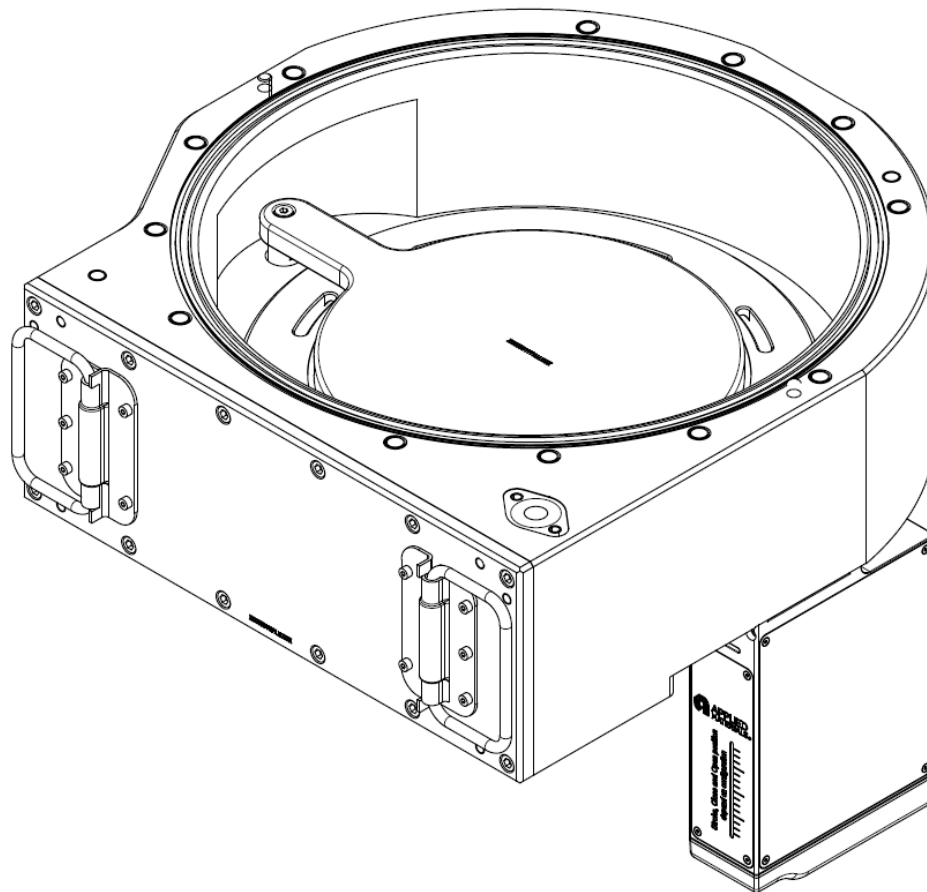


## Symmetrical flow control & isolation valve

**Series 670**  
**DN 250 mm (I. D. 10")**

This manual is valid for the following product ordering number

**67048-JH52-ADU1 (left)**  
**67048-JH52-ADV1 (right)**



Sample picture: 67048-JH52-ADV1

## Imprint

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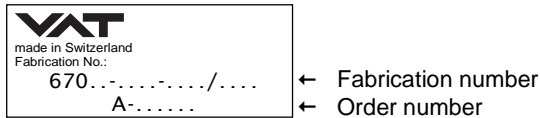
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# 1 Description of product

## 1.1 Identification of product

The fabrication number and order fabrication are fixed on the product directly or by means of an identification plate.



## 1.2 Use of product

Use product for clean and dry vacuum applications only. Other applications are only allowed with the written permission of VAT.

## 1.3 Used abbreviations

Abbreviation	Description
SFV	Symmetrical flow valve
CPA	Control performance analyser

## 1.4 Related documents

- Product data sheet
- Dimensional drawing
- External controller manual (862870)

## 1.5 Important information



This symbol points to a very important statement that requires particular attention.

### Example:



VAT disclaims any liability for damages resulting from inappropriate packaging.


## 1.6 Technical data

Please refer to P/N 1078021 Product Data Sheet.

## 2 Safety

### 2.1 Compulsory reading material

Read this chapter prior to performing any work with or on the product. It contains important information that is significant for your own personal safety. This chapter must have been read and understood by all persons who perform any kind of work with or on the product during any stage of its serviceable life.


	NOTICE
	<p><b>Lack of knowledge</b></p> <p>Failing to read this manual may result in property damage. Firstly, read manual.</p>





These Installation, Operating & Maintenance Instructions are an integral part of a comprehensive documentation belonging to a complete technical system. They must be stored together with the other documentation and accessible for anybody who is authorized to work with the system at any time.

### 2.2 Danger levels



	⚠ DANGER
	<p><b>High risk</b></p> <p>Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p>

	⚠ WARNING
	<p><b>Medium risk</b></p> <p>Indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p>


	⚠ CAUTION
	<p><b>Low risk</b></p> <p>Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.</p>

	NOTICE
	<p><b>Command</b></p> <p>Indicates a hazardous situation which, if not avoided, may result in property damage.</p>

**2.3 Personnel qualifications**

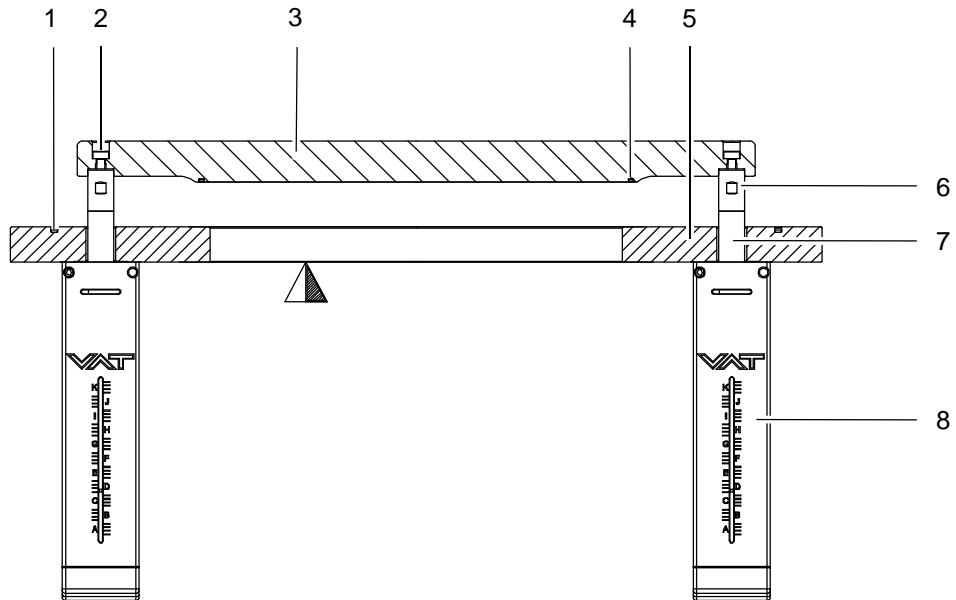
	 <b>WARNING</b>	
	<p><b>Unqualified personnel</b>                  Inappropriate handling may cause serious injury or property damage.                  Only qualified personnel are allowed to carry out the described work.</p>	

**2.4 Safety labels**


Label	Part No.	Location on valve
	T-9001-156	On protective foil covering the valve opening

### 3 Design and Function

#### 3.1 Design



Sample picture

- |   |                             |                                                                                     |                             |
|---|-----------------------------|-------------------------------------------------------------------------------------|-----------------------------|
| 1 | Flange seal (customer side) | 6                                                                                   | Intermediate piece          |
| 2 | Plate screw                 | 7                                                                                   | Actuator shaft with bellows |
| 3 | Plate                       | 8                                                                                   | Actuator (stepper motor)    |
| 4 | Plate seal                  |  | Valve seat side             |
| 5 | Flange                      |                                                                                     |                             |

#### 3.2 Function

The valve plate (3) acts as a throttling element and varies the conductance of the valve opening. The controller calculates the required plate position to achieve the set point pressure. Actuation is performed by two synchronous stepper motors (8). Encoders monitor the position. This principle ensures fast and accurate process pressure control.

## 4 Installation

	<b>WARNING</b>
	<p><b>Unqualified personnel</b>                  Inappropriate handling may cause serious injury or property damage.                  Only qualified personnel are allowed to carry out the described work.</p>

### 4.1 Unpacking

	<b>WARNING</b>
	<p><b>Heavy weight</b>                  Physical overstraining.                  Use a crane to lift valves DN 200 (8") and larger.</p>

	<b>NOTICE</b>
	<p><b>Physical overstraining at actuators</b>                  Inappropriate handling with the valve may cause in damage of actuator.                  Do not place the valve on the actuators.</p>





- Make sure that the supplied products are in accordance with your order.
- Inspect the quality of the supplied products visually. If it does not meet your requirements, please contact VAT immediately.
- Store the original packaging material. It may be useful if products must be returned to VAT.


1.




## 4.2 Installation into the system

	<b>⚠ CAUTION</b>
	<p><b>Valve opening</b> Risk of injury. Do not connect the controller to power before the valve is installed complete into the system.</p>

	<b>NOTICE</b>
	<p><b>Wrong connection</b> Wrong connection may result in damage of controller or power supply. Connect all cables exactly as shown in the following schematic.</p>

	<b>NOTICE</b>
	<p><b>Burned connector pins (spark)</b> Connector pins or electronic parts could damage, if plugged and unplugged under power. Do not plug or unplug connectors under power.</p>

	<b>NOTICE</b>
	<p><b>Contamination</b> Gate and other parts of the valve must be protected against contamination. Always wear clean room gloves when handling the valve.</p>

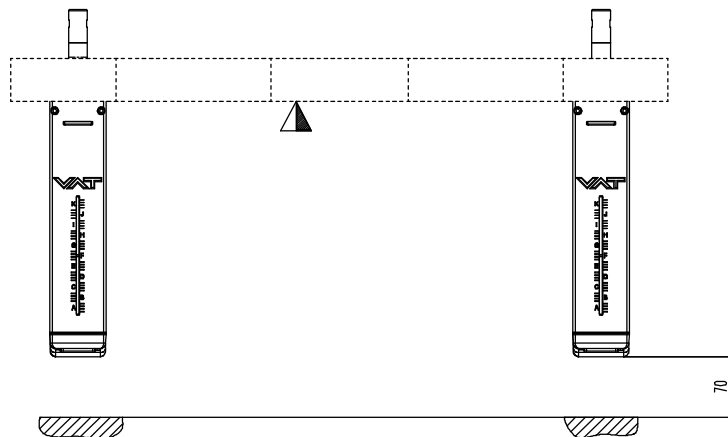


- Make sure that the sealing surfaces of the valve and the chamber are undamaged.
- Mount valve to a clean system only.

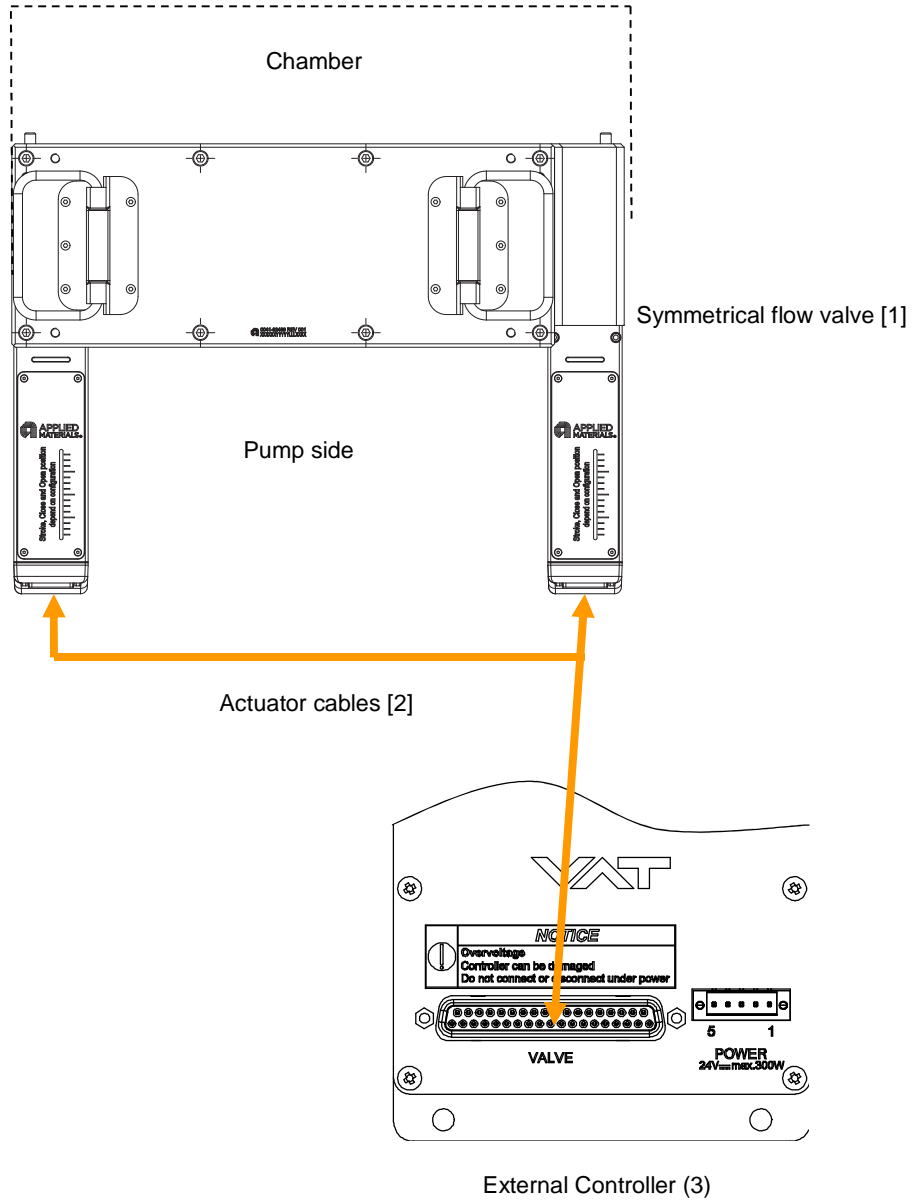
### 4.2.1 Installation space condition



Install the valve with actuators with space for dismantling and air circulation as shown in figure below. (sample picture)



4.2.2 Installation overview



Sample picture

### 4.2.3 Installation procedure (mechanical, connection)

All numbers in brackets refer to chapter «Installation overview».




1. Remove protective covers from body flanges.
2. Install symmetrical flow valve [1] into the vacuum system..




- Do not tighten the flange screws stronger than indicated under «Tightening torque».
  - Do not admit higher forces to the valve than indicated under «Admissible forces».
  - Make sure that enough space is kept free to do preventive maintenance work. The required space is indicated on the dimensional drawing
3. Install actuator cables [2] to actuators and then to the External Controller [3]. Refer to chapter «Installation overview».
  4. Install all electrical connections at External Controller. Refer to «External Controller manual».
  5. This valve may optionally be equipped with a heating device. Connect VAT heating device according to manual of respective heating device.

6.

4.2.4 Installation procedure (homing)

Description		Required tool
1. Mount the valve and all required components		
2. Switch ON the power supply.		
<p>3. If the valve does not start the homing procedure automatically (depends on valve setting), initiate homing procedure manually: Valve &gt; Parameters &gt; System &gt; Control Mode = [Homing], press save button or [Enter] on keyboard.</p> <p>4. Wait until Homing is finished. The position of valve is now 20% open.</p> <p> The SFV Axis Initialization Mode will be automatically disabled after the homing!</p>		CPA
<p>5. Valve is ready for use.</p> <p> Make sure that nothing is limiting the full stroke of the valve plate movement!</p>		

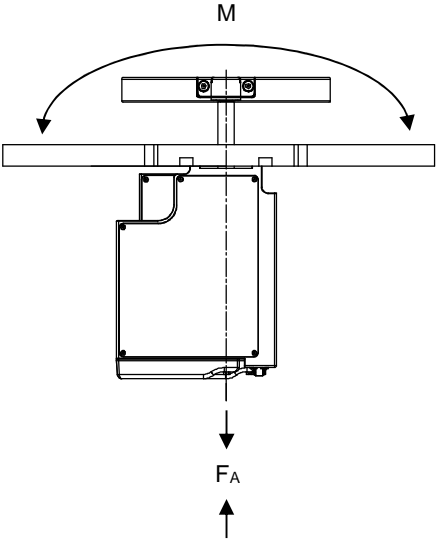
	NOTICE
	<p><b>Physical overstraining at valve flange.</b></p> <p>Physical overstraining may cause in damage of valve flange.</p> <p>Do force (fasten) the screws more as specified by the screw manufacturer.</p>

7.

### 4.3 Admissible forces




Forces from evacuating the system, from the weight of other components, and from baking can lead to deformation and malfunctioning of the valve. Stress has to be relieved by suitable means, e.g. bellows sections.

Axial tensile or compressive force «F <sub>A</sub> »		Bending moment «M»		
N	lb.	Nm	lbf.	
4000	880	160	120	
For a combination of both forces (F <sub>A</sub> and M) the values are invalid. Verify that the depth of the mounting screws is min. 1x thread diameter. Please contact VAT for more information.				

8.

9.

## 5 Operation

	<b>⚠ WARNING</b>
	<b>Unqualified personnel</b> Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.

	<b>⚠ CAUTION</b>
	<b>Valve opening</b> Risk of injury. Do not operating before the valve is installed complete into system.



For «Operation» refer to «External Controller manual».






## 6 Trouble shooting



For «Trouble shooting » refer to «External Controller manual» 907203EB.

If you need any further information, please contact one of our service centers. You can find the addresses on our website: [www.vatvalve.com](http://www.vatvalve.com).

## 7 Maintenance

	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>Unqualified personnel</b>                  Inappropriate handling may cause serious injury or property damage.                  Only qualified personnel are allowed to carry out the described work.</p>
	<p style="text-align: center;"><b>⚠ CAUTION</b></p> <p><b>Hot surfaces</b>                  Heated valve may result in minor or moderate injury.                  Do not touch valve and heating device during operation. Once heating is switched off (valve and system) await until the valve is cooled down complete before doing any work.</p>
	<p style="text-align: center;"><b>⚠ CAUTION</b></p> <p><b>Valve opening</b>                  Risk of injury.                  Human body parts must be kept out of the valve opening and away from moving parts.</p>
	<p style="text-align: center;"><b>NOTICE</b></p> <p><b>Contamination</b>                  Gate and other parts of the valve could be contaminated.                  Always wear cleanroom gloves when handling the valve.</p>
	<p style="text-align: center;"><b>NOTICE</b></p> <p><b>Scratches on sealing surface</b>                  Scratches on sealing surface cause in malfunction (leak) of valve                  Only qualified personnel are allowed to carry out the described work.</p>



## 7.1 Maintenance intervals

Under clean operating conditions, the valve does not require any maintenance during the specified cycle life. Contamination from the process may influence the function and requires more frequent maintenance.

Before carrying out any maintenance, please contact VAT. It has to be individually decided whether the maintenance can be performed by the customer or has to be carried out by VAT [www.vatvalve.com](http://www.vatvalve.com). The fabrication number on the valve has always to be specified. Refer to chapter «1.1 Identification of product» for fabrication number.

## 7.2 Maintenance procedures

- Open / close the service cover and valve cleaning. Refer to manual of customized process chamber.



This task is described on customer side.



CPA 4.0 is integrated in the controller. Please following the instruction for installation.

- Removing the plate and plate seal replacement. Refer to chapter «7.2.1 Removing the plate and plate seal replacement».
- Replace the actuator shaft. Refer to chapter «7.2.2 Remove the actuator and replace the bellows feedthrough».

## 7.2.1 Removing the plate and plate seal replacement


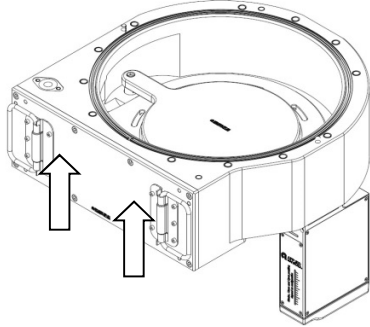

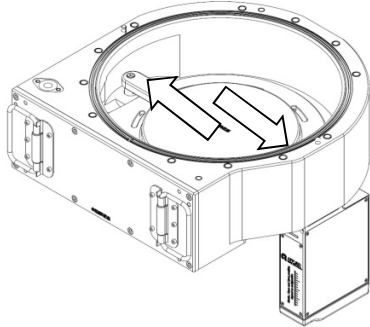

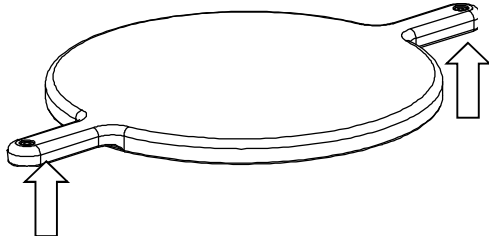
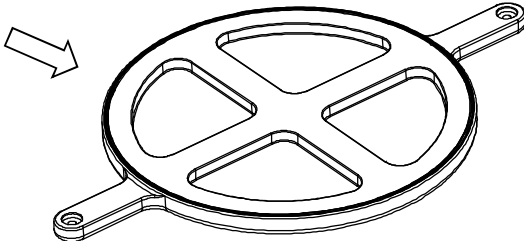
### 7.2.1.1 Required tools

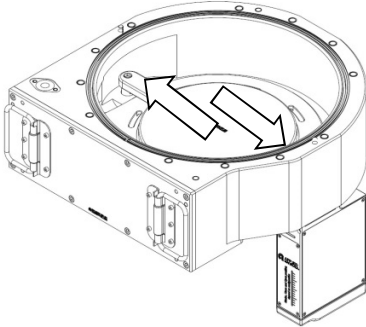

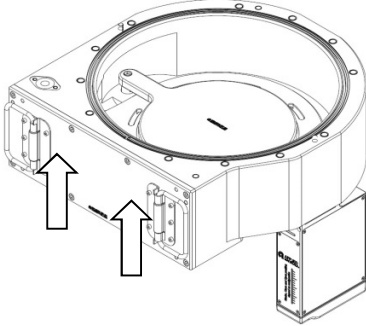



- Allen wrench 5 mm
- Cleanroom wiper
- O-ring removal tool
- Isopropyl alcohol
- CPA 4.0 (in EC2 integrated)
- Clean room gloves




Electrical power is required.

	Description	Required tool
<p>Use the CPA 4.0 which is integrated in the EC2 controller.</p> <p>1. Go to [LOCAL] mode.</p>		<p>CPA</p>
<p>2. Select position [20] = 20 % open.</p>		<p>CPA</p>
<p>If PFO available on EC2 controller, proceed here, if not go to next step.</p> <p>3. Disable the PFO in menu: Valve &gt; Parameters &gt; Power Fail Option &gt; Enable = [False], press save button or [Enter] on keyboard.</p>		<p>CPA</p>

	Description	Required tool
4. Switch OFF the power supply		
 Sample pictures... 5. Loosen the 8 plate screws at the Service port and demount the Service port.		Allen wrench 5 mm
 Sample pictures... 6. Loosen the plate screws at plate complete. <b>Do not remove the screws.</b>		Allen wrench 5 mm
7. Hold the plate by hand. Lift the plate and turn the Arms carefully in a line towards the service port and remove the plate from chamber.  Take care to sealing surface and valve surface.		
8. Place the plate (seal side up) on a clean surface. 9. Remove the seal. 10. Clean plate and the seal groove. 11. Install the new seal equally around 360° in seal groove.		<ul style="list-style-type: none"> <li>• O-ring removal tool</li> <li>• Cleanroom wiper</li> <li>• Isopropyl alcohol</li> </ul>
12. Clean the internal valve		<ul style="list-style-type: none"> <li>• Cleanroom wiper</li> <li>• Isopropyl alcohol</li> </ul>

Description	Required tool	
<p>13. Install the plate in valve as shown in picture.</p> <p>14. Tighten the plate screws with 8 Nm</p>		<p>Allen wrench 5 mm</p>
<p> Sample pictures...</p> <p>15. Install the service port and tighten the 8 plate screws with 6 Nm.</p>		<p>Allen wrench 5 mm</p>
<p>16. Switch ON the power supply.</p>		
<p>17. Select [LOCAL]</p>		<p>CPA</p>
<p> If PFO available on EC2 controller, proceed here, if not go to next step.</p> <p>18. Enable the PFO in menu: Valve &gt; Parameters &gt; Power Fail Option &gt; Enable = [TRUE], press save button or [Enter] on keyboard</p>		

Description		Required tool
19. Select [CLOSE], the valve is executing Homing and moves to close position.		CPA
20. Close the service cover. Refer to manual of customized process chamber.		
21. Valve is ready for use.		

## 7.2.2 Remove the actuator and replace the bellows feedthrough


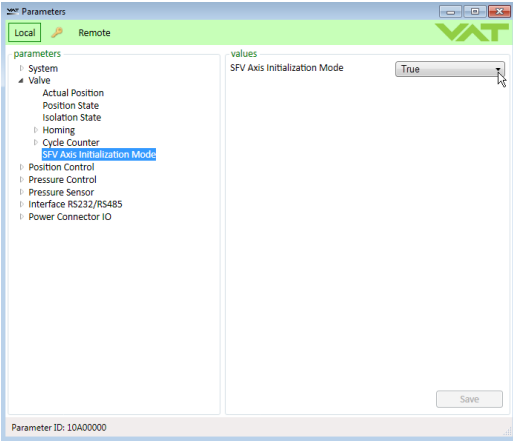
### 7.2.2.1 Required tools





- Allen wrench 2.5 mm
- Pozidriv screwdriver No.1
- Allen wrench 3 mm
- CPA 4.0 (in EC2 integrated)
- Allen wrench 4 mm





Electrical power is required.



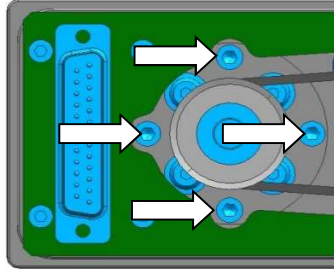
### Remove the actuator

	Description	Required tool
22. Use the description of chapter «7.2.1 Removing the plate and plate seal replacement to remove the plate. Only steps for removing are needed.		
21. Place the plate on a clean surface.		
22. Switch ON the power supply.		
23. Select [LOCAL].		CPA
24. Enter the SFV Axis Initialization Mode: Parameters > Valve > SFV Axis Initialization Mode > True, press save button or [Enter] on keyboard		
25. Switch OFF the power supply.		





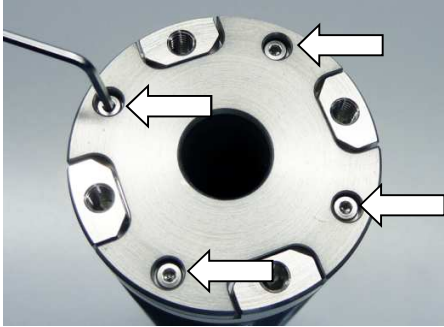
Description	Required tool
<p>26. Disconnect the power cable</p>	
<p>  Take care to sealing surface of flange and actuator.         </p> <p>27. Loosen the actuator screws (white arrows) complete and remove the actuators.</p> <p>  Make sure that the actuator not dropdown. Hold the actuator with the second hand.         </p>	


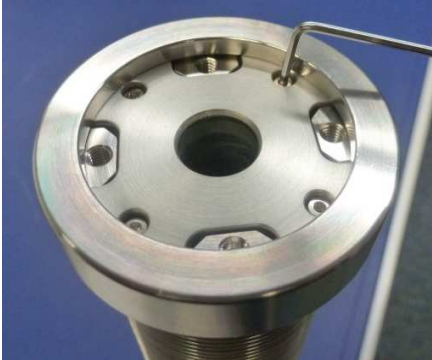


Description	Required tool
<p>  Take care to sealing surface and valve surface                       28. Remove the actuator                 </p>	

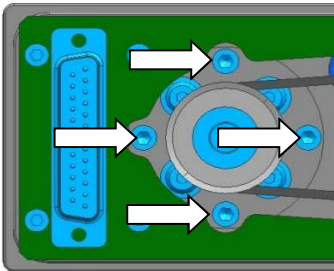

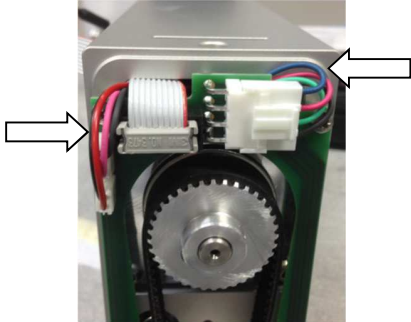
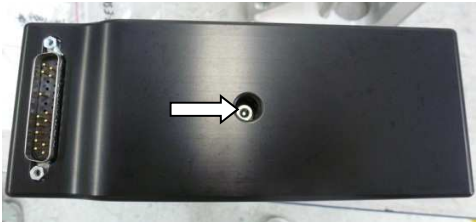
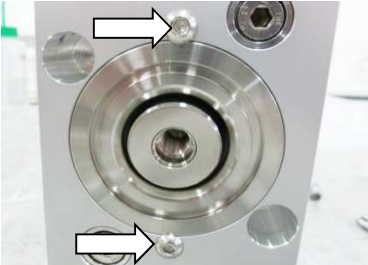
**Replace the bellows**

Description	Required tool
<p>                     29. Loosen the cover screw.                      30. Remove the cover of actuator.    Take care to cables.                 </p>	
<p>31. Loosen these 4 screws complete.</p>	



Description	Required tool	
32. Loosen and remove these 2 screws		Allen wrench 2.5 mm
33. Remove the bellows complete  Take care to surface of actuator and bellows complete.		
34. Take the adjusting ring		
35. Loosen and remove all 4 screws.		Allen wrench 1.5 mm

Description	Required tool
<p>36. Remove the shaft and install the new one</p>	
<p>37. Fasten the 4 screws by hand with the adjusting ring</p>	 <p>Adjusting ring 579811</p> <p>Allen wrench 1.5 mm</p>
<p>38. Remove the adjusting ring</p>	
<p>39. Install new bellows complete in actuator. For new bellows complete refer to chapter: «Spare parts».</p> <p> Take care to surface of actuator and bellows complete. Do not scratch the bellows at actuator surface!</p>	

Description	Required tool
<p>40. Fasten the 4 screws by hand with Allen wrench 3 mm.</p> <p>41. Now fasten the 4 screws crosswise with 4 Nm</p>	
<p>42. Close the actuator cover</p> <p> Take care to the cables Do not jam the cables!</p>	
<p>43. Fasten the cover screw adequately</p>	
<p>44. Fasten these 2 screws adequately</p>	




**7.2.3 Mount the actuator**






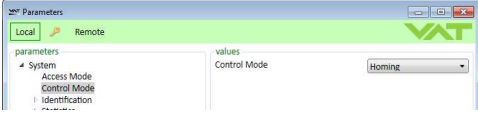
**7.2.3.1 Required tools**


- Allen wrench 2.5 mm
- Allen wrench 3 mm
- Allen wrench 4 mm
- Pozidriv screwdriver No.1
- CPA 4.0 (in EC2 integrated)



Electrical power is required.

<p> Take care to sealing surface and valve surface</p> <p>45. Insert the new actuator</p>		
<p>46. Fasten the actuator screws by hand</p>		<p>Allen wrench 4mm</p>

<p>47. Fasten the actuator screws with 8Nm</p>		<p>Allen torque wrench 4mm</p>
<p>48. Connect the power cables</p> <p> <b>Take care to the connector position at actuators, refer to 3 dots at connector for correct connection.</b></p>		<p>Pozidriv screwdriver No.1</p>
<p> <b>The plate is not installed for the next steps!</b></p> <p>49. Switch ON the power supply.</p>		
<p>50. If the valve does not start the homing procedure automatically (depends on valve setting), initiate homing procedure manually: Valve &gt; Parameters &gt; System &gt; Control Mode = [Homing], press save button or [Enter] on keyboard.</p> <p>51. Wait until Homing is finished. The position of valve is now 20% open.</p> <p> The SFV Axis Initialization Mode will be automatically disabled after the homing!</p>		<p>CPA</p>
<p>52. Switch OFF the power supply.</p>		
<p>53. Install the plate, refer to chapter: «7.2.1 Removing the plate and plate seal replacement.</p>		

<p>54. Select [CLOSE], the valve is executing Homing and moves to close position.</p>		<p>CPA</p>
<p>55. Close the service cover. Refer to manual of customized process chamber.</p>		
<p>56. Valve is ready for use.</p>		



## 8 Repairs

Repairs may only be carried out by the VAT service staff. In exceptional cases, the customer is allowed to carry out the repairs, but only with the prior consent of VAT.

Please contact one of our service centers. You will find the addresses on our website [www.vatvalve.com](http://www.vatvalve.com).

## 9 Dismounting and Storage

	<b>WARNING</b>
	<p><b>Unqualified personnel</b>                  Inappropriate handling may cause serious injury or property damage.                  Only qualified personnel are allowed to carry out the described work.</p>

### 9.1 Dismounting


	<b>NOTICE</b>
	<p><b>Contamination</b>                  Gate and other parts of the valve could be contaminated.                  Always wear clean room gloves when handling the valve.</p>


	<b>NOTICE</b>
	<p><b>Valve in open position</b>                  Valve body may become damaged if valve gate is in open position.                  Move valve gate to the closed position before dismounting the valve.</p>

1. Close the valve.
2. For dismounting the valve please follow the instructions of chapter «Installation», however in reverse order.



## 9.2 Storage

<b>NOTICE</b>	
	<p><b>Wrong storage</b></p> <p>Inappropriate temperatures and humidity may cause damage to the product.</p> <p>Valve must be stored at:</p> <ul style="list-style-type: none"><li>– relative humidity between 10% and 70%</li><li>– temperature between +10 °C and +50 °C</li><li>– non-condensing environment</li></ul>

<b>NOTICE</b>	
	<p><b>Inappropriate packaging</b></p> <p>Product may get damaged if inappropriate packaging material is used.</p> <p>Always use the original packaging material and handle product with care.</p>

1. Clean / decontaminate valve.
2. Cover all valve openings with a protective foil.
3. Pack valve appropriately, by using the original packaging material.

## 10 Packaging and Transport

	⚠ WARNING
	<p><b>Unqualified personnel</b></p> <p>Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.</p>

	⚠ WARNING
	<p><b>Harmful substances</b></p> <p>Risk of injury in case of contact with harmful substances. Remove harmful substances (e. g. toxic, caustic or microbiological ones) from valve before you return the valve to VAT.</p>

	NOTICE
	<p><b>Inappropriate packaging</b></p> <p>Product may get damaged if inappropriate packaging material is used. Always use the original packaging material and handle product with care.</p>



When returning products to VAT, please fill out the VAT form «Declaration of Chemical Contamination» and send it to VAT in advance. The form can be downloaded from our website [www.vatvalve.com](http://www.vatvalve.com).

- If products are radioactively contaminated, the VAT form «Contamination and Radiation Report» must be filled out. Please contact VAT in advance.
- If products are sent to VAT in contaminated condition, VAT will carry out the decontamination procedure at the customer's expense.

### 10.1 Packaging

1. Cover all valve openings with a protective foil.
2. Pack valve appropriately, by using the original packaging material.



VAT disclaims any liability for damages resulting from inappropriate packaging.

## 10.2 Transport



### **NOTICE**


#### **Inappropriate packaging**

Product may get damaged if inappropriate packaging material is used.  
Always use the original packaging material and handle product with care.



VAT disclaims any liability for damages resulting from inappropriate packaging.

## 11 Disposal

	<b>⚠ WARNING</b>	
	<b>Harmful substances</b> Environmental pollution. Discard products and parts according to the local regulations.	

## 12 Spare parts



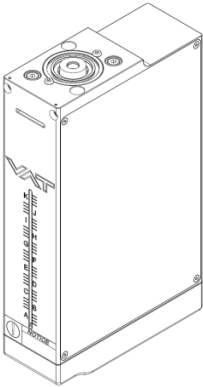
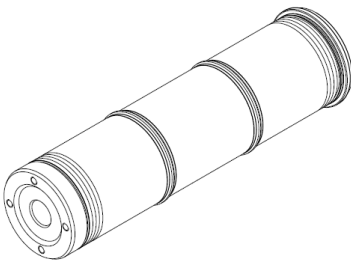
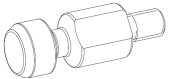
### NOTICE

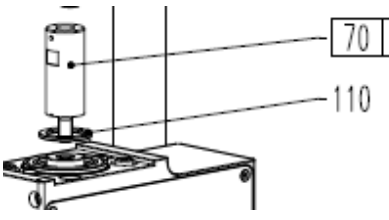
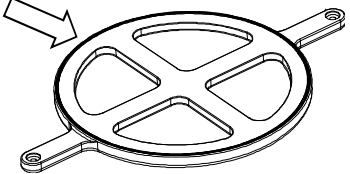
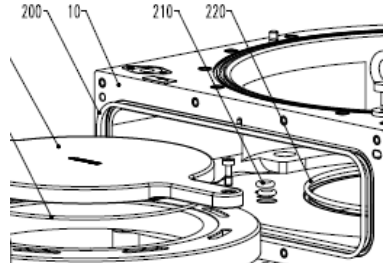
#### Non-original spare parts

Non-original spare parts may cause damage to the product.  
Use original spare parts from VAT only.



- Please specify the fabrication number of the product when you place an order for spare parts; see chapter «1.1 Identification of product». This is to ensure that the appropriate spare parts are supplied.
- VAT makes a difference between spare parts that may be replaced by the customer and those that need to be replaced by the VAT service staff.
- The following table(s) only contains spare parts that may be replaced by the customer. If you need any other spare parts, please contact one of our service centers. You will find the addresses on our website [www.vatvalve.com](http://www.vatvalve.com).

Item	Description	Part number
	Actuator complete	(2 x) 926607
	Bellows complete	(2 x) 890901
	Actuator seal	(2 x) 889748
	(60) Actuator mounting pin	(4 x) 892041

Item	Description	Part number
	(70) Intermediate peace	(2 x) 888957
	(110) Actuator circle	(2x) 892461
	(110) Plate seal	889746
	(210) Pump ring screw seal	(6 x) 889744
	(220) Pump ring seal	889745
	(200) Service port seal	889743

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## 13 Appendix

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