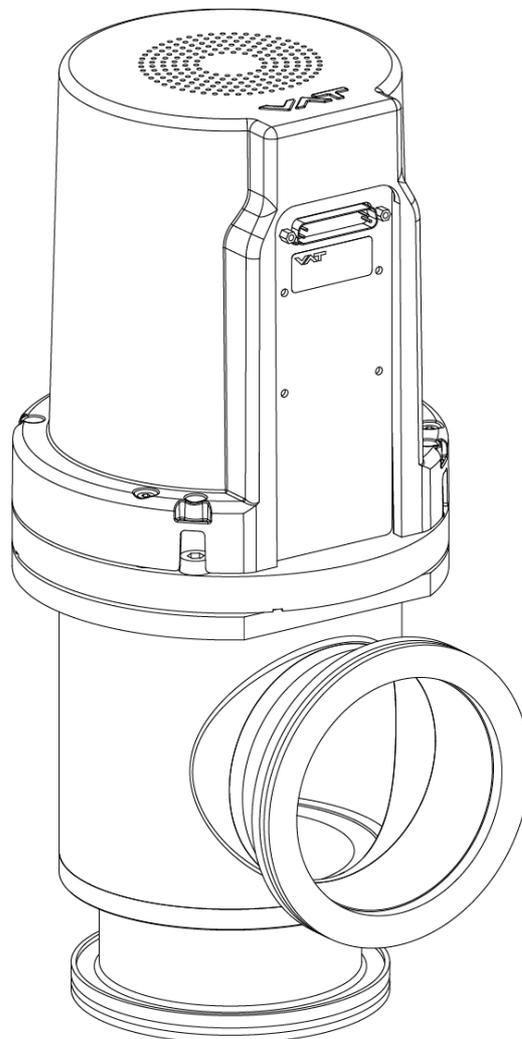


Control Angle Valve

Series 620
DN 100 (I.D. 4")

This manual is valid for the following product ordering numbers

62040-QE52-....
62040-XE52-....



Sample picture

Imprint

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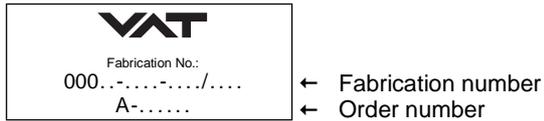
Contents

1	Description of product.....	4
1.1	Identification of product	4
1.2	Use of product	4
1.3	Used abbreviations.....	4
1.4	Related documents.....	4
1.5	Important information.....	4
1.6	Technical data of valve unit	5
2	Safety	6
2.1	Compulsory reading material.....	6
2.2	Danger levels	6
2.3	Personnel qualifications.....	7
2.4	Safety labels.....	7
3	Design and Function.....	8
3.1	Design	8
3.2	Function of valve	8
4	Installation	9
4.1	Unpacking	9
4.2	Installation of valve into the system.....	10
4.2.1	Installation example – chamber / pump (preferred layout)	11
4.2.2	Installation procedure.....	12
4.3	Admissible forces	13
5	Operation	14
6	Maintenance	15
6.1	Maintenance intervals.....	15
6.2	Maintenance procedures	16
6.2.1	Replacement of plate and bonnet seals and valve cleaning	17
7	Repairs.....	19
8	Dismounting and Storage.....	20
8.1	Dismounting	20
8.2	Storage.....	21
9	Packaging and Transport	22
9.1	Packaging.....	22
9.2	Transport.....	22
10	Disposal	23
11	Spare parts	24
11.1	Overview	24
11.2	Accessories.....	24
12	Appendix.....	25

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.



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
CPA	Control Performance Analyzer
EC	External Controller
PFO	Power Fail Option

1.4 Related documents

- Product data sheet
- Dimensional drawing
- Manual of heating device

1.5 Important information



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

Example:



Refer to chapter: «Technical data» for detailed information.

1.6 Technical data of valve unit

Data		
Pressure range at 20 °C	1 × 10 ⁻⁸ mbar to 1.2 bar (abs)	
Leak rate to outside at 20 °C	< 1 × 10 ⁻⁹ mbar l/s	
Leak rate valve seat (local) at 20 °C	< 1 × 10 ⁻⁹ mbar l/s	
Max. differential pressure on plate during isolation	1.0 bar (in opening direction)	
	1.1 bar (in closing direction)	
Max. differential pressure on plate during opening	1 bar (in either direction)	
Cycles until first service (unheated and under clean conditions)		
- Pressure control (open - max. throttle - open)	1'000'000	
- Closing / opening	200'000	
Admissible operating temperature	10°C to +80°C	
Mounting position	Any	
Process side materials	body	Stainless steel 316L (1.4404)
	plate	Stainless steel 316L (1.4404)
	bellows	Stainless steel 316Ti (1.4571)
Seals	bonnet seal	FKM (e.g. Viton®)
	plate	FKM (e.g. Viton®)
Max. controllable conductance (N ₂ molecular flow)	400 l/s	
Min. controllable conductance (N ₂ molecular flow)	0.2 l/s	
Full stroke	30 mm	
Actuating time	Throttling (pressure / position control) 0% -> 100% or 100% -> 0%	2 s typ.
	Close 0% -> isolated 0% -> close signal 100% -> isolated 100% -> close signal	0.6 s typ. 1.1 s typ. 1.4 s typ. 1.9 s typ.
	Open 0% -> 100%	0.8 s typ.
Controller	External control unit (EC2)	
Weight	approx. 11 kg	
Dimensions	Refer to dimensional drawing (available on request)	

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>Lack of knowledge 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>High risk Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p>

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

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

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

2.3 Personnel qualifications

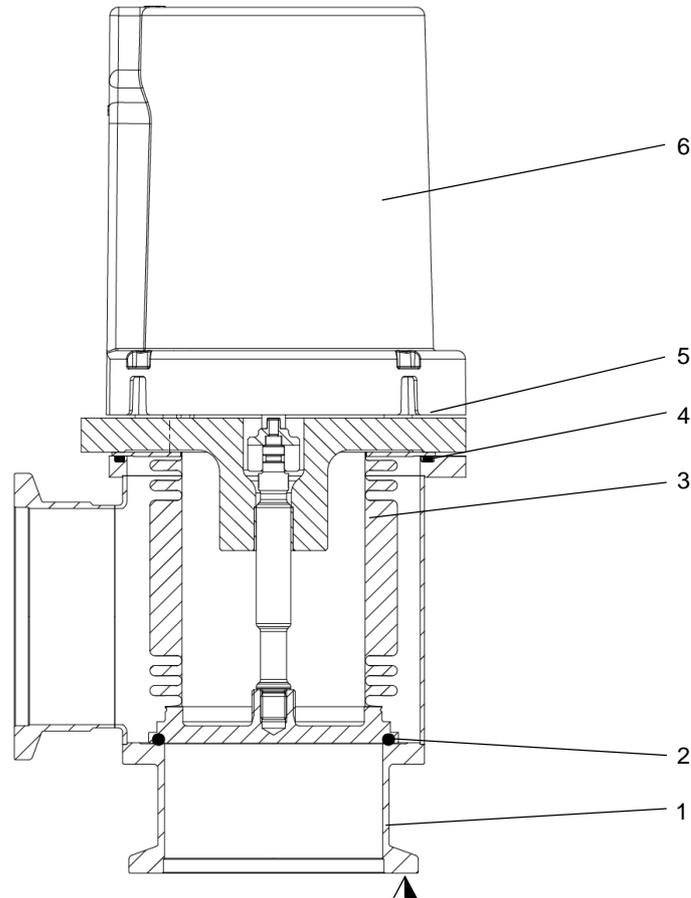
	 WARNING
	Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.

2.4 Safety labels

Label	Part No.	Location on valve
	T-9001-155 (crushing hazard)	On flange protection covering the valve opening

3 Design and Function

3.1 Design



Sample picture

- | | | |
|-------------------|---------------|----------|
| 1 Valve body | 3 Bellows | 5 Bonnet |
| 2 Plate seal | 4 Bonnet seal | 6 Cover |
| ▲ Valve seat side | | |

3.2 Function of valve

The valve plate 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 one synchronous stepper motor. Encoder monitors the position. This principle ensures fast and accurate process pressure control.

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.

1. Open the transport case and remove inside packing material as far as necessary.
2. Lift the valve carefully and place it on a clean place.



Do not remove protective covering from valve opening

4.2 Installation of valve into the system

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

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

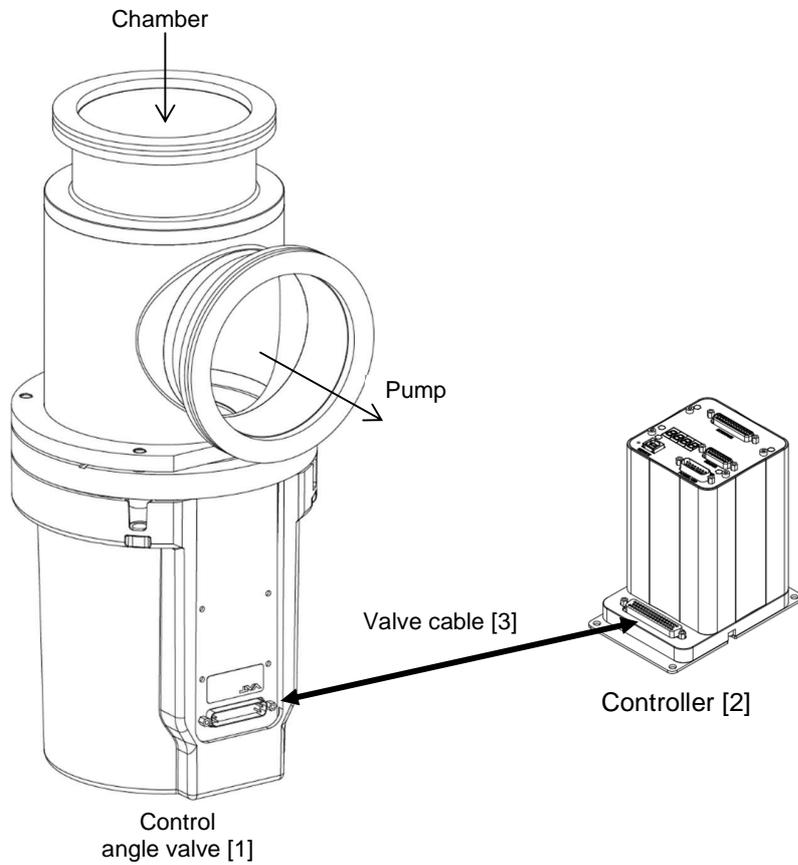
	NOTICE
	<p>Burned connector pins (spark) Connector pins or electronic parts could damage, if plugged and unplugged under power. Do not plug or unplug connectors under power.</p>

	NOTICE
	<p>Contamination 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 example – chamber / pump (preferred layout)



Sample picture

4.2.2 Installation procedure

All numbers in brackets refer to chapter «Installation example – chamber / pump».

1. Remove protective covering from body flanges.
2. Install the valve [0] into the vacuum system.

Valve flange type: EVAC ISO Tapered™ 62040-QE52-....	Valve flange type: ISO-K 62040-XE52-....
<p>Use chain clamp for flange «EVAC ISO Tapered™» Tightening torque depends on exact type of chain clamp. Follow recommendation of chain clamp manufacturer.</p>	<p>Use 8 pieces of clamp for ISO-K flange DN100 Tightening torque depends on type and material of clamp and screw. Follow recommendation of chain clamp manufacturer.</p>



- The valve seat side is indicated by the symbol «Δ». Refer to chapter «Design» or dimensional drawing.
- 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. Cover flanges with appropriate insulation material (not part of the valve) to prevent injuries and heat loss.
4. Install all electrical connections at External Controller [2] according to «External Controller manual».
5. Connect cables (Power and Sensor) of bellows heater according to chapter «Installation of bellows heater into the system »
6. Connect cables (Power and Sensor) of jacket heater according to «Manual of heating device» (not content of this manual).

4.3 Admissible forces

	NOTICE
	<p>Force at valve body</p> <p>Forces from the weight of other components can lead to deformation of the valve body and to malfunction of the valve.</p> <p>Do not higher force the valve body as specified.</p>

The following forces are admissible.

Axial tensile or compressive force «F _A »		Bending moment «M»		
N	lb.	Nm	Lbf	
500	112	54	40	

5 Operation

	NOTICE
	<p>Damage during heat up ramp and cool down If valve is closed and fan not running then valve may get damaged. Make sure that valve is in open position and fan running.</p>
	WARNING
	<p>Unqualified personnel Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.</p>
	WARNING
	<p>Electric shock Electrical shock may get result in death or serious injury. Operation is allowed only if all protective covers of heating device are closed and no parts under voltage could be reached.</p>
	CAUTION
	<p>Valve opening Risk of injury. Do not operating before the valve is installed complete into system.</p>
	CAUTION
	<p>Hot valve 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 (<25°C) before doing any work.</p>
	NOTICE
	<p>Overheating Do not cover the ventilation grid. If ventilation grid is covered the valve motor may be damaged.</p>



For «Operation of valve» refer to «External Controler manual»

If you need any further information, please contact one of our service centers. You will find the addresses on our website www.vatvalve.com.

6 Maintenance

	<p style="text-align: center;">⚠ WARNING</p> <p>Unqualified personnel 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;">⚠ WARNING</p> <p>Valve opening Risk of serious injury. Human body parts must be kept out of the valve opening and away from moving parts. Disconnect power on controller before doing any work.</p>
	<p style="text-align: center;">⚠ CAUTION</p> <p>Hot valve 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 (<25°C) before doing any work</p>
	<p style="text-align: center;">NOTICE</p> <p>Damage during heat up ramp and cool down If valve is closed and fan not running then valve may get damaged. Make sure that valve is in open position and fan running.</p>
	<p style="text-align: center;">NOTICE</p> <p>Contamination Gate and other parts of the valve might have been contaminated during usage. Always wear protective gloves when handling the valve.</p>
	<p style="text-align: center;">NOTICE</p> <p>Cleanliness Gate and other parts of the valve must be protected from contamination during service. Always wear clean room gloves when handling the valve.</p>

6.1 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.

6.2 Maintenance procedures

NOTICE	
	<p>Damage during service</p> <p>If valve is closed during service procedure valve may get damaged. Make sure that PFO is deactivated and valve is in open position before starting service procedure.</p>

One maintenance procedure is defined for this valve:

- **Replacement of plate seal, bonnet seal and valve cleaning**



Required frequency of cleaning and replacement of seals is depending on process conditions.



For spare parts of plate and bonnet seal refer to chapter: «Spare parts».

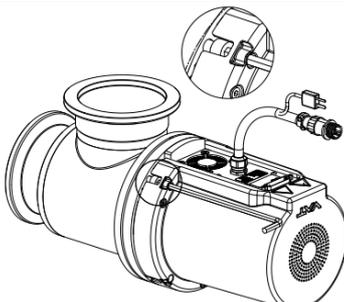
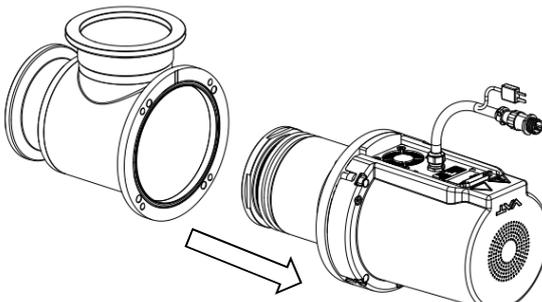
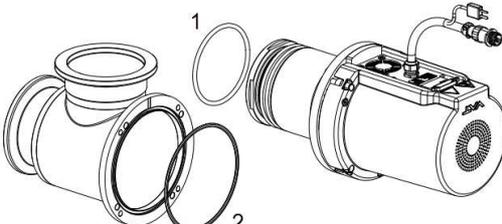


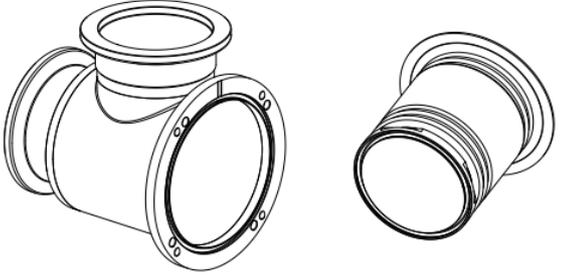
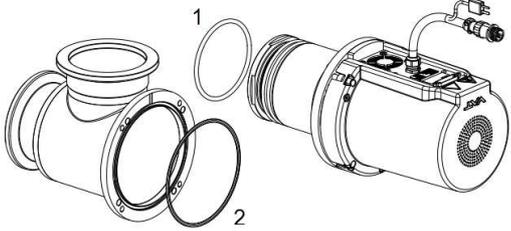
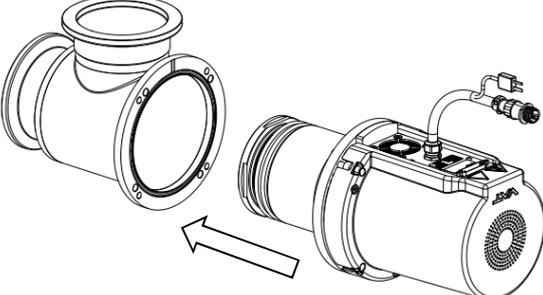
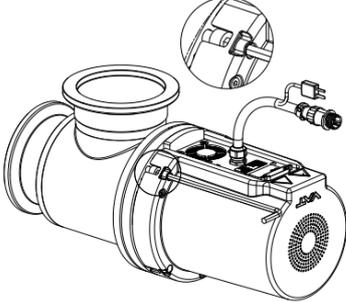
To deactivate PFO refer to «External Controller manual».

6.2.1 Replacement of plate and bonnet seals and valve cleaning

6.2.1.1 Required tools

- Allen Wrench No. 6 (Allen torque wrench No. 6)
- Clean room wiper
- Isopropyl alcohol
- O-ring removal tool (see chapter Accessories)

	Description	Required tool
<ol style="list-style-type: none"> 1. Obey the safety advice! 2. Open the valve 3. Switch OFF PFO 4. Switch OFF power to the valve 5. Disconnect valve cable 		
<ol style="list-style-type: none"> 6. Loosen 4 screws 		Allen wrench No. 6
<ol style="list-style-type: none"> 7. Remove actuator unit with bellows from valve body 		
<ol style="list-style-type: none"> 8. Remove plate O-ring (1) and bonnet O-ring (2) 		O-ring removal tool

Description	Required tool	
<p>9. Clean the O-ring grooves</p>		<p>Clean room wiper soaked with isopropyl alcohol</p>
<p>10. Install the new bonnet and plate O-rings</p> <p> For new O-rings refer to chapter: «Spare parts».</p>		
<p>11. Assemble actuator unit with bellows into valve body in reverse order.</p>		
<p>12. Fasten the bonnet screws with 14.5 Nm (crosswise)</p>		<p>Allen torque wrench No. 6</p>
<p>13. Connect valve cable 14. Switch ON power to the valve 15. Switch ON PFO</p>		



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.

8 Dismounting and Storage

	⚠ WARNING
	<p>Unqualified personnel</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>Harmful substances</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>

8.1 Dismounting

	NOTICE
	<p>Damage during cool down</p> <p>If valve is closed and fan not running then valve may get damaged. Make sure that valve is in open position and fan running.</p>

	NOTICE
	<p>Contamination</p> <p>Gate and other parts of the valve might have been contaminated during usage. Always wear protective gloves when handling the valve.</p>

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

	⚠ CAUTION
	<p>Hot valve</p> <p>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 (<25°C) before doing any work</p>

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

8.2 Storage

NOTICE	
	<p>Wrong storage</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">- relative humidity between 10% and 70%- temperature between +10 °C and +50 °C- non-condensing environment

NOTICE	
	<p>Inappropriate packaging</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 or cap.
3. Pack valve appropriately, by using the original packaging material.

9 Packaging and Transport

	⚠ WARNING
	<p>Unqualified personnel</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>Harmful substances</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>Inappropriate packaging</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.

- 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

	NOTICE
	<p>Inappropriate packaging</p> <p>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

Observe the local regulations for disposal

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

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

	⚠ CAUTION
	<p>Risk of damage Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury. A large number of diverse materials are used in the product. Some of them could cause human and machine damage in the case of improper handling.</p> <ul style="list-style-type: none"> • Observe local regulations in regard to waste disposal without fail. • Commission an authorized waste disposal company for the professional disposal of your waste.

	NOTICE
	<p>Improper disposal Some built-in materials can cause damage, if improperly handled. - When disposing, take into account all the different materials used</p>



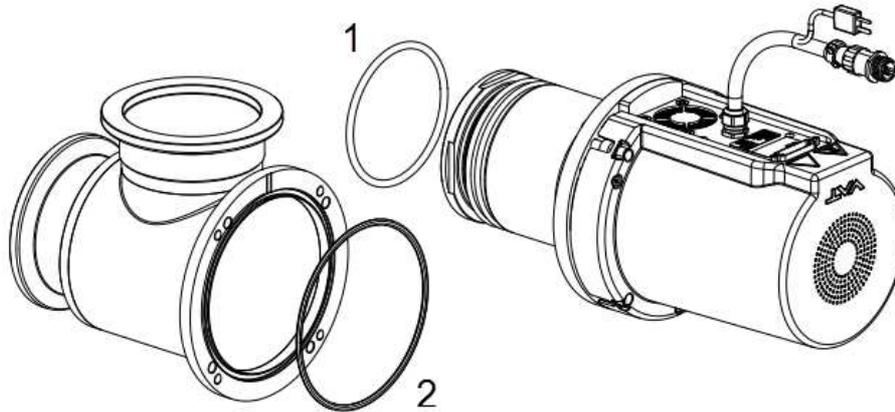
- Hire an authorised waste disposal company to dispose of the waste in a professional manner.

The following list should help you to dismantle your product without making serious errors and to properly separate out the product scrap.

Material groups	Hazard level
non-ferrous metals	high
stainless steel	low
aluminium	low
plastics	medium
lubricants	high
electronic scrap	high
batteries	very high
cables and wires	medium
motors	medium
seals and rubber parts	high

11 Spare parts

11.1 Overview



Item	Description	Part No.
1	Plate seal (FKM (e.g. Viton®))	216210
2	Bonnet seal (FKM (e.g. Viton®))	N-5100-253
	Bellows unit	1007115

11.2 Accessories

Description	Part number
O-ring removal tool 	234859

12 Appendix

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