


# Control Gate Valve with stepper motor actuator

This manual is valid for the valve ordering numbers:  
 64036-.E52 and 64040-.E52

The respective product identification is given on each valve in the following way  
 (or similar):

FABR. NO : F64- . . . . . / . . . . .      Made in Switzerland in 19 . .  
 FILE NO : 640..-.E52-....                      Patented                      

Explanation of symbols:



Read declaration carefully before you start any other action!



Keep body parts and objects away from the valve opening!



Attention!



Hot surfaces; do not touch!



Product is in conformity with EC guidelines, if applicable!



Loaded springs and/or air cushions are potential hazards!



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



Wear gloves!



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



## Installation, Operating, and Maintenance Instructions Series 64.0, DN 63 - 100

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### Imprint:

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## Intended Use of Product

Use product for vacuum applications under the conditions indicated in chapter "Technical Data" only! Other applications are only allowed with the written permission of VAT.

Corrosive process gases may impact the performance of the product. Please contact VAT to assure that the product is compatible with the process gases used in your application.

## Technical data

Pressure range	1 x 10 <sup>-8</sup> mbar to 2 bar (abs)
Differential pressure on the closed gate	2 bar in either direction
Max. differential pressure at opening	30 mbar
Admissible temperature: Valve	< 150°C
Actuator	< 50°C
Cycles until first service	200000
Operation	only with VAT PM-4/5 controller and connection cable

Further data according to VAT catalogue «Vacuum Valves 2008».

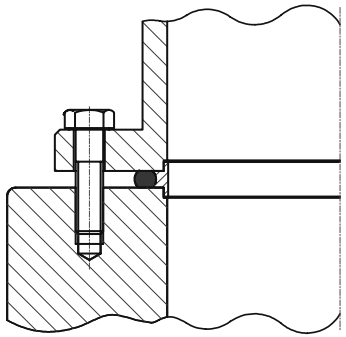
## Installation into the vacuum system

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

### Tightening torque for mounting screws on flanges

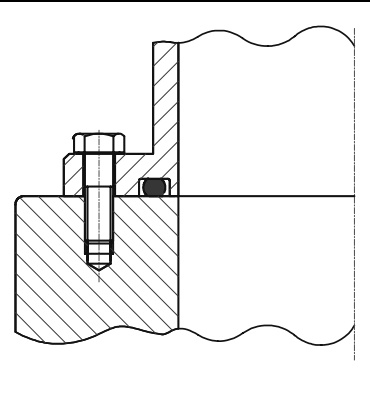
#### 1. Mounting with centering ring

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.

DN		max. tightening torque (Nm)			max. tightening torque (lbs . ft)			
mm	inch	ISO-F	JIS	ASA-LP	ISO-F	JIS	ASA-LP	
63/100	4	8 – 10	8 – 10	8 – 10	6 – 8	6 – 8	6 – 8	

#### 2. Mounting with O-ring in groove

Tighten mounting screws of the flanges uniformly in crosswise order. Observe the maximum torque according to the grade of screws and depth of thread you use.

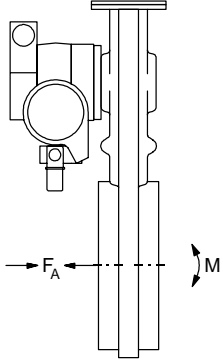


### Admissible forces

Forces from evacuating the system, from the weight of other components, and from baking can lead to deformation of the valve body and to malfunction of the valve. The stress has to be relieved by suitable means, e.g. bellows sections. The following forces are admissible:

DN (nom. I.D.)		Axial tensile or compressive force «F <sub>A</sub> »		Bending moment «M»	
mm	inch	N	lbf	Nm	lbf · ft
63	2 <sup>1</sup> / <sub>2</sub>	1960	440	78	58
100	4	2450	560	98	72

If a combination of both forces (F<sub>A</sub> and M) occurs, the values mentioned above are invalid. Please contact VAT for more information.



### Electrical connection



Do not touch electrical parts under voltage!



This control valve may only be operated with a VAT PM-4 or PM-5 Adaptive Pressure Controller and the corresponding cable supplied by VAT.

The PM-4 or PM-5 control unit has to be turned off for at least 60 seconds before connecting or disconnecting the cable to the valve.



## Operation

Operation is allowed only after the installing procedure.

### Differential pressure

Do not open the valve, if the differential pressure on the gate is larger than 30 mbar.

### Power failure

	with power-fail option	without power-fail option
Valve closed	no change	no change
Valve open or control position	will close	undefined

## Preventive Maintenance

The numbers in brackets refer to the drawing on page 9

**Note!** The process environment of your application (i.e. corrosive gases, deposition on parts inside valve body) may suggest shorter preventive maintenance intervals than suggested below.

Baking of the valve is highly recommended for contaminating processes. VAT offers customized heater box for series 64 valves.

For quick maintenance, VAT recommends to exchange the complete gate assembly in order to reduce the downtime of the system.

Recommended maintenance after every 100'000 cycles:

VAT recommends to clean the gate O-ring (or to replace it, if necessary), clean the inside surfaces, inspect the bonnet seal and inspect ball bearings and crank bolt

Recommended maintenance after every 200'000 cycles:

Additional to the 100'000 cycles maintenance interval, VAT recommends to clean and lubricate the ball bearings (replace it, if necessary), replace the locking balls, replace the crank bolt, inspect, clean and re-lubricate the ball guide plate (replace it if the balls have seized in the bushings), inspect, clean and re-lubricate the feedthrough O-ring (replace it if necessary)

The following table refers to the items on pages 4 to 5 and the spare parts list on page 5

Cycles *)	Procedures	Recommended spare parts kits
Every 100'000	1., 2., 3.	A, E For individual items see spare parts list on page 6
Every 200'000	1., 2., 3., 4., 5., 6., 7.	B, C, E For individual items see spare parts list on page 6

\*) Definition of a cycle: Movement of the gate from open into closed or control position and back into open position



## Procedures

### 1. Precondition for all maintenance work

- Vent both valve chambers
- Give 'OPEN' command on PM-4 or PM 5 control to open gate valve
- Turn off power to PM-4 or PM-5 control unit. If power-fail option is installed, press 'F2' key to disable power-fail option temporarily and turn off power to PM-4 or PM-5 control unit within following 60 seconds
- Wait for another 60 seconds, then disconnect cable to valve actuator

### 2. Removal of the gate assembly (4) / Replacement of the crank bolt (6) / Replacement of the bonnet seal (3)

- Unfasten the bonnet screws (1)
- Remove the bonnet plate (2) and the bonnet seal (3)
- Pull the lever (16) a little bit out of the bonnet opening
- Loosen the hexagonal socket-head bolt (7) for the crank bolt (6)
- Remove the crank bolt (6), while lifting the gate assembly (4) a little bit if necessary
- Slide out the gate assembly (4) carefully from the body and put it on a clean workshop place
- Re-assemble in reverse direction
- Fasten the screws (1) crosswise with equal torque:  $\approx 14 \text{ Nm}$  (10 lbf ft)

### 3. Replacement of the gate O-ring (5)

- Put a suitable tool beneath the O-ring at the venting hole and lift the O-ring carefully out of the groove (take care that the groove will not be damaged)
- Clean groove and sealing surface
- Install new O-ring by pressing it crosswise uniformly into the groove. Make sure, the O-ring is not twisted (pay attention to the seam of the O-ring)

### 4. Replacement of the ball bearings (23)

- DN 63: Replace complete ball bearing assembly (1 pc)
- DN 100: Replace each individual ball bearing (2 pcs)

### 5. Replacement of the locking balls (20)

- Put the gate assembly (4) carefully on a clean workshop place with the O-ring side to the bottom
- DN 63: Push center spring down and dismount two-piece circlip from the center bearing. Lift off ball guide plate
- DN 100: Unscrew the hexagonal nuts (18). Lift off counter plate (19) and ball guide plate (17)
- Remove the locking balls (20)

6. Replacement of actuator

- Close and lock valve
- Remove the position indicator box (8) from the actuator and unscrew the 2 hexagon bolts of the actuator
- Pull off actuator from the gear wheel of the feedthrough assembly (9). Take hold of the actuator on both sides of the actuator flange and use your thumb to push against the shaft of the feedthrough
- Remove 3 screws and cover (14) from the face side of the actuator to have access to the toothed belt pulley
- Turn pulley smoothly counter-clockwise until the rack stops. Turn back by 90° into clockwise direction
- Check whether valve is closed and properly locked
- Set up actuator on gear wheel and shaft in a right angle to the valve. If the actuator cannot engage with the gear wheel, turn actuator under little pressure a few degrees counter-clockwise until it engages with the gear wheel
- For change into position A2 or B2, first unscrew the 2 hexagonal bolts of the feedthrough assembly and put them into the bolt holes in the lateral axis
- Turn the actuator slightly back to the right angle position so that the 2 bolts can fit loosely in the threaded holes
- Fasten the 2 bolts only when flange area of the actuator lies tightly on the actuator flange of the valve
- Set position indicator box (8) on actuator. The square metal portion on the bottom side must exactly fit to the square portion of the shaft
- Align position indicator so that the 4 cylinder head screws will fit loosely in the threaded holes. Fasten screws
- Verify the correct adjustment of the position indicator. Open valve by turning the belt pulley by two revolutions into clockwise direction. Turn belt pulley counter-clockwise until the microswitch switches. The microswitch must switch between ½ and ¼ of a revolution before the rack stops in the actuator. In the position where the microswitch has switched, the valve must be closed and locked. In this case, you will notice a certain resistance prior to switching

7. Replacement of feedthrough O-ring (11)

- Remove gate assembly (4) as per items 1 and 2
- Remove actuator as per item 6
- Push the roll pin (12) out of the feedthrough shaft. Use VAT feedthrough assembling tool or a punch. Remove lever (16) with O-ring protection washer (13). Do not forget to attach washer (13) again when mounting
- Loosen the 2 screws of the feedthrough assembly (9)
- Slide out complete feedthrough assembly (9) carefully and remove the feedthrough O-ring (11)

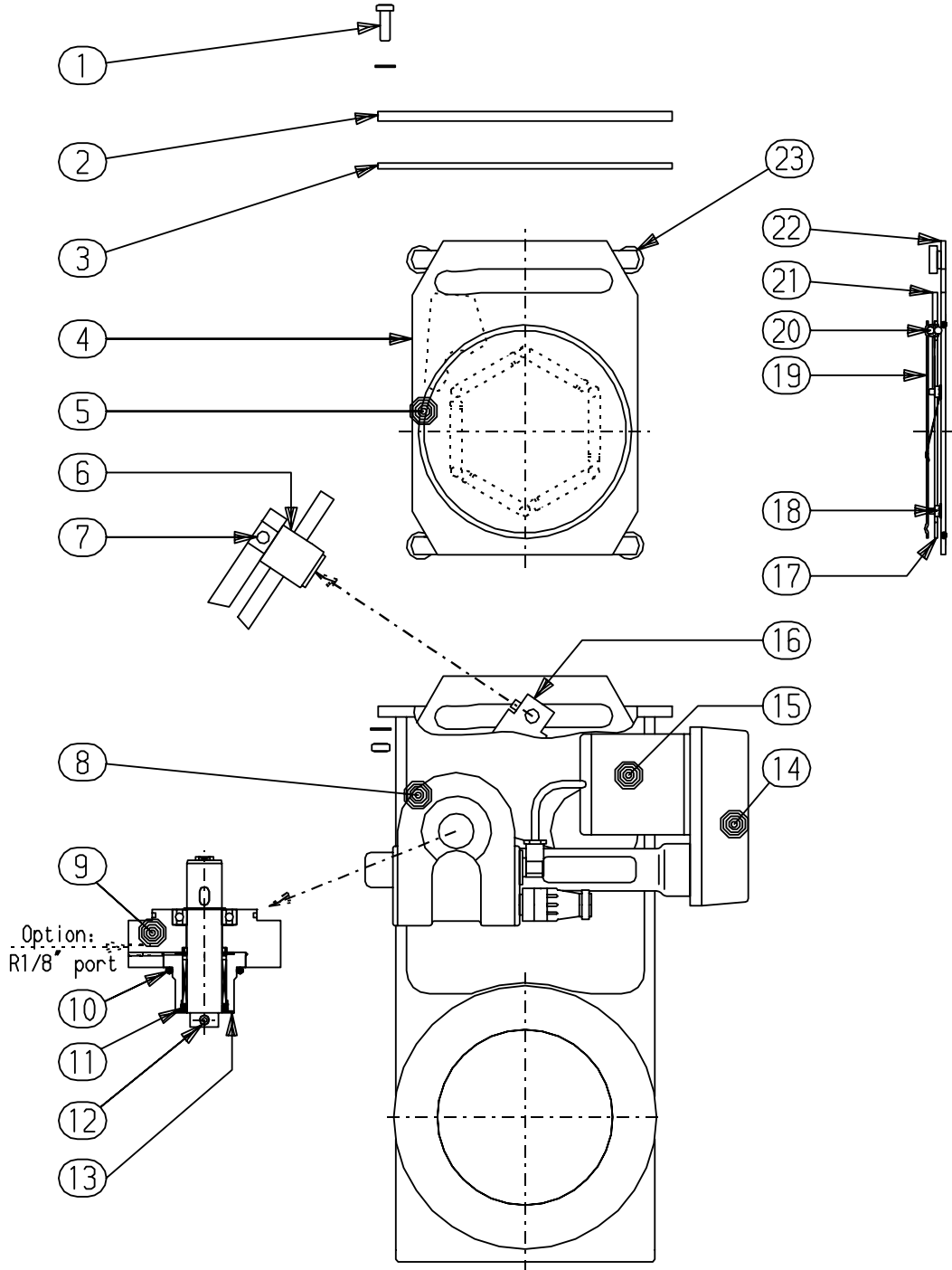




## Spare Parts

The item numbers refer to the assembly drawing on page 10

Item	Description	Part No.	
		63	100
3	Bonnet seal	77775-R1	77778-R1
4	Gate assembly	89146-R1	94842-R1
5	Gate O-ring Viton other materials	N-5102-340 on request	N-5102-351 on request
6	Crank bolt	79090-R1	79090-R1
7	Crank bolt mounting screw with spring washer	N-6005-458 N-6162-405	N-6005-458 N-6162-405
9	Feedthrough assembly	96443-R1	96443-R1
12	Feedthrough connection pin	N-6097-478	N-6097-478
	Actuator (without position indicator)	51683-R1	51683-R1
8	Position indicator A-side B-side	77422-R1 77423-R1	77422-R1 77423-R1
10	Static actuator seal	N-5100-222	N-5100-222
11	Feedthrough O-ring (option R <sup>1</sup> / <sub>8</sub> " port: 2 pcs)	220001	220001
15	Stepper motor	220363	220363
20	Locking balls	N-6121-052 (8 pcs)	N-6121-052 (12 pcs)
23	Ball bearing assembly	66856-R1 (1 pc)	67064-R1 (2 pcs)
A	Seal kit	97442-R1	97446-R1
B	Actuator replacement kit, consisting of actuator seal, bonnet seal, feedthrough O-ring, feedthrough connection pin, static actuator seal	101036-R1	101037-R1
C	Gate spare parts kit, consisting of gate O-ring, crank bolt, crank bolt mounting screw with spring washer	101038-R1	101039-R1
D	Feedthrough assembling tool	240451	
E	VAT vacuum grease (40 g)	N-6951-012	



## Trouble Shooting

Valve does not close/open/control	<ul style="list-style-type: none"><li>- Is differential pressure &lt; 30 mbar?</li><li>- Do not operate valve, while differential pressure is &gt; 30 mbar. Equalize pressure first.</li><li>- Is PM control unit activated (hooked up to power, switched on)?</li><li>- Is valve cable connected properly?</li></ul>
Pressure control does not work properly	<ul style="list-style-type: none"><li>- Please refer to Trouble Shooting section of PM control unit (operation instruction M64005EB)</li></ul>
Leak at gate	<ul style="list-style-type: none"><li>- Clean valve seat and gate!</li><li>- Check surface of seat and O-ring</li><li>- Change O-ring, if necessary</li></ul>
Leak at body	<ul style="list-style-type: none"><li>- Flange seals leaktight?</li><li>- Bonnet seal leaktight?</li><li>- Screws at bonnet tightened properly?</li></ul>

## Repairs

Contact VAT for repairs or maintenance. The fabrication No. marked on the valve body has always to be specified. It has to be individually decided whether the work can be performed by the customer or has to be carried out by VAT.

Power to the control unit has to be switched off and the cable to the valve has to be disconnected (wait at least 60 seconds) before removal/installation of the valve from/into the system.



Keep fingers and objects away from the valve opening!

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

## Warranty

Each product sold by VAT Vakuumentile AG (VAT) is warranted to be free from the manufacturing defects that adversely affect the normal functioning thereof during the one-year period 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.

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