



## New Version Pendulum Valve

This manual is valid for the valve ordering number(s):

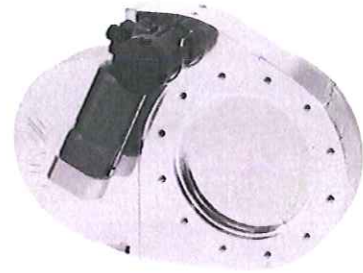
16236-.A(H)11/21/28/31/41/48

16240-.A(H)11/21/28/31/41/48

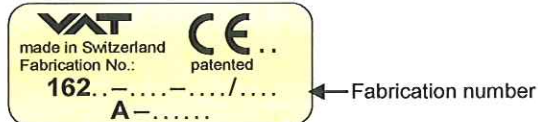
16244-.A(H)11/21/28/31/41/48

16246-.A(H)11/21/28/31/41/48

16248-.A(H)11/21/28/31/41/48



The fabrication number is indicated on each product as per the label below (or similar):



### Explanation of symbols:



Read declaration carefully before you start any other action!



Attention!



Product is in conformity with EC guidelines, if applicable!



Disconnect electrical power and compressed air lines. Do not touch parts under voltage!



Keep body parts and objects away from the valve opening!



Hot surfaces; do not touch!



Loaded springs and/or air cushions are potential hazards!



Wear gloves!



Read these «Installation, Operating & Maintenance Instructions» and the enclosed «General Safety Instructions» carefully before you start any other action!



Installation, Operating & Maintenance Instructions

Series 162, DN 63-250 (I.D. 2½ - 10")

---

**Imprint:**

**Manufacturer** VAT Vakuumventile AG, CH-9469 Haag, Switzerland

Website	Phone	Fax	Email
www.vatvalve.com	+41 81 771 61 61	+41 81 771 48 30	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 2008

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:

1	Use of product.....	4
1.1	Technical data.....	4
2	Installation.....	5
2.1	Unpacking.....	5
2.2	Installation into the system.....	5
2.3	Tightening torque for flange screws.....	5
2.3.1	Mounting with centering ring.....	5
2.3.2	Mounting with O-ring in groove.....	6
2.4	Admissible forces.....	6
2.5	Connections.....	7
2.5.1	Compressed air connection at standard valve.....	7
2.5.2	Compressed air connection at 3-position actuator (optional).....	8
2.5.3	Electrical Connection standard valve.....	9
2.5.4	Electrical connection 3-position valve (optional).....	10
3	Operation.....	11
3.1	Normal operation.....	11
3.2	Operation under increased temperature.....	11
3.3	Behavior in case of compressed air pressure drop.....	11
3.4	Behavior in case of a power failure.....	11
3.4.1	Emergency operation at power failure.....	12
3.5	Operation of 3-position actuator (optional).....	12
3.5.1	Normal operation of 3-position actuator.....	12
3.5.2	Behavior in case of compressed air pressure drop.....	12
3.5.3	Adjustment procedure of third position.....	13
3.5.4	3-position actuator control logic.....	13
4	Trouble shooting.....	13
5	Maintenance & repairs.....	14
5.1	Safety instructions.....	15
5.2	Lubrication & Tightening torque specifications.....	16
5.2.1	Lubrication specifications.....	16
5.2.2	Tightening torque specifications.....	16
5.3	Maintenance procedures.....	16
5.3.1	Standard cleaning procedure.....	16
5.3.2	Replacement and cleaning of rotary feedthrough seal.....	17
5.3.3	Retrofit of the standard actuator with a 3-position actuator.....	19
6	Drawing.....	20
6.1	Valve assembly drawing.....	20
6.2	3-position actuator assembly drawing.....	21
7	Spare parts.....	22
7.1	Seal kits.....	22
7.2	Grease.....	22
7.3	Cleaning tool.....	22
7.4	Single spare parts.....	23
8	Warranty.....	24





## 1 Use of product

Use product for clean and dry indoor vacuum applications under the conditions indicated in chapter «Technical data» only!  
Other applications are only allowed with the written permission of VAT.

### 1.1 Technical data

Pressure range at 20°C	not coated	$1 \times 10^{-8}$ mbar to 1.2 bar (abs)
	hard anodized	$1 \times 10^{-6}$ mbar to 1.2 bar (abs)
Leak rate to the outside at 20°C	not coated, FKM seals	$\leq 1 \times 10^{-9}$ mbar ls <sup>-1</sup>
	not coated, FFKM seals	$\leq 1 \times 10^{-8}$ mbar ls <sup>-1</sup>
	hard anodized	$\leq 1 \times 10^{-5}$ mbar ls <sup>-1</sup>
Leak rate at seat at 20°C	not coated	$\leq 1 \times 10^{-9}$ mbar ls <sup>-1</sup>
	not coated, FFKM seals	$\leq 1 \times 10^{-7}$ mbar ls <sup>-1</sup>
	hard anodized	$\leq 1 \times 10^{-4}$ mbar ls <sup>-1</sup>
Molecular flow conductance	DN 63:	Min: on req. ls <sup>-1</sup> Max: 440 ls <sup>-1</sup>
	DN 100:	Min: on req. ls <sup>-1</sup> Max: 1'700 ls <sup>-1</sup>
	DN 160:	Min: on req. ls <sup>-1</sup> Max: 5'000 ls <sup>-1</sup>
	DN 200:	Min: 15 ls <sup>-1</sup> Max: 12'000 ls <sup>-1</sup>
	DN 250:	Min: 25 ls <sup>-1</sup> Max: 22'000 ls <sup>-1</sup>
Differential pressure on the gate		$\leq 1.2$ bar (abs) in either direction
Max. differential pressure at opening	DN 63:	$\leq 30$ mbar
	DN 100:	$\leq 30$ mbar
	DN 160:	$\leq 10$ mbar
	DN 200:	$\leq 5$ mbar
	DN 250:	$\leq 5$ mbar
Cycles until first service		$\leq 200'000$
Bake-out temperature	Valve	$\leq 120^\circ\text{C}$
	Actuator	$\leq 80^\circ\text{C}$
	Position indicator	$\leq 50^\circ\text{C}$
Material	Body, Gate	AlMg4.5Mn (AA 5083)
	Sealing ring	AlMgSi1 (AA 6082)
	Other materials in contact with media	1.4301 (AISI 304) 1.4435, (AISI 316L), 1.4034 (AISI 420),
Mounting position		any
Compressed air pressure (above ATM)		5-7 bar (75-100 psi)
Maximum pressure above atmosphere at exhaust line		0.5 bar (7 psi)

< For any additional technical information please have a look at the valve specific product data sheet >



## 2 Installation



Do not lift the valve at the actuator! The valve may get damaged

### 2.1 Unpacking

Make sure, that the delivered components are according the order.  
Visually check the quality of the components.  
If something of the delivery is not as expected please immediately contact VAT.

#### Notice:

Please do not throw away the original packaging. Packaging may be useful in a case of service to return the components to VAT.

### 2.2 Installation into the system

The valve seat side is indicated by the symbol "▽" on the connection flange.

### 2.3 Tightening torque for flange screws

#### 2.3.1 Mounting with centering ring

Tighten mounting screws of the flanges uniformly in crosswise order. Observe the maximum torque levels in the following table. Higher tightening torques deform the valve body and can lead to an improper function of the valve. **ATTENTION:** Do not install the flange screws over the maximum specified depth. A flange screw which is installed over the maximum depth may result in a damage of the valve!

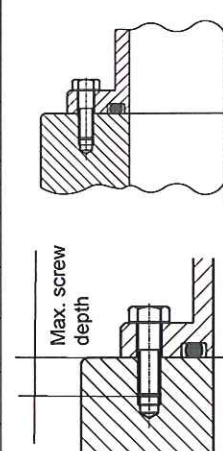
DN		max. tightening torque (Nm)			max. tightening torque (lbf . ft)			Max. screw depth (mm)			
mm	Inch	ISO-F	JIS	ASA-LP	ISO-F	JIS	ASA-LP	ISO-F	JIS	ASA-LP	
63	2 ½	8 - 10	8 - 10	8 - 10	6 - 8	6 - 8	6 - 8	12	12	12	
100	4	8 - 10	8 - 10	8 - 10	6 - 8	6 - 8	6 - 8	12	12	12	
160	6	13 - 15	13 - 15	13 - 15	9 - 11	9 - 11	15 - 22	14	14	14	
200	8	13 - 15	13 - 15	13 - 15	9 - 11	9 - 11	15 - 22	15	15	15	
250	10	17 - 20	17 - 20	17 - 20	13 - 15	13 - 15	13 - 15	12	12	12	
320	12	-	-	-	-	-	-	-	-	-	
350	14	N/A	-	-	N/A	-	-	N/A	-	-	



### 2.3.2 Mounting with O-ring in groove

Tighten mounting screws of the flanges uniformly in crosswise order. Observe the maximum torque levels in the following table. Higher tightening torques may damage the threads in the valve body and can lead to an improper function of the valve. **ATTENTION:** Do not install the flange screws over the maximum specified depth. A flange screw which is installed over the maximum depth may result in a damage of the valve!

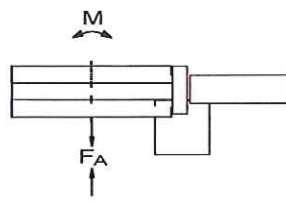
DN		max. tightening torque (Nm)			max. tightening torque (lbf . ft)			Max. screw depth (mm)		
mm	Inch	ISO-F	JIS	ASA-LP	ISO-F	JIS	ASA-LP	ISO-F	JIS	ASA-LP
63	2 ½	20 – 23	35 – 40	35 – 40	15 – 17	26 – 30	26 -30	12	12	12
100	4	20 – 23	35 – 40	35 – 40	15 – 17	26 – 30	26 -30	12	12	12
160	6	35 - 40	35 - 40	35 – 40	26 – 30	26 -30	26 -30	14	14	14
200	8	35 - 40	35 – 40	80 - 90	26 – 30	26 -30	59 - 67	15	15	15
250	10	35 - 40	65 - 70	80 - 90	26 – 30	48 –52	59 - 67	12	12	12
320	12	-	-	-	-	-	-	-	-	-
350	14	N/A	-	-	N/A	-	-	N/A	-	-



### 2.4 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.

DN (nom. I.D.)		Axial tensile or compressive force «F <sub>A</sub> »		Bending moment «M»	
mm	inch	N	lb	Nm	Lbf.ft
63	2½	1000	220	40	30
100	4	1000	220	40	30
160	6	2000	440	80	60
200	8	2000	440	80	60
250	10	2500	550	100	75
320	12	-	-	-	-
350	14	-	-	-	-
400	16	-	-	-	-



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 max. 1 x thread diameter. Please contact VAT for more information.



## 2.5 Connections

### 2.5.1 Compressed air connection at standard valve



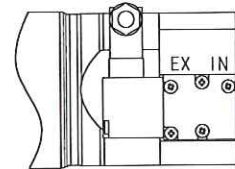
Connect compressed air only if:  
- valve has been installed into the vacuum system  
- moving parts cannot be touched



Compressed air pressure (min. - max. overpressure): 5 - 7 bar / 75 - 100 psig  
Use only clean, dry or slightly oiled air!

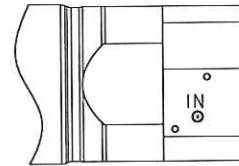
#### With solenoid:

1. Connect compressed air to the <IN> port of the solenoid (internal thread R 1/8", 1/8" NPT for USA)



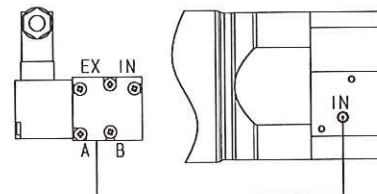
#### Without solenoid:

1. Connect compressed air to the <IN> port of the actuator (internal thread M5)



#### Solenoid delivered separately :(External solenoid): (solenoid is not attached to valve)

1. Connect the <A> port of the solenoid with the <IN> port of the actuator
2. Make sure that a plug is installed at the <B> port of the solenoid
3. Connect compressed air to the <IN> port of the solenoid (internal thread R 1/8", 1/8" NPT for USA)





2.5.2 Compressed air connection at 3-position actuator (optional)



Connect compressed air only if:  
 - valve has been installed into the vacuum system  
 - moving parts cannot be touched

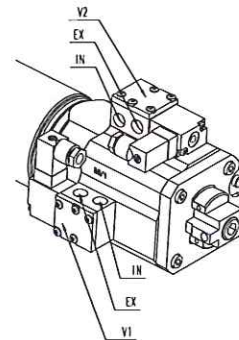


Compressed air pressure (min. - max. overpressure): 5 - 7 bar / 75 - 100 psig  
 Use only clean, dry or slightly oiled air!

**ATTENTION:** Air pressure at the <IN> port and at the <MID> port has to be the same!

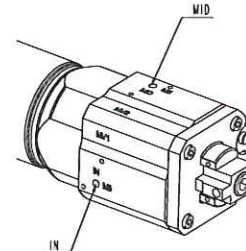
**With solenoid:**

1. Connect compressed air to the <IN> port of the main cylinder solenoid V1 (internal thread R 1/8", 1/8" NPT for USA)
2. Connect compressed air to the <MID> port of the 3-position cylinder solenoid V2 (internal thread R 1/8", 1/8" NPT for USA)



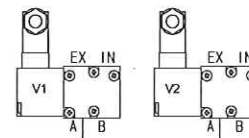
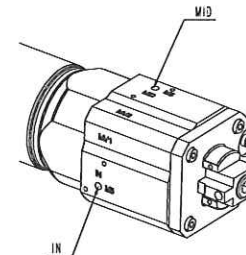
**Without solenoid:**

1. Connect compressed air to the <IN> port of the main (internal thread M5)
2. Connect compressed air to the <MID> port of the 3-position cylinder (internal thread M5)



**Solenoid delivered separately: (External solenoid):**  
 (solenoid is not attached to valve)

1. Connect the <A> port of main cylinder solenoid V1 to the <IN> port of the main cylinder
2. Make sure that a plug is installed at the <B> port of the main cylinder solenoid V1
3. Connect compressed air to the <IN> port of the main cylinder solenoid V1 (internal thread R 1/8", 1/8" NPT for USA)
4. Connect the <A> port of 3-position cylinder solenoid V2 to the <MID> port of the 3-position cylinder
5. Make sure that a plug is installed at the <B> port of the 3-position cylinder solenoid V2
6. Connect compressed air to the <IN> port of the 3-position cylinder solenoid V2 (internal thread R 1/8", 1/8" NPT for USA)







Installation, Operating & Maintenance Instructions  
Series 162, DN 63-250 (I.D. 2½ - 10")

2.5.3 Electrical Connection standard valve



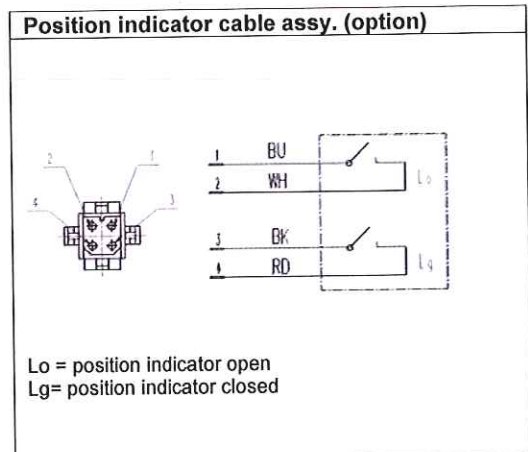
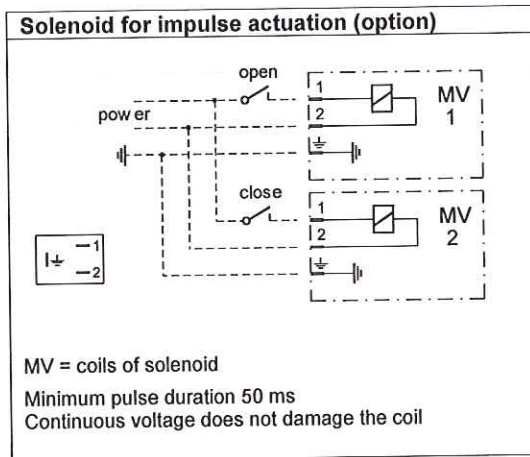
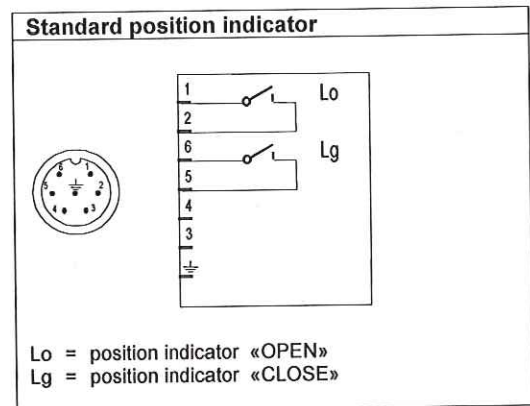
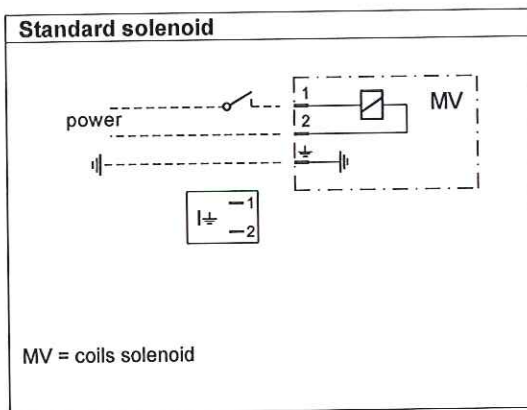
Do not touch any electrically charged parts!

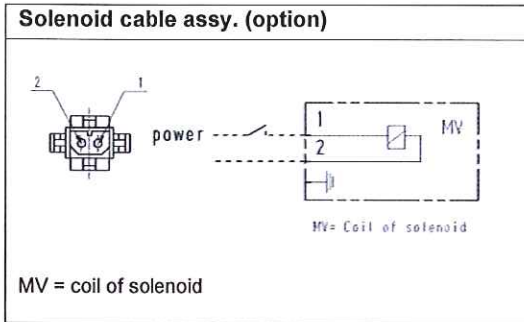


Connect electrical power only if  
- valve has been installed into the vacuum system  
- moving parts cannot be touched

Verify that mains voltage matches voltage stated on the solenoid! Sockets for position indicator and solenoid are supplied with the valve.

Wire solenoid and position indicator according to the following diagrams:





**2.5.4 Electrical connection 3-position valve (optional)**



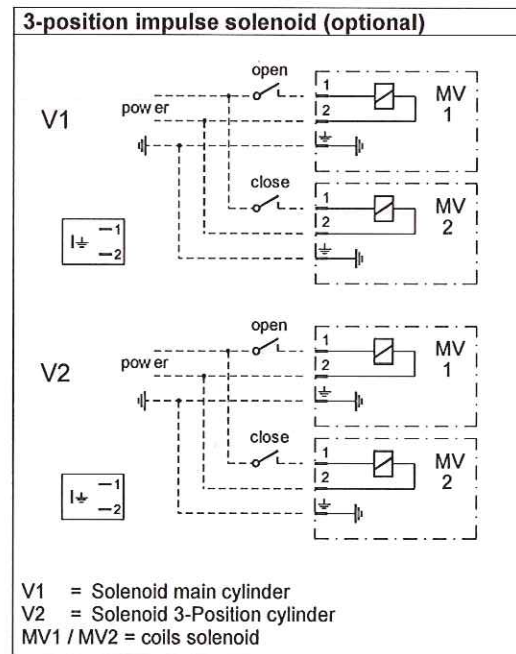
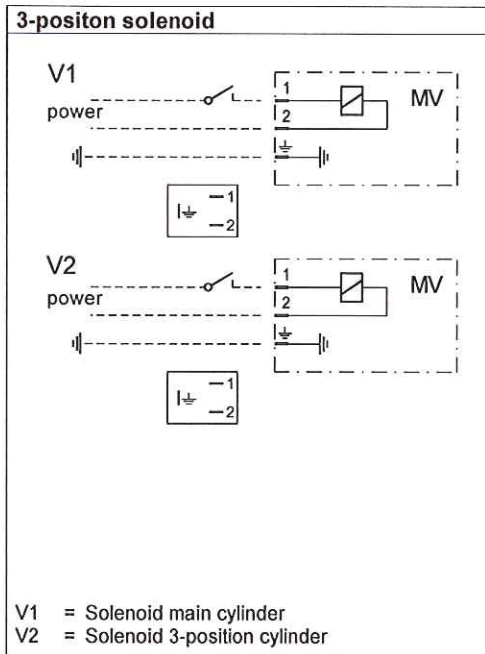
Do not touch any electrically charged parts!

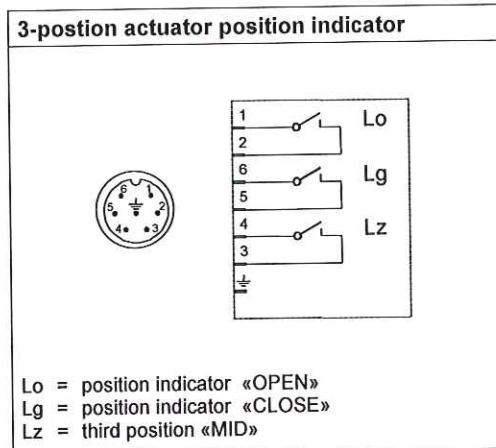


Connect electrical power only if  
 - valve has been installed into the vacuum system  
 - moving parts cannot be touched

Verify that mains voltage matches voltage stated on the solenoid! Sockets for position indicator and solenoid are supplied with the valve.

Wire solenoid and position indicator according to the following diagrams:





### 3 Operation

#### 3.1 Normal operation

Valve is opened by means of compressed air

Valve is closed by a spring

#### 3.2 Operation under increased temperature

See «1.1 Technical data»

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

Valve closed: valve remains closed  
Valve opened: valve will close (Normally Closed)  
Valve in intermediate position: valve will close (Normally Closed)

#### 3.4 Behavior in case of a power failure

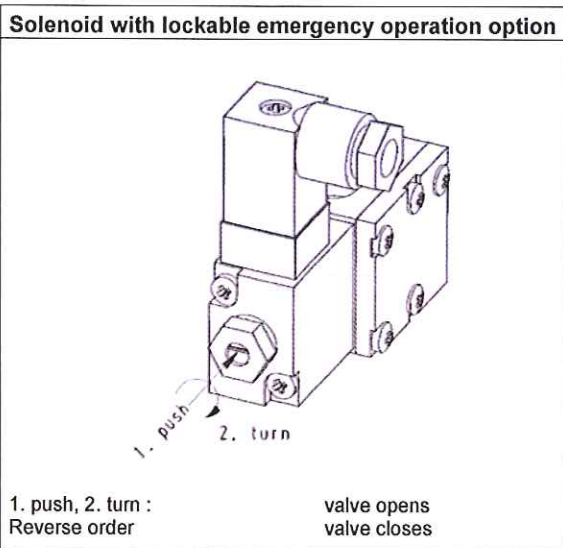
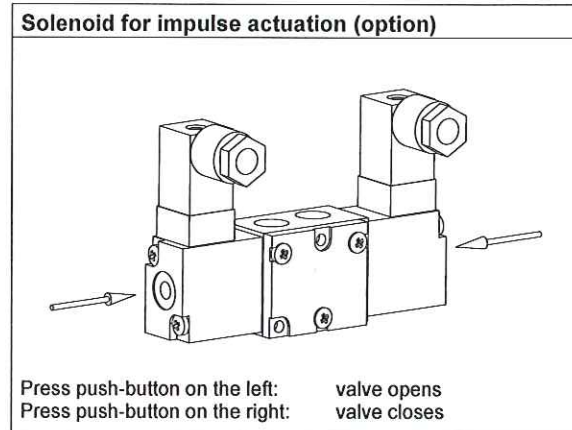
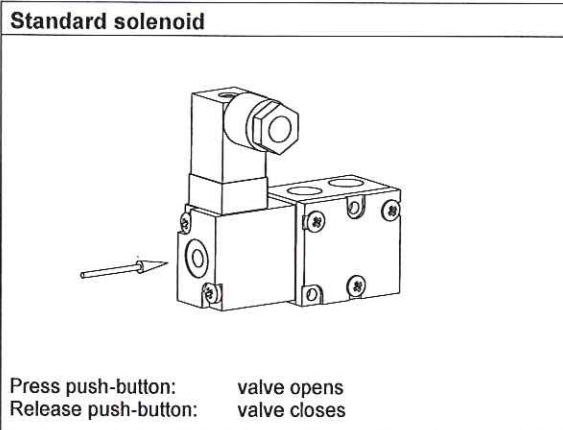
Standard solenoid: valve will close  
Impulse solenoid: valve position will not change, but a started movement will be completed





### 3.4.1 Emergency operation at power failure

In case of a power failure, the valve can be actuated manually if compressed air is available.



## 3.5 Operation of 3-position actuator (optional)

### 3.5.1 Normal operation of 3-position actuator

Valve will be moved into the MID position by means of compressed air

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

Valve in MID position: valve will close (Normally Closed)



### 3.5.3 Adjustment procedure of third position

(Numbers in brackets refer to the picture on paragraph 6.2)

1. Remove complete air pressure supply from the gate valve actuator
2. Unlock clamping screw (57)
3. Turn the adjustment screw (58) clockwise (closing direction) or counter clockwise (opening direction) to adjust the third position (max. allowed torque 15 Nm / 11 lbf.ft)
4. Apply air pressure according section 2.5.2 to move the gate into the intermediate position. Repeat item 1 to 4 until required third position is adjusted.
5. Lock clamping screw (57) with torque 3.4 Nm / 2.5 lbf.ft

### 3.5.4 3-position actuator control logic

Gate Position	Compressed air port	
	<IN>	<MID>
Open	1	0 or 1
Intermediate	0	1
Close	0	0

1 = compressed air at specific port  
 0 = no compressed air at specific port

**REMARKS:** The OPEN position has priority compared to the MID position

## 4 Trouble shooting

Failure	Check	Action
Valve does not close or open	Compressed air available	Connect air pressure <see section 2.5.1>
	Check air pressure	Set up air pressure according specifications <see section 2.5.1>
	Power for solenoid available	Connect electrical power to solenoid <see section 2.5.3>
Valve does not open completely	Check air pressure	Set up air pressure according specifications <see section 2.5.1>
Valve does not closely completely	Check if pressure on exhaust line is in specifications <see section 1.1>	Install separate exhaust line
		Increase diameter of exhaust line
Leak at gate	Check if sealing ring, pendulum plate or valve body is contaminated or damaged	Clean or replace components <see section 5.3>
	Check if the o-rings of sealing ring are contaminated or damaged	Clean or replace components <see section 5.3>
	Sealing surfaces on valve body damaged?	Please contact your VAT service center for repair. You can find the addresses on our website: <a href="http://www.vat.ch">http://www.vat.ch</a>
Leak to outside	Check flange seals and valve sealing surfaces	Clean flange seal and sealing surfaces with alcohol.
		Please contact your VAT service center for repair if the valve sealing surfaces are damaged. You can find the addresses on our website: <a href="http://www.vat.ch">http://www.vat.ch</a>



		Clean flange seals and sealing surfaces with alcohol or replace seals if necessary
Leak to outside	Check if the valve is installed correctly	Verify if the valve is installed correctly and the admissible forces does not exceed the specifications <see section 2.2>
	Check bonnet seal and sealing surfaces	Verify if the bonnet screws are tightened according specifications <see section 5.3>
		Clean bonnet seal and sealing surfaces with alcohol or replace bonnet seal if necessary <see section 5.3>
		Please contact your VAT service center for repair if the valve sealing surfaces are damaged. You can find the addresses on our website: <a href="http://www.vat.ch">http://www.vat.ch</a>
Leak to outside	Check if actuator feed through is leak tight	Perform He leak check of the rotary feedthrough o-ring at the bottom of the plate which is between the actuator and the valve housing at the Leak Detection Port LDP2 <See section 6>
		Clean seal and sealing surfaces of the rotary feedthrough with alcohol or replace rotary feedthrough o-ring if necessary <See Maintenance Procedure Section 5.3.2>
		Please contact your VAT service center for repair if the valve sealing surfaces are damaged. You can find the addresses on our website: <a href="http://www.vat.ch">http://www.vat.ch</a>
	Check if piston feed trough's are leak tight	Perform He leak check at the Leak Detection Port LDP1 for the piston feedthrough <See section 6>
		Please contact your VAT service center for repair if a leak at the piston feed through's was detected. You can find the addresses on our website: <a href="http://www.vat.ch">http://www.vat.ch</a>

If you need any further information, please contact one of our service centers. You can find the addresses on our website: <http://www.vat.ch>

## 5 Maintenance & repairs

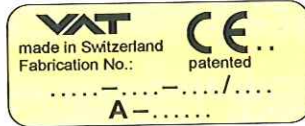
Under clean operating conditions, the valve does not require any maintenance during the specified cycle life. Contamination from the process may influence the function and requires more frequent maintenance.

Before carrying out any maintenance or repairs, please contact VAT. It has to be individually decided whether the maintenance/repair can be performed by the customer or has to be carried out by VAT. The fabrication number on the valve





Installation, Operating & Maintenance Instructions  
Series 162, DN 63-250 (I.D. 2½ - 10")



← Fabrication number

has always to be specified.

All supplies (e. g. compressed air, electrical power) must be disconnected for removal/installation of the valve from/into the system and for maintenance work.



Even with disconnected supply, loaded springs and/or air cushions in cylinders can be potential hazards.

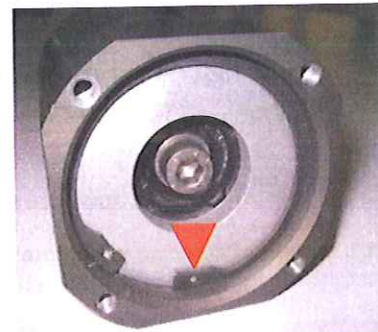


Keep fingers and objects away from the valve opening!

Products returned to VAT must be free of harmful substances such as e.g. toxic, caustic or microbiological ones. If products are radioactively contaminated, fill in the VAT form «Contamination and Radiation Report» and send it with the product. The form is available at VAT. The maximum values indicated in the form must not be exceeded.

### 5.1 Safety instructions

WARNING	
	<p><b>Serious personal safety hazard by loaded spring inside the actuator</b></p> <p>Do <b>never</b> remove the Circlip inside the actuator. (see picture to the right)</p> <p>For service or repair reasons always return actuator to VAT Switzerland</p>



CAUTION	
	<p><b>Personal safety hazard by loaded spring of the ring piston inside the valve housing</b></p> <p>Before carrying out any maintenance or repairs please contact VAT</p>



## 5.2 Lubrication & Tightening torque specifications

### 5.2.1 Lubrication specifications

(Numbers in brackets refer to the picture on page 20)

Location	Description	Amount of vacuum grease [ml / gram]				
		DN 63	DN 100	DN 160	DN 200	DN 250
L1	Lubrication of dynamic seal (3)	-	-	-	0.2 / 0.4	0.2 / 0.4
	Grease depot	-	-	-	0.3 / 0.6	0.4 / 0.8
L2	Lubrication of rotary feed through seal (12)	-	-	-	0.05 / 0.1	0.05 / 0.1
	Grease depot	-	-	-	0.1 / 0.2	0.1 / 0.2
L3	Lubrication of bonnet seal (10)	-	-	-	0.1 / 0.2	0.1 / 0.2
L4	Lubrication of actuator shaft (20)	-	-	-	0.1 / 0.2	0.1 / 0.2

### 5.2.2 Tightening torque specifications

(Numbers in brackets refer to the picture on page 20)

Location	Description	Torque [Nm / Lbf.ft]				
		DN 63	DN 100	DN 160	DN 200	DN 250
T1	Fasting torque of gate fixation screw (17)	-	-	-	14.5 / 10.7	14.5 / 10.7
T2	Fasting torque of bonnet screws (15)	-	-	-	6.0 / 4.4	14.5 / 10.7
T3	Fasting torque of actuator fixation screws (20)	-	-	-	6.0 / 4.4	6 / 4.4

## 5.3 Maintenance procedures

### 5.3.1 Standard cleaning procedure

(Numbers in brackets refer to the picture on page 20)

1. Vent the chamber on the A and B side of the valve to atmosphere
2. Remove electrical supply from the valve
3. Remove compressed air supply from the valve
4. Unscrew the two bonnet screws (15)
5. Remove the bonnet (19) by slightly swinging up and down
6. Place the bonnet (19) on a clean surface
7. Apply compressed air to the "IN" port of the actuator <see section 2.5.1> **ATTENTION:** Swinging pendulum plate, step back from the valve
8. Unscrew gate fixation screw (17)
9. Slide out gate (1) from the actuator shaft (20)
10. Place gate (1) on a clean surface



11. Push the "Service Button" <see section 6> **ATTENTION:** The service button has to be pushed during the following next two steps
12. Unlatch the sealing ring (2) by swinging to the "Unlock" position <see section 6>
13. Remove the sealing ring (2) from the valve body (18)
14. Release the "Service Button" <see section 6
15. Place the sealing ring (2) on a clean surface
16. Remove the gate seal (7) and the dynamic seal (3) from the sealing ring (2) by an appropriate tool
17. Clean the sealing ring (2), the dynamic seal (3) and the gate seal (7) with alcohol
18. Replace the gate seal (7) or the dynamic seal (3) of the sealing ring (2) if necessary
19. Uniformly lubricate the dynamic seal (3) with the amount of grease specified in section 5.2.1
20. Install the dynamic seal (3) on the sealing ring
21. Deposit the amount of grease specified in section 65.2.1 uniformly over the whole circumference on the bottom side of the dynamic seal <see section 6> [lubrication location L1]
22. Install the gate seal (7) into the sealing ring (2)
23. Clean the gate (1) especially the sealing surfaces of the gate with alcohol
24. Clean the valve body (18) and especially sealing surfaces of the dynamic seal (3) of the valve body (18) with alcohol. **ATTENTION:** Do not directly expose the rotary feedthrough or the piston feed through's to an air stream. Hazard of grease contamination of the valve!
25. Push the "Service Button" **ATTENTION:** The service button has to be pushed during the following next two steps
26. Insert the sealing ring (2) into the valve body (18)
27. Latch the sealing ring (2) by swinging into the "Lock" direction <see section 6>
28. Locate the gate (1) on the actuator shaft (20) below the alignment piece (16)
29. Push the gate (1) into the direction of the actuator axis to the hard stop
30. Fasten the gate fixation screw (17) with the appropriate torque specified in the section 5.2.2
31. Remove compressed air supply from the valve **ATTENTION:** Swinging pendulum plate, step back from the valve
32. Remove the bonnet seal (10) with an appropriate tool from the bonnet (19)
33. Clean the bonnet seal (10) with alcohol or replace the seal (10) if necessary
34. Clean the bonnet o-ring groove with alcohol
35. Uniformly lubricate the bonnet seal (10) with the amount of grease specified in section 5.2.1 [lubrication location L3]
36. Install the lubricated bonnet seal (10)
37. Clean the bonnet sealing surface at the valve housing (18) with alcohol
38. Install the bonnet (19)
39. Fasten the two bonnet screws (15) with the appropriate torque specified in the section 5.2.2

### 5.3.2 Replacement and cleaning of rotary feed through seal

(Numbers in brackets refer to the picture on page 20)

1. Vent the chamber on the A and B side of the valve to atmosphere
2. Remove electrical supply from the valve
3. Remove compressed air supply from the valve
4. Unscrew the two bonnet screws (15)
5. Remove the bonnet (19) by slightly swinging up and down
6. Place the bonnet (19) on a clean surface
7. Apply compressed air to the "IN" port of the actuator <see section 2.5.1> **ATTENTION:** Swinging pendulum plate, step back from the valve
8. Unscrew gate fixation screw (17)
9. Slide out gate (1) from the actuator shaft (20)
10. Place gate (1) on a clean surface
11. Remove the three actuator fixation screws (21)
12. Pull out actuator (6) from the valve body (18)
13. Remove rotary feedthrough seal (12) from the valve body (18)
14. Clean rotary feedthrough seal (12) with alcohol or replace seal if necessary
15. Clean the o-ring groove respectively the rotary feedthrough sealing surfaces of the valve body (18) with alcohol
16. **ATTENTION:** Do not directly expose the piston feedthrough's to an air stream. Hazard of grease contamination of the valve!
17. Clean the rotary feedthrough sealing surfaces of the actuator shaft (20) with alcohol
18. Visually check the rotary feedthrough sealing surfaces of the actuator shaft (20)
19. Uniformly lubricate the rotary feedthrough seal (12) with the amount of grease specified in section 5.2.1
20. Install the lubricated rotary feedthrough seal (12) into the valve body (18)
21. Deposit the amount of grease specified in section 5.2.1 uniformly over the whole circumference on the bottom side of the rotary feedthrough seal <see section 6> [lubrication location L2]
22. Uniformly lubricate the actuator shaft (20) with the amount of grease specified in section 5.2.1 [lubrication location L4]





23. Clean the actuator air pressure seal (22) with alcohol or replace the seal if necessary.
24. Slightly lubricate the actuator air pressure seal (22) with vacuum grease
25. Clean the sealing surfaces of the actuator air pressure seal (22) at the actuator (6) and the valve body (18)
26. Install the actuator (6) on the valve body (18). **ATTENTION:** Carefully insert the actuator shaft (20) into the valve body (18) to not damage the rotary feedthrough seal (12)
27. Fasten the three actuator fixation screws (21) with the appropriate torque specified in the section 5.2.2
28. Clean the valve body (18) with alcohol **ATTENTION:** Do not directly expose the rotary feedthrough or the piston feedthrough's to an air stream. Hazard of grease contamination of the valve!

**ATTENTION:** VAT recommends during the replacement of the rotary feedthrough seal to clean and lubricate the seals of the sealing ring (2) too. Go ahead with item 48 if you do not want to service the sealing ring.

29. Push the "Service Button" <see section 6>
30. **ATTENTION:** The service button has to be pushed during the following next two steps
31. Unlatch the sealing ring (2) by swinging to the "Unlock" position <see section 6>
32. Remove the sealing ring (2) from the valve body (18)
33. Release the "Service Button" <see section 6
34. Place the sealing ring (2) on a clean surface
35. Remove the gate seal (7) and the dynamic seal (3) from the sealing ring (2) by an appropriate tool
36. Clean the sealing ring (2), the dynamic seal (3) and the gate seal (7) with alcohol
37. Replace the gate seal (7) or the dynamic seal (3) of the sealing ring (2) if necessary
38. Uniformly lubricate the dynamic seal (3) with the amount of grease specified in section 5.2.1
39. Install the dynamic seal (3) on the sealing ring
40. Deposit the amount of grease specified in section 65.2.1 uniformly over the whole circumference on the bottom side of the dynamic seal <see section 6> [lubrication location L1]
41. Install gate seal (7) into the sealing ring (2)
42. Clean the gate (1) especially the sealing surfaces of the gate with alcohol
43. Clean the sealing surfaces of the dynamic seal (3) at the valve body (18) with alcohol **ATTENTION:** Do not directly expose the rotary feedthrough or the piston feedthrough's to an air stream. Hazard of grease contamination of the valve!
44. Push the "Service Button"
45. **ATTENTION:** The service button has to be pushed during the following next two steps
46. Insert the sealing ring (2) into the valve body (18)
47. Latch the sealing ring (2) by swinging into the "Lock" direction <see section 6>
48. Locate the gate (1) on the actuator shaft (20) below the alignment piece (16)
49. Push the gate (1) into the direction of the actuator axis to the hard stop
50. Fasten the gate fixation screw (17) with the appropriate torque specified in the section 5.2.2
51. Remove compressed air supply from the valve **ATTENTION:** Swinging pendulum plate, step back from the valve
52. Remove the bonnet seal (10) with an appropriate tool from the bonnet (19)
53. Clean the bonnet seal (10) with alcohol or replace the seal (10) if necessary
54. Clean the bonnet o-ring groove with alcohol
55. Uniformly lubricate the bonnet seal (10) with the amount of grease specified in section 5.2.1 [lubrication location L3]
56. Install the lubricated bonnet seal (10)
57. Clean the bonnet sealing surface at the valve housing (18) with alcohol
58. Install the bonnet (19)
59. Fasten the gate fixation screw (17) with the appropriate torque specified in the section 5.2.2



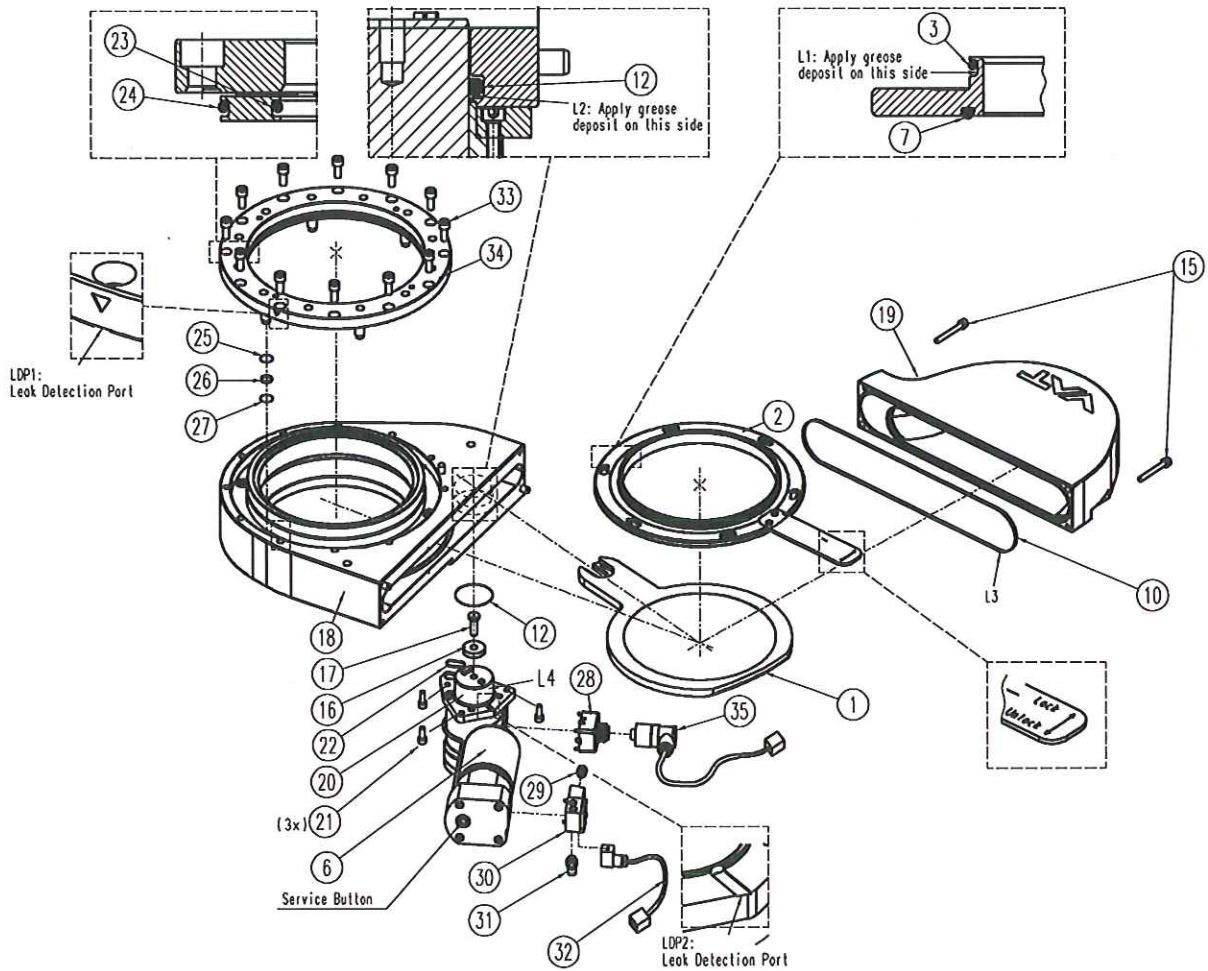
### 5.3.3 Retrofit of the standard actuator with a 3-position actuator

(Numbers in brackets refer to the picture on page 21)

1. Remove electrical supply from the valve
2. Remove the complete compressed air supply from the actuator (6)
3. Remove the pneumatic pipe (51) of the actuator (6). **ATTENTION:** Remove the pneumatic pipe at the one touch fitting (59) in advance of the one touch fitting (60)
4. Remove the QTY 4 actuator bottom screws (23) of the actuator (6)
5. Remove the QTY 4 shipping screws (52) of the 3-position cylinder (53)
6. Remove the shipping protection (56) of the 3-position cylinder (53) by removing the QTY 4 shipping nuts (52)
7. **ATTENTION:** Do not clean the 3-position actuator pneumatic seal (54) of the 3-position cylinder (53)
8. Clean the sealing surface of the 3-position actuator pneumatic seal (54) at the actuator (6)
9. Install the 3-position cylinder (53) on the actuator (6)
10. Fasten the QTY 4 3-position actuator bottom screws (55) uniformly stepwise. Tightening Torque (3.4Nm / 2.5 lbf.ft)
11. Install the pneumatic pipe (51) of the actuator (6). **ATTENTION:** Install the pneumatic pipe at the one touch fitting (60) in advance of the one touch fitting (59)
12. Apply compressed according the specifications. <see section 2.5.2>
13. Check if the compressed air connections at the one touch fittings (59) and (60) are leak tight.

## 6 Drawing

### 6.1 Valve assembly drawing



#### Description

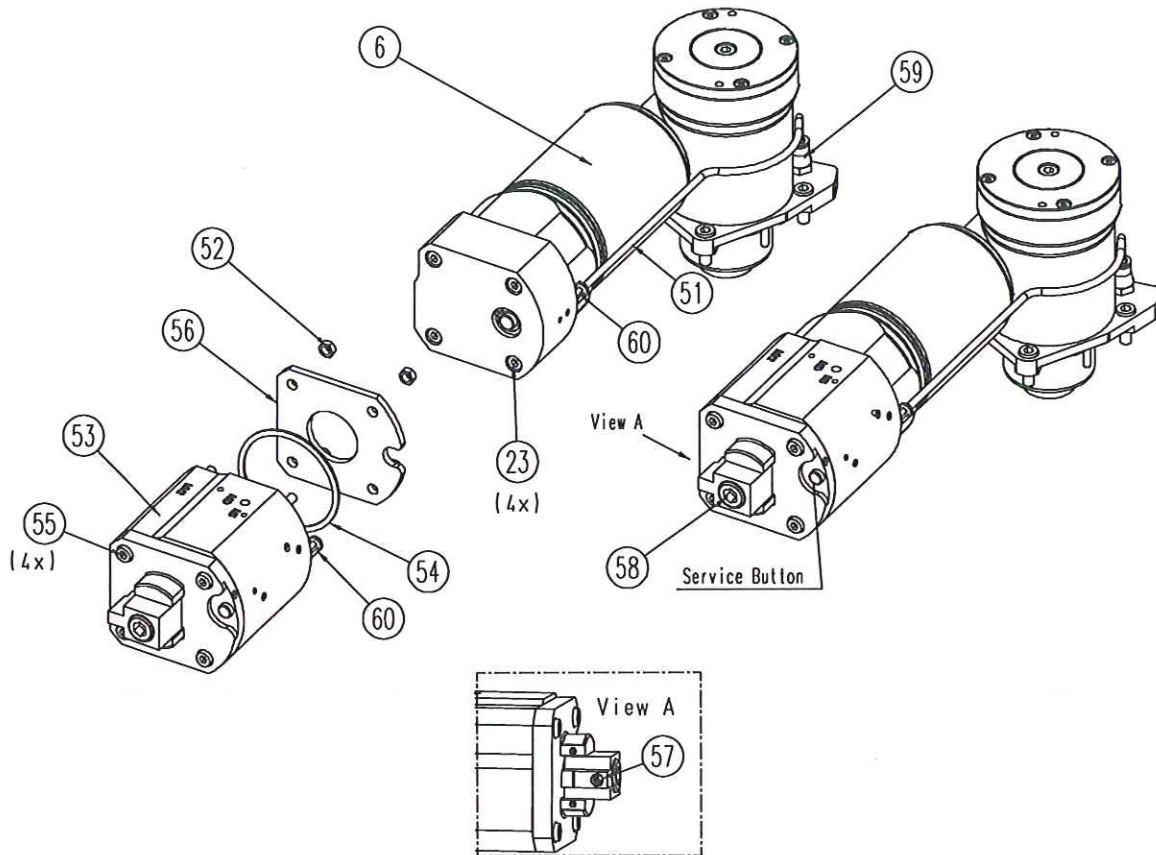
Item	Description
1	Gate
2	Sealing ring
3	Dynamic seal
5	Actuator shaft
6	Actuator
7	Gate seal

Item	Description
10	Bonnet seal
12	Rotary feed through seal
15	Bonnet screws
16	Alignment piece
17	Gate fixation screw
18	Valve body

Item	Description
19	Bonnet
20	Actuator shaft
21	Actuator fixation screws
22	Actuator air pressure seal
23	Actuator bottom screws



### 6.2 3-position actuator assembly drawing



#### Description

Item	Description
51	Pneumatic pipe
6	Actuator
23	Actuator bottom screws
52	Shipping nut
53	3-position cylinder
54	3-position actuator pneumatic seal
55	3-position actuator bottom screws

Item	Description
56	Shipping protection
57	Clamping screw
58	Adjustment screw
59	One touch fitting
60	One touch fitting



## 7 Spare parts



Please specify the **fabrication number of the valve** (see yellow label on valve) when ordering spare parts. This is to ensure that the appropriate spare parts are supplied.

### 7.1 Seal kits

Pos	Description	DN 63		DN 100		DN 160		DN 200		DN 250	
		P/N:	QTY	P/N:	QTY	P/N:	QTY	P/N:	QTY	P/N:	QTY
-	Seal kit - Gate seal made of Viton - Dynamic seal made of Viton - VAT Vacuum grease (10g)	on req.	1	on req.	1	on req.	1	On req.	1	203883	1

### 7.2 Grease

Item	Description	Req. QTY	Ordering Number
-	Syringe VAT- vacuum grease (10g)	1	206793

### 7.3 Cleaning tool

Item	Description	Req. QTY	Ordering Number
-	Cleaning tool	1	305709
-	Replacement pads QTY 50	1	305656



#### 7.4 Single spare parts

(Items refer to the picture on page 20 and 21)

Pos	Description	DN 63		DN 100		DN 160		DN 200		DN 250	
		P/N:	QTY	P/N:	QTY	P/N:	QTY	P/N:	QTY	P/N:	QTY
1	Gate blank	on req.	1	on req.	1	on req.	1	232566	1	251215	1
2	Sealingring blank VITON	on req.	1	on req.	1	on req.	1	247739	1	247550	1
3	Dynamic seal VITON	on req.	1	on req.	1	on req.	1	N-5111-266	1	N-5111-274	1
7	Gate seal VITON	on req.	1	on req.	1	on req.	1	N-5100-266	1	N-5100-275	1
10	Bonnet seal VITON	on req.	1	on req.	1	on req.	1	N-5100-273	1	N-5100-277	1
12	Rotary feed through seal VITON	on req.	1	on req.	1	on req.	1	N-5111-329	1	N-5111-329	1
16	Alignment piece Alu for Alu gate fixation screw	on req.	1	on req.	1	on req.	1	on req.	1	on req.	1
17	Gate fixation screw SST	N-5002-497	1	N-5002-497	1	N-5002-497	1	N-5002-497	1	N-5002-497	1
21	Actuator fixation screws	218188	3	218188	3	218188	3	218188	3	218188	3
22	Actuator air pressure seal	N-7100-016	1	N-7100-016	1	N-7100-016	1	N-7100-016	1	N-7100-016	1
23	Ring piston seal inside	on request	1	on request	1	on request	1	on request	1	N-7100-277	1
24	Ring piston seal outside	on request	1	on request	1	on request	1	on request	1	N-7100-278	1
25	Piston seals pneumatic VITON	on req.		on req.		on req.		on req.		N-7121-112	8
26	Spacer ring	on req.		on req.		on req.		on req.		247695	8
27	Piston seals vacuum VITON	on req.		on req.		on req.		on req.		N-7121-112	8
30	Solenoid	94800-R1	1	94800-R1	1	94800-R1	1	94800-R1	1	94800-R1	1
33	Piston assembly mounting screws	on request		on request		on request		on request		228777	24
34	Piston assembly complete without o-rings, without screws	on request	1	on request	1	on request	1	on request	1	261967	1
35	Position indicator	259093	1	259093	1	259093	1	259093	1	259093	1
51	Pneumatic pipe	247374	1	247374	1	247374	1	247374	1	247374	1
59	One touch fitting	248044	1	248044	1	248044	1	248044	1	248044	1
60	One touch fitting	N-7607-023	1	N-7607-023	1	N-7607-023	1	N-7607-023	1	N-7607-023	1
61	Actuator bottom screws	245873	4	245873	4	245873	4	245873	4	245873	4



## 8 Warranty

Each product sold by VAT Vakuumventile AG (VAT) is warranted to be free from the manufacturing defects that adversely affect the normal functioning thereof during the warranty period stated in VAT's «Terms of Sale» immediately following delivery thereof by VAT, provided that the same is properly operated under conditions of normal use and that regular, periodic maintenance and service is performed or replacements made, in accordance with the instructions provided by VAT. The foregoing warranty shall not apply to any product or component that has been repaired or altered by anyone other than an authorized VAT representative or that has been subject to improper installation or abuse, misuse, negligence or accident. VAT shall not be liable for any damage, loss, or expense, whether consequential, special, incidental, direct or otherwise, caused by, arising out of or connected with the manufacture, delivery (including any delay in or failure to deliver), packaging, storage or use of any product sold or delivered by VAT shall fail to conform to the foregoing warranty or to the description thereof contained herein, the purchaser thereof, as its exclusive remedy, shall upon prompt notice to VAT of any such defect or failure and upon the return of the product, part or component in question to VAT at its factory, with transportation charges prepaid, and upon VAT's inspection confirming the existence of any defect inconsistent with said warranty or any such failure, be entitled to have such defect or failure cured at VAT's factory and at no charge therefor, by replacement or repair of said product, as VAT may elect. VAT MAKES NO WARRANTY OR REPRESENTATION OF ANY KIND, EXPRESS OR IMPLIED, (INCLUDING NO WARRANTY OR MERCHANTABILITY), EXCEPT FOR THE FOREGOING WARRANTY AND THE WARRANTY THAT EACH PRODUCT SHALL CONFORM TO THE DESCRIPTION THEREOF CONTAINED HEREIN, and no warranty shall be implied by law.

Furthermore, the «Terms of sale» at the back of the price list are applicable.