

## T 8394 EN

### Series 3725

### Type 3725 Electropneumatic Positioner



#### Application

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

Reference variable	4 to 20 mA
Travel	5 to 50 mm
Opening angles	24 to 100°

The positioner ensures a predetermined assignment of the valve position (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 valve and issues a corresponding output signal pressure (output variable  $y$ ).

#### Special features

- Simple direct attachment to SAMSON Type 3277 Actuator (120 to 700 cm<sup>2</sup>, see Fig. 1)
- Attachment according to IEC 60534-6-1 (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 a non-volatile memory (EEPROM)
- Tight-closing function can be activated
- Continuous monitoring of zero point
- Non-contact position sensing
- Unaffected by environmental effects and steam hammering

#### Version

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



Fig. 1: Type 3725, direct attachment to Type 3277 Actuator

Fig. 2: Type 3725, attachment to Type 3372 Actuator



Fig. 3: Type 3725, attachment to rotary actuators according to VDI/VDE 3845

## Principle of operation

The Type 3725 Electropneumatic 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 opening 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 (see Fig. 4):

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

The travel or opening angle is measured by the 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. The electronics unit determines the current position of the actuator stem or opening angle from this information.

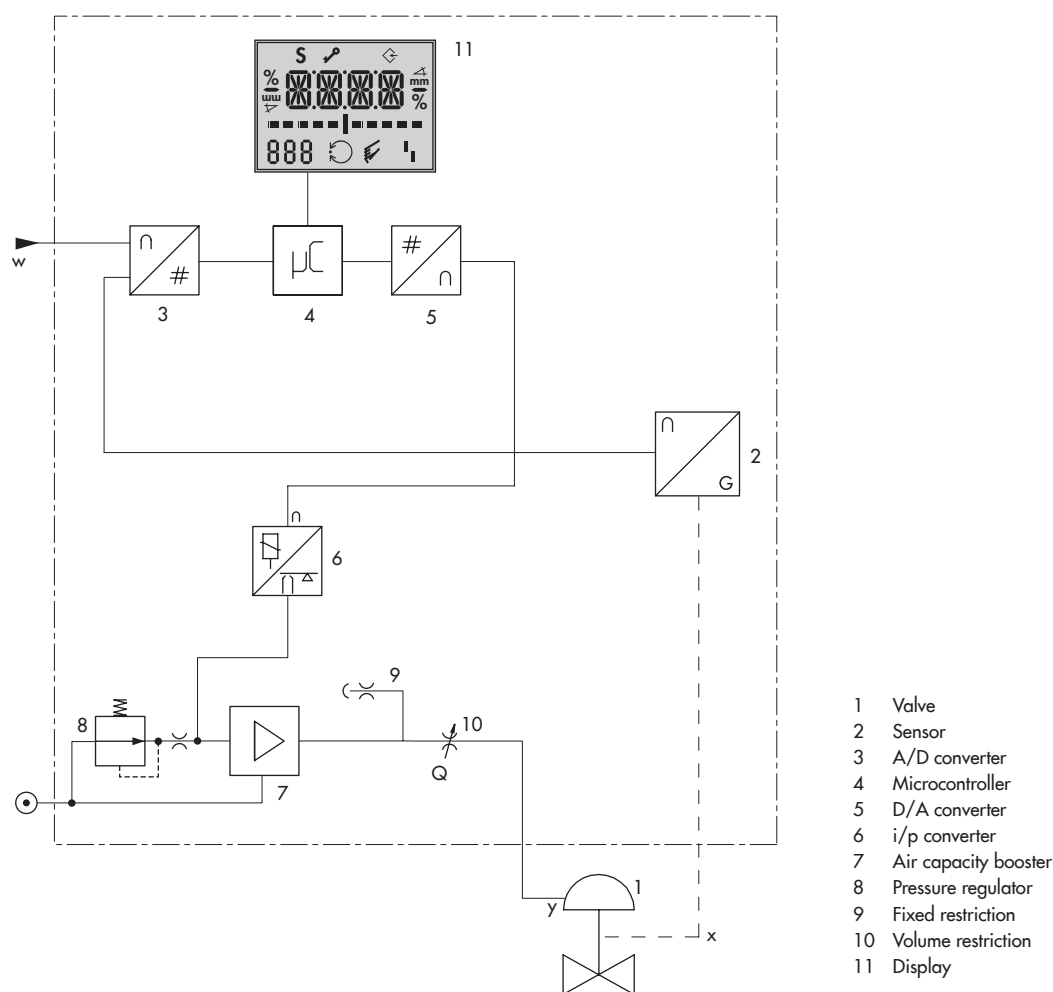
The position of the actuator stem or opening angle is transmitted to the microcontroller (3) over the A/D converter (4). The PD control algorithm in the microprocessor compares this actual position to the 4 to 20 mA control signal after it has been converted by the A/D converter (3). In case of a system deviation, the activation of the i/p module (6) is changed so that the actuator of the 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 an 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.

The menu is structured with all parameters listed one after the other on the same level. This allows users to read and change parameters at the device.

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



**Fig. 4:** *Circuit diagram of the Type 3725 Positioner*

**Table 1: Technical data**

Type 3725 Positioner		
Travel (adjustable)	Direct attachment to Type 3277: Direct attachment to Type 2780-2: Attachment to Type 3372 Actuator: Attachment according to IEC 60534-6 (NAMUR): Attachment to rotary actuators:	5 to 30 mm 6/12/15 mm 15/30 mm 5 to 50 mm 24 to 100°
Reference variable w (reverse polarity protection) Static destruction limit	Signal range 4 to 20 mA · 2-wire unit 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 (corresponds to 315 Ω at 20 mA)	
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 <sup>1)</sup>	
Direction of action	w/x reversible	
Air consumption	≤100 l <sub>n</sub> /h with a supply pressure up to 6 bar and a signal pressure of 0.6 bar	
Air output capacity To fill actuator with air To vent actuator	At Δp 6 bar: 8.5 m <sub>n</sub> <sup>3</sup> /h      At Δp = 1.4 bar: 3.0 m <sub>n</sub> <sup>3</sup> /h,      K <sub>vmax</sub> (20 °C) = 0.09 At Δp 6 bar: 14.0 m <sub>n</sub> <sup>3</sup> /h      At Δp = 1.4 bar: 4.5 m <sub>n</sub> <sup>3</sup> /h,      K <sub>vmax</sub> (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: Effect of vibration: Supply air:	≤0.15 %/10 K ≤0.25 % up to 2000 Hz and 4 g according to IEC 770 None
Electromagnetic compatibility	Complying with EN 61000-6-2, EN 61000-6-3 and NAMUR Recommendation NE 21	
Explosion protection <sup>2)</sup>	Intrinsic safety: <b>ATEX, STCC, CSA, GOST</b>	
Degree of protection	IP 66	
Compliance	<b>CE · EAC</b>	
Materials		
Housing	Polyphthalamide (PPA)	
Cover	Polycarbonate (PC) <sup>3)</sup>	
External parts	Stainless steel 1.4571 and 1.4301	
Cable gland	M20 x 1.5, black polyamide (PA)	
Vent plugs	High-density polyethylene (PE-HD)	
Weight	<b>Approx. 0.5 kg</b>	

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

<sup>2)</sup> See Table 2 on page 4 for details on explosion protection certificates.



<sup>3)</sup> Makrolon®

## Article code

Positioner	Type 3725-	x	x	x	0	0	0	0	x	0	0
With LCD and autotune, 4 to 20 mA reference variable											
Explosion protection <sup>1)</sup>											
Without		0	0	0							
Intrinsic safety: <b>ATEX</b>		1	1	0	0						
Intrinsic safety: <b>STCC</b>		1	1	0	0						
Intrinsic safety: <b>CSA c/us</b>		1	3	0	0						
Intrinsic safety: <b>GOST</b>		1	1	3	0						
Shipbuilding certificate											
Without									0		
Bureau Veritas certification									1		

<sup>1)</sup> See Table 2 for details on explosion protection certificates.

**Table 2:** Summary of explosion protection certificates

Type	Certification	Type of protection
3725-1100	<b>STCC</b> On request	
	 Number PTB 11 ATEX 2020 X	II 2 G Ex ia IIC T4
	Date 2011-08-25	
	EC type examination certificate	
3725-113	 Number RU C-DE.GB08.B.00697	1 Ex ia IIC T4 Gb X
	Date 2014-12-15	
	Valid until 2019-12-14	
3725-130	<b>CSA c/us</b> Number 2703735 X	Ex ia IIC T4; Class I, Zone 0, AEx ia IIC T4; Class I, Div. 1, Groups A, B, C, D
	Date 2014-06-03	

## 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 cm<sup>2</sup>), 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 cm<sup>2</sup> 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 (without pneumatic connecting rail)

Direct attachment to Type 3277 Actuator (120 to 700 cm<sup>2</sup>)

Attachment according to IEC 60534-6-1 (NAMUR)

Attachment to rotary actuators according to VDI/VDE 3845

Attachment to Type 3278 Rotary Actuator (160/320 cm<sup>2</sup>)

Pneumatic connecting rail

G 1/4 or 1/4 NPT

Pressure gauge (max. 6 bar)

With/without

