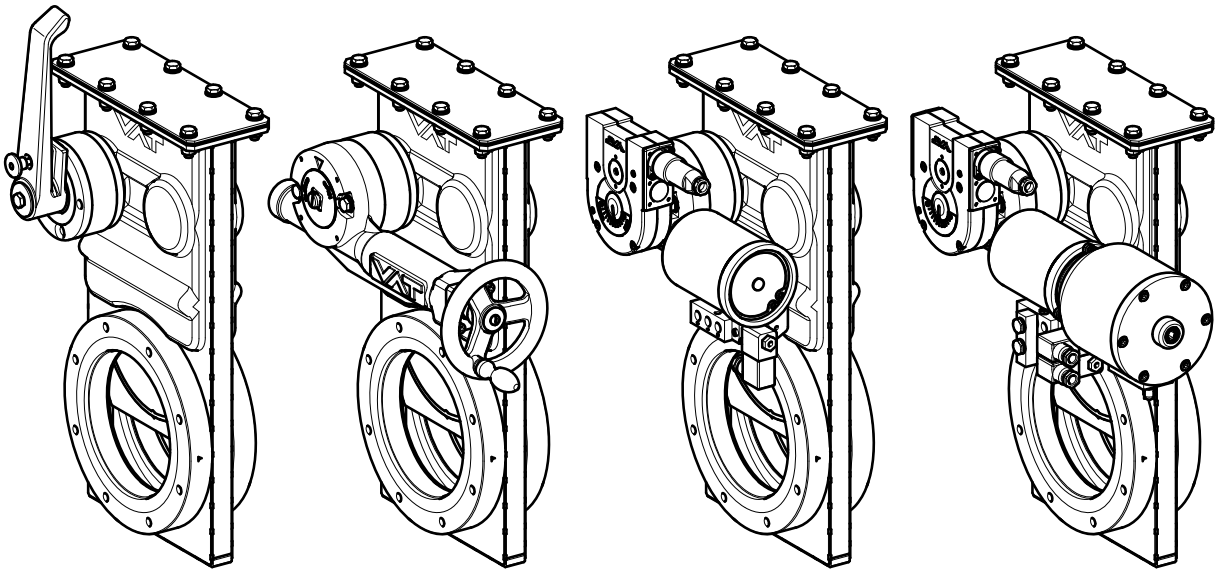
Installation, Operating & Maintenance Instructions

HV gate valve
with
manual actuator / pneumatic actuator / 3-position pneumatic actuator

Series 140
DN 63 – 400 mm (I. D. 2½" – 16")

This manual is valid for the following product ordering number/s:

14036- . E01 / 06 / 08 / 14 / 24 / 28 / 34 / 44 / 48
14038- . E01 / 06 / 08 / 14 / 24 / 28 / 34 / 44 / 48
14040- . E01 / 06 / 08 / 14 / 24 / 28 / 34 / 44 / 48
14044- . E01 / 06 / 08 / 14 / 24 / 28 / 34 / 44 / 48
14046- . E01 / 06 / 08 / 14 / 24 / 28 / 34 / 44 / 48
14048- . E01 / 06 / 08 / 14 / 24 / 28 / 34 / 44 / 48
14050- . E01 / 06 / 08 / 14 / 24 / 28 / 34 / 44 / 48
14051- . E01 / 06 / 08 / 14 / 24 / 28 / 34 / 44 / 48
14052- . E01 / 06 / 08 / 14 / 24 / 28 / 34 / 44 / 48



Sample image

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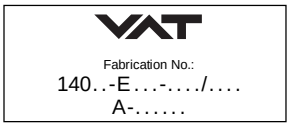
1 Description of product

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

Lack of knowledge

Failing to read this manual may result in property damage.

Firstly, read manual.

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

High risk

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Medium risk

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Low risk

Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Command

Indicates a hazardous situation which, if not avoided, may result in property damage.

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 (DN63-100) T-9001-156 (DN160-400)	Protective cover

Table 2-1

3 Design and Function

3.1 Design

3.1.1 Manual actuated

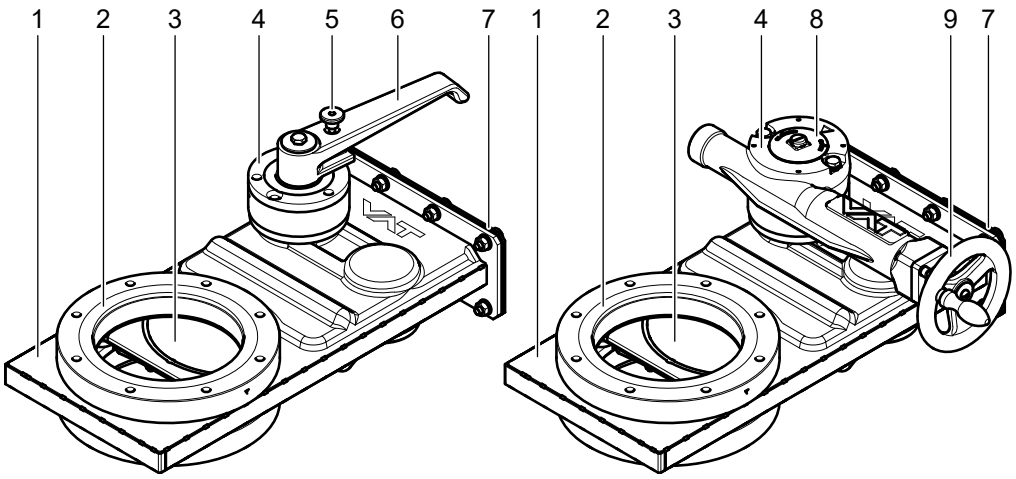


Figure 3-1

1 Valve body
2 Sealing surface
3 Valve plate
4 Manual drive
5 Locking bolt
6 Positioning lever
7 Bonnet flange
8 Position indicator
9 Hand wheel

3.1.2 Pneumatically actuated

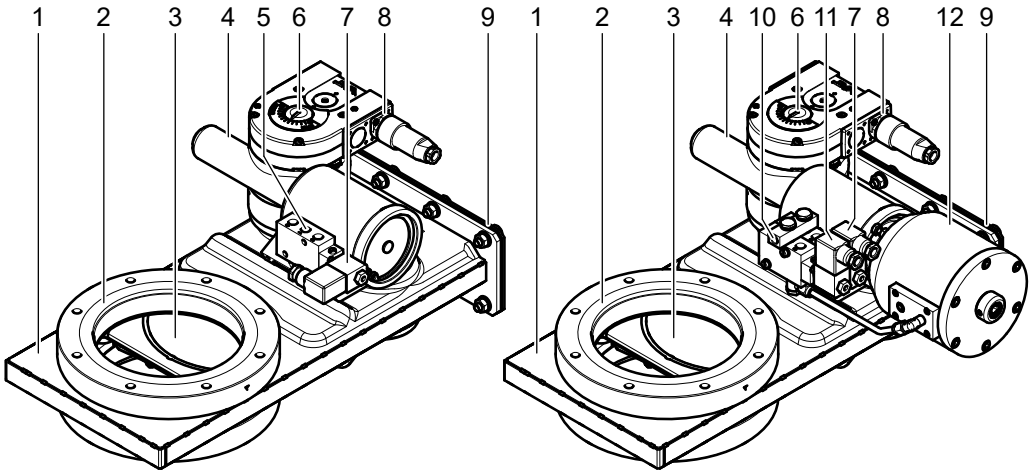


Figure 3-2

1 Valve body
2 Sealing surface
3 Valve plate
4 Pneumatic drive
5 Compressed air connection
6 Position indicator
7 Power supply connection solenoid valve main cylinder
8 Position indicator signal connection
9 Bonnet flange
10 Compressed air connection main and auxiliary cylinder
11 Power supply connection solenoid valve auxiliary cylinder
12 Auxiliary cylinder for intermediate position

3.2 Function

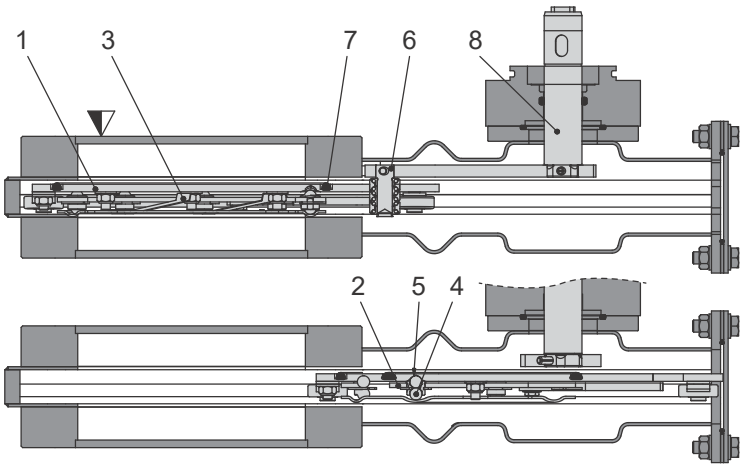
The valve features the VATLOCK sealing technology.
This means, the valve is mechanically locked in the closed position. In the open position, the mechanism is not locked.

Leaf springs hold gate and counter-plate against the carriage with the ball retainers. The ball pairs are in the detents.

For closing, the mechanism is moved forward into the closing position. The locking starts after the leaf spring stop touches the body. The ball retainers move the ball pairs out of the detents. Gate and counter-plate are spread apart. The gate seal is pressed against the sealing surface without scuffing.

The arrangement of the ball pairs ensures an increase of the sealing force with vacuum on either side of the gate.

During opening the movements proceed in the reverse order. See «Figure 3-3».



1 Valve gate
2 Counter-plate
3 Leaf springs
4 Ball pairs
5 Ball detents
6 Crank bolt
7 Gate seal
8 Actuator
▼ Valve seat side

Figure 3-3

4 Installation

⚠ WARNING

Unqualified personnel

Inappropriate handling may cause serious injury or property damage.

Only qualified personnel are allowed to carry out the described work.

⚠ WARNING

Heavy weight

Physical overstraining.

Use a crane to lift the product.

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 valve can be lifted only at the eyebolt threats; see dimensional drawing.

4.2 Installation into the system

⚠ WARNING

Movable parts

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.

NOTICE

Contamination

Product may get contaminated.

Always wear cleanroom gloves when handling the product.

NOTICE

Inappropriate tools

Sealing surfaces may get damaged.

Do not use sharp-edged tools.

NOTICE

Wrong tightening torque

Valve body and screws may get damaged.

Use tightening torque according the size of the screws.

NOTICE

Too long screws

Valve body may get deformed and / or malfunctions may occur.

Use only screws recommended by VAT.

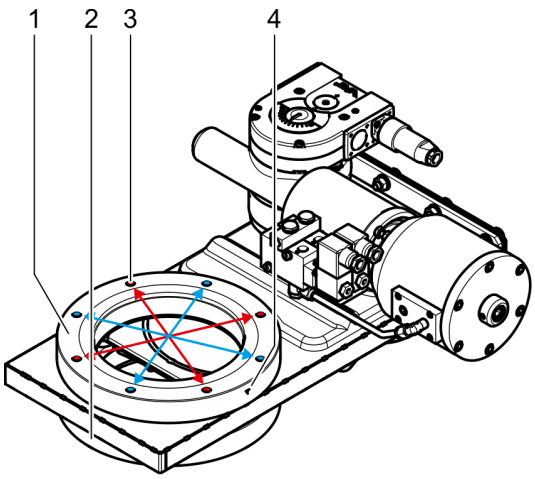


Figure 4-1

1 Flange A (valve seat side)
2 Flange B
3 Screw threads
4 Symbol “valve seat side”

Proceed as follows to install the valve into a system:

1. Identify flange type according the fabrication number on the identification plate; see chapter «1.1 Identification of product».

   Example: 14 . . – **P** . . . / . . . = Flange type ISO-F

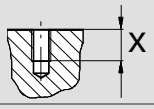
Valve			Maximum screw-in depth «X» in mm 					
Nom. I. D.			Flange types					
mm	inch		**C**	**U**	**P**	**J**	**T**	**A**
63	2½	X =	13	13	13	12	15	-
80	3	X =	13	-	13	12	-	-
100	4	X =	13	13	13	12	15	-
160	6	X =	13	13	14	14	15	18
200	8	X =	13	13	16	16	20	-
250	10	X =	13	13	16	16	20	28
320 350	12 14	X =	- 15	- 15	16 -	16 16	28 16	- -
400	16	X =	-	-	20	25	-	25
			C = CF-F, metric thread **U** = CF-F, UNF thread		**P** = ISO-F **J** = JIS		**T** = ASA-LP **A** = ASA	

Table 4-1

1. Remove protective covers from body flanges.

2. Clean sealing surfaces and seals of both flanges;
   see (1) and (2) according to «Figure 4-1» on page 13 .

The valve seat side is marked with the symbol «∇» on flange «A».

3. Lift valve to the mounting position.

4. Mount four screws (3) according to «Figure 4-1» evenly in crosswise order until the seal touches the sealing surface.

5. Tighten all screws with the torques appropriate for their property classes.

4.2.1 Admissible forces and bending moments

Forces from evacuating the system, from the weight of other components or 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 or moments are admissible:

DN (nom. I. D.)		Axial tensile or compressive force «FA»		Bending moment «M»	
mm	inch	N	lbf	Nm	lbf · ft
63	2½	1960	440	78	58
80	3	2190	492	88	65
100	4	2450	560	98	72
160	6	2940	660	147	108
200	8	2940	660	147	108
250	10	3430	770	196	145
320 350	12 14	3920	880	294	217
400	16	7840	1760	980	722
If a combination of both forces («FA» and «M») occurs, the values mentioned above are invalid. Please contact VAT for more information.					

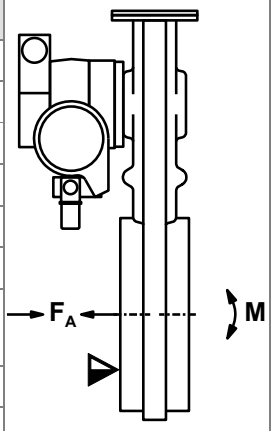


Table 4-2

4.3 Compressed air connection

⚠ WARNING

Valve in open position

Risk of injury when compressed air is connected to the valve.

Connect compressed air only when:
– valve is installed in the vacuum system
– moving parts cannot be touched

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

⚠ DANGER

Electric shock

Parts being under voltage will result in serious injury or death.

Do not touch parts being under voltage.

NOTICE

Wrong voltage

Electrical components may get damaged.

Supply electrical components with the correct voltage.

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 product data sheet and dimensional drawing.

5 Operation

⚠ WARNING

Unqualified personnel

Inappropriate handling may cause serious injury or property damage.

Only qualified personnel are allowed to carry out the described work.

⚠ WARNING

Movable parts

Human body parts may get jammed and severely injured.

Do not operate before product is installed completely into the vacuum system.

5.1 Normal operation

5.1.1 Manually actuated

Valve is opened and closed manually by a lever or hand wheel.

5.1.1.1 Lever actuated

1. Pull out and hold locking bolt.
2. To open valve, rotate lever counter-clockwise.
3. To close valve, rotate lever clockwise.

The lever is fixed in position “open” and “closed” by the locking bolt.

5.1.1.2 Hand wheel actuated

1. To open valve, rotate hand wheel counter-clockwise.
2. To close valve, rotate hand wheel clockwise

The actual valve position is indicated at the position indicator.

5.1.2 Pneumatically actuated

Valve is opened and closed pneumatically by a pneumatic drive.

Valve remains closed (N.C.) when solenoid valve for main cylinder is off.

5.1.2.1 Actuating main cylinder

1. To open valve, switch on solenoid valve for main cylinder.
2. To close valve, switch off solenoid valve for main cylinder.

5.1.2.2 Actuating auxiliary cylinder

This section only applies if using a valve with 3-position pneumatic actuator.

1. To move valve to intermediate position, switch off solenoid valve for auxiliary cylinder.
2. To move valve to open or closed position, switch on solenoid valve for auxiliary cylinder.

Valve moves to either open or closed position after switching off the solenoid valve for the auxiliary cylinder, depending if the solenoid valve for the main cylinder is switched on or off.

5.1.2.3 Adjusting the intermediate position

This section only applies if using a valve with 3-position pneumatic actuator.

The intermediate position can be adjusted independently from the compressed air pressure.

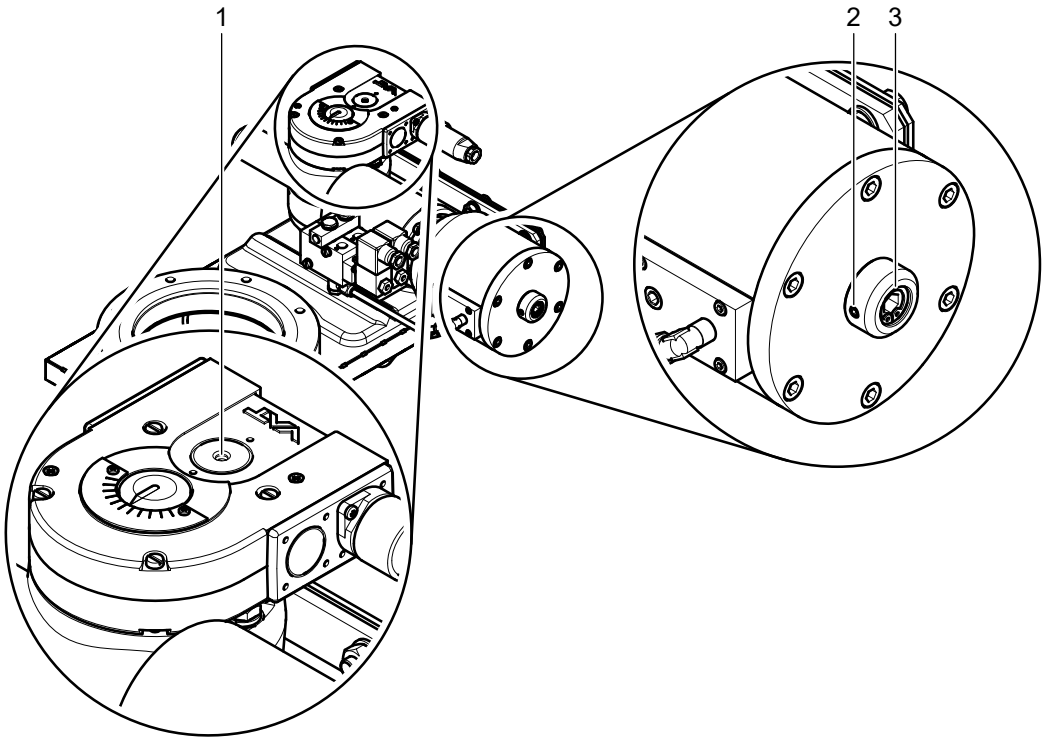


Figure 5-1

1 Micro switch adjustment screw
2 Locking screw
3 Bolt screw

Proceed as follows to adjust the intermediate position:

For easy adjustment, VAT recommends to switch off the compressed air supply while adjusting the intermediate position.

1. Loosen locking screw (2) using a 2.5 mm Allen wrench.

2. To adjust intermediate position, rotate bolt screw (3) using an 8 mm Allen wrench.

- Rotating the bolt screw clockwise moves the intermediate position towards the “open” position.
- Rotating the bolt screw counter-clockwise moves the intermediate position towards the “closed” position.

3. Tighten locking screw (2) after intermediate position is adjusted.

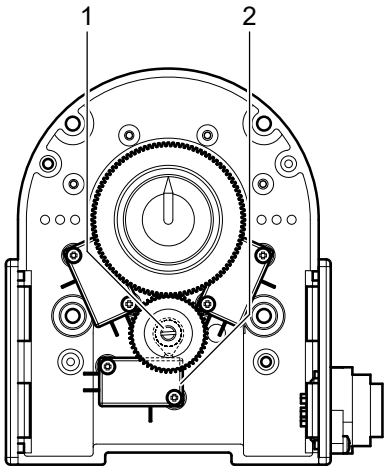


Figure 5-2

1 Micro switch adjustment screw
2 Micro switch intermediate position

4. Rotate micro switch adjustment screw (1) until the signal contact of the micro switch for the intermediate position (2) is closed (refer to electrical diagram).

5.2 Operation under increased temperature

Maximum allowed temperature, see product data sheet.

5.3 Behavior in case of air pressure drop

Valve closed:
Valve remains closed and leak tight.

Valve open or intermediate position:
Valve position undefined.

5.4 Behavior in case of power failure

Standard solenoid valve:
Valve closes

Solenoid valve for impulse actuation (optional):
Valve position does not change, but an already started movement will be completed.

6 Trouble shooting

Failure	Check	Action	See
Valve does not close / open	Compressed air supply	Connect compressed air supply	«4.3 Compressed air connection»
	Operating pressure	Adjust operating pressure	Product data sheet
	Power supply at solenoid valve	Connect power supply	«4.4 Electrical connection»
Leak at gate	Gate seal	Clean or replace gate seal	«7.3 Removing valve gate»
	Operating pressure	Adjust operating pressure	Product data sheet
Leak at body	Bonnet seal and sealing surface	• Clean sealing surface • Clean or replace bonnet seal	«7.3 Removing valve gate», steps 1 to 7
	Rotary feed through	Check leak tightness via integrated leak port	Position referenced on dimensional drawing.

Table 6-1

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

7 Maintenance

⚠ WARNING

Unqualified personnel

Inappropriate handling may cause serious injury or property damage.

Only qualified personnel are allowed to carry out the described work.

⚠ WARNING

Heavy weight

Physical overstraining.

Use a crane to lift the product.

⚠ WARNING

Hazardous components

Human body parts may get jammed and severely injured.

Before starting maintenance:
– disconnect compressed air supply
– disconnect electrical power supply

⚠ WARNING

Movable parts

Human body parts may get jammed and severely injured.

Keep human body parts away from movable parts.

7.1 Maintenance intervals

Under clean operating conditions the valve does not require any maintenance during 200 000 cycles (DN400: after 200 000 cycles in horizontal mounting position, after 50 000 cycles in vertical mounting position). After 200 000 cycles, VAT recommends to replace the valve gate; see chapter «7.3 Removing valve gate».

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.

7.2 Required tools

- Torque wrench 18 Nm
- Cleanroom wipe soaked with alcohol (2% methyl ethyl ketone)
- O-Ring removal tool; see «Table 12-1» on page 42

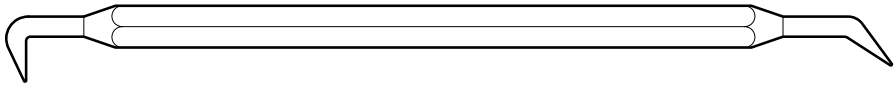


Figure 7-1

7.3 Removing valve gate

⚠ WARNING

Loaded spring steel sheet

Human body parts may get jammed and severely injured.

Do not put human body parts between valve gate and spring steel sheet.

NOTICE

Contamination

Product may get contaminated.

Always wear cleanroom gloves when handling the product.

NOTICE

Inappropriate tools

Sealing surfaces may get damaged.

Do not use sharp-edged tools.

Proceed as follows to remove the valve gate:

1. Vent chambers on either side to atmospheric pressure.
2. Open the valve.
3. Disconnect compressed air supply.
4. Disconnect electrical power supply.

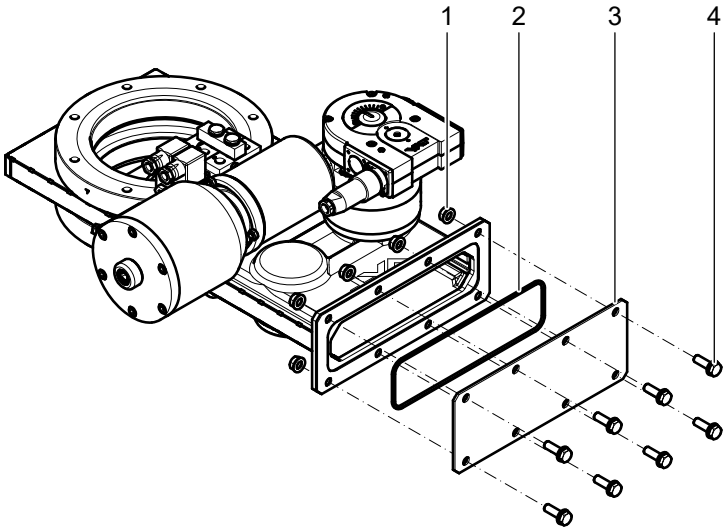


Figure 7-2

1	Nuts	3	Bonnet flange
2	Bonnet seal	4	Bonnet screws

5. Loosen and remove bonnet screws (4) and nuts (1).
6. Remove bonnet flange (3).
7. Remove bonnet seal (2).

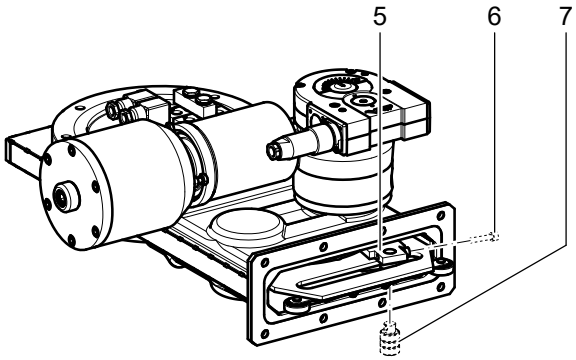


Figure 7-3

5 Gate lever
6 Locking screw
7 Crank bolt

8. Loosen and remove locking screw (6) using an Allen wrench.
9. Remove crank bolt (7).

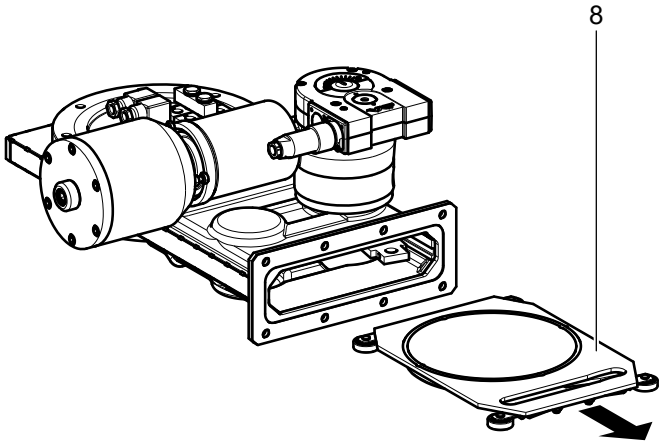


Figure 7-4

8 Valve gate

10. Carefully pull out the valve gate (8).

7.4 Replacing gate O-ring

	NOTICE **Contamination** Product may get contaminated. Always wear cleanroom gloves when handling the product.

	NOTICE **Inappropriate tools** Sealing surfaces may get damaged. Do not use sharp-edged tools.

Proceed as follows to replace the gate O-ring:

1. Remove valve gate. See chapter «7.3 Removing valve gate».

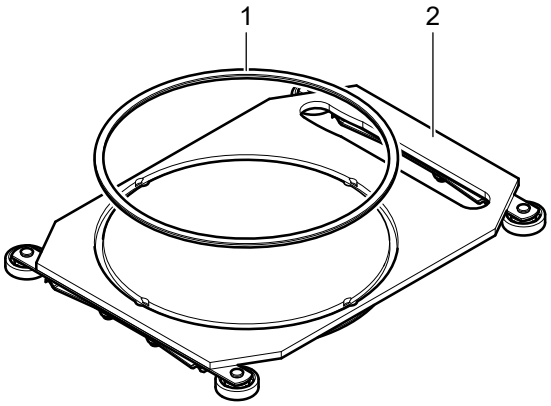


Figure 7-5

1 Gate O-ring
2 Valve gate

2. Use O-ring removal tool (see chapter «7.2 Required tools») to remove gate O-ring (1) from groove.

Do not damage the sealing surface!

3. Check and clean sealing surface on valve gate with an alcohol soaked cleanroom wipe.
4. Install new gate O-ring (1).

Press O-ring uniformly in crosswise order (diagonal) into groove.

5. Mount mechanism unit including lever as described in chapter «7.3 Removing ».

7.5 Installing valve gate

⚠ WARNING

Loaded spring steel sheet

Human body parts may get jammed and severely injured.

Do not put human body parts between valve gate and spring steel sheet.

NOTICE

Contamination

Product may get contaminated.

Always wear cleanroom gloves when handling the product.

NOTICE

Inappropriate tools

Sealing surfaces may get damaged.

Do not use sharp-edged tools.

Proceed as follows to install the valve gate:

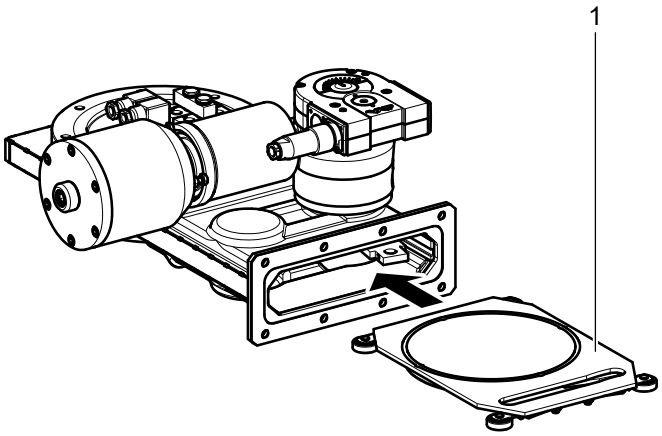


Figure 7-6

1 Valve gate

1. Clean valve gate (1) with an alcohol soaked cleanroom wipe.
2. Carefully slide valve gate (1) into the valve body.

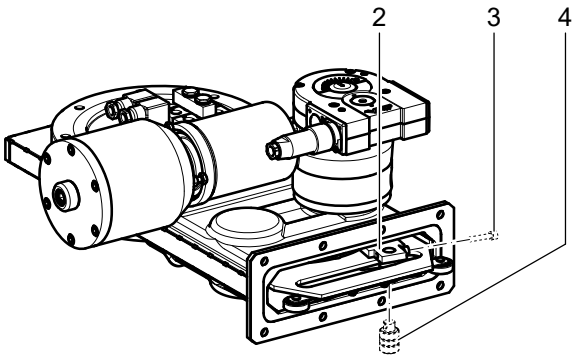


Figure 7-7

2 Gate lever
3 Locking screw
4 Crank bolt

3. Position crank bolt (4) in the opening of the valve gate and in the mounting hole on the gate lever (2).

4. Install locking screw (3) on the gate lever (2) using an Allen wrench.

5. Carefully slide valve gate (1) and gate lever (2) in the valve body.

Check and make sure that to upper edge of the valve gate is inside the valve body.

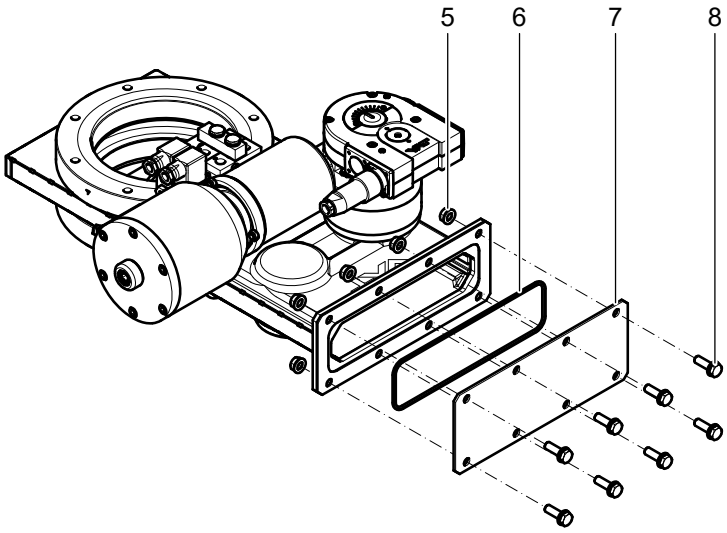


Figure 7-8

5	Nuts	7	Bonnet flange
6	Bonnet seal	8	Bonnet screws

6. Inspect and clean bonnet seal (6). Replace if necessary.

7. Position bonnet seal (6) in groove on valve body.

8. Position bonnet flange (7) on bonnet seal (6).

9. Install bonnet screws (8) and nuts (5).

10. Tighten bonnet screws in crosswise order.

11. Connect compressed air supply.

12. Connect electrical power supply.

The valve is ready to use.

7.6 Removing position indicator

Proceed as follows to remove the position indicator:

1. Vent chambers on either side to atmospheric pressure.
2. Check and make sure valve is closed.
3. Disconnect compressed air supply.
4. Disconnect electrical power supply.

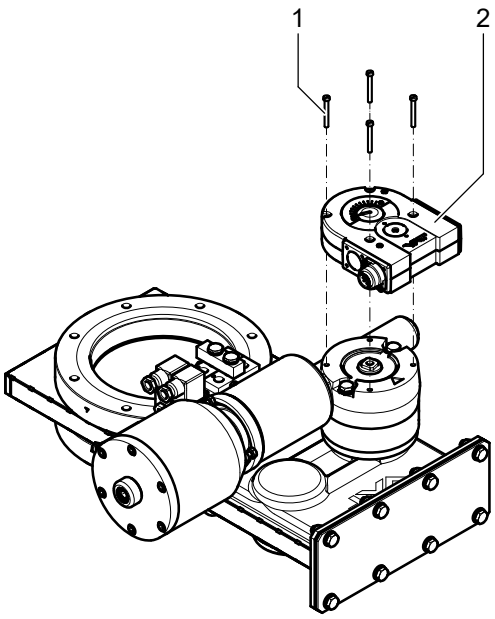


Figure 7-9

1 Slotted screws
2 Position indicator

5. Loosen and remove four slotted screws (1) using a slotted screwdriver.
6. Remove position indicator (2).

7.7 Installing position indicator

Proceed as follows to install the position indicator:

1. Check and make sure valve is closed and locked.

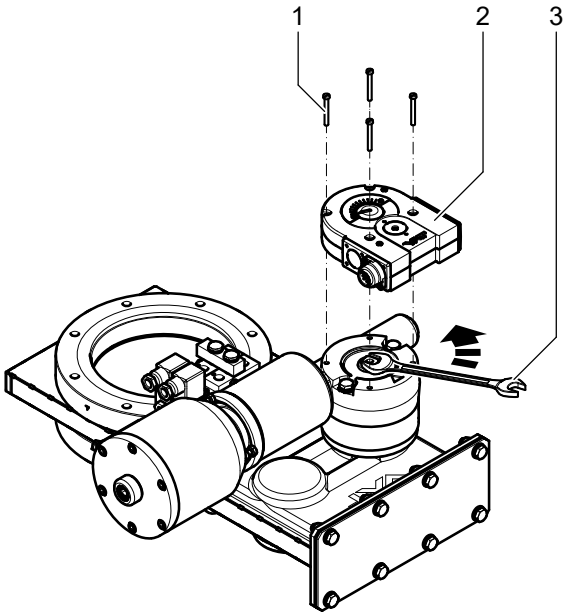


Figure 7-10

1 Slotted screws
2 Position indicator
3 Flat wrench

2. If valve is not closed, use a flat wrench (3) with appropriate size and rotate the square shaft of the rotary feedthrough counter-clockwise until the valve is closed and locked.
3. Position the position indicator (2) over the square shaft. Do not tilt.
4. Install four slotted screws (1) using a slotted screwdriver.
5. Connect compressed air supply.
6. Connect electrical power supply.

The valve is ready to use.

7.8 Removing rotary drive

NOTICE

Contamination

Product may get contaminated.

Always wear cleanroom gloves when handling the product.

NOTICE

Inappropriate tools

Sealing surfaces may get damaged.

Do not use sharp-edged tools.

Proceed as follows to remove the rotary drive:

1. Vent chambers on either side to atmospheric pressure.
2. Check and make sure valve is closed.
3. Disconnect compressed air supply.
4. Disconnect electrical power supply.
5. Remove valve gate. See chapter «7.3 Removing valve gate».
6. Remove position indicator. See chapter «7.6 Removing position indicator».

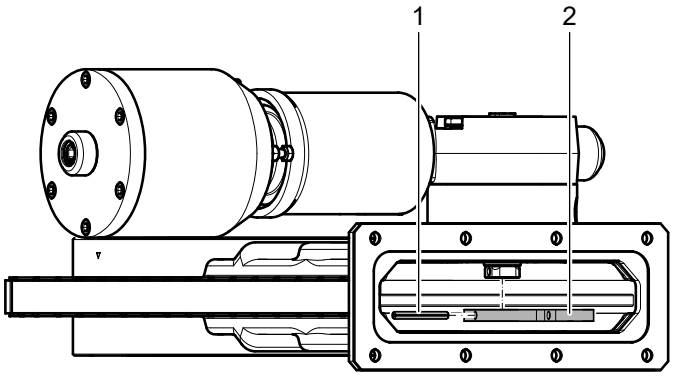


Figure 7-11

1 Dowel pin
2 Gate lever

7. Pull out and remove dowel pin (1).
8. Pull out and remove gate lever (2).

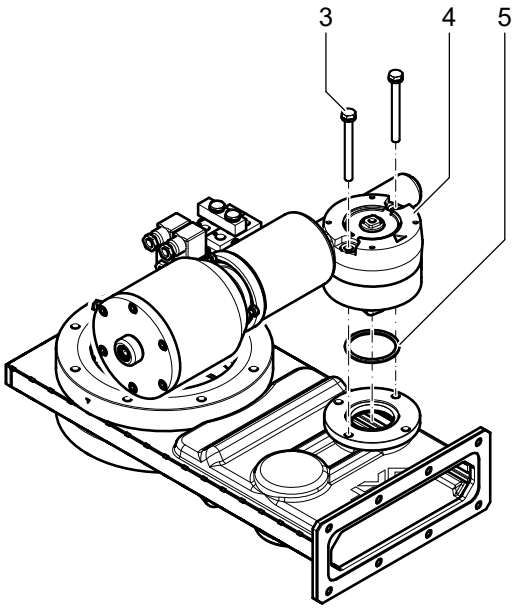


Figure 7-12

3 Screws and spring-lock washers
4 Rotary drive
5 O-ring

9. Loosen and remove screws and spring-lock washers (3).
10. Carefully pull out and remove rotary drive (4).
11. Remove O-ring (5).

7.9 Installing rotary drive

NOTICE

Contamination

Product may get contaminated.

Always wear cleanroom gloves when handling the product.

NOTICE

Inappropriate tools

Sealing surfaces may get damaged.

Do not use sharp-edged tools.

Proceed as follows to install the rotary drive:

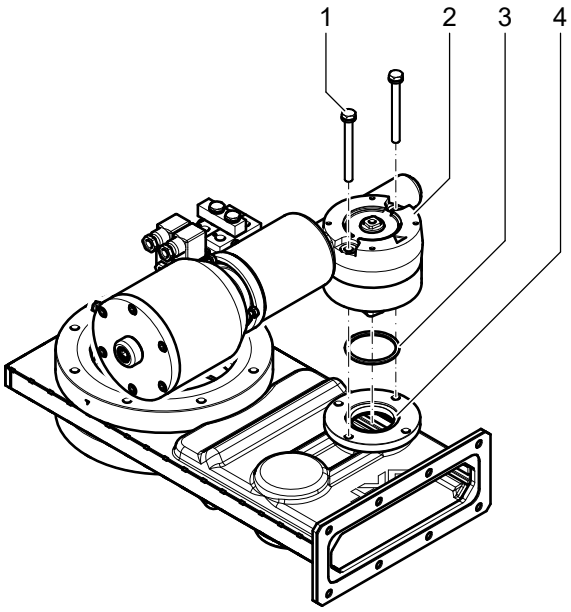


Figure 7-13

1	Screws and spring-lock washers	3	O-ring
2	Rotary drive	4	Sealing surface

1. Clean sealing surface (4) with an alcohol soaked cleanroom wipe.
2. Inspect and clean O-ring (3). Replace if necessary.
3. Position O-ring (3) centered on sealing surface (4).

4. Carefully position rotary drive (2) centered on the mounting flange.
5. Install screws and spring-lock washers (3). Tighten screws in crosswise order.

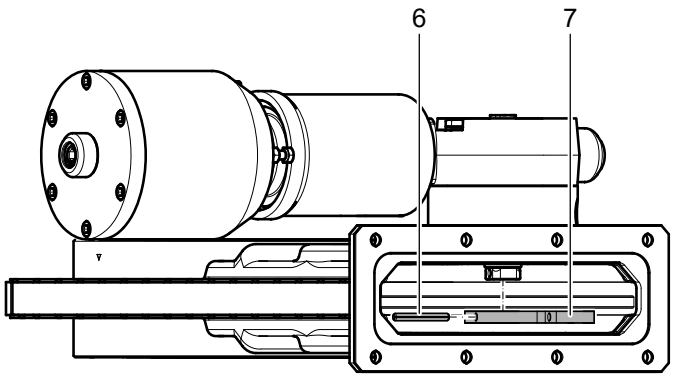


Figure 7-14

6 Dowel pin
7 Gate lever

6. Position gate lever (7) on the square shaft of the rotary feed through. Check and make sure that the drill holes on the gate lever and on the square shaft are matching up.
7. Insert the dowel pin (6).
8. Install valve gate. See chapter «7.5 Installing valve gate».
9. Install position indicator. See chapter «7.7 Installing position indicator».
10. Connect compressed air supply.
11. Connect electrical power supply.

The valve is ready to use.

8 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.

9 Dismounting and Storage

⚠ WARNING

Unqualified personnel

Inappropriate handling may cause serious injury or property damage.

Only qualified personnel are allowed to carry out the described work.

⚠ WARNING

Heavy weight

Physical overstraining.

Use a crane to lift the product.

⚠ WARNING

Hazardous components

Human body parts may get jammed and severely injured.

Before dismounting the product
– disconnect compressed air supply
– disconnect electrical power supply

⚠ WARNING

Movable parts

Human body parts may get jammed and severely injured.

Keep human body parts away from movable parts.

NOTICE

Contamination

Product may get contaminated.

Always wear cleanroom gloves when handling the product.

9.1 Dismounting

NOTICE

Valve in open position

Valve mechanism may get damaged if valve is in open position.

Close valve before dismounting the valve from the system.

1. Close valve.
2. Carry out the steps according to chapter «4 Installation» in reverse order.
   Pay attention to the safety instructions!

9.2 Storage

NOTICE

Wrong storage

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

NOTICE

Inappropriate packaging

Product may get damaged if inappropriate packaging material is used.

Always use the original packaging material and handle product with care.

1. Clean / decontaminate valve.
2. Cover all valve openings with a protective foil.
3. Pack valve appropriately by using the original packaging material.

10 Packaging and Transport

⚠ WARNING

Unqualified personnel

Inappropriate handling may cause serious injury or property damage.

Only qualified personnel are allowed to carry out the described work.

⚠ WARNING

Heavy weight

Physical overstraining.

Use a crane to lift the product.

⚠ WARNING

Harmful substances

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.

NOTICE

Inappropriate packaging

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.
- 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.

10.1 Packaging

NOTICE

Valve in open position

Valve mechanism may get damaged if valve is in open position.

Make sure that the valve is closed.

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.

10.2 Transport

NOTICE

Inappropriate packaging

Product may get damaged if inappropriate packaging material is used.

Always use the original packaging material and handle product with care.

VAT disclaims any liability for damages resulting from inappropriate packaging.

11 Disposal

Observe the local regulations for disposal

⚠ WARNING

Harmful substances

Environmental pollution.

Discard products and parts according to the local regulations.

⚠ WARNING

Unqualified personnel

Inappropriate handling may cause serious injury or property damage.

Only qualified personnel are allowed to carry out the disposal.

⚠ CAUTION

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.

- Observe local regulations in regard to waste disposal without fail.
- Commission an authorized waste disposal company for the professional disposal of your waste.

NOTICE

Improper disposal

Some built-in materials can cause damage, if improperly handled**.**

- When disposing, take into account all the different materials used

- 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

12 Spare parts

NOTICE

Non-original spare parts

Non-original spare parts may cause damage to the product.

Use original spare parts from VAT only.

- 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 12-1» 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.

Description	Part No.	Quantity per valve	Maintenance procedure see chapter
O-ring removal tool	234859	1	«7.2 Required tools»
Bonnet seal	On request	1	«7.3 Removing valve gate»
Valve gate, completely lubricated	On request	1	«7.3 Removing valve gate»
Gate seal	On request	1	«7.4 Replacing gate O-ring»
Position indicator	On request	1	«7.6 Removing position indicator» and «7.7 Installing position indicator»
Rotary drive	On request	1	«7.8 Removing rotary drive» and «7.9 Installing rotary drive»
Housing	On request	1	«7.8 Removing rotary drive» and «7.9 Installing rotary drive»

Table 12-1

13 Appendix