

Application

Single-acting or double-acting positioner for attachment to pneumatic control valves

Reference variable 4 to 20 mA

Travels 5.3 to 200 mm



JIS

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

Special features

- Easy attachment to common linear actuators over SAMSON direct attachment interface (Fig. 1), over NAMUR rib (Fig. 3) or to control valves with rod-type yokes according to IEC 60534-6
- Any desired mounting position
- Calibrated travel sensor without gears susceptible to wear
- Analog pneumatic output prevents pulsing in case of leaking actuator
- Fast analog control loop
- High control accuracy (fine tuning) without dead band and continuous pneumatic output
- Two-wire system with small electric load below 300 Ω for explosion-protected version and version without explosion protection
- Output pressure limitation over DIP switch
- Selectable tight-closing function with fixed switching point
- Low air consumption of approx. 110 l_n/h independent of supply and output pressure
- Aluminum housing in IP 66 degree of protection
- Check valve in the exhaust air port
- Resistant to shock and vibrations
- Extended temperature range also for intrinsically safe version
- Travel range selectable over DIP switches within the rated travel range
- Zero and span adjustable over potentiometers
- Reference variable range and direction of action adjustable over DIP switches, e.g. for split-range operation
- Certified according to IEC 61508/SIL

Additional options

- Stainless steel housing



Fig. 1 · Type 3730-0 Positioner, direct attachment to Type 3277 Pneumatic Actuator

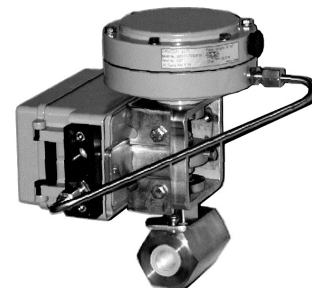


Fig. 2 · Type 3730-0 Positioner on Type 3510 Micro-flow Valve



Fig. 3 · Type 3730-0 Positioner, NAMUR attachment

Principle of operation

The electropneumatic positioner is attached to pneumatic control valves. It is used to assign the valve stem position (controlled variable x) to the input signal (reference variable w). The input signal received from a control system is compared to the travel of the control valve, and an output signal pressure (output variable y) is produced.

The positioner consists of a travel sensor system proportional to resistance, an analog i/p converter with a downstream booster and the electronics with microcontroller.

The position of the valve stem is transmitted as a linear travel motion over the pick-up lever to the travel sensor (2) and supplied to an analog PD controller (3). The PD controller compares this actual value to the DC control signal coming from the control system, e.g. a 4 to 20 mA signal. In case of a system deviation, the operation of the i/p converter (6) is changed so that the actuator of the control valve (1) is pressurized or vented accordingly over the downstream booster (7).

This causes the valve plug to move to the position determined by the reference variable.

The supply air is supplied to the booster and the pressure regulator (8). An intermediate flow regulator (9) with fixed settings is used to purge the positioner and, at the same time, guarantees trouble-free operation of the booster.

The output signal pressure of the booster can be limited by activating DIP switch S5 (4).

The volume restriction (10) and DIP switch S6 are used to optimize the positioner by adapting it to the actuator size and changing the gain factor.

Operation

The positioner is operated and adjusted over potentiometers and DIP switches. The configuration of the positioner is facilitated by instructions included on the inside of the cover which are intended to ensure a quick and trouble-free adaptation of the positioner to the control valve.

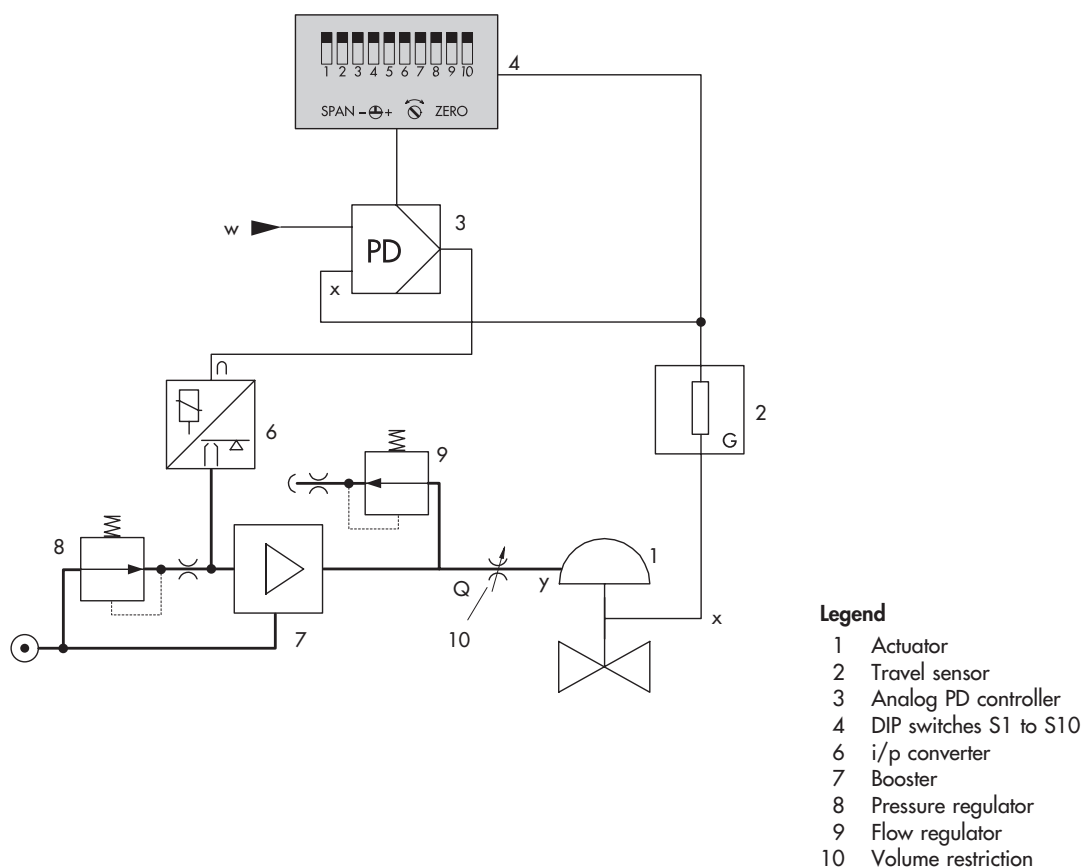


Fig. 4 · Functional diagram of the Type 3730-0 Positioner

Table 1 · Technical data

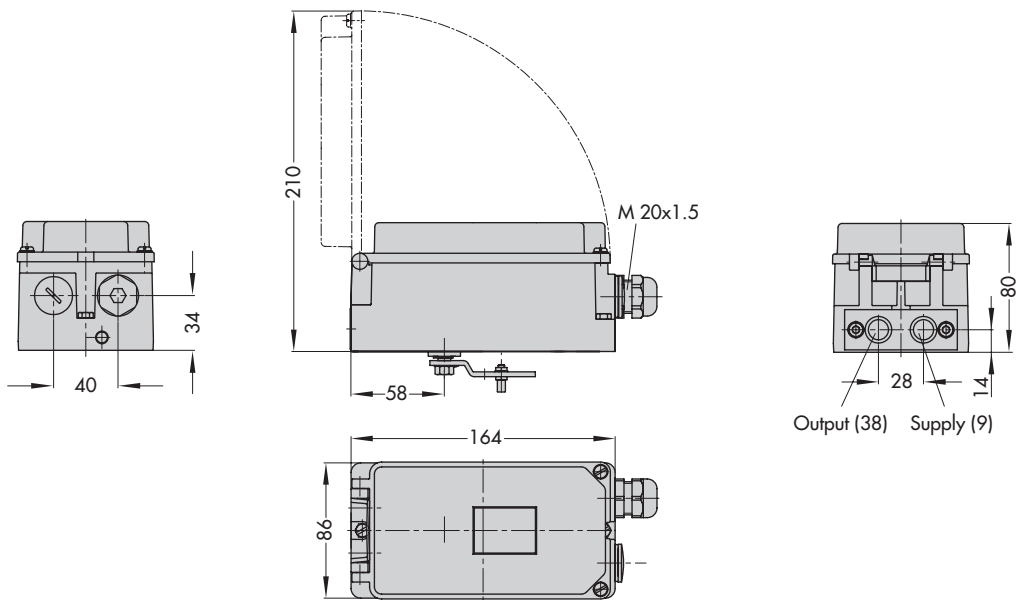
Type 3730-0 i/p Positioner			
Travel	Adjustable	Direct attachment to Type 3277 Actuator	5.3 to 30 mm (lever M)
		Attachment to Type 3510 Micro-flow Valve	5.3 to 15 mm (lever S)
		Attachment acc. to IEC 60534-6 (NAMUR)	5.3 to 200 mm (lever S, M, L, XL)
Travel range	Adjustable	Within the initialized travel/angle of rotation; restricted to 1/5 at the maximum	
Reference variable w	Signal range	4 to 20 mA · 4 to 12 mA and 12 to 20 mA Adjustable over DIP switches S6 and S7	
	Static destruction limit	100 mA	
Minimum current		> 3.6 mA	
Load impedance		≤ 6 V (corresponds to 300 Ω at 20 mA) for versions with and without explosion protection	
Supply air	Supply air	1.4 to 7 bar (20 to 105 psi)	
	Air quality	According to ISO 8573-1: Max. particle size and density: Class 2 · 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. 2.4 bar over DIP switch S5	
Characteristic		Linear · Deviation ≤ 1 %	
Hysteresis		≤ 1 %	
Sensitivity		≤ 0.1 %	
Direction of action	Adjustable	Over DIP switch S4	
Air consumption		Independent of supply air approx. 110 l _n /h at a supply pressure of 4 bar	
Air output capacity for the actuator to be	Pressurized	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	
	Vented	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 · -45 to +80 °C with metal cable gland The limits in the EC Type Examination Certificate additionally apply for explosion-protected versions	
Influences	Temperature	≤ 0.15 %/10 K	
	Supply air	None	
	Vibrations	≤ 0.25 % up to 2000 Hz and 4 g according to IEC 770	
Electromagnetic compatibility		Complies with EN 61000-6-2, EN 61000-6-3 and NAMUR Recommendation NE 21 requirements	
Electrical connections		One M20 x 1.5 cable gland for 6 to 12 mm clamping area · Second M20 x 1.5 threaded connection additionally exists · Screw terminals for 2.0 to 2.5 mm ² wire cross-section	
Explosion protection		See table below	
Degree of protection		IP 66 / NEMA 4X	
Implementation in safety-related systems in compliance with IEC 61508/SIL		Probability of failure on demand of safety functions PFD < 2.8 × 10 ⁻⁷ for a confidence level of 95 %. The safe failure fraction (SFF) according to Table A1 in IEC 61508-2 is greater or equal to 0.99. Suitable for implementation in safety-related systems with a hardware fault tolerance of 1 or 2 up to and including SIL 4.	
Materials			
Housing		Die-cast aluminum EN AC-ALSi12(Fe) (EN AC-44300) acc. to DIN EN 1706 Chromated and powder paint coated · Special version in stainless steel 1.4581	
External parts		Stainless steel 1.4571 and 1.4301	
Cable gland		Polyamide, black, M20 x 1.5	
Weight		Approx. 1 kg	

Summary of explosion protection certificates

Type of approval	Certificate number	Date	Comments
EC Type Examination Certificate First Addendum	PTB 03 ATEX 2099	2003-07-21	⊕ II 2 G EEx ia IIC T6 Perm. ambient temperature T6/50 °C; Type 3730-01
		2006-08-25	II 2 D IP 66 T 80 °C
Statement of Conformity First Addendum	PTB 03 ATEX 2179 X	2003-09-30	⊕ II 3 G EEx nA II T6
		2004-12-09	II 3 G EEx nL IIC T6; Zone 2 II 3 D IP 54/65 T 80 °C; Zone 22; Type 3730-08
FM approval	3021579	2004-12-01	Cl. I, II, III; Div. 1; Gr. A, B, C, D, E, F, G Cl. I, Zone 0, AEx ia IIC T6 Cl. I; Div. 2; Gr. A, B, C, D NEMA Type 4X; Type 3730-03
GOST approval	POCC 04.B00267 C3-409/05	2005-01-24	0 Ex ia IIC T6 X; 2 Ex nA II T6 X DIP A21 Ta 80 °C, IP 65; Type 3730-01 Valid until 2008-01-24
JIS approval	TC17330	2005-07-29	Ex ia IIC T6; Type 3730-07

Dimensions in mm

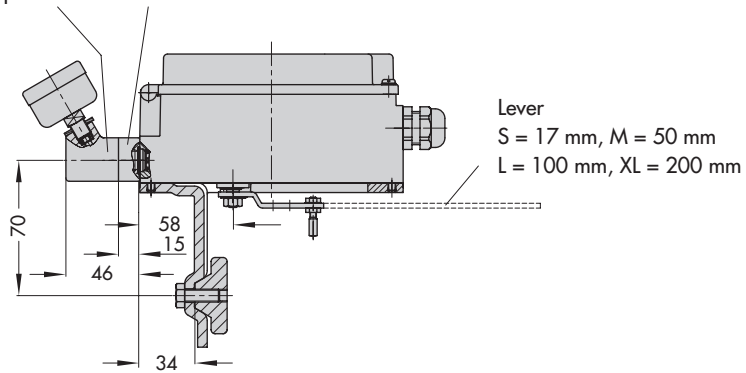
Direct attachment



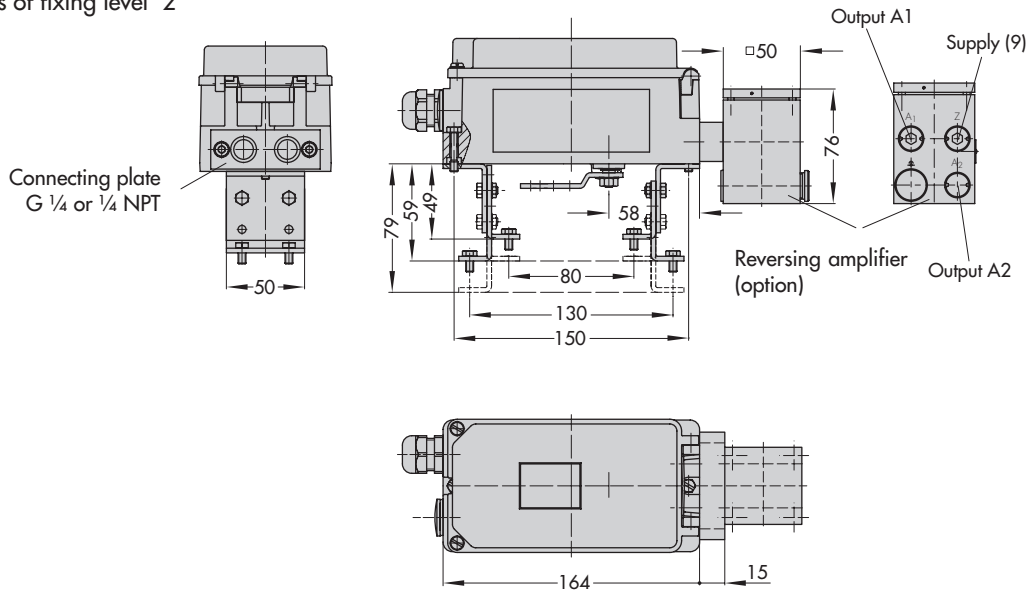
Attachment acc. to IEC 60534-6 and NAMUR

Pressure gauge bracket
G 1/4 or 1/4 NPT

or connecting plate



Attachment to rotary actuators VDI/VDE 3845 for all sizes of fixing level 2



Article code

Positioner	Type 3730- 0 x 0 0 0 0 0 0 0 0 0 x 0 0 x 0 0 0																					
With DIP switches, 4 ... 20 mA reference variable*																						
Explosion protection																						
Without	0																					
⊕ II 2 G EEx ia IIC T6 acc. to ATEX	1																					
Ex ia acc. to FM/CSA	3																					
Ex ia Japan JIS	7																					
⊕ II 3 G EEx nA/nL II T6 and ⊕ II 3 D IP 54/65 T 80 °C acc. to ATEX	8																					
Housing material																						
Standard aluminum												0										
Stainless steel 1.4581												1										
Special applications																						
Without																				0		
Device compatible with paint (lowest permissible ambient temperature -20 °C)																				1		
Exhaust air connection with ¼-18 NPT thread																				2		
Special version																						
None																				0	0	0
GOST approval Ex ia/Ex nA	1																			0	1	4

* Additional functions such as limit switches, solenoid valve, position transmitter or external position sensor, e.g. with Type 3730-2 Positioner

Attachment of the positioner

The Type 3730-0 Electropneumatic Positioner can be mounted directly on a Type 3277 Actuator. When attached to Type 3277-5 (120 cm²) and to actuators with fail-safe action "Actuator stem extends", the signal pressure is routed to the actuator through an internal bore in the actuator yoke.

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

Using the appropriate bracket, the positioner can also be attached according to IEC 60534-6 (NAMUR recommendation). The positioner can be mounted on either side of the control valve.

Ordering text

Positioner Type 3730-0x

- Without pneumatic connection (only for direct attachment to Type 3277 Actuator)
- With pneumatic connecting rail ISO 228/1 - G ¼
- With pneumatic connecting rail ¼-18 NPT
- Without/with pressure gauge up to max. 6 bar
- Attachment to Type 3277 Actuator (120/240/350/700 cm²)
- Attachment according to IEC 60534-6 (NAMUR)
- Travel: ... mm
If applicable, stem diameter: ... mm
- Adapter M 20x1.5 to ½ NPT
- Metal cable gland

Specifications subject to change without notice



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