MOUNTING AND OPERATING INSTRUCTIONS



EB 8384-6 EN

Translation of original instructions



Series 3730 Type 3730-6 Electropneumatic Positioner

with pressure sensors, communication: HART®

Firmware version 1.12



Edition October 2020

Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices. The images shown in these instructions are for illustration purposes only. The actual product may vary.

- ➔ For the safe and proper use of these instructions, read them carefully and keep them for later reference.
- → If you have any questions about these instructions, contact SAMSON's After-sales Service (aftersalesservice@samsongroup.com).



Documents relating to the device, such as the mounting and operating instructions, are available on our website at *www.samsongroup.com* > *Service & Support* > *Downloads* > *Documentation*.

Definition of signal words

Hazardous situations which, if not avoided, will result in death or serious injury

Hazardous situations which, if not avoided, could result in death or serious injury

Property damage message or malfunction

i Note

Additional information

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Recommended action

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1 Safety instructions and measures

Intended use

SAMSON's Type 3730-6 Positioner is mounted on pneumatic control valves and used to assign the valve position to the control signal. The device is designed to operate under exactly defined conditions (e.g. operating pressure, temperature). Therefore, operators must ensure that the positioner is only used in applications where the operating conditions correspond to the technical data. In case operators intend to use the positioner in other applications or conditions than specified, contact SAMSON.

SAMSON does not assume any liability for damage resulting from the failure to use the device for its intended purpose or for damage caused by external forces or any other external factors.

→ Refer to the technical data for limits and fields of application as well as possible uses.

Reasonably foreseeable misuse

The Type 3730-6 Positioner is *not* suitable for the following applications:

- Use outside the limits defined during sizing and by the technical data

Furthermore, the following activities do not comply with the intended use:

- Use of non-original spare parts
- Performing maintenance activities not described in these instructions

Qualifications of operating personnel

The positioner must be mounted, started up or operated only 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 hazards due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.

Explosion-protected versions of this device must be operated only by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.

Personal protective equipment

No personal protective equipment is required for the direct handling of the positioner. Work on the control valve may be necessary when mounting or removing the device.

- → Observe the requirements for personal protective equipment specified in the valve documentation.
- → Check with the plant operator for details on further protective equipment.

Revisions and other modifications

Revisions, conversions or other modifications of the product are not authorized by SAMSON. They are performed at the user's own risk and may lead to safety hazards, for example. Furthermore, the product may no longer meet the requirements for its intended use.

Safety features

Upon failure of the air supply or electric signal, the positioner vents the actuator, causing the valve to move to the fail-safe position determined by the actuator.

Warning against residual hazards

The positioner has direct influence on the control valve. Any hazards that could be caused in the valve by the process medium, the signal pressure or by moving parts are to be prevented by taking appropriate precautions. Plant operators and operating personnel must observe all hazard statements, warning and caution notes in these mounting and operating instructions, especially for installation, start-up and service work.

If inadmissible motions or forces are produced in the pneumatic actuator as a result of the supply pressure, it must be restricted using a suitable supply pressure reducing station.

Responsibilities of the operator

Operators are responsible for proper use and compliance with the safety regulations. Operators are obliged to provide these mounting and operating instructions to the operating personnel and to instruct them in proper operation. Furthermore, operators must ensure that operating personnel or third parties are not exposed to any danger.

Responsibilities of operating personnel

Operating personnel must read and understand these mounting and operating instructions as well as the specified hazard statements, warning and caution notes. Furthermore, the operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

Referenced standards, directives and regulations

Devices with a CE marking fulfill the following requirements of the Directives:

- Type 3730-6: 2014/30/EU, 2011/65/EU
- Type 3730-6-110, -210, -510, -810: 2014/30/EU, 2014/34/EU, 2011/65/EU

Devices with an EAC marking fulfill the following requirements of the Regulations:

- Type 3730-6: TR CU 020/2011
- Type 3730-6-113, -213, -813: TR CU 012/2011 with the applicable GOST standards:
 - ГОСТ 31610.11-2014 (IEC 60079-11:2011)
 - ГОСТ 31610.15-2012/МЭК 60079-15:2005
 - FOCT 31610.0-2014 (IEC 60079-0:2011)
 - ГОСТ IEC 60079-1-2011
 - ГОСТ IEC 60079-31-2010

See the 'Certificates' section for the declarations of conformity and EAC certificates.

Referenced documentation

The following documents apply in addition to these mounting and operating instructions:

- Operating instructions for valve diagnostics: > EB 8389
- Safety manual: ► SH 8384-6
- The mounting and operating instructions of the components on which the positioner is mounted (valve, actuator, valve accessories etc.).

1.1 Notes on possible severe personal injury

Risk of fatal injury due to the ignition of an explosive atmosphere.

Incorrect installation, operation or maintenance of the positioner in potentially explosive atmospheres may lead to ignition of the atmosphere and ultimately to death.

- ➔ The following regulations apply to installation in hazardous areas: EN 60079-14 (VDE 0165, Part 1).
- ➔ Installation, operation or maintenance of the positioner must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.
- → Read the special instructions concerning explosion protection (see section 1.4).

1.2 Notes on possible personal injury

Crush hazard arising from moving parts on the valve.

Control valves contain moving parts (actuator and plug stem), which can injure hands or fingers if inserted into the valve.

- → Do not touch any moving valve parts while the control valve is in operation.
- → Before performing any mounting or installation work on the positioner, put the control valve out of operation by disconnecting and locking the supply air and control signal.
- ➔ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.

Incorrect electrical connection will render the explosion protection unsafe.

- → Adhere to the terminal assignment.
- → Do not undo the enameled screws in or on the housing.

Intrinsic safety rendered ineffective in intrinsically safe devices.

Every time the positioner is operated, even not within the plant (e.g. during maintenance, calibration and work on equipment), it must be ensured that the conditions for intrinsically safe circuits are observed.

- → Only connect intrinsically safe devices intended for use in intrinsically safe circuits to certified intrinsically safe input-connected units.
- → Do not place intrinsically safe devices back into operation that were connected to intrinsically safe input-connected units without certification.
- → Do not exceed the maximum permissible electric values specified in the EC type examination certificates when interconnecting intrinsically safe electrical equipment (U_i or U₀, I_i or I₀, P_i or P₀, C_i or C₀ and L_i or L₀).

1.3 Notes on possible property damage

Risk of damage to the positioner due to incorrect mounting position.

- → Do not mount the positioner with the back of the device facing upward.
- → Do not seal or restrict the vent opening when the device is installed on site.

An incorrect electric signal will damage the positioner.

For the positioner to function properly, a current source and compliance with the prescribed terminal assignment are necessary.

- \rightarrow Only use a current source and never a voltage source.
- → Connect the electrical wiring to the positioner according to the prescribed terminal assignment.

Malfunction due to initialization not yet completed.

The initialization causes the positioner to be calibrated to adapt it to the mounting situation. After initialization is completed, the positioner is ready for use.

- → Initialize the positioner on first start-up.
- → Re-initialize positioner after changing the mounting position.

Risk of positioner damage due to incorrect grounding of the electric welding equipment.

→ Do not ground electric welding equipment near to the positioner.

Incorrect cleaning will damage the window.

The window is made of Makrolon[®] and will be damaged when cleaned with abrasive cleaning agents or agents containing solvents.

- → Do not rub the window dry.
- ➔ Do not use any cleaning agents containing chlorine or alcohol or abrasive cleaning agents.
- → Use a non-abrasive, soft cloth for cleaning.

1.4 Special instructions concerning explosion protection

Explosive dust atmospheres of zone 21 or zone 22

- → The following applies to type of protection Ex i in combustible dust atmospheres:
 If intrinsic safety is impaired by the influence of dust, an enclosure complying with Clause 6.1.3 of EN 60079-11 with at least degree of protection IP 5X must be used. The requirements according to Clause 6.1.3 apply to the cable entries and conduit systems accordingly.
 - The degree of ingress protection is verified by a test according to IEC 60529 and EN 60079-0 (e.g. performed by VDE).
- ➔ For use in the presence of combustible dust in compliance with type of protection Ex tb IIIC (protection by enclosure), observe clause 5.6.3 of EN 60079-14.

Equipment for use in zone 2/zone 22:

- ➔ In equipment operated according to type of protection Ex nA (non-sparking equipment) according to EN 60079-15, circuits may be connected, interrupted or switched while energized only during installation, maintenance or repair.
- Observe the special conditions of use mentioned in the statement of conformity for the rated values and the installation of the series-connected fuse for interconnection of Ex nA circuits.

- → Positioners with type of protection Ex nA or Ex tc can be used with a cover with or without window.
- → The Types 3730-61, 3730-65 and 3730-68 Positioners are 100 % identical in design, except for the marking and the housing cover.
- → For type of protection Ex nA, connect the VCC connection in the program interface adapter in series with a fuse according to IEC 60127, 250 V F or T with a fuse rating of max. I_N ≤40 mA.
- → Connect the signal current circuit in series with a fuse according to IEC 60127-2/VI, 250 V T with a fuse rating of I_N ≤63 mA.
- → Connect the transmitter current circuit in series with a fuse according to IEC 60127-2/VI, 250 V T with a fuse rating of $I_N \leq 40$ mA.
- → Install the fuses outside the hazardous area.

Servicing explosion-protected devices

- → Observe the following for servicing equipment in a section relevant for explosion protection:
 - It must not be put back into operation until a qualified inspector has assessed the
 equipment according to explosion protection requirements, has issued an inspection certificate or given the device a mark of conformity. Inspection by a qualified
 inspector is not required if the manufacturer performed a routine test on the device before putting it back into operation. Document the passing of the routine test
 by attaching a mark of conformity to the device.
 - Replace explosion-protected components only with original, routine-tested components by the manufacturer.
 - Devices that have already been used outside hazardous areas and are intended for future use inside hazardous areas must comply with the safety requirements placed on serviced devices. They must be subjected to testing according to the specifications in EN 60079-19.
 - EN 60079-19 applies to servicing explosion-protected devices.
 - Use the protective cable designed by SAMSON when interconnecting non-intrinsically safe set point calibrators with intrinsically safe equipment for repair, calibration etc. to ensure that components relevant to explosion protection are not damaged.

2 Markings on the device

2.1 Nameplate

Version without explosion protection

SAMSON 373	0 - 6	
Digital HART	Positioner	
Supply 1		10
Input 3		
Shutdown at ∠	l	
5	j	
A See technical da	ta for ambient ter	nperature
Diagnostics EXPE	RTplus	
Firmware 6		
Model 3730 - 6		
VarID 8	Serial no.	9
SAMSON AG D-60314 F	rankfurt Made	in Germany

Explosion-protected version

SAMSON	3730 - 6	10
Digital HAR	RT® Position	er
Supply	1	
	2	
Input	3	
Shutdown at	4	
certificate and maxim	cal data and explos for permissible amb num values for conr trinsically safe circu	pient temperature nection to
Diagnostics I	XPERTplus	
Firmware	6	
Model 3730		-
	3 Serial no	
SAMSON AG D-60	314 Frankfurt	Made in Germany

Date 1)	
11	

- 1 Supply pressure
- 2 Explosion protection marking
- 3 Input signal
- 4 Emergency shutdown
- 5 Features: ⊠ Yes/□ No
 - Fault indicator
 - Limit switches, software
 - Limit switch, inductive
 - Solenoid valve
 - Forced venting function
 - Position indicator
 - Leakage detection
 - Binary input
- 6 Firmware version
- 7 Model number
- 8 Configuration ID
- 9 Serial number
- 10 Conformity
- 11 Month and year of manufacture (mm/YYYY)
- ¹⁾ Date, Data, Дата or 날짜

2.2 Article code

With display and autotune, HART [®] comm two software limit switches, one fault alar	unication. 4 to 20 mA set point.		T			-	-			
iwo soliwore infin switches, one fault didr	· · · · · · · · · · · · · · · · · · ·									
Explosion protection			Т	Τ						
Without		0	0	0						
ATEX II 2 G Ex ia IIC T6 Gb; II 2	D Ex ia IIIC T80 °C Db	1	1	0						
IECEx Ex ia IIIC T80 °C Db; Ex ia	a IIC T6 Gb	1	1	1						
NEPSI Ex ia IIC T4~T6 Ga; Ex ia	D 20 T80	1	1	2						
GOST (EAC) 1Ex ia IIC T6T4 Gb; Ex i Ex tb IIIC T80 °C Db	a IIIC T80 °C Db;	1	1	3						
TR CMU 1055 II 2G Ex ia IIC T6 Gb; II 2	D Ex ia IIIC T80°C Db	1	1	6						
FM Intrinsically safe: IS / Class AEx ia IIC / Class I / Zon Non Incendive: NI / Class S / Class II / Div. 2 / Gr.	I / Div. 2 / Gr. ABCD;	1	3	0						
CSA Ex ia IIC T4/T5/T6; Class Class I, Groups A,B,C,and Class III; Type 4 Enclosure	I, Zone 0; I D; Class II Groups E,F and G;	1	3	1						
ATEX II 2 G Ex d[ia] IIC T6 Gb;	II 2 D Ex tb IIIC T80 °C Db	2	1	0						
IECEx Ex db[ia] IIC T6 Gb; Ex tb	IIIC T80 °C Db	2	1	1						
GOST (EAC) 1Ex d [ia] IIC T6T4 Gb 2	(; Ex tb IIIC T80 °C Db X	2	1	3						
ATEX II 2 D Ex tb IIIC T80 °C D)	5	1	0						
IECEx Ex tb IIIC T80°C Db		5	1	1						
TR CMU 1055 II 2D Ex tb IIIC T80°C Db		5	1	6						
ATEX II 3 G Ex nA ic IIC T6 Gc;	II 3 D Ex tc IIIC T80°C Dc IP66	8	1	0						
IECEx Ex nA IIC T6; Ex nL IIC T6	: Ex tD A22 IP66 T80 °C	8	1	1						
NEPSI Ex ic IIC T4~T6 Gc; Ex nA Ex tD A22 IP66 T80°C	IIC T4~T6 Gc;	8	1	2						
GOST (EAC) 2Ex nA IIC T6T4 Gc X; 2 Ex tc IIIC T80°C Dc X	Ex ic IIC T6T4 Gc X;	8	1	3						
TR CMU 1055 II 3G Ex nA IIC T6 Gc; II 3	D Ex tc IIIC T80°C Dc	8	1	6						
Option (additional equipment)										
Inductive limit switch										
Without					0					
SJ2-SN (NC contact)					1			5		
Venting function										
Without					(0				
Solenoid valve, 24 V DC						1				
Forced venting, 24 V DC					:	2				

Positioner	Туре 3730-6-ххххххх х 0 х х 0 х 0 0
Additional equipment	
Without	0
Position transmitter	1 0
Leakage sensor (including cable and fixing screw)	2 0
Binary input	3 0
External position sensor	
Without	o
With, including 10 m connecting cable	1 1
Prepared for connection, without sensor	2
Function	
Standard (control valves)	0
Emergency shutdown	
3.8 mA	0
4.4 mA	1
Housing material	
Aluminum (standard)	1
Stainless steel	2
Special applications	
Without	0
Device compatible with paint	1
Exhaust air port with 1/4-18 NPT thread, back of positioner see	aled 2
With additional vent hole and VDI/VDE 3847 adapter	6
With additional vent hole	7

2.3 Firmware versions

Firmwar	e revisions
Old	New
1.0x	1.10
	A positioner that has not yet been initialized has 'Out of specification' NAMUR status (previously 'Failure').
	Default settings of diagnostic parameters revised ▶ EB 8389-1.
1.10	1.11
	A positioner that has not yet been initialized assumes the 'Out of specification' NAMUR sta- tus ('Failure' in version 1.10 and lower). Default values of the dynamic test adapted to the positioner series. Other production-related revisions.
1.11	1.12
	Correction: the valve position is now measured in the fail-safe position. Before correction, 0 or 100 % was issued as a fixed value in the fail-safe position although the valve position may have had another value.

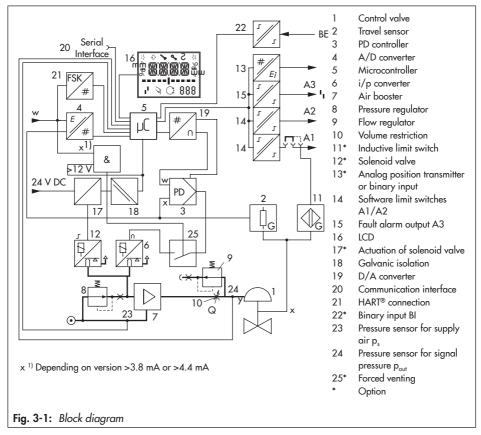
3 Design and principle of operation

→ See Fig. 3-1

The electropneumatic positioner is mounted on pneumatic control valves and 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 consists of a travel sensor system (2) proportional to resistance, an analog i/p converter (6) with a downstream air booster (7) and the electronics with microcontroller (5).

The positioner is fitted with three binary contacts as standard: A fault alarm output indi-



cates a fault to the control room and two configurable software limit switches are used to indicate the end positions of the valve.

The valve position (x) is transmitted as a either an angle of rotation or travel to the pick-up lever and to the travel sensor (2) and supplied to an analog PD controller. An A/D converter (4) transmits the position of the valve to the microcontroller (5). The PD controller (3) compares this actual position to the 4 to 20 mA DC control signal (reference variable) after it has been converted by the A/D converter (4). In case of a set point deviation, the activation 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 (w).

The supply air is supplied to the booster (7) 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 supplied by the booster can be limited by software. Both pressure sensors (23 and 24) monitor the supply pressure p_s and the signal pressure p_{out} .

The volume restriction Q (10) is used to optimize the positioner.

3.1 Additional equipment

Inductive limit switch

In this version, the rotary shaft of the positioner carries an adjustable tag which actuates the built-in proximity switch. The optional inductive contact (11) is connected to A1, while the remaining software limit switch is connected to A2.

Solenoid valve

If the operating voltage for the solenoid valve (12) falls below 12 V, the supply pressure for the booster is vented to the atmosphere. As a result, the actuator is vented and the control valve moves to the fail-safe position. In manual mode, the manual set point is reset to 0 %. A different manual set point must entered again.

Forced venting

If the voltage signal at terminals +81/-82 falls below 12 V, the i/p converter (6) is not activated. The positioner vents the actuator, causing the valve to move to the fail-safe position determined by the actuator, independent of the reference variable.

Analog position transmitter

The position transmitter (13) is a two-wire transmitter and issues the travel sensor signal as a 4 to 20 mA signal processed by the microcontroller. Since this signal is issued independent of the positioner's input signal, the momentary travel/angle of rotation is controlled in real-time. Additionally, the position transmitter allows positioner faults to be indicated over a signal current of <2.4 mA or >21.6 mA.

Leakage sensor

By upgrading the positioner with a leakage sensor, it is possible to detect seat leakage when the valve is in the closed position. Details on EXPERTplus Valve Diagnostics in the Operating Instructions ► EB 8389-1.

Binary input

The optional binary input can be configured:

- To connect a floating contact
- To connect a non-floating contact (0 to 24 V DC)

By selecting a certain function, one of the following actions can be activated:

- Transmit switching state The switching state of the binary input is logged.
- Activate local write protection After the first initialization, a local write protection can be activated.
 While the binary input is active, no settings can be changed at the positioner.
 The positioner cannot be re-initialized.
 Enabling configuration over Code 3 is not active (18).
- Switch AUTO/MAN
 The positioner changes from the automatic mode ⊂ (AUTO) to the manual mode ^A (MAN) or vice versa.

 This function is not performed if the positioner is in the fail-safe position mode (SAFE).

 Various diagnostic functions in Operating Instructions > EB 8389-1 (EXPERTplus valve diagnostics)

Additionally, the external solenoid valve function can be selected if a non-floating contact is configured:

External solenoid valve
 The voltage for an external solenoid
 valve is connected in parallel to terminals
 +31/-32. This allows the switching state
 of the solenoid valve to be monitored.

i Note

The optional binary input can only be configured using the operator software, e.g. TROVIS-VIEW. The switching state is transmitted when the switch is closed by default.

External position sensor

In this version, only the sensor is mounted to the control valve. The positioner is located separately from the valve. The connection of x and y signals to the valve is established by cable and piping for air.

3.2 Attachment versions

The positioner is suitable for the following types of attachment using the corresponding accessories:

- Direct attachment to SAMSON Type 3277 Actuator
- Attachment to actuators according to IEC 60534-6
- Attachment according to VDI/ VDE 3847-1/-2

- Attachment to Type 3510 Micro-flow Valve
- Attachment to rotary actuators according to VDI/VDE 3845

3.3 Communication

The positioner is equipped with an interface for HART® protocol (Highway Addressable Remote Transducer) for communication purposes. Data are transmitted in a superimposed frequency (FSK = Frequency Shift Keying) on the existing signal loop for the 4 to 20 mA set point.

Either a HART® capable handheld communicator or a computer with FSK modem can be used to establish communication and operate the positioner.

i Note

The HART® device revision as well as the indicating and operating modules supported by the Type 3730-6 Positioner can be found on the SAMSON website (> www.samsongroup.com > SERVICE & SUPPORT > Downloads > Device integration > 3730-6 > 'Device Revision' to 'Firmware' assignment).

3.4 Configuration using the TROVIS-VIEW software

The positioner can be configured with SAMSON's TROVIS-VIEW Software.

The positioner has for this purpose a **serial interface** to allow the RS-232 or USB port of a computer to be connected to it using an adapter cable.

The TROVIS-VIEW software enables the user to easily configure the positioner as well as view process parameters online.

i Note

TROVIS-VIEW provides a uniform user interface that allows users to configure and parameterize various SAMSON devices using device-specific database modules. The device module 3730-6 can be downloaded free of charge from our website at ► www.samsongroup.com > SERVICE & SUPPORT > Downloads > TROVIS-VIEW. Further information on TROVIS-VIEW. Further information on TROVIS-VIEW (e.g. system requirements) is available on our website and in the Data Sheet ► T 6661.

3.5 Technical data

lectropneumatic Positioner

Туре 3730-	-6 Positioner					
	hnical data for the e	explosion-protected devices may be further re	stricted by the limits specified in the			
Travel	Adjustable	Direct attachment to Type 3277 Actuator: 3.6 to 30 mm Attachment according to IEC 60534-6-1: 3.6 to 300 mm Attachment according to VDI/VDE 3847: 3.6 to 300 mm Rotary actuators: 24 to 100° opening angle				
Travel range	Adjustable	Adjustable within the initialized travel/angle of rotation; travel can be restricted to $1/5\ {\rm at}$ the maximum				
Set point w	Signal range	4 to 20 mA · Two-wire device, reverse polarit	y protection · Minimum span 4 mA			
	Static destruction limit	30 V				
Minimum cur	rent	3.6 mA for display · Emergency venting at ≤3 sion	3.8 mA or ≤4.4 mA depending on ver-			
Load impeda	ince	≤9.2 V (corresponding to 460 Ω at 20 mA)				
Supply	Supply air	1.4 to 7 bar (20 to 105 psi)				
	Air quality acc. to ISO 8573-1 (edition 2001-02)	Maximum 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 pressu	ure (output)	0 bar up to the supply pressure · Can be limited between 1.4 and 7.0 bar by software				
Characteris- tic	Adjustable	Linear/Equal percentage/Reverse equal perce User-defined (over operator software) Butterfly valve, rotary plug valve and segment age	-			
	Deviation	≤1 %				
Hysteresis		≤0.3 %				
Sensitivity		≤0.1 %				
Transit time		Exhaust and supply adjustable separately up to 240 s by software				
Direction of a	action	Reversible				
Air consumption, steady state		Independent of supply air approx. 110 l _n /h				
Air output	Actuator (supply)	At $\Delta p = 6$ bar: 8.5 m _n ³ /h · At $\Delta p = 1.4$ bar:	$3.0 \text{ m}_n^3/\text{h} \cdot \text{K}_{\text{Vmax}(20 °C)} = 0.09$			
capacity	Actuator (exhaust)	At $\Delta p = 6$ bar: 14.0 m _n ³ /h · At $\Delta p = 1.4$ bar	$: 4.5 \text{ m}_{n}^{3}/\text{h} \cdot \text{K}_{\text{Vmax}(20 °C)} = 0.15$			
Permissible a	mbient temperature	-20 to +80 °C for all versions -45 to +80 °C with metal cable gland The temperature limits for the explosion-prote- limits specified in the test certificates.	cted devices may be restricted by the			

Influences	т ,	-0.15 % /10 K
		≤0.15 %/10 K
	Supply air	None
	Effect of vibration	≤0.25 % up to 2000 Hz and 4 g according to IEC 770
Electromagn	etic compatibility	Complying with EN 61000-6-2, EN 61000-6-3, EN 61326-1 and NAMUR Recommendation NE 21
Electrical co	nnections	One M20x1.5 cable gland for 6 to 12 mm clamping range · Second M20x1.5 threaded connection additionally exists · Screw terminals for 0.2 to 2.5 mm ² wire cross-sections
Degree of p	rotection	IP 66/NEMA 4X
Certified according to IEC 61508/SIL		 Suitable for use in safety-instrumented systems up to SIL 2 (single device/HFT = 0) and SIL 3 (redundant configuration/HFT = 1) according to IEC 61511. Triggered by the set point, emergency venting depending on positioner version at ≤3.8 mA or ≤4.4 mA By the optional solenoid valve, emergency venting at 0 V
		• By the optional forced venting function, emergency venting at <12 V
Communica	tion (local)	SAMSON SSP interface and serial interface adapter, software requirements (SSP): TROVIS-VIEW with database module 3730-6
Communica	tion (HART®)	HART® field communications protocol · Impedance in HART® frequency range: Receiving 350 to 450 Ω · Sending approx. 115 Ω
Software For handheld requirements communicator		Device description for Type 3730-6
(HART®)	For computer	DTM file according to specification 1.2, suitable for integrating the device into frame applications that support the use of FDT/DTM (e.g. PACTware)
Explosion pr	rotection	
Refer to Tab	le 3-3	
Binary conto	acts	
Two software	e limit switches, rever	se polarity protection, floating, configurable switching characteristics
	No response	≤1.0 mA
-	Response	≥2.2 mA
One fault al	arm contact, floating	1
	No response	≥2.2 mA · No fault alarm
0	Response	≤1.0 mA · Fault alarm
For connecti	•	NAMUR switching amplifier acc. to EN 60947-5-6
Materials		
Housing		Die-cast aluminum EN AC-AlSi12(Fe) (EN AC-44300) acc. to DIN EN 1706, chromate and powder coating · Special version: stainless steel 1.4408
External par	+~	Stainless steel 1.4404/316L

Type 3730-6 Positioner				
Cable gland	M20x1.5, black polyamide			
Weight	Approx. 1.0 kg · Stainless steel version: 2.2 kg			
Conformity	C€ [AI			

Table 3-2: Optional additional functions

Electronic forced venting Ap	pproval acc. to IEC 61508/SIL			
Input	24 V DC · Electrical isolation and reverse polarity protection · Static destruction lin 40 V			
	Power draw: $I = \frac{U - 5.7 \text{ V}}{3.84 \text{ k}\Omega}$ (corresponding to 4.8 mA at 24 V/114 mW)			
Signal '0' (no response)	<12 V (emergency venting at 12 V)			
Signal '1' (response)	>19 V			
Solenoid valve · Approval ac	c. to IEC 61508/SIL			
Input	24 V DC \cdot Reverse polarity protection \cdot Static destruction limit 40 V			
	Power draw: $I = \frac{U-5.7 \text{ V}}{3.84 \text{ k}\Omega}$ (corresponding to 4.8 mA at 24 V/114 mW)			
Signal '0' (no response)	<12 V (emergency venting at 0 V)			
Signal '1' (response)	>19 V			
Service life	>5 x 10 ⁶ switching cycles			
Analog position transmitter	Two-wire transmitter · Galvanically isolated			
Supply	12 to 30 V DC · Reverse polarity protection · Static destruction limit 40 V			
Output signal	4 to 20 mA			
Operating direction	Reversible			
Operating range	-10 to +114 %			
Characteristic	Linear			
Hysteresis	Same as positioner			
High-frequency influence	Same as positioner			
Other influences	Same as positioner			
Fault alarm	Can be issued as current signal 2.4 ±0.1 mA or 21.6 ±0.1 mA			
Leakage sensor · Suitable for	operation in hazardous areas			
Temperature range	-40 to +130 °C			
Tightening torque	20 ±5 Nm			

Design and principle of operation

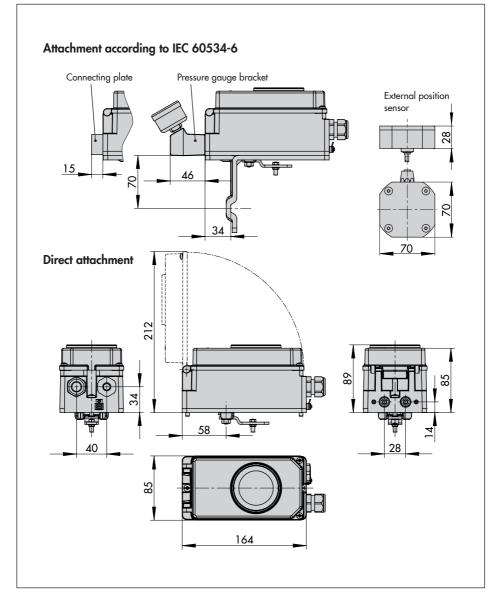
Inductive limit switch by Pepperl+Fuchs		For connection to switching amplifier acc. to EN 60947-5-6 Can be used in combination with a software limit switch			
SJ2-SN proximity switch		Measuring plate not detected: ≥3 mA · Measuring plate detected: ≤1 mA			
External p	oosition sensor				
Travel		Same as positioner			
Cable		10 m · Flexible and durable · With M12x1 connector · Flame-retardant according to VDE 0472 · Resistant to oils, lubricants and coolants as well as other aggressive media			
Permissible ambient temperature		-40 to +90 °C with a fixed connection between positioner and position sensor · The limits in the test certificate additionally apply for explosion-protected versions.			
Immunity to vibration		Up to 10 g in the range of 10 to 2000 Hz			
Degree of protection		IP 67			
Binary in	out · Galvanic isolati	on · Switching behavior configured by software			
Active swi	itching behavior (def	ault setting)			
Connection		For external switch (floating contact) or relay contact			
Electric data		Open-circuit voltage when contact is open: max. 10 V Pulsed DC current reaching peak value of 100 mA and RMS value of 0.01 mA when contact is closed			
Contact	Closed, R < 20 Ω	ON switching state (default setting)			
	Open, R > 400 Ω	OFF switching state (default setting)			
Passive sv	vitching behavior				
Connection		For externally applied DC voltage, reverse polarity protection			
Electric data		3 to 30 V · Static destruction limit 40 V · Power draw 3.7 mA at 24 V			
Voltage	>6 V	ON switching state (default setting)			
	<1 V	OFF switching state (default setting)			

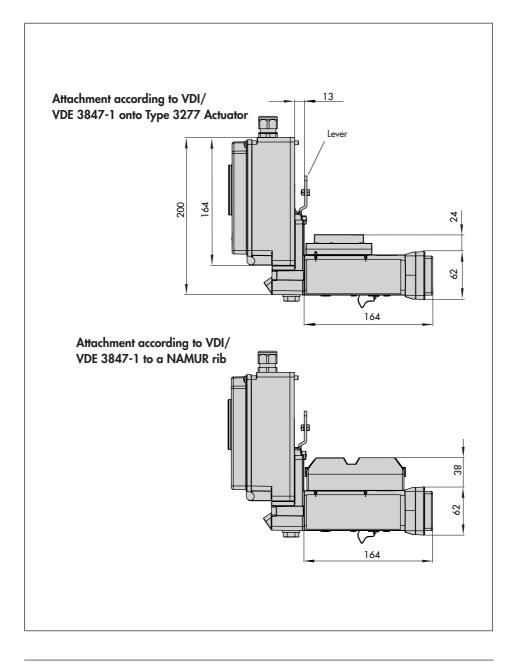
Туре 3730-6	Certifico	ition		Type of protection
-110	ATEX	Number	PTB 10 ATEX 2007	ll 2 G Ex ia IIC T6 Gb Il 2 D Ex ia IIIC T80 °C Db
		Date	2020-01-20	
-210		Number	PTB 10 ATEX 2007	II 2 G Ex d[ia] IIC T6 Gb II 2 D Ex tb IIIC T80 °C Db
		Date	2020-01-20	
-510		Number	PTB 10 ATEX 2007	II 2 D Ex tb IIIC T80 °C Db
		Date	2020-01-20	
-910		Number	PTB 10 ATEX 2008X	II 3 G Ex nA ic IIC T6 Gc II 3 D Ex tc IIIC T80°C Dc IP66
-810		Date	2010-08-18	
		Number	2682094	Ex ia IIC T4/T5/T6; Class I, Zone 0
-131	CSA	Date	2017-05-24	Class I, Gruops A,B,C,and D Class II Groups E,F and G; Class III; Type 4 Enclosure
	FM	Number	3012394	Intrinsically safe: IS, Class I, II, III, Div. 1, Gr. A, B, C, D, E, F, G AEx ia IIC / Class I / Zone 0 Non incendive: NI, Class I, Div. 2, Gr. A, B, C, D S, Class II, Div. 2, Gr. F, G Enclosure Type 4X
-130		Date	2014-11-05	
	GOST (EAC)	Number	RU C-DE.AA87.B.01278	1Ex ia IIC T6T4 Gb Ex ia IIIC T80 °C Db Ex tb IIIC T80 °C Db
-113		Date	2018-11-30	
		Valid until	2023-11-29	
-213		Number	RU C-DE.AA87.B.01278	1Ex d [ia] IIC T6T4 Gb X Ex tb IIIC T80 °C Db X
		Date	2018-11-30	
		Valid until	2023-11-29	
-813		Number	RU C-DE.AA87.B.01278	2Ex nA IIC T6T4 Gc X
		Date	2018-11-30	2Ex ic IIC T6T4 Gc X Ex tc IIIC T80°C Dc X
		Valid until	2023-11-29	

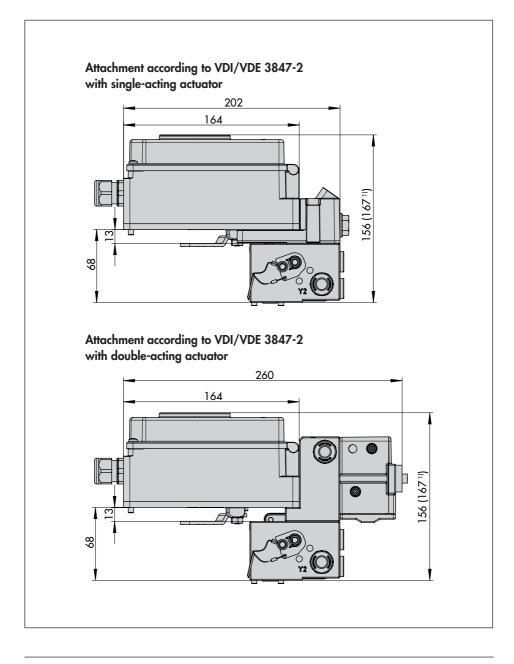
 Table 3-3:
 Summary of explosion protection approvals

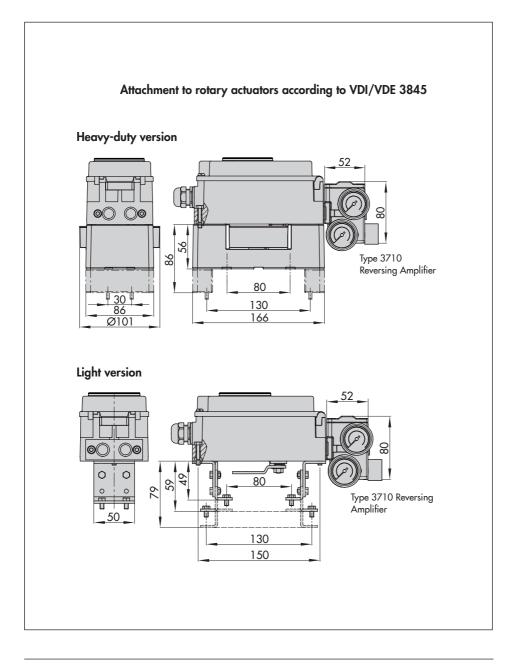
Туре 3730-6	Certification			Type of protection
-111	IECEx	Number	IECEx PTB 10.0057	Ex ia IIIC T80°C Db
		Date	2020-09-17	Ex ia IIC T6 Gb
-211		Number	IECEx PTB 10.0057	Ex db[ia] IIC T6 Gb Ex tb IIIC T80°C Db
		Date	2020-09-17	
		Number	IECEx PTB 10.0057	Ex tb IIIC T80°C Db
-511		Date	2020-09-17	
		Number	IECEx PTB 10.0058X	Ex nA IIC T6
-811		Date	2010-12-10	Ex nL IIC T6 Ex tD A22 IP 66 T80 °C
	NEPSI	Number	GYJ17.1406X	Ex ia IIC T4~T6 Ga
-112		Date	2017-11-21	Ex iaD 20 T80
		Valid until	2022-11-20	
		Number	GYJ17.1407X	Ex ic IIC T4~T6 Gc
-812		Date	2017-11-21	Ex nA IIC T4~T6 Gc Ex tD A22 IP66 T80°C
		Valid until	2022-11-20	
	TR CMU 1055	Number	ZETC/35/2021	II 2G Ex ia IIC T6 Gb
-116		Date	2021-07-26	II 2D Ex ia IIIC T80°C Db
		Valid until	2024-07-25	
		Number	ZETC/35/2021	II 2D Ex th IIIC T80°C Dh
-516		Date	2021-07-26	
		Valid until	2024-07-25	
		Number	ZETC/35/2021	II 3G Ex nA IIC T6 Gc
-816		Date	2021-07-26	II 3D Ex tc IIIC T80°C Dc
		Valid until	2024-07-25	

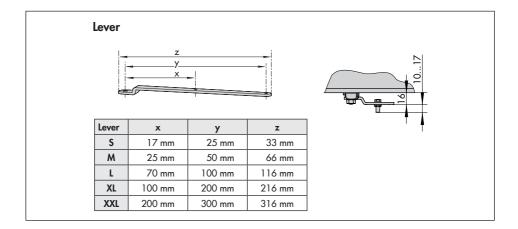
3.6 Dimensions in mm



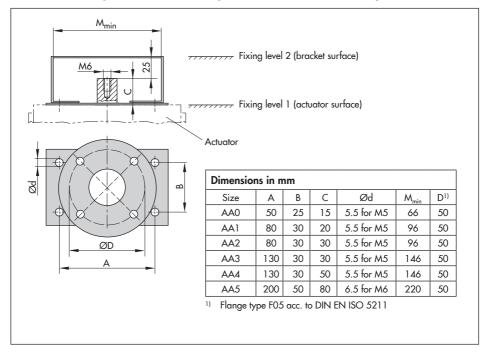








3.6.1 Fixing levels according to VDI/VDE 3845 (September 2010)



4 Shipment and on-site transport

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

4.1 Accepting the delivered goods

After receiving the shipment, proceed as follows:

- Check the scope of delivery. Check that the specifications on the nameplate of the positioner match the specifications in the delivery note. See the 'Markings on the device' section for nameplate details.
- 2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).

4.2 Removing the packaging from the positioner

Observe the following sequence:

- ➔ Do not remove the packaging and the protective caps on the pneumatic ports until immediately before installation.
- → Dispose and recycle the packaging in accordance with the local regulations.

4.3 Transporting the positioner

→ Pack the positioner properly to comply with terms of transportation.

Transport instructions

- Protect the positioner against external influences (e.g. impact).
- Protect the positioner against moisture and dirt.
- Observe transport temperature depending on the permissible ambient temperature (see the 'Design and principle of operation' section).

4.4 Storing the positioner

Risk of device damage due to improper storage.

- → Observe the storage instructions.
- ➔ Avoid long storage times.
- Contact SAMSON in case of different storage conditions.

i Note

We recommend regularly checking the control valve and the prevailing storage conditions during long storage periods.

Storage instructions

- Protect the positioner against external influences (e.g. impact, shocks, vibration).
- Do not damage the corrosion protection (coating).
- Protect the positioner against moisture and dirt. In damp spaces, prevent condensation. If necessary, use a drying agent or heating.
- Make sure that the ambient air is free of acids or other corrosive media.
- Observe storage temperature depending on the permissible ambient temperature (see the 'Design and principle of operation' section).
- Store the positioner with the cover closed.
- Seal the pneumatic and electrical connections.
- Do not place any objects on the positioner.

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

Risk of fatal injury due to the ignition of an explosive atmosphere.

- Observe EN 60079-14 (VDE 0165, Part 1) for work on the positioner in potentially explosive atmospheres.
- → Work in potentially explosive atmospheres must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosionprotected devices in hazardous areas.

Crush hazard arising from moving parts on the valve.

- ➔ Do not touch any moving valve parts while the control valve is in operation.
- Before performing any mounting or installation work on the positioner, put the control valve out of operation by disconnecting and locking the supply air and control signal.
- ➔ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.

Risk of malfunction due to incorrect mounting parts/accessories.

Only use the mounting parts and accessories listed in these mounting and operating instructions to mount and install the positioner. Pay special attention to the type of attachment.

5.1 Installation conditions

Work position

The work position for the positioner is the front view onto the operating controls on the positioner seen from the position of operating personnel.

Operators must ensure that, after installation of the positioner, the operating personnel can perform all necessary work safely and easily access the device from the work position.

Mounting orientation

- → Observe mounting position (see Fig. 5-2).
- → Do not seal or restrict the vent opening (see Fig. 5-1) when the device is installed on site.

5.2 Preparation for installation

Before mounting, make sure the following conditions are met:

- The positioner is not damaged.
- The air supply is not yet connected to the positioner.
- The current is not yet connected to the positioner.

Proceed as follows:

- → Lay out the necessary material and tools to have them ready during mounting.
- → Adjust correct lever and pin position (see section 5.3).
- → Seal the signal pressure output at the back with the screw plug (4, order no. 0180-1436) and the associated O-ring (order no. 0520-0412) if not already been done so.
- → Remove the protective caps from the pneumatic connections.

5.3 Adjusting the lever and pin position

i Note

The **M** lever is included in the scope of delivery.

S, *L* and *XL* levers are available as accessories (see section 5.12). The *XXL* lever is available on request.

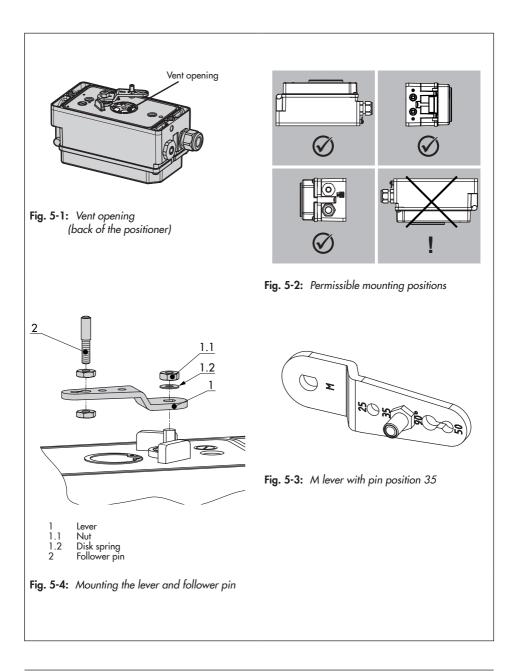
The positioner is adapted to the actuator and to the rated travel by the lever on the back of

the positioner and the pin inserted into the lever.

The travel tables on page 5-4 show the maximum adjustment range at the positioner. The travel that can be implemented at the valve is additionally restricted by the selected fail-safe position and the required compression of the actuator springs.

The positioner is equipped with the **M** lever (pin position 35) as standard (see Fig. 5-3). If a pin position other than position 35 with the standard **M** lever is required or an **L** or **XL** lever size is required, proceed as follows (see Fig. 5-4):

- 1. Unthread the nut (1.1) to unfasten the mounted lever.
 - → Make sure that the lever does not rest on the end stops.
- Fasten the follower pin (2) in the assigned lever hole (pin position as specified in the travel tables on page 5-4). Only use the longer follower pin included in the mounting kit.
- 3. Place the lever (1) on the shaft of the positioner and fasten it tight using the disk spring (1.2) and nut (1.1).
 - → Make sure that the lever does not rest on the end stops.



5.3.1 Travel tables

 Table 5-1: Direct attachment to Type 3277-5 and Type 3277 Actuator

Actuator size	Rated travel	Adjustment range at positioner 1)	Required	Assigned
[cm ²]	[mm]	Travel [mm]	lever	pin position
120	7.5	5.0 to 25.0	м	25
120/175/240/350	15	7.0 to 35.0	м	35
355/700/750	30	10.0 to 50.0	М	50

1) The min./max. adjustment range is based on the NOM (nominal range) initialization mode

SAMSON valves with Type 3271 Actuator		Adjustment range at positioner Other control valves ¹⁾			
Actuator size	Rated travel	Min. travel	Max. travel	Required	Assigned
[cm ²]	[mm]	[mm]	[mm]	lever	pin position
60 and 120 with Type 3510 Valve	7.5	3.6	18.0	S	17
120	7.5	5.0	25.0	м	25
120/175/240/350	15	7.0	35.0	М	35
355/700/750	7.5	7.0	35.0	м	35
355/700/750	15 and 30	10.0	50.0	м	50
1000/1400/2800	30	14.0	70.0	L	70
	60	20.0	100.0	L	100
1400/2800	120	40.0	200.0	XL	200
See manufacturer's specifications	200	See manufacturer's specifications		300	

Table 5-2: Attachment according to IEC 60534-6 (NAMUR)

¹⁾ The min./max. adjustment range is based on the NOM (nominal range) initialization mode

Table 5-3: Attachment to rotary actuators

Opening angle	Required lever	Assigned pin position
24 to 100°	М	90°

5.4 Positioner attachment

5.4.1 Direct attachment

a) Type 3277-5 Actuator

- → Required mounting parts and accessories: Table 5-5
- → Observe the travel table on page 5-4.

Actuator with 120 cm² (see Fig. 5-5)

The signal pressure from the positioner is routed over the signal pressure connection of the connecting plate (9, Fig. 5-23 left) to the actuator diaphragm chamber. To proceed, first screw the connecting plate (9) included in the accessories onto the actuator yoke.

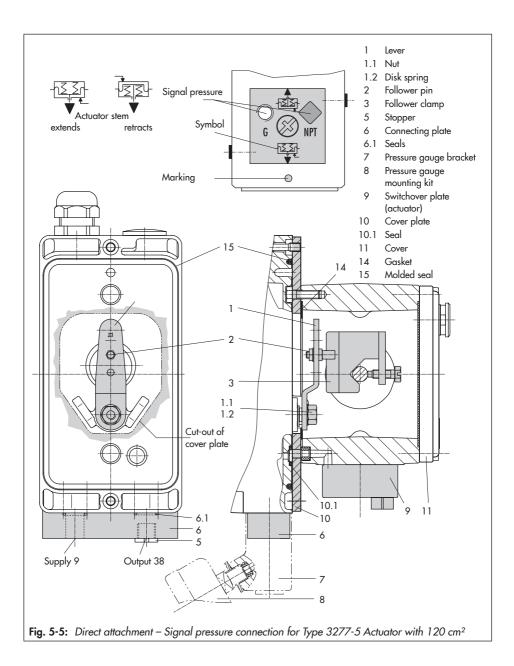
- Turn connecting plate (9) so that the correct symbol for the fail-safe action "actuator stem extends" or "actuator stem retracts" is aligned with the marking (Fig. 5-23, below).
 - → Make sure that the gasket for the connecting plate (9) is correctly inserted.
- The connecting plate has threaded holes with NPT and G threads. Seal the threaded connection that is not used with the rubber seal and square plug.
- 4. Mount connecting plate (6) or pressure gauge bracket (7) with pressure gauges on the positioner, making sure the two seals (6.1) are seated properly.
- 5. Place follower clamp (3) on the actuator stem, align it and screw tight so that the

mounting screw is located in the groove of the actuator stem.

- Mount cover plate (10) with narrow side of the cut-out (Fig. 5-5, on the left) pointing towards the signal pressure connection. Make sure that the gasket (14) points towards the actuator yoke.
- 7. 15 mm travel: Keep the follower pin (2) on the M lever (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 hole for pin position 25 and screw tight.

- Insert molded seal (15) into the groove of the positioner housing and insert the seal (10.1) on the back of the housing.
- 9. Place positioner on the cover plate (10) in such a way 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 rotary pushbutton. The lever (1) must rest on the follower clamp with spring force. Fasten the positioner on the cover plate (10) using the two fastening screws.
- 10. Mount cover (11) on the other side.
 - → Make sure that the vent plug is located at the bottom when the control valve is installed to allow any condensed water that collects to drain off.



b) Type 3277 Actuator

- → Required mounting parts and accessories: Table 5-6
- \rightarrow Observe the travel table on page 5-4.

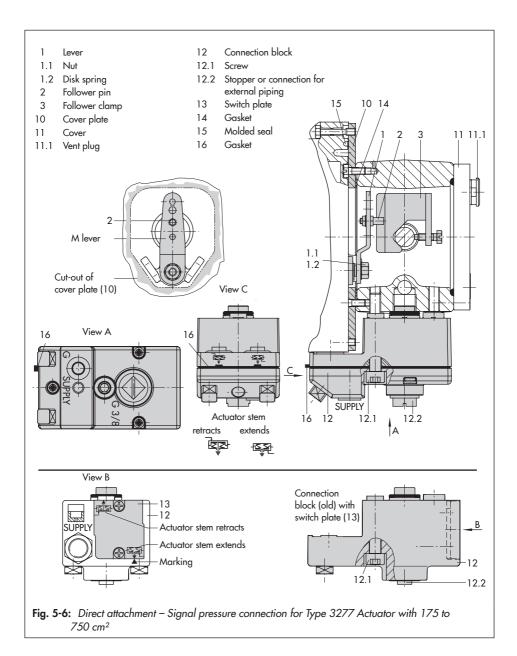
Actuators with 175 to 750 cm² effective areas (see Fig. 5-6)

Mount the positioner on the yoke. The signal pressure is routed to the actuator over the connection block (12), for actuators with failsafe action "actuator stem extends" internally through a hole in the valve yoke and for "actuator stem retracts" through an external pipe.

- Place follower clamp (3) on the actuator stem, align it and screw tight so that the mounting screw is located in the groove of the actuator stem.
- Mount cover plate (10) with narrow side of the cut-out (Fig. 5-6, on the left) pointing towards the signal pressure connection. Make sure that the gasket (14) points towards the actuator yoke.
- For actuators with 355, 700 or 750 cm², remove the follower pin (2) on the M lever (1) on the back of the positioner from pin position 35, reposition it in the hole for pin position 50 and screw tight. For actuators 175, 240 and 350 cm² with 15 mm travel, keep the follower pin (2) in pin position 35.
- 4. Insert molded seal (15) into the groove of the positioner housing.
- Place positioner on the cover plate in such a way that the follower pin (2) rests on the top of the follower clamp (3). Ad-

just the lever (1) correspondingly and open the positioner cover to hold the positioner shaft in position at the cap or rotary pushbutton. The lever (1) must rest on the follower clamp with spring force. Fasten the positioner on the cover plate (10) using the two fastening screws.

- 6. Make sure that the tip of the gasket (16) projecting from the side of the connection block is positioned to match the actuator symbol for the actuator's fail-safe action "actuator stem extends" or "actuator stem retracts". If this is not the case, unscrew the three fastening screws and lift off the cover. Turn the gasket (16) by 180° and re-insert it. The old connection block version (Fig. 5-6, bottom) requires the switch plate (13) to be turned to align the actu-
- ator symbol with the arrow marking.
 Place the connection block (12) with the associated seals against the positioner and the actuator yoke and fasten using the screw (12.1). For actuators with failsafe action "actuator stem retracts", additionally remove the stopper (12.2) and mount the external signal pressure pipe.
- 8. Mount cover (11) on the other side.
 - Make sure that the vent plug is located at the bottom when the control valve is installed to allow any condensed water that collects to drain off.



5.4.2 Attachment according to IEC 60534-6

- → See Fig. 5-7
- → Required mounting parts and accessories: Table 5-7
- \rightarrow Observe the travel table on page 5-4.

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

 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) for fastening.

Actuator sizes 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 hole.
 - For attachment to valves with rodtype yokes, use two U-bolts (15) around the yoke. Align the NAMUR bracket (10) according to the embossed scale so that the follower plate (3) is shifted by half the angle range to the NAMUR bracket (the slot of the follower plate is centrally

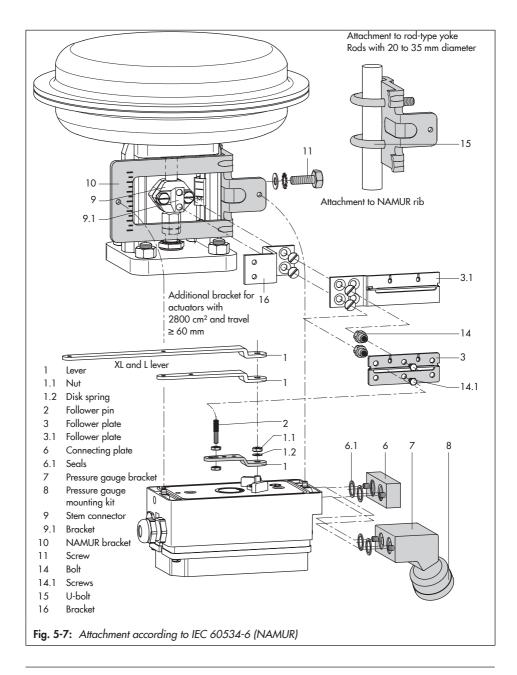
aligned with the NAMUR bracket at mid valve travel).

- Mount connecting plate (6) or pressure gauge bracket (7) with pressure gauges on the positioner, making sure the two seals (6.1) are seated properly.
- Select required lever size (1) M, L or XL and pin position according to the actuator size and valve travel listed in the travel table on page 5-4.

If a pin position other than position **35** with the standard **M** lever is required or an **L** or **XL** lever size is required. Proceed as described in section 5.3.

 Place positioner on the NAMUR bracket in such a way 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 its two fastening screws.



5.4.3 Attachment according to VDI/VDE 3847-1

The Type 3730-6-xxx0xxxx0x0060xx and Type 3730-6-xxx0xxxx0x007000 Positioners with air purging of the actuator's spring chamber can be attached according to VDI/ VDE 3847-1.

The Type 3730-6-xxx0xxxx0x0000xx Positioner without air purging of the actuator's spring chamber can be attached according to VDI/VDE 3847.

This type of attachment allows the positioner to be replaced quickly while the process is running by blocking the air in the actuator. The signal pressure can be blocked in the actuator by unscrewing the red retaining screw (20) and turning the air blocker (19) on the bottom of the adapter block.

Attachment to Type 3277 Actuator (see Fig. 5-8)

→ Required mounting parts and accessories: see Table 5-8

Mount the positioner on the yoke as shown in Fig. 5-8. The signal pressure is routed to the actuator over the connecting plate (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.

Only the Y1 port is required for positioner attachment. The Y2 port can be used for air purging of the spring chamber.

1. Place follower clamp (3) on the actuator stem, align it and screw tight so that the

mounting screw is located in the groove of the actuator stem.

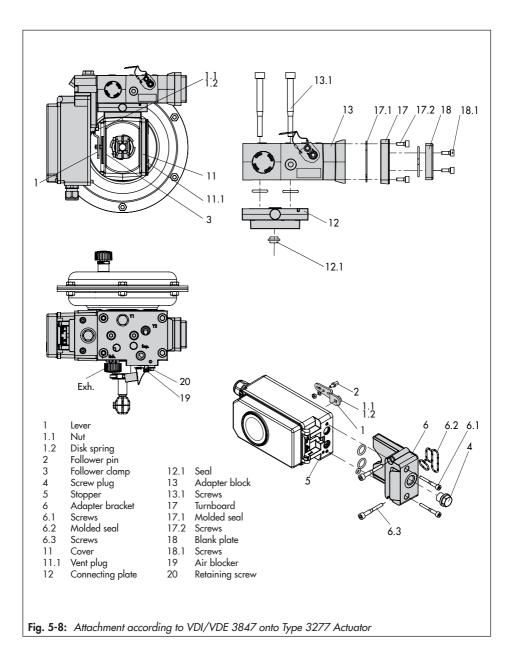
- Place the adapter bracket (6) on the positioner and mount using the screws (6.1). Make sure that the seals are correctly seated. For positioners with air purging, remove the stopper (5) before mounting the positioner. For positioners without air purging, replace the screw plug (4) with a vent plug.
- For actuators with 355, 700 or 750 cm², remove the follower pin (2) on the M lever (1) on the back of the positioner from pin position 35, reposition it in the hole for pin position 50 and screw tight.

For actuators 175, 240 and 350 cm² with 15 mm travel, keep the follower pin (2) in pin position 35.

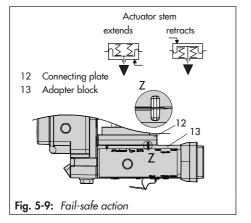
- 4. Insert the molded seal (6.2) in the groove of the adapter bracket (6).
- 5. Insert the molded seal (17.1) into the turnboard (17) and mount the turnboard to the adapter block (13) using the screws (17.2).
- Mount the blank plate (18) to the turnboard (17) using the screws (18.1). Make sure that the seals are correctly seated.

i Note

A solenoid valve can also be mounted in place of the blank plate (18). The orientation of the turnboard (17) determines the mounting position of the solenoid valve. Alternatively, a restrictor plate can be mounted (► AB 11).



- 7. Insert the screws (13.1) through the middle holes of the adapter block (13).
- Place the connecting plate (12) together with the seal (12.1) onto the screws (13.1) corresponding to the fail-safe action "actuator stem extends" or "actuator stem retracts". The fail-safe action that applies is determined by aligning the groove of the adapter block (13) with the groove of the connecting plate (12) (Fig. 5-9).



- Mount the adapter block (13) together with the connecting plate (12) to the actuator using the screws (13.1).
- 10. Insert the vent plug (11.1) into the **Exh.** connection.
- For fail-safe action "actuator stem extends", seal the Y1 port with a blanking plug.

For fail-safe action "actuator stem retracts", connect the Y1 port to the signal pressure connection of the actuator. Place positioner on the adapter block (13) in such a way 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 rotary pushbutton.

The lever (1) must rest on the follower clamp with spring force.

Fasten the positioner to the adapter block (13) using the two fastening screws (6.3). Make sure the molded seal (6.2) is properly seated.

- 12. Mount cover (11) on the other side to the yoke.
 - → Make sure that the vent plug is located at the bottom when the control valve is installed to allow any condensed water that collects to drain off.

Attachment to NAMUR rib (see Fig. 5-10)

- Required mounting parts and accessories: see Table 5-8
- Observe the travel table on page 5-4.
- Series 240 Valves, actuator size up to 1400-60 cm²: Screw the two bolts (14) to the bracket of the stem connector or directly to the stem connector (depending on the version), place the follower plate (3) on top and use the screws (14.1) to fasten it.

Type 3251 Valve, 350 to 2800 cm²:

Screw the longer follower plate (3.1) to the bracket of the stem connector or directly to the stem connector (depending on the version).

Type 3254 Valve, 1400-120 to 2800 cm²: Screw the two bolts (14) to the bracket (16). Fasten the bracket (16) onto the stem connector, place the follower plate (3) on top and use the screws (14.1) to fasten it.

Mount the positioner on the NAMUR rib as shown in Fig. 5-10.

For attachment to the NAMUR rib, fasten the NAMUR connection block (10) directly into the existing yoke bore using the screw and toothed lock washer (11). Align the marking on the NAMUR valve connection (on the side marked '1') to 50 % travel.

For attachment to **valves with rod-type yokes** using the formed plate (15), which is placed around the yoke: screw the four studs into the NAMUR connection block (10). Place the NAMUR connection block on the rod and position the formed plate (15) on the opposite side. Use the nuts and toothed lock washers to fasten the formed plate onto the studs. Align the marking on the NAMUR valve connection (on the side marked '1') to 50 % travel.

- Place the adapter bracket (6) on the positioner and mount using the screws (6.1). Make sure that the seals are correctly seated. For positioners with air purging, remove the stopper (5) before mounting the positioner. For positioners without air purging, replace the screw plug (4) with a vent plug.
- Select required lever size (1) M, L or XL and pin position according to the actuator size and valve travel listed in the travel table on page 5-4.

If a pin position other than position 35 with the standard M lever is required or an L or XL lever size is required. Proceed as described in section 5.3.

- 5. Insert the molded seal (6.2) in the groove of the adapter bracket.
- 6. Insert the molded seal (17.1) into the turnboard (17) and mount the turnboard to the adapter block (13) using the screws (17.2).

 Mount the blank plate (18) to the turnboard using the screws (18.1). Make sure that the seals are correctly seated.

i Note

A solenoid valve can also be mounted in place of the blank plate (18). The orientation of the turnboard (17) determines the mounting position of the solenoid valve. Alternatively, a restrictor plate can be mounted (► AB 11).

- 8. Fasten the adapter block (13) to the NAMUR connection block using the screws (13.1).
- 9. Insert the vent plug into the Exh. connection.
- 10. Place the positioner on the adapter block (13) in such a way that the follower pin (2) rests on the top of the follower plate (3, 3.1). Adjust the lever (1) correspondingly.

Fasten the positioner to the adapter block (13) using the two fastening screws (6.3). Make sure the molded seal (6.2) is properly seated.

11. For single-acting actuators without air purging, connect the Y1 port of the adapter block to the signal pressure connection of the actuator. Seal the Y2 port with a blanking plug. For **double-acting actuators and actuators with air purging**, connect the Y2 port of the adapter block to the signal pressure connection of the second actuator chamber or spring chamber of the actuator.

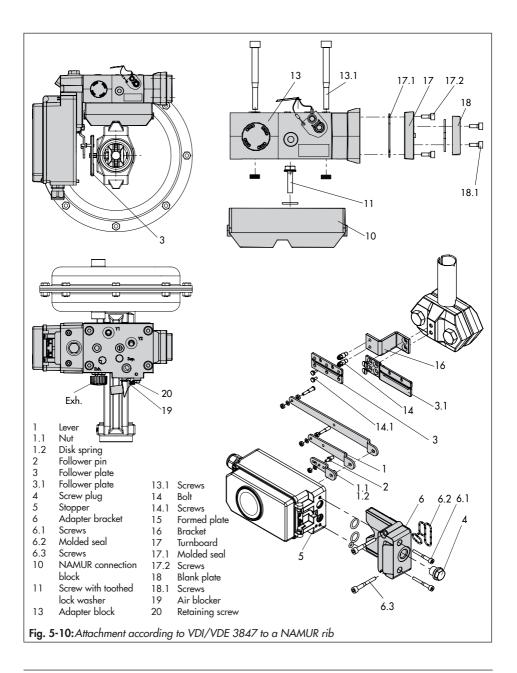
5.4.4 Attachment according to VDI/VDE 3847-2

Attachment according to VDI/VDE 3847-2 for PFEIFFER SRP (single-acting) and DAP (double-acting) rotary actuators in sizes 60 to 1200 with NAMUR interface and air purging of the actuator's spring chamber allows the direct attachment of the positioner without additional piping.

Additionally, the positioner can be replaced quickly while the process is running by blocking the air in single-acting actuators.

Procedure to block the actuator in place (see Fig. 5-11):

- 1. Unscrew the red retaining screw (1).
- Turn the air blocker (2) on the bottom of the adapter block according to the inscription.



a) Version for single-acting actuator

Mounting onto a PFEIFFER Type 31a (edition 2020+) SRP Rotary Actuator

→ See Fig. 5-13

- 1. Fasten the adapter block (1) to the actuator's NAMUR interface using the four fastening screws (2).
 - Make sure that the seals are correctly seated.
- Mount the follower wheel (3) onto the actuator shaft. Use the matching shaft adapter (see Table 5-9).
- 3. Place the adapter bracket (4) onto the adapter block (1) and fasten it using the fastening screws (5).
 - Make sure that the seals are correctly seated.
- Insert and fasten the follower pin in the 90° position on the positioner's lever (see Fig. 5-12).
 - → Only use the longer follower pin included in the mounting kit.
- 5. Align the positioner on the adapter bracket (1) in such a way that the follower pin engages into the actuator's follower wheel (3).
- Fasten the positioner onto the adapter bracket (4) using the fastening screws (6).
 - → Make sure that the seals are correctly seated.

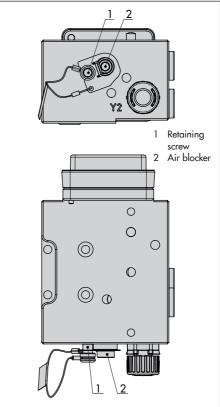


Fig. 5-11:Adapter block for attachment according to VDI/VDE 3847-2

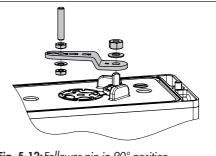
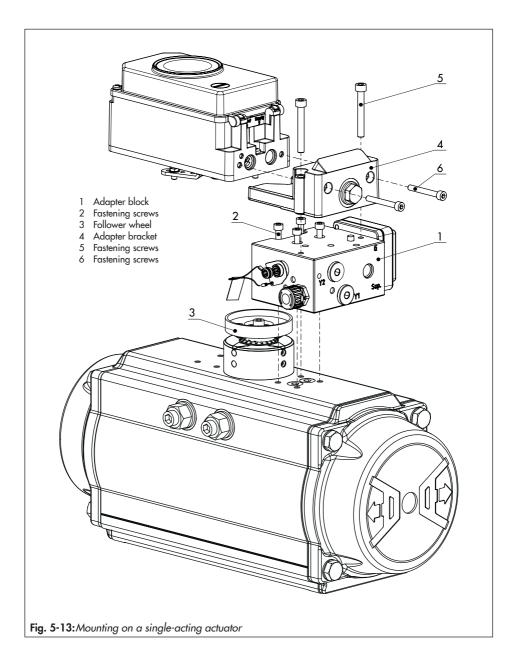


Fig. 5-12: Follower pin in 90° position



b) Version for double-acting actuator

A reversing amplifier must be additionally mounted for applications with double-acting (DAP) actuators or applications with single-acting (SAP) actuators that include partial stroke testing.

In this case, a special adapter bracket (4) is required for mounting.

- → See Fig. 5-15
- Fasten the adapter block (1) to the actuator's NAMUR interface using the four fastening screws (2).
 - Make sure that the seals are correctly seated.
- Mount the follower wheel (3) onto the actuator shaft. Use the matching adapter (see Table 5-9).
- Place the adapter bracket (4) onto the adapter block (1) and fasten it using the fastening screws (5).
 - Make sure that the seals are correctly seated.
- Insert and fasten the follower pin in the 90° position on the positioner's lever (see Fig. 5-12).
- 5. Align the positioner on the adapter bracket (1) in such a way that the follower pin engages into the actuator's follower wheel (3).
- Fasten the positioner onto the adapter bracket (4) using the fastening screws (6).

- Mount the Type 3710 Reversing Amplifier (7) together with the two guide bushings (8) and terminal plate (9) onto the adapter bracket using the associated fastening screws (10).
 - → Make sure that the seals are correctly seated.
- Remove the vent plug at the adapter block and seal the opening with the G ¹/₄ screw plug.
- Mount the turnboard marked 'Doppel' for double-acting actuators or the turnboard marked 'PST' for single-acting actuators with partial stroke testing. See Fig. 5-14.
 - → Make sure that the seals are correctly seated.

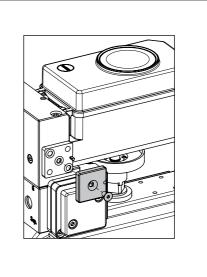
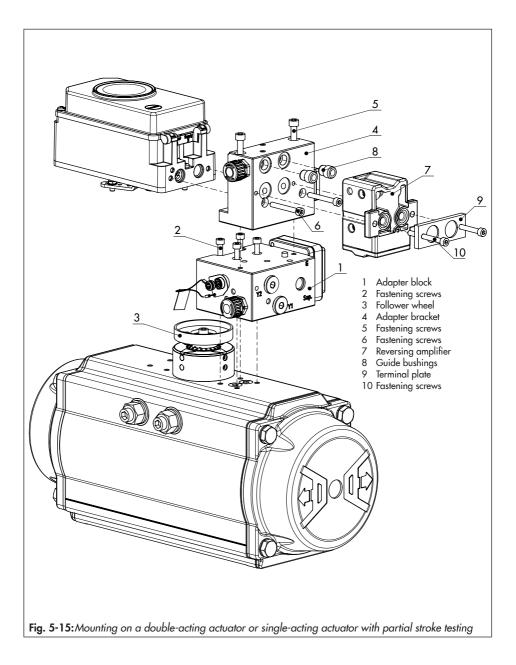


Fig. 5-14: Mounting the turnboard



Intermediate plate for AA4 interface

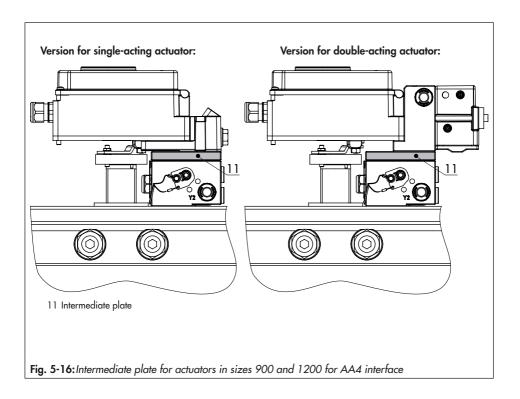
→ Refer to Fig. 5-16

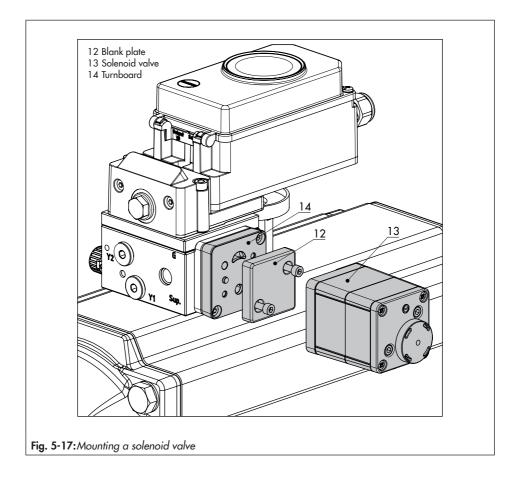
An intermediate plate (1) must be mounted between the adapter block and adapter bracket for PFEIFFER SRP and DAP rotary actuators in sizes 900 and 1200 with AA4 interface. This plate is included in the accessories for the shaft adapter AA4 (see Table 5-9).

Mounting a solenoid valve

➔ Refer to Fig. 5-17

A solenoid valve (13) can also be mounted in place of the blank plate (12). The orientation of the turnboard (14) determines the mounting position of the solenoid valve. Alternatively, a restrictor plate can be mounted. Further information can be found in the document ► AB 11 (Accessories for Solenoid Valves).





5.4.5 Attachment to Type 3510 Micro-flow Valve

- → Refer to Fig. 5-18
- → Required mounting parts and accessories: Table 5-7
- → Observe the travel table on page 5-4.

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

- 1. Fasten the bracket (9.1) to the stem connector.
- Screw the two bolts (9.2) to the bracket (9.1) of the stem connector (9), place the follower plate (3) on top and use the screws (9.3) for fastening.
- Mount the travel indication scale (accessories) to the outer side of the yoke using the hex screws (12.1), ensuring that the scale is aligned with the stem connector.
- Fasten the hex bar (11) onto the outer side of yoke by screwing the M8 screws (11.1) directly into the holes on the yoke.
- 5. Fasten the bracket (10) to the hex bar (11) using the hex screw (10.1), shim and tooth lock washer.
- Mount connecting plate (6) or pressure gauge bracket (7) with pressure gauges on the positioner, making sure the two seals are seated properly.
- Unscrew the standard M lever (1) including follower pin (2) from the positioner shaft.

- Take the S lever (1) and screw the follower pin (2) in the hole for pin position 17. Proceed as described as in section 5.3.
- Place positioner on the bracket (10) in such a way that the follower pin slides into the groove of the follower pin (3). Adjust the lever (1) correspondingly. Screw the positioner to the bracket (10) using both its screws.

5.4.6 Attachment to rotary actuators

- → See Fig. 5-20
- ➔ Required mounting parts and accessories: Table 5-10
- \rightarrow Observe the travel table on page 5-4.

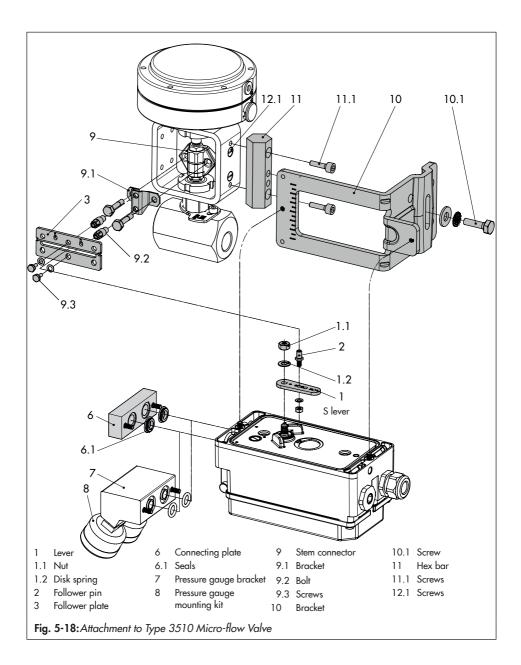
The positioner is mounted to the rotary actuator using two pairs of brackets.

Prior to attaching the positioner to the SAMSON Type 3278 Rotary Actuator, mount the associated adapter (5) to the free end of the rotary actuator shaft.

i Note

When attaching the positioner as described below, it is important that the actuator's direction of rotation is observed.

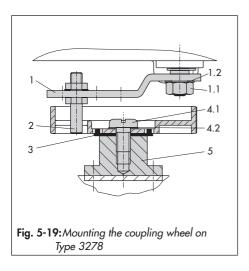
1. Place follower clamp (3) on the slotted actuator shaft or adapter (5).

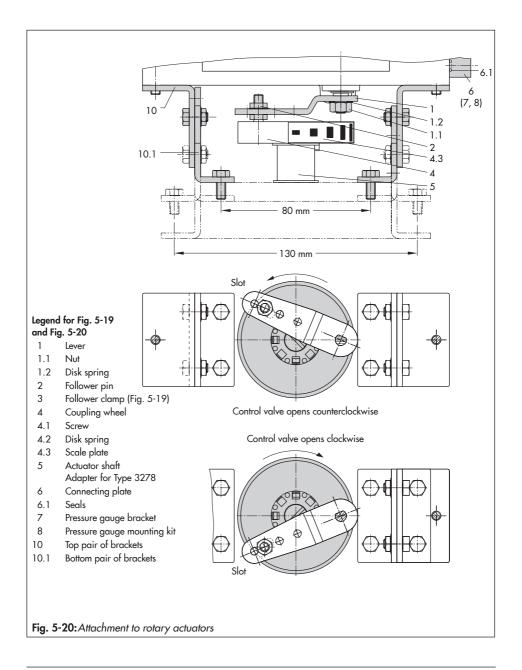


- Place coupling wheel (4) with flat side facing the actuator on the follower clamp (3). Refer to Fig. 5-20 to align slot so that it matches the direction of rotation when the valve is in its closed position.
- Fasten the coupling wheel (4) and follower clamp (3) tightly onto the actuator shaft using screw (4.1) and disk spring (4.2).
- 4. Fasten the bottom pair of brackets (10.1) with the bends pointing either facing to the inside or to the outside (depending on the actuator size) onto the actuator housing. Position the top pair of brackets (10) and fasten.
- 5. Mount connecting plate (6) or pressure gauge bracket (7) with pressure gauges on the positioner, making sure the two seals are seated properly. Double-acting springless rotary actuators require the use of a reversing amplifier on the connection

side of the positioner housing (see section 5.4.7).

- Unscrew the standard follower pin (2) from the positioner's M lever (1). Use the metal follower pin (Ø 5 mm) included in the mounting kit and screw tight into the hole for pin position 90°.
- 7. Place positioner on the top bracket (10) and fasten tight. Taking the actuator's direction of rotation into account, adjust lever (1) so that it engages in the slot of the coupling wheel (4) with its follower pin (Fig. 5-20). It must be guaranteed that the lever (1) is parallel to the long side of the positioner when the actuator is at half its angle of rotation.
- 8. Stick the scale plate (4.3) on the coupling wheel so that the arrow tip indicates the closed position and it can be easily read when the valve is installed.





a) Heavy-duty version

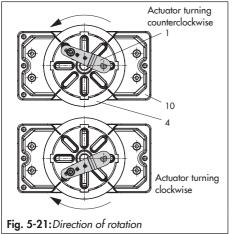
- → See Fig. 5-22
- → Required mounting parts and accessories: Table 5-10

Both mounting kits contain all the necessary mounting parts. The parts for the actuator size used must be selected from the mounting kit.

Prepare actuator and mount possibly required adapter supplied by the actuator manufacturer.

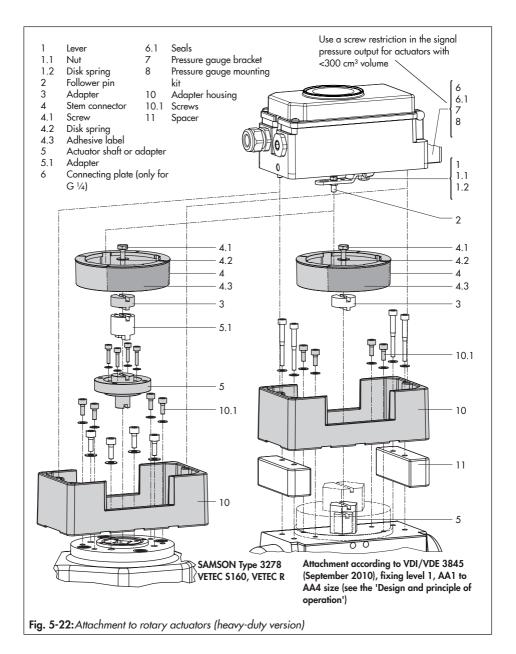
- Mount the housing (10) onto the rotary actuator. In case of VDI/VDE attachment, place spacers (11) underneath, if necessary.
- For SAMSON Type 3278 and VETEC S160 Rotary Actuators, fasten the adapter (5) onto the free end of the shaft and for VETEC R Actuator, place on the adapter (5.1). For Type 3278, VETEC S160 and VETEC R Actuators, place on the adapter (2) Fact VDI (VDE

place on the adapter (3). For VDI/VDE



version, this step depends on the actuator size.

- Stick adhesive label (4.3) onto the coupling in such a way that the yellow part of the sticker is visible in the window of the housing when the valve is OPEN. Adhesive labels with explanatory symbols are enclosed and can be stuck on the housing, if required.
- Fasten coupling wheel (4) on the slotted actuator shaft or adapter (3) using screw (4.1) and disk spring (4.2).
- Unscrew the standard follower pin (2) from the positioner's M lever (1). Attach the follower pin (Ø5 mm) included in the mounting kit to pin position 90°. Proceed as described in section 5.3.
- 6. Mount connecting plate (6) for required G ¼ connecting thread or pressure gauge bracket (7) with pressure gauges on the positioner, making sure the two seals (6.1) are seated properly. Double-acting springless rotary actuators require the use of a reversing amplifier on the connection side of the positioner housing (see section 5.4.7).
- For actuators with a volume of less than 300 cm³, screw the screw restriction (order no. 1400-6964) into the signal pressure output of the positioner (or the output of the pressure gauge bracket or connecting plate).
- Place positioner on housing (10) and screw it tight. Taking the actuator's direction of rotation into account, adjust lever (1) so that it engages in the correct slot with its follower pin (Fig. 5-21).



5.4.7 Reversing amplifier for double-acting actuators

For the use with double-acting actuators, the positioner must be fitted with a reversing amplifier, e.g. the SAMSON Type 3710 Reversing Amplifier (see Mounting and Operating Instructions ► EB 8392).

The following applies to all reversing amplifiers:

The signal pressure of the positioner is supplied at the output 1 of the reversing amplifier. An opposing pressure, which equals the required supply pressure (Z) when added to the pressure at output 1, is applied at output 2.

The following relationship applies:

output 1 + output 2 = Supply pressure (Z).

Connect output 1 to the signal pressure connection on the actuator that causes the valve to open when the pressure rises.

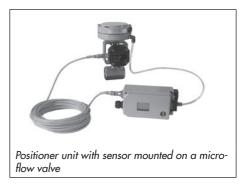
Connect output 2 to the signal pressure connection on the actuator that causes the valve to close when the pressure rises.

→ Set slide switch on positioner to AIR TO OPEN.

i Note

How the outputs are marked depends on the reversing amplifier used. **Type 3710**: Output $1/2 = Y_1/Y_2$

5.5 Mounting the external position sensor



➔ Required mounting parts and accessories: Table 5-11

In the positioner version with an external position sensor, the sensor located in a separate housing is attached over a plate or bracket to the control valve. The travel pick-off corresponds to that of a standard device. The positioner can be mounted as required to a wall or a pipe.

For the pneumatic connection either a connecting plate (6) or a pressure gauge bracket (7) must be fixed to the housing, depending on the accessory chosen. Make sure the seals (6.1) are correctly inserted (see Fig. 5-7, bottom right).

For the electrical connection a 10 m connecting lead with M12x1 connectors is included in the scope of delivery.

i Note

 In addition, the instructions in sections 5.10 and 5.11 apply for the pneumatic and electrical connection. Operation and setting are described in the 'Start-up and configuration' section.

Since 2009, the back of the position sensor (20) is fitted with two pins acting as mechanical stops for the lever (1). If this position sensor is mounted using old mounting parts, two corresponding Ø 8 mm holes must be drilled into the mounting plate/bracket (21). A template is available for this purpose. See Table 5-11.

5.5.1 Mounting the position sensor with direct attachment

Type 3277-5 Actuator with 120 cm² (Fig. 5-23)

The signal pressure from the positioner is routed over the signal pressure connection of the connecting plate (9, Fig. 5-23 left) to the actuator diaphragm chamber. To proceed, first screw the connecting plate (9) included in the accessories onto the actuator yoke.

- Turn the connecting plate (9) so that the correct symbol for the fail-safe action "actuator stem extends" or "actuator stem retracts" is aligned with the marking (see Fig. 5-23, bottom).
 - → Make sure that the gasket for the connecting plate (9) is correctly inserted.
- The connecting plate has threaded holes with NPT and G threads. Seal the threaded connection that is not used with the rubber seal and square plug.

Type 3277 Actuator with 175 to 750 cm²:

The signal pressure is routed to the connection at the side of the actuator yoke for the version with fail-safe action "actuator stem extends". For the fail-safe action "actuator stem retracts" the connection on the top diaphragm case is used. The connection at the side of the yoke must be fitted with a venting plug (accessories).

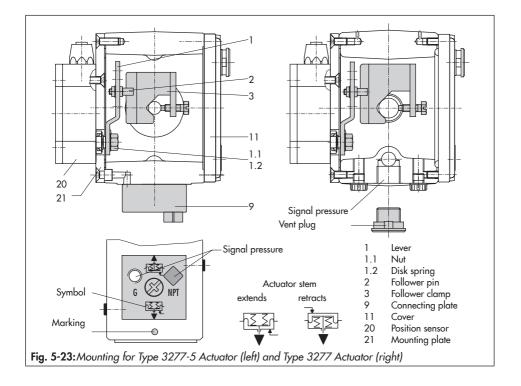
Mounting the position sensor

- Place the lever (1) on the sensor in mid-position and hold it in place. Unthread the nut (1.1) and remove the lever together with the disk spring (1.2) from the sensor shaft.
- 2. Screw the position sensor (20) onto the mounting plate (21).
- Depending on the actuator size and rated valve travel, determine which lever and position of the follower pin (2) is to be used from the travel table on page 5-4. The positioner is delivered with the M lever in pin position 35 on the sensor. If necessary, remove the follower pin (2) from its pin position and move it to the hole for the recommended pin position and screw tight.
- Place the lever (1) and disk spring (1.2) on the sensor shaft. Place the lever in mid-position and hold it in place. Screw on the nut (1.1).
- 5. Place follower clamp (3) on the actuator stem, align it and screw tight so that the mounting screw is located in the groove of the actuator stem.

- 6. Place the mounting plate together with the sensor onto the actuator yoke so that the follower pin (2) rests on the top of the follower clamp (3). It must rest on it with spring force. Fasten the mounting plate (21) onto the actuator yoke using both fixing screws.
- 7. Mount cover (11) on the other side.
 - Make sure that the vent plug is located at the bottom when the control valve is installed to allow any condensed water that collects to drain off.

5.5.2 Mounting the position sensor with attachment according to IEC 60534-6 (NAMUR)

- → See Fig. 5-24
- ➔ Required mounting parts and accessories: Table 5-11
- Place the lever (1) on the position sensor in mid-position and hold it in place. Unthread the nut (1.1) and remove the lever together with the disk spring (1.2) from the sensor shaft.



2. Screw the position sensor (20) onto the bracket (21).

The standard attached M lever with the follower pin (2) at position 35 is designed for 120 to 350 cm² actuators with 15 mm rated travel. For other actuator sizes or travels, select the lever and pin position from the travel table on page 5-4. L and XL levers are included in the mounting kit.

3. Place the lever (1) and disk spring (1.2) on the sensor shaft. Place the lever in **mid-position** and **hold it in place**. Screw on the nut (1.1).

- 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) for fastening.
- Place the bracket with the sensor at the NAMUR rib in such a way that the follower pin (2) rests in the slot of the follower plate (3), then screw the bracket using its fixing screws onto the valve.

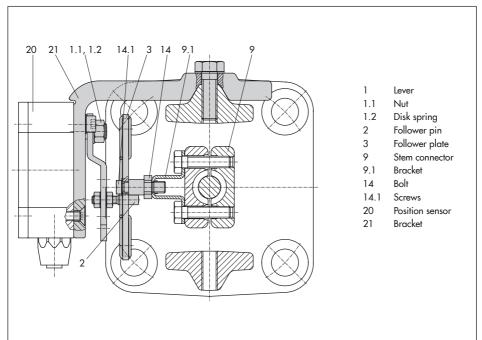
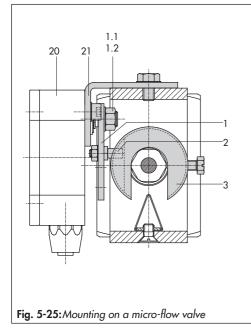


Fig. 5-24: Mounting according to IEC 60534-6 (NAMUR)

5.5.3 Mounting the position sensor on a Type 3510 Micro-flow Valve

- → See Fig. 5-25
- → Required mounting parts and accessories: Table 5-11
- Place the lever (1) on the position sensor in mid-position and hold it in place. Unscrew the nut (1.1) and remove the standard attached M lever (1) together with the disk spring (1.2) from the sensor shaft.
- 2. Screw position sensor (20) onto the bracket (21).

- Select the S lever (1) from the accessories and screw the follower pin (2) into the hole for pin position 17. Place the lever (1) and disk spring (1.2) on the sensor shaft. Place the lever in mid-position and hold it in place. Screw on the nut (1.1).
- Place follower clamp (3) on the valve stem connector, align at a right angle and screw tight.
- Position the bracket (21) with the position sensor on the valve yoke and screw tight, making sure the follower pin (2) slides into the groove of the follower clamp (3).



- 1 lever
 - 1.1 Nut
- 1.2 Disk spring
- 2 Follower pin
- 3 Follower clamp
- 20 Position sensor
- 21 Bracket

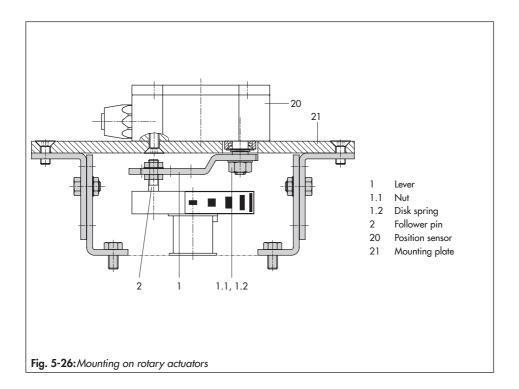
5.5.4 Mounting on rotary actuators

- → See Fig. 5-26
- → Required mounting parts and accessories: Table 5-11
- Place the lever (1) on the position sensor in mid-position and hold it in place. Unthread the nut (1.1) and remove the lever together with the disk spring (1.2) from the sensor shaft.
- 2. Screw the position sensor (20) onto the mounting plate (21).

- Replace the follower pin (2) normally attached to the lever (1) with the metal follower pin (Ø 5 mm) from the accessories and screw it into the hole for pin position 90°.
- Place the lever (1) and disk spring (1.2) on the sensor shaft. Place the lever in mid-position and hold it in place. Screw on the nut (1.1).

Follow the instructions describing attachment to the standard positioner in section 5.4.6.

Instead of the positioner, attach the position sensor (20) with its mounting plate (21).



5.6 Mounting the leakage sensor

→ See Fig. 5-27

Normally, the control valve is delivered with positioner and leakage sensor already mounted.

If the leakage sensor is mounted after the valve has been installed or it is mounted on another control valve, proceed as described in the following.

Risk of malfunction due to incorrect fastening.

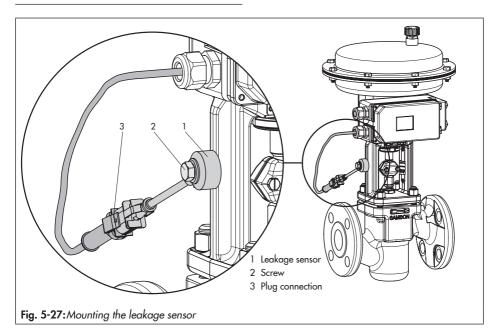
Fasten the leakage sensor using a torque of 20 ±5 Nm.

The M8 threaded connection on the NAMUR rib should preferably be used to mount the sensor (Fig. 5-27).

∹∑- Tip

If the positioner was mounted directly onto the actuator (integral attachment), the NAMUR interfaces on either side of the valve yoke can be used to mount the leakage sensor.

The start-up of the leakage sensor is described in detail in the Operating Instructions for EXPERTplus Valve Diagnostics.



5.7 Retrofitting inductive limit switch

Required retrofit kit:

Limit switch

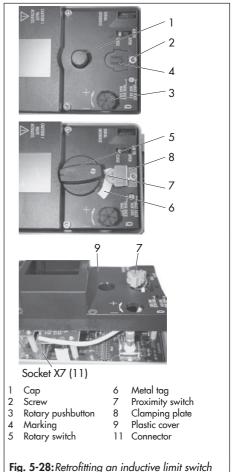
Order no. 1402-1770

i Note

The same requirements apply to retrofitting a unit as to servicing the positioner. For explosion-protected positioners, the requirements specified under 'Servicing explosion-protected devices' in the 'Safety instructions and measures' section must be observed. Check the "Limit switch, inductive" box on the nameplate after installing the limit switch.

- Remove rotary pushbutton (3) and cap (1), unthread the five fastening screws (2) and lift off the plastic cover (9) together with the display, taking care not to damage the ribbon cable (between PCB and display).
- 2. Use a knife to cut an opening at the marked location (4).
- Push connector (11) with cable through the opening and secure the proximity switch (7) on the cover with a dot of glue.
- 4. Remove the jumper (8801-2267) at the socket X7 of the top board and insert the cable connector (11).
- 5. Guide the cable in such a way that the plastic cover can be placed back onto the positioner. Insert the fixing screws (2) and screw tight. Attach the clamping plate (8) onto the proximity switch.

- 6. Attach the rotary switch (5). Make sure the flattened side of the positioner shaft is turned so that the rotary switch (5) can be attached with the metal tag next to the proximity switch.
- On start-up of the positioner, set the option inductive alarm under Code 38 from No to YES.



5.8 Mounting positioners with stainless steel housings

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

i Note

The pneumatic connecting plate and pressure gauge bracket are available in stainless steel (order numbers listed below). The Type 3710 Pneumatic Reversing Amplifier is also available in stainless steel.

Connecting plate	G ¼	1400-7476
(stainless steel)	¼ NPT	1400-7477
Pressure gauge bracket (stainless steel)	G ¼ ¼ NPT	1402-0265 1400-7108

Table 5-4 to Table 5-10 apply for attaching positioners with stainless steel housings with the following restrictions:

Direct attachment

All mounting kits from Table 5-6 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 5-7 can be used. Connecting plate in stainless steel.

Attachment to rotary actuators

All mounting kits from Table 5-10 can be used except for the heavy-duty version. Connecting plate in stainless steel.

5.9 Air purging function for single-acting actuators

The instrument air leaving the positioner is diverted to the actuator spring chamber to provide corrosion protection inside the actuator. Observe the following points:

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

The air purging function is automatically provided.

Direct attachment to Type 3277, 175 to 750 cm²

FA: Remove stopper (12.2, Fig. 5-6) at the black connection block and connect the supply to the actuator chamber on the vented side.

Mounting possibly incorrect when old powder-paint-coated aluminum connection blocks are used.

Mount old powder-paint-coated aluminum connection blocks as described in 'Attachment according to IEC 60534-6 (NAMUR rib or attachment to rod-type yokes)' and 'Attachment to rotary actuators'.

FE: The air purging function is automatically provided.

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

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 1⁄4	0310-2619
(M20x1.5)	1/4 NPT	0310-2550

i Note

The adapter uses one of the M20x1.5 connections in the housing which means **only one** cable gland can be installed.

If other valve accessories must 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 (e.g. check valve G 1/4, order no. 8502-0597) 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.

5.10 Pneumatic connection

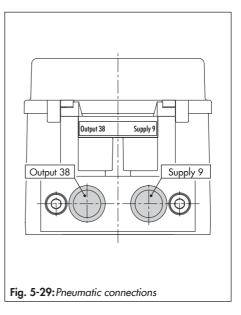
Risk of injury by possible movement of exposed parts (positioner, actuator or valve) after connecting the signal pressure.

Do not touch or block exposed moving parts.

Incorrect connection of the supply air will damage the positioner and will lead to malfunction.

- → Screw the screw fittings into the connecting plate, pressure gauge mounting block or connection block from the accessories.
- → Never screw threaded parts directly into the housing.

The pneumatic ports are located on the back of the positioner (see Fig. 5-29).



Connecting the supply air

Before performing the pneumatic connection, make sure the following conditions are met:

 The positioner is properly mounted onto the control valve.

If this is the case:

→ Connect the pneumatic connections in the connecting plate, pressure gauge mounting block and connection block (optionally designed as a bore with 1⁄4 NPT or G 1⁄4 thread). Customary fittings for metal or copper tubing or plastic hoses can be used.

5.10.1 Signal pressure connection

The signal pressure connection depends on how the positioner is mounted onto the actuator:

Type 3277 Actuator

- The signal pressure connection is fixed.

Attachment according to IEC 60534-6 (NAMUR)

- For "actuator stem retracts" fail-safe action: connect the signal pressure to the connection on top of the actuator.
- For "actuator stem extends" fail-safe action: connect the signal pressure to the connection on bottom of the actuator.

Rotary actuators

For rotary actuators, the manufacturer's specifications for connection apply.

5.10.2 Signal pressure reading

-☆- Tip

To monitor the supply air and signal pressure, we recommend mounting pressure gauges (see accessories in section 5.12).

Mounting the pressure gauges:

→ See section 5.2 and section Fig. 5-7

5.10.3 Supply pressure

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

i Note

PLOW is indicated under Code 0 if the supply pressure is lower than the upper bench range value determined during plotting of the valve signature.

Actuator stem extends FA (AIR TO OPEN)

Fail-close (for globe and angle valves):

→ Required supply pressure = Upper bench range value + 0.2 bar, at least 1.4 bar.

Actuator stem retracts FE (AIR TO CLOSE)

Fail-open (for globe and angle valves):

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

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

- d = Seat diameter [cm]
- Δp = Differential pressure across the valve [bar]

A = Actuator area [cm²]

F = Upper bench range value of the actuator [bar]

If there are no specifications, calculate as follows:

→ Required supply pressure = Upper bench range value + 1 bar

5.10.4 Signal pressure (output)

The signal pressure at the output (38) of the positioner can be restricted to 1.4 bar, 2.4 bar or 3.7 bar in Code 16. The limitation is not activated by default [7.0 bar].

5.11 Electrical connection

For electrical installation, 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.

Incorrect electrical connection will render the explosion protection unsafe.

- → Adhere to the terminal assignment.
- → Do not undo the enameled screws in or on the housing.

Intrinsic safety rendered ineffective in intrinsically safe devices.

- Only connect intrinsically safe devices intended for use in intrinsically safe circuits to certified intrinsically safe inputconnected units.
- Do not place intrinsically safe devices back into operation that were connected to intrinsically safe input-connected units without certification.

→ Do not exceed the maximum permissible electric values specified in the EU type examination certificates when interconnecting intrinsically safe electrical equipment (U_i or U₀, l_i or I₀, P_i or P₀, C_i or C₀ and L_i or L₀).

The ambient temperature ranges of the tables in the EC type examination certificate apply for the assignment between the permissible ambient temperature, temperature class, maximum short-circuit currents and maximum power P_i and P_0 .

The following additionally applies: For positioners in type of protection Ex tb (Type 3730-65) and type of protection Ex nA (Type 3730-68), the cable glands and blanking plugs must be certified according to EN 60079-7 (Ex e).

Selecting cables and wires

→ Observe Clause 12 of EN 60079-14 for installation of the intrinsically safe circuits.

Clause 12.2.2.7 applies when running multicore cables or wires with more than one intrinsically safe circuit.

The radial thickness of the insulation of a conductor for common insulating materials (e.g. polyethylene) must not be smaller than 0.2 mm. The diameter of an individual wire in a fine-stranded conductor must not be smaller than 0.1 mm. Protect the conductor ends against splicing, e.g. by using wire-end ferrules.

When two separate cables or wires are used for connection, an additional cable gland

can be installed. Seal cable entries left unused with plugs. Fit equipment used in ambient temperatures below -20 °C with metal cable entries

Equipment for use in zone 2/zone 22

In equipment operated according to type of protection Ex nA (non-sparking equipment) according to EN 60079-15, circuits may be connected, interrupted or switched while energized only during installation, maintenance or repair.

The special conditions of use mentioned in the statement of conformity must be observed for the rated values and the installation of the series-connected fuse for interconnection of Ex nA circuits.

For Ex nA equipment (non-sparking equipment), circuits may be connected, interrupted or switched while energized only during installation, maintenance or repair.

- Positioners with type of protection Ex nA or Ex tc can be used with a housing cover with or without window.
- The Type 3730-61, Type 3730-65 and Type 3730-68 Positioners are 100 % identical in design, except for the marking and the housing cover.
- For type of protection Ex nA, the VCC connection in the interface adapter must be connected in series with a fuse according to IEC 60127, 250 V F or T with a fuse rating of I_N ≤40 mA.
- The signal current circuit must be connected in series with a fuse according to IEC 60127-2/VI, 250 V T with a fuse rating of I_N ≤63 mA.

 The transmitter current circuit must be connected in series with a fuse according to IEC 60127-2/VI, 250 V T with a fuse rating of I_N ≤40 mA.

The fuses must be installed outside the hazardous area.

Cable entry

Cable entry with M20x1.5 cable gland, 6 to 12 mm clamping range (see accessories in Table 5-4).

There is a second M20x1.5 threaded hole in the housing that can be used for additional connection, when required. The screw terminals are designed for wire cross-sections of 0.2 to 2.5 mm². Tighten the screws by 0.5 to 0.6 Nm.

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

- Only use a current source.
- ≥3.6 mA: Microprocessor and display active
- <3.7 mA: LOW reading on display
- ≤3.8 mA: Emergency shutdown (version with shutdown at 3.8 mA)
- >3.9 mA: Supply to actuator possible (version with shutdown at 3.8 mA)
- ≤4.4 mA: Emergency shutdown (version with shutdown at 4.4 mA)
- >4.6 mA: Supply to actuator possible (version with shutdown at 4.4 mA)
- >22 mA: OVERLOAD reading on display

In general, it is not necessary to connect the positioner to a bonding conductor. However, if it is to be connected, it can be connected

either to the terminal for equipotential bonding inside or outside the device.

Depending on the version, the positioner is equipped with inductive limit switches and/ or a solenoid valve.

The position transmitter is operated on a two-wire circuit. The usual supply voltage is 24 V DC. Taking the resistance of the supply leads into account, the voltage at the position transmitter terminals can be between 12 and 30 V DC.

Refer to Fig. 5-30 or to the label on the terminal block.

Connecting the electrical power

Before performing the pneumatic connection, make sure the following conditions are met:

- The positioner is properly mounted onto the control valve.
- The air supply is properly connected.

If this is the case:

→ Connect the electrical power (mA signal) as shown in Fig. 5-30.

5.11.1 Switching amplifier according to EN 60947-5-6

For operation of the limit switches, switching amplifiers must be connected in the output circuit. To ensure the operating reliability of the positioner, the amplifiers must comply with the limit values of the output circuits conforming to EN 60947-5-6.

Observe the relevant regulations for installation in hazardous areas.

5.11.2 Establishing communication

Communication between computer and positioner using an FSK modem or handheld communicator (if necessary, using an isolation amplifier) is based on the HART® protocol.

Viator FSK modem

_	RS-232	Not ex	Order no. 8812-0130
_	PCMCIA	Not ex	Order no. 8812-0131
_	USB	Not ex	Order no. 8812-0132

If the load impedance of the controller or control station is too low, an isolation amplifier must be connected between controller and positioner (interfacing as for positioner connected in hazardous areas). See Fig. 5-31.

If the positioner is used in hazardous areas, an explosion-protected isolation amplifier must to be used.

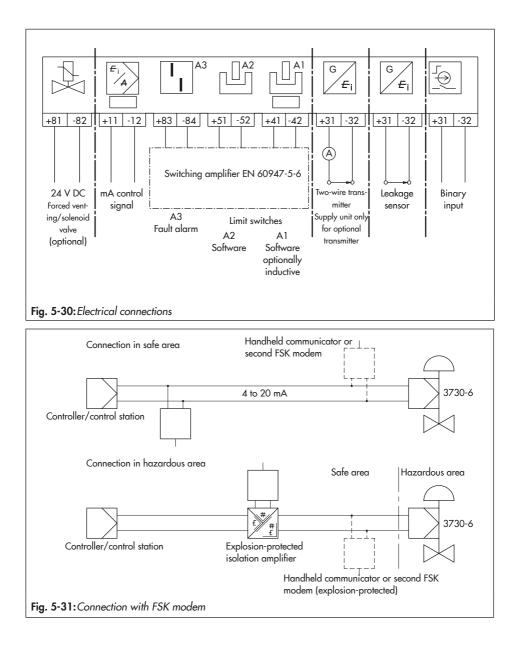
Using the HART® protocol, all connected control room and field units can be addressed individually using a point-to-point connection or the standard (multidrop) bus.

Point-to-point:

The bus address/polling address must always be set to zero (0).

Standard bus (multidrop):

In the standard bus (multidrop) mode, the positioner follows the analog current signal (reference variable) in the same way as for point-to-point communication. This operating mode is, for example suitable for split-range operation of positioners (series connection).



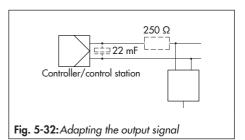
Installation

The bus address/polling address has to be within a range of 1 to 15.

i Note

Communication errors may occur when the process controller/control station output is not HART[®]-compatible.

Alternatively, a 250 Ω resistor can be connected in series and a 22 µF capacitor can be connected in parallel to the analog output. The load for the controller output will increase as a result.



5.12 Mounting accessories

Table 5-4: General accessories

Designation		Order no.
Reversing amplifier for double-acting actuators		Туре 3710
	Black plastic (6 to 12 mm clamping range)	8808-1011
	Blue plastic (6 to 12 mm clamping range)	8808-1012
Cable gland M20x1.5	Nickel-plated brass (6 to 12 mm clamping range)	1890-4875
	Nickel-plated brass (10 to 14 mm clamping range)	1922-8395
	Stainless steel 1.4305 (8 to 14.5 mm clamping range)	8808-0160
A Junton MOOul 5 to 14 NDT	Powder-coated aluminum	0310-2149
Adapter M20x1.5 to ½ NPT	Stainless steel	1400-7114

Installation

Designation		Order no.
	S	0510-0522
	Μ	0510-0510
Lever	L	0510-0511
	XL	0510-0512
	XXL	0510-0525
Retrofit kit for inductive limit switch 1 x SJ2-SN		
Isolated USB interface c ROM	adapter (SSP interface to USB port on a computer) including TROVIS-VIEW CD-	1400-9740
Serial interface adapter (SAMSON SSP interface to RS-232 port on a computer)		1400-7700
TROVIS-VIEW 6661 (▶ www.samsongroup.com > SERVICE & SUPPORT > Downloads > TROVIS-VIEW)		

Table 5-5: Direct attachment to Type 3277-5 Actuator

Designation			Order no.
	Standard version for actuators 120 cm ² or smaller		1400-7452
Mounting parts	Version compatible with paint for actuators 120 cm ²	or smaller	1402-0940
	Old switchover plate for Type 3277-5xxxxxx.00 Act	uator (old)	1400-6819
	New switchover plate for Type 3277-5xxxxxx.01 Ac	tuator (new) 1)	1400-6822
Accessories for actuator	New connecting plate for Type 3277-5xxxxx.01 Ad	ctuator (new) ¹⁾ , G ¹ / ₈ and ¹ / ₈ NPT	1400-6823
	Old connecting plate for Type 3277-5xxxxx.00 Actuator (old): G 1/8		
	Old connecting plate for Type 3277-5xxxxx.00 Actuator (old): ½ NPT		
	Connecting plate (6)	G 1⁄4	1400-7461
		1/4 NPT	1400-7462
	Pressure gauge bracket (7)	G 1/4	1400-7458
Accessories for		1/4 NPT	1400-7459
positioner	Pressure gauge mounting kit (8) up to max. 6 bar (output/supply)	Stainless steel/brass	1402-0938
		Stainless steel/stainless steel	1402-0939
	Pressure gauge mounting kit (8) up to max. 6 bar	Stainless steel/brass	1402-1637
(with	(without inscription)	Stainless steel/stainless steel	1402-1638

¹⁾ Only new switchover and connecting plates can be used with new actuators (Index 01). Old and new plates are not interchangeable.

Mounting parts/accessories		Order no.
Standard version for actuators 175, 240, 350, 355, 700, 750 cm ²		1400-7453
Version compatible with paint for actuators 175, 240, 350, 35	5, 700, 750 cm²	1402-0941
	G 1/4	1400-8819
Connection block with seals and screw	1/4 NPT	1402-0901
	Stainless steel/brass	1402-0938
Pressure gauge mounting kit up to max. 6 bar (output/supply)	Stainless steel/stainless steel	1402-0939
Piping with screw fittings 1)		Order no.
	G ¼/G ¾	1402-0970
Actuator (175 cm²), steel	1/4 NPT/3/8 NPT	1402-0976
	G 1/4/G 3/8	1402-0971
Actuator (175 cm²), stainless steel	1/4 NPT/3/8 NPT	1402-0978
	G 1/4/G 3/8	1400-6444
Actuator (240 cm²), steel	1/4 NPT/3/8 NPT	1402-0911
	G 1/4/G 3/8	1400-6445
Actuator (240 cm ²), stainless steel	1/4 NPT/3/8 NPT	1402-0912
	G 1/4/G 3/8	1400-6446
Actuator (350 cm²), steel	1/4 NPT/3/8 NPT	1402-0913
	G 1⁄4/G 3⁄8	1400-6447
Actuator (350 cm²), stainless steel	1/4 NPT/3/8 NPT	1402-0914
	G 1⁄4/G 3⁄8	1402-0972
Actuator (355 cm²), steel	1/4 NPT/3/8 NPT	1402-0979
	G 1/4/G 3/8	1402-0973
Actuator (355 cm²), stainless steel	1/4 NPT/3/8 NPT	1402-0980
	G 1⁄4/G 3⁄8	1400-6448
Actuator (700 cm²), steel	1/4 NPT/3/8 NPT	1402-0915
	G 1/4/G 3/8	1400-6449
Actuator (700 cm²), stainless steel	1/4 NPT/3/8 NPT	1402-0916
	G 1/4/G 3/8	1402-0974
Actuator (750 cm²), steel	1/4 NPT/3/8 NPT	1402-0981
	G 1/4/G 3/8	1402-0975
Actuator (750 cm²), stainless steel	1/4 NPT/3/8 NPT	1402-0982

Table 5-6: Direct attachment to Type 3277 Actuator

¹⁾ For "actuator stem retracts" fail-safe action with air purging of the top diaphragm chamber

Table 5-7: Attachment to NAMUR rib or attachment to rod-type yokes ¹⁾ according to IEC 60534-6

Travel in mm	Lever	For actuator		Order no.
7.5	S	Type 3271-5 with 60/120 cm² on Type 3510 M	Nicro-flow Valve	1402-0478
5 to 50	M ²⁾	Actuators from other manufacturers and Type 3271 with 120 to 750 cm ² effective areas		1400-7454
14 to 100	L	Actuators from other manufacturers and Type 32	271 with 1000 and 1400-60 cm ²	1400-7455
		Type 3271, 1400-120 and 2800 cm ² versions v	vith 30/60 mm travel ³⁾	1400-7466
30 or 60	L	Mounting brackets for Emerson and Masoneilan linear actuators (in addition, a mounting kit according to IEC 60534-6 is required depending on the travel). See rows above.		1400-6771
		Valtek Type 25/50	1400-9554	
40 to 200	XL	Actuators from other manufacturers and Type 3271 with 1400-120 and 2800 cm ² and with 120 mm travel		1400-7456
Accessories			Order no.	
G 1/4		1400-7461		
Connecting plate			1/4 NPT	1400-7462
G 1/4		1400-7458		
Pressure gauge bracket		1/4 NPT	1400-7459	
Pressure gauge mounting kit up to max. 6 bar (output/supply) Stainless steel/brass Stainless steel/stainless steel		1402-0938		
		nting kit up to max. o bar (output/supply)	Stainless steel/stainless steel	1402-0939

1) 20 to 35 mm rod diameter

²⁾ M lever is mounted on basic device (included in the scope of delivery)

³⁾ In conjunction with Type 3273 Side-mounted Handwheel with 120 mm rated travel, additionally one bracket (0300-1162) and two countersunk screws (8330-0919) are required.

Table 5-8: Attachment according to VDI/VDE 3847-1

Mounting parts			Order no.
VDI/VDE 3847 interface adapter			1402-0257
	Aluminum	ISO 228/1-G 1/4	1402-0268
Connecting plate, including connection for air purging of actuator spring chamber		1/4-18 NPT	1402-0269
	Stainless steel	ISO 228/1-G 1/4	1402-0270
		1/4-18 NPT	1402-0271
Mounting kit for attachment to SAMSON Type 3277 Actuator with 175 to 750 cm ²			1402-0868
Mounting kit for attachment to SAMSON Type 3271 Actuator or third-party actuators			1402-0869
Travel pick-off for valve travel up to 100 mm			1402-0177
Travel pick-off for 100 to 200 mm valve travel (SAMSON Type 3271 Actuator only)			1402-0178

Designation		Order no.
	Mounting block for PFEIFFER Type 31a (edition 2020+) Rotary Actuators with dummy plate for solenoid valve interface	1402-1645
Mounting parts	Blank plate for solenoid valve interface (sold individually)	1402-1290
	Adapter bracket for Type 3730 (VDI/VDE 3847)	1402-0257
	Adapter bracket for Type 3730 and Type 3710 (DAP/PST)	1402-1590
	Shaft adapter AA1	1402-1617
Accessories for actuator	Shaft adapter AA2	1402-1616
	Shaft adapter AA4	1402-1888

 Table 5-10:
 Attachment to rotary actuators

Mounting parts/accessories			Order no.
Attachment according to VDI/VDE 3845 (September 2010), actuator surface corresponds to fixing level 1			
Size	e AA1 to AA4, version with CrNiMo steel bracket		1400-7448
Size	e AA1 to AA4, heavy-duty version		1400-9244
Size	e AA5, heavy-duty version (e.g. Air Torque 10 000)		1400-9542
Bra	cket surface corresponds to fixing level 2, heavy-duty versio	n	1400-9526
Atto	achment for rotary actuators with max. 180° opening angle	, fixing level 2	1400-8815 and 1400-9837
Attachment	to SAMSON Type 3278 with 160/320 cm², CrNiMo steel l	pracket	1400-7614
Attachment to SAMSON Type 3278 with 160 cm ² and to VETEC Type S160, Type R and Type M, heavy-duty version			1400-9245
Attachment to SAMSON Type 3278 with 320 cm ² and to VETEC Type S320, heavy-duty version			1400-5891 and 1400-9526
Attachment	Attachment to Camflex II		
	G 1/4		1400-7461
	Connecting plate	1/4 NPT	1400-7462
		G 1/4	1400-7458
Accessories	Accessories Pressure gauge bracket	1/4 NPT	1400-7459
	Pressure gauge mounting kit up to max. 6 bar (output/	Stainless steel/brass	1402-0938
	supply)	Stainless steel/stainless steel	1402-0939

Mounting parts/accessories			
Template for mounting position sensor on older mounting parts			1060-0784
Direct attachment	Mounting parts for actuator with 120 cm	1400-7472	
	Connecting plate (9, old) with	1400-6820	
	Type 3277-5xxxxxx.00 Actuator 1/8 NPT		1400-6821
	Connecting plate (new) with Type 3277-5	1400-6823	
	Mounting parts for actuators with 175, 2	40, 350, 355 and 750 cm ²	1400-7471
NAMUR attachment	Mounting parts for attachment to NAMU	1400-7468	
Attachment to Type 3510 Micro- flow Valve	Mounting parts for Type 3271 Actuator with 60 cm ²		1400-7469
	VDI/VDE 3845 (September 2010), see the 'Design and principle of operation' section for details.		
	Actuator surface corresponds to fixing level 1		
	Size AA1 to AA4 with follower clamp and coupling wheel, version with CrNiMo steel bracket		1400-7473
	Size AA1 to AA4, heavy-duty version		1400-9384
Attachment to rotary actuators	Size AA5, heavy-duty version (e.g. Air Torque 10 000)		1400-9992
	Bracket surface corresponds to fixing level 2, heavy-duty version		1400-9974
	SAMSON Type 3278 with 160 cm ² and VETEC Type S160 and Type R, heavy- duty version		1400-9385
	SAMSON Type 3278 with 320 cm ² and VETEC Type S320, heavy-duty version		1400-5891 and 1400-9974
	Connecting plate (6)	G 1⁄4	1400-7461
		1/4 NPT	1400-7462
Accessories for positioner	Pressure gauge bracket (7)	G 1⁄4	1400-7458
		1/4 NPT	1400-7459
	Pressure gauge mounting kit up to max. 6 bar (output/supply)	Stainless steel/brass	1402-0938
		Stainless steel/stainless steel	1402-0939
	Bracket to mount the positioner on a wall (Note: The other fastening parts are to be provided at the site of installation as wall foundations vary from site to site).		0309-0184

 Table 5-11:
 Attachment of external position sensor

¹⁾ Only new connecting plates can be used with new actuators (Index 01). Old and new plates are not interchangeable.

6 Operation

Rotary pushbutton

The rotary pushbutton is located underneath the front protective cover. The positioner is operated on site using the rotary pushbutton:

Turn 🟵: Select codes and values Press 🏵: confirm setting.

AIR TO OPEN/AIR TO CLOSE slide switch

- AIR TO OPEN applies to a valve opening as the signal pressure increases.
- AIR TO CLOSE applies to a valve closing as the signal pressure increases.

The signal pressure is the pneumatic pressure at the output of the positioner applied to the actuator.

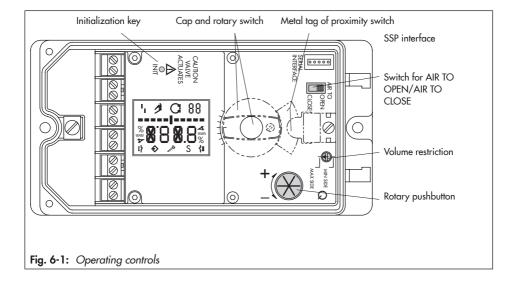
Volume restriction Q

The volume restriction serves to adapt the air output capacity to the size of the actuator. Depending on the air passage at the actuator, two fixed settings are available.

- For actuators smaller than 240 cm² (Type 3271-5), select MIN SIDE.
- For actuators 240 cm² and larger, select MAX SIDE for a side connection.

Readings

Icons assigned to certain codes, parameters and functions are indicated on the display.



Operating modes

- 🧷 (manual mode)

The positioner follows the manual set point (Code 1) instead of the mA signal.

blinks: The positioner is not initialized. Operation only possible over manual set point (Code 1).

- C (automatic mode)

The positioner is in closed-loop operation and follows the mA signal.

– SSAFE

The positioner vents the output. The valve moves to the mechanical fail-safe position.

Bar graph

In manual $/^{2}$ and automatic \bigcirc modes, the bars indicate the set point deviation that depends on the sign (+/-) and the value. One bar element appears per 1 % set point deviation.

If the positioner has not been initialized, (\nearrow blinks on the display), the bar graph indicates the lever position in degrees in relation to the mid-axis. One bar element corresponds to approximately a 5° angle of rotation. The fifth bar element blinks (reading > 30°) if the permissible angle of rotation has been exceeded. Lever and pin position must be checked.

Status messages

- Failure
- Maintenance demanded/Maintenance required
- Blinks: Out of specification

These icons indicate that an error has occurred.

A classified status can be assigned to each error. Classifications include "No message", "Maintenance required", "Maintenance demanded" and "Failure" (► EB 8389-1 on EXPERTplus valve diagnostics).

\Rightarrow Enable configuration

This indicates that the codes marked with an asterisk (*) in the code list are enabled for configuration (see the 'Start-up and configuration' section).

6.1 Serial interface

The positioner must be supplied with at least 3.8 mA.

The positioner can be connected directly to the computer over the local serial interface and the serial interface adapter. The operator software is TROVIS-VIEW (version 4) with installed device module 3730-6.

Fo	ailure/malfunction Manual mod	Closed-loop de control	Code
	Designation Position Parameters		Bar graph for set point deviation or lever position
	imit switch alarm 1	₩.₩.₩ ∲ & S	Vnits VI Limit switch alarm 2
C	Main	nance demanded, tenance required Out of specification	
AUTO	Automatic	C blinking	Emergency mode (see error code 62)
CL	Clockwise	、 、	
CCL	Counterclockwise	🧷 blinking	Positioner not initialized
ERR	Error	5	Valve in mechanical fail-safe position
ESC	Cancel	L.	- 4
HI	ix higher than 21.6 mA	1	Failure
10	ix lower than 2.4 mA	ß	Maintenance demanded/Maintenance required
LOW	w lower than 3.7 mA	Co	•
MAN	Manual setting	/ [®] blinks	Out of specification
MAX	Maximum range	📌 blinks	Write protection active (over binary input optio
No	Not available/not active		or HART [®] communication)
NOM	Rated travel		·
0/C	Type of application: On/off valv ▶ EB 8389-1	'e	
OVERLOAI	D w > 22 mA		
PLOW	p _s lower than upper bench range value	e	
RES	Reset		
SAFE	Fail-safe position		
SUB	Substitute calibration		
TUNE	Initialization in progress		
YES	Available/active		
ZP	Zero calibration		
0 bar	No supply air		
77	Increasing/increasing		
ZЛ	Increasing/decreasing		

6.2 HART[®] communication

The positioner must be supplied with at least 3.6 mA. The FSK modem must be connected in parallel to the current loop.

A DTM file (Device Type Manager) conforming to the Specification 1.2 is available for communication. This allows the device, for example to be run with the PACTware user interface. All the positioner's parameters are accessible over the DTM and the user interface.

For start-up and settings, proceed as described in the 'Start-up and configuration' section. Refer to the code list in Annex A for the parameters necessary for the user interface.

i Note

If complex functions are started in the positioner, which require a long calculation time or lead to a large quantity of data being saved in the volatile memory of the positioner, the alert 'busy' is issued by the DTM file. This alert is **not an error message** and can be simply confirmed.

Locking HART® communication

The write access for HART® communication can be disabled over Code 47. This function can only be enabled or disabled locally at the positioner.

Write access is enabled by default.

Locking on-site operation

The on-site operation including the INIT key can be locked over HART® communication. The word 'HART' then blinks on the display when Code 3 is selected. This locking function can only be disabled over HART® communication. On-site operation is enabled by default.

6.2.1 Dynamic HART® variables

The HART® specification defines four dynamic variables consisting of a value and an engineering unit. These variables can be assigned to device parameters as required. The universal HART® command 3 reads the dynamic variables out of the device. This allows manufacturer-specific parameters to also be transferred using a universal command.

In the Type 3730-6 Positioner, the dynamic variables can be assigned as listed in Table 6-1 in the Device settings folder (> Positioner > HART communication):

Variable	Meaning	Unit
Set point	Set point	%
Direction of action set point	Direction of action set point	
Set point after transit time specification Set point after transit time specification		%
Valve position	Valve position	
Set point deviation e	Set point deviation e	
Absolute total valve travel	Absolute total valve travel	-
Binary input status	0 = Not active 1 = Active 255 = -/-	-
Internal solenoid valve/forced venting status	0 = De-energized 1 = Energized 2 = Not installed	-
Condensed state	0 = No message1 = Maintenance3 = Failurerequired4 = Out of specification2 = Maintenance7 = Function checkdemanded	-
Temperature	Temperature	
Leakage sensor sound level	Leakage sensor sound level	
Ambient pressure	Ambient pressure	
Signal pressure p out Signal pressure p _{out}		bar
Supply pressure	Supply pressure	bar
Flow rate Flow rate		m³/h
Differential pressure	Differential pressure	
All active errors	0 = No errors16 = On/off error activated1 = Control loop64 = Set point outside range2 = Zero128 = Total valve travel exceeded4 = w too low256 = Operating mode not AUTO8 = PST/FST status	-

 Table 6-1: Dynamic HART® variables assignment

7 Start-up and configuration

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

Risk of fatal injury due to the ignition of an explosive atmosphere.

 Observe EN 60079-14 (VDE 0165, Part 1) for work on the positioner in potentially explosive atmospheres.

➔ Installation, operation or maintenance of the positioner must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.

Crush hazard arising from moving parts on the valve.

- → Do not touch any moving valve parts while the control valve is in operation.
- → Before performing any mounting or installation work on the positioner, put the control valve out of operation by disconnecting and locking the supply air and control signal.
- ➔ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.

Before start-up, make sure the following conditions are met:

- The positioner is properly mounted according to the instructions.
- The pneumatic and electrical connections have been performed according to the instructions.

Reading after connecting the electrical power supply:



The \sim wrench icon blinks on the display when the **positioner has not yet been initialized**. The reading indicates the lever position in degrees in relation to the mid-axis.

Code 0 is displayed when a **positioner has been initialized**. The positioner is in the last active operating mode.

The positioner performs a test in the start-up phase while following its automation task at the same time.

During the start-up phase, operation on site is unrestricted, yet write access is limited.

Sequence for start-up:

Action		
1. Determine the fail-safe position.	7.1	
2. Adjust the volume restriction Q.	7.2	
3. Limit the signal pressure.	7.3	
4. Check the operating range of the positioner.	7.4	
5. Initialize the positioner.	7.5	
6. Configure the positioner by setting further parameters.	7.6	
 Positioners with inductive limit switches: Adjust the inductive limit switch. 	7.7	

7.1 Determining the fail-safe position

Define the fail-safe position of the valve (0 %) taking the valve type and the actuator's direction of action into account. Position the AIR TO OPEN/AIR TO CLOSE slide switch accordingly:

- AIR TO OPEN setting

Signal pressure opens the valve, e.g. for a fail-close valve The AIR TO OPEN setting always applies to double-acting actuators.

- AIR TO CLOSE setting

Signal pressure closes the valve, e.g. for a fail-open valve

For checking purposes: after successfully completing initialization, the positioner display must read 0 % when the valve is closed and 100 % when the valve is open. If this is not the case, change the slide switch position and re-initialize the positioner.

i Note

The switch position is prompted prior to an initialization. After an initialization has been completed, changing the switch position does not have any effect on the operation of the positioner.

7.2 Adjusting the volume restriction Q

The volume restriction Q serves to adapt the air output capacity to the size of the actuator:

- MAX BACK setting for 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.
- MAX SIDE setting for actuators with a transit time ≥1 s (the air flow rate does not need to be restricted.)

Fig. 7-3: Volume restriction Q MIN SIDE setting

Intermediate settings are not permitted.

Malfunction due to changed start-up settings.

➔ Initialize an initialized positioner again after the settin of the volume restriction has been changed.

7.3 Limiting the signal pressure

If the maximum actuator force may cause damage to the valve, the signal pressure must be limited.

→ Do not activate pressure limitation for double-acting actuators (AIR TO OPEN (AtO) failsafe position). Default setting is 'No'.

Enable configuration at the positioner before limiting the signal pressure.

Enable configuration:

Configuration is locked again if no settings are entered within 120 s.

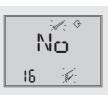
- Turn (*) until Code 3 appears (reading: No).
- 2. Press 🛞, the code number 3 blinks.
- 3. Turn 🏶 until YES appears.
- 4. Press 🛞 to confirm (reading: ⇒).



Enable configuration Default: No

Limit the signal pressure:

- 1. Turn 🏵 until Code 16 appears.
- 2. Press 🏵, the code number 16 blinks.
- Turn (*) until the required pressure limit (1.4/2.4/3.7 bar) appears.
- 4. Press 🏶 to confirm.



Pressure limit Default: No

7.4 Checking the operating range of the positioner

To check the mechanical attachment and the proper functioning, the valve should be moved through the operating range of the positioner in the 2 manual mode with the manual set point.

Select manual mode (^(/)):

- 1. Turn 🏶 until Code 0 appears.
- 2. Press 🏵, the code number 0 blinks.
- 3. Turn 🏶 until MAN appears.
- Press ♥. The positioner changes to the manual mode (

Check the operating range:

- 1. Turn 🏵 until Code 1 appears.
- Press 𝔅, the code number 1 and 𝔅 icon blink.
- 3. Turn 🟵 until the pressure in the positioner builds up and the control valve moves to its final positions so that the travel/angle can be checked.

The angle of rotation of the lever on the back of the positioner is indicated.

A horizontal lever (mid position) is equal to 0° .



A

-11-

Manual set point w (current angle of rotation is indicated)

Operating mode Default: MAN To ensure the positioner is working properly, the outer bar elements must not blink while the valve is moving through the operating range.

Exit Code 1 by pressing the rotary pushbutton (�).

The permissible range has been exceeded when the displayed angle is more than 30° and the outer right or left bar element blinks. The positioner goes to the fail-safe position (SAFE). After canceling the fail-safe position (SAFE) (see the 'Operation' section) it is **absolutely essential** that you check the lever and pin position as described in the 'Installation' section.

Risk of injury due to the actuator stem extending or retracting.

➔ Before exchanging the lever or changing the pin position, disconnect the supply air and electrical auxiliary power.

7.5 Initializing the positioner

Risk of injury by exposed moving parts on the positioner, actuator or valve.

➔ Do not touch or block exposed moving parts.

The process is disturbed by the movement of the actuator or valve.

- Do not perform the initialization while the process is running. First isolate the plant by closing the shut-off valves.
- → Check the max. permissible signal pressure of the valve before starting initialization. During initialization, the positioner issues an output signal pressure up to the maximum supply pressure supplied. If necessary, limit the signal pressure by connecting an upstream pressure reducing valve.

i Note

Reset positioner to its default settings (see the 'Operation' section) before mounting it on a different actuator or changing its mounting position.

During initialization the positioner adapts itself optimally to the friction conditions and the signal pressure required by the control valve. The type and extent of auto tuning depends on the initialization mode selected:

- Maximum range (MAX) (standard range) Initialization mode for simple start-up of valves with two clearly defined mechanical end positions, e.g. three-way valves (see section 7.5.1)
- Nominal range (NOM) Initialization mode for all globe valves (see section 7.5.2)
- Manually selected OPEN position (MAN) Initialization mode for globe valves requiring OPEN position to be entered manually (see section 7.5.3)
- Manually selected end positions (MAN2)
 Initialization mode for globe valves with manual entry of both positions (see section 7.5.4)
- Substitute calibration (SUb)

This mode allows a positioner to be replaced while the plant is running, with the least amount of disruption to the plant (see section 7.5.5).

For normal operation, simply start initialization by pressing the INIT key after mounting the positioner on the valve and defining the fail-safe position and setting the volume restriction. The positioner only needs to work with its default settings. If necessary, perform a reset (see the 'Operation' section).

i Note

When the write protection $illet^{\circ}$ is activated, initialization cannot be started. An initialization procedure in progress can be canceled by pressing the rotary pushbutton. STOP is displayed for three seconds and the positioner changes to the fail-safe position (SAFE). Clear the fail-safe position again over Code 0 (see the 'Operation' section).

Alternating readings

Initialization in progress

Icon depending on initialization mode select-

The time required for the initialization procedure depends on the actuator transit time, which means that initialization can take a few minutes

After a successful initialization, the positioner runs in closed-loop operation indicated by the C closed-loop operation icon.

A malfunction leads to the process being canceled. The initialization error is displayed according to how it has been classified by the condensed state (see the 'Malfunction' section).



TUNE Bar graph display indicating the progress of the initialization

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Initialization successfully completed. Positioner in automatic mode (C)

i Note

When Code 48 - h0 = YES, the diagnostics automatically start to plot the reference graphs required for the valve signature after initialization has been completed. This is indicated by TEST and D1 appearing on the display in alternating sequence.

An error during the plotting of the reference graphs is indicated on the display over Code 48 - h1 and Code 81. The reference graphs do not have any effect on closed-loop operation.

Fail-safe action AIR TO CLOSE

If the slide switch is set to AIR TO CLOSE, the positioner automatically switches to the direction of action increasing/decreasing (ビス) after initialization has been completed. This results in the assignment (left) between set point and valve position.

The tight-closing function is activated.

Set Code 15 (set point cutoff increase) to 99 % for three-way valves.

Fail-safe	Direction of action	Set point Valve	
position		CLOSED at	OPEN at
Actuator stem extends (FA) AIR TO OPEN	קצ	0 %	100 %
Actuator stem retracts (FE) AIR TO CLOSE	עא	100 %	0 %

7.5.1 MAX – Initialization based on maximum range

The positioner determines travel/angle of rotation of the closing member from the CLOSED position to the opposite travel stop and adopts this travel/angle of rotation as the operating range from 0 to 100 %.

Enable configuration:

Configuration is locked again if no settings are entered within 120 s.

- Turn Turn until Code 3 appears (reading: No).
- 2. Press 🛞, the code number 3 blinks.
- 3. Turn 🛞 until YES appears.
- 4. Press to confirm (reading: ⇒).

Enter the pin position:

- 1. Turn 🏵 until Code 4 appears.
- 2. Press 🏵, the code number 4 blinks.
- 3. Turn 🏵 to select pin position on lever (see relevant section on attachment).
- 4. Press 🏵 to confirm.

Select the initialization mode:

- 1. Turn 🏵 until Code 6 appears.
- 2. Press 🏵, the code number 6 blinks.
- 3. Turn 🏵 until MAX appears.
- Press To confirm the MAX initialization mode.

Start initialization:

➔ Press INIT key.

After initialization, the maximum travel/angle of rotation (Code 5) which was detected during initialization is indicated.



Ч

Default: MAX

Pin position Default: No



Enable configuration Default: No

7.5.2 NOM – Initialization based on nominal range

The calibrated sensor allows the exact valve travel to be measured very accurately. During initialization, the positioner checks whether the control valve can move through the indicated nominal range (travel or angle) without collision. If this is the case, the indicated nominal range is adopted with the limits of travel/angle range start (Code 8) and travel/angle range end (Code 9) as the operating range.

i Note

The maximum possible travel must always be greater than the rated travel entered. If this is not the case, initialization is automatically canceled (error message Code 52) because the rated travel could not be achieved.

Enable configuration:

Configuration is locked again if no settings are entered within 120 s.

- Turn Suntil Code 3 appears (reading: No).
- 2. Press 🛞, the code number 3 blinks.
- 3. Turn 🏶 until YES appears.
- 4. Press to confirm (reading: ⇒).

Enter the pin position and nominal range:

- 1. Turn 🏵 until Code 4 appears.
- 2. Press 🛞, the code number 4 blinks.
- 3. Turn 🏵 to select pin position on lever (see relevant section on attachment).
- 4. Press 🏵 to confirm.
- 5. Turn 🏵 until Code 5 appears.
- 6. Press 🏵, the code number 5 blinks.
- 7. Turn \circledast and set rated travel of the valve.
- 8. Press 🏵 to confirm.



Enable configuration Default: No

Pin position Default: No



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Nominal range (locked when Code 4 = No)

Select the initialization mode:

- 1. Turn 🏵 until Code 6 appears.
- 2. Press 🛞, the code number 6 blinks.
- 3. Turn 🏵 until NOM appears.
- Press To confirm the NOM initialization mode.

NÖM 6 📡

Init mode Default: MAX

Start initialization:

- ➔ Press INIT key.
- → After the initialization has been successfully completed: Check the direction of action (Code 7) and, if necessary, change it.

7.5.3 MAN – Initialization based on a manually selected OPEN position

Before starting initialization, move the control valve manually to the OPEN position. The positioner calculates the differential travel/angle from the OPEN and CLOSED positions and adopts it as the operating range with limits of lower travel/angle range value (Code 8) and upper travel/angle range value (Code 9).

Enable configuration:

Configuration is locked again if no settings are entered within 120 s.

- Turn (*) until Code 3 appears (reading: No).
- 2. Press 🛞, the code number 3 blinks.
- 3. Turn 🏶 until YES appears.



Enable configuration Default: No

Enter the pin position:

- 1. Turn 🏶 until Code 4 appears.
- 2. Press 🏵, the code number 4 blinks.
- Turn Turn to select pin position on lever (see relevant section on attachment).
- 4. Press 🏵 to confirm.

Select the initialization mode:

- 1. Turn 🏶 until Code 6 appears.
- 2. Press 🏵, the code number 6 blinks.
- 3. Turn 🏵 until MAN appears.
- Press To confirm the MAN initialization mode.

Enter OPEN position:

- 1. Turn 🏵 until Code 0 appears.
- 2. Press 🏵, the code number 0 blinks.
- 3. Turn 🏵 until MAN appears.
- 4. Press 🏶 to confirm.
- 5. Turn 🏵 until Code 1 appears.
- 6. Press 🏵, the code number 1 blinks.
- Turn Sclockwise in small steps until the required valve position is reached. The valve must be moved with a monotonically increasing signal pressure.
- 8. Press 🏵 to confirm the OPEN position.

Start initialization:

➔ Press INIT key.





Init mode Default: MAX



Manual set point (current angle of rotation is indicated)

7.5.4 MAN2 – Initialization based on manually selected end positions

Before starting initialization, move the control valve manually to the end positions. The positioner calculates the travel/angle difference from the positions that the valve moved to and adopts it as the operating range with limits of lower travel/angle range value (Code 8) and upper travel/angle range value (Code 9).

i Note

This initialization mode can only be started when the valve position differs in the end positions and the positioner has not yet been initialized.

Enable configuration:

Configuration is locked again if no settings are entered within 120 s.

- Turn I code 3 appears (reading: No).
- 2. Press 🛞, the code number 3 blinks.
- 3. Turn 🏶 until YES appears.
- 4. Press to confirm (reading: ⇒).

Enter the pin position:

- 1. Turn 🏶 until Code 4 appears.
- 2. Press 🏵, the code number 4 blinks.
- Turn to select pin position on lever (see relevant section on attachment).
- 4. Press 🏵 to confirm.

Select the initialization mode and enter end positions:

- 1. Turn 🏵 until Code 6 appears.
- 2. Press 🏵, the code number 6 blinks.
- 3. Turn 🏶 until MAN appears.



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Init mode Default: MAX

Pin position Default: No



Enable configuration Default: No

- 4. Press 🟵 to confirm the MAN2 as the initialization mode. *POS1* and the current angle position of the lever are indicated on the display in alternating sequence.
- 5. Turn 🟵 clockwise in small steps until the required valve position is reached. The valve must be moved with a monotonically increasing signal pressure.

Press to confirm the valve position (reading: WAIT). The valve position is adopted after the pressure settles. POS2 and the current angle position of the lever are indicated on the display in alternating sequence.

Turn 🟵 until the valve reaches its OPEN position.

Press 🏵 to confirm the valve position (reading: WAIT). Initialization can be started as soon as MAN2 is indicated again on the display.

Start initialization:

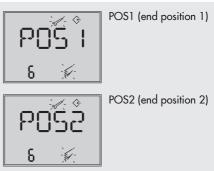
→ Press INIT key.

After initialization, the tight-closing function (Code 14) is deactivated.

7.5.5 SUB – Substitute calibration

A complete initialization procedure takes several minutes and requires the valve to move through its entire travel range several times. In the SUB initialization mode, the control parameters are estimated and not determined by an initialization procedure. As a result, a high level of accuracy cannot be expected. A different initialization mode should be selected if the plant allows it.

The substitute calibration is used to replace a positioner while the process is running. For this purpose, the control valve is usually fixed mechanically in a certain position or pneumatically



by means of a pressure signal which is routed to the actuator externally. The blocking position ensures that the plant continues to operate with this valve position.

The blocking position can also be the fail-safe position when this condition is beneficial for the temporary phase.

→ Perform a reset before re-initializing the positioner if the substitute positioner has already been initialized (see the 'Operation' section).

Enable configuration:

Configuration is locked again if no settings are entered within 120 s.

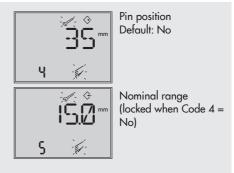
- 1. Turn 🏶 until Code 3 appears (reading: No).
- 2. Press (*), the code number 3 blinks.
- 3. Turn 🛞 until YES appears.
- 4. Press to confirm (reading: →).

Enter the pin position and nominal range:

- 1. Turn 🏵 until Code 4 appears.
- 2. Press 🛞, the code number 4 blinks.
- 3. Turn 🏵 to select pin position on lever (see relevant section on attachment).
- 4. Press 🛞 to confirm.
- 5. Turn 🏵 until Code 5 appears.
- 6. Press 🟵, the code number 5 blinks.
- 7. Turn 🛞 and set rated travel of the valve.
- 8. Press 🛞 to confirm.



Enable configuration Default: No



Init mode

Default: MAX

Select the initialization mode:

- 1. Turn 🏵 until Code 6 appears.
- 2. Press 🏵, the code number 6 blinks.
- 3. Turn 🏵 until SUB appears.
- Press I to confirm the SUB initialization mode.

Enter the direction of action:

- 1. Turn 🏶 until Code 7 appears.
- 2. Press 🏵, the code number 7 blinks.
- Turn to select the direction of action (∠∠√∠).
- 4. Press 🏵 to confirm.

Deactivate travel limit:

- 1. Turn 🏵 until Code 11 appears.
- 2. Press 🏵, the code number 11 blinks.
- 3. Turn 🏶 until No appears.
- Press To deactivate the travel limit function.

Change pressure limit and control parameters:

i Note

Do not change the pressure limit (Code 16). Only change the control parameters K_P (Code 17) and T_V (Code 18) if the settings of the replaced positioner are known.



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Direction of action Default: ㅋㅋ

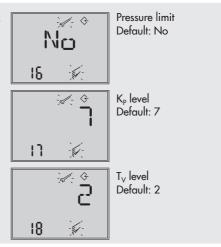


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Travel limitation Default: No

Start-up and configuration

- Turn Dutil the required Code 16/17/18 appears.
- 2. Press 🟵, the code number 16/17/18 blinks.
- 3. Turn 🏵 to set the control parameter selected.
- 4. Press 🏵 to confirm.



Enter closing direction and blocking position:

- 1. Turn 🏵 until Code 34 appears.
- 2. Press 🛞, the code number 34 blinks.
- Turn (*) and set the closing direction (CCL = counterclockwise/CL = clockwise).
- 4. Press 🏵 to confirm.
- 5. Turn 🏵 until Code 35 appears.
- 6. Press 🟵, the code number 35 blinks.
- Turn to set the blocking position, e.g. 5 mm (read off at travel indicator scale of the blocked valve or measure with a ruler).
- Set switch for fail-safe position AIR TO OPEN or AIR TO CLOSE according to section 7.1.
- 9. Adjust volume restriction as described in section 7.2.



Closing direction (direction of rotation causing the valve to move to the CLOSED position (view onto positioner display); standard CCL



Blocking position Default: 0

Start initialization:

→ Press INIT key.

The operating mode is changed to automatic mode C.

Since initialization has not been completed, the error code 76 (no emergency mode) and possibly also error code 57 (control loop) may appear on the display. These alarms do not influence the positioner's readiness for operation.

- → If the positioner shows a tendency to oscillate in automatic mode, the parameters K_P and T_V must be slightly corrected. Proceed as follows:
 - Set T_v (Code 18) to 4.
 - If the positioner still oscillates, the gain K_{P} (Code 17) must be decreased until the positioner shows a stable behavior.

Zero point calibration

→ Finally, if process operations allow it, the zero point must be calibrated according to the 'Operation' section.

7.5.6 Tuning the KP input filter

Changing the KP level (Code 17) affects the set point deviation. This effect can be compensated for by tuning the input filter without having to re-initialize the positioner.

Enable configuration:

Configuration is locked again if no settings are entered within 120 s.

- Turn Turn until Code 3 appears (reading: No).
- 2. Press 🏵, the code number 3 blinks.
- 3. Turn 🛞 until YES appears.
- 4. Press to confirm (reading: ⇒).



Enable configuration Default: No

Tune the input filter:

- 1. Turn 🏵 until Code 6 appears.
- 2. Press 🏵, the code number 6 blinks.
- 3. Turn 🏵 until KP appears.
- Press INIT key. During the tuning, the valve moves through its whole range and the input filter is recalibrated.

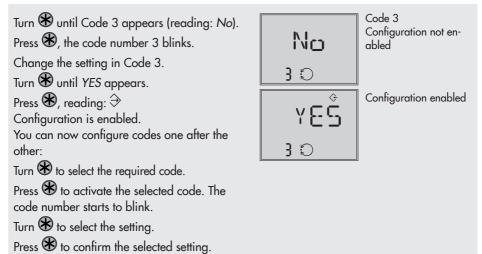
K₽ € ≹

Tuning the input filter Default: MAX

7.6 Setting other parameters

All codes and their meaning and default settings are listed in the code list in Annex A.

Codes which are marked with an asterisk must be enabled with Code 3 before the associated parameters can be configured as described below.



If no settings are entered within 120 seconds, the enabled configuration function becomes invalid and the display returns to Code 0.

Cancel the setting:

To cancel a value before it is confirmed (by pressing 🏵) proceed as follows:

Turn 🏵 until ESC appears. Press 🏵 to confirm. The entered value is not adopted.

 $F S \Gamma$ -`**Y**- 💭

Canceling the reading

7.7 Adjusting inductive limit switch

The positioner version with an inductive limit switch has an adjustable tag (1) mounted on the axis of rotation, which operates the proximity switch (3).

For operation of the inductive limit switch, the corresponding switching amplifier (see the 'Installation' section) must be connected to the output circuit.

When the tag (1) is located in the inductive field of the contact, the switch assumes a high resistance. When it moves outside the field, the switch assumes a low resistance.

Normally, the limit switch is adjusted in such a way that it will provide a signal in both end positions of the valve. The contact, however, can also be adjusted to indicate intermediate valve positions.

The required switching function, i.e. whether the output relay is to be picked up or released when the tag enters the field, must be selected at the switching amplifier, if required.

i Note

The inductive limit switch replaces the software limit switch A1 with terminal assignment +41/-42.

Each switching position can optionally be set to indicate when the tag has entered the field or when it has left the field.

The second software limit switch remains effective, the function of the software limit switch A1 is disabled.

Software adaptation

- Code 38 (inductive alarm is set to YES).
- The inductive limit switch is connected to the terminals +41/-42 (see the 'Installation' section).
- The device is set up accordingly in the delivered state.

Adjust the switching point

i Note

During adjustment or testing, the switching point must always be approached from midposition (50 %).

To guarantee the switching under all ambient conditions, adjust the switching point approx. 5 % before the mechanical stop (OPEN - CLOSED).

For CLOSED position:

- 1. Initialize the positioner.
- 2. Move the valve to 5 % in the MAN mode (see display).
- Adjust the tag at the yellow adjustment screw (2) until the tag enters or leaves the field and the switching amplifier responds. You can measure the switching voltage as an indicator.

Contact function:

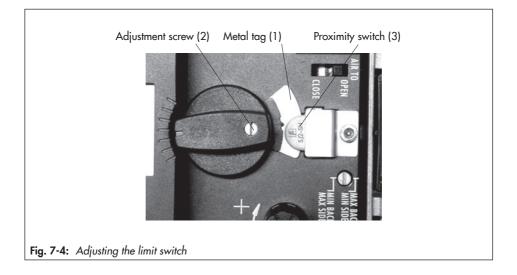
- Tag leaving the field > contact is closed.
- Tag entering the field > contact is opened.

For OPEN position:

- 1. Initialize the positioner.
- 2. Move the valve to 95 % in the MAN mode (see display).
- Adjust the tag (1) at the yellow adjustment screw (2) until the tag enters or leaves the field of the proximity switch (3).
 You can measure the switching voltage as an indicator.

Contact function:

- Tag leaving the field > contact is closed.
- Tag entering the field > contact is opened.



8 Operation

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

Risk of fatal injury due to the ignition of an explosive atmosphere.

Installation, operation or maintenance of the positioner must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.

Crush hazard arising from moving parts on the valve.

- → Do not touch any moving valve parts while the control valve is in operation.
- → Before performing any mounting or installation work on the positioner, put the control valve out of operation by disconnecting and locking the supply air and control signal.
- ➔ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.

8.1 Adapting the display direction

The display contents can be turned by 180° to adapt the display reading to the actuator's mounting situation. If the displayed data appear upside down, proceed as follows:

- 1. Turn 🏶 until Code 2 appears.
- 2. Press 🛞, the code number 2 blinks.
- 3. Turn 🛞 and select the desired reading direction.
- 4. Press 🏶 to confirm.



Reading direction for right attachment of pneumatic connections

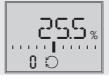


Reading direction for left attachment of pneumatic connections

8.2 Changing the operating modes

8.2.1 Closed-loop operation (automatic mode)

After initialization has been completed successfully, the positioner is in $\rm C$ automatic mode (AUTO).



RUTO

Automatic mode

Automatic mode

8.2.2 Manual mode

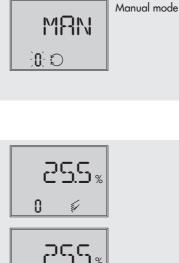
Switching to /> manual mode (MAN):

- 1. Turn 🏵 until Code 0 appears.
- Press X, reading: AUTO, the code number 0 blinks.
- 3. Turn 🏶 until MAN appears.
- Press ♥. The positioner changes to the manual mode (

The manual mode starts using the last set point used in automatic mode, ensuring a bumpless changeover. The current position is displayed in %.

Adjusting the manual set point:

- 1. Turn 🏵 until Code 1 appears.
- 2. Press 🏵, the code number 1 blinks.
- Turn until sufficient pressure has been built up in the positioner and the control valve moves to the required position.



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The positioner automatically returns to Code 0 if no settings are made within 120 seconds, but remains in the manual mode.

Switch to C automatic mode

- 1. Turn 🏵 until Code 0 appears.
- 2. Press 🟵, the code number 0 blinks.
- 3. Turn 🏵 until AUTO appears.
- 4. Press 🏵. The positioner switches to automatic mode.

8.2.3 Fail-safe position (SAFE)

If you want to move the valve to the fail-safe position determined during start-up (see the 'Start-up and configuration' section), proceed as follows:

- 1. Turn 🏵 until Code 0 appears.
- 2. Press (*), reading: current operating mode (AUtO or MAN), the code number 0 blinks.

- 3. Turn 🏶 until SAFE appears.
- 4. Press 🛞, reading: S

The valve moves to the fail-safe position. If the positioner has been initialized, the current valve position in % is indicated on the display.

Exiting the fail-safe position:

- 1. Turn 🏵 until Code 0 appears.
- 2. Press 🏵, the code number 0 blinks.
- 3. Turn 🏵 and select the required operating mode (AUTO or MAN).
- 4. Press 🏵 to confirm.
- 5. The positioner switches to the operating mode selected.

8.3 Performing zero calibration

In case of inconsistencies in the closed position of the valve, e.g. with soft-seated plugs, it might be necessary to recalibrate zero.

Risk of injury due to the actuator stem extending or retracting.

→ Do not touch or block the actuator stem.

The process is disturbed by the movement of the actuator stem.

→ Do not perform zero calibration while the process is running. First isolate the plant by closing the shut-off valves.

The positioner must be connected to the supply air to perform the zero calibration.

A zero calibration is not possible if there is zero point shift of more than 5 %. In this case, Code 54 is activated. The positioner must be re-initialized.

Enable configuration:

Configuration is locked again if no settings are entered within 120 s.

- Turn Turn until Code 3 appears (reading: No).
- 2. Press 🛞, the code number 3 blinks.
- 3. Turn 🏶 until YES appears.
- 4. Press to confirm (reading: ⇒).



Enable configuration Default: No

Perform zero calibration:

- 1. Turn 🏵 until Code 6 appears.
- 2. Press 🛞, the code number 6 blinks.
- 3. Turn 🏵 until ZP appears.
- → Press INIT key. Zero calibration starts. The positioner moves the valve to the CLOSED position and recalibrates the internal electrical zero point.



Init mode Default: MAX

8.4 Resetting the positioner

A reset allows the positioner to be reset to the default settings. To reset the positioner, the options DIAG, STD and DS are available in Code 36. Table 8-2 lists the reset functions.

i Note

Code 36 – DS is usually selected when the valve is mounted in another position or when the positioner is to be mounted to another valve.

Performing a reset does not necessarily mean the positioner must be re-initialized.

Enable configuration:

Configuration is locked again if no settings are entered within 120 s.

- Turn Turn until Code 3 appears (reading: No).
- 2. Press 🛞, the code number 3 blinks.
- 3. Turn 🛞 until YES appears.

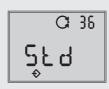


Enable configuration Default: No

Operation

Reset start-up parameters:

- Turn ♥ until Code 36 appears (reading: ••-••-).
- 2. Press 🏵, the code number 36 blinks.
- 3. Turn 🏵 until DIAG/STD/DS appears.
- Press I to confirm. The parameters are reset depending on the setting made (see Table 8-2).



Reset Default: No

Table 8-2: Reset functio	ns
--------------------------	----

		Reset Code 36		
		DIAG	STD	DS
Initializ	Initialization		YES	YES
Fail-sa	fe action			
	Air supply failure	No	No	YES
	Power supply failure of positioner	No	No	YES
	Power supply failure of external solenoid valve	No	No	YES
Emergency mode		No	No	No
Opera	ting hours counter	No	No	No
	Device in operation	No	YES	YES
	Device switched on since initialization	No	YES	YES
	Device in operation since initialization	No	YES	YES
Loggin	g	No	YES	YES
Code	Parameters			
2	Reading direction	No	YES	YES
4	Pin position	No	YES	YES
5	Nominal range	No	YES	YES
6	Initialization mode	No	YES	YES
7	Direction of action	No	YES	YES
8	Lower travel/angle range value	No	YES	YES
9	Upper travel/angle range value	No	YES	YES

		Reset Code 36		
		DIAG	STD	DS
10	Lower travel/angle range value	No	YES	YES
11	Upper travel/angle range value	No	YES	YES
12	Set point, lower range value	No	YES	YES
13	Set point, upper range value	No	YES	YES
14	CLOSED end position	No	YES	YES
15	OPEN end position	No	YES	YES
16	Pressure limit	No	YES	YES
17	Proportional-action coefficient Kp level	No	No	No
18	Derivative-action time Tv level	No	No	No
19	Tolerance band	No	YES	YES
20	Valve characteristic selection	No	YES	YES
21	Enter transit time OPEN	No	YES	YES
22	Enter transit time CLOSED	No	YES	YES
24	Total valve travel limit	No	YES	YES
25	Alarm mode	No	YES	YES
26	Limit A1	No	YES	YES
27	Limit A2	No	YES	YES
32	Error message in case of condensed state 'Function check'	No	YES	YES
33	Error message in case of 'Maintenance required' and 'Out of specification' condensed states	No	YES	YES
38	Inductive limit switch	No	No	No
46	Bus address	No	No	YES
48 - 49 -	Diagnostics (► EB 8389-1)			

9 Malfunction

Malfunctions are indicated on the display by error codes. Annex A lists possible error messages and recommended action.

The error codes appear on the display corresponding to their status classification set over the condensed state (Maintenance required/ Maintenance demanded: $\overset{}{\sim}$, Out of specification: $\overset{}{\sim}$ blinking, Failure: **1**). If 'No message' is assigned to the error code as the status classification, the error is not included in the condensed state.

A status classification is assigned to every error code in the default setting. The assignment of the status classification can be changed in TROVIS-VIEW and over the parameters of the DD. Refer to the operating instructions for the valve diagnostics EB 8389-1 on EXPERTplus valve diagnostics for more details.

To provide a better overview, the classified messages are summarized in a condensed state for the positioner according to the NAMUR Recommendation NE 107. The status messages are divided into the following categories:

– Failure

The positioner cannot perform its control task due to a malfunction in the positioner itself or in one of its peripherals or the positioner has not yet been successfully initialized.

Maintenance required

The positioner still performs its control task (with restrictions). A maintenance demand or above average wear has been determined. The wear tolerance will soon be exhausted or is reducing at a faster rate than expected. Maintenance is necessary in the medium term.

Maintenance demanded

The positioner still performs its control task (with restrictions). A maintenance demand or above average wear has been determined. The wear tolerance will soon be exhausted or is reducing at a faster rate than expected. Maintenance is necessary in the short term.

- Out of specification

The positioner is running outside the specified operating conditions.

If an event is classified as "No message", this event does not have any affect on the condensed state.

Table 9-1: Condensed state reading

Condensed state	Desitioner displays
Condensed state	Positioner display
Failure	۹,
Function check	Text e.g. TUNE or TEST
Maintenance required/ maintenance demanded	ß
Out of specification	/ ^{Se} blinking

The message with the highest priority determines the condensed state in the positioner.

9.1 Troubleshooting

Risk of fatal injury due to the ignition of an explosive atmosphere.

→ Installation, operation or maintenance of the positioner must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosionprotected devices in hazardous areas.

Crush hazard arising from moving parts on the valve.

- ➔ Do not touch any moving valve parts while the control valve is in operation.
- → Before performing any mounting or installation work on the positioner, put the control valve out of operation by disconnecting and locking the supply air and control signal.
- Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.

Table 9-1 lists general errors.

If the positioner detects an error, the possible source of error is displayed in Code 49 onwards. In this case, *ERR* is displayed.

Example:



Example: Error caused by pin position

→ Refer to the code list (Annex A) for possible causes and the recommended action.

Fault alarm output

'Failure' as the condensed state causes the optional fault alarm output to be switched.

- The 'Function check' condensed state can also activate the fault alarm output (Code 32).
- The 'Maintenance required/Maintenance demanded' condensed state and 'Out of specification' can also activate the fault alarm output (Code 33).

Confirming error messages

- Turn (*) until Code 3 appears (reading: No).
- 2. Press 🛞, the code number 3 blinks.
- 3. Turn 🛞 until YES appears.
- 1. Turn 🛞 until the the error code that you want appears.
- 2. Press 🏵 to confirm the error message.

i Note

Contact SAMSON's After-sales Service for malfunctions that cannot be remedied as described in Table 9-2 and the code list in Annex A.

Description of fault	Measures
No reading on the display	 → Check electrical connection and electrical power. → Check the ambient temperature (the display's operating range is from -30 to +65 °C).
Actuator moves too slowly	 → Check the supply pressure. → Deactivate software restriction. → Check the cross-section of the piping and screw fittings. → Check the configuration of the mounting parts.
Actuator moves in the wrong direction.	 → Check the characteristic setting. → Check the piping. → Check the configuration of the mounting parts.
Air leaks from the positioner.	 → Check attachment. → Check the seals in the connecting plate.

Table 9-2: Further troubleshooting

9.2 Emergency action

Fail-safe action is triggered by the i/p converter or solenoid valve and upon supply air failure. The positioner fully discharges its pneumatic output to the atmosphere, causing the pneumatic actuator to be vented. As a result, the valve moves to the fail-safe position. The fail-safe position depends on how the springs are arranged in the pneumatic actuator (air-to-close or air-to-open).

When the supply air fails, the optional solenoid valve or forced venting is triggered and after reaching the shutdown signal, all positioner functions, except open/closed loop control, remain active (including diagnostics as well as position and status feedback).

-☆- Tip

Emergency action in the event of valve or actuator failure is described in the associated valve and actuator documentation.

→ Plant operators are responsible for emergency action to be taken in the plant.

10 Servicing

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

Risk of fatal injury due to the ignition of an explosive atmosphere.

→ Installation, operation or maintenance of the positioner must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosionprotected devices in hazardous areas.

Crush hazard arising from actuator and plug stem moving.

- ➔ Do not touch any moving valve parts while the control valve is in operation.
- Before performing any mounting or installation work on the positioner, put the control valve out of operation by disconnecting and locking the supply air and control signal.
- ➔ Do not impede the movement of the actuator and plug stem by inserting objects into the yoke.

Intrinsic safety rendered ineffective in intrinsically safe devices.

 Only connect intrinsically safe devices intended for use in intrinsically safe circuits to certified intrinsically safe input-connected units.

- Do not place intrinsically safe devices back into operation that were connected to intrinsically safe input-connected units without certification.
- → Do not exceed the maximum permissible electric values specified in the EU type examination certificates when interconnecting intrinsically safe electrical equipment (U_i or U₀, l_i or I₀, P_i or P₀, C_i or C₀ and L_i or L₀).

The positioner was checked by SAMSON before it left the factory.

- The product warranty becomes void if service or repair work not described in these instructions is performed without prior agreement by SAMSON's Aftersales Service.
- Only use original spare parts by SAMSON, which comply with the original specifications.

The positioner does not require any maintenance.

10.1 Cleaning the cover window

Occasionally, the window in the cover may need to be cleaned.

Incorrect cleaning will damage the window. The window is made of Makrolon[®] (new design) and will be damaged when cleaned with abrasive cleaning agents or agents containing solvents.

- ➔ Do not rub the window dry.
- Do not use any cleaning agents containing chlorine or alcohol or abrasive cleaning agents.
- → Use a non-abrasive, soft cloth for cleaning.

10.2 Cleaning the filters

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.

10.3 Maintenance of the supply air pressure reducing stations

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

10.4 Firmware updates

Firmware updates on positioners currently in operation can be performed as described below. Only individuals with a written approval may perform updates. Approved individuals are named by SAMSON's Quality Management and assigned a test mark.

Laptops and computers connected to the power supply must only be interconnected with intrinsically safe equipment if the SAMSON isolated USB interface adapter (order no. 1400-9740) is connected inbetween for software programming or test routines.

Updates outside the hazardous area:

→ Remove the positioner and perform the update outside the hazardous area.

Updates on site:

- Updates on site are only permitted after the plant operator presented a signed hot work permit.
- After updating has been completed, add the current firmware to the nameplate (e.g. using a label).
- → The individual approved by SAMSON confirms the update by attaching the assigned test mark (stamp).

10.5 Periodic inspection and testing of the positioner

We recommend inspection and testing according to Table 10-1 at the minimum.

Inspection and testing	Action to be taken in the event of a negative result	
Check the markings, labels and nameplates on the positioner for their readability and	Immediately renew damaged, missing or incor- rect nameplates or labels.	
completeness.	Clean any inscriptions that are covered with dirt and are illegible.	
Check the positioner and leakage sensor (if installed) to ensure they are mounted firmly.	Tighten the any loose mounting screws.	
Check the pneumatic connections.	Tighten any loosen male connectors of the screw fittings.	
	Renew any air pipes or hoses that leak.	
Check the power lines.	Tighten any loose cable glands.	
	Make sure that the stranded wires are pushed into the terminals and tighten any loose screws on the the terminals.	
	Renew damaged lines.	
Check error messages on the display (indicated by the I and \nearrow icons).	Troubleshooting (see the 'Malfunction' section).	

Table 10-1: Recommended inspection and testing

11 Decommissioning

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

Risk of fatal injury due to ineffective explosion protection.

The explosion protection becomes ineffective when the positioner cover is opened.

→ The following regulations apply to installation in hazardous areas: EN 60079-14 (VDE 0165, Part 1).

The process is disturbed by interrupting closed-loop control.

Do not mount or service the positioner while the process is running and only after isolating the plant by closing the shut-off valves.

To decommission the positioner before removing it, proceed as follows:

- ➔ Put the control valve out of operation. See associated valve documentation.
- → Shut off and lock the supply air line to the positioner.
- → Disconnect and lock the electrical supply.

12 Removal

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

Risk of fatal injury due to the ignition of an explosive atmosphere.

- The following regulations apply to installation in hazardous areas: EN 60079-14 (VDE 0165, Part 1).
- → Installation, operation or maintenance of the positioner must only be performed by personnel who has undergone special training or instructions or who is authorized to work on explosionprotected devices in hazardous areas.
- → Put the positioner out of operation (see the 'Decommissioning' section).
- → Disconnect the wires for electrical input and remove them from the positioner.
- ➔ Unscrew the screw fittings at the Output 38 and Supply 9 ports of the positioner.
- ➔ To remove the positioner, loosen the three fastening screws on the positioner.

13 Repairs

A defective positioner must be repaired or replaced.

Risk of positioner damage due to incorrect service or repair work.

- Do not perform any repair work on your own.
- → Contact SAMSON's After-sales Service for repair work.

13.1 Servicing explosionprotected devices

If a part of the device on which the explosion protection is based needs to be serviced, the device must not be put back into operation until a qualified inspector has assessed it according to explosion protection requirements, has issued an inspection certificate, or given the device a mark of conformity. Inspection by a qualified inspector is not required if the manufacturer performed a routine test on the device before putting it back into operation. Document the passing of the routine test by attaching a mark of conformity to the device.

Replace explosion-protected components only with original, routine-tested components by the manufacturer. Devices that have already been used outside hazardous areas and are intended for future use inside hazardous areas must comply with the safety requirements placed on serviced devices. Before being operated inside hazardous areas, test the devices according to the specifications for servicing explosion-protected devices.

EN 60079-19 applies to servicing explosion-protected devices.

13.2 Returning devices to SAMSON

Defective devices can be returned to SAMSON for repair.

Proceed as follows to return devices to SAMSON:

- 1. Put the positioner out of operation (see the 'Decommissioning' section).
- Remove the positioner (see the 'Removal' section).
- Proceed as described on the Returning goods page of our website
 ▶ www.samsongroup.com > Service & Support > After-sales Service > Returning goods

Disposal

14 Disposal



We are registered with the German national register for waste electric equipment (stiftung ear) as a producer of electrical and electronic equipment, WEEE reg. no.: DE 62194439

- → Observe local, national and international refuse regulations.
- → Do not dispose of components, lubricants and hazardous substances together with your other household waste.

∹∑́- Tip

On request, we can appoint a service provider to dismantle and recycle the product.

15 Certificates

The following certificate is shown on the next page:

- EU declaration of conformity for Type 3730-6
- EU declaration of conformity for Type 3730-6-110 and -210
- EU declaration of conformity for Type 3730-6-810
- EAC certificate for Type 3730-6
- EAC certificate for Type 3730-6-113, -213 and -813
- ATEX: statement of conformity
- ATEX: EU type examination certificate
- IECEx: IECEx certificate of conformity for Type 3730-6-111, -211 and -511
- IECEx: IECEx certificate of conformity for Type 3730-6-811
- CSA certificate
- FM certificate

The certificates shown were up to date at the time of publishing. The latest certificates can be found on our website:

www.samsongroup.com > Products & Applications > Product selector > Valve accessories > 3730-6



samsor

Hanno Zager Leiter Qualitätssicherung/Head of Quality Managment/ Responsable de l'assurance de la qualité

SAMSON AKTIENGESELLSCHAFT Weismüllerstraße 3 60314 Frankfurt am Main

SMART IN FLOW CONTROL.

Dirk Hoffmann

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Telefon: 069 4009-0 · Telefax: 069 4009-1507 E-Mail: samson@samson.de Revison 07

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SMART IN FLOW CONTROL.



EU Konformitätserklärung/EU Declaration of Conformity/ Déclaration UE de conformité

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller/ This declaration of conformity is issued under the sole responsibility of the manufacturer/ La présente déclaration de conformité est établie sous la seule responsabilité du fabricant. Für das folgende Produkt / For the following product / Nous certifions que le produit

Elektropneumatischer Stellungsregler mit HART-Kommunikation / Electropneumatic Positioner with HART communication / Positionneur électropneumatique avec communication HART Typ/Type/Type 3730-6-110 und -210

entsprechend der EU-Baumusterprüfbescheingung PTB 10 ATEX 2007 ausgestellt von der/ according to the EU Type Examination PTB 10 ATEX 2007 issued by/ établi selon le certificat CE d'essais sur échantillons PTB 10 ATEX 2007 émis par:

> Physikalisch Technische Bundesanstalt Bundesallee 100 D-38116 Braunschweig Benannte Stelle/Notified Body/Organisme notifié 0102

wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt / the conformity with the relevant Union harmonisation legislation is declared with/ est conforme à la législation d'harmonisation de l'Union applicable selon les normes:

EMC 2014/30/EU

EN 61000-6-2:2005, EN 61000-6-3:2007 +A1:2011, EN 61326-1:2013

Explosion Protection 94/9/EC (bis/to 2016-04-19) Explosion Protection 2014/34/EU (ab/from 2016-04-20)

RoHS 2011/65/EU

EN 60079-0:2009, EN 60079-11:2012, EN 60079-31:2009

EN 50581:2012

Hersteller / Manufacturer / Fabricant:

SAMSON AKTIENGESELLSCHAFT Weismüllerstraße 3 D-60314 Frankfurt am Main Deutschland/Germany/Allemagne

Frankfurt / Francfort, 2017-07-29 Im Namen des Herstellers/ On behalf of the Manufacturer/ Au nom du fabricant.

IV. H. Erge

Hanno Zager Leiter Qualitätssicherung/Head of Quality Managment/ Responsable de l'assurance de la qualité

SAMSON AKTIENGESELLSCHAFT Weismüllerstraße 3 60314 Frankfurt am Main

Dirk Hoffmann Zentralabteilungsleiter/Head of Department/Chef du département Entwicklungsorganisation/Development Organization

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Revison 07

:e 3730-6-110-210 de en fra rev07

SMART IN FLOW CONTROL



EU Konformitätserklärung/EU Declaration of Conformity/ Déclaration UE de conformité

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller/ This declaration of conformity is issued under the sole responsibility of the manufacturer/ La présente déclaration de conformité est établie sous la seule responsabilité du fabricant. Für das folgende Produkt/For the following product/Nous certifions que le produit

Elektropneumatischer Stellungsregler mit HART-Kommunikation / Electropneumatic Positioner with HART communication / Positionneur électropneumatique avec communication HART Typ/Type/Type 3730-6-810

entsprechend der EU-Baumusterprüfbescheingung PTB 10 ATEX 2008 X ausgestellt von der/ according to the EU Type Examination PTB 10 ATEX 2008 X issued by/ établi selon le certificat CE d'essais sur échantillons PTB 10 ATEX 2008 X émis par:

> Physikalisch Technische Bundesanstalt Bundesallee 100 D-38116 Braunschweig Benannte Stelle/Notified Body/Organisme notifié 0102

wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt / the conformity with the relevant Union harmonisation legislation is declared with/ est conforme à la législation d'harmonisation de l'Union applicable selon les normes:

EMC 2014/30/EU

EN 61000-6-2:2005. EN 61000-6-3:2007 +A1:2011, EN 61326-1:2013

Explosion Protection 94/9/EC (bis/to 2016-04-19) Explosion Protection 2014/34/EU (ab/from 2016-04-20) EN 60079-15:2010. EN 60079-31:2009

RoHS 2011/65/EU

EN 60079-0:2009, EN 60079-11:2012,

EN 50581.2012

Hersteller / Manufacturer / Fabricant:

SAMSON AKTIENGESELLSCHAFT Weismüllerstraße 3 D-60314 Frankfurt am Main Deutschland/Germany/Allemagne

Frankfurt / Francfort, 2017-07-29 Im Namen des Herstellers/ On behalf of the Manufacturer/ Au nom du fabricant.

IV. H. Erge

Hanno Zager Leiter Qualitätssicherung/Head of Quality Managment/ Responsable de l'assurance de la qualité

SAMSON AKTIENGESELLSCHAFT Weismüllerstraße 3 60314 Frankfurt am Main

Dirk Hoffmann Zentralabteilungsleiter/Head of Department/Chef du département Entwicklungsorganisation/Development Organization

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Revison 07

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	CEPTNONKAT COOTBETCTBNA
FHI	№ EAЭC RU C-DE.ЭА11.В.00045/19
LIIL	Серия RU № 0197354
Иесто нахождения (адрес Иасловка, дом 20, строе Иосква, улица Верхняя	ИКАЦИИ Общества с ограниченной ответственностью «ТМС РУС», с юридического лица): Российская Федерация, 127083, город Москва, улица Верхняя ние 2: адрес места осуществления деятельности: Российская Федерация, 127083, город а Масловка, дом 20, строение 2, помещения № 18, 28. Аттестат аккредитации у11 от 02.07.2015. Номер телефона. +7 (495) 221-18-04; адрес электронной почты
Место нах Российская Федерация, 10	о с ограниченной ответственностью «Самсон Контролс». хождения (адрес юридического лица) и адрес места осуществления деятельности 09544, город Москва, бульвар Энтузиастов, дом 2, этаж 5, комната 11. ОГРН 1037700041026 i) 777-45-45; адрес электронной почты: samson@samson.ru.
ИЗГОТОВИТЕЛЬ «S	SAMSON AG Mess- und Regeltechnik». есто нахождения (адрес юридического лица) и адрес места осуществления деятельности
по изготовлению продукц	ии: Weismullerstrasse 3, D-60314 Frankfurt am Main, Германия.
ПРОДУКЦИЯ По 3731-3, 3731-5, 4763, 476 соответствия на бланке N Серийный выпуск.	озиционеры, типы 3724, 3725, 3730-0, 3730-1, 3730-2, 3730-3, 3730-4, 3730-5, 3730-6 65. Изготовление в соответствии со стандартами, указанными в приложении к сертификат № 0676628.
КОД ТН ВЭД ЕАЭС СООТВЕТСТВУЕТ Т совместимость техничес	9032 81 000 0 "РЕБОВАНИЯМ технического регламента Таможенного союза «Электромагнитная ких средств» (ТР ТС 020/2011)
тветственностью «Инног нализа состояния прои	протокола сертификационн 5016-02/ИР от 22 10,2019, выданного испытательной лабораторией Общества с отраниченн вационные решения», аттестат аккредитации РОСС RU.0001.21 ЛАВ90, акта о результат заодства № 00082-A от 04.07.2019 органа по сертификации Общества с отраниченн 2 РУС», руководств по эксплуатации 4218-3725-3724-2018.PЭ, 4218-3730-4763-2018.F 2
АОПОАНИТЕЛЬНА. беспечивается соблюдение «Эпектрическое оборудован и методы и иопытаний». Назнач ю эксплуатации 4218-3725-372	Я ИНФОРМАЦИЯ Стандарт: в результате применения которого на добровольной осно требований технического регламента: подразделы 6.2 и 7.2 ГОСТ Р 515221-2011 (МЗК 61326-1200 исе для измерения, управления и пабораторного применения часть 1. Общие требован ченный срок службы - 15 лет Назначенный срок хранения – 2 года. Условия хранения указаны в руководств 24-2010 Р.9, 4216-3730-4753-2016 Р.9, 4216-3731-2018 он ШИИ»
СРОК ДЕЙСТВИЯ С	<u>05.11.2019</u> ПО 04.11.2024
включительно	I IMS I
	ы (уполномоченное Нарр Назарова Лилия Юрьевна а но сертификации (серона) М.П. (в Ко.)
	сперт-аудитор) жсперты-аудиторы)) Фались) Состанование (ФИСС) (ФИСС)

ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ

ПРИЛОЖЕНИЕ

К СЕРТИФИКАТУ СООТВЕТСТВИЯ № ЕАЭС RU C-DE.ЭА11.В.00045/19

Серия RU № 0676628 Лист 1 из 1

Стандарты, в соответствии с которыми изготавливается продукция

Обозначение стандарта	Наименование стандарта
IEC 61000-6-2:2016	Electromagnetic compatibility (EMC). Part 6-2: Generic standards. Immunity for industrial environments
EN 61000-6-3:2007	Electromagnetic compatibility (EMC). Part 6-3: Generic standards. Emission standard for residential, commercial and light-industrial environments
EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use. EMC requirements. Part 1: General requirements

Назарова Лилия Юрьевна Ha Руководитель (уполномоченное M.II. (0.N.P) лицо) органа по сертификации Ходоров Владимир Игоревич Эксперт (эксперт-аудитор) (0.N.O.) (эксперты (эксперты-аудиторы))

ТАМОЖЕННЫЙ СОЮЗ EPTNOUKAT COOTBETETENA № TC RU C-DE.AA87.B.01278 Серия RU № 0743927 ОРГАН ПО СЕРТИФИКАЦИИ Орган по сертификации взрывозацинценного и рудничного оборудования (ОС ЦСВЭ) Общества с ограниченной ответственностью «Центр по сертификации взрывозащищенного и рудничного оборудования» (ООО «НАНИЮ ЦСВЭ»). Адрее места нахождения юридического лица: Россия, 140004, Московская область, Люберешкий район, город Люберцы, поселок ВУТИ, АО «Завод «ЭКОМАЦЬ», литера В, Объект 6, этак 3, офис 26. Адрее места осуществления деятельности в области аккредитации: Россия, 140004, Московская область, Люберешкий район, город Люберцы, поселок ВУТИ, АО «Завод «ЭКОМАЦЬ», литера В, Объект 6, этак 3, офис 26. Адрее места осуществления деятельности в области аккредитации: Россия, 14004, Московская область, Люберешкий район, город Люберцы, поселок ВУТИ, АО «Завод «ЭКОМАЦЬ», Литера В, Объект 6, этак 3, офися 26/3, 26/4, 26/5, 27/6, 30/1, 32. Аттестат № RA.RU,111ААЯ от 20,07.2015 г. Темение 1/ (00), 578 0.25 1. // 2006 558 92. // А матере самирии поста и може поста и поселости и Московская области (000 558 0.25 // 2006 558 92. // 2006 559 92. Телефон: +7 (495) 558-83-53, +7 (495) 558-82-44. Адрес электронной почты: ccve@ccve.ru ЗАЯВИТЕЛЬ Общество с ограниченной ответственностью «Самсон Контролс», Россия, 109147, Москва, ул. Марксистская, д. 16. ОГРН: 1037700041026. Телефон: +7 (495) 7774545. Адрес электронной почты: samson@samson.ru ИЗГОТОВИТЕЛЬ SAMSON AG Mess- und Regeltechnik, Weismüllerstrasse 3, 60314 Frankfurt am Main, Германия. продукция Позиционеры типов 3730-01, 3730-11, 3730-31, 3730-6-113, 3730-08, 3730-18, 3730-38, 3730-6-813, 3730-6-213 с электропреобразователем (барьером) типа 3770-1 (выпускаются в соответствии с технической документацией SAMSON AG Mess- und Regeltechnik на позиционеры типов 3730-01, 3730-11, 3730-31, 3730-6-113, 3730-08, 3730-18, 3730-38, 3730-6-813, 3730-6-213 с электропреобразователем (барьером) типа 3770-1) с Ех-маркировками согласно приложению (см. бланки №№ 0550180, 0550181, 0550182, 0550183). Серийный выпуск. ΚΟΔ ΤΗ ΒЭΔ ΤΟ 9032 810000 СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ ТР ТС 012/2011 «О безопасности оборудования для работы во взрывоопасных средах». СЕРТИФИКАТ ВЫДАН НА ОСНОВАНИИ Протокола оценки и испытаний № 227.2018-Т от 29.11.2018 Испытательной лаборатории взрывозащищенного и рудничного оборудования (ИЛ ЦСВЭ) Общества с ограниченной ответственностью «Центр по сертификации изрывозащищенного и рудничного оборудования (ООО «НАНИО ЦСВэ») (агтестат № КА.я.U.2.1АКО6 от 19.01.2016); Акта о результатах анализа состояния производства сертифицируемой продукции № 151-А/18 от Акта о результата апализа оссоявля арховадищенного и рудничного оборудования (ОС ЦСВЭ) Общества с ограниченной ответственностью «Центр по сертификации взрывозащищенного и рудничного оборудования» (ООО «НАНИО ЦСВЭ») (аттестат № RA.RU.11AA87 выдая 20.07.2015). Схема сертификации - 1с. **ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ** Перечень стандартов - см. приложение, бланк № 0550183. Условия и срок хранения указаны в технической документации. Назначенный срок службы - 15 лет. РОК ДЕИСТВИЯ С 30.11.2018 29.11.2023 включительно по Коган Алексей Александрович уководитель (уполномоченное що) органа по сертификации Мозеров Валентин Алексеевич Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы))

ПРИЛОЖЕНИЕ

К СЕРТИФИКАТУ СООТВЕТСТВИЯ № ТС RU C-DE.AA87.B.01278 Лист 1

Серия RU № 0550180

1. НАЗНАЧЕНИЕ И ОБЛАСТЬ ПРИМЕНЕНИЯ

Позиционеры типов 3730-01, 3730-11, 3730-31, 3730-6-113, 3730-08, 3730-18, 3730-38, 3730-6-813, 3730-6-213 с электропреобразователем (барьером) типа 3770-1 (далее – позиционеры) прелналначены для преобразования электрического входного сигнала в пропорциональный пневматический выходной сигнал и выдачи токового или цифрового сигнала положения клагана.

Область применения – взрывоопасные зоны помещений и наружных установок, а также зоны, опасные по воспламенению горючей пыли, согласно Ех-маркировке, ГОСТ IEC 60079-14-2013, регламентирующим применение электрооборудования во ворыкоопасных средах.

2. ОСНОВНЫЕ ТЕХНИЧЕСКИЕ ДАННЫЕ

позиционеры типов 3730-01 позиционеры типов 3730-18 позиционеры типов 3730-18 позиционеры типов 3730-38 позиционеры типов 3730-38 позиционеры типов 3730-6-113 3730-6-213 с электропреобразователем (барьером) типа 3770-1 позиционеры типов 3730-6-813 2.2. Диапазон температур окружающей среды, ⁶ C:	IEx in IIC To74 GI Fex in IIC To74 GI Res in IIC T80°C DI 2Ex rA IIC T80°C DI 2Ex rA IIC T80°C DI IEx in IIC T80°C DI IEx in IIC T80°C DI 2Ex rA IIC T674 GI Ex th IIC T80°C DI Ex th IIC T80°C DI Ex th IIC T80°C DI Ex th IIC T80°C DI 2Ex in IIC T674 GI Ex th IIC T80°C DI 2Ex in IIC T674 GI Ex th IIC T80°C DI Ex in IIC T674 GI Ex th IIC T80°C DI Ex th IIC T80°C DI Ex th IIC T80°C DI Ex th IIC T80°C DI Ex th IIC T80°C DI
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позниконеры типов 3730-11 позниконеры типов 3730-18 позниконеры типов 3730-31 позниконеры типов 3730-38 позниконеры типов 3730-6-113 3730-6-213 с электропреобразователем (барьером) типа 3770-1 позниконеры типов 3730-6-813	ExtellICT807CDe2 IEx in IIICT807CD Ex in IIICT807CD Ext in IIICT807CD 1807EX bHICT807CD 287xA1ICT6T4GE ExtellICT807CDe2 IIEX in IIICT6T4GE 1807CD 1807EX bHICT807CD 287xEIICT807CDe2 1807EX bHICT807CD ExtellICT807CDe2 IEX in IIICT807CD 1807EX bHICT807CD 1807EX
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позиционеры типов 3730-6-113 3730-6-213 с электропреобразователем (барьером) типа 3770-1 позиционеры типов 3730-6-813	2Ex is IIC TG., T4 G RHH 2Ex nA IIC TG., T4 G C Ex te IIIC T80°C De S IEx is IIC T6., T4 G Ex is IIC T60°C D RHH 780°C D IEx is UIC T80°C D IEx d [ia] IIC T6., T4 Gb Ex te IIIC T80°C D Ex te IIIC T80°C D
позиционеры типов 3730-6-113 3730-6-213 с электропреобразователем (барьером) типа 3770-1 позиционеры типов 3730-6-813	neinu 2Ex nA IIC 76, 74 GE 2 Ex te IIIC T80°C De 2 Ex te IIIC T80°C De 2 IEx ia IIC 76, 74 G Ex ia IIIC 780°C D neinu Ex di IIIC T80°C D Ex di Iaj IIC 76, 74 GB 2 Ex de IIIC T80°C Db 3
1730-6-213 с электропреобразователем (барьером) типа 3770-1 позиционеры типов 3730-6-813	Ex te IIIC T80°C De 2 IEx ia IIC T6T4 G Ex ia IIIC T80°C D num Ex to IIIC T80°C D IEx d [ia] IIC T6T4 Gb Ex to IIIC T80°C Db 2
1730-6-213 с электропреобразователем (барьером) типа 3770-1 позиционеры типов 3730-6-813	ТЕх іа ПС Тб Т4 G Ех іа ШС Т80°С D или Ех іb ШС Т80°С D ПЕх іb ППС Т80°С D 1Ех іb ППС Т80°С D Ех іb ППС Т80°С Db 3
1730-6-213 с электропреобразователем (барьером) типа 3770-1 позиционеры типов 3730-6-813	Ех ia ШС Т80°С D или Ex th ШС Т80°С D 1Ex d [ia] ПС Т6 T4 G Ex th ПІС Т80°С Db Ех th ПІС Т80°С Db 3
позиционеры типов 3730-6-813	или Ex tb IIIC T80°C D IEx d [ia] IIC T6T4 Gb J Ex tb IIIC T80°C Db J
позиционеры типов 3730-6-813	1Ex d [ia] IIC T6T4 Gb 2 Ex tb IIIC T80°C Db 2
позиционеры типов 3730-6-813	Ex th IIIC T80°C Db 3
позиционеры типов 3730-6-813	Ex th IIIC T80°C Db 3
	2Ex nA IIC T6T4 Ge 3
2.2. Диапазон температур окружающей среды, ⁶ С:	2Ex ic IIC T6T4 G
2.2. Диапазон температур окружающей среды, °С:	inth Ex to IIIC T80°C D
позиционеры типов 3730-6-113, 3730-6-213:	
um li = 52mA	от минус 55 до +45(Тб)/+60(Т5)/+75(Т4
uta li = 25mA	от минус 55 до +60(Т6)/+80(Т5)/+80(Т4
позиционеры типов 3730-1	от минус 40 до +50(Тб)/+70(Т5)/+80(Т4
возиционеры типов 3730-11:	and a second sec
ция I, = 52мА	от минус 40 до +45(Т6)/+60(Т5)/+75(Т4
ин I = 25мА	от минус 40 до +60(Т6)/+80(Т5)/+80(Т4
позиционеры типов 3730-31:	01 1000 10 20 100 100 100 100 100 100 10
usa li = 52mA	от минус 55 до +45(Тб)/+60(Т5)/+75(Т4
uta Ii = 25mA	от минус 55 до +60(Т6)/+80(Т5)/+80(Т4
позиционеры типов 3730-08	от минус 40 до +50(Тб)/+70(Т5)/+80(Т4
позиционеры типов 3730-18	от минус 40 до +60(Т6)/+70(Т5)/+80(Т4
позиционеры пинов 5750-16	от минус 55 до +60(Т6)/+70(Т5)/+80(Т4
позиционеры типов 3730-6-813:	01 Millige 55 10 100(10)+10(13)+80(14
una li = 52mA	от минус 55 до +45(Тб)/+60(Т5)/+75(Т4
ua li = 25mA	от минус 55 до +60(Тб)/+80(Т5)/+80(Т4
электропреобразователь типа 3770-1	от минус 35 до 400 1004 30 130 480 14
2.3. Степень защиты от внешних воздействий:	ОТ минус 43 до то
	не ниже IP5
позиционеры с Ех-маркировкой 2Ex nA II T6 T4 Gc X	1P65, 1P6
все оставлива позиционеры	
Руководитель (уполномоченное	Коган Алексей Александрови
МП. манцо) органа по сертификации Эксперт-аудитор (эксперт)	Мозеров Валентин Алексееви
Эксперт-аудитор (эксперт)	инициалы, фамилия
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приложение

К СЕРТИФИКАТУ СООТВЕТСТВИЯ № ТС RU C-DE.AA87.B.01278 Лист 2

Серия RU № 0550181

Клеммы 11/12 31/32 41/42 41/42 15/22 41/42 15/22 81/82 83/84 41/42 11/12 11/12 44/45 41/42 15/52 11/12 31/32 41/42 41/42 15/52 41/42 11/12 31/32 41/42 15/52 81/82 83/84 11/12 11/1	U.* B 28/32 30 30 30 16 20 20 20 20 20 20 20 20 20 20 20 20 20	Li,* MA 115/87,5 100 115/87,5 100 52/25 60 51 60 60 7 15 100 115/87,5 60 60 7 52/25 60 115 52/25 60 115 115 115 115 115 60 115 52/25 60 100 52/25 60 115 115 115 60 115 60 115 60 115	podestonatemente P ₈ ,* Br I I I I I I I I I I I I I		C _k . 14D 5,3 5,3 5,3 5,3 30 5,3 5,3 5,3 6 0 66 5,3 6 30 16 35 5,3 30 5,3 30 16 35 5,3 30 30 30 30 30 30 30 30 30 3	U6,B - - - - - - - - - - - - - - - - - - -	In MA	- - - - - - - - - - - - - - - - - - -		C.
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41/42 и 51/52 11/12 31/32 41/42 41/42 и 51/52 81/82 83/84 Интерфейе ВU тчок положения раннае искробетоп X	20 28 30 30 16 20 28 20 16	60 115 115 100 100 52/25 60 115 60	0,25 1 0,25 0,169/0,064	0 0 0 0 0 100	16 35 5,3 56,3 5,3 30	•	•			
11/12 31/32 41/42 и 51/52 81/82 83/84 Интерфейс ВU птокк положения эдиные искробезоп X	28 28 30 30 16 20 28 20 16	115 115 100 100 52/25 60 115 60	1 0,25 0,169/0,064	0 0 0 100	35 5,3 56,3 5,3 30	•	•			
31/32 41/42 и 51/52 81/82 83/84 Интерфейе ВU итчик положения адиные искробезоп X	28 30 30 16 20 28 20 16	115 100 100 52/25 60 115 60	0,169/0,064	0 0 0 100	5,3 56,3 5,3 30	•	•			
41/42 41/42 и 51/52 81/82 83/84 Интерфейс ВU птонк положения эдиме искробезоп X	30 30 16 20 28 20 16	100 100 52/25 60 115 60	0,169/0,064	0 0 100	56,3 5,3 30					-
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41/42 и 51/52 81/82 83/84 Интерфейс ВU пчик положения одные искробезоп X	16 20 28 20 16	52/25 60 115 60	0,169/0,064	100	5,3	•				-
41/42 и 51/52 81/82 83/84 Интерфейс ВU пчик положения одные искробезоп X	20 28 20 16	60 115 60	0,169/0,064		30			-	-	
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83/84 Интерфейс BU пчик положения одные искробезоп Х	20 16	60			5,3					
Интерфейс BU пчик положения одные искробезоп Х	16			0	5,3	-	-		-	
пчик положения одные искробезоп Х			0,25	0	5,3	-	-			
пчик положения одные искробезоп Х		25	0,064	0	0	7,88	61,8	120	10	1 6
одные искробезоп Х				370	730	7,88	61	120	10	6
X		аметры по	зиционеров с							1
	Deaman	uconofician	асные параметр			Deman		обезопасные		
EC. PC NEWLOW	U.* B	L.* MA	P.* Br	Lo METH	C _L HΦ	U ₀ , B	Ia. MA	Po, MBT	- napamerpi	
11/12	28	115	rh Di	0	5,3	00, D	10. M/S	Fo, MDT	Lo, MTH	Ca
1012	28	115	1	0		-				-
11/12			1							-
	28		1					-		-
			0,169/0,064		30					-
			0,25					-	-	1
			1							144
31/32			1		5,3					1.00
	30	100	0,25		56,3	-				
1				0	5,3	-				
41/42	20	52/25	0,169/0,064	100	30		-			
41/42 n 51/52	20	60	0,4	0	5.3			1		-
81/82	30	100	-	0	5.3	-	-			-
83/84	20	60	0.4			-				-
	20				0	7.88	62	120	10	6
				10000	100	.,00	. de		10	0
				370	730	7.88	61	120	10	6
	1.11					1,00		140	10	0
	32	132	12	0	53				-	-
			1							-
			0.160/0.064					1		-
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			0,4							-
					3,3	_				-
					5,3				•	
	20	60	0,2	0	5,3	•		-	-	
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	41/42 tr 51/52 81/82 83/84 Интерфейс BU Латчик положения 11/12 31/32 41/42 41/42 tr 51/52 81/82 83/84 Интерфейс SSP Латчик	11/12 28 44/45 20 41/42 и 51/52 30 11/12 30 31/32 28/30 - - 41/42 и 51/52 20 41/42 и 51/52 20 41/42 и 51/52 20 81/82 30 81/82 30 81/84 20 Интерфейс 20 11/12 32 31/32 32 41/42 и 51/52 20 Интерфейс 20 11/12 32 31/32 30 81/82 30 11/12 32 31/32 32 41/42 и 51/52 20 41/42 и 51/52 20 81/84 30 81/82 32 81/84 20 91/142 и 51/52 20 81/84 20 91/142 и 51/52 20 81/82 32 81/84 <	11/12 28 115 44/45 20 52/25 41/42 # 51/52 20 60 11/12 30 1100 31/32 28/30 115/100 - - - 41/42 20 52/25 41/42 20 52/25 41/42 20 52/25 41/42 20 52/25 11/12 30 100 83/84 20 60 Hirrepdenc 20 25 11/12 32 132 31/32 32 132 31/32 32 132 31/32 32 132 31/32 32 132 31/32 32 132 31/32 32 132 31/32 32 132 31/32 32 132 31/32 32 132 31/32 32 132 31/32	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$

ПРИЛОЖЕНИЕ

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2.6. Электрические параметры позиционеров с Ех-маркировкой 2Ex nA IIC T6... T4 Ge X

Llen.	Клеммы	Номинальное и постоянного т			Ток, мА	
	11/12	-		_	420	
Датчик положения	31/32	-			420	
Концевой датчик	41/42	8		8		1.1.1.1.1.1
Программное обеспечение	41/42 и 51/52	8			8	
Магнитный клапан	81/82	62	624			
Индикация ошибок	83/84	8		8		
Датчик положения (оммический)		630				
2.7. Электрические параметры по IEx d [ia] IIC/IIB T6 Gb X, Ex tb II	IC T80°C Db X:	с электропреобразо	ователем (бар	ьером) типа 3		аркировкой
 максимальное напряжение перемени номинальный ток, мА 	ого тока U _m В				250 80	
 выходной сигнад 					4-20 MA	1000
2.8. Выходные искробезопасные г	араметры электропреоб	бразователя типа 31	770-1:	1000		2
Цепь	Клеммы	U ₆ , B	Io, MA	Pa, MBT	Lo, мГн	Сь, мкФ
Канал 1	+/-	17,2	110	473	3	360
Канал 2, 3	+/-	12,6	49	154	15	1,15

3. ОПИСАНИЕ КОНСТРУКЦИИ И ОБЕСПЕЧЕНИЯ ВЗРЫВОЗАЩИЩЕННОСТИ ИЗДЕЛИЙ

Позиционеры типов 3730-6-113, 3730-6-213, 3730-6-813 выполнены в прямоугольном корпусе, изготовленного из нержавеющей стали или из алюминиевого сплава с содержанием магния, цинка и циркония менее 7,5%. На одной боковой стороне поверхности корпуса имеются отверстия под кабельные яводы, на другой – фитинги пневматической системы. Внутри корпусов позиционеров размещены электронные платы схем управления. На корпусе имеется заземляющий зажим и маркировочная табличка.

Позиционеры типов 3730-01, 3730-11, 3730-31, 3730-08, 3730-18, 3730-38 выполнены в виде единого блока, состоящего из корпуса и крыщки. Внутри корпуса расположена электронная плата ИР преобразователя, элементы для подключения электрических и пиевматических линий. На корпусе имеются отверстия под кабельные вводы.

Электропреобразователь типа 3770-1 представляет собой электронную схему многоканального барьера искрозациты, помещенную в цилиндрический корпус из алюминиевого сплава с содержанием магния, цинка и циркония менее 7,5%. На корпусе имеются отверстия под кабельные вводы, наружный и внутренний заземляющие зажимы. Взрывозащищенность позиционеров обеспечивается выполнением требований стандартов.

ГОСТ 31610.11-2014 (IEC 60079-11:2011). Вэрывоопасные среды. Часть 11. Оборудование с видом вэрывозащиты искробезопасная электрическая цепь «i», ГОСТ 31610.15-2012/МЭК 60079-15:2005. Электрооборудование для взрывоопасных газовых сред. Часть 15. Конструкция, испытания и маркировка электрооборудования с видом защиты «п». ГОСТ 31610.0-2014 (IEC 60079-0:2011). Взрывоопасные среды. Часть 0. Оборудование. Общие требования. ГОСТ IEC 60079-1-2011 Взрывоопасные среды. Часть 1. Оборудование с видом взрывозащиты «взрывонепроницаемые оболочки «d», ГОСТ IEC 60079-31-2010 Взрывоопасные среды. Часть 31. Оборудование с защитой от воспламенения пыли оболочками «t» согласно Ех-маркировке, приведенной в п.2.1

4. МАРКИРОВКА

- Ех-маркировка, наносимая на позиционеры, должна включать следующие данные:
- товарный знак или наименование предприятия изготовителя;
- тип излелия:
- заводской номер:
- Ех-маркировку;

FRIEx

М.П.

- специальный знак взрывобезопасности;
- предупредительные надписи;

REMAN ювание или знак центра по сертификации и номер сертификата соответствия;

> Руководитель (уполномоченное лицо) органа по сертификации

Коган Алексей Александрович

Мозеров Валентин Алексеевич

Эксперт-аудитор (эксперт)

ПРИЛОЖЕНИЕ

К СЕРТИФИКАТУ СООТВЕТСТВИЯ № ТС RU C-DE.AA87.B.01278 Лист 4

Серия RU № 0550182

5. СПЕЦИАЛЬНЫЕ УСЛОВИЯ ПРИМЕНЕНИЯ

Знак X, стоящий после Ех-маркировки, означает, что при эксплуатации позиционеров необходимо соблюдать следующие специальные" условия:

5.1. Позиционеры типа 3730-38 с Ех-маркировкой 2Ex nA IIC T6... Т4 Gc X подключаются к цепи питания датчика положения через предохранитель с иомпиальным током I№ 40 мА.

5.2. Позиционеры типов 3730-08, 3730-18 с Ех-маркировкой 2Ех пА ПС Т6... Т4 Gc X подключаются к сигнальным ценям через предохранитель с номинальным током Ім ≤ 80 мА.

5.3. Позиционеры типа 3730-6-813 с Ех-маркировкой 2Ех пА ПС Тб...Т4 Gc X полключаются к сигнальным цепям и цепям питанов датчока положения через предохранитель с номинальным током № 80 мА, а цепь программного интерфейсного адаптера через предохранитель но моков № 40 мА.

5.4. Предохранители, указанные в п. 5.1, 5.2, 5.3, устанавливаются вне взрывоопасной зоны

5.5. Подсоединение внешних электрических цепей к позиционерам с Ех-маркировкой 1Ex d [ia] IIC T6 Gb X,

Ex th IIIC T80°C Db X необходимо осуществлять через кабельные вводы, имеющие сертификат соответствия требованиям ТР TC012/2011 на электрооборудование с видом корывнозащиты "а" для ворьмоопасной гизовой смеск категории IIC. 5.6. Не используемые отверствя под кабелыные вводы позиционеров с Ex-маркировкой IEx d [ja] IIC T6 Gb X,

Ex tb IIIC T80°C Db X закрываются заглушками, имеющими сертификат соответствия требованиям ТР TC012/2011.

Специальные условия применения, обозначенные знаком Х, должны быть отражены в сопроводительной документации, подлежащей обязательной поставке с каждым позиционером.

Виесение изменений в конструкцию позиционером возможно только по согласованию с НАНИО ЦСВЭ в соответствии с требованиями ТР ТС 012/2011.

Инспекционный контроль - 2019 г., 2020 г., 2021 г., 2022 г.

Руководитель (уполномоченное лицо) органа по сертификации Эксперт-аудитор (эксперт) Коган Алексей Александрович

Мозеров Валентин Алексеевич

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Physikalisch-Technische Bundesanstalt Braunschweig und Berlin Nationales Metrologieinstitut





(1) EU-TYPE EXAMINATION CERTIFICATE

(Translation)

(2) Equipment or Protective Systems Intended for Use in Potentially Explosive Atmospheres - Directive 2014/34/EU

(3) EU-Type Examination Certificate Number:

PTB 10 ATEX 2007

Issue: 1

- (4) Product: Digital positioner, type 3730-6-110..., 3730-6-510... and 3730-6-210... with HART communication
- (5) Manufacturer: SAMSON AG

(6) Address: Weismüllerstraße 3, 60314 Frankfurt, Germany

- (7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- (8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential Test Report PTB Ex 19-25141.

- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with: EN 60079-0:2018 EN 60079-11:2012 EN 60079-31:2014
- (10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.
- (11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.
- (12) The marking of the product shall include the following:



In case of dispute, the German text shall prevail.

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L	Physikalisch-Technische Bu Braunschweig und Berlin Nationales Metrologieinstitut	ındesanstalt	(Ε ×
(13)	SCHE	DULE	
(14)	EU-Type Examination Certificate Nun	nber PTB 10 ATEX 200	7, Issue: 1
(15)	Description of Product		
	The digital positioner with HART communicatio for the conversion of electrical actuating signals	n is a single or double acting s into pneumatic actuating pr	positioner. It is us essure signals.
	The equipment is installed inside the hazardous	s area.	
	The equipment is available in three designes, type 3730-6-210 with a field barrier connected		
	Marking		
	Туре 3730-6-110		
	😥 II 2 G Ex ia IIC T6 Gb and		
	II 2 D Ex ia IIIC T80 °C Db		
	Type 3730-6-210 with field barrier, type 3770	-1	
	😥 II 2 G Ex db [ia] IIC T6 Gb and		
	II 2 D Ex the IIIC T80 ℃ Db		
	Тур 3730-6-510:		
	😥 II 2 D Ex th IIIC T80 °C Dh		
	For relationship between type of protection, ten temperature range, reference is made to the taken the taken temperature range.		permissible ambie
	Type of protection / Options	Permissible ambient temperature range	
	Т6	60 °C	
	Ex ia IIC T5	-55 °C 70 °C	
	T4 Ex ia IIIC	80 °C -55 °C 80 °C	
			-
	Option, structure-borne	60 °C -40 °C 70 °C	
	sound sensor		1

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SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 10 ATEX 2007, Issue: 1

Regarding type of protection "tb"

Dust group	Max. surface temperature	Permissible ambient temperature range
IIIC	T 80 °C	-40 °C 70 °C

Electrical data

Type 3730-6-210 with field barrier, type 3770-1 connected in series

Operating values: 2	ŧ	20 mA	
Supply circuit		= 10 = 250	v v

Type 3730-6-110

The positioner may be connected to certified intrinsically safe circuits provided the permissible maximum values for U_i , I_i and P_i are not exceeded.

The circuits for the voltage/power supply, the serial SSP interface and the external position sensor are operationally interconnected and safely electrically isolated from the other intrinsically safe circuits up to a peak value of the nominal voltage of 60 V. The intrinsically safe circuits are safely electrically isolated from each other up to a peak value of the nominal voltage of 60 V. All circuits are safely isolated from ground.

sheet 3/9

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EDULE TO EU-TYPE EXAMINATION CERTIFICATE	E PTB 10 ATEX 2007, Issue:
Operating values:	4 20 mA
/oltage/power supply terminals 11/12)	type of protection Ex ia IIC/IIE only for connection to a cer intrinsically safe circuit
	Maximum values:
	$U_i = 28$ V $I_i = 115$ mA
	or
	$U_i = 32$ V $I_i = 87.5$ mA
	P₁ = 1 W C₁ = 5.3 nF L₁ negligibly low
	only for connection to a centrintrinsically safe circuit Maximum values: $U_i = 28 V \\ I_i = 115 mA$ or $U_i = 32 V \\ I_i = 87.5 mA \\ P_i = 1 W \\ C_i = 5.3 nF$
	L negligibly low
r	
inary input ierminals 31/32)	type of protection Ex ia IIC/IIE only for connection to a cer intrinsically safe circuit
	Maximum values:
	$U_i = 30 V$
	l _i = 100 mA
	$C_i = 56.3 \text{ nF}$
r	L negligibly low
inary input	



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SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 10 ATEX 2007, Issue: 1

Structure-borne sound sensor (passive) type of protection Ex ia IIC/IIB/IIIC (terminals 31/32) only for connection to a certified intrinsically safe circuit

Maximum values:

Ui	=	30	V
Ii.	= 1	00	mA
Co	=	1.4	nF
Ci	=	5.3	nF
L		neg	ligibly low

(terminals 41/42)

only for connection to a certified intrinsically safe circuit

Maximum values:

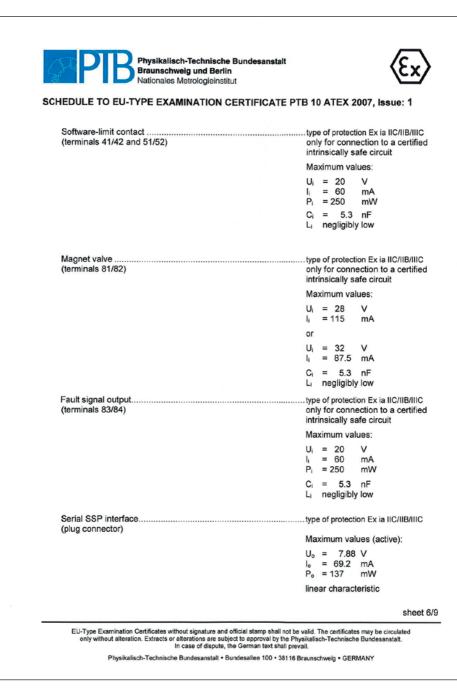
Ui	= 16	V
li –	= 52	mA
Pi	= 169	mW
or		
U	= 16	V
l,	= 25	mA
Pi	= 64	mW
Ci	= 30	nF
Li	= 100	μH

For relationship between temperature class, permissible ranges of the ambient temperature, maximum short-circuit currents and maximum power for analyzing units connected to these clamps, reference is made to the table:

Temperature class	Permissible ambient temperature range	I _o / P _o		
T6	45 °C			
T5	-55 °C 60 °C	52 mA / 169 mW		
T4	75 °C	1		
T6	60 °C			
T5	-55 °C 80 °C	25 mA / 64 mV		
T4	80 °C			

sheet 5/9

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SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 10 ATEX 2007, Issue: 1

	$C_{\circ} = 650$ nF $L_{\circ} = 10$ mH
	or
	only for connection to a certified intrinsically safe circuit
	Maximum values (passive):
	$U_i = 20$ V
	$ I_1 = 60 mA P_1 = 200 mVV $
	C _i negligibly low L _i negligibly low
External position sensor	type of protection Ex ia IIC/IIB/IIIC
(Analog PCB, pins p9, p10, p11)	Maximum values:
	$U_{o} = 7.88 V$
	$I_{\circ} = 13.2 \text{ mA}$ $P_{\circ} = 27 \text{ mW}$
	linear characteristic
	$L_o = 10 \text{ mH}$ $C_o = 1 \mu F$
	$L_i = 370 \mu H$ $C_i = 66 nF$
type 3730-6-510:	
type of protection "tb"	
Voltage/power supply (terminals 11/12)	Nominal signal: 4 20 mA Rated voltage: 28V
Position check-back (terminals 31/32)	Nominal signal: 4 20mA Rated voltage: 28V
Structure-borne sound sensor (passive)	Capacityt: max. 1,4 nF Rated voltage: 30V
Binary input (terminals 31/32)	Nominal signal: 0 30 V DC Rated voltage: 30 V
Inductive limit contact (terminals 41/42)	Nominal signal: 8 V DC, 8 mA Rated voltage: 16 V
	sheet 7/9

sheet 7/9

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SCH	HEDULE TO EU-TYPE EXAMINATION CERTIFICATE	E PTB 10 ATEX 2007, Issue: 1
	Software-limit contact (terminals 41/42; 51/52)	Nominal signal: 8 V DC, 8 mA Rated voltage: 20 V
	Magnet valve (terminals 81/82)	Nominal signal: 6 24 V DC Rated voltage: 28 V
	Fault signal output	Nominal signal: 6 24 V DC Rated voltage: 28 V
	Serial SSP interface (plug connector)	Nominal signal: SSP-interface Rated voltage: 20 V
	External position sensor (flange coupling)	Nominal signal:: 4 20 mA Rated voltage: 28V
	Changes with respect to previous editions	
	 Adaption to the state of the standards given above. Type 3730-6-510 is included in this edition. The char dust explosion protection. Incorporation of dust explosion protection trough intr 	
(16)	 Type 3730-6-510 is included in this edition. The char dust explosion protection. 	
	 Type 3730-6-510 is included in this edition. The char dust explosion protection. Incorporation of dust explosion protection trough intr 	
	 Type 3730-6-510 is included in this edition. The char dust explosion protection. Incorporation of dust explosion protection trough intr <u>Test Report</u> PTB Ex 19-25141 Specific conditions of use 	
	 Type 3730-6-510 is included in this edition. The char dust explosion protection. Incorporation of dust explosion protection trough intr <u>Test Report</u> PTB Ex 19-25141 Specific conditions of use 	
	 Type 3730-6-510 is included in this edition. The char dust explosion protection. Incorporation of dust explosion protection trough intr <u>Test Report</u> PTB Ex 19-25141 Specific conditions of use 	
	 Type 3730-6-510 is included in this edition. The char dust explosion protection. Incorporation of dust explosion protection trough intr <u>Test Report</u> PTB Ex 19-25141 Specific conditions of use 	
	 Type 3730-6-510 is included in this edition. The char dust explosion protection. Incorporation of dust explosion protection trough intr <u>Test Report</u> PTB Ex 19-25141 Specific conditions of use 	



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SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 10 ATEX 2007, Issue: 1

(18) Essential health and safety requirements

Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz

Braunschweig, January 20, 2020



sheet 9/9

EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

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CONFORMITY STATEMENT

(Translation)

- (2)Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - Directive 94/9/EC
- (3)Test Certificate Number:

(1)

PTB 10 ATEX 2008 X

- Digital positioner, type 3730-6-810 (4) Equipment:
- (5) Manufacturer: SAMSON AG Mess- und Regeltechnik
- Address: Weismüllerstr. 3, 60314 Frankfurt, Germany (6)
- This equipment and any acceptable variation thereto are specified in the schedule to this certificate and (7)the documents therein referred to.
- The Physikalisch-Technische Bundesanstalt, on the basis of the Council Directive 94/9/EC of 23 March (8)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, given in Annex II to the Directive. The examination and test results are recorded in the confidential assessment and test report PTB Ex

10-29352

- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with: EN 60079-15:2005 EN 60079-0:2006 EN 61241-0:2006 EN 61241-1:2004
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) This Conformity Statement relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.
- (12) The marking of the equipment shall include the following:

(Ex) II 3 G Ex nA II T6 or II 3 G Ex nL IIC/IIB T6 or II 3 D Ex tD A22 IP66 T80 °C Braunschweig, August 18, 2010 Zertifizierungssektor Exp On behalf of /PTB: ŀØ au Dr.-Ing. U. Johannsme Direktor und Professor Sheet 1/6 Conformity Statements without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail. Physikalisch-Technische Bundesanstalt • Bundesallee 100 • 38116 Braunschweig • GERMANY

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(13)

SCHEDULE

(14) CONFORMITY STATEMENT PTB 10 ATEX 2008 X

(15) Description of equipment

The digital positioner of type 3730-6-810 with HART communication is a single or double acting positioner. It is used for the conversion of electrical actuating signals into pneumatic actuating pressure signals.

The equipment is installed inside the hazardous area.

For relationship between type of protection, temperature class, options and permissible ambient temperature range, reference is made to the table:

Type of protection / Option	IS	Permissible temperatur	
	T6		60 °C
Ex nA IIC or Ex nL IIC	Τ5	-55 °C	70 °C
	T4		80 °C
			60 °C
Option, structure-borne so	ound sensor	-40 °C	70 °C
· ·			80 °C

Electrical data

Signal circuittype of protection Ex nA II (terminals 11/12)

Maximum operational values:

I = 4 ... 20 mA

or

type of protection Ex nL IIC/IIB

U = 32 V I = 132 mA P = 1.2 W L = negligibly low C = 5.3 nF

Sheet 2/6

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SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 10 ATEX 2008 X

Position ch or binary in		······	type of protection Ex nA II
	-borne sound sensor		Maximum operational values
			or
			type of protection Ex nL IIC/I U = 32 V
			U = 32 V I = 132 mA
			L = negligibly low C = 56.3 nF
			type of protection Ex nA II
(terminals 4	41/42)		Maximum operational values
			U = 8 V I = 8 mA
			or
			type of protection Ex nL IIC/I
			U = 20 V
			l = 52 mA P = 169 mW
			or
			U = 20 V
			I = 25 mA P = 64 mW
			$L = 100 \mu H$
			C = 30 nF
	short-circuit currents and		nges of the ambient temperat lyzing units, reference is mad
	Temperature class	temperature range	I _o / P _o
	Т6	45 °C	
	T5	-55 °C 60 °C	52 mA / 169 mW
	T4	75 °C	
	T6	60 °C	
	T5	-55 °C 80 °C	25 mA / 64 mW
	T4	80 °C	

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SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 10 ATEX 2008 X

	Software-limit contact	type of protection Ex nA II
	(terminals 41/42 and 51/52)	
		Maximum operational values: U = 8 V
		I = 8 mA
		or
		type of protection Ex nL IIC/IIB
		U = 20 V I = 60 mA P = 400 mW
		L = negligibly low C = 5.3 nF
	Magnet valve (terminals 81/82)	type of protection Ex nA II
		Maximum operational values:
		U = 624 V DC
		or type of protection Ex nL IIC/IIB
		U = 32 V
		I = 132 mA
		L = negligibly low C = 5.3 nF
	Fault signal output	type of protection Ex nA II
		Maximum operational values:
		U = 8 V I = 8 mA
		or
		type of protection Ex nL IIC/IIB
		U = 20 V I = 60 mA P = 400 mW
		L
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- Ex10:		Sheet 4/6
Ň	Conformity Statements without signature and official stamp shall not be valid only without alteration. Extracts or alterations are subject to approval by the Ph In case of dispute, the German text shall pre-	ysikalisch-Technische Bundesanstalt.
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SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 10 ATEX 2008 X

		Serial SSP interface	type of protection Ex nA II		
		(plug connector)	Maximum operational values:		
			U = 8 V DC I = 20 mA		
			or		
			type of protection Ex nL IIC/IIB		
			U = 20 V I = 60 mA P = 200 mW		
			L = negligibly low C = 5.3 nF		
		External position sensor (Analog PCB, pins p9, p10, p11)	. type of protection Ex nA II or <u>Ex nL IIC/IIB</u>		
			Maximum operational values:		
			U = 7.88 V I = 61 mA P = 120 mW		
			$ L = 10 mH C = 1 \mu F $		
	(16)	Assessment and test report PTB Ex 10-29352			
	(17)	Special conditions for safe use			
	(,	Type of protection Ex nA II:			
		A fuse according to IEC 60127-2/II, 250 V F or IEC 60127- current of max. 80 mA shall be connected in series to the check-back circuit.	2/VI, 250 V T with a nominal fuse signal circuit and to the position		
		A fuse according to IEC 60127-2/II, 250 V F or IEC 60127- current of max. 40 mA shall be connected in series to the seria	2/VI, 250 V T with a nominal fuse I SSP interface.		
		All fuses shall be installed outside of the hazardous area.			
		Type of protection Ex nL IIC:			
dot		No fuses are required for the operation with energy-limite Ex nL IIC.	ed circuits of type of protection		
ZSEx10200e.dot			Sheet 5/6		
ZSE		Conformity Statements without signature and official stamp shall not be valid. only without alteration. Extracts or alterations are subject to approval by the Phy In case of dispute, the German text shall prev	sikalisch-Technische Bundesanstalt.		
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Braunschweig und Berlin

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 10 ATEX 2008 X

(18) <u>Essential health and safety requirements</u> met by compliance with the standards mentioned above

Zertifizierungssektor Explosioneschutz NCHNINGH On behalf of PTB: Q CULLA Dr.-Ing. U. Johannsm Direktor und Professo

Braunschweig, August 18, 2010

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Sheet 6/6

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E	P NYSIKAIIS Braunschweig un	ch-Technisch d Berlin	ie buna	esanstan	
		1. E R G	ÄNZUN	G	
	zur	Konformitätsauss	age PTB 10	0 ATEX 2008 X	
	Gerät:	Digitaler Stellungsregle	er Typ 3730-6-	810	
	Kennzeichnung	g: 🔄 II 3 G Ex nA II II 3 D Ex tD A2		GExnLIIC/IIBT6b: C	zw.
	Hersteller:	SAMSON AG Mess- u	ind Regeltechn	ik	
	Anschrift:	Weismüllerstr. 3, 6031	14 Frankfurt, De	eutschland	
	Beschreibung	der Ergänzungen und Än	derungen		
	Der Digitale Stellungsregler Typ 3760-6-810. mit HART Kommunikation ist ein einfach bzw. doppelt wirkender Stellungsregler. Er dient der Umwandlung von elektrischen Stellsignalen in pneumatische Stelldrucksignale.				
	Der Einsatz er	folgt innerhalb des explos	sionsgefährdete	en Bereiches.	
		enhang zwischen der Zü n Umgebungstemperatur			en Optionen und
	Z	ündschutzart / Optionen		Zulässiger Umgebun temperaturbereich	
			Т6	60 °C	-
	E	x ic IIC bzw. Ex nA II	T5 T4	-55 °C 70 °C	
			14	60 °C	
	0	ption Körperschallsensor		-40 °C 70 °C	
	0	ption Körperschallsensor		-40 °C 70 °C 80 °C	
dotm	Elektrische Da	iten		80 °C	
SEx10201d.dotm	Elektrische Da	iten eis	in	80 °C	herheit Ex ic IIC
ZSEx10201d.dotm	Elektrische Da Signalstromkre	iten eis	in nı ei Hi	Zündschutzart Eigensich r zum Anschluss an eini gensicheren Stromkreis öchstwerte:	herheit Ex ic IIC
ZSEx10201d.dotm	Elektrische Da Signalstromkre	iten eis	in nı ei Hi	Zündschutzart Eigensich zum Anschluss an eine gensicheren Stromkreis	herheit Ex ic IIC
ZSEx10201d.dofm	Elektrische Da Signalstromkre	iten eis	in nı ei Hi	Zündschutzart Eigensich ar zum Anschluss an eine gensicheren Stromkreis öchstwerte: = 32 V = 32 mA	herheit Ex ic IIC

Ergänzung zur Konformitätsaussage	PTB 10 ATEX 2008 X
	L _i vernachlässigbar klein C _i = 5,3 nF
	bzw.
	in Zündschutzart Ex nA II
bzw. Binäreingang bzw. Körperschallsensor	in Zündschutzart Eigensicherheit Ex ic IIC nur zum Anschluss an einen bescheinigte eigensicheren Stromkreis
(Klemmen 31/32)	Höchstwerte:
	$U_i = 32$ V $I_i = 132$ mA Pi = 1 W (nur für den Stellungsrückmelder zutreffend)
	L _i vernachlässigbar klein C _i = 56,3 nF
	bzw.
	in Zündschutzart Ex nA II
Induktiver Grenzkontakt (Klemmen 41/42)	in Zündschutzart Eigensicherheit Ex ic IIC nur zum Anschluss an einen bescheinigte eigensicheren Stromkreis
	Höchstwerte:
	$U_i = 20 V$ $I_i = 52 mA$ $P_i = 169 mW$
	bzw.
	$U_i = 20 \qquad V$ $I_i = 25 \qquad mA$ $P_i = 64 \qquad mW$
	$L_i = 100 \mu H$ $C_i = 30 nF$
	bzw.
	in Zündschutzart Ex nA II
	Seit



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1 Ergänzung zur Konformitätsaussage PTB 10 ATEX 2008 X

Der Zusammenhang zwischen der Temperaturklasse, den zulässigen Umgebungstemperaturbereichen, den maximalen Kurzschlussströmen und der maximalen Leistung für Auswertegeräte ist der Tabelle zu entnehmen:

Temperaturklasse	Zulässiger Umgebungs- temperaturbereich	I/P
T6	45 °C	
T5	-55 °C 60 °C	52 mA / 169 mW
T4	75 °C	1
Т6	60 °C	
Т5	-55 °C 80 °C	25 mA / 64 mW
T4	80 °C	1

(Klemmen 41/42 und 51/52)

Software-Grenzkontaktein Zündschutzart Eigensicherheit Ex ic IIC nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis

Höchstwerte:

	$\begin{array}{llllllllllllllllllllllllllllllllllll$
	L_i vernachlässigbar klein $C_i = 5,3$ nF
	bzw.
	in Zündschutzart nA II
Magnetventil (Klemmen 81/82)	. in Zündschutzart Eigensicherheit Ex ic IIC nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis
	Höchstwerte:
	$U_i = 32$ V $I_i = 132$ mA
	L_i vernachlässigbar klein $C_i = 5.3$ nF
	bzw.
	in Zündschutzart Ex nA II
	Seite 3/5

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1 Ergänzung zur Konformitätsaussage PTB 10 ATEX 2008 X

Störmeldeausgang (Klemmen 83/84)	.in Zündschutzart Eigensicherheit Ex ic IIC nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis			
	Höchstwerte:			
	$\begin{array}{llllllllllllllllllllllllllllllllllll$			
	L_i vernachlässigbar klein $C_i = 5,3$ nF			
	bzw.			
	in Zündschutzart Ex nA II			
Serielle Schnittstelle SSP (Steckverbinder)	.in Zündschutzart Eigensicherheit Ex ic IIC nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis			
	Höchstwerte:			
	$\begin{array}{llllllllllllllllllllllllllllllllllll$			
	L _i vernachlässigbar klein C _i = 5,3 nF			
	bzw.			
	in Zündschutzart Ex nA II			
Externer Positionssensor (Analogplatine Pins p9, p10, p11)	. in Zündschutzart Eigensicherheit Ex ic IIC nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis			
	Höchstwerte:			
	$U_i = 7,88 V$ $I_i = 61 mA$ $P_i = 120 mW$			
	$L_i = 10 \text{mH}$ $C_i = 1 \mu\text{F}$			
	bzw.			
	in Zündschutzart Ex nA II			
	Seite 4/5			
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1 Ergänzung zur Konformitätsaussage PTB 10 ATEX 2008 X

Die besonderen Bedingungen der Konformitätsaussage werden modifiziert:

Zündschutzart Ex ic IIC:

keine besonderen Anforderungen

Zündschutzart Ex nA II:

Dem Signalstromkreis und dem Stellungsrückmelderstromkreis ist jeweils eine Sicherung nach IEC 60127-2/II, 250 V F bzw. nach IEC 60127-2/VI, 250 V T mit einem Sicherungsnennstrom von maximal 80 mA vorzuschalten.

Bei der Seriellen Schnittstelle SSP ist in die Verbindung Vcc eine Sicherung nach IEC 60127-2/II, 250 V F bzw. nach IEC 60127-2/VI, 250 V T mit einem Sicherungsnennstrom von maximal 40 mA vorzuschalten.

Alle Sicherungen sind außerhalb des explosionsgefährdeten Bereiches zu errichten.

Künftige Kennzeichnung:

🖄 II 3 G Ex ic nA IIC T6 Gc bzw. II 3 D Ex tc IIIC T80 °C Dc IP66

Angewandte Normen

			EN 00070 04 0000
EN 60079-0:2009	EN 60079-11:2012	EN 60079-15:2010	EN 60079-31:2009

Prüfbericht: PTB Ex 14-24013

Konformitätsbewertungsstelle, Sektor Explosionsschutz CHNISCA m_Auftrag Dr.-Ing. T. Ho Regierungsrat

Braunschweig, 27. August 2014

Seite 5/5

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	IECEx	IECEx Certificate of Conformity	8					
INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres for rules and details of the IECEx Scheme visit www.iecex.com								
Certificate No.:	IECEX PTB 10.0057	Page 1 of 4	Certificate history:					
Status:	Current	Issue No: 1	Issue 0 (2010-12-10)					
Date of Issue:	2020-09-17							
Applicant:	SAMSON AKTIENGESELLSCHAFT Weismüllerstraße 3 60314 Frankfurt am Main Germany							
Equipment:	Digital positioner, type 3730-6-111, 373	0-6-211 and 3730-6-511 with HART commu	nication					
Optional accessory:								
Type of Protection:	Intrinsic Safety "i", Flameproof enclose	ures "d", Protection by enclosures "tD"						
Marking:	type 3730-6-111 Ex ia IIIC T80 °C Db and Ex ia IIC T6 Gb							
	type 3730-6-211 Ex db[ia] IIC T6 Gb and Ex tb IIIC T80 °C	Db						
	type 3730-6-511 Ex tb IIIC T80 °C Db							
Approved for issue of Certification Body:	n behalf of the IECEx	Dr. F. Lienesch						
Position:		Head of Department "Explosion Prote Technology and Instrumentation"	ection in Sensor					
Signature: (for printed version)		Hle	7					
Date:		28.9.20						
2. This certificate is	nd schedule may only be reproduced in full. not transferable and remains the property o authenticity of this certificate may be verified	of the issuing body. by visiting www.lecex.com or use of this QR C	Code.					
Certificate issue	d by:							
Physikalisch-Te Bundesallee 10 38116 Braunscl Germany		Physikat Breamed						

	IEĈEx	IECEx Certificate of Conformity
Certificate No.:	IECEX PTB 10.0057	Page 2 of 4
Date of issue:	2020-09-17	Issue No: 1
Manufacturer:	SAMSON AG Mess- und Regeltec Weismuellerstr. 3 60314 Frankfurt am Main Germany	hnik
Additional manufacturing locations:		
the IEC Standard list assessed and found	t below and that the manufacturer's qu	presentative of production, was assessed and tested and found to comply with ality system, relating to the Ex products covered by this certificate, was am requirements. This certificate is granted subject to the conditions as set out i nts as amended
STANDARDS : The equipment and a to comply with the fo		d in the schedule of this certificate and the identified documents, was found
IEC 60079-0:2017 Edition:7.0	Explosive atmospheres - Part 0: Eq	zipment - General requirements
IEC 60079-11:2011 Edition:6.0	Explosive atmospheres - Part 11: E	uipment protection by intrinsic safety "i"
IEC 60079-31:2013 Edition:2	Explosive atmospheres - Part 31:	aupment dust ignition protection by enclosure "t"
		compliance with safety and performance requirements assly included in the Standards listed above.
TEST & ASSESSME A sample(s) of the e		he examination and test requirements as recorded in:
Test Report:		
DE/PTB/ExTR10.00	65/01	
Quality Assessment	Report:	
DE/TUN/QAR06.00	11/10	

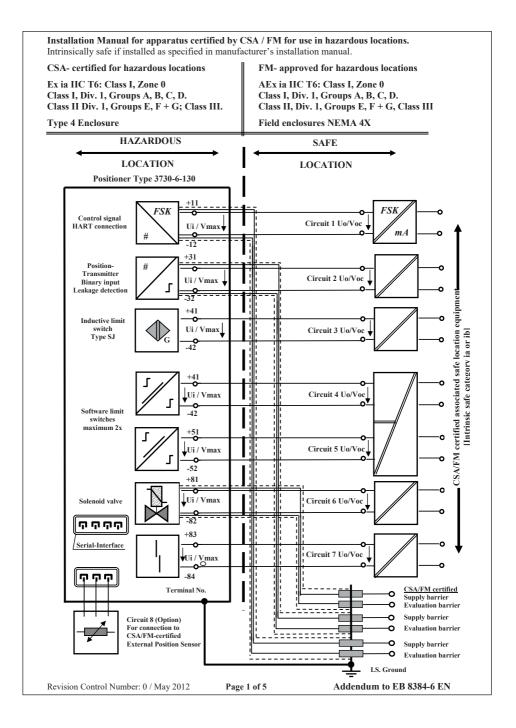
IEC.	IECEx Certificate of Conformity				
Certificate No.: IECEx PTB 10.0057	Page 3 of 4				
Date of issue: 2020-09-17	Issue No: 1				
EQUIPMENT: Equipment and systems covered by this Ce	rtificate are as follows:				
The digital positioner with HAR conversion of electrical actuatin	F communication is a single or double acting positioner. It is used for the g signals into pneumatic actuating pressure signals.				
The equipment is installed insid	e the hazardous area.				
The equipment is available in the series.	vo designs, type 3730-6-111 and type 3730-6-211 with a field barrier connected in				
For further information see sch	edule.				
SPECIFIC CONDITIONS OF USE: NO					
	Reading of the second states of the second second				

IEC <i>IECEx</i>	IECEx Certificate of Conformity
Certificate No.: IECEx PTB 10.0057	Page 4 of 4
Date of issue: 2020-09-17	Issue No: 1
DETAILS OF CERTIFICATE CHANGES (for	issues 1 and above)
 Adding the modifications of the first and s: 2. Update to Standards IEC 60079-0:2017, 1 3. Added positioner connection to intrinsical 4. Added to the model code 3730-6-511 for 1 5. Added a dedicated nameplate for the Ext 5. Update labelling according to the fallowing 1050-1443, 1050-1444 Labelling 	EC 60079-11:2012 and IEC 60079-31:2014. y safe circuits of Group III. type of protection Ex tb.
Annex:	
Annex to IECEx PTB 10.0057 issue-01.pdf	

	Certification Sche	the IECEx Scheme visit www.ie	Atmospheres
Certificate No.:	IECEx PTB 10.0058X	issue No.:0	Certificate history:
Status:	Current		
Date of Issue:	2010-12-10	Page 1 of 3	
Applicant:	SAMSON AG Mess- un Weismuellerstr. 3 60314 Frankfurt am Main Germany	nd Regeltechnik	
Electrical Apparatus: Optional accessory:	Digital positioner, type 3	3730-6-811	
Type of Protection:	Construction, test and n	narking of type of protection "	'n", Protection by enclosures "tD"
Marking:	Ex nA II T6 or Ex nL IIC/	IIB T6 or Ex tD A22 IP66 T80 %	c
Approved for issue on Certification Body:	behalf of the IECEx	DrIng. U. Johannsmeyer	
Position:		Department Head Intrinsic Sa	afety and Safety of Systems"
Signature: (for printed version)		Arany	
Date:		2011-01-12	
2. This certificate is no	schedule may only be reprodu t transferable and remains the enticity of this certificate may	iced in full. property of the issuing body. be verified by visiting the Officia	I IECEx Website.
Certificate issued by:			
Physikalisch	n-Technische Bundesanstal Bundesallee 100 38116 Braunschweig Germany	t (РТВ)	PB
			*

Certificate No.:	IECEx PTB 10.0058X	
Date of Issue:	2010-12-10	Issue No.: 0
		Page 2 of 3
Manufacturer:	SAMSON AG Mess- und Weismueilerstr. 3 60314 Frankfurt am Main Germany	Regeltechnik
Manufacturing location(s):		
found to comply with the I covered by this certificate.	EC Standard list below and that the ma was assessed and found to comply w	ntative of production, was assessed and tested and nufacturer's quality system, relating to the Ex products ith the IECEx Quality system requirements. This & Scheme Rules, IECEx 02 and Operational Documents
STANDARDS: The electrical apparatus a locuments, was found to	nd any acceptable variations to it spec comply with the following standards:	ified in the schedule of this certificate and the identified
IEC 60079-0 : 2004 Edition: 4.0	Electrical apparatus for explosive g	as atmospheres - Part 0: General requirements
IEC 60079-15 : 2001 Edition: 2	Electrical apparatus for explosive g	as atmospheres - Part 15: Type of protection 'n'
IEC 61241-0 : 2004 Edition: 1	Electrical apparatus for use in the requirements	presence of combustible dust - Part 0: General
IEC 61241-1 : 2004 Edition: 1		presence of combustible dust - Part 1: Protection by
	ot indicate compliance with electrical s expressly included in the Sta	afely and performance requirements other than those ndards listed above.
TEST & ASSESSMENT F A sample(s) of the equipn	REPORTS: nent listed has successfully met the ex-	amination and test requirements as recorded in
Test Report:		
DE/PTB/ExTR10.0066/00		
Quality Assessment Repo	<u>rt:</u>	
DE/TUN/QAR06.0011/03		

Certificate No .:	IECEx PTB 10.0058X			
Date of Issue:	2010-12-10		Issue No.: 0	
			Page 3 of 3	
	Sc	chedule		
QUIPMENT: uipment and systems co	wered by this certificate are as fo			
e conversion of electrical	actuating signals into pneumati	c actuating pressure	or double acting positioner. It is used fo a signals.	r
	nstalled inside the hazardous are		and a seril office and load features	
range, reference is or further information see	made to the table:	perature class, optic	ons and permissible ambient temperatu	ие
ONDITIONS OF CERTIF	ICATION: YES as shown below	w:		
use current of max. 80 mA coording to IEC 60127-2/ connected in series to the	shall be connected in series to I, 250 V F or IEC 60127-2/VI, serial SSP interface. All fuses sh	the signal circuit an 250 V T with a nom hall be installed outs	IEC 60127-2/VI, 250 V T with a nomine d to the position check-back circuit. A fu inal fuse current of max. 40 mA shall be ide of the hazardous area. ergy-limited circuits of type of protection	50



Notes general for CSA Certification:

- The apparatus may be installed in intrinsically safe circuits only when used in conjunction with CSA / FM certified apparatus. For maximum values of U_i or V_{max}; I_i or I_{max}; P_i or P_{max}; C_i and L_i of the various apparatus see Table 1, 2 and 3 on page 1 and 3
- 2.) For barrier selection see Table 2 on page 3.
- 3.) Use only supply wires suitable for 5°C above surrounding temperature.
- 4.) For the permissible maximum values for the intrinsically safe circuits 1, 3, 4 and 6 see Table 1 and 2 For the permissible barrier parameters for the circuits 1, 2 and 6 see Table 2
- 5.) Cable entry M 20 x 1.5 or metal conduit according to drawing No. 1050 0540 T

Notes for CSA Installation:

The installation must be in accordance with the C. E. C. Part 1. (Canadian Electrical Code)

For CSA installation, 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 install per C.E. Part 1.

Division 2 wiring method shall be in accordance to the Canadian Electrical Code Part 1.

Notes for FM Installation:

The installation must be in accordance with the National Electrical Code ANSI/NFPA 70 and ANSI/RP 12.06.01

For FM installation, Safety Barrier must be FM approved and installed in accordance with ANSI/NFPA 70 and ANSI/RP 12.06.01

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 install per National Electrical Code ANSI/NFPA 70 and ANSI/RP 12.06.01

Division 2 wiring method shall be in accordance to the ANSI/NFPA 70 and ANSI/RP 12.06.01

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

Table 1: Maximum values

	HART-connection		Position		Binar-	Leakage	Limit switches		Solenoid	Fault alarm
			transmitter		Input	sensor	inductive	software	valve	output
Circuit No.	1		2		3	4 and 5	6	7		
Terminal No.	11 / 12			31 / 32		41 / 42	41 / 42 51 / 52	81 / 82	83 / 84	
U _i or V _{max} [V]	28	32	28	32	30	###	16	20	28/32	20
I _i or I _{max} [mA]	115	87.5	115	87.5	100	###	25/52	60	115/87.5	60
Pi or P _{max} [W]	1			1	###	###	64/169	250	1	250
Ci	5.3nF		5.3	nF	56.3nF	5.6nF	30nF	5.3nF	5.3nF	5.3nF
Li	0μΗ		0µ	ιH	0µH	C0 1.4nF	100µH	0µH	0µH	0μH

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Circuit	Se	erial interface I	BU	External position sensor ($R_i \ge 10K\Omega$ passive)				
Terminal		Connector		Analog pcb. pin p9, p10, p11/ External Connector				
U _i or V _{max} [V]	20V	U ₀ or V _{0C}	7.88V	U ₀ or V _{0C}	7.	88V		
Ii or Imax [mA]	60 mA	I ₀ or I _{SC}	69.2 mA	I ₀ or I _{SC}	13.	2 mA		
Pi or P _{max} [W]	200 mW	P ₀ or P _{max}	137 mW	P ₀ or P _{max}	27	mW		
Ci	0nF	C ₀	1.65 μF	C ₀	1.65 µF	C _i =66 nF		
Li	0 μΗ L ₀		10 mH	L ₀	10 mH	L _i =370 μH		

Table 2: CSA/FM - certified barrier parameters of circuit 1, 2 and 6

Barrier		Suppl	y barrier	Evaluation barrier			
Darrier	$\mathbf{V}_{0\mathbf{C}}$	R _{min}	I _{SC}	P _{max}	V_{0C}	R _{min}	I _{SC}
circuit 1,2,6	$\leq 28 \mathrm{V}$	$\geq 245\Omega$	≤115mA	≤1W	≤ 28V	#	0mA

Barrier	Output Syste	m Parameters	Parameters Output Entity Parameter				
Darrier	V _{max}	R _{min}	V _{max}	I _{SC}	Po		
circuit 1,2,6	≤28V	$\geq 245\Omega$	$\leq 28 \mathrm{V}$	115mA	1W		

In grounded signal circuits with only one barrier, the return line must be grounded or included in the potential equalization network of the system

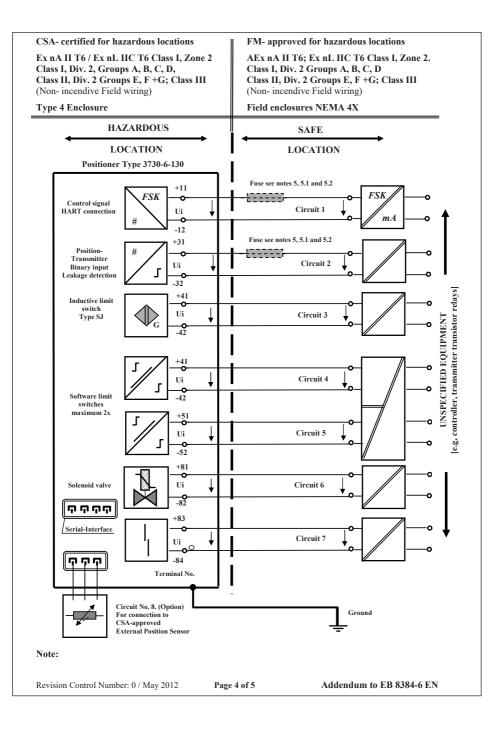
Notes: Entity parameters must meet the following requirements:

 $\begin{array}{l} U_0 \text{ or } V_{0C} \leq U_i \text{ or } V_{max} \ / \ I_0 \text{ or } I_{SC} \leq I_i \text{ or } I_{max} \ / \ P_0 \text{ or } P_{max} \leq P_i \text{ or } P_{max} \\ C_a \geq C_i + C_{cable} \text{ and } L_a \geq L_i + L_{cable} \end{array}$

Table 3: For the Model 3730 – 6-130 Positioners the correlation between temperature classification, permissible ambient temperature ranges and maximum short-circuit current is shown in the table below:

Permissible ambient temperature range									
		HART positioner	Limit switch inductive						
		HART positioner	I ₀ =25mA/P ₀ =64mW	I ₀ =52mA/P ₀ =169mW					
	T6	$-55^{\circ}C \le Ta \le +60^{\circ}C$	≤+60°C	≤+45°C					
Temperaturklasse	Т5	$-55^\circ C \le Ta \le +70^\circ C$	≤+70°C	≤+60°C					
	T4	$-55^{\circ}C \le Ta \le +80^{\circ}C$	≤+80°C	≤+70°C					

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- 1.) The installation must be in accordance with the Canadian Electrical Code, Part 1
- 2.) For the maximum values for the individual energy limited circuits see Table 4.
- 3.) Cable entry only rigid metal conduit according to drawing No. 1050-0539 T and 1050-0540 T
- The positioners rated voltage is 32 V DC and thus below the limit of 75 V DC specified in IEC 60079-15:2001, Clause 12 b.
- 5.) For type of protection Ex nA, the signal current circuit and the position transmitter circuit is to be connected in series with a fuse according to IEC 60127-2/II, 250 V F or according to IEC 60127-2/VI, 250 V T with a rated fuse current of max. IN ≤ 80mA.
- 5.1) For type of protection Ex nA, the Vcc connection in the program interface adapter is to be connected in series with a fuse according to IEC 60127-2/II, 250 V F or according to IEC 60127-2/VI, 250 V T with a rated fuse current of max. IN ≤ 40mA.
- 5.2) The fuses must be installed **<u>outside the hazardous area</u>**.

No fuses are required for connection to current circuits with limited energy in type of protection Ex nL.

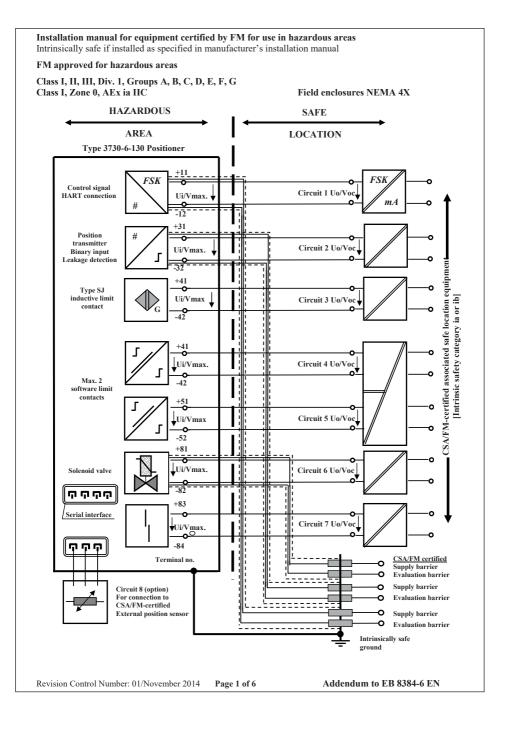
Table 4: Electrical rating of energy-limited circuits (Non- Incendive) Parameters

	HART- connection	Position transmitter	Binar- Input	born	cture- e sound	Limit s	witches	Solenoid	Fault alarm	
	connection	transmitter	input	se	nsor	inductive	software	valve	output	
Circuit No.	1		2			3	4 and 5	6	7	
Terminal No.	11 / 12	31 / 32				41 / 42	41 / 42 51 / 52	81 / 82	83 / 84	
U _i or V _{max} [V]	32	32	32 32 ###		20	20	32	20		
I _i or I _{max} [mA]	132	132	132	#	###	25/52	60	132	60	
Pi or P _{max} [W]	1.2	1.2	###	#	##	64/169	400	###	400	
Ci	5.3nF	5.3nF	56.3nF	56.3nF 5.3nF		30nF	5.3nF	5.3nF	5.3nF	
Li	0μΗ	0μΗ	0μΗ	C0	1.4nF	100µH	0µH	0µH	0μΗ	
Circuit		Serial interface	BU		Ext	ernal posit	osition sensor ($R_i \ge 10K\Omega$ passive)			
Terminal		Connector			Analo	og pcb. pin p9, p10, p11/ External Connector				
Ui or V _{max} [V]	20V	U ₀ or V _{0C}	7.88	V	U ₀	or V _{0C}		7.88V		
Ii or Imax [mA]	60 mA	I ₀ or I _{SC}	69.2 n	ıA	Io	or I _{SC}		13.2 mA		
Pi or P _{max} [W]	400 mW	Po or P _{max} 137 mW		W	P ₀ o	or P _{max}		27 mW		
Ci	0 nF	С ₀ 10 µF		F		C ₀	10 µF	Ci	=66 nF	
L _i	0 µH	L ₀	10 m	H		L ₀	10 mH	Li=	370 µH	

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Addendum to EB 8384-6 EN



Notes on FM installation:

Installation must be in accordance with ANSI/NFPA 70 and ANSI/RP 12.06.01. For FM installation, safety barriers must be FM approved and installed in accordance with ANSI/NFPA 70 and ANSI/RP 12.06.01.

Each pair of intrinsically safe wires must be protected by a shield that is grounded at the intrinsically safe ground. The shield must extend as close to the terminals as possible (installation acc. To ANSI/NFPA 70 and ANSI/RP 12.06.01).

The division 2 wiring method must be in accordance with ANSI/NFPA 70 and ANSI/RP 12.06.01.

Electrical rating of intrinsically safe equipment and equipment for installation in hazardous areas

Table 1: Maximum values

	HART connection		room		Binary	Binary Leakage input sensor		ontacts	Solenoid	Fault alarm
			trans	transmitter		sensor	Inductive	Software	valve	output
Circuit no.	1 11/12				2		3	4 and 5	6	7
Terminal no.					31/32		41/42	41/42 51/52	81/82	83/84
U _i or V _{max.} [V]	28	32	28	32	30	###	16	20	28/32	20
I _i or I _{max.} [mA]	115	87.5	115	87.5	100	###	25/52	60	115/87.5	60
P _i or P _{max.} [W]	1		1	1	###	###	64/169	250	1	250
Ci			5.3	nF	56.3 nF	5.6 nF	30 nF	5.3 nF	5.3 nF	5.3 nF
Li			0	μH	0 µH	C0 1.4 nF	100 µH	0 μΗ	0 μΗ	0 μΗ

Circuit	Se	erial interface I	BU	External position sensor ($R_i \ge 10 \text{ K}\Omega$ passive)			
Terminal		Connector		Analog PCB pin p9, p10, p11/external connector			
Ui or V _{max.} [V]	20 V	U ₀ or V _{0C}	7.88 V	U ₀ or V _{0C}	7.88 V		
I _i or I _{max.} [mA]	60 mA	I ₀ or I _{SC}	69.2 mA	I ₀ or I _{SC}	13.	2 mA	
Pi or P _{max.} [W]	200 mW	P ₀ or P _{max.}	137 mW	P ₀ or P _{max.}	27	mW	
Ci	0 nF	C ₀	650 nF	C ₀	1.0 μF	C _i =66 nF	
Li	0 μΗ L ₀		10 mH	L ₀	10 mH	L _i =370 μH	

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Table 2: CSA/F	Table 2: CSA/FM-certified barrier parameters of circuit 1, 2 and 6										
Barrier		Suppl	y barrier	Evaluation barrier							
Darrier	V _{0C}	R _{min} .	I _{SC}	P _{max} .	V _{0C}	R _{min} .	Isc				
Circuit 1 ,2, 6	$\leq 28 \ V$	\geq 245 Ω	≤115 mA	$\leq 1 \text{ W}$	$\leq 28 \ V$	#	0 mA				

In grounded signal circuits with only one barrier, the return line must be grounded or included in the equipotential bonding system of the system.

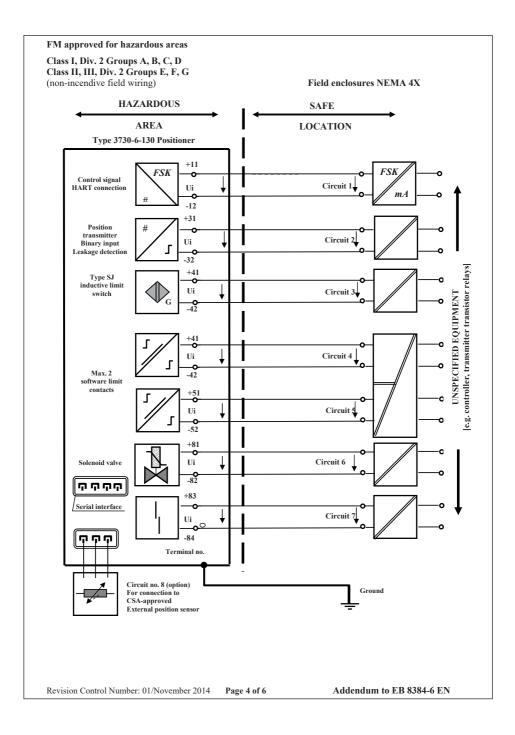
Note! Entity parameters must meet the following requirements:

 $U_0 \text{ or } V_{0C} \leq U_i \text{ or } V_{max.}/I_0 \text{ or } I_{SC} \leq I_i \text{ or } I_{max.}/P_0 \text{ or } P_{max.} \leq P_i \text{ or } P_{max.}$

 $C_a \ge C_i + C_{cable}$ and $L_a \ge L_i + L_{cable}$

Table 3: Relation between temperature class, permissible ambient temperature and max. short-circuit current for Type 3730-6-130

Permissible ambient temperature range									
		HART positioner		limit contact					
		HART positioner	I ₀ =25 mA/P ₀ =64 mW						
	T6	$-55 \le Ta \le +60$ °C	≤+60 °C	≤+45 °C					
Temperature class	Т5	$-55 \le Ta \le +70$ °C	≤+70 °C	≤+60 °C					
	T4	$-55 \le Ta \le +80 \ ^\circ C$	≤ +80 °C	≤+70 °C					

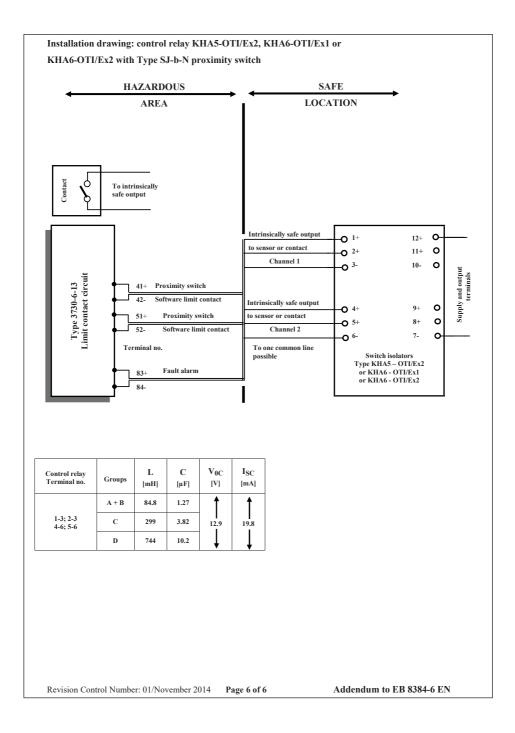


Note!

- 1.) For the maximum values of the individual energy limited circuits see Table 4.
- 2.) Cable entry: only rigid metal conduit according to drawing no. 1050-0540 T

Table 4: Electrical rating of energy-limited circuits (non-incendive) parameters

	HART connection	Position	Binary		akage nsor	Limit o	contacts	Solenoid	Fault alarm
	connection	transmitter	input	se	lisor	Inductive	Software	valve	output
Circuit no.	1		2			3	4 and 5	6	7
Terminal no.	11/12	31/32				41/42	41/42 51/52	81/82	83/84
U _i or V _{max.} [V]	32	32	32 32 ###		20	20	32	20	
I _i or I _{max.} [mA]	132	132	132	ŧ	###	25/52	60	132	60
Pi or P _{max.} [W]	1.2	1.2	###	#	##	64/169	400	1.2	400
Ci	5.3 nF	5.3 nF	56.3 nF	56.3 nF 5.3 nF		30 nF	5.3 nF	5.3 nF	5.3 nF
L_i	0 μΗ	0 μΗ	0 µH	C0 1	l.4 nF	100 µH	0 μΗ	0 μH	0 µH
Circuit	:	Serial interface	BU		Ext	ernal posit	ion sensor (R _i ≥10 KΩ	passive)
Terminal		Connector			Anal	og PCB pir	n p9, p10, p1	11/external	connector
U _i or V _{max.} [V]	20 V	$U_{0} \mbox{ or } V_{0C}$	7.88	V	U ₀	or V _{0C}		7.88 V	
I _i or I _{max.} [mA]	60 mA	I ₀ or I _{SC}	69.2 m	nA	I ₀	or I _{SC}		13.2 mA	
P _i or P _{max.} [W]	400 mW	P ₀ or P _{max} . 137 mW		W	P ₀ o	or P _{max.}		27 mW	
Ci	0 nF	C ₀ 10 µF		F		C ₀	10 μF Ci=60		=66 nF
Li	0 µH	L ₀	10 m	H	L ₀		10 mH	Li=	≡370 μH



16.1 Parameters and functions

	Parameter – Readings/ values [default setting]	Description
Note:	Codes marked with an asteri	sk (*) must be enabled with Code 3 prior to configuration.
0	Operative mode [MAN] Manual mode AUTO Automatic mode SAFE Fail-safe position ESC Cancel	Switchover from automatic to manual mode is bumpless. Automatic mode only possible if positioner has been initialized. Reading: Code 0
1	Manual set point (manual w) [0] to 100 % of the nominal range	Adjust the manual set point with the rotary pushbutton. The current travel/angle is displayed in $\%$ when the positioner is initialized. If the positioner is not initialized, the position of the lever in relation to the longitudinal axis is indicated in degrees (°). Note: can only be selected when Code $0 = MAN$
2	Reading direction 1234,7EZL,ESC	The reading direction of the display is turned by 180°.
3	Enable configuration [No], YES, ESC	Enables changing of data (automatically deactivated when the ro- tary pushbutton has not been operated for 120 seconds). Codes marked with an asterisk (*) can only be read and not overwritten when their configuration is not enabled. <i>HART</i> blinks on the display when the on-site operation is locked over HART® communication. <i>PST</i> is displayed when the on-site operation is locked by the time-controlled partial stroke test. In these cases, codes can only read over the SSP interface.
4*	Pin position [No], 17, 25, 35, 50, 70, 100, 200 mm, 90° with rotary actuators, 300 mm with piston actuators, ESC	When attaching the positioner to the control valve, the follower pin must be inserted in the proper pin position on the lever depending on the travel/angle. For initialization using NOM (nominal range) or SUB (substitute calibration), the pin position must be entered. For initialization using MAX, MAN and MAN2, the pin position is not required, however, it is required under Code 5 to display the nominal range.

Code no.	Parameter – Readings/ values [default setting]	Descript	ion						
4*	Pin position (continued)		position ode 4	Standard Code 5		ment range Code 5			
	If you select a pin position in		17	7.5	3.6	to 17.7			
	Code 4 that is too small, the		25	7.5	5.0	to 25.0			
	positioner switches to SAFE		35	15.0	7.0	to 35.4			
	mode for reasons of safety.		50	30.0	10.0	to 50.0			
			70	40.0	14.0	to 70.7			
			100	60.0	20.0	to 100.0			
		: :	200	120.0	40.0	to 200.0			
			90°	90.0	24.0	to 100.0			
5*	Nominal range [15.0] mm or angle °, ESC	For initialization using NOM (nominal range) or SUB (substitute calibration), the nominal range must be entered. The possible ad- justment range depends on the pin position from the table for Code 4. After initialization to the maximum range (MAX), the maximum rated travel/angle reached on initialization is displayed.							
6*	Initialization mode (init mode) [MAX], NOM, MAN, MAN2, SUB, KP, ZP, ESC	MAX:	clearly define determines tra	d mechanical e	nd positions ptation of the	of valves with two ons · The positioner the closing member osite stop in the			
		NOM:	determines tra		otation of the	e positioner closing member I nominal range			
		MAN:	nominal rang mines travel/	g 1 · For all glo e (OPEN positio angle of rotatio n (100 %) to the	on) · The pos n from the m	itioner deter- anually selected			
		MAN2: Manual setting 2 · For all globe valves with un nominal range (OPEN and CLOSED position) positioner determines travel/angle of rotation the manually selected OPEN (100 %) and the selected CLOSED position (0 %)							
		SUB:		bration · To rep ng, with the lea		oner while the disruption to the			

Code no.	Parameter – Readings/ values [default setting]	Descript	lion	
6*	Initialization mode (init mode)	KP:	Fine tuning of the input filter \cdot The valve moves through its entire valve range.	
	(continued)	NP:	Zero calibration · The zero point is recalibrated.	
			Note: Valve will temporarily be moved from its operating point to CLOSED position.	
7*	Direction of action (w/x)	Set poir	it's effect on the valve position	
	[אס], ארא, ESC	77:	Increasing/increasing: a globe valve opens as the set point increases.	
		צא:	Increasing/decreasing: a globe valve closes as the set point increases.	
		The dire as follow	action of action is adapted to the change in closed direction ws:	
		ATO:	AIR TO OPEN \cdot On completing initialization, the direction of action remains increasing/increasing (77). A globe valve opens as the reference variable increases.	
		ATC:	AIR TO CLOSE · On completing initialization, the direc- tion of action changes to increasing/decreasing (ער). A globe valve closes as the mA signal increases.	
8*	Travel/angle range start (lower x-range value)	Lower re range.	ange value for the travel/angle of rotation in the operating	
	[0.0] to 80.0 % of the nomi-	Nominal range and characteristic are automatically adapted.		
	nal range, ESC Specified in mm or angle °	The operating range is the actual travel/angle of the valve an limited by the lower travel/angle range value (Code 8) and the		
	provided Code 4 is activat-	upper tr	avel/angle range value (Code 9).	
	ed.		the operating range and the nominal range are identical. ninal range can be limited to the operating range by the	
		lower a	nd upper travel/angle range values. The value is displayed be entered.	
		See also	o the example in Code 9.	

Code no.	Parameter – Readings/ values [default setting]	Description
9*	Travel/angle range end (upper x-range value) 20.0 to [100.0 %] of the nominal range, ESC Specified in mm or angle ° provided Code 4 is activat- ed.	Upper range value for the travel/angle of rotation in the operating range. Nominal range and characteristic are automatically adapted. Example: The operating range is modified, for example to limit the range of a control valve which has been sized too large. For this function, the entire resolution range of the set point is converted to the new limits. 0 % on the display corresponds to the adjusted lower limit and 100 % to the adjusted upper limit.
10*	Lower travel/angle limit (lower x-limit) 0.0 to 49.9 % of the operat- ing range, [No], ESC	Lower limitation of the travel/angle of rotation to the entered val- ue. The characteristic is not adapted.
11*	Upper travel/angle limit (upper x-limit) 50.0 to 120.0 %, [100 %] of the operating range, No, ESC	Upper limitation of the travel/angle of rotation to the entered value. The characteristic is not adapted. Example: In some applications, it is better to limit the valve travel, e.g. if a certain minimum medium flow is required or a maximum flow must not be reached. The lower limit must be adjusted with Code 10 and the upper limit with Code 11. If a tight-closing function has been set up, it has priority over the travel limitation. When set to No, the valve can be opened past the rated travel with a set point outside of the 4 to 20 mA range.
12*	Set point range start (w-start) [0.0] to 75.0 %, ESC	Lower range value (0 % = 4 mA) of the valid set point range. This value must be smaller than the upper range value. The set point range is the difference between Set point, upper range value – Set point, lower range value. The difference must be larger or equal to 25 % (= 4 mA). When the set point range of 0 to 100 % = 4 to 20 mA, the valve moves through its entire operating range from 0 to 100 % travel/ angle of rotation. In split-range operation , the valves operate with smaller set points. The control signal of the control unit to control two valves is divided such, for instance, that the valves move through their full travel/angle of rotation at only half the input signal (first valve set to 0 to 50 % = 4 to 12 mA and second valve set to 50 to 100 % =12 to 20 mA).

Code no.	Parameter – Readings/ values [default setting]	Description
13*	Set point end (w-end) 25.0 to [100.0] %, ESC	Upper range value (100 % = 20 mA) of valid set point range This value must be greater than the lower range value.
14*	CLOSED end position/set point cutoff decrease (end position w <) 0.0 to 49.9 %, [1.0 %] of the span adjusted in Code 12/13, No, ESC	Limit of the set point w Actuators with ATO fail-safe action are completely vented and actuators with ATC fail-safe action are completely filled with air when the set point falls below the adjusted limit. This action always lead to the tight-closing of the valve. Codes 14/15 have priority over Codes 8/9/10/11. Codes 21/22 have priority over Codes 14/15.
15*	OPEN end position/set point cutoff increase (end position w >) 50.0 to 100.0 % of the span adjusted in Code 12/13, [No], ESC	Limit of the set point w Actuators with ATO fail-safe action are completely filled with air and actuators with ATC fail-safe action are completely vented when the set point falls below the adjusted limit. This action always lead to the valve to be opened to the maximum. Codes 14/15 have priority over Codes 8/9/10/11. Codes 21/22 have priority over Codes 14/15. Example: set the cutoff to 99 % for three-way valves.
16*	Pressure limit 1.4 to 7.0 bar, [No], ESC Do not activate pressure lim- itation for double-acting ac- tuators (with closed position ATO).	Signal pressure to actuator can be limited. After changing the pressure limit setting, the actuator must be vent- ed once (e.g. by selecting the fail-safe position).
17*	Proportional-action coeffi- cient Kp level 0 to 17 [7], ESC Kp level changes affect the set point deviation. This ef- fect can be compensated for by tuning the input filter in Code 6.	During positioner initialization, the values for Kp and Tv are opti- mally set. If the value for the KP level is below 3, the error code 61 is activated. If the positioner tends to overshoot impermissibly due to other disturbances, the KP and TV levels can be adapted accordingly after initialization. Increment TV level until desired behavior is reached or when the maximum value of 4 is reached, the KP level can be decreased in increments.
18*	Derivative-action time Tv level 1, [2], 3, 4, No, ESC	See Code 19 A change of the TV level has no effect on the set point deviation.

Code no.	Parameter – Readings/ values [default setting]	Description	
19*	Tolerance band 0.1 to 10.0 %, [5.0 %] of the operating range, ESC	Used for error monitoring. If the set point deviation is greater than selected tolerance band for a time longer than the lag time [30 s], this causes the error code 57 (control loop) to be activated. Note: The lag time can only be set using the operator software.	
20*	Select characteristic [0] to 9, ESC	 Characteristic selection (see section 16.2) Linear Equal percentage Reverse equal percentage SAMSON butterfly valve, linear SAMSON butterfly valve, equal percentage VETEC rotary plug valve, equal percentage VETEC rotary plug valve, equal percentage Segmented ball valve, linear Segmented ball valve, equal percentage User-defined (defined over operator software) 	
21*	Transit time OPEN (w ramp OPEN) [0] to 240 s, ESC The entered transit time does not apply when fail-safe action, solenoid valve or forced venting function are triggered nor when the auxiliary energy fails.	The time required to move through the operating range when opening the valve. This parameter can be used to increase the Min. transit time OPEN (Code 40). Limitation of the transit time (Code 21 and 22): For some applica- tions it is recommendable to limit the transit time of the actuator to prevent it from engaging too fast in the running process. Code 21 has priority over Code 15.	
22*	Transit time CLOSED (w ramp CLOSED) [0] to 240 s, ESC The entered transit time does not apply when fail-safe action, solenoid valve or forced venting function are triggered nor when the auxiliary energy fails.	The time required to move through the operating range when clos- ing the valve. This parameter can be used to increase the Min. transit time CLOSED (Code 41). Code 22 has priority over Code 14.	

Code no.	Parameter – Readings/ values [default setting]	Description	
23*	Absolute total valve travel [0] to 99 · 10 ⁷ , YES, ESC Exponential reading from 9999 travel cycles onwards		e 6 – STD and Code 36 – DS. is saved in a non-volatile memory ev-
24*	Total valve travel limit 1000 to 99 · 10 ⁷ [1.000000], ESC Exponential reading from 9999 travel cycles onwards	selected status classification Note: The 'Total valve travel status classification 'Mainter	message is generated depending on
25*	Alarm mode 0, 1, [2], 3, ESC	activated (when the position Explosion-protected version 0: A1 \geq 2.2 mA 1: A1 \leq 1.0 mA 2: A1 \geq 2.2 mA 3: A1 \leq 1.0 mA Version without explosion protection 0: A1 R = 348 Ω 1: A1 non-conducting 2: A1 R = 348 Ω 3: A1 non-conducting When a positioner has not be switches always register the If there is no mA signal at the switches both switch to \leq 1.0 explosion protection). Note: The fault alarm output	according to EN 60947-5-6 $A2 \le 1.0 \text{ mA}$ $A2 \le 1.0 \text{ mA}$ $A2 \ge 2.2 \text{ mA}$ $A2 \ge 2.2 \text{ mA}$ rotection A2 non-conducting A2 non-conducting A2 non-conducting $A2 = 348 \Omega$
26*	Limit A1 (alarm limit 1) 0.0 to 100.0 [2.0] % of the operating range, No, ESC The setting has no effect when an inductive limit switch is installed.	The valve position limit relat Alarm A1 responds when th	ing to the operating range. ne value falls below the limit.

Code no.	Parameter – Readings/ values [default setting]	Description
27*	Limit A2 (alarm limit 2) 0.0 to 100.0 [98.0] % of the operating range, No, ESC	The valve position limit relating to the operating range. Alarm A2 responds when the value falls below the limit.
28*	Alarm test Reading direction: Standard Turned [No] [No] A1 1A A2 2A A3 3A ESC ESC	Testing the software limit switch alarm A1 and A2 as well as the fault alarm contact A3. If the test is activated, the contact is switched five times. A1/1A: Software limit switch A1 to ≥2.2 mA A2/2A: Software limit switch A2 to ≥2.2 mA A3/3A: Fault alarm contact A3 to ≤1.0 mA
29*	Position transmitter x/ix ³⁾ [スカ], マム, ESC	Operating direction of the position transmitter: it indicates assign- ment between travel/angle position and output signal i based on CLOSED position. The operating range (see Code 8) of the valve is represented by the 4 to 20 mA signal. Values exceeding or falling below the limits 2.4 mA or 21.6 mA can be represented. When a positioner has not been connected (set point w less than 3.6 mA), the signal is 0.9 mA and 3.8 mA or 4.4 mA when the positioner has not been initialized. When Code 32 = YES, the position transmitter issues the value as set in Code 32 = No, 4 mA is issued during a running autotune.
30*	Fault alarm ix ³⁾ [No], HI, LO, ESC	Select if and how faults that cause the fault alarm contact to be switched are also indicated at the position transmitter output. HI ix =21.6 \pm 0.1 mA or LO ix =2.4 \pm 0.1 mA
31*	value is last indicated value of the position transmitter]	Testing the position transmitter. Values can be entered in relation to the operating range. The momentary valve position is used in initialized positioners lo- cally as the start value (bumpless changeover to the test mode). When testing by software, the entered simulation value is issued as the position feedback signal for 30 seconds.

³⁾ Analog position transmitter: Code 29/30/31 can only be selected if the position transmitter (optional) is installed.

Code no.	Parameter – Readings/ values [default setting]	Description	
32*	Error message in case of 'Function check' condensed state [YES], No, ESC	YES: No:	'Failure' and 'Function check' condensed state cause an error message to be generated. 'Failure' condensed state causes an error message to be generated.
33*	Error message in case of 'Maintenance required' and 'Out of specification' con- densed states [YES], No, ESC	YES: No:	'Failure', 'Maintenance required' and 'Out of specifica- tion' condensed state cause an error message to be gen- erated. 'Failure' condensed state causes an error message to be generated.
34*	Closing direction CL, [CCL], ESC	onto rot	Clockwise Counterclockwise n of rotation to reach the valve's CLOSED position (view ary switch with positioner cover open). Ieeds only be entered in SUB initialization mode (Code 6).
35*	Blocking position [0.0] mm/° /%, ESC		e to CLOSED position leeds only be entered in SUB initialization mode (Code 6).
36* 36*	Reset STD, DIAG, DS, ESC	STD: DAG:	Resets start-up - Resets parameters to their default settings. - Resets diagnostics assessment. - Information parameters (read only) remain unchanged. - Re-initialize positioner. Reset diagnostics assessment
		DAG:	 Parameter settings, reference values and logs remain unchanged. The positioner does not need to be re-initialized.
		DS:	 Resets positioner to default settings. Resets parameters to their default settings. Resets diagnostics assessment. Information parameters (read only) are deleted. Re-initialize positioner.

Code no.	Parameter – Readings/ values [default setting]	Description	
37	Options Read only	Indicates which option (terminals 31 and 32, Fig 17) is installed. No : No option installed POS : Analog position transmitter d! : Binary input LS : Leakage sensor XI : 4 to 20 mA x input When the binary input is used, DI and HIGH or LOW status are displayed in alternating sequence. When the leakage sensor is used, LS and the detected sound level in dB are displayed in alternating sequence.	
38*	Inductive limit switch [No], YES, ESC	Indicates whether the inductive limit switch option is installed or not.	
39	Set point deviation e info Read only	Difference of the target position ($e = w - x$)	
40	Min. transit time OPEN Read only	Minimum opening time determined during initialization	
41	Min. transit time CLOSED Read only	Minimum closing time determined during initialization	
42	Set point Read only	Set point w used in automatic mode 4 to 20 mA correspond to 0 to 100 %	
43	Firmware version Read only	Device type and current firmware version (displayed in alternating sequence)	
44	y info Read only	 Control signal y in % in relation to the travel range determined during initialization MAX: The positioner builds up its maximum output pressure, see description in Code 14 and 15. OP: The positioner vents completely, see description in Code 14 and 15. : The positioner is not initialized. 	

Code no.	Parameter – Readings/ values [default setting]	Description
45	Internal solenoid valve/ forced venting Read only	Indicates whether a solenoid valve/forced venting is installed or not. If a voltage supply is connected at the terminals +81/-82, YES and HIGH appear on the display in alternating sequence. If a volt- age supply is not connected (actuator vented, fail-safe position in- dicated on the display by the S icon), YES and LOW appear on the display in alternating sequence.
46*	Bus address [0] to 1 <i>5,</i> ESC	Using the HART® protocol, all connected control room and field units can be addressed individually using a point-to-point connec- tion or the standard (multidrop) bus. Point-to-point connection: HART® master device connected to one HART® field unit. With this connection, the device address must also be set to '0'. Standard (multidrop) bus: Up to 15 field units connected in paral- lel to a single pair of wires. The master device distinguishes them by their preset addresses between 1 and 15.
47*	HART [®] write protection YES, [No], ESC	When write protection is active, device data can be read, but not overwritten over HART® communication.
48* 49*	Diagnostic parameters · Deta ► EB 8389-1.	sils on EXPERTplus Valve Diagnostics in the Operating Instructions

16.1.1 Error codes

Initialization errors

Erro actic		Condensed state message active, when prompted, <i>ERR</i> appears. When fault alarms exist, they are displayed here.
50	x > range	 Value of measuring signal too high or too low; the lever operates near its mechanical stops. Pin not mounted properly NAMUR attachment: bracket slipped or follower pin not properly seated on the follower plate's slot. Follower plate not mounted properly.
	Status classification	[Maintenance required]
	Recommended action	Check attachment and pin position.Re-initialize positioner.
51	∆x < range	 Insufficient measuring span of the sensor Pin not mounted properly. Wrong lever mounted. Pressure limit set too low. An angle of rotation smaller than 16° at the positioner shaft only generates an alarm. An angle below 9° leads to the initialization being canceled.
	Status classification	[Out of specification]
	Recommended action	Check attachment and pressure limit.Re-initialize positioner.
52	Attachment	 The nominal range could not be achieved during initialization with NOM initialization mode (the maximum travel/angle reached is indicated on the display). Wrong lever mounted. Supply pressure too low; valve cannot be moved to desired position.
	Status classification	[Maintenance required]
	Recommended action	Check attachment and supply pressure.Re-initialize positioner.

Erro actic		Condensed state message active, when prompted, <i>ERR</i> appears. When fault alarms exist, they are displayed here.
53	Initialization time exceeded (initialization time >)	 Timeout detected during initialization Valve takes too long to open. Valve cannot find fixed end stops (e.g. when lined control butterfly valves are used). Valve tends to hunt considerably.
	Status classification	[Maintenance required]
	Recommended action	 Check supply pressure and install pneumatic volume booster, if necessary. Adjust travel/angle stops. Reduce hunting tendency (e.g. restrict or open booster bypass). Re-initialize the positioner.
54	Initialization - Internal solenoid valve/forced venting	 Internal solenoid valve/forced venting not or improperly connected. An attempt was made to initialize the device from fail-safe position.
	Status classification	[Maintenance required]
	Recommended action	 Check connection and supply voltage of solenoid valve/forced vent- ing. Re-initialize positioner. Switch to manual mode. Re-initialize positioner.
55	Transit time not reached (transit time <)	Actuator transit times detected during initialization are so short (< 0.3 s) that optimal positioner tuning is impossible.
	Status classification	[Out of specification]
	Recommended action	Activate volume restriction in positioner output.Re-initialize positioner.
56	Pin/switch position	 Pin position not entered for nominal range (NOM) or substitute (SUB) initialization. ATO/ATC switch defective.
	Status classification	[Maintenance required]
	Recommended action	 Enter pin position and nominal range. Re-initialize positioner. Return positioner to SAMSON for repair.

Operational errors

		Condensed state message active, when prompted, <i>Err</i> appears. When fault alarms exist, they are displayed here.
57	Control loop Additional indication at the fault alarm contact	Control loop error, the valve no longer follows the controlled variable within tolerable times (tolerance band alarm Code 19). • Actuator is blocked. • Positioner attachment has shifted subsequently. • Insufficient supply pressure
	Status classification	[Maintenance required]
	Recommended action	Check attachment.Check supply pressure.
58	Zero point	Mounting arrangement or linkage has slipped.Valve trim, particularly with soft seat, is worn.
	Status classification	[Maintenance required]
	Recommended action	 Check valve and positioner attachment. Calibrate zero. We recommend to re-initialize the positioner if zero deviates by more than 5 %.
59	Inconsistent data memory	The error is detected by automatic monitoring and corrected automati- cally.
	Status classification	Failure (cannot be classified)
60	Internal device error Additional indication at the fault alarm contact	The positioner goes to the fail-safe position (SAFE).
	Status classification	Failure (cannot be classified)
	Recommended action	Return positioner to SAMSON for repair.
61	KP too low	Proportional-action coefficient Kp level lower than 3 was detected during initialization. Note: A Kp level < 3 does not cause the initialization process to be canceled.
	Status classification	[Maintenance required]
	Recommended action	Activate volume restriction in positioner output.Increase the bypass restriction setting of booster (if installed).

Erro actio	r codes – Recommended on	Condensed state message active, when prompted, <i>Err</i> appears. When fault alarms exist, they are displayed here.	
62	x signal Additional indication at the fault alarm contact	 Actuator's measured value recording failed. Conductive plastic element defective. The emergency mode on the display is indicated by a blinking closed-loop operation icon and 4 dashes instead of the position reading. Note on the open-loop operation: If the measuring system has failed, the positioner is still in a reliable state. The positioner switches to emergency mode where the position cannot be accurately controlled anymore. However, the positioner continues operation according to its set point so that the process remains in a safe state. 	
	Status classification	[Maintenance demanded]	
	Recommended action	Return positioner to SAMSON for repair.	
63	SIL shutdown/w too low	 Emergency shutdown of the i/p block is implemented by 3.8 mA or 4.4 mA (depending on the positioner version)^r. The set point w is lower than 3.7 mA. This state is indicated on the positioner display by LOW blinking. 	
	Status classification	[No message]	
	Recommended action	 Raise the current (depending on version) above the limit. Check set point w. If necessary, restrict lower limit of current source to ensure that a current below 3.7 mA cannot be issued. 	
64	i/p converter (y)	Current circuit of i/p converter interrupted.	
	Status classification	Failure (cannot be classified)	
	Recommended action	Return positioner to SAMSON for repair.	

Hardware errors

Error appendix

Error c action	odes – Recommended	Condensed state message active, when prompted, <i>Err</i> appears. When fault alarms exist, they are displayed here.
65	Hardware	Initialization key jammed.
	Additional indication at the fault alarm contact	• A hardware error has occurred. The positioner changes to the fail- safe position (SAFE).
		As long as the error exists, no EXPERTplus diagnostic messages are logged.
	Status classification	[Failure]
	Recommended action	Confirm error and return to automatic mode or perform a reset and re-initialize the positioner. In the problem still persists, return device to SAMSON for repair.
66	Unassigned	
67	Check calculation	Hardware controller monitored by test calculation.
	Additional indication at the fault alarm contact	
	Status classification	[Failure]
	Recommended action	Confirm error. If this is not possible, return the device to SAMSON for repair.

Error codes – Recommended action		Condensed state message active, when prompted, <i>Err</i> appears. When fault alarms exist, they are displayed here.
68 to 71	Unassigned	
72	Pressure sensor	Pressure sensor for supply air and/or pressure sensor for signal pressure defective
	Status classification	Maintenance required (cannot be classified)
	Recommended action	Return positioner to SAMSON for repair.
73 to 75	Unassigned	
76	No emergency mode	The travel measuring system of the positioner has a self-monitoring func- tion (see Code 62). An emergency mode (open-loop control) is not available for certain ac- tuators, such as double-acting actuators. In case of a travel sensing er- ror, the positioner vents the output (Output 38) or A1 in double-acting
		actuators. During the initialization, the positioner automatically checks whether the actuator has such a function or not.
	Status classification	[No message]
	Recommended action	Merely information, confirm, if necessary. No further action required.

Data errors

Diagnosis errors

Error codes – Recommended action		Condensed state message active, when prompted, <i>Err</i> appears. When fault alarms exist, they are displayed here.
77	Unassigned	
78	Unassigned	
		Messages generated in EXPERTplus The error does not have any direct effect on the positioner's functioning.
	Status classification	Maintenance required (cannot be classified)
80	Unassigned	

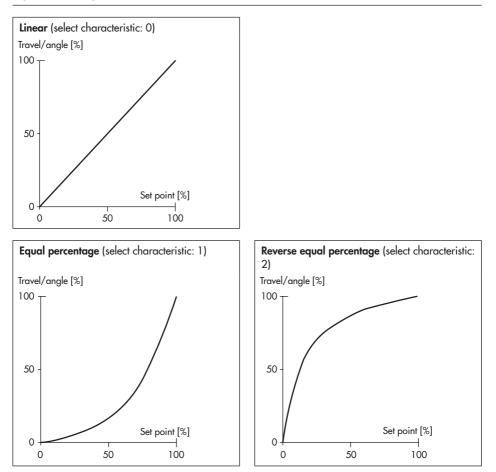
Error codes – Recommended action		Condensed state message active, when prompted, <i>Err</i> appears. When fault alarms exist, they are displayed here.
81 Valve signature canceled		Error during automatic plotting of the valve signature Error messages are not yet saved in a non-volatile memory. They cannot be reset.
	Status classification	[Maintenance required]
	Recommended action	Restart the valve signature recording or start initialization including valve signature.
82	Unassigned	
83	Unassigned	
84	PST/FST	A partial stroke test or full stroke test cannot be started or has been canceled.
	Status classification	[No message]
	Recommended action	Read out test status (only in the operator software)
85	On/off valve	The transit time and breakaway time or the final travel/angle value of the on/off valve has changed.
	Status classification	[No message]
	Recommended action	Check valve and actuator.

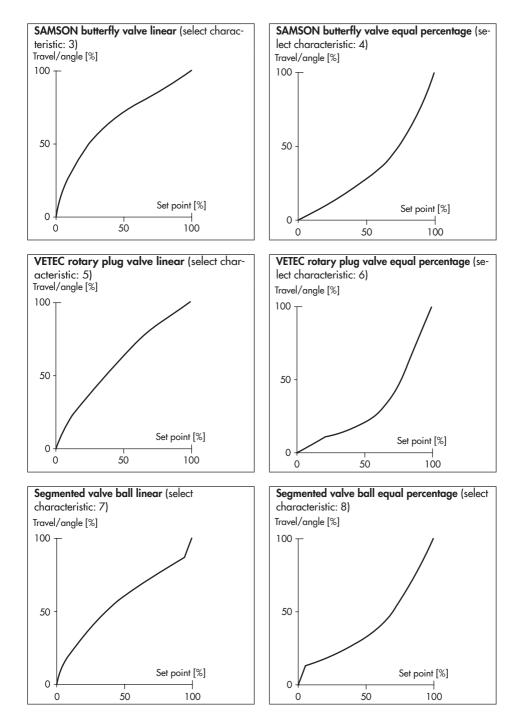
16.2 Selecting the characteristic

The characteristics that can be selected in Code 20 are shown in the following in graph form.

i Note

A characteristic can only be defined (user-defined characteristic) using a workstation/operating software (e.g. TROVIS-VIEW).





17 Annex B

17.1 Accessories

Table	17-2:	General	accessories
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Designation		Order no.
Reversing amplifier for double-acting actuators		Туре 3710
	Black plastic (6 to 12 mm clamping range)	8808-1011
	Blue plastic (6 to 12 mm clamping range)	8808-1012
Cable gland M20x1.5	Nickel-plated brass (6 to 12 mm clamping range)	1890-4875
	Nickel-plated brass (10 to 14 mm clamping range)	1922-8395
	Stainless steel 1.4305 (8 to 14.5 mm clamping range)	8808-0160
	Powder-coated aluminum	0310-2149
Adapter M20x1.5 to ½ NPT	Stainless steel	1400-7114
	S	0510-0522
	Μ	0510-0510
Lever	L	0510-0511
	XL	0510-0512
	XXL	0510-0525
Retrofit kit for inductive limit switch 1 x SJ2-SN		1402-1770
Isolated USB interface adapter (S	SP interface to USB port on a computer) inc. TROVIS-VIEW CD-ROM	1400-9740
Serial interface adapter (SAMSC	N SSP interface to RS-232 port on a computer)	1400-7700
TROVIS-VIEW 6661 (> www.sar	nsongroup.com > SERVICE & SUPPORT > Downloads > TROVIS-VIEW)

Table 17-3: Direct attachment to Type 3277-5 Actuator

Designation		Order no.
	Standard version for actuators 120 cm ² or smaller	1400-7452
Mounting parts	Version compatible with paint for actuators 120 cm ² or smaller	1402-0940
	Old switchover plate for Type 3277-5xxxxx.00 Actuator (old)	1400-6819
	New switchover plate for Type 3277-5xxxxxx.01 Actuator (new) 1)	1400-6822
Accessories for actuator	New connecting plate for Type 3277-5xxxxx.01 Actuator (new) ¹¹ , G ¹ / ₈ and ¹ / ₈ NPT	1400-6823
	Old connecting plate for Type 3277-5xxxxx.00 Actuator (old): G 1/8	1400-6820
	Old connecting plate for Type 3277-5xxxxxx.00 (old): ½ NPT	1400-6821

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Designation			Order no.
	Connecting plate (6)	G 1⁄4	1400-7461
		1/4 NPT	1400-7462
Accessories for		G 1⁄4	1400-7458
positioner	Pressure gauge bracket (7)	1/4 NPT	1400-7459
	ressure gauge mounting kit (8) up to max. 6 bar	Stainless steel/brass	1402-0938
	(output/supply)	Stainless steel/stainless steel	1402-0939

¹⁾ Only new switchover and connecting plates can be used with new actuators (Index 01). Old and new plates are not interchangeable.

Table 17-4: Direct attachment to Type 3277 Actuator

Mounting parts/accessories		Order no.
Standard version for actuators 175, 240, 350, 355, 700, 750 cm ²		1400-7453
Version compatible with paint for actuators 175, 240, 350, 35	5, 700, 750 cm ²	1402-0941
Connection block with seals and screw	G 1/4	1400-8819
Connection block with sedis and screw	1/4 NPT	1402-0901
	Stainless steel/brass	1402-0938
Pressure gauge mounting kit up to max. 6 bar (output/supply)	Stainless steel/stainless steel	1402-0939
Piping with screw fittings 1)		Order no.
A	G 1/4/G 3/8	1402-0970
Actuator (175 cm²), steel	1/4 NPT/3/8 NPT	1402-0976
	G 1⁄4/G 3⁄8	1402-0971
Actuator (175 cm ²), stainless steel	1/4 NPT/3/8 NPT	1402-0978
	G 1/4/G 3/8	1400-6444
Actuator (240 cm ²), steel	1/4 NPT/3/8 NPT	1402-0911
	G 1/4/G 3/8	1400-6445
Actuator (240 cm ²), stainless steel	1/4 NPT/3/8 NPT	1402-0912
A	G 1/4/G 3/8	1400-6446
Actuator (350 cm ²), steel	1/4 NPT/3/8 NPT	1402-0913
	G 1⁄4/G 3⁄8	1400-6447
Actuator (350 cm ²), stainless steel	1/4 NPT/3/8 NPT	1402-0914
A	G 1/4/G 3/8	1402-0972
Actuator (355 cm²), steel	1/4 NPT/3/8 NPT	1402-0979
	G 1⁄4/G 3⁄8	1402-0973
Actuator (355 cm ²), stainless steel	1/4 NPT/3/8 NPT	1402-0980
	G 1/4/G 3/8	1400-6448
Actuator (700 cm²), steel	1/4 NPT/3/8 NPT	1402-0915
	G 1⁄4/G 3⁄8	1400-6449
Actuator (700 cm²), stainless steel	1/4 NPT/3/8 NPT	1402-0916

Mounting parts/accessories		Order no.
Actuator (750 cm²), steel	G 1/4/G 3/8	1402-0974
	1/4 NPT/3/8 NPT	1402-0981
	G 1/4/G 3/8	1402-0975
Actuator (750 cm ²), stainless steel	1/4 NPT/3/8 NPT	1402-0982

¹⁾ For "actuator stem retracts" fail-safe action with air purging of the top diaphragm chamber

Table 17-5: Attachment to NAMUR rib or attachment to rod-type yokes 1) according to
IEC 60534-6

Travel in mm	Lever	For actuator		Order no.
7.5	S	Type 3271-5 with 60/120 cm ² on Type 3510 Micro-flow Valve		1402-0478
5 to 50	M ²⁾	Actuators from other manufacturers and Type 3271 with 120 to 750 $\rm cm^2$ effective areas		1400-7454
14 to 100	L	Actuators from other manufacturers and Type 3271 with 1000 and 1400-60 cm ²		1400-7455
	L	Type 3271, 1400-120 and 2800 cm ² versions with 30/60 mm travel ³⁾		1400-7466
30 or 60		Mounting brackets for Emerson and Masoneilan linear actuators (in addition, a mounting kit according to IEC 60534-6 is required depending on the travel). See rows above.		1400-6771
		Valtek Type 25/50		1400-9554
40 to 200	XL	Actuators from other manufacturers and Type 3271 with 1400-120 and 2800 cm ² and with 120 mm travel		1400-7456
	Accessories			Order no.
G 1/4			G 1⁄4	1400-7461
Connecting plate			1/4 NPT	1400-7462
Pressure aquae bracket -		G 1⁄4	1400-7458	
		Ket	1/4 NPT	1400-7459
Pressure gauge mounting kit up to max. 6 bar (output/supply)			Stainless steel/brass	1402-0938
		nting kit up to max. o bar (output/supply)	Stainless steel/stainless steel	1402-0939

1) 20 to 35 mm rod diameter

²⁾ M lever is mounted on basic device (included in the scope of delivery)

³⁾ In conjunction with Type 3273 Side-mounted Handwheel with 120 mm rated travel, additionally one bracket (0300-1162) and two countersunk screws (8330-0919) are required.

Mounting parts			Order no.
VDI/VDE 3847 interface adapter			1402-0257
Connecting plate, including connection for air purging of actuator spring chamber	Aluminum	ISO 228/1-G 1/4	1402-0268
	Aluminum	1/4-18 NPT	1402-0269
	Stainless steel	ISO 228/1-G 1/4	1402-0270
		1/4-18 NPT	1402-0271
Mounting kit for attachment to SAMSON Type 3277 Actuate	or with 175 to 750	cm ²	1402-0868
Mounting kit for attachment to SAMSON Type 3271 Actuator or third-party actuators			1402-0869
Travel pick-off for valve travel up to 100 mm		1402-0177	
Travel pick-off for 100 to 200 mm valve travel (SAMSON Type 3271 Actuator only)			1402-0178

Table 17-7: Attachment according to VDI/VDE 3847-2

Designation		Order no.
	Mounting block for PFEIFFER Type 31a (edition 2020+) Rotary Actuators with dummy plate for solenoid valve interface	1402-1645
Mounting parts	Blank plate for solenoid valve interface (sold individually)	1402-1290
	Adapter bracket for Type 3730 (VDI/VDE 3847)	1402-0257
	Adapter bracket for Type 3730 and Type 3710 (DAP/PST)	1402-1590
	Shaft adapter AA1	1402-1617
Accessories for actuator	Shaft adapter AA2	1402-1616
	Shaft adapter AA4	1402-1888

Table 17-8: Attachment to rotary actuators

Mounting parts/accessories		
Attachment according to VDI/VDE 3845 (September 2010), actuator surface corresponds to fixing level 1		
Size AA1 to AA4, version with CrNiMo steel bracket	1400-7448	
Size AA1 to AA4, heavy-duty version	1400-9244	
Size AA5, heavy-duty version (e.g. Air Torque 10 000)	1400-9542	
Bracket surface corresponds to fixing level 2, heavy-duty version		
Attachment for rotary actuators with max. 180° opening angle, fixing level 2	1400-8815 and 1400-9837	
Attachment to SAMSON Type 3278 with 160/320 cm², CrNiMo steel bracket		
Attachment to SAMSON Type 3278 with 160 cm ² and to VETEC Type S160, Type R and Type M, heavy-duty version		

Mounting parts/accessories			Order no.
Attachment to SAMSON Type 3278 with 320 cm ² and to VETEC Type S320, heavy-duty version		1400-5891 and 1400-9526	
Attachment to Camflex II		1400-9120	
Accessories	Connecting plate	G 1⁄4	1400-7461
		1/4 NPT	1400-7462
	Pressure gauge bracket	G 1⁄4	1400-7458
		1/4 NPT	1400-7459
	Pressure gauge mounting kit up to max. 6 bar (output/ supply)	Stainless steel/brass	1402-0938
		Stainless steel/stainless steel	1402-0939

 Table 17-9:
 Attachment of external position sensor

Mounting parts/accessories			
Template for mounting position sensor on older mounting parts		1060-0784	
	Mounting parts for actuator with 120 cm ²	1400-7472	
	Connecting plate (9, old) withG 1/8	1400-6820	
Direct attachment	Type 3277-5xxxxx.00 Actuator 1/8 NPT	1400-6821	
	Connecting plate (new) with Type 3277-5xxxxx.01 Actuator (new) 1)	1400-6823	
	Mounting parts for actuators with 175, 240, 350, 355 and 750 $\rm cm^2$	1400-7471	
NAMUR attachment	Mounting parts for attachment to NAMUR rib using L or XL lever	1400-7468	
Attachment to Type 3510 Micro- flow Valve	Mounting parts for Type 3271 Actuator with 60 cm ²	1400-7469	
	VDI/VDE 3845 (September 2010), see the 'Design and principle of operation' section for details.		
	Actuator surface corresponds to fixing level 1		
	Size AA1 to AA4 with follower clamp and coupling wheel, version with CrNiMo steel bracket	1400-7473	
Attachment to ro-	Size AA1 to AA4, heavy-duty version	1400-9384	
tary actuators	Size AA5, heavy-duty version (e.g. Air Torque 10 000)	1400-9992	
,	Bracket surface corresponds to fixing level 2, heavy-duty version	1400-9974	
	SAMSON Type 3278 with 160 \mbox{cm}^2 and VETEC Type \$160 and Type R, heavy-duty version	1400-9385	
	SAMSON Type 3278 with 320 cm ² and VETEC Type S320, heavy-duty version	1400-5891 and 1400-9974	

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Mounting parts/accessories		Order no.	
	Connecting plate (6)	G 1⁄4	1400-7461
		1/4 NPT	1400-7462
	Pressure gauge bracket (7)	G 1⁄4	1400-7458
Accessories for		1/4 NPT	1400-7459
positioner	Pressure gauge mounting kit up to max. 6 bar (output/supply)	Stainless steel/brass	1402-0938
		Stainless steel/stainless steel	1402-0939
	Bracket to mount the positioner on a wall (Note: The other fastening parts are to be provided at the site of installation as wall foundations vary from site to site).		0309-0184

¹⁾ Only new connecting plates can be used with new actuators (Index 01). Old and new plates are not interchange-

able.

17.2 After-sales service

Contact our after-sales service for support concerning service or repair work or when malfunctions or defects arise.

E-mail contact

You can reach our after-sales service at aftersalesservice@samsongroup.com.

Addresses of SAMSON AG and its subsidiaries

The addresses of SAMSON AG, its subsidiaries, representatives and service facilities worldwide can be found on our website (www.samsongroup.com) or in all SAMSON product catalogs.

Required specifications

Please submit the following details:

- Order number and position number in the order
- Specifications on the nameplate:
 - Supply pressure
 - Explosion protection specifications
 - Input signal
 - Emergency shutdown
 - Features
 - Firmware version
 - Model number
 - Configuration ID
 - Serial number



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