

Operating and maintenance manual  
UMA universal diaphragm actuator  
Series 811

Original instructions

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## 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](mailto:sale@arca-valve.com)  
[www.arca-valve.com](http://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

Acceptance documents (if ordered) and operating documentation for this product can be downloaded from the ARCA ONSITE portal.

Two options are available here:

1. Scan the **QR Code**<sup>1</sup> on the product. 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. The order no. and serial no. can be found in the device pass and in our order confirmation.

**Entry example**

2512345	1234567
---------	---------

Search	Clear
--------	-------

[← back / zurück](#)

*Illustration 1: ARCA ONSITE*

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

## 2 Safety

### 2.1 General safety information

The operating manual contains detailed descriptions for the safe installation, commissioning and maintenance of the product.

- Read this operating manual attentively in its entirety in order to familiarise yourself with the product.
- Particular attention must be paid to the information in this chapter.

### 2.2 Explanation of symbols and notices

Safety and warning instructions are intended to avoid hazards to the life or health of operating or maintenance personnel, and to avoid material damage. It is emphasised through the use of the special terms defined here. Additionally, their location is marked by warning symbols (pictograms). The signal terms used have the following meanings:



#### **DANGER**

means that death, serious injuries and/or considerable damage to property will occur if the corresponding preventive measures are not taken and maintained.



#### **WARNING**

means that death, serious injuries and/or considerable damage to property can occur if the corresponding preventive measures are not taken and maintained.



#### **CAUTION**

means that minor injuries and/or damage to property can occur if the corresponding preventive measures are not taken and maintained.



#### **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.

### 2.3 Structure of the warning notices

#### Section-related warning notice

Section-related warning notices refer to the entire chapter, sections or several paragraphs within this operating manual. Section-related warning notices are structured as follows:



## **⚠ DANGER**

### **Type and source of the danger**

Possible consequences of disregard

- ▶ Measure to avoid the danger
- ▶ Further measures

### **Embedded warning notice**

Embedded warning notices refer to a certain area within a section. They apply to smaller information units than the section-related warning notices. Embedded warning notices are structured as follows:

**⚠ DANGER!** Instructions for avoiding a dangerous situation.

## **2.4 Intended use**

The product complies with laws, regulations and standards valid at the time of delivery.

The product does not pose a danger to people, property or environment if it is used for its intended purpose and the warning notices contained in this operating manual and attached to the product are observed. This applies to the entire lifetime, from the delivery, assembly and operation to the disassembly and disposal.

The following is deemed to be used for the intended purpose:

- Operate the product exclusively in accordance with this operating manual and in accordance with the specification in the order confirmation and the device pass.
- Use exclusively original ARCA spare parts for the maintenance of the product.



## **⚠ DANGER**

### **Risk of death and serious injuries as well as damage to property and the environment!**

Risk of death and serious injuries as well as damage to property and the environment due to hazardous operating media, high temperatures and pressures as well as moving parts.

- ▶ The following requirements and conditions must be complied with without fail.
- ▶ Observe warning notices.

### **Maintenance**

Ensure or observe the following before performing any maintenance work:

- Depressurise the actuator and the attached valve.
- If necessary, cool the actuator down or heat it up to ambient temperature.
- Disconnect electrical connections, if any.
- The actuator springs are inserted with a high preload; it is imperative to follow the disassembly instructions according to the chapter entitled [11.5] *Diaphragm*.
- Ensure that the system cannot be started up by third parties.



- You are expressly directed to observe the regulations for potentially explosive equipment where necessary. Refer also to the chapter [2.6] *Use in potentially explosive areas (optional)*.

### Limits of use

Operate the actuator only within the following limits of use.

Max. operating pressure [bar]	Min. operating temperature [°C]	Max. operating temperature [°C]
6	-20 / Low temperature version -40	+80

The actuator is designed for a maximum number of switching cycles of 1 million full strokes.

The max. permissible switching cycle frequency is 1 full stroke per second.

## 2.5 Inappropriate use

Inappropriate use is use of the product other than as described in the chapter entitled [2.4] *Intended use*.

In the addition, the following applies:

- Unauthorised modifications to the product can lead to injuries, damage to property and malfunctions. The user alone bears this risk. Warranty and liability claims are excluded.

## 2.6 Use in potentially explosive areas (optional)

The product can also be used in potentially explosive areas if fitted with the **optional** additional "EX" equipment.



### **⚠ WARNING**

#### **Unsuitable product for potentially explosive areas**

Risk of explosion!

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



### **⚠ WARNING**

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

Risk of explosion or damage to the product!

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



### **⚠ WARNING**

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

Risk of explosion due to high surface temperature!

The temperature class of the product 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 product is not exceeded.



### **⚠ WARNING**

#### **Contaminated operating medium**

Risk of explosion and damage to the product due to clogging up with fine dust or solid contents!

- ▶ Install a pre-filter or fine filter
- ▶ Clean the filter after 100,000 switching cycles or at least twice annually.



### **⚠ WARNING**

#### **Heat radiation**

Risk of explosion due to high surface temperature as a result of heat radiation from additionally attached products!

- ▶ Make sure that the maximum permissible surface temperature is not exceeded.
- ▶ Insulate or decouple any attached products that radiate increased heat.



### **⚠ WARNING**

#### **Dust deposits**

Risk of explosion due to raised product temperature as a result of dust deposits!

- ▶ Remove dust deposits that are thicker than 2 mm.
- ▶ Avoid electrostatic charging of the surface; remove dust deposits properly without rubbing the surface.



### **⚠ WARNING**

#### **Damaged surface coating**

Risk of explosion due to damage to the surface coating in conjunction with corrosion and aluminium!

- ▶ Make sure that the surface coating is not damaged and that there is no corrosion.



### **⚠ WARNING**

#### **Exceeding the layer thickness of the surface coating**

Risk of explosion due to electrostatic charging of the electrically non-conductive surface coating!

- ▶ Make sure in case of overpainting that the surface coating does not exceed a total thickness of 0.2 mm.



### **⚠ WARNING**

#### **External impact effect**

Risk of explosion due to generation of sparks caused by an impact!

- ▶ Avoid external impact effects on the product.



### **⚠ WARNING**

#### **Internal impact energy**

Risk of explosion due to spark formation after contact of the actuator stem with the stem of the manual operation. Only applies with the actuator function "normally open" and vented pressure chamber!

- ▶ Make sure that the manual operation (if fitted) is in the neutral position and blocked by the hand wheel lock (6) when not in use.



### **⚠ WARNING**

#### **Dismantling the product**

Risk of explosion due to the ingress of an explosive atmosphere!

- ✓ The product may only be opened after it has been proven that no explosive atmosphere exists in the area around the product
- ▶ Ensure through ventilation that there is no explosive atmosphere. If this is not possible, take the product to an area where there is no risk of explosion.



### **⚠ WARNING**

#### **Non-conductive materials with pipe-laying work**

Risk of explosion due to potential differences when using non-conductive materials!

- ▶ When using non-conductive materials for piping or sealing, care must be taken that they are bridged with conductors.



### **⚠ WARNING**

#### **Non-conductive lubricants**

Risk of explosion due to potential differences when using non-conductive lubricants!

- ▶ Use only electrically conductive lubricants to lubricate the components.



### ⚠ WARNING

#### Contaminated breathing air

Risk of explosion due to the ingress of dust and gas via the breathing aperture and breathing line!

- ✓ The product is equipped with exhaust air blanketing, which prevents dust or gas entering the spring chamber via the breathing aperture.
- ▶ The exhaust air blanketing components must be inspected after 100,000 switching cycles or at least twice annually.



### ⚠ WARNING

#### Exceeding the max. surface temperature at bearing points

Risk of explosion due to raised surface temperature in case of inadequate lubrication and dust deposits at the bearing points!

- ▶ Make sure that the maximum permissible surface temperature is not exceeded.
- ▶ The lubrication and dust deposits at the bearing points must be inspected after 100,000 switching cycles or at least twice annually.

#### ATEX nameplate

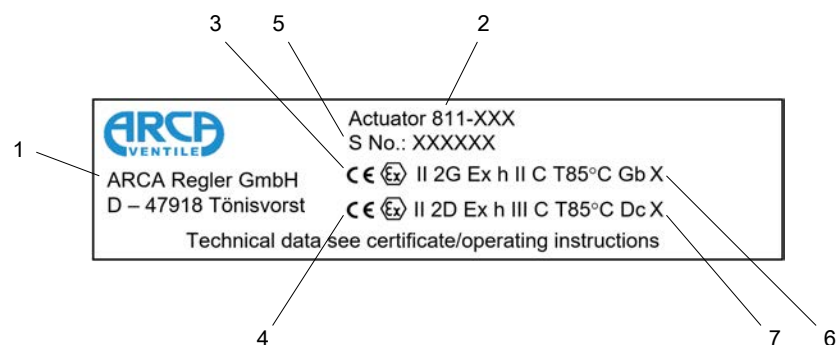


Illustration 2: ATEX nameplate

1	Manufacturer
2	Type designation
3	ATEX marking for gas atmosphere
4	ATEX marking for dust atmosphere
5	Serial no.
6	"X" marking – the actuator can be used for an ambient temperature of -40 °C up to a surface temperature of +80 °C.
7	"X" marking – the actuator can be used for an ambient temperature of -40 °C up to a surface temperature of +80 °C. - The actuator exhaust (74) must be replaced by an exhaust line that leads to a non-explosive atmosphere.

#### Gas atmospheres

When using the product in gas atmospheres of device category 2G, it must be ensured that the spring chamber is ventilated with instrument air. To this end the product is equipped with exhaust air supply (71).

**NOTICE!** If the direction of action is reversed, make sure that the actuator exhaust (74) is mounted with its aperture facing vertically downwards.

### Dust atmospheres

For the use of the product in dust atmospheres of device category 2D, the actuator exhaust (74) must be replaced by an exhaust line that leads to a non-explosive atmosphere.

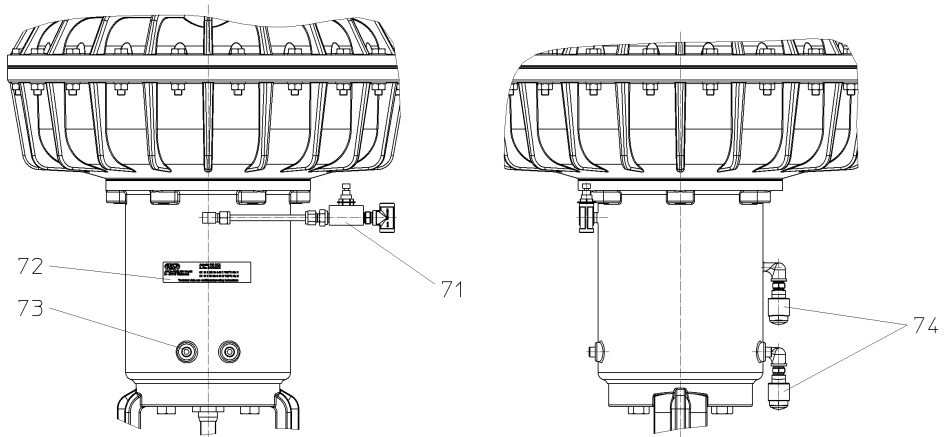


Illustration 3: Additional equipment - EX

## 2.7 Residual risks

There may still be residual risks even if the product is used for its intended purpose.

- Danger of being crushed by unsecured actuators

In case of negligent use of personal protective equipment:

- Danger due to noise resulting in hearing loss
- Thermal hazards (burning, scalding, etc.)
- Danger due to escape of the operating medium

Furthermore, there may be unapparent residual risks despite all precautions taken.

Residual risks can be minimised if the notes on safety and commissioning as well as the operating manual as a whole are observed.

## 2.8 Qualification of the personnel

The product is exclusively intended for use in plants and installations in which trained technical personnel carry out the necessary work. Technical personnel are persons who are entrusted with the installation, commissioning and operation of this product and who have the appropriate qualifications for their work activities, such as, for example:

- training or instruction in accordance with current technical safety standards in the maintenance and usage of appropriate safety equipment.
- Training in First Aid.
- In the case of systems with explosion protection: training or instruction and authorisation to carry out work on potentially explosive systems.

Repair work may be carried out only by trained and qualified technical personnel.

Work on electrical equipment may be carried out only by trained electricians or persons who have received electrotechnical instruction.

Persons	Instructed persons	Persons with a recognised technical education	Persons with a recognised electrotechnical education	Superiors with relevant skills	ARCA service personnel
Transport	X	X	X	X	X
Installation	X	X	X	X	X
Commissioning		X	X	X	X
Maintenance	X	X	X	X	X
Fault finding		X	X		X
Mechanical troubleshooting		X			X
Electrical troubleshooting			X		X
Repairs		X	X	X	X
Disposal	X	X	X	X	X

## 2.9 Operator's duty of care

To avoid accidents, malfunctions and environmental impacts, the respective person responsible for the transport, commissioning, operation, maintenance and disposal of the product must ensure the following:

- Observation of all warning and danger notices.
- Regular instruction of personnel on all applicable questions of work safety, the operating manual and in particular the safety instructions that it contains.
- Regulations and work instructions for safe working as well as the corresponding instructions for the conduct of the personnel in case of accidents and fire are to be kept at the ready at all times and hung up in the plant if necessary.
- Operate the product only if it is in perfect working order.
- Use only spare parts, lubricants and operating resources approved by the manufacturer.
- Observe the specified operating conditions and requirements at the place of installation.
- Provide all necessary devices and the personal protective equipment required for the respective task.
- Refer to the chapter entitled Maintenance for the prescribed maintenance intervals and comply with the corresponding regulations.
- Allow installation, commissioning and maintenance of the product to be carried out only by qualified and trained personnel in accordance with this operating manual.
- The operator must ensure that the product is used for its intended purpose.

- Before commissioning the product the operator must carry out a risk assessment and define appropriate inspection and maintenance intervals according to the operating conditions.

## 2.10 Personal protective equipment

Personal protective equipment must be worn during work in order to minimise health risks.

- During work, always wear the protective equipment necessary for the respective work
- Follow the notices about personal protective equipment displayed in the working area.

Always wear	
	<p><b>Protective clothing</b></p> <p>Tight-fitting work clothes with a low tear resistance, with narrow sleeves and without protruding parts. They primarily serve to protect against being caught up by moving machine parts.</p> <p>Do not wear rings, chains or other jewellery.</p>
	<p><b>Safety shoes</b></p> <p>To protect against heavy falling parts and slipping on smooth floors.</p>
Wear in case of particular environmental conditions	
	<p><b>Special protective equipment is necessary in particular environmental conditions.</b></p> <p><b>It is to be selected according to the environment.</b></p> <p><b>Safety glasses</b></p> <p>To protect the eyes against flying parts and splashes of liquids.</p>
	<p><b>Helmet</b></p> <p>To protect against falling and flying parts and materials.</p>
	<p><b>Hearing protection</b></p> <p>To protect against hearing damage.</p>

## 3 Transport, storage and packaging

### 3.1 Transport



#### **WARNING**

##### **Tipping or falling load!**

Danger of death and danger of damage to property due to load tipping over or falling!

- ▶ Only suitable and approved means of transport and lifting equipment may be used for transporting the product.
- ▶ Lifting equipment must generally be attached to the housing of the product, not to attachments.
- ▶ Allow only instructed persons to select and attach the lifting equipment.
- ▶ Do not stand under suspended loads.

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

The attachment points on actuators (lifting eyes, ring bolts, etc.) are designed solely for transporting the actuator. Under no circumstances may these attachment points be used if the actuator is coupled to a valve.

### 3.2 Storage



#### **NOTICE**

##### **Improper storage!**

There is a danger of the product and in particular the attached electronic accessories no longer functioning if 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.

To protect against contamination and to protect the sealing surfaces, openings such as nozzles, flanges, etc. must be sealed using suitable means. These should be removed by technical personnel at the place of installation.

### 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, airplane, rail or truck.



## 4 Nameplate


CONTROL-VALVE	App.-No.	1	Series	2						
	Body-Type	3	DN	4	mm		PN	5		
	Kv	6		Seat- $\phi$	7		mm	Stroke	8	mm
	Material	9					Function	10		
	Servo-Motor	11		Air-Supply	12		Signal-Range	13		
	14									

Illustration 4: Nameplate

1	App. no. / Serial no.
2	Type designation / Year of manufacture
3	Valve design
4	Nominal size
5	Nominal pressure
6	Flow coefficient, characteristic curve
7	Seat diameter
8	Valve stroke
9	Material of housing / trim
10	Actuator function
11	Actuator type
12	Max. actuation pressure
13	Actuation pressure range
14	Actuator type key

### Place of installation

The nameplate is attached to the actuator yoke or the actuator head.

**5 Type code**

<b>811</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>2A</b>	<b>-</b>	<b>O</b>	<b>H</b>
[1]		[2]	[3]	[4]	[5]		[6]	[7]

**1. Series**

811

**2. Actuator size**

1	U0 diaphragm area 210 cm <sup>2</sup>
2	UI diaphragm area 320 cm <sup>2</sup>
3	UIII diaphragm area 720 cm <sup>2</sup>
5	UV diaphragm area 1440 cm <sup>2</sup>

**3. Yoke (Ø = mounting in mm)**

0	without
1	Ø40
2	Ø48
3	Ø56
4	Ø72
5	Ø100
9	Special version

**4. Stroke**

0	Special
1	10 mm
3	20 mm
4	30 mm
5	45 mm
6	60 mm
7	75 mm
8	100 mm
9	120 mm

**5. Spring no.**

1A	2054610
1B	2054611
1C	2054615
1D	2054616
2A	2054620
2B	2054621
2C	2054622
2D	2054625
2E	2014987
3A	2054630
3B	2054631
3C	2054632
3D	2054633

<b>5. Spring no.</b>	
3E	2054634
3F	2054633 + 2054639
5A	2054650
5B	2054651
5C	2054652
5D	2054658
5E	2054658 + 2054659
5F	3130610
<b>6. Function</b>	
O	Stem extended by spring (normally closed)
S	Stem retracted by spring (normally open)
<b>7. Additional equipment</b>	
BE	Ventilation of the spring chamber
BH	HV trestle for attachment
EX	Explosion-proof version
H	Cover
HB	Stroke limiter
HV	Manual operation
SB	Stem protection bellows
T	Low temperature version max. -40 °C
VA	Screws VA
Z	Peripheral bolt ASME

**Example of type designation**

811-2232A-O HV VA

Diaphragm actuator 811 – actuator size UI – mounting diameter 48 mm – stroke 20 mm – spring 2054620 – function normally closed – additional equipment manual operation + screws VA.

## 6 Sectional drawings

Some versions of the actuator are illustrated below. Further versions are possible by combining the different components.

### Connections

Z1 see section on [9.2] *Actuating signal connection*

### 6.1 Parts list

Item	Name
1	Split pin
2	* Castle nut
3	Hand wheel
4	Clamping sleeve
5	Hex nut
6	Hand wheel lock
7	Bearing lock
8	Bearing washer
9	Bearing
10	Guide bush
11	Hand wheel spindle
12	Grub screw
13	Threaded bushing
14	Clamping sleeve
15	Grooved pin
16	Clamping ring
17	Hand wheel spindle
18	Cap nut
19	Hex nut
20	Manual operation trestle
21	Hex screw
22	Cover
23	Cylinder head bolt
24	Guide bush
25	* Plain bearing
26	* Sealing element
27	Spacer sleeve
28	Diaphragm cover
29	Hex nut
31	Washer
32	* Diaphragm
33	Diaphragm plate
34	Hex screw
35	Washer
36	Hex nut
37	Stem

Item	Name
38	Compression spring
41	* Sealing element
42	Tightening screw
43	Spring plate
44	Support disc
45	Bearing
46	Spring housing
47	* Plain bearing
48	Cylinder head bolt
49	Serrated washer
54	Stroke dial
55	Yoke
61	Pressure relief valve
62	Protective cap
63	Double nipple
64	Hex screw
65	Washer
66	Diaphragm housing
67	Intermediate ring
68	Intermediate ring
69	Intermediate ring
70	Hex nut
71	Exhaust air ventilation
72	Nameplate Ex
73	Cylinder screw
74	Actuator exhaust
80	Stroke limiter trestle
81	Stem
82	Hex nut
83	Guide bush
84	Hex nut
85	Hex screw
	* Recommended spare part / wearing part

**6.2 811-\*\*\*\*-O H**

Function: Normally closed [O]; additional equipment: Cover [H].

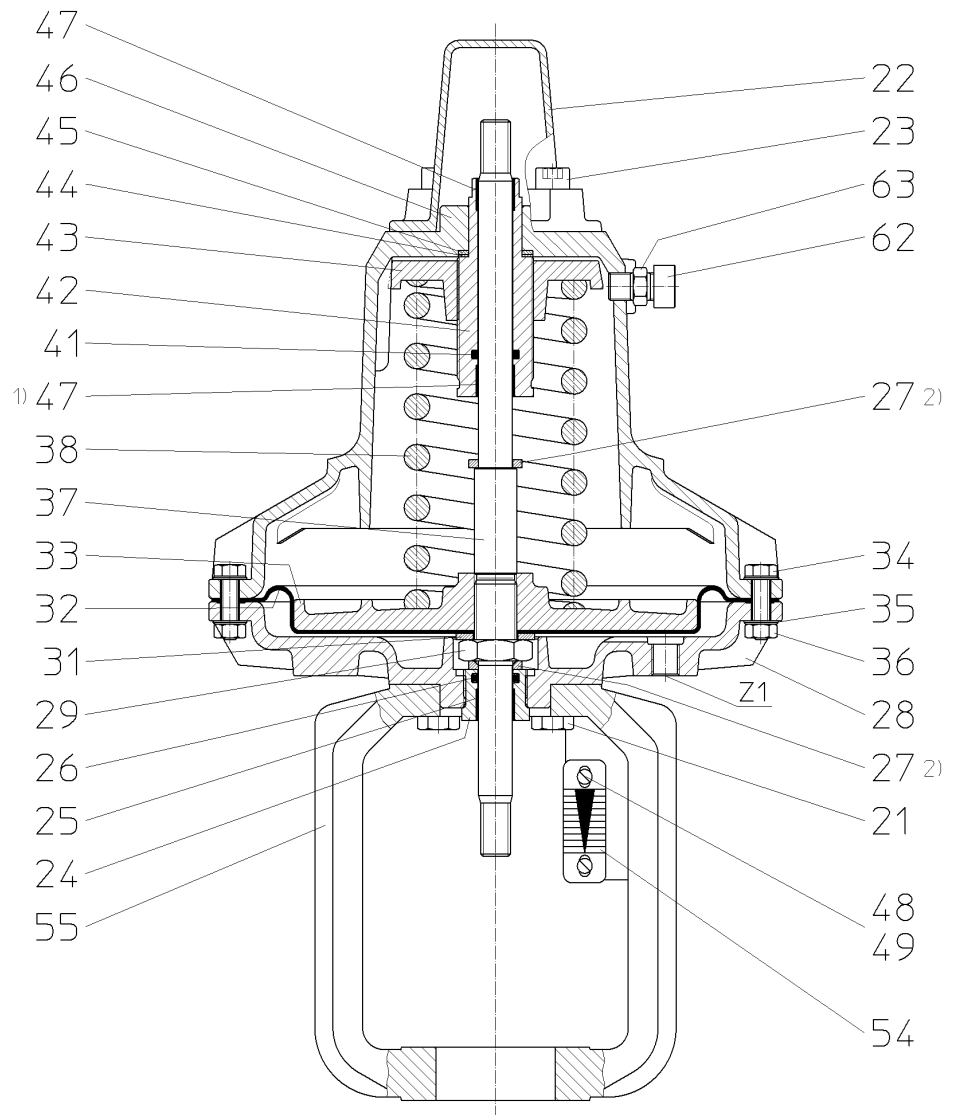


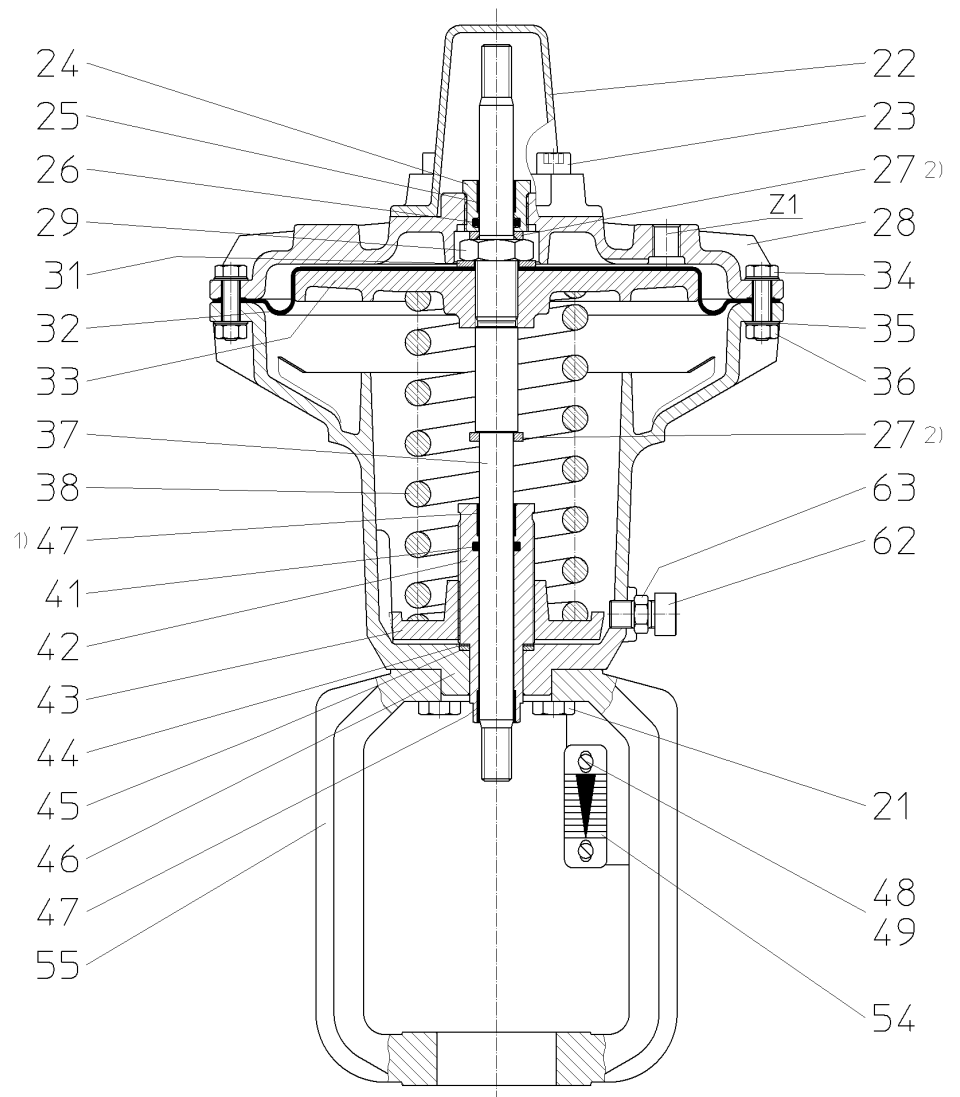
Illustration 5: 811-\*\*\*\*-O H

1) Only fitted in actuator sizes UIII and UV.

2) Only fitted in actuator sizes UIII and UV for special applications.

**6.3 811-\*\*\*\*-S H**

Function: Normally open [S]; additional equipment: Cover [H].

*Illustration 6: 811-\*\*\*\*-S H*

1) Only fitted in actuator sizes UIII and UV.

2) Only fitted in actuator sizes UIII and UV for special applications.

**6.4 811-\*\*\*\*-O HV**

Function: Normally closed [O]; additional equipment: Manual operation [HV].

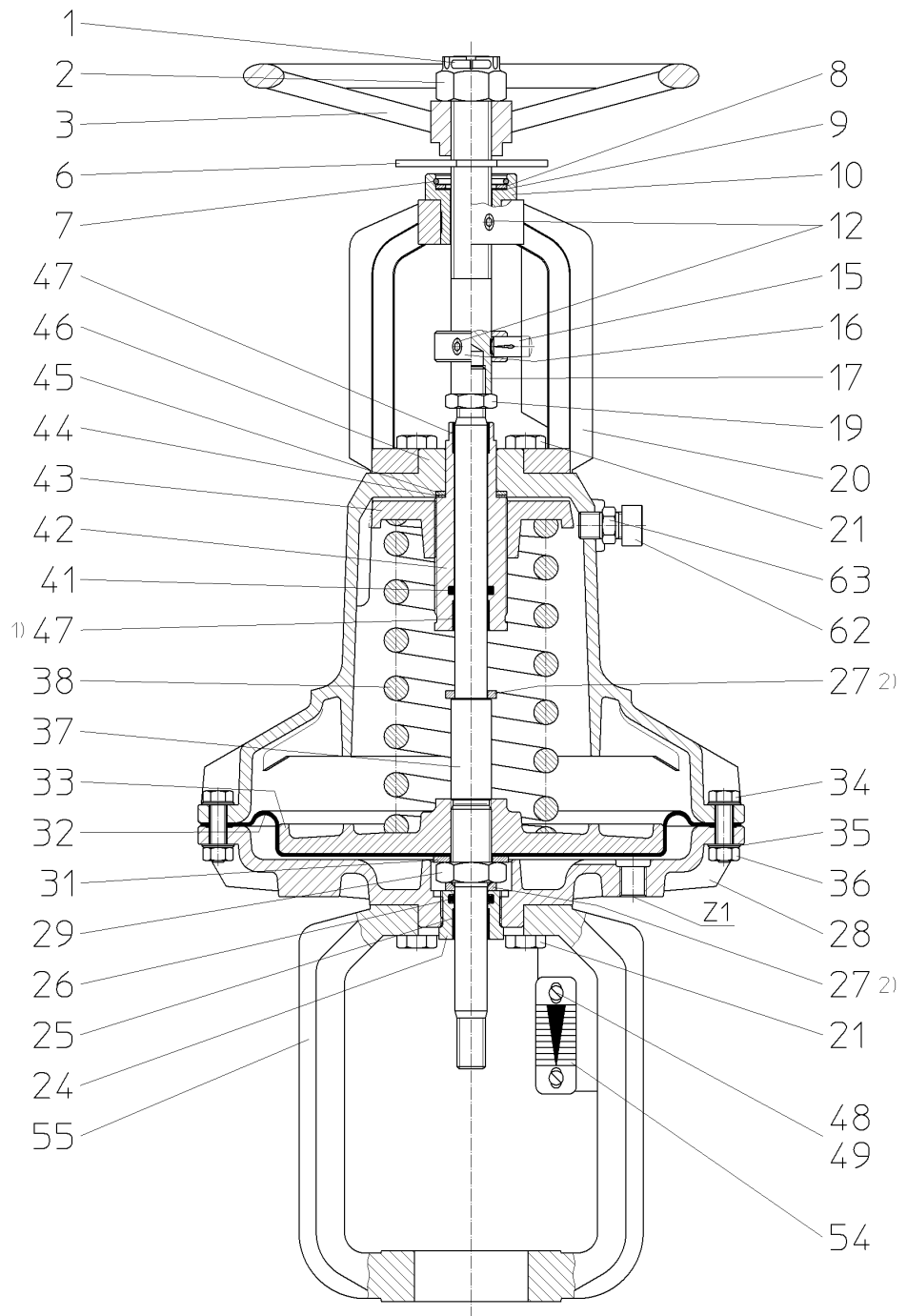


Illustration 7: 811-\*\*\*\*-O HV

1) Only fitted in actuator sizes UIII and UV.

2) Only fitted in actuator sizes UIII and UV for special applications.





**6.6 811-\*\*\*\*-O HB**

Function: Normally closed [O]; additional equipment: Stroke limiter [HB].

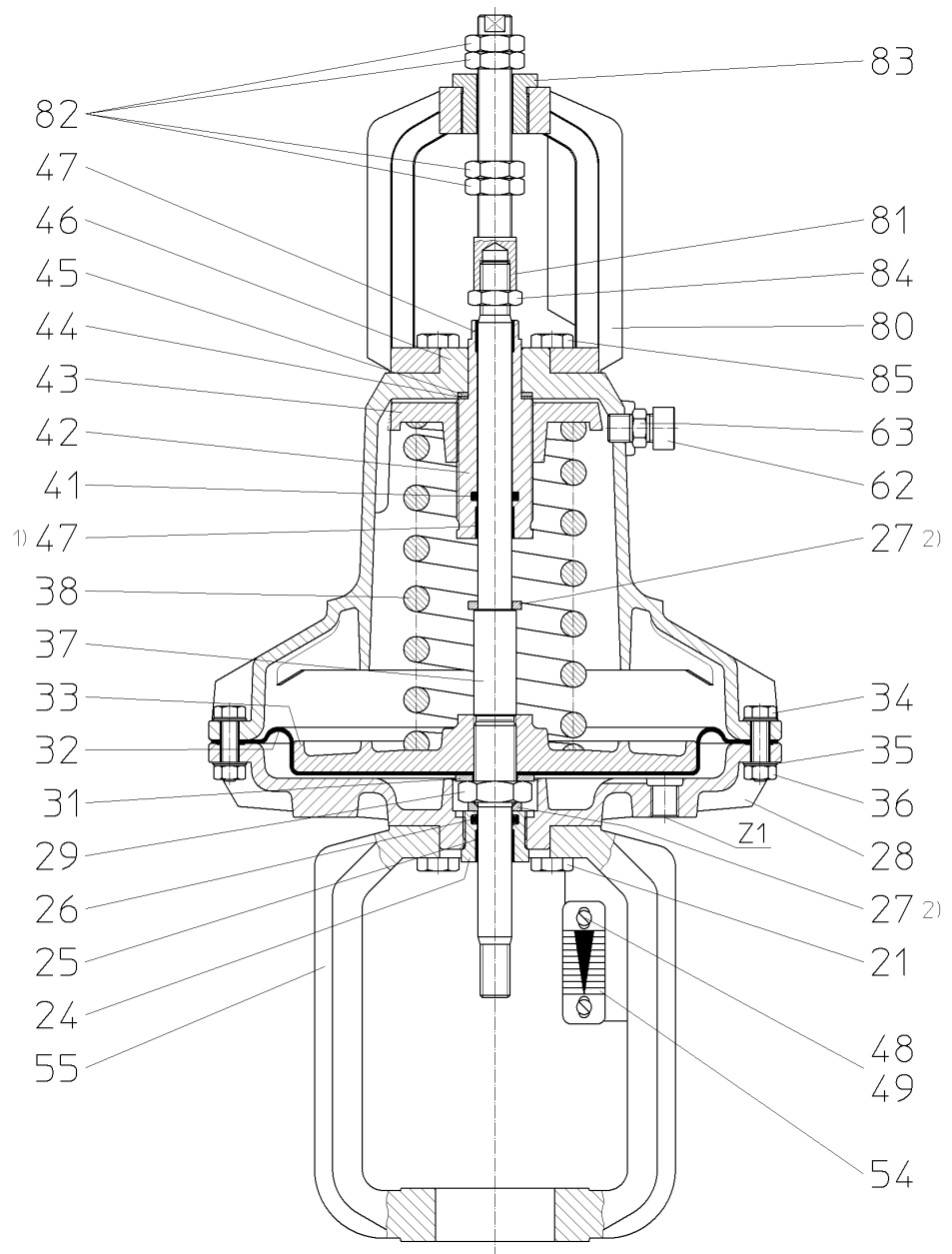


Illustration 9: 811-\*\*\*\*-O HB

1) Only fitted in actuator sizes UIII and UV.

2) Only fitted in actuator sizes UIII and UV for special applications.

**6.7 811-\*\*\*\*-S HB**

Function: Normally open [S]; additional equipment: Stroke limiter [HB].

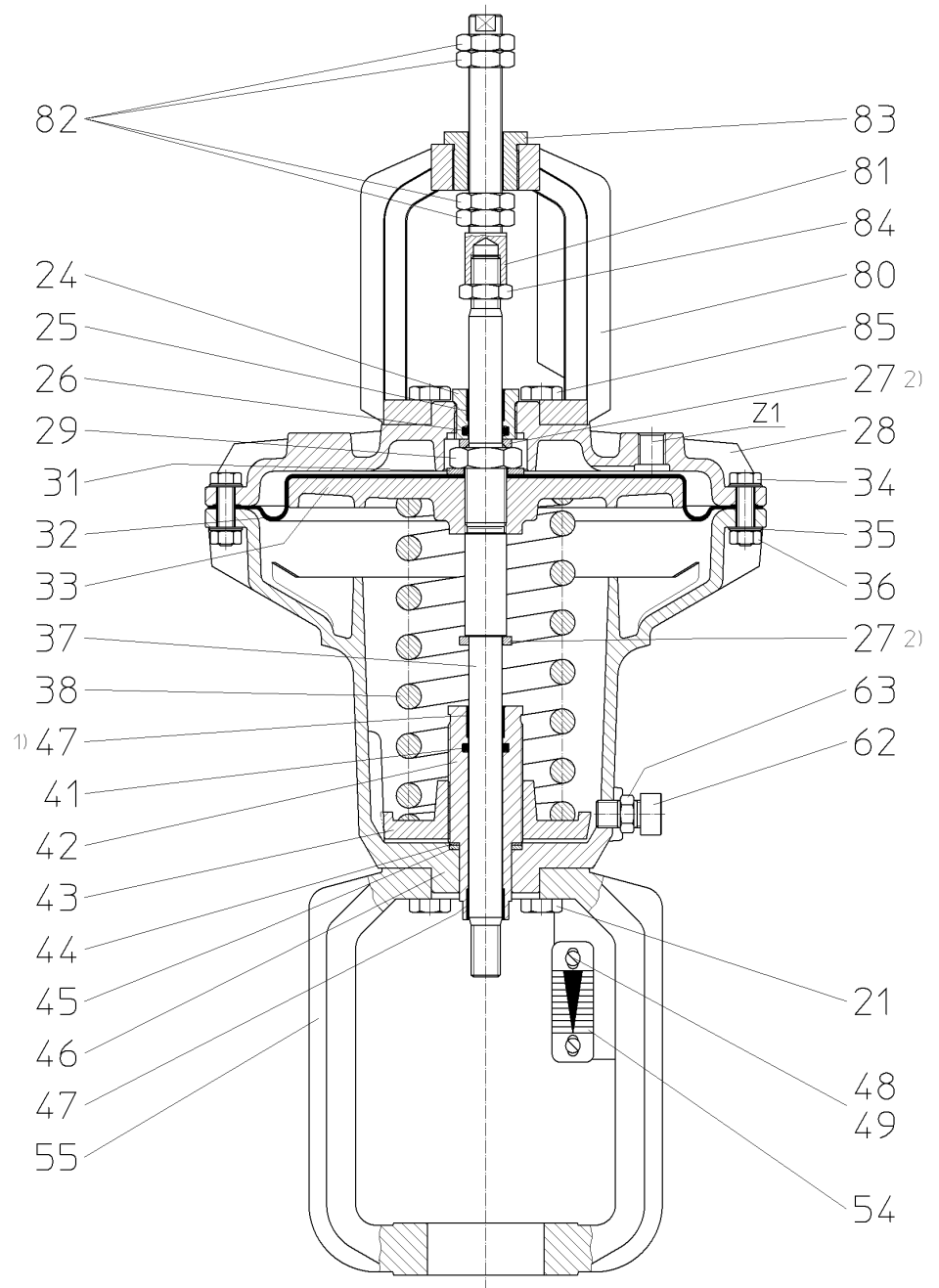


Illustration 10: 811-\*\*\*\*-S HB

1) Only fitted in actuator sizes UIII and UV.

2) Only fitted in actuator sizes UIII and UV for special applications.

**6.8 811-548\*\*-O H**

Actuator size: UV [5]; Yoke:  $\varnothing 72$  [4]; Stroke: 100 [8]; Function: Normally closed [O]; additional equipment: Cover [H].

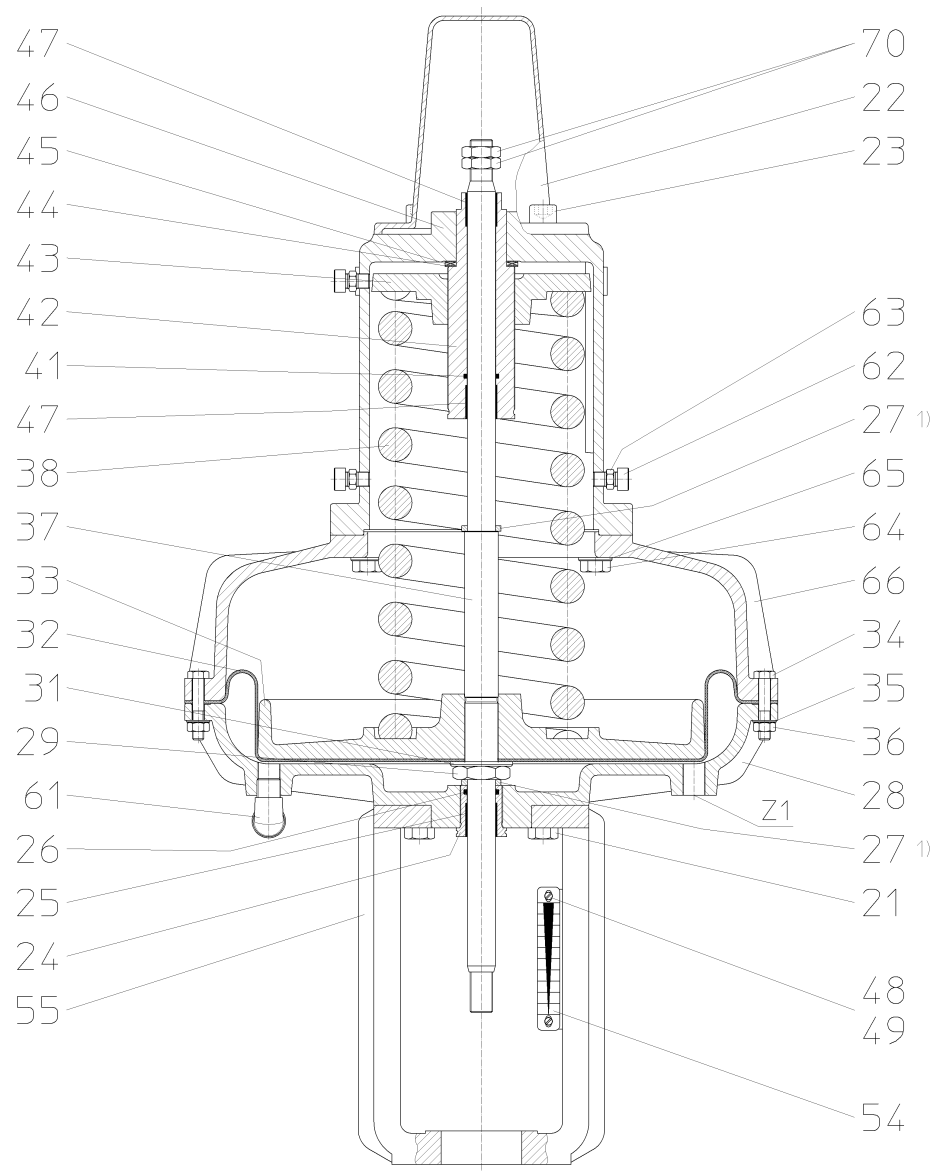


Illustration 11: 811-548\*\*-O H

1) Only fitted in actuators for special applications.

**6.9 811-548\*\*-S H**

Actuator size: UV [5]; Yoke:  $\varnothing 72$  [4]; Stroke: 100 [8]; Function: Normally open [S]; additional equipment: Cover [H].

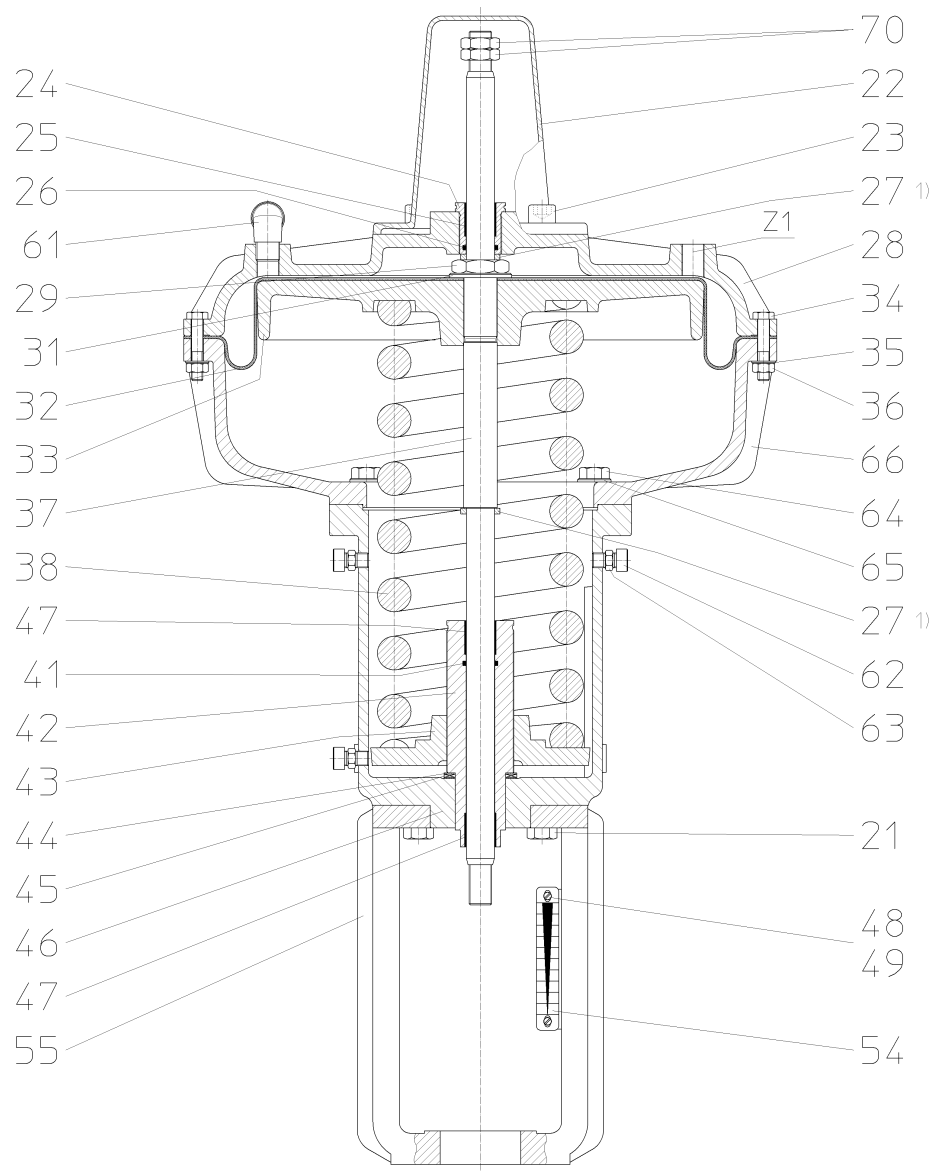


Illustration 12: 811-548\*\*-S H

1) Only fitted in actuators for special applications.

**6.10 811-559\*\*-O H**

Actuator size: UV [5]; Yoke:  $\varnothing 100$  [5]; Stroke: 120 [9]; Function: Normally closed [O]; additional equipment: Cover [H].

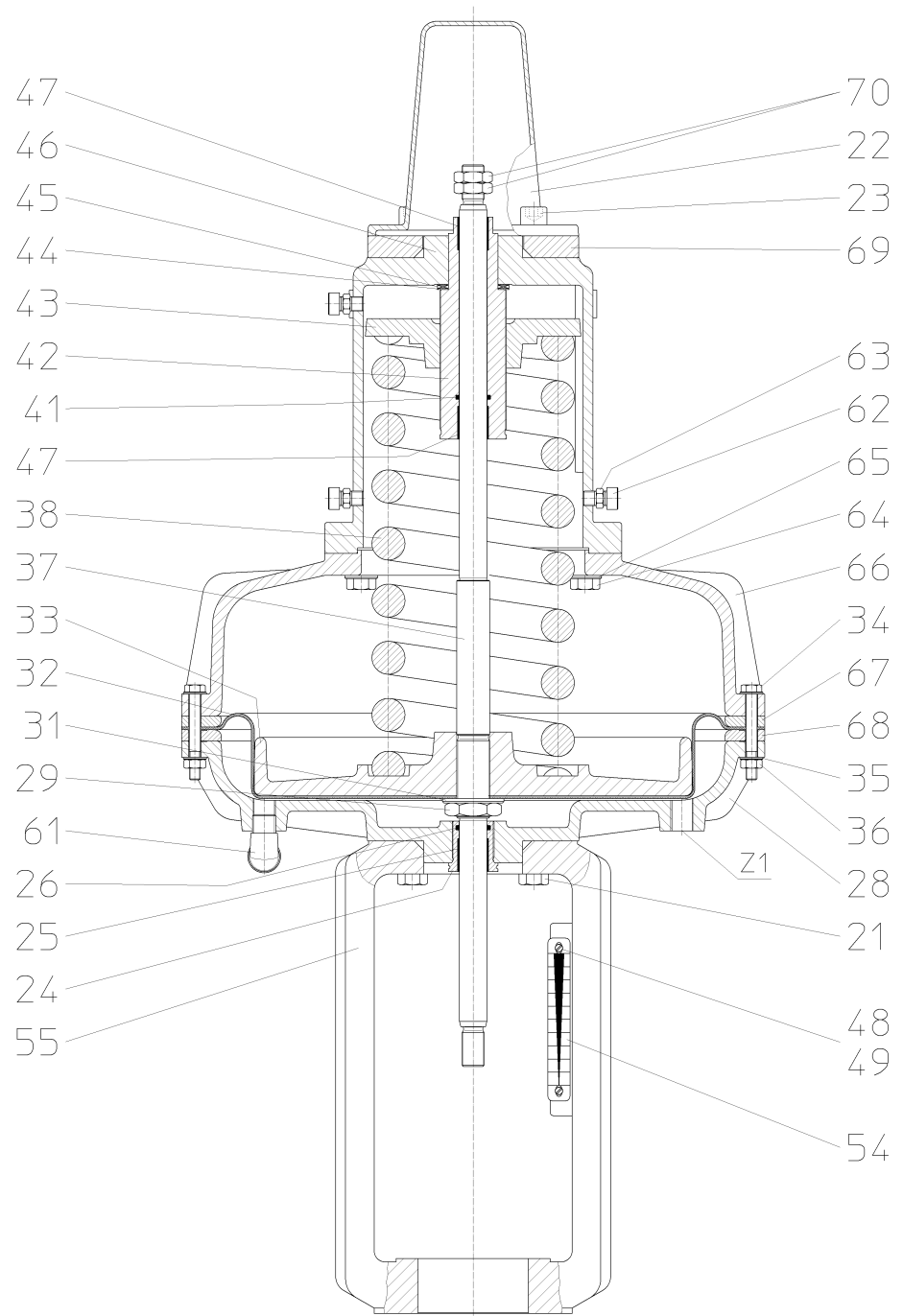


Illustration 13: 811-559\*\*-O H

**6.11 811-559\*\*-S H**

Actuator size: UV [5]; Yoke:  $\varnothing 100$  [5]; Stroke: 120 [9]; Function: Normally open [S]; additional equipment: Cover [H].

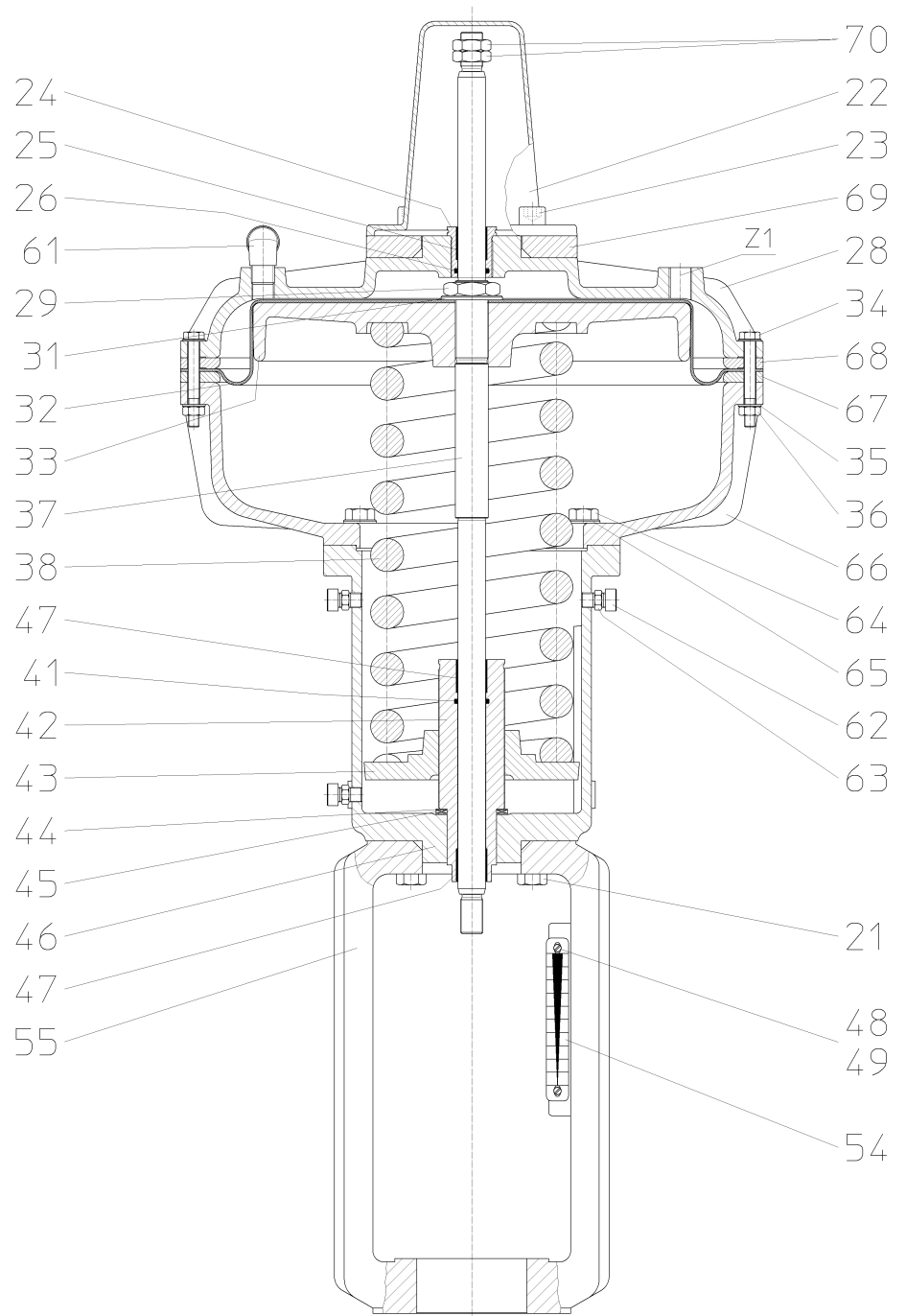


Illustration 14: 811-559\*\*-S H

## 7 Functional description

The series 811 has been developed as a single-action diaphragm actuator for linear valves. The centrally located stem (37) is connected through a coupling for this purpose to the operating stem of the valve.

The actuator stem is guided accurately by the plain bearings (25, 47). Connected to the actuator stem (37) is a diaphragm plate (33) that supports the diaphragm (32) and transmit its movement to the stem (37). The diaphragm (32) divides the actuator housing (28, 46/66) into pressure and spring chambers. The actuator stem (37) moves when the force applied by the actuation signal air pressure is higher on one side of the diaphragm (32) than the force of the springs (38).

Through the rotation of the tightening screw (42), the spring plate (43) moves and tensions or relaxes the spring (38). The spring preload can thus be adjusted to the required actuating forces.

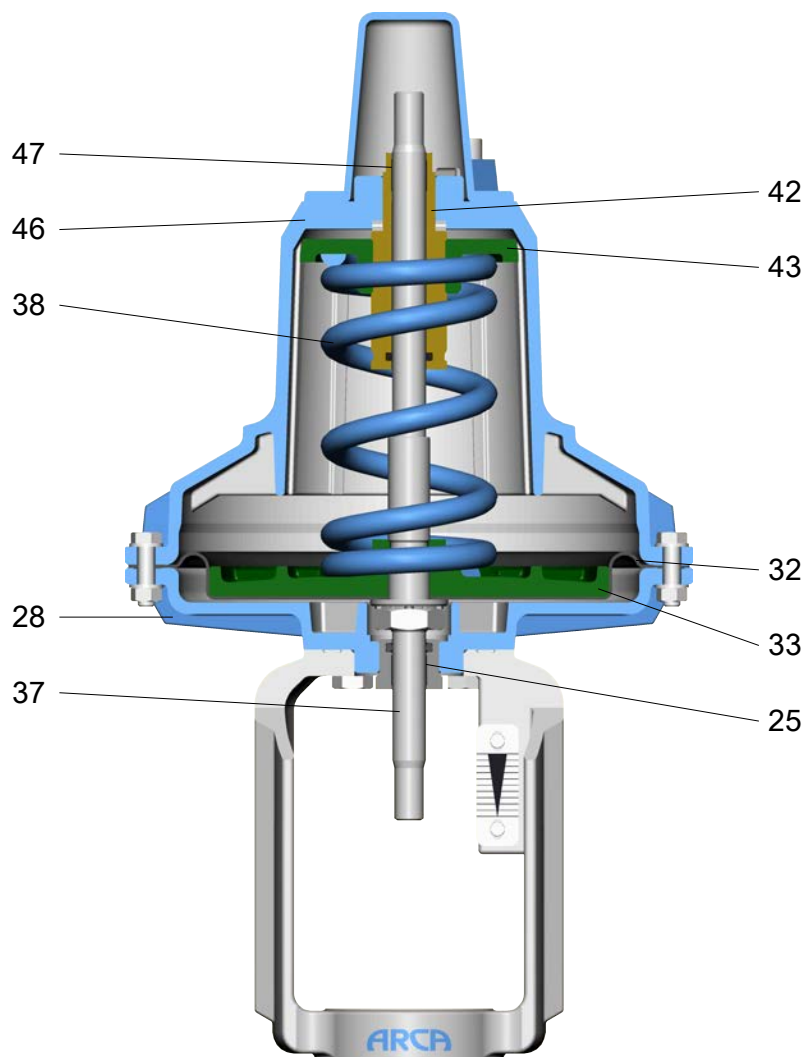


Illustration 15: Sectional drawing



## 8 Installation

### Place of installation

The actuator should be easily accessible from at least one side and from above.

Include a catwalk or similar in the planning in case of greater heights.

An electric crane or block and tackle is to be provided for the actuator sizes UIII and UV.

### Installation

The actuator yoke (55) has a central bore that enables rotation of the actuator in any direction. The actuator is fastened to the valve with the slotted nut of the valve. Actuator and valve are coupled to each other via a coupling.

The maximum permissible actuating forces of the valve must be observed.

### Mounting position



Please note:

#### CAUTION

#### Mounting position

- ▶ Pipeline horizontal
- ▶ Diaphragm chamber above the valve
- ▶ Align the actuator and attached parts to the valve

---

**Please consult us in case of a different installation position!**

## 9 Commissioning

### 9.1 Adjustment

#### Stroke adjustment

- **⚠ CAUTION!** Shear forces must not be transmitted to the actuator stem (37) when coupling actuator and valve.
- **⚠ CAUTION!** Do not turn the actuator stem (37) in a radial direction.
- **NOTICE!** Adjust the stroke so that the closing position of the valve is not hindered by the internal, non-adjustable stroke limiter of the actuator.

#### Adjustment of the spring preload

The spring preload can be adjusted with the tightening screw (42) in order to adapt different operating conditions to the available actuation signal range.

- Apply actuation pressure to the actuator high enough to move the stem out of its end position.
- If the required actuation pressure at the start of the stroke movement lies above or below the desired start signal, the tightening screw (42) is adjusted accordingly until the start signal and the start of the stroke coincide.

**NOTICE!** Turning the tightening screw (42) clockwise increases the spring preload, while turning it counter clockwise reduces the spring preload.

Actuator size	Width across flats of the tightening screw [mm]
U0	20
UI	22
UIII	30
UV	36

#### 9.1.1 If stroke limitation is fitted

The **upper** and **lower** end positions of the actuator can be limited with the adjusting nuts (82). See also chapters [6.6] *811-\*\*\*\*\*-O HB* and [6.7] *811-\*\*\*\*\*-S HB*.

- Depressurise the actuator
- Loosen the nuts (82)
- Adjust the upper and lower end positions
- Lock the nuts (82)

#### 9.1.2 If manual operation is fitted

With the manual operation, the actuator can be moved within its stroke range without an actuation signal being present. See also chapters [6.4] *811-\*\*\*\*\*-O HV* and [6.5] *811-\*\*\*\*\*-S HV*.

- Pull out the hand wheel lock (6)
- Actuate the hand wheel (3)

**NOTICE!** The manual operation must be placed in the neutral position again in order to be able to move the actuator over the entire stroke range by means of an actuation signal.

Actuator size	Number of revolutions required to traverse the entire stroke range (approx.)
U0-20	10
UI-30	12
UIII-30	10
UIII-60	20
UV-60	15
UV-100	25
UV-120	30

#### Neutral position

The neutral position can be reached by turning the hand wheel (3) in the anticlockwise direction up to the stop.

## 9.2 Actuating signal connection

#### Air quality

**CAUTION!** Ensure correct air quality!

Oil-free, instrument-quality air with no water or dust, solid material content max. 1 mg/m<sup>3</sup> (standard atmospheric conditions), max. particle size 0.1 mm, oil content max. 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.

#### Air connections

The actuator has air connections (Z...) with an internal thread.

Actuator size	Connection Z1
U0	G ¼
UI	G ¼
UIII	G ½
UV	2x G ½

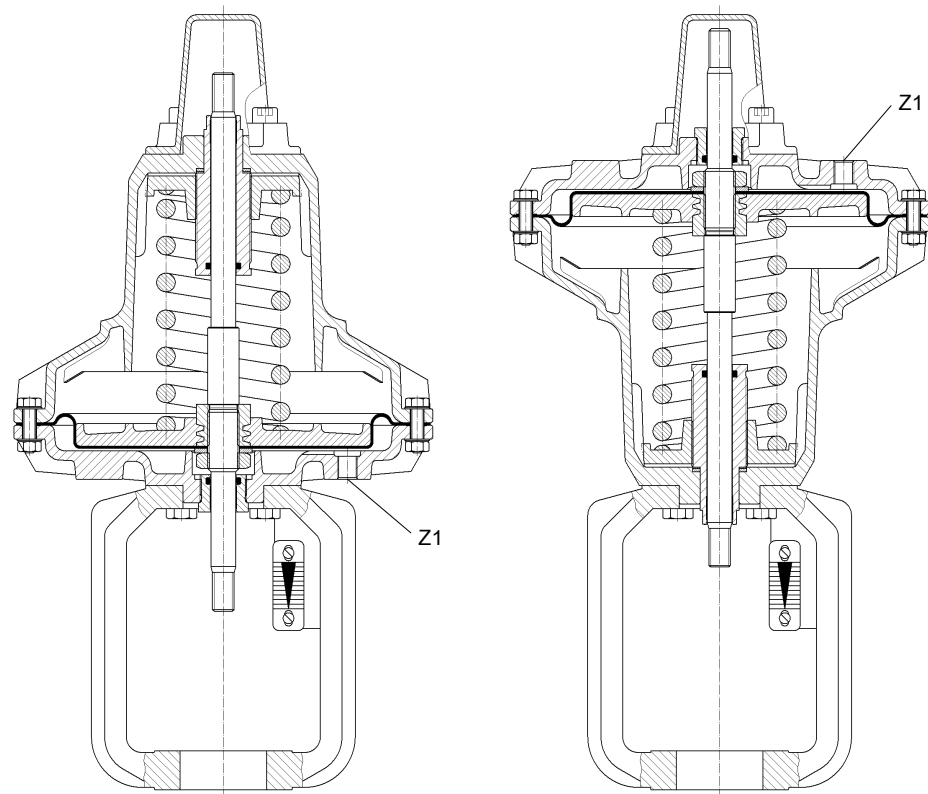


Illustration 16: Air connections

#### Standard

- Connect the air supply pipe to the connection "Z1" with the aid of a screw connection.

### 9.3 Positioner installation

#### Installation according to IEC 60534-6-1 (NAMUR)

The actuator yoke (55) is designed on the basis of the directive IEC 60534-6-1 (NAMUR) and enables the attachment on both sides of auxiliary devices with an M8 fastening thread.

## 10 Maintenance

### 10.1 Care

- Clean the stem (37) if necessary
  - Clean the stem (37) of adhering dirt using a soft cloth

**NOTICE!** Never use sandpaper, since this will damage the surface of the stem and reduce the lifetime of the stem sealing.

### 10.2 Maintenance

The actuator requires almost no maintenance.

Nevertheless, the connections must be checked after 100,000 operating cycles or twice per year for leaks.

In addition it is necessary to check and clean the gliding surfaces.

Depending on the operating conditions of the actuator, the operator is responsible for defining appropriate inspection and maintenance intervals.

## 11 Disassembly / assembly of the actuator



### ⚠ WARNING

#### Disregarding the safety instructions

Risk of injury!

- ▶ Observe the notes in the chapter entitled [2] *Safety*

### 11.1 Procedure

- Disassembly in the given order.
  - Dismounted parts are to be secured carefully against falling down (risk of injury or damage).
- Clean all components.
- Before assembly, all components must be inspected for damage or wear and replaced where necessary.
- Assembly in the reverse order using the new components.
  - Seals must generally be replaced.
  - Insert O-rings and shaped rings with a suitable lubricant.
  - Refer to the chapter entitled [12] *Torque tables* for the tightening torques of bolted connections.

#### Recommended lubricants

O-rings, shaped rings, guide bands	Bolted connections	Roller bearing
Molykote 55	Metaflux lubricating metal paste 70-85	Shell Retinax Grease EP2

### 11.2 Manual operation (if mounted)

#### "Air to open" function (normally closed)

See also chapter [6.4] *811-\*\*\*\*\*-O HV*

- Place the manual operation in the neutral position – see chapter [9.1.2] *If manual operation is fitted*
- Loosen the hex nut (19)
- Loosen the grub screw (12) in the clamping ring (16)
- Unscrew the hand wheel spindle (17) complete with the hand wheel (3) from the stem (37)
- Unscrew and remove the hex screws (21)
- Remove the manual operation HV trestle (20)

#### "Air to close" function (normally open)

See also chapter [6.5] *811-\*\*\*\*\*-S HV*

- Place the manual operation in the neutral position – see chapter [9.1.2] *If manual operation is fitted*
- Unscrew and remove the hex screws (21)
- Remove the manual operation HV trestle (20)

### 11.3 Stroke limitation (if mounted)

See also chapters [6.6] 811-\*\*\*\*\*-O HB and [6.7] 811-\*\*\*\*\*-S HB

- Loosen the hex nut (84)
- Unscrew and remove the stem (81) from the stem (37)
- Unscrew and remove the hex screws (85)
- Remove the stroke limiter HB trestle (80)

### 11.4 Reversing the direction of action

From O function "Air to open" to S function "Air to close" or vice versa

- Remove any positioner if fitted
- **If manual operation is fitted:** Dismount the manual operation as described in the chapter [9.1.2] *If manual operation is fitted*.
  - **NOTICE!** When reversing the actuator, a new manual operation corresponding to the direction of action must be mounted.
- **If stroke limiter is fitted:** Dismount the stroke limiter as described in the chapter [9.1.1] *If stroke limitation is fitted*.
- **Without manual operation or stroke limiter fitted:**
  - Unscrew and remove the cylinder head bolts (23)
  - Remove the cover (22)
- Unscrew and remove the hex screws (21)
- Raise and turn the complete actuator housing (28, 46)
- Observe the notes in the chapter [9.1] *Adjustment* when assembling!

### 11.5 Diaphragm



#### **! DANGER**

**Danger of death and serious injuries as well as damage to property due to high spring preload!**

If the following instructions are disregarded, serious injuries resulting in death as well as severe damage to property cannot be ruled out.

- ▶ It is imperative to follow the instructions and the given order below
- ▶ Observe warning notices

- 
- Remove any positioner if fitted
  - **If manual operation is fitted:** Dismount the manual operation as described in the chapter [9.1.2] *If manual operation is fitted*.
  - **If stroke limiter is fitted:** Dismount the stroke limiter as described in the chapter [9.1.1] *If stroke limitation is fitted*.
  - **In the case of S function "Air to close":**
    - Decouple the actuator stem (37) and the valve stem
  - Dismount 4 hex nuts (36) and bolts (34) **evenly** at the periphery.
  - Mount assembly/disassembly bolts (34) in grade 8.8 and new hex nuts (36) in grade 8.8.
    - **NOTICE!** The assembly/disassembly bolts (34) and nuts (36) in grade 8.8 are not part of the scope of delivery!

Actuator size	Bolt size
U0 + UI	M8 x 75
UIII + UV	M10 x 150

- Loosen the hex nuts (36) of the short bolts (34)
- Loosen the hex nuts (36) of the newly mounted assembly/disassembly bolts (34) **evenly** in order to relax the springs (38).
- **In the case of O function "Air to open":**
  - Remove the spring housing (46)
  - Remove the spring plate (43) and compression spring (38)
- **In the case of S function "Air to close":**
  - Remove the diaphragm cover (28)
- Remove the stem (37) complete with the diaphragm plate (33) and the diaphragm (32)
- Unscrew and remove the hex nuts (29)
- Remove the diaphragm (32) and replace it by a new diaphragm (32)
  - **NOTICE!** Fabric side faces the diaphragm plate (33)

## 11.6 Spring

- **In the case of O function "Air to open":**
  - Disassembly according to chapter [11.5] *Diaphragm* up to removal of the compression spring (38).
- **In the case of S function "Air to close":**
  - Disassembly according to the chapter [11.5] *Diaphragm* up to the removal of the complete stem (37).
- Replace the compression spring (38) by a new compression spring.

## 11.7 Guide and sealing elements / bearing (45)

- **In the case of O function "Air to open":**
  - Disassembly according to chapter [11.5] *Diaphragm* up to removal of the compression spring (38).
- **In the case of S function "Air to close":**
  - Disassembly according to the chapter [11.5] *Diaphragm* up to the removal of the stem (37).
  - Remove the tightening screw (42) with spring plate (43)
- Replace the O-rings (26, 41) and plain bearings (25, 47)
- Remove the bearing (45) and support discs (44)
- **NOTICE!** When assembling, all O-rings, bearings and support discs must be inserted using a suitable lubricant.



## 12 Torque tables - bolted connections

### 12.1 Bolts conforming to DIN EN ISO 4017/4014/4762

Thread	Torque [Nm]	
	A4-80	8.8
M6	7	8
M8	17	18
M10	34	36
M12	60	65
M16	140	150

### 12.2 Bolts conforming to ASME B18.2.1

Thread	Torque [Nm/lbf ft]	
	A193B8	A193B7
1/4"-UNC	4/3	9/7
5/16"-UNC	9/7	19/14
3/8"-UNC	17/13	35/26
1/2"-UNC	40/30	84/62
5/8"-UNC	76/56	160/118

### 12.3 Hex nut (29)

Actuator size	Thread	Torque [Nm]
U0	M20x1.5	40
UI	M20x1.5	50
UIII	M24x1.5	75
UV	M30x1.5	85

### 13 Fault removal



#### **⚠ WARNING**

#### **Improper troubleshooting work**

Risk of injury!

- ▶ For all troubleshooting work, observe the corresponding notes – in particular the safety instructions – in this operating manual or in the operating manuals for the additionally installed components.

Please contact the manufacturer if problems occur that are not described in this table.

<b>Fault</b>	<b>Possible causes</b>	<b>Action</b>
Actuator stem doesn't move	No actuation air pressure signal present	Check signal source
	Actuation signal connection incorrectly implemented	Check actuation signal connection and direction of action of the actuator
	Actuation signal air pressure too low	Increase air pressure, observe max. permissible air pressure
	Actuator diaphragm defective	Replace actuator diaphragm
	Manual operation, if any, is engaged	Relieve manual operation
Actuator stem seal is leaking	Sealing element worn	Replace sealing element, clean stem surface
	Stem surface damaged	Replace stem and sealing elements
Actuating force too low	Actuation signal air pressure too low	Increase air pressure, observe max. permissible air pressure
	Leaks in the actuation signal line	Check the signal line
	Positioner, if any, is incorrectly adjusted	Check the positioner adjustment
	Incorrect actuator	Use a more powerful actuator, check operating data

## 14 Disposal and recycling



### **DANGER**

**Danger of death and serious injuries as well as damage to property due to high spring tension!**

If the following instructions are disregarded, serious injuries resulting in death as well as severe damage to property cannot be ruled out!

- ▶ The actuator may only be disposed of with the actuator springs removed
- ▶ Remove actuator springs before disposal
- ▶ Strictly follow the disassembly instructions



### **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



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