

Series 3725

Type 3725 Electropneumatic Positioner



Application

Single-acting positioner for attachment to pneumatic linear and rotary valves. Self-calibrating, automatic adaptation to valve and actuator.

Reference variable	4 to 20 mA
Travel	3.75 to 50 mm
Opening angle	24 to 100°

Ex certified

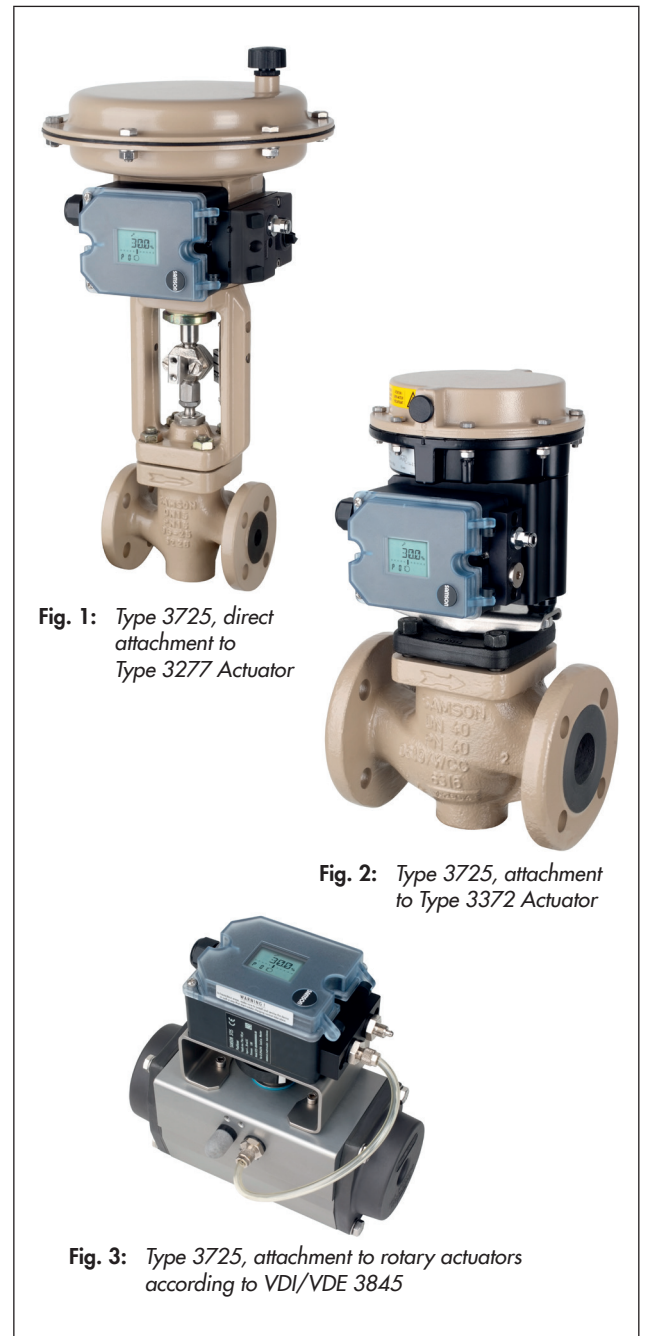
The positioner ensures a predetermined assignment of the valve (controlled variable x) to the input signal (reference variable w). It compares the input signal received from a control system to the travel or rotational angle of the control valve and issues a corresponding output signal pressure (output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

Special features

- Simple direct attachment to SAMSON Type 3277 Actuator (120 to 700 cm², see Fig. 1)
- Attachment according to IEC 60534-6 (NAMUR)
- Attachment to rotary actuators according to VDI/VDE 3845 (see Fig. 3)
- Attachment to Type 3372 Actuator for Series V2001 Valves (see Fig. 2)
- Easy operation with intuitive navigation menu using three capacitive keys
- LCD easy to read in any mounted position due to selectable reading direction
- Variable, automatic start-up
- Preset parameters (only values deviating from the standard need to be adjusted)
- Permanent storage of all parameters in EEPROM (protected against power failure)
- Two-wire system with a small electrical load of 300 Ω
- Activatable tight-closing function
- Continuous monitoring of zero point
- Non-contact position sensing
- Unaffected by environmental effects and steam hammering

Version

- Electropneumatic positioner with local operation and LCD
 - **Type 3725-000**, without explosion protection
 - **Type 3725-110**, explosion protection according to ATEX
 - **Type 3725-113**, explosion protection according to GOST
 - **Type 3725-130**, explosion protection according to CSA



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 (reference variable 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 the following components (Fig. 4):

- Magnetoresistive sensor (2)
- Analog i/p converter (6) with a downstream booster (7)
- Electronics unit with microcontroller (4)

The travel or opening angle is measured by the external pick-up lever, non-contact magnetoresistive sensor and downstream electronics.

The pick-up lever is connected to a magnet inside the device. The motion of the pick-up lever causes the direction of the magnetic field to change. This change is sensed by the sensor (2). The electronics unit determines the current position of the actuator stem or opening angle from this information.

The position of the actuator stem or opening angle is transmitted to the microcontroller (3) over the A/D converter (4). The

PD control algorithm in the microprocessor compares this actual position to the 4 to 20 mA control signal after it has been converted by the A/D converter (3). In case of a system deviation occurs, the activation of the i/p converter is changed so that the actuator of the control valve (1) is pressurized or vented accordingly over the downstream booster (7). The supply air is supplied to the booster and the pressure regulator (8).

Operation

A user-friendly, intuitive concept using three capacitive keys and a LCD has been developed: Users select parameters by touching the arrow keys and confirm the settings with the confirmation key. In the menu, all parameters are listed in one level, meaning there is no need to search through submenus. All parameter settings can be read and changed on site.

All values are displayed on the LCD. The reading direction of the LCD can be rotated by 180°.

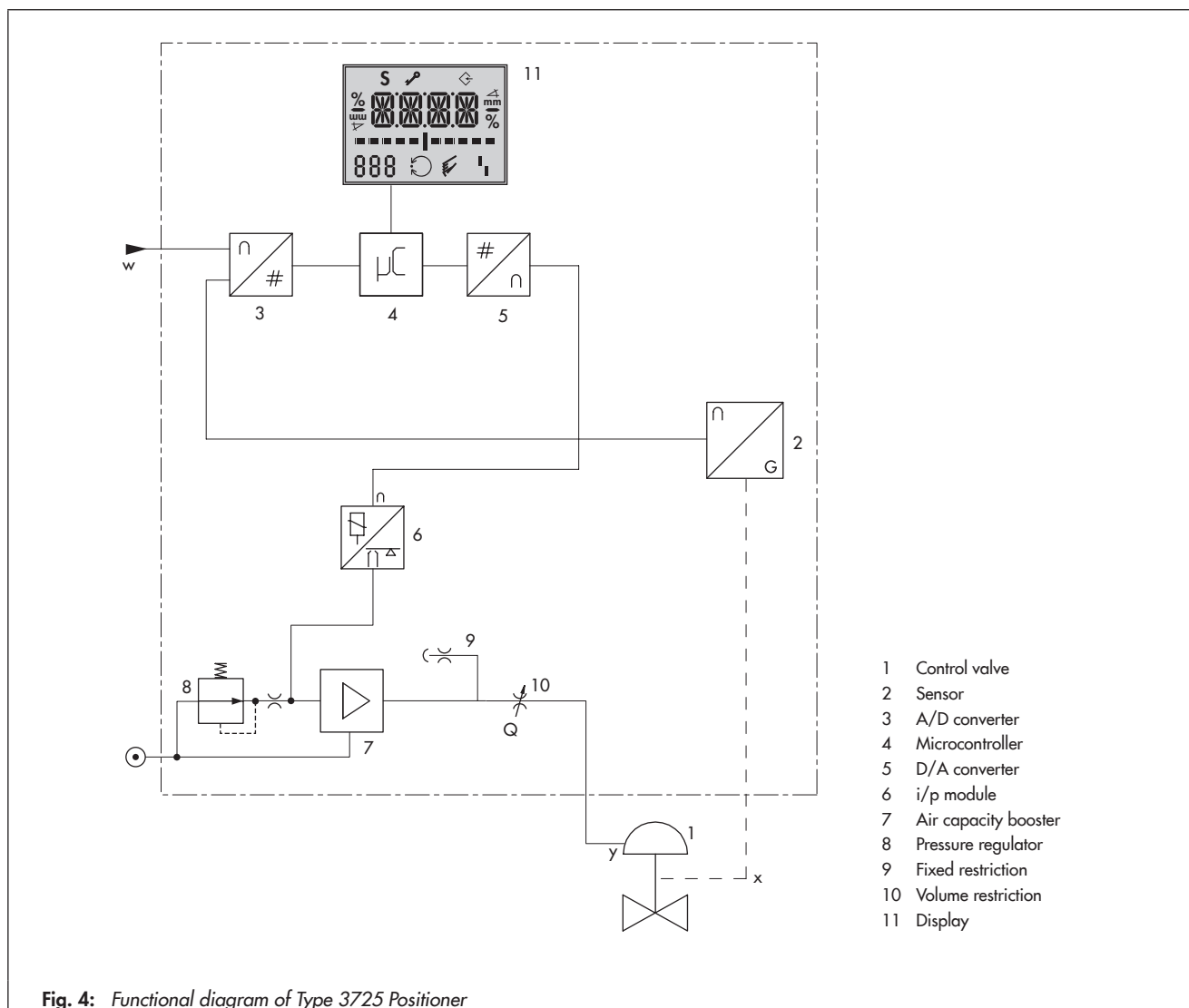


Table 1: Technical data

Type 3725 Positioner	
Travel (adjustable)	Direct attachment to Type 3277 Actuator: 3.75 to 30 mm Direct attachment to Type 2780-2 Actuator: 6/12/15 mm Attachment to Type 3372 Actuator: 15/30 mm Attachment according to IEC 60534-6 (NAMUR): 3.75 to 50 mm Attachment to rotary actuators: 24 to 100°
Reference variable w (reverse polarity protection) Static destruction limit	4 to 20 mA signal range · Two-wire device · Split-range operation 4 to 11.9 mA and 12.1 to 20 mA ±33 V
Minimum current	3.8 mA
Load impedance	Max. 6.3 V
Supply air Air quality acc. to ISO 8573-1	Supply air: 1.4 to 7 bar (20 to 105 psi) 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 approx. 2.3 bar by software
Characteristic	3 characteristics for globe valves · 9 characteristics for rotary valves
Hysteresis	≤ 0.3 %
Sensitivity	≤ 0.1 %
Transit time	Only for actuators with initialization time > 0.5 s ¹⁾
Direction of action	w/x reversible
Air consumption	≤ 100 l _n /h with a supply pressure up to 6 bar and a signal pressure of 0.6 bar
Air output capacity Actuator filled with air Actuator vented	At Δp = 6 bar: 8.5 m _n ³ /h, At Δp = 1.4 bar: 3.0 m _n ³ /h K _{Vmax} (20 °C) = 0.09 At Δp = 6 bar: 14.0 m _n ³ /h, At Δp = 1.4 bar: 4.5 m _n ³ /h K _{Vmax} (20 °C) = 0.15
Permissible ambient temperature	-20 to +80 °C -25 to +80 °C with metal cable gland The limits in the test certificates additionally apply for explosion-protected versions
Safety	
Influences	Temperature: ≤ 0.15 %/10 K Influence of vibrations: ≤ 0.25 % up to 2000 Hz and 4 g according to IEC 770 Supply air: None
Electromagnetic compatibility	Complying with EN 61000-6-2, EN 61000-6-3 and NAMUR Recommendation NE 21
Explosion protection	⊕ II 2G Ex ia IIC T4 according to ATEX Intrinsically safe, Ex ia IIC T4 according to CSA Group ⊕ 1Ex ia IIC T4 Gb X according to GOST
Degree of protection	IP 66
Materials	
Housing	Polyphthalamide (PPA)
Cover	Polycarbonate (PC)
External parts	Stainless steel 1.4571 and 1.4301
Cable gland	M20 x 1.5, black polyamide (PA)
Venting	High-density polyethylene (PE-HD)
Weight	
	Approx. 0.5 kg

¹⁾ For faster actuators, a volume restriction must be used. Otherwise, the initialization cannot be performed successfully.

Table 2: Explosion protection certificates

Type of approval	Certificate number	Date	Comments
EC Type Examination Certificate	PTB 11 ATEX 2020 X	2011-08-25	II 2G Ex ia IIC T4
GOST certification	RU C-DE.GB08.B.00697	2014-12-15	1Ex ia IIC T4 Gb X
CSA certification	2703735	2014-06-03	Ex ia IIC T4

Article code

Positioner	Type 3725-	x	x	x	0	0	0	0	0	0	0	9	9	9	9
With LCD and autotune, 4 to 20 mA reference variable															
Explosion protection															
Without		0	0	0											
⊕ II 2G Ex ia IIC T4 according to ATEX		1	1	0	0										
Intrinsically safe, Ex ia IIC T4 according to CSA Group		1	3	0	0										
⊕ 1Ex ia IIC T4 Gb X according to GOST		1	1	3	0										

Mounting the positioner

The Type 3725 Electropneumatic Positioner can be attached directly to the Type 3277 Actuator over a connection block.

When attached to the Type 3277-5 Actuator (120 cm²), the signal pressure is routed over an internal bore in the actuator yoke to the actuator.

In actuators with fail-safe action "actuator stem retracts" and in actuators with effective diaphragm areas of 240 cm² or larger, the signal pressure is routed to the actuator over ready-made external piping.

Ordering text

Type 3725 Positioner

Attachment

Direct attachment to Type 3277 Actuator
(without pneumatic connecting rail)

Direct attachment to Type 3277 Actuator (120 to 700 cm²)

Attachment according to IEC 60534-6 (NAMUR)

Attachment to rotary actuators acc. to VDI/VDE 3845

Attachment to Type 3278 Rotary Actuator (160/320 cm²)

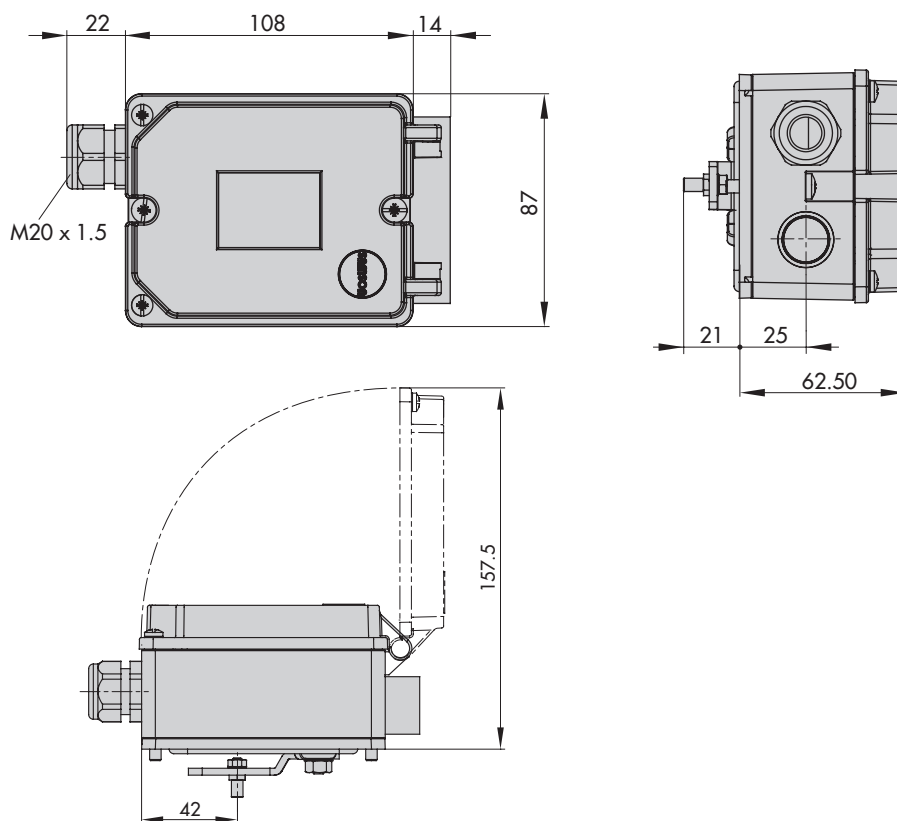
Pneumatic connecting rail

G 1/4 or 1/4 NPT

Pressure gauge (max. 6 bar)

With or without

Dimensions in mm



Specifications subject to change without notice



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