

Series 3730
Electropneumatic Positioner
Type 3730-0



Fig. 1 · Type 3730-0

Mounting and Operating Instructions

EB 8384-0 EN

Edition May 2007



Contents	Page
1	Design and principle of operation 6
1.1	Technical data 8
2	Attachment to the control valve – Mounting parts and accessories 9
2.1	Direct attachment 12
2.1.1	Type 3277-5 Actuator 12
2.1.2	Type 3277 Actuator 14
2.2	Attachment according to IEC 60534-6 16
2.3	Reversing amplifier for double-acting actuators 18
2.3.1	Pressure gauge attachment 18
2.4	Attachment to Type 3510 Micro-flow Valve 20
2.5	Attaching positioners with stainless steel housings 22
2.6	Air purging function for single-acting actuators 22
3	Connections 23
3.1	Pneumatic connections 23
3.1.1	Signal pressure gauges 24
3.1.2	Supply pressure 24
3.2	Electrical connections 25
4	Operation 27
4.1	Operator controls 27
5	Start-up and settings 28
5.1	Default switch positions 28
5.2	Fail-safe position 28
5.3	Volume restriction Q 28
5.4	Presetting the travel 29
5.5	Direction of action 29
5.6	Limiting the signal pressure 29
5.7	Reference variable 29
5.8	Connecting the positioner 30
5.9	Presetting zero 30
5.10	Gain factor 30
5.11	Adapting the travel 30

5.12	Activate the tight-closing function	30
6	Maintenance	31
7	Servicing explosion-protected devices	31
8	Dimensions in mm	32
	Certificates	33

General safety instructions



- ▶ *The positioner may only be assembled, started up or operated by trained and experienced personnel familiar with the product. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the relevant standards.*
- ▶ *Explosion-protected versions of this positioner may only be operated by personnel who have undergone special training or instructions or who are authorized to work on explosion-protected devices in hazardous areas. Refer to section 7 on Servicing explosion-protected versions.*
- ▶ *Any hazards that could be caused by the process medium, the operating pressure, the signal pressure or by moving parts of the control valve are to be prevented by means of the appropriate measures.*
- ▶ *If inadmissible motions or forces are produced in the actuator as a result of the supply pressure level, it must be restricted by means of a suitable supply pressure reducing station. Do not operate the positioner with the back of the positioner/exhaust air opening facing upwards. The exhaust air opening must not be sealed when the positioner is installed on site.*
- ▶ *Proper shipping and appropriate storage are assumed.*
- ▶ **Note!** *The device with a CE marking fulfils the requirements of the Directives 94/9/EC (ATEX) and 89/336/EEC (EMC). The declaration of conformity is available on request.*

Article code		Type 3730-0 X 0 0 0 0 0 0 0 0 0 X 0 0 X 0 X X																	
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 65 T 80 °C acc. to ATEX	8																	
Housing material	Aluminum								0										
	Stainless steel 1.4581								1										
Special applications	Without													0					
	Compatible with paint														1				
	Exhaust air with ¼ NPT connection														2				
Special versions	Without GOST approval															0	0	0	
	Ex ia/Ex nA	1														0	1	4	

1 Design and principle of operation

The electropneumatic positioner is mounted to pneumatic control valves and is used to assign the valve position (controlled variable x) to the control signal (reference variable w). The DC control signal received from a control unit is compared to the travel of the control valve and issues a signal pressure (output variable y).

A supply pressure between 1.4 to 6 bar is required. The electric input signal is a reference variable between 4 to 20 mA.

The positioner is designed depending on the corresponding accessories for direct attachment to Type 3277 Actuators or for attachment to actuators according to IEC 60534-6 (NAMUR).

The positioner basically consists of a travel sensor system which is proportional to resistance, an analog i/p converter with downstream air capacity booster, and analog controller electronics.

The position of the valve is transmitted as linear travel motion via pick-up lever and travel sensor (2) to an analog PD controller (3). The PD controller compares this actual position to the 4 to 20 mA DC control signal received from a control unit. In case of a system deviation, the operation of the i/p converter (6) is changed so that the actuator (1) is filled or vented via the downstream air capacity booster (7). This causes the valve plug to move to the position determined by the reference variable.

The pneumatic air capacity booster (7) and the pressure regulator (8) are provided with supply air. An intermediate flow regulator

(9) with fixed settings is used to purge the positioner and also guarantees trouble-free operation of the pneumatic booster.

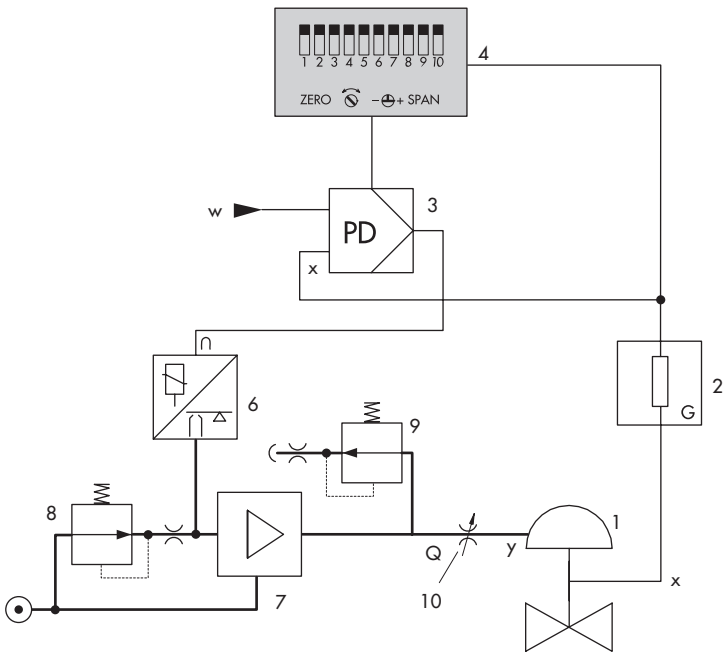
The output signal pressure supplied by the booster can be limited over the DIP switch **S5**.

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

Tight-closing function:

After activating the tight-closing function (refer to section 5.12), the pneumatic actuator is completely filled with air or vented as soon as the reference variable falls below or exceeds the corresponding deactivating point of 4.16 mA or 19.84 mA.



In the case of three-way valves, the function allows the plug move to the end position with full actuator force.



- 1 Control valve
- 2 Travel sensor
- 3 PD controller
- 4 DIP switches
- 6 i/p converter
- 7 Air capacity booster
- 8 Pressure regulator
- 9 Flow regulator
- 10 Volume restriction

Fig. 2 - Functional diagram

1.1 Technical data

Positioner	
Nominal travel, adjustable	Direct attachment to Type 3277: 5.3 to 30 mm, Attachment acc. to IEC 60534-6: 5.3 to 200 mm
Travel range	Adjustable within the rated travel, max. ratio 1:5
Reference variable w	Signal range 4 to 20 mA, split-range range 4 to 12 mA/12 to 20 mA, selectable at DIP switches. 2-wire device, reverse polarity protection, static destruction limit 100 mA.
Minimum current	> 3.6 mA
Load impedance	Version without explosion protection: $\leq 6 \text{ V}$ (corresponding to 300Ω at 20 mA), explosion-protected version: $\leq 6 \text{ V}$
Supply air	Supply pressure from 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 supply pressure, can be limited to approx. 2.4 bar over DIP switch
Characteristic	Linear; Deviation from terminal-based conformity $\leq 1 \%$
Hysteresis	$\leq 1 \%$
Sensitivity	$\leq 0.1 \%$
Direction of action	Selectable over DIP switch
Air consumption, st. state	Independent of supply pressure approx. $120 \text{ l}_n/\text{h}$
Air delivery Actuator pressurized Actuator vented	At $\Delta p = 6 \text{ bar}$: $8.5 \text{ m}_n^3/\text{h}$, at $\Delta p = 1.4 \text{ bar}$: $3.0 \text{ m}_n^3/\text{h}$ $K_{V\max(20^\circ\text{C})} = 0.09$ at $\Delta p = 6 \text{ bar}$: $14.0 \text{ m}_n^3/\text{h}$, at $\Delta p = 1.4 \text{ bar}$: $4.5 \text{ m}_n^3/\text{h}$ $K_{V\max(20^\circ\text{C})} = 0.15$
Permissible ambient temperature	-20 to $+80^\circ\text{C}$, with metal cable gland -45 to $+80^\circ\text{C}$ The limits specified in the EC Type Examination Certificate additionally apply for explosion-protected devices.
Influences	Temperature: $\leq 0.15 \%$ /10 K Supply air: None Vibration: $\leq 0.25 \%$ up to 2000 Hz and 4 g acc. to IEC 770
Electromagnetic compatibility	Complying with requirements specified in EN 61000-6-2, EN 61000-6-3 and NAMUR Recommendation NE 21
Explosion protection	 II 2 G EEx ia IIC T6 / II 2 D IP 65 T 80 °C or  II 3 G EEx nA/nL IIC T6 / II 3 D IP 65 T 80 °C
Degree of protection	IP 66
Materials	Die-cast aluminum EN AC-Al Si12(Fe) (EN AC-44300) acc. to DIN 1725, chromated and plastic coated; External parts: Stainless steel 1.4571 and 1.4301
Weight	Approx. 1 kg

2 Attachment to the control valve – Mounting parts and accessories

The positioner can be attached either directly to a SAMSON Type 3277 Actuator or according to IEC 60534-6 (NAMUR) to control valves with cast yokes or rod-type yoke.

For attachment to the various actuators, corresponding mounting parts and accessories are required. These are listed with their order numbers in Tables 1 to 4.

On attaching the positioner, it is important to observe the assignment between lever and pin position according to the travels listed in the **travel tables**.

The travel that can be achieved at the valve is restricted by the pin position used and additionally by the selected fail-safe action and the actuator spring compression required.

The positioner is standard equipped with the lever **M** (pin position **35**).

Note!

If the standard mounted lever M (pin position 35) is replaced, the newly mounted lever must be moved once all the way as far as it will go in both directions to adapt it to the internal measuring lever.

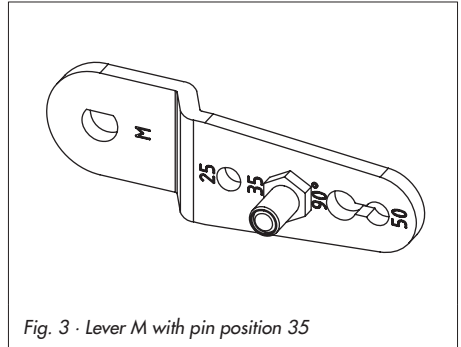


Fig. 3 · Lever M with pin position 35

Attachment to the control valve – Mounting parts and accessories

Travel table for direct attachment to Type 3277 Actuator							
Type 3277-5 and 3277 Actuators	Actuator size	Rated travel	Adjustment range at positioner		Required lever	Assigned pin position	
	cm ²	mm	Min.	Travel			Max.
	120	7.5	5.3		20.0	M	25
	120/240/350	15	5.3		35.4	M	35
700	30	9.5		50.0	M	50	
Travel table for attachment according to IEC 60534-6 (NAMUR)							
SAMSON valves			Other valves/actuators			Required lever	Assigned pin position
cm ²	Rated travel mm	Min.	Travel	Max.			
Type 3271 Actuator	60 and 120 with Type 3510 Valve	7.5	5.3		17.6	S	17
	120	7.5	5.3		17.6	M	25
	120/240/350	15	7.5		35.4	M	35
	700/1400/2800	15 and 30/30	10.0		50.0	M	50
	1400/2800	60	14.0		70.7	L	70
	1400/2800	60	20.0		100.0	L	100
	2800	120	40.0		200.0	XL	200

Table 1	Direct attachment to Type 3277-5 Actuator	Order no.
Mounting parts	For actuators with 120 cm ² effective diaphragm area, see Fig. 4	1400-7452
Accessories for the actuator	Switchover plate (old) for Actuator Type 3277-5xxxxx.00 (old)	1400-6819
	Switchover plate new for Actuator Type 3277-5xxxxx.01 (new)	1400-6822
	Connecting plate for additional attachment of a solenoid valve G 1/8	1400-6820
	Connecting plate (old) for Actuator Type 3277-5xxxxx.00 (old) 1/8 NPT	1400-6821
	Connecting plate new for Actuator Type 3277-5xxxxx.01 (new)	1400-6823
	Note: Only new switchover and connecting plates can be used with new actuators (Index 01). Old and new plates are not interchangeable.	
Accessories for the positioner	Connecting plate (6)	G ¼: 1400-7461 ¼ NPT: 1400-7462
	or pressure gauge bracket (7)	G ¼: 1400-7458 ¼ NPT: 1400-7459
	Pressure gauge mounting kit (8) up to max. 6 bar (output and supply)	Stainless steel/Brass: 1400-6950 Stainless steel/St. steel: 1400-6951

Table 2		Direct attachment to Type 3277 Actuator		
Accessories	Mounting parts for actuators with 240, 350 and 700 cm ² , see Fig. 5			1400-7453
	Required piping with screw fittings for "Actuator stem retracts" or when the top diaphragm chamber is filled with air	cm ²	Steel	Stainl. steel
		240	1400-6444	1400-6445
		350	1400-6446	1400-6447
700	1400-6448	1400-6449		
Connection block with seals and screw	G 1/4: 1400-8811	¼ NPT: 1400-8812		
Pressure gauge mounting kit up to max. 6 bar (output and supply)	Stainless steel/Brass: 1400-6950	Stainl. steel/St. steel: 1400-6951		

Table 3		Attachment to NAMUR ribs or control valves with rod-type yokes (20 to 35 mm rod diameter) according to IEC 60534-6, see Fig. 6		
Travel in mm	Lever	For actuators		Order no.
7.5	S	Type 3271-5 Actuator with 60/120 cm ² on Type 3510 Valve, see Fig. 8		1400-7457
5 to 50	Without (lever M on basic model)	Actuators from other manufacturers and Type 3271 with 120 to 700 cm ²		1400-7454
14 to 100	L	Actuators from other manufacturers and Type 3271, 1400-60 version		1400-7455
40 to 200	XL	Actuators from other manufacturers and Type 3271, versions 1400-120 and 2800 cm ² with 120 mm travel		1400-7456
30 or 60	L	Type 3271 Actuator, versions 1400-120 and 2800 cm ² (30 or 60 mm travel)		1400-7466
Mounting brackets for Emerson and Masoneilan linear actuators In addition, a mounting kit acc. to IEC 60534-6 is required depending on the travel. See row above.				1400-6771
Accessories	Connecting plate	G ¼: 1400-7461	¼ NPT: 1400-7462	
	or pressure gauge bracket (7)	G ¼: 1400-7458	¼ NPT: 1400-7459	
	Pressure gauge mounting kit up to max. 6 bar (output/supply)	St. steel/Brass: 1400-6950	St. steel/St. steel: 1400-6951	

Table 4		General accessories		
Accessories	Pneumatic reversing amplifier for double-acting actuators	G ¼	1079-1118	
		¼ NPT	1079-1119	
	Cable gland M20 x 1.5	Nickel-plated brass		1890-4875
	Adapter M 20 x 1.5 to ½ NPT, aluminum	0310-2149		
Cover plate with list of parameters and operating instructions		German/English (standard)	1990-3528	
		English/Spanish	1990-5769	
		English/French	1990-5768	

2.1 Direct attachment

2.1.1 Type 3277-5 Actuator

Refer to Table 1 on page 10 for the required mounting parts and the accessories with their order numbers as well as to the travel table on page 10!

Actuator with 120 cm²

Depending on the type of positioner attachment, the signal pressure is routed either left or right of the yoke through a bore to the actuator diaphragm. Depending on the fail-safe action of the actuator "Actuator stem extends" or "Actuator stem retracts" (valve closes or opens if the supply air fails), the switchover plate (9) must first be attached to the actuator yoke. Align the switchover plate with the corresponding symbol for left or right attachment according to the marking (view looking onto the switchover plate).

1. Mount connecting plate (6) or pressure gauge bracket (7) with pressure gauges onto the positioner, making sure both seal rings (6.1) are seated properly.
2. Remove screw plug (4) on the back of the positioner and close the signal pressure output "Output 38" on the connecting plate (6) or on the pressure gauge bracket (7) with the stopper (5) included in the accessories.
3. Place follower clamp (3) on the actuator stem, align and screw tight so that the mounting screw is located in the groove of the actuator stem.
4. Mount cover plate (10) with narrow side of the cut-out opening (Fig. 4, on the left) pointing towards the signal pressure connection. Make sure that the bonded gasket (14) points towards the actuator yoke.
5. **15 mm travel:** Keep the follower pin (2) at lever **M** (1) on the back of the positioner in the pin position **35** (delivered state).
7.5 mm travel: Remove the follower pin (2) from the pin position **35**, reposition it in the bore for pin position **25** and screw tight.
6. Insert formed seal (15) in the groove of the positioner casing.
7. Place positioner on the cover plate (10) in such a manner that the follower pin (2) rests on the top of the follower clamp (3). Adjust the lever (1) correspondingly and open the positioner cover to hold the positioner shaft in position at the cap or the switch. The lever (1) must rest on the follower clamp with spring force. Mount the positioner on the cover plate (10) using the two fixing screws. During the installation make sure that the seal ring (10.1) is inserted in the bore of the intermediate plate.
8. Mount cover (11) on the other side. Make sure that the vent plug points downwards when the control valve is installed to allow any condensed water that collects to drain off.

Attachment to the control valve – Mounting parts and accessories

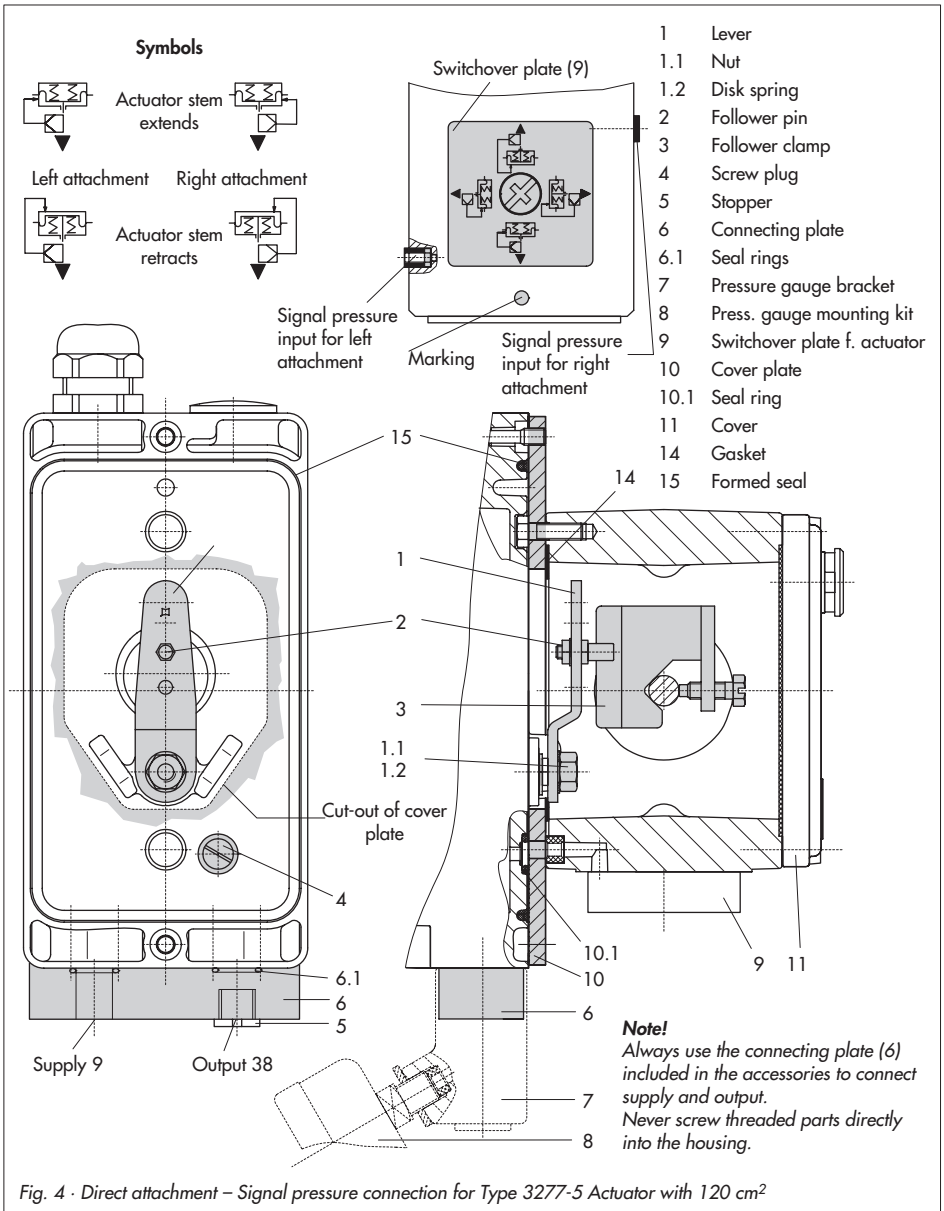


Fig. 4 - Direct attachment – Signal pressure connection for Type 3277-5 Actuator with 120 cm²

2.1.2 Type 3277 Actuator

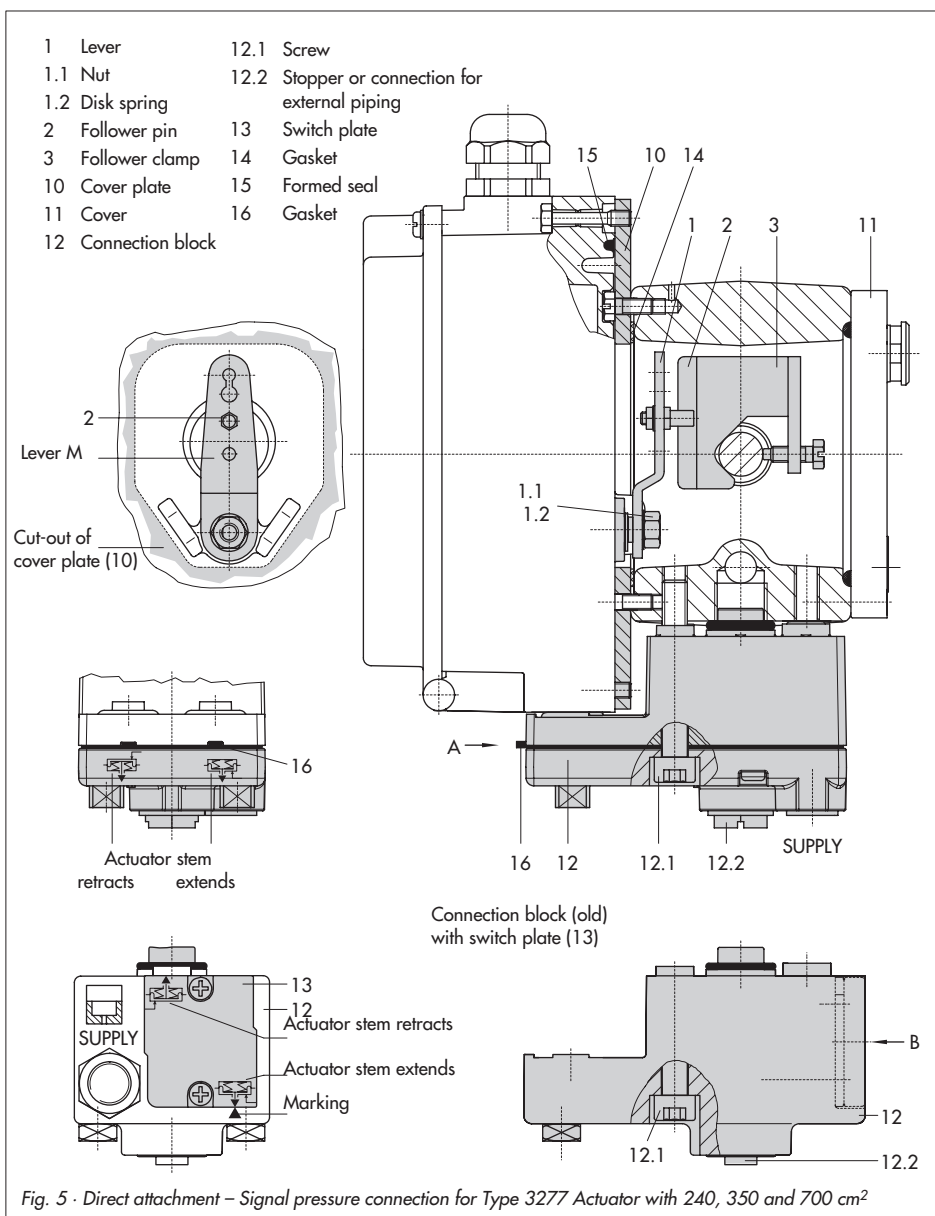
Refer to Table 2 on page 11 for the required mounting parts and the accessories with their order numbers as well as to the travel table on page 10!

Actuators with 240 to 700 cm²

The positioner can be mounted either on the left or on the right side of the yoke. The signal pressure is routed to the actuator over the connection block (12), for actuators with fail-safe action "Actuator stem extends" internally through a bore in the valve yoke and for "Actuator stem retracts" through external piping.

1. Place follower clamp (3) on the actuator stem, align and screw tight so that the mounting screw is located in the groove of the actuator stem.
2. Mount cover plate (10) with narrow side of the cut-out opening (Fig. 5, on the left) pointing towards the signal pressure connection. Make sure that the bonded gasket (14) points towards the actuator yoke.
3. For actuators with 700 cm², remove the follower pin (2) at lever **M** (1) on the back of the positioner from pin position **35**, reposition it in the bore for pin position **50** and screw tight.
For actuators 240 and 350 cm² with 15 mm travel, the follower pin (2) remains in pin position **35**.
4. Insert formed seal (15) in the groove of the positioner casing.
5. Place positioner on the cover plate in such a manner that the follower pin (2) rests on the top of the follower clamp (3). Adjust the lever (1) correspondingly and open the positioner cover to hold the positioner shaft in position at the cap or the switch. The lever (1) must rest on the follower clamp with spring force. Mount the positioner on the cover plate (10) using the two fixing screws.
6. Make sure that the tip of the gasket (16) projecting from the side of the connection block (12) is positioned above the actuator symbol that corresponds with the actuator with fail-safe action "Actuator stem extends" or "Actuator stem retracts." If necessary, remove the three fixing screws and the cover. Then reposition the gasket (16) turned by 180°. The previous version of the connection block (Fig. 5, bottom) requires the switch plate (13) to be turned such that the corresponding actuator symbol points to the marking.
7. Place the connection block (12) with the associated seal rings against the positioner and the actuator yoke. Screw it tight using the fixing screw (12.1). For actuators with fail-safe action "Actuator stem retracts", additionally remove the stopper (12.2) and fit on the external signal pressure piping.
8. Mount cover (11) on the other side. Make sure that the vent plug points downwards when the control valve is installed to allow any condensed water that collects to drain off.

Attachment to the control valve – Mounting parts and accessories



2.2 Attachment according to IEC 60534-6

The positioner is attached to the control valve with a NAMUR bracket (10).

Refer to Table 3 on page 11 for the required mounting parts and the accessories with their order numbers as well as to the travel table on page 10!

1. Screw the two bolts (14) to the bracket (9.1) of the stem connector (9), place the follower plate (3) on top and use the screws (14.1) to tighten.

Actuator size 2800 cm² and 1400 cm² with 120 mm travel:

For a travel of 60 mm or smaller, screw the longer follower plate (3.1) directly to the stem connector (9). For a travel exceeding 60 mm, mount the bracket (16) first and then the follower plate (3) to the bracket together with the bolts (14) and screws (14.1).

2. Mount NAMUR bracket (10) to the control valve as follows:
For attachment to the NAMUR rib, use an M8 screw (11) and toothed lock washer directly in the yoke bore.
For attachment to valves with rod-type yokes, use two U-bolts (15) around the yoke.
Align the NAMUR bracket (10) according to the embossed scale so that the slot of the follower plate (3) is centrally aligned with the NAMUR bracket at mid valve travel.

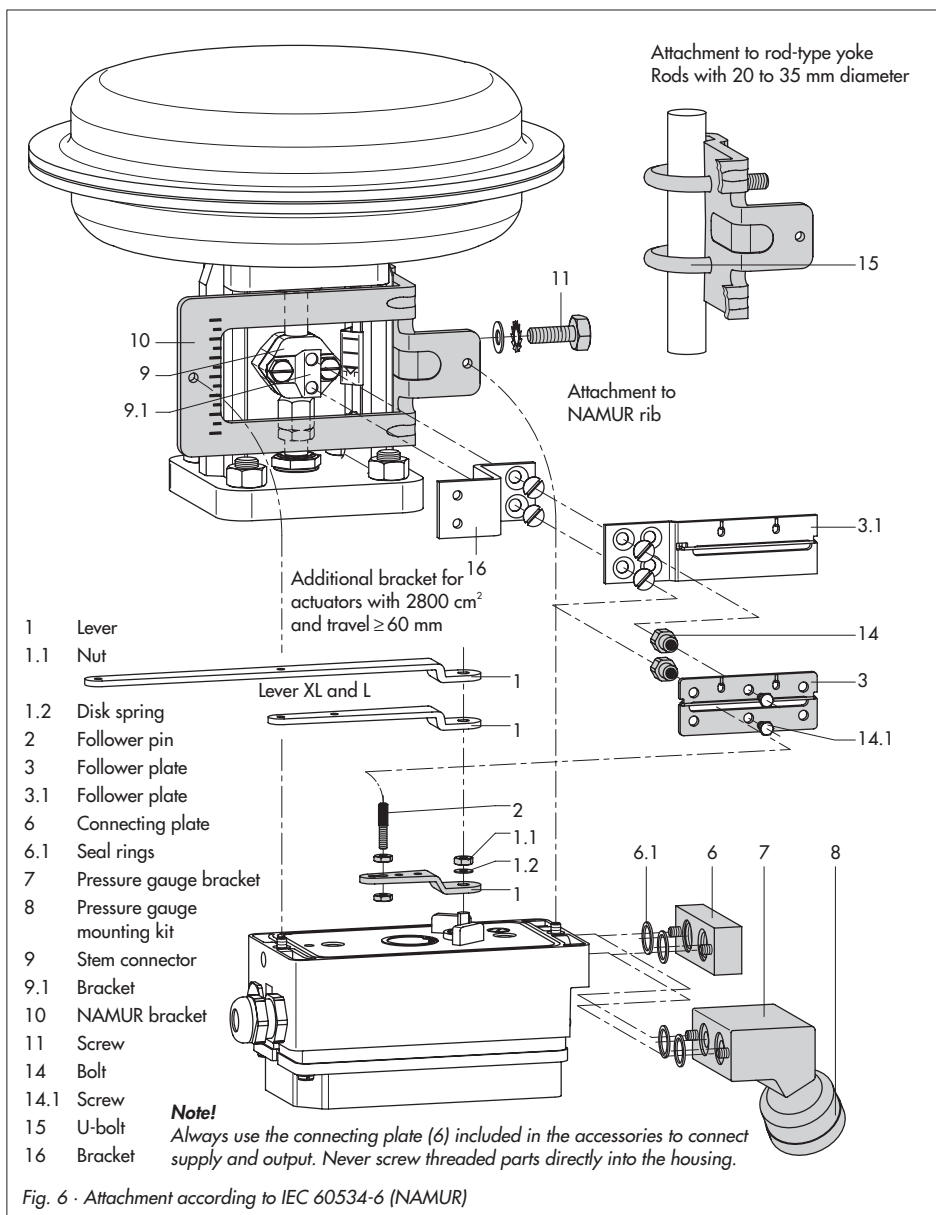
3. Mount connecting plate (6) or pressure gauge bracket (7) with pressure gauges (8) on the positioner, making sure both seal rings (6.1) are seated properly.
4. Select required lever size (1) **M**, **L** or **XL** and pin position according to the actuator size and valve travels listed at the bottom of the table.
Should you require a pin position other than position **35** with the standard installed lever **M**, or require a lever size **L** or **XL**, proceed as follows:
5. Screw the follower pin (2) in the assigned lever bore (pin position) as listed in the table. Only use the longer follower pin (2) included in the mounting kit.
6. Place lever (1) on the positioner shaft and screw tight using the disk spring (1.2) and nut (1.1).

Note!

If you have mounted a new lever (1), you must move it once all the way as far as it will go in both directions.

7. Place positioner on the NAMUR bracket in such a manner that the follower pin (2) rests in the slot of the follower plate (3, 3.1). Adjust the lever (1) correspondingly.
Screw the positioner to the NAMUR bracket using both its fixing screws.

Attachment to the control valve – Mounting parts and accessories



2.3 Reversing amplifier for double-acting actuators

For the use with double-acting actuators, the positioner must be fitted with a reversing amplifier. The reversing amplifier is listed as an accessory in the Table 4 on page 11.

The output signal pressure of the positioner is supplied at the output **A₁** of the reversing amplifier. An opposing pressure, which equals the required supply pressure when added to the pressure at **A₁**, is applied at output **A₂**.

The rule **A₁ + A₂ = Z** applies.

Mounting

1. Mount the connecting plate (6) from the accessories in Table 4 to the positioner. Make sure that both O-rings (6.1) are seated correctly.
2. Thread the special nuts (1.3) from the accessories of the reversing amplifier into the boreholes of the connecting plate.
3. Insert the gasket (1.2) into the recess of the reversing amplifier and push both the special hollow screws (1.1) into the connecting boreholes **A₁** and **Z**.
4. Place the reversing amplifier onto the connecting plate (6) and screw tight using both the special screws (1.1).
5. Use a screwdriver (8 mm wide) to screw the enclosed filters (1.6) into the connecting boreholes **A₁** and **Z**.

Note!

The sealing plug (1.5) should not be unscrewed out of the reversing amplifier. The rubber seal (1.4) is not required and can be removed when the sealing plug is used.

Signal pressure connections

A₁: Output **A₁** leading to the signal pressure connection at the actuator which opens the valve when the pressure increases

A₂: Output **A₂** leading to the signal pressure connection at the actuator which closes the valve when the pressure increases

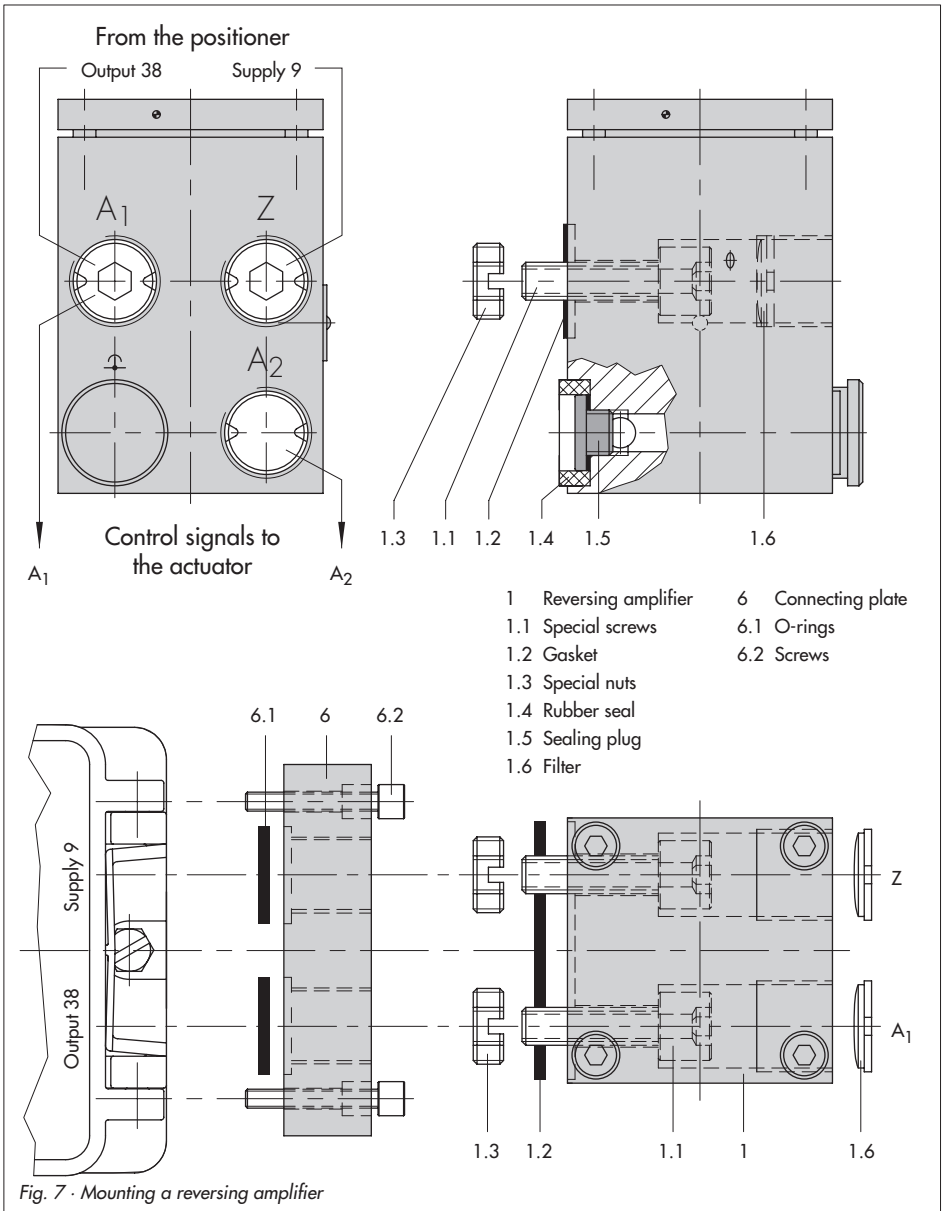
- Position the DIP switch **S1** according to the symbol AIR TO OPEN as described in section 5.2.

2.3.1 Pressure gauge attachment

The mounting sequence shown in Fig. 7 remains unchanged. Screw a pressure gauge bracket onto the connections **A₁** and **Z**.

Pressure gauge	G ¼	1400-7106
bracket	¼ NPT	1400-7107

Pressure gauges for supply air Z and output **A₁** as listed in Tables 1 to 4



2.4 Attachment to Type 3510 Micro-flow Valve

The positioner is attached to the valve yoke using a bracket.

Refer to Table 3 on page 11 for the required mounting parts and the accessories with their order numbers as well as to the travel table on page 10!

1. Place clamp (3) on the valve stem connector, align at a right angle and screw tight.
2. Screw bracket (10) to the valve yoke using two screws (11).
3. Mount connecting plate (6) or pressure gauge bracket (7) with pressure gauges to the positioner, making sure both O-rings (6.1) are seated properly.
4. Unscrew the standard installed lever **M** (1) including follower pin (2) from the positioner shaft.
5. Take lever **S** (1) and screw follower pin (2) in the bore for pin position **17**.
6. Place lever **S** on the positioner shaft and screw tight using the disk spring (1.2) and nut (1.1).
Move lever once all the way as far as it will go in both directions.
7. Place positioner on the bracket (10) in such a manner that the follower pin slides into the groove of the clamp (3). Adjust the lever (1) correspondingly. Screw the positioner to the bracket (10) using both its screws.

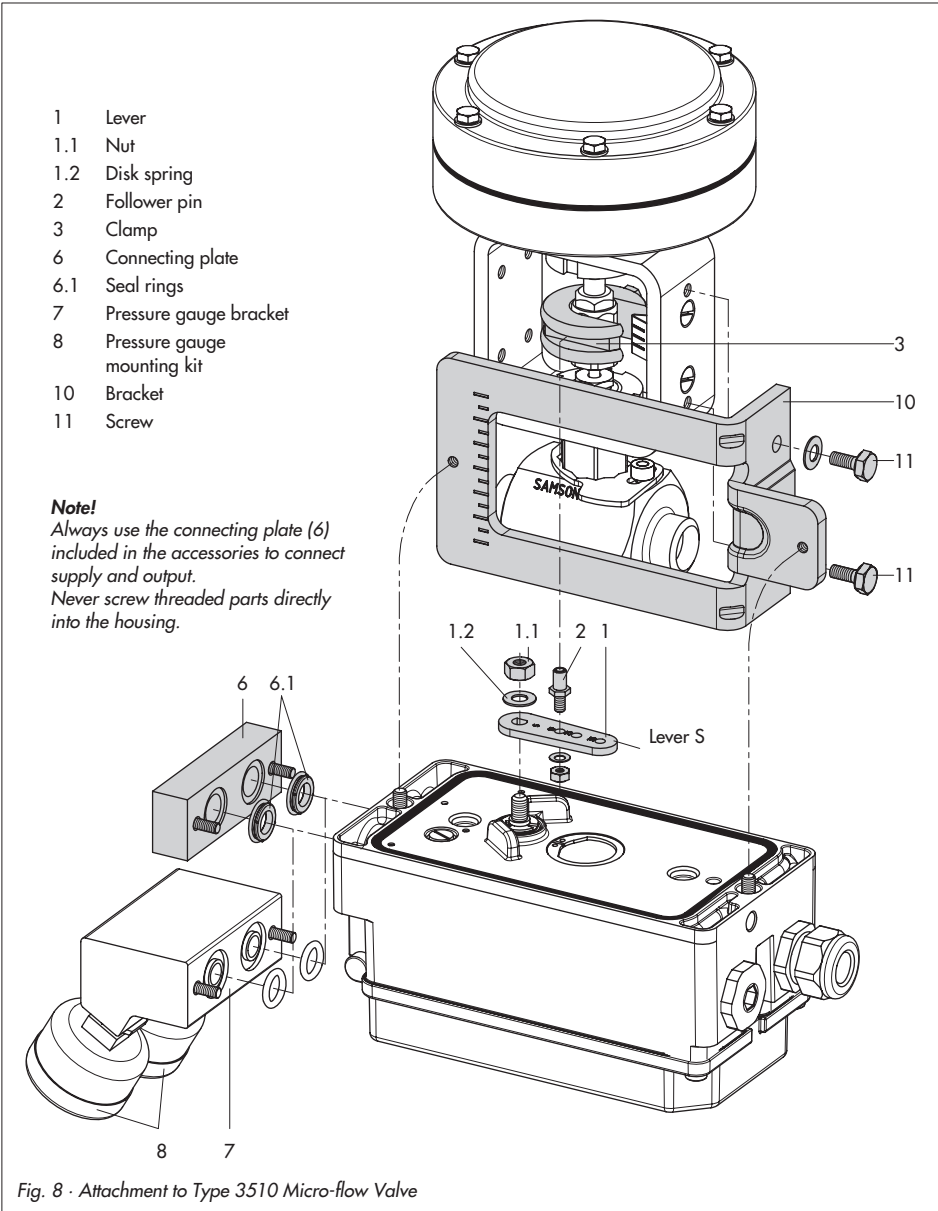


Fig. 8 - Attachment to Type 3510 Micro-flow Valve

2.5 Attaching positioners with stainless steel housings

Positioners with stainless steel housings require mounting parts that are completely made of stainless steel or free of aluminum.

Note!

The pneumatic connecting plate and pressure gauge bracket are available made of stainless steel (order numbers listed below). A stainless steel version of the pneumatic reversing amplifier is **not** available.

Connecting plate (stainless steel):	G ¼ ¼ NPT	1400-7476 1400-7477
Pressure gauge bracket (st. steel):	Only in ¼ NPT	1400-7108

The Tables 1 to 4 (pages 10 and 11) apply for attaching positioners with stainless steel housings with the following restrictions:

Direct attachment

All mounting kits from Tables 1 and 2 can be used. The connection block is not required. The stainless steel version of the pneumatic connecting plate routes the air internally to the actuator.

Attachment according to IEC 60534-6 (NAMUR rib or attachment to rod-type yokes)

All mounting kits from Table 3 can be used. Connecting plate in stainless steel.

2.6 Air purging function for single-acting actuators

The exhaust air from the positioner is diverted to the actuator spring chamber to provide corrosion protection inside the actuator. The following must be observed:

Direct attachment to Type 3277-5 (stem extends FA/stem retracts FE)

The air purging function is automatically provided.

Direct attachment to Type 3277, 240 to 700 cm²

FA: Remove the stopper 12.2 (Fig. 5 on page 15) at the connection block and make a pneumatic connection to the spring chamber on the vented side.

FE: The air purging function is automatically provided.

Attachment acc. to IEC 60534-6 (NAMUR rib or attachment to rod-type yokes)

The positioner requires an additional port for the exhaust air that can be connected over piping. An adapter available as an accessory is used for this purpose:

Threaded bushing	G ¼	0310-2619
(M20 x 1.5):	¼ NPT	0310-2550

Note!

The adapter uses one of the M20 x 1.5 connections in the housing which means **just one** cable gland can be installed.

Should other valve accessories be used which vent the actuator (e.g. solenoid valve, volume booster, quick exhaust valve), this exhaust air must also be included in the purging function. The connection over the adapter at the positioner must be protected with a check valve mounted in the piping. Otherwise the pressure in the positioner housing would rise above the ambient pressure and damage the positioner when the exhausting components respond suddenly.

3 Connections

3.1 Pneumatic connections

Caution!

The threads in the positioner housing are not designed for direct air connection!

The screw glands must be screwed into the connecting plate, the pressure gauge mounting block or the connection block from the accessories. The air connections are optionally designed as a bore with 1/4 NPT or G 1/4 thread.

The customary fittings for metal and copper pipes or plastic hoses can be used.

Note!

The supply air must be dry and free from oil and dust. The maintenance instructions for upstream pressure reducing stations must be observed.

Blow through all air tubes and hoses thoroughly prior to connecting them.

If the positioner is attached directly to the Type 3277 Actuator, the connection of the positioner's output pressure to the actuator is fixed. For attachment according to IEC 60534-6 (NAMUR), the signal pressure can be routed to either the top or bottom diaphragm chamber of the actuator, depending on the actuator's fail-safe action "Actuator stem extends" or "Actuator stem retracts".

3.1.1 Signal pressure gauges

To monitor the supply air (Supply) and signal pressure (Output), we recommend that pressure gauges be attached (see accessories in Tables 1 to 4).

3.1.2 Supply pressure

The required supply air pressure depends on the bench range and the actuator's operating direction (fail-safe action). The bench range is registered on the nameplate either as spring range or signal pressure range. The direction of action is marked **FA** or **FE**, or by a symbol.

Actuator stem extends FA (Air to open ATO)

Fail-safe position "Valve CLOSED"
(for globe and angle valves):

Required supply pressure = Upper bench range value + 0.2 bar,
minimum 1.4 bar.

Actuator stem retracts FE (Air to close ATC)

Fail-safe position "Valve OPEN"
(for globe and angle valves):

For tight-closing valves, the maximum signal pressure $p_{st_{max}}$ is roughly estimated as follows:

$$p_{st_{max}} = F + \frac{d^2 \cdot \pi \cdot \Delta p}{4 \cdot A} \text{ [bar]}$$

d = Seat diameter [cm]

Δp = Differential pressure across the valve
[bar]

A = Actuator diaphragm area [cm²]

F = Upper bench range of the actuator
[bar]

If there are no specifications, calculate as follows:

Required supply pressure =
Upper bench range value + 1 bar

Note!

The signal pressure at the output (Output 38) of the positioner can be limited to approx. 2.4 bar by setting the DIP switch S5.

3.2 Electrical connections



For electrical installation, you are required to observe the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. In Germany, these are the VDE regulations and the accident prevention regulations of the employers' liability insurance association.

The following standards apply for assembly and installation in hazardous areas:
 EN 60079-14: 2003 (VDE 0165 Part 1/8.98) "Electrical apparatus for explosive gas atmospheres" and EN 50281-1-2: 1999 (VDE 0165 Part 2/11.99) "Electrical apparatus for use in the presence of combustible dust".

For the interconnection of intrinsically safe electrical equipment, the permissible maximum values specified in the EC type examination certificate apply (U_i or U_o ; I_i or I_o ; P_i or P_o ; C_i or C_o and L_i or L_o).

The following applies for equipment with type of protection EEx nA (non-sparking apparatus) according to the standard EN 50021 (1999): Connecting, interrupting, or switching circuits while energized is only allowed during installation, maintenance or repair work.

The following applies for equipment connected to energy-limited circuits with type of protection EEx nL (energy-limited apparatus) according to the standard EN 50021 (1999): This type of equipment may be switched under normal operating conditions.

For the interconnection of equipment to energy-limited circuits with type of protection EEx nL IIC, the permissible maximum values specified in the statement of conformity or the addenda to the statement of conformity apply.

Caution!

The terminal assignment specified in the certificate must be adhered to.

Reversing the assignment of the electrical terminals may cause the explosion protection to become ineffective.

Do not tamper with enameled screws inside or on the housing.

Cable entries left unused must be sealed with blanking plugs.

Devices used at ambient temperatures below $-20\text{ }^{\circ}\text{C}$ must have metal cable entries.

Cable entries

The cable entry with M20 x 1.5 cable gland, 6 to 12 mm clamping area. There is a second M 20x1.5 threaded hole in the housing that can be used for additional connection, when required.

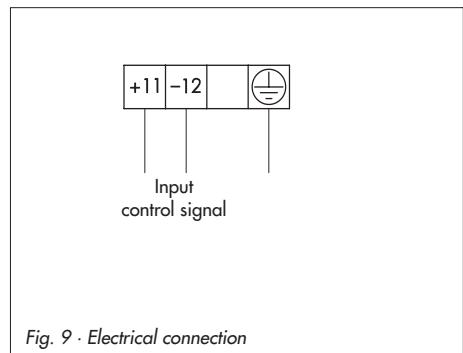


Fig. 9 · Electrical connection

The screw terminals are designed for wire cross-sections of 0.2 to 2.5 mm². Tighten by at least 0.5 Nm.

The wires for the reference variable must be connected to the terminals 11 and 12 located in the housing.

In general, it is not necessary to connect the positioner to a bonding conductor. Should this be required, however, this conductor can be connected inside the device.

Note!

The minimum permissible reference variable should not fall below 3.6 mA.

Accessories:

Plastic cable gland M20 x 1.5:

Black Order no. 8808-1011

Blue Order no. 8808-1012

Nickel-plated brass Order no. 1890-4875

Adapter M20 x 1.5 to ½ NPT

Aluminum, powder-coated

Order no. 0310-2149

4 Operation

4.1 Operator controls

DIP switches S1 to S10

The positioner is mainly operated via the DIP switches, which allow you to set the most important functions.

ZERO and SPAN adjusters

The ZERO and SPAN potentiometers are used to adjust the starting point (zero) and the upper range value (span) of the reference variable.

Volume restriction Q

The volume restriction is used to adapt the air supply to the actuator size. Depending on the air passage at the actuator, two fixed settings are available.

DIP switches and their functions		S5	Limit output signal pressure to 2.4 bar
S1	Fail-safe action of the actuator	S6	Change gain factor
S2/S3	Rated travel of the control valve	S7/S8	Set range of reference variable
S4	Direction of action w/x	S9/S10	Activate tight-closing function

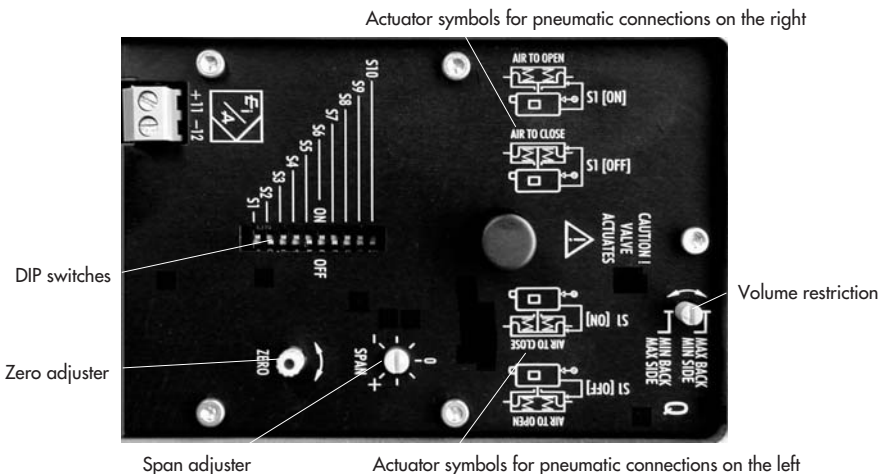


Fig. 10 · Operator controls

5 Start-up and settings

5.1 Default switch positions

After the positioner has been mounted on the valve, all switches **S1 to S10** must be set to **OFF**.

5.2 Fail-safe position

The switch position of switch **S1** depends on the fail-safe position of the valve:

- ▶ **AIR TO OPEN** · Upon air supply failure, the valve is completely closed by the actuator. As the signal pressure increases at the output of the positioner (OUTPUT 38), the valve opens.
- ▶ **AIR TO CLOSE** · Upon air supply failure, the valve is completely opened by the actuator. As the signal pressure increases at the output of the positioner, the valve closes.

To determine the switch position, read the associated switch position **S1 = ON** or **OFF** from the cover plate at the actuator symbols.

The symbols are read properly when the symbol shows the actuator on top of the valve; the symbols written upside down do not apply.

AIR TO OPEN: Pneumatic connections point to the right **S1 = ON**. Pneumatic connections point to the left **S1 = OFF**.

AIR TO CLOSE: Pneumatic connections point to the right **S1 = OFF**. Pneumatic connections point to the left **S1 = ON**.

AIR TO OPEN always applies for double-acting actuators. Proceed as described

in section 2.3 to connect the reversing amplifier.

5.3 Volume restriction Q

The volume restriction Q is used to adapt the air delivery to the size of the actuator:

- ▶ Actuators with a **transit time < 1 s**, e.g. linear actuators with an effective area smaller than 240 cm², require a restricted air flow rate (MIN).
- ▶ Actuators with a **transit time ≥ 1 s** do not require the air flow rate to be restricted (MAX).

The position of volume restriction Q also depends on how the signal pressure is routed at the actuator in **SAMSON actuators**:

- ▶ The "SIDE" position applies for actuators with a loading pressure connection at the side, e.g. Type 3271-5.
- ▶ The "BACK" position applies for actuators with a loading pressure connection at the back, e.g. in Type 3277-5.

The "SIDE" restriction position always applies for **actuators from other manufacturers**.

Overview · Position of the volume restriction*			
Signal pressure	Transit time	< 1 s	≥ 1 s
Connection at the side		MIN SIDE	MAX SIDE
Connection at the back		MIN BACK	MAX BACK

* Intermediate positions are not permitted.

5.4 Presetting the travel

At switches **S2** and **S3**, select the travel that comes closest to the rated valve travel, taking into account the pin position. If necessary, perform a final adaptation as described in section 5.11.

Pin position	Travel when span adjuster is set to 0							
	S2	S3	S2	S3	S2	S3	S2	S3
17	OFF	OFF	ON	OFF	OFF	ON	ON	ON
25	5.3		7.5		10.6		15	
35	7.5		10.6		15		21.2	
50	10.6		15		21.2		30	
70	15		21.2		30		42.4	
100	21.2		30		42.4		60	
200	42.4		60		84.8		120	

5.5 Direction of action

At switch **S4**, set the direction of action w/x.

- ▶ >> The valve travel x increases as the reference variable w increases.
- ▶ <> The valve travel decreases when the reference variable increases.

Fail-safe action AIR TO OPEN	>>	S4	ON
	<>		OFF
Fail-safe action AIR TO CLOSE	>>	S4	OFF
	<>		ON

5.6 Limiting the signal pressure

Set switch **S5** to **ON** to limit the output signal pressure to 2.4 bar if required by the actuator.

5.7 Reference variable

Use switches **S7** and **S8** to determine the input signal, i.e. the range of the reference variable.

Switches	S7	S8	S7	S8	S7	S8
	OFF	OFF	ON	OFF	OFF	ON
Input mA	4...11.9		12.1...20		4...20	

In split-range operation (Fig. 11, below), the control valves work with smaller reference variable ranges. The signal to control two control valves is divided such that both valves move through their full travel range at 50 % of the input signal (e.g. first valve set to 4 to 11.9 mA and second valve adjusted to 12.1 to 20 mA).

To avoid overlapping, a dead band of ± 0.1 mA is to be observed.

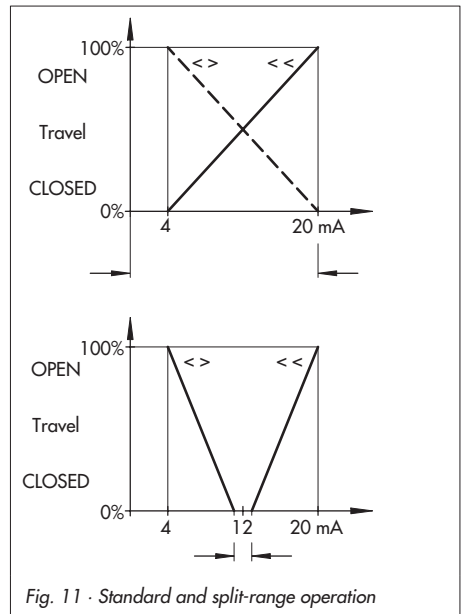


Fig. 11 · Standard and split-range operation

5.8 Connecting the positioner

Apply the supply air to the pneumatic connection (Supply 9). Make sure to use the appropriate pressure as specified in section 3.1.2.

Apply the electric reference variable (ammeter at terminals 11 and 12).



Caution!

Upon connection of the electric reference variable, the signal pressure may cause the plug stem to move, risk of injury!

5.9 Presetting zero

- ▶ Set **SPAN** adjuster to 0.
- ▶ Adjust the input signal according to the table below using an ammeter.
- ▶ Turn **ZERO** adjuster until the plug stem just starts to move from its initial position.

Direction of action	Reference variable [mA]	Input signal for zero [mA]
>>	4 to 20	4
>>	4 to 12	4
>>	12 to 20	12
<<	4 to 20	20
<<	4 to 12	12
<<	12 to 20	20

5.10 Gain factor

- ▶ Move the valve in small steps. If the valve tends to hunt, set switch **S6** to **ON** to reduce the gain of the control loop.
- ▶ When this switch position has been changed, check zero as described in section 5.9.

5.11 Adapting the travel

In case the rated travel of the control valve does not correspond with the selected travel according to the table in section 5.4:

- ▶ Adjust the upper range value of the input signal (e.g. 4, 12 or 20 mA) using the ammeter.
- ▶ Turn the **SPAN** adjuster until the plug stem moves as far as it will go to the end position.

5.12 Activate the tight-closing function

Having adjusted zero and span, the tight-closing function (description on page 6) must be activated at switches **S9** and **S10** to ensure a tight valve shut-off.

AIR TO OPEN	S9 ON	S10 OFF
AIR TO CLOSE	S9 OFF	S10 ON
Three-way valve	S9 ON	S10 ON

6 Maintenance

The positioner does not require any maintenance.

There are filters with a 100 µm mesh size in the pneumatic connections for supply and output which can be removed and cleaned, if required.

The maintenance instructions of any upstream supply air pressure reducing stations must be observed.

7 Servicing explosion-protected devices

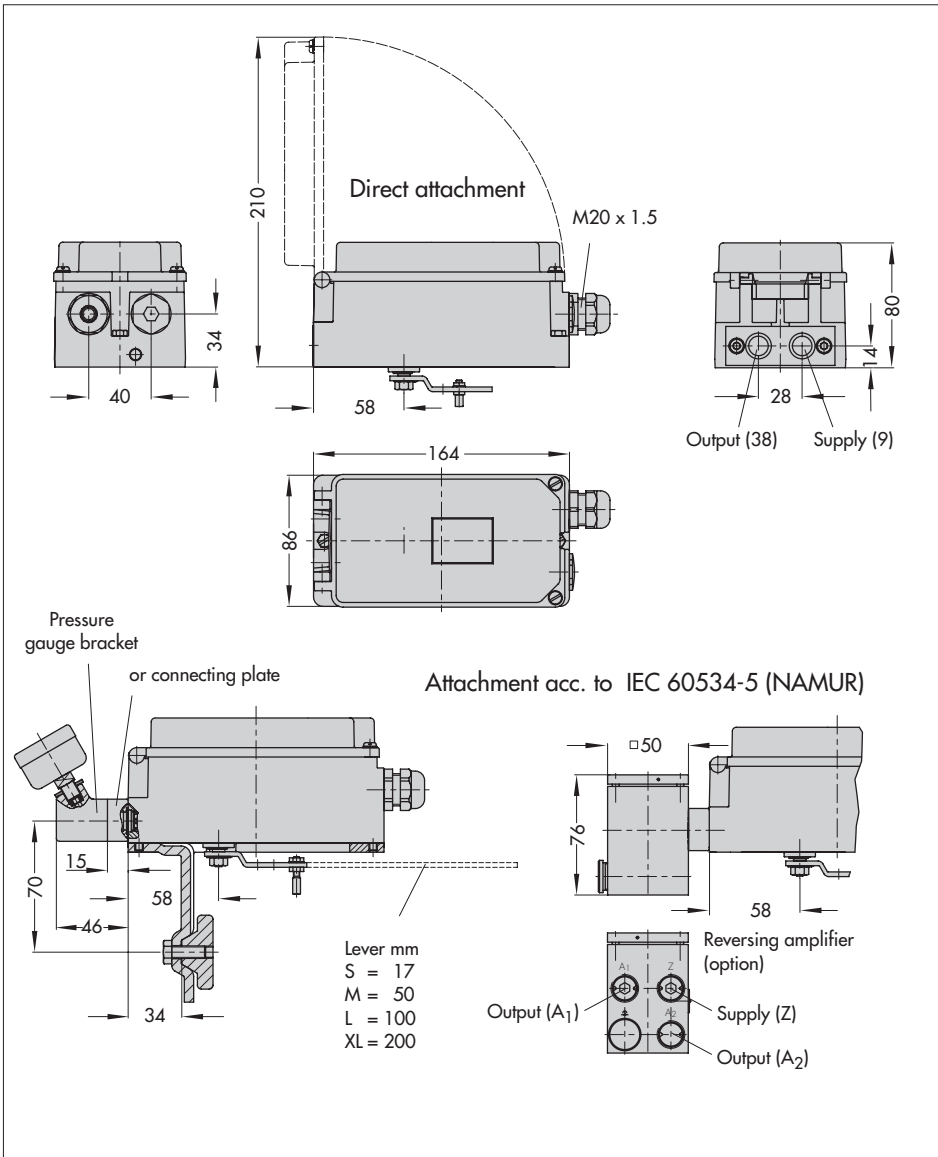
If a part of the positioner on which the explosion protection is based needs to be serviced, the positioner must not be put back into operation until an expert has inspected the device according to explosion protection requirements, has issued a certificate stating this or given the device a mark of conformity.

Inspection by an expert is not required if the manufacturer performs a routine test on the device prior to putting it back into operation. The passing of the routine test must be documented by attaching a mark of conformity to the device.

Explosion-protected components may only be replaced by original, checked components from the manufacturer.

Devices that have already been used outside of hazardous areas and are intended for use in hazardous areas in future must comply with the safety demands placed on repaired devices. Prior to operation, they must be tested according to the specifications stipulated for "Repairing explosion-protected devices".

8 Dimensions in mm



(13) **S c h e d u l e**(14) **EC TYPE EXAMINATION CERTIFICATE No. PTB 03 ATEX 2099**(15) **Description of Equipment**

The Model 3730-01 ... Positioner is a single- or double-acting positioner for attachment to linear or rotary actuators. It serves for translating control signals into valve stem positions.

The Model 3730-01 ... Positioner is a positive five-terminal network which may be connected to any certified intrinsically safe circuit, provided the permissible maximum values of U_i , I_i and P_i are not exceeded.

For air supply non-combustible media are used.

The device is intended for use inside and outside of hazardous locations.

The correlation between temperature classification and permissible temperature ranges is shown in the table below.

Temperature class	Permissible ambient temperature range
T6	-40°C ... 50°C
T5	-40°C ... 70°C
T4	-40°C ... 80°C

Electrical data

Signal circuit
(terminals 11/12)

Type of protection: Intrinsic safe EEx ia IIC
only for connection to a certified intrinsically safe circuit

Maximum values:

$U_i = 28 \text{ V}$
 $I_i = 115 \text{ mA}$
 $P_i = 1 \text{ W}$

$C_i = 5,3 \text{ nF}$; L_i negligible

(16) **Test Report PTB Ex 03-23199**

Schedule to the EC Type Examination Certificate No. PTB 03 ATEX 2099

(17) **Special conditions for safe use**

None

(18) **Special health and safety requirements**

In compliance with the standards specified above.

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, 21 July 2003

(Signature) (seal)

Dr.-Ing. U. Gerlach
Regierungsdirktor

TRANSLATION

Statement of Conformity

- (1) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**
- (2) EC Type Examination Certificate Number

PTB 03 ATEX 2179 X

- (4) Equipment: Model 3730.08 - e/p Positioner
- (5) Manufacturer: SAMSON AG Mess- und Regeltechnik
- (6) Address: Weismüllerstr. 3, 60314 Frankfurt am Main, Germany

(7) The equipment and any acceptable variation thereof are specified in the schedule to this certificate and the documents referred to therein.

(8) The Physikalisch-Technische Bundesanstalt, notified body number 0102 according to Article 9 of the Council Directive 94/97 of 23 March 1994, certifies that this equipment has been found to comply with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.

The examination and test results are recorded in confidential report.

PTB Ex 03-23300

(9) The essential health and safety requirements are satisfied by compliance with

EN 50021: 1999

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use as specified in the schedule to this certificate.

(11) In compliance with the Directive 94/9/EC this Statement of Conformity relates only to the design and construction of the equipment specified. Further requirements of this Directive apply to manufacture and marketing of this equipment.

(12) The marking of the equipment shall include the following:



Zertifizierungsstelle Explosionschutz
By order

Braunschweig, 30. September 2003

(Signature) (Seal)

Dr.-Ing. U. Lehmannsmeyer
Regierungsdirktor

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

(13)

S c h e d u l e

(14) **Statement of Conformity PTB 03 ATEX 2179 X**

(15) **Description of Equipment**

The Model 3730-08...e/p Positioner, is a single- or double-acting positioner for attachment to linear or rotary actuators. It serves for translating control signals into valve stem positioners.

For pneumatic auxiliary power non-combustible media are used.

The device is intended for use inside and outside of hazardous locations.

The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below:

Temperature class	Permissible ambient temperature range
T6	-40 °C ... 50 °C
T5	-40 °C ... 70 °C
T4	-40 °C ... 80 °C

Electrical data

Signal circuit
(terminals 11/12)

Type of protection EEx nA II

(16) Test report **PTB Ex-03-23300**

(17) The signal circuit (terminals 11/12) shall be preceded by a fuse installed outside of the hazardous location. This fuse shall comply with IEC 60127-2/II, Z50 V F, or with IEC 30127-2/VI, Z50 VI with a maximum fuse nominal current $I_N \leq 80$ mA.

The cable entries of the enclosure for the Model 3730-08...e/p Positioner shall provide at least a Degree of Protection IP 54 in compliance with EN 60529. The wiring shall be connected in such a manner that the connection facilities are not subjected to pull and twisting.

Statements of Conformity without signature and seal are invalid.
This Statement of Conformity may be reproduced only in its entirety without any changes.
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-technische Bundesanstalt Bundesallee 100 D-38116 Braunschweig **ptb37 Ex n.doc**

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

(18) **Basis health and safety requirements**

Are satisfied by compliance with the standard specified above.

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, 30. September 2003

(Signature) (seal)

Dr.-Ing. U. Johannmeyer
Regierungsdirfaktor

Statements of Conformity without signature and seal are invalid.
This Statement of Conformity may be reproduced only in its entirety without any changes.
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.
Physikalisch-technische Bundesanstalt Bundesallee 100 D-38116 Braunschweig **ptb37 Ex n.doc**

**TRANSLATION
ADDENDUM N.o.: 1**

to the Statement of conformity PTB 03 ATEX 2179 X

Equipment: Model 3730-08.. e/p Positioner

 **II 3G EEx nA II T6**

Marking: SAMSON AG, Mess- und Regeltechnik
Address: Weismüllerstr. 3, D-60314 Frankfurt, Germany

Description of the additions and modifications

The Model 3730-08.. e/p Positioner may be connected in future also to energy-limited circuits with type of protection EEx nL IIC T6. The electrical data are complemented as follows.

Electrical data

Signal circuit
(terminals 11/12)

Type of protection EEx nA II
or
Type of protection EEx nL IIC

Maximum Values:

U_i = 28V
I_i = 115mA
P_i = 1W
C_i = 5.3nF
L_i = negligible

or

U_i = 30V
I_i = 100mA
P_i = 1W
C_i = 5.3nF
L_i = negligible

The equipment is mounted in a metallic enclosure which ensures at least degree of protection IP 54.

The marking of the Model 3730-08 e/p Positioner is complemented as follows:

 **II 3 G EEx nA II T6 or II 3 G EEx nL IIC T6
II 3 DIP 54 T 80 °C or II 3 DIP 65 T 80 °C**

The special conditions are complemented as follows:

If the signal circuit of the Model 3730-08 e/p Positioner is to be connected to a circuit with type of protection EEx nA II, the signal circuit shall be preceded by a fuse complying with ICE 60127-2/II, 250 V/F or IEC 60127/VI, 250 V/I with a maximum current rating of IN ≤ 60 mA. The fuse shall be installed outside of the hazardous location.

If the signal circuit is to be connected to a circuit with type of protection EEx nL IIC, no preceding fuse need be provided.

The manufacturer shall ensure and supply documentary evidence that the equipment enclosure including cable entries provides either the degree of protection IP54 or IP65 according to EN 60529, depending on the application.

All the other data apply unaltered also to this Addendum No. 1

Test report: PTB Ex-04-24290

Zertifizierungsstelle Explosionsschutz
By order Braunschweig, 9. December 2004

(Signature) (Seal)

Dr.-Ing. U. Johannsmeier
Regierungsdirektor

Addendum Page 1

Installation Manual for apparatus certified by CSA for use in hazardous locations.

Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

Table 1: Maximum values of signal circuit (terminals 11 and 12)

Signal circuit	U ₀ or V _{max}	I ₀ or I _{max}	P ₀ or P _{max}	C _i	U _i
	28V	115mA	1W	5,3nF	0,1H

Notes: U₀ ≤ U₀ or V_{max} / I₀ ≤ I₀ or I_{max}
P₀ or P_{max} ≤ P_i or P_{max}

Table 2: CSA - certified barrier parameters of signal circuit (terminals 11 and 12)

Barrier	Supply barrier		Evaluation barrier	
	V _{oc}	R _{min}	V _{oc}	R _{min}
Signal circuit	≤ 28V	≥ 300Ω	28V	Diode

Table 3: The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below:

Temperature class	Permissible ambient temperature range
T6	50°C
T5	-40°C ≤ t _a ≤ 70°C
T4	80°C

Intrinsically safe if installed as specified in manufacturer's installation manual.**CSA - certified for hazardous locations**

Ex to IIC T6: Class I, Zone 0

Class II Div. 1, Groups E, F + G, Class III.

Type 4 Enclosure**Notes:**

- 1.) The apparatus may be installed in intrinsically safe circuit only when used in conjunction with CSA certified apparatus. For maximum values of U₀ or V_{max}; I₀ or I_{max}; P₀ or P_{max};
Grand U₀ of the various apparatus see Table 1.
- 2.) For barrier selection see Table 2.
- 3.) The installation must be in accordance with the C. E. C. Part 1.

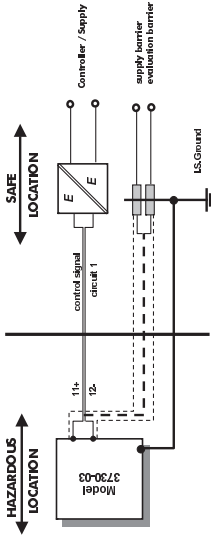
- 4.) Use only supply wires suitable for 5°C above surrounding temperature.

For CSA Certification, Safety Barrier must be CSA Certified and installed in accordance with C.E.C. Part 1. Each pair of I.S. wires must be protected by a shield that is grounded at the I.S. Ground. The shield must extend as close to the terminals as possible.

Revision Control Number: 1 February 05

Addendum to EB 8384-0 EN

Addendum Page 2

**Controller CSA - certified****Supply and evaluation barrier CSA - certified**

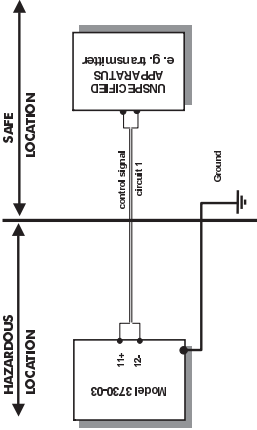
For the permissible maximum values for the intrinsically safe circuit see Table 1 or for the permissible barrier parameters for the circuit see Table 2.

Cable entry M 20 x 1.5 or metal conduit according to drawing No. 1050 - 0540 T

CSA - certified for hazardous locations

Ex nA II Class I, Zone 2

Class II, Div. 2 Groups E, F + G, Class III.

Type 4 Enclosure**Notes:**

- 1.) The installation must be in accordance with the Canadian Electrical Code, Part 1
- 2.) For the barrier values for the signal circuit see Table 1 and 2.
- 3.) The enclosure must be certified.
- 4.) Cable entry only rigid metal conduit according to drawing No. 1050-0540 T

Revision Control Number: 1 February 05

Addendum to EB 8384-0 EN

Installation Manual for apparatus approved by FM for use in hazardous locations.
Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

Table 1: Maximum values

Signal circuit	U _i or V _{max}	I _{or} I _{max}	P _{or} P _{max}	C	L _i
	28V	115mA	1W	5,3nF	0,µH

Notes: I_b or V_{oc} or $V_i \leq U_i$ or V_{max} / I_b or I_{oc} or $I_i \leq I_{or}$ or I_{max}
 P_o or $P_{max} \leq P$ or P_{max}

Table 2: FM - approved barrier parameters of solenoid valve circuit

Barrier	Supply barrier			Evaluation barrier		
	V _{oc}	I _{oc}	I _{bc}	V _{oc}	I _{bc}	I _{oc}
Signal circuit	≤ 28V	≥ 300Ω	≤ 115mA	28V	#	0mA

Table 3: The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below.

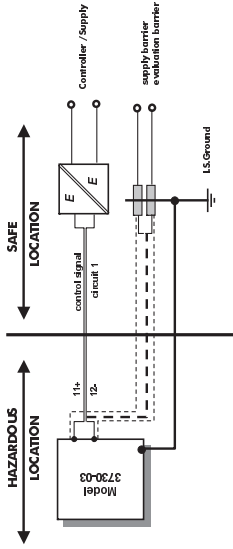
Temperature class	Permissible ambient temperature range
T6	50°C
T5	-40°C ≤ t _a ≤ 70°C
T4	80°C

Intrinsically safe if installed as specified in manufacturer's installation manual.

FM- approved for hazardous locations
Class I, Zone 0, A Ex Ia IIC T6,
Class I, II, III, Division 1, Groups A, B, C, D, E, F + G NEMA 4X Enclosure

Notes:
1.) The apparatus may be installed in intrinsically safe circuit only when used in conjunction with the FM approved apparatus and the FM approved supply barrier.
U_i or V_{max} / I_{or} I_{max} / P_{or} P_{max} / C_i and L_i of the various apparatus see Table 1.

- The apparatus may be installed in intrinsically safe circuit only when used in conjunction with the FM approved intrinsically safe barrier. For barrier selection see Table 2.
- Installation shall be in accordance with the National Electrical Code ANSI/NFPA 70 and ANSI/ISA RP 12.06.01
- Use only supply wires suitable for 5°C above surrounding temperature.



Version: Model 3730-03 e/p Positioner.

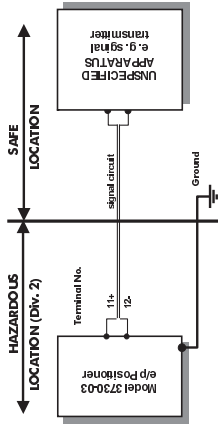
Supply and evaluation barrier FM/CSA- approved.

For the permissible maximum values for the intrinsically safe circuit see Table 1
For the permissible barrier parameters for the circuit see Table 2

Cable entry M20 x 1,5 or metal conduit according to drawing No. 1050—0540 T

FM- approved for hazardous locations
Class I, Division 2, Groups A, B, C, D
Class II Division 2, Groups F + G, Class III

NEMA 4X Enclosure



Notes:

- For the maximum values for the circuit see Table 1 and 2.
- Cable entry only rigid metal conduit according to drawing and 1050-0540 T
- The installation shall be in accordance with the National Electrical Code ANSI/NFPA 70



SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
Internet: <http://www.samson.de>

EB 8384-0 EN

S/Z 2007-05