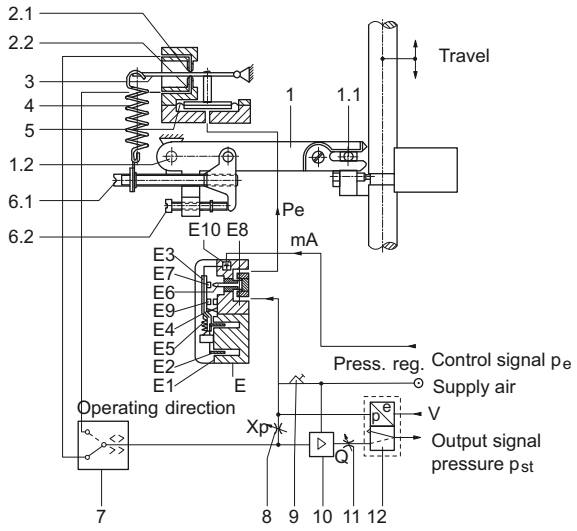


Fig. 13 · Functional diagram of Electropneumatic Positioner

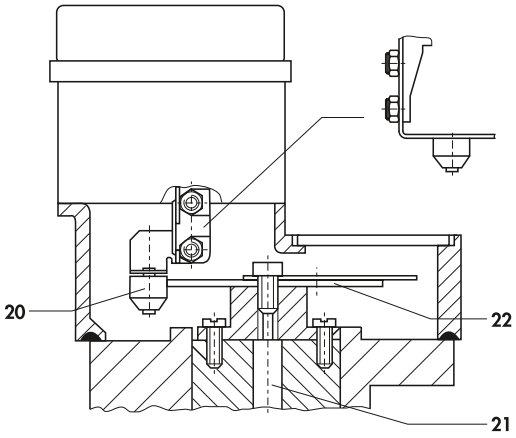


Fig. 14 · Transmission of rotary motion to the positioner

Electro Pneumatic Positioner ,Pneumatic Positioner For Both Rotary & Linear Actuator

Table 1: Technical data Pneumatic Positioner

Controlled variable (travel range)	7.5 to 60 mm With lever extension: 7.5 to 90 mm
Reference variable	0.2 to 1 bar (3 to 15 psi)
Split-range operation 0 to 50% or 50 to 100 %, reference variable span (up to 50 mm travel)	0.2 to 0.6 bar (3 to 9 psi) and 0.6 to 1 bar (9 to 15 psi)
Range spring	See Table 3 on page 5
Supply air	1.4 to 6 bar (20 to 90 psi), Air quality acc. to ISO 8573-1: Maximum particle size and density: Class 4 · Oil content: Class 3, pressure dew point: Class 3
Signal pressure p_{st} (output)	Max. 0 to 6.0 bar (0 to 90 psi)
Characteristic	Linear characteristic, deviation from terminal-based conformity: ≤ 1.5 %
Hysteresis	< 0.5 %
Sensitivity	< 0.1 %
Operating direction	Reversible
Proportional band X_p (at 1.4 bar supply air)	1 to 3.0 % with spring 1 1 to 2.0 % with spring 2 1 to 1.5 % with spring 3
Air consumption in steady state, X_p = 1 %	At supply air = 1,4 bar: 0.13 m_n^3/h At supply air = 6 bar: 0.33 m_n^3/h
Air output capacity	At Δp 1.4 bar: 3.0 m_n^3/h At Δp 6 bar: 8.5 m_n^3/h
Actuating time for Type 3271 “stem extends”	240 cm² ≤ 1.8 s 350 cm² ≤ 2.5 s 700 cm² ≤ 10 s
Permissible ambient temperature[1) 2)]	–20 to +80 °C
Inluence	Temperature: < 0.02%/1 K Supply air: < 0.20 %/0.1 bar Variable position when turned by 180°: < 3.50%
Degree of protection	IP 65
Weight	Approx. 1.1 kg
Materials	Housing: Die-cast aluminum, chromated and plastic coated External parts: Stainless steel

Electro Pneumatic Positioner ,Pneumatic Positioner For Both Rotary & Linear Actuator

Table 2: Technical data Electropneumatic Positioner

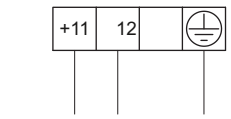
Controlled variable (travel range)	7.5 to 60 mm, with lever extension: 7.5 to 90 mm
Reference variable[1] Split-range 0 to 50 % or 50 to 100 % reference variable span (up to 50 mm travel)	4 to 20 mA (Ex), R_i = 250 Ω [2)] 4 to 20 mA (without explosion protection), R_i = 200 Ω [2)] 0 to 20 mA, R_i = 200 Ω [2)] 5 mA, 1 to R_i = 880 Ω [2)]
Range spring	See Table 3 on page 5
Supply air	1.4 to 6 bar (20 to 90 psi) Air quality acc. to ISO 8573-1: Max. particle size and density: Class 4 Oil content: Class 3 · Pressure dew point: Class 3
Signal pressure p_{at} (output)	Max. 0 to 6.0 bar (0 to 90 psi)
Characteristic	Linear characteristic Deviation from terminal-based conformity ≤ 1.5 %
Hysteresis	< 0.5 %
Sensitivity	< 0.1 %
Operating direction	Reversible
Proportional band Xp (at 1.4 bar supply air)	1 to 3.0 % with spring 1 1 to 2.0 % with spring 2 1 to 1.5 % with spring 3
Air consumption in steady state (Xp = 1 %)	With 1.4 bar supply air: 0.19 m_n^3/h With 6 bar supply air: 0.5 m_n^3/h
Air output	At Δp 1.4 bar: 3.0 m_n^3/h At Δp 6 bar: 8.5 m_n^3/h
Transit time with Type 3271 Actuator, “stem extends”	240 cm² ≤ 1.8 s 350 cm² ≤ 2.5 s 700 cm² ≤ 10.0 s
Inluences	Temperature: < 0.03 %/1 K Supply air: < 0.3 %/0.1 bar Vibrations: < 2 % between 10 up to 150 Hz and 4 g Variable position when turned by 180°: < 3.5 %
Degree of protection	IP 65
Electromagnetic compatibility	Complying with EN 61000-6-2, EN 61000-6-3 and EN 61326-1
Weight	Approx. 1.2 kg
Materials	Housing: Die-cast aluminum, chromated and plastic coated
	External parts: Stainless steel

Electro Pneumatic Positioner ,Pneumatic Positioner For Both Rotary & Linear Actuator

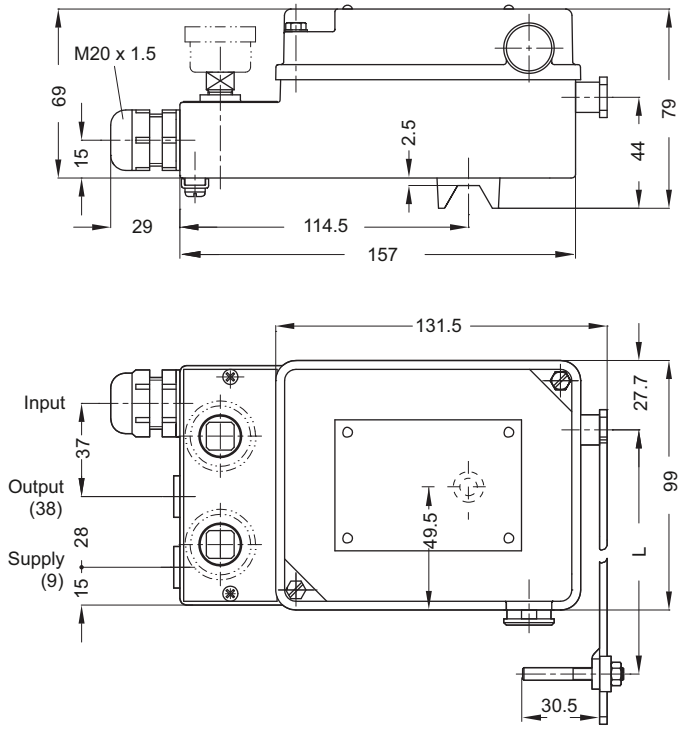
Table 3: Assignment of lever and range spring

Lever	Rated travel	Travel min./max.	Reference variable (input signal)	Range spring
Lever length L 40 to 127 mm	15 mm	7.5 to 15 mm	100 % 50 %	1 2
	30 mm	14 to 32 mm	100 % 50 %	2 3
	60 mm	30 to 70 mm	100 %	3
Lever length L with extension 40 to 200 mm	20 mm	7.5 to 26 mm	100 % 50 %	1 2
	40 mm	14 to 50 mm	100 % 50 %	2 3
	>60 mm	30 to 90 mm	100 %	3

Electrical connection and dimensions in mm



Control signal input
0/4 to 20 mA



Electro Pneumatic Positioner ,Pneumatic Positioner For Both Rotary & Linear Actuator

Table 4 :Technical data. All pressure in bar (gauge)

For Rotary Pneumatic & Electropneumatic Positioner			
Travel range		Attachment acc. to IEC 60534 (NAMUR): 7.5 ... 120 mm	
Opening angle		70°, 75° or 90° depending on cam disk	
Reference variable w	Signal range bar (psi)	0.2 ... 1 bar (3 ... 15 psi)	
	Span bar (psi)	0.4 ... 0.8 bar (6 ... 12 psi)	
	Overloadabe max.	2 bar (29 psi)	
Reference variable w	Signal range	Two-wire device, reverse polarity protection	
		0/4 ... 20 mA	1 ... 5 mA
	Span	8 ... 20 mA	2 ... 4 mA
	Internal resistance R_i a t 20 °	200Ω	Ω
Supply air	Supply air range	1.4 ... 6 bar (20 ... 90 psi)	
	Air quality acc. to ISO 8573-1 (2001-02)	Maximum particle size and density: Class 4 · Oil contents: Class 3; Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected	
Output signal pressure p_{st}		Can be limited between 0 ... approx. 2.5 and 0 ... 6 bar (0 ... approx. 35 and 0 ... 90 psi)	
Characteristic		Linear Deviation from terminal-based conformity: ≤ 1 %	
Hysteresis		≤ 0.3 %	
Sensitivity		≤	
Operating direction		Reversible	
Propoptional band X		0.5 ... 2.5 % (proportional-action coefficient K_p: > 200 ... 40)	
Air consumption		With air supply of 1.4 bar	With air supply of 6 bar
	Pneumatic	≤ 230 I_n/h	≤ 2 30 I_n/h 1)
	Electropneumatic	≤ 280 I_n/h	≤ 280 I_n/h 1)
Air delivery	Actuator filled with air	3.0 m_n^3/h	8.5 m_n^3/h
	Actuator vented	4.5 m_n^3/h	14.0 m_n^3 /h
Permissible ambient temperature 7)	Standard	–20...80 °C: Optional limit switches/solenoid valve/position transmitter with plastic cable gland –40...80 °C: Optional limit switches/solenoid valve with metal cable gland	
	Low temperature vers	–50...80 °C: Optional limit switches/solenoid valve with metal cable gland	
	Standard	–20...80 °C: Optional limit switches/solenoid valve/position transmitter with plastic cable gland –40...80 °C: Optional limit switches/solenoid valve with metal cable gland	
	Low temperature versio	–45...80 °C: Optional limit switches/solenoid valve with metal cable gland	
Influence		Temperature:≤ 0.3 %/10 K · Supply air: ≤ 1 % between 1.4 ... 6 bar	
Electromagnetic compatability		Requirements specified in EN 61000-6-2 and EN 61000-6-3 are met	
Vibrations		No influence between 10 und 150 Hz and 4 g	
Explosion protection		Type of protection ⟨Ex⟩ II 2G Ex ia IIC T6 or ⟨Ex⟩ II 3G Ex nA II T6 for Zone 2	
Degree of protection		IP 54 (IP 65 and NEMA 4 possible by fitting a filter check valve (see accessories))	
Weight		Approx. 1 kg	