

**Series 3724**  
**Type 3724 Electropneumatic Positioner**



Type 3724 Positioner (cover removed)

## **Mounting and Operating Instructions**

### **EB 8395 EN**

Firmware version 1.01  
Edition October 2014

## Definition of signal words



### **DANGER!**

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



### **WARNING!**

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



### **NOTICE**

*Property damage message or malfunction*



### **Note:**

*Additional information*



### **Tip:**

*Recommended action*

<b>1</b>	<b>General safety instructions</b> .....	<b>4</b>
<b>2</b>	<b>Article code</b> .....	<b>5</b>
<b>3</b>	<b>Design and principle of operation</b> .....	<b>6</b>
3.1	Technical data .....	8
<b>4</b>	<b>Connections</b> .....	<b>10</b>
4.1	Pneumatic connections.....	10
4.1.1	Supply pressure .....	10
4.2	Electrical connections .....	11
4.2.1	Selecting cables and wires.....	12
4.2.2	Cable entry .....	12
<b>5</b>	<b>Operation</b> .....	<b>13</b>
5.1	Operating controls .....	13
<b>6</b>	<b>Start-up and settings</b> .....	<b>15</b>
6.1	Adapting the display.....	16
6.2	Enable configuration to change parameters .....	16
6.3	Adjusting the volume restriction Q.....	17
6.4	Entering the opening direction/direction of action .....	18
6.5	Entering the direction of action.....	18
6.6	Limiting the signal pressure .....	18
6.7	Adjusting the limit contacts .....	19
6.8	Setting other parameters.....	19
6.9	Initialization .....	20
6.10	Zero calibration .....	21
6.11	Manual mode.....	22
6.12	Reset.....	23
6.13	Faults .....	24
<b>7</b>	<b>Code list</b> .....	<b>25</b>
7.1	Parameter codes .....	25
7.2	Error codes.....	27
<b>8</b>	<b>Appendix</b> .....	<b>29</b>
8.1	Maintenance .....	29
8.2	Nameplate.....	29
8.3	Customer inquiries .....	29
8.4	Dimensions in mm.....	30
	<b>Index</b> .....	<b>31</b>

# 1 General safety instructions

For your own safety, follow these instructions concerning the mounting, start up and operation of the positioner:

- The positioner is to 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 is referred to as individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
- 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.
- If inadmissible motions or forces are produced in the pneumatic actuator as a result of the supply pressure level, it must be restricted using a suitable supply pressure reducing station.

**To avoid damage to any equipment, the following also applies:**

- Proper shipping and storage are assumed.



**Note:**

*Devices with a CE marking fulfill the requirements of the Directives 2004/108/EC and 2006/95/EC.*

*The Declaration of Conformity is available on request.*

---

## 2 Article code

Positioner	Type 3724-	0	0	0	0	0	0	0	x	0	0	0	0	0
Housing material														
Housing: 1.4409 · Cover: 1.4404									0					
Surface finish														
Micro-bead blasted									1					
Polished ( $R_a \leq 0.6 \mu\text{m}$ )									2					
Permissible ambient temperature														
-20 to +80 °C										0				
Degree of protection														
IP 65 <sup>1)</sup> (only applies in combination with Type 3379 Pneumatic Actuator)													0	

<sup>1)</sup> In preparation

### 3 Design and principle of operation

The Type 3724 Positioner is delivered as a ready-mounted unit on Type 3379 Pneumatic Actuators.

The positioner is used to assign the valve position (controlled variable  $x$ ) to the control signal (reference variable  $w$ ). The positioner compares the electric control signal of a control system to the travel of the control valve (1) and issues a signal pressure (output variable  $y$ ) for the pneumatic actuator.

The positioner mainly consists of the following components (see Fig. 1):

- Magneto-resistive sensor (2)
- Analog i/p converter (6) with a downstream air capacity booster (7)
- Electronics unit with microcontroller (4)
- Software limit contacts (12)

The travel is measured by an internal pick-up rod, which is connected to a magnet, as well as a non-contact magneto-resistive sensor and the downstream electronics.

The motion of the pick-up rod causes the direction of the magnetic field to change. This change is sensed by the sensor (2). The electronics unit determines the current valve position from this information.

The position of the valve is transmitted to the microcontroller (4) over its A/D converter (3). The microcontroller contains a modified PID controller which compares the actual valve position with the 4 to 20 mA control signal. The resulting output value is passed on to the D/A converter. In case of a system deviation, the activation of the i/p module

(6) is changed so that the actuator (1) is pressurized or vented accordingly over the downstream air capacity booster (7). The supply air is supplied to the booster (7) and the pressure regulator (8).



#### **NOTICE**

*Unauthorized manual adjustments to the positioner will damage it!  
Do not move the pick-up rod manually!*

The output signal pressure supplied by the booster can be limited to 2.3 bar by software.

The volume restriction Q (10) is used to optimize the positioner by adapting it to the actuator.

#### **Tight-closing function**

The pneumatic actuator is completely filled with air or vented as soon as the reference variable falls below 1 % or exceeds 99 % (see end positions set in P10 and P11 parameters).

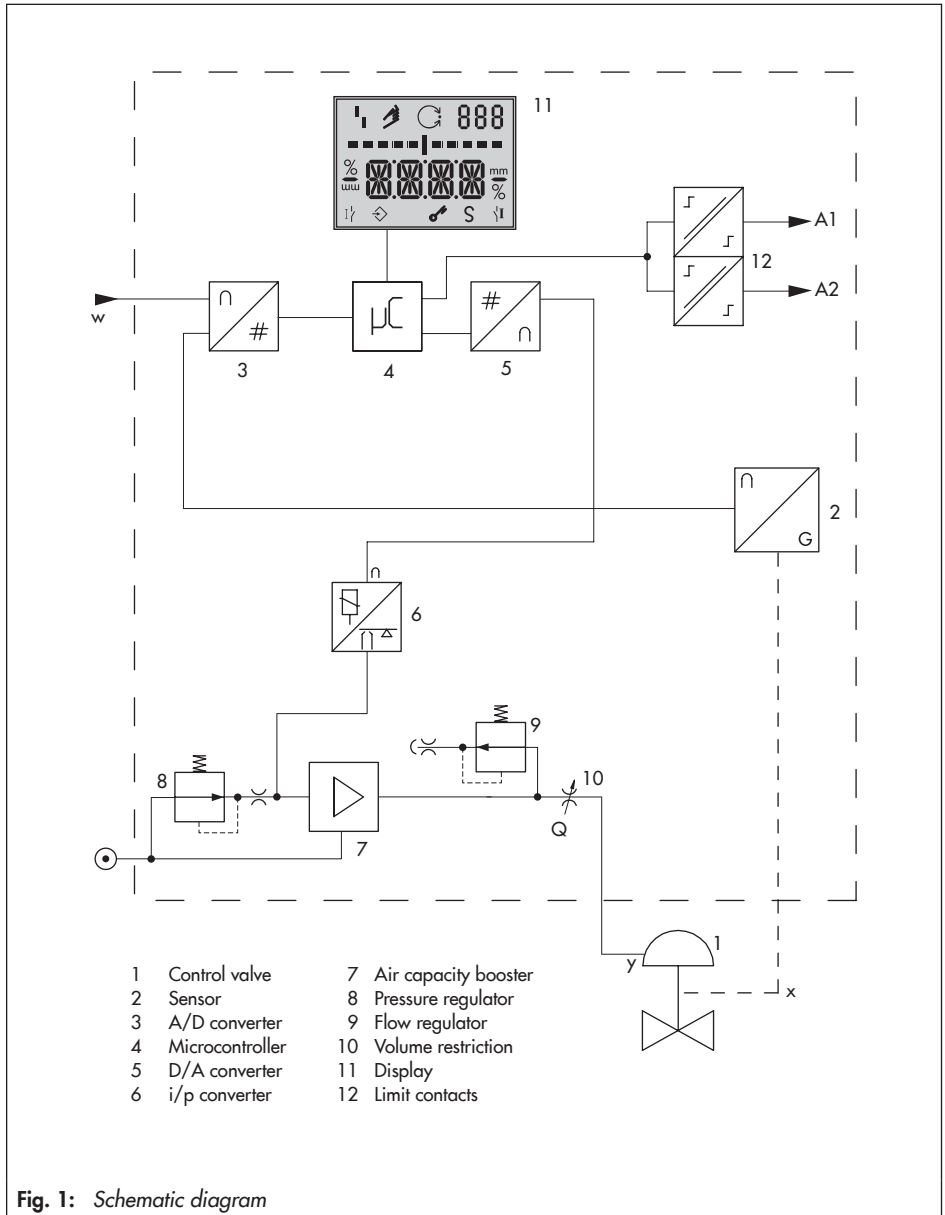


Fig. 1: Schematic diagram

### 3.1 Technical data

**Table 1:** *General technical data*

<b>Positioner</b>	
Attachment	Type 3379 piston Ø: 63 mm · Effective area: 31 cm <sup>2</sup> Type 3379 piston Ø: 90 mm · Effective area: 63 cm <sup>2</sup>
Travel	4 to 16 mm, adjustable in steps of 0.5 mm
Reference variable w (reverse polarity protection) Static destruction limit	Signal range 4 to 20 mA · Two-wire device Split-range operation 4 to 11.9 mA and 12.1 to 20 mA ± 32 V
Minimum current	3.8 mA
Load impedance	Max. 6.3 V
Supply air Air quality acc. to ISO 8573-1	1.4 to 7 bar (20 to 105 psi) Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected
Signal pressure (output)	0 bar up to the capacity of the supply pressure minus 0.4 bar Can be limited to approx. 2.3 bar by software
Characteristic	Three selectable characteristics: Linear · Equal percentage · Reverse equal percentage
Transit time	Only for actuators with initialization time > 0.4 s <sup>1)</sup>
Direction of action	w/x reversible
Perm. ambient temperature	-20 to +80 °C
Electromagnetic compati- bility	Complying with EN 61000-6-2, EN 61000-6-3 and NAMUR Recommendation NE 21
Degree of protection	IP 65 <sup>2)</sup> (only applies in combination with Type 3379 Pneumatic Actuator)
<b>Materials</b>	
Housing	1.4409
Cover	1.4404
Dome (visual indicator)	Polycarbonate
<b>Weight (without actuator)</b>	<b>Approx. 1.2 kg</b>

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

<sup>2)</sup> In preparation



**Table 2:** *Limit contacts*

Binary contacts		Two software limit contacts (min. and max.)
Version		Reverse polarity protection, galvanic isolation
Adjustment range		0 to 100 % (see section 6.7, page 19)
Step size		0.5 %
Static destruction limit		$\pm 32$ V
Signal state	No response	Non-conducting (highly resistive), $I < 100 \mu\text{A}$
	Response	Conducting ( $R = 330 \Omega$ )
For connection to		<ul style="list-style-type: none"> <li>- Binary input of a PLC acc. to IEC 61131-2</li> <li>- <math>P_{\text{max}} = 400 \text{ mW}</math></li> </ul>

## 4 Connections

### 4.1 Pneumatic connections

The Type 3724 Positioner is delivered ready mounted on the Type 3379 Pneumatic Actuator. The pneumatic connections of the positioner are connected internally to the connections of the actuator.

The pneumatic connections of the actuator are used (refer to the Mounting and Operating Instructions of the Type 3379 Pneumatic Actuator ► EB 8315 EN) for start-up (see section 6, page 15).



#### NOTICE

*Dirty supply air will cause the positioner to malfunction!*

*Only use supply air that is dry and free of oil and dust!*

*Blow through all air pipes and hoses thoroughly before connecting them!*

#### 4.1.1 Supply pressure

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

##### Actuator stem extends FA (air to open)

Fail-close (for globe and angle valves):  
Required supply pressure = Upper bench range value + 0.4 bar, minimum 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  $p_{st,max}$  is roughly estimated as follows:

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

$d$  = Seat diameter [cm]

$\Delta p$  = Differential pressure across the valve [bar]

$A$  = Actuator area [cm<sup>2</sup>]

$F$  = Upper bench range value [bar]

**If there are no specifications, calculate as follows:**

Recommended supply pressure =

Upper bench range value + 1 bar



#### Note:

*The signal pressure at the output (38) of the positioner can be restricted to approx. 2.3 bar by setting P9 parameter to ON.*

## 4.2 Electrical connections



### **DANGER!** **Risk of electric shock!**

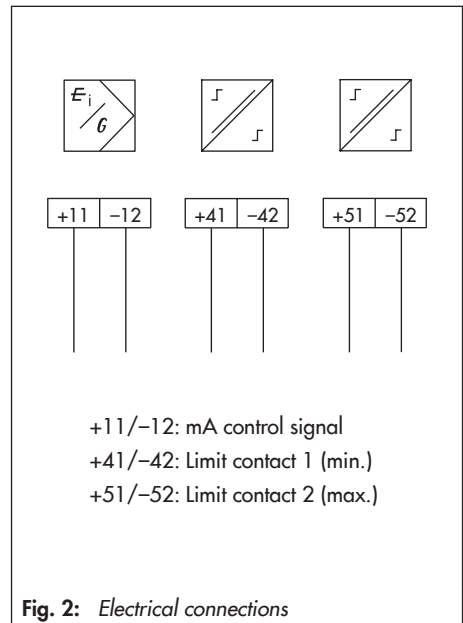
For electrical installation, observe the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use.



### **NOTICE**

An incorrect electric signal will damage the positioner!  
Only use a current source and never a voltage source!

Perform the electrical connections according to Fig. 2. Guide the wires to the cage clamp terminals of the positioner as described in sections 4.2.1 and 4.2.2.



### Accessories

Description	Order no.
Cable gland: Black plastic, M16 x 1.5	8808-1010

## 4.2.1 Selecting cables and wires

The minimum radial thickness of the conductor insulation must be suitable for the conductor diameter and type of insulation. It must be at least 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.

## 4.2.2 Cable entry

The M16 x 1.5 cable gland is designed for a clamping range of 6 to 12 mm.

The cage clamp terminals hold wire cross-sections of 0.2 to 1.5 mm<sup>2</sup>.

- Turn the cover counterclockwise to unscrew it. Remove cover.
- To unlock the cage clamp terminals: place a slotted screwdriver on the plastic part (Fig. 3) and **lightly** push it into the terminal block.
- Insert or remove the wire **without force**.
- Guide wires for the reference variable to the terminals +11 and -12 located on the housing.

### ! NOTICE

*A reference variable above or below the static destruction limit will damage the positioner!*

*Keep the reference variable within the static destruction limit of  $\pm 32$  V!*

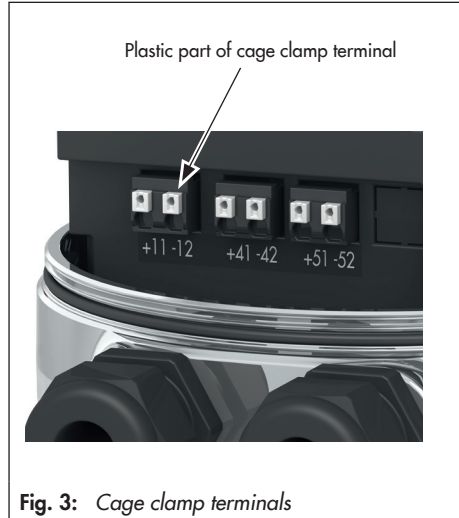


Fig. 3: Cage clamp terminals

### Placing on the cover

- Place on cover while briefly turning it counterclockwise to center it and then fasten by turning it clockwise.

## 5 Operation

The positioner is operated by three pushbuttons for menu navigation on the display (see Fig. 4):

△: Up

\*: Confirm

▽: Down

→ To adapt the air capacity, adjust the volume restriction (see section 6.3).

### 5.1 Operating controls

Press △ or ▽ button to select a parameter code (P0 to P20). Then press \* button to confirm the selected code.


To save changes to parameters in a non-volatile memory, proceed as follows:

→ After changing parameters, press △ or ▽ to change to Code P0 or

→ Wait three minutes until the display returns automatically to P0.



**Note:**

- The  icon on the display indicates that the changed parameter settings have not yet been saved in the non-volatile memory.
- The selected parameter code remains active until you change the setting or exit the parameter code.
- After changing settings in P2, P4 and P8 parameter codes, the positioner must be re-initialized.

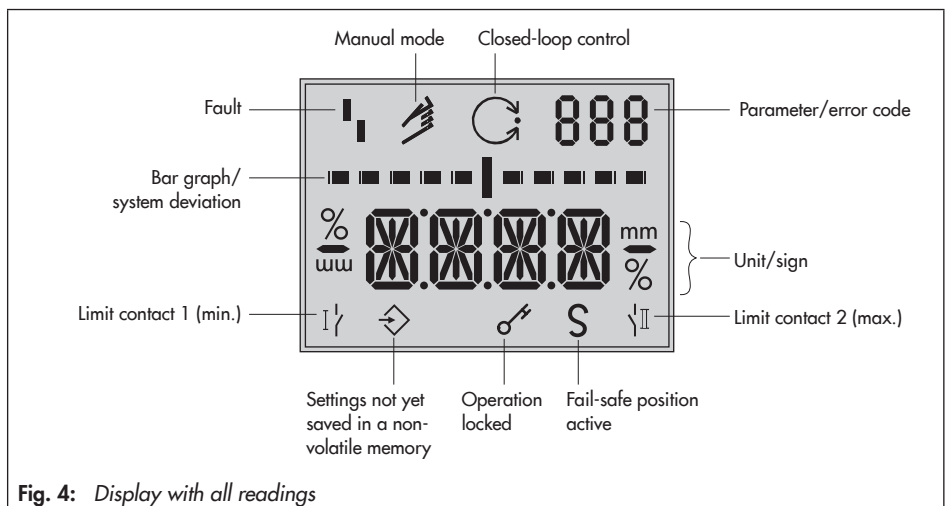


Fig. 4: Display with all readings

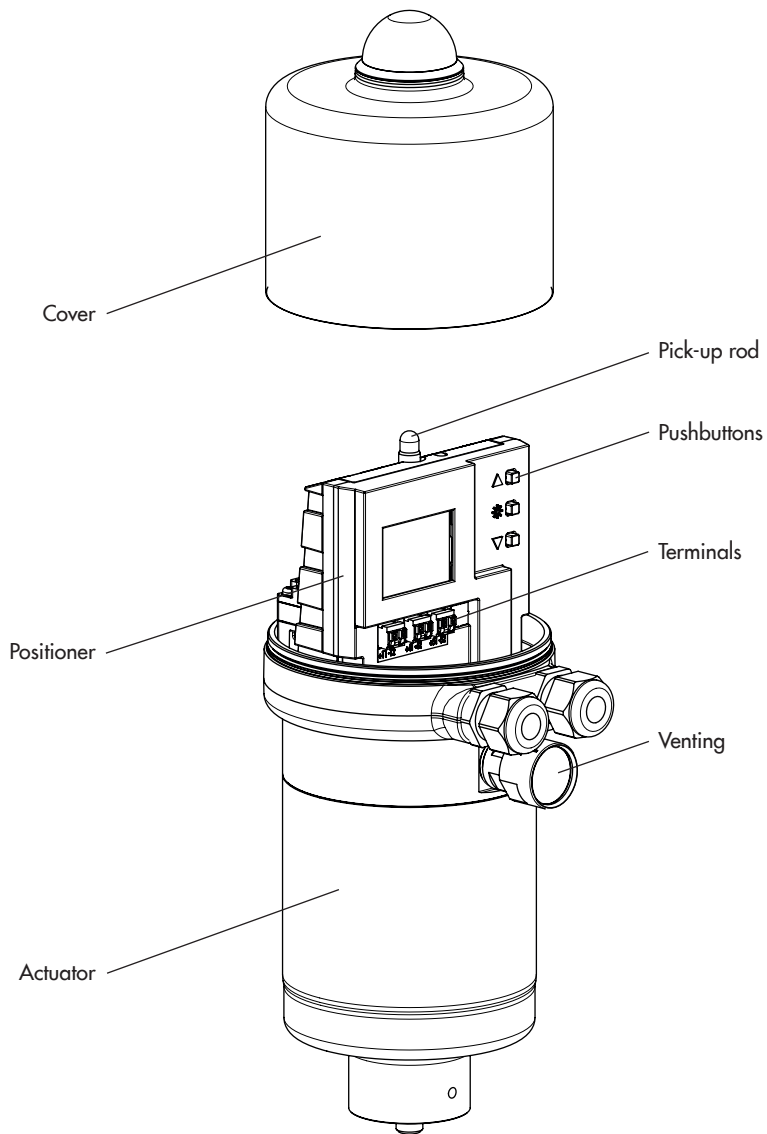


Fig. 5: Type 3724 Positioner mounted on Type 3379 Pneumatic Actuator

## Volume restriction Q

The volume restriction serves to adapt the air output capacity to the size of the actuator. Two fixed settings are possible (refer to section 6.3).


## Display

Display	Meaning
ESC	Cancel
Err	Error
LOW	w too low
MAN	Manual mode
MAX	Maximum range
RST	Reset
INIT	Initialization
ON/OFF	Activated/deactivated
ZERO	Zero calibration

Icons which are assigned to certain codes and functions are indicated on the display. The bar elements indicate the system deviation that depends on the sign (+/-) and the value.

One bar element appears per 1 % system deviation.

If the positioner has not yet been initialized, the position of the pick-up rod in the working range of  $\pm 10$  mm is indicated.

If the fault indication icon  appears on the display, press  $\Delta$  or  $\nabla$  until **ERR** appears on the display to view the relevant **E0** to **E15** error code(s) (see code list in section 7.2, page 27).

## 6 Start-up and settings

### ! NOTICE

*The process is disturbed by the movement of the actuator stem!  
Do not perform the initialization while the process is running! First isolate the plant by closing the shut-off valves!*


- Perform pneumatic connections on the actuator as described in ► EB 8315 EN.
- Connect the supply air to the loading pressure connection.
- Check whether a vent plug or silencer is screwed into the exhaust port.
- Connect the 4 to 20 mA signal.
  - Terminals +11/-12
- Connect software limit contacts, if applicable.
  - Terminals +41/-42: Limit contact 1 (min.)
  - Terminals +51/-52: Limit contact 2 (max.)

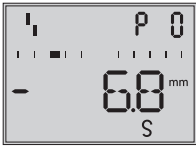


### Note:

- **LOW** on the display indicates that the reference variable is lower than 3.8 mA.
- The positioner is ready for operation with its default settings for most applications.

### Reading after connecting the electrical signal

Code **P0** appears on the display. The  fault indication icon and und **S** (fail-safe position) appear on the display when the positioner has not yet been initialized. The reading indicates the position of the pick-up rod in the working range of  $\pm 10$  mm.



*Reading when the positioner has not yet been initialized*

Code **P0** and the valve position in % appear on the display after connecting the electrical signal to an initialized positioner.



*Initialization successfully completed, positioner runs in closed-loop operation*



**Note:**

*The positioner has a function to monitor the working range. If the pick-up rod moves too close to the mechanical stops (risk of mechanical damage), the positioner vents the actuator and the valve moves to its fail-safe position (**S** displayed together with **E8** error code).*

## 6.1 Adapting the display

The display reading direction can be rotated by 180°. If the displayed data appear upside down, proceed as follows:

Press  $\Delta$  or  $\nabla$  until Code **P1** appears.



*Code **P1**: Reading direction*

Press  $*$  to confirm the selected code. **P1** blinks.

Press  $\Delta$  or  $\nabla$  until the display is set in the desired direction.

Press  $*$  to confirm display direction.

## 6.2 Enable configuration to change parameters

**Before** changing parameter settings in an initialized positioner, configuration must be enabled first by selecting Code **P19**.



***LOCK** and the key icon indicate that the configuration is locked.*

Press  $\Delta$  or  $\nabla$  until Code **P19** appears.

Press  $*$  to confirm the selected code. **P19** blinks.

Press  $\Delta$  until OPEN appears on the display.

Press  $*$  to enable configuration.

If no settings are entered within three minutes, the enabled configuration function becomes invalid.



## 6.3 Adjusting the volume restriction Q

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

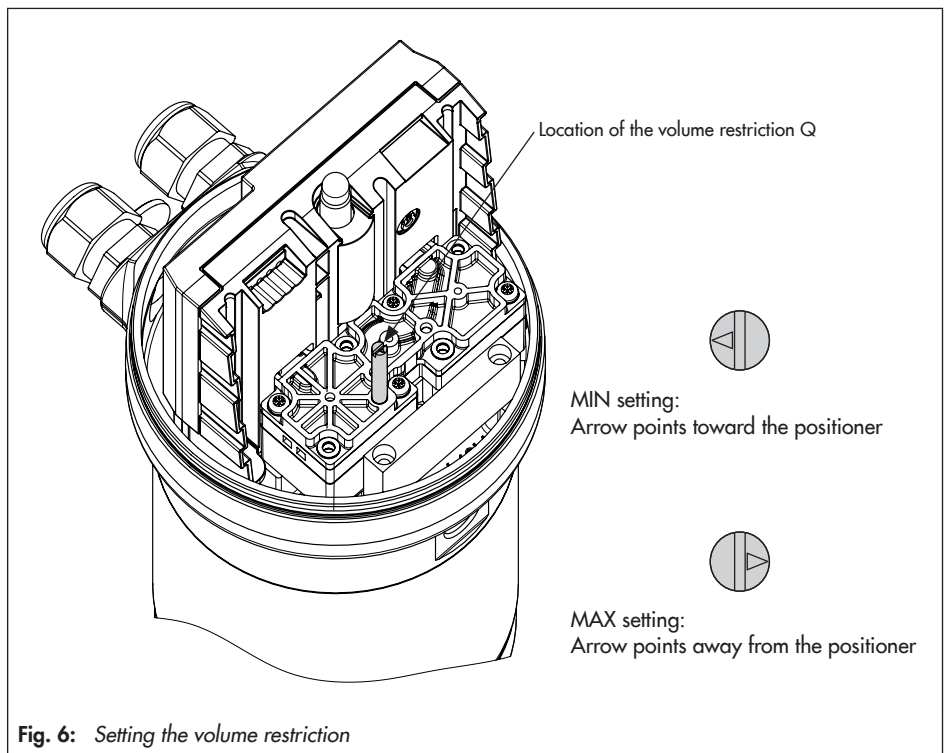
- Actuators with a **transit time < 0.4 s** require a restricted air flow rate.  
Setting to MIN
- Actuators with a transit time  $\geq 0.4$  s do not require the air flow rate to be restricted.  
Setting to MAX

Intermediate settings are not permitted.



### NOTICE

*Risk of malfunction due to a change to the volume restriction setting!  
Re-initialize positioner after changing the volume restriction setting!*



## 6.4 Entering the opening direction/direction of action

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

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

Enable configuration (section 6.2).



Default ATO

- Press  $\Delta$  or  $\nabla$  until Code **P2** appears.
- Press  $*$  to confirm selected code. **P2** blinks.
- Press  $\Delta$  or  $\nabla$  until the required fail-safe position appears.
- Press  $*$  to confirm setting.



**Note:**

*The changed opening direction/direction of action first becomes effective after the positioner has been re-initialized.*

## 6.5 Entering the direction of action

The direction of action (**P7**) is set to increasing/increasing by default.

**For checking purposes:** After successfully completing initialization, the positioner dis-

play should read 0 % when the valve is closed and 100 % when the valve is open.

If necessary, the direction of action can be changed either before or after initialization.

The following correlation applies:

Valve	CLOSED	OPEN
Reading	0 %	100 %
>>	4 mA	20 mA
<<	20 mA	4 mA

>> Increasing/increasing

<< Increasing/decreasing

## 6.6 Limiting the signal pressure

If the maximum actuator force may cause damage to the valve, the signal pressure must be limited. Set Code **P9** to ON. This limits the signal pressure to approx. 2.3 bar.


Make sure the configuration is enabled (section 6.2) before changing this setting.

## 6.7 Adjusting the limit contacts

The electronic limit contacts can be triggered by the position of pick-up rod exceeding or falling below an adjustable switching point.

### Limit contact 1 (min., Code P12):



The limit contact is activated when the pick-up rod moves below the adjusted switching value. The limit contact is deactivated when the pick-up rod moves above the adjusted switching value by 1 % again.


→  indicates it is active




### Limit contact 2 (max., Code P13):

The limit contact is activated when the pick-up rod moves above the adjusted switching value. The limit contact is deactivated when the pick-up rod moves below the adjusted switching value by 1 % again.

→  indicates it is active

Press  or  to select Code **P12** for limit contact 1 or **P13** for limit contact 2.

Press , **P12** or **P13** blinks.

Press  or  to adjust the required switching value in steps of 0.5 % and press  to confirm the value.



#### Note:

The switching values for **P12** and **P13** must be adjusted to be at least 5 % away from each another. It is not possible to enter switching values that are less than 5 % away from one another.

## 6.8 Setting other parameters

The following table lists all the parameter codes and their default settings. If you want to change the default setting of a parameter, proceed in the same manner as previously described.

More details concerning the parameter codes can be found in section 7.

Parameter codes [Default setting] Codes marked with * indicate that the positioner needs to be re-initialized afterwards	
P0	Status indication
P1	Reading direction
P2*	ATO/ATC [ATO]
P4*	Nominal range [MAX]
P5	Characteristic [0]
P6	Reference variable [4 to 20 mA]
P7	w/x direction of action [>>]
P8*	Gain Kp [50]
P9	Pressure limitation 2.3 bar [OFF]
P10	End position w < [ON]
P11	End position w > [OFF]
P12	Limit A1, min. [2 %]
P13	Limit A2, max. [98 %]
P14	Display of reference variable w
P15	INIT Start initialization
P16	ZERO Start zero calibration
P17	MAN Manual mode
P18	RST Reset
P19	Enable configuration
P20	Firmware version

## 6.9 Initialization

During initialization the positioner adapts itself optimally to the friction conditions and the signal pressure required by the control valve.



### NOTICE

*The process is disturbed by the movement of the actuator stem!*

*Do not perform the initialization while the process is running! First isolate the plant by closing the shut-off valves!*

The type and extent of self-adaptation depends on the preset parameters.

**MAX** is the default setting for the nominal range (Code **P4**).

During the initialization process, the positioner determines the travel range of the valve (from the CLOSED position to the opposite end position).

Alternatively, a different travel can be selected in Code **P4** (see code list in section 7.1).



### Note:

*The travel set in Code **P4** is only limited during initialization. However, it might be exceeded in closed-loop control when the control signal is higher than 20 mA.*

Start initialization by activating Code **P15** as follows:



Press  $\Delta$  or  $\nabla$  to select Code **P15**.

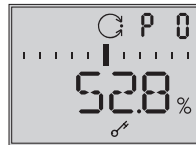
Press  $*$  six seconds long. **6-5-4-3-2-1-** is counted down on the display.

**Initialization starts. INIT blinks on the display!**




### Note:

*The time required for the initialization procedure depends on the actuator transit time and can take a few minutes.*



*Initialization successfully completed, positioner runs in closed-loop operation*

After a successful initialization, the positioner changes to closed-loop operation indicated by the  closed-loop operation icon and control position reading in % predetermined by the reference variable on the display. Configuration is locked.

A malfunction leads to the process being interrupted and the positioner moving to the fail-safe position. The fault indication icon appears on the display (see section 6.13).

### Canceling initialization

The initialization can be canceled by pressing **\***.

- ESC blinks on the display.
- Press **\*** to confirm.



**Note:**

*This code must be confirmed by pressing **\***. Otherwise, the code remains active.*

#### Initial state 1:

*Positioner has **not** been initialized*

The positioner goes to the fail-safe position after the initialization process has been canceled.

#### Initial state 2:

*Positioner has been initialized*

On canceling a new initialization process, the positioner returns to closed-loop operation. The settings of the previous initialization are used.

A new initialization can be started directly afterwards.

## 6.10 Zero calibration

In case of inconsistencies in the closing position of the valve, e.g. with soft-seated plugs, it might be necessary to recalibrate zero. Enable configuration as described in section 6.2.

Start the zero calibration by activating Code **P16** as follows:



Press **Δ** or **∇** until Code **P16** appears.

Press **\*** six seconds long. **6-5-4-3-2-1-** is counted down on the display.

#### **Zero calibration starts, the display blinks!**

The positioner moves the control valve to the CLOSED position and recalibrates the internal electric zero point.

When the zero calibration has been successfully completed, the positioner returns to closed-loop operation (display with status indication).

### Canceling zero calibration

The zero calibration can be canceled by pressing **\***.

- ESC blinks on the display.
- Press **\*** to confirm.



**Note:**

*This code must be confirmed by pressing **\***. Otherwise, the code remains active.*

The positioner returns to closed-loop operation without performing a zero calibration.

A new zero calibration can be started directly afterwards.

## 6.11 Manual mode

The valve position can be moved as follows using the **Manual mode** function: Enable configuration as described in section 6.2.

Press **Δ** or **▽** until Code **P17** appears.

Press **\*** six seconds long. **6-5-4-3-2-1-** is counted down on the display.

**P17** blinks.

The set point for manual mode is indicated on the display of an initialized positioner.



If the positioner has not yet been initialized, the position of the pick-up rod is indicated in the working range of  $\pm 10$  mm.

Press **Δ** or **▽** to change the set point for manual mode.

### Initialized positioner

The manual mode starts using the last set point of the closed-loop control, ensuring a bumpless changeover.

The bar elements on the display indicate the system deviation between the set point for manual mode and set point used for closed-loop control while manually moving the valve in Code P17.

The set point for manual mode is adjusted in steps of 0.1 %. You can move the valve controlled within its range.

### Positioner that has not been initialized

Press  $\Delta$  or  $\nabla$  for a long time to move the valve manually.

The valve is only moved in one direction uncontrolled. The bar elements on the display indicate the change in direction.

Press  $\ast$  to deactivate manual mode.



**Note:**

The Manual mode function can only be exited as described or by interrupting the electrical supply (cold start). The positioner does **not** automatically exit this function and return to the display with the status indication.

---

## 6.12 Reset

A reset causes an initialization to be undone and all parameters settings are reset to the default settings (see parameter code list in section 7.1, page 25).

Enable configuration (section 6.2).

Press  $\Delta$  or  $\nabla$  until Code **P18** appears.



Press  $\ast$  six seconds long. **6-5-4-3-2-1-** is counted down on the display.

**RST** blinks while  $\ast$  is pressed. As soon as the button is released, the reset process is completed and the display returns to status indication (**P0**).




**Note:**

The **I** fault indication icon appears on the display after a reset since the positioner needs to be re-initialized. The error code **E2** is also activated (see section 6.13).

---

## 6.13 Faults

In case of a fault, the fault indication icon  appears on the display.

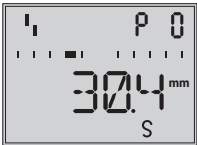
If the fault indication icon appears after a parameter code setting has been changed, this indicates that this setting does not match the values determined during initialization. See Code **E1** (see code list in section 7.2).

Press buttons past Code **P0** or **P20**. The respective error code **E0** to **E15** together with **ERR** appear on the display.

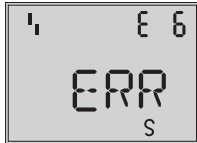
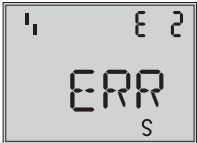
Refer to the code list for the cause of the errors and the recommended action.

### Example:

If, for instance, a travel has been entered in Code **P4** (nominal range) which is larger than the maximum valve travel possible, the initialization process would be interrupted (**E2** error code) because the rated travel would not have been reached (**E6** error code). The valve moves to the fail-safe position (**S** indicated on the display).



Display of the fault indication



The nominal range (Code **P4**) must be changed and the positioner re-initialized to remedy this problem.

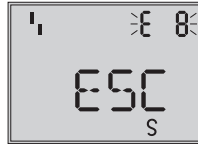
### Resetting error codes

The **E0** and **E8** error codes can be reset as follows:

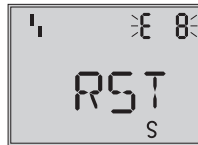
Press  $\Delta$  or  $\nabla$  to select the error code.



Press  $*$  to confirm the error code. **ESC** appears on the display. **E8** blinks.



Press  $\Delta$  or  $\nabla$  until **RST** appears.



Press  $*$  to reset the error.

The reset procedure can be canceled by pressing  $*$  when **ESC** appears.



## 7 Code list

### 7.1 Parameter codes

Code	Display, values [default setting]	Description
<b>Note:</b> Codes marked by an asterisk (*) indicate that the positioner needs to be re-initialized afterwards		
P0	Status reading with basic information	The reading indicates the valve position in % when the positioner is initialized. Press $\star$ to display the actual valve position when the positioner is initialized.
P1	Reading direction	The reading direction of the display is turned by 180°.
P2*	ATO / ATC [ATO]	Parameter to adapt the positioner to how the control valve functions: ATO – Air to open (valve CLOSED in fail-safe position) ATC – Air to close (valve OPEN in fail-safe position)
P4*	Nominal range [MAX]	The travel is adjustable from 4 to 16 mm in steps of 0.5 mm. <b>MAX:</b> Maximum possible travel
P5	Characteristic 0 to 2 [0]	Three different characteristics can be selected to define the relationship between the input variable and the position of the actuator stem: <b>0</b> → Linear <b>1</b> → Equal percentage <b>2</b> → Reverse equal percentage
P6	Reference variable [4 to 20 mA] SRLO/SRHI	For split-range operation: <b>SRLO:</b> low range 4 to 11.9 mA <b>SRHI:</b> high range 12.1 to 20 mA
P7	w/x [>>]/<<	Direction of action of the reference variable w to the travel x (increasing/increasing or increasing/decreasing)
P8*	Gain $K_p$ 30/[50]	On initializing the positioner, the gain is set to the selected value. If the positioner hunts, the $K_p$ value can be reduced.
P9	Pressure limitation ON/[OFF]	The signal pressure can take on the same pressure as the supply air at the maximum [OFF] or, in the case that the maximum actuator force can damage the valve, the pressure is limited to approx. 2.3 bar.
P10	End position w < [ON]/OFF	Lower tight-closing function: If w reaches up to 1 % towards the final value that causes the valve to close, the actuator is immediately completely vented (with <b>ATO</b> - air to open) or filled with air (with <b>ATC</b> - air to close).

Code	Display, values [default setting]	Description
P11	End position w > ON/[OFF]	Upper tight-closing function: If w reaches up to 99 % towards the final value that causes the valve to open, the actuator is immediately completely filled with air (with <b>ATO</b> - air to open) or vented (with <b>ATC</b> - air to close).
P12	Limit A1, min. [2 %]	The lower switching point can be adjusted in steps of 0.5 %. <b>Note:</b> Keep a distance of 5 % to the switching value adjusted in <b>P13</b> .
P13	Limit A2, max. [98 %]	The upper switching point can be adjusted in steps of 0.5 %. <b>Note:</b> Keep a distance of 5 % to the switching value adjusted in <b>P12</b> .
P14	Info w      Initialized	Indicates the internally adjusted set point in the positioner (adjusted set point in 0 to 100 % according to the settings in <b>P6</b> and <b>P7</b> ). Press * to display external set point (applied set point in 0 to 100 % according to the 4-20 mA signal).
	Not initialized	Displays external set point in 0 to 100 % according to the 4-20 mA signal.
P15	Start initialization	The initialization process can be interrupted by pressing *. The control valve moves to the fail-safe position. After a power supply failure during initialization, the positioner starts with the settings from the last initialization (if they exist).
P16	Start zero calibration	The zero calibration process can be interrupted by pressing *. The control valve returns to closed-loop operation. <b>Note:</b> A zero calibration cannot be started when E1 error code exists. After a power supply failure during zero calibration, the positioner starts with the settings from the last zero calibration.
P17	Manual mode <sup>1)</sup>	Press $\Delta$ or $\nabla$ to enter the set point.
P18	Reset	Parameters are reset to their default setting. The positioner can only return to closed-loop operation after it has been re-initialized.
P19	Enable configuration [LOCK]/OPEN	Enable configuration to change parameter settings. This function is automatically canceled when none of the buttons are pressed within three minutes.
P20	Firmware version	Installed firmware version is displayed. Press * to display the last four digits of the serial number.

<sup>1)</sup> Also not available when the positioner has not been initialized

## 7.2 Error codes

In case of a fault, the fault indication icon  appears on the display.

The errors listed in the following table are assigned to error classes:

**Error class 1:** No operation possible

**Error class 2:** Manual operation only possible

**Error class 3:** Manual operation and closed-loop control possible

Code	Description		Class
E0	<b>Zero error</b> (operational error)	Only with tight-closing function <b>P10</b> (end position $w < \text{set to ON}$ ). The zero point has shifted by more than 5 % compared to initialization. The error may arise when the valve seat trim is worn.	3
	Recommended action	Check valve and positioner attachment. If OK, perform a zero calibration over Code <b>P16</b> (see section 6.10). <b>Error code can be reset (see section 6.13).</b>	
E1	<b>Displayed and INIT values are not identical</b> (operational error)	Adjusted and displayed valves are not identical to the INIT values as the parameters were changed after initialization.	3
	Recommended action	Reset parameters or perform initialization.	
E2	<b>Positioner has not been initialized</b>	Malfunction or parameter change requiring the positioner to be re-initialized.	2
	Recommended action	Set parameters and initialize the positioner over Code <b>P15</b> .	
E3	<b>K<sub>p</sub> setting</b> (initialization error)	Positioner hunts. Volume restriction set incorrectly, too much gain.	2
	Recommended action	Check the volume restriction setting as described in section 6.3. Limit gain K <sub>p</sub> in Code <b>P8</b> . Re-initialize the positioner.	
E4	<b>Transit time too short</b> (initialization error)	The transit times of the actuator determined during initialization are so short (below 0.4 second) that optimal positioner tuning is not possible.	2
	Recommended action	Check the volume restriction setting as described in section 6.3. Re-initialize the positioner.	

E5	<b>Standstill detection is not possible</b> (initialization error)	Supply pressure varies. Mounting incorrect.	2
	Recommended action	Check supply air and mounting. Re-initialize the positioner.	
E6	<b>Travel is not achieved during initialization</b> (initialization error)	Supply pressure is too low, actuator leaks, incorrect travel adjusted or pressure limit function activated.	2
	Recommended action	Check supply air, mounting and setting. Re-initialize the positioner.	
E7	<b>Actuator does not move</b> (initialization error)	No supply air, mounting blocked.	2
	Recommended action	Check supply air, mounting and mA input signal. Re-initialize the positioner.	
E8	<b>x &gt; range</b>	Pick-up rod near to the end stops	1
	Recommended action	Check mounting and re-initialize the positioner. <b>Error code can be reset (see section 6.13).</b>	
E9 to E15	<b>Device error</b> (internal)	Return positioner to SAMSON AG for repair.	1/3



## 8 Appendix

### 8.1 Maintenance

The positioner does not require any maintenance.

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

### 8.2 Nameplate

<b>SAMSON 3724 Positioner</b>		
Model 3724 - 0001000000000.00		
Var-ID <b>1</b>	Firmware <b>2</b>	Input <b>4</b>
Serial no. <b>3</b>		Supply <b>5</b>
SAMSON AG D-60314 Frankfurt		 See technical data for ambient temperature
		Made in Germany

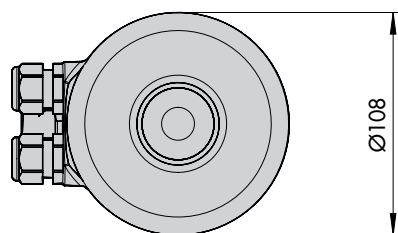
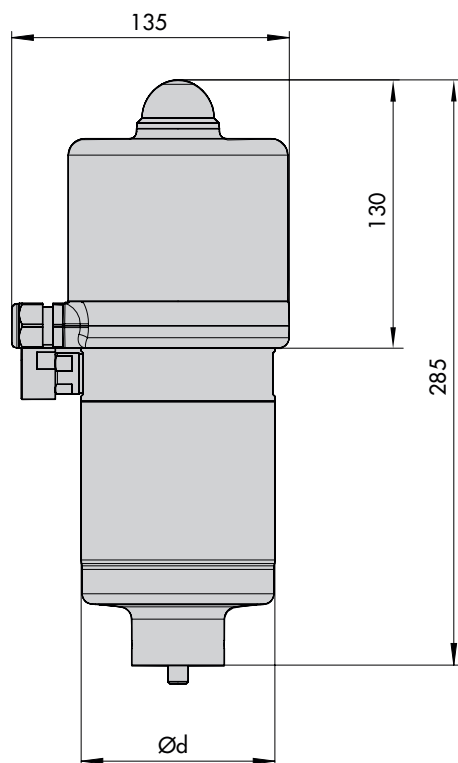
- 1 Configuration ID (Var.-ID)
- 2 Firmware version
- 3 Serial number
- 4 Reference variable
- 5 Supply air

### 8.3 Customer inquiries

Please submit the following details:

- Type designation
- Configuration ID (Var.-ID)
- Serial no.
- Firmware version

## 8.4 Dimensions in mm



Actuator	Piston Ø	Ød
Type 3379	63 mm	69 mm
	90 mm	94 mm

Fig. 7: Dimensional drawings of Type 3724 Positioner with Type 3379 Pneumatic Actuator

## Index

**A**

Accessories.....	11
Actuator.....	10, 14
transit time.....	17
Article code.....	5

**C**

Cable.....	12
Cable entry.....	12
Characteristic.....	25
Connections	
electrical connections.....	11
pneumatic connections.....	10
terminals.....	12

**D**

Default settings.....	19
Dimensions in mm.....	30
Direction of action.....	18
Display.....	13
adapting.....	16
readings.....	13

**E**

Enable configuration.....	16
End position.....	25
Error codes.....	27
reset.....	24

**F**

Faults.....	24
Firmware.....	26

**G**

Gain.....	25
-----------	----

**I**

Initialization.....	20, 21
cancel.....	21

**L**

Limit contacts.....	9, 19
---------------------	-------

**M**

Maintenance.....	29
Manual mode.....	22
Materials.....	8

**N**

Nameplate.....	29
----------------	----

**O**

Operating controls.....	13
display.....	13, 15
pushbuttons.....	13
volume restriction.....	15
Operation.....	13–14

**P**

Parameter codes.....	19, 25
Pressure limit.....	25
Principle of operation.....	6, 7

**R**

Reference variable.....	25
Reset.....	23

**S**

Safety instructions.....	4, 11
Schematic diagram.....	7

**Index**

Signal pressure .....	18
Start-up .....	15
Supply pressure.....	10
<b>T</b>	
Technical data.....	8
Tight-closing function.....	6
Transit time .....	17
<b>V</b>	
Volume restriction.....	15, 17
<b>W</b>	
Wires .....	12
<b>Z</b>	
Zero calibration .....	21











SAMSON AG · MESS- UND REGELTECHNIK  
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany  
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507  
samson@samson.de · www.samson.de

**EB 8395 EN**

2014-11-04 · English