

RP45 PRESSURE REDUCING VALVES

INSTALLATION AND MAINTENANCE INSTRUCTIONS



GENERAL INFORMATION

- These instructions must be carefully read before performing any work involving VALSTEAM ADCA products. Failure to observe these instructions may result in hazardous situations.
- These instructions describe the entire life cycle of the product. Keep them in a location that is accessible to every user and make these instructions available to every new owner of the product.
- Current regional and plant safety regulations must be considered and followed during installation, operation, and maintenance work.
- The images shown in these instructions are for illustration purposes only.
- For problems that cannot be solved with the help of these instructions, please contact VALSTEAM ADCA or its representative.

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We reserve the right to change the design and material of this product without notice.

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1. SAFETY INFORMATION

1.1. Explanation of symbols



DANGER

Hazardous situation which, if not avoided by applying the correct preventive measures, will result in fatal or serious injury and/or considerable damage to property.



WARNING

Hazardous situation which, if not avoided by applying the correct preventive measures, could result in fatal or serious injury and/or considerable damage to property.



CAUTION

Hazardous situation which, if not avoided by applying the correct preventive measures, could result in moderately severe or minor injury.



NOTICE

Situation which, if not avoided, can result in property damage or product malfunction.



NOTE

Indicates additional information, tips and recommendations.

1.2. Intended use

Refer to the markings on the device, such as nameplate and laser markings, Information Sheet (IS) and these Installation and Maintenance Instructions (IMI) to check that the product was designed for the intended use and meets the specifications used for sizing and selection. This includes checking application, material suitability, process medium, pressure and temperature as well as their respective limiting values.

VALSTEAM ADCA does not assume any responsibility for damage resulting from inappropriate use of the product, damage caused by external stresses or any other external factors. Correct installation of the product is the full responsibility of the contractor.

Inappropriate use of the product is any use other than the one described in this chapter. Inappropriate use also includes:

- Use of spare parts which are not genuine;
- Performance of maintenance work not described in these instructions;
- Use outside the limits defined by the accessories connected to the product.
- Unauthorized modifications to the product.

If the product is to be used for an application or with a fluid other than the one it was designed for, contact VALSTEAM ADCA.

1.3. Qualification of personnel

Handling, installation, operation and maintenance work must be carried out by fully trained and qualified personnel, capable of judging the work which they are assigned to perform and recognizing potentially hazardous situations. They should be trained to properly use this product according to these Installation and Maintenance Instructions.

Where a formal “Permits to Work” system is implemented in the plant it must be complied with.

1.4. Personal protective equipment

Personal protective equipment should always be worn during work in order to protect against hazards posed by e.g. the process medium, dangerous temperatures, noise, falling or projected objects and working at height. These equipment includes a helmet, safety glasses, safety harness, protective clothes, safety shoes, hearing protection, etc.



NOTE

Always assess whether you or others in your vicinity require any protective equipment. When in doubt check with the plant's health & safety responsible personnel for details on required protective equipment.

1.5. The system

The complete system should be assessed as well as every action (e.g. closing of shut-off valves, disconnection of the power supply) to ensure this will not bring additional risk to personnel or property.

Dangerous actions that can result in a hazardous situation include isolation of protective devices such as safety valves, vents, vacuum relief valves, disconnection of electric safety devices, sensors and alarms.

1.6. ATEX

If the product is in the scope of the ATEX 2014/34/EU directive and as such bears the Ex marking, consult its specific Additional Instructions for use in Potentially Explosive Areas (IMI EX). In such cases, handling, installation, operation and maintenance work must only be performed by personnel qualified and authorized to work in potentially explosive areas.

1.7. General safety notes



DANGER

RISK OF BURSTING IN PRESSURE EQUIPMENT

Valves, ancillaries and pipelines are pressure equipment. Working above their operating limits or improper opening can lead to component bursting.

- Observe the maximum operating limits of the product and check if they are lower than those of the system in which it is being installed. Check the product Information Sheet (IS).
- Install a safety device.
- Before starting any work on the product, depressurize it and cool or heat it up to ambient temperature. This also applies to the line in which it is fitted.
- Drain the process medium from the product and all the relevant plant sections.



WARNING

RISK OF BURNS

Depending on the operating conditions, products and pipelines may get very hot or cold and cause burn injuries.

- Do not touch the product while it is hot or cold, allowing it firstly to cool down or heat up.
- Wear protective clothing and safety gloves during working operations.
- Thermally insulate tubes and products as a preventive measure.

RISK OF INJURY CAUSED BY FLUID ATTACK ON PRODUCTS MATERIALS

The product must only be used with mediums that do not attack the materials of the product (body, gaskets, seals). Otherwise, leaks may occur, and hot and/or hazardous fluid can escape.

- Do not use the product with mediums other than the ones it was designed for. Check section 1.2 - Intended Use.
- Prevent medium contamination.



WARNING

RISK OF INJURY CAUSED BY UNDER TIGHTENED PRODUCT OR ITS COMPONENTS

Excessively low tightening torques may cause medium to escape and/or components to be projected at high speed, which may result in a hazardous situation depending on the medium, chemical properties and/or its operating conditions.

- Do not loosen any screws while the equipment is pressurized.
- Observe the specified tightening torques on these Installation and Maintenance Instructions. If the relevant torque value is not mentioned contact VALSTEAM ADCA.

RISK OF HEARING LOSS

Depending on the operating conditions, the product may generate loud noises.

- Wear hearing protection when in the vicinity of the product.

RISK OF INJURY AS A RESULT OF ILLEGIBLE INFORMATION

Important information written in the product nameplate, markings and warning signs may wear overtime or get illegible due to e.g. dirt accumulation, resulting in hazardous situations and personal injury or property damage.

- Keep nameplates, markings and warning signs in a legible state, replacing when illegible, missing or damaged.



CAUTION

RISK OF INJURY DUE TO RESIDUAL PROCESS MEDIUM

Direct contact with dangerous process medium may lead to personal injury, e.g. smoke inhalation and chemical burns.

- Drain the process medium from the product and all the relevant plant sections.
- Wear protective clothing, safety gloves, mask, and eye protection.

RISK OF INJURY DUE TO IMPROPER HANDLING

Manual handling (e.g. lifting, carrying, pushing, pulling) of large and/or heavy products may result in personal injury.

- Assess the risk associated with the handling task.
- Use adequate handling methods and appropriate auxiliary handling equipment.



NOTICE

RISK OF PRODUCT DAMAGE DUE TO EXCESSIVELY HIGH TIGHTENING TORQUES

High tightening torques may lead to premature wearing of product components.

- Observe the specified tightening torques on these Installation and Maintenance Instructions. If the relevant torque value is not mentioned contact VALSTEAM ADCA.

2. PRODUCT INFORMATION

The ADCA RP45 series pressure reducing valves are single seated, bellows sealed proportional controllers that operate without auxiliary energy. These are used in industrial applications to maintain the pressure downstream of the valve within acceptable limits of the adjusted set point.

These valves are specially designed for use with steam, compressed air and other gases compatible with the construction and have limited use with liquids.

The regulator is used in conjunction with a diaphragm (45) or piston actuator (connected to each other through a sensing pipe) which is either supplied pre-assembled onto the valve or delivered separately. If delivered separately, the actuator should be assembled according to these Installation and Maintenance Instructions (IMI).

2.1. Principle of operation

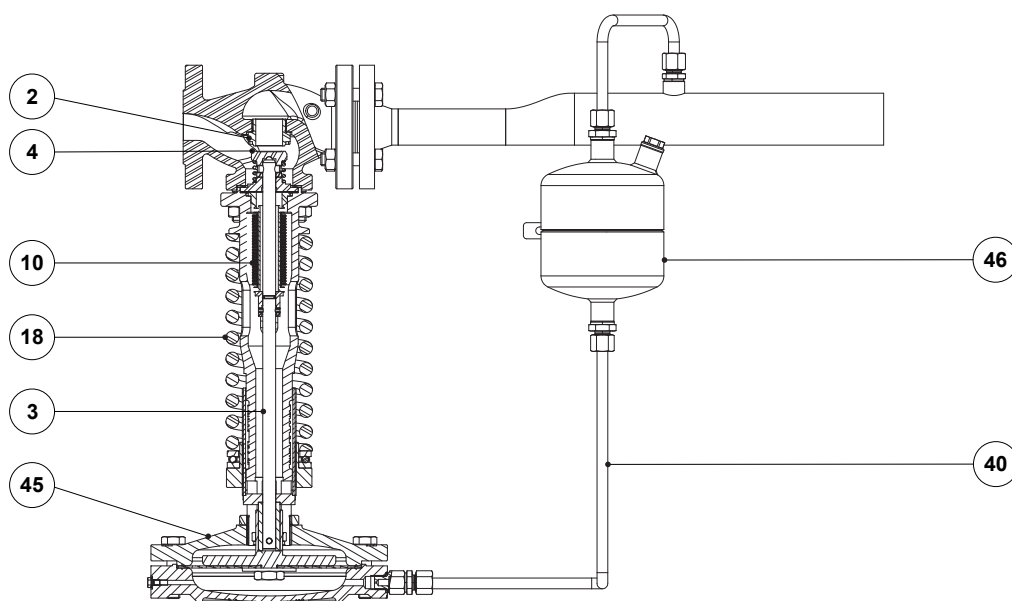


Fig. 1

The valve is supplied with the adjustment spring (18) slightly pre-compressed.

The sensing pipe (40) can be supplied separately or pre-assembled from the factory, in which case it is connected directly onto the valve outlet port. When supplied separately, it is meant for connection onto the pipeline downstream and should be installed at a minimum of 1 meter or 15 pipe diameters away from the valve outlet.

A seal pot (46) is fitted on the sensing pipe when operating with steam or liquids at temperatures above 90 °C, protecting the actuator diaphragm and/or seals against overheating. The sensing pipe and seal pot are filled with the process medium in such case (in steam application, water is used).

The process medium enters the valve body in the direction indicated by the arrow and while there is no backpressure, the valve is kept open and the medium flows between seat (2) and plug (4). The downstream pressure starts to rise and is transmitted through the sensing pipe (40) into the actuator (45).

The pressure force in the actuator chamber pushes the stem (3) and valve plug toward the seat, closing the valve. The adjustment spring compression is adjustable and its force acts against the actuator. Compression of the adjustment spring causes increase in downstream pressure and vice versa.

Under stable conditions the actuator force and spring force are balanced against each other.

When downstream pressure changes due to flow demand, so does the pressure inside the actuator and unbalancing of forces occurs causing the valve to respond by opening or closing. The valve closes when downstream pressure rises and vice versa, regulating flow to keep downstream reduced pressure stable.

Sealing of the valve stem is made via bellows (10) which serves the additional purpose of balancing the forces on the valve plug.

The valve has limited use with liquids because the plug closes in the direction of the fluid flow, which can produce vibrations and hammers. To avoid this, the valve can be installed with the fluid direction against the plug under certain conditions. However, it is suggested to consult VALSTEAM ADCA before installing the valve with liquids. Alternative models are also available for reducing service in liquid applications.

2.2. Certification

This product has been specifically designed for use with liquids and gases which are in Group 2 of the European PED – 2014/68/EU Pressure Equipment Directive and it complies with its requirements.

CE MARKING – GROUP 2 (PED – European Directive)		
PN16	PN40	Category
DN 15 to 50	DN 15 to 32	SEP
DN 65 to 150	DN 40 to 100	1 (CE marked)
–	DN 125 and 150	2 (CE marked)

CE MARKING – GROUP 2 (PED – European Directive)		
ANSI 150 lb	ANSI 300 lb	Category
1/2" to 2"	1/2" to 1"	SEP
2 1/2" to 4"	1 1/2" to 4"	1 (CE Marked)
6"	6"	2 (CE Marked)

NOTE

If the product falls within category SEP it must not be CE marked, unless other directives are applicable.

This product is not in the scope of the ATEX 2014/34/EU directive as it does not have its own potential ignition source. Personnel responsible for the plant installation must assess the risks caused by static electricity and take the necessary precautionary measures to prevent static charge. These measures include e.g. connection of the product to the equipotential bonding system.

2.3. Product identification

The following items are indicated on the product nameplate or directly on its body:

- Manufacturer
- Product model (e.g. RP45G)
- Pressure rating (e.g. PN 40, ANSI 300#)
- Nominal size (e.g. DN 40, 1 1/2")
- Min. operating temperature (e.g. T_{min} = -10 °C)
- Max. operating temperature (e.g. T_{max} = 250 °C)
- Flow direction (indicated by an arrow)
- Serial number and year of manufacturing (e.g. Reg.:17483/19)

- CE Marking (when applicable – see section 2.2 – Certification)
- EX Marking (when applicable e.g. EX h IIB T6...T3 Gb – see section 2.2 – Certification)

2.4. Technical data

For technical data including dimensions, materials, limiting conditions and versions refer to the product's respective Information Sheet (IS).

3. TRANSPORT, STORAGE AND PACKAGING



WARNING

RISK DUE TO FALLING LOADS

Loads may tip or fall over resulting in damage to property, serious injury or death.

- Use suitable equipment when moving or lifting suspended loads.
- Make sure no one is standing below the suspended load.



CAUTION

RISK OF INJURY DUE TO IMPROPER HANDLING

Manual handling (e.g. lifting, carrying, pushing, pulling) of large and/or heavy products may result in personal injury such as back injury.

- Assess the risk associated with the handling task.
- Use adequate handling methods and appropriate auxiliary handling equipment.



NOTICE

RISK OF PRODUCT DAMAGE DUE TO IMPROPER STORAGE

- Do not remove any packaging or protective covers until immediately before installation at the site.
- Store the product in a solid base in a dry, cool and dust-free environment.
- Until its installation, protect it from the weather, dirt, corrosive atmospheres and other harmful influences.

RISK OF PRODUCT DAMAGE DUE TO LONG TERM STORAGE

Some product components may deteriorate with time (e.g. valve packings, seals).

- Do not store the product for more than 12 months.
- If for any reason the product must be stored for longer periods of time contact VALSTEAM ADCA.

Products are individually wrapped in plastic film, thermo shrinkable plastic and/or stored in a cardboard box as they leave VALSTEAM ADCA. Avoid removing packaging and any protective cover until immediately before installing the product at the site.



NOTE

If the transport packaging has any shipping damage contact VALSTEAM ADCA or its representative.

Before storing and transporting the product protect it from impacts and mechanical damage, paying special care with sealing surfaces and other fragile parts.



NOTE

If the corrosion protection (paint and other surface coatings) of the product is damaged during transport or other handling procedures repair it immediately.

4. INSTALLATION

Before performing any installation work, refer to section 1 – Safety information.



WARNING

RISK OF INJURY DUE TO INSUFFICIENT SUPPORT DURING INSTALLATION

Insufficient support of the product during installation may cause it to fall and cause personal injury.

- Ensure the product is safely held in place during installation.
- Wear protective safety shoes.



NOTICE

RISK OF PRODUCT DAMAGE DUE TO STRESS

The product is not intended to withstand external stresses that may be induced by the system to which it is being connected to.

- Make sure that the connected pipe does not subject the body to any stress (forces or torques) during installation and operation.
- Do not use the product as an elevation point.

4.1. Preparation for installation

Before installation, make sure the following conditions are met:

- The installation area has easy access and the device is to be installed in a position where operation and maintenance work can be performed safely.
- The product will be installed with proper support and free of any stresses that can be induced by the system due to e.g. pipe expansions. The necessary precautions are recommended during system design.
- The pipeline where the product will be installed is designed in such a way that it takes into account the weight of the product. The pipeline may require support on both sides next to the product, particularly if its size and weight are considerable and especially if vibrations are to be expected in the system.
- The product is not damaged.
- Make sure all the necessary materials and tools are readily available during installation work.
- Referring to these Installation and Maintenance Instructions (IMI), Information Sheet (IS) and nameplate, check that the product is suitable for the intended installation: temperature, medium, pressure, temperature, etc. – see section 1.2 – Intended use.
- Check that there are no foreign bodies inside the pipelines and ancillaries, flushing may be necessary. These should be thoroughly cleaned.
- An additional ADCA pipeline strainer or filter may be necessary to install upstream of the pressure regulator in some applications, preventing damage caused by solid particles in the process medium.
- It is recommended that a suitable safety valve is fitted on the downstream side of the pressure regulator in order to protect downstream equipment from over pressure. The valve should be set at a pressure below the safe working pressure of the downstream equipment and sized according to the maximum capacity of the pressure regulator should it fail in the fully open position. Ensure the safety valve outlet pipe is connected to a safe place.
- There are pressure gauges installed both upstream and downstream of the regulator. These will be used for monitorization, downstream set point adjustment and, if necessary, troubleshooting. Check that these devices function properly.
- In steam service applications, the pressure reducing valve should be positioned where condensation is unable to collect or that, alternatively, a humidity separator with accompanying steam trap station is fitted so that the pipeline drains correctly. Slope the pipeline upstream and downstream of the regulator if necessary.
- A bypass line can be fitted to prevent system shutdown during maintenance procedures. In that case a globe valve with regulating plug should be fitted in the bypass line to allow manual adjustment of downstream pressure.
- If the sensing pipe is not fitted onto the valve body, it must be installed downstream at a minimum of 1 meter or 15 pipe diameters away from the valve outlet. The

sensing pipe should be 10mm diameter copper or stainless steel. Weld a 3/8" threaded coupling at the side in the middle of the pipeline. In case of steam or gases service the sensing pipe may also be welded on the top of the pipeline. An ADCA seal pot must be installed in the sensing pipe when operating with steam or liquids at temperatures above 90 °C.



NOTE

For reference on the configuration of a typical pressure reducing station, consult the assembly drawing ADCR.04.3055.

4.2. Mounting the actuator onto the valve

Pressure regulators are typically delivered as an assembled unit, with the actuator already mounted. When delivered separately these must be assembled together either before installing the regulator in the pipeline or before starting up.

Proceed as follows for valves DN 15 to DN 100 or NPS ½" to 4":

1. Screw the lock nut (24) on the bonnet until reaching the end stop.
2. Position the actuator on top of the bonnet assembly (15, 15A).
3. Fix the actuator onto the valve bonnet by screwing it (clockwise). As the actuator housing touches the lock nut, unscrew the actuator by no more than a full turn until the compression fitting (60) is square with the valve outlet connection.
4. Screw the lock nut (24) tightly against the actuator housing, tightening with the recommended torque – see section 9.6 – Tightening torques.

Proceed as follows for valves above DN 100 or NPS 4":

1. Insert the guide (54A) of the actuator through the central hole of the pillar flange (29).
2. Align the compression fitting (60) with the valve outlet connection.
3. Secure the actuator in place by screwing the lock nut (31) onto the guide (54A), tightening with the recommended torque – see section 8.6 – Tightening torques.

4.3. Installation procedure

1. Remove plastic film and other packaging, as well as the protective covers which are placed on flanges or connection ends. Make sure the pressure regulator is free from foreign matter.
2. The recommended installation position is horizontal, with the actuator vertically, pointing downwards. Installation with the actuator pointing upwards (above the pipeline) is possible only when the medium temperature is below 90 °C.
3. The pressure regulator has an arrow or inlet/outlet designation, be sure that it is installed in the appropriate direction according to fluid flow.

4. If the sensing pipe is not fitted onto the valve body, it must be installed downstream of the valve at a minimum of 1 meter away or 15 pipe diameters. The connection on the downstream pipeline must be at the top or at the side. Do not remove the flow restrictor (58) from the actuator.
5. The seal pot must be installed in the sensing pipe when operating with steam or liquids at temperatures above 90 °C. The installation position of the seal pot is with the inlet and outlet connections in the vertical plane and the eccentric plugged port on the top.
6. Take care with jointing materials and sealing compounds to ensure that none may be permitted to block or enter the pressure regulator, causing malfunction. In case of flanged connections use appropriate flange gaskets.
7. If the valve is to be thermally insulated, only insulate the valve body itself. Do not insulate the adjustment spring, actuator, sensing pipe and seal pot, if fitted.

5. START-UP

Before performing the start-up procedure, refer to section 1 – Safety Information.

The start-up procedure must be followed every time the product is put back into service.



CAUTION

RISK OF CRUSHING INJURY DUE TO MOVING PARTS

The movement of the adjustment spring which occurs during valve operation and set point adjustment can crush hands and fingers.

- Keep hands and fingers away from moving parts when the valve is being adjusted or when the valve is in operation. Pay special care to the adjustment spring and connected parts.



NOTICE

RISK OF PRODUCT DAMAGE DUE TO CONTAMINATION

The plant operator is responsible for cleaning the pipelines in the plant as well as keeping the product well maintained. At start-up the presence of small particles in the medium (dirt, scale, weld splatters, etc.) may damage the product or cause malfunction.

- Flush pipelines before start-up.
- Clean protection varnishes from pipes and flanges, leftover paint, graphite, grease, etc.
- Use a pipeline strainer or a filter.

5.1. Preparation for start-up

Before starting up, make sure the following conditions are met:

- All works on the system have been completed.
- All the necessary safety devices have been installed.
- When required, warning notices are used to alert others that the system is starting up.
- The product is correctly installed – see section 4 – Installation.
- Referring to these Installation and Maintenance Instructions (IMI), Information Sheet (IS) and nameplate, check that the product is suitable for the intended installation: temperature, medium, pressure, temperature, etc. – see section 1.2 – Intended use.
- A safety check was performed by qualified personnel. Checking for leaks, structural damage and integrity of system components.
- Upstream and downstream shut-off valves are closed.
- The adjustment spring (18) is relaxed. If not, release tension by turning the spring adjusting nut (20) counterclockwise with the help of the supplied adjustment rod.

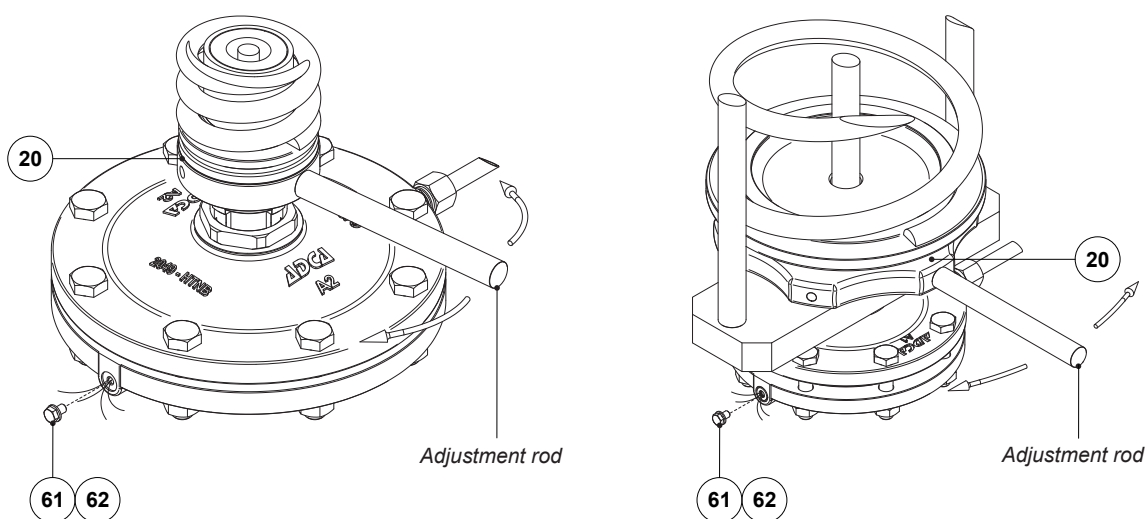


Fig. 2 - Changing the compression of the adjustment spring

If a seal pot is installed on the sensing pipe, proceed as follows:

- Unscrew the plug on the seal pot and the actuator vent screw (61).
- Fill the pot with the process medium with the help of the supplied funnel until it emerges from the actuator vent without bubbles. Fill the pot with water in case of steam service.
- Close the actuator vent with the washer (62) and vent screw (61) and proceed to fill the pot until the process medium starts to overflow.
- Screw the plug on the seal pot tightly.

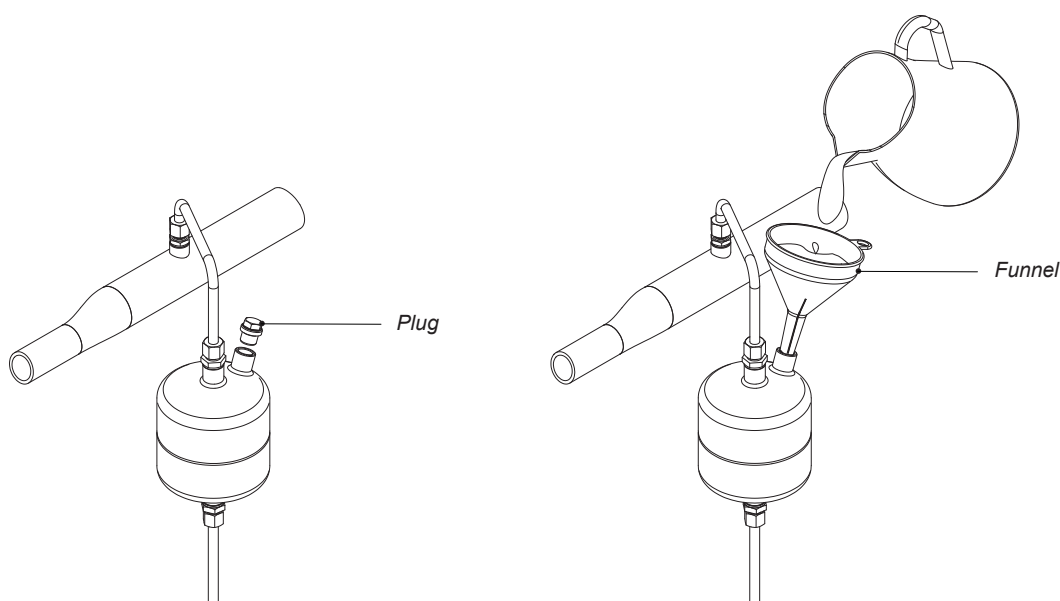


Fig. 3 - Filling the seal pot

5.2. Start-up procedure

1. Open the upstream shut-off valve followed by the downstream shut-off valve. Both valves should be operated very slowly to prevent sudden surges of pressure that can damage the pressure regulator.
2. Set the downstream pressure by turning the spring adjusting nut (20) with the help of the adjustment rod, monitoring with the aid of the downstream pressure gauge.
 - a. Turn the adjustment rod clockwise to increase spring compression and increase downstream pressure – see Figure 2.
 - b. Turn the adjustment rod counterclockwise to decrease spring compression and reduce downstream pressure – see Figure 2.
3. Check the pressure regulator to ensure it is operating correctly.



NOTE

24 hours after system start-up, it is recommended to check the pipe connection for leaks and retighten when necessary. Clean strainers/filters to avoid blocking.

6. OPERATION

Before operating the product refer to section 1 – Safety Information.

CAUTION

RISK OF CRUSHING INJURY DUE TO MOVING PARTS

The movement of the adjustment spring which occurs during valve operation and set point adjustment can crush hands and fingers.

- Keep hands and fingers away from moving parts when the valve is being adjusted or when the valve is in operation. Pay special care to the adjustment spring and connected parts.

Immediately after completing the start-up procedure, the product is ready for operation.

7. SHUTDOWN

Before performing the shutdown procedure, refer to section 1 – Safety information.

7.1. Shutdown procedure

1. Switch of the system and secure it so it cannot be turned on by unauthorized personnel.
2. Fully close the upstream shut-off valve, to stop the process medium from flowing through the pressure regulator.
3. Allow medium to cool down and completely drain it from the pipeline and pressure regulator.
4. Make sure the pipeline and pressure regulator are not under pressure and are at a safe temperature.
5. Fully close the downstream shut-off valve.
6. If the pressure regulator won't be back in operation for a long period of time relax the adjustment spring (18).
7. If the pressure regulator is to be removed from the pipeline – see section 3 – Transport, storage and packaging.

8. PARTS LIST

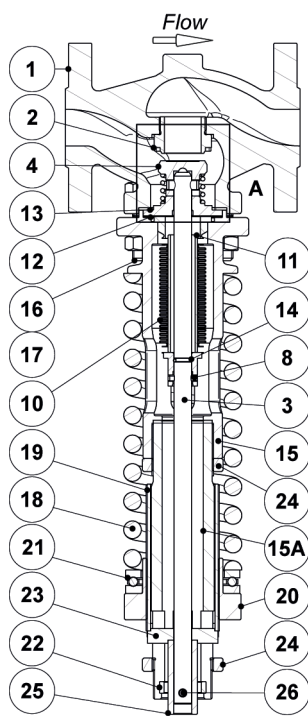


Fig. 4
1/2" to 2" – DN 15 to DN 50

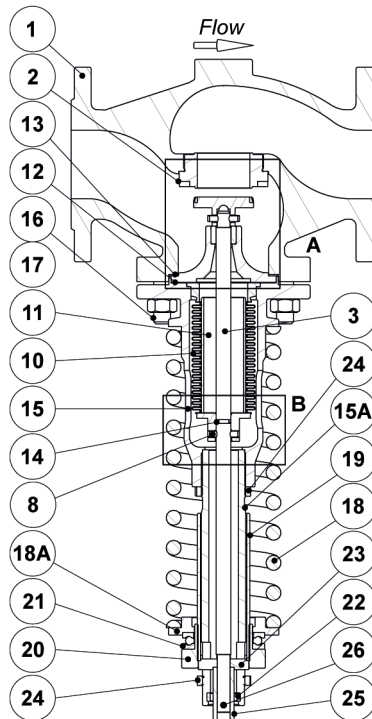


Fig. 5
2 1/2" to 4" – DN 65 to DN 100

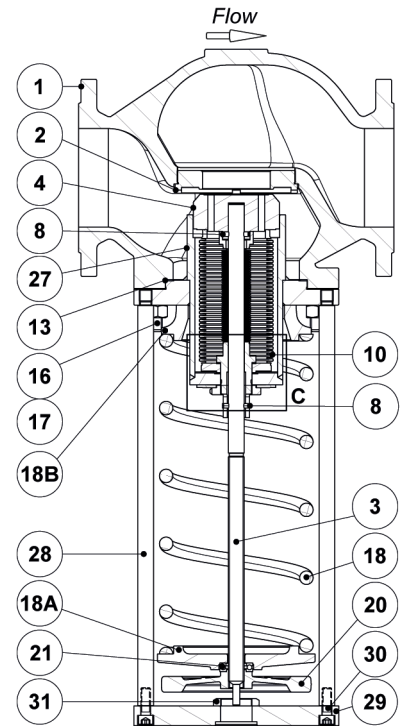


Fig. 6
5" and 6" – DN 125 and DN 150

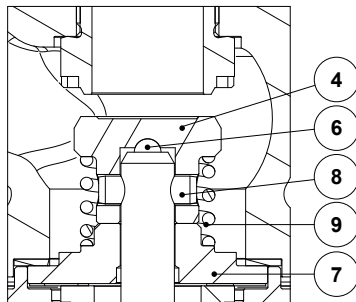


Fig. 7 - Detail A
1/2" to 2" – DN 15 to DN 40

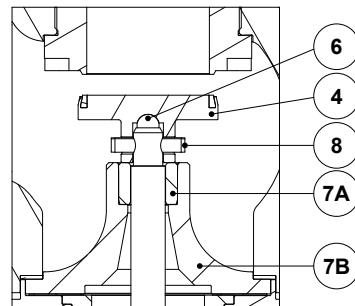


Fig. 8 - Detail A
2" and 2 1/2" – DN 50 and DN 65

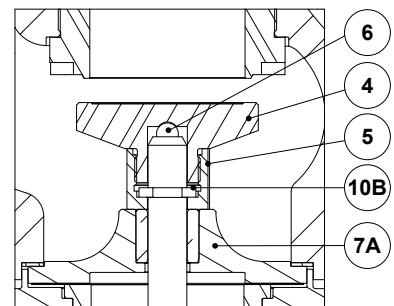


Fig. 9 - Detail A
3" and 4" – DN 80 and DN 100

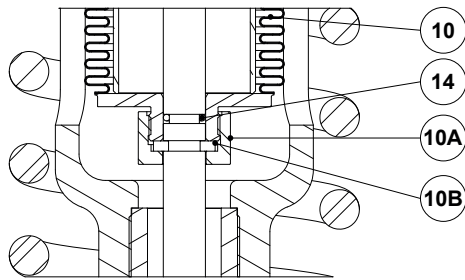


Fig. 10 - Detail B
3" and 4" – DN 80 and DN 100

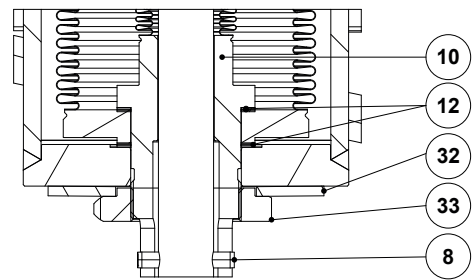


Fig. 11 - Detail C
5" and 6" – DN 125 and DN 150

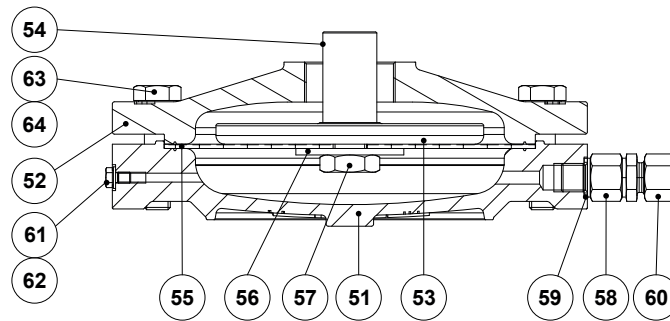


Fig. 12 - A series

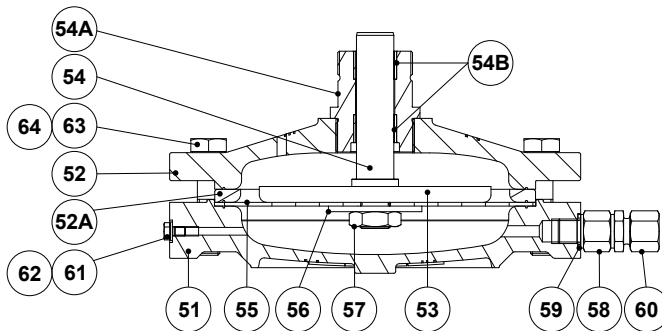


Fig. 13 - B series

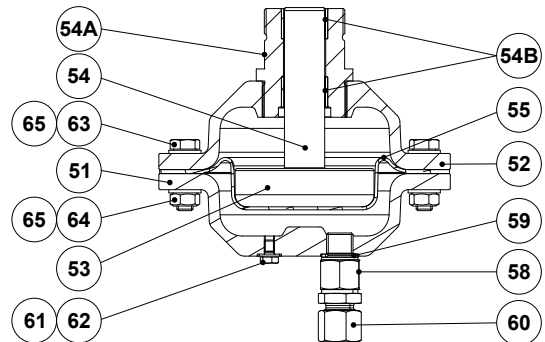


Fig. 14 - C series

MATERIALS					
POS. N°	DESIGNATION	SPARE PARTS	POS. N°	DESIGNATION	SPARE PARTS
1	Valve body		24	Lock nut	
2	Seat	X	25	Pressure tube	
3	Stem	X	26	Pin	
4	Valve plug	X	27	Bellows housing	
5	Nut	X	28	Pillars	
6	Ball	X	29	Pillars flange	
7	Stem guide		30	Bolt	
7A	Stem guide		31	Lock nut	
8	Pin	X	32	Belleville washer	
9	Compensating spring	X	33	Tightening nut	
10	Bellows	X	51	Lower diaphragm chamber	
10A	Nut		52	Upper diaphragm chamber	
10B	Split ring		52A	Spacer ring	
11	Guide tube	X	53	Pressure plate	
12	Bellows gasket	X	54	Diaphragm plate spindle	
13	Body gasket	X	54A	Guide	
14	O-ring	X	54B	Plain bearing	X
15	Bonnet		55	Diaphragm	X
15A	Bonnet extension		56	Washer	
16	Stud		57	Hex nut	
17	Nut		58	Flow restrictor	
18	Adjustment spring	X	59	Gasket	
18A	Lower spring plate		60	Compression fitting	
18B	Upper spring plate		61	Vent screw	
19	Threaded tube		62	Washer	
20	Spring adjusting nut		63	Bolt	
21	Ball bearing		64	Nut	
22	Spacer		65	Washer	
23	Pressure star				

9. MAINTENANCE

Before performing a maintenance procedure, refer to section 1 – Safety information.

The product requires maintenance to ensure that it operates correctly and safely throughout its lifetime. Maintenance work should be performed in a planned manner at periodic intervals. These intervals must be defined by the operator according to the service conditions.

9.1. Maintenance procedure

1. Make sure all the necessary materials and tools are readily available during maintenance work.
2. Perform the shutdown procedure – see section 7 – Shutdown.
3. Perform the maintenance procedure – see the following sections.
4. Put the product back into operation – see section 5 – Start-up.

9.2. Replacing the actuator

1. Drain the actuator, sensing pipe and seal pot through the actuator vent screw (61) if applicable.
2. Remove the sensing pipe from the actuator.
3. Relax the adjustment spring (18) by turning the spring adjusting nut (20) counterclockwise using the adjustment rod – see Figure 2.
4. Proceed as follows for valves DN 15 to DN 100 or NPS 1/2" to 4":
 - a. Unscrew the lock nut (24) away from the actuator housing and until reaching the end stop.
 - b. Remove the actuator from the valve by unscrewing it (counterclockwise). If the valve is fitted onto the pipeline with the actuator facing down, support it so it does not fall.
 - c. Position the new actuator on top of the bonnet assembly (15, 15A).
 - d. Fix the actuator onto the valve bonnet by screwing it (clockwise). As the actuator housing touches the lock nut, unscrew the actuator by no more than a full turn until the compression fitting (60) is square with the valve outlet connection.
 - e. Screw the lock nut (24) tightly against the actuator housing, tightening with the recommended torque – see section 9.6 – Tightening torques.
5. Proceed as follows for valves above DN 100 or NPS 4":
 - a. Unscrew the lock nut (31) and remove the actuator from the valve. If the valve is fitted onto the pipeline with the actuator facing down, support it so it does not fall.
 - b. Insert the guide (54A) of the new actuator through the central hole of the flange

- (29).
- c. Align the compression fitting (60) with the valve outlet connection.
 - d. Secure the actuator in place by screwing the lock nut (31) onto the guide (54A). tightening with the recommended torque – see section 9.6 – Tightening torques.
6. Connect the sensing pipe to the new actuator.

9.3. Replacing the actuator diaphragm

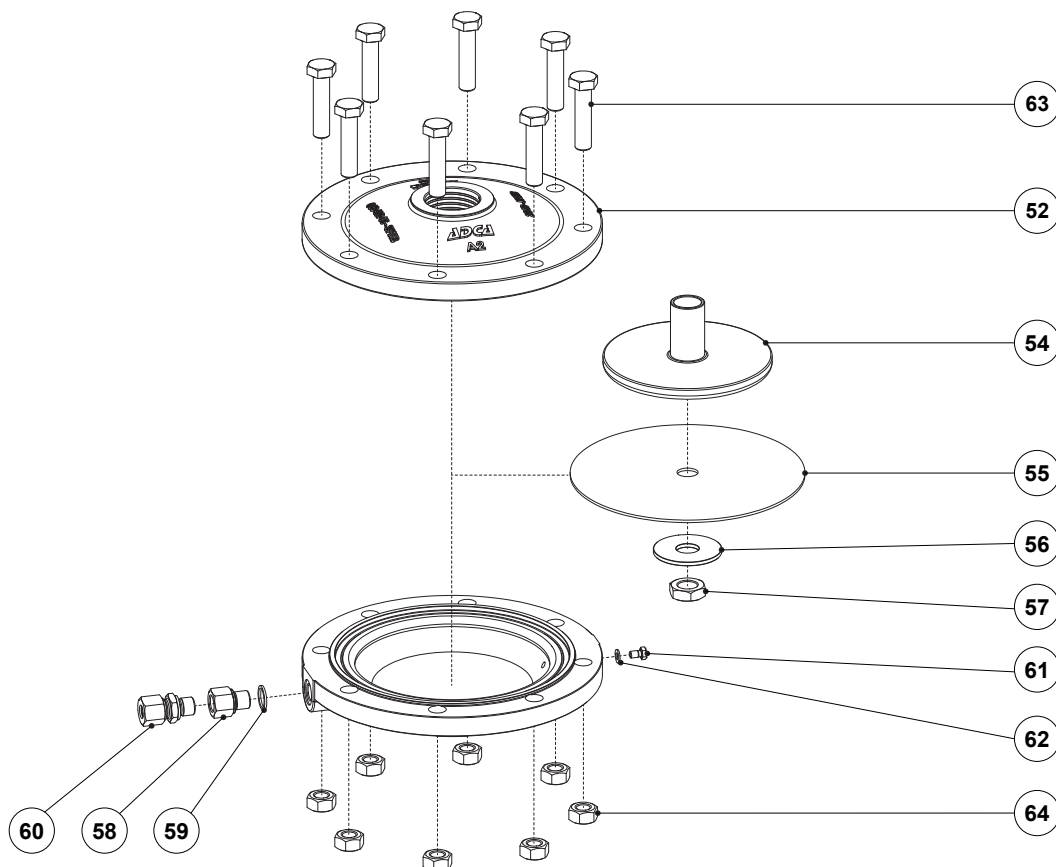


Fig. 15 - Replacing the actuator diaphragm

1. Relax the adjustment spring (18) by turning the spring adjusting nut (20) counterclockwise using the adjustment rod – see Figure 2.
2. Follow the relevant instructions in section 9.2 – Replacing the actuator – to remove the actuator from the valve body.
3. Unscrew nuts and bolts (63, 64) and remove washers (65), if any, from the actuator. Separate the lower (51) and upper (52) diaphragm chambers.
4. Remove the diaphragm assembly.
5. Untighten the nut (57), remove the washer (56) (except C series actuators) and replace the diaphragm (55).

6. Refit the washer (56) and tighten the nut (57) with the recommended torque – see section 9.6 – Tightening torques. Except C series actuators.
7. Position the diaphragm assembly on the lower diaphragm chamber, fit the upper diaphragm casing in place and screw nuts and bolts (64, 65) with the washers (62), if any. Tighten with the recommended torque – see section 9.6 – Tightening torques.

9.4. Replacing the adjustment spring

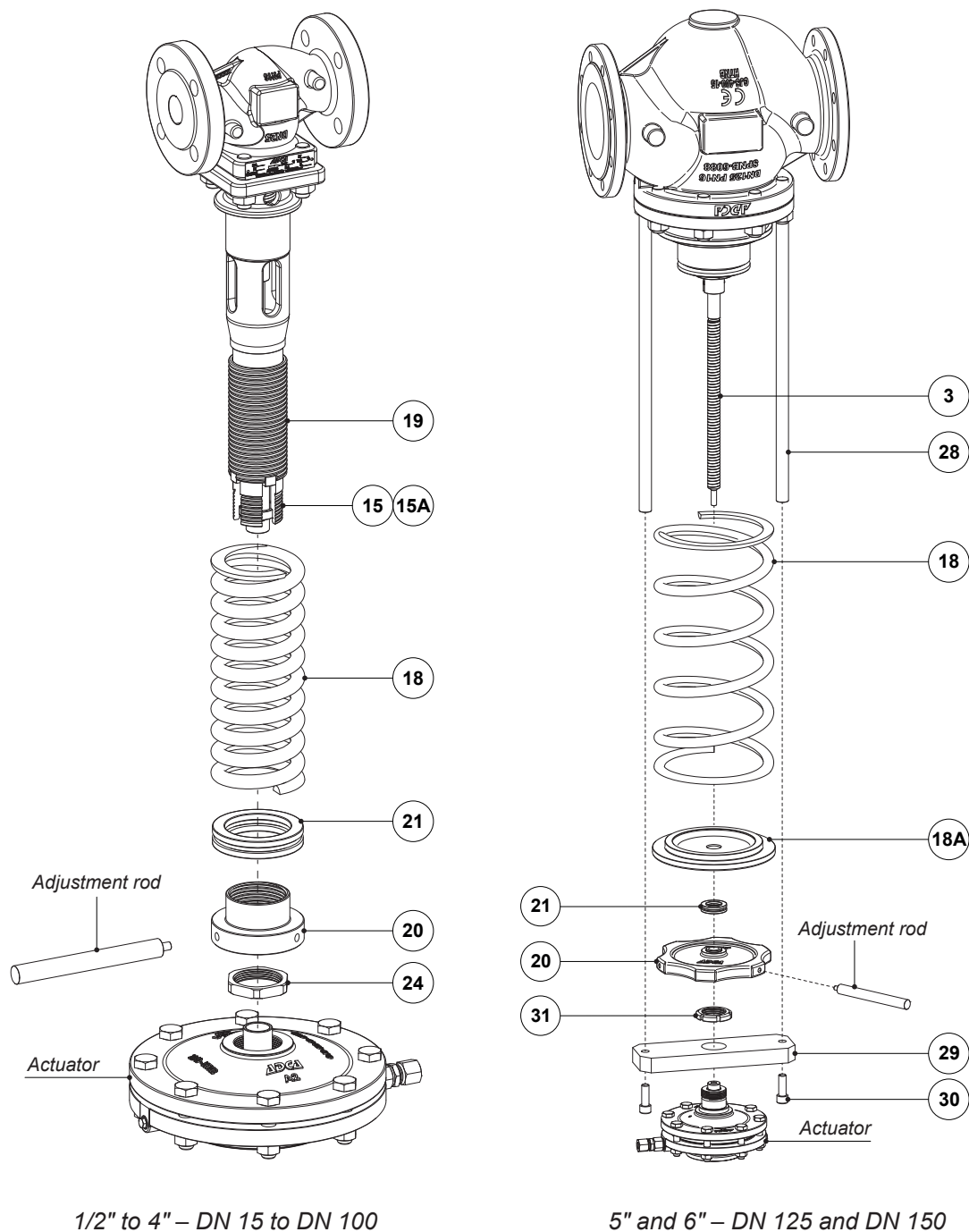


Fig. 16 - Replacing the adjustment spring

1. Relax the adjustment spring (18) by turning the spring adjusting nut (20) counterclockwise using the adjustment rod – see Figure 2.
2. Follow the relevant instructions in section 9.2 – Replacing the actuator – to remove the actuator from the valve body.
3. Proceed as follows for valves DN 15 to DN 100 or NPS 1/2" to 4":
 - a. Unscrew the spring adjusting nut completely and remove it as well as the ball bearing (21) and lower spring plate (18A), if fitted.
 - b. Replace the adjustment spring (18), fit lower spring plate, ball bearing and spring adjusting nut back into place.
 - c. Apply a suitable thread lubricant onto the threaded tube (19).
 - d. Raise the threaded tube (19) with the help of a flat head screwdriver until it touches the spring adjustment nut, center the threads and screw the adjustment nut.
4. Proceed as follows for valves above DN 100 or NPS 4":
 - a. Unscrew the two bolts (30) and remove the pillar flange (29).
 - b. Unscrew the spring adjusting nut (20) completely and remove it as well as the ball bearing (21) and lower spring plate (18A).
 - c. Replace the adjustment spring (18), fit lower spring plate, ball bearing and spring adjusting nut back into place by screwing.
 - d. Fit the pillar flange (29) by screwing the two bolts (30). Tighten with the recommended torque – see section 9.6 – Tightening torques.
5. Follow the relevant instructions in section 9.2 – Replacing the actuator – to reassemble the actuator onto the valve.

9.5. Replacing seat and plug

For instructions on how to replace seat and plug contact VALSTEAM ADCA.

9.6. Tightening torques

POS. N°	DESIGNATION	TORQUE (Nm)
		All sizes
24	Lock nut	100
30	Pillar flange bolts	50
57	Diaphragm assembly nut	120
63, 64	Actuator chamber bolts and nuts	M8: 30
		M10: 45
		M12: 60

10. TROUBLESHOOTING

Before applying any corrective measure, refer to section 1 – Safety information.

If the malfunction cannot be solved with the help of the following table, contact VALSTEAM ADCA or its representative.

Malfunction	Possible cause	Corrective measure
Downstream pressure exceeds the adjusted set point	Foreign matter is stuck between the seat and the plug.	Remove foreign matter.
	Seat and plug are worn or damaged.	Replace the plug and seat. Contact VALSTEAM ADCA.
	The valve is oversized.	- Check valve sizing and if necessary, install a different sized regulator. - Contact VALSTEAM ADCA.
	The sensing pipe is blocked.	Inspect the sensing pipe, flow restrictor, actuator and clean thoroughly.
	The diaphragm of the actuator failed.	Replace the damaged diaphragm.
	The sensing pipe is connected in the wrong place on the downstream pipeline.	- Connect the sensing pipe to another point in the downstream pipeline. - Avoid connecting the sensing pipe close to points where pipework changes direction, or close to valves and fittings.
Downstream pressure drops below the adjusted set point	Foreign matter is blocking the valve.	Remove foreign matter.
	The valve is undersized.	- Check valve sizing and if necessary, install a different sized regulator. - Contact VALSTEAM ADCA.
	Strainer installed upstream of the valve is blocked.	Clean strainer.
	Sensing pipe is blocked.	Inspect the sensing pipe, flow restrictor, actuator and clean thoroughly.
	The sensing pipe is connected in the wrong place on the downstream pipeline.	- Connect the sensing pipe to another point in the downstream pipeline. - Avoid connecting the sensing pipe close to points where pipework changes direction, or close to valves and fittings.
Downstream pressure is unstable	The valve is undersized.	- Check valve sizing and if necessary, install a different sized regulator. - Contact VALSTEAM ADCA.
	The sensing pipe is connected in the wrong place on the downstream pipeline.	- Connect the sensing pipe to another point in the downstream pipeline. - Avoid connecting the sensing pipe close to points where pipework changes direction, or close to valves and fittings.
	The actuator flow restrictor is missing or is too large.	- Reinstall flow restrictor. - Install a smaller flow restrictor or an additional needle valve.
The valve is leaking through the bonnet (stem sealing)	The bellows sealing is damaged.	- Check if the flow restrictor was not removed from the actuator. - Replace bellows. Contact VALSTEAM ADCA.
Leakage through the actuator	Diaphragm is damaged.	- Check if the flow restrictor was not removed from the actuator. - Replace the diaphragm.
Loud noise	High flow velocity or cavitation.	- Check valve sizing and install a larger valve if necessary. - Contact VALSTEAM ADCA.

11. DISPOSAL

Once the product has reached the end of its working life, it should be sent for disposal in accordance with the prevailing national and local regulations.

Before disposal make sure that the product is clean and free from fluid residues.

During its disposal, pay special attention to rubbers, resins and polymer components (PVC, PTFE, PP, PVDF, FKM, NBR, etc.).

Do not dispose of components and hazardous substances together with household waste.

12. RETURNING PRODUCTS

Information regarding hazards and precautionary measures to be considered due to contaminating fluids and residues or mechanical damage that may represent a health, safety or environmental risk, must be provided in writing when returning products to VALSTEAM ADCA.



WARNING

RISK DUE TO PRESENCE OF HAZARDOUS RESIDUES ON RETURNED PRODUCTS

Contaminated fluids and residues may represent an environmental risk, or risk to VALSTEAM ADCA personnel.

- Information regarding any hazards or precautionary measures to be considered must be provided in writing when returning products to VALSTEAM ADCA.
- Health and Safety information sheets relating to any substances identified as hazardous or potentially hazardous must be provided outside the packaging.
- Use Hazmat labels on the packaging.

IMPORTANT NOTE

Total or partial disregard of these Installation and Maintenance Instructions involves loss of any right to warranty.

The extent and warranty period are specified in the “General sales conditions”.