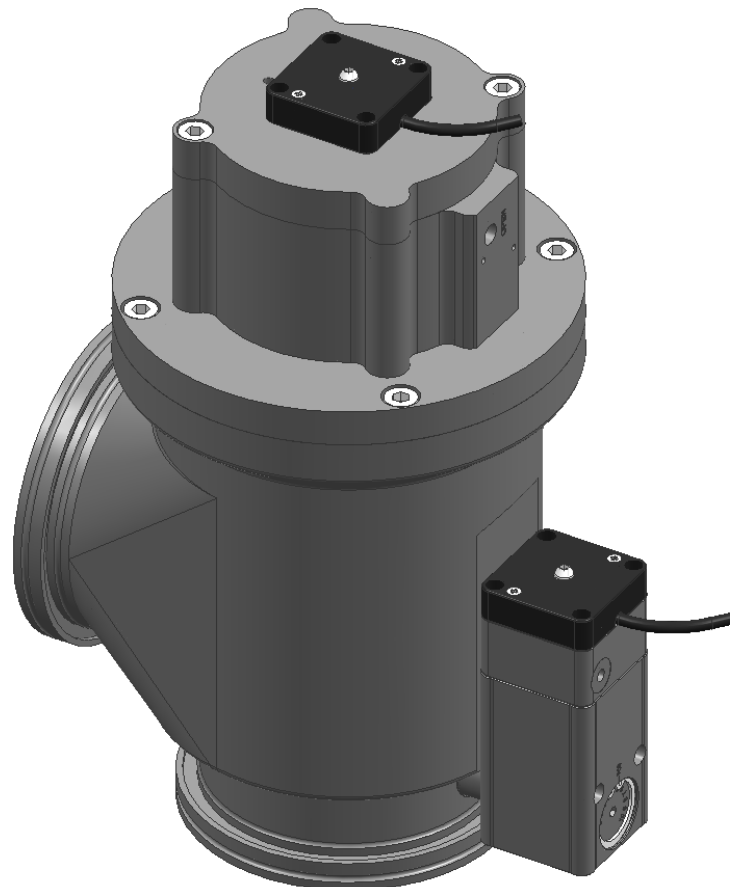


## Angle valve with soft-pump function Aluminum body with double acting pneumatic actuator

**Series 292**  
**DN 100–160 mm (I. D. 4" – 6")**

This manual is valid for the following product ordering numbers:  
**292..-.....-.....**



Sample picture

## Imprint

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# 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 vacuum applications only. 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
	DN 100: T-9001-155 DN 160: T-9001-156	On protective foil covering the valve opening
	253198	On valve body or actuators

Table 2-1

### 3 Design and Function

#### 3.1 Design

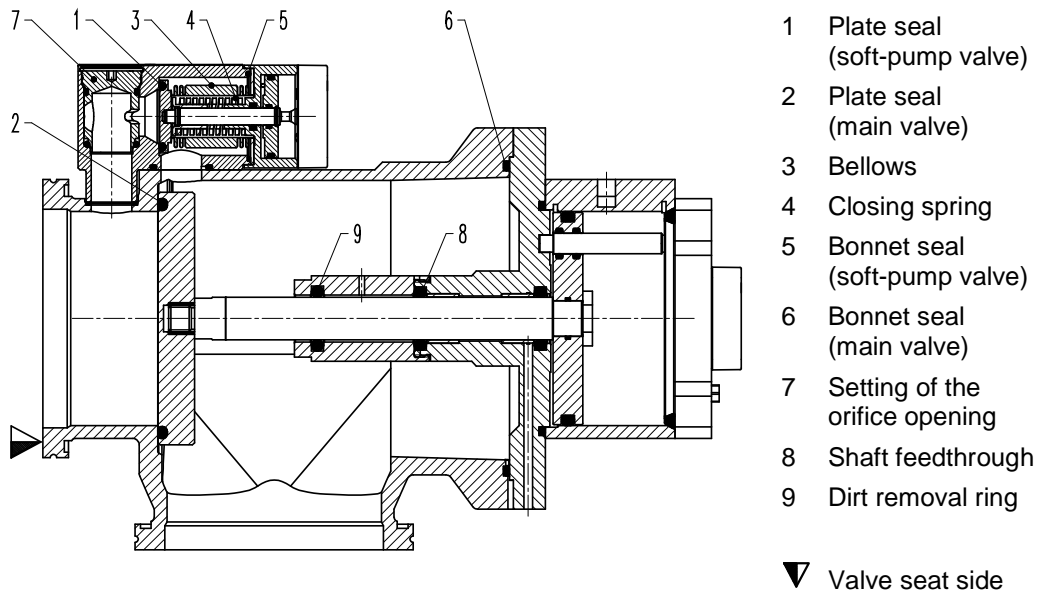



Figure 3-1

#### 3.2 Function

Main valve closes and opens pneumatically.  
 Bypass valve opens pneumatically and closes by a spring (NC).



## 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







- 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.



The protective covers may only be removed immediately before the valve is mounted into the system. Unprotected sealing surfaces must be treated with care and keep clean.

## 4.2 Installation into the system

	<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>Movable parts</b> Human body parts may get jammed and severely injured. Do not connect or supply electrical power and compressed air before the product is completely mounted in the system.</p>
	<p style="text-align: center;"><b>⚠ CAUTION</b></p> <p><b>Hot surfaces</b> Risk of burning when touching hot surfaces. Take safety measures in order that the valve cannot be touched during operation. Ensure air circulation of coil.</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>
	<p style="text-align: center;"><b>NOTICE</b></p> <p><b>Inappropriate tools</b> Sealing surfaces may get damaged. Do not use sharp-edged tools.</p>

1. Check and carefully clean sealing surfaces of valve flanges and counter flanges.
2. Install valve with connection components appropriate for ISO-K flanges according the specification of «Table 4-1» on page 11 into account.

#### 4.2.1 Admissible forces and bending moments

DN (nom. I. D.)		Axial tensile or compressive force « $F_A$ »		Bending moment « $M$ »	
mm	inch	N	lbf	Nm	lbf · ft
100	4	250	56	27	20
160	6	300	68	42	31

A combination of both forces « $F_A$ » and « $M$ » is not allowed. Please contact VAT.

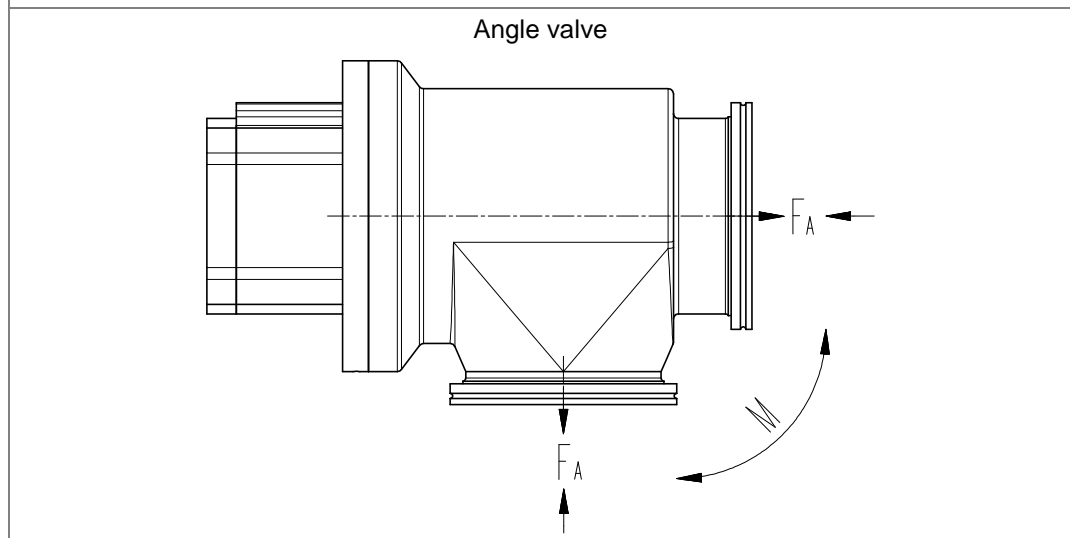


Table 4-1

### 4.3 Compressed air connection

	<b>WARNING</b>
	<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>

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.




### 4.4 Electrical connection

	<b>DANGER</b>
	<p><b>Electric shock</b>            Parts being under voltage will result in serious injury or death.            Do not touch parts being under voltage.</p>

	<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.
3. Connect heater (option) according to the wiring diagram in the product data sheet and dimensional drawing.

## 5 Operation

	<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>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>
	<p style="text-align: center;"><b>⚠ CAUTION</b></p> <p><b>Hot surfaces</b> Risk of burning at valve with heater. Do not touch hot surfaces.</p>

### 5.1 Normal operation

Main valve closes and opens pneumatically.  
Bypass valve opens pneumatically and closes by a spring (NC).

### 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.






## 5.5 Trouble shooting

Failure	Check	Action	See
Valve does not close / open	Compressed air connected correctly?	Check air pressure	Product data sheet
	Solenoid valve connected correctly?	Check electrical power supply and wiring	Product data sheet
No or wrong position indicator signal	Position indicator connected correctly?	Check electrical power supply and wiring	Product data sheet
Leak at plate or body	Contamination?	Clean or replace seals	Chapter «6.3 Replacement of vacuum seals»

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> Human body parts may get jammed and severely injured. Before starting maintenance: – disconnect compressed air supply – disconnect electrical power supply</p>
	<p style="text-align: center;"><b>⚠ CAUTION</b></p> <p><b>Hot surfaces</b> Risk of burning at valve with heater. Touch hot surfaces only if the valve has cooled down.</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>
	<p style="text-align: center;"><b>NOTICE</b></p> <p><b>Inappropriate tools</b> Sealing surfaces and valve plate may get damaged. Do not use sharp-edged tools.</p>

## 6.1 Maintenance intervals

Under clean operating conditions the valve does not require any maintenance during the specified cycles.

For more information or a general overhaul please contact one of our service centers. You will find the addresses on our website [www.vatvalve.com](http://www.vatvalve.com).



Contamination resulting from the process may impair the function of the valve and require more frequent maintenance.

## 6.2 Required tools

- Allen wrench depending on valve size
- Torque wrench 1 Nm / 20 Nm / 35 Nm
- Open-end wrench 19 / 22
- Cleanroom wiper soaked with alcohol (2% methyl ethyl ketone)
- O-Ring removal tool; see «Table 11-1» on page 28

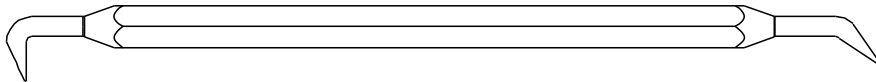


Figure 6-1



### 6.3 Replacement of vacuum seals

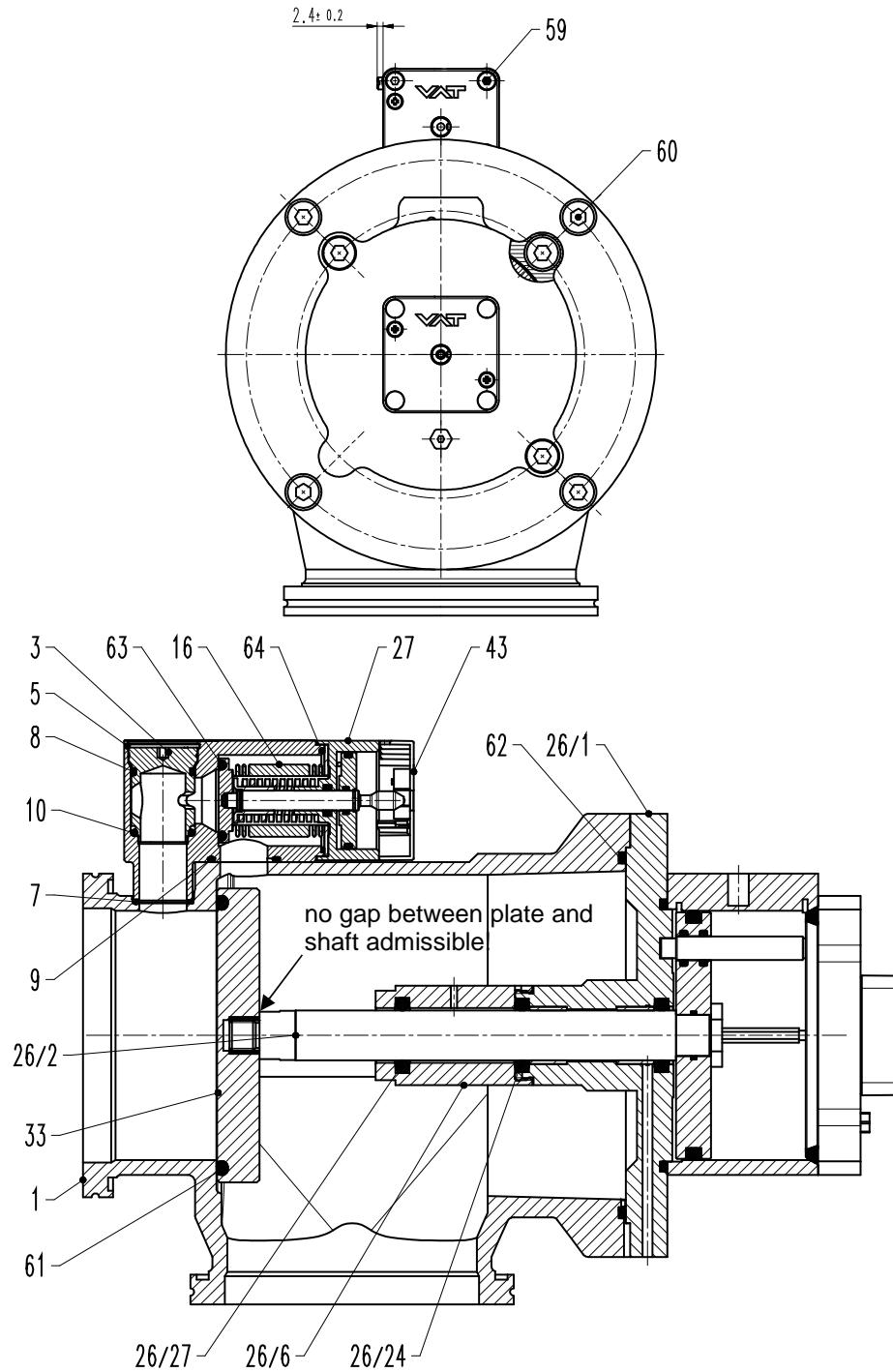


Figure 6-2

### 6.3.1 Preparatory steps

1. Detach the soft-pump valve from the main valve by removing the 2 screws (6) «Figure 6-3».
2. Remove O-rings (7) and (9) and discard them. The item number in brackets refers to «Figure 6-2».

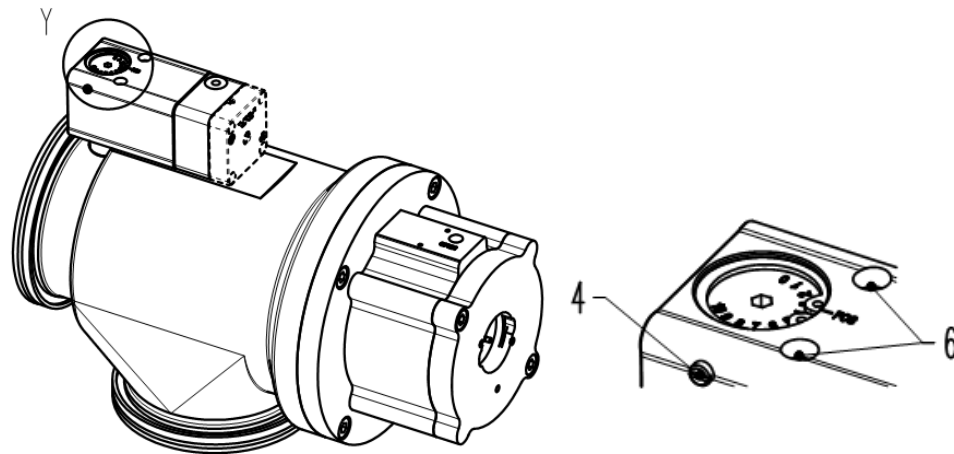


Figure 6-3

### 6.3.2 Replacement of vacuum seals – soft-pump valve

The following item numbers in brackets refer to «Figure 6-2» on page 17.

1. Remove 4 screws (59) uniformly and crosswise.



Attention loaded spring!

2. Withdraw "actuator/plate assembly" carefully from valve body.
3. Remove bonnet seal (O-ring, 64) from groove and discard it.
4. Pull plate seal (O-ring, 63) out of groove by picking it with a needle and discard it.



Do not damage the sealing surface!

5. Remove setscrew (4) and clean it with alcohol (exceptional «Figure 6-3» on page 18).
6. Remove circlip (5) and take out the setting piece (3) by pushing it from the vacuum side.
7. Remove O-rings (8, 10) and discard them.

8. Make sure that all sealing surfaces are undamaged and clean them with alcohol.
9. Lubricate new O-rings (8, 10) slightly with VAT high vacuum grease.
10. Mount lubricated O-rings (8, 10) to the setting piece (3).
11. Insert setting piece (3) and circlip (5).



Do not damage O-rings while inserting setting piece (3).

12. Mount setscrew (4) by using Loctite 222.



The dimension of  $2.4 \pm 0.2$  must be met!


13. Put new plate seal (O-ring, 63) on groove and press it crosswise into groove at 4 points.
14. Press entire plate seal (O-ring, 63) uniformly into groove.
15. Mount new bonnet seal (O-ring, 64) into groove.
16. Insert "actuator/plate" assembly carefully into the valve body.



Do not cant!

17. Mount 4 screws (59) uniformly and crosswise in 2 to 3 steps. Torque screws with 2.3 Nm.
18. Mount new O-rings (7) and (9).
19. Attach the soft-pump valve to the main valve by mounting the 2 screws (6) and torque them with 2.3 Nm.

### 6.3.3 Dismount actuator / plate assembly – main valve

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

The follow item numbers in brackets refer to «Figure 6-2» on page 17.

1. Loosen and remove screws (60) uniformly and in crosswise order.
2. Withdraw actuator / plate assembly carefully from body.
3. Remove bonnet seal (62) from groove by using an O-ring removal tool.

### 6.3.4 Replacement of shaft feedthrough seal

1. Remove plate (33) from actuator shaft (26/2) by unscrewing the plate. Use an Allen wrench (size 19 mm) to avoid shaft rotation, plug in a drift punch (diameter 5 mm) into the radial plate hole and create the loosening torque.
2. Unscrew sleeve (26/6) by using an Allen wrench and withdraw sleeve from shaft (26/2) to have access to the shaft feedthrough O-ring (26/24) and to the dirt removal O-ring (26/27)
3. Remove shaft feedthrough O-ring (26/24) and dirt removal O-ring (26/27) from groove by using an O-ring removal tool.
4. Apply vacuum grease on the new shaft feedthrough O-ring (26/24; 0.20 g) and in its O-ring groove (0.80 g) and disperse it.
5. Put the lubricated shaft feedthrough O-ring (26/24) into the groove.
6. Apply vacuum grease on the actuator shaft (26/2; 0.20 g), the thread of the actuator flange (26/1; 0.10 g), the dirt removal O-ring (26/27; 0.20 g) and in its groove (0.80 g) and disperse it.
7. Put the lubricated dirt removal O-ring (26/27) into its groove.
8. Push sleeve (26/6) on the actuator shaft (26/2) and screw it to the actuator flange (26/1). Use a 10 Nm torque to fasten the thread.



Do not damage the O-rings when you assemble the sleeve.

9. Apply 0.20 g vacuum grease on the thread of the actuator shaft (26/2) and screw the plate (33) to the actuator shaft.



There must not be a gap between the plate (33) and shaft (26/2); see «Figure 6-2» on page 17.

### 6.3.5 Replacement of plate seal – main valve

1. Remove plate seal (61) from groove by using an O-ring removal tool.
2. Check sealing surface and clean it with a cleanroom wiper.
3. Put new plate seal (61) on groove and press it into groove at 4 opposite spots.
4. Press remaining sections uniformly into groove.

### 6.3.6 Mount actuator / plate assembly – main valve

1. Check sealing surfaces of bonnet flange / valve seat and clean them with a cleanroom wiper.
2. Put bonnet seal (62) into body.
3. Insert actuator / plate assembly carefully.



Do not cant!

4. Fasten screws (60) uniformly and in crosswise order, in 2 to 3 steps.

	DN 100	DN 160
Torque [Nm]	20	20

Table 6-1

After performed leak test the valve is ready for use.

## 6.4 Replacement of pneumatic seals





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

## 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> Human body parts may get jammed and severely injured. Before dismantling 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>⚠ CAUTION</b></p> <p><b>Hot surfaces</b> Risk of burning at valve with heater. Touch hot surfaces only if the valve has cooled down.</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

	<b>NOTICE</b>
	<p><b>Valve in open position</b> Valve body and plate may get damaged if valve is in open position. Close the valve before dismantling the valve from the system.</p>

1. Apply pneumatic pressure to close the double acting main valve.
2. Disconnect compressed air supply.
3. Disconnect electrical power supply.
4. Dismount valve from system.

## 8.2 Storage


	<b>NOTICE</b>
	<p><b>Wrong storage</b> Inappropriate temperatures and humidity may cause damage to the product. Valve must be stored at: – relative humidity between 10% and 70% – temperature between +10 °C and +50 °C – non-condensing environment</p>


	<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>


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

	<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>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.

	<b>NOTICE</b>
	<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.



- 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


<b>NOTICE</b>	
	<p><b>Valve in open position</b> Valve body and plate may get damaged if valve is in open position. Make sure that the valve is closed.</p>

1. Cover all valve openings with protective covers or foils.
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>
	<p><b>Harmful substances</b> Environmental pollution. Discard products and parts according to the local regulations.</p>

## 11 Spare parts

	NOTICE
<p><b>Non-original spare parts</b>                  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
Seal kit	on request	1	«6.3 Replacement of vacuum seals»
Pneumatic grease	N-6951-403	1 (12 g)	
Vacuum grease	N-6951-011	1 (10 g)	
O-ring removal tool	234859	1	

Table 11-1

