



Operating manual  
ARCASMART<sup>®</sup> electro-pneumatic positioner  
Series 826

Original instructions

© ARCA Regler GmbH. All rights reserved.

Cover picture background: Freepik.com

## Table of contents

<b>1</b>	<b>General data</b> .....	<b>5</b>
1.1	Validity of the manual .....	5
1.2	Contact details.....	5
1.3	Other applicable documents.....	5
1.4	Place of storage of the manual.....	5
1.5	ARCA ONSITE .....	5
<b>2</b>	<b>Safety</b> .....	<b>7</b>
2.1	Introduction.....	7
2.2	General safety information .....	7
2.3	Explanation of symbols and notices .....	7
2.4	Warning symbols on the device .....	8
2.5	Intended use.....	8
2.6	Improper modifications to the device.....	9
2.7	Qualified Personnel .....	9
2.8	Liability disclaimer .....	9
2.9	Laws and regulations .....	9
2.10	Conformity to directives.....	9
2.10.1	Conformity to European directives .....	10
2.10.2	Conformity to UK directives.....	10
2.11	Use in potentially explosive areas .....	10
<b>3</b>	<b>Transport, storage and packaging</b> .....	<b>13</b>
3.1	Transport .....	13
3.2	Storage.....	13
3.3	Packaging.....	13
<b>4</b>	<b>Type plate</b> .....	<b>14</b>
<b>5</b>	<b>Type key</b> .....	<b>15</b>
<b>6</b>	<b>Description</b> .....	<b>17</b>
6.1	Overview of the device components .....	17
<b>7</b>	<b>Assembly</b> .....	<b>18</b>
7.1	Safety instructions for assembly.....	18
7.2	Mounting a linear actuator.....	19
7.2.1	Mounting with mounting kit for "Integrated Fitting Linear Actuator".....	19
7.2.2	Mounting with mounting kit "Linear actuator IEC 60534" .....	21
7.3	Mounting with mounting kit "Rotary actuator VDI/VDE 3845" .....	24
7.4	Use of positioners in humid environment .....	27
<b>8</b>	<b>Electrical connection</b> .....	<b>30</b>
8.1	Electrical connection .....	32
8.2	Earthing .....	32

<b>9</b>	<b>Pneumatic connection</b> .....	<b>33</b>
<b>10</b>	<b>Commissioning</b> .....	<b>35</b>
10.1	Local operation .....	35
10.2	Initialising in "NO INIT" operating mode .....	38
<b>11</b>	<b>Parameter overview</b> .....	<b>39</b>
11.1	Menu structure overview .....	39
11.2	Quick Start.....	40
11.3	Setup .....	41
11.4	Maint/Diags .....	43
<b>12</b>	<b>Service and maintenance</b> .....	<b>44</b>
<b>13</b>	<b>Technical Data</b> .....	<b>46</b>
<b>14</b>	<b>Explosion protection</b> .....	<b>48</b>
14.1	Type code.....	48
14.2	Marking for explosion protection .....	48
14.3	Ambient temperature.....	49
14.4	Electrical data.....	49
<b>15</b>	<b>Fault removal</b> .....	<b>50</b>
15.1	Symbols for the device status .....	50
15.2	Info IDs, fault reports and remedial measures .....	51
<b>16</b>	<b>Disposal and recycling</b> .....	<b>53</b>

## 1 General data

This operating manual contains instructions that enable the product to be safely and properly installed, put into operation and maintained.

The target group for this operating manual is exclusively specially trained and authorised technical personnel.

Please contact the manufacturer if you encounter problems that cannot be solved with the aid of this operating manual.

The product is subject to technical changes at any time.

### 1.1 Validity of the manual

This operating manual applies to the product in the version described in the device pass.

### 1.2 Contact details

Further information about the product can be obtained from:

#### Manufacturer's address

ARCA Regler GmbH  
Kempener Str. 18  
D-47918 Tönisvorst  
Tel.: +49 (0) 2156-7709-0  
Fax: +49 (0) 2156-7709-55  
E-mail: sale@arca-valve.com  
www.arca-valve.com

### 1.3 Other applicable documents

The product can be delivered as part of an actuator and equipped with additional components that are described in their own operating manuals. The instructions as well as the warning and safety information contained therein must also be observed.

Furthermore, the following documents apply in addition to this operating manual.

- Device pass
- Installation drawing

### 1.4 Place of storage of the manual

The operating manual and all other applicable documents are part of the product. They must be kept in the immediate vicinity of the product and must be accessible to the personnel at all times.

### 1.5 ARCA ONSITE

If the product was supplied as part of a complete control valve, the operating documentation can be downloaded from our ARCA ONSITE portal with the help of the control valve's serial number.

Two options are available here:

1. Scan the **QR code**<sup>1</sup>, which can be found on the control valve. Further entries are not required.

2. Visit the website <https://onsite.arca-valve.com/search> and enter the ARCA order no. and ARCA serial no. of the control valve. The order no. and serial no. of the control valve can be found on the device pass and on our order confirmation.

**Entry example**

2512345	1234567
<input type="button" value="Search"/>	<input type="button" value="Clear"/>

[← back / zurück](#)

*Illustration 1: ARCA ONSITE*

<sup>1</sup> **QR Code** is a registered trademark of DENSO WAVE INCORPORATED

## 2 Safety

### 2.1 Introduction

This manual contains all the information you need for the connection and commissioning of the device.

It is addressed to people who mechanically mount, electrically connect, parameterise and commission the device, as well as service and maintenance technicians.

This manual applies to devices from firmware version 1.01.00 onwards.

We expressly state that the contents of this operating manual do not form part of or modify a former or existing agreement, assurance or legal relationship. All obligations are specified in the particular purchase contract which also contains all the applicable warranty regulations. These contractual warranty conditions are neither extended nor restricted by any statements in this document.

The contents reflect the technical state at the time of printing.

We reserve the right to make technical changes in the course of further development.



#### **WARNING**

##### **Use of a damaged or incomplete device**

Risk of explosion!

- ▶ Do not use damaged or incomplete devices.

### 2.2 General safety information

#### **Requirement for safe use**

This equipment has been supplied from the factory in a totally safe condition. To maintain this condition and to ensure safe operation of the device, follow these instructions and observe all safety-relevant information.

Pay attention to the notices and symbols on the device. Do not remove any notices or symbols from the device. Keep the notices and symbols in a fully legible condition at all times.

### 2.3 Explanation of symbols and notices

This documentation contains notes that you must observe for your own personal safety and for the avoidance of damage to property. Notes concerning personal safety are highlighted by a warning triangle; notes concerning only damage to property are not marked by a warning triangle. Depending on the danger level, the warning notes are shown in decreasing order of severity as follows:



#### **DANGER**

**means that death or serious injuries will occur if the corresponding preventive measures are not taken.**



**⚠ WARNING**

means that death or serious injuries can occur if the corresponding preventive measures are not taken.



**⚠ CAUTION**

with a warning triangle means that slight injury and/or damage to property can occur if the corresponding preventive measures are not taken.



**NOTICE**

indicates an important item of information about the product itself or how the product should be handled, to which special attention should be paid.

**CAUTION**

without a warning triangle means that damage to property can occur if the corresponding preventive measures are not taken.

**ATTENTION**

indicates that an undesirable event or condition can occur if the corresponding instructions are not observed.

If several danger levels occur, the warning note for the respectively highest level will always be used. If a warning note with a warning triangle warns against personal injury, a warning against damage to property may be included in the same warning note.

**2.4 Warning symbols on the device**

Symbol	Explanation of the warning symbols on the device
	Observe the operating manual
	Protect the device against shocks (otherwise the protection class is not guaranteed)

**2.5 Intended use**

Observe the following:



**⚠ WARNING**

ARCA positioners may be used only for the applications specified in the associated technical documentation. Proper transport, storage, erection, assembly, installation, commissioning, operation and maintenance are required for trouble-free and safe operation. The permissible environmental conditions must be maintained. Notices in the associated documentation must be observed.





## 2.6 Improper modifications to the device

### **WARNING**

#### **Modification to the device**

Modifications and repairs to the device can result in danger to the personnel, plant and environment!

- ▶ Modify or repair the device only as described in the instructions delivered with the device. The manufacturer's warranty and the product approvals are rendered null and void if this is ignored.

## 2.7 Qualified Personnel

The device may be set up and operated only in conjunction with this documentation. Commissioning and operation may be performed only by **qualified personnel**. Qualified personnel within the meaning of the safety instructions in this documentation are persons authorised to commission, earth and mark devices, systems and circuits according to the safety standards.

Qualified persons are those who are familiar with the erection, assembly, commissioning and operation of the product. These persons have the following qualifications:

- They are authorised and have been trained or instructed to operate and maintain devices and systems in accordance with the safety standards for electrical circuits, high pressures and aggressive and/or hazardous media.
- They have been trained or instructed in the care and use of appropriate safety equipment in accordance with safety standards.

## 2.8 Liability disclaimer

We have checked the contents of this manual for correspondence to the hardware and software described. Nevertheless, deviations cannot be ruled out; therefore we cannot give any guarantee for full correspondence. The details are checked regularly and any necessary corrections will be included in subsequent editions.

## 2.9 Laws and regulations

The test certificates, regulations and laws applicable to your country must be observed for the connection, assembly and operation.

These are, for example:

- IEC 60079-14 (international)
- EN 60079-14 (EC)
- SI 2016:1107 (as amended)
- Operational safety ordinance

## 2.10 Conformity to directives

The applied standards can be found in the Declaration of Conformity for the device.

### 2.10.1 Conformity to European directives

The CE mark on the device indicates its conformity to the following European directives:

2014/30/EU EMC	Directive of the European Parliament and of the Council on the approximation of the Laws of the Member States regarding electromagnetic compatibility.
2014/34/EU ATEX	Directive of the European Parliament and of the Council on the harmonisation of the Laws of the Member States relating to equipment and protection systems intended for use in potentially explosive atmospheres.
2011/65 EU RoHS	Directive of the European Parliament and Council to restrict the use of certain hazardous substances in electrical and electronic devices

### 2.10.2 Conformity to UK directives

The UKCA mark on the device indicates its conformity to the following directives:

SI 2016/1091	Electromagnetic Compatibility Regulations 2016 and related amendments
SI 2016/1107	The Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016 and related amendments
SI 2016/1101	The Electrical Equipment (Safety) Regulations 2016 and related amendments
SI 2012/3032	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 and related amendments

## 2.11 Use in potentially explosive areas



### **⚠ WARNING**

#### **Unsuitable device for potentially explosive areas**

Risk of explosion!

- ▶ Use only devices that are approved for use in Ex-zones and are marked accordingly.
- ▶ Make sure that the device is suitable for the area of use.



### **⚠ WARNING**

#### **Loss of safety of the device in the ignition protection class Intrinsic Safety "Ex i"**

If the device has already been operated on non-intrinsically safe circuits or with a higher operating voltage, the safety of the device for use in potentially explosive areas is no longer guaranteed. There is a danger of explosion!

- ▶ Connect the device in the ignition protection class Intrinsic Safety exclusively to an intrinsically safe electrical circuit.
- ▶ Observe the electrical data in the certificate.



### **⚠ WARNING**

#### **Impermissible accessories and impermissible spare parts**

Danger of explosion in potentially explosive areas or damage to the device!

- ▶ Use exclusively original accessories and original spare parts.
- ▶ Observe all relevant installation and safety instructions described in the manuals for the device, accessories and spare parts.



### **⚠ WARNING**

#### **Open cable entry or incorrect cable gland**

Danger of explosion in potentially explosive areas or damage to the device!

- ▶ Seal the cable entries for the electrical connections. Use exclusively cable glands or blanking plugs for this that are approved for the respective ignition protection class.



### **⚠ WARNING**

#### **Exceeding the maximum ambient or media temperature**

Risk of explosion in potentially explosive areas

The temperature class of the device is no longer valid if the maximum permissible ambient or media temperature is exceeded!

- ▶ Make sure that the maximum permissible ambient or media temperature of the device is not exceeded.



### **⚠ WARNING**

#### **Electrostatic charging of nameplates**

The nameplates used on the device can reach a charging capacity of 5 pF.

- ▶ Keep the device and the cables at a distance from strong electromagnetic fields.



## CAUTION

### **Electrostatically endangered assemblies**

The device contains electrostatically endangered assemblies. Electrostatically endangered assemblies can be destroyed by voltages far below the threshold of human perception. These voltages already occur if you touch a component or electrical connection without having electrostatically discharged yourself first. The damage caused to an assembly due to overvoltage is not usually immediately apparent and only becomes noticeable after a lengthy period of operation.

- ▶ Therefore, prevent electrostatic charging.

## 3 Transport, storage and packaging

### 3.1 Transport

Transport at a temperature lower than  $-40\text{ °C}$  or higher than  $+80\text{ °C}$  is not permissible.

### 3.2 Storage



#### NOTICE

##### Improper storage!

There is a danger of the product no longer functioning if it is stored improperly.

- ▶ Storage at a temperature lower than  $-40\text{ °C}$  or higher than  $+80\text{ °C}$  is not permissible.
- ▶ It must be stored in roofed-over storage places and that are weather-proof.

Openings are sealed with suitable means to prevent the ingress of dirt. These should be removed by technical personnel at the place of installation.



#### ⚠ CAUTION

##### Inadequate protection during storage

The packaging offers only limited protection against moisture and infiltration!

- ▶ Provide additional packaging if necessary.

### 3.3 Packaging

The product is packed in a PE film inside the outer packaging (cardboard box, wooden crate, pallet, lattice box).

If the packaging, in particular the PE film, has been opened, the product must be stored immediately in a heated room.

The product must be packed in weatherproof or seaworthy packaging for transport by ship, rail or truck.

### 4 Type plate

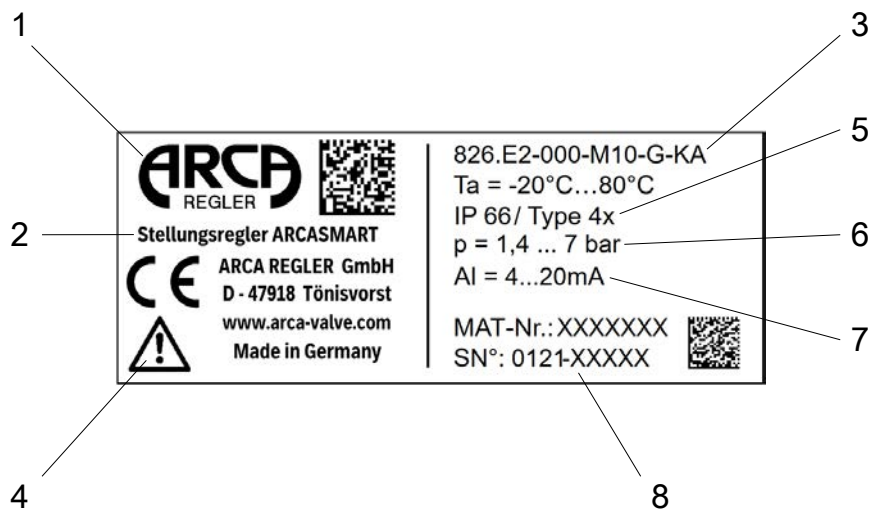


Illustration 2: 826 nameplate

1	Manufacturer
2	Device name
3	Type
4	Observe the operating manual
5	Protection class
6	Auxiliary energy (supply air)
7	Nominal signal range
8	Fabrication number

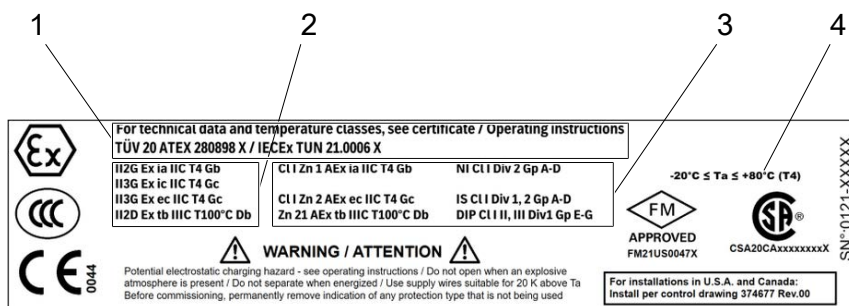


Illustration 3: 826\_nameplate\_EX

1	Approvals
2	ATEX/IECEx marking for potentially explosive areas
3	FM/CSA marking for potentially explosive areas
4	Permissible ambient temperature for operation in potentially explosive areas

## 5 Type key

<b>826</b>	<b>E</b>	<b>2</b>	<b>-</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>M</b>	<b>1</b>	<b>0</b>	<b>-</b>	<b>G</b>	<b>-</b>	<b>KA</b>
[1]	[2]	[3]	-	[4]	[5]	[6]	-	[7]	[8]	[9]	-	[10]	-	[11]

### 1. Series

826

### 2. Explosion protection

E	not explosion proof
X	Ex i (IS)
S	Ex i (IS); Ex e (NI)
D	Ex i (IS); Ex e (NI); Ex t (DIP)

### 3. Basic device connection

2	2-wire
---	--------

### 4. Analogue output

0	no analogue module
A	with analogue module

### 5. Binary output

0	no binary module
B	with binary module

### 6. Communication

0	without communication
H	with HART communication

### 7. Housing material /cover

M	Anodised aluminium / anodised aluminium
K	Anodised aluminium / plastic

### 8. Pneumatics

1	single-acting
2	double-acting

### 9. Position recording

0	Standard (contactless)
---	------------------------

### 10. Connecting thread electrical/pneumatic

G	M20x1.5 / G 1/4
N	1/2" NPT / 1/4" NPT
M	M20x1.5 / 1/4" NPT
P	1/2" NPT / G 1/4

### 11. Options Z

SE	Silencer, rust-proof stainless steel
ZD	Supply air restrictor
KA	Customised design

**Example of type designation**

826.E2-000-M10-G-KA

826 positioner - without explosion protection - 2-wire connection - without analogue module - without binary module - without communication - aluminium housing - single-acting - standard contactless position recording - connecting thread electrical M20x1.5 / pneumatic G ¼ - customised design



## 6 Description

### 6.1 Overview of the device components

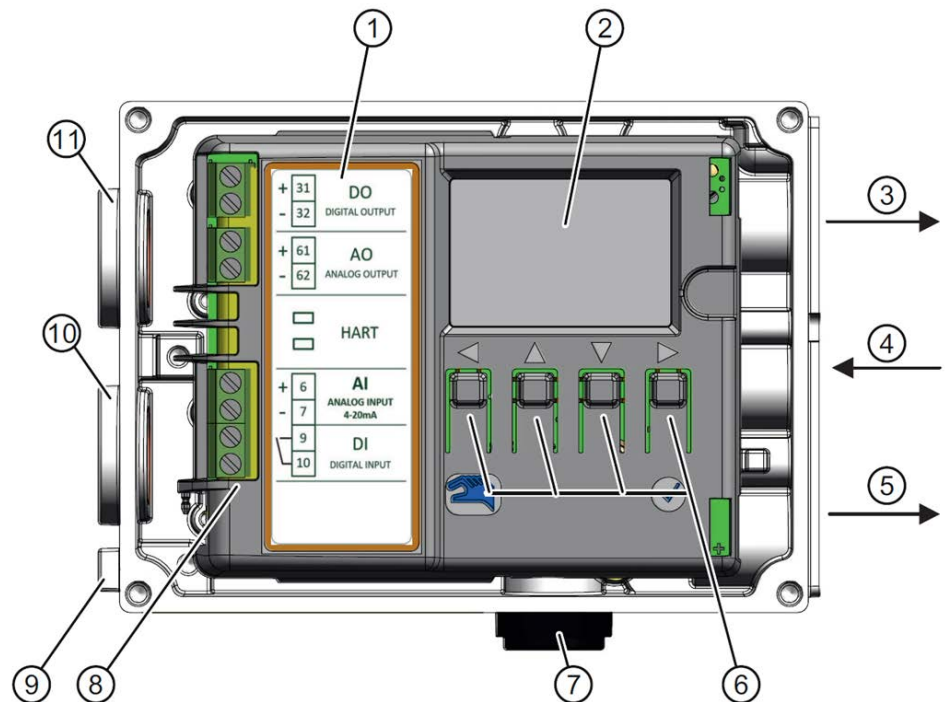


Illustration 4: View of positioner, lid open

1	Connection diagram on module cover
2	Display
3	Output: Actuation pressure Y1
4	Input: Supply air pressure PZ
5	Output: Actuation pressure Y2 on <input type="checkbox"/> double-acting actuators
6	Buttons
7	Exhaust air outlet with silencer
8	Connecting terminals
9	Earthing, M4 thread
10	Lower cable gland, thread M20x1.5
11	Upper cable gland, thread M20x1.5

Also refer to the chapter [9] *Pneumatic connection*

## 7 Assembly

### 7.1 Safety instructions for assembly



#### **⚠ CAUTION**

##### **Note before working on the control valve**

You must place the control valve in the safe position before working on it. Make sure that the control valve has reached the safe position. If you only interrupt the auxiliary pneumatic energy to the positioner, it may take a certain time for the safe position to be reached.

#### **CAUTION**

##### **Improper installation**

Improper installation can result in damage to the device, its destruction or the impairment of its function.

Ascertain that the device shows no visible signs of damage each time before installing it.

Ascertain that the process connections are clean and that suitable seals and cable glands are used.

Install the device using suitable tools.



#### **⚠ CAUTION**

##### **Mechanical impact**

It is essential that the following sequence is observed during installation in order to avoid injury or mechanical damage to the positioner/mounting kit:

- ▶ Mount mechanically the positioner
- ▶ Connect the pneumatic auxiliary energy
- ▶ Connect the auxiliary electrical energy supply
- ▶ Carry out the commissioning procedure



#### **⚠ CAUTION**

##### **Humid environment/dry compressed air**

If the environment is humid, mount the positioner in such a way that there is no chance of the positioner axle freezing (getting stuck) at low ambient temperatures.

Make sure that water does not enter an open housing or screw connection. If the positioner cannot be immediately and permanently mounted and connected on site, it is possible for water to enter.

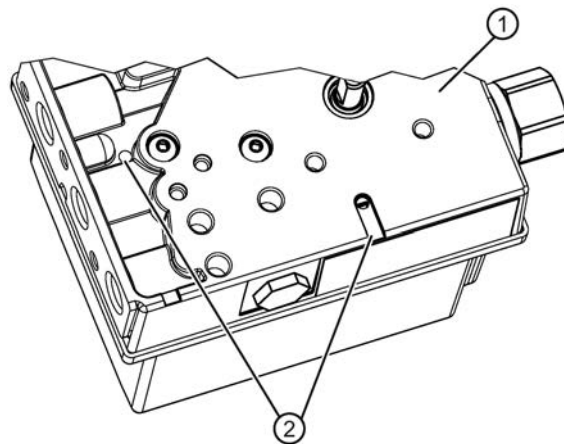
In general, only dry compressed air may be used to operate the positioner. Also refer to the chapter Technical data. You should therefore make use of the usual water separators. In extreme cases it may be necessary to use an additional dryer. The use of dryers is particularly important if you operate the positioner at low ambient temperatures.

#### **ATTENTION**

##### **Icing of the exhaust air outlets**

The exhaust air outlets (2) can ice up. The function of the device is impaired.

- Do not assemble the positioner with the baseplate (1) facing up.



1	Baseplate
2	Exhaust air outlets

Illustration 5: Exhaust air outlets, baseplate

## 7.2 Mounting a linear actuator

### 7.2.1 Mounting with mounting kit for "Integrated Fitting Linear Actuator"

Included with the "integrated fitting linear actuator" are (see figures below for serial numbers):

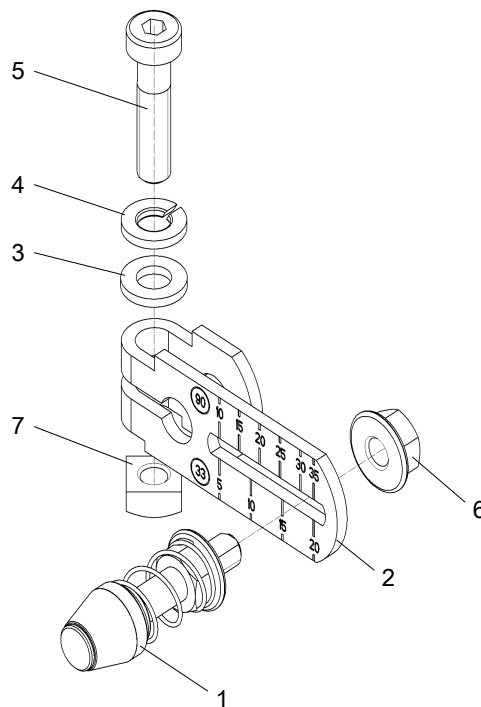
Serial no.	No. of items	Name	Note
1	1	Driver pin cpl. with roller	mounted on lever (2)
2	1	Lever	
3	1	Washer	B6.4 - DIN 125 - A2
4	1	Spring lock washer	A6 – DIN 127- A2
5	1	Cylinder screw	M6 x 25 - DIN 7984 - A2
6	1	Hex nut	M6 - DIN 6923 – A2
7	1	Square nut	M6 - DIN 557 - A4
8	2	Cylinder screw	M8 x 65 - DIN 912 - A2
9	2	Spring lock washer	A8 - DIN 127 - A2
10	1	Screw plug	R1/4 – DIN 906 – A4
11	1	O-ring	13 x 2.5

**Mounting procedure (see figures below)**

- Fig. 5: Adjust the pin (1) on the previously assembled lever (2) to the value of the stroke range given on the actuator or, if this is not available as a scale value, to the next larger scale value. In case of uncertainty with regard to the actual working stroke (pneumatic actuators often have a setting distance reserve), the next larger scale value should be selected. The centre of the pin should rest on the scale line on the lever (2).

2. Fig. 6: Push the lever (2) to the stop on the positioner axle, and fix it with cylinder screw (5). The maximum tightening torque of 8/6 [Nm/lbf ft] must not be exceeded when doing this.
3. Open the rear actuation pressure outlet by removing the screw (12) and the O-ring (13).
4. When fitting with spring chamber exhaust air ventilation open the exhaust air outlet by removing the screw (14) and the O-ring (15).
5. Fig. 7: Seal the actuation pressure outlet with screw plug (10). When fitting with exhaust air ventilation remove exhaust air silencer and seal.
6. Insert the O-ring (11) in the yoke recess.
7. Locate the positioner on the actuator in such a way that the roller passes between the pins (16).
8. Align the positioner horizontally at the yoke, and assemble it with the screws (8) and spring lock washers (9).

**Assembly procedure plan -  
integrated fitting**



*Illustration 6: Lever mounted*

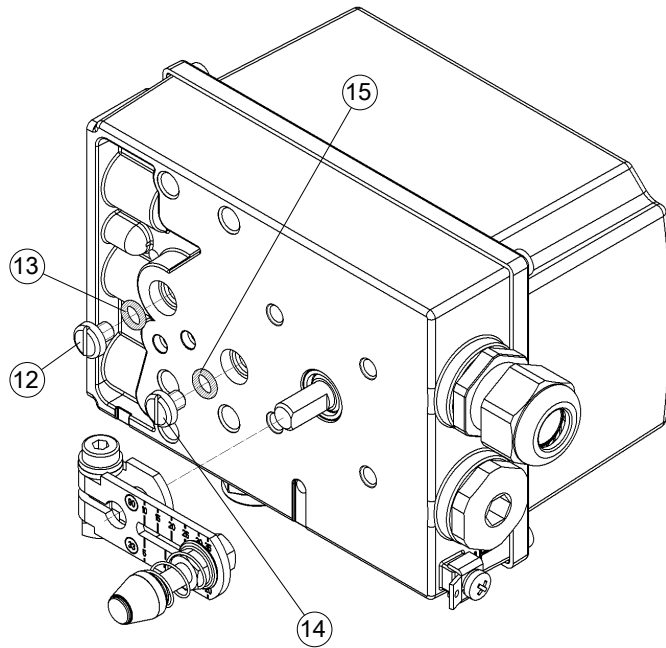


Illustration 7: Mounting the lever on the positioner

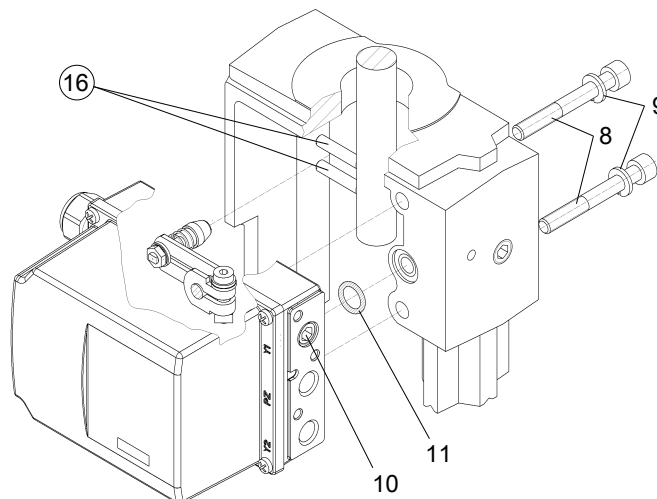


Illustration 8: Mounting the positioner on the actuator

### 7.2.2 Mounting with mounting kit "Linear actuator IEC 60534"

Included with the mounting kit "Linear actuator IEC 60534", stroke 3 to 35 mm, are (see figures below for serial numbers):

Serial no.	No. of items	Name	Note
1	1	Driver pin cpl. with roller	mounted on lever (2)
2	1	NAMUR lever	for stroke range 3 mm to 35 mm, or (order separately for stroke range > 35 mm to 130 mm, see Fig. 10)
3	2	Washer	B 6.4 - DIN 125 - A2

4	3	Spring lock washer	A6 - DIN 127 - A2
5	3	Cylinder screw	M6 x 25 - DIN 7984 - A2
6	1	Hex nut	M6 - DIN 6923 - A2
7	1	Square nut	M6 - DIN 557 - A4
9	6	Spring lock washer	A8 - DIN 127 - A2
17	1	NAMUR mounting bracket IEC 60534	standardised connecting location for mounting bracket with rib, column or flat surface
18	1	Sensing hoop	Guides the roller with the driver pin and turns the lever arm
19	2	Clamping piece	Assembly of the sensing hoop to the actuator's stem
20	2	U-bolts	Only for actuators with columns
21	2	Hex screw	M8 x 16 - DIN 933-A2
22	6	Washer	B 8.4 - DIN 125 - A2
23	4	Hex screw	M8 x 20 - DIN 933-A2
24	4	Hex nut	M8 - DIN 934 - A4

**Mounting procedure (see figures below)**

1. Fig. 9: Assemble the clamping pieces (19) using the cylinder screws (5) and spring lock washers (4) to the actuator stem.
2. Push the sensing hoop (18) into the cut-outs in the clamping pieces (19). Adjust to the required length, and tightened the screws (5) so that it is still just possible to push the sensing hoop.
3. Fig. 10: Adjust the pin (1) on the previously assembled lever (2) to the value of the stroke range given on the actuator or, if this is not available as a scale value, to the next larger scale value. In case of uncertainty with regard to the actual working stroke (pneumatic actuators often have a setting distance reserve), the next larger scale value should be selected. The centre of the pin should rest on the scale line on the lever (2).
4. Push the lever (2) to the stop on the positioner axle, and fix it with cylinder screw (5). The maximum tightening torque of 8/6 [Nm/lbf ft] must not be exceeded when doing this.
5. Fig. 11: Mount the mounting bracket (17) to the rear of the positioner with two hex screws (21), spring lock washer (9) and washers (22). The choice of the row of holes depends on the width of the actuator's lantern width. The roller should engage in the sensing hoop (18) as close to the stem as possible, but must not touch the clamping pieces (19).
6. Fig. 12: Hold the positioner with the fixing angle to the actuator in such a way that the pin (1) passes inside the sensing hoop (18).
7. Tighten the sensing hoop (18).
8. Prepare the assembly parts in accordance with the actuator type:
  - Actuator with a rib: hex screw (23), washer (22) and spring lock washer (9).
  - Actuator with a flat surface: four hex screws (23) with washer (22) and spring lock washer (9).
  - Actuator with columns: two U-bolts (20), four hex nuts (24) with washer (22) and spring lock washer (9).

- Attach the positioner with the previously prepared assembly parts to the yoke. Adjust the height of the positioner so that the horizontal position of the lever is achieved as close as possible to the centre of the stroke. The actuator's lever scale provides orientation here. It is essential that the horizontal lever position is passed through within the stroke range.

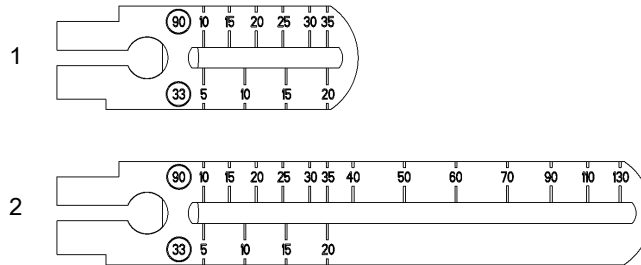


Illustration 9: NAMUR lever 3 mm to 35 mm (1), NAMUR lever > 35 mm to 130 mm (2)

**Assembly procedure - linear actuator IEC**

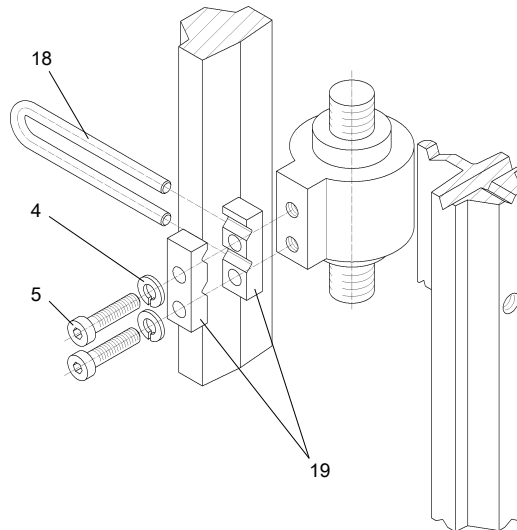


Illustration 10: Mounting the feedback lever on the actuator stem

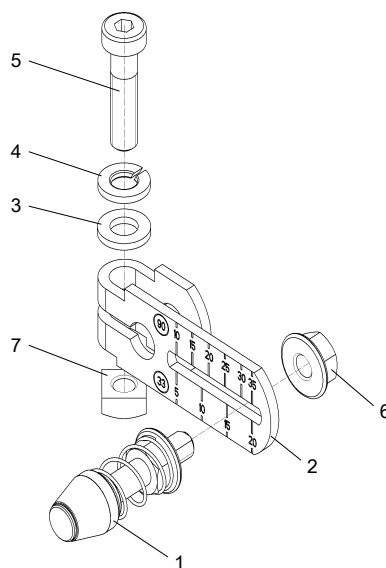


Illustration 11: Lever mounted

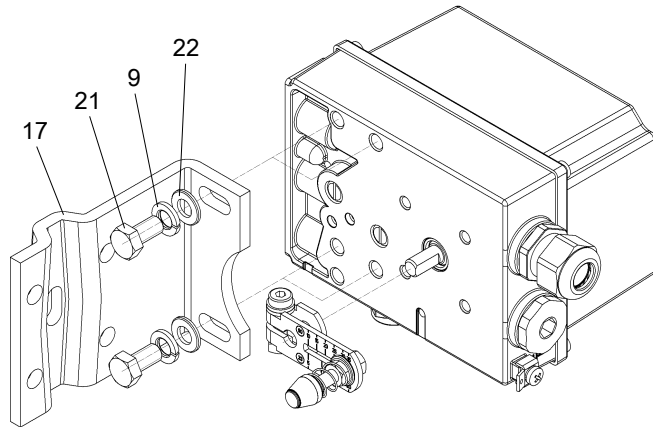


Illustration 12: Assembly with mounting bracket

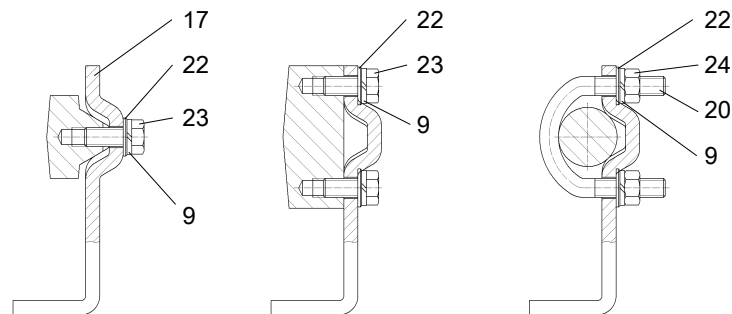


Illustration 13: Fastening to different types of yoke

### 7.3 Mounting with mounting kit "Rotary actuator VDI/VDE 3845"

Included with the mounting kit "Rotary actuator VDI/VDE 3845", are (see figures below for serial numbers):

Serial no.	No. of items	Name	Note
3	1	Washer	B6.4 - DIN125 - A2
25	1	Coupling wheel	Mounting on the axle of the positioner
26	1	Driver	Fitted to the actuator's shaft stub
27	1	Labels	Display of the actuator position, consisting of scale and pointer
	8	Scale	Various divisions
	1	Pointer	Reference point for scale
28	4	Hex screw	M6 x 12 - DIN933 - A2
29	4	Lock washer	S6
30	1	Cylinder screw	M6 x 12 - DIN84 - A2
31	1	Mounting bracket VDI/VDE3845	
32	1	Square nut	M4 - DIN562 -A2

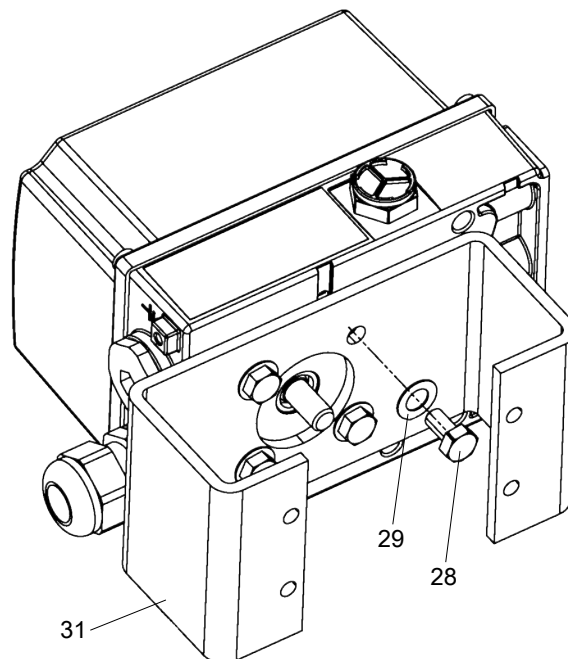


33	1	Hexagon socket screw	M4 x 10 - DIN916 - A2
34	1	Allen key	for item 33

**Mounting procedure (see figures below)**

1. Fig. 13: Attach the VDI/VDE 3845 mounting bracket (31), actuator-specific, supplied by actuator manufacturer, to the rear of the positioner, and fix it in place with the hex screws (28) and lock washers (29).
2. Insert square nut (32) into the coupling wheel (25), screw the hexagon socket screw (33) into the square nut (32).
3. Fig. 14: Push the coupling wheel (25) as far as it will go on the positioner axle, pull it back about 1 mm and tighten the hexagon socket screw (33) with the supplied Allen key (34).
4. Fig. 15: Place the driver (26) on the actuator's shaft stub and tighten it with cylinder screw (30) and washer (3).
5. Fig. 16: Carefully place the positioner with the mounting bracket on the actuator. One of the two pins (35) of the coupling wheel (25) must engage in the driver (26).
6. Fig. 17: Align the positioner / mounting bracket centrally on the actuator, and screw tight (screws are not included with the supply, but are part of the actuator's mounting bracket!).

**Assembly procedure for VDI/VDE 3845 rotary actuator**



*Illustration 14: Mounting bracket*

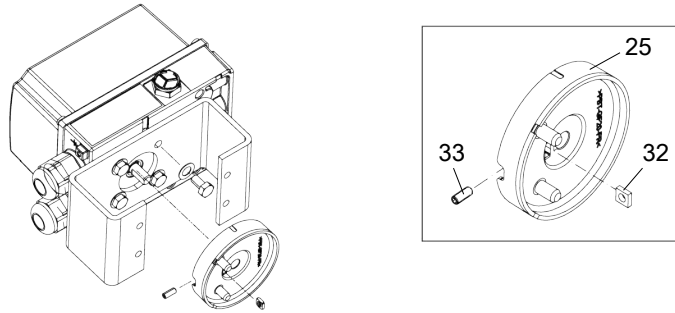


Illustration 15: Coupling wheel

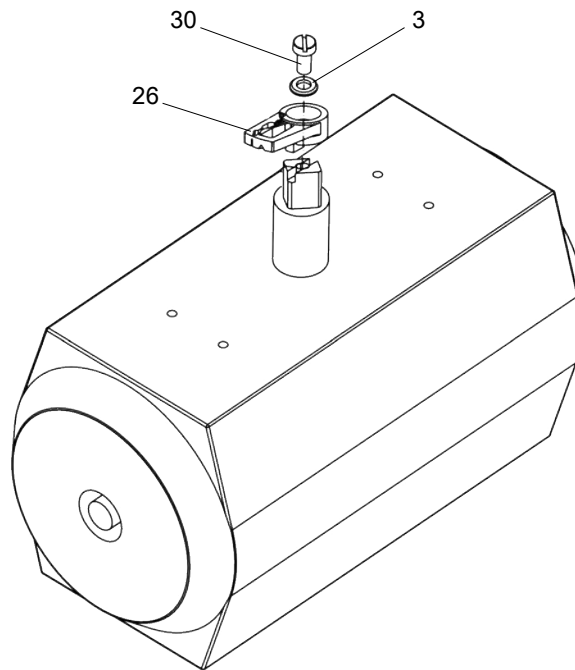


Illustration 16: Mounting the driver on the actuator

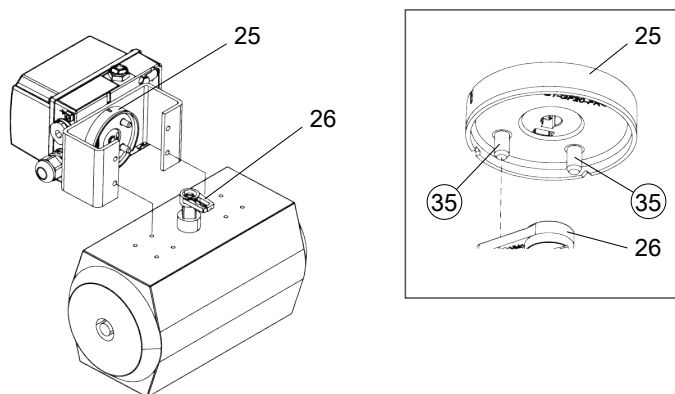


Illustration 17: Alignment of mounting bracket

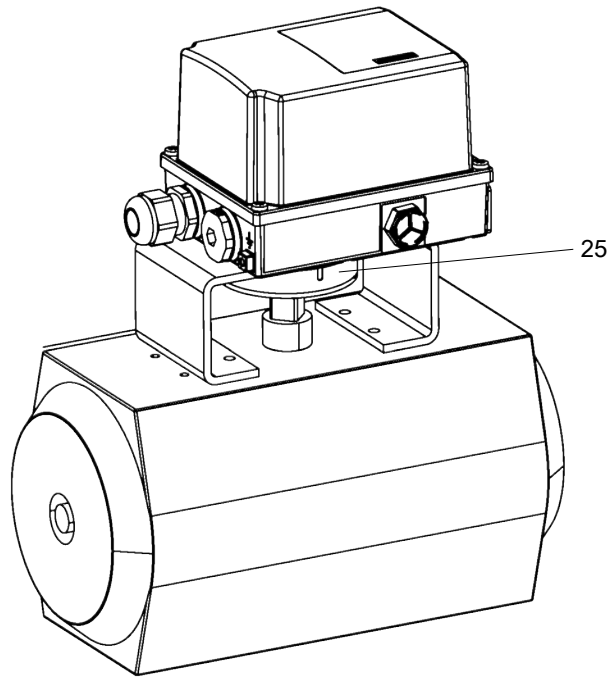


Illustration 18: Positioner with mounting bracket fitted on rotary actuator

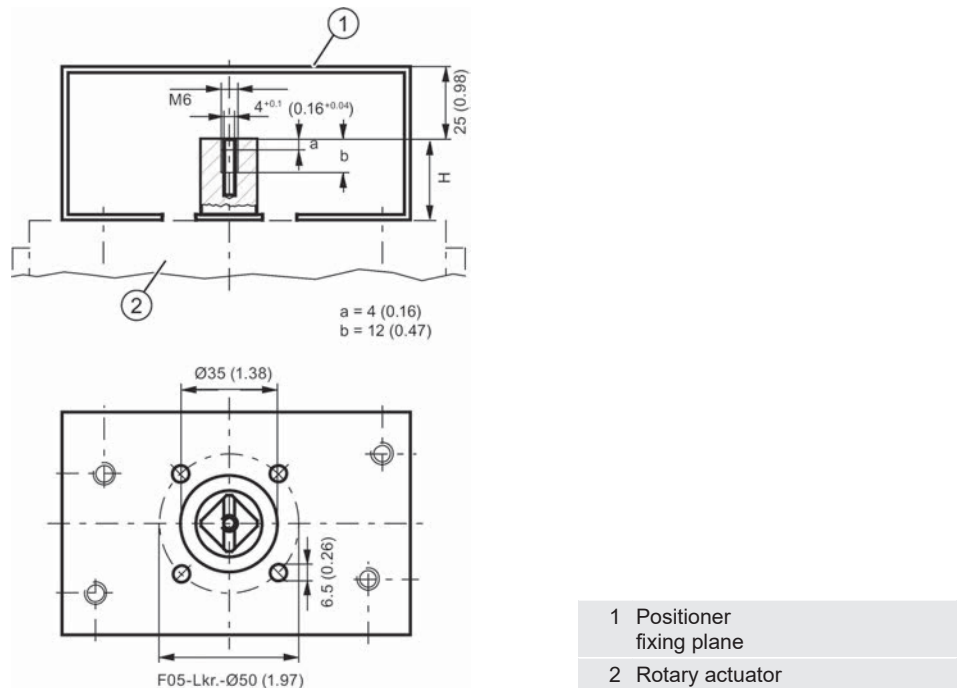


Illustration 19: Mounting bracket (supplied by the actuator manufacturer) and dimensions

## 7.4 Use of positioners in humid environment

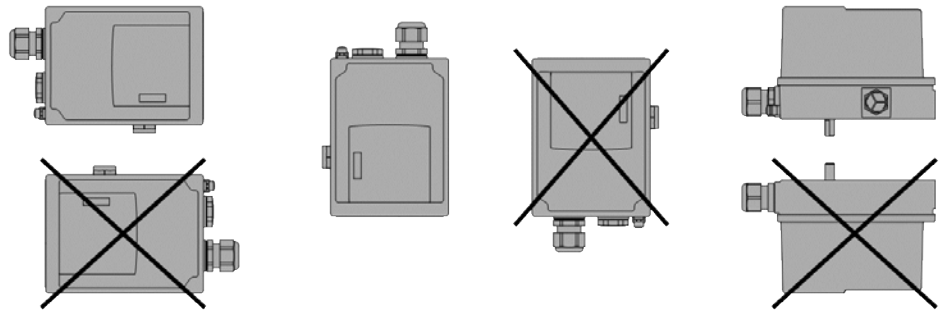
### CAUTION

Never clean the positioner with a high pressure cleaner. Protection class IP66 is inadequate for this.

This information provides you with important notes on mounting and operating the positioner in wet environments (frequent heavy rain and/or persistent tropical condensation) in which protection class IP66 is no longer sufficient, in particular when there is a risk that the water might freeze.

**Avoid unfavourable mounting positions:**

- in order to prevent the penetration of liquids into the device, e.g. through the exhaust air openings, during normal operation.
- As the digital display is otherwise difficult to read.



*Illustration 20: Favourable and unfavourable mounting positions*

If local conditions force you to operate the positioner in an unfavourable mounting position, you can prevent the entry of water through additional measures.

**Additional measures**

The additional steps necessary to prevent the entry of water depends on the mounting position chosen. In certain cases you may need:

- Screw connection with sealing rings (e.g. FESTO: CK -1/4 -PK-6)
- Plastic hose, approx. 20 to 30 cm (e.g. FESTO: PUN- 8X1.25 SW)
- Cable ties (number and length depend on the local conditions)

**Procedure**

1. Assemble the pipeline in such a way that rainwater or condensation that runs along the length of the pipes can drip off before reaching the positioner's connection strip.
2. Check that the seals for the electrical connections are correctly seated.
3. Check that the seal of the housing cover is not damaged or soiled. Clean or replace it if necessary.
4. If possible, mount the positioner in such a way that the sintered bronze silencer on the underneath of the housing is pointing downwards (vertical mounting position). If this is not possible, the silencer should be replaced by a plastic hose using a suitable screw connection.

**Assembling the screw connection with plastic hose**

1. Unscrew the silencer from the exhaust air opening on the underside of the housing.
2. Screw the screw connection mentioned above into the exhaust air opening.
3. Fit the plastic hose mentioned above to the screw connection and check that it is tightly seated.

4. Use a cable tie to fasten the plastic hose to the valves in such a way that the opening is pointing downwards.
5. Check that the hose is not kinked, and that the exhaust air can flow out easily.

## 8 Electrical connection

### Basic safety instructions



#### **⚠ WARNING**

##### **Inappropriate power supply**

Risk of explosion in potentially explosive areas in case of inappropriate power supply, e.g. if alternating current is used instead of direct current.

- ▶ Connect the device in accordance with the prescribed supply and signal circuits. The applicable regulations can be found in the certificates or on the nameplate.



#### **⚠ WARNING**

##### **Unsafe low-voltage power supply**

Risk of explosion in potentially explosive areas due to voltage flashover.

- ▶ Connect the device to a low-voltage power supply with safe isolation.



#### **⚠ WARNING**

##### **Connection of the device when live**

Risk of explosion in potentially explosive areas

- ▶ Connect the device in potentially explosive areas only when switched off.

⇒ **Exceptions:** energy-restricted circuits may be connected in potentially explosive areas even when live.



#### **⚠ WARNING**

##### **Missing potential equalisation**

If there is no potential equalisation, there is a risk of explosion in potentially explosive areas due to equalising current or ignition sparks.

- ▶ Make sure that potential equalisation is available for the device.

⇒ **Exceptions:** in the case of devices with the ignition protection class Intrinsic Safety "Ex i" it may be possible to dispense with potential equalisation.



#### **⚠ WARNING**

##### **Unprotected wire ends**

Risk of explosion in potentially explosive areas due to unprotected wire ends.

- ▶ Protect unused wire ends according to IEC/EN 60079-14.



### **⚠ WARNING**

#### **Improper routing of shielded cables**

Risk of explosion due to equalising currents between the potentially explosive area and areas that are not potentially explosive.

- ▶ Earth shielded cables leading into the potentially explosive area at one end only.
- ▶ In case of earthing at both ends, lay a potential equalisation conductor.



### **⚠ WARNING**

#### **Unsuitable cables and/or cable glands**

Risk of explosion in potentially explosive areas and if cables and/or cable glands are connected that do not match each other or do not meet the technical requirements.

- ▶ Use only cables and cable glands that meet the specified requirements.
- ▶ Tighten the cable glands according to the specified torques.
- ▶ When replacing cable glands, use only cable glands of the same type.
- ▶ Check for firm seat tightness of the cables after installation.

### **CAUTION**

#### **Formation of condensation in the device**

Damage to the device due to the formation of condensation when the temperature difference between transport or storage and the place of installation is more than 20 °C.

- Leave the device to stand for a few hours in the new environment before putting it into operation.

### **CAUTION**

#### **Excessively high ambient temperature**

Damage to the cable insulation.

- If the ambient temperature is  $\geq 60$  °C, use heat-resistant cables designed for an ambient temperature at least 20 °C higher.

### **CAUTION**

#### **Connection of a voltage source to a current input**

Damage to the device if a voltage source is connected to the current input  $I_w$  (terminals 6 and 7).

- Never connect the current input  $I_w$  to a voltage source, otherwise the positioner can be destroyed.
- Always use a current source with a maximum output current  $I$  of 20 mA.



**⚠ WARNING**

**"Ex i" version**

Only certified, intrinsically safe electrical circuits may be connected as auxiliary power, control or signal circuits.

For reasons of tightness (IP housing protection class) and the necessary tensile strength, use only cables with diameter of  $\geq 8$  mm (or a suitable sealing insert in the case of smaller cable diameters) with the standard cable gland M20x1.5.

In the NPT version the positioner is supplied with an adaptor. Make sure when inserting a mating part in the adaptor that the maximum permissible torque of 10 Nm is not exceeded.

**2-wire operation**

To maintain the auxiliary energy, the input current  $I_w$  must be 3.6 mA.

**8.1 Electrical connection**

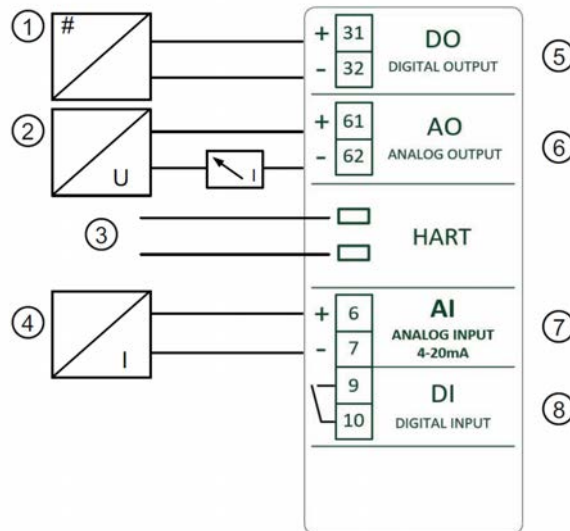


Illustration 21: Electrical connection diagram

1 Digital input or switching amplifier	5 Digital output
2 Power source DC 12 to 30 V	6 Analogue output position feedback
3 HART plug	7 Analogue input current input 4-20 mA
4 Signal source 4-20 mA	8 Digital input (potential-free contact)

**8.2 Earthing**

The positioner is earthed using the mounting kit or using the earth with M4 thread on the housing, (9) in Overview of the device components (Page 15).



## 9

## Pneumatic connection


**⚠ WARNING**

For reasons of safety, the auxiliary pneumatic energy should only be connected after assembly when, in the presence of an electrical signal, the positioner is in “NO INIT” operating mode.

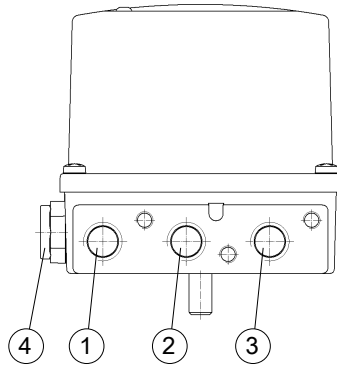


Illustration 22: Pneumatic connection

1 Output: Actuation pressure Y2 <sup>*)</sup>	3 Output: Actuation pressure Y1
2 Input: Supply air pressure PZ	4 Exhaust air outlet with silencer, thread G1/4

<sup>\*)</sup> double-acting actuators

**Also refer to chapter [6.1] Overview of the device components**

**ATTENTION**

Ensure correct air quality!

Oil-free, instrument air with no water or dust, solid material content max. 1 mg/m<sup>3</sup> (standard atmospheric conditions), max. particle size 1 mm, oil content max. 0.1 mg/m<sup>3</sup> (standard atmospheric conditions), pressurised dew point 20 K below the lowest ambient temperature.

When working on the compressed air system ensure that any contamination present such as water, oil, chips, soldering material residues, etc. are expelled by blowing out.

**Procedure:**

- If appropriate, connect manometer block for supply air and actuation pressure.
- Connection via internal thread:
  - P<sub>z</sub>: Supply air pressure 1.4 to 7 bar
  - Y1: Actuation pressure 1 for single-acting and double-acting actuators
  - Y2: Actuation pressure 2 for double-acting actuators
  - E: Exhaust air output (remove silencer if necessary)
- Safety position at failure of auxiliary electrical energy:
  - Single-acting: Y1 = vented
  - Double-acting: Y1 = max. actuation pressure (supply air pressure)
  - Double-acting: Y2 = vented

4. Connect actuation pressure Y1 or Y2 (double-acting actuators only) according to the desired safety position.
5. Connect supply air pressure to  $P_z$ .

So that spring-loaded pneumatic actuators can reliably exploit the maximum possible setting distance, it is necessary that the supply pressure exceeds the maximum required final pressure of the actuator by a sufficient margin.

Check the leak-tightness of the entire pipeline after mounting the pneumatic connections. Apart from constant consumption of air, a leak results in the positioner constantly trying to correct the position deviation. The consequence is premature wear of the entire control device.

## 10 Commissioning



### ⚠ WARNING

#### Improper commissioning in potentially explosive areas

Failure of device or risk of explosion in potentially explosive areas

- ▶ Do not put the device into operation until it is completely assembled and connected.
- ▶ Consider the effects on other devices in the plant before commissioning.



### ⚠ WARNING

#### Loss of the explosion protection

Risk of explosion in potentially explosive areas due to open or improperly closed device.



### ⚠ WARNING

#### Opening the device when live

Risk of explosion in potentially explosive areas

- ▶ Open the device only when it is switched off.
  - ▶ Before commissioning, check that the cover, the cover fastenings and the cable glands have been fitted properly.
- ⇒ **Exceptions:** devices of the ignition protection class Intrinsic Safety "Ex i" may also be opened in a potentially explosive area when switched on.



### ⚠ WARNING

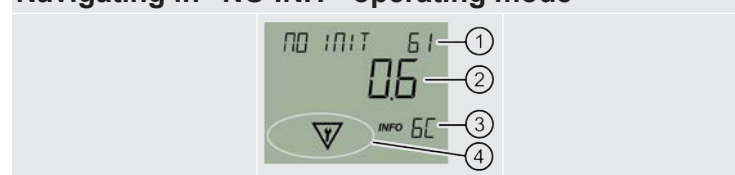
#### Risk of crushing from lever for position recording

When putting the positioner into operation, the valve may make a sudden movement. When the positioner is in the "NO INIT" operating mode, the valve starts moving as soon as you push the left-hand button on the positioner. Risk of crushing and shearing with mounting kits that use a lever for recording the position. When starting up and whilst operating, the lever may sever or crush limbs. Risk of injury when working on control valves due to the high actuating force of the pneumatic actuator.

- ▶ Once the positioner and mounting kit have been fitted, no longer reach into the lever's movement range.

### 10.1 Local operation

#### Navigating in "NO INIT" operating mode



Initialise		Configure
	Valve open/ closed	

- 1 Operating mode and setpoint in percent
- 2 Position recording angle in degrees
- 3 Information (chapter [15.2] *Info IDs*)
- 4 Symbols for device status (chapter [15.1] *Device status*)

**Navigating in “AUTO” operating mode**

MANUAL		Configure
	No function	

**Navigating in “MANUAL” operating mode**

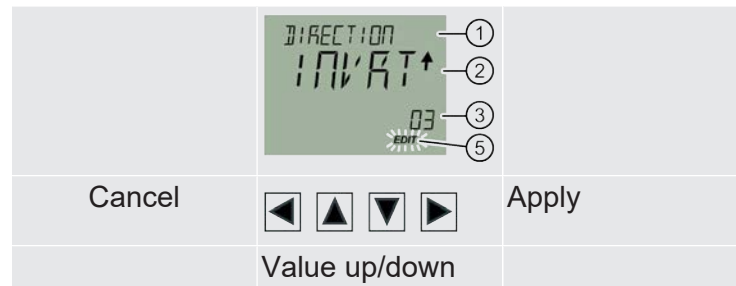
AUTO		Configure
	Valve open/ closed	

- 1 Operating mode and setpoint in percent
- 2 Valve position in percent
- 3 Information (chapter [15.2] *Info IDs*)
- 4 Symbols for device status (chapter [15.1] *Device status*)

**Navigating in “Parameter view” operating mode**

Change AUTO, MANUAL		Next
	Parameter up/ down	

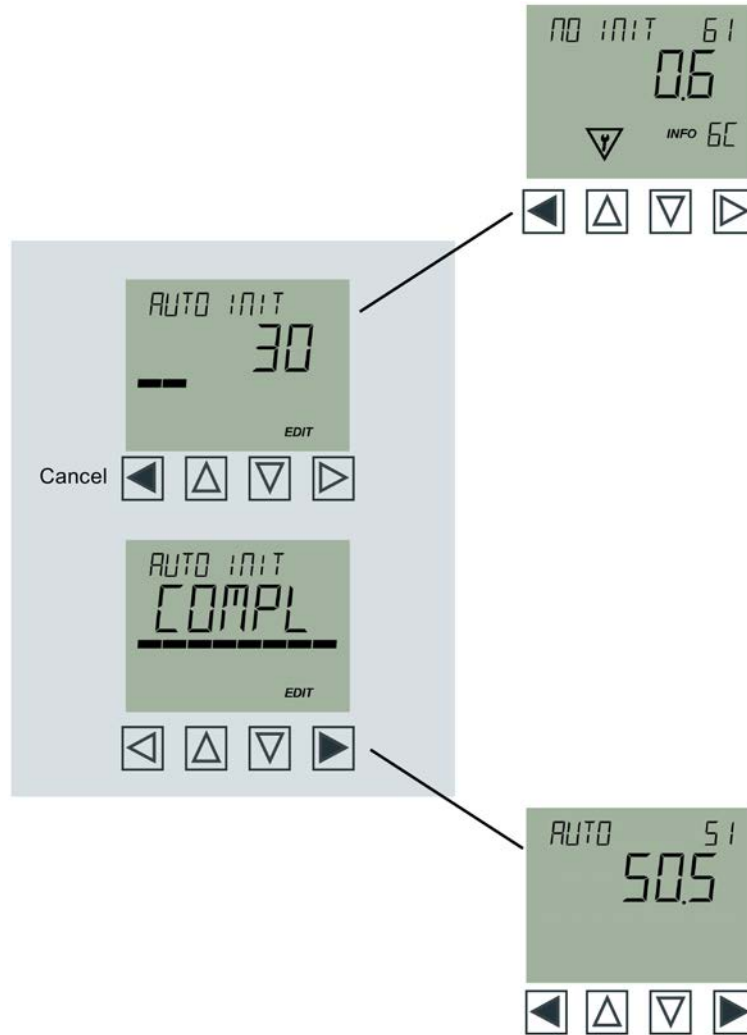
**Navigating in “Edit view” operating mode**



1	In parameter view: Parameter name In edit view: Name or unit of the parameter (alternating)
2	Parameter value
3	Parameter ID
4	EDIT permanently activated
5	EDIT flashing

### 10.2 Initialising in "NO INIT" operating mode

If "NO INIT" is shown in the display, this means that the device is not initialised, info ID (chapter [15.2] *Info IDs*) [6C]. Put the device into operation by initialising with "NO INIT".

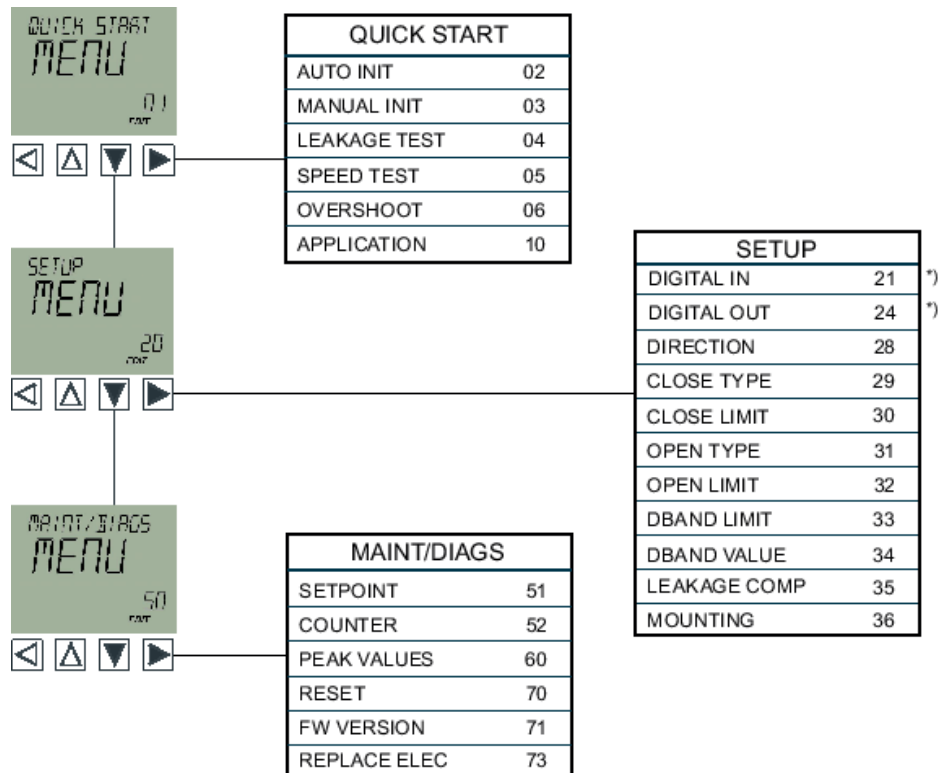


## 11 Parameter overview

### 11.1 Menu structure overview

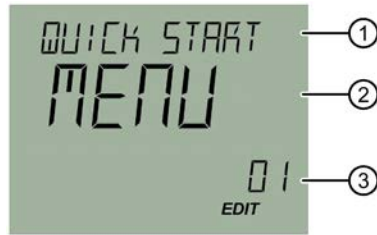
**NOTICE!** Parameter ID on the display

The overview of the menu structure, apart from the menus and parameters, also contains the parameter IDs. These parameter IDs are added to the explanations of the menus and parameters below in [ ]. Example "AUTO INIT" [02].



\*) Visible when device option 1 is installed with digital input (DI) and digital output (DO).

### 11.2 Quick Start



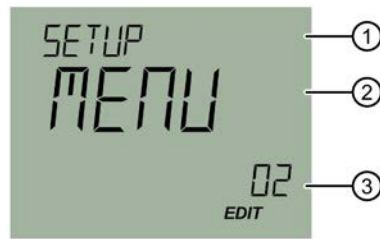
(3)	(1)	(2)	Meaning
02	AUTO INIT	WIZ	Assistant for automatic initialisation of the valve. End positions are automatically determined.
03	MANUAL INIT	WIZ	Assistant for manual initialisation of the valve. Specify the end positions manually in this assistant.
04	LEAKAGE TEST	WIZ	Assistant to determine the pneumatic leakage. Stroke movement caused by leakage in %/minute.
05	SPEED TEST	WIZ	Assistant to determine the actuating times in seconds.
06	OVERSHOOT	WIZ	Assistant to determine the overshoot in % in relation to the total stroke. On overshoot of less than 3 % is shown in the display as "Ok".
10	APPLICATION	Selection of the application profile.	
		AUTO	Basic setting, suitable for all applications.
		TIGHT	Tight-fitting valve. Move valve with maximum actuating force in the end positions.
		FAST	Dynamic valve. Valve with fast control reaction
		EXACT	Valve with precise control reaction
		ONOFF	Open/Closed valve that moves into the end positions with maximum actuating force.
		BOOST	Valve with booster
SMALL	Small valve with attenuated control reaction		

WIZ = Assistant



### 11.3 Setup

Setting the device parameters.



Parameter values set at the factory are printed bold in the table.

(3)	(1)	(2)	Meaning
21	DIGITAL IN	MENU	Menu for setting the digital inputs. Available when option is installed with digital input (DI) and digital output (DO).
		<b>NONE</b>	Digital input is not active.
		HOLD	Holds the current valve position.
		BUTTN	Activates the button lock. Operation no longer possible.
		MSG	Activates the digital output.
		GO CL	When digital input is activated, moves to the valve position as set in "CLOSE LIMIT" [30] parameter.
23	POLARITY DI	<b>HIGH</b>	Normally Open: Normally open contact
		LOW	Normally Closed: Normally closed contact
24	DIGITAL OUT	MENU	Menu for setting the digital outputs. Available when "Digital Input/Digital Output (DI/DO)" option is installed.
		<b>NONE</b>	Digital output is not active.
		ERR	Activates the digital output in case of control deviation or device error.
		<b>ERR M</b>	Activates the digital output in case of manual mode, control deviation or device error.
		<b>HIGH</b>	Normally Open: Normally open contact
		LOW	Normally Closed: Normally closed contact
28	DIRECTION	<b>AUTO</b>	Working direction automatically detected during initialisation
		INVRT	Inverted working direction
29 *)	CLOSE TYPE	<b>FAST</b>	Fast reaction in end positions
		TIGHT	Maximum actuating force in end positions
		SLOW	Precise reaction in end positions
		LIMIT	Precise response, controlled to the value of "CLOSE LIMIT" [30].
30*)	CLOSE LIMIT	<b>0.0 ... 100.0</b>	Sets the value in % from which the valve closes.
31*)	OPEN TYPE	<b>FAST</b>	Fast reaction in end positions
		TIGHT	Maximum actuating force in end positions
		SLOW	Precise reaction in end positions
		LIMIT	Precise reaction, regulated to the value of "OPEN LIMIT" [32].

32*)	OPEN LIMIT	0.0 ... <b>100.0</b>	Sets the value in % from which the valve opens.
33*)	DBAND LIMIT	0.1 ... 3.0	Maximum range of the dead zone in %
34*)	DBAND VALUE	x.x	Current value of the dead zone
35	LEAKAGE COMP	<b>ON</b>	Activated leakage compensation
		OFF	Deactivated leakage compensation
36	MOUNTING	<b>AUTO</b>	Automatic determination of the actuator
		LEVER	Fitted to linear actuator, driver pin fitted on lever
		STEM	Fitted to linear actuator, driver pin fitted on stem
		TURN	Fitted to rotary actuator

\*) Visible if "AUTO" is selected in "QUICK START" > APPLICATION [10].

## 11.4 Maint/Diags

Service menu



(3)	(1)	(2)	Meaning
51	SETPOINT	##.##	Display current setpoint in mA. Status bar (1) alternately shows the parameter name or the set unit.
52	COUNTER	MENU	
53	OPERATE TIME	#####	Display number of operating hours.
54	DIRECTN CHNG	#####	Number of direction changes
55	STROKES	#####	Display added up strokes. One stroke corresponds to a total of 200 %.
56	PILOT 1 PIC2 01	#####	Number of operating cycles for pilot valve 1
57	PILOT 2 PIC2 02	#####	Number of operating cycles for pilot valve 2
60	PEAK VALUES	MENU	
61	TIME OPEN	##.#	Time in seconds until valve is open.
62	TIME CLOSE	##.#	Time in seconds until valve is closed.
63	ELEC TMP MIN	##.##	Lowest measured electronics temperature in °C
64	ELEC TMP MAX	##.##	Highest measured electronics temperature in °C
70	RESET	FACT	Restore factory settings
71	FW VERSION	#####	Show FW version in display.
73	REPLACE ELEC	WIZ	Assistant for calibrating new electronics. Needed for PIN LOCK 2457

## 12 Service and maintenance

### Basic safety instructions



#### **⚠ WARNING**

##### **Impermissible repair of the device**

Repairs may be carried out only by authorised personnel.

#### **CAUTION**

##### **Penetration of moisture into the device**

Damage to the device

- Make sure that no moisture gets into the device during cleaning and maintenance work.



#### **⚠ CAUTION**

##### **Cancelling the key lock**

Improper changing of parameters can impair the process safety.

- ▶ Make sure that only authorised personnel cancel the key lock if the device is used for safety applications.



#### **⚠ WARNING**

##### **Impermissible accessories and impermissible spare parts**

Risk of explosion in potentially explosive areas or damage to the device.

- ▶ Use exclusively original accessories and original spare parts.
- ▶ Observe all relevant installation and safety instructions described in the manuals for the device, accessories and spare parts.



#### **⚠ WARNING**

##### **Improper connection following maintenance**

Risk of explosion in potentially explosive areas or damage to the device

- ▶ Connect the device correctly following maintenance.
- ▶ Close the device after maintenance.



#### **⚠ WARNING**

##### **Electrostatic charging**

Risk of explosion in potentially explosive areas due to electrostatic charging, which can occur, for example, when cleaning housings with a dry cloth.

- ▶ Prevent electrostatic charging in potentially explosive areas.

**⚠ WARNING****Open housing**

Risk of explosion in potentially explosive areas due to hot components and/or charged capacitors in the interior of the device.

▶ Switch the device off before opening it in a potentially explosive area.

⇒ **Exceptions:** devices of the ignition protection class Intrinsic Safety "Ex i" may also be opened in a potentially explosive area when switched on.

**⚠ WARNING****Dust deposits thicker than 5 mm**

Risk of explosion in potentially explosive areas. The device can heat up as a result of dust deposits.

▶ Remove dust deposits that are thicker than 5 mm.

The positioner requires almost no maintenance. Filters are fitted to the pneumatic connections to protect the positioner against large particles of dirt. Dirt present in the supply air can collect on the filter and then adversely affect the operation of the positioner (increased actuating time). In such a case, the filters can be cleaned as follows:

1. Switch off the auxiliary pneumatic energy and disconnect the pipeline.
2. Carefully remove the metal filters from the holes and clean them (e.g. with compressed air).
3. Insert the filters.
4. Connect the pipelines again and turn on the auxiliary pneumatic energy.

## 13 Technical Data

### General data

Protection class of aluminium cover	IP66 in accordance with EN60529
Protection class of plastic cover	Type 4X in accordance with UL 50E
Climate class	according to IEC 721
Storage	1K5 but -20 °C to +80 °C <sup>1)</sup>
Transport	2K4 but -20 °C to +80 °C <sup>1)</sup>
Operation	4K3, but -20 °C to +80 °C
Shock resistance	98.1 m/s <sup>2</sup> , 27...300 Hz recommended continuous operation range of the complete valve ≤ 30 m/s <sup>2</sup>
CE and UKCA mark	The relevant directives and applied standards with their issue dates can be found in the declaration of conformity.
Mounting position	Any, although in wet environments the pneumatic connections and exhaust opening must not face upwards
Connections	
electrical	Screw terminals 2.5 AWG30-14 Cable gland M 20x1.5 or Cable gland 1/2 –14 NPT
pneumatic	Internal thread G 1/4 DIN 45141 or Internal thread 1/4 –18 NPT

<sup>1)</sup> If commissioning takes place at ≤ 0 °C it is important that the positioner is flushed for long enough with dry instrument air.

### Pneumatic data

Auxiliary energy (supply air)	
Medium	Instrument air according to DIN ISO 8573-1, class 2
Pressure	1.4...7 bar

### Electrical data

Analogue input AI	Input signal	4 ... 20 mA
	Current to maintain the auxiliary energy	≥ 3.8 mA
	Maximum load voltage	6.5 V equates to 325Ω at 20 mA
	Static destruction limit	± 40 mA
Analogue output AI	Nominal signal range	4 ... 20 mA
	Dynamic range I0	≥ 3.6 ... 20.5 mA
	Supply voltage UH	12 ... 30 V
	External load RB [kΩ]	≤ (UH [V] – 12) / I0 [mA]
	Resolution of nominal signal range	0.05 %
	Nominal signal range conversion error	± 0.3 %

	Maximum temperature influence effect	0.1 %/10 K
	Maximum residual ripple	0.5 %
	Electrical isolation	Galvanically isolated from the remaining electrical inputs/outputs
Digital input DI	Signal status 0, zero-potential contact, open	> 300 k $\Omega$
	Signal status 1, zero-potential contact, closed	< 3 k $\Omega$
	Electrical isolation	Galvanically connected with analogue input; Galvanically isolated from the outputs
	Contact loading	Only usable for zero-potential contact; Max. contact load $\leq$ 20 $\mu$ A at 3 V
Digital output DI	Maximum supply voltage UH	35 V
	Limit current consumption to	50 mA
	Signal status high	Conducting, maximum terminal voltage 3 V
	Signal status low	Locked, I < 60 $\mu$ A

## 14 Explosion protection

### 14.1 Type code

There is a nameplate on every device (page 14). On this nameplate there is an article number that is specific to the device. Lower-case letters are used for variable places in the article number and explained in the following tables. These represent a different order variant, depending on the variable used.

<b>826</b>	<b>a</b>	<b>b</b>	<b>-</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>-</b>	<b>f</b>	<b>g</b>	<b>0</b>	<b>-</b>	<b>h</b>	<b>-</b>	<b>i</b>
[1]	[2]	[3]	-	[4]	[5]	[6]	-	[7]	[8]	[9]	-	[10]	-	[11]

826 (f=K)				826 (f=M)			
Polycarbonate with window				Aluminium without window			
If housing f =		If explosion protection a =		If short info i =			
K		X		-		or	
M		X,S,D		-		or	
Short info i =		SE					

### 14.2 Marking for explosion protection

<b>826</b>	<b>a</b>	<b>b</b>	<b>-</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>-</b>	<b>f</b>	<b>*</b>	<b>0</b>	<b>-</b>	<b>*</b>	<b>-</b>	<b>i</b>
[1]	[2]	[3]	-	[4]	[5]	[6]	-	[7]	[8]	[9]	-	[10]	-	[11]

With		ATEX / IECEx	CSA	FM
Ex Marking		TÜV 20 ATEX 280898 X IECEX TUN 21.0006X EMA 22 UKEX 0011 X	CSA 21CA80100598X	FM21US0047X
f =	a =			
M, K	X	II 2 G Ex ia IIC T4 Gb II 3 G Ex ic IIC T4 Gc	Ex ia IIC T4 Gb Ex ic IIC T4 Gc IS CI I Div 1, 2 Gp A-D	CI I Zn 1 AEx ia IIC T4 Gb IS CI I Div 1, 2 Gp A-D
M	S	II2G Ex ia IIC T4 Gb II3G Ex ic IIC T4 Gc II3G Ex ec IIC T4 Gc	Ex ia IIC T4 Gb Ex ic IIC T4 Gc Ex ec IIC T4 Gc IS CI I Div 1, 2 Gp A-D CI I Div 2 Gp A-D	CI I Zn 1 AEx ia IIC T4 Gb CI I Zn 2 AEx ec IIC T4 Gc IS CI I Div 1, 2 Gp A-D NI CI I Div 2 Gp A-D
M	D	II2G Ex ia IIC T4 Gb II3G Ex ic IIC T4 Gc II3G Ex ec IIC T4 Gc II2D Ex tb IIIC T100°C Db	Ex ia IIC T4 Gb Ex ic IIC T4 Gc Ex ec IIC T4 Gc Ex tb IIIC T100°C Db IS CI I Div 1, 2 Gp A-D CI I Div 2 Gp A-D CI II, III Div 1 Gp E-G	CI I Zn 1 AEx ia IIC T4 Gb CI I Zn 2 AEx ec IIC T4 Gc Zn 21 AEx tb IIIC T100°C Db IS CI I Div 1, 2 Gp A-D NI CI I Div 2 Gp A-D DIP CI II, III Div 1 Gp E-G



### 14.3 Ambient temperature

Maximum permissible ambient temperature in potentially explosive areas:

Positioner	Temperature class T4
826 f = M, K	$-20\text{ °C} \leq T_a \leq +80\text{ °C}$





### 14.4 Electrical data

	Basic electronics with explosion protection		
	Ex "ia"	Ex "ic"	Ex "ec", "tb"
<b>Analogue input (AI) HART / 4 - 20 mA</b>			
<b>Terminals 6(+ ) and 7(-)</b>			
For connection to circuits	$U_i \leq 30\text{ V}$	$U_i \leq 30\text{ V}$	$U_n \leq 30\text{ V}$
with the following maximum values	$I_i \leq 100\text{ mA}$	$I_i \leq 100\text{ mA}$	$I_n \leq 100\text{ mA}$
	$P_i \leq 750\text{ mW}$	-	-
	$C_i \leq 6\text{ nF}$	$C_i \leq 6\text{ nF}$	-
	$L_i \leq 221\text{ }\mu\text{H}$	$L_i \leq 221\text{ }\mu\text{H}$	-
<b>Analogue input (AO) 4 - 20 mA</b>			
<b>Terminals 61(+ ) and 62(-)</b>			
For connection to circuits	$U_i \leq 30\text{ V}$	$U_i \leq 30\text{ V}$	$U_n \leq 30\text{ V}$
with the following maximum values	$I_i \leq 100\text{ mA}$	$I_i \leq 100\text{ mA}$	$I_n \leq 100\text{ mA}$
	$P_i \leq 750\text{ mW}$	-	-
	$C_i \leq 7\text{ nF}$	$C_i \leq 7\text{ nF}$	-
	$L_i \leq 66\text{ }\mu\text{H}$	$L_i \leq 66\text{ }\mu\text{H}$	-
<b>Analogue output (AO) electrically isolated from the analogue input (AI)</b>			
Test voltage	DC 840 V, 1 s		

## 15 Fault removal

### 15.1 Symbols for the device status









The device status is shown on the display with the help of symbols. Alarms in the measured value view are shown on the display as a symbol in the bottom line of the display. If more than one diagnostic statuses are pending at the same time, the symbol for the most critical status is displayed. The following table shows the possible causes for the device status and measures for the user or service department. The sequence of the symbols in the table corresponds to the priority of the device status, starting with the most critical report.








Display symbols - NAMUR NE 107			Meaning
Symbol	Device status	Priority *	Priority *
	Failure	1	<p><b>Cause:</b> Output signal invalid due to a fault in the field device or in the peripherals.</p> <p><b>Action:</b> Maintenance is necessary immediately.</p>
	Functional check	2	<p><b>Cause:</b> Output signal temporarily invalid (e.g. frozen) due to work on the device.</p> <p><b>Action:</b> Disable manual mode using HMI or engineering system.</p>
	Outside specification	3	<p><b>Cause:</b> Deviations from the ambient or process conditions, which (due to self-monitoring or warnings/errors in the device) are recorded by the device, indicate that the measurement is unreliable or that deviations from the setting value in the actuators are very likely to be higher than expected under normal operating conditions.</p> <p>Process or ambient conditions may damage the device or lead to unsafe results.</p>
	Maintenance requirement	4	<p><b>Cause:</b> The output signal is still valid but the wear reserve is coming to an end and/or there will soon be functional restrictions.</p> <p><b>Action:</b> Maintenance is recommended as soon as possible.</p>

\*The smallest number stands for the highest severity of fault.

## 15.2 Info IDs, fault reports and remedial measures

In the following table you will find the IDs of diagnostic messages as well as possible causes and instructions for remedial measures.

Messages on the display (chapter [10.1] <i>Local operation</i> )			Meaning / Cause	Remedial measure
ID	Symbol	Status bar		
6A		-	<ul style="list-style-type: none"> <li>Error during initialisation</li> <li>Compressed air supply not sufficient</li> <li>Mounting kit not correctly installed</li> <li>Valve blocked</li> </ul>	Eliminate the cause. Start initialisation.
6C		NO INIT + setpoint in percent	Positioner not initialised	Start initialisation with 
6d		-	<ul style="list-style-type: none"> <li>Measuring range for position recording exceeded</li> <li>Pivoting range of the valve greater than 110°</li> <li>Positioner mounted on another actuator without re-initialisation</li> <li>Valve's end positions worn</li> </ul>	Check the mounting kit and wear. Start initialisation.
6E		DI-HOLD + setpoint in percent	Hold valve position is activated by digital input (DI).	Parametrised behaviour. Adjust setting in parameter "DIGITAL IN" [21] if required.
6F		DI-GO CL + setpoint in percent	Move to valve position is activated by digital input (DI).	Parametrised behaviour. Adjust setting in parameter "DIGITAL IN" [21] if required.
6H		DI-GO OL + setpoint in percent	Move to valve position is activated by digital input (DI).	Parametrised behaviour. Adjust setting in parameter "DIGITAL IN" [21] if required.
6L	-	-	Digital input (DI) is activated. This status is reported via the digital output (DO).  Setting in parameter "BEHAVIOR DI [22] > MSG"	Not necessary.
6N		-	<ul style="list-style-type: none"> <li>Maximum angle range exceeded</li> <li>Active lever arm not adjusted to the setting distance</li> </ul>	Position the driver pin to a larger stroke value. Check the mounting kit.

			<ul style="list-style-type: none"> <li>▪ Mounting kit not correctly installed</li> </ul>	
6P		-	<ul style="list-style-type: none"> <li>▪ Below minimum angle range</li> <li>▪ Active lever arm not adjusted to the setting distance</li> <li>▪ Mounting kit not correctly installed</li> </ul>	<p>Position the driver pin to a smaller stroke value.</p> <p>Check the mounting kit.</p>
6r		-	Pneumatic leakage present	Rectify the pneumatic leakage on the actuator and pipeline.
6t		-	<ul style="list-style-type: none"> <li>▪ Control deviation</li> <li>▪ Compressed air supply not sufficient</li> <li>▪ Mounting kit not correctly installed</li> <li>▪ Valve blocked</li> </ul>	Eliminate the cause.
6U		MANUAL	Device in manual mode	Use  to switch to "AUTO" operating mode.
L		-	<p>Button lock is activated.</p> <p>Digital input (DI) is activated.</p> <p>Setting in parameter "BEHAVIOR DI [22] &gt; BUTTN"</p>	Switch the digital input (DI).
LP		-	Parameter and device function are write-protected by a user PIN.	Disable write protection with user PIN LOCK 2457.

**Also refer to chapter [11.2] Quick Start**

**Also refer to chapter [11.3] Setup**

## 16 Disposal and recycling



### **WARNING**

#### **Operating media and auxiliary materials that are hazardous to health**

Danger to people and the environment!

- ▶ Wear suitable protective equipment
- ▶ If applicable, collect and dispose of rinsing medium or residual medium. Particular attention is to be paid to dead spaces (pressure compensation, bellows, etc.)
- ▶ Observe the legal regulations for the disposal of media that are hazardous to health

---

ARCA products are modularly constructed and can be sorted by material into the following components.

- Electronic components
- Metals
- Plastics
- Greases and oils
- Packaging material

The general rules are:

- greases and oils are usually water pollutants and must not be allowed to escape into the environment
- Dispose of dismantled materials properly or recycle the separate materials
- Observe national disposal regulations



[www.arca-valve.com](http://www.arca-valve.com)