

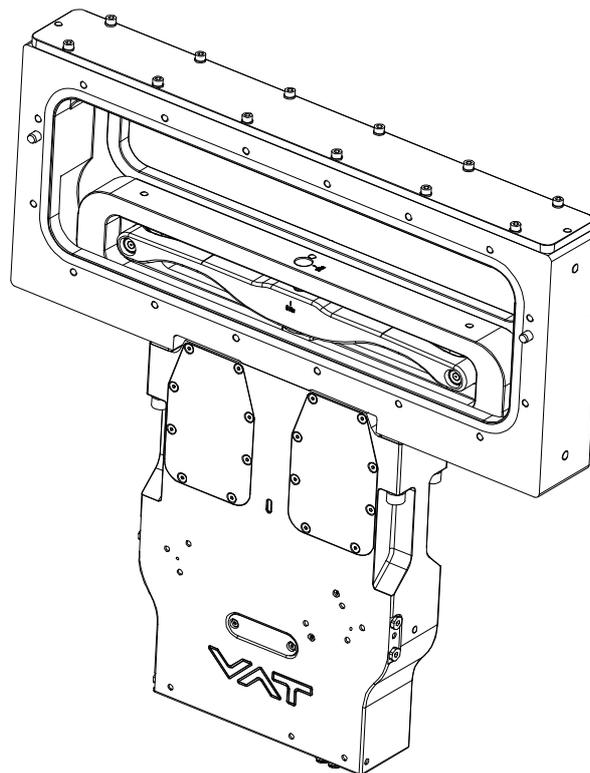
## Transfer valve / insert L-MOTION with double acting pneumatic actuator

**Series 043 / 053**  
**80 × 500**

This manual is valid for the following product ordering numbers:

**043..-.....-.....**

**053..-.....-.....**



Sample picture

## Imprint

Manufacturer VAT Vakuumventile AG, CH-9469 Haag, Switzerland

Website: [www.vatvalve.com](http://www.vatvalve.com)  
Phone: +41 81 771 61 61  
Fax: +41 81 771 48 30  
Email: [CH@vatvalve.com](mailto:CH@vatvalve.com)

Publisher VAT Vakuumventile AG, CH-9469 Haag, Switzerland

Editor VAT Vakuumventile AG, CH-9469 Haag, Switzerland

Print VAT Vakuumventile AG, CH-9469 Haag, Switzerland

Copyright © VAT Vakuumventile AG 2016

No part of these Instructions may be reproduced in any way (photocopies, microfilms or any other reproduction processes) nor may it be manipulated with electronic systems, duplicated or distributed without written permission from VAT. Offenders are liable to pay damages.

The original VAT firmware and updated state of the art versions of the VAT firmware are intended for use with VAT products. The VAT firmware contains a limited, time unlimited user license. The VAT firmware may not be used for purposes other than those intended nor is it permitted to make copies of the VAT firmware. In particular, it is strictly forbidden to give copies of the VAT firmware to other people.

The use of trade names, brand names, trademarks, etc. in these Instructions does not entitle third parties to consider these names to be unprotected and to use them freely. This is in accordance with the meaning of the laws and acts covering brand names and trademarks.

## Contents

<b>1</b>	<b>Description of product.....</b>	<b>5</b>
1.1	Identification of product.....	5
1.2	Use of product.....	5
1.3	Related documents.....	5
1.4	Important information.....	5
1.5	Technical data.....	5
<b>2</b>	<b>Safety .....</b>	<b>6</b>
2.1	Compulsory reading material.....	6
2.2	Danger levels .....	6
2.3	Personnel qualifications.....	7
2.4	Safety labels.....	7
<b>3</b>	<b>Design and Function.....</b>	<b>8</b>
3.1	Design.....	8
3.2	Function .....	9
3.2.1	Series 043.....	9
3.2.2	Series 053.....	9
<b>4</b>	<b>Installation .....</b>	<b>10</b>
4.1	Unpacking .....	10
4.2	Installation into the system.....	11
4.3	Compressed air connection .....	14
4.4	Electrical connection.....	16
4.5	Initial operation.....	16
<b>5</b>	<b>Operation .....</b>	<b>17</b>
5.1	Normal operation.....	17
5.2	Operation under increased temperature.....	17
5.3	Behavior in case of compressed air pressure drop.....	17
5.4	Behavior in case of power failure .....	17
5.4.1	Manual emergency operation.....	18
5.5	Trouble shooting.....	19
<b>6</b>	<b>Maintenance .....</b>	<b>20</b>
6.1	Maintenance intervals.....	20
6.2	Required tools .....	21
6.3	Replacement of gate .....	21
6.4	Replacement of gate O-ring.....	24
6.5	Replacement of vulcanized gate .....	26
<b>7</b>	<b>Repairs .....</b>	<b>27</b>
<b>8</b>	<b>Dismounting and Storage.....</b>	<b>28</b>
8.1	Dismounting .....	28
8.2	Storage .....	29
<b>9</b>	<b>Packaging and Transport .....</b>	<b>30</b>
9.1	Packaging .....	31
9.2	Transport.....	31

<b>10</b>	<b>Disposal.....</b>	<b>32</b>
<b>11</b>	<b>Spare parts.....</b>	<b>33</b>

# 1 Description of product

## 1.1 Identification of product

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



← Fabrication number

← Order number

## 1.2 Use of product

Use product for clean and dry indoor vacuum applications under the conditions indicated in the product data sheet and dimensional drawing. Other applications are only allowed with the written permission of VAT.

## 1.3 Related documents

- Product data sheet
- Dimensional drawing

## 1.4 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.

## 1.5 Technical data

See product data sheet and dimensional drawing.

## 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> 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> Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p>

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

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

	NOTICE
	<p><b>Command</b> 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

Table 2-1

### 3 Design and Function

#### 3.1 Design

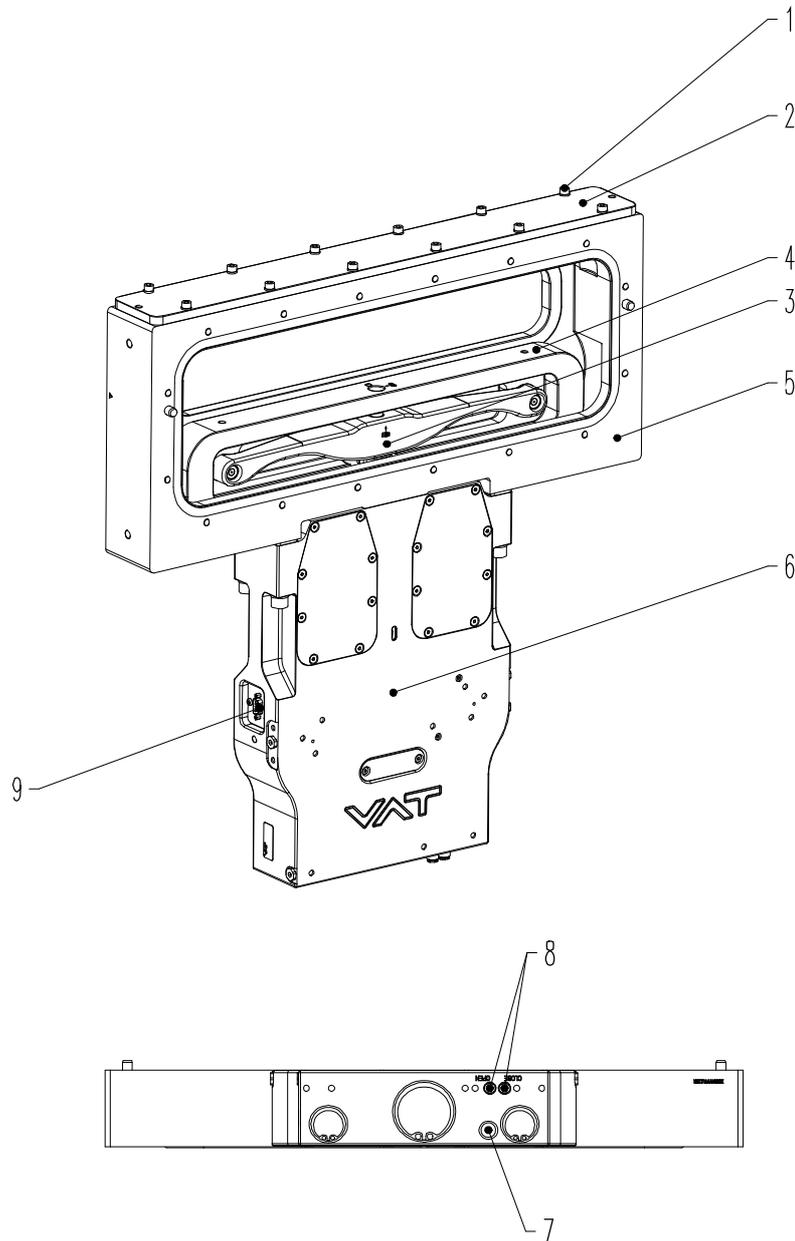


Figure 3-1 Rear side and bottom view

1	Service cover screws	4	Gate	7	Pressure adjustment	8	Compressed air connection
2	Service cover	5	Valve body			9	Position indicator
3	Torsion bar	6	Actuator				

### 3.2 Function

The main actuator performs an L-movement triggered by a pneumatically sequence control. The valve starts in open position (1); see «Figure 3-2» and «Figure 3-3». The single shaft actuator moves the gate upwards until position (2) is reached. The gate is moved towards sealing surface through pneumatic piston. Movement ends in closed position (3).

#### 3.2.1 Series 043

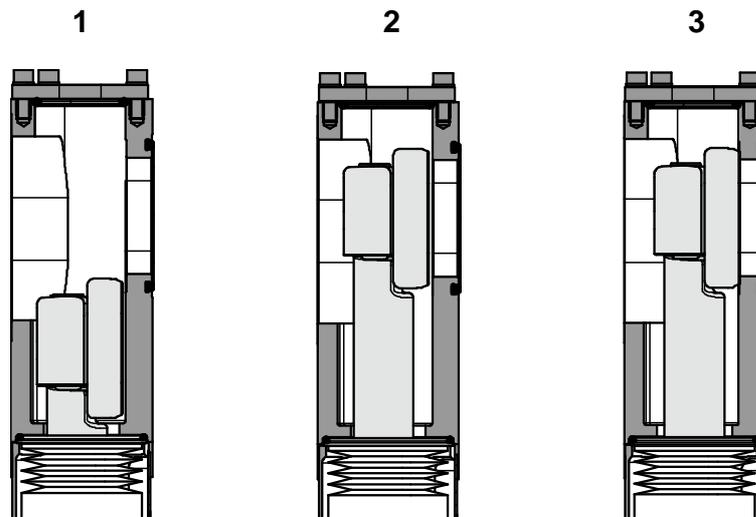


Figure 3-2

#### 3.2.2 Series 053

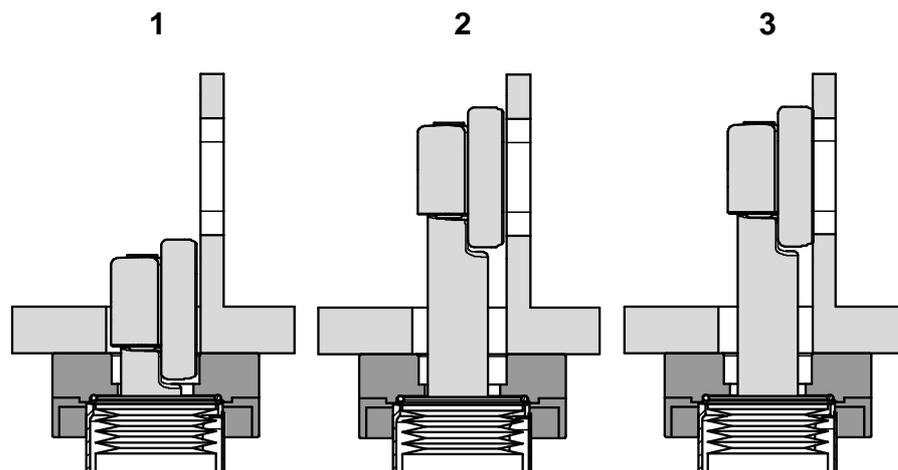


Figure 3-3

## 4 Installation



### WARNING

#### Unqualified personnel

Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.

### 4.1 Unpacking



- 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.



### NOTICE

#### Suspended load

The actuators will be damaged if they touch the ropes or any solid object. Use assisting staff when handling the valve by a crane.



- Remove the protective plastic bag only immediately before the valve is mounted to the system.
- Do not remove blue foil on the valve body openings as long as possible in order to protect the valve interior from dust and particles.

## 4.2 Installation into the system

	<b>⚠ WARNING</b>
	<p><b>Hazardous components</b></p> <p>Parts, loaded springs, air cushions etc. may move or release a movement and cause serious injury.</p> <p>Do not connect or supply electrical power and compressed air before the product is completely mounted in the system.</p>

	<b>NOTICE</b>
	<p><b>Insufficient stability</b></p> <p>Product may get damaged when actuated at this stage.</p> <p>Do not operate before product is installed completely into the vacuum system.</p>

	<b>NOTICE</b>
	<p><b>Contamination</b></p> <p>Product may get contaminated.</p> <p>Always wear cleanroom gloves when handling the product.</p>



- Make sure that the sealing surfaces of the valve and the chamber are undamaged.
- Mount valve to a clean system only.
- Make sure that the dimensions and tolerances specified on the dimensional drawing are strictly met under all operation conditions.
- Clamps for installation into the system are not included in the scope of supply. Please refer to system installation description for further information.

### 4.2.1 Series 043

1. Remove protective foil.
2. Install the valve to the chamber:
  - For positioning use the position holes (1) at the seat side and the positioning pins (2) at the other side (standard body, for customized interface please refer the dimensional drawing)
3. Fix the body of the valve with 16 M8 screws per side. Both sides of the valve are manufactured with 16 bolt pattern M8, 12mm deep (standard body, for customized interface please refer the dimensional drawing);
  - Tighten the screws crosswise with **15 Nm**

see «Figure 4-1 » on page **Error! Bookmark not defined.**

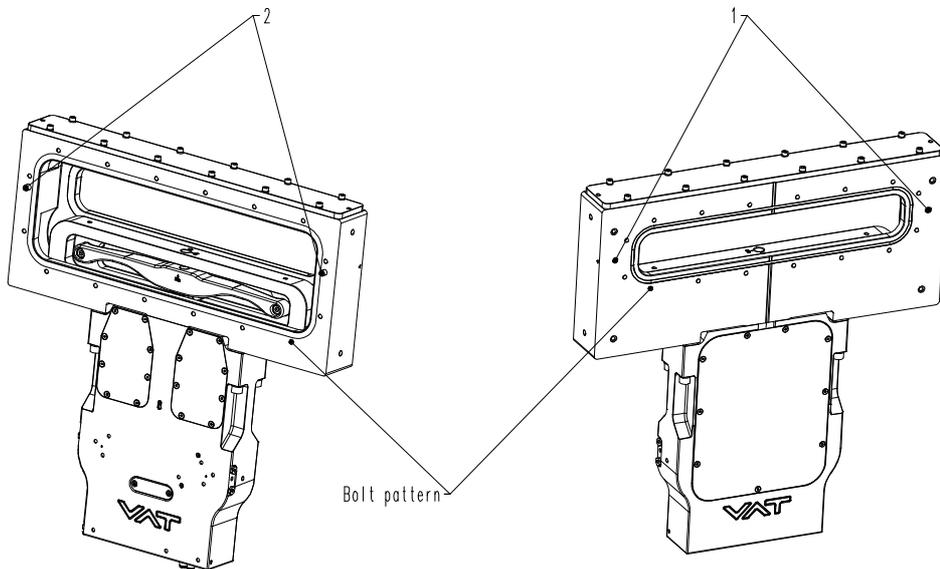
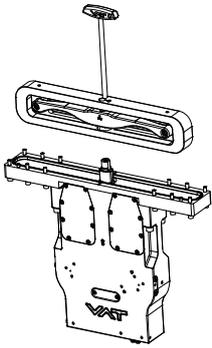
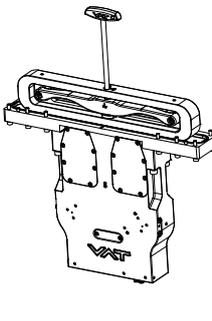


Figure 4-1

**4.2.2 Series 053**

Valve installation to the system			
step	Visualization	Description	Needed tools
1		<p><b>Mount the actuator to the transfer module</b></p> <p>1 Insert the actuator carefully to the module interface</p> <p>2 a) If the valve comes w/o a bonnet flange (not shown): Tighten the actuator with the 4 pc. M12 hexagon screws with a torque of 50 Nm</p> <p>b) If the valve comes with a bonnet flange (like in the beside shown picture): Tighten the actuator with the 12 pc. M12 hexagon screws with a torque of 14.5 Nm</p> <p>3 If the valve comes with an already installed gate, please skip the next step (2).</p> <p>➔ <b>ATTENTION: Do not operate the actuator/valve without the gate and seat mounted! Severe damage to the valve will occur if operated without the mentioned items</b></p>	Torque wrench

2		<p><b>Installation of the kit gate</b></p> <p>1 Grasp the kit gate by screwing the convenience tool into the M8 thread next to gate fixation screw</p>	<p>Convenience tool Torque wrench</p>
		<p>2 Place the gate onto the shaft and tighten the gate / shaft fixation screw for the gate fixation with a torque of 5 Nm → use torque wrench</p>	
3		<p><b>Connect the valve to power supply</b></p> <p>1 Connect electrical power supply. 2 Connect compressed air supply</p>	

### 4.3 Initial operation



In order to ensure leak tightness of the valve, it is essential to carry out one cycle on each valve

	NOTICE
	<p><b>Before carry out one cycle please make sure that the CDA pressure and the electrical connection is done according to the product data sheet and dimensional drawing</b></p>

1. Open valve.
2. **Install kit gate (if not mounted)**
3. Close valve.

#### WARNING:



**Do not operate the actuator/valve without the gate and seat mounted! Severe damage to the valve will occur if operated without the mentioned items**

### 4.4 Compressed air connection

	⚠ WARNING
	<p><b>Valve in open position</b>                  Risk of injury when compressed air is connected to the valve.                  Connect compressed air only when:</p> <ul style="list-style-type: none"> <li>- valve is installed in the vacuum system</li> <li>- moving parts cannot be touched</li> </ul>

	⚠ WARNING
	<p><b>Wrong compressed air pressure</b>                  Risk of injury if valve is connected to air supply.                  Connect valve only with a compressed air pressure ≤ 7 bar (100 psig).</p>

	NOTICE
	<p><b>Wrong compressed air pressure</b>                  No proper operation if the pressure of the compressed air is less than 4 bar (60 psig).                  Only operate the valve with regular compressed air lines.</p>



Use clean, dry or slightly oiled air only.



Admissible air pressure range; see product data sheet.

1. Connect compressed air according to the product data sheet and dimensional drawing.

## 4.5 Electrical connection

	<b>NOTICE</b>
	<p><b>Wrong voltage</b> Electrical components may get damaged. Supply electrical components with the correct voltage.</p>

1. Connect solenoid valve according to the product data sheet and dimensional drawing.
2. Connect position indicator according to the product data sheet and dimensional drawing.



Fabrication number: 043...**24**.... without solenoid valve

Fabrication number: 043...**44**.... with solenoid valve

## 4.6 Initial operation



In order to ensure leak tightness of the valve, it is essential to carry out one cycle.

3. Open valve.
4. Close valve.

## 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>⚠ WARNING</b>
	<b>Movable parts</b> Human body parts may get jammed and severely injured. Do not operate before product is installed completely into the vacuum system.

### 5.1 Normal operation

Valve is opened and closed pneumatically (double acting compressed air cylinder with sequence control).

### 5.2 Operation under increased temperature

Maximum allowed temperature, see product data sheet.

### 5.3 Behavior in case of compressed air pressure drop

See product data sheet.

### 5.4 Behavior in case of power failure

See product data sheet.

5.4.1 Manual emergency operation

	 <b>WARNING</b>
	<p><b>Movable parts</b>                  Human body parts may get jammed and severely injured.                  Do not operate before product is installed completely into the vacuum system.</p>



- Only valid for the ordering number 043...44 with solenoid valve

In case of power failure, valve can be actuated manually; see «Figure 5-1» below.  
 Compressed air must be supplied!

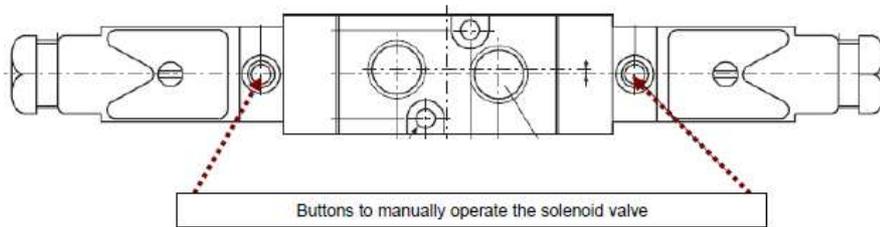


Figure 5-1

## 5.5 Trouble shooting

Failure	Check	Action	See
Valve cannot be operated	Solenoid valve correctly connected?	Check wiring	«4.5 Electrical connection»
	Electrical power connected?	Check voltage	«4.5 Electrical connection»
	Compressed air available?	Check tubing	«4.4 Compressed air connection»
	Compressed air connected?	Check air pressure	«4.4 Compressed air connection»
Leak at gate	Contamination?	Clean valve and gate	«6.3 Replacement of gate»
	Gate damaged?	Replace gate	«6.3 Replacement of gate»
	Seal compression weak?	Check compressed air	«4.4 Compressed air connection»
Leak at body	Flanges leak tight?	Clean or replace flange O-ring	–
	Leak at bellows?	Contact VAT	<a href="http://www.vatvalve.com">www.vatvalve.com</a>

Table 5-1

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

## 6 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>⚠ WARNING</b></p> <p><b>Hazardous components</b>                  Parts, loaded springs, air cushions etc. may move or release a movement and cause serious injury.                  Before starting maintenance:                  – disconnect compressed air supply                  – disconnect electrical power supply</p>
	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>Movable parts</b>                  Human body parts may get jammed and severely injured.                  Keep human body parts away from movable parts.</p>
	<p style="text-align: center;"><b>NOTICE</b></p> <p><b>Contamination</b>                  Product may get contaminated.                  Always wear cleanroom gloves when handling the product.</p>

### 6.1 Maintenance intervals



- Impacts from the process may require more frequent maintenance.
- When the valve has reached the specified cycles; see product data sheet; we recommend to have it serviced by VAT. Please contact your nearest VAT service center to get recommendations and an offer. You will find the addresses on our website [www.vatvalve.com](http://www.vatvalve.com).

## 6.2 Required tools

- Convenience tool; see «Table 11-1» on page 33
- Cleanroom wiper soaked with alcohol (2% methyl ethyl ketone)
- Allen wrench No. 4 / No. 5
- Torque wrench 3.4 Nm / 5 Nm
- O-Ring removal tool; see «Table 11-1» on page 33

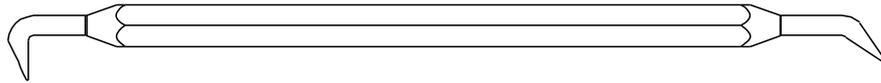


Figure 6-1

## 6.3 Replacement of gate

	<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>

	<b>⚠ WARNING</b>
	<p><b>Movable parts</b> Human body parts may get jammed and severely injured. Keep human body parts away from movable parts.</p>

	<b>NOTICE</b>
	<p><b>Wrong tightening torque</b> Valve body and screws may get damaged. Use tightening torque according to size of the screws.</p>

	<b>NOTICE</b>
	<p><b>Contamination</b> Product may get contaminated. Always wear cleanroom gloves when handling the product.</p>

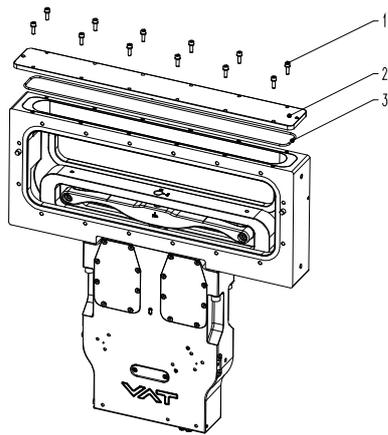
### 6.3.1 Series 043

1. Open the valve.



Make sure that the gate assembly is in OPEN position.

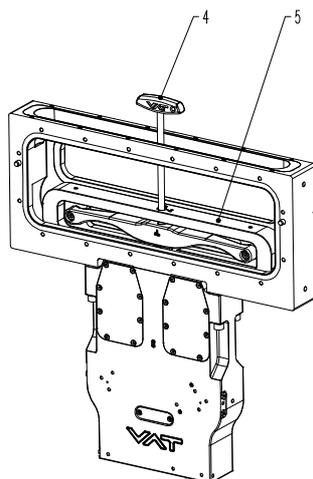
2. Disconnect electrical power supply.
3. Disconnect compressed air supply.
4. Remove all service cover screws (1) on top of the service cover (2), use Allen wrench No. 4.



- 1 Service cover screw
- 2 Service cover
- 3 O-ring

Figure 6-2

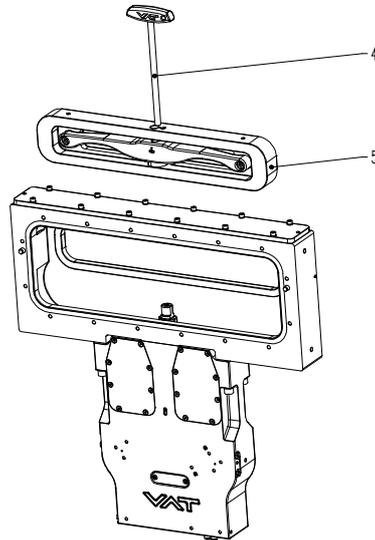
5. Remove service cover (1) and O-ring (3).
6. Loosen the screw for the gate (5), use convenience tool (4).
7. Grasp the gate (5), by using the convenience tool (4) into the M8 thread: see «Figure 6-3».



- 4 Convenience tool
- 5 Gate

Figure 6-3

8. Remove the gate (5) carefully, if necessary wiggle gently, use convenience tool (4); see «Figure 6-4».



- 4 Convenience tool
- 5 Gate complete

Figure 6-4

### 6.3.2 Series 053

1. Open the valve.



Make sure that the gate assembly is in OPEN position.

2. Disconnect electrical power supply.
3. Disconnect compressed air supply.
4. Unmount the complete actuator/valve from the chamber.
5. Loosen the screw for the gate (5), use convenience tool (4).
6. Grasp the gate (5), by using the convenience tool (4) into the M8 thread: see «Figure 6-5».

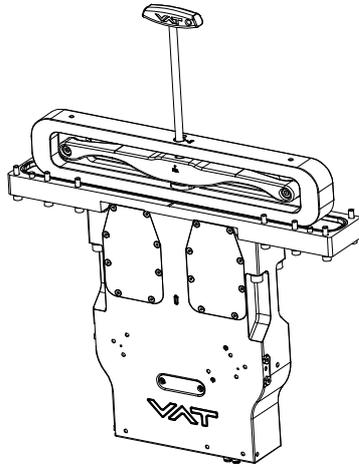


Figure 6-5

7. Remove the gate (5) carefully, if necessary wiggle gently, use convenience tool (4); see «Figure 6-6».

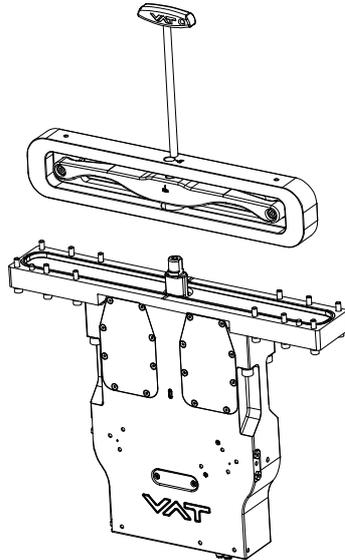
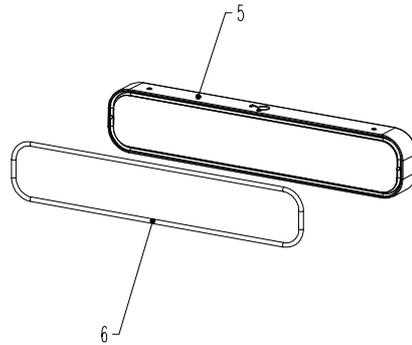


Figure 6-6

## 6.4 Replacement of gate O-ring

1. Perform steps 1 to 8 of chapter «6.3 Replacement of gate».

- Carefully remove gate O-ring (6) with an O-ring removal tool from gate (5).



- 5 Gate
- 6 Gate O-Ring

Figure 6-7

- Cleaning of O-ring groove with cleanroom wiper.
- Carefully install the new O-ring.

## 6.5 Replacement of vulcanized gate

Vulcanized version of the gate/valve-size in the meanwhile not available



Make sure that the gate assembly is in OPEN position

Valve is ready for use.

## 7 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).

## 8 Dismounting and Storage

	<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>⚠ WARNING</b></p> <p><b>Hazardous components</b>                  Parts, loaded springs, air cushions etc. may move or release a movement and cause serious injury.                  Before dismounting the product:                  – disconnect compressed air supply                  – disconnect electrical power supply</p>
	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>Movable parts</b>                  Human body parts may get jammed and severely injured.                  Keep human body parts away from movable parts.</p>
	<p style="text-align: center;"><b>NOTICE</b></p> <p><b>Contamination</b>                  Product may get contaminated.                  Always wear cleanroom gloves when handling the product.</p>

### 8.1 Dismounting

1. Open valve.

For dismounting the valve follow the instruction of chapter «4 Installation», however in reverse order.



Observe safety instruction of chapter «4 Installation».

## 8.2 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.

## 9 Packaging and Transport

	<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>⚠ WARNING</b></p> <p><b>Harmful substances</b> 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>
	<p style="text-align: center;"><b>NOTICE</b></p> <p><b>Inappropriate packaging</b> 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.

## 9.1 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.

## 9.2 Transport

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



VAT disclaims any liability for damages resulting from inappropriate packaging.

## 10 Disposal

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

## 11 Spare parts

	NOTICE
	<p><b>Non-original spare parts</b></p> <p>Non-original spare parts may cause damage to the product. Use original spare parts from VAT only.</p>



- 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.
- «Table 11-1» 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).

Description	Part No.	Quantity per valve	Maintenance procedure see chapter
Convenience tool	426599	1	«6.3 Replacement of gate»
Gate complete	on request	1	«6.3 Replacement of gate»
O-ring removal tool	234859	1	«6.2 Required tools»

Table 11-1