

## T 8384-1 EN

### Type 3730-1 Electropneumatic Positioner

Series 3730



#### Application

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

<b>Set point</b>	<b>4 to 20 mA</b>
<b>Travels</b>	<b>3.75 to 200 mm</b>
<b>Opening angle</b>	<b>24 to 100°</b>

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

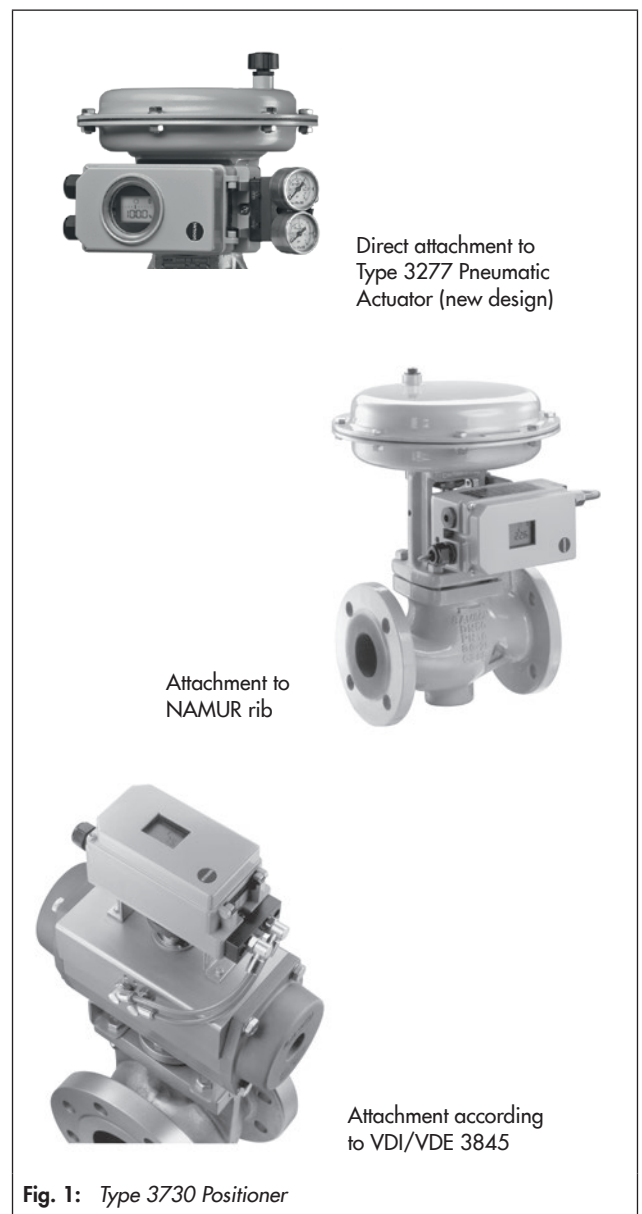
- Simple attachment to all common linear and rotary actuators with interface for SAMSON direct attachment, NAMUR rib or valves with rod-type yokes according to IEC 60534-6-1, or to rotary actuators according to VDI/VDE 3845
- Any desired mounting position of the positioner
- Simple single-knob, menu-driven operation
- LCD easy to read in any mounted position due to selectable reading direction
- Variable, automatic start-up
- Preset parameters - only values deviating from the standard need to be adjusted
- Calibrated travel sensor without gears susceptible to wear
- Permanent storage of all parameters in EEPROM (protected against power failure)
- Two-wire system with a small electrical load of 300  $\Omega$
- Tight-closing function can be activated
- Continuous monitoring of zero point
- Two standard programmable position alarms

#### Version

- **Type 3730-1:** electropneumatic positioner with on-site operation and LCD

#### Additional options

- Inductive limit contact with proximity switches
- Stainless steel housing



## 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 opening 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 filled with air. If necessary, the signal pressure change can be slowed down with a volume restriction that can be connected as necessary.

A constant air stream with a fixed set point to the atmosphere is created by flow regulator (9) with a fixed set point.

The i/p module (6) is supplied with a constant upstream pressure by the pressure regulator (8) to compensate for any fluctuations 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 sub-menus. 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  $180^\circ$ .

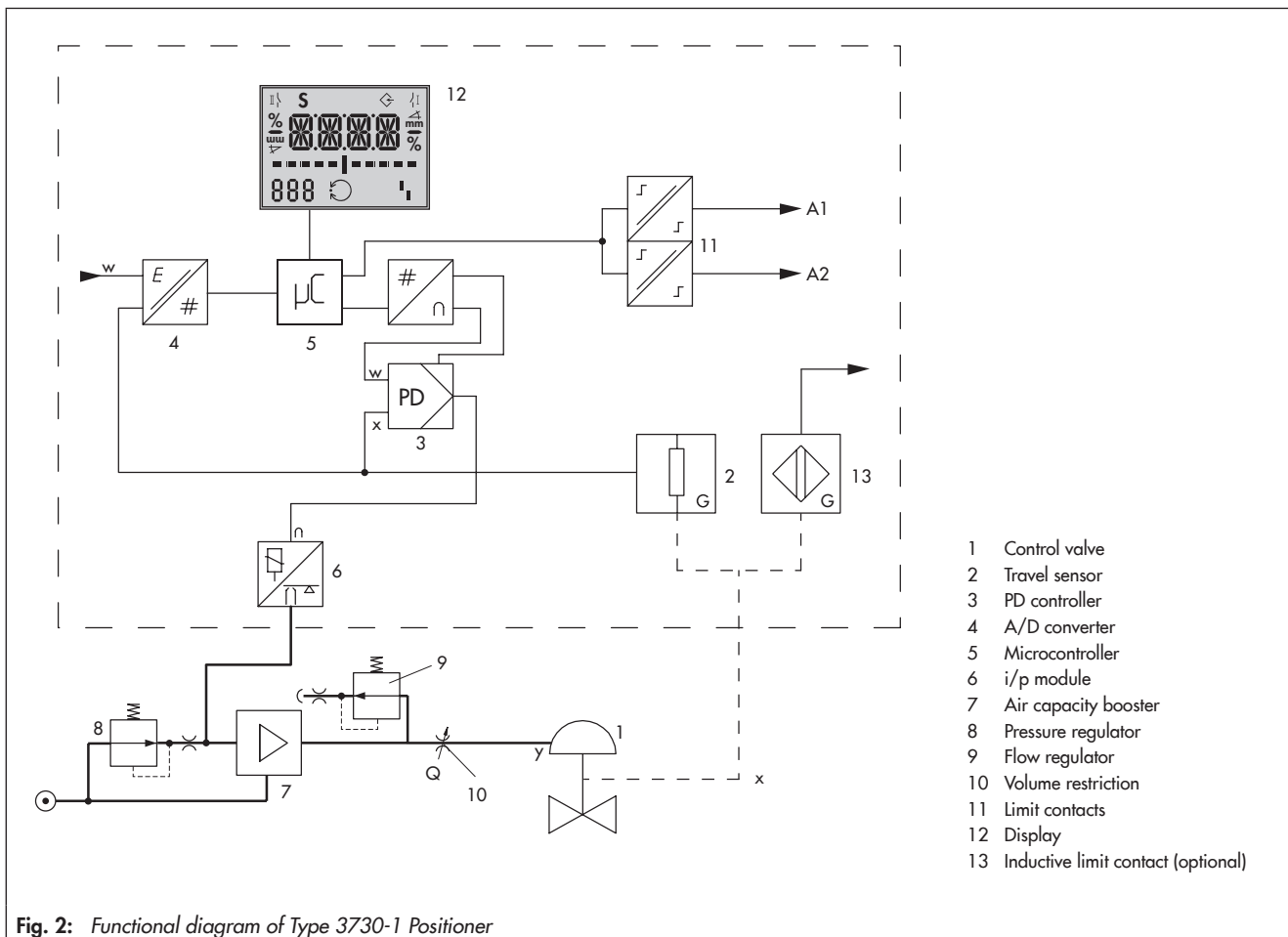








Fig. 2: Functional diagram of Type 3730-1 Positioner

**Table 1: Technical data of Type 3730-1 Positioner**

The technical data for the explosion-protected devices may be restricted by the limits specified in the test certificates.			
Travel	Adjustable	Direct attachment to Type 3277 Actuator	3.6 to 30 mm
		Attachment according to IEC 60534-6 (NAMUR)	3.6 to 200 mm
		Attachment to rotary actuators according to VDI/VDE 3845	24 to 100° opening angle
Travel range		Adjustable within the initialized travel/angle of rotation; 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	
	Split-range operation	4 to 11.9 mA and 12.1 to 20 mA	
	Static destruction limit	100 mA	
Minimum current		3.7 mA	
Load impedance		≤6 V (corresponding to 300 Ω at 20 mA)	
		1.4 to 7 bar (20 to 105 psi)	
Supply air	Air quality acc. to ISO 8573-1 (edition 2001-02)	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. 2.4 bar over software	
Characteristic		Optionally, 3 characteristics for globe valves and 8 characteristics for rotary valves	
Hysteresis		≤1 %	
Sensitivity		≤0.1 %	
Transit time		<0.5 s for initialization not permissible · Adaptation over volume restriction Q	
Direction of action		Reversible	
Air consumption		Independent from supply pressure approx. 110 l <sub>n</sub> /h	
Air output capacity	to fill actuator with air	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(20 °C)</sub> = 0.09
	to vent actuator	At Δp = 6 bar: 14.0 m <sub>n</sub> <sup>3</sup> /h	At Δp = 1.5 bar: 4.5 m <sub>n</sub> <sup>3</sup> /h · K <sub>Vmax(20 °C)</sub> = 0.15
Permissible ambient temperature		-20 to 80 °C in all versions -45 to 80 °C with metal cable gland <b>The temperature limits for the explosion-protected devices may be restricted by the limits specified in the test certificates.</b>	
Influences	Temperature	≤0.15 %/10 K	
	Supply air	None	
	Effect of vibration	≤0.25 % of 15 to 1500 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 M20 x 1.5 cable gland for 6 to 12 mm clamping range · Second M20 x 1.5 threaded connection additionally exists · Screw terminals for 0.2 to 2.5 mm <sup>2</sup> wire cross-sections	
Explosion protection		See Table 2	
Degree of protection		IP 66/NEMA 4X	
Use in safety-instrumented systems (SIL)		Observing the requirements of IEC 61508, the systematic capability of the pilot valve for emergency venting as a component in safety-instrumented systems is given.	
		Use is possible on observing the requirements of IEC 61511 and the required hardware fault tolerance in safety-instrumented systems up to SIL 2 (single device/HFT = 0) and SIL 3 (redundant configuration/HFT = 1).	
Weight		1.0 kg · Special version in stainless steel: 2.2 kg	
Compliance			
<b>Materials</b>			
Housing		Die-cast aluminum EN AC-ALSi12(Fe) (EN AC-44300) acc. to DIN EN 1706, chromated and powder coated · Special version: stainless steel 1.4408	
External parts		Stainless steel 1.4404/316L	
Cable gland		M20 x 1.5, black polyamide	
<b>Binary contacts</b>			
Two software limit contacts with configurable limits (0.5 % steps), reverse polarity protection, floating · See rows below for default settings			
Signal state		Version without explosion protection	Ex
		No response: Conductive (R = 348 Ω) Response: Non-conducting	No response: ≥ 2.2 mA Response: ≤ 1.0 mA
Operating voltage		For connection to the binary input of the PLC acc. to IEC 61131-2, P <sub>max</sub> = 400 mW or for connection to NAMUR switching amplifier acc. to EN 60947-5-6	For connection to NAMUR switching amplifier acc. to EN 60947-5-6
<b>Options</b>			
Pepperl+Fuchs inductive limit contact		For connection to switching amplifier acc. to EN 60947-5-6. Can be used in combination with a software limit contact.	
SJ2-SN proximity switch		Measuring plate not detected: ≥3 mA · Measuring plate detected: ≤1 mA	

**Table 2: Explosion protection certificates**

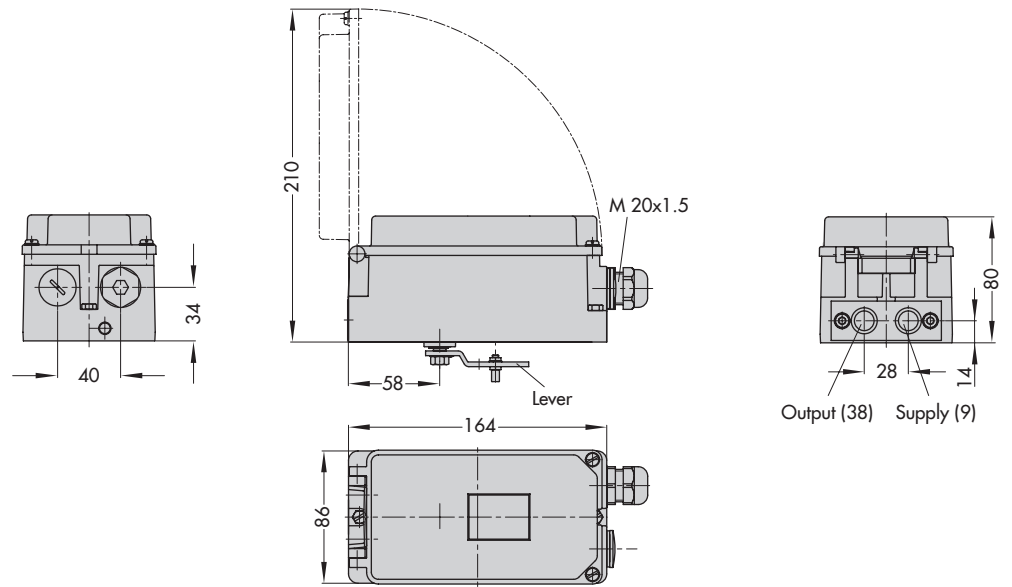
Type	Certification			Type of protection/comments
-7	<b>STCC</b>	Number	ZETC/14/2018	0Ex ia IIC T6X 2Ex s II T6 X
		Date	2018-04-27	
		Valid until	2021-04-26	
-11	 <sup>1)</sup>	Number	PTB 04 ATEX 2033	II 2G Ex ia IIC T6..T4 Gb; II 2D Ex ia IIIC T80°C Db
		Date	2017-01-24	
	<b>CCoE</b>	Number	A/P/HQ/MH/144/1164	Ex ia IIC T6
		Date	2014-10-27	
		Valid until	2019-10-26	
		Number	RU C-DE.AA87.B.01278	1 Ex ia IIC T6/T5/T4 Gb X Ex tb IIIC T80°C Db X
Date		2018-11-30		
	Valid until	2023-11-29		
<b>IECEX</b>	Number	IECEX PTB 06.0055X	Ex ia IIC T6...T4 Gb; Ex ia IIIC T80°C Db	
	Date	2017-01-26		
<b>NEPSI</b>	On request			
-13	<b>CSA</b>	Number	1675820	Ex ia IIC T6; Class I, Zone 0; Class II, Groups E, F, G; Ex nA II T6; Class I, Zone 2 Class I, Div.2, Groups A, B, C, D Class II, Div.2, Groups E, F, G Class III: Type 4 Enclosure
		Date	2017-05-18	
<b>FM</b>	Number	3023478	Class I, Zone 0 AEx ia IIC Class I, II, III, Div.1, Groups A, B, C, D, E, F, G Class I, Div.2, Groups A, B, C, D Class II, Div.2, Groups F, G NEMA Type 4X	
	Date	2008-11-03		
-15	 <sup>1)</sup>	Number	PTB 04 ATEX 2033	II 2D Ex tb IIIC T80°C Db
		Date	2017-01-24	
<b>IECEX</b>	Number	IECEX PTB 06.0055X	Ex tb IIIC T80°C Db	
	Date	2017-01-26		
3730 -18	 <sup>2)</sup>	Number	PTB 04 ATEX 2114 X	II 3G Ex nA II T6 Gc; II 3D Ex tc IIIC T80°C Dc
		Date	2017-01-26	
		Number	RU C DE.08.B.01278	2 Ex nA IIC T6/T5/T4 Gc X 2 Ex ic IIC T6/T5/T4 Gc X Ex tc IIIC T80°C Dc X
		Date	2018-11-30	
	Valid until	2023-11-29		
<b>IECEX</b>	Number	IECEX PTB 06.0055X	Ex nA IIC T6...T4 Gc; Ex tc IIIC T80°C Dc	
	Date	2017-01-26		
<b>NEPSI</b>	Number	GY14.1110X	Ex ic IIC T4~T6 Gc; Ex nA IIC T4~T6 Gc	
	Date	2014-05-08		
	Valid until	2019-05-07		

<sup>1)</sup> EC type examination certificate

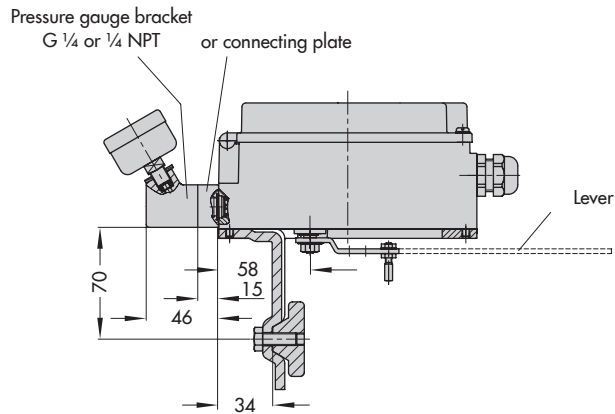
<sup>2)</sup> Statement of conformity

Dimensions in mm

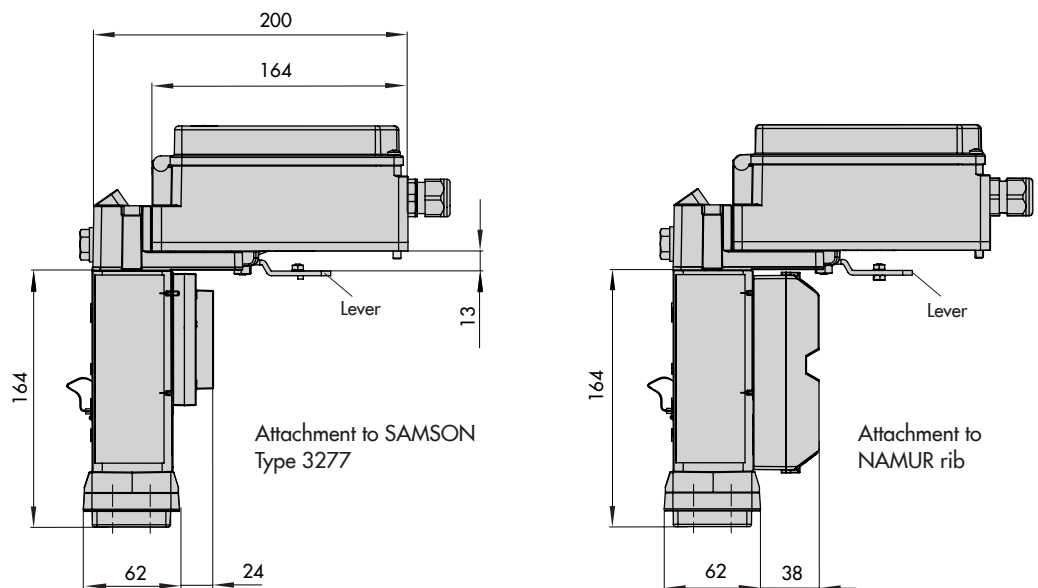
Direct attachment



Attachment according to IEC 60534-6 (NAMUR)

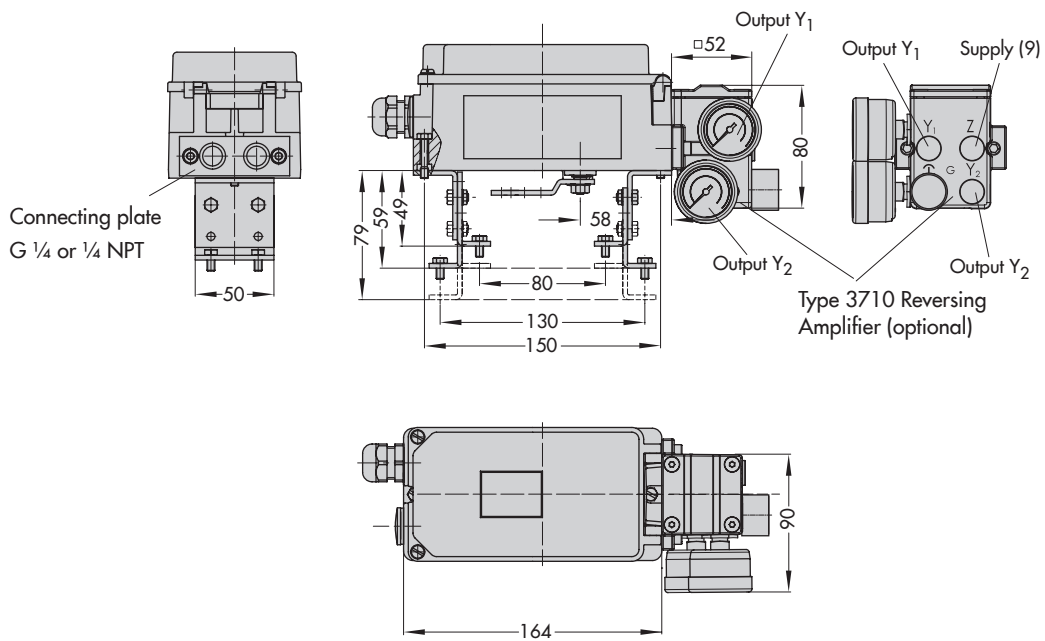


Attachment according to VDI/VDE 3847



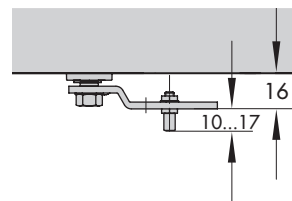
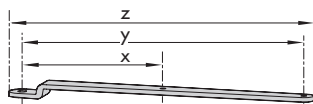
Dimensions in mm

Attachment to rotary actuators



Lever

Lever	x	y	z
S	17 mm	25 mm	33 mm
M	25 mm	50 mm	66 mm
L	70 mm	100 mm	116 mm
XL	100 mm	200 mm	216 mm



## Article code

Positioner	Type 3730-1	x	x	0	0	0	0	0	0	0	0	x	0	0	x	0	0	0
With LCD and autotune, 4 to 20 mA set point, two software limit contacts*																		
Explosion protection																		
Without		0																
ATEX: II 2G Ex ia IIC T6..T4 Gb; II 2D Ex ia IIIC T80°C Db		1																
FM/CSA: Class I, Zone 0 AEx ia IIC; Class I, II, III, Div.1, Groups A–G; Class I, Div.2, Groups A–D; Class II, Div.2, Groups F, G/ Ex ia IIC T6; Class I, Zone 0; Class II, Groups E–G; Ex nA II T6; Class I, Zone 2; Class I, Div.2, Groups A–D; Class II, Div.2, Groups E–G		3																
ATEX: II 2D Ex tb IIIC T80°C Db		5																
ATEX: II 3G Ex nA II T6 Gc; II 3D Ex tc IIIC T80°Dc		8																
Option: Inductive limit contact																		
Without		0																
With SJ2-SN proximity switch (NC contact)		1																
Housing material																		
Aluminum (standard)												0						
Stainless steel 1.4581												1						
Special applications																		
Without																		0
Device compatible with paint (lowest permissible ambient temperature –20 °C)																		1
Exhaust air port with ¼ NPT thread, back of housing sealed																		2
Special version																		
Without																		0 0 0

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

### Mounting the positioner

The Type 3730 Electropneumatic Positioner can be attached directly to the Type 3277 Actuator over a connection block.

In actuators with fail-safe action “actuator stem extends” and Type 3277-5 Actuator (120 cm<sup>2</sup>), the signal pressure is routed over an internal hole in the actuator yoke to the actuator.

In actuators with fail-safe action “actuator stem retracts” and in actuators with effective diaphragm areas of 175 cm<sup>2</sup> or 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 60534-6-1 (NAMUR recommendation). The positioner can be mounted on either side of the control valve.

A pair of universal brackets is used for the attachment to Type 3278 Rotary Actuators or other rotary actuators according to VDI/VDE 3845. The rotary motion of the actuator is transferred to the positioner over a coupling wheel with scale.

### Ordering text

Positioner Type 3730-1x

- Without pneumatic connecting rail (only when directly attached to Type 3277)
- 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
- Additional cover label with list of parameters and operating instructions in English/Spanish or English/French (standard version German/English)
- Attachment to Type 3277 Actuator (120 to 750 cm<sup>2</sup>)
- Attachment acc. to IEC 60534-6-1 (NAMUR)  
Travel: ... mm, if applicable, stem diameter: ... mm
- Attachment to Type 3278 Rotary Actuator (160/320 cm<sup>2</sup>)
- Attachment to rotary actuators according to VDI/VDE 3845
- Pneumatic reversing amplifier for double-acting actuators with connection acc. to ISO 228/1-G ¼ or ¼-18 NPT
- Adapter M20 x 1.5 to ½ NPT
- Metal cable gland
- Free of substances that impair paint adhesion
- Exhaust air port with ¼ NPT thread
- Special version: housing made of CrNiMo steel

