



**Agilent Technologies**

*Vacuum Products Division*

**Agilent Valves  
by VAT  
Aluminum Gate  
Valves  
Series 12**

*Instruction Manual*

Part No. UserManAVbVSeries12

Rev. A

December 2013

**Agilent Valves by VAT****Introduction to the****Aluminum Gate Valves Series 12**

Thank you for choosing Agilent Valves by VAT. With the combination of these two well-known names in the Vacuum industry, we are confident that Agilent Valves by VAT will meet your most demanding vacuum control needs. The valves are available in manual, push-rod operation and double acting pneumatic operation. The pneumatic valves are available with solenoid (pilot) valves at 115 VAC, 220 VAC and 24 VDC, and a position indicator. See operator's manual for more information.

## Warranty

Products manufactured by Seller are warranted against defects in materials and workmanship for twelve (12) months from date of shipment thereof to Customer, and Seller's liability under valid warranty claims is limited, at the option of Seller, to repair, to replace, or refund of an equitable portion of the purchase price of the Product. Items expendable in normal use are not covered by this warranty. All warranty replacement or repair of parts shall be limited to equipment malfunctions which, in the sole opinion of Seller, are due or traceable to defects in original materials or workmanship. All obligations of Seller under this warranty shall cease in the event of abuse, accident, alteration, misuse, or neglect of the equipment. In-warranty repaired or replaced parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the repaired or replaced parts. After expiration of the applicable warranty period, Customer shall be charged at the then current prices for parts, labor, and transportation.

Reasonable care must be used to avoid hazards. Seller expressly disclaims responsibility for loss or damage caused by use of its Products other than in accordance with proper operating procedures.

Except as stated herein, Seller makes no warranty, express or implied (either in fact or by operation of law), statutory or otherwise; and, except as stated herein, Seller shall have no liability under any warranty, express or implied (either in fact or by operation of law), statutory or otherwise. Statements made by any person, including representatives of Seller, which are inconsistent or in conflict with the terms of this warranty shall not be binding upon Seller unless reduced to writing and approved by an officer of Seller.

## Warranty Replacement and Adjustment

All claims under warranty must be made promptly after occurrence of circumstances giving rise thereto, and must be received within the applicable warranty period by Seller or its authorized representative. Such claims should include the Product serial number, the date of shipment, and a full description of the circumstances giving rise to the claim. Before any Products are returned for repair and/or adjustment, written authorization from Seller or its authorized representative for the return and instructions as to how and where these Products should be returned must be obtained. Any Product returned to Seller for examination shall be prepaid via the means of transportation indicated as acceptable by Seller. Seller reserves the right to reject any warranty claim not promptly reported and any warranty claim on any item that has been altered or has been returned by non-acceptable means of transportation. When any Product is returned for examination and inspection, or for any other reason, Customer shall be responsible for all damage resulting from improper packing or handling, and for loss in transit, notwithstanding any defect or non-conformity in the Product. In all cases, Seller has the sole responsibility for determining the cause and nature of failure, and Seller's determination with regard thereto shall be final.

If it is found that Seller's Product has been returned without cause and is still serviceable, Customer will be notified and the Product returned at Customer's expense; in addition, a charge for testing and examination may be made on Products so returned.

## Voiding the Warranty

The valves described in this manual are designed to be used in a clean system. Minute particles such as a piece of lint can seriously affect the ability of the valve to produce a vacuum-tight seal. Therefore, opening the valve before it is to be used, storing it, or operating it in any environment other than as a clean system is considered by Agilent, Inc. as misuse of the equipment and will render the warranty null and void.

When a valve is used with toxic chemicals, or in an atmosphere that is dangerous to the health of humans, or is environmentally unsafe, it will be the responsibility of the Customer to have the valve cleaned by an independent agency skilled and approved in handling and cleaning contaminated materials before the valve will be accepted by Agilent, Inc. for repair.

Therefore, all details of the Agilent, Inc. "Request for Return Health and Safety Certification" (attached) must be complied with including the requirement that a notarized certificate from the cleaning agency certifying that the valve has been cleaned and is harmless to humans and environmentally safe before Agilent, Inc. will accept the returned valve. The certificate must accompany all other shipping papers, including the completed Request for Return Health and Safety Certification, and be attached securely to the outside of the box containing the valve. Improper and/or incomplete documentation will result in the unopened, unrepared valve being returned to the Customer at the Customer's expense.

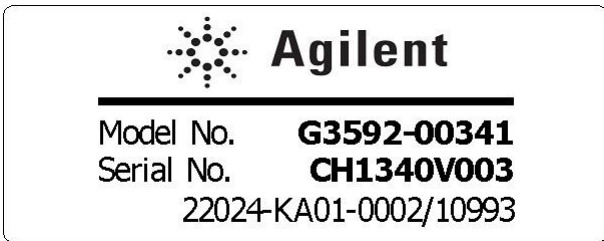
Agilent, Inc. will ship a replacement valve at no charge to assist the Customer and to minimize downtime. However, if the malfunctioning valve is not returned to Agilent, Inc. within 30 days and meeting all of the requirements of paragraphs 2 and 3 above, the Customer will be billed for the replacement valve at the then current rate plus shipping charges.

# Vacuum Gate Valve with pneumatic actuator

This manual describes the Aluminium Gate Valve with ISO-F, ISO-63, ISO-100 and 250 flanges.

This manual is valid for the valve ordering number(s) listed on page 31 of this manual.

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!



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!

**Imprint**

Seller Agilent Technologies, Inc.

[www.agilent.com](http://www.agilent.com)

See back cover for contact information

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## 1 Use of product

Use product for clean and dry indoor vacuum applications under the conditions indicated below. Other applications are only allowed with the written permission of Agilent.

### 1.1 Technical data

|                                    |   |
|------------------------------------|---|
| Pressure range                     | ISO 63-100: $1 \times 10^{-7}$ mbar to 2 bar (abs)<br>ISO 160: $1 \times 10^{-7}$ mbar to 1.6 bar (abs)<br>ISO 250 : $1 \times 10^{-7}$ mbar to 1.2 bar (abs) |
| Differential pressure on the gate  | ISO 63 – 160 : $\leq 1.6$ bar in either direction<br>ISO 250 : $\leq 1.2$ bar in either direction   |
| Differential pressure at opening   | $\leq 30$ mbar  |
| Admissible temperature:            | Valve body $\leq 120^{\circ}\text{C}$   |
| Actuator                           | $\leq 80^{\circ}\text{C}$   |
| Position indicator                 | $\leq 80^{\circ}\text{C}$   |
| Solenoid                           | $\leq 50^{\circ}\text{C}$   |
| Position indicator: Contact rating | 5 A / 250 V AC, 3 A / 50 V DC   |
| Solenoid                           | See tag on solenoid   |

Further data is available in the Agilent Aluminum Gate Valve Series 12 Data sheet located on the Agilent Vacuum Products website: [www.agilent.com](http://www.agilent.com).

## 2 Installation

### 2.1 Unpacking

Before unpacking the valve, make sure that the packaging is in good condition and the valve has not been damaged.

**Note!** The plastic packing material and/or protective covers may only be removed immediately before the valve is mounted into the system. Unprotected sealing surfaces must be treated with care and kept clean.

### 2.2 Installation

The valve seat side is indicated by the symbol  $\nabla$  on the connection flange.

### 2.3 Tightening torque for flange screws

The screws of the flanges have to be tightened uniformly in crosswise order. The tightening torques indicated in the following table have to be observed.

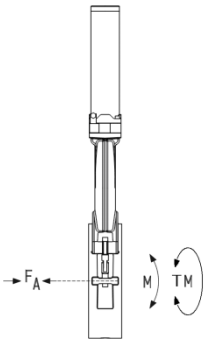
| ISO |      | Tightening torque Nm | lbf · ft |
|-----|------|----------------------|----------|
| mm  | inch | ISO                  | ISO      |
| 63  | 2½   | 6-8                  | 4.5-6    |
| 100 | 4    | 6-8                  | 4.5-6    |
| 160 | 6    | 8-10                 | 6-7.5    |
| 250 | 10   | 8-10                 | 6-7.5    |

Higher tightening torques may deform the valve body. This can lead to improper function of the valve or to a leaky valve gate.

### 2.4 Admissible forces

Forces from evacuating the system and from the weight of other components 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 «FA» |     | Bending moment «M» |          | Maximum admissible torsional moment of body «TM» |          |
|----------------|------|---|-----|--------------------|----------|--|----------|
| mm             | inch | N                                       | lbf | Nm                 | lbf · ft | Nm   | lbf · ft |
| 63             | 2½   | 980                                     | 220 | 39                 | 29       | 3'000  | 2'210    |
| 100            | 4    | 1080                                    | 242 | 49                 | 36       | 10'000   | 7'370    |
| 160            | 6    | 3000                                    | 674 | 150                | 110      | 10'000   | 7'370    |
| 250            | 10   | 3500                                    | 787 | 200                | 148      | 12'000   | 8'850    |



If a combination of forces («FA», «M» and «TM») occurs, the values mentioned above are invalid.

**ATTENTION:** The stated maximum torsional moment «TM» is only valid for the valve equipped with the standard flange to flange dimension (see the Agilent Aluminum Gate Valve Series 12 Data sheet located on the Agilent Vacuum Products website: [www.agilent.com](http://www.agilent.com).)

## 2.5 Compressed air connection



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

With solenoid: Connect compressed air to connection **IN** (internal thread R 1/8", 1/8" NPT for USA)

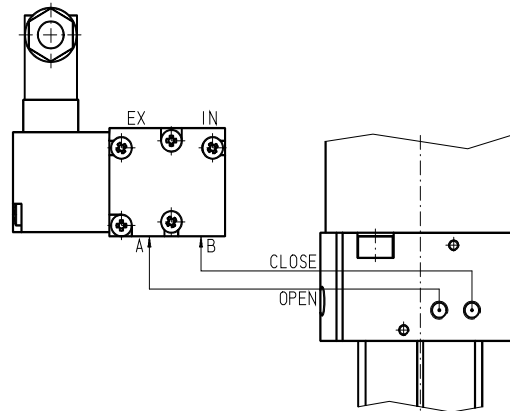
Without solenoid: Connect compressed air to connection **OPEN** and **CLOSE** (internal thread M5)

Solenoid delivered separately (not attached to valve):

Compressed air connection at pneumatic cylinder: internal thread M5

Compressed air connected to <A>: valve opens

Compressed air connected to <B>: valve closes



Compressed air pressure (min. - max. overpressure): 4 - 7 bar / 55 - 100 psig

Use only clean, dry or slightly oiled air!

## 2.6 Electrical connection



Do not touch any electrically charged parts!



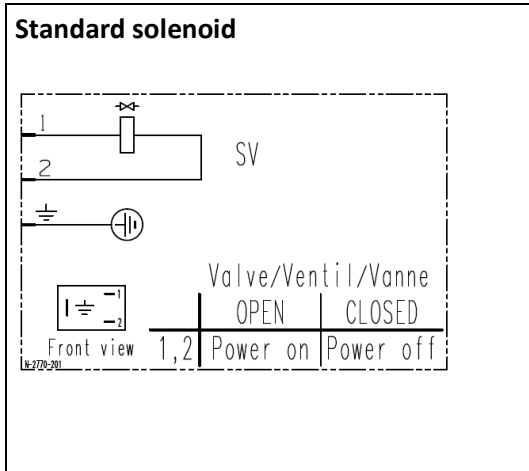
Connect electrical power only if

- valve has been installed into the vacuum system
- moving parts cannot be touched

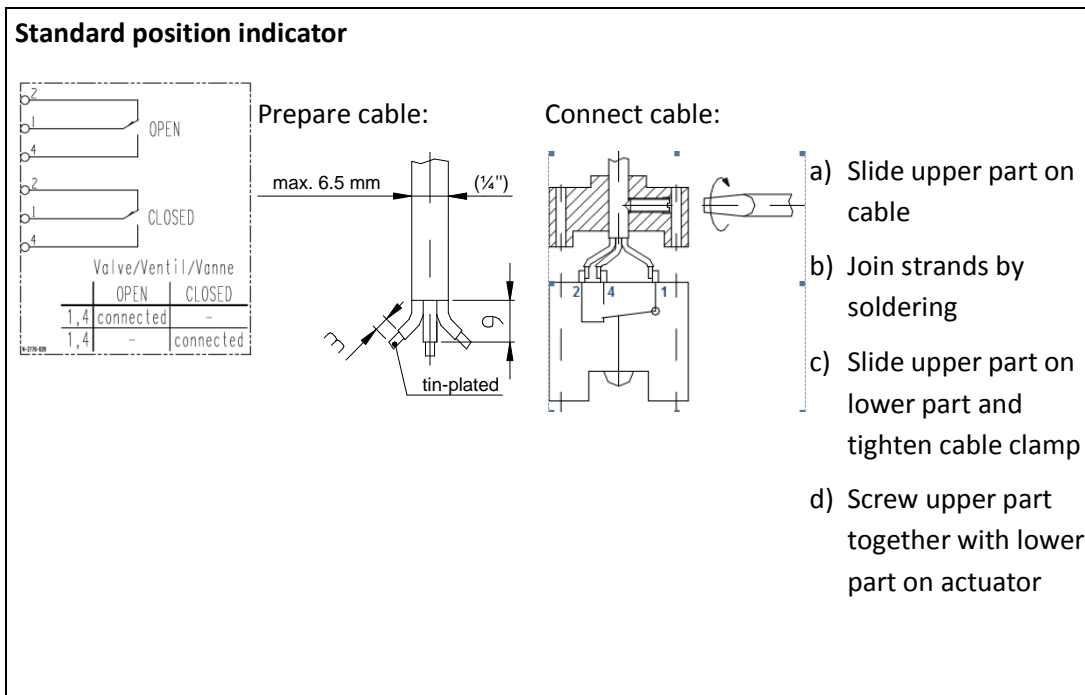
Verify that mains voltage matches voltage stated on the solenoid! Sockets for position indicator and solenoid are supplied with the valve.

Wire solenoid and position indicator according to the following diagrams:

### 2.6.1 Electrical connection Solenoid



### 2.6.2 Electrical connection position indicator



## 3. Operation

### 3.1 Normal operation

Valve is opened and closed by means of compressed air.

### 3.2 Admissible temperature

The maximum temperatures indicated in the technical data are only valid as long as the valve is in one of the end positions. Cycling the valve at these temperatures may reduce the cycle life of the mechanism. See

1.1 Technical data.

### 3.3 Compressed air failure

Valve closed: valve remains closed

Valve open: valve position is undefined

### 3.4 Power failure

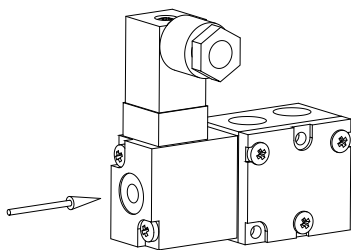
Standard solenoid: valve closes

Solenoid for impulse actuation (option): valve position does not change, but a started movement will be completed

### 3.5 Emergency operation at power failure

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

#### Standard solenoid



Press push-button: valve opens

Release push-button: valve closes

## 4. Trouble shooting

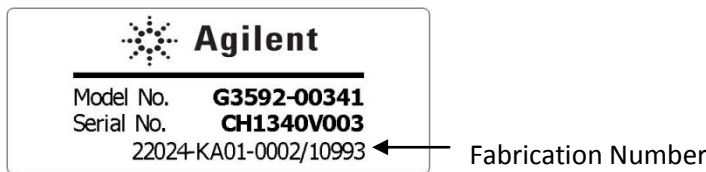
| Failure                      | Check                                 | Action   |
|------------------------------|---------------------------------------|--|
| Valve does not open or close | Electrical power available?           | Connect electrical power and check voltage                       |
|                              | Compressed air available?             | Connect compressed air and check pressure                        |
|                              | Does the solenoid work?               | Replace solenoid   |
| Leak at gate                 | Valve seat or gate seal contaminated? | Clean valve seat and gate seal or replace gate seal if necessary |
|                              | Compressed air available?             | Connect compressed air and check pressure                        |
| Leak at body                 | Flanges leak tight?                   | Fasten screws or replace bonnet seal if necessary                |

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

## 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 Agilent to decided whether the maintenance/repair can be performed by the customer or has to be returned for factory repair. The fabrication number on the valve:



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 Agilent must be free of harmful substances such as e.g. toxic, caustic or biological ones. If products are radioactively contaminated, fill in the Agilent Health and Safety Form near the back of the manual 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 Cleaning or replacement of gate seal and, or bonnet seal ISO63-100 Gate Valves

The figures in brackets refer to the drawing on page 25

1. Vent vacuum chambers on either side of the valve
2. Open the valve by means of compressed air
3. Switch off compressed air and power supply
4. Disconnect compressed air and power lines from the valve
5. Place the valve on a clean surface
6. Clean (A) or replace (B) gate seal:
  - (A) 1. Leave gate seal in groove and clean it by using a lint-free cloth and alcohol.
  2. Slightly lubricate seal with vacuum grease



Removal of gate seal

- (B) 1. Pull gate seal out of groove by means of a scribing tool

**Attention:** Be careful not do damage the bottom of the groove!

2. Clean seal groove by using a lint-free cloth and alcohol.
  3. Put new gate seal on seal groove and press it into groove uniformly
7. Clean (A) or replace (B) bonnet seal (5):
    - (A) 1. Leave bonnet seal in groove and clean it by using a lint-free cloth and alcohol
    2. Slightly lubricate seal with vacuum grease
  - (B) 1. Pull bonnet seal out of groove by means of a scribing tool

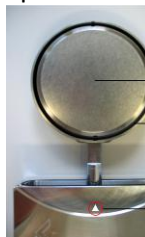


Removal of bonnet seal

**Attention:** Be careful not to damage the bottom of the groove!

2. Clean seal groove by using a lint-free cloth and alcohol.
  3. Put new bonnet seal on seal groove and press it into groove on one short side.
  4. Distribute seal uniformly over long sides to opposite short side and press it fully into the groove
8. Clean sealing surface of upper part of body (6) by using a lint-free cloth and alcohol
  9. Clean sealing surface of valve seat on lower part of body (2) by using a lint-free cloth and alcohol

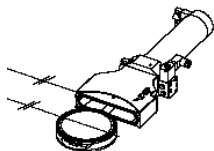
Make sure to have gate (8) on seat side «∇»:  
Symbol «∇» on upper part of body (6)



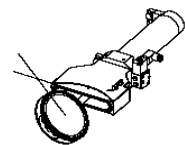
Gate  
Gate seal  
Seat side «∇»

**Note:** Mechanism with actuator shaft (8) is stiffly rotatable by 360°!

10. Align mechanism with opening of upper part of body (2)



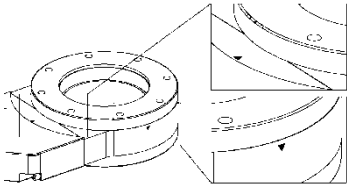
correct



Wrong

- 12 Set upper part of body (6)/ actuator assembly carefully on lower part of body (2)

**Attention:** The triangles «▽» of both body parts must face each other!



- 13 Insert bonnet screws (3) and fasten them with torque 6 Nm / 4.5 lbf.ft.  
 14 Perform function and leak test.  
 15 Valve is ready for operation

## 5.2 Cleaning of locking balls ISO63-100 Gate Valves

The figures in brackets refer to the drawing on page 25

The lower part of the body (flange part) need not be removed from the system for cleaning the locking balls! (If ball need replacement, the valve should be returned for factory repair.)

When the locking balls are cleaned, we recommend to clean the gate seal and bonnet seal as well (see relevant chapter).

1. Vent vacuum chambers on either side of the valve
2. Open the valve by means of compressed air
3. Switch off compressed air and power supply
4. Disconnect compressed air and power lines from the valve
5. Place the valve on a clean surface
6. Remove bonnet screws (3)
7. Withdraw actuator (1) with mechanism carefully from lower part of the valve body (2) and place it on a clean surface
8. Remove nuts (7) from gate (8)
9. Lift off counter plate (10) carefully and put it on a clean place
10. Remove all visible locking balls (9) from shaft (11)
11. Clean locking balls (3):
  1. Clean ball tracks in gate (8) and counter plate (10) by using a lint-free cloth, and check their condition with regard to wear.
  2. Clean balls and ball sockets in shaft (11) by using a lint-free cloth and alcohol
  3. Lubricate balls with vacuum grease.
  4. Insert balls into ball tracks in gate (8)
12. Put gate (8) in place, insert washers and nuts (7) and fasten nuts with a torque of 5 Nm /3.75 lbf.ft  
**Attention:** slightly lubricate the [threaded bolts](#).



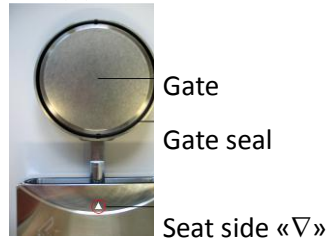
13. Clean and check bonnet sealing surfaces and seal (5)

Make sure to have gate (8) on seat side «▽»:

Symbol «▽» on upper part of body (6)

**Note:** Mechanism with actuator shaft (8) is stiffly

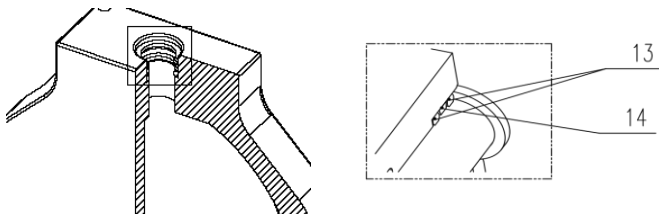
rotatable by 360°!



### 5.3 Cleaning or replacing of shaft feedthrough seals ISO63-100 Gate Valves

The figures in brackets refer to the drawing on page 25

1. Vent vacuum chambers on either side of the valve
2. Open valve by means of compressed air
3. Switch off compressed air and power supply
4. Disconnect compressed air and power lines from the valve
5. Place the valve on a clean surface
6. Remove solenoid (21)
7. Remove bonnet screws (3)
8. Withdraw actuator (1) with mechanism carefully from lower part of the valve body (2) and place it on a clean surface
9. Slowly pull out the gate mechanism by hand from the upper part of body (6)
10. Remove nuts (7) from gate (8)
11. Lift gate (8) carefully and put it on a clean surface
12. Remove all visible balls (9) from ball guidance
13. Lift actuator (1) and put it on a clean surface
14. Remove position indicator (20) and screws (12), if applicable.
15. Separate actuator (1) from upper part of body (6)
16. Remove both seals (13) and spacer (14) carefully from upper part of body (6) **Attention:** Do not damage the sealing surface!



17. Clean feedthrough hole in upper part of body (6) and spacer (14) by using a lint-free cloth and alcohol
18. Remove seals (13)
19. Clean seals by using a lint-free cloth and alcohol or replace the seals if necessary
20. Extensively lubricate first seal (13) with vacuum grease and insert it into the feedthrough hole of the upper part of body (6)
21. Insert spacer (14)
22. Extensively lubricate second seal (13) with vacuum grease and insert it into the feedthrough hole of upper part of body (6)
23. Extensively lubricate space between both seals with vacuum grease
24. Clean actuator shaft (11)

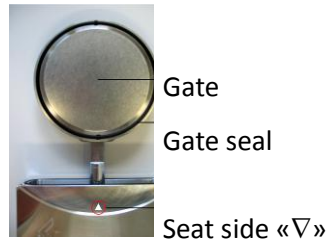
25. Reconnect actuator (1) and upper part of body (6)
26. Insert screws (12) and fasten them with a torque of 6 Nm / 4.5 lbf . ft
27. Insert position indicator (20) into cylinder bottom and fasten screws, if applicable
28. Clean ball tracks in gate (8), counter-plate (10) and shaft (11) by using a lint-free cloth and alcohol
29. Clean balls (9) by using a lint-free cloth and alcohol
30. Lubricate balls (9) with vacuum grease
31. Insert balls (9) into ball track of counter-plate (10)
32. Put actuator (1) respective ball track of shaft (11) onto ball (9) of counter-plate (10)
33. Insert balls (9) into ball tracks of the shaft (11)
34. Put gate (8) in place, insert washers and nuts (7) and fasten nuts with a torque of 5 Nm / 3.75 lbf.ft

**Attention:** slightly lubricate the [threaded bolts](#)

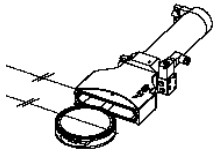
35. Clean and check bonnet sealing surfaces and seal (5)

Make sure to have gate (8) on seat side «∇»:  
Symbol «∇» on upper part of body (6)

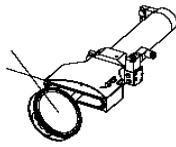
**Note:** Mechanism with actuator shaft (8) is stiffly rotatable by 360°!



36. Align mechanism with opening of upper part of body (2)

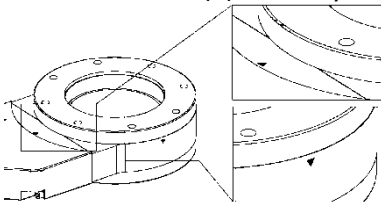


correct



Wrong

37. Move mechanism into upper part of body (6) to position OPEN
38. Put actuator (1) carefully on the lower part of body (2). **Attention:** Observe seat sign "∇"!



39. Insert bonnet screws (3) and fasten them with a torque of 6 Nm / 4.5 lbf. ft
40. Perform function and leak test
41. Valve is ready for operation

## 5.4 Cleaning or replacement of gate seal and/or bonnet seal ISO250 Gate Valve

The figures in brackets refer to the drawing on page 26

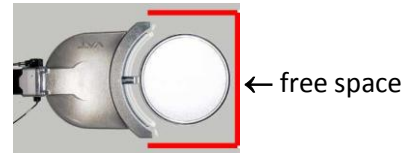
The lower part of the body (flange part) need not be removed from the system for cleaning/replacing the gate seal and/or bonnet seal!

### a) Separation of upper part of body (11) / actuator assembly from lower part of body (10):

1. Vent vacuum chambers on either side of valve
2. Open valve by means of compressed air
3. Switch off compressed air and power supply
4. Disconnect compressed air and power lines from valve
5. Loosen and swing out both screws (12)  
**Attention:** Make sure to maintain upper part of body (11) / actuator assembly in its position while swinging out the screws!
6. Withdraw upper part of body (11) / actuator assembly carefully from lower part of body (10) and put it on a clean place (seat side symbol «▽» on top)

### b) Cleaning or replacement of gate seal and bonnet seal:

7. Apply compressed air (air pressure approx. 1 bar) and move mechanism slowly out of upper part of body (11)  
**Attention:** Provide sufficient free space in order to prevent the mechanism from touching any objects!

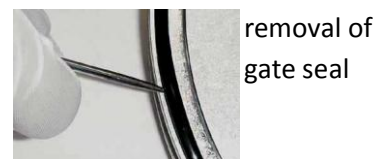


8. Disconnect compressed air from valve
9. Clean (A) or replace (B) gate seal (1):  
(A) 1. Leave gate seal in groove and clean it by using a lint-free cloth

and alcohol

2. Slightly lubricate seal with VAT vacuum grease [see «Spare parts»]

- (B) 1. Pull gate seal out of groove by means of a scribing tool  
**Attention:** Be careful not to damage the bottom of the groove!



removal of gate seal

2. Clean seal groove by using a lint-free cloth and alcohol
3. Put new gate seal on seal groove and press it into groove uniformly and crosswise



installation of gate seal

10. Clean (A) or replace (B) bonnet seal (2):
  - (A)1. Leave bonnet seal in groove and clean it by using a lint-free cloth and alcohol
    2. Slightly lubricate seal with vacuum grease
  - (B)1. Pull bonnet seal out of groove by means of a scribing tool
 

**Attention:** Be careful not to damage the bottom of the groove!

    2. Clean seal groove by using a lint-free cloth and alcohol
    3. Put new bonnet seal on seal groove and press it into groove on one short side
      4. Distribute seal uniformly over long sides to opposite short side and press it fully into groove

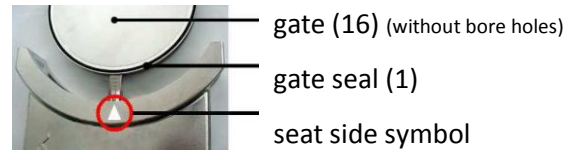
11. Clean sealing surface of upper part of body (11) by using a lint-free cloth and alcohol
12. Clean sealing surface of valve seat on lower part of body (10) by using a lint-free cloth and alcohol

**c) Mounting of upper part of body (11) / actuator assembly on lower part of body (10):**

13. Make sure to have gate (16) on seat side «∇»:
 

Symbol «∇» on upper part of body (11)


**Note:** Mechanism with actuator shaft (13) is stiffly rotatable by 360°!



14. Align mechanism with opening of upper part of body (11)

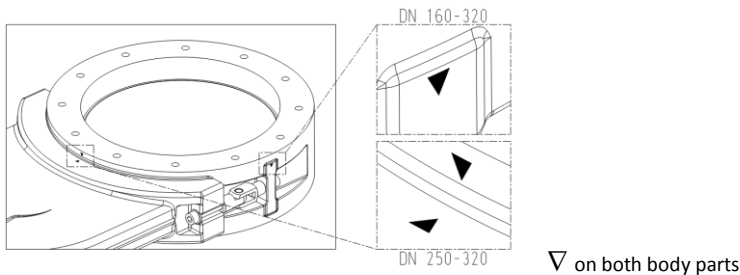


15. Apply compressed air (air pressure approx. 1 bar) and move mechanism slowly into upper part of body (11)

**Attention**  Make sure to keep the space between body opening and mechanism free of any objects or body parts!

16. Disconnect compressed air from valve
17. Set upper part of body (11) / actuator assembly carefully on lower part of body (10)

**Attention:** The tips of the triangles «∇» of both body parts must face each other!



18. Swing back both screws (12) and tighten them alternately
 

Tightening torque:      DN 160 - 200:      14 Nm / 10.5 lbf · ft  
   DN 250:      20 Nm / 15.0 lbf · ft
19. Connect electrical power and compressed air
20. Perform function and leak test

## 5.5 Cleaning of locking balls ISO250 Gate Valve

The figures in brackets refer to the drawing on page 26

The lower part of the body (flange part) need not be removed from the system for cleaning the locking balls! When the locking balls are cleaned/replaced, we recommend to clean the gate seal and bonnet seal as well

(see relevant chapter).

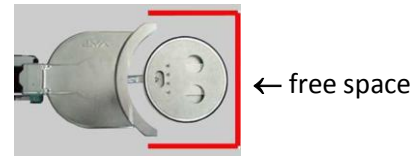
### a) Separation of upper part of body (11) / actuator assembly from lower part of body (10):

1. Carry out steps 1 - 6 of chapter «**Cleaning or replacement of gate seal and/or bonnet seal**», however with seat side «▽» down!

### b) Cleaning of locking balls:

2. Apply compressed air (air pressure approx. 1 bar) and move mechanism slowly out of upper part of body (11)

**Attention:** Provide sufficient free space in order to prevent the mechanism from touching any objects!



3. Disconnect compressed air from valve
4. Remove lock nut (14) with disk (15)
5. Withdraw mechanism from actuator shaft (13) and put it on a clean place
6. Remove screws (19)
7. Lift off counter plate (17) carefully and put it on a clean place
8. Remove all visible balls (3) from ball guidance (18)
9. Lift off ball guidance (18) carefully and put it on a clean place  
**Attention:** Balls can get caught in the lower ball sockets of the ball guidance (18)!
10. Remove all balls (3) from ball tracks in gate (16)
11. Clean balls (3):
  1. Clean ball tracks in gate (16) and counter plate (17) by using a lint-free cloth, and check their condition with regard to wear
  2. Clean balls and ball sockets in ball guidance (18) by using a lint-free cloth and alcohol
  3. Lubricate balls with VAT vacuum grease [see «Spare parts»]
  4. Insert balls into ball tracks in gate (16)
12. Put ball guidance (18) carefully on gate (16) so that balls (3) get into ball sockets  
**Attention:** Regard correct position!



13. Insert remaining balls into ball sockets in ball guidance (18)

13. Put counter plate (17) on ball guidance

14. Insert and tighten screws (19)

**Attention:** The internal screws first, then the outside screws. **Tightening torque: 9 Nm!**

15. Move mechanism on actuator shaft (13) to its stop

**Attention:** Spanner width of ball guidance (18) and shaft (13) must match!

Mechanism must not rotate against the shaft!

16. Mount lock nut (14) with disk (15)

17. Clean sealing surface of upper part of body (11) by using a lint-free cloth and alcohol

18. Clean sealing surface of valve seat on lower part of body (10) by using a lint-free cloth and alcohol

**c) Mounting of upper part of body (11) / actuator assembly on lower part of body (10):**

19. Carry out steps 13 - 20 of chapter «Cleaning or replacement of gate seal and/or bonnet seal»

Valve is ready for operation

## 5.6 Cleaning or replacing of shaft feedthrough seals ISO250 Gate Valve

The figures in brackets refer to the drawing on page 26

The lower part of the body (flange part) need not be removed from the system for cleaning/replacing the shaft feedthrough seals! When the shaft feedthrough seals are cleaned/replaced, we recommend to clean the gate seal and bonnet seal as well (see relevant chapter).

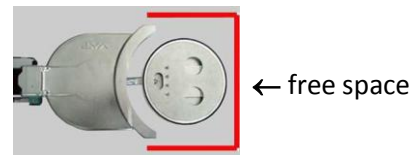
**a) Separation of upper part of body (11) / actuator assembly from lower part of body (10):**

1. Carry out steps 1 - 6 of chapter «Cleaning or replacement of gate seal and/or bonnet seal», however with seat side «▽» down!

**b) Cleaning or replacement of shaft feedthrough seals:**

2. Apply compressed air (air pressure approx. 1 bar) and move mechanism slowly out of upper part of body (11)

**Attention:** Provide sufficient free space in order to prevent the mechanism from touching any objects!



3. Disconnect compressed air from valve

4. Remove lock nut (14) with disk (15)

5. Withdraw mechanism from actuator shaft (13) and put it on a clean place

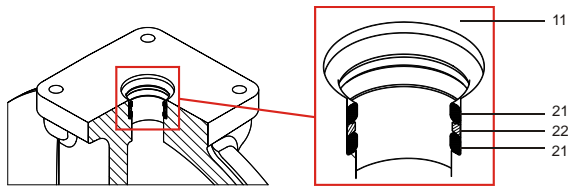
6. Apply compressed air (air pressure approx. 1 bar) and move actuator shaft (13) slowly into upper part of body (11)

7. Disconnect compressed air from valve

8. Put upper part of body (11) / actuator assembly in upright position (actuator on top)

9. Take a note in which position the actuator is mounted with regard to the seat side [see symbol «▽» on upper part of body (11)], so that the actuator can be mounted in the same position after completion of the maintenance work

10. Remove 4 screws (20)
11. Withdraw actuator from upper part of body (11) and put it on a clean place
12. Remove both seals (21) and spacer (22) carefully from upper part of body (11)  
**Attention:** Be careful not to damage the sealing surface!
13. Clean feedthrough opening in upper part of body (11) and spacer (22) by using a lint-free cloth and alcohol
14. Clean seals of shaft feedthrough (21); see drawing below
  - (A) 1. Clean seals by using a lint-free cloth and alcohol
  2. Lubricate first seal extensively with vacuum grease and insert it in feedthrough opening in upper part of body (11)
  3. Insert spacer (22)
  4. Lubricate second seal extensively with vacuum grease and insert it in feedthrough opening in upper part of body (11)
15. Lubricate space between both seals extensively with vacuum grease



11 upper part of body

21 first and second shaft feedthrough seal

22 spacer = space between both seals → area to be lubricated

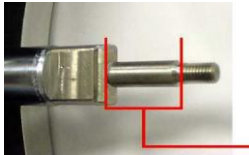
16. Clean actuator shaft (13):
  1. Apply compressed air and move out actuator shaft slowly in its full length (air pressure approx. 1 bar)
  2. Clean actuator shaft by using a lint-free cloth and alcohol
  3. Lubricate running surface of actuator shaft slightly with vacuum grease
  4. Move back actuator shaft slowly with compressed air (air pressure approx. 1 bar)
  5. Remove excessive grease from shaft
  6. Disconnect compressed air from actuator
17. Put actuator on upper part of body (11)  
**Attention:** Actuator must be mounted in the same position as it was before disassembly!
14. Mount and tighten 4 screws (20)

Tightening torque:

ISO 160: 6 Nm / 4.5 lbf · ft

ISO 200 - 250: 14 Nm / 10.5 lbf · ft

15. Apply compressed air (air pressure approx. 1 bar) and move actuator shaft slowly out of upper part of body (11)
16. Disconnect compressed air from actuator
17. Remove excessive grease from shaft
18. Lubricate end piece of shaft without thread slightly with vacuum grease



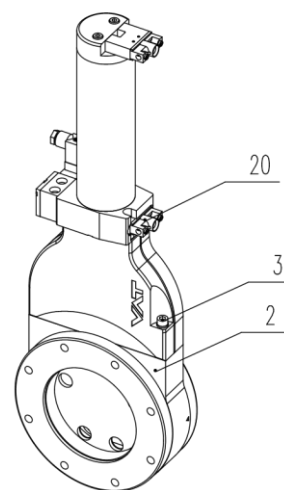
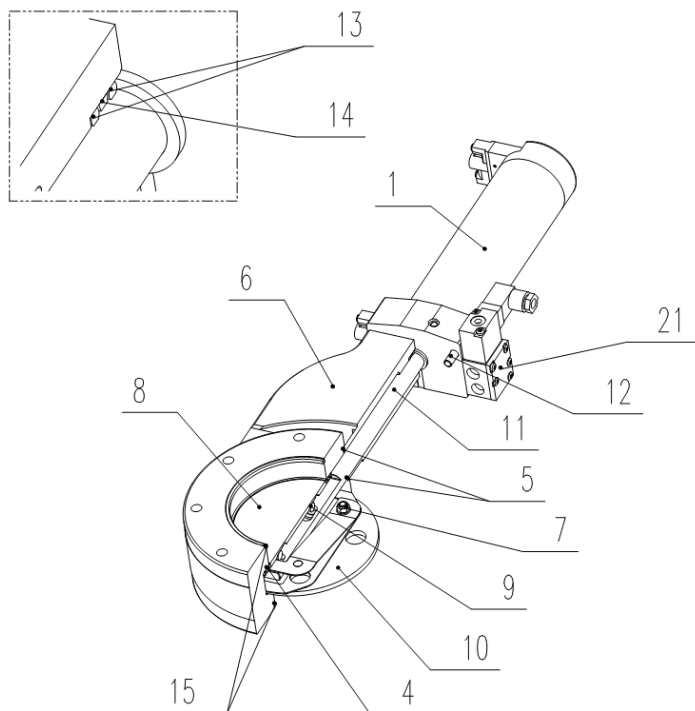
area to be lubricated

19. Move mechanism on actuator shaft (13) to its stop  
**Attention:** Spanner width of ball guidance (18) and shaft (13) must match!  
Mechanism must not rotate against the shaft!
  20. Mount lock nut (14) with disk (15)
  21. Clean sealing surface of upper part of body (11) by using a lint-free cloth and alcohol
  22. Clean sealing surface of valve seat on lower part of body (10) by using a lint-free cloth and alcohol
- c) Mounting of upper part of body (11) / actuator assembly on lower part of body (10):**
23. Carry out steps 13 - 20 of chapter «**Cleaning or replacement of gate seal and/or bonnet seal**»

Valve is ready for operation

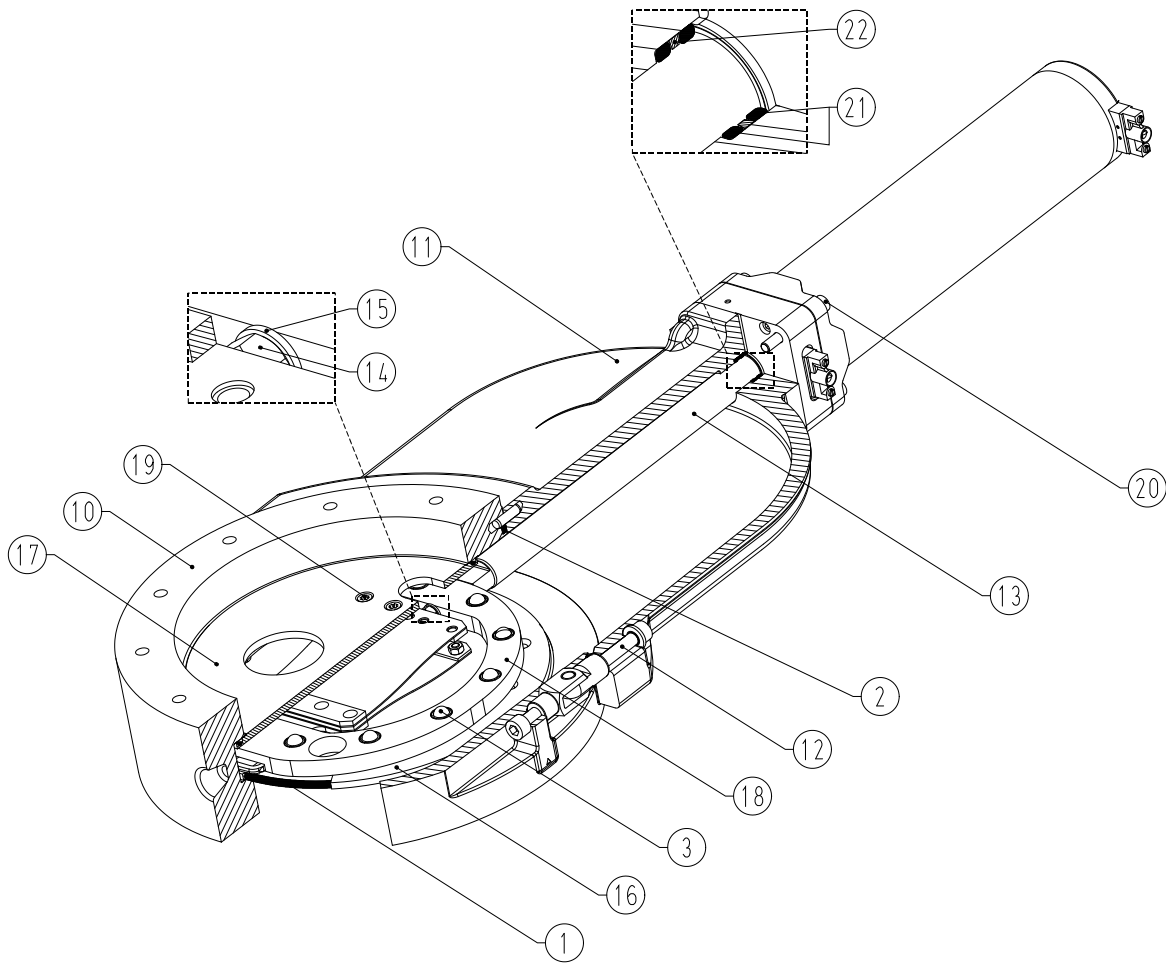


## 6.0 Drawings ISO63-100 Gate Valve



| Item | Designation   | Item | Designation   | Item | Designation        |
|------|---------------|------|---------------|------|--------------------|
| 1    | Actuator      | 7    | Hexagonal nut | 13   | O-Ring feedtrough  |
| 2    | Lower body    | 8    | Gate          | 14   | Spacer             |
| 3    | Bonnet screws | 9    | Ball          | 15   | Flange seal        |
| 4    | Gate seal     | 10   | Counter-plate | 20   | Position Indicator |
| 5    | Bonnet seal   | 11   | Shaft         | 21   | Solenoid           |
| 6    | Upper body    | 12   | Allen screw   |      |                    |

### ISO250 Gate Valve



| Item | Designation        | Item | Designation    | Item | Designation             |
|------|--------------------|------|----------------|------|-------------------------|
| 1    | gate seal          | 13   | actuator shaft | 19   | countersunk-head screws |
| 2    | bonnet seal        | 14   | lock nut       | 20   | cylinder head screws    |
| 3    | locking balls      | 15   | disk           | 21   | feedthrough seals       |
| 10   | lower part of body | 16   | gate           | 22   | spacer                  |
| 11   | upper part of body | 17   | counter plate  |      |                         |
| 12   | swing screws       | 18   | ball guidance  |      |                         |

## 7.0 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.

| Designation            | Ordering No. |             |             |             |
|------------------------|--------------|-------------|-------------|-------------|
|                        | 63           | 100         | 160         | 250         |
| ISO                    |              |             |             |             |
| Seal kit <sup>1)</sup> | X3202-60099  | X3202-60100 | X3202-60101 | X3202-60102 |

<sup>1)</sup> Seal kit includes: gate seal, bonnet seal, shaft feedthrough seals

| <i>Description Aluminum Gate Valves - Series 12</i>                                | <i>Part Number</i> |
|--|--------------------|
| Valve, Gate, Aluminum, 63 ISO, Air-operated, Position Indicator, 115VAC            | X3202-60000        |
| Valve, Gate, Aluminum, 63 ISO, Air-operated, Position Indicator, 220VAC            | X3202-60001        |
| Valve, Gate, Aluminum, 63 ISO, Air-operated, Position Indicator, 24VDC             | X3202-60002        |
| Valve, Gate, Aluminum, 63 ISO, Air-operated, Position Indicator, without Solenoid  | X3202-60003        |
| Valve, Gate, Aluminum, 63 ISO, Hand-operated                                       | X3202-60004        |
| Valve, Gate, Aluminum, 100 ISO, Air-operated, Position Indicator, 115VAC           | X3202-60010        |
| Valve, Gate, Aluminum, 100 ISO, Air-operated, 220VAC, Position Indicator           | X3202-60011        |
| Valve, Gate, Aluminum, 100 ISO, Air-operated, 24VDC, Position Indicator            | X3202-60012        |
| Valve, Gate, Aluminum, 100 ISO, Air-operated, Position Indicator, without Solenoid | X3202-60013        |
| Valve, Gate, Aluminum, 100 ISO, Hand-operated                                      | X3202-60014        |
| Valve, Gate, Aluminum, 160 ISO, Air-operated, Position Indicator, 115VAC           | X3202-60020        |
| Valve, Gate, Aluminum, 160 ISO, Air-operated, Position Indicator, 220VAC           | X3202-60021        |
| Valve, Gate, Aluminum, 160 ISO, Air-operated, Position Indicator, 24VDC            | X3202-60022        |
| Valve, Gate, Aluminum, 160 ISO, Air-operated, Position Indicator, without Solenoid | X3202-60025        |
| Valve, Gate, Aluminum, 160 ISO, Hand-operated                                      | X3202-60026        |
| Valve, Gate, Aluminum, 250 ISO, Air-operated, Position Indicator, 115VAC           | X3202-60027        |
| Valve, Gate, Aluminum, 250 ISO, Air-operated, Position Indicator, 220VAC           | X3202-60028        |
| Valve, Gate, Aluminum, 250 ISO, Air-operated, Position Indicator, 24VDC            | X3202-60029        |
| Valve, Gate, Aluminum, 250 ISO, Air-operated, Position Indicator, without Solenoid | X3202-60030        |

## 8.0 Quality Information (CE, RoHS, etc)

### Conformity with the current machinery directive 2006/42/EG

Changes contained in this new directive have had an impact on Agilent Valves by VAT products. Valves are definitely classified as “incomplete machines”. Technical adjustments were not required. The situation has, however, required changes in our product documentations.

To meet the requirements of the new directive, the manufacturer took the following steps:

- The Machinery Directive 2006/42/EG forbids placing the CE logo on incomplete machines. All Agilent Valves by VAT and most spare parts can therefore not carry the CE logo. The declaration of conformity is no longer required and a declaration of incorporation is provided by the manufacturer.
- Agilent Valves by VAT with an integrated controller no longer carry the CE logo, because they too come under the Machinery Directive. The declaration of incorporation will now also mention conformity to the directive on electromagnetic compatibility (EMC Directive 2004/108/EG).
- Pneumatically actuated Agilent Valves by VAT belong to the category of «actuating devices» according to article 1, para 3.10 of the Pressure Equipment Directive 97/23/EG. They are therefore excluded from this Directive and must not be handled as a pressure device.
- Assembly parts or spare parts like controllers, position indicators or heating components, which are directly attached or built into the valve, get neither a CE logo nor a CE declaration. They do not come under the Machinery Directive

Agilent Valve by VAT products are in conformity with the effective EC guidelines. A Declaration of Incorporation and Conformity is supplied with the relevant product and or on special request.

### ISO 9001:2000, ISO 14001:2004

The manufacturer maintains a quality management system according to ISO 9001:2000 and an environmental management system according to ISO 14001:2004. Both systems are regularly audited and certified by the SQS (Swiss Commission for Quality and Management Systems).

### Manufactures declaration on the use of dangerous substances (RoHS & REACH)

No harmful substances are knowingly used in any Agilent Valve's by VAT products. As regards the use of dangerous substances in products we conform to the following international directives and legislation:

Directive 2011/65/EU of the European Parliament and Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

a. All electronic components and their homogeneous parts in our products meet the restrictions on all substances named in the RoHS directive.

Regulation (EG) no. 1907/2006 of the European Parliament and Council on the registration, evaluation, authorization and restriction of chemicals (REACH).

b. REACH requires manufacturers of products to register all substances contained in the products, if these substances are likely to be released during operation. If our products are used appropriately, there can be no intentional release of such substances.



**Vacuum Products Division  
Instructions for returning products**

Dear Customer:

Please follow these instructions whenever one of our products needs to be returned.

- 1) Complete the attached Request for Return form and send it to Agilent Technologies (see below), taking particular care to identify all products that have pumped or been exposed to any toxic or hazardous materials.
- 2) After evaluating the information, Agilent Technologies will provide you with a Return Authorization (RA) number via email or fax, as requested.  
**Note:** Depending on the type of return, a Purchase Order may be required at the time the Request for Return is submitted. We will quote any necessary services (evaluation, repair, special cleaning, eg).
- 3) **Important steps for the shipment of returning product:**
  - Remove all accessories from the core product (e.g. inlet screens, vent valves).
  - Prior to shipment, drain any oils or other liquids, purge or flush all gasses, and wipe off any excess residue.
  - If ordering an Advance Exchange product, **please use the packaging from the Advance Exchange to return the defective product.**
  - Seal the product in a plastic bag, and package product carefully to avoid damage in transit. You are responsible for loss or damage in transit.
  - Agilent Technologies is not responsible for returning customer provided packaging or containers.
  - **Clearly label package with RA number.** Using the shipping label provided will ensure the proper address and RA number are on the package. Packages shipped to Agilent without a RA clearly written on the outside cannot be accepted and will be returned.
- 4) Return only products for which the RA was issued.
- 5) **Product being returned under a RA must be received within 15 business days.**
- 6) **Ship to the location specified on the printable label, which will be sent, along with the RA number, as soon as we have received all of the required information.** Customer is responsible for freight charges on returning product.
- 7) Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.

RETURN THE COMPLETED **REQUEST FOR RETURN** FORM TO YOUR NEAREST LOCATION:

**EUROPE:**  
Fax: 00 39 011 9979 330  
Fax Free: 00 800 345 345 00  
Toll Free: 00 800 234 234 00  
[vpt-customer@agilent.com](mailto:vpt-customer@agilent.com)

**NORTH AMERICA:**  
Fax: 1 781 860 9252  
Toll Free: 800 882 7426, Option 3  
[vpl-ra@agilent.com](mailto:vpl-ra@agilent.com)

**PACIFIC RIM:**  
please visit our website for individual  
office information  
<http://www.agilent.com>



Please read important policy information on Page 3 that applies to all returns.

**1) CUSTOMER INFORMATION**

|                                      |               |  |  |
|--------------------------------------|---------------|--|--|
| <b>Company Name:</b>                 |               | <b>Contact Name:</b>   |  |
| <b>Tel:</b>                          | <b>Email:</b> | <b>Fax:</b>  |  |
| <b>Customer Ship To:</b>             |               | <b>Customer Bill To:</b>   |  |
|                                      |               |  |  |
|                                      |               |  |  |
| Europe only: <b>VAT reg. Number:</b> |               | USA/Canada only: <input type="checkbox"/> <b>Taxable</b> <input type="checkbox"/> <b>Non-taxable</b> |  |

**2) PRODUCT IDENTIFICATION**

| Product Description | Agilent P/N | Agilent S/N | Original Purchasing Reference |
|---------------------|-------------|-------------|-------------------------------|
|                     |             |             |                               |
|                     |             |             |                               |
|                     |             |             |                               |

**3) TYPE OF RETURN** (Choose one from each row and supply Purchase Order if requesting a billable service)

- 3A.  Non-Billable  Billable **➔** New PO # (hard copy must be submitted with this form):
- 3B.  Exchange  Repair  Upgrade  Consignment/Demo  Calibration  Evaluation  Return for Credit

**4) HEALTH and SAFETY CERTIFICATION**

**AGILENT TECHNOLOGIES CANNOT ACCEPT ANY PRODUCTS CONTAMINATED WITH BIOLOGICAL OR EXPLOSIVE HAZARDS, RADIOACTIVE MATERIAL, OR MERCURY AT ITS FACILITY.**  
**Call Agilent Technologies to discuss alternatives if this requirement presents a problem.**

**The equipment listed above (check one):**

**HAS NOT** pumped or been exposed to any toxic or hazardous materials. OR

**HAS** pumped or been exposed to the following toxic or hazardous materials. If this box is checked, the following information must also be filled out. Check boxes for all materials to which product(s) pumped or was exposed:

Toxic  Corrosive  Reactive  Flammable  Explosive  Biological  Radioactive

**List all toxic/hazardous materials. Include product name, chemical name, and chemical symbol or formula:**

---

**NOTE:** If a product is received at Agilent which is contaminated with a toxic or hazardous material that was not disclosed, **the customer will be held responsible** for all costs incurred to ensure the safe handling of the product, and **is liable** for any harm or injury to Agilent employees as well as to any third party occurring as a result of exposure to toxic or hazardous materials present in the product.

**Print Name:** \_\_\_\_\_ **Authorized Signature:** ..... **Date:** \_\_\_\_\_

**5) FAILURE INFORMATION:**

|  |
|--|
| Failure Mode (REQUIRED FIELD. See next page for suggestions of failure terms): |
| Detailed Description of Malfunction: (Please provide the error message)        |
| Application (system and model):  |

|  |                                    |              |
|--|------------------------------------|--------------|
| <b>I understand and agree to the terms of Section 6, Page 3/3.</b> |                                    |              |
| <b>Print Name:</b>   | <b>Authorized Signature:</b> ..... | <b>Date:</b> |



**Vacuum Products Division  
Request for Return Form  
(Health and Safety Certification)**

Please use these Failure Mode to describe the concern about the product on Page 2.

**TURBO PUMPS and TURBO CONTROLLERS**

| APPARENT DEFECT/MALFUNCTION  | POSITION   | PARAMETERS   |
|--|--|--|
| - Does not start<br>- Does not spin freely<br>- Does not reach full speed<br>- Mechanical Contact<br>- Cooling defective | - Noise<br>- Vibrations<br>- Leak<br>- Overtemperature<br>- Clogging | - Vertical<br>- Horizontal<br>- Upside-down<br>- Other:<br>.....<br>Power:                      Rotational Speed:<br>Current:                    Inlet Pressure:<br>Temp 1:                    Foreline Pressure:<br>Temp 2:                    Purge flow:<br>OPERATING TIME: |

**ION PUMPS/CONTROLLERS**

|                         |                        |
|-------------------------|------------------------|
| - Bad feedthrough       | - Poor vacuum          |
| - Vacuum leak           | - High voltage problem |
| - Error code on display | - Other                |

**VALVES/COMPONENTS**

|                        |                  |
|------------------------|------------------|
| - Main seal leak       | - Bellows leak   |
| - Solenoid failure     | - Damaged flange |
| - Damaged sealing area | - Other          |

**LEAK DETECTORS**

|                          |                           |
|--------------------------|---------------------------|
| - Cannot calibrate       | - No zero/high background |
| - Vacuum system unstable | - Cannot reach test mode  |
| - Failed to start        | - Other                   |

**INSTRUMENTS**

|                          |                     |
|--------------------------|---------------------|
| - Gauge tube not working | - Display problem   |
| - Communication failure  | - Degas not working |
| - Error code on display  | - Other             |

**SCROLL AND ROTARY VANE PUMPS**

|                        |                         |
|------------------------|-------------------------|
| - Pump doesn't start   | - Noisy pump (describe) |
| - Doesn't reach vacuum | - Over temperature      |
| - Pump seized          | - Other                 |

**DIFFUSION PUMPS**

|                        |                       |
|------------------------|-----------------------|
| - Heater failure       | - Electrical problem  |
| - Doesn't reach vacuum | - Cooling coil damage |
| - Vacuum leak          | - Other               |

Section 6) **ADDITIONAL TERMS**

**Please read the terms and conditions below as they apply to all returns and are in addition to the Agilent Technologies Vacuum Product Division – Products and Services Terms of Sale.**

- Customer is responsible for the freight charges for the returning product. Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.
- Customers receiving an Advance Exchange product agree to return the defective, rebuildable part to Agilent Technologies **within 15 business days**. Failure to do so, or returning a non-rebuildable part (crashed), will result in an invoice for the non-returned/non-rebuildable part.
- Returns for credit toward the purchase of new or refurbished Products are subject to prior Agilent approval and may incur a restocking fee. Please reference the original purchase order number.
- Units returned for evaluation will be evaluated, and a quote for repair will be issued. If you choose to have the unit repaired, the cost of the evaluation will be deducted from the final repair pricing. A Purchase Order for the final repair price should be issued within 3 weeks of quotation date. Units without a Purchase Order for repair will be returned to the customer, and the evaluation fee will be invoiced.
- A Special Cleaning fee will apply to all exposed products per Section 4 of this document.
- If requesting a calibration service, units must be functionally capable of being calibrated.





# Service & Support

## North America

Agilent Technologies  
121 Hartwell Avenue  
Lexington, MA 02421 USA  
Tel.: +1 781 861 7200  
Toll-Free: +1 800 882 7426  
Fax: +1 781 860 5437  
vpl-customerservice@agilent.com

## Benelux

Agilent Technologies Netherlands B.V.  
Herculesweg 8  
4338 PL Middelburg The Netherlands  
Tel: +31 118 671570  
Fax: +31 118 671569  
Toll free: 00 800 234 234 00

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No.3, Wang Jing Bei Lu, Chao Yang Dis-  
trict, Beijing, 100102 China Tel.: +86 (10)  
6439 7888  
Fax: +86 (10) 6439 1318  
Toll-Free: 800 820 8266  
vpc-customerservice@agilent.com

## France

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