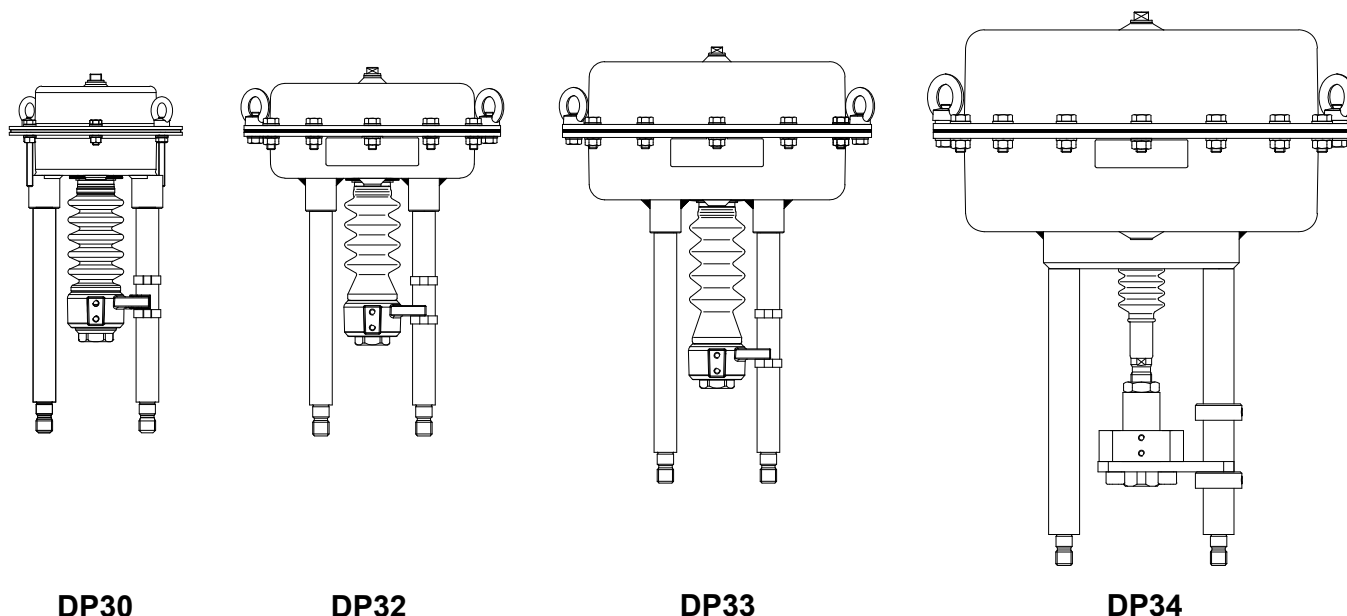


Operating and installation instructions

Pneumatic actuators - DP30 / DP32 / DP33 / DP34



Contents

1.0 General information on operating instructions	2	7.0 Disassembly of the actuator unit from the valve	18
2.0 Notes on possible dangers	2	7.1 Disassembly of the actuator unit	18
2.1 Significance of symbols	2	8.0 Care and maintenance	19
2.2 Explanatory notes on safety information	2	8.1 Replacing the rolling diaphragm	19
3.0 Storage and transport	2	8.2 Replacing the guiding band and the o-ring	21
4.0 Description	3	9.0 Troubleshooting	21
4.1 Scope of applications	3	10.0 Troubleshooting table	22
4.2 Operating principles	3	11.0 Warranty / Guarantee	23
4.3 Diagram	4		
4.4 Technical data	10		
4.5 Marking	11		
5.0 Installation	11		
5.1 General notes on installation	11		
5.2 Requirements at the place of installation	12		
5.3 Valve with actuator	13		
5.4 Control pressure connection	15		
5.5 Assembling the valve, operating mode „actuator stem extends by spring force“	15		
5.6 Setting the starting point, operating mode „actuator stem extends by spring force“	16		
5.7 Assembling the valve, operating mode „actuator stem retracts by spring force“	16		
5.8 Setting the starting point, operating mode „actuator stem retracts by spring force“	17		
6.0 Putting the valve into operation	17		

1.0 General information on operating instructions

These operating instructions provide information on mounting and maintaining the actuators. Please contact the supplier or the manufacturer in case of problems which cannot be solved by reference to the operating instructions.

They are binding on the transport, storage, installation, start-up, operation, maintenance and repair.

The notes and warnings must be observed and adhered to.

- Handling and all work must be carried out by expert personnel or all activities must be supervised and checked.

It is the owner's responsibility to define areas of responsibility and competence and to monitor the personnel.

- In addition, current regional safety requirements must be applied and observed when taking the fittings out of service as well as when maintaining and repairing them.

The manufacturer reserves the right to introduce technical modifications at any time.

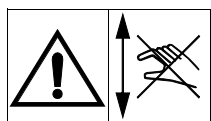
These Operating Instructions comply with the requirements of EU Directives.

2.0 Notes on possible dangers

2.1 Significance of symbols



Warning of general danger.



Exposed to injury!

Don't put your hand into the up or downwards moving appliance.

2.2 Explanatory notes on safety information

In these Operating and Installation Instructions dangers, risks and items of safety information are highlighted to attract special attention.

Information marked with the above symbol and “**ATTENTION !**” describe practices, a failure to comply with which can result in serious injury or danger of death for users or third parties or in material damage to the system or the environment. It is vital to comply with these practices and to monitor compliance.

All other information not specifically emphasised such as transport, installation, operating and maintenance instructions as well as technical data (in the operating instructions, product documentation and on the device itself) must also be complied with to the fullest extent in order to avoid faults which in turn can cause serious injury to persons or damage to property.

3.0 Storage and transport



ATTENTION !

- Protect against external force (like impact, vibration, etc.).

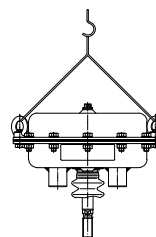
- Valve mountings such as actuators, handwheels, hoods must not be used to take external forces, e.g. they are not designed for use as climbing aids, or as connecting points for lifting gear.

- Suitable materials handling and lifting equipment should be used.

Observe max. load-carrying capacity of the eye nuts:

DP30 = 30kg, DP32/33 = 100kg, DP34 = 170kg

(Refer to catalog sheet for weights)



- At -20°C to +65°C.

- Do not damage paint protection. (The actuators should rest in the packing till installation.)

4.0 Description

4.1 Scope of applications

The pneumatic actuators are to be mounted on the top of valves and are necessary to operate the valves (stem movement) under service conditions.

The units are suitable for being employed in control systems used in the chemical industry.



ATTENTION !

- Refer to the data sheet for applications, limits on use and possibilities.

Please contact the supplier or the manufacturer if you have any questions.

4.2 Operating principles

By means of the pneumatic actuator units, pneumatic control signals are converted into a translatory motion. The necessary restoring force is generated by means of the compression springs on the bulk of the diaphragm plate.

In case of air fall-off, the actuator will be restored by means of the spring force in the starting position.

The operating mode of the actuator is the following:

„actuator stem extends by spring force“ (on air failure) or

„actuator stem retracts by spring force“ (on air failure)

This operation is obtained and dependent on the assembly of the springs.

By using a rolling diaphragm, linear rod forces during long lifts can be obtained.

In open / close operation, the operating pressure should be restricted depending on the actuator's operating range. The permitted operating range with which the actuator's lift range can be travelled through is indicated on the name plate. The idea behind this is to extend the service life of the actuators, and it can also mean that a filter or pressure regulator must be used.

The pneumatic actuators with manual emergency adjustment can be operated without operating pressure by turning the handwheel.

In case of usual operating the handwheel is locked by a locking device. This prevents the handwheel from turning. To engage the handwheel, the locking device must first be pulled out.



ATTENTION !

- After engaging, the manual emergency adjustment has to be set in starting position to avoid the deadlock with usual operating.

4.3 Diagram

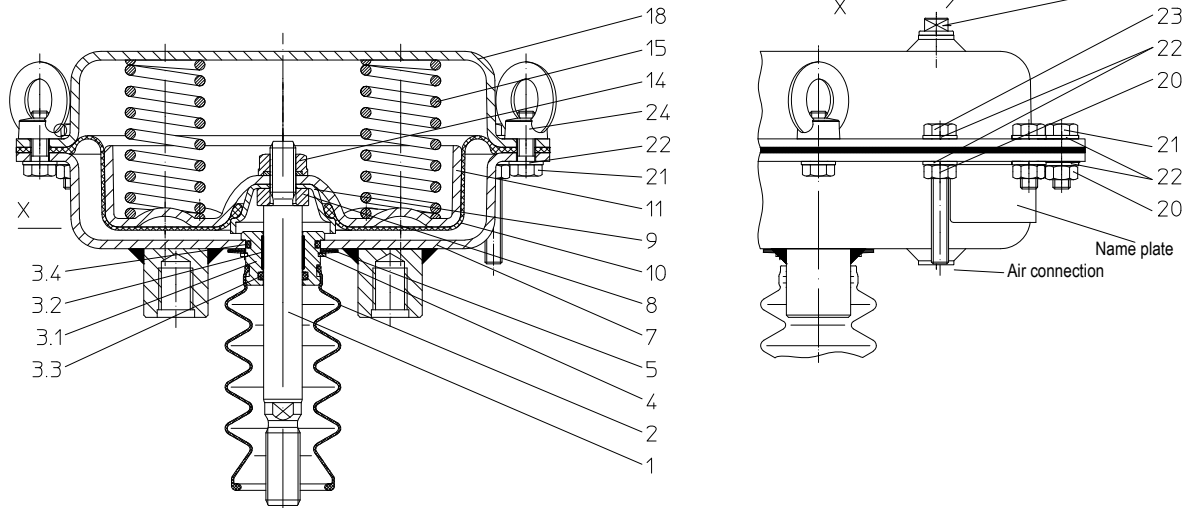


Fig. 1: DP30 / DP32 „actuator stem extends by spring force“

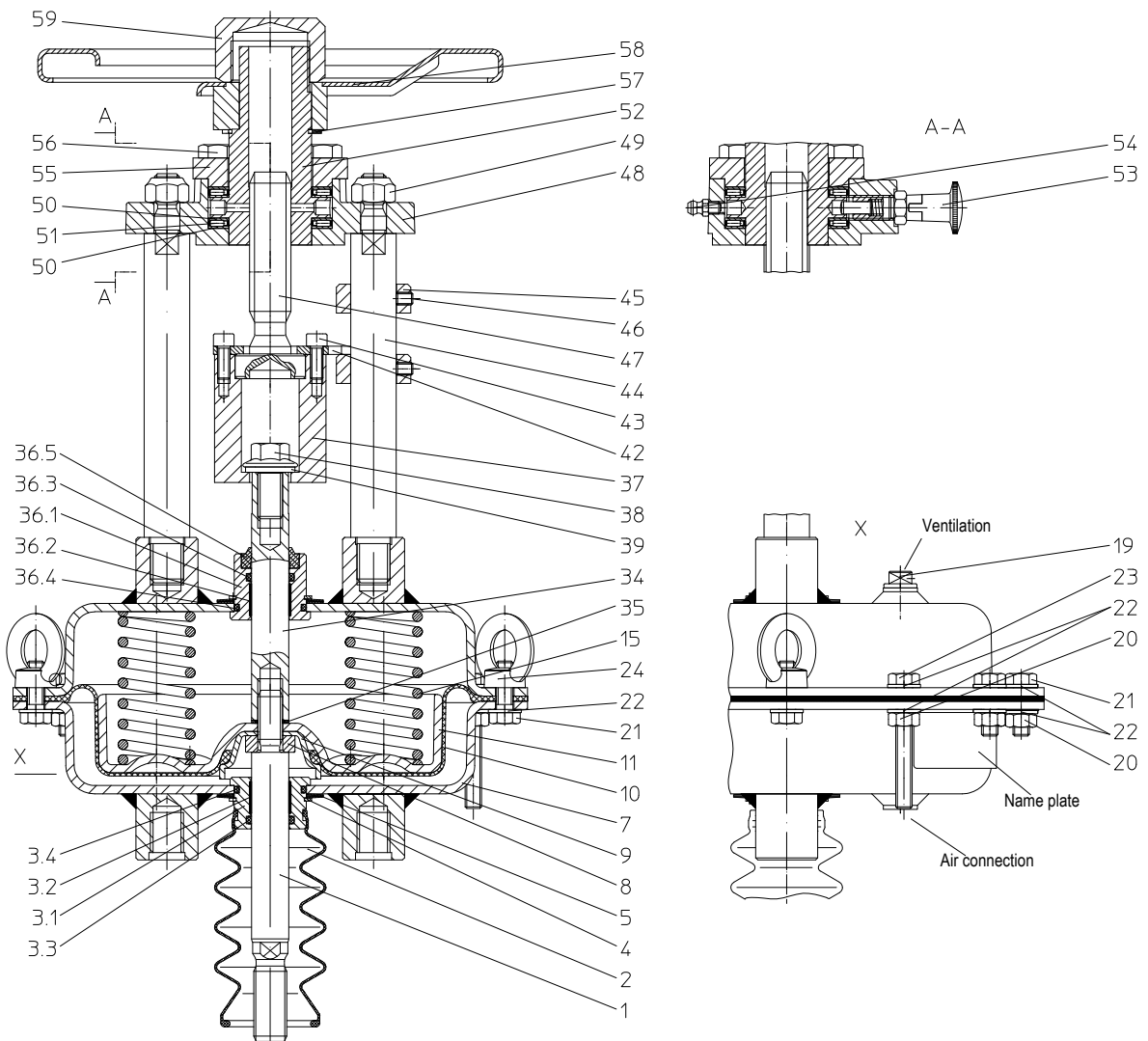


Fig. 2: DP30 / DP32 with manual emergency adjustment „actuator stem extends by spring force“

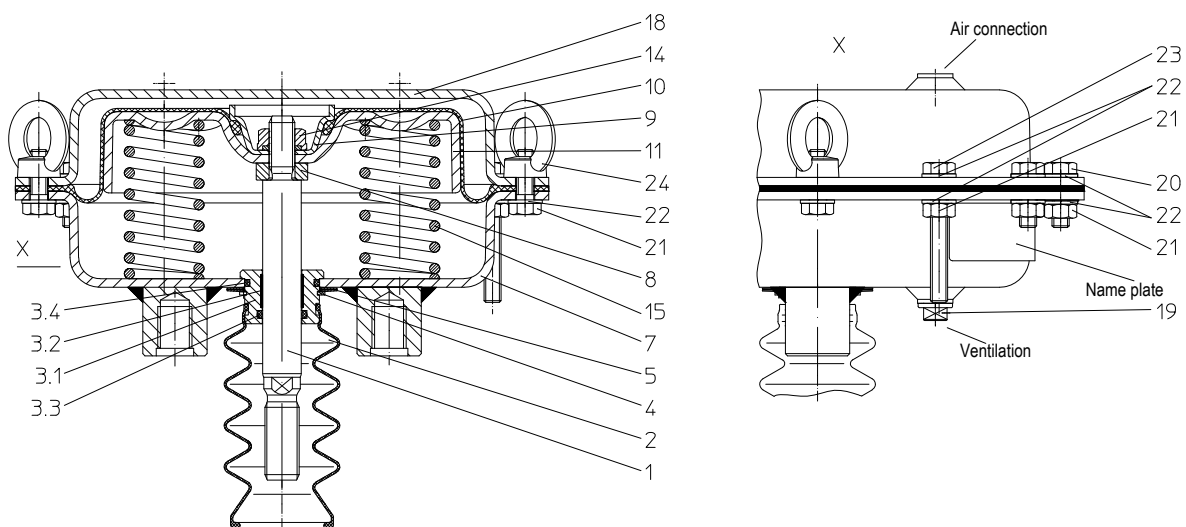


Fig. 3: DP30 / DP32 „actuator stem retracts by spring force“

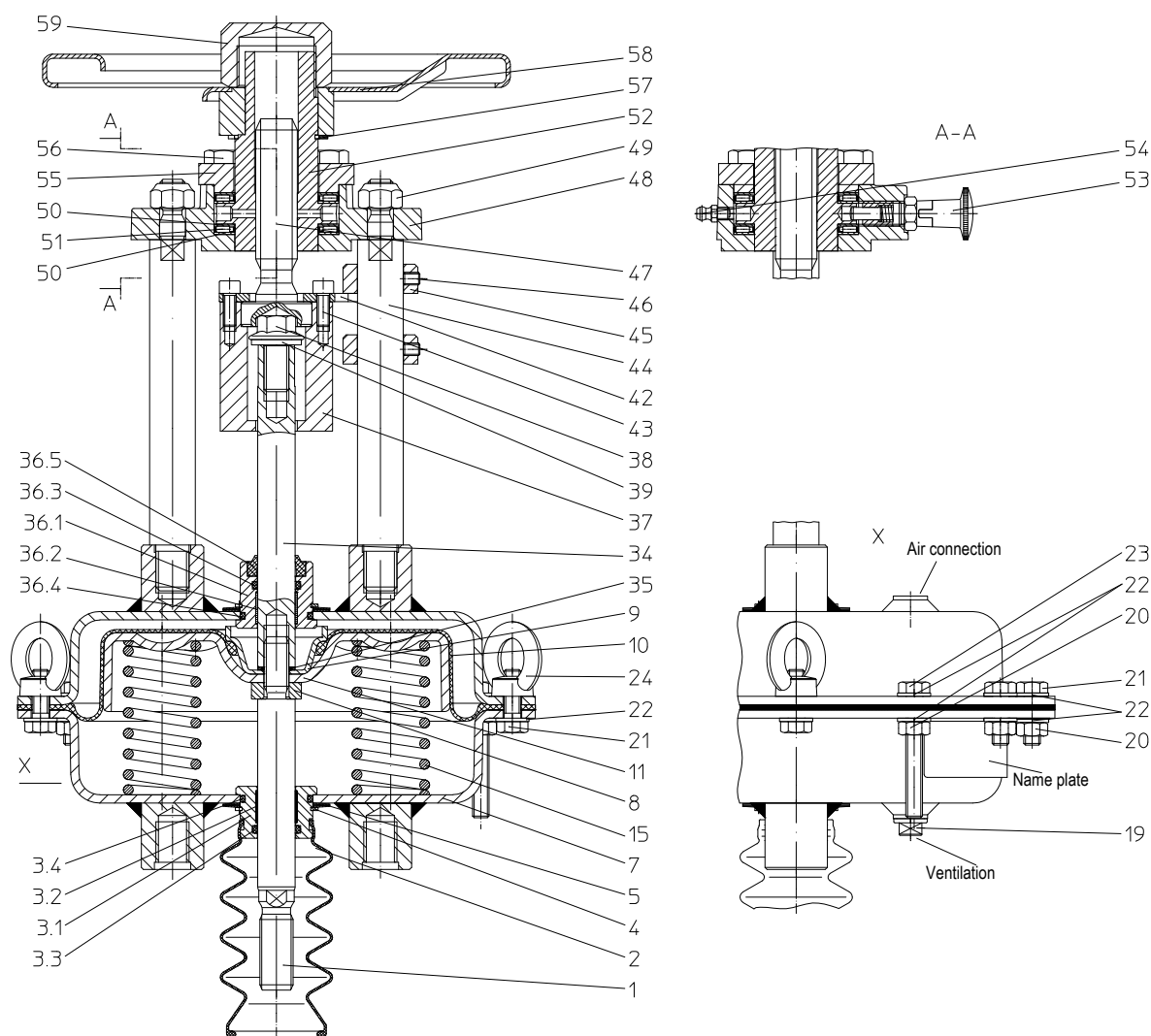


Fig. 4: DP30 / DP32 with manual emergency adjustment „actuator stem retracts by spring force“

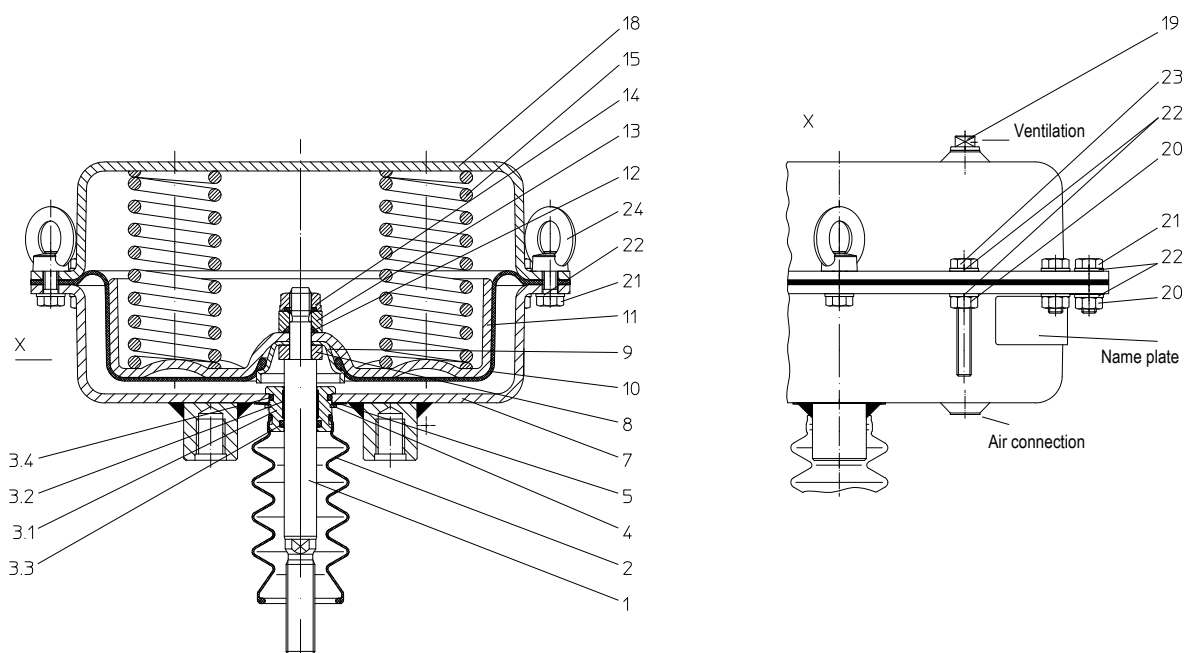


Fig. 5: DP33 „actuator stem extends by spring force“

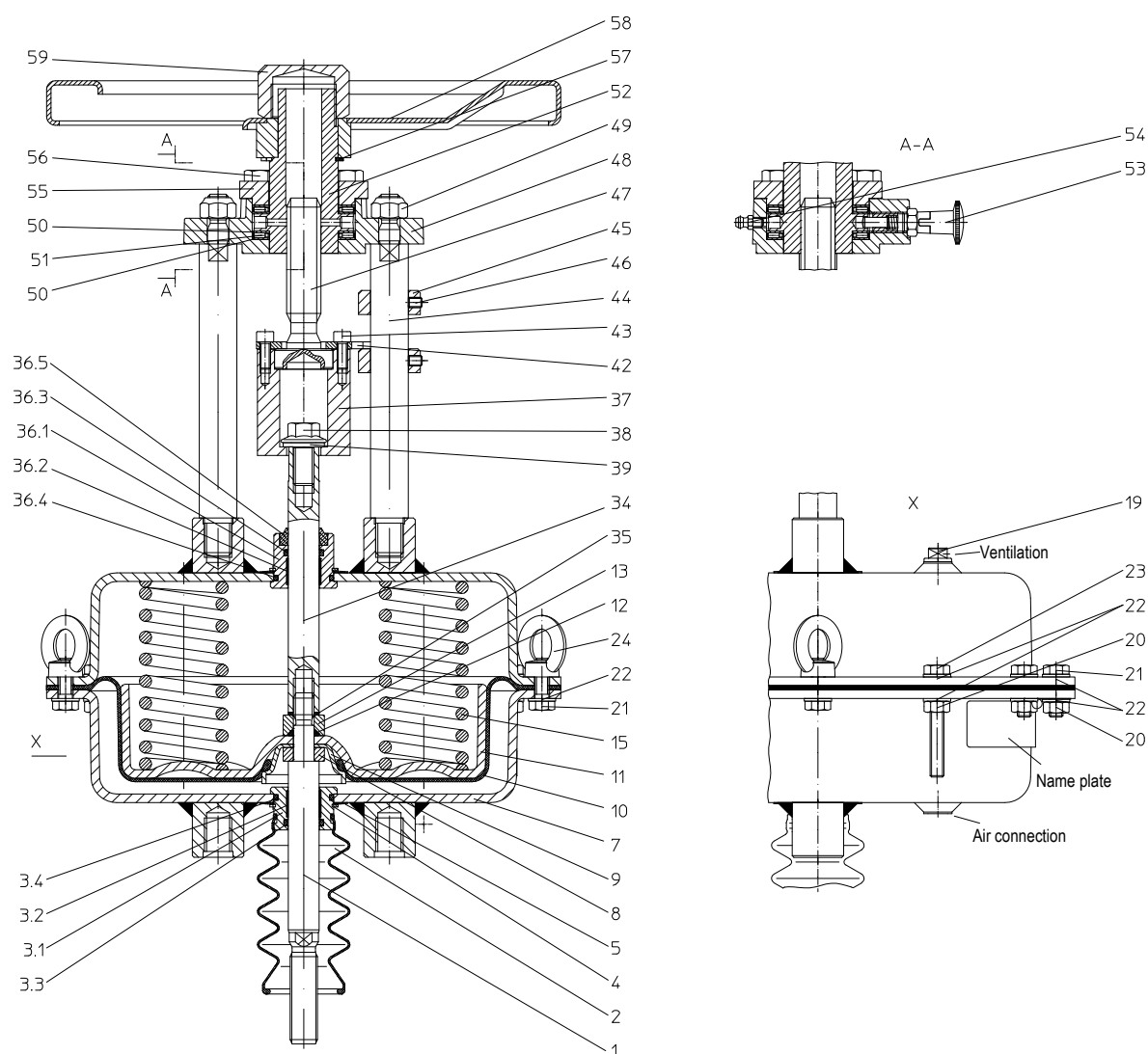


Fig. 6: DP33 with manual emergency adjustment „actuator stem extends by spring force“

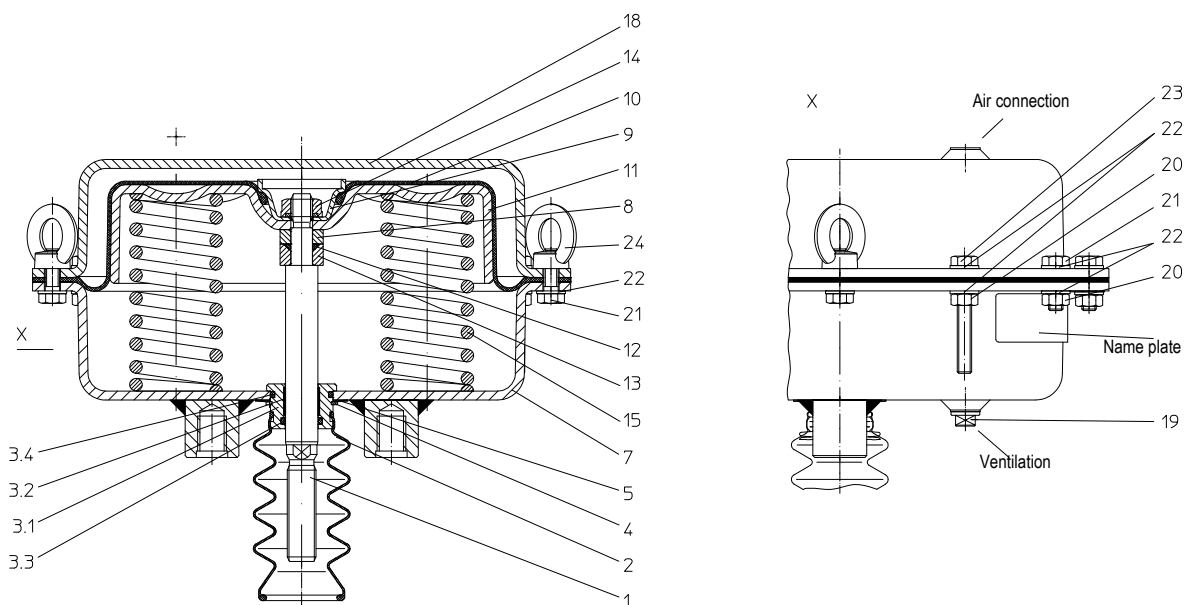


Fig. 7: DP33 „actuator stem retracts by spring force“

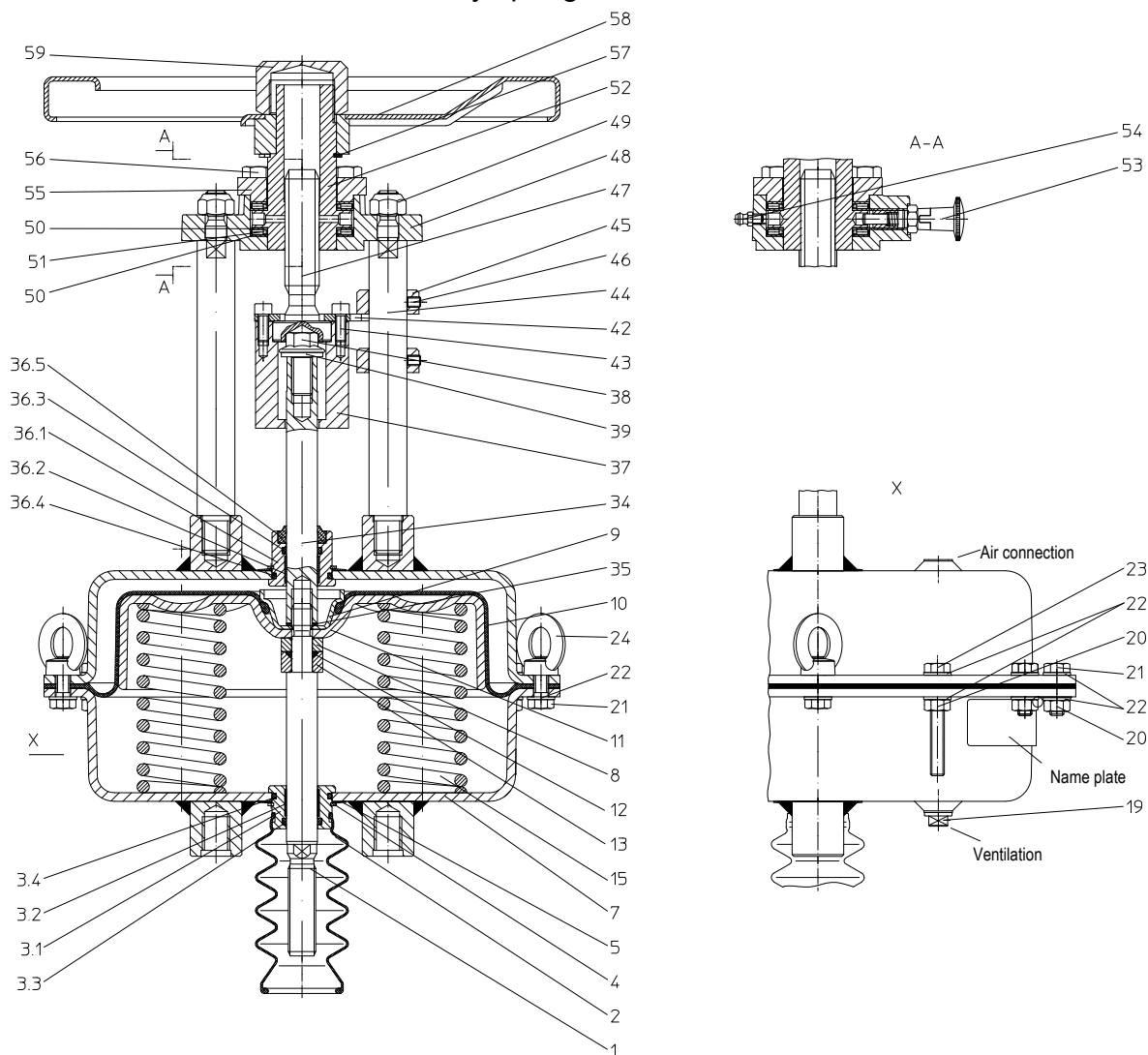


Fig. 8: DP33 with manual emergency adjustment „actuator stem retracts by spring force“

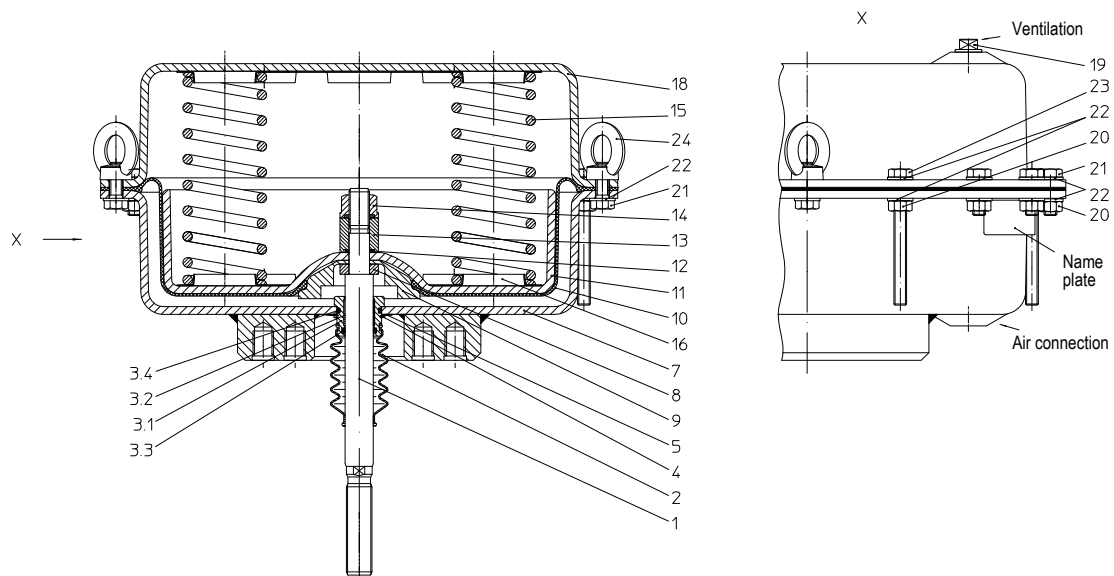


Fig. 9: DP34 „actuator stem extends by spring force“

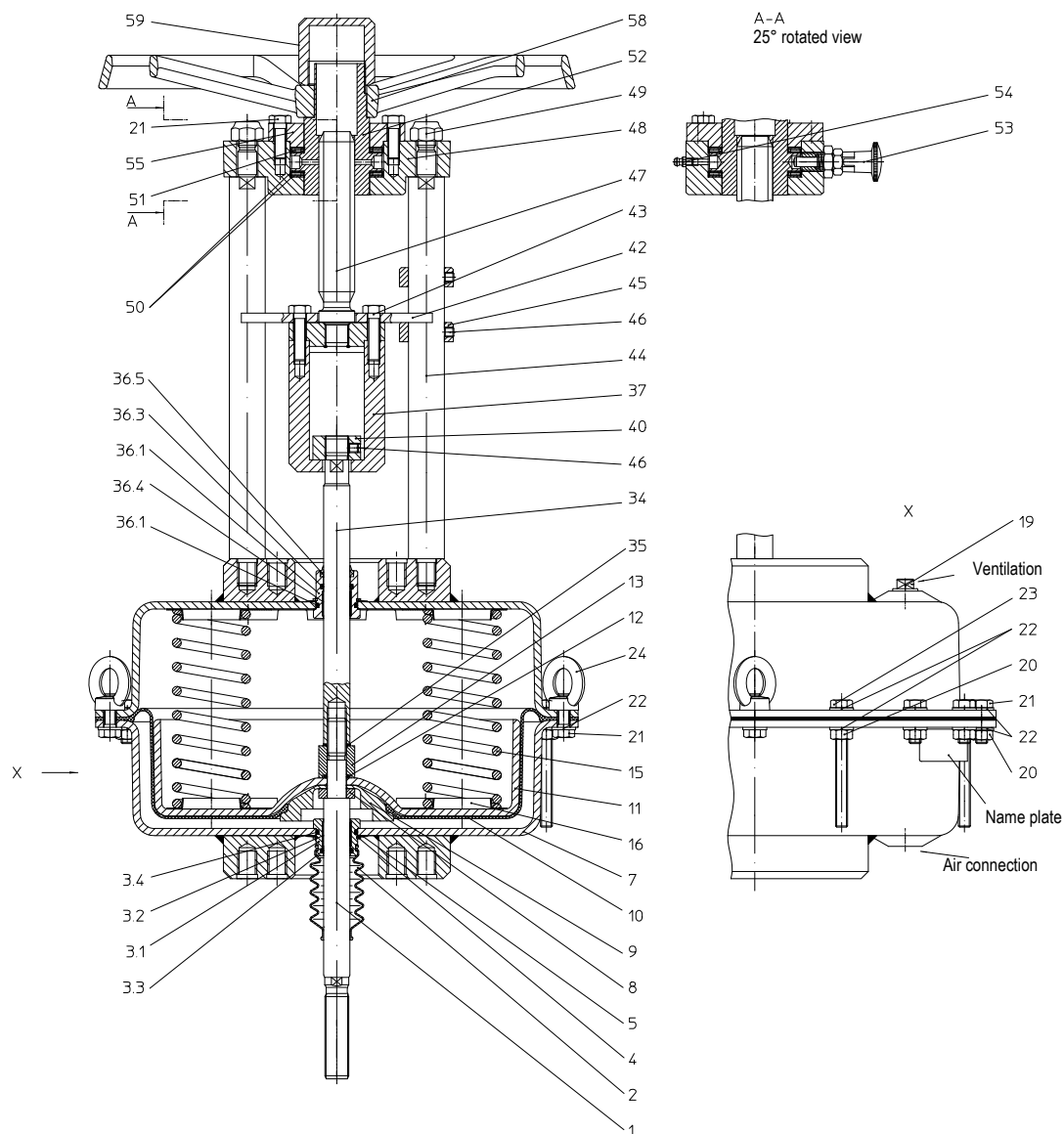


Fig. 10: DP34 with manual emergency adjustment „actuator stem extends by spring force“

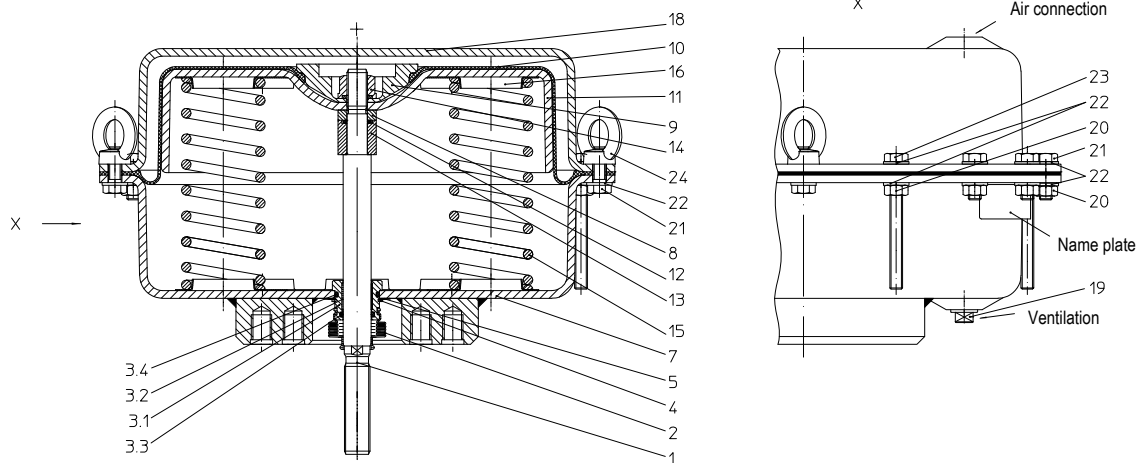


Fig. 11: DP34 „actuator stem retracts by spring force“

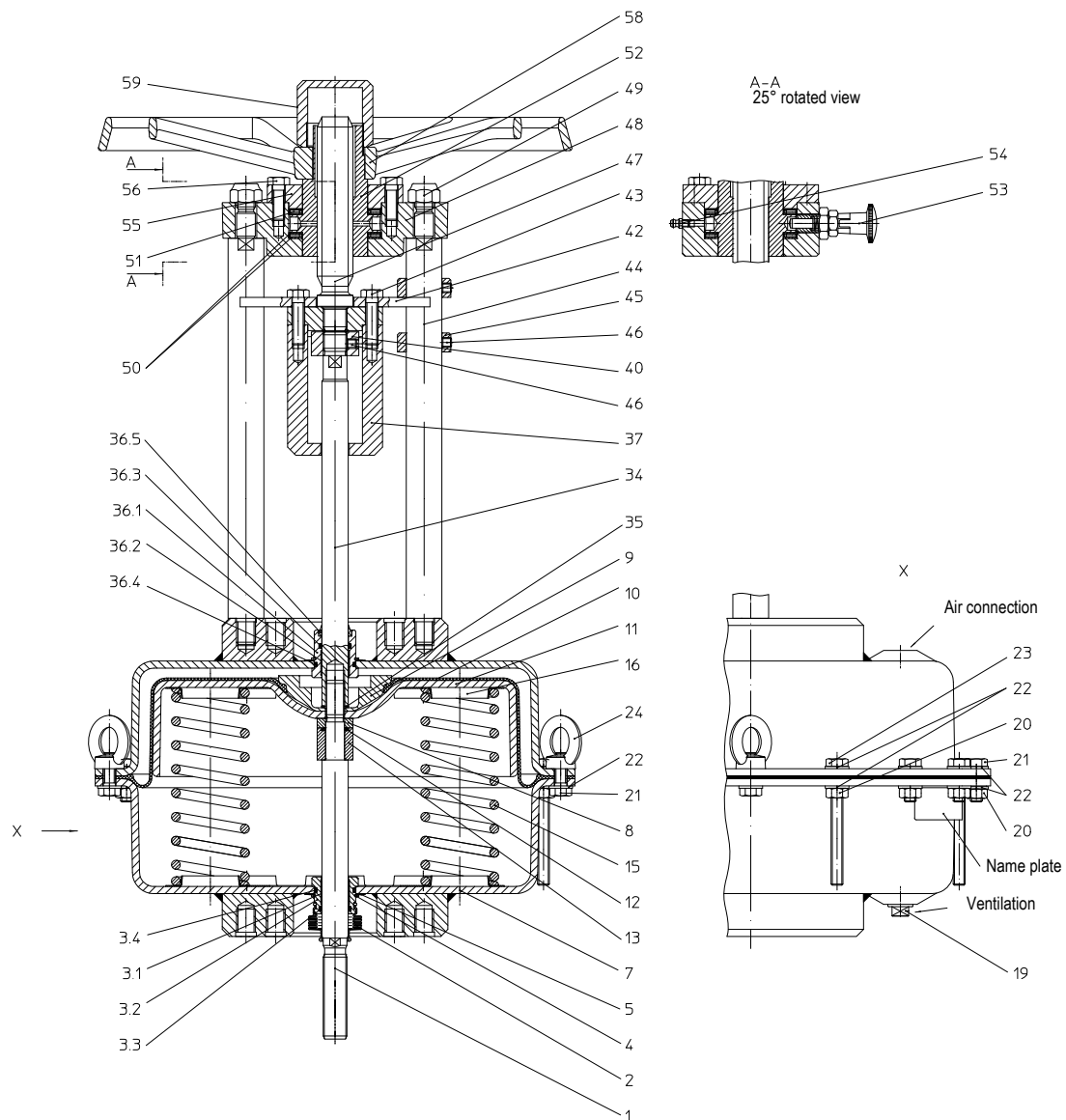


Fig. 12: DP34 with manual emergency adjustment „actuator stem retracts by spring force“

4.4 Technical data

Actuator type	Diaphragm area	Part-No.00001 / 2		Spring range	Nominal travel	Number of springs	Filling-volume	
	(cm ²)	Standard	with manual emergency adjustment	(bar)	(mm)	(Pieces)	(Litre)	
DP30	80	92046	92246	0,6-1,5	20	1	0,37	
		92048	92248	2,2-4,5			0,34	
DP32	250	92050	92250	0,2-1,0	20	4	1	
				0,4-1,2			1,1	
		92052	92252	0,8-2,4	20	8	1,2	
		92057	92257	0,2-1,0	30	4		1,4
				0,4-1,2				
		92059	92259	0,8-2,4	30	8	1	
		92054	92254	1,5-2,5	20	6		
		92060	92260	2,0-3,3	20	8		
DP33	400	92070	92270	0,2-1,0	20	4	1,7	
				0,4-1,2			1,9	
		92072	92272	0,8-2,4	20	8	2,1	
		92076	92276	0,2-1,0	30	4		2,4
				0,4-1,2				
		92078	92278	0,8-2,4	30	8	2	
		92080	92280	1,7-2,7	20	6		2,2
				1,5-3,0	30			
		92074	92274	2,3-3,7	20	8	2	
				2,0-4,0	30		2,2	
DP34	800	92130	92330	0,2-1,0	30	4	3,8	
				0,4-1,2			4,4	
		92132	92332	0,8-2,4	30	8	5,5	
		92136	92336	0,2-1,0	50	4		6,6
				0,4-1,2				
		92138	92338	0,8-2,4	50	8	6,9	
		92140	92340	2,1-3,0	30	6		6,9
				1,5-3,0	50			
		92134	92334	2,4-3,6	30	8	6,1	
				2,0-4,0	50		6,9	
		92144	92344	0,2-1,0	65	4	8,2	
				0,4-1,2				
		92126	92326	1,0-2,0	65	4	6,8	
		92128	92328	2,0-4,0	65	8		

max. operating pressure 6 bar

4.5 Marking

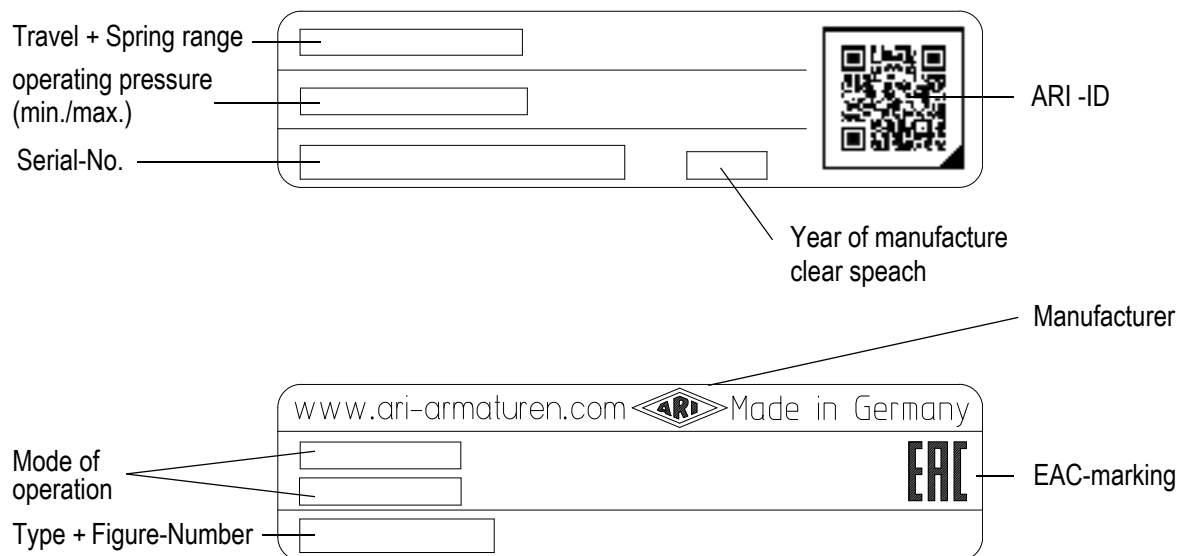


Fig. 13

- Address of manufacturer: refer to item 11.0 Warranty / Guarantee

5.0 Installation

5.1 General notes on installation

The following points should be taken into account besides the general principles governing installation work:



ATTENTION !

- Observe the information provided in the operating manual of the applicable valve.
- Observe the information provided in the operating manuals of all components (for ex. position adjuster, filter reduction station, interlocking relay ...).
- Valve (all included) with traverse.
- Observe the applicable current driving power and the provided line length of the chosen line cross section.
- The actuator unit's technical data must be in agreement with the requirements for operation.
- The control air must be in accordance with the instructions given on the nameplates of the actuator unit.
- The air quality should be in accordance with DIN IEC 60654-2.
- The actuator unit must be provided in full, with distance columns and coupling parts, for the extension on the applicable valve.
- Personnel with knowledge of the rules and regulations is required for the construction of the compressed air system.
- Actuators have no internal stops. The stops must be ensured by means of the valve, for instance.

5.2 Requirements at the place of installation

The place of installation should be easily accessible and provide ample space for maintenance and removing the actuator. The valve should preferably installed vertically with the actuator at the top. Inclined or horizontal installation without supports is permissible only with light actuators.

For this installation position, the two distance columns (or joke) have to be above each other in the vertical plane.

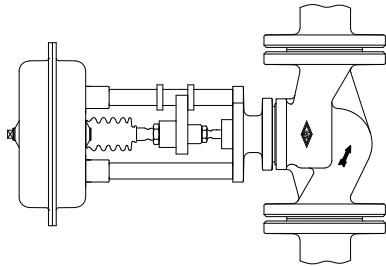


Fig. 14: Pipeline vertically

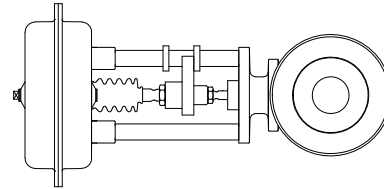


Fig. 15: Pipeline horizontally



ATTENTION !

- It's not allowed to exceed the maximum permissible actuator weights. For this, care must be taken on the according operation an installation instructions of the valve.

- The actuator can be employed within a temperature range with the min. of -40°C and the max. of $+80^{\circ}\text{C}$. By minus temperatures, attention must be given that the control air is dry, and by high temperatures, if possible, that insulation against heat is provided for.

5.3 Valve with actuator

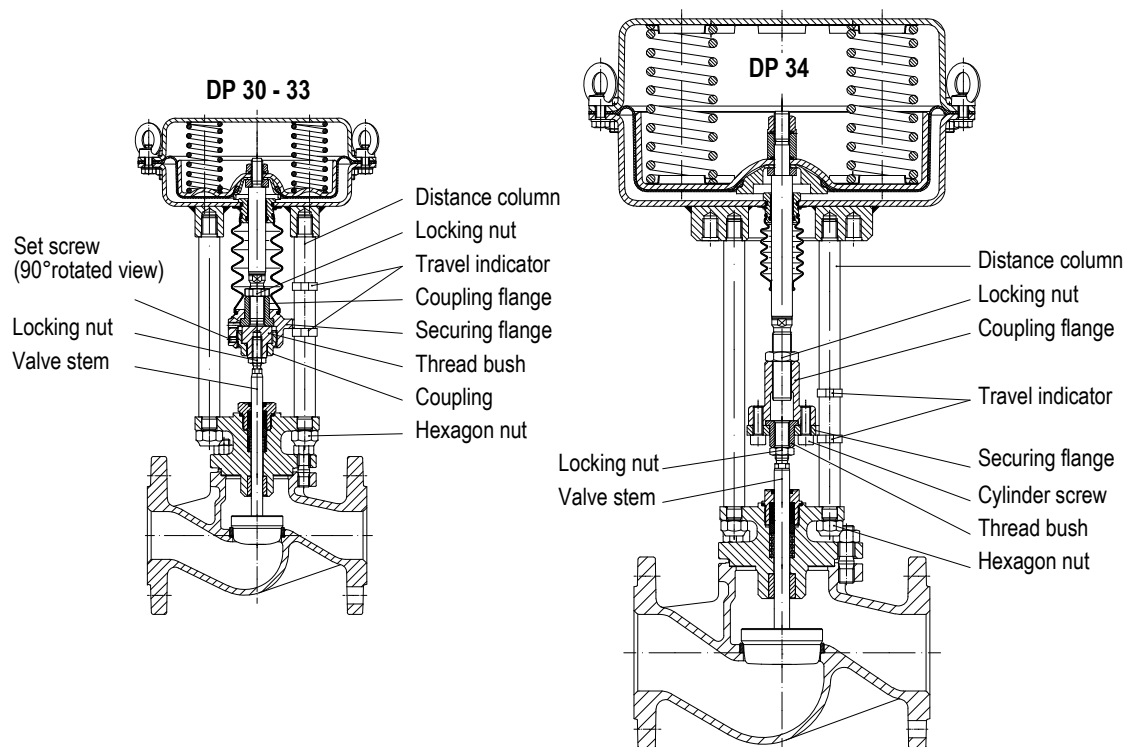


Fig. 16: Pneumatic straight through control valve
Operating mode of the actuator: „actuator stem extends by spring force“
Spring closes on air failure.

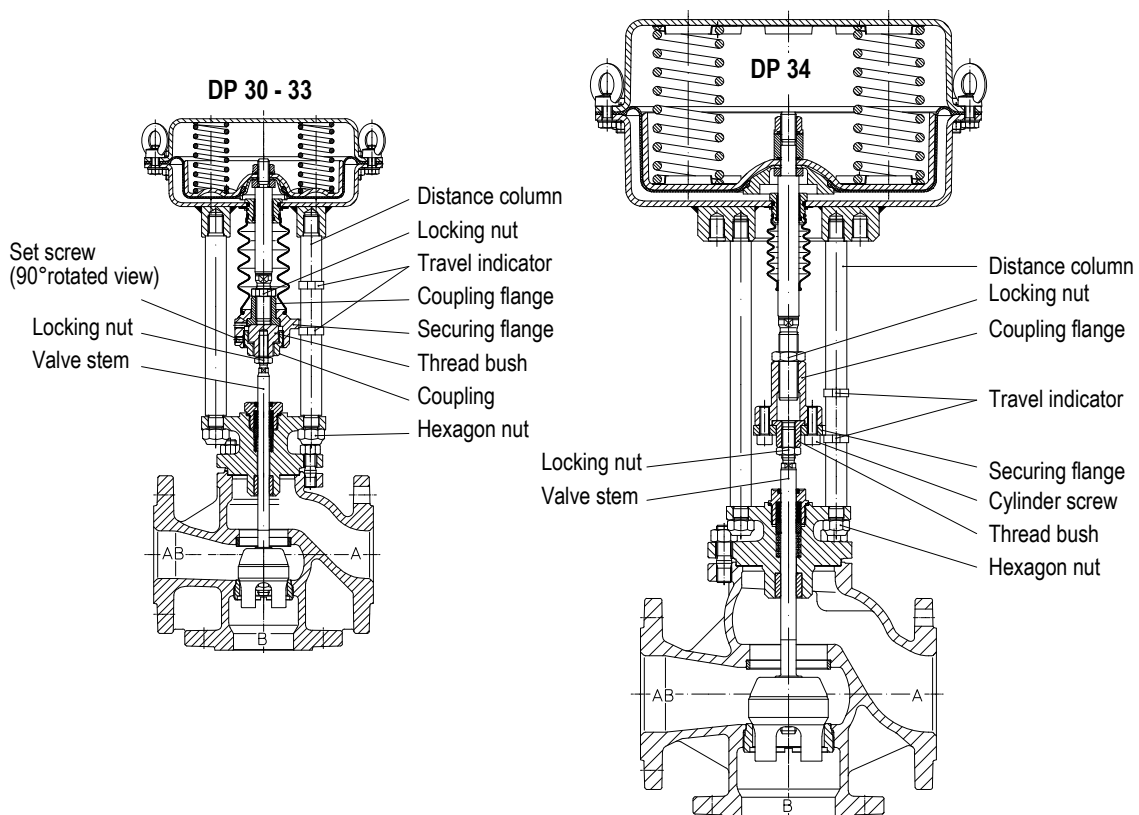


Fig. 17: Pneumatic three-way control valve as a mixing valve (path AB-B)
Operating mode of the actuator: „actuator stem extends by spring force“
Spring closes B - AB on air failure.

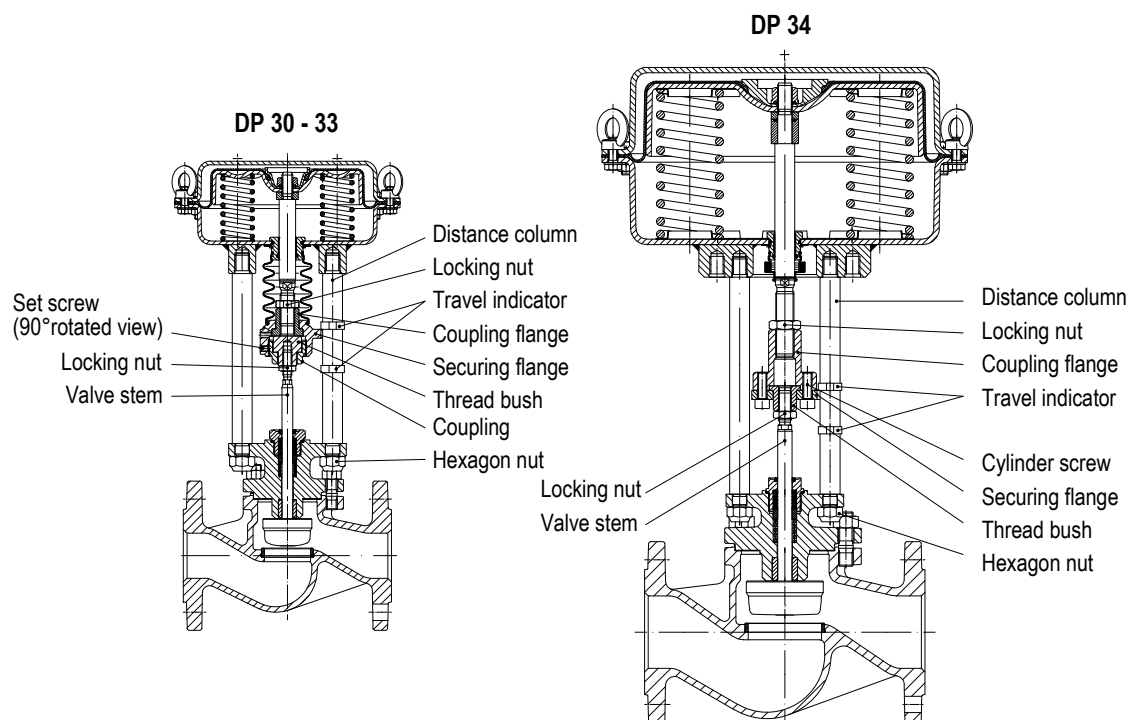


Fig. 18: Pneumatic straight through control valve

Operating mode of the actuator: „actuator stem retracts by spring force“
Spring opens on air failure.

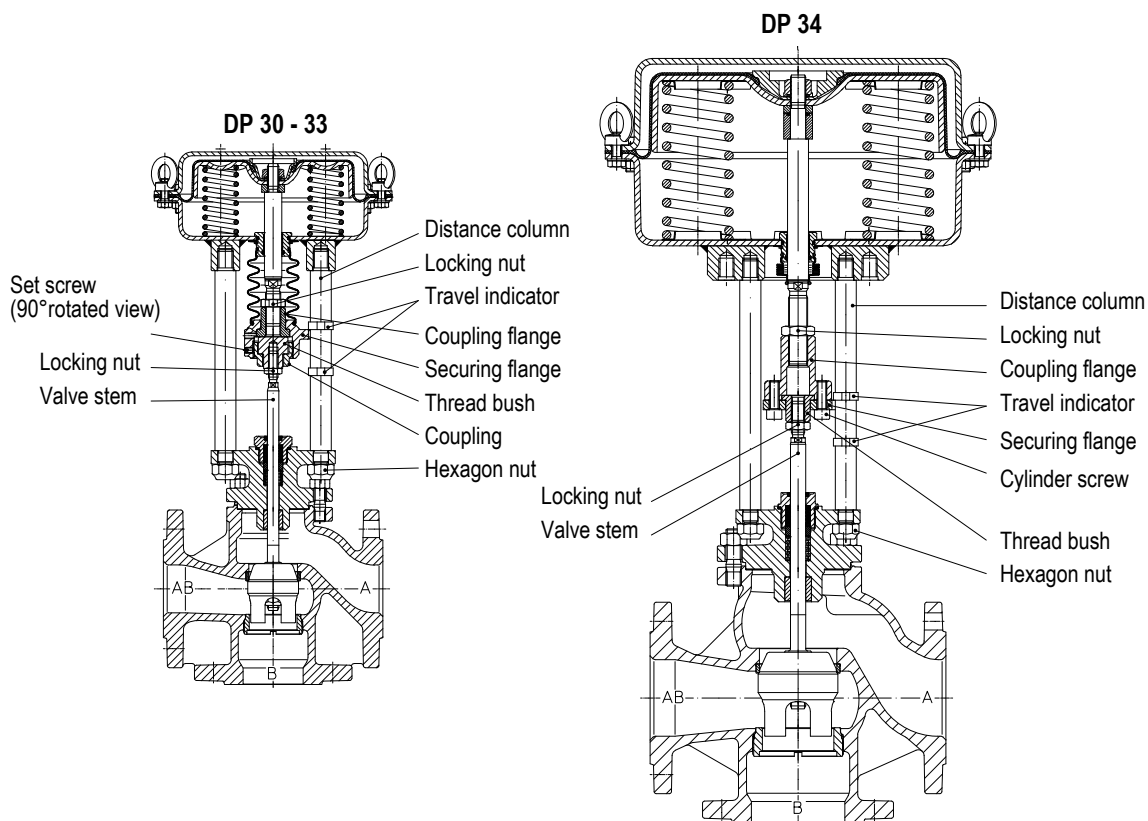


Fig. 19: Pneumatic three-way control valve as a mixing valve (path AB-B)

Operating mode of the actuator: „actuator stem retracts by spring force“
Spring opens on air failure.

5.4 Control pressure connection

The control pressure-connecting line is to be hooked up to the diaphragm base (pos. 7) during the „Spring closes“ operating mode and to the diaphragm cover (pos. 18) during the „actuator stem retracts by spring force“ operating mode.

The threaded joint connection is the following. By actuators DP30 / DP 32 and DP 33: G1/4“ and by the actuator DP 34: G3/8“.



ATTENTION !

- *The actuator diaphragm is only allowed to be admitted control air on the opposite side of the springs (pressure chamber).
The component hole (ventilation) on the spring side must always be open.*

5.5 Assembling the valve, operating mode „actuator stem extends by spring force“

Straight through valves will be closed by spring force on air failure (Fig. 16).

Flow B - AB of 3-way mixing valves will be closed by spring force on air failure (Fig. 17).

- In the case that the valve and actuator have been delivered separately, the plug with stem are to be set into the terminal position by means of pressing „CLOSE.“
- In the case of the three-way mixing valves, the end position is the path B-AB.



ATTENTION !

- *During assembly jobs, the plug is not allowed to be turned on the valve seat while under contact pressure.*

DP30, DP32, DP33:

Unscrew set screw and coupling with thread bush from the securing flange.

DP34:

Loosen cylinder screws.

Remove the lock washer, securing flange and thread bush from the actuator connection.

- Screw the lock nut onto the valve stem.

DP30, DP32, DP33:

Place the coupling over the valve stem and screw the thread bush onto the valve stem.

DP34:

Place the lock washer and securing flange over the valve stem and screw the thread bush onto the valve stem.

- Check that the actuator has been set into the correct operating mode.

Actuators with manual emergency adjustment:

Check the position of the manual emergency adjustment, please refer to Fig. 2, Fig. 6 and Fig. 10.

- Connect the control pressure line to the connection of the diaphragm base (pos. 7) and pressure measuring equipment.
- Drive the actuator with control pressure in midtravel (in the middle of the spring range).
- Place the actuator onto the valve-traverse and fasten by means of hexagon nuts.

5.6 Setting the starting point, operating mode „actuator stem extends by spring force“

- Set the actuator unit to the desired starting point of the spring range.
- Screw the thread bush on the valve stem respectively screw the coupling flange on the actuator stem until the thread bush is fastened into the coupling flange.
Simultaneously, the plug on the valve seat must also be tight.
- Observe, that the valve stem is deep enough into the thread bush, respectively the actuator stem is deep enough into the coupling flange.
If necessary, screw back the coupling flange or the thread bush.
- **DP30, DP32, DP33:**
Screw coupling into the securing flange and tighten. Lock with set screw.
- **DP34:**
Fasten the safety flange and lock washer with cylinder screws onto the coupling flange.
- Check to see if at the starting point of the spring range (of the plug), lifts from the seat.
- After a test run adjust the position indicator to the terminal positions and screw both locking nuts tightly (at ca. 50% lifting positioning).
(Do not turn the plug on the valve seat while under contact pressure).

5.7 Assembling the valve, operating mode „actuator stem retracts by spring force“

Straight through valves will be opened by spring force on air failure (Fig. 18).

Flow B - AB of 3-way mixing valves will be opened by spring force on air failure (Fig. 19).

- In case the valve and actuator have been delivered separately, the plug with stem are to be set into the terminal position by means of pressing „OPEN.“
- In the case of the three-way mixing valves, the terminal position is the horizontal throughway A-AB.



ATTENTION !

- During assembly jobs, the plug is not allowed to be turned on the valve seat while under contact pressure.

- **DP30, DP32, DP33:**
Unscrew set screw and coupling with thread bush from the securing flange.
- **DP34:**
Loosen cylinder screws.
Remove the lock washer, securing flange and thread bush from the actuator connection.
- Screw the lock nut onto the valve stem.
- **DP30, DP32, DP33:**
Place the coupling over the valve stem and screw the thread bush onto the valve stem.
- **DP34:**
Place the lock washer and securing flange over the valve stem and screw the thread bush onto the valve stem.
- Check that the actuator has been set into the correct operating mode.
- **Actuators with manual emergency adjustment:**
Check the position of the manual emergency adjustment, please refer to Fig. 4, Fig. 8 and Fig. 12.
- Connect the control pressure line to the diaphragm cover connection (pos. 18) and pressure measuring equipment.
- Drive the actuator with control pressure in midtravel (in the middle of the spring range).
- Place onto the valve traverse and fasten by means of hexagon nuts.

5.8 Setting the starting point, operating mode „actuator stem retracts by spring force“

- Set the actuator unit to the desired starting point of the spring range.
- Screw the thread bush on the valve stem respectively screw the coupling flange on the actuator stem until the thread bush is fastened onto the coupling flange.
Simultaneously, the plug must be set in the OPEN position.
(The three-way valves must be adjacent to the plug in the casing seat.)
- Observe, that the valve stem is deep enough into the thread bush, respectively the actuator stem is deep enough into the coupling flange.
If necessary, screw back the coupling flange or the thread bush.
- **DP30, DP32, DP33:**
Screw coupling into the securing flange and tighten. Lock with set screw.
- **DP34:**
Fasten the safety flange and lock washer with cylinder screws onto the coupling flange.
- Check to see that the starting point of the spring range (of the plug) lifts out of the terminal position and after obtaining the control pressure-target value, that the valve motion drives through and is resting on the valve seat.
- After a test run, adjust the position indicator to the terminal positions and screw both locking nuts tightly. (at a ca. 50% lifting positioning)
(Do not turn the plug on the valve seat while under contact pressure.)

6.0 Putting the valve into operation



ATTENTION !

Before putting a new plant into operation or restarting a plant after repairs or modification, always make sure that:

- *All works has been completed!*
- *The valve is in the correct position for its function.*
- *Safety devices have been attached.*

Before putting a new plant into operation make sure that:

- Attention paid that the control pressure connection has been properly installed (please see point 5.4).
- Check to make sure that all mobile, exterior parts can move freely.
- All applicable, current information given in the operating manuals for additional parts (for ex. positioner, filter reduction station, interlocking relay, ...) have been observed.
- In case of improper functioning, all assembly and setting jobs must be checked over and corrected, is necessary.

7.0 Disassembly of the actuator unit from the valve

The following points should be taken into account besides the general principles governing installation work:



ATTENTION !

- Due to safety reasons, the system must be driven down prior to disassembly of the actuator unit (**in a pressureless state!**).

To proceed with the disassembly of the actuator unit from the valve, the following must be observed:

- Drive the actuator with control pressure into the middle position.
- **DP30, DP32, DP33:**
Unscrew set screw and coupling with thread bush from the securing flange.
- **DP34:**
Loosen cylinder screws.
Remove the lock washer, securing flange and thread bush from the actuator connection.
- Loosen the hexagon nuts and remove the actuator from the valve.

7.1 Disassembly of the actuator unit

- Unscrew coupling flange and locking nut from the actuator stem.
- Reduce the control pressure to „0“ and separate the control pressure connection line from the compressed air.
- Loosen the screws (pos. 21) of the actuator unit and remove the diaphragm covering (pos. 18).



ATTENTION !

- *For operations with increased initial spring tension (see Fig. 20), additional screws have been provided for. For the sizes DP30 / DP32 and DP33, there are an additional two screws and for DP34, there are four longer screws (23) provided. As the last step, the screws are to be loosened equally, in order to disassemble the initial spring tension.*
- **The procedure must be followed according to this sequence, or else there is a risk of INJURY.**

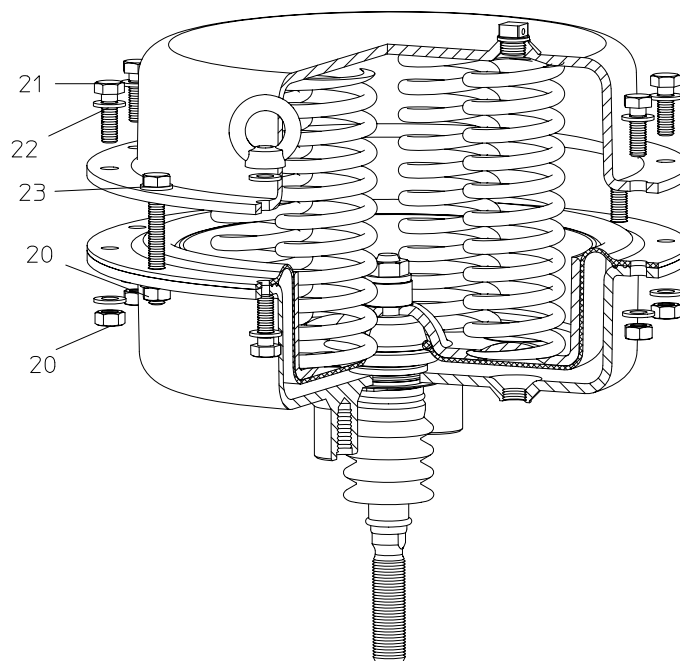


Fig. 20

8.0 Care and maintenance

Maintenance and maintenance intervals have to be defined by the operator according to the service conditions.

- For each operating mode, the actuator unit, if need be, should be freed from exterior dirt.
- The actuator unit may not be cleaned with high-pressure equipment or with aggressive cleaning products, that are a health hazard, or with flammable cleaning products or solvents.
- After cleaning, for example, an inspection should be carried out checking the sealings of the actuator unit.
- In order to ensure smooth running, the operation device for the control air should be furnished with a maintenance unit.
- The rolling diaphragm (pos. 10) and the stem guiding with O-ring-sealing are wearing parts and must be replaced when necessary (see point 8.1).
- **Actuators with manual emergency adjustment:**
Lubricate with grease by using lubricating nipple (pos. 54).

8.1 Replacing the rolling diaphragm



ATTENTION !

- When replacing the rolling diaphragme, the springs must be changed, too.

- Remove the actuator from the valve, as described in point 7.0, and disassemble.
- Take out the construction units: stem (pos. 1) / diaphragm plate (pos. 11) / rolling diaphragm (pos. 10) / diaphragm flange (pos. 9).
- Loosen the flange nut (pos. 14).
- Remove the diaphragm flange (pos. 9) .
- Replace the rolling diaphragm (pos. 10) and reassemble.

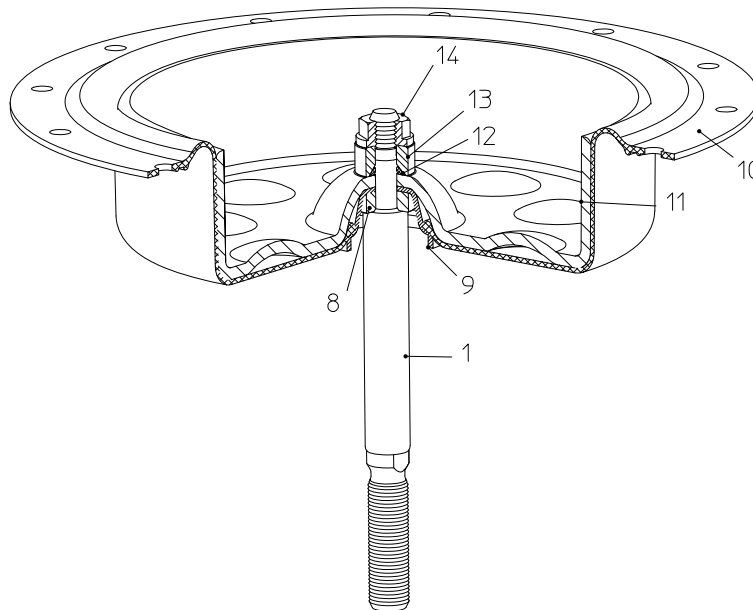


Fig. 21: „actuator stem extends by spring force“

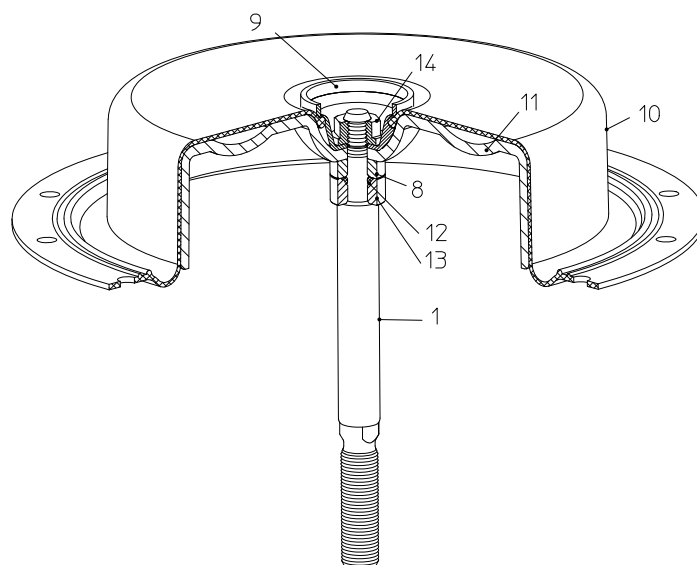


Fig. 22: „actuator stem retracts by spring force“

Concerning the unit DP30/32/33, attention must be given, that during the assembly of this construction unit, a borehole be made in the rolling diaphragm (pos. 10) and that it is aligned with the camber in the diaphragm plate (pos. 11).

- When inserting the assembly group into the actuator „actuator stem extends by spring force“, one mould of the diaphragm plate (pos. 11) must align with one hole of the diaphragm (pos. 10) which must also be exact over the air connection hole of the diaphragm base (pos. 7) (Fig. 21 and Fig. 23).
- When inserting the assembly group into the actuator „actuator stem retracts by spring force“, one mould of the diaphragm plate (pos. 11) must align with one hole of the diaphragm (pos. 10) which must also be exact over the air connection hole of the diaphragm cover (pos. 18) (Fig. 22 and Fig. 23).

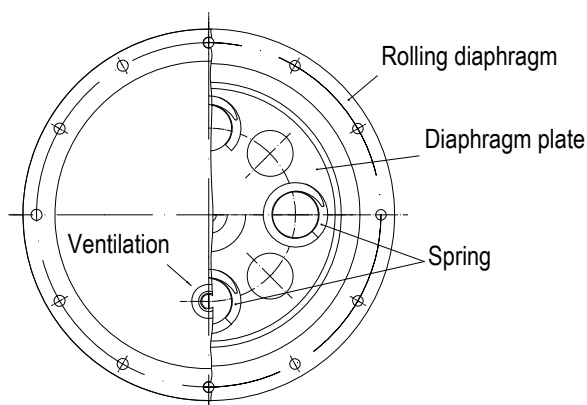


Fig. 23



ATTENTION !

- The springs will only have an optimal contact surface if they are aligned correctly.

Tightening torques of the flange nuts:

DP 30 / 32 / 33	M 12	50 Nm
DP 34	M 16x1,5	120 Nm

Tightening torques of the screws on the periphery:

DP 30 / 32 / 33	M 8	5 Nm
DP 34	M 10	15 Nm

8.2 Replacing the guiding band and the o-ring

- Remove the actuator unit from the valve, as described in point 7.0, and disassemble.
- Replace the guiding band (pos. 3.2) and / or the O-ring (pos. 3.3).
- Pay attention that the top surface of the stem is clean and undamaged.
- Grease the guiding band (pos. 3.2), O-ring (pos. 3.3) and stem (pos. 1).
- Reassemble the actuator unit.



ATTENTION !

- Observe the tightening torques of the screws (see point 8.1).

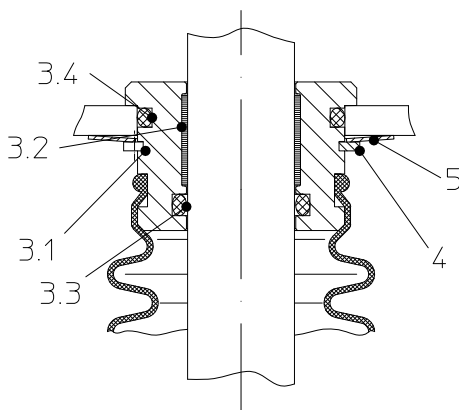


Fig. 24

9.0 Troubleshooting

In the event of malfunction or faulty operating performance check that the installation and adjustment work has been carried out and completed in accordance with these Operating Instructions.



ATTENTION !

It is essential that the safety regulations are observed when identifying faults.

If malfunctions cannot be eliminated with the help of the following table „10.0 Troubleshooting table“, the supplier or manufacturer should be consulted.

10.0 Troubleshooting table



ATTENTION !

- read point 7.0 and 8.0 prior to dismantling and repair work !
- read point 6.0 before restarting the plant !

Fault	Possible causes	Corrective measures
Actuator unit does not move	No compressed air on the control pressure line	Discern the causes and remedy
	Actuator unit has been improperly installed	Check the actuator's operating mode and connect to the control pressure line in accordance to this operating mode.
	The rolling diaphragm is defect	Replace the rolling diaphragm and springs
	Manual emergency adjustment is blocked	Set the manual emergency adjustment into the correct position (both position indicators must be at the starting point and be in the same position).
There is not enough positioning force available	Wrong spring pieces (the spring range of the actuator is wrong)	Replace springs (actuator unit)
	Stem sealing has a leak	Renew the stem sealing
	The ventilation is plugged and the air cannot escape from the actuator unit	Screw cap must be disengaged
	The actuator unit does not ventilate sufficiently	Check the control adjustment

11.0 Warranty / Guarantee

The extent and period of warranty cover are specified in the "Standard Terms and Conditions of Albert Richter GmbH & Co. KG" valid at the time of delivery or, by way of departure, in the contract of sale itself.

We guarantee freedom of faults in compliance with state-of-the-art technology and the confirmed application.

No warranty claims can be made for any damage caused as the result of incorrect handling or disregard of operating and installation instructions, technical data sheets and relevant regulations.

This warranty also does not cover any damage which occurs during operation under conditions deviating from those laid down by specifications or other agreements.

Justified complaints will be eliminated by repair carried out by us or by a specialist appointed by us.

No claims will be accepted beyond the scope of this warranty. The right to replacement delivery is excluded.

The warranty shall not cover maintenance work, installation of external parts, design modifications or natural wear.

Any damage incurred during transport should not be reported to us but *rather* to the competent cargo-handling depot, the railway company or carrier company immediately or else claims for replacements from these companies will be invalidated.