Block Valves
All Sizes

INSTRUCTION MANUAL

Manual No. 699912040
Revision L
September 2004
Block Valves: Instruction Manual for All Sizes

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</tr>
</tbody>
</table>
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Preface

Document Conventions

This manual uses the following standard safety protocols:

- **WARNING**
  
The warning messages are for attracting the attention of the operator to a particular procedure or practice which, if not followed correctly, could lead to serious injury.

- **CAUTION**
  
The caution messages are displayed before procedures, which if not followed, could cause damage to the equipment.

- **NOTE**
  
The notes contain important information.

This product must only be operated and maintained by trained personnel.

Before operating or servicing equipment, read and thoroughly understand all operation/maintenance manuals provided by Vacuum Technologies. Be aware of the hazards associated with this equipment, know how to recognize potentially hazardous conditions, and how to avoid them. Read carefully and strictly observe all cautions and warnings. The consequences of unskilled, improper, or careless operation of the equipment can be serious.

In addition, consult local, state, and national agencies regarding specific requirements and regulations. Address any safety, operation, and/or maintenance questions to your nearest Vacuum Technologies office.

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In the United States, you can contact Vacuum Technologies Customer Service at 1-800-8VARIAN.

Internet users:

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- Visit our web site at www.varianinc.com/vacuum
- Order on line at www.evarian.com
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de to which this declaration relates is in conformity with the following standard(s) or other normative documents.
auf das sich diese Erklärung bezieht, mit der/den flogenden Norm(en) oder Richtlinie(n) übereinstimmt.
auquel se réfère cette déclaration est conforme à la (auz) norme(s) ou au(x) document(s) normatif(s).
al que se refiere esta declaración es conforme a la(s) norma(s) u otro(s) documento(s) normativo(s).
waamaar deze verklaring verwijst, aan de volende norm(en) of richtlijn(en) beantwoordt.
a cui se riferisce questa dichiarazione è conforme alla/e sequente/i norma/o documento/I normativo/i.

98/37/EEC, Machinery Directive
EN 60204-1. . . . . . . . . . . . . . . . . . . Electrical equipment of industrial machines; general requirements

Aluminum GateKeeper Valves  NW100, NW160, NW200, NW250,
Aluminum Butterfly Valves  NW63, NW100, NW160, NW200, NW250,
Aluminum Block Valves  NW16, NW25, NW40, NW50, NW63, NW80,
Stainless Steel Block Valves  NW16, NW25, NW40,
Stainless Steel Tube Valves  NW16, NW25, NW40

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Lexington, MA, 02421-3133 USA

April 2002
Section 1. Introduction and Installation

Vacuum Technologies small right-angle and in-line block valves are compact bellows-sealed valves for use in roughing and high vacuum applications. The valve body is made of aluminum or stainless steel, and incorporates Klamp-Flange®, CFF or tube end fittings to provide reliable and convenient vacuum connections. The main seal and all vacuum seals are Viton®.

The valves are available in manually-operated and pneumatically-operated versions. The pneumatic valve is also available with a position indicator. The position indicator delivers an electrical output signal when the valve cycles, and is user-set in either the normally-open or normally-closed position.

The NW 16 and NW 25 valves are identical except for their port sizes; therefore, all internal spare parts are interchangeable. The NW 40 valve, however, is a larger-bodied valve requiring different internal components.

The NW 50, NW 63 and NW 80 are available only as stainless steel, right-angle valves.

This manual contains the necessary information to install, operate and maintain the Vacuum Technologies block valves listed in Table 1-1 and Table 1-2 on page 1-2.

Refer to the following sections:

- “Installation” on page 1-3
- “Operation” on page 1-5
- “Maintenance” on page 1-6
### Table 1-1 Valve Ordering Information NW16 – NW25

<table>
<thead>
<tr>
<th>Valve</th>
<th>Material</th>
<th>Right-Angle, All Models Part No.</th>
<th>In-Line, All Models Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manually-operated</td>
<td>Aluminum</td>
<td>L6280</td>
<td>L9180</td>
</tr>
<tr>
<td></td>
<td>Stainless Steel</td>
<td>L9480</td>
<td>L9580</td>
</tr>
<tr>
<td>Pneumatically-operated</td>
<td>Aluminum</td>
<td>L6281</td>
<td>L9181</td>
</tr>
<tr>
<td>(with or without solenoid, without position indicator)</td>
<td>Stainless Steel</td>
<td>L9481</td>
<td>L9581</td>
</tr>
<tr>
<td>Pneumatically-operated</td>
<td>Aluminum</td>
<td>L6282</td>
<td>L9182</td>
</tr>
<tr>
<td>(with or without solenoid, with position indicator)</td>
<td>Stainless Steel</td>
<td>L9482</td>
<td>L9582</td>
</tr>
</tbody>
</table>

### Table 1-2 Valve Ordering Information NW50 – NW80

<table>
<thead>
<tr>
<th>Valve</th>
<th>Material</th>
<th>Right-Angle, All Models Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manually-operated</td>
<td>Aluminum</td>
<td>L7280</td>
</tr>
<tr>
<td>Pneumatically-operated</td>
<td>Aluminum</td>
<td>L72823</td>
</tr>
<tr>
<td>(with or without solenoid, with position indicator)</td>
<td>Aluminum</td>
<td>L72823</td>
</tr>
</tbody>
</table>
1.1 Installation

All valves are installed in a vacuum system by brazing welding, Conflat® gaskets, or Klamp-Flange® or KF couplings.

KF coupling Consists of two symmetrical flange fittings (one of which is on the valve body), a centering ring, an O-ring and a flange clamp (Figure 1-1).

NW 50 valves Installed in a vacuum system by means of a Klamp® (Quick Clamp) flange or ISO coupling.

ISO 63 and ISO 80 valves Installed using an ISO coupling consisting of two symmetrical flanges, a centering ring, and claw clamps.

To install the valve:

1. Wipe the O-ring clean and grease it very lightly with Dupont Krytox® GPL2O7 vacuum lubricant (Part No. 695400010) before installation.

2. Assemble the KF coupling and tighten the wing nut or ratchet firmly to ensure proper compression of the O-ring seal.

   \[\text{NOTE}\]

   The pneumatic valve uses a 1/8 NPT inlet fitting and requires a minimum of 80 psig air pressure to operate.

3. Install a filter and lubricator in the air inlet line (pneumatic valve only).
1.1.1 Electrical Connections to Solenoid

To supply power to the solenoid:

1. Remove the connector from the solenoid by removing the holding screw and pulling the connector away from the solenoid.

2. Remove the terminal block from its housing by inserting a small, flat-head screwdriver in the slot provided at the terminal base and prying the housing off (Figure 1-2).

3. Feed the power line through the housing grommet and connect the three leads to the terminal contacts which are clearly labeled 1, 2, and ground.

4. Push the terminal block back into the housing and snap it in place.

5. Plug the connector back into the solenoid and tighten the holding screw.

**NOTE**

*The housing can be rotated 360° in 90° increments so that the power line exits the connector in the most convenient direction.*

---

Figure 1-2 Solenoid Assembly

1. Remove the connector from the solenoid by removing the holding screw and pulling the connector away from the solenoid.

2. Remove the terminal block from its housing by inserting a small, flat-head screwdriver in the slot provided at the terminal base and prying the housing off (Figure 1-2).

3. Feed the power line through the housing grommet and connect the three leads to the terminal contacts which are clearly labeled 1, 2, and ground.

4. Push the terminal block back into the housing and snap it in place.

5. Plug the connector back into the solenoid and tighten the holding screw.
1.2 Operation

This section discusses the operation of:

- “Manually-Operated Valves”
- “Pneumatically-Operated Valves”

1.2.2 Manually-Operated Valves

The manual valve operates by means of a hand-actuated knob.

To close the valve:

- Turn the knob in a clockwise direction. To properly compress the main O-ring seal and obtain a good vacuum seal, turn the knob clockwise until a slight resistance is felt, then firmly torque the knob approximately ¼ turn.

To open the valve:

- Turn the knob counterclockwise until the valve is fully open to ensure maximum conductance.

1.2.3 Pneumatically-Operated Valves

Pneumatic valves are spring-closed air-opened valves.

When electric power is:

- Supplied to the solenoid valve, air is supplied to the cylinder and the valve opens.
- Removed, the valve closes (Figure 1-3).

![Figure 1-3 Solenoid Operation](image_url)
1.3 Maintenance

This section discusses the maintenance of:

- "Manual Valves"
- "Pneumatic Valves" on page 1-11

1.3.4 Manual Valves

Manual valve maintenance consists of:

- "Disassembly and Cleaning" on page 1-8
- "Reassembly" on page 1-10

Figure 1-4 shows an exploded view of the small manual block valve and the large block valve. The numbers of the small block valve correspond to items in Table 1-3. The numbers of the large block valve correspond to items in 1-4.

![Figure 1-4 Small and Large Manual Block Valve – Exploded View](image-url)
## Table 1-3 Small Block Valves: Manual Valve Parts List

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Vacuum Technologies Part No. or Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knob</td>
<td>L5967301 (aluminum)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L8819001 (plastic)</td>
</tr>
<tr>
<td>2</td>
<td>Set Screw</td>
<td>#10-32 x 5/8 lg</td>
</tr>
<tr>
<td>3</td>
<td>Screw, Allen head cap</td>
<td>#10-32 x 5/8 lg</td>
</tr>
<tr>
<td>4</td>
<td>Top Plate</td>
<td>L5491001</td>
</tr>
<tr>
<td>5</td>
<td>Valve Stem</td>
<td>L5490001</td>
</tr>
<tr>
<td>6</td>
<td>Bellows Nut</td>
<td>85073001</td>
</tr>
<tr>
<td>7</td>
<td>Bellows and Seal Disc</td>
<td>L8739301</td>
</tr>
<tr>
<td>8</td>
<td>O-ring, Viton</td>
<td>Parker No.2-213</td>
</tr>
<tr>
<td>9</td>
<td>O-ring Viton</td>
<td>Parker No.2-031</td>
</tr>
<tr>
<td>10</td>
<td>Valve Body</td>
<td>–</td>
</tr>
</tbody>
</table>

## Table 1-4 Large Block Valves: Manual Valve Parts List

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Vacuum Technologies Part No. or Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knob</td>
<td>L8819001 (plastic)</td>
</tr>
<tr>
<td>2</td>
<td>Set Screw</td>
<td>#10-32 x 1/2 lg</td>
</tr>
<tr>
<td>3</td>
<td>Screw Socket, Head Cap</td>
<td>#10-32 x 3/4 lg</td>
</tr>
<tr>
<td>4</td>
<td>Top Plate</td>
<td>L6606001</td>
</tr>
<tr>
<td>5</td>
<td>Bellow/Valve Stem Assembly</td>
<td>Ref</td>
</tr>
<tr>
<td>6</td>
<td>Valve Stem</td>
<td>L6608001</td>
</tr>
<tr>
<td>7</td>
<td>Bellows Nut</td>
<td>L6609001</td>
</tr>
<tr>
<td>8</td>
<td>Bellows</td>
<td>L6603001</td>
</tr>
<tr>
<td>9</td>
<td>O-ring, Bellows, Viton</td>
<td>66892014</td>
</tr>
<tr>
<td>10</td>
<td>Seal Disc</td>
<td>L6602001</td>
</tr>
<tr>
<td>11</td>
<td>O-ring, Seal Disc, Viton</td>
<td>660892277</td>
</tr>
<tr>
<td>12</td>
<td>O-ring, Bonnet, Viton</td>
<td>66892043</td>
</tr>
</tbody>
</table>
1.3.4.1 Disassembly and Cleaning

Refer to Figure 1-4 on page 1-6 for this procedure.

**NOTE**

In this procedure, the components (shown in Figure 1-4, identified in Table 1-3 and Table 1-4) are enclosed in parentheses using the following convention:

- A single number refers to both the small and large valve.
- In a set of numbers separated by a semi-colon:
  - The first item number identifies an item in the small block valve.
  - The second item number identifies an item in the large block valve.

To disassemble and clean the valve:

1. Loosen the set screw (2) with a 3/32 Allen wrench and pull the knob (1) off the valve stem (5; 6).

2. Remove the four Allen head cap screws (3) and pull the top plate (4) and bellows/valve stem assembly (7, 8, 9, and 10; 5) from the valve body as one unit. If only the main seal O-ring (8) is to be replaced, do so at this time and then reassemble the valve (“Reassembly” on page 1-10).

3. Holding the valve stem (5; 6) of the bellows/valve stem assembly ((8, 9, and 10; 5) between the fingers of one hand, unscrew the top plate (4) with the other hand and remove the plate from the valve stem (5; 6).

The bellows/valve stem assembly (7, 8, 9, and 10; 5) is treated as a single unit; its separate components, however, are listed on the parts list.

4. Remove the O-ring (8; 11) from the seal disc and the O-ring (9; 12) from the valve body (10; 13). Use plastic tweezers or a similar non-destructive instrument to remove the O-rings so as not to mar O-ring groove surfaces.
5. Clean the internal metal components using an alcohol-dampened cloth or a light abrasive cloth such as Scotch-Brite™.

CAUTION When cleaning the parts of the bellows/valve stem assembly (7, 8, 9, and 10; 5), wipe only the surface area of the bellows and seal disk exposed to the vacuum system. Soaking the bellows/valve stem assembly in an alcohol bath damages the O-ring (8) and causes it to outgas under vacuum.
1.3.4.2 Reassembly

Refer to Figure 1-4 on page 1-6 for this procedure.

NOTE

In this procedure, the components (shown in Figure 1-4, identified in Table 1-3 and Table 1-4) are enclosed in parentheses using the following convention:

- A series of numbers not separated by a semi-colon refer to both the small and large valve.
- In a series of numbers separated by a semi-colon:
  - The first item number identifies an item in the small block valve.
  - The second item number identifies an item in the large block valve.

To reassemble the manual valve:

NOTE

Use new O-rings (8 and 9; 9, 11 and 12) for this procedure.

1. Wipe new O-rings clean and very lightly grease them with Dupont Krytox® GPL2O7 vacuum lubricant.

2. Place O-rings (8 and 9) into their respective grooves.

3. Take the bellows/valve stem assembly (7, 8, 9, and 10; 5) and hold it securely in one hand. Using the other hand, thread the top plate (4) onto the valve stem (5; 6) until the top plate is flush with the bellows.

4. Place the bellows/valve stem assembly (7, 8, 9, and 10; 5) with the top plate into the valve body and secure with cap screws (3). Be sure the seal disc is not in contact with the seal area of the body before tightening the cap screws.

5. Push the knob onto the valve stem and secure it by tightening the set screw on the flat of the valve stem(5; 6).
1.3.5 Pneumatic Valves

Pneumatic valve maintenance consists of:

- “Disassembly and Cleaning” on page 1-14
- “Reassembly” on page 1-16
- “Position Indicator” on page 1-18 – discusses installation and servicing of the position indicator and microswitches

Figure 1-5 shows an exploded view of the small pneumatic block valve and the large pneumatic block valve. The numbers of the small block valve correspond to the items in Table 1-5. The numbers of the large block valve correspond to the items in Table 1-6 on page 1-13.

Figure 1-5 Small and Large Pneumatic Block Valve – Exploded View
### Table 1-5 Small Valves: Pneumatic Valve Parts List

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Vacuum Technologies Part No. or Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NW16 or NW25</td>
</tr>
<tr>
<td>1</td>
<td>Air cylinder Cover</td>
<td>L5484001</td>
</tr>
<tr>
<td>2</td>
<td>Screw, Allen head cap</td>
<td>#10-32 x 2 lg</td>
</tr>
<tr>
<td>3</td>
<td>Visual Indicator Cap</td>
<td>L5673-001</td>
</tr>
<tr>
<td>4</td>
<td>Stop Nut</td>
<td>ESNA 29NTE 040</td>
</tr>
<tr>
<td>5</td>
<td>Piston Cup</td>
<td>660202114</td>
</tr>
<tr>
<td>6</td>
<td>Air Cylinder</td>
<td>L5480001</td>
</tr>
<tr>
<td>7</td>
<td>Quad Ring</td>
<td>699000025</td>
</tr>
<tr>
<td>8</td>
<td>Valve Stem</td>
<td>L5483001</td>
</tr>
<tr>
<td>9</td>
<td>Spring</td>
<td>660285312</td>
</tr>
<tr>
<td>10</td>
<td>Special Washer, Aluminum (not used on new models)</td>
<td>L5482001</td>
</tr>
<tr>
<td>11</td>
<td>Bellows &amp; Seal Disc</td>
<td>L8739301</td>
</tr>
<tr>
<td>12</td>
<td>O-ring</td>
<td>Parker No. 2-213, Viton</td>
</tr>
<tr>
<td>13</td>
<td>O-ring</td>
<td>Parker No. 2-031, Viton</td>
</tr>
<tr>
<td>14</td>
<td>Valve Body</td>
<td>–</td>
</tr>
<tr>
<td>15</td>
<td>Solenoid kit for aluminum (solenoid valve and brass elbow) and stainless steel valves (solenoid valve and straight brass fitting)</td>
<td>110/115 V, 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>220/240 V, 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 VDC</td>
</tr>
</tbody>
</table>
Table 1-6  Large Block Valves: Pneumatic Valve Parts List

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Vacuum Technologies Part No. or Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NW50</td>
</tr>
<tr>
<td>1</td>
<td>Air Cylinder Cover</td>
<td>L6612001</td>
</tr>
<tr>
<td>2</td>
<td>Screw Allen Head Cap</td>
<td>1/4-20 x 21/4 lg</td>
</tr>
<tr>
<td>3</td>
<td>Visual Indicator Cap</td>
<td>L6611001</td>
</tr>
<tr>
<td>4</td>
<td>Stop Nut</td>
<td>617935016</td>
</tr>
<tr>
<td>5</td>
<td>Piston Cup</td>
<td>660203140</td>
</tr>
<tr>
<td>6</td>
<td>Air Cylinder</td>
<td>L6604001</td>
</tr>
<tr>
<td>7</td>
<td>Quad Ring</td>
<td>699000026</td>
</tr>
<tr>
<td>8</td>
<td>Valve Stem</td>
<td>L6607001</td>
</tr>
<tr>
<td>9</td>
<td>Spring</td>
<td>660285698</td>
</tr>
<tr>
<td>10</td>
<td>Special Washer</td>
<td>L9973001</td>
</tr>
<tr>
<td>11</td>
<td>Bellows</td>
<td>L6603001</td>
</tr>
<tr>
<td>12</td>
<td>O-ring, Bellows, Viton</td>
<td>66892014</td>
</tr>
<tr>
<td>13</td>
<td>Seal Disc</td>
<td>L6602001</td>
</tr>
<tr>
<td>14</td>
<td>O-ring, Seal Disc, Viton</td>
<td>660892227</td>
</tr>
<tr>
<td>15</td>
<td>O-ring, Bonnet, Viton</td>
<td>660892043</td>
</tr>
<tr>
<td>16</td>
<td>Valve Body</td>
<td>L6604001</td>
</tr>
<tr>
<td></td>
<td>Valve Body, Nickel-plated</td>
<td>L6600003</td>
</tr>
<tr>
<td>17</td>
<td>Solenoid</td>
<td>110/115 V, 50/50 Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>626771150</td>
</tr>
<tr>
<td>18</td>
<td>Elbow 1/8 NPT</td>
<td>623434001</td>
</tr>
</tbody>
</table>
1.3.5.3 Disassembly and Cleaning

Refer to Figure 1-5 on page 1-11 for this procedure.

In this procedure, the components (shown in Figure 1-5, identified in Table 1-5 and Table 1-6) are enclosed in parentheses, using the following convention:

- A single number refers to both the small and large valve.
- In a set of numbers separated by a semi-colon:
  - The first item number identifies an item in the small block valve.
  - The second item number identifies an item in the large block valve.

To disassemble and clean the valve:

1. Using a 5/8 wrench, turn the solenoid valve fitting (15; 17) counterclockwise and remove the complete solenoid valve assembly as one unit.
2. Place the solenoid valve assembly (15; 17) aside.
3. Unscrew the four cap screws (2) and remove the air cylinder cover (1).
4. Pull the air cylinder (6) away from the valve body (14; 16). All components except for the O-ring (13; 15) remain with the air cylinder. This group of components is collectively referred to as the trim assembly. If only the main seal is to be replaced, do so at this time, then reassemble the valve. For more information, refer to “Reassembly” on page 1-16.
5. To disassemble the trim assembly, pull the red visual indicator cap (3) off the valve stem (8).
6. Using a 7/16" deep socket wrench, turn the stop nut (4) counterclockwise while gripping the bellows seal disc (11) in the other hand.
7. Remove the stop nut (4) and pull the air cylinder (6) away from the valve stem (8).
8. Proceed to:
   - Step 9 if disassembly of the air cylinder is necessary (e.g. an air leak is suspected).
   - Step 12 on page 1-15, if disassembly of the air cylinder is not required.
9. Place the air cylinder upside down on a flat surface with the large bore and piston cup insert (5) facing down.
10. Remove the piston cup insert from the air cylinder (6) by inserting the eraser end of a pencil (or similar non-destructive object) into the center bore of the air cylinder and pushing the piston cup out the other side.
11. Ensure that the air cylinder (6) is still in the upside down position, using plastic tweezers or other nondestructive instrument, pull the quad ring (7) out of the center bore of the air cylinder (Figure 1-6).

**NOTE**

*When removing the quad ring, care must be taken not to mar any metal surfaces, especially the groove in which the quad ring is positioned.*

![Figure 1-6 Positioning the Quad Ring in the Air Cylinder](image)

12. Remove the spring (9) from the valve stem (8).

13. Position the bellows/valve stem assembly in the vise with the valve stem pointed up and the seal disc between the jaws. Tighten the vise jaws on the seal disc periphery firmly but not so tight as to deform the seal disk (Figure 1-7).

**NOTE**

*Further disassembly requires a soft-jaw vise, two 1¼-20 nuts, and two 7/16 open end wrenches.*

![Figure 1-7 Removing the Stem from the Seal Disc](image)

14. Thread both nuts to the midpoint of the threaded section of the stem. Using two wrenches, tighten the two nuts into each other by turning the bottom nut counterclockwise while simultaneously turning the top nut clockwise (Figure 1-7).
15. Turn the bottom nut counterclockwise using the wrench. The nuts should not rotate with respect to the stem, instead the stem rotates with respect to the seal disc. Continue turning the stem until it separates from the seal disc.

16. Remove the nuts from the stem (8).

17. Separate the remaining component: bellows and seal disc (11) by hand.

18. Using plastic tweezers or other non-destructive instrument, remove O-ring (12; 14) from the seal disc and the O-ring (13; 15) from the valve body.

19. Proceed to:
   - Step 20, if an air leak is suspected in the solenoid.
   - Otherwise, disassembly is complete.

   **CAUTION**

   When cleaning the parts of the bellows/stem assembly, wipe only the surface area of the bellows and seal disk exposed to the vacuum system. Soaking the bellows/stem assembly in an alcohol bath damages the O-ring (8) and causes it to outgas under vacuum.

20. Clean the metal components using an alcohol-dampened cloth or a light abrasive cloth such as Scotch-Brite™.

21. Wipe all surfaces with an alcohol-dampened cloth and allow components to dry thoroughly.

### 1.3.5.4 Reassembly

Refer to Figure 1-5 on page 1-11 for this procedure.

**NOTE**

In this procedure, the components (shown in Figure 1-5, identified in Table 1-5 and Table 1-6) are enclosed in parentheses, using the following convention:

- A single number or a series of numbers not separated by a semi-colon refer to both the small and large valve.

- In a set of numbers separated by a semi-colon:
  - The first item number identifies an item in the small block valve.
  - The second item number identifies an item in the large block valve.
To reassemble the valve:

**NOTE**

When completely rebuilding the valve, be sure to reassemble with new O-rings, quad ring, and cylinder cup.

1. Wipe all O-rings (12 and 13; 14 and 15) clean and very lightly grease them with Dupont Krytox® GPL207 vacuum lubricant.
2. Secure the bellows and seal disc (11; 11, 12 and 13) in a vise as described in disassembly procedures, step 13.
3. Place the O-ring (12 – large valve only) into its groove on the bellows and seal disc (11).
4. Place the washer (10) into the bellow and over the seal disc threaded stud (11; 13) with the stepped side facing up. This washer is used to center the spring on bellows assemblies without a boss machined into the seal disc.
5. Take the valve stem (8) in hand, apply Loctite® 242 adhesive to the first three female threads.
6. Thread the valve stem (8) onto the threaded rod of the seal disc (11) by turning the stem clockwise until finger-tight.
7. Place the spring (9) over the stem so it is seated on the special washer (10). This washer is required only in older model valves.
8. Proceed to:
   - Step 9 if resassembly of the air cylinder is necessary.
   - Step 15, if resassembly of the air cylinder is not required.
9. Lubricate the quad ring (7) liberally with Sta-lube 3120 grease. The piston cup (5) has a rubber-coated bottom surface and a metal upper surface (Figure 1-8). Apply Sta-lube liberally to the side walls and the rubber-coated bottom surface, leaving the metal top surface dry.

![Figure 1-8 Position of Quad Ring In its Groove](image-url)
10. Place the quad ring (7) in its groove.
11. Push the piston cup (5) into the air cylinder (6) with the rubber-coated side down.
12. Place the air cylinder (6) onto the valve stem (8) with the rubber side of the piston cup (5) facing up.
13. Thread the stop nut (4) onto the valve stem (8).
14. Using a torque wrench, torque the stop nut to 45 inch-pounds.
15. Push the red visual indicator cap (3) onto the valve stem (8).
16. Place the O-ring (13; 15) into its groove on the valve body.
17. Place the air cylinder/bellows assembly into the valve body.
18. Put the air cylinder cover (1) into position and secure the assembly with cap screws (2).
19. Mount the solenoid assembly to the air cylinder and tighten with a 5/8" open end wrench.

1.3.5.5 Position Indicator

This discussion details how to disassemble the position indicator so that:

- A defective microswitch can be fixed
  (see “Replacing the Defective Microswitch” on page 1-21)

  or

- A new position indicator can be installed using a kit
  (see “Installing the Position Indicator Kit” on page 1-22).

In either case:

1. Disassemble the valve as explained in “Disassembly/Reassembly” on page 1-21.
2. Perform the procedure required.
3. Reassemble the valve as explained in “Disassembly/Reassembly” on page 1-21.
4. Once either procedure is complete, the switches can be tested (see “Test Procedure” on page 1-23).
Figure 1-9 shows an exploded view of the position indicator and Table 1-7 lists the associated callouts.

Note: Microswitch S1 mounts in the two upper holes.

Note: Microswitch S2 mounts in the two upper holes.

Figure 1-9  Position Indicator Assembly Exploded View
### Table 1-7  Position Indicator Parts List

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Vacuum Technologies Part No. or Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Holding Screw</td>
<td>Included with item 1</td>
</tr>
<tr>
<td>2</td>
<td>Connector</td>
<td>MPM 193-07N</td>
</tr>
<tr>
<td>3</td>
<td>Gasket</td>
<td>Included with item 1</td>
</tr>
<tr>
<td>4</td>
<td>Position Indicator Cover</td>
<td>L5978001</td>
</tr>
<tr>
<td>5</td>
<td>Screw, Phillips head</td>
<td>#6-32 x 1/4 lg</td>
</tr>
<tr>
<td>6</td>
<td>Connector Base</td>
<td>MPM 193</td>
</tr>
<tr>
<td>7</td>
<td>Screw, Phillips head</td>
<td>#2-56 x 3/8 lg</td>
</tr>
<tr>
<td>8</td>
<td>Gasket</td>
<td>Included with item 6</td>
</tr>
<tr>
<td>9</td>
<td>Nut</td>
<td>#2-56</td>
</tr>
<tr>
<td>10</td>
<td>Lockwasher</td>
<td>#2</td>
</tr>
<tr>
<td>11</td>
<td>Microswitch</td>
<td>Cherry E61-10H</td>
</tr>
<tr>
<td>12</td>
<td>Threaded Holder</td>
<td>Q3033001</td>
</tr>
<tr>
<td>13</td>
<td>Screw, Phillips head</td>
<td>#2-56 x 1/2 lg</td>
</tr>
<tr>
<td>14</td>
<td>Lockwasher</td>
<td>#2</td>
</tr>
<tr>
<td>15</td>
<td>Washer, Flat</td>
<td>#2</td>
</tr>
<tr>
<td>16</td>
<td>Microswitch Mounting Bracket</td>
<td>L8673301</td>
</tr>
<tr>
<td>17</td>
<td>Screw, Philips head</td>
<td>#6-32 x 1/4 lg</td>
</tr>
<tr>
<td>18</td>
<td>Lockwasher</td>
<td>#6</td>
</tr>
<tr>
<td>19</td>
<td>Screw, Allen head cap</td>
<td>#10-32 x 2 lg (NW16, NW25, NW50, ISO63)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/4-20 x 2 lg (NW40, ISO80)</td>
</tr>
<tr>
<td>20</td>
<td>Lockwasher</td>
<td>No.10 (NW16, NW25, NW50, ISO63)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/4&quot; (NW40, ISO80)</td>
</tr>
<tr>
<td>21</td>
<td>Air Cylinder Cover, Aluminum</td>
<td>L5484001 (NW16, NW25)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L5674001 (NW40)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L6612001 (NW50, ISO63)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L4474001 (ISO80)</td>
</tr>
<tr>
<td>22</td>
<td>Screw, Shoulder, 5/16 by 1/2&quot;, Stainless Steel</td>
<td>L8844001</td>
</tr>
</tbody>
</table>
1.3.5.5.1 Disassembly/Reassembly

Refer to Figure 1-9 on page 1-19 for this procedure:

1. Remove the holding screw (1) from the connector (2) and pull the connector off the connector base (6).

2. Remove the screw (5) from the position indicator cover (4) and lift the cover off the air cylinder cover (21).

The components of the position indicator are now accessible. To reassemble the valve, reverse the steps in the procedure above.

1.3.5.5.2 Replacing the Defective Microswitch

To replace the microswitch:

1. Disconnect the soldered leads from the Microswitch pins.

2. Unscrew the mounting screws (13) and remove the Microswitch (11).

3. Reassemble a new switch on the bracket (16) as shown in Figure 1-9 on page 1-19.

   Note the position of the switches on the bracket and wire the microswitches as shown in Figure 1-10 on page 1-23.

4. Solder the leads to the Microswitch. Leads are wired to the connector base as indicated in Table 1-8.

Table 1-8 Connector Base Wiring

<table>
<thead>
<tr>
<th>Base Pin</th>
<th>Wire</th>
<th>Dual Microswitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Orange</td>
<td>Switch 2, NO</td>
</tr>
<tr>
<td>2</td>
<td>Blue</td>
<td>Switch 1, NO</td>
</tr>
<tr>
<td>3</td>
<td>White</td>
<td>Switch 1 and 2, Common</td>
</tr>
<tr>
<td>4</td>
<td>Green</td>
<td>Ground</td>
</tr>
</tbody>
</table>
1.3.5.5.3 Installing the Position Indicator Kit

To install a position indicator kit:

1. Remove the cover (4) from the position indicator assembly by removing the electrical connector and the screw and lockwasher from the top cover.

2. Apply air pressure to the valve and allow the valve to remain in the open position.

3. Remove the red visual indicator cap (not shown) from the valve stem.

4. Apply a small amount of Loctite #242 to the threads of the special shoulder screw (22) before threading it into the valve stem. Install the 5/16 by 1/2" long stainless steel shoulder screw on the valve stem. Tighten the shoulder screw until it is fully threaded into the valve stem then torque it to 30 inch-pounds.

5. Remove the air pressure from the valve to close it.

6. Carefully mount the position indicator assembly on the valve. It may be necessary to move the switches back to clear the shaft. Use two #6-32 x ¾" pan head screws and two #6 lockwashers to fasten the position indicator on the top of the valve.

1.3.5.5.3.1 Wiring the Position Indicator

Refer to Figure 1-9 on page 1-19 for this procedure.

To wire the position indicator:

1. Remove the holding screw (1) and pull the connector (2) away from the base (6).

2. Using the holding screw, push the terminal block out of the connector housing.

3. Feed the No.22 AWG wire through the housing grommet and connect the leads to the appropriate terminal block contacts for the desired operation.

NOTE

The position indicator can be wired for normally-open or normally-closed operation, or both:

- **Normally-open** The position indicator supplies an electrical output signal when the valve is open.

- **Normally-closed** The position indicator supplies a signal when the valve is closed.

- **Both** A signal is supplied when the valve is open or closed.
4. Wire terminal contacts as detailed in Figure 1-10.

5. Push the terminal block back into the connector housing and snap it into place.

6. Plug the connector back into the base and secure it with the holding screw.

1.3.5.5.4 Test Procedure

Once a microswitch is replaced or a position indicator is installed, perform the test procedure for dual switches:

1. Connect an Ohmmeter to pin 1 (orange wire, Figure 1-10) and pin S (white wire) of switch S2 connector, then set the meter to measure resistance (Ohms).
2. With the valve in the open position (air pressure applied), adjust switch S2 (right side) until the Microswitch closes.
3. Tighten the screws holding switch S2.
4. Actuate the valve five times and ensure that the switch S2 opens and closes and is in the correct position.
5. Close the valve by removing the air pressure from the valve.
6. Connect the Ohmmeter to pin 2 (blue wire) and pin S (white wire) of the switch S1 connector. The meter should still be set to read resistance (Ohms).
7. With the valve in the closed position (no air pressure), adjust switch S1 (left side) until the Microswitch closes.
8. Apply air pressure to open the valve. Switch S1 should open. Readjust it if necessary by tightening the screws.
9. Actuate the valve five times to ensure that the switch opens and closes and is in the correct position.
10. Place the cover on the position indicator and replace the connector using the appropriate hardware.
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# Appendix A. Technical Specifications

Table A-1 lists the block valve specifications.

## Table A-1  Block Valve Specifications

<table>
<thead>
<tr>
<th>NW 16</th>
<th>NW 25</th>
<th>NW 40</th>
<th>NW 50</th>
<th>ISO 63</th>
<th>ISO 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductance</td>
<td>3 liters/sec</td>
<td>12 liters/sec</td>
<td>32 liters/sec</td>
<td>61 liters/sec</td>
<td>100 liters/sec</td>
</tr>
<tr>
<td>Main Seal Leak Rate</td>
<td>≤ (1 \times 10^{-9}) std cc/sec Helium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Leak Rate</td>
<td>≤ (1 \times 10^{-10}) std cc/sec Helium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Materials

- **Valve Body**: Aluminum (6061-T6) or stainless steel
- **Bellows**: Stainless Steel T300 Series
- **O-rings, vacuum**: Viton V747-75
- **Air Piston**: Viton V747-75

### Baking Temperature

- **Manual valve**: 80° C (176° F) 150° C (302° F)
- **Pneumatic valve**: 80° C (176° F) without solenoid 150° C (302° F) without solenoid
- 60° C (140° F) with solenoid 60° C (140° F) with solenoid

### Miscellaneous

- **Service Life Bellows**: 1,000,000 cycles
- **Manual valve, number of turns to open (seated to fully open)**: 6 9

### Pneumatic Valve

- **Air connection**: 1/8 NPT
- **Air pressure**: 80 psig (minimum)
- **Open/close time**: < 1 second
- **Actuation**: Spring closed, air opened
- **Power loss**: Valve closes
### Table A-1  Block Valve Specifications (Continued)

<table>
<thead>
<tr>
<th></th>
<th>NW 16</th>
<th>NW 25</th>
<th>NW 40</th>
<th>NW 50</th>
<th>ISO 63</th>
<th>ISO 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical rating</td>
<td>125/250 VAC, 5 A maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal hookup</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NO or NC or both</td>
<td></td>
</tr>
<tr>
<td>Microswitch life</td>
<td>250,000 cycles with 1 A load</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B. Spare Parts Kits/Accessories and Replacement Parts

Table B-1 lists the spare part kits by valve type.

Table B-1  Spare Part Kits

<table>
<thead>
<tr>
<th>Valve Type</th>
<th>Valve</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual</td>
<td>NW 16 or NW 25*</td>
<td>L6125301</td>
</tr>
<tr>
<td></td>
<td>NW 40*</td>
<td>L6126301</td>
</tr>
<tr>
<td></td>
<td>NW 50**</td>
<td>L6625301</td>
</tr>
<tr>
<td></td>
<td>ISO 63**</td>
<td>L7276301</td>
</tr>
<tr>
<td></td>
<td>ISO 80**</td>
<td>L7278301</td>
</tr>
<tr>
<td></td>
<td>*Includes: Bellows, Stem, Stem nut, and O-rings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>**Includes: Bellows assembly, and O-rings</td>
<td></td>
</tr>
<tr>
<td>Pneumatic</td>
<td>NW 16 or NW 25</td>
<td>L6127301</td>
</tr>
<tr>
<td></td>
<td>NW 40</td>
<td>L6128301</td>
</tr>
<tr>
<td></td>
<td>NW50</td>
<td>L6615301</td>
</tr>
<tr>
<td></td>
<td>ISO 63</td>
<td>L7277301</td>
</tr>
<tr>
<td></td>
<td>ISO 80</td>
<td>L7279301</td>
</tr>
<tr>
<td></td>
<td>Includes: Quad ring, Bellows, all O-rings, and Lubricant</td>
<td></td>
</tr>
</tbody>
</table>

Table B-2 on page B-2 lists the accessories and replacement parts by valve type.
Table B-2  KF Clamp® and Centering Ring Ordering Information

<table>
<thead>
<tr>
<th>KF Fitting</th>
<th>KF Clamp with Ratchet Closure Part No.</th>
<th>Centering Ring with Viton O-ring Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NW16</td>
<td>KQ16AR</td>
<td>KC16SV</td>
</tr>
<tr>
<td>NW25</td>
<td>KQ25AR</td>
<td>KC25SV</td>
</tr>
<tr>
<td>NW40</td>
<td>KQ40AR</td>
<td>KC40SV</td>
</tr>
<tr>
<td>NW50</td>
<td>KQ50AR</td>
<td>KC50SV</td>
</tr>
<tr>
<td>ISO63</td>
<td>IC063100A</td>
<td>IC063AV</td>
</tr>
<tr>
<td>ISO80</td>
<td>IC063100A</td>
<td>IC80AV</td>
</tr>
<tr>
<td>Dupont Krytox® GPL207 Vacuum Grease</td>
<td>695400010</td>
<td></td>
</tr>
<tr>
<td>Sta-lube bearing grease</td>
<td>3120</td>
<td></td>
</tr>
</tbody>
</table>
Request for Return
Health and Safety Certification

1. Return authorization numbers (RA#) will not be issued for any product until this Certificate is completed and returned to a Varian, Inc. Customer Service Representative.

2. Pack goods appropriately and drain all oil from rotary vane and diffusion pumps (for exchanges please use the packing material from the replacement unit), making sure shipment documentation and package label clearly shows assigned Return Authorization Number (RA#). VVT cannot accept any return without such reference.

3. Return product(s) to the nearest location:

   North and South America
   Varian, Inc.
   Vacuum Technologies
   121 Hartwell Ave.
   Lexington, MA 02421
   Fax: (781) 860-9252

   Europe and Middle East
   Varian S.p.A.
   Via F.lli Varian, 54
   10040 Leini (TO) – ITALY
   Fax: (39) 011 997 9350

   Asia and ROW
   Varian Vacuum Technologies
   Local Office

For a complete list of phone/fax numbers see www.varianinc.com/vacuum

4. If a product is received at Varian, Inc. in a contaminated condition, the customer is held responsible for all costs incurred to ensure the safe handling of the product, and is liable for any harm or injury to Varian, Inc. employees occurring as a result of exposure to toxic or hazardous materials present in the product.


CUSTOMER INFORMATION

Company name: ....................................................................................................................................................................
Contact person: Name: ................................................................. Tel:.................................................................
                   Fax:................................................................................................................................. E-mail: .................................................................
Ship method:           Shipping Collect #: ................. P.O.#: .................................................................
Europe only: VAT Reg Number:  
Customer ship to:  ...................................................................... Customer bill to: ........................................ .........................

PRODUCT IDENTIFICATION

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Varian, Inc. Part Number</th>
<th>Varian, Inc. Serial Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


TYPE OF RETURN (check appropriate box)

☐ Paid Exchange ☐ Paid Repair ☐ Warranty Exchange ☐ Warranty Repair ☐ Loaner Return
☐ Credit ☐ Shipping Error ☐ Evaluation Return ☐ Calibration ☐ Other .................

HEALTH and SAFETY CERTIFICATION

VACUUM TECHNOLOGIES CANNOT ACCEPT ANY BIOLOGICAL HAZARDS, RADIOACTIVE MATERIAL, ORGANIC METALS, OR MERCURY AT ITS FACILITY. CHECK ONE OF THE FOLLOWING:

☐ I confirm that the above product(s) has (have) NOT pumped or been exposed to any toxic or dangerous materials in a quantity harmful for human contact.

☐ I declare that the above product(s) has (have) pumped or been exposed to the following toxic or dangerous materials in a quantity harmful for human contact (Must be filled in):

Print Name....................................................... Signature .......................................................... Date .................................

PLEASE FILL IN THE FAILURE REPORT SECTION ON THE NEXT PAGE

Do not write below this line

Notification (RA) #:................................. Customer ID #: ........................................... Equipment #:.................................
**FAILURE REPORT**

(Please describe in detail the nature of the malfunction to assist us in performing failure analysis):

**TURBO PUMPS AND TURBOCONTROLLERS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Position</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Does not start</td>
<td>☐ Noise</td>
<td>☐ Vertical</td>
</tr>
<tr>
<td>☐ Does not spin freely</td>
<td>☐ Vibrations</td>
<td>☐ Horizontal</td>
</tr>
<tr>
<td>☐ Does not reach full speed</td>
<td>☐ Leak</td>
<td>☐ Upside-down</td>
</tr>
<tr>
<td>☐ Mechanical Contact</td>
<td>☐ Overtemperature</td>
<td>☐ Other</td>
</tr>
<tr>
<td>☐ Cooling defective</td>
<td>☐ Clogging</td>
<td></td>
</tr>
<tr>
<td>☐ Horizontal</td>
<td></td>
<td>Operation Time:</td>
</tr>
</tbody>
</table>

Describe Failure:

Turbocontroller Error Message:

**ION PUMPS/CONTROLLERS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Position</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Bad feedthrough</td>
<td>☐ Poor vacuum</td>
<td></td>
</tr>
<tr>
<td>☐ Vacuum leak</td>
<td>☐ High voltage problem</td>
<td></td>
</tr>
<tr>
<td>☐ Error code on display</td>
<td>☐ Other</td>
<td></td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:

**VALVES/COMPONENTS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Position</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Main seal leak</td>
<td>☐ Bellows leak</td>
<td></td>
</tr>
<tr>
<td>☐ Solenoid failure</td>
<td>☐ Damaged flange</td>
<td></td>
</tr>
<tr>
<td>☐ Damaged sealing area</td>
<td>☐ Other</td>
<td></td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:

**LEAK DETECTORS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Position</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Cannot calibrate</td>
<td>☐ No zero/high background</td>
<td></td>
</tr>
<tr>
<td>☐ Vacuum system unstable</td>
<td>☐ Cannot reach test mode</td>
<td></td>
</tr>
<tr>
<td>☐ Failed to start</td>
<td>☐ Other</td>
<td></td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:

**INSTRUMENTS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Position</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Gauge tube not working</td>
<td>☐ Display problem</td>
<td></td>
</tr>
<tr>
<td>☐ Communication failure</td>
<td>☐ Degas not working</td>
<td></td>
</tr>
<tr>
<td>☐ Error code on display</td>
<td>☐ Other</td>
<td></td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:

**ALL OTHER VARIAN, INC.**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Position</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Pump doesn’t start</td>
<td>☐ Noisy pump (describe)</td>
<td></td>
</tr>
<tr>
<td>☐ Doesn’t reach vacuum</td>
<td>☐ Overtemperature</td>
<td></td>
</tr>
<tr>
<td>☐ Pump seized</td>
<td>☐ Other</td>
<td></td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:

**DIFFUSION PUMPS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Position</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Heater failure</td>
<td>☐ Electrical problem</td>
<td></td>
</tr>
<tr>
<td>☐ Doesn’t reach vacuum</td>
<td>☐ Cooling coil damage</td>
<td></td>
</tr>
<tr>
<td>☐ Vacuum leak</td>
<td>☐ Other</td>
<td></td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:
Sales and Service Offices

Argentina
Varian Argentina Ltd.
Sucursal Argentina
Av. Ricardo Balbin 2316
1428 Buenos Aires
Argentina
Tel: (54) 1 783 5306
Fax: (54) 1 786 5172

Benelux
Varian Vacuum Technologies
Rijksstraatweg 269 H,
3956 CP Leersum
The Netherlands
Tel: (31) 343 469910
Fax: (31) 343 469961

Brazil
Varian Industria e Comercio Ltda.
Avenida Dr. Cardoso de Mello 1644
Vila Olimpia
Sao Paulo 04548 005
Brazil
Tel: (55) 11 3845 0444
Fax: (55) 11 3845 9350

Canada
Central coordination through:
Varian Vacuum Technologies
121 Hartwell Avenue
Lexington, MA 02421
USA
Tel: (781) 861 7200
Fax:(781) 860 5437
Toll Free: (800) 882 7426

China
Varian Technologies - Beijing
Room 1201, Jinyu Mansion
No. 129A, Xuanwumen Xidajie
Xicheng District
Beijing 1000031 P.R. China
Tel: (86) 10 6641 1530
Fax: (86) 10 6641 1534

France and Wallonie
Varian s.a.
7 avenue des Tropiques
Z.A. de Courtaboeuf – B.P. 12
Les Ulis cedex (Orsay) 91941
France
Tel: (33) 1 69 86 38 13
Fax: (33) 1 69 28 23 08

Germany and Austria
Varian Deutschland GmbH
Alsfelder Strasse 6
Postfach 11 14 35
64289 Darmstadt
Germany
Tel: (49) 6151 703 353
Fax: (49) 6151 703 302

India
Varian India PVT LTD
101-108, 1st Floor
1010 Competent House
7, Nangal Raya Business Centre
New Delhi 110 046
India
Tel: (91) 11 5548444
Fax: (91) 11 5548445

Italy
Varian Vacuum Technologies
Via F.lli Varian, 54
10040 Leini, (Torino)
Italy
Tel: (39) 011 997 9 111
Fax: (39) 011 997 9 350

Japan
Varian Vacuum Technologies
Sumitomo Shibaura Building, 8th Floor
4-16-36 Shibaura
Minato-ku, Tokyo 108
Japan
Tel: (81) 3 5232 1253
Fax: (81) 3 5232 1263

Korea
Varian Technologies Korea, Ltd.
Shinsa 2nd Building 2F
966-5 Daechi-dong
Kangnam-gu, Seoul
Korea 135-280
Tel: (82) 2 3452 2452
Fax: (82) 2 3452 2451

Mexico
Varian S.A.
Concepcion Beistegui No 109
Col Del Valle
C.P. 03100
Mexico, D.F.
Tel: (52) 5 523 9465
Fax: (52) 5 523 9472

Taiwan
Varian Technologies Asia Ltd.
14F-16 No.77, Hsin Tai Wu Road Sec. 1,
Hsi Chih, Taipei Hsien
Taiwan, R.O.C.
Tel: (886) 2 2698 9555
Fax: (886) 2 2698 9678

UK and Ireland
Varian Ltd.
28 Manor Road
Walton-On-Thames
Surrey KT 12 2QF
England
Tel: (44) 1932 89 8000
Fax: (44) 1932 22 8769

United States
Varian Vacuum Technologies
121 Hartwell Avenue
Lexington, MA 02421
USA
Tel: (781) 861 7200
Fax: (781) 860 5437
Toll Free: (800) 882 7426

Other Countries
Varian Vacuum Technologies
Via F.lli Varian, 54
10040 Leini, (Torino)
Italy
Tel: (39) 011 997 9111
Fax: (39) 011 997 9350

Internet Users:
Customer Service and Technical Support:
vpl.customer.support@varianinc.com
Worldwide Web Site:
www.varianinc.com/vacuum
Order On-line:
www.evarian.com

Representatives in most countries