PRE-VENT®- Valves

GENERAL INSTALLATION AND OPERATING INSTRUCTIONS

Contents: Page

In buying a Pre-Vent regulating and on/off valve, you have acquired a product manufactured in accordance with the latest regulations and guidelines, and one complying with the stringent requirements of our Quality Management system conforming to ISO 9001.

To ensure trouble-free and safe operation with the valve, it is essential familiarise yourself with the contents of these general instructions for installation and operation, before installing and commissioning the valve.

Failure to observe or comply with these operating instructions will invalidate the manufacturer's guarantee and liability. The manufacturer's general conditions of sales and terms of delivery shall apply unless otherwise stated.

Range of application:

These operating instructions apply to all valves manufactured by Pre-Vent GmbH.

Product description:

Pre-Vent valves are designed first and foremost to operate as active elements in a production sequence, regulating or controlling the flow of fluids, gases or vapours. They are generally controlled via external regulation and control circuits.

As a rule our valves consist of the actuator itself, the drive (pneumatic or electrical), and various components such as position regulators, solenoid valves, filter regulator stations etc.

The individual components and peripheral equipment are covered by the operating instructions from the component and equipment manufacturers.

1. Installation

The actuator may only be erected and commissioned by trained and experienced personnel. Experienced personnel are persons who are familiar with the erection, commissioning and operational requirements, and especially with the safety requirements, and who can demonstrate corresponding certification for their activities.
Special care must be taken during installation to avoid stressing pipework.

2. Transport

Actuator valves are generally supplied complete with drives and peripheral equipment all fitted and tested. It is therefore essential to follow the correct procedures with the valves during transport and unpacking, to avoid later problems in use. If lifting equipment has to be used on account of the weight, it must be ensured that the maximum permitted loading forces are not exceeded and that the lifting equipment has been tested. Valves that are supplied with a lifting lug should be lifted by this lug. For all other transport, care should be taken that the peripheral devices mounted on the valve are not affected or damaged.

3. Storage

Prior to erection on site, the valves must be stored so that they are protected against the effects of weather, dirt and other harmful influences. Long-term storage (> 6 months) must absolutely be avoided, as this may lead to leakage within the valve or at the gland seals. It must be ensured that during storage all orifices in the valve are sealed with blind plugs or other similar seals.

4. Pre-conditions for installation

The factory pressure tests, seal tests and functional tests, and the works Quality Management system, ensure that the construction of the valves complies with that stated in the contract.

Before installing the valve, it must be ensured that the pipework into which the valve is to be installed has been carefully cleaned and is free of dirt and impurities. Particular care must be taken that there are no metal particles or objects in the pipework, which could damage the valve if they come in contact with it.

5. Erection/commissioning

The following points must be checked prior to erection or commissioning of the valve.

Check before erecting:

a) Does the design and rating of the valve correspond to its intended use? A valve that is not correctly rated for the use to which it is put may become damaged, and may cause a breakdown of the production plant or injury to personnel.
b) Is the rating and functional data in full agreement with the operating data for the plant?
c) Is sufficient space available at the erection site, so that the valve can be installed without any problem or safety risk?
d) Has the pipework been cleaned in ascendance with the requirements?
e) Have all blind plugs and locking caps been removed from the valve, so that the valve will not be obstructed when it is installed?
f) Is the valve visibly clean and in good order?

Check before commissioning:

a) Does the direction arrow on the valve casing match the direction of flow of the medium?
b) Is the pipework in order and are the pipework flanges axially aligned and parallel?
c) Does the separation of the pipework end-flanges match the installed length of the valve?
d) Is the mounting position given with the valve spindle vertical?
If this is not the case, the valve should be underslung or suspended under the drive. If attention is not paid to the mounting position, premature leakage of the outer seal (gland) may occur, for which the supplier will not be liable.
e) Is the gland packing tightened?
If the gland packing is not tightened, external leakage may occur, for which the supplier will not be liable.
f) Is there an appropriate de-stressing section both before and after the installation point? If the de-stressing section is too short (< 5x pipework diameter) it may cause undesirable fluid-flow effects, which may affect the operation of the valve or in the worst case may cause long-term damage to the valve.
g) Is potential equalisation provided?
For valves of ATEX 100 design, the valve itself must also be earthed.
h) Earthing must be provided for valves with electrical drives > 40 V.

Commissioning

The following risks may occur during commissioning:
a) Critical operating conditions may lead to unacceptable noise emission and vibration.
b) Incorrect installation may lead to damage to the valve or to the plant.
c) The temperature of the medium is transmitted to the surface of the medium.
d) Due to the risk of injury, do not place your hands between the yoke or the columns and the valve spindle. There is a serious risk of injury due to crushing.

Since the sources of danger lie within the field of operations, the Operator must take care that:

The Operator must ensure that all national and international environmental requirements are taken into account and all corresponding limiting conditions for the workplace are complied with. These must be maintained by means of specific site protection measures, and the Operator must instruct his personnel in these measures.

5.1 Flanged connections

Connecting material such as seals, bolts and nuts are not included in the scope of supply.
The Operator must confirm that the connection of the pipework with the valve has been carried out in every respect in accordance with safety and current regulations. The manufacturer of the valve accepts no responsibility for leaks between the pipework flange and the valve.

5.2 Welded connections

Welding must comply with the current welding guidelines.
When welding the valve casing into the pipework, all internal components such as the valve seat and valve body must first be removed, along with any attachments. Ensure that the pipework is cleaned again after welding and that the casing has cooled down after being annealed, before the valve components are re-assembled again.

6. Maintenance

Caution: Do not over-tighten the gland, this may cause locking of the valve.

7. Repair

Never open a valve when it is under pressure, there is a serious risk of injury. Installation and repair may only be carried out by trained and experienced personnel.

For spare parts lists and instructions on repair, please refer to the individual equipment manufacturer‘s operating instructions, where available, or consult the Technical Support

8. Disposal

If valves are to be taken out of service and disposed of, they must be cleaned of any dangerous or harmful product residues. The materials must be disposed of in accordance with the current regulations.

9. Contacting us

Details / specific information (Operating instructions with spare parts lists) are available for download on our website.

PRE-VENT GmbH
Sales - Production - Servicing

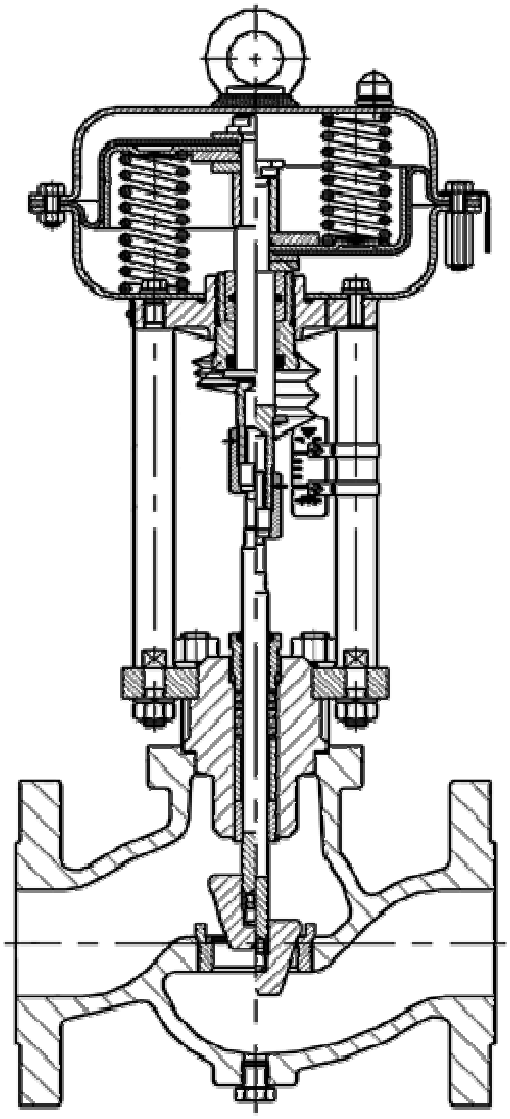
Gewerbepark Lindach A9
84489 Burghausen, Germany

Tel: +49 8677 98788-0
Fax: +49 8677 98788-80

Email: office.pre-vent@fiwagroup.com
Web: www.pre-vent.com

Manual version 1.1 08.11.2010

BR11 Instruction Manual



Contents:

To ensure trouble-free and safe operation of the valve, it is essential to be familiar with the contents of this BR11 Instruction Manual, and also with the general instructions for installation and operation, before installing and operating the valve.

Failure to observe or comply with these operating instructions will invalidate the manufacturer's guarantee and liability. The manufacturer's general conditions of sales and terms of delivery shall apply unless otherwise stated.

1. FUNCTIONAL PRINCIPLE

The valve regulates mass-flow by a linear movement of the valve spindle, which may be operated pneumatically, electrically or manually. As the stroke of the valve alters, the circular gap between the valve seat and the valve block is increased or reduced. This directly influences the amount of fluid flowing through the valve.

2. INSTALLATION

The valve may be mounted in any position; however, for valves of DN 80 size and above, vertical installation with the drive mounted above is preferred. For valves with extended construction, bellows, or drives weighing more than 50 kg, a suitable support or suspension mounting should be provided for the drive, otherwise its own weight might cause wear and leakage at the seals.

3. OPERATING CONDITIONS

Regulator valves should be operated under conditions that take into account the size and nature of the construction and the type of material. To ensure trouble-free operation over the whole operational lifetime, the regulator valve and its accessories should be regularly inspected and maintained.

Normal operating conditions:

a) With pneumatic positioning drive
Ambient temperature from - 25 to + 80℃, with silicone diaphragm of -40 °C to +80 °C
Relative humidity up to 98 %,
The control and feed air supplies must contain no mechanical impurities, oil or corrosive substances, copper or aluminium alloys, and must be dehumidified such that the dew-point corresponds to a temperature that is at least 10 ℃ lower than the operating temperature of the p osition controller and the positioning drive.

b) With electrical positioning drive
In accordance with the manufacturer's instructions.

c) With hand-operated drives of type NN
Ambient temperature from - 25 to + 80℃
Relative humidity up to 98 %.

4. OPERABILITY, MAINTENANCE AND REPAIR - STANDARD CONSTRUCTION

The operability of the regulator valve during use is based on maintaining an appropriate flow characteristic and not exceeding the permitted leakage level for the valve.

To ensure long-term correct and safe operation of the valve, it is essential to carry out regular recorded inspections. Valves that operate continuously should be checked at least every 6 months. Valves that operate discontinuously should be checked at least every 12 months.
If it is necessary to carry out maintenance or repair work on the regulator valve, it should be carried out as follows:

4.1. Gland packing

A key criterion for operability is external seal-tightness, which is provided by the gland packing.

The gland packing to be used is normally pre-specified based on the operating conditions.
With normal gland packing, the tightness of the seal is achieved by tightening the sealing nut.

WARNING:
When the valve is supplied, the sealing nut is only hand-tightened. Before putting the valve into service, it is essential to tighten the sealing sufficiently to achieve an adequate contact pressure, thus ensuring a secure external seal, but without blocking the valve spindle.

If self-adjusting sealing glands are used, the constant contact pressure is provided by a stainless steel spring. For this reason, the sealing nut should be screwed in up to the stop.

To change the gland packing, proceed as follows:

Before changing the gland packing, ensure that the valve is not under pressure and is not contaminated.

1. Loosen the upper part of the valve by opening the casing nuts (21) between the casing and the top of the valve.
2. Lift the upper part of the valve out of the casing, along with the valve spindle and the valve block. Loosen the coupling nut and counter-nut (35,37) and the lock-nut (36), and unscrew them from the valve spindle.
3. Undo the sealing nut (or screw plug) (12) from the sealing gland, and withdraw the valve spindle and valve block from the upper part of the valve.
4. Using appropriate tools, remove all parts of the sealing gland (13,14) from the gland packing space, and carefully clean out the packing space.
5. Fit a new casing gasket (15) and carefully clean the surfaces of the seal in the casing and on the upper part.
6. Insert the valve spindle and the valve block into the upper part of the valve.
7. Carefully locate the upper part of the valve on the valve casing and fasten it in place with the nuts (19).
8. Carefully fit the new sealing gland parts over the valve spindle and into the packing space, taking care to get everything in the correct order (insert the parts in reverse order to the order in which they were taken out).
9. Screw on and tighten the packing seal nut (12).
10. Screw the counter-nut and coupling nut (35,37) and the lock-nut (36) on to the valve spindle and connect the drive and the valve solidly back together.

4.2. Replacement of the valve seat and the valve block

If it is necessary to change the valve seat and valve block due to a change in the operating conditions or due to wear and tear, proceed as follows:
Before making the change, ensure that the valve is not under pressure and is not contaminated.

In order to achieve a better seal when changing the valve seat and valve block, we recommend lapping the seat and the block with a fine abrasive paste.

Replacing the valve block

1. Loosen the upper part of the valve by opening the casing nuts (21) between the casing and the top of the valve.
2. Lift the upper part of the valve out of the casing, along with the valve spindle and the valve block. Loosen the coupling nut and counter-nut (35,37) and the lock-nut (36), and unscrew them from the valve spindle.
3. Undo the sealing nut (or screw plug) (12) from the sealing gland, and withdraw the valve spindle and valve block from the upper part of the valve.
4.
   a) For Kvs = 0.01...1, the whole valve spindle is replaced, because the valve spindle and valve block are a single part.
   b) For Kvs = 1.6...16; Kvs = 63...630 (for DN 150...250) and Kvs = 0.01...1, and for models with extended construction or bellows.
   Knock out the dowel pin (6) using a punch, and unscrew the valve block; screw in a new block, drill it and knock in a dowel to secure it in place again.
   c) For Kvs = 25...160 (for DN 40...100):
   Unscrew the spindle from the block (4) and take out the insert (5). Place the insert on the spindle and screw it into a new valve block.
5. For a pressure-balanced valve block, the same procedure is used as for a normal block; however, when re-introducing the valve spindle into the upper part of the valve, take care not to damage the auxiliary edge-seal on the valve block.
6. Push the spindle with its new valve block into the upper part of the valve.
7. Carefully place the upper part of the valve into the valve casing and fasten it down with the nuts (19).
8. Tighten the gland seal nut.
9. Screw the counter-nut and coupling nut (35,37) and the lock-nut (36) on to the spindle and couple the drive and the valve solidly together again.

Replacing the seat

1. Loosen the upper part of the valve by opening the casing nuts (21) between the casing and the top of the valve.
2. Unscrew the valve seat (3) in counter-clockwise direction, using a suitable seat wrench.
3. Take a new or repaired valve seat, thoroughly clean the threads, lightly smear the seal cone with lubricant, and screw it in place.
4. Re-assemble the valve as when changing the valve block (items 7-9 above).

5. OPERABILITY, MAINTENANCE AND REPAIR – MODELS WITH EXTENDED OR BELLOWS CONSTRUCTION

The regulator valve's operability during use is based on maintaining an appropriate flow characteristic and not exceeding the permitted leakage level for the valve.

To ensure long-term correct and safe operation of the valve, it is essential to carry out regular recorded inspections. Valves that operate continuously should be checked at least every 6 months. Valves that operate discontinuously should be checked at least every 12 months.
If it is necessary to carry out maintenance or repair work on the regulator valve, it should be carried out as follows:

5.1. Gland packing

A key criterion for operability is external seal-tightness, which is provided by the gland packing.
The gland packing to be used is normally pre-specified based on the operating conditions.
With normal gland packing, the tightness of the seal is achieved by tightening the sealing nut.

WARNING:
When the valve is supplied, the sealing nut is only hand-tightened. Before putting the valve into service, it is essential to tighten the sealing sufficiently to achieve an adequate contact pressure, thus ensuring a secure external seal, but without blocking the valve spindle.

If self-adjusting sealing glands are used, the constant contact pressure is provided by a stainless steel spring. For this reason, the sealing nut should be screwed in up to the stop.

For models with extended and bellows construction, the gland packing is changed as described in item 4 above.

5.2. Replacement of the valve seat and the valve block

If it is necessary to change the valve seat and valve block due to a change in the operating conditions or due to wear and tear, proceed as follows:
Before making the change, ensure that the valve is not under pressure and is not contaminated.

In order to achieve a better seal when changing the valve seat and valve block, we recommend lapping the seat and the block with a fine abrasive paste.

Replacing the valve block

The procedure is identical to that described for models of normal construction; however, please note:

1. a) For Kvs = 0.01 ...16; Kvs = 63...630 (for DN 150...250) Knock out the dowel pin (6) using a punch, and unscrew the valve block; screw in a new block, drill it and knock in a dowel to secure it in place again.
   b) For Kvs = 25...160 (for DN 40...100):
   Unscrew the spindle from the block (4) and take out the insert (5). Place the insert on the spindle and screw it into a new valve block.

2. To avoid damage in the models with metal bellows (the version with insulating section does not have a bellows), take care that no torque is applied to the bellows when unscrewing the valve block and screwing it back in. We recommend applying an opposing torque to the valve spindle.

Replacing the seat

Exactly as described in item 4.2 above.

5.3. Replacing the bellows

1. Loosen the upper part of the valve by opening the casing nuts (21) between the casing and the top of the valve.
2. Lift the upper part of the valve out of the casing, along with the valve spindle and the valve block. Loosen the coupling nut and counter-nut (35,37) and the lock-nut (36), and unscrew them from the valve spindle.
3. Loosen the gland nut on the cover. Loosen the coupling nuts (99) on the bellows and take off the cover flange and the drive.
4. Loosen the cover (sleeve) (91), to expose the bellows.
5. Remove the valve block (4) from the bellows as described in item 5.2.
6. Withdraw the bellows spindle extension with the metal bellows welded on to it, drawing it upwards out of the bellows cover (89).
7. Clean the surfaces of the seal on the connecting piece.
8. Fit a new bellows seal (87) and insert the bellows. Fit a new cover seal (93) and replace the cover, then screw the cover flange back in place with the connecting nuts (99).
9. Tighten the gland nut.
10. Screw the valve block back into the bellows, as described above.
11. CAUTION
    Take great care that no torque is applied to the bellows when unscrewing the valve block and screwing it back in.
12. Screw the counter-nut and coupling nut (35,37) and the lock-nut (36) on to the valve spindle, and connect the drive and the valve solidly back together.

6. PNEUMATIC P/R DRIVE

When the pressure rises in the drive pressure chamber, a force is applied to the membrane in the drive unit. If this force exceeds the spring force of the springs in the second chamber, the springs are compressed and the drive spindle starts to travel out or in, according to the function. If the pressure continues to increase, once the maximum spring force is reached the springs will be pressed against the end-stop and the drive will halt. Thus, a simple pneumatic drive can reach a defined position in proportion to the air pressure.
The size of the drive is based on the cm^2 surface of the membrane.

Drive size	Stroke [mm]	Spring range (kPa)													
		1		2		3		4		5		6		7	
		20 - 100		40 - 200		40 - 120		80 - 240		60 - 140		120 - 280		180 - 380	
		No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]
250	20	3	-	6	-	3	-	6	-	3	6	6	6	-	-
400	20	3	-	6	-	3	-	6	-	3	6	6	6	-	-
630	38	3	-	6	-	3	10	6	10	3	10 + 10	6	10 + 10	12	10 + 10
1000	38	3	-	6	-	3	9,5	6	9,5	3	9,5 + 9,5	6	9,5 + 9,5	12	9,5 + 9,5
	50	3	-	6	-	3	12,5	6	12,5	3	12,5 + 12,5	6	12,5 + 12,5	12	12,5 + 12,5
	63	3	-	6	-	3	16	6	16	3	16 + 16	6	16 + 16	12	16 + 16

Spring range and drive sizes for pneumatic drives of type P/R

P type drive: Single membrane drive.
Safe position NO (open on loss of pressure)
When pressure rises in the upper chamber, the drive spindle travels out.

R type drive: Single membrane drive.
Safe position NC (closed on loss of pressure)
When pressure rises in the lower chamber, the drive spindle travels in.

6.1. Changing the operating mode of the drive

No additional components are required in order to alter the direction of operation of type P/R pneumatic drives.

Changing P to R and vice versa

1. Disconnect the valve from the drive.
2. Ensure that no air pressure is applied to the drive.
3. Remove the top cover of the position drive, taking care that the tensioning nuts (long nuts) (82) are unscrewed to the ends – in accordance with the notes on the warning label.

The further steps in the procedure depend on the current operating mode of the drive before it is changed.

To change the drive function from P to R, proceed as follows:

4. Undo the special nuts (34) from the bolts on the positioning drive.
5. Remove the membrane with its membrane plate, spacer ring, washer and spacer cover (or spacer covers for drive sizes 630 and 1000).
6. Remove the springs (31) from the lower casing.
7. Turn the membrane together with all the parts as listed above through 180 degrees, and fit the membrane back over the drive bolts.
8. Screw the special nuts (34) on to the drive bolts, thus compressing the whole of the above group of components.
9. Place the springs on the membrane plate so that they fit in the guide cut-outs and their ends are aligned with the axis of the bolts.
10. Place the top cover over the springs and initially tighten the tensioning nuts (82).
11. Compress the springs evenly until the upper part of the drive end-stop is pressed against the lower part, then insert the rest of the bolts and screw on the nuts.

To change the drive function from R to P, proceed as follows:

4. Remove the springs (31) from the membrane plate (28).
5. Undo the special nuts (34) from the bolts on the positioning drive.
6. Remove the membrane with its membrane plate, spacer ring, washer and spacer cover (or spacer covers for drive sizes 630 and 1000).
7. Place the springs in the designated locations in the lower cover.
8. Turn the membrane together with all the parts as listed above through 180 degrees, and fit the membrane back over the drive bolts, so that the 6 mm diameter opening on the base and the nut on the edge of the drive membrane plate are axially aligned with one of the openings on the edge of the membrane.
9. Screw the special nuts (34) on to the drive bolts, thus compressing the whole of the above group of components.
10. Place the springs on the membrane plate (28) so that they fit in the guide cut-outs. To check that the springs are in the correct position, rotate the membrane (to the position of the notch on the nut at the edge of the membrane plate) until the 6 mm opening on the base is visible. By sighting through the opening, check that there is a spring in place on the underside.
11. Place the top cover over the springs and initially tighten the tensioning nuts (82).
12. Compress the springs evenly until the upper part of the drive end-stop is pressed against the lower part, then insert the rest of the bolts and screw on the nuts.

6.2. Changing the membrane

Should it be necessary to change a membrane, the drive should be dismantled as described in item 6.1. Instead of putting the drive back together in reverse order, it should simply be re-assembled in its original order after changing the membrane.

7. OTHER DRIVES

It is possible to equip model BR11 valves with electrical drives. Sizing the drive to the regulator valve is normally a part of the bidding process.

It is also possible to supply model BR11 valves with a purely manual operation (type NN), or to fit the pneumatic drive with an additional hand-wheel (type P/R-N).
(See the following diagrams)

8. DRAWINGS / SPARE PARTS LISTS

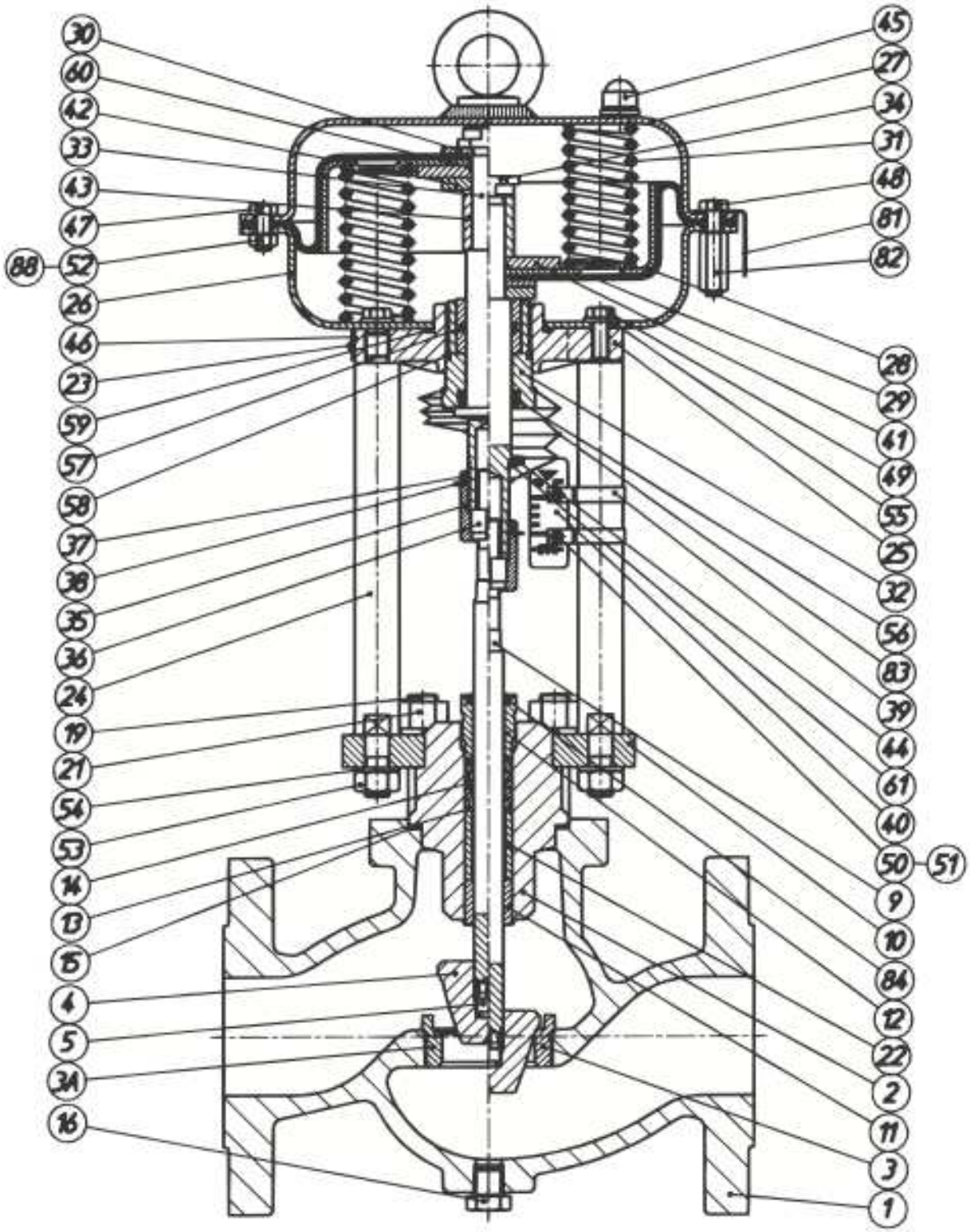


Figure 1 – Regulator valve DN 15... 100 with valve plates Kvs = 25... 160, with pneumatic positioning drive

Parts list and drawing numbers

No. on drawing	Name of component
1	Casing
2	Standard throttle
2A	Throttle of unloaded valve
2B	Extended throttle
2C	Bellows throttle
2C1	Seal unit
3	Valve seat
3A	Valve seat seal
4	Valve blade
4A	Unloaded valve blade (unit)
4A1	Unloaded valve blade seal ring
5	Insert piece
6	Dowel pin
7	Support ring
8	Ring
9	Valve bolts
10	Connecting plate
11	Guide sleeve
12	Threaded plug
13	Support ring
14	Seal
14A	V seal set
14B	Spring
15	Casing seal
16	Plug StB 3/8° (optional)
17	Plug StB ¼°
18	Valve nameplate
19	casing bolt
20	Fastening nut
21	Nut
22	Spacer sleeve
31	Spring

No. on drawing	Name of component
32	Throttle unit
33	Actuator drive bolts
34	Special nut
35	Connecting nut
36	Lock-nut
37	Thin nut (counter-nut)
38	Position indicator
39	Pillar clamp
40	Hub plate
41	Washer
42	Washer
43	Spacer sleeve
44	Support ring
45	Vent plug
46	Drive nameplate
47	Bolt
48	Bolt
49	Bolt
50	Bolt pin M4x8
51	Nut M4-A
52	Nut
53	Nut
54	Spring washer
55	Ring washer
56	Wiper ring
57	O seal ring
58	O seal ring
59	O seal ring
60	O seal ring
61	Circlip
62	Upper cover

No. on drawing	Name of component
71	Bolt
72	Washer
73	O seal ring 8.3x2.4
74	O seal ring
75	Z circlip
76	Bracket (bracket unit)
77	Drive bolt
78	Carrier
79	Connecting piece
80	Rack-nut (counter-nut)
81	Warning table
82	Tensioning nut
83	Bolt sleeve
84	Wiper ring
85	O seal ring
86	Linear throttle casing seal
87	Bellows unit seal
88	Washer
89	Throttle cover, DW and DM
90	Throttle – DW
91	Throttle – DM
92	Spacer sleeve
93	Bellows throttle seal
94	Sleeve
95	O seal ring
96	O se al ring
97	O seal ring
98	Bolt
99	Nut
100	Spring washer
101	Sleeve
102	O seal ring

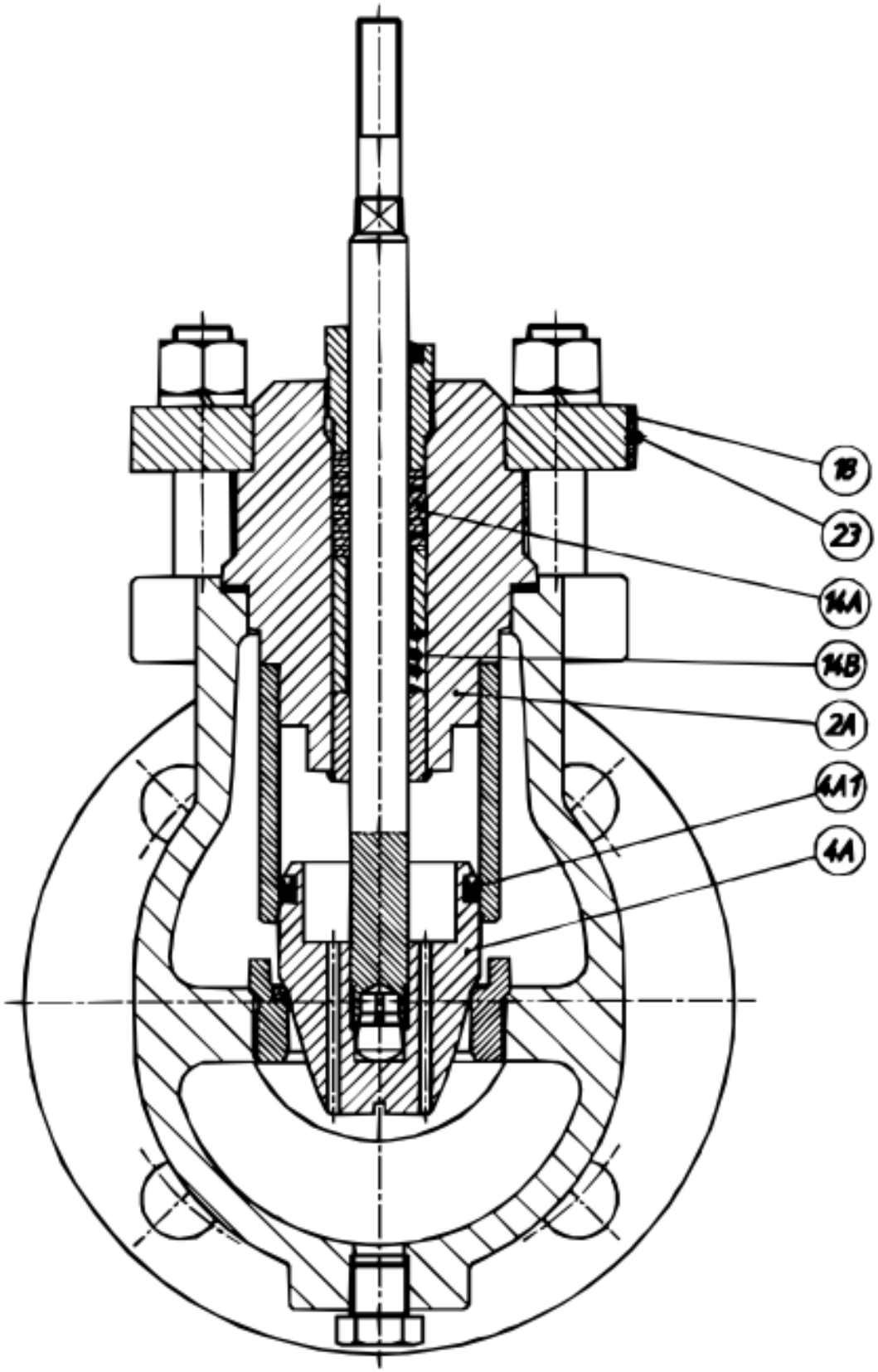


Figure 2 – Regulator valve DN 40... 100 with pressure-balanced block

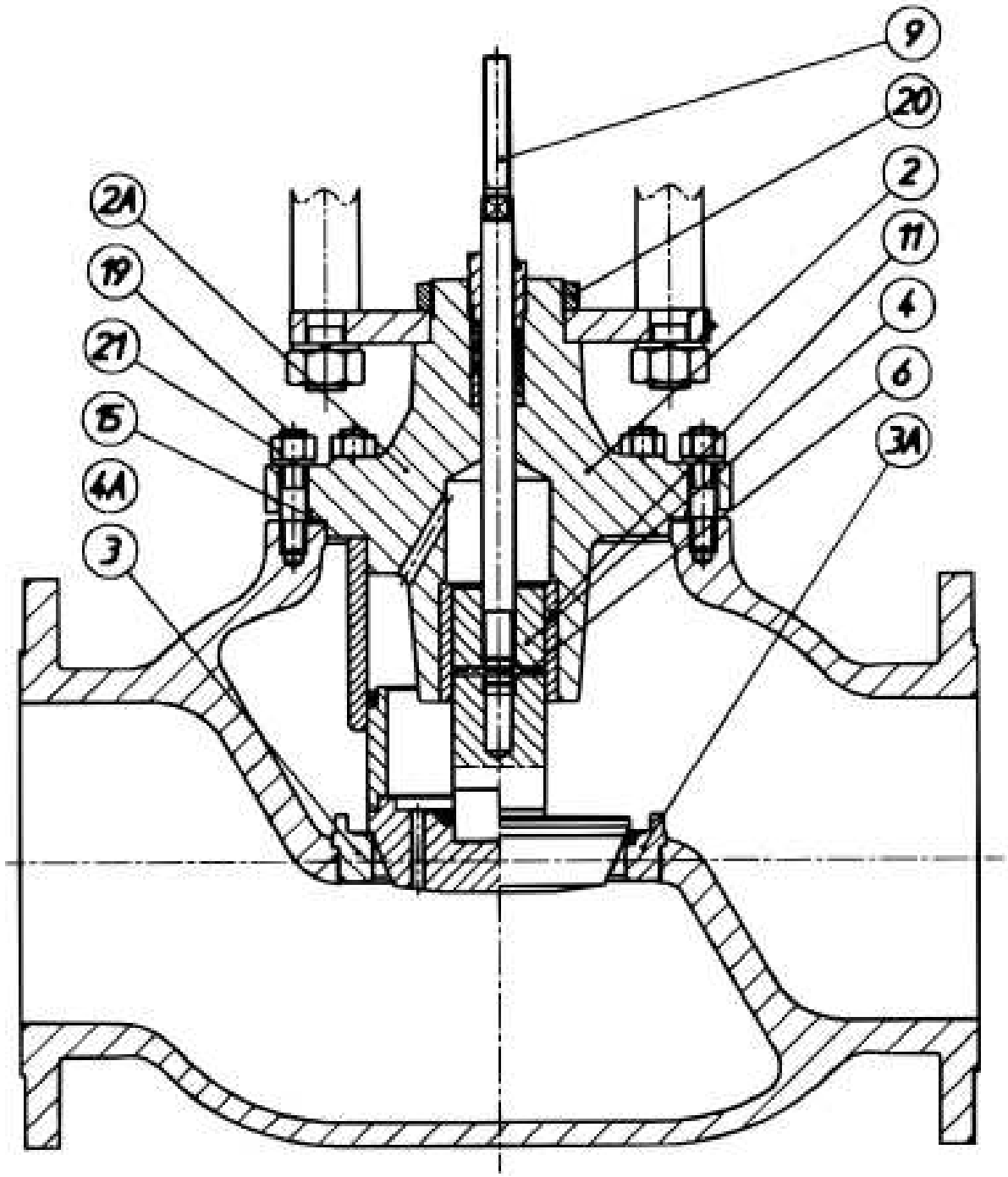


Figure 3 – Regulator valves DN 150... 250 with valve block Kvs = 63... 630
Standard valve and pressure-balanced valve

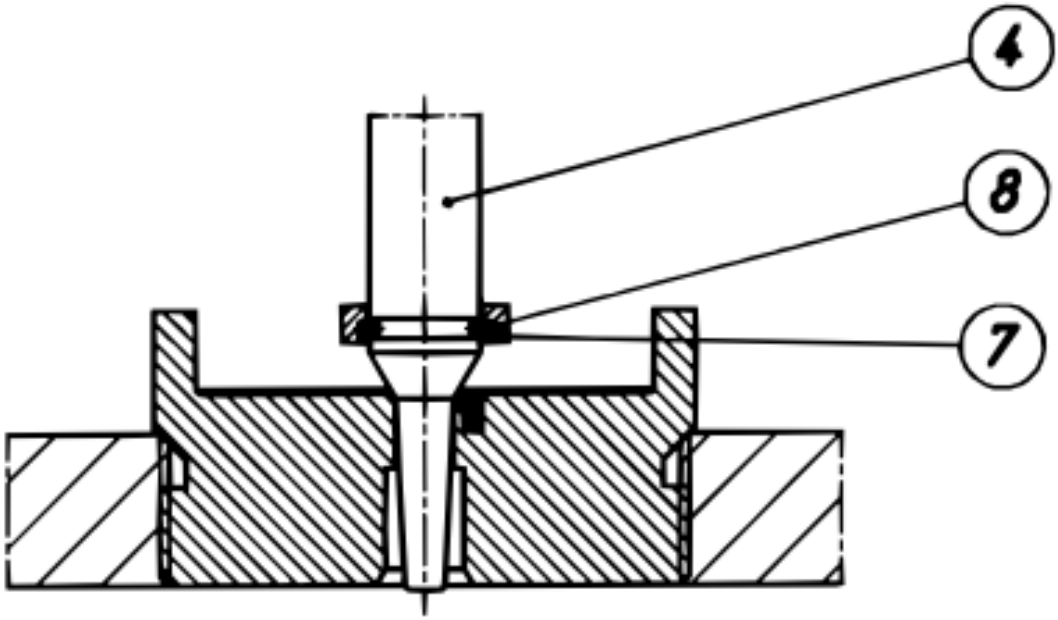


Figure 4 – Spindle with valve block Kvs = 0.01... 1 with standard seating

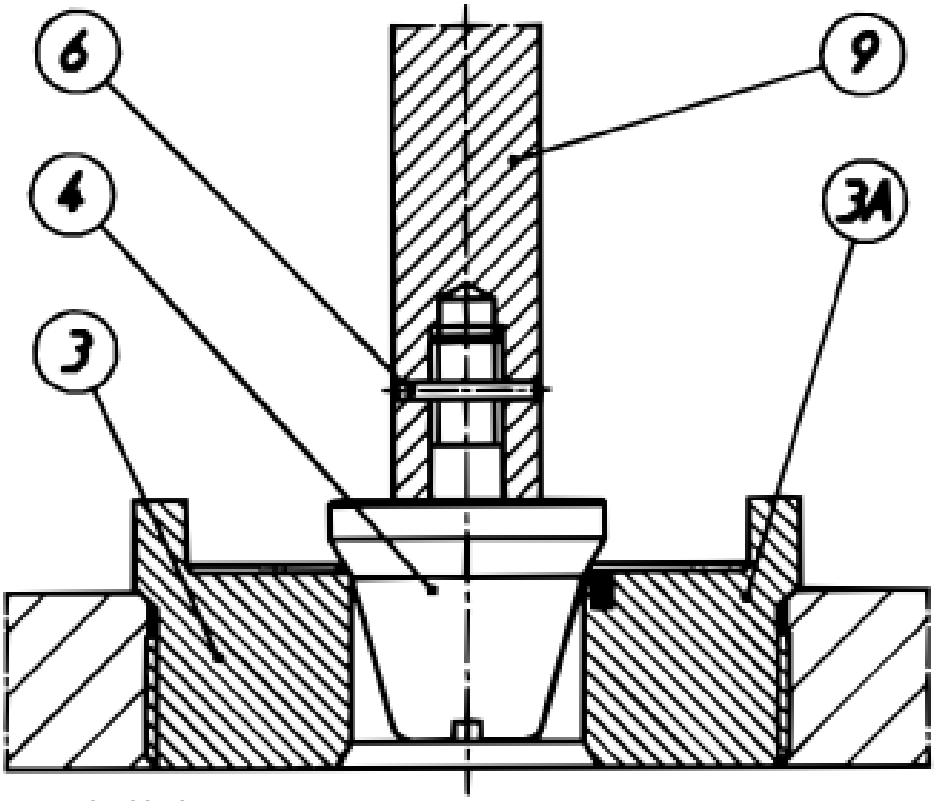


Figure 5 – Valve block Kvs = 1.6... 16, Kvs = 0.01... 1
(e.g. for models with bellows, extended cover)

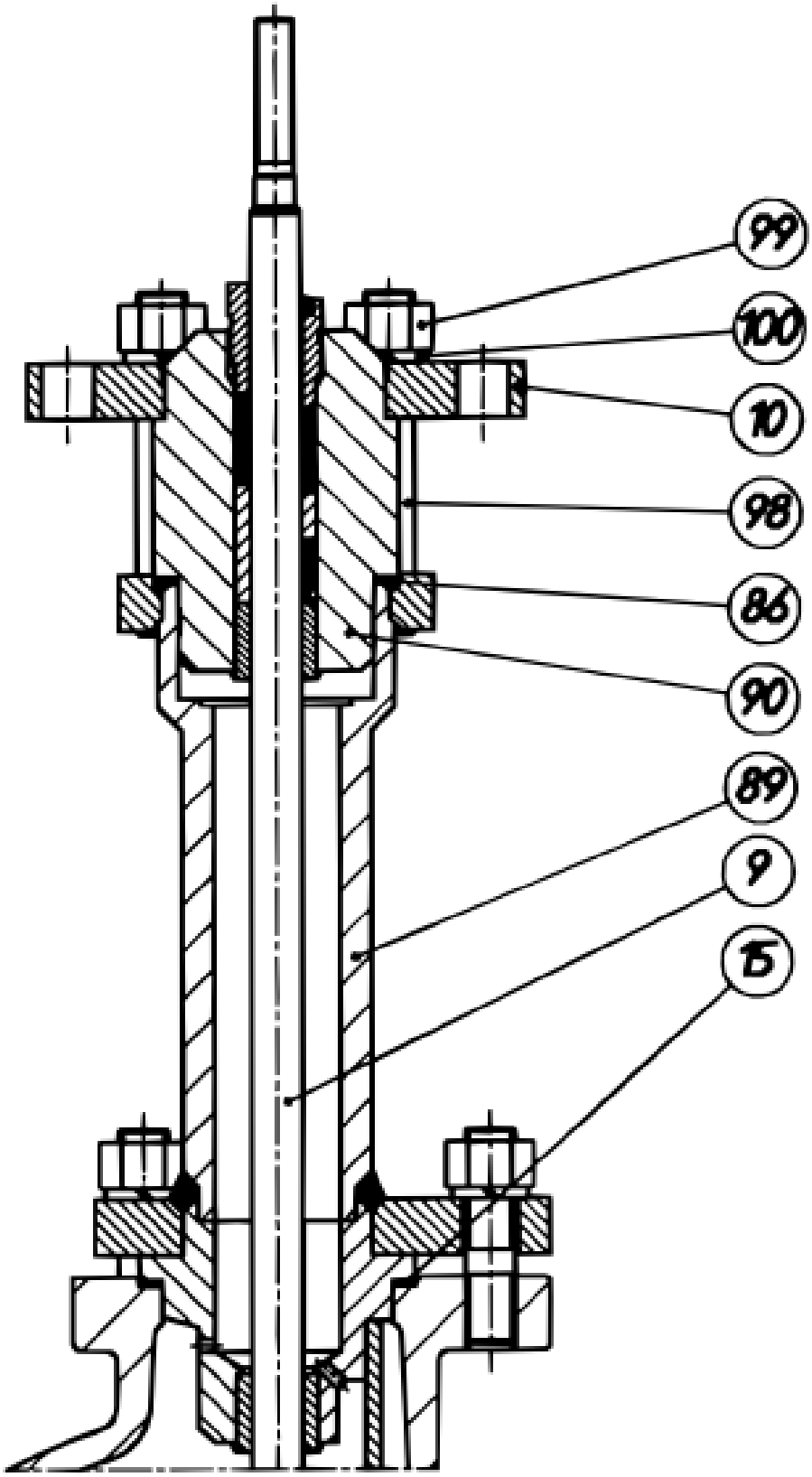


Figure 6 – Model with extended cover

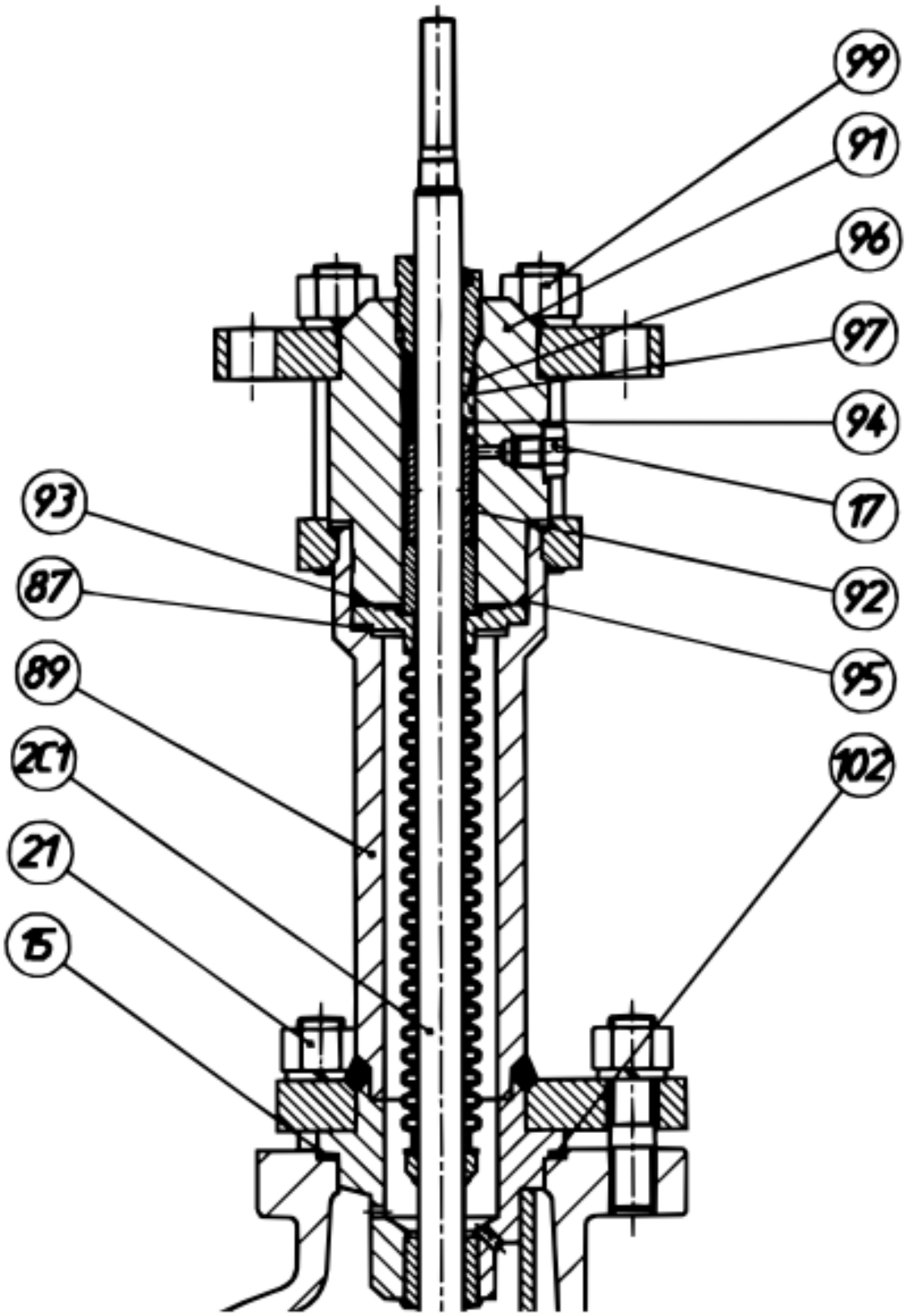


Figure 7 – Model with bellows - 2C

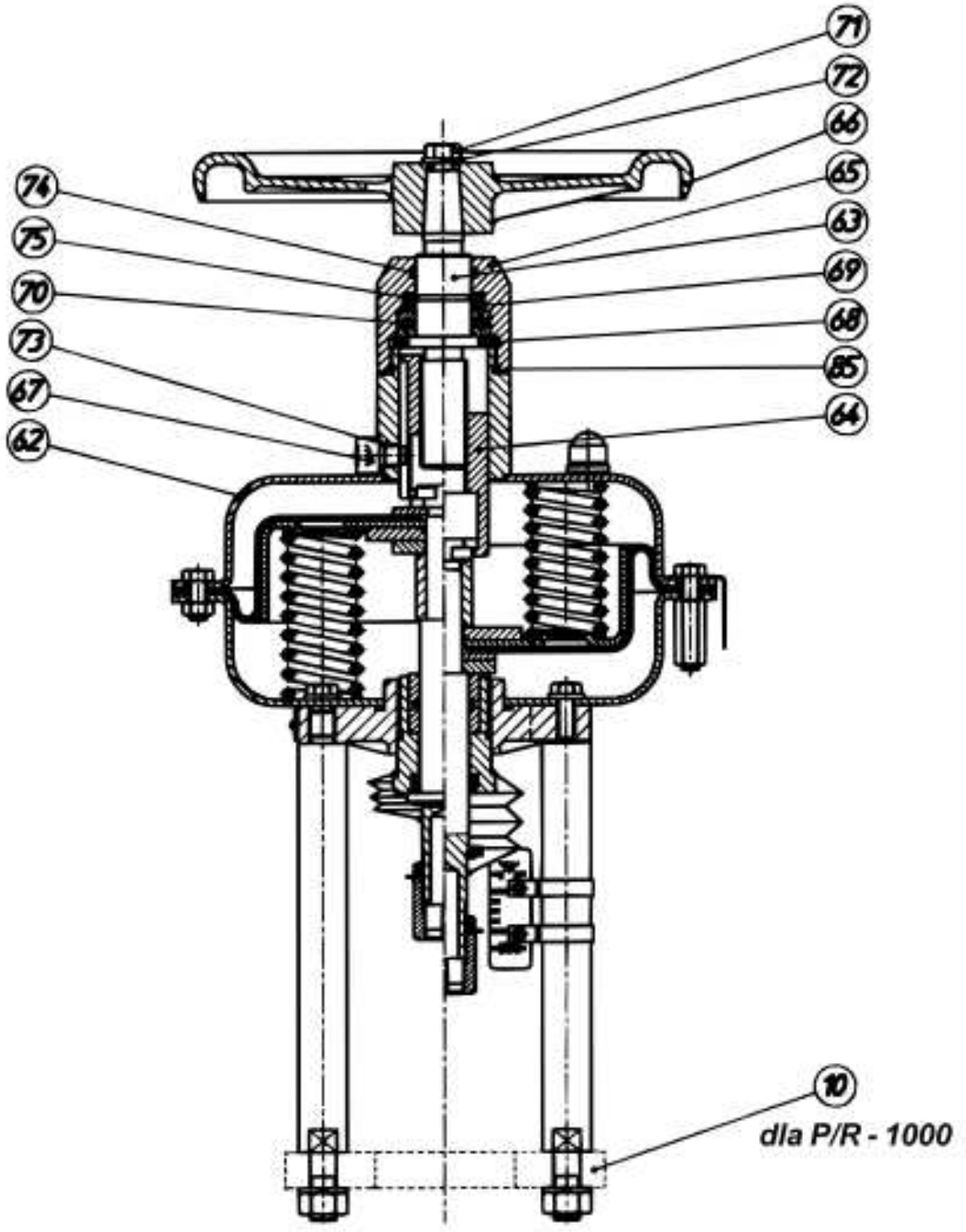


Figure 8 - Pneumatic positioning drive with manual drive type P/R-N

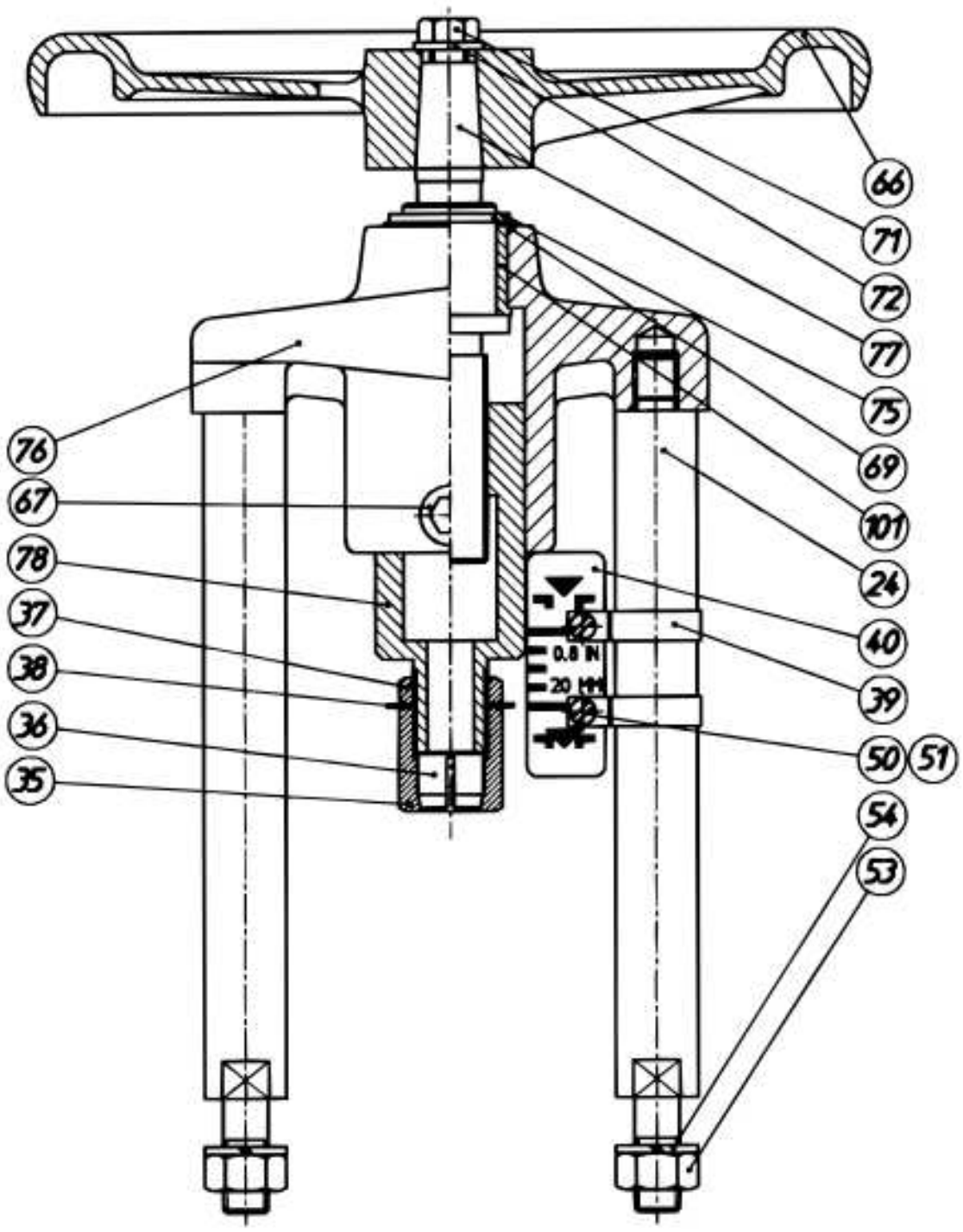


Figure 9 - Manual drive, type NN

9. Contacting us

Details / specific information (Operating instructions with spare parts lists) are available for download on our website.

PRE-VENT GmbH
Sales - Production - Servicing

Gewerbepark Lindach A9
84489 Burghausen, Germany

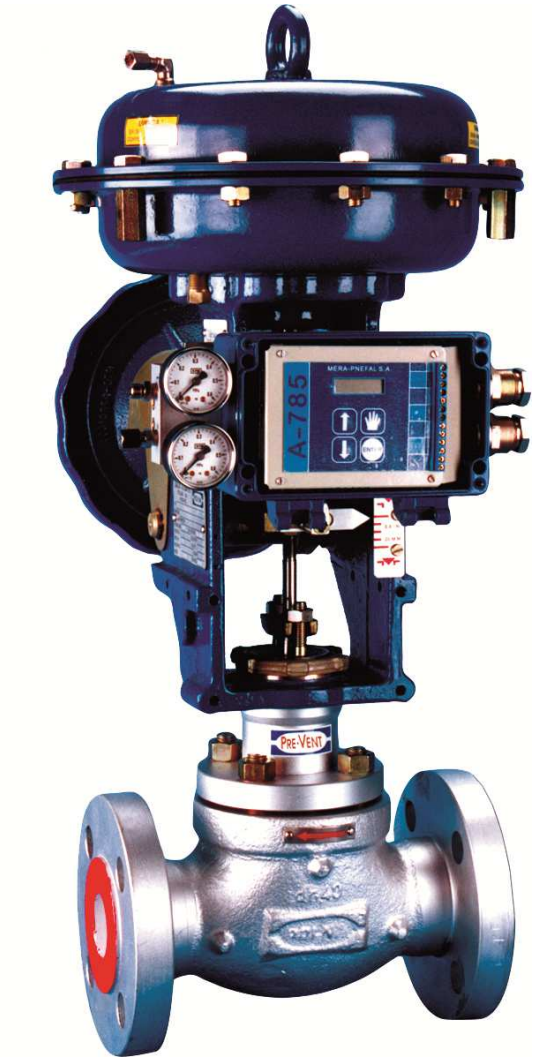
fon +49 8677 98788-0
fax +49 8677 98788-80

Email: office.pre-vent@fiwagroup.com
Web: www.pre-vent.com

Manual version 1.1 30.08.2012

Pre-Vent Armaturen

BR12a Instruction Manual



Contents: Page

To ensure trouble-free and safe operation of the valve, it is essential to be familiar with the contents of this BR12a Instruction Manual, and also with the general instructions for installation and operation, before installing and operating the valve.

Failure to observe or comply with these operating instructions will invalidate the manufacturer's guarantee and liability. The manufacturer's general conditions of sales and terms of delivery shall apply unless otherwise stated.

1. FUNCTIONAL PRINCIPLE

The valve regulates mass-flow by a linear movement of the valve stem, which may be operated pneumatically, electrically or manually. As the stroke of the valve alters, the circular gap between the valve seat and the valve plug is increased or reduced. This directly influences the amount of fluid flowing through the valve.

2. INSTALLATION

The valve may be mounted in any position; however, for valves of DN 80 size and above, vertical installation with the actuator mounted above is preferred. For valves with extended construction, bellows, or drives weighing more than 50 kg, a suitable support or suspension mounting should be provided for the actuator, otherwise its own weight might cause wear and leakage at the stuffing box.

3. OPERATING CONDITIONS

Regulator valves should be operated under conditions that take into account the size and nature of the construction and the type of material. To ensure trouble-free operation over the whole operational lifetime, the regulator valve and its accessories should be regularly inspected and maintained.

Normal operating conditions:

a) With pneumatic actuator
Ambient temperature from - 25 to + 80℃, with silicone diaphragm of -40 °C to +80 °C
Relative humidity up to 98 %.
The control and feed air supplies must contain no mechanical impurities, oil or corrosive substances, copper or aluminium alloys, and must be dehumidified such that the dew-point corresponds to a temperature that is at least 10 ℃ lower than the operating temperature of the position controller and the positioning drive.

b) With electrical actuator
In accordance with the manufacturer's instructions.

c) With hand-operated actuator of type NN
Ambient temperature from - 25 to + 80℃
Relative humidity up to 98 %.

4. OPERABILITY, MAINTENANCE AND REPAIR - STANDARD CONSTRUCTION

The operability of the regulator valve during use is based on maintaining an appropriate flow characteristic and not exceeding the permitted leakage level for the valve.

To ensure long-term correct and safe operation of the valve, it is essential to carry out regular recorded inspections. Valves that operate continuously should be checked at least every 6 months. Valves that operate discontinuously should be checked at least every 12 months.
If it is necessary to carry out maintenance or repair work on the regulator valve, it should be carried out as follows:

4.1. Stuffing box

A key criterion for operability is external seal-tightness, which is provided by the stuffing box.
The stuffing box to be used is normally pre-specified based on the operating conditions.
With normal stuffing box, the tightness of the seal is achieved by tightening the sealing nut or the lantern ring.

WARNING:
When the valve is supplied, the stuffing box nut is only hand-tightened. Before putting the valve into service, it is essential to tighten the sealing sufficiently to achieve an adequate contact pressure, thus ensuring a secure external seal, but without blocking the valve spindle.

If self-adjusting stuffing box used, the constant contact pressure is provided by a stainless steel spring. For this reason, the stuffing box nut should be screwed in up to the stop.

To change the stuffing box, proceed as follows:

Before changing the stuffing box, ensure that the valve is not under pressure and is not contaminated.

1. Loosen the upper part (bonnel) of the valve by opening the body nuts (19) between the body and the top of the valve.
2. Lift the upper part of the valve out of the body, along with the valve stem and the valve plug. Loosen the lantern ring (14) by slackening the nuts (16), and withdraw the valve stem and valve plug from the upper part of the valve.
3. Remove all parts of the stuffing box (13,24) from the packing space using suitable tools, and carefully clean out the packing space.
4. Fit a new body gasket (9) and seating seal (8) carefully clean the surfaces of the seal in the body and on the upper part.
5. Insert the valve stem and the valve plug into the upper part of the valve.
6. Carefully locate the upper part of the valve on the valve body and fasten it in place with the nuts (19).
7. Carefully fit the new stuffing box parts over the valve stem and into the packing space, taking care to get everything in the correct order (insert the parts in reverse order to the order in which they were taken out).
8. Fit on the lantern ring and secure it with the nuts (16).
9. Connect the actuator and the valve solidly back together.

4.2. Replacement of the valve seat and the valve plug

If it is necessary to change the valve seat and valve stem due to a change in the operating conditions or due to wear and tear, proceed as follows:
Before making the change, ensure that the valve is not under pressure and is not contaminated.

In order to achieve a better seal when changing the valve seat and valve block, we recommend lapping the seat and the plug with a fine abrasive paste.

Replacing the valve plug

1. Loosen the upper part (bonnel) of the valve by opening the body nuts (19) between the body and the top of the valve.
2. Lift the upper part of the valve out of the body, along with the valve stem and the valve plug. Disconnect the drive stem from the valve stem. Remove the clamping bush (6) or perforated clamping bush (cage) (7).
3. Undo the stuffing box by loosening the nuts (16) on the lantern ring (14) and withdraw the valve stem and valve plug from the upper part of the valve.
4. Knock out the dowel pin (20) using a punch, and unscrew the valve plug; screw a new plug on to the stem (3), drill it and knock in a dowel to secure it in place again.
5. Push the stem with its new plug into the upper part (bonnel) of the valve.
6. To seal the valve, also remove the seat (5), fit a new seat gasket (8) and replace the seat again.
7. Replace the clamping cage (6) or perforated cage (7) on the valve seat. Carefully place the bonnel of the valve onto the valve body and fasten it down with the nuts (19).
8. Pre-tension the stuffing box by tightening the nuts (16) on the lantern ring (14).
9. Re-connect the actuator and the valve.

Replacing the seat

1. Loosen the upper part (bonnel) of the valve by opening the body nuts (19) between the body and the top of the valve. Remove the clamping cage (6) or the perforated cage (7).
2. Since the valve seat (5) is only clamped in place, it can normally be removed without using any special tools.
3. Fit a new seat gasket (8) and a new valve seat (5). Replace the clamping cage or perforated cage on the seat.
4. Re-assemble the valve as when changing the valve plug, see 4.2 above (items 7-9).

5. OPERABILITY, MAINTENANCE AND REPAIR – MODELS WITH EXTENDED OR BELLOWS CONSTRUCTION

The regulator valve's operability during use is based on maintaining an appropriate flow characteristic and not exceeding the permitted leakage level for the valve.

To ensure long-term correct and safe operation of the valve, it is essential to carry out regular recorded inspections. Valves that operate continuously should be checked at least every 6 months. Valves that operate discontinuously should be checked at least every 12 months.

If it is necessary to carry out maintenance or repair work on the regulator valve, it should be carried out as follows:

5.1. Stuffing box

A key criterion for operability is external seal-tightness, which is provided by the stuffing box.

The stuffing box to be used is normally pre-specified based on the operating conditions.
With normal stuffing box, the tightness of the seal is achieved by tightening the nuts (16) on the lantern ring (14).

WARNING:
When the valve is supplied, the stuffing box is only hand-tightened. Before putting the valve into service, it is essential to tighten the sealing via the nuts (16), sufficiently to achieve an adequate contact pressure, thus ensuring a secure external seal, but without blocking the valve stem.

If self-adjusting stuffing box are used, the constant contact pressure is provided by a stainless steel spring. For this reason, the stuffing box nuts (16) should be screwed in up to the stop.

For models with extended and bellows construction, the stuffing box is changed as described in item 4 above.

5.2. Replacement of the valve seat and the valve plug

If it is necessary to change the valve seat and valve plug due to a change in the operating conditions or due to wear and tear, proceed as follows:
Before making the change, ensure that the valve is not under pressure and is not contaminated.

In order to achieve a better seal when changing the valve seat and valve block, we recommend lapping the seat and the block with a fine abrasive paste.

Replacing the valve plug

The procedure is identical to that described for models of normal construction; however, please note:
To avoid damage in the models with metal bellows (the version with extension bonnel does not have a bellows), take care that no torque is applied to the bellows when unscrewing the valve plug and screwing it back in. We recommend applying an opposing torque to the valve stem.
Replacing the seat
Exactly as described in item 4.2 above.

5.3. Replacing the bellows

1. Loosen the upper part of the valve by opening the body nuts (19) between the body and the bonnel of the valve.
2. Lift the upper part of the valve out of the body, along with the bellows (23), upper bonnel (2C), valve stem and valve plug. Disconnect the actuator stem from the valve stem. Remove the clamping cage (6) or perforated cage (cage) (7).
3. Loosen the gasket on the upper bonnel cover. Unfasten the connecting nuts (31) on the bellows, and take off the upper bonnel (2C).
4. Unscrew the fastening nut (27) from the upper part of the bellows (25).
5. Withdraw the bellows (25) from the bellows bonnel, along with the valve stem.
6. Dismantle the valve plug (4a; 4b) from the bellows as described in item 5.2.
7. Clean the surfaces of the gaskets on the connecting piece.
8. Screw the valve plug back onto the new valve stem with bellows as described and dowel in place.
9. WARNING

   Take great care that no torque is applied to the bellows when unscrewing the valve plug and screwing it back in.
10. Fit a new bellows gasket (26) and insert the bellows from below into the bellows bonnel. Replace the securing nut (27) and tighten it. Fit a new body gasket (29), replace the upper bonnel gasket, and fasten it to the bellows bonnel (23) using the connecting nuts (31).
11. Pre-tension the stuffing box by tightening the nuts (16) on the lantern ring (14).
12. Fit a new gasket (8) and a new valve seat (5). Replace the clamping cage or perforated cage on the seat.
13. Re-assemble the valve as when changing the valve plug, see 4.2 above (items 7-9).

6. PNEUMATIC P/R DRIVE

(For drawing numbers, see BR11 manual)
When the pressure rises in the actuator pressure chamber, a force is applied to the diaphragm in the actuator unit. If this force exceeds the spring force of the springs in the second chamber, the springs are compressed and the actuator stem starts to travel out or in, according to the function. If the pressure continues to increase, once the maximum spring force is reached the springs will be pressed against the end-stop and the actuator will stop. Thus, a single actuating pneumatic drive can reach a defined position in proportion to the air pressure.
The size of the drive is based on the cm^2 surface of the diaphragm.

Drive size	Hub	Spring range (kPa)													
		1		2		3		4		5		6		7	
		20 – 100		40 – 200		40 – 120		80 – 240		60 – 140		120 – 280		180 - 380	
		How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)
250	20	3	-	6	-	3	-	6	-	3	6	6	6	-	-
400	20	3	-	6	-	3	-	6	-	3	6	6	6	-	-
630	38	3	-	6	-	3	10	6	10	3	10+10	6	10+10	12	10+10
1000	38	3	-	6	-	3	9.5	6	9.5	3	9.5+ 9.5	6	9.5+ 9.5	12	9.5+ 9.5
	50	3	-	6	-	3	12.5	6	12.5	3	12.5+ 12.5	6	12.5+ 12.5	12	12.5+ 12.5
	63	3	-	6	-	3	16	6	16	3	16+16	6	16+16	12	16+16

Spring range and drive sizes for pneumatic drives of type P/R

P type drive: Single acting diaphragm actuator.
Safe position NO (open on loss of pressure)
When pressure rises in the upper chamber, the actuator stem travels out.

R type drive: Single acting diaphragm actuator.
Safe position NC (closed on loss of pressure)
When pressure rises in the lower chamber, the actuator stem travels in.

6.1. Changing the operating mode of the drive

No additional components are required in order to alter the direction of operation of type P/R pneumatic actuator.

Changing P to R and vice versa

1. Disconnect the valve from the actuator.
2. Ensure that no air pressure is applied to the actuator.
3. Remove the top cover of the actuator, taking care that the tensioning nuts (long nuts) (82) are unscrewed to the ends – in accordance with the notes on the warning label,

   The further steps in the procedure depend on the current operating mode of the actuator before it is changed.

To change the actuator function from P to R, proceed as follows:

4. Undo the special nuts (34) from the bolts on the actuator.
5. Remove the diaphragm with its diaphragm plate, spacer ring, washer and spacer cover (or spacer covers for drive sizes 630 and 1000).
6. Remove the springs (31) from the lower cover.
7. Turn the diaphragm together with all the parts as listed above through 180 degrees, and fit the diaphragm back over the actuator stem.
8. Screw the special nuts (34) on to the actuator bolts, thus compressing the whole of the above group of components.
9. Place the springs on the diaphragm plate so that they fit in the guide cut-outs and their ends are aligned with the axis of the bolts.
10. Place the top cover over the springs and initially tighten the tensioning nuts (82).
11. Compress the springs evenly until the upper part of the drive end-stop is pressed against the lower part, then insert the rest of the bolts and screw on the nuts.

To change the drive function from R to P, proceed as follows:

4. Remove the springs (31) from the diaphragm plate (28).
5. Undo the special nuts (34) from the bolts on the actuator.
6. Remove the diaphragm with its diaphragm plate, spacer ring, washer and spacer cover (or spacer covers for drive sizes 630 and 1000).
7. Place the springs in the designated locations in the lower cover.
8. Turn the diaphragm together with all the parts as listed above through 180 degrees, and fit the diaphragm back over the drive bolts, so that the 6 mm diameter opening on the base and the nut on the edge of the diaphragm plate are axially aligned with one of the openings on the edge of the diaphragm.
9. Screw the special nuts (34) on to the actuator stem, thus compressing the whole of the above group of components.
10. Place the springs on the diaphragm plate (28) so that they fit in the guide cut-outs. To check that the springs are in the correct position, rotate the diaphragm (to the position of the notch on the nut at the edge of the diaphragm plate) until the 6 mm opening on the base is visible. By sighting through the opening, check that there is a spring in place on the underside.
11. Place the top cover over the springs and initially tighten the tensioning nuts (82).
12. Compress the springs evenly until the upper part of the drive end-stop is pressed against the lower part, then insert the rest of the bolts and screw on the nuts.

6.2. Changing the diaphragm

Should it be necessary to change a diaphragm, the actuator should be dismantled as described in item 6.1. Instead of putting the actuator back together in reverse order, it should simply be re-assembled in its original order after changing the diaphragm.

7. PNEUMATIC TYPE P1/R1 DRIVE

When the pressure rises in the actuator pressure chamber, a force is applied to the diaphragm in the actuator unit. If this force exceeds the spring force of the springs in the second chamber, the springs are compressed and the drive stem starts to travel out or in, according to the function. If the pressure continues to increase, once the maximum spring force is reached the springs will be pressed against the end-stop and the drive will halt. Thus, single acting pneumatic actuator can reach a defined position in proportion to the air pressure.
The size of the drive is based on the cm^2 surface of the diaphragm.

Drive size	Hub	Spring range (kPa)													
		1		2		3		4		5		6		7	
		20 – 100		40 – 200		40 – 120		80 – 240		60 – 140		120 – 280		180 - 380	
		How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)
400	20	3	-	6	-	3	5	6	5	3	5+5	6	5+5	-	-
630	20	3	-	6	-	3	5	6	5	3	5+5	6	5+5	12	5+5
	38	3	-	6	-	3	9,5	6	9.5	3	9.5+ 9.5	6	9.5+ 9.5	12	9.5+ 9.5
1000	38	3	-	6	-	3	9,5	6	9.5	3	9.5+ 9.5	6	9.5+ 9.5	12	9.5+ 9.5
	50	3	-	6	-	3	12.5	6	12.5	3	12.5+ 12.5	6	12.5+ 12.5	12	12.5+ 12.5
	63	3	-	6	-	3	15.5	6	15.5	3	15.5+ 15.5	6	15.5+ 15.5	12	15.5+ 15.5
1500	38	3	-	6	-	3	9.5	6	9.5	3	9.5+ 9.5	6	9.5+ 9.5	12	9.5+ 9.5
	50	3	-	6	-	3	12.5	6	12.5	3	12.5+ 12.5	6	12.5+ 12.5	12	12.5+ 12.5
	63	3	-	6	-	3	15.5	6	15.5	3	15.5+ 15.5	6	15.5+ 15.5	12	15.5+ 15.5
	80	3	-	6	-	3	9.5	6	9.5	3	9.5+ 9.5	6	9.5+ 9.5	12	9.5+ 9.5

Spring range and actuator sizes for pneumatic actuators of type P1/R1

P1 type drive: Single diaphragm actuator.
Safe position NO (open on loss of pressure)
When pressure rises in the upper chamber, the drive stem travels out.

R1 type drive: Single diaphragm actuator.
Safe position NC (closed on loss of pressure)
When pressure rises in the lower chamber, the drive stem travels in.

7.1. Changing the operating mode of the actuator

1. No additional components are required in order to alter the direction of operation of type P1/R1 pneumatic actuator.
2. Disconnect the valve stem from the actuator stem.
3. Remove the top cover of the actuator (44), taking care that the tension lock is loosened right to the end in accordance with the note on the warning label.

The further steps in the procedure depend on the current operating mode of the drive before it is changed.

To change the drive function from P1 to R1, proceed as follows:

4. Loosen the thin nut (53) on the actuator stem.
5. Remove the diaphragm (55) with its diaphragm plate (45), spacer ring (47), washer (50) and cover (or spacer covers for drive sizes 630 and 1000) (48/49); take care, the stem must be secured before it can fall out of the sealing gland system.
6. Remove the springs from the lower casing.
7. Turn the diaphragm together with all the parts as listed above through 180 degrees, and fit them over the actuator stem in reverse order to that in which they were taken off.
8. Screw the thin nut onto the actuator stem so as to press all the above components together.
9. Place the springs in the cut-outs provided for the purpose on the diaphragm plate, so that they are evenly distributed around the axis of the stem.
10. Place the top cover of the actuator on the springs and compress the springs evenly. First tighten the tensioning nuts (remembering to insert the warning notice), until the upper drive cover is screwed firmly against the lower actuator cover. Then insert the rest of the bolts and screw on the respective nuts.

To change the drive function from R1 to P1, proceed as follows:

11. Remove the springs from the diaphragm plate.
12. Loosen the thin nut (53) on the drive stem.
13. Remove the diaphragm (55) with its diaphragm plate (45), spacer ring (47), washer (50) and cover (or spacer covers for drive sizes 630 and 1000) (48/49); take care, the stem must be secured before it can fall out of the sealing gland system.
14. Place the springs (54) in the places provided in the lower cover of the actuator (43).
15. Turn the diaphragm together with all the parts as listed above through 180 degrees, and fit them on the actuator stem so that the 6 mm diameter opening on the base and the nut on the edge of the diaphragm plate (45) lie in the axis of one of the openings on the circumference of the diaphragm.
16. Arrange the diaphragm system on the springs so that the springs are located in the corresponding cut-outs in the diaphragm plate. To check that the springs are in the correct position, gently rotate the diaphragm (to the position of the notch on the nut at the edge of the diaphragm plate) until the 6 mm opening on the base (45) is visible. By sighting through the opening, check that there is a spring in place on the underside.
17. Screw the thin nut (53) on to the actuator stem so that all the above components are pressed together.
18. Place the upper cover of the valve on the front of the stem and compress the springs evenly. First tighten the tensioning nuts (long nuts) (remember to insert the warning notice!), until the upper actuator cover is firmly screwed against the lower drive cover. Then insert the rest of the bolts and screw on the respective nuts.

7.2 Changing the control air range (spring range) for pneumatic actuator type P1/R1

The construction of the positioning drive permits the use of different control air ranges; this is achieved by applying different numbers of springs, or altering their pre-tensioning by fitting spacers:

5.0 mm – 2 off (for 20 mm hub),

9.5 mm – 2 off (for 38 and 80 mm hubs),

12.5 mm – 2 off (for 50 mm hub),

15.5 mm – 2 off (for 63 mm hub) – for drive sizes 1000 and 1500.

For the nominal range, the elements are mounted on the actuator stem on the inside of the diaphragm plate. Additional tensioning of the springs is achieved by fitting either one or two spacers to the outer side of the diaphragm plate, depending on the desired range.

The change in pre-tensioning is achieved by altering the position using the following spacers: 5 mm for the 20 mm hub; 9.5 mm for the 38 and 80 mm hubs; 12.5 mm for the 50 mm hub, and 15.5 mm for the 63 mm hub. Additional 4.5 mm thick spring plates are used for the 80 mm hub.

The number of components is given in Table 1, and the way in which they are fitted is shown in the overall layout drawing for positioning drives.

8. OTHER ACTUATORS

It is possible to equip model BR12a valves with electrical actuator. Sizing the actuator to the regulator valve is normally a part of the bidding process.
It is also possible to supply model BR12a valves with a purely manual operation (type NN), or to fit the pneumatic actuator with an additional hand-wheel (type P/R-N).
(See the following diagrams)

9. DRAWINGS / SPARE PARTS LIST

Number and description of parts.

No.	Description
Individual valve components	
1	Body
2a	Standard bonnel
2b	Extension bonnel
2c	Upper bonnel
3	Stem
4a	Parabolic valve plug
4b	Perforated plug
5	Valve seat
6	Clamping cage
7	Perforated clamping cage
8	Valve seat gasket
9	Body gasket
10	Guide sleeve
11	Blind plugs
12	Securing nut
13	Pressure sleeve
14	Thrust lever
15	Double-nut bolt
16	Nut
17	Thin nut
18	Double-nut bolt
19	Nut
20	Slot dowel
21	Company nameplate
22	Rivet pin
23	Bellows bonnel
24	Stuffing box
25	Bellows
26	Seal
27	Nut
28	Securing washer
29	Seal
30	Double-nut bolt
31	Nut
32	Guiding ring
33	Seal
34	Spacer sleeve (TA air)
35	Seal packing (TA air)
36	Spacer sleeve (TA air)
37	Stuffing box (TA air)

No.	Description
Individual components of positioning drive	
38	Pressure sleeve (TA air)
39	Leaf spring (TA air)
40	Pressure plate (TA air)
41	Double-nut bolt (TA air)
42	Bracket
43	Lower actuator cover
44	Upper actuator cover
45	Diaphragm plate
46	Stem
47	Spacer ring
48	Spacer sleeve
49	Spacer sleeve
50	Washer
51	Support ring
52	Tensioning nut
53	Thin nut
54	Spring
55	Diaphragm
56	Flange of actuator stem P1/R1-400
57	Stroke plate
58	Actuator supplier nameplate
59	Valve supplier nameplate
60	Warning label
61	Stroke indicator
62	Sliding sleeve
63	Cover
64	Air vent plug
65	Rivet pin 3x6
66	Bolt
67	Bolt
68	Bolt
69	Bolt
70	Shaft bolt
71	Nut
72	Washer
73	O ring
74	Washer ring
75	Circlip
76	O ring

No.	Description
77	Z wiper ring
78	O ring
79	Nut
80a	Shaft connecting piece, upper, P1/R1 630
80b	Shaft connecting piece, upper, P1/R1 1000; 1500
81a	Shaft connecting piece, lower, P1/R1 630
81b	Shaft connecting piece, upper, P1/R1 1000; 1500
82a	Connecting sleeve P1/R1-630
82b	Connecting sleeve P1/R1 1000; 1500
83	Grub screw
84	Drive bolt
85	Drive wheel
86	Support nut
87	Lever
88	Drive joint
89	Lever axle
90	Pivot pins
91	Spindle nut
92	Drive cover
93	Longitudinal journal bearing
94	Slot dowel
95	Support ring (P1/R1B-400;630)
96	Circlip
97	Circlip
98	Circlip
99	Bolt
100	Washer
101	Connecting piece (for electrical positioning motors)
Individual components of type 20 drive	
102	Drive bracket
103	Drive wheel
104	Drive sleeve
105	Drive cover
106	Drive shaft
107	Slot
108	Stroke plate
109	Ball bearing
110	Oiler
111	Indicator
112	Slot dowel
113	Shaft bolt

Figure 1: Regulator valve type Z1A with pneumatic drive type P1/R1 and side-mounted hand-wheel (cross-section)

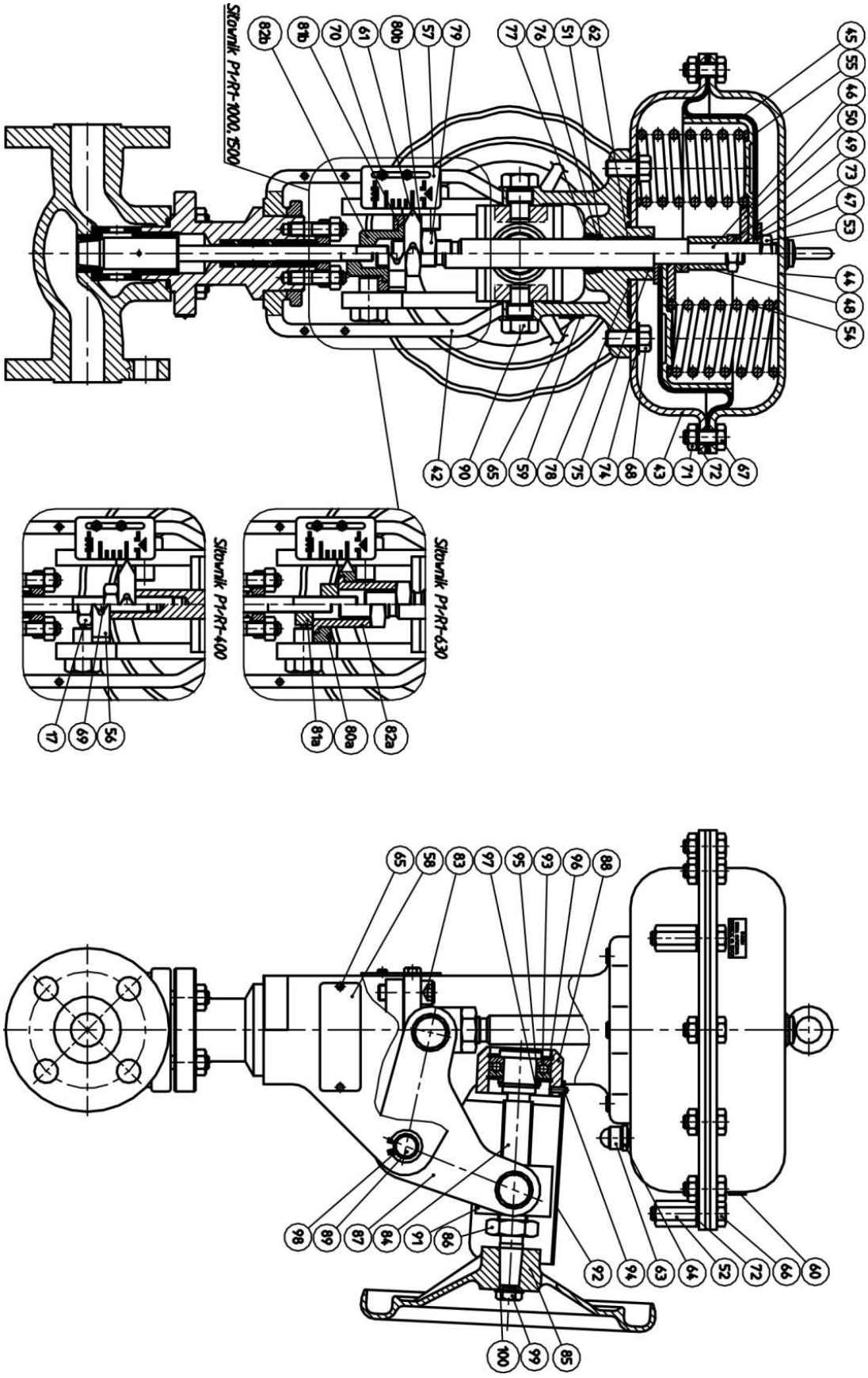


Figure 2: Different types of valve plug and pressing cages

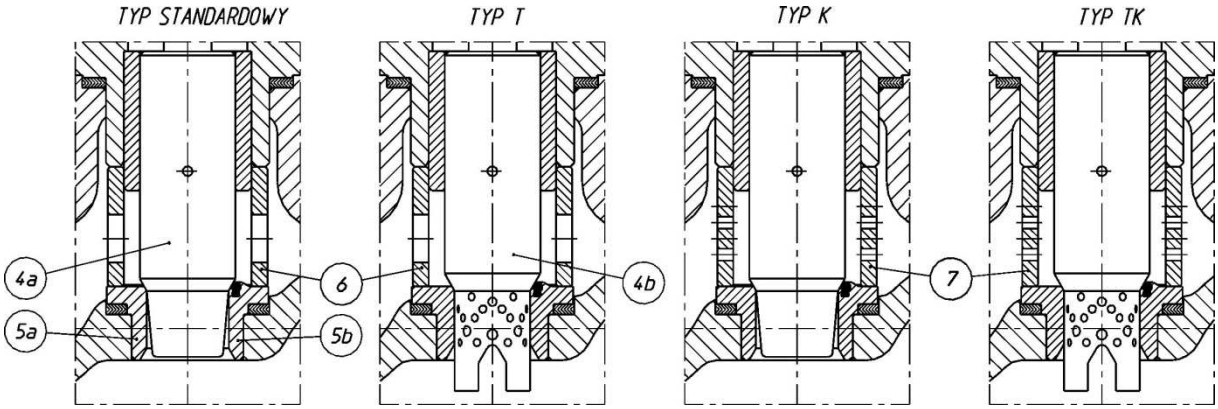
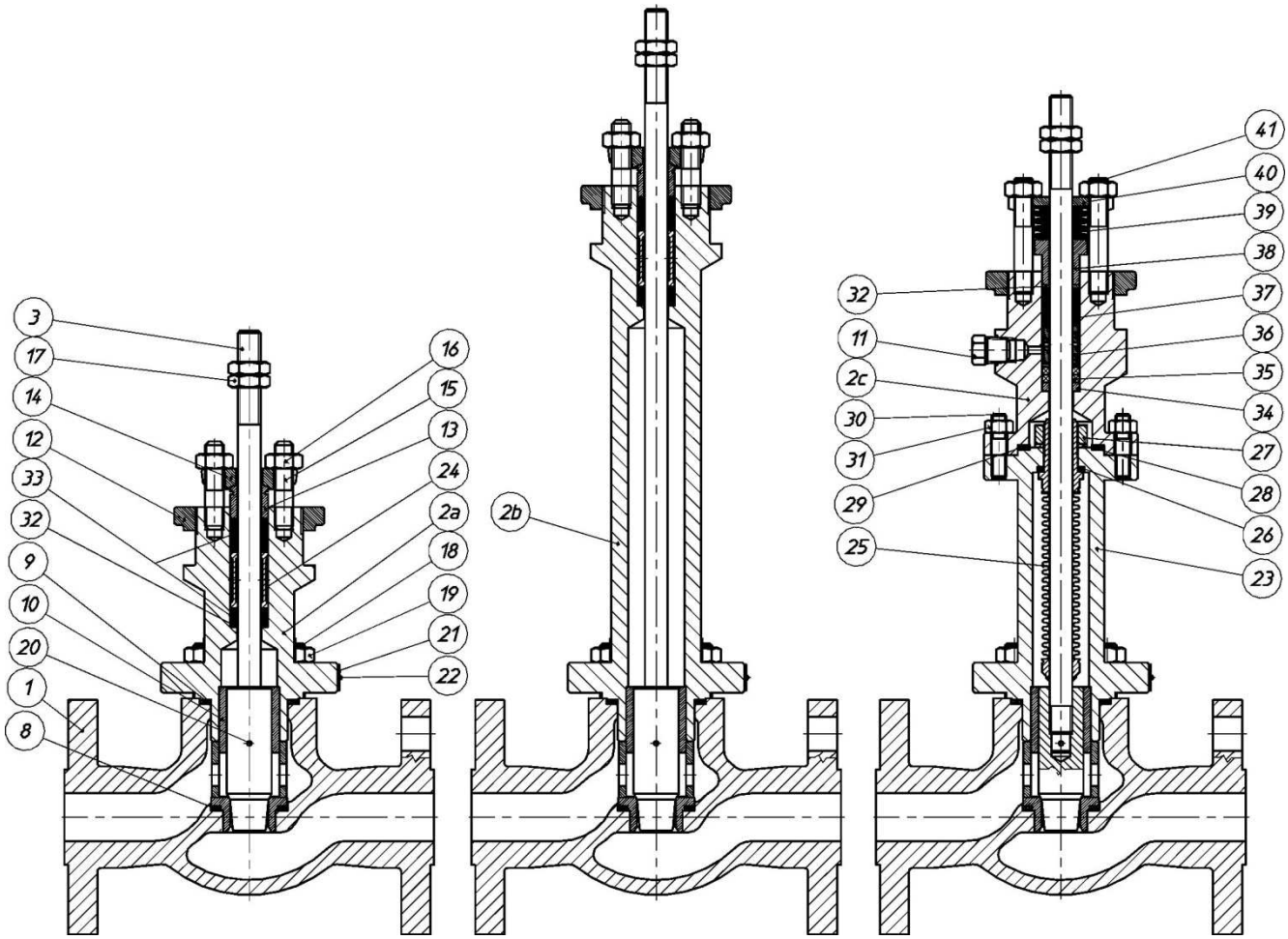


Figure 3: Different models of control valve type BR12a



Standard Extended model Model with bellows

Figure 4: Pneumatic positioning actuator with manual handwheel, type P/R-N

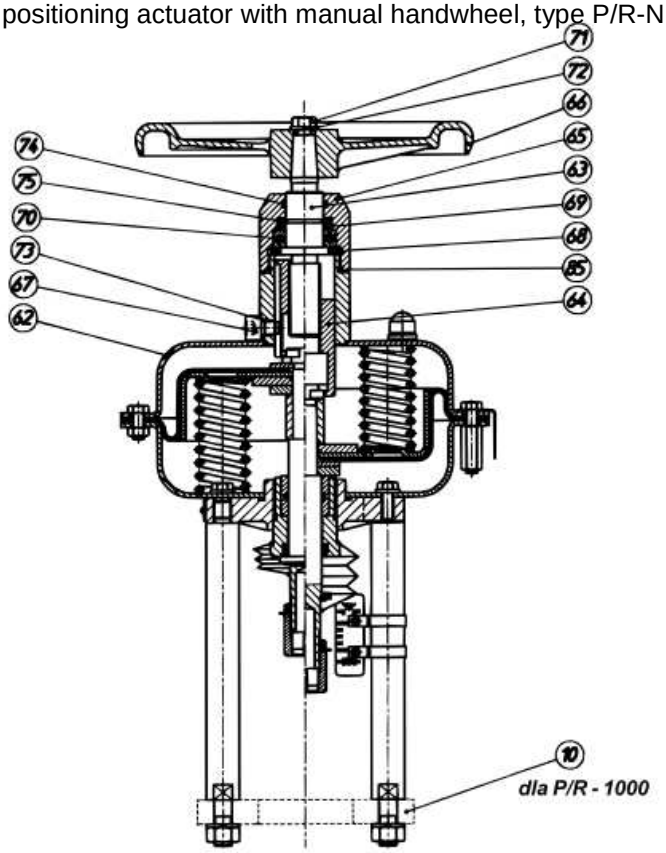
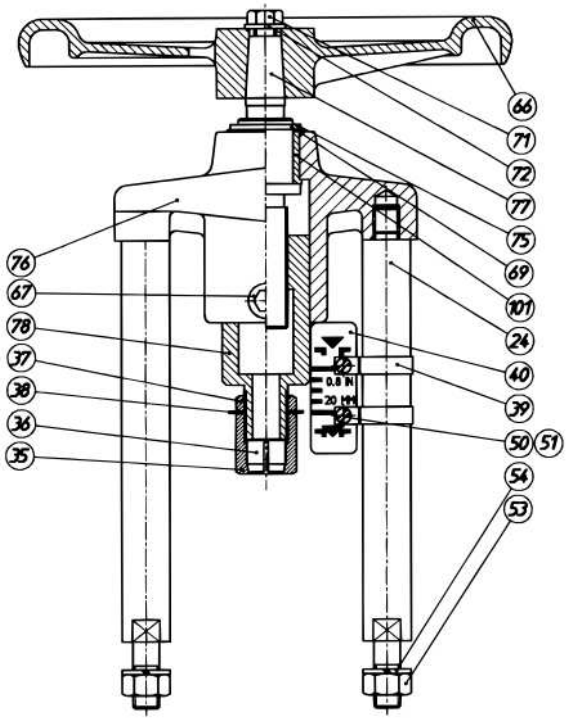


Figure 5: Manual actuator, type NN



10. Contacting us

Details / specific information (Operating instructions with spare parts lists) are available for download on our website.

PRE-VENT GmbH
Sales - Production - Servicing

Gewerbepark Lindach A9
84489 Burghausen, Germany

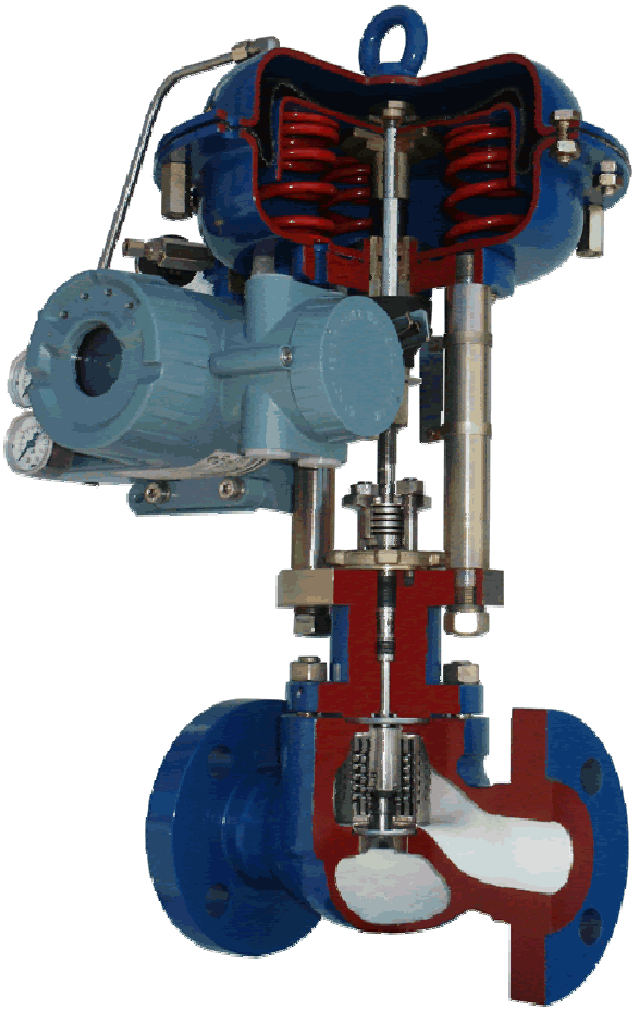
Tel: +49 8677 98788-0
Fax: +49 8677 98788-80

Email: office.pre-vent@fiwagroup.com
Web: www.pre-vent.com

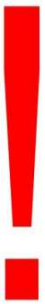
Manual Version 1.1 30.08.2012

Pre-Vent Armaturen

BR12b Instruction Manual



Contents: Page



To ensure trouble-free and safe operation of the valve, it is essential to be familiar with the contents of this BR12b Instruction Manual, and also with the general instructions for installation and operation, before installing and operating the valve.

Failure to observe or comply with these operating instructions will invalidate the manufacturer's guarantee and liability. The manufacturer's general conditions of sales and terms of delivery shall apply unless otherwise stated.

1. FUNCTIONAL PRINCIPLE

The valve regulates mass-flow by a linear movement of the valve stem, which may be operated pneumatically, electrically or manually. As the stroke of the valve alters, the openings in the cage can be released or covered. This directly influences the amount of fluid flowing through the valve.

2. INSTALLATION

The valve may be mounted in any position; however, for valves of DN 80 size and above, vertical installation with the actuator mounted above is preferred. For valves with extended construction, bellows, or drives weighing more than 50 kg, a suitable support or suspension mounting should be provided for the actuator, otherwise its own weight might cause wear and leakage at the stuffing box.

3. OPERATING CONDITIONS

Regulator valves should be operated under conditions that take into account the size and nature of the construction and the type of material. To ensure trouble-free operation over the whole operational lifetime, the regulator valve and its accessories should be regularly inspected and maintained.

.

Normal operating conditions:

a) With pneumatic actuator
Ambient temperature from - 25 to + 80℃, with silicone diaphragm of -40 °C to +80 °C
Relative humidity up to 98 %.
The control and feed air supplies must contain no mechanical impurities, oil or corrosive substances, copper or aluminium alloys, and must be dehumidified such that the dew-point corresponds to a temperature that is at least 10 ℃ lower than the operating tem perature of the position controller and the positioning drive.

b) With electrical actuator
In accordance with the manufacturer's instructions.

c) With hand-operated actuator of type NN
Ambient temperature from - 25 to + 80℃
Relative humidity up to 98 %.

4. OPERABILITY, MAINTENANCE AND REPAIR - STANDARD CONSTRUCTION

The operability of the regulator valve during use is based on maintaining an appropriate flow characteristic and not exceeding the permitted leakage level for the valve.

To ensure long-term correct and safe operation of the valve, it is essential to carry out regular recorded inspections. Valves that operate continuously should be checked at least every 6 months. Valves that operate discontinuously should be checked at least every 12 months.
If it is necessary to carry out maintenance or repair work on the regulator valve, it should be carried out as follows:

4.1. Stuffing box

A key criterion for operability is external seal-tightness, which is provided by the stuffing box.
The stuffing box to be used is normally pre-specified based on the operating conditions.
With normal stuffing box, the tightness of the seal is achieved by tightening the sealing nut or the lantern ring.

WARNING:
When the valve is supplied, the stuffing box nut is only hand-tightened. Before putting the valve into service, it is essential to tighten the sealing sufficiently to achieve an adequate contact pressure, thus ensuring a secure external seal, but without blocking the valve spindle.

If self-adjusting stuffing box used, the constant contact pressure is provided by a stainless steel spring. For this reason, the stuffing box nut should be screwed in up to the stop.

To change the stuffing box, proceed as follows:

Before changing the stuffing box, ensure that the valve is not under pressure and is not contaminated

1. Loosen the upper part (bonnel) of the valve by opening the body nuts (21) between the body and the top of the valve.
2. Lift the upper part of the valve out of the body, along with the valve stem and the valve plug. Loosen the lantern ring (16) by slackening the nuts (18), and withdraw the valve stem and valve plug from the upper part of the valve.
3. Remove all parts of the stuffing box (35, 36, 37, 38, 39) from the packing space using suitable tools, and carefully clean out the packing space.
4. Fit a new body gasket (9) and seating seal (10) carefully clean the surfaces of the seal in the body and on the upper part.
5. Insert the valve stem and the valve plug into the upper part of the valve.
6. Carefully locate the upper part of the valve on the valve body and fasten it in place with the nuts (21).
7. Carefully fit the new stuffing box parts over the valve stem and into the packing space, taking care to get everything in the correct order (insert the parts in reverse order to the order in which they were taken out).
8. Fit on the lantern ring and secure it with the nuts (18).
9. Connect the actuator and the valve solidly back together.

4.2. Replacement of the valve seat and the valve plug

If it is necessary to change the valve seat and valve stem due to a change in the operating conditions or due to wear and tear, proceed as follows:
Before making the change, ensure that the valve is not under pressure and is not contaminated.

Replacing the valve plug

1. Loosen the upper part (bonnel) of the valve by opening the body nuts (21) between the body and the top of the valve.
2. Lift the upper part of the valve out of the body, along with the valve stem and the valve plug. Disconnect the drive stem from the valve stem. Remove control cage (6) and if present remove throttle cages I (7) and II (8).
3. Undo the stuffing box by loosening the nuts (18) on the lantern ring (16) and withdraw the valve stem and piston cone (4a/4b) from the upper part of the valve.
4. Knock out the dowel pin (20) using a punch, and unscrew the valve plug; screw a new plug on to the stem (3), drill it and knock in a dowel to secure it in place again.
5. Push the stem with its new plug into the upper part (bonnel) of the valve.
6. To seal the valve, also remove the seat (5), fit a new seat gasket (10) and replace the seat again.
7. If present replace the throttle cage I (7) and throttle cage II (8) and also the control cage (6) on the valve seat. Carefully place the bonnet of the valve onto the valve body and fasten it down with the nuts (21).
8. Pre-tension the stuffing box by tightening the nuts (18) on the lantern ring (16).
9. Re-connect the actuator and the valve.

Replacing the seat

1. Loosen the upper part (bonnel) of the valve by opening the body nuts (21) between the body and the top of the valve. Remove the control cage (6) and if present remove the throttle cage I (7) and the throttle cage II (8).
2. Since the valve seat (5) is only clamped in place, it can normally be removed without using any special tools.
3. Fit a new seat gasket (10) and a new valve seat (5). Replace the control cage and if present replace the throttle cage I and the throttle cage II on the seat.
4. Re-assemble the valve as when changing the valve plug, see 4.2 above (items 7-9).

5. OPERABILITY, MAINTENANCE AND REPAIR – MODELS WITH EXTENDED OR BELLOWS CONSTRUCTION

The regulator valve's operability during use is based on maintaining an appropriate flow characteristic and not exceeding the permitted leakage level for the valve.

To ensure long-term correct and safe operation of the valve, it is essential to carry out regular recorded inspections. Valves that operate continuously should be checked at least every 6 months. Valves that operate discontinuously should be checked at least every 12 months.

If it is necessary to carry out maintenance or repair work on the regulator valve, it should be carried out as follows:

5.1. Stuffing box

A key criterion for operability is external seal-tightness, which is provided by the stuffing box.

The stuffing box to be used is normally pre-specified based on the operating conditions.
With normal stuffing box, the tightness of the seal is achieved by tightening the nuts (18) on the lantern ring (16).

WARNING:
When the valve is supplied, the stuffing box is only hand-tightened. Before putting the valve into service, it is essential to tighten the sealing via the nuts (18), sufficiently to achieve an adequate contact pressure, thus ensuring a secure external seal, but without blocking the valve stem.

If self-adjusting stuffing box are used, the constant contact pressure is provided by a stainless steel spring. For this reason, the stuffing box nuts (18) should be screwed in up to the stop.

For models with extended and bellows construction, the stuffing box is changed as described in item 4 above.

5.2. Replacement of the valve seat and the valve plug

If it is necessary to change the valve seat and valve plug due to a change in the operating conditions or due to wear and tear, proceed as follows:

Before making the change, ensure that the valve is not under pressure and is not contaminated.

In order to achieve a better seal when changing the valve seat and valve block, we recommend lapping the seat and the block with a fine abrasive paste.

Replacing the valve plug

The procedure is identical to that described for models of normal construction; however, please note:

To avoid damage in the models with metal bellows (the version with extension bonnel does not have a bellows), take care that no torque is applied to the bellows when unscrewing the valve plug and screwing it back in. We recommend applying an opposing torque to the valve stem.

Replacing the seat
Exactly as described in item 4.2 above.

5.3. Replacing the bellows

1. Loosen the upper part of the valve by opening the body nuts (19) between the body and the bonnel of the valve.
2. Lift the upper part of the valve out of the body, along with the bellows (25), upper bonnel (2C), valve stem and valve plug. Disconnect the actuator stem from the valve stem. Remove the control cage (6) and if present remove the throttle cage I (7) and the throttle cage II (8).
3. Loosen the gasket on the upper bonnel cover. Unfasten the connecting nuts (33) on the bellows, and take off the upper bonnel (2C).
4. Unscrew the fastening nut (29) from the upper part of the bellows (27).
5. Withdraw the bellows (27) from the bellows bonnel, along with the valve stem.
6. Dismantle the valve plug (4a; 4b) from the bellows as described in item 5.2.
7. Clean the surfaces of the gaskets on the connecting piece.
8. Screw the valve plug back onto the new valve stem with bellows as described and dowel in place.
9. WARNING

   Take great care that no torque is applied to the bellows when unscrewing the valve plug and screwing it back in.
10. Fit a new bellows gasket (26) and insert the bellows from below into the bellows bonnel. Replace the securing nut (27) and tighten it. Fit a new body gasket (29), replace the upper bonnel gasket, and fasten it to the bellows bonnel (23) using the connecting nuts (31).
11. Pre-tension the stuffing box by tightening the nuts (16) on the lantern ring (14).
12. Fit a new gasket (8) and a new valve seat (5). Replace the clamping cage or perforated cage on the seat.
13. Re-assemble the valve as when changing the valve plug, see 4.2 above (items 7-9).

6. PNEUMATIC P/R DRIVE

(For drawing numbers, see BR11 manual)

When the pressure rises in the actuator pressure chamber, a force is applied to the diaphragm in the actuator unit. If this force exceeds the spring force of the springs in the second chamber, the springs are compressed and the actuator stem starts to travel out or in, according to the function. If the pressure continues to increase, once the maximum spring force is reached the springs will be pressed against the end-stop and the actuator will stop. Thus, a single actuating pneumatic drive can reach a defined position in proportion to the air pressure. The size of the drive is based on the cm^2 surface of the diaphragm.

Drive size	Stroke	Spring range (kPa)													
		1		2		3		4		5		6		7	
		20 – 100		40 – 200		40 – 120		80 – 240		60 – 140		120 – 280		180 - 380	
		How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)
250	20	3	-	6	-	3	-	6	-	3	6	6	6	-	-
400	20	3	-	6	-	3	-	6	-	3	6	6	6	-	-
630	38	3	-	6	-	3	10	6	10	3	10+10	6	10+10	12	10+10
1000	38	3	-	6	-	3	9,5	6	9,5	3	9,5+ 9,5	6	9,5+ 9,5	12	9,5+ 9,5
	50	3	-	6	-	3	12,5	6	12,5	3	12,5+ 12,5	6	12,5+ 12,5	12	12,5+ 12,5
	63	3	-	6	-	3	16	6	16	3	16+16	6	16+16	12	16+16

Spring range and drive sizes for pneumatic drives of type P/R

P type drive: Single acting diaphragm actuator.
Safe position NO (open on loss of pressure)
When pressure rises in the upper chamber, the actuator stem travels out.

R type drive: Single acting diaphragm actuator.
Safe position NC (closed on loss of pressure)
When pressure rises in the lower chamber, the actuator stem travels in.

6.1. Changing the operating mode of the drive

No additional components are required in order to alter the direction of operation of type P/R pneumatic actuator.

Changing P to R and vice versa

1. Disconnect the valve from the actuator.
2. Ensure that no air pressure is applied to the actuator.
3. Remove the top cover of the actuator, taking care that the tensioning nuts (long nuts) (82) are unscrewed to the ends – in accordance with the notes on the warning label,

   The further steps in the procedure depend on the current operating mode of the actuator before it is changed.

To change the actuator function from P to R, proceed as follows:

4. Undo the special nuts (34) from the bolts on the actuator.
5. Remove the diaphragm with its diaphragm plate, spacer ring, washer and spacer cover (or spacer covers for drive sizes 630 and 1000).
6. Remove the springs (31) from the lower cover.
7. Turn the diaphragm together with all the parts as listed above through 180 degrees, and fit the diaphragm back over the actuator stem.
8. Screw the special nuts (34) on to the actuator bolts, thus compressing the whole of the above group of components.
9. Place the springs on the diaphragm plate so that they fit in the guide cut-outs and their ends are aligned with the axis of the bolts.
10. Place the top cover over the springs and initially tighten the tensioning nuts (82).
11. Compress the springs evenly until the upper part of the drive end-stop is pressed against the lower part, then insert the rest of the bolts and screw on the nuts.

To change the drive function from R to P, proceed as follows:

4. Remove the springs (31) from the diaphragm plate (28).
5. Undo the special nuts (34) from the bolts on the actuator.
6. Remove the diaphragm with its diaphragm plate, spacer ring, washer and spacer cover (or spacer covers for drive sizes 630 and 1000).
7. Place the springs in the designated locations in the lower cover.
8. Turn the diaphragm together with all the parts as listed above through 180 degrees, and fit the diaphragm back over the drive bolts, so that the 6 mm diameter opening on the base and the nut on the edge of the diaphragm plate are axially aligned with one of the openings on the edge of the diaphragm.
9. Screw the special nuts (34) on to the actuator stem, thus compressing the whole of the above group of components.
10. Place the springs on the diaphragm plate (28) so that they fit in the guide cut-outs. To check that the springs are in the correct position, rotate the diaphragm (to the position of the notch on the nut at the edge of the diaphragm plate) until the 6 mm opening on the base is visible. By sighting through the opening, check that there is a spring in place on the underside.
11. Place the top cover over the springs and initially tighten the tensioning nuts (82).
12. Compress the springs evenly until the upper part of the drive end-stop is pressed against the lower part, then insert the rest of the bolts and screw on the nuts.

6.2. Changing the diaphragm

Should it be necessary to change a diaphragm, the actuator should be dismantled as described in item 6.1. Instead of putting the actuator back together in reverse order, it should simply be re-assembled in its original order after changing the diaphragm.

7. PNEUMATIC TYPE P1/R1 DRIVE

When the pressure rises in the actuator pressure chamber, a force is applied to the diaphragm in the actuator unit. If this force exceeds the spring force of the springs in the second chamber, the springs are compressed and the drive stem starts to travel out or in, according to the function. If the pressure continues to increase, once the maximum spring force is reached the springs will be pressed against the end-stop and the drive will halt. Thus, single acting pneumatic actuator can reach a defined position in proportion to the air pressure.
The size of the drive is based on the cm^2 surface of the diaphragm.

Drive size	Stroke	Spring range (kPa)													
		1		2		3		4		5		6		7	
		20 – 100		40 – 200		40 – 120		80 – 240		60 – 140		120 – 280		180 - 380	
		How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)	How many springs	total compression (mm)
400	20	3	-	6	-	3	5	6	5	3	5+5	6	5+5	-	-
630	20	3	-	6	-	3	5	6	5	3	5+5	6	5+5	12	5+5
	38	3	-	6	-	3	9,5	6	9,5	3	9,5+9,5	6	9,5+9,5	12	9,5+9,5
1000	38	3	-	6	-	3	9,5	6	9,5	3	9,5+9,5	6	9,5+9,5	12	9,5+9,5
	50	3	-	6	-	3	12,5	6	12,5	3	12,5+12,5	6	12,5+12,5	12	12,5+12,5
	63	3	-	6	-	3	15,5	6	15,5	3	15,5+15,5	6	15,5+15,5	12	15,5+15,5
1500	38	3	-	6	-	3	9,5	6	9,5	3	9,5+9,5	6	9,5+9,5	12	9,5+9,5
	50	3	-	6	-	3	12,5	6	12,5	3	12,5+12,5	6	12,5+12,5	12	12,5+12,5
	63	3	-	6	-	3	15,5	6	15,5	3	15,5+15,5	6	15,5+15,5	12	15,5+15,5
	80	3	-	6	-	3	9,5	6	9,5	3	9,5+9,5	6	9,5+9,5	12	9,5+9,5

Spring range and actuator sizes for pneumatic actuators of type P1/R1

P1 type drive: Single diaphragm actuator.
Safe position NO (open on loss of pressure)
When pressure rises in the upper chamber, the drive stem travels out.

R1 type drive: Single diaphragm actuator.
Safe position NC (closed on loss of pressure)
When pressure rises in the lower chamber, the drive stem travels in.

7.1. Changing the operating mode of the actuator

1. No additional components are required in order to alter the direction of operation of type P1/R1 pneumatic actuator.
2. Disconnect the valve stem from the actuator stem.
3. Remove the top cover of the actuator (44), taking care that the tension lock is loosened right to the end in accordance with the note on the warning label.

The further steps in the procedure depend on the current operating mode of the drive before it is changed.

To change the drive function from P1 to R1, proceed as follows:

4. Loosen the thin nut (53) on the actuator stem.
5. Remove the diaphragm (55) with its diaphragm plate (45), spacer ring (47), washer (50) and cover (or spacer covers for drive sizes 630 and 1000) (48/49); take care, the stem must be secured before it can fall out of the sealing gland system.
6. Remove the springs from the lower casing.
7. Turn the diaphragm together with all the parts as listed above through 180 degrees, and fit them over the actuator stem in reverse order to that in which they were taken off.
8. Screw the thin nut onto the actuator stem so as to press all the above components together.
9. Place the springs in the cut-outs provided for the purpose on the diaphragm plate, so that they are evenly distributed around the axis of the stem.
10. Place the top cover of the actuator on the springs and compress the springs evenly. First tighten the tensioning nuts (remembering to insert the warning notice), until the upper drive cover is screwed firmly against the lower actuator cover. Then insert the rest of the bolts and screw on the respective nuts.

To change the drive function from R1 to P1, proceed as follows:

11. Remove the springs from the diaphragm plate.
12. Loosen the thin nut (53) on the drive stem.
13. Remove the diaphragm (55) with its diaphragm plate (45), spacer ring (47), washer (50) and cover (or spacer covers for drive sizes 630 and 1000) (48/49); take care, the stem must be secured before it can fall out of the sealing gland system.
14. Place the springs (54) in the places provided in the lower cover of the actuator (43).
15. Turn the diaphragm together with all the parts as listed above through 180 degrees, and fit them on the actuator stem so that the 6 mm diameter opening on the base and the nut on the edge of the diaphragm plate (45) lie in the axis of one of the openings on the circumference of the diaphragm.
16. Arrange the diaphragm system on the springs so that the springs are located in the corresponding cut-outs in the diaphragm plate. To check that the springs are in the correct position, gently rotate the diaphragm (to the position of the notch on the nut at the edge of the diaphragm plate) until the 6 mm opening on the base (45) is visible. By sighting through the opening, check that there is a spring in place on the underside.
17. Screw the thin nut (53) on to the actuator stem so that all the above components are pressed together.
18. Place the upper cover of the valve on the front of the stem and compress the springs evenly. First tighten the tensioning nuts (long nuts) (remember to insert the warning notice!), until the upper actuator cover is firmly screwed against the lower drive cover. Then insert the rest of the bolts and screw on the respective nuts.

7.2 Changing the control air range (spring range) for pneumatic actuator type P1/R1

The construction of the positioning drive permits the use of different control air ranges; this is achieved by applying different numbers of springs, or altering their pre-tensioning by fitting spacers:

5.0 mm – 2 off (for 20 mm hub),

9.5 mm – 2 off (for 38 and 80 mm hubs),

12.5 mm – 2 off (for 50 mm hub),

15.5 mm – 2 off (for 63 mm hub) – for drive sizes 1000 and 1500.

For the nominal range, the elements are mounted on the actuator stem on the inside of the diaphragm plate. Additional tensioning of the springs is achieved by fitting either one or two spacers to the outer side of the diaphragm plate, depending on the desired range.

The change in pre-tensioning is achieved by altering the position using the following spacers: 5 mm for the 20 mm hub; 9.5 mm for the 38 and 80 mm hubs; 12.5 mm for the 50 mm hub, and 15.5 mm for the 63 mm hub. Additional 4.5 mm thick spring plates are used for the 80 mm hub.

The number of components is given in Table 1, and the way in which they are fitted is shown in the overall layout drawing for positioning drives.

8. OTHER ACTUATORS

It is possible to equip model BR12b valves with electrical actuator. Sizing the actuator to the regulator valve is normally a part of the bidding process.
It is also possible to supply model BR12b valves with a purely manual operation (type NN), or to fit the pneumatic actuator with an additional hand-wheel (type P/R-N).
(See the following diagrams)

9. DRAWINGS / SPARE PARTS LIST

Number and description of parts.

No.	Description
Individual valve components	
1a/1b	Body
2a	Standard bonnet
2b	Extension bonnet
2c	Upper bellows bonnet
3	Stem
4a	Piston plug
4b	Piston plug pressure balanced
5	Valve seat
6	Control cage
7	Throttle cage I
8	Throttle cage II
9	Body sealing
10	Seat sealing
11	Control cage sealing
12	Guiding nut
13	Blind plugs
14	Securing nut
15	Pressure sleeve
16	Thrust lever
17	Double-nut bolt
18	Nut
19	Thin nut
20	Double-nut bolt
21	Body nut
22	Pin
23	Nameplate
24	Rivet pin

No.	Description
Individual components of positioning drive	
40	Pressure sleeve (TA air)
41	Leaf spring (TA air)
42	Pressure plate (TA air)
43	Double-nut bolt (TA-Luft)
44	Spring
45	Sealing nut ballanced plug
46	Support ring ballanced plug
47	Sealing ring ballanced plug
48	Castet yoke
49	Drive cover down
50	Drive cover up
51	Diaphragm plate
52	Actuator stem
53	Spacer ring
54	Spacer sleeve
55	Pretension bush
56	Washer
57	Support ring
58	Tensioning nut
59	Securing nut
60	Actuator spring
61	Diaphragm
62	Indicator fixing
63	Stroke indicator
64	Nameplate
65	Nameplate
66	Nameplate

No.	Description
82	O-ring
83	Z wiper ring
84	O-ring
85	Nut
86a	Shaft connecting piece, upper, P1/R1 630
86b	Shaft connecting piece, upper, P1/R1 1000; 1500
87a	Shaft connecting piece, lower, P1/R1 630
87b	Shaft connecting piece, upper, P1/R1 1000; 1500
88a	Connecting sleeve P1/R1-630
88b	Connecting sleeve P1/R1 1000; 1500
89	Grub screw
90	Drive bolt
91	Drive wheel
92	Support nut
93	Pivot lever
94	Drive joint
95	Lever axle
96	Pivot pins
97	Spindle nut
98	Drive cover
99	Longitudinal journal bearing
100	Slot dowel
101	Support ring (P1/R1B-400;630)
102	Circlip
103	Circlip
104	Circlip
105	Nut
106	Washer
107	Connecting piece (for electrical positioning motors)

25	Lower bellow bonnet
26	Spacer ring
27	Bellow
28	Bellow sealing
29	Nut
30	Securing washer
31	Bellow sealing
32	Double-nut bolt
33	Nut
34	Support ring
35	Sealpacking
36	Spacer sleeve (TA air)
37	Seal packing (TA air)
38	Spacer sleeve (TA air)
39	Stuffing box (TA air)

67	Stroke indicator
68	Guiding bush
69	Braesing plug
70	Guiding ring
71	Rivet pin 3x6
72	Bolt
73	Bolt
74	Bolt
75	Bolt
76	Fixing nut
77	Nut
78	Washer
79	O-ring
80	Washer ring
81	Circlip

Individual components of type 20 drive	
108	Actuator yoke
109	Drive wheel
110	Drive sleeve
111	Drive cover
112	Drive shaft
113	Slot
114	Stroke plate
115	Ball bearing
116	Oiler
117	Indicator
118	Slot dowel
119	Shaft bolt

Figure 1: Regulator valve type Br12b with pneumatic drive type P1/R1 and side-mounted hand-wheel (cross-section)

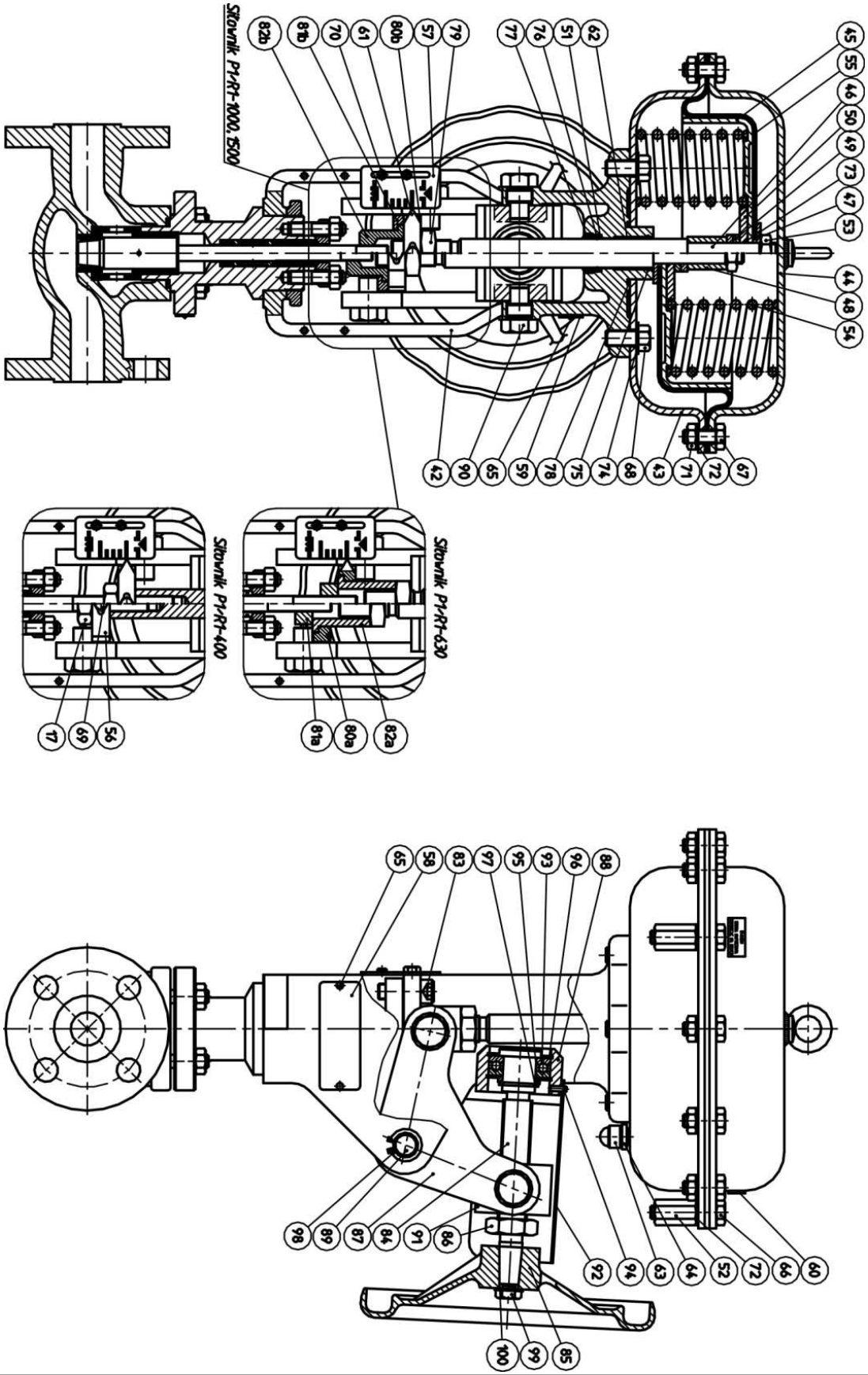


Figure 2: Different models of control valve type BR12b

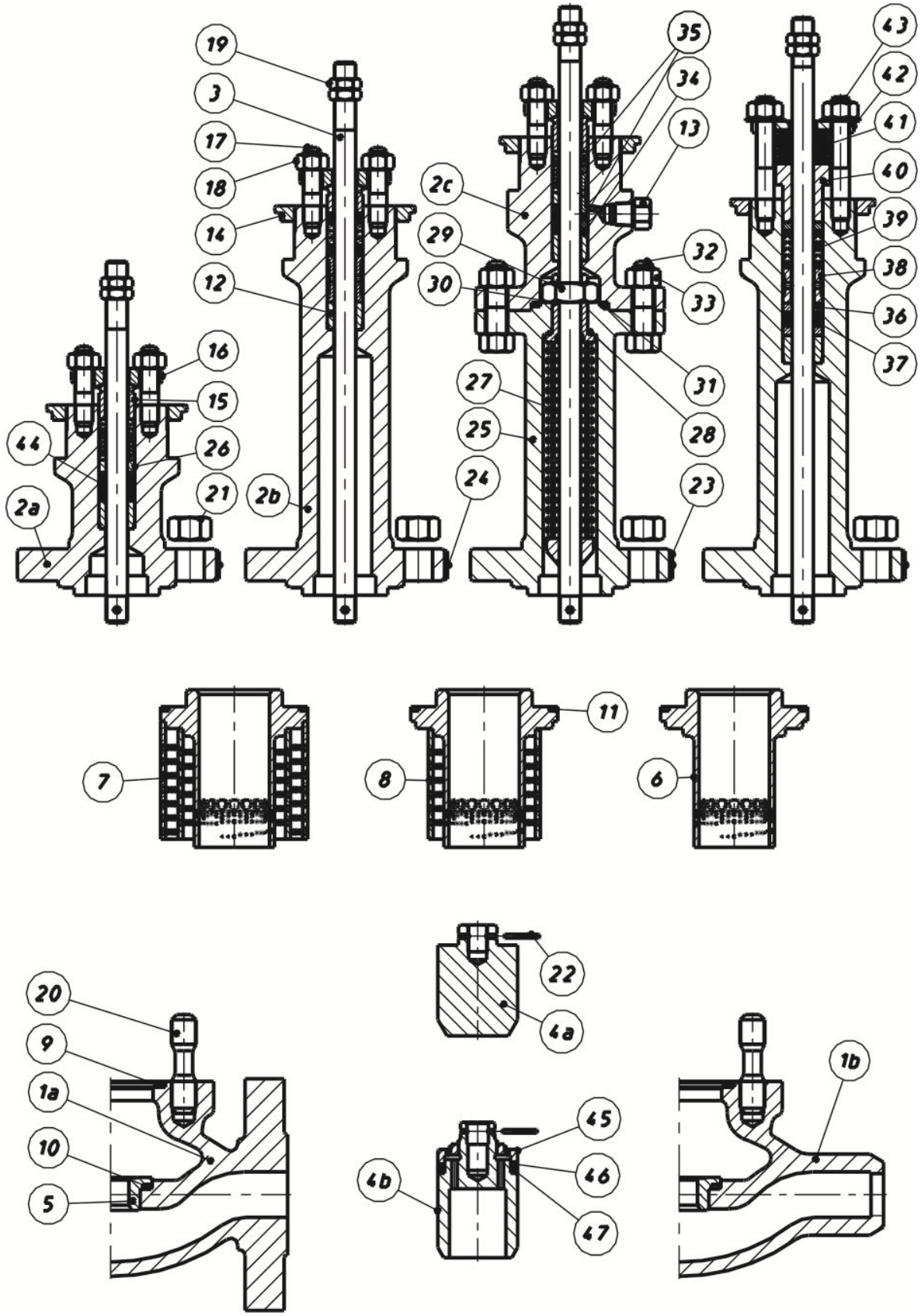
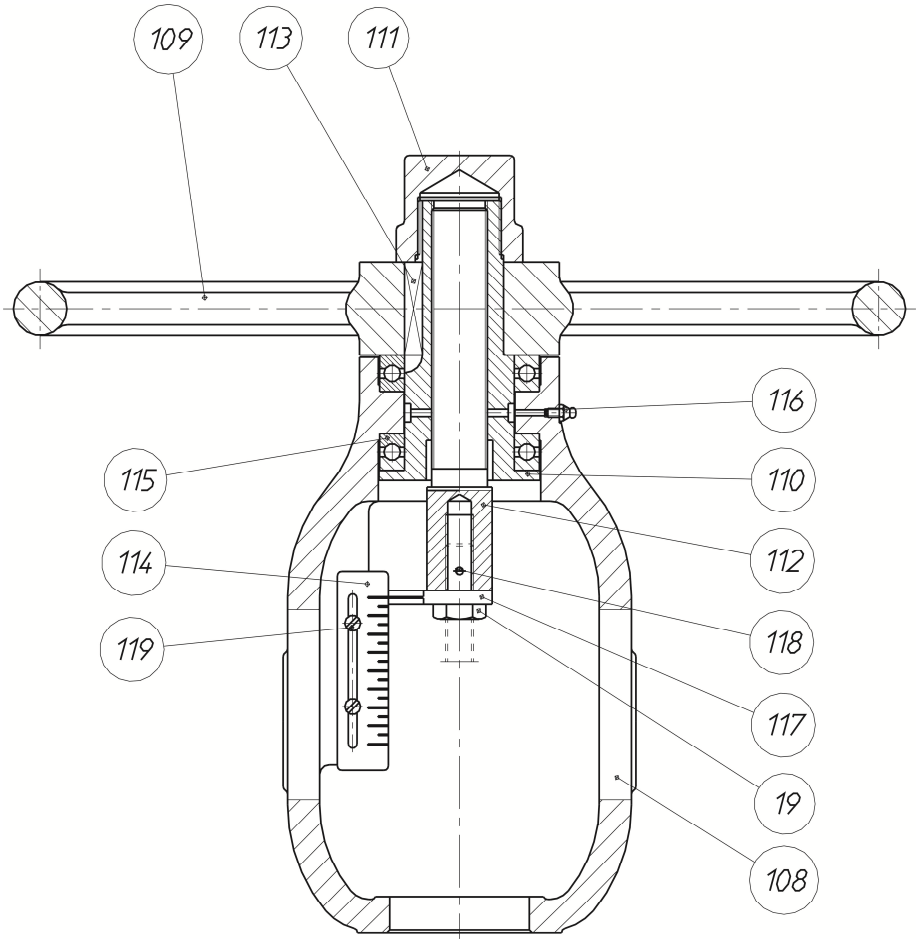


Figure 3: Pneumatic positioning actuator with manual handwheel, type P/R-N



10. Contacting us

Details / specific information (Operating instructions with spare parts lists) are available for download on our website.

PRE-VENT GmbH
Sales - Production - Servicing

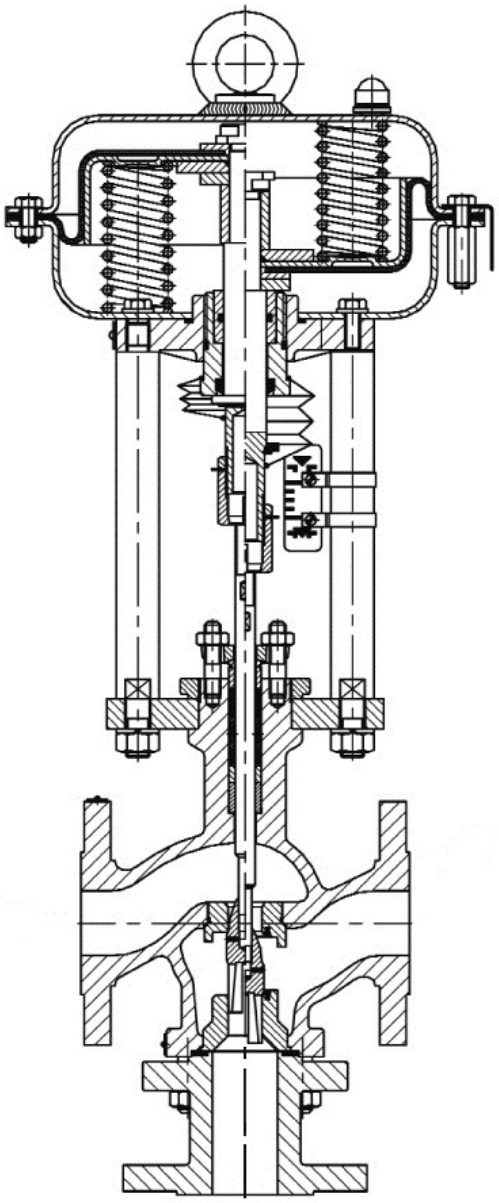
Gewerbepark Lindach A9
84489 Burghausen, Germany

Tel: +49 8677 98788-0
Fax: +49 8677 98788-80

Email: office.pre-vent@fiwagroup.com
Web: www.pre-vent.com

Manual Version 1.1 31.08.2012

BR13 Instruction Manual



Contents: Page

To ensure trouble-free and safe operation of the valve, it is essential to be familiar with the contents of this BR13 Instruction Manual, and also with the general instructions for installation and operation, before installing and operating the valve.

Failure to observe or comply with these operating instructions will invalidate the manufacturer's guarantee and liability. The manufacturer's general conditions of sales and terms of delivery shall apply unless otherwise stated.

1. FUNCTIONAL PRINCIPLE

The valve regulates mass-flow by a linear movement of the valve spindle, which may be operated pneumatically, electrically or manually. As the stroke of the valve alters, the circular gap between the valve seat and the valve block is increased or reduced. This directly influences the amount of fluid flowing through the valve.

2. INSTALLATION

The valve may be mounted in any position; however, for valves of DN 80 size and above, vertical installation with the drive mounted above is preferred. For valves with extended construction, bellows, or drives weighing more than 50 kg, a suitable support or suspension mounting should be provided for the drive, otherwise its own weight might cause wear and leakage at the seals.

3. OPERATING CONDITIONS

Regulator valves should be operated under conditions that take into account the size and nature of the construction and the type of material. To ensure trouble-free operation over the whole operational lifetime, the regulator valve and its accessories should be regularly inspected and maintained.

Normal operating conditions:

a) With pneumatic positioning drive
Ambient temperature from - 25 to + 80℃, with silicone diaphragm of -40 °C to +80 °C
Relative humidity up to 98 %,
The control and feed air supplies must contain no mechanical impurities, oil or corrosive substances, copper or aluminium alloys, and must be dehumidified such that the dew-point corresponds to a temperature that is at least 10 ℃ lower than the operating temperature of the p osition controller and the positioning drive.

b) With electrical positioning drive
In accordance with the manufacturer's instructions.

c) With hand-operated drives of type NN
Ambient temperature from - 25 to + 80℃
Relative humidity up to 98 %.

4. OPERABILITY, MAINTENANCE AND REPAIR - STANDARD CONSTRUCTION

The operability of the regulator valve during use is based on maintaining an appropriate flow characteristic and not exceeding the permitted leakage level for the valve.

To ensure long-term correct and safe operation of the valve, it is essential to carry out regular recorded inspections. Valves that operate continuously should be checked at least every 6 months. Valves that operate discontinuously should be checked at least every 12 months.
If it is necessary to carry out maintenance or repair work on the regulator valve, it should be carried out as follows:

4.1. Gland packing

A key criterion for operability is external seal-tightness, which is provided by the gland packing.

The gland packing to be used is normally pre-specified based on the operating conditions.
With normal gland packing, the tightness of the seal is achieved by tightening the sealing nut.

WARNING:
When the valve is supplied, the sealing nut is only hand-tightened. Before putting the valve into service, it is essential to tighten the sealing sufficiently to achieve an adequate contact pressure, thus ensuring a secure external seal, but without blocking the valve spindle.

If self-adjusting sealing glands are used, the constant contact pressure is provided by a stainless steel spring. For this reason, the sealing nut should be screwed in up to the stop.

To change the gland packing, proceed as follows:

Before changing the gland packing, ensure that the valve is not under pressure and is not contaminated.

1. Disconnect the connection between valve and drive. in valves with air-operated or hand-operated actuators, by undoing connecting nut (32) after loosening low (counter) nut (34)
2. undo nut (13) fastening actuator or hand-operation and disconnect it from the valve
3. undo and remove from valve stem the interlocking nut (33) and the connecting nut (32)
4. Loosen sealing packings in the packing-chamber by loosen the nut (11) on the threaded bolts (10), the packing gland (12) or the gland plate (18) by the TA Luft version.
5. Loosen the nut (11) at the 3-way-bottom-flange (10) and remove the flange essay and the body gasket .
6. remove fitted seat (4.2)
7. pull out head and stem (5) set from packing-chamber of the valve body and remove it
8. loosen the nut (11) the packing gland (12) or packing plate (18) and packing gland or plate
9. Remove the pilot sleeve (14) and the packing (8,15) with suitable tools and clean the packing chamber.
10. Put in the stem (5) with plug into the valve
11. Install carfully the new packing. Observe the correct placement. (in reversed order as removed)
12. Install the pilot sleeve (14) and tight it.
13. Install fitted seat (4.2) new gasket (7) and the flange essay (2) and tight it about the nuts (11).
14. Interlocking nut (33) and connecting nut (32) back on to the stem.
15. Replace caferully the drive and connect him in reverse order as by disassembling

4.2. Replacement of the valve seat and the valve plug

If it is necessary to change the valve seat and valve block due to a change in the operating conditions or due to wear and tear, proceed as follows:

Before making the change, ensure that the valve is not under pressure and is not contaminated.

In order to achieve a better seal when changing the valve seat and valve block, we recommend lapping the seat and the block with a fine abrasive paste.

Replacing the double plug

1. Disassembling the valve as described in point 4.1 (changing packing gland) (point 1 until 7).
2. Knock out the pin (17) and unscrew the plug, screw in a new plug, redrill and put in the pin. Please check that the stem has no grooves or other damages.
3. Install the stem (5) with plug into the valve.
4. Tight with the nuts (11) the packing gland or gland plate that the stuffing box seals.
5. Install fitted seat (4.2) new gasket (7) and the flange essay (2) and tight it about the nuts (11).
6. Interlocking nut (33) and connecting nut (32) back on to the stem
7. Replace carefully the drive and connect him in reverse order as by disassembling

Replacing fitted seat (4.2)

1. Disconnect the connection between valve and drive. in valves with air-operated or hand-operated actuators, by undoing connecting nut (32) after loosening low (counter) nut (34)
2. Undo nut (13) fastening actuator or hand-operation and disconnect it from the valve
3. Undo and remove from valve stem the interlocking nut (33) and the connecting nut (32)
4. Loosen sealing packings in the packing-chamber by loosen the nut (11) on the threaded bolts (10), the packing gland (12) or the gland plate (18) by the TA Luft version.

5. Loose the nut (11) at the 3-way-bottom-flange (10) and remove the flange essay and the body gasket.
6. remove fitted seat (4.2)
7. Install new fitted seat (4.2) new gasket (7) and the flange essay (2) and tight it about the nuts (11).
8. Tight with the nuts (11) the packing gland or gland plate that the stuffing box seals.
9. Interlocking nut (33) and connecting nut (32) back on to the stem
10. Replace carefully the drive and connect him in reverse order as by disassembling

Replacing screwed in seat (4.1)

1. Disassembling the valve as described in „replacing fitted seat (4.2) “. Point 1 until 6
2. Remove stem with double plug from the body
3. Screw out anticlockwise the seat (4.1) with suitable seat-tool
4. Clean the new seat or repaired seat, grease them with mounting paste and screw in.
5. Install the stem (5) with plug into the valve.
6. Tight with the nuts (11) the packing gland or gland plate that the stuffing box seals
7. Install fitted seat (4.2) new gasket (7) and the flange essay (2) and tight it about the nuts (11).
8. Interlocking nut (33) and connecting nut (32) back on to the stem
9. Replace carefully the drive and connect him in reverse order as by disassembling

5. PNEUMATIC P/R DRIVE

When the pressure rises in the drive pressure chamber, a force is applied to the membrane in the drive unit. If this force exceeds the spring force of the springs in the second chamber, the springs are compressed and the drive spindle starts to travel out or in, according to the function. If the pressure continues to increase, once the maximum spring force is reached the springs will be pressed against the end-stop and the drive will halt. Thus, a simple pneumatic drive can reach a defined position in proportion to the air pressure.
The size of the drive is based on the cm^2 surface of the membrane.

Drive size	Stroke [mm]	Spring range (kPa)													
		1		2		3		4		5		6		7	
		20 - 100		40 - 200		40 - 120		80 - 240		60 - 140		120 - 280		180 - 380	
		No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]	No. of springs	Total tenstion [mm]
250	20	3	-	6	-	3	-	6	-	3	6	6	6	-	-
400	20	3	-	6	-	3	-	6	-	3	6	6	6	-	-
630	38	3	-	6	-	3	10	6	10	3	10 + 10	6	10 + 10	12	10 + 10
1000	38	3	-	6	-	3	9,5	6	9,5	3	9,5 + 9,5	6	9,5 + 9,5	12	9,5 + 9,5
	50	3	-	6	-	3	12,5	6	12,5	3	12,5 + 12,5	6	12,5 + 12,5	12	12,5 + 12,5
	63	3	-	6	-	3	16	6	16	3	16 + 16	6	16 + 16	12	16 + 16

Spring range and drive sizes for pneumatic drives of type P/R

P type drive: Single membrane drive.
Safe position NO (open on loss of pressure)
When pressure rises in the upper chamber, the drive spindle travels out.

R type drive: Single membrane drive.
Safe position NC (closed on loss of pressure)
When pressure rises in the lower chamber, the drive spindle travels in.

5.1 Changing the operating mode of the drive

No additional components are required in order to alter the direction of operation of type P/R pneumatic drives.

Changing P to R and vice versa

1. Disconnect the valve from the drive.
2. Ensure that no air pressure is applied to the drive.
3. Remove the top cover of the position drive, taking care that the tensioning nuts (long nuts) (82) are unscrewed to the ends – in accordance with the notes on the warning label.

The further steps in the procedure depend on the current operating mode of the drive before it is changed.

To change the drive function from P to R, proceed as follows:

4. Undo the special nuts (34) from the bolts on the positioning drive.
5. Remove the membrane with its membrane plate, spacer ring, washer and spacer cover (or spacer covers for drive sizes 630 and 1000).
6. Remove the springs (31) from the lower casing.
7. Turn the membrane together with all the parts as listed above through 180 degrees, and fit the membrane back over the drive bolts.
8. Screw the special nuts (34) on to the drive bolts, thus compressing the whole of the above group of components.
9. Place the springs on the membrane plate so that they fit in the guide cut-outs and their ends are aligned with the axis of the bolts.
10. Place the top cover over the springs and initially tighten the tensioning nuts (82).
11. Compress the springs evenly until the upper part of the drive end-stop is pressed against the lower part, then insert the rest of the bolts and screw on the nuts.

To change the drive function from R to P, proceed as follows:

4. Remove the springs (31) from the membrane plate (28).
5. Undo the special nuts (34) from the bolts on the positioning drive.
6. Remove the membrane with its membrane plate, spacer ring, washer and spacer cover (or spacer covers for drive sizes 630 and 1000).
7. Place the springs in the designated locations in the lower cover.
8. Turn the membrane together with all the parts as listed above through 180 degrees, and fit the membrane back over the drive bolts, so that the 6 mm diameter opening on the base and the nut on the edge of the drive membrane plate are axially aligned with one of the openings on the edge of the membrane.
9. Screw the special nuts (34) on to the drive bolts, thus compressing the whole of the above group of components.
10. Place the springs on the membrane plate (28) so that they fit in the guide cut-outs. To check that the springs are in the correct position, rotate the membrane (to the position of the notch on the nut at the edge of the membrane plate) until the 6 mm opening on the base is visible. By sighting through the opening, check that there is a spring in place on the underside.
11. Place the top cover over the springs and initially tighten the tensioning nuts (82).
12. Compress the springs evenly until the upper part of the drive end-stop is pressed against the lower part, then insert the rest of the bolts and screw on the nuts.

5.2 Changing the membrane

Should it be necessary to change a membrane, the drive should be dismantled as described in item 6.1. Instead of putting the drive back together in reverse order, it should simply be re-assembled in its original order after changing the membrane.

6. Other Drives

It is possible to equip model BR13 valves with electrical drives. Sizing the drive to the regulator valve is normally a part of the bidding process.
It is also possible to supply model BR13 valves with a purely manual operation (type NN), or to fit the pneumatic drive with an additional hand-wheel (type P/R-N).

(See the following diagrams)

7. DRAWINGS / SPARE PARTS LISTS

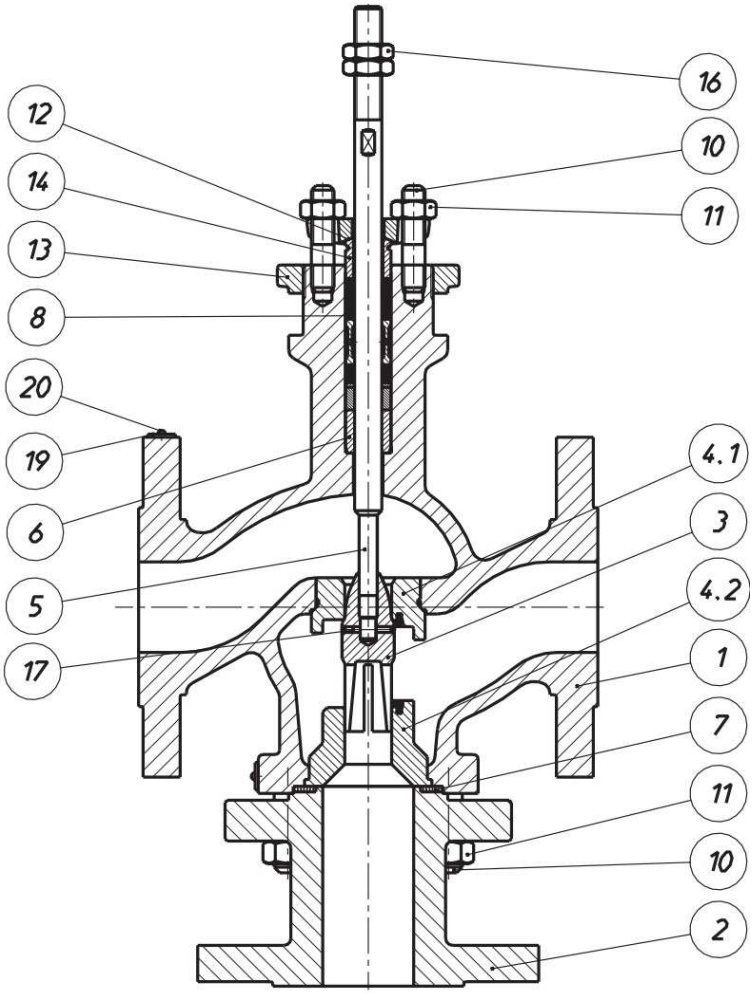


Figure 1a
valve BR13 with standard stuffing box

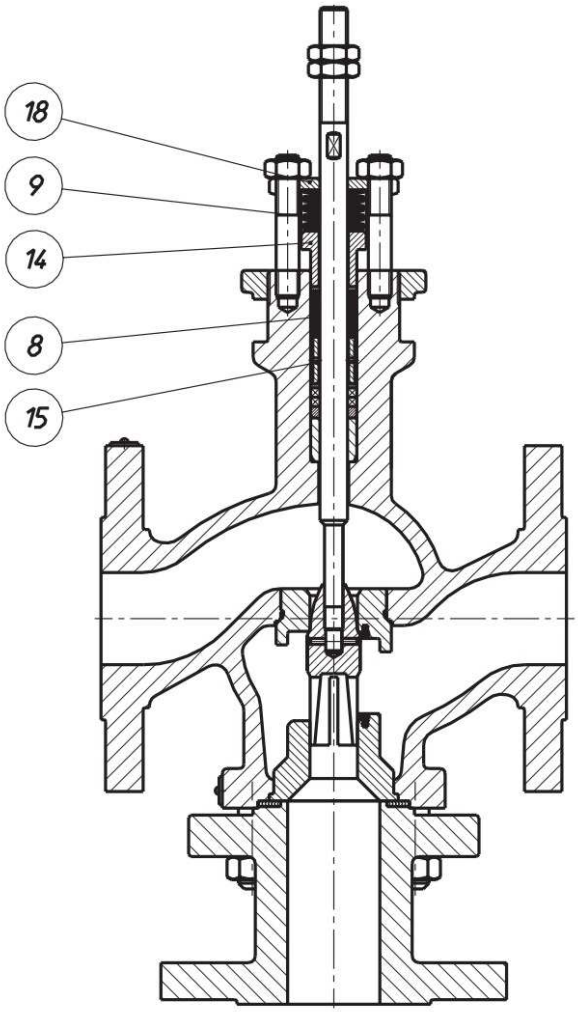


Figure 1b
Valve BR13 with TA-Luft stuffing box

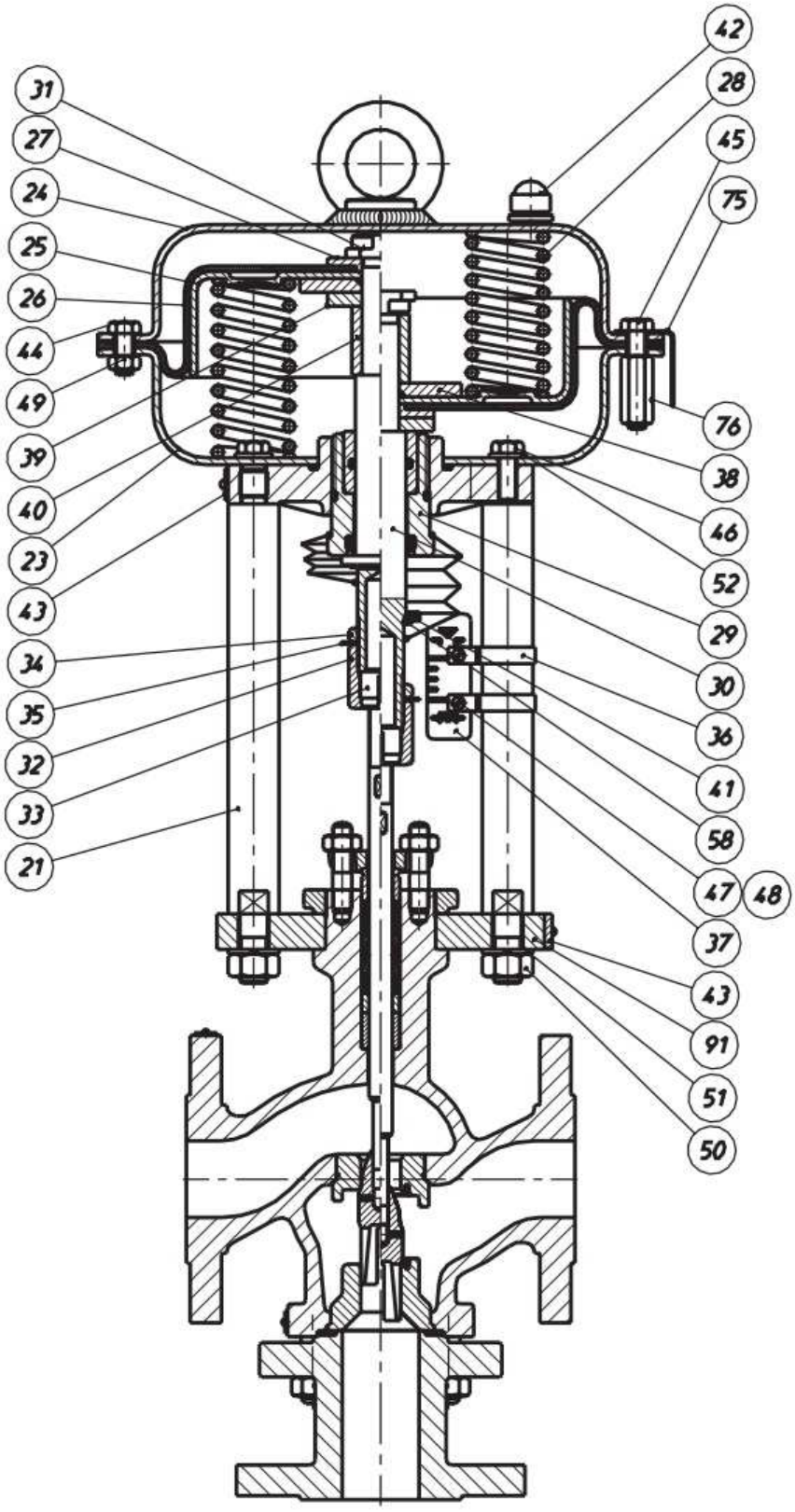


Figure 2a
Valve BR13 with pneumatic drive P/R

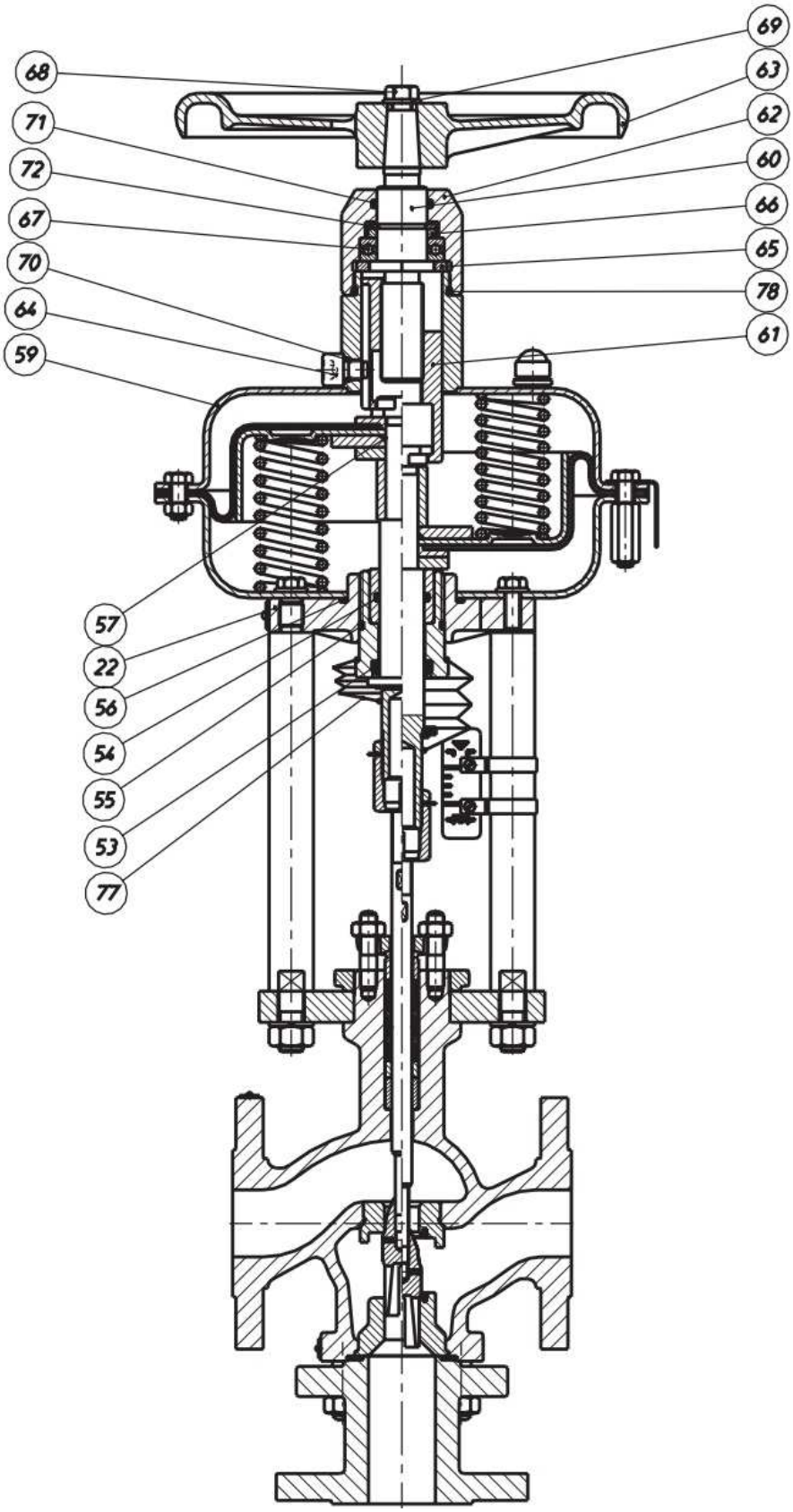


Figure 2b
Valve BR13 with pneumatic drive
PN/RN

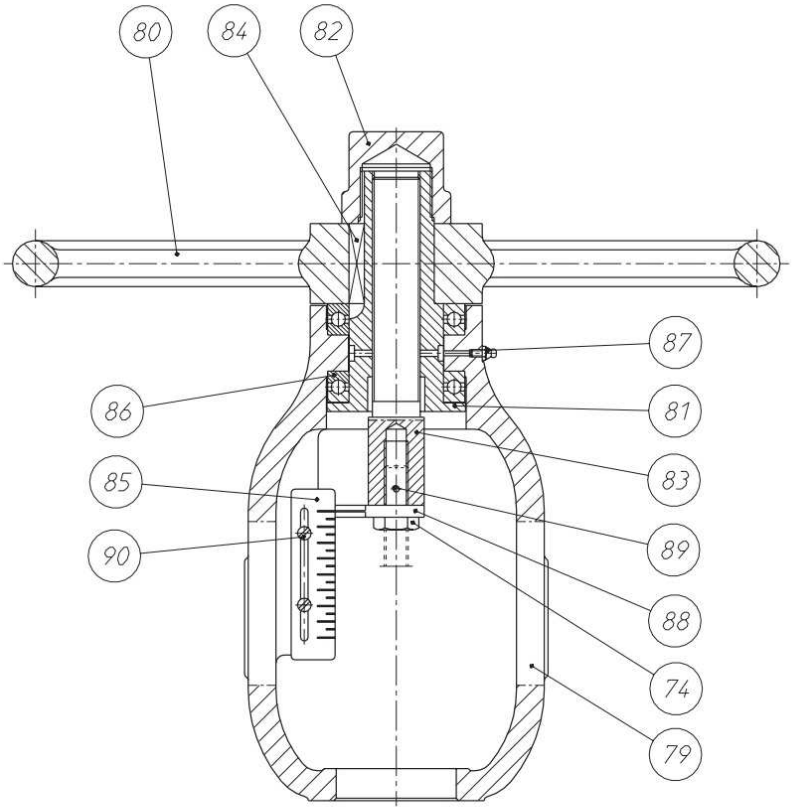


Figure 3a
Handwheel Typ 20

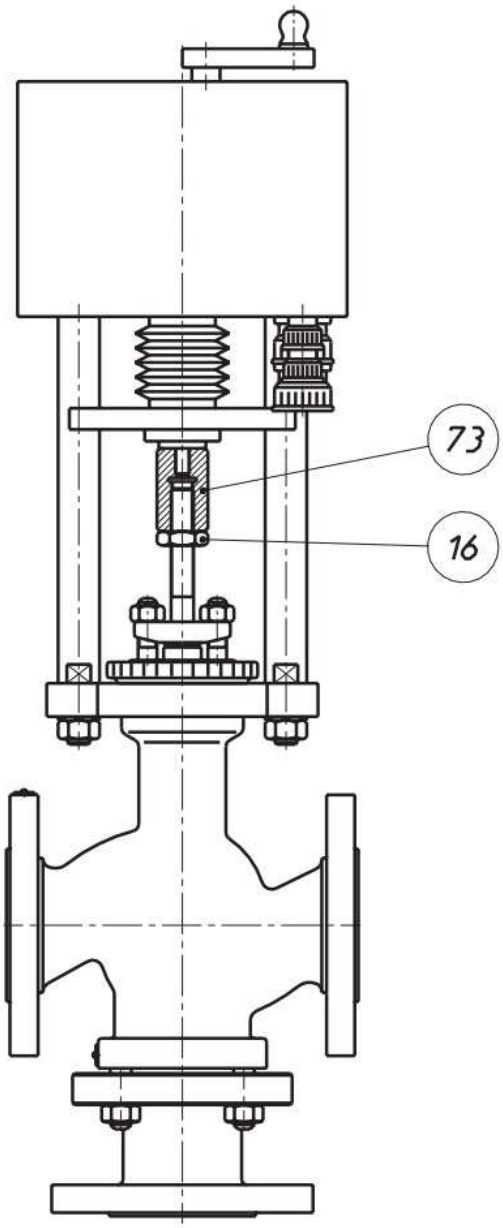


Figure 3b
Valve BR13 with electric drive

	Part name
1	Body
2	Flange essay (3 –way-flange)
3	plug
4.1	Screwed in seat
4.2	Fitted seat
5	stem
6	Guiding sleeve
7	Body gasket
8	Stuffing box
9	spring
10	Bolt
11	Nut
12	Packing gland
13	Fastening nut
14	Pilot sleeve
15	Spacing sleeve
16	Nut (low)
17	Pin
18	Gland plate
19	Nameplate
20	Rivet pin 3x6
21	Column
22	Bracket
23	Bottom housing
24	Top housing (set)
25	Diaphragm plate
26	diaphragm
27	Spacing ring
28	spring
29	Packing-box set
30	Actuator stem
31	Special nut
32	Connecting nut
33	Interlocking nut
34	Low (counter) nut
35	Position indicator
36	Column clamping ring
37	Stroke plate
38	washer
39	washer
40	Spacing sleeve
41	Stopper ring
42	Venting pin
43	Actuator nameplate
44	Bolt
45	bolt
46	bolt
47	screw M4x8
48	nut M4-A
49	Nut
50	nut
51	Spring washer
52	Washing ring
53	Scraping ring

	Part name
54	O-Ring
55	O-Ring
56	O-Ring
57	O-Ring
58	snapring
59	Top housing (set)
60	Drive bolt
61	Driver
62	holder
63	Drive wheel
64	Special bolt
65	washer
66	washer
67	Thrust bearing
68	bolt
69	washer
70	O-Ring
71	O-Ring
72	Snap ring Z
73	Connector
74	
75	Warning plate
76	turnbuckle
77	Stem casing
78	O-Ring
79	Drive yoke
80	Drive wheel
81	Drive sleeve
82	Drive cap
83	Drive stem
84	key
85	Stroke plate
86	Ball bearing
87	Grease nipple
88	indicator
89	Pin with notches
90	screw
91	Connecting plate

9. Contacting us

Details / specific information (Operating instructions with spare parts lists) are available for download on our website.

PRE-VENT GmbH
Sales - Production - Servicing

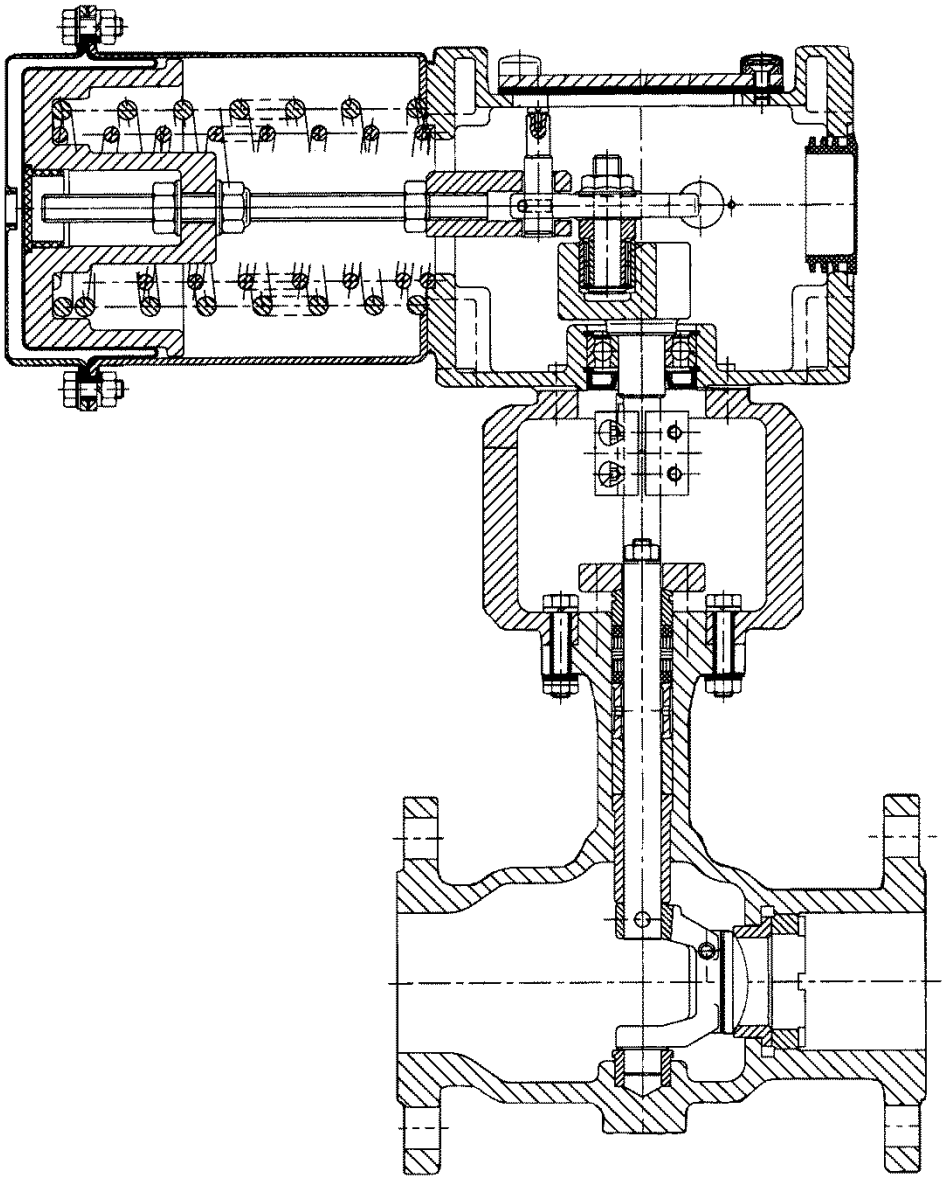
Gewerbepark Lindach A9
84489 Burghausen, Germany

fon +49 8677 98788-0
fax +49 8677 98788-80

Email: office.pre-vent@fiwagroup.com
Web: www.pre-vent.com

Manual version 1.1 08.07.2013

BR33 Instruction Manual



with rotary actuator BR99-1-NT BR99-2-NT / BR99-3-NT

Contents: Page

To ensure trouble-free and safe operation of the valve, it is essential to be familiar with the contents of this BR33 Instruction Manual, and also with the general instructions for installation and operation, before installing and operating the valve.

Failure to observe or comply with these operating instructions will invalidate the manufacturer's guarantee and liability. The manufacturer's general conditions of sales and terms of delivery shall apply unless otherwise stated.

The valve must be installed and commissioned by qualified staff. Qualified staff is defined as personnel who are familiar with the installation, commissioning and operation of this product and possess the relevant qualifications in their field of activity

These installation and operating instruction shall apply to:

- Rotary plug valves Series 33
- Diameter DN 25 – DN 300, DN 1“ – DN 12““
- pressure class PN 10-PN 63, ANSI 150# - ANSI 600#
- with mounted pneumatic or electric rotary actuator
- with or without accessories

Control valves control gases, vapours or liquids and change the flow conditions of a process.

The control valve consists of the body (valve bottom) and actuator which, depending on the control signal, changes the position of the closure member (plug) relative to the seat.

The bodies have been arranged in logical kits, allowing the user to assemble the highest possible number of variants from a minimum of components to match each individual application. Our range also includes a series of peripheral units such as positioners, boosters, filter reducing stations or solenoid valves. Positioners and solenoid valves can be assembled according to NAMUR recommendations. This manual does not include any instructions for peripheral equipment. However, the relevant instructions are available upon request.

Control valves are generally delivered as tested and assembled units with the actuator fitted. Parts of the body and actuator subject to corrosion are protected by a coat of paint. Unpainted components are greased and the openings of the housings are closed with plugs. High-grade steel parts are delivered without a protective coat of paint (pickled or blasted). Careful loading and transport arrangements are required to avoid the product tram suffering impact and jolting movements. Do not allow lifting gear to hit or be attached to the valve spindle, travel indicator and peripheral units, if applicable. Promptly touch up any damages to the corrosion protection. Upon arrival on site, store the control valve on a solid base in a closed room. Until its installation, the valve must be protected tram the weather, dirt and other potentially deteriorating influences. Do not remove the plugs protecting the flanges and the inside of the control valve until it has arrived at the place of installation.

The pressure, leak and operation tests performed in the factory and the quality management system introduced by the manufacturer ensure that the execution of the control valve complies with the specifications set forth in the contract. The series number and vital valve actuator data are found on the rating plate.

! Before installing the valve, carefully clean the piping.

1. Before installation, check the following items:

Please note the mentioned data for min./max. values in pressure and temperature on the CE-plate ! A mismatch may cause considerable damage to the control valve. The manufacturer refuses any responsibility for such damages !

Does the nominal/operation data on the rating plate match the operational data of the facility.

A mismatch may cause considerable damage to the control valve. The manufacturer refuses any responsibility for such damages !

At the point of installation, is there enough space to fit and remove the valve?

The purification of fully assembled pipes made by flushing or purging, the control valve must be replaced with a matching piece!

Was the piping flushed and cleaned prior to the installation

Do not allow cleaning agent to penetrate the packing of the stuffing box

Was the piping flushed and cleaned prior to the installation?

Carefully remove all foreign particles!

Vibrations of the piping must be avoided by separate connections at the piping!

Does the direction of the flow arrow on the housing coincide with the direction of flow of the medium?

Is excessive tension in the installation and operation of the control valve avoided?

Corresponds the distance between the pipe ends of the valve length?

Is the preferred installation position of the control valve with vertical valve shaft achieved?

If all of the above items have been verified, the control valve can be inserted and connected to the piping.

If the shaft offset relative to the perpendicular contact customer service department or contract partner!

Flange connection:

Connecting materials (seals, screws, nuts) are not included in the scope of delivery !
If a completely installed piping is to be flushed or blown through for cleaning, replace the control valve with a matching piece !

When the control valve is installed in the piping:

- Connect instrument air to the actuator or installed accessories (applies to pneumatic actuators).

- Connect according to the wiring diagram in the removable actuator cover or according to manufacturer's actuator documentation (applies to electrical actuators).

2. COMMISSIONING

Continuously increase load until operation parameters are reached.

Sudden exposure of the control valve to the fulloperating pressure and operating temperature may cause stress cracks !

After the first loading (trial run) in depressurised and cooled condition, evently tighten screw connections of sealing components crosswise (if required)!

The BR33 can not be installed in any fire-safe piping due to not available certificate !

The BR33 is not suitable for unstable medium.

The ambient temperature should not be higher than 80℃. For higher ambient temperature the valve must be isolated to protect the actuator.

3. MAINTENANCE:

Measure	Intervall
Standard packing system	Readjustment after 10.000 cycles at standard operation conditions Readjustment after 5.000 cycles at “difficult“ operation conditions Standard stuffing boxes subjected to “difficult“ operating conditions -packing exposed to aggresive medium -major temperature change during operation -occurence of vibrations -unfavourable installation position
Selfadjusting packing system	Maintenance free
Pneumatic actuator	Maintenance free
Electrical actuator	On recommandation of the manufacturer

Control valves are pressure vessels !
Improper opening of the actuator or fitting may result in bodily injury

If a fault or defect occurs which, according to the list of measures below, requires the customer services departement or contract partner to be contacted, the manufacturer's guarantee shall be rendered null and void
and the manufacturer released tram any responsibility unless the customer services department or contract partner is duly notified.

Defect	No.	Possible cause	Remedy
Shaft does not move	1.1	No aux. Energy supply (pneumatic air or electrical power) to actuator and accessories (solenoid valve, filter reducing station, positioner, limit switch and special accessories)	Pneumatic actuators: check supply line for leaks; check pressure(usually max. 6 bar) Electrical actuator: check power supply (connections, circuit breakers, voltage).
	1.2	The fitted accessories do not work	See maintenance and operating instruction of access.
	1.3	the pneumatic actuator is defective	Contract customer service department or contract partner
	1.4	the electrical actuator is defective	See maintenance and operating instructions of actuator manufacture
	1.5	Excessive tightening of the stuffing box packing	Contract customer service department or contract partner
	1.6	Valve trim worn, stuck	Contract customer service department or contract partner
Jolting shaft movement	2.1	damaged shaft or damaged bearing	Contract customer service department or contract partner
	2.2	The actuator not powerful enough	Compare actuator specs on the rating plate with operating specifications of the facility – if incompatible, contract customer service department or contract partner
Shaft travel less than full stroke (0 to 100% stroke)	3.1	Air supply pressure to low	Provide air at the pressure stated on the rating plate
	3.2	Pneumatic actuators: bad hand wheel position	Take hand wheel to limit position
	3.3	Electrical actuator: limit switch wrong adjusted	Readjust Limit switch to actuator manufacturer's specification
	3.4	Bad adjusted or defect Positioner	Readjust positioner switch to actuator manufacturer's positioners specification
	3.5	Foreign particles in valve seat, damaged trim	Contract customer service department or contract partner
Excessive valve seat leakage	4.1	Damaged sealing edges at valve seat area	Contract customer service department or contract partner
	4.2	Foreign particles in seat area	Contract customer service department or contract partner
	4.3	Plug does not close fully	see 3.1 to 3.5
Leakage at the stuffing box	5.1	Packing defecte	Cange packing, install only original parts. Contract customer service department or contract partner
Leaking housing	6.1	Medium or flow related damage	Contract customer service department or contract partner
No limit switch signal	7.1	Power supply to limit switch interrupted	check power supply (connections, circuit breakers, voltage).
Vibrating positioner	8.1	Defective positioner	See maintenance and operating instructions of positioner manufacture

All the protective measures appropriate for the medium in question should be taken prior to assembling the valve. The valve should be rinsed thoroughly. Please note that the disassembly procedure also affects parts of the valve which are wetted by the medium, and that vapours may still be emitted by the body or the packing even though the valve has been well rinsed. All parts that are marked in the list with an (*) should be examined carefully for wear before they are reinstalled, and if necessary replaced

3.1 Replacing the seat:

3.1.a) First of all, the threaded retaining ring (8) must be loosened and unscrewed using a seat tool (seat wrenches designed specially for the 33 series are available from PRE-VENT).

3.1.b) The valve seat (6) can then be take out. When you carry out work on the valve seat, you must be careful not to damage either the edge or the face. If the valve seat needs to be reworked, you can find the necessary dimensions on the drawing available from PRE-VENT.

3.1.c) Seat and retaining ring assembly

Attention
When the valve is reinstalled, the seat ring must be centred by placing it on the valve plug (with the valve in the closed position) and screwing it tight with the threaded retaining ring. To do so, insert the seat ring in the valve, adjust the plug to the "valve closed" position and screw the ring tight carefully (by hand). It is a good idea to disassemble the actuator beforehand, and to hold the valve stem in the closed position with your hand, as you will then be able to work more accurately. When the seat ring is "hand-tight", adjust the plug to the open position and tighten the ring firmly.

Note:

A suitable sealing paste can be applied to the face of the seat ring to improve the quality of the seal.

A suitable assembly paste (either copper or nickel-based) should always be used for the threaded retaining ring).

3.2 Dismantling the valve:

3.2.a) Valves DN 25 – 150: The joint between the bridge and the shaft is formed by a DIN 1 tapered pin. You can separate the bridge from the valve shaft by turning the shaft 90° and then knocking out this pin from seat side.

When you reassemble the valve, it is essential to ensure that the bridge and the valve shaft are correctly positioned before you knock the tapered pin back in again. It is not possible to rotate the valve shaft, and thus the actuator, through 180° simply by turning within this joint.

3.2.b) **Valves DN 200 – 300**: Before you can separate the bridge from the valve shaft, you must turn the shaft 180°, so that the plug is on the side of the valve facing away from the seat. You can then knock the tapered pin (20) out carefully from this side using a mandrel. Particular care is essential with ceramic plugs.

When you assemble the valve, you must always knock the tapered pin (20) in from the rear of the bridge. Remember to take account of the key taper of the pin.

3.2.c) The shaft (10) is now free. You can pull it out from above by loosening the nuts (29) and removing the gland (15) and the packing box (16).

3.2.d) You can now also remove the packing rings, the staffing box ring (18) and the distance ring (17) (if any) from above.

Make a note of the type of packing and the order of the packing rings to simplify reassembly!

3.2.e) The bridge (2) and the plug (4) can be levered out of the plug guide (12) (this also causes the shaft guide (13) to be shifted upwards) and removed through the side of the valve facing away from the seat. You can then remove the shaft guide and take the plug guide (12) out of the valve body.

3.2.f) The plug and the plug bridge are only joined together by means of a cylindrical pin (21), which you can remove by knocking it carefully with a mandrel. The plug can easily be reworked by polishing it on a lathe. If any additional reworking is necessary, it is a good idea to use a ball turning attachment; in this case, however, you must make sure that the outside diameter of the seat collar is turned by the same amount as the plug cap (contrary to the reworking drawings).

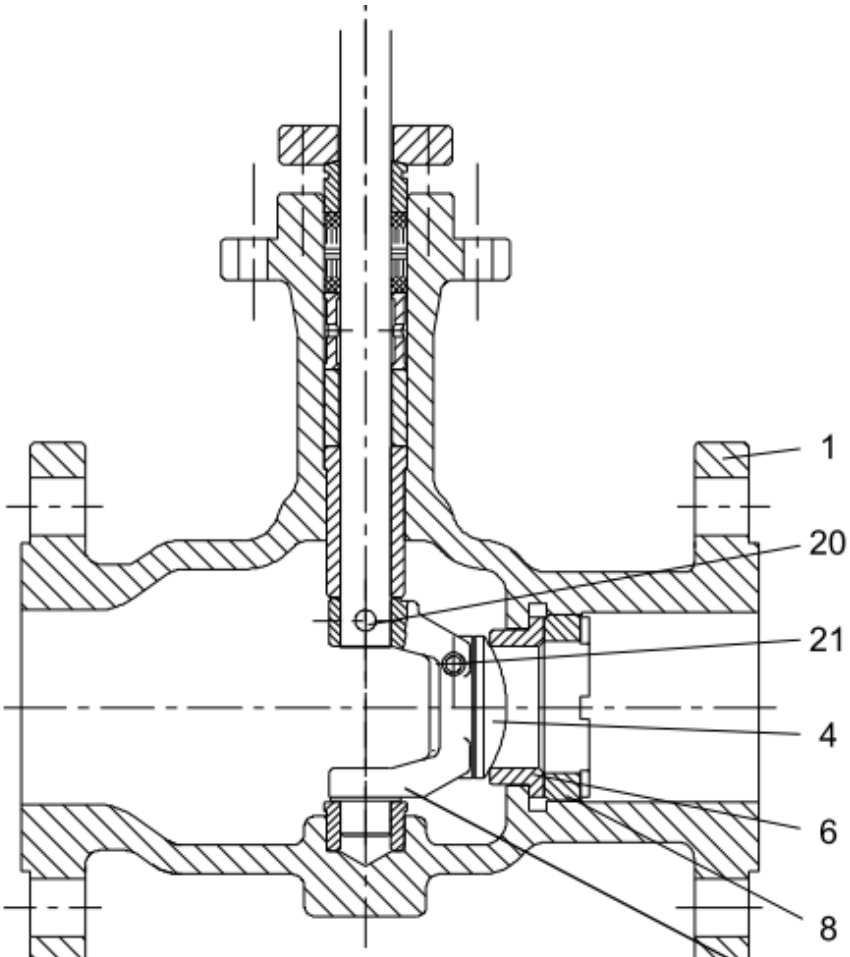
If the plug is reworked excessively, the seat/plug geometry will deviate too much from the ideal (design) geometry; a breakaway torque may develop as a result. It is therefore advisable to install a new seat/plug trim if the old one is severely worn

Part names:

Pos. 4 Plug

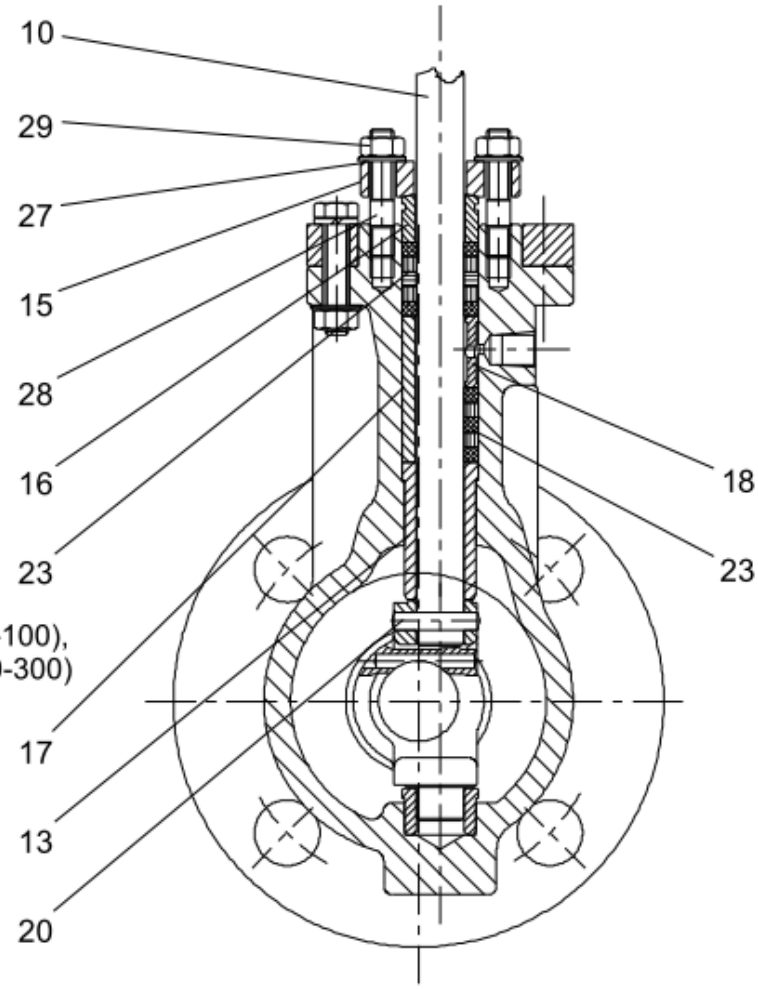
Pos. 6 Seat

Pos. 8 Seat retainer



longitudinal section

| | = recommended Spare Parts



Pos. 1	Valve body
Pos. 2	Arc
Pos. 4	Plug
Pos. 6	Seat ring
Pos. 8	Seat retainer
Pos. 10	Shaft
Pos. 12	Plug bearing
Pos. 13	Shaft bearing
Pos. 15	Packing boy gland
Pos. 16	Packing box ring
Pos. 17	Distance ring
Pos. 18	Packing box ring
Pos. 20	Conical pin (DN 25-100), Wedge pin (DN 200-300)
Pos. 21	Pin
Pos. 23	Packing
Pos. 27	Spring washer
Pos. 28	Packing bolt
Pos. 29	Packing box nuts

| | = recommended spare part

4. Dismantling the actuator generally :

The compressed air supply must be interrupted before the actuator is disassembled.
All parts that are marked in the list as recommendedspare parts should be examined carefully for wear before they are reinstalled, and if necessary replaced!

SEPARATING THE ACTUATOR AND VALVE UNITS

First of all, the nuts and bolts that join the valve body to the actuator yoke must be loosened.You can then disassemble the lock by removing the four fillister-head screws and pulling the featherkey off of the valve shaft and the sliding block. The actuator unit can now be lifted off of the valve.

The actuator should be pretensioned against the spring bias by means of the stop screw (35) before it is assembled on the valve. Once the actuator has been completely assembled on the valve, the screw must then be unscrewed again until the leakage is within the stipulated tolerance. The stop screw must be locked in this position.

DISMANTLING THE ACTUATOR UNIT

a) Any positioners, position repeaters, solenoid valves, etc. that have been mounted should be removed before the valve is disassembled.

b) Now remove the front panel (14). To do so, lever off the caps (45) over the fixing screws (47) using a sharp knife.After you have loosened the slotted screws below them, you can remove the front panel.

5. Dismantling rotary actuator BR99-1-NT [120 cm2]

5.1 Disassembling built-on accessories:

If a limit switch unit is installed, it need only be loosened by unscrewing the two hexagon socket screws and then removed along with the cable terminals

5.2 Disassembling the hand-wheel unit

5.2.a) To dismantle the hand-wheel unit, you must first loosen the clamping lever (103) that locks it in position.

5.2.b) You can then turn the hand-wheel (101) counter clockwise until you feel a resistance.

5.2.c) If you continue unscrewing the hand-wheel, you will reach a washer (151), which you must lever out with a screwdriver in order to disassemble the hand-wheel spindle (150).

5.2.d) The disk wheel (101) is fitted onto the hand-wheel spindle and can be lifted off if the countersunk bolt (102) is removed.

5.3 Separating the spring barrel from the actuator casing

Attention!!!!
The stop screw (35) must sit closely on the spring side. It is essential to maintain the correct order. The diaphragm casing (5) must never be separated if the threaded rod is not joined to the fork head (21) and the actuator lever (2)

risk of accidents due to the spring bias!

5.3.a) After the bolts have been loosened, the diaphragm casing (5) and the diaphragm itself (15) can be removed.The sealing plug which is now visible can be levered out with a fine screwdriver, and the nut underneath it (36) loosened with a socket wrench in order to unload the actuator spring. Hold the diaphragm disk (4) with your hand as you do so, as there might be a (very slight) residual bias when the spring is disassembled.

When you install the diaphragm, make sure that the gummed side rests against the pressure side, in other words the fabric side of the diaphragm must be facing the diaphragm disk. If you install the diaphragm incorrectly, the diaphragm will fail after only a short time in operation.

5.3.b) You can now remove the diaphragm disk and the spring (12), and separate the spring barrel from the actuator casing. To disassemble the eyebolt, remove the grub screw (27) and pull the stoke indicator (19) up out of the actuator lever (2) using suitable pliers. When you reassemble the actuator subsequently, you must not forget the two PVC thrust rings, or corrosion may occur.

5.4 Dismantling the actuator casing

5.4.a) First of all, you should remove the stop screws (35) and the locking nuts (36)..

5.4.b) You must then remove the sealing plugs (63 and 65) before you can disassemble the bearing bolt. The bearing bolt (10) can be loosened by removing the top retaining ring, the shim ring (48) and the setscrew (50), and then pressed out. When you reassemble the casing, you must not forget the flange sleeves, which are vital for operation of the actuator.

5.4.c) The actuator lever (2) can now be removed from the casing, together with the adjustment bolt (8) and the needle bearing (58).Since the actuator function (direction of rotation of the valve) is controlled by the position of the lever, you must either make a note of the position of the adjustment bolt before you replace the needle bearing or mark it to simplify reassembly.

5.4.d) Finally, you can lift the sliding block (3) out of the actuator casing and remove the radial shaft seal (55) carefully with a screwdriver. The bearing (54) can then be knocked out from the inside.

When you assemble the actuator, you must protect the surface of the bearing bore against corrosion with a small amount of grease..

5.5 Reversing the direction of the actuator

To reverse the direction of the actuator (from "air opens" to "air closes"or vice versa):

5.5.a) Disassemble the spring barrel as described in 5.3

5.5.b) Remove the plugs (60 and 61) and refit them again on the opposite side.

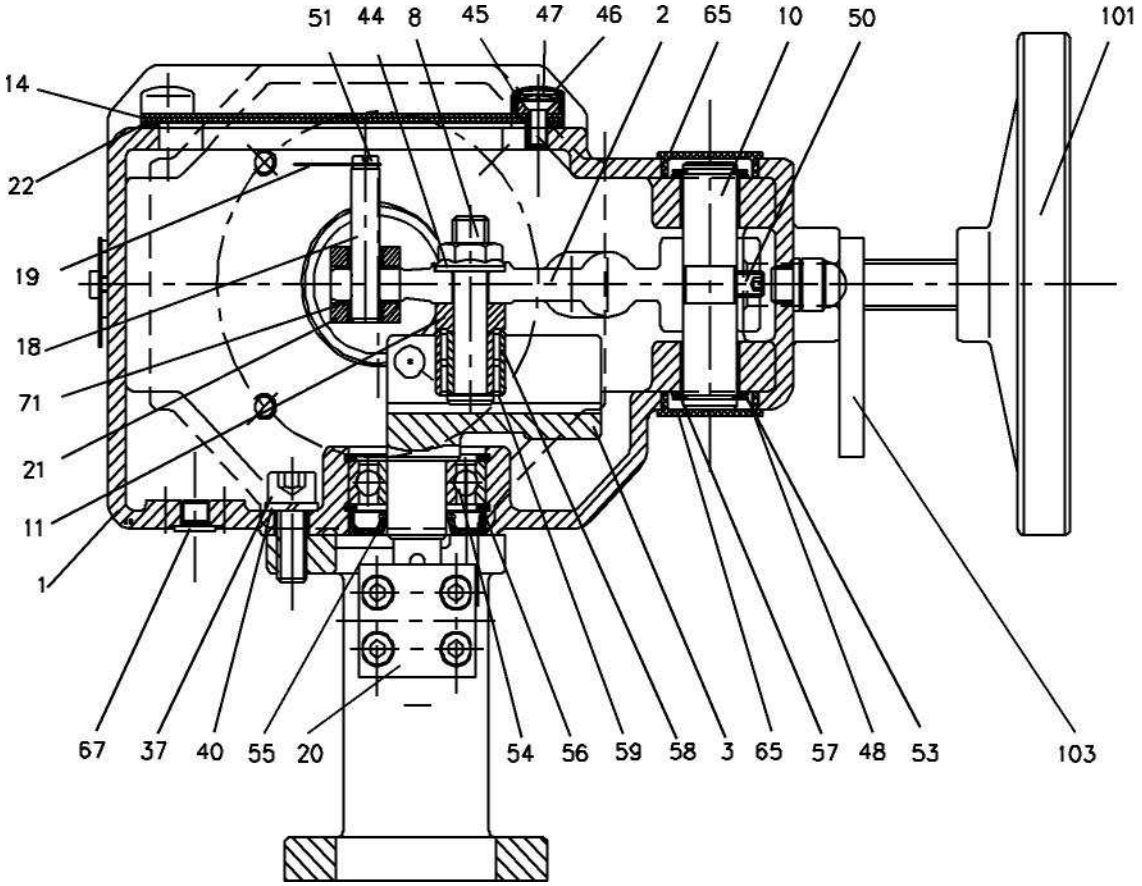
5.5.c) Insert the threaded rod (16) again on the free side of the actuator and lock it with the indicator pin (49).Then screw in and tighten the setscrew (49).

5.5.d) The spring barrel is joined to the actuator casing by means of bolts and washers (33 and 34).The next step is to slide the spring (12), the diaphragm casing (4) and the shim (43) over the threaded rod and tighten them with the hexagon nut (41).

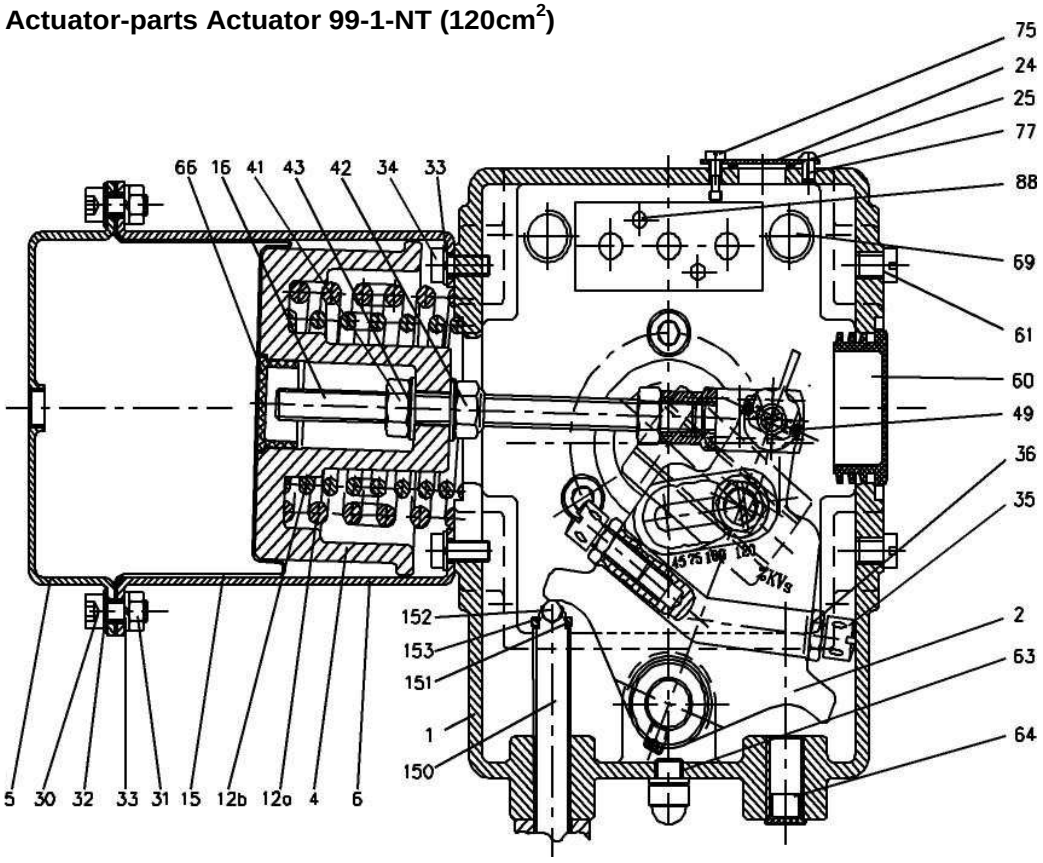
5.5.e) Then fit the plug (66) into the diaphragm disk and slide the diaphragm (15) onto the disk, fabric side first (see page 3). Fit the diaphragm casing (5) onto the spring barrel and tighten it by means of nuts and bolts (30 to 33).

5.5.f) If a positioner is installed, convert the pickoff lever to the "linear" cam (for "air closes" action) as described in section 5 (page 4) of the enclosed "Positioner Module" operating instructions and set the positioner in accordance with section 3.

5.5.g) Finally, tighten the stroke indicator (19) on the indicator pin (18) again with the countersunk screw (51), and fasten the front panel (14) onto the actuator with the screws (45 and 46).



5.6 Actuator-parts Actuator 99-1-NT (120cm^2)



Pos.1	Act.Housing	GG-25
Pos.2	Primary Lever	GGG-40
Pos.3	Secondary Lever	1.4540
Pos.4	Diaphragm Plate	POM-Natur
Pos.5	Diaphragm Housing	St 37.2
Pos.6	Spring Housing	St 37.2
Pos.8	Regulater adjusting srew	1.4021
Pos.10	Main Shaft	1.4021
Pos.12	Spring	Springsteel
Pos.15	Diaphragm	NBR
Pos.16	Threaded rod	8.8
Pos.18	Main Shaft	A2
Pos.20c	Featherkey	1.4021
Pos.35	Locking screw	St /verz.
Pos.58	Needle bearing	St

| | = recommended spare parts

6. Dismantling rotary actuator BR99-2-NT / BR99-3-NT [240 cm^2] / [779 cm^2]

6.1 Disassembling built-on accessories

If a limit switch unit is installed, it need only be loosened by unscrewing the two hexagon socket screws and then removed along with the cable terminals

6.2 Disassembling the hand-wheel unit

6.2.a) First of all, unload the hand-wheel unit by loosening the locking screw (117) (star-grip screw) a few turns and then turning the hand-wheel (116) full counter clockwise until you feel a resistance.

6.2.b) Once the bolts (107) that secure the flange (101) to the actuator casing (1) have been unscrewed, the complete hand-wheel unit can be removed from the casing.

6.2.c) You must first remove the retaining ring (107) from the adjusting bolt (102), before you can dismantle the hand-wheel unit

6.2.d) If you now continue turning the hand-wheel counterclockwise, the adjusting bolt (102) will be screwed out of the guide nut (108), and you can pull it out of the flange together with the hand-wheel.

6.2.e) The hand-wheel is merely fitted onto the adjusting bolt and locked in position by a featherkey**.**

6.2.f) Before you reassemble the hand-wheel unit, you should examine all the bushes and thrust rings for wear and replace them if necessary. Be particularly careful not to forget the thrust rings (115 and 110) during the assembly procedure, as they affect the operation of the hand-wheel unit.

6.3 Separating the spring barrel from the actuator casing

Attention!!!
It is essential to maintain the correct order. The diaphragm casing (5) must never be loosened if the eyebolt is not joined to the lever.

risk of accidents due to the spring bias!!!!!!!!!!!!!

6.3.a) After the bolts have been loosened, the diaphragm casing (5) and the diaphragm itself (15) can be removed. The sealing plug which is now visible can be levered out with a fine screwdriver, and the nut underneath it (36) loosened with a socket wrench in order to unload the actuator spring. Hold the diaphragm disk (4) with your hand as you do so, as there might be a (very slight) residual bias when the spring is disassembled.

When you install the diaphragm, make sure that the gummed side rests against the pressure side, in other words the fabric side of the diaphragm must be facing the diaphragm disk. If you install the diaphragm incorrectly, the positioner will fail after only a short time in operation.

6.3.b) You can now remove the diaphragm disk and the spring (12), and separate the spring barrel from the actuator casing. To disassemble the eyebolt, remove the grub screw (27) and pull the stoke indicator pin (18) up out of the actuator lever using suitable pliers. When you reassemble the actuator subsequently, you must not forget the two PVC thrust rings, or corrosion may occur.

6.4 Dismantling the actuator casing

6.4.a) First of all, you should remove the cap nuts (64), together with the stop screws (35) and the locking nuts underneath them.

6.4.b) Now loosen the adjusting nut (41).

6.4.c) You must then remove the sealing plug (63) and the setscrew (65) before you can disassemble the bearing bolt. The bearing bolt (10) can be loosened by removing the retaining ring (57) and the setscrew (50), and then pressed out. When you reassemble the casing, you must not forget the thrust rings, which are vital for operation of the actuator.

6.4.d) The actuator lever (2) can now be removed from the casing, together with the adjustment bolt (8) and the needle bearing (58). Since the actuator function (direction of rotation of the valve) is controlled by the position of the lever, you should mark this position on the lever to simplify reassembly.

6.4.e) Finally, after you have removed the Seeger circlip (56), you can lift the sliding block and the ball bearing out of the actuator casing along with the radial shaft seal (55).

The fit between the ball bearing and the actuator casing is a push fit. This ensures that no axial forces, which might result in excessive hysteresis, are able to act on the valve shaft when the actuator is assembled. It is important to make sure that the radial shaft seal is pressed flush into the actuator casing, and that the sliding block and the ball bearing can be moved inside the casing bore. The surface of the bearing bore should be protected against corrosion with a small amount of grease.

6.5 Reversing the direction of the actuator

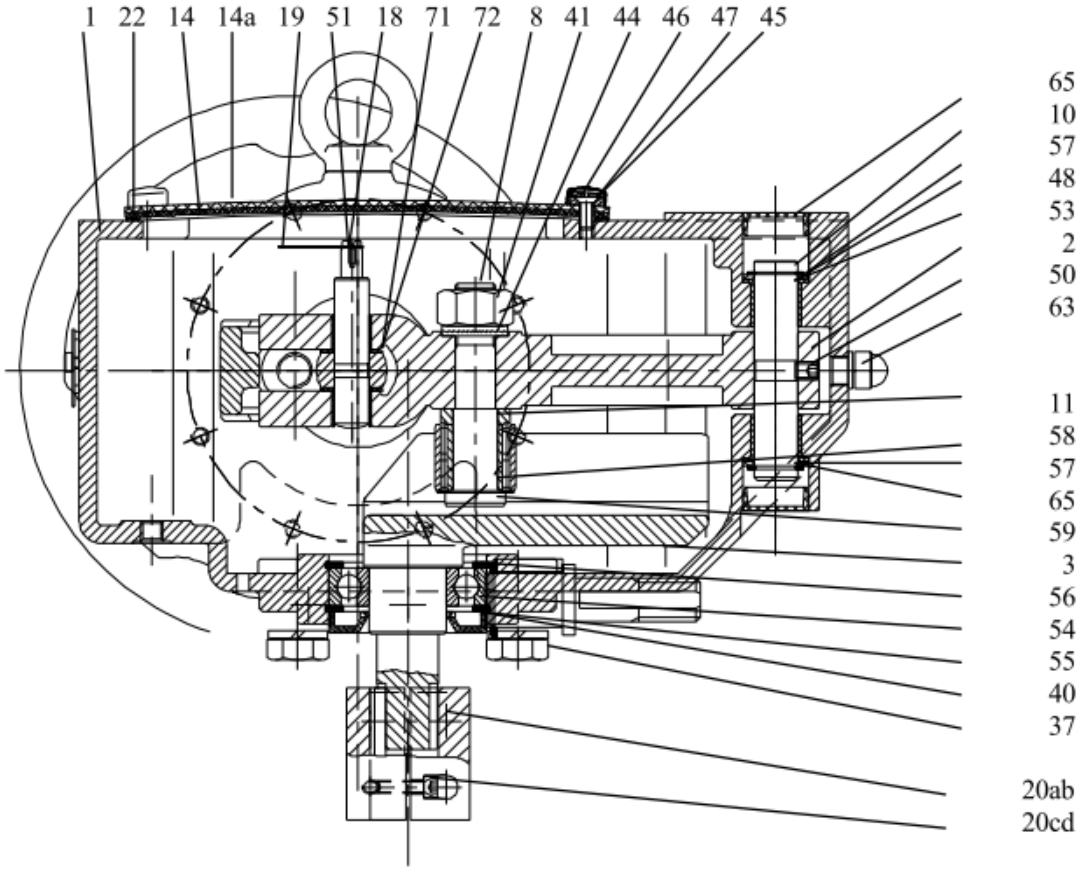
To reverse the direction of the actuator (from "air opens" to "air closes" or vice versa):

6.5.a) Der Blinddeckel bzw. eine evtl. vorhandene Handverstellung zu entfernen.

6.5.b) Das Federgehäuse nach Punkt III zu demontieren und auf der entgegengesetzten Seite wieder zu montieren.

6.5.c) Die Handverstellung bzw. der Blinddeckel auf den nunmehr freien Flansch des Antriebsgehäuses zu befestigen.

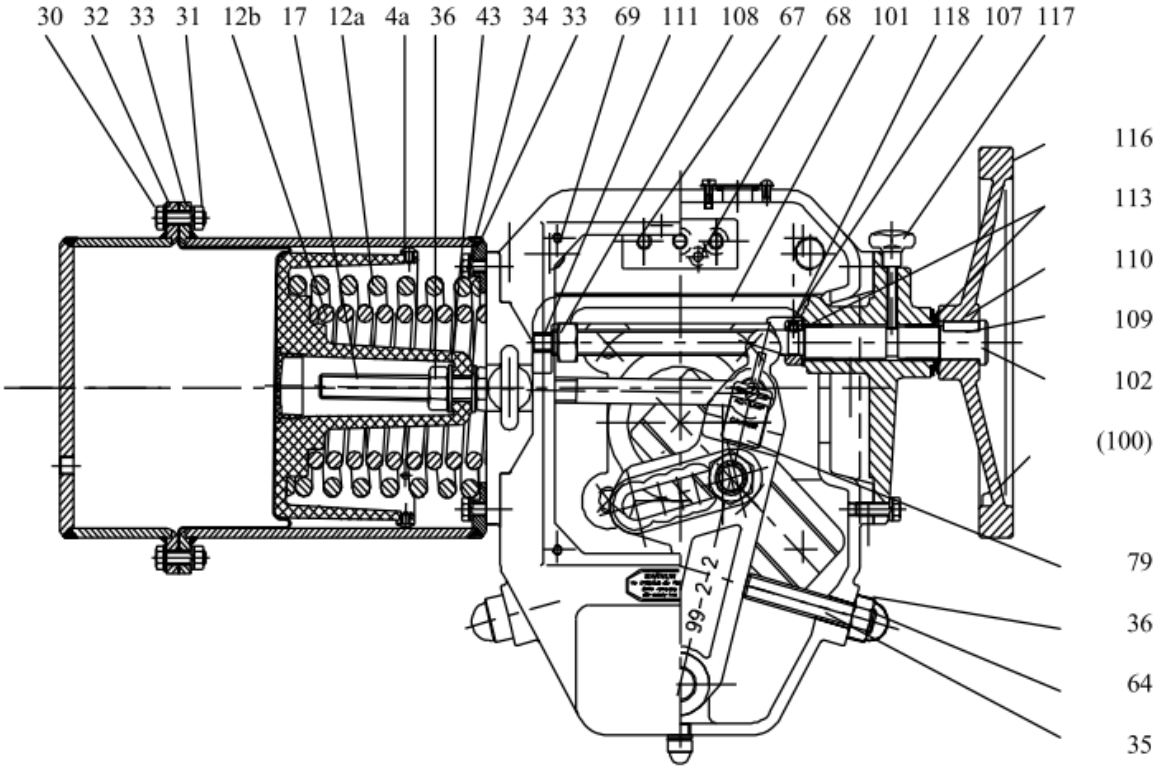
6.6 Actuator parts actuator 99-2-NT / 99-3-NT



List of actuator parts

Pos. 1	Act.Housing
Pos. 2	Primary Lever
Pos. 3	Secondary Lever
Pos. 4	Diaphragm Plate
Pos. 5	Diaphragm Housing
Pos. 6	Spring Housing
Pos. 8	Regulater Adjusting
Pos.10	Main Shaft
Pos.12	Spring
Pos.15	Diaphragm
Pos.18	Main Shaft
Pos.22	Front panel

| | = recommended spare part



Pos. 45	Cap
Pos. 55	Radial shaft seal
Pos. 56	Circlip
Pos. 57	Retaining ring
Pos. 58	Needle bearing
Pos. 63	Sealing plug
Pos. 64	Cap nuts
Pos. 65	Setscrew
Pos.101	Flange
Pos.102	Adjusting bolt
Pos.107	Retaining ring
Pos.108	Guid nut
Pos.110	Thrustrings
Pos.116	Handwheel
Pos.117	Locking srew

| | = recommended spare part

9. Contacting us

Details / specific information (Operating instructions with spare parts lists) are available for download on our website.

PRE-VENT GmbH
Sales - Production - Servicing

Gewerbepark Lindach A9
84489 Burghausen, Germany

fon +49 8677 98788-0
fax +49 8677 98788-80

Email: office.pre-vent@fiwagroup.com
Web: www.pre-vent.com

Manual version 1.0 16.10.2012