



## USER INSTRUCTIONS

Installation  
Operation  
Maintenance

# Valtek FlowTop

General Service Control Valve  
Type V750 and V752

FCD VLEEIM1485-04 11/22

*This document is the 'Original Instructions'*



## General Service Control Valve - Valtek FlowTop

The Valtek FlowTop product line is low cost, compact and light-weight. Yet, it is rugged and can be used safely and confidently in a wide range of general service applications plant-wide. Its modular design provides trim and material options to suit most service situations. Simplicity of design reduces maintenance and parts inventory costs. It is ideally suited for flow and pressure control of liquid and gas media in oil and gas, power, chemical and petrochemical processing and related industries. The Valtek FlowTop control valve package provides flow rates, control accuracy and reliability at levels comparable to special engineered service control valves, but at a significantly lower cost. The Valtek FlowTop is manufactured to ISO 9001 standards.

The following instructions are designed to assist in unpacking, installing and performing maintenance as required on Flowsolve Valtek FlowTop control valves. This instruction manual does not include specific product design data. Such data can be found on the valve's serial plate or specification documents; additionally, dimensional information can be found in the Valtek FlowTop technical bulletin. Procure needed documents as necessary before you begin any work on the valve.

User Instructions cannot deal with all possible situations and installation options. It is required that only trained and qualified technicians are authorized to adjust, repair or work on control valves, actuators, positioners and other accessories. Review this bulletin prior to installing, operating or performing any maintenance on the valve. Additional Installation, Operation, and Maintenance Instructions (IOMs) cover other features (actuators, handwheels, packing and positioners).

To avoid possible injury to personnel or damage to valve parts, WARNING and NOTICE indicators must be strictly followed. Modifying this product, substituting non-factory parts or using maintenance procedures other than outlined could drastically affect performance and be hazardous to personnel and equipment and may void existing warranties. This manual should be used in conjunction with applicable local and national laws. Failure to comply with User Instructions will render the manufacturer's guarantee and liability null and void. Unless otherwise agreed, the manufacturer's general terms and conditions of sale shall apply.

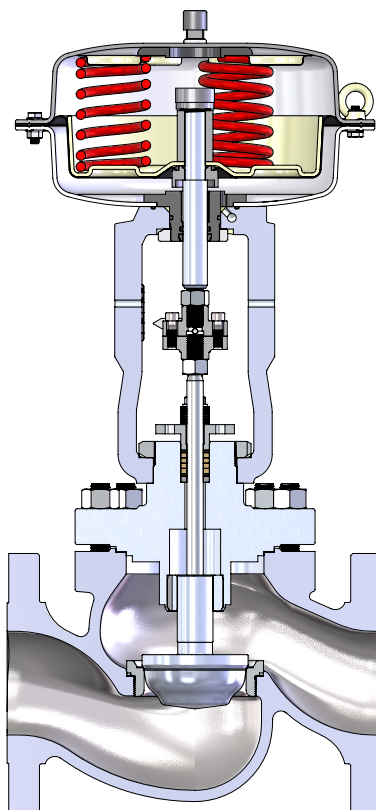


Figure 1: Valtek FlowTop V750 with screwed seat

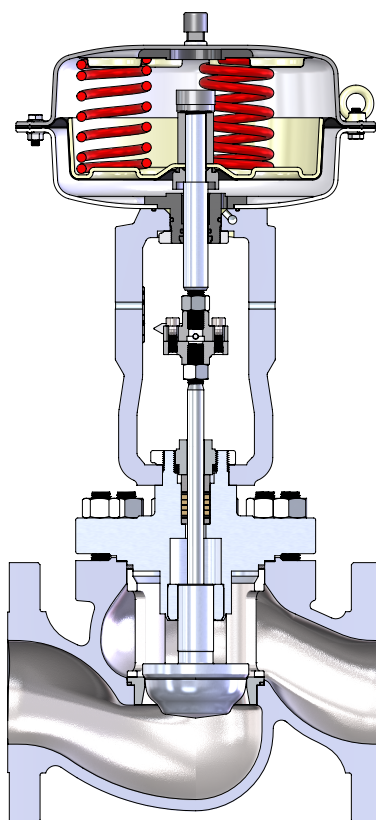


Figure 2: Valtek FlowTop V752 with clamped seat

**Read the user instructions carefully before use.  
Keep for future reference.**

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# 1 Scope of Manual

The following user information covers the Valtek FlowTop general service control valve:

- Screwed seat - Type V750, clamped seat - Type V752
- English ASME Units - Class 150 & 300, NPS ½ - 6
- Assembled with a pneumatic actuator
- Comes with or without ancillary equipment

# 2 Intended Use

**WARNING** Control valves are pressure vessels designed and rated for specific application conditions. Before installation, check the serial number and / or the tag number to ensure that the valve and actuator being installed are correct for the intended application. Do not use the valve outside of its rated design limits. Exceeding the design limits may cause hazardous conditions including leakage of the process media or rupture of the pressure boundary resulting in possible process loss, equipment or environmental damage, or serious personal injury or death.

The specific product design data can be found on the valve's serial plate, data sheet and the calculation sheet (in acc. to the IEC 60534-7:2010).

The noise level emitted by control valves is always determined by the operating data and the installation situation and is different for each application. There is no general typical value for this. In any case, technical measures are used to try to keep this below 80 dB(A). The individually expected pre-calculation noise level can be found in the calculation data sheets.

The Valtek FlowTop handles a wide variety of general service applications, while offering high flow capacity. All sizes come standard with unbalanced trim; for high pressure drop applications optional pressure balanced trim is available for NPS size 3 to 6.

The Valtek FlowTop consists of the body, bonnet, trim, and actuator. The valve is designed with a high level of interchangeability allowing the user to assemble the greatest possible number of variations from a minimum number of components to match each application. There are five bonnet designs: standard bonnet or extended bonnet (either as unbalanced or pressure balanced), and bellows seal bonnets.

The Valtek FlowTop is designed in compliance with **EN 1349:2009** - Industrial Process Control Valves (DIN EN 1349 and VDE 0409-1349).

The Valtek FlowTop is designed for use in **MODERATE** and **WORLDWIDE** environmental conditions. However, the intended use of the pneumatic actuators and the accessories is limited by their permissible ambient temperature application

limits. When operated in the moderate range, a service life of 7 to 10 years can be expected before servicing. Leaks can occur at low temperatures (-60°C to -25°C), at high temperatures permanent damage to the elastomers (+60°C to +80°C, expected service life then < 1 year). Humidity up to 93% non-condensing, air pollution up to 300 µg/m3 unless restricted by accessories.

The product offering may include optional ancillary equipment, such as positioners, air-filter regulators, solenoid valves, limit switches or boosters. Digital, I/P, or pneumatic positioners can be mounted directly, with a mounting bracket or according to NAMUR standards. Refer to the relevant manufacturer's user instructions for information regarding other ancillary equipment.

# 3 Product Identification

Each Valtek FlowTop (V750 and V752) control valve comes with an attached serial plate which includes key information specifically for each control valve:

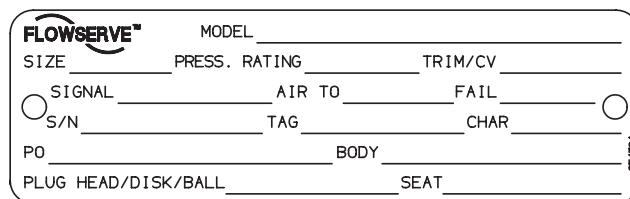


Figure 3: Serial Plate (WW-design, WorldWide)

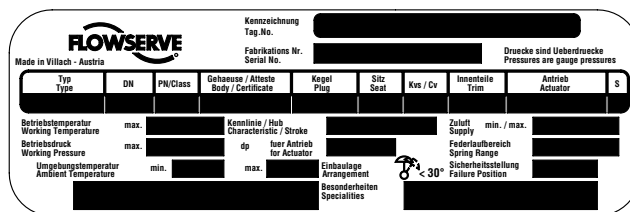


Figure 4: Serial Plate (EU-design, European Union)

The same serial number shown on the plate will appear on all Valtek FlowTop data sheets, dimensional drawings, bills of material, and spare parts lists. Other information located on the serial plate is self-explanatory for the Valtek FlowTop control valve.

You can download .pdf versions of the Valtek FlowTop documentation including a technical bulletin and user instructions at **www.flowserve.com**. It is the user's responsibility to keep this and related documentation on file and accessible for the Valtek FlowTop product.

# 4 Valtek FlowTop Modification

Valtek FlowTop control valves are generally delivered as tested and assembled units, with factory-mounted actuators.

**Unauthorized modification of the Valtek FlowTop control valve voids the product test certification and product warranties, could drastically affect product performance, and could be hazardous to personnel and equipment.**

**NOTICE** Before Valtek FlowTop re-use, all necessary tests must be repeated and recorded in compliance with all test routines, guidelines and engineering standards.

## 5 Safety

Safety terms - WARNING and NOTICE - are used to highlight specific dangers and / or provide additional information that may not be readily apparent in the User Instructions. WARNING directions must be strictly followed.

**⚠ WARNING** or **⚠ WARNING** indicates that severe personal injury, death and substantial property damage can occur if proper precautions are not taken.

**NOTICE** NOTICE indicates practices or provides additional technical information.

Green fields indicate safety-related informations.

## 6 Packaging and Transport

**Pay close attention to shipping marks and transport pictograms.**

Careful packing, loading and transport arrangements are required to prevent products from being damaged during transport. Standard packaging includes a cardboard box, with or without a wooden pallet base as needed. Special packaging may include a wooden box. Packaging may use cardboard, plastic wrap, foam, or paper as packing material. Filling material may be a carton type or paper.

**4** Shipping marks display product and package dimensions and

weight (for further information see Packaging and Sending Instructions, Form L 002). Packing guidelines for export follow HPE standards. (Nonreturnable packaging may contain up to 90% recyclable materials.)

## 7 Storage

**Maximum storage time for control valves is 6 months.**

**NOTICE** The packing box begins to break down after 6 months. Leakage may develop.

Upon arrival on site, store the Valtek FlowTop on a solid base in a cool, dry closed room. Until its installation, the valve must be protected from the weather, dirt and other potentially harmful influences.

Do not remove the protective covers from the body flanges of the control valve or from the instrument ports of the actuator and accessories until the valve is ready for installation at the site.

## 8 Unpacking - Lifting

**Hoisting and lifting are inherently dangerous activities and require safe rigging and proper training to mitigate hazards. Use standard industry safety practices, personal protection, and warranted lifting devices.**

**⚠ WARNING** Crushing hazard ! Arrange rigging to prevent tipping of the control valve. Do not allow the valve assembly to rotate during removal. Do not stand under suspended loads. Failure to do so can cause serious personal injury and damage the valve or nearby equipment.

**NOTICE** Be aware that the center of gravity may be above the lifting point. Do not allow the sling to touch the stem, travel indicator or peripheral equipment. Observe the maximum permitted working load limit.

Flowserve is not a transport and lifting company. It is the responsibility of the persons commissioned on site to carry

out these tasks in accordance with good and relevant rigging and lifting practices and in compliance with the currently applicable rules. The proposals presented are tried and tested methods from the manufacture of control valves. We are in no way responsible for the local practices that result from the suggestions made here. The situation, the possibilities and the requirements on the plant site are simply too individual and must be included in the planning and realization of this task. The aim is to ensure safe and trouble-free operation because of rigging and lifting.

**WARNING** Due to the design, sharp edges cannot be completely avoided - always wear cut-resistant gloves and safety shoes.

The stem of the valve and actuator are burnished, sealing surfaces are carefully machined, any damage inevitably leads to premature wear and leakage during subsequent operation. Control valves are supplied with accessories, piped, adjusted, and tested in the factory. Damage to the supply piping, to the lever mechanism of the positioner or to the limit switch or in general to the built-on accessories leads to malfunctions, which must be repaired before commissioning and for which the manufacturer is not liable.

1. Check the packing list against materials received to ensure all components and accessories are present.
2. Control valves are usually packaged lying down and arrive at their place of installation. There they must be properly erected to be transported to their final location.
3. Small valves under 23 kg are usually moved by hand, see Figure 5 for suggestions for handling heavier valves.

**WARNING** Ring nuts and Ring bolts according to DIN 580 and DIN 582 may only be loaded in the longitudinal direction of the ring plane, considering their load capacity. Inclined loads or transverse loads are not permitted!

4. Upon removing the control valve from the packaging, we recommend that you:
  - Promptly touch up any damage to the corrosion protection.
  - Contact your shipper immediately to report any damage.
  - Call your Flowserve representative if you experience any problems.
  - Do not remove the protective covers from the body flanges of the control valve or from the instrument ports of the actuator and accessories until the valve is ready for installation at the site.

Suggested rigging method / maximum load capacity:



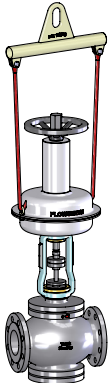
Without lifting points		2 lifting eye nuts
< 23 kg	> 23 kg	WLL ≤ 280 kg
		

Figure 5: Valtek FlowTop rigging method

## 9 Installation

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

**NOTICE** *The successful sizing and selection of control valves depends on the knowledge of the actual process conditions in the system in which the valve will be installed. This clear information about the operating conditions is not always available. However, the more assumptions made about the flow conditions, the less accurate the sizing of the control valve. Basically, control valves are designed according to the operating data specified by the customer. The following standards can be used to calculate control valves: Kv value calculation - EN 60543-2-1, ANSI / ISA 75.01.01 and noise calculation - EN 60534-8-3, EN 60534-8-4, VDMA 24 422/1979/1989 (withdrawn). If these calculations attest a critical valve operating condition, the selection of suitable trims divides these into several uncritical throttle points. Since all these calculations consider only the punctual installation location of the valve, these are only valid under the condition of an “undisturbed pipe flow profile”. This pipe flow can only be achieved by professional piping - according to the recognized rules of technology - with sufficient distance to sources of interference such as pumps, bends, T-pieces, pipe extensions, pipe reducers or other valves. Yes, even improperly executed welds near the control valve can affect design accuracy and adversely affect the predicted valve behavior. **The minimum SPR (straight piping run) should be 0.5 meters or 6 x DN upstream and downstream of the valve.** In case of problematic operating conditions (cavitation, evaporation, two-phase flow, noise, excessive medium speeds, etc.) double the downstream section. As a preventive measure, vibration situations and pressure pulsations in the pipeline can be identified by pulsation studies (VDI 3842) by the plant planner or operator and avoided by suitable planning measures. Experience has shown that control valves are operated continuously with a workload of 10 - 90%. In particular, continuous operation < 10 % can damage the control valve. Subsequent changes using a modified interior trim are only possible to a limited extent and do not always lead to success. In the worst case, such a problem can be resolved only by a subsequent expensive pipe change. Flowserve Control Valves GmbH is a manufacturer of valves, not a piping contractor. Our expertise is in the design and manufacture of control valves. This does not include piping design and layouts. It is in the responsibility of the plant planner / operator to install the valve to good piping practices. We kindly provide this information based on our wealth of experience and expressly emphasize that we cannot in any way accept responsibility for the actual performance of a pipeline installation resulting from the recommendations given here. As a rule, it should be assumed that the shorter the straight pipe run before a valve, the higher the probability of turbulent flow into the valve.*

 **Prior to installation of the valve, we require, that you check the following conditions to reduce the risk of malfunction and safety related incidents.**

No.	Check	Possible malfunction or safety related incident
1	Confirm that the nominal / operational data on the serial plate matches the operational data of the facility.	<i>An operational mismatch can cause considerable damage to the valve or may lead to a failure at the facility.</i>
2	Confirm that the line is clear of dirt, welding slag, chips, scale or other foreign material.	<i>The risk of control valve damage due to foreign particles will be reduced if a suitable strainer is installed upstream of the valve. (Suggested mesh size of 0.004 inch (0,1 mm))</i>
3	Confirm the piping flanges are coaxial, parallel, and correspond with the face-to-face dimension of the valve.	<i>Incompatible sizing may result in excessive tension, valve malfunction or flange connection leakage.</i>
4	Confirm the piping is routed correctly and the valve is free of additional piping forces.	<i>Incorrect routing may result in leakage and / or potential valve failure.</i>
5	Confirm that the control valve can be installed in an upright position whenever possible.	<i>Non-upright positioning may increase wear in the packing, resulting in leakage and premature wear.</i>

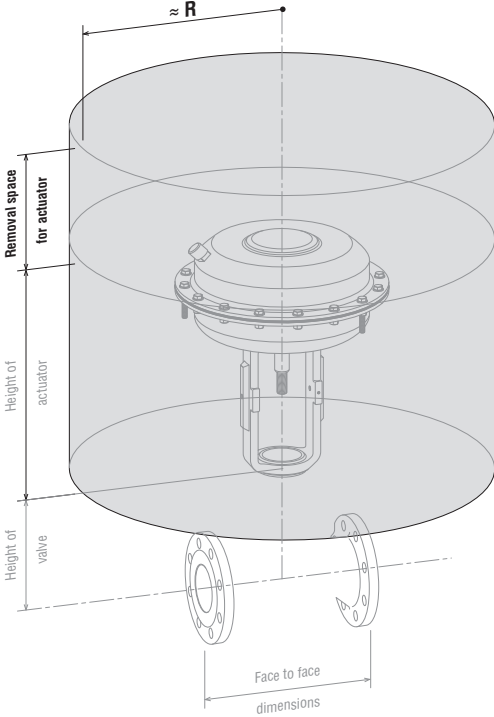
No.	Check	Possible malfunction or safety related incident																				
6	<p>Confirm the actuator has enough overhead clearance to disassemble the plug from the valve body.</p> <table border="1" data-bbox="236 824 791 1028"> <thead> <tr> <th rowspan="2">Actuator Code</th> <th colspan="2">Removal Space</th> <th colspan="2">≈ R</th> </tr> <tr> <th>mm</th> <th>inch</th> <th>mm</th> <th>inch</th> </tr> </thead> <tbody> <tr> <td>253</td> <td rowspan="3">180</td> <td rowspan="3">7.1</td> <td>260</td> <td>10.2</td> </tr> <tr> <td>503</td> <td>290</td> <td>11.4</td> </tr> <tr> <td>701</td> <td>330</td> <td>13.0</td> </tr> </tbody> </table> <p style="text-align: center;"><i>Table 2: Overhead clearance dimensions</i></p>	Actuator Code	Removal Space		≈ R		mm	inch	mm	inch	253	180	7.1	260	10.2	503	290	11.4	701	330	13.0	 <p style="text-align: center;"><i>Figure 6: Overhead clearance drawing</i></p>
Actuator Code	Removal Space		≈ R																			
	mm	inch	mm	inch																		
253	180	7.1	260	10.2																		
503			290	11.4																		
701			330	13.0																		
7	<p>Confirm there are suitable straight piping run upstream and downstream of the valve installation site in order to minimize a sudden pressure surge in the flow.</p>	<p><i>Absence of suitable piping lengths can create critical operating conditions and cause unacceptable levels of noise and vibration.</i></p>																				
8	<p>Confirm removal of all hazards and ensure appropriate protective measures are in place.</p>	<p><i>none</i></p>																				
9	<p>Confirm flow direction to ensure the correct valve installation. Flow direction is indicated by the arrow on the valve body.</p>	<p><i>Improper flow direction causes critical changes to operating conditions that may damage the control valve.</i></p>																				
10	<p>Confirm that the air supply and instrument signal lines are dry and clear of dirt and oil.</p>	<p><i>At a minimum, the instrument air must conform to ISA- 7.0.01-1996 (ISO 8573-1 Compressed Air - Class 2) requirement or those of the accessory manufacturer.</i></p>																				
11	<p>Confirm the valve is grounded in order to prevent an electrical discharge.</p>	<p><i>Noncompliance may result in electrical discharges.</i></p>																				
12	<p>Confirm that the bonnet bolting of valves used in NACE MR 0175 / MR 0103 or ISO 15 156 applications are ventilated.</p>	<p><i>Do not cover or insulate over bonnet flange bolting !</i></p>																				
13	<p>Throttling control valves are typically equipped with a pneumatic actuator and valve positioner. Refer to the appropriate positioner manual for connections and maximum air supplies.</p>	<p><i>The air supply must be limited to less than 87 psig (6 bar) per the actuator serial plate. An air filter regulator should be installed to ensure that the supply pressure to the pneumatic actuator does not exceed the air supply pressure indicated on the WW or EU serial plate.</i></p>																				

Table 1: Basic safety messages for installing the valve

After these requirements are confirmed the valve can be installed and connected in the piping.

1. Remove the protective flange covers and coating from the control valve; clean the flange gasket surface.

**NOTICE** Unsuitable cleaning agents can damage and cause leakage in PTFE and graphite gaskets. Consult a current chemical resistance list before applying.

2. Install the control valve in an upright position whenever

possible. Vertical installation permits easier valve maintenance.

3. Install and connect the control valve to the pipeline. Locate gaskets in the center of the body flanges and secure nuts and bolts.
4. Connect the power supply and instrument signal lines.




## 10 Valve Quick-Check

Apply appropriate personal protective equipment when working on the control valve to prevent hazards arising from the operation. Protect yourself against freezing, burns and cuts by wearing appropriate protective clothing, gloves and eye protection.

Do not over-tighten packing.

Sudden exposure of the control valve to full working pressure and temperature may cause stress cracks.

 Prior to valve operation, we require, that you check the following conditions to reduce the risk of malfunction and safety related incidents.

No.	Important information	Possible malfunction or safety related incident
1	Avoid critical operating conditions where excessive noise or vibration levels might occur.	Impermissible continuous operation of a control valves under critical conditions can damage the valve.
2	Avoid frequent system start-ups and shutdowns.	Critical operating conditions, which can damage the control valve, may be encountered during system start-up or shut down.
3	Keep the operating medium free of foreign particles.	Installing a suitable strainer upstream of the control valve can prevent foreign particles from damaging the valve.
4	Instrument air must conform to ISA 7.0.01-1996 (with a dew point at least 18°F (10°C) below ambient temperature, particle size below 1 µm and oil content not to exceed 1 ppm)	Contaminated instrument air can damage the accessories and control valve or cause them to fail.
5	 Do not touch the body and bonnet ! The temperature of the operating medium is transferred to the surface of the linear actuator.	Excessive hot surface temperatures can put you at risk for burns. Frigid surface temperatures can put you at risk for freezing.
6	 Critical operating conditions can cause excessive or hazardous levels of vibration or noise.	Impermissible levels of vibration can cause hearing loss, vascular and nerve damage and damage to joints and bones. Use hearing protection when noise levels exceed 80 dB(A).
7	 Incorrect maintenance can result in the emission of hot, cryogenic, and / or toxic operating media.	Incorrect maintenance can put you at risk for heat related burns, freezing, acid burns or poisoning.



**⚠ WARNING** Due to risk of crushing hazard, do not work between the yoke legs while the valve is in operation.

Prior to start-up, we strongly recommend that you:

1. Stroke the valve and compare the plug position indicator on the stem clamp to the stroke indicator plate. The plug should change position in a smooth, linear fashion.

**NOTICE** *If over tightened, excessive friction may impair smooth control.*

2. Adjust instrument signals to ensure a full stroke.
3. Check the packing box bolting to ensure the correct adjustment (See Section 11: Valve Maintenance).

**NOTICE** *Over tightening can cause excessive packing wear and high stem friction that may impede plug movement.*

4. Continuously increase load until operation parameters are reached.
5. Minor relaxation of the flange bolting is possible after initial assembly. Retorque the bonnet flange bolting if necessary before installation or following an initial temperature excursion to ensure the bonnet gaskets do not leak (See Table 4).

Pressure Size	Class 150 <sup>1)</sup>		Class 300 <sup>1)</sup>	
	Nm	ft lb	Nm	ft lb
1/2"	15	11	15	11
3/4"				
1"				
1 1/2"	17	13	21	16
2"	22	16	27	20
3"	26	19	43	32
4"	46	34	76	56
6"	76	56	146	108

<sup>1)</sup> V750 is designed for Class 150 while V752 is designed for Class 300

Table 4: Recommended Body Bolt Torque Values

## 11 Valve Maintenance

Maintenance intervals and service life of a valve can only be determined empirically on site. The intervals specified in the User Instructions are recommendations and serve only as a guide. Under problematic operating conditions, maintenance intervals may be significantly reduced. We strongly recom-

mend a site survey followed by establishing a documented procedure for performing the maintenance work. Maintenance personnel should perform and log the work accordingly. The data collected can be used as a basis for dynamically determining the maintenance intervals and activities.

Recommended Maintenance Actions					
No.	Service	Inter- val	Valve Condition		
			Good	Adequate	Inadequate
1	Visual inspection of the valve	Bi-weekly	No action	Clean valve stem with a soft cloth	Overhaul or replace valve after product lifecycle
2	Visual inspection of the packing	Bi-weekly	No action	Retighten leaky packing box	Replace leaky packing box immediately
	Preventive change of the PTFE-packing	→	Dependent upon results of previous maintenance (see numbers 1 and 2 above) or a minimum of once every 24 months		
	Preventive change of the Graphite-packing	→	Dependent upon results of previous maintenance (see numbers 1 and 2 above) or a minimum of once every 18 months		
3	Visual inspection of body bolting	Yearly	No action	Retighten body bolting if bonnet gasket leaks.	Remove from service and replace body bolting immediately if gasket leakage persists or if bolting is damaged
4	Visual inspection of the actuator	Bi-weekly	No action	Clean actuator stem with a soft cloth	Overhaul or replace actuator after product lifecycle
5	Preventive overhaul of the valve	→	Dependent upon results of previous maintenance (see numbers 1 to 4 above) or a minimum once every 60 months		
6	Operation test	→	No action	Perform 3 full strokes if packing and / or bonnet tightening is modified; check for leakage	

Recommended maintenance actions using the Logix digital positioner with ValveSight diagnostic solution software					
No.	Service	Interval	Valve Condition		
			Good	Adequate	Inadequate
7	Visual inspection of diagnostic interface	Weekly	No action - valve is healthy	Take action per warning	Overhaul or replace required part per alarm
8	Check health parameter of valve	Warning	No action - valve is healthy	Replace packing box components per warning	Overhaul or replace valve after alarm
9	Check health parameter of actuator	Warning	No action - actuator is healthy	Check and retighten air supply	Overhaul or replace actuator after alarm
10	Check health parameter of control	Warning	No action - control is healthy	Overhaul or replace valve; trim and bonnet components must be checked and / or repaired after alarm	
11	Check health parameter of positioner	Warning	No action - positioner is healthy	Start step test	Overhaul or replace positioner after alarm

Table 5: Service activities check list

 Prior to valve operation, we require, that you check the following conditions to reduce the risk of malfunction and safety related incidents.


No.	Check	Possible malfunction or safety related incident										
1	Check the packing follower for proper tightness.	<p>The standard version is described here. Further details are described on pages 19, 20, 22. The packing follower is factory adjusted. If leakage is detected around the packing follower tighten it clockwise using a wrench in quarter turn intervals until the leakage stops.</p> <table border="1"> <thead> <tr> <th>Wrench Size</th> <th>Adjustment Interval</th> <th>Maximum Adjustment</th> </tr> </thead> <tbody> <tr> <td>SW 24 ~ 15/16 AF</td> <td rowspan="3">quarter turn</td> <td>one,</td> </tr> <tr> <td>SW 32 ~ 1 1/4 AF</td> <td>three-quarter turn</td> </tr> <tr> <td>SW 46 ~ 1 13/16 AF</td> <td>one complete turn</td> </tr> </tbody> </table> <p>Table 7: Packing Adjustment</p> <p>Do not overtighten packing.</p> <p>Overtightened packing can cause excessive packing wear and high stem friction that may impede plug movement.</p> <p>If leakage cannot be stopped, the packing must be replaced.</p>	Wrench Size	Adjustment Interval	Maximum Adjustment	SW 24 ~ 15/16 AF	quarter turn	one,	SW 32 ~ 1 1/4 AF	three-quarter turn	SW 46 ~ 1 13/16 AF	one complete turn
Wrench Size	Adjustment Interval	Maximum Adjustment										
SW 24 ~ 15/16 AF	quarter turn	one,										
SW 32 ~ 1 1/4 AF		three-quarter turn										
SW 46 ~ 1 13/16 AF		one complete turn										
2	Check for signs of gasket leakage through the bonnet and end flanges.	Tighten the bonnet bolting nuts. See Section 13: Disassembly and Reassembly for instructions. Also see Table 4 in Section 10.										
3	Check if all nuts and bolts are securely fastened.	 <b>Avoid critical operating conditions if excess noise or vibration levels occur during operation.</b>										
4	Check valve for smooth, full-stroke operation. Unsteady stem movement could indicate an internal valve problem.	Internal valve failure requires an immediate overhaul or control valve replacement by qualified staff.										

Table 6: Basic safety messages for maintenance the valve

After these requirements are confirmed proceed with valve maintenance.

**⚠ WARNING** **Crushing hazard ! Failure to keep hands, hair, and clothing away from all moving parts when operating the control valve can cause serious injury.**

1. Clear all dirt and / or foreign material from the plug stem and control valve.
2. If leakage is detected, retighten the packing follower by one full turn clockwise (See Table 7: Packing Adjustment).
3. If retightening packing does not stop the leakage, overhaul the control valve and replace the packing (See Section 13: Disassembly and Reassembly).
4. If leakage is detected, retighten bonnet and flange bolting.

5. Make sure all nuts and bolts are securely fastened.
6. If possible, stroke the valve and check for smooth, full-stroke operation. Unsteady stem movement could indicate an internal valve problem.
7. Make sure all accessory brackets and bolting are securely fastened.
8. Check control valve health parameters:
  - Characteristic curves of the valve with flow
  - Upstream pressure
  - Downstream pressure

into the control room.

**NOTICE** *Monitor trim and bonnet components. If nominal and actual values differ by more than 5%, maintenance may be required.*

## 12 Troubleshooting

**Contact customer service department or contract partner for any fault or defect found, otherwise the manufacturer's guarantee shall be rendered null and void and the manufacturer released from any responsibility. If the user performs the repairs, these User Instructions must be adhered to and carried out in a competent manner. Original Equipment Manufacturer spare parts must be used to make the repair.**

Defect	No.	Possible Causes	Remedy
Stem does not move	1.1	• No auxiliary energy supply (pneumatic air) to actuator and accessories (positioner, air filter regulator, solenoid valve, limit switch, and/or special accessories)	• Pneumatic actuators: Check supply for leaks Check air pressure (usually 87 psig; 6 bar)
	1.2	• Mounted accessories do not work	• See User Instructions for accessory manufacturer
	1.3	• Pneumatic actuator is defective	• Contact customer service department or contract partner
	1.4	• Excessive tightening of the packing box	• Loosen packing follower until valve operates properly  <b>NOTICE</b> <i>Make sure there are no leaks.</i>
	1.5	• Valve trim worn or stuck	• Contact customer service department or contract partner
Jerky stem movement	2.1	• Damaged stem	• Contact customer service department or contract partner

Defect	No.	Possible Causes	Remedy
Jerky stem movement	2.2	<ul style="list-style-type: none"> <li>Actuator not powerful enough</li> </ul>	<ul style="list-style-type: none"> <li>Compare actuator specifications on the serial plate with operation specifications of the facility. If incompatible, contact customer service department or contract partner</li> </ul>
Stem travel less than full stroke (0 to 100 %)	3.1	<ul style="list-style-type: none"> <li>Air supply pressure too low</li> </ul>	<ul style="list-style-type: none"> <li>Provide air at the pressure stated on the serial plate (European production only).</li> </ul>
	3.2	<ul style="list-style-type: none"> <li>Pneumatic actuators: Improper handwheel position</li> </ul>	<ul style="list-style-type: none"> <li>Move handwheel to limit position , otherwise contact factory for information.</li> </ul>
	3.3	<ul style="list-style-type: none"> <li>Improperly adjusted or defective positioner</li> </ul>	<ul style="list-style-type: none"> <li>Readjust positioner to positioner manufacturer's specification</li> </ul>
	3.4	<ul style="list-style-type: none"> <li>Foreign particles in valve seat or damaged trim</li> </ul>	<ul style="list-style-type: none"> <li>Contact customer service department or contract partner</li> </ul>
Excessive valve seat leakage	4.1	<ul style="list-style-type: none"> <li>Damaged sealing surfaces on valve seat or plug</li> </ul>	<ul style="list-style-type: none"> <li>Contact customer service department or contract partner</li> </ul>
	4.2	<ul style="list-style-type: none"> <li>Foreign particles in seat area</li> </ul>	<ul style="list-style-type: none"> <li>Contact customer service department or contract partner</li> </ul>
	4.3	<ul style="list-style-type: none"> <li>Plug does not close fully</li> </ul>	<ul style="list-style-type: none"> <li>Refer to No. 3.1 to 3.5</li> </ul>
Leaking packing box system	5.1	<ul style="list-style-type: none"> <li>Compression force on packing box too low</li> </ul>	<ul style="list-style-type: none"> <li>Slightly retighten packing box</li> </ul> <p><b>NOTICE</b> <i>Make sure stem can still move.</i></p>
	5.2	<ul style="list-style-type: none"> <li>Worn packing</li> </ul>	<ul style="list-style-type: none"> <li>Slightly retighten packing box</li> </ul> <p><b>NOTICE</b> <i>Make sure stem can still move.</i></p> <p>If the packing does not stop leaking, contact customer service department or contract partner</p>
	5.3	<ul style="list-style-type: none"> <li>Dirty stem</li> </ul>	<ul style="list-style-type: none"> <li>Clean stem with suitable cleaning agent</li> </ul>
	5.4	<ul style="list-style-type: none"> <li>Damaged stem</li> </ul>	<ul style="list-style-type: none"> <li>Contact customer service department or contract partner</li> </ul>
Leaking bonnet gasket	6.1	<ul style="list-style-type: none"> <li>Gasket compression is too low</li> </ul>	<ul style="list-style-type: none"> <li>Properly retighten bonnet bolting nuts crosswise</li> </ul>
	6.2	<ul style="list-style-type: none"> <li>Gasket defective</li> </ul>	<ul style="list-style-type: none"> <li>Contact customer service department or contract partner</li> </ul>
	6.3	<ul style="list-style-type: none"> <li>Corrosion</li> </ul>	<ul style="list-style-type: none"> <li>Contact customer service department or contract partner</li> </ul>
Leaking body	7.1	<ul style="list-style-type: none"> <li>Corrosion or high velocity related damage</li> </ul>	<ul style="list-style-type: none"> <li>Contact customer service department or contract partner</li> </ul>
No limit switch signal	8.1	<ul style="list-style-type: none"> <li>Power supply to limit switch interrupted</li> </ul>	<ul style="list-style-type: none"> <li>Check power supply (connections, circuit breakers, voltage)</li> </ul>
	8.2	<ul style="list-style-type: none"> <li>Limit switch out of adjustment</li> </ul>	<ul style="list-style-type: none"> <li>Readjust limit switch operating distance; see limit switch data sheet</li> </ul>
Unstable positioner	9.1	<ul style="list-style-type: none"> <li>Defective positioner</li> </ul>	<ul style="list-style-type: none"> <li>See user instruction of the positioner manufacturer</li> </ul>

## 13 Disassembly and Reassembly

The Valtek FlowTop control valve is allowed to be disassembled and reassembled only by qualified staff - personnel who are familiar with disassembling, re-assembling, installation and commissioning of this product, and possess the relevant qualifications in their field of activity.

When performing repairs, personnel are to follow these instructions using only **original** equipment manufacturer (OEM) spare parts and recommended special tools to ensure the reliability of the Valtek FlowTop control valve.

Only Flowserve trained and authorized personnel are allowed to repair (disassemble and reassemble) the Valtek FlowTop in hazard areas.

Valves are provided for oil and grease-less service or oxygen service may only disassembled and reassembled in clean rooms (ISO 14644- ISO 8, US FED STD 209 E - M 6.5, or equivalent).

**⚠ WARNING** Control valves are pressure vessels. Improper opening of the valve or actuator can result in bodily injury.

**⚠** Prior to disassemble and reassemble, we require, that you check the following conditions to reduce the risk of malfunction and safety related incidents.

No.	Important information	Possible malfunction or safety related incident
1	Disregarding these instructions may bring serious or harmful consequences.	<i>Failure to comply with these user instructions will render the manufacturer's guarantee and liability null and void. Unless otherwise agreed, the manufacturer's general terms and conditions of sale shall apply.</i>
2	<b>⚠</b> Always observe system safety instructions when preparing for and performing the repair procedure.	<b>Potential hazards and their sources are under the operator's influence. The operator must observe national and international environmental regulations for control valve removal from the pipe and cleaning. Permissible exposure limits must be maintained, appropriate personal protective equipment must be used and service personnel must be properly instructed in performing the repair procedure.</b>
3	<b>⚠</b> Make sure the pipeline is depressurized and in ambient state, also a suitable rigging (e.g. Endless Sling) and securing devices (e.g. Vee Trough with Stands / Vise) are readily available.	<b>Remove the Valtek FlowTop from the pipeline in a depressurized and ambient state. Failure to do so can cause serious personal injury. The control valve is not equipped with integral stands, therefore guard against the valve from tipping over. Bodily injuries can be the result. Use appropriate clamps, blocking or other stabilizing support. Attachment to overhead crane can ensure stability.</b>
4	Confirm that you have the required spare parts at the site.	<i>Not having the full complement of parts, accessories and tools can slow or stop repair work.</i>
5	<b>⚠</b> Confirm that you have the required tools available to manage the disassembly and reassembly (See Section 16: Special Tools).	<b>Improper tools and / or improper use of tools can result in personal injury or damage to the parts.</b>
6	Review the serial plate information to identify the valve. The serial number and the part numbers needed are required when ordering spare parts.	<i>A serial plate used for product identification is attached on every control valve (See Section 3: Product Identification).</i>
7	Do not damage any valve surfaces during repair.	<i>Damaging the stem surface and / or packing area may lead to premature leakages in the packing area.</i>
8	Check all parts for damage such as scoring, deformities, corrosion or overexpansion.	<i>If in doubt, replace faulty parts. Never reuse gaskets.</i>

Table 9: Basic safety messages for repairing the control valve

After these requirements are confirmed the control valve can be maintained and repaired.

## Description of the Procedure

1. Disconnect the air supply from the actuator and / or assembled accessories.
2. Disassemble the positioner from the valve as necessary (See Figure 7: Remove the positioner).
3. Move the actuator to the open (retracted) position.
4. Turn the cap screws (240) counter clockwise to loosen (See Figure 8: Remove the actuator).
5. Turn the lock nut (113) clockwise to loosen. Keep actuator coupling (345) from turning by securing with a wrench.
6. Turn the yoke lock nut (76) counter clockwise to loosen.
7. Lift off and store the actuator safely.
8. Place the valve body assembly on a table for disassembly.

**NOTICE** Before you start working, find out which valve variant you are dealing with. There are basically two different constructions that primarily relate to the seat design. This also applies to the bonnets and packing, which are all described individually due to the variety of combinations.

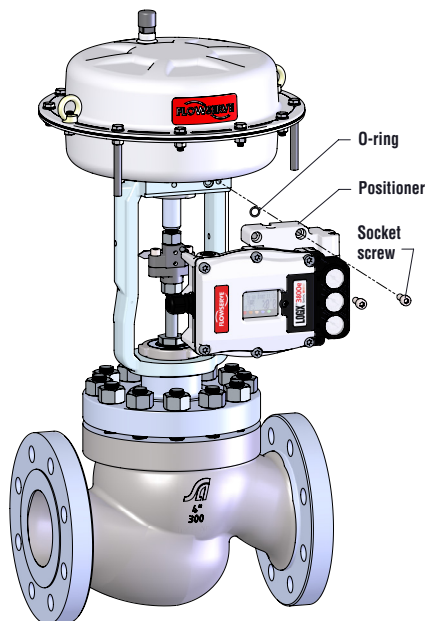


Figure 7: Remove the positioner

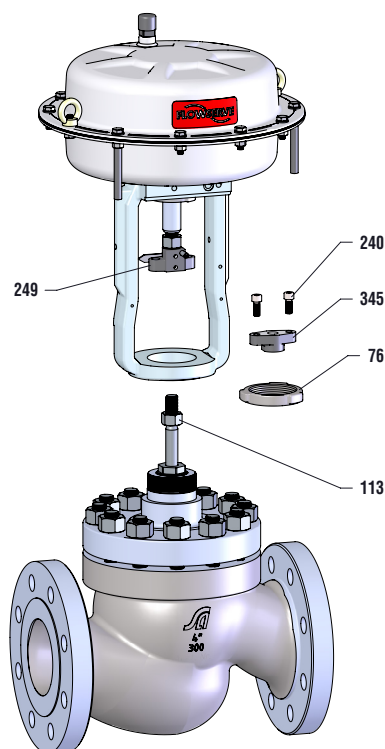


Figure 8: Remove the actuator

Item	Part	Item	Part
76	Yoke Lock Nut	249	Actuator Coupling
113	Lock Nut	345	Valve Coupling
240	Socket Head Srew (2x)		

Table 10: Coupling parts identification

### Clamped seat ring design - disassembly instructions of the valve body assembly

1. Turn the bonnet nuts (114) counter clockwise to loosen.
2. Place the Ring Nut Tool (See Section 16: Special Tools) on the stem (51) then slowly lift the bonnet assembly (40) upwards out of the body (1).

**WARNING** **Crushing hazard ! Lifting the bonnet and plug from the control valve involves personal physical risk by falling parts.**

Please exercise caution.

**NOTICE** *Exercise care with a pressure balanced plug design. While removing the pressure balanced plug, the retainer may stick to the bonnet then become detached while lifting the plug and stem out of the valve. Secure the seat retainer as you remove the plug and stem.*

3. Remove the bonnet gasket (58) and seat retainer gasket (56).
4. Remove the seat retainer (30), seat ring (20) and profile ring (55).
5. Check stressed surface areas for damage such as scoring and deformities.
6. To disassemble the bonnet assembly, switch to the relevant description.
7. Use a standard brass scraper or other suitable tool to clean bolting. Check for corrosion or any other damage.

### Clamped seat ring design - reassembly instructions of the valve body assembly.

8. Lubricate all bolt and screw threads and bearing surfaces (stem, underside of the nuts) with a suitable, approved lubricant (See Section 15: Lubricants).

**NOTICE** *Never allow lubricants to come in contact with the bonnet or sealing surfaces.*

9. Install a new profile ring (55) and seat ring (20).
10. Lower the seat retainer (30) into the body and place it on top of the seat ring (See Figure 9).

11. Lower the plug assembly (50) into the body with the plug touching the seat ring surface.

**NOTICE** *For details, see the associated bonnet variant (see Page 17 - 19).*

12. Install the new seat retainer gasket (56) and the new bonnet gasket (58).
13. Carefully lower the bonnet (40) onto the plug in the body of the valve (See right column for pressure balanced trim).
14. Install and finger tighten the bonnet nuts (114) to the bonnet bolts (108).

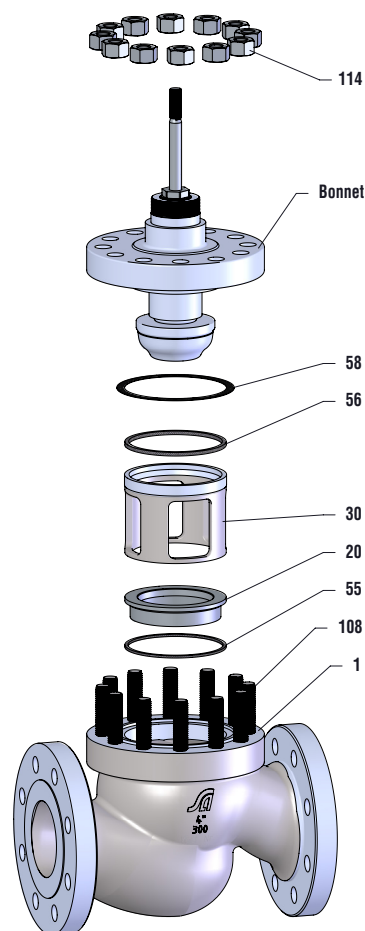


Figure 9: Disassemble / Reassemble the valve

Item	Part	Item	Part
1	Body	56	Seat retainer gasket
20	Seat ring	58	Bonnet gasket
30	Seat retainer	108	Stud bolt
(40)	Bonnet	114	Hex nut
55	Profile ring		

Table 11: Valve parts

15. Install the new packing.

**NOTICE** For details, see the associated packing variant (see Page 19 - 20). Install and push two packing rings consecutively using the Tamping Tool and pre-tighten it. Repeat the procedure with remaining rings. Rotate each ring 180° from the overlapping point. Make sure each ring is clean. Dirty rings result in stem leakage.

16. Tighten the bonnet nuts (114) in four steps - 30%, 60%, 100%, and all around 100% - using a crosswise pattern (See Section 14: Torque Requirements).

**NOTICE** Check the plug's freedom of movement by lifting it approximately ~10 mm (0.4 inch) between tightenings. Loosen the bolted connection and start again if it proves difficult to move the plug.

17. Finish packing follower (80) tightening with a wrench (See Table 7, Page 10, 19 - 20).

18. Replace the pneumatic diaphragm actuator and accessories (See page 21).

19. After reinstalling the control valve in the pipeline, perform 3 full strokes and check the tightening of the packing follower and bonnet bolting.

**NOTICE** Do not over tighten the packing. Over tightened packing may produce higher friction and reduce product service life.

20. Log the maintenance interval and the work performed.

### Screwed seat ring design - disassembly instructions of the valve body assembly

1. Turn the bonnet nuts (114) counter clockwise to loosen.
2. Place the Ring Nut Tool (See Section 16: Special Tools) on the stem (51) then slowly lift the bonnet assembly (40) upwards out of the body (1).

**⚠ WARNING** Crushing hazard ! Lifting the bonnet and plug from the control valve involves personal physical risk by falling parts.

Please exercise caution.

**NOTICE** Exercise care with a pressure balanced plug design. While removing the pressure balanced plug, the retainer may stick to the bonnet then become detached while lifting the plug and stem out of the valve. Secure the seat retainer as you remove the plug and stem.

3. Remove the bonnet gasket (58).

4. Remove the seat ring (20) and profile ring (55).

**NOTICE** Do a visual inspection. Only remove parts that are to be replaced.

5. Check stressed surface areas for damage such as scoring and deformities.

6. To disassemble the bonnet assembly, switch to the relevant description.

7. Use a standard brass scraper or other suitable tool to clean bolting. Check for corrosion or any other damage.

### Screwed seat ring design - reassembly instructions of the valve body assembly.

8. Lubricate all bolt and screw threads and bearing surfaces (stem, underside of the nuts) with a suitable, approved lubricant (See Section 15: Lubricants).

**NOTICE** Never allow lubricants to come in contact with the bonnet or sealing surfaces.

9. Install a new profile ring (55) and seat ring (20) if previously disassembled.

10. Lower the plug assembly (50) into the body with the plug touching the seat ring surface.

**NOTICE** For details, see the associated bonnet variant (see Page 17 - 19).

11. Install the new bonnet gasket (58).

12. Carefully lower the bonnet (40) onto the plug in the body of the valve.

13. Install and finger tighten the bonnet nuts (114) to the bonnet bolts (108).



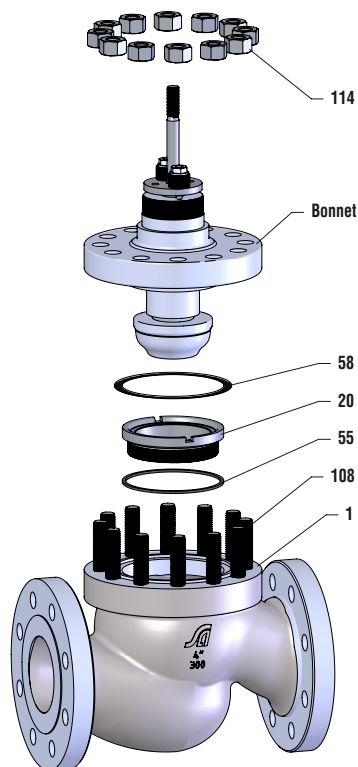


Figure 10: Disassemble / Reassemble the valve

Item	Part	Item	Part
1	Body	58	Bonnet gasket
20	Seat ring	108	Stud bolt
(40)	Bonnet	114	Hex nut
55	Profile ring		

Table 12: Valve parts

14. Install the new packing.

**NOTICE** For details, see the associated packing variant (see Page 17 - 19). Install and push two packing rings consecutively using the Tamping Tool and pre-tighten it. Repeat the procedure with remaining rings. Rotate each ring 180° from the overlapping point. Make sure each ring is clean. Dirty rings result in stem leakage.

15. Tighten the bonnet nuts (114) in four steps - 30%, 60%, 100%, and all around 100% - using a crosswise pattern (See Section 14: Torque Requirements).

**NOTICE** Check the plug's freedom of movement by lifting it approximately ~10 mm (0.4 inch) between tightenings. Loosen the bolted connection and start again if it proves difficult to move the plug.

16. Finish packing follower (80) tightening with a wrench

(See Table 7, Page 10, 19 - 20).

17. Replace the pneumatic diaphragm actuator and accessories (See page 21).

18. After reinstalling the control valve in the pipeline, perform 3 full strokes and check the tightening of the packing follower and bonnet bolting.

**NOTICE** Do not over tighten the packing. Over tightened packing may produce higher friction and reduce product service life.

19. Log the maintenance interval and the work performed.

### Standard and Extension Bonnet design - disassembly instructions

1. Remove the plug assembly (50) from the bonnet (40).
2. To disassemble the packing assembly, switch to the relevant description (see Page 19 - 20).

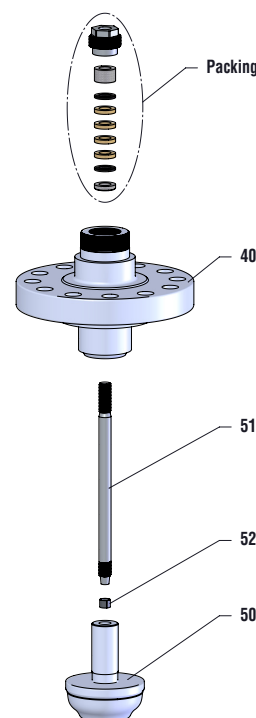


Figure 11: Disassemble / Reassemble the bonnet

Item	Part	Item	Part
40	Bonnet	51	Stem
50	Plug	52	Lock bushing

Table 13: Bonnet parts

## Standard and Extension Bonnet design with a pressure balanced trim - disassembly instructions

1. Remove the sleeve (30) from the plug assembly (50).
2. Remove the plug assembly (50) from the bonnet (40).
3. Remove the backup ring (66) and O-ring (65) from the plug (50).

**NOTICE** The disassembly and reassembly of the plug and stem is only possible with special tools.

4. To disassemble the packing assembly, switch to the relevant description (see Page 19 - 20).
5. Reassemble the pressure balanced plug with new backup rings (66) and a new O-ring (65).

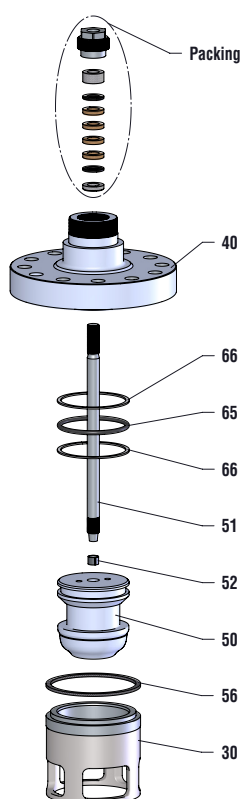


Figure 12: Disassemble / Reassemble the bonnet

Item	Part	Item	Part
30	Sleeve	52	Lock bushing
40	Bonnet	56	Seat retainer gasket
50	Plug	65	O-ring
51	Stem	66	Backup ring

Table 14: Bonnet parts

## Bellows Seal Bonnet design NPS 1/2 - 2 - disassembly instructions

1. To disassemble the packing assembly, switch to the relevant description (see Page 19 - 20).
2. Turn the hex nuts (110) counter clockwise to loosen.
3. Remove the head (40) and upper head gasket (59).
4. Lower the plug (50) into a three jaw-chuck with soft brackets and turn the plug from the stem and bonnet (51 / 5) counter clockwise to loosen then move the bellows seal assembly up and out then also remove the lower head gasket (59).

**NOTICE** The bolting between plug and stem are secured against twisting. The bellows seal assemblies are secured with a lock bushing (52). The lock bushing (52) usually remains in the plug (50) and can be reused. If the plug (50) is damaged and replaced, a new lock bushing (52) must be used.

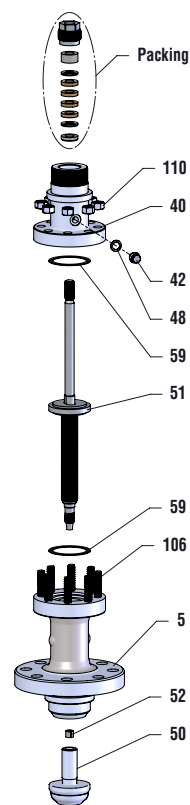


Figure 13: Disassemble / Reassemble the bonnet

Item	Part	Item	Part
5	Bonnet	51	Stem
40	Head	52	Lock bushing
42	Plug screw	59	Head gasket
48	Plug gasket	106	Stud bolt
50	Plug	110	Hex nut

Table 15: Bonnet parts

## Bellows Seal Bonnet design NPS 3 - 6 - disassembly instructions

1. To disassemble the packing assembly, switch to the relevant description (see Page 19 - 20).
2. Turn the hex nuts (110) counter clockwise to loosen.
3. Remove the head (40) and head gasket (59).
4. Remove the hex nut (110) counter clockwise to loosen then pull off the seal carrier (91) and remove the profile ring (60).
5. Pull the plug assembly (50) out downwards of the bonnet (5).

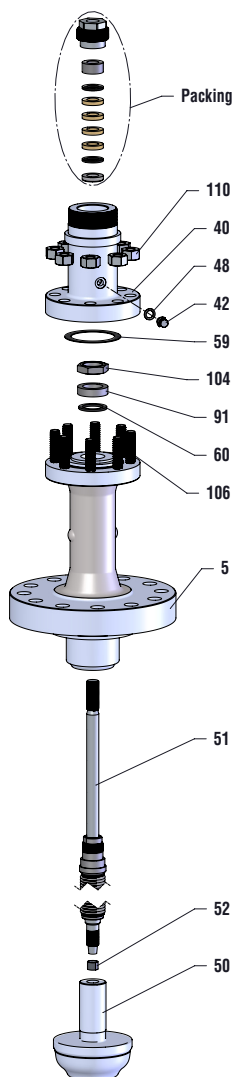


Figure 14: Disassemble / Reassemble the bonnet

Item	Part
5	Bonnet
40	Head
42	Plug screw
48	Plug gasket
50	Plug
51	Stem
52	Lock bushing

Item	Part
59	Head gasket
60	Profile ring
91	Seal carrier
104	Hex nut
106	Stud bolt
110	Hex nut

Table 16: Bonnet parts

### General:

Check stressed surface areas for damage such as scoring or deformities.

Use a standard brass scraper or other suitable tool to clean all bolting. Check for corrosion or any other damage.

Always replace damaged parts with original spare parts.

The reassembly takes place in reverse order.

**NOTICE** Before you start working, find out which packing variant you are dealing with. There are basically two different constructions. Internal Packing and external Packing design.

### Internal packing design, unloaded - disassembly instructions

1. Turn the packing follower (80) counter clockwise to loosen and remove the upper stem guide (87).
2. Use an Packing Driver Tool to remove the packing box ring (93) and packing (88) by knocking out from below.

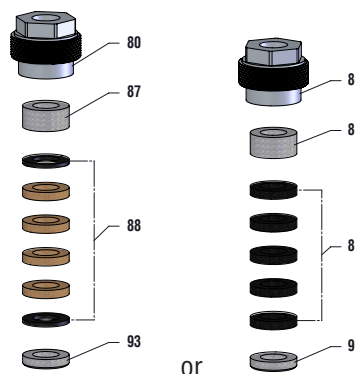


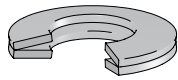
Figure 15: Disassemble / Reassemble the packing

Item	Part
80	Packing follower
87	Upper stem guide

Item	Part
88	Packing
93	Packing box ring

Table 17: Packing parts

**NOTICE** The belleville springs must be stacked in series!



### Internal packing design, live loaded - disassembly instructions

1. Turn the packing follower (80) counter clockwise to loosen, remove the belleville springs (138) and upper stem guide (87).
2. Use an Packing Driver Tool to remove the packing box ring (93) and packing (88) by knocking out from below.

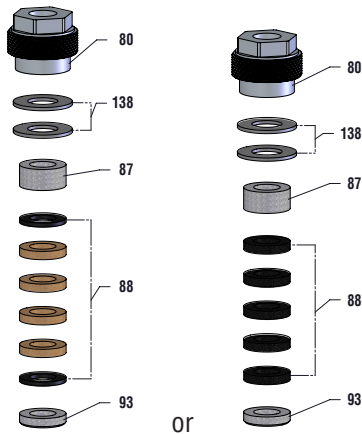


Figure 16: Disassemble / Reassemble the packing

Item	Part	Item	Part
80	Packing follower	93	Packing box ring
87	Upper stem guide	138	Belleville spring
88	Packing		

Table 18: Packing parts

### External packing design, live loaded - disassembly instructions

1. Turn the nuts (117) counter clockwise to loosen, remove the washer (112) belleville springs (138) and gland flange (80).
2. Use an Packing Driver Tool to remove the packing box ring (93) and packing (88) by knocking out from below.

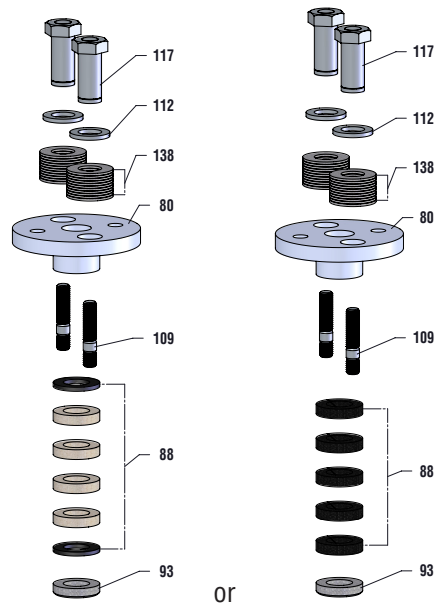


Figure 17: Disassemble / Reassemble the packing

Item	Part	Item	Part
80	Gland flange	112	Washer
88	Packing	117	Nuts
93	Packing box ring	138	Belleville spring
109	Studs		

Table 19: Packing parts

### MegaStream noise reduction and CavStream anti-cavitation trims:

Structurally, there is no difference between a seat retainer and a MegaStream retainer; both are assembled and disassembled identically. Follow instructions in Section 13.



Figure 18: MegaStream

CavStream should be treated the same as the plug assembly. Follow same instructions as noted on pages 13 through 18.

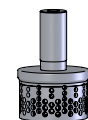


Figure 19: CavStream

**NOTICE** Care should be taken to observe any wear on the CavStream plug head.

## Reassemble the actuator and positioner onto the valve:

1. Mount the pneumatic diaphragm actuator onto the bonnet and tighten the yoke lock nut (76) clockwise (see Section 14: Required Torques).

**NOTICE** Position the actuator with the vent plug positioned at the rear.

2. Move the actuator to the open position.
3. Screw in the lock nut (113) and actuator coupling (345) and adjust the distance between the valve coupling (345) and actuator coupling (249) by adjusting the stroke length.

Size	Stroke	
1/2" - 2"	20 +0.5 mm	0.787 +0.02 in.
3" - 4"	40 +0.5 mm	1.574 +0.02 in.
6"	60 +0.8 mm	2.362 +0.03 in.

Table 20: Stroke adjustment length

4. Adjust the valve coupling (345) until the actuator coupling (249) lines up.

**NOTICE** Press the stem / plug into the seat by hand.

5. Move the actuator to the close position and install the cap screws (240).
6. Secure the lock nut (113). Keep actuator coupling (249) from turning by securing with a wrench.
7. Reassemble the positioner on the valve as necessary (see relevant accessory User Instruction).
8. Connect the valve into the pipeline (See Section 9: Installation).
9. After reinstalling the control valve into the pipeline, perform three full strokes and check the tightness of the packing follower and bonnet bolting (See Section 10: Valve Quick-Check).
10. Log the maintenance interval and the work performed.

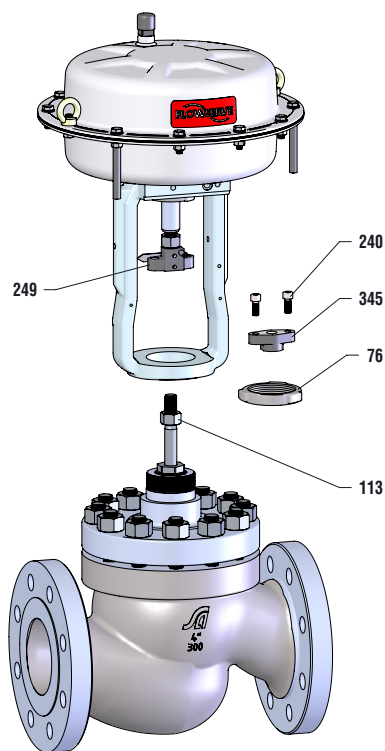


Figure 20: Reassemble the actuator

Item	Part	Item	Part
76	Actuator Lock Nut	249	Actuator Coupling
113	Lock Nut	345	Valve Coupling
240	Socket Head Screw (2x)		

Table 21: Coupling parts identification

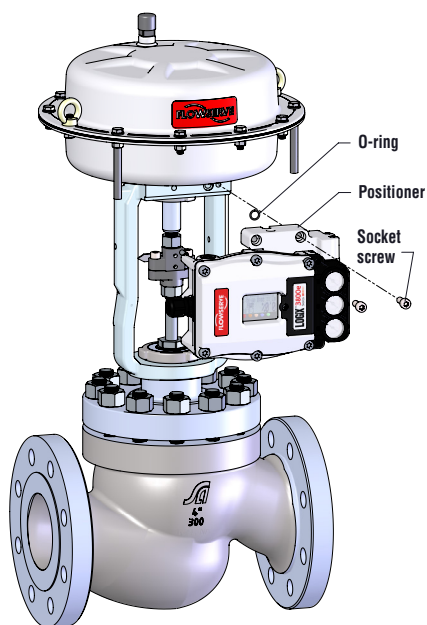


Figure 21: Reassemble the positioner

# 14 Torque Requirements

Pressure Class		Torque Requirements for BONNET NUTS (114) per nominal diameter							
		1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"
Class 150 <sup>1)</sup>	Nm	15			17	22	26	46	76
Class 300 <sup>1)</sup>		15			21	27	43	76	146
Class 150 <sup>1)</sup>	ft lb	11			13	16	19	34	56
Class 300 <sup>1)</sup>		11			16	20	32	56	108

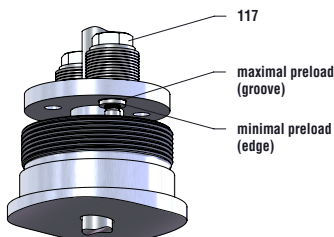
<sup>1)</sup> V750 is designed for Class 150 while V752 is designed for Class 300

Pressure Class		Torque Requirements for HEAD NUTS (110) per nominal diameter							
		1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"
Class 150	Nm	13			14		30		24
Class 300		10			12		25		46
Class 150	ft lb	9.6			10.3		22		17.7
Class 300		7.4			8.9		18.4		34

Pressure Class		Torque Requirements for SCREWED SEATS (20) per nominal diameter							
		1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"
Class 150	Nm	40			100	162	457	841	1653
Class 300		40			100	162	457	841	1653
Class 150	ft lb	30			74	120	337	620	1 219
Class 300		30			74	120	337	620	1 219

Pressure Class		Torque Requirements for PLUG and STEM (50, 51) per nominal diameter							
		1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"
Class 150 / 300	Nm	40					80		170
Class 150 / 300	ft lb	30					59		125

Torque Requirements for Internal Packing System		
Wrench Size	Minimum preload	Maximum preload
SW 24	Quarter turn intervals until leakage stops	One, three-quarter turn
SW 32		
SW 46		One complete turn

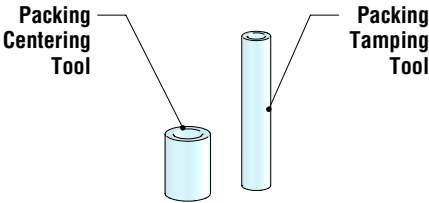

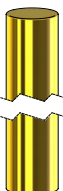
Torque Requirements for External Packing System		
Minimum preload	Maximum preload	Figure
Is marked by the lower edge of the nut (117)	Is marked by the groove in the nut (117)	 <p>117 maximal preload (groove) minimal preload (edge)</p>

**NOTICE** The yoke lock nut (76) should be tighten with a rounded chisel and a 1,5 kg (3.5 lbs) hammer before the 'kickback' effect occurs. The coupling part bolting should be tighten properly by hand in accordance with the relevant technical standards.

## 15 Lubricants

Application site		Valve - working temperature		Actuator - ambient temperature	
		Standard -40°C to +425°C	Low -60°C to -41°C	Standard -40°C to 80°C	Optionally -60°C to +80°C
Static lubrication / release agents	Valve: Threads of the stem (2.2/2.4) and twist-lock of the stem (2.3), thread of the seat (2.1) and hex nut (2.6); Bonnet-bolting (1.3/1.4) and head-bolting (3.17/3.16)	Klüberpaste HEL 46-450 [Chesterton 785 (FG)]		N/A	
	Actuator: Threads of the packing-follower (3.4), coupling (5.2, 5.1, 5.3, 5.5) and yoke locknut (5.10)	N/A		Klüber Unisilikon L250L	Klüber Unisilikon L250L
Initial lubrication on sliding surfaces	Valve: Guide of the plug (2.2), V-ring balancing (2.12)	HEL 46-450 [785 (FG)]	without	N/A	
	Actuator: O-ring's (6.17, 6.50, 6.10, 6.51) and guide (6.8.2)	N/A		Klüber Unisilikon L250L	Klüberalfa YV 93-1202

## 16 Special Tools

Special Tool	Use															
 <p>Packing Centering Tool</p> <p>Packing Tamping Tool</p>	<p><b>Packing Tamping Tool</b></p> <p>Recommended tool for assembling.</p> <table border="1"> <thead> <tr> <th rowspan="2">Description</th> <th colspan="3">Part N°</th> </tr> <tr> <th>Stem Ø 12 mm</th> <th>Stem Ø 16 mm</th> <th>Stem Ø 20 mm</th> </tr> </thead> <tbody> <tr> <td>Packing Centering Tool</td> <td>329834</td> <td>329836</td> <td>329844</td> </tr> <tr> <td>Packing Tamping Tool</td> <td>329835</td> <td>329842</td> <td>329843</td> </tr> </tbody> </table>	Description	Part N°			Stem Ø 12 mm	Stem Ø 16 mm	Stem Ø 20 mm	Packing Centering Tool	329834	329836	329844	Packing Tamping Tool	329835	329842	329843
Description	Part N°															
	Stem Ø 12 mm	Stem Ø 16 mm	Stem Ø 20 mm													
Packing Centering Tool	329834	329836	329844													
Packing Tamping Tool	329835	329842	329843													
	<p><b>Ring Nut Tool</b></p> <p>Recommended tool for disassembling and reassembling.</p> <p>Lifting eye nut according to DIN 582 - size M12, M16, M20</p>															
	<p><b>Packing Driver Tool</b></p> <p>Recommended tool for disassembling.</p> <table border="1"> <thead> <tr> <th rowspan="2">Description</th> <th colspan="3">Dimension (Brass rod)</th> </tr> <tr> <th>Stem Ø 12 mm</th> <th>Stem Ø 16 mm</th> <th>Stem Ø 20 mm</th> </tr> </thead> <tbody> <tr> <td>Packing Driver Tool</td> <td>Ø 15<sup>-1</sup> x 250 mm</td> <td>Ø 21<sup>-1</sup> x 300 mm</td> <td>Ø 25<sup>-1</sup> x 400 mm</td> </tr> </tbody> </table>	Description	Dimension (Brass rod)			Stem Ø 12 mm	Stem Ø 16 mm	Stem Ø 20 mm	Packing Driver Tool	Ø 15 <sup>-1</sup> x 250 mm	Ø 21 <sup>-1</sup> x 300 mm	Ø 25 <sup>-1</sup> x 400 mm				
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Packing Driver Tool	Ø 15 <sup>-1</sup> x 250 mm	Ø 21 <sup>-1</sup> x 300 mm	Ø 25 <sup>-1</sup> x 400 mm													

## 17 Disposal

Up to 95 % of the FlowTop control valve is metal. The remaining materials are synthetic, rubber, polytetrafluoroethylene (PTFE), graphite, paint, and lubricants.

The valve should be professionally disassembled and reas-

sembled. Metal parts should be scrapped, with the remaining materials disposed of according to the national conditions.

Peripheral units (accessories) should be recycled according to the relevant manufacturer's User Instructions.

**NOTICE** Potential hazards and their sources are under the operator's influence. The operator must observe national and international environmental conditions for control valve removal from the pipeline and cleaning. Permissible limit values must be maintained to ensure suitable protective measures; service personnel must be properly instructed in performing the disassembly and reassembly procedure.

# 18 Parts List

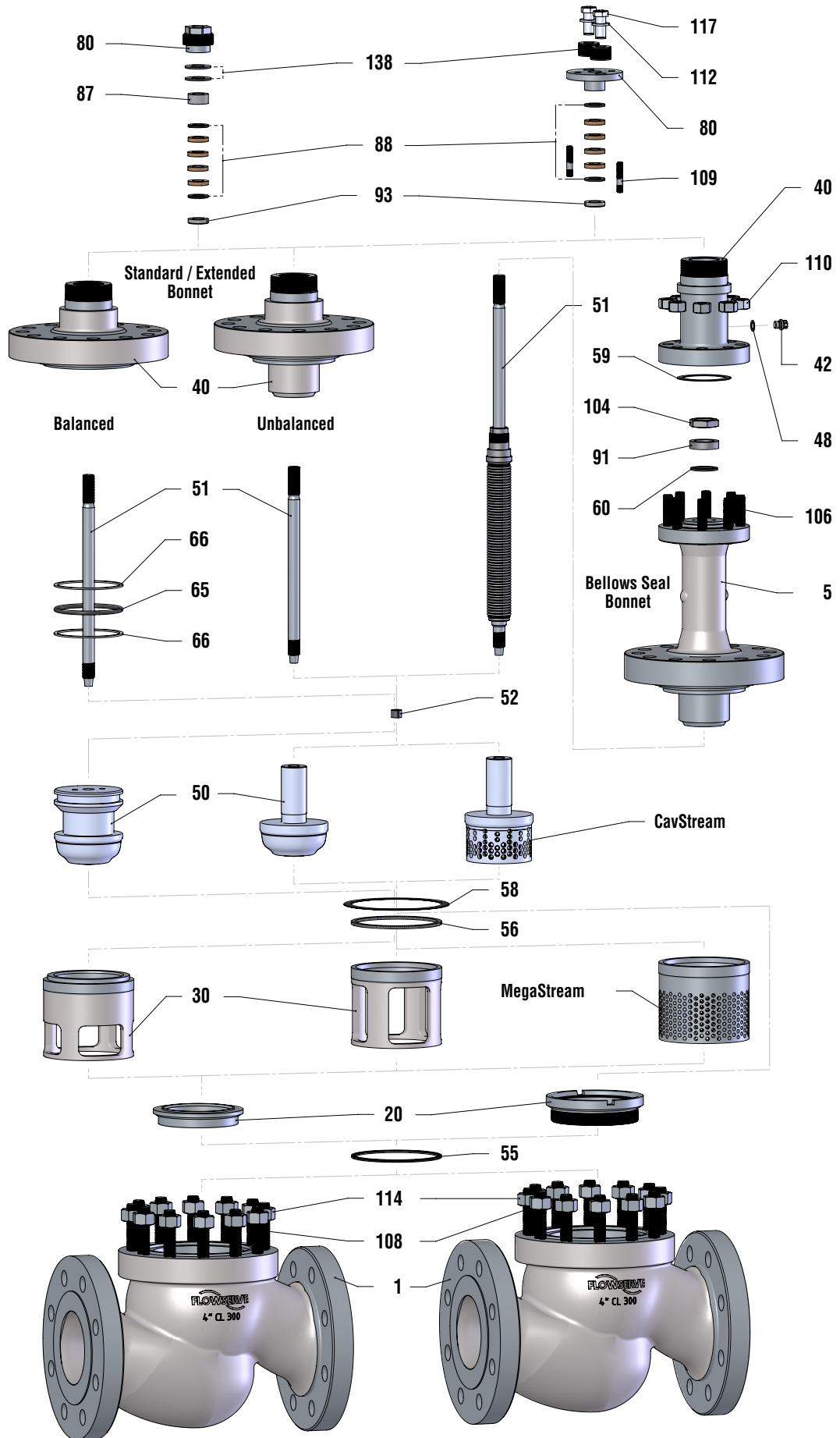
<sup>1)</sup> see page 18, <sup>2)</sup> see page 14 and page 21

Item	Part	Available Materials		
1	Body	A216 WCC	A351 CF8M	A351 CF3M
5	Bonnet	A105 or WCC	F316 or CF8M	F316L or CF3M
20	Seat ring	410SS	316SS	316L
30	Seat retainer	410SS	316SS	316L
	Sleeve <sup>1)</sup>	410HT	316SS (nitrided)	316L (nitrided)
40	Bonnet / Head	A105 or WCC	F316 or CF8M	F316L or CF3M
42	Plug screw	A2		
48	Plug gasket	Pure Graphite		
50	Plug	410SS	316SS	316L
51	Stem	17-4PH (con. H11500)	316L (strain hardened level 2)	
52	Lock bushing	316SS		
55	Profile ring	Pure Graphite		
56	Seat retainer gasket	316SS - Graphite Layer		
58	Bonnet gasket	316SS - Graphite Layer		
59	Head gasket	Pure Graphite		
60	Profile ring	Pure Graphite		
65	O-ring <sup>1)</sup>	Buna-N, Viton, EPDM, Kalrez or Chemraz		
66	Backup ring <sup>1)</sup>	PTFE or PEEK		
76	Yoke lock nut <sup>2)</sup>	316SS		
80	Packing follower	316SS		
87	Upper guiding	316SS (nitrided)		
88	Packing	PTFE or Graphite		
91	Seal carrier	316 SS		
93	Packing box ring	316SS		
104	Hex nut	316 SS		
106	Stud bolt	A193 B7	A193 B8 Cl 2	
108	Stud bolt	A193 B7	A193 B8 Cl 2	
109	Studs	A193 B8M2 Cl 2B		
110	Hex nut	A194 2H	A194 8	
112	Washer	316SS		
113	Lock nut <sup>2)</sup>	316SS		
114	Hex nut	A194 2H	A194 8	
117	Nuts	316L		
138	Belleville spring	1.4310		
240	Socket head screw <sup>2)</sup>	316SS		
249	Actuator coupling <sup>2)</sup>	316SS		
345	Valve coupling <sup>2)</sup>	316SS		

## NOTICE

The specified materials may differ from the delivered product in detail. So they are for rough orientation only. If you need the materials actually used orient yourself to the bill of materials (BOM).





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