

# Variable Leak Valve

**Model**  
**951-5106**

## User Manual

**87-400-085-01 (D)**  
**05/2011**



**Agilent Technologies**

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### WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

## Variable Leak Valve

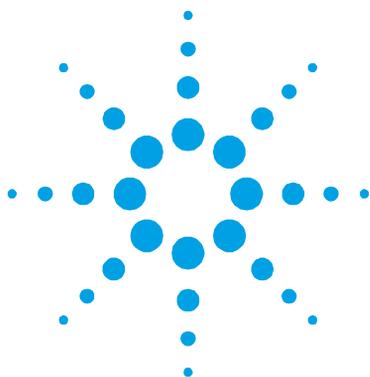


## Variable Leak Valve

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Original Instructions



**1**      **Instructions for Use**  
**Safety Information**

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## Safety Information

This equipment is destined for use by professionals. The user should read this instruction manual and any other additional information supplied by Agilent before operating the equipment. Agilent will not be held responsible for any events occurring due to non-compliance, even partial, with these instructions, improper use by untrained persons, non-authorized interference with the equipment or any action contrary to that provided for by specific national standards.

This manual uses the following standard protocol:

### CAUTION!

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

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### 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.

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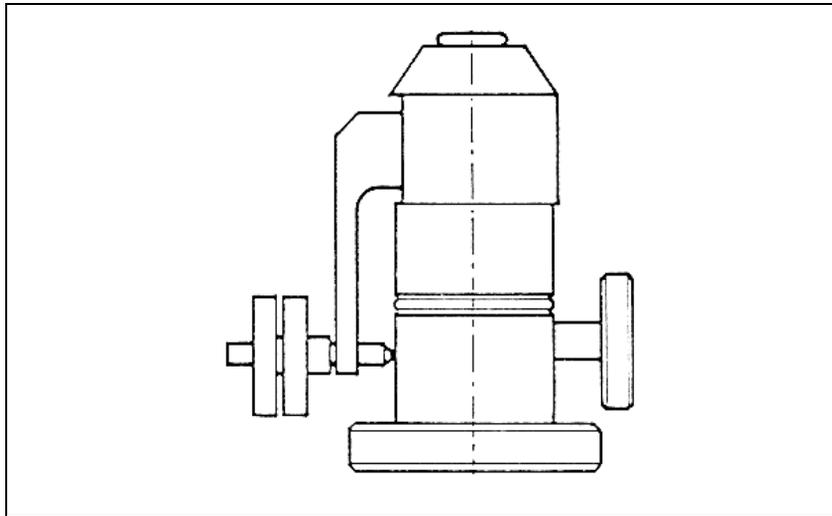
### NOTE

The notes contain important information taken from the text.

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## General

The variable leak valve can be added to any vacuum system to establish an adjustable leak. It offers unprecedented control sensitivity and stability with leak rates as small as  $1 \times 10^{-10}$  Torr-litres per second. Leak rate adjustment is controlled with knurled knobs. The entire valve, including the drive mechanism, is bakeable to  $450^{\circ}\text{C}$  in either the open or closed position. Both components of the seal mechanism (sapphire assembly and gasket assembly) are easily replaceable.



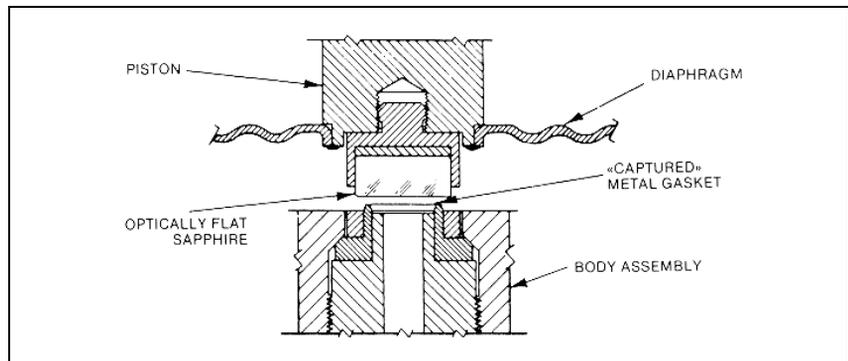
**Figure 1** Variable leak valve

## Variable Leak Valve Description

The variable leak valve includes a movable piston with an optically-flat sapphire that meets a captured metal gasket (see the following figure). This forms a seal completely free from friction, seizing, and shear. The sapphire's movement is controlled through a threaded shaft-and-lever mechanism having a mechanical advantage of 13,000 to 1. Spring washers keep this drive mechanism constantly loaded and eliminate the backlash usually associated with this type of device. This provides immediate response to small movements in the finger-controlled adjusting knobs. While some permanent compression takes place in the gasket each time a seal is made, the change is very slight. Return of the knob to a previous position will result in approximately the same leak rate.

## The Valve is Shipped in a Closed, Leak-Tight Condition.

To open a leak, the knurled knobs must be turned (together) a minimum of two full turns counterclockwise. The valve is closed by turning the knobs (together) clockwise to the stop position against the handle.



**Figure 2** Sealing detail

## Variable Leak Valve Specifications

Tab. 1

Minimum leak rate	$1 \times 10^{-9}$ Torr-litres/sec. in normal operation; $1 \times 10^{-10}$ Torr-litres/sec. with condensable vapours eliminated from leak gas
Rate of change of leak	The valve provides an increasing rate of change as the size of the leak increases giving precise control in proportion to the size of the leak
Vacuum range	From atmospheric pressure to below $10^{-11}$ Torr
Temperature range	Up to 450 C in either open or closed position
Inlet gas pressure	500 psi maximum
Gasket life	For unbaked systems, approximately 300 closures; For baked systems, 20 to 30 closures Gasket assemblies are replaceable
Material	300 series stainless steel; sapphire; OFHC copper and copper alloy
Weight	1.8 Kg (4 lbs)

## Variable Leak Valve Outline

The outline dimensions for the variable leak valve are shown in the following figure.

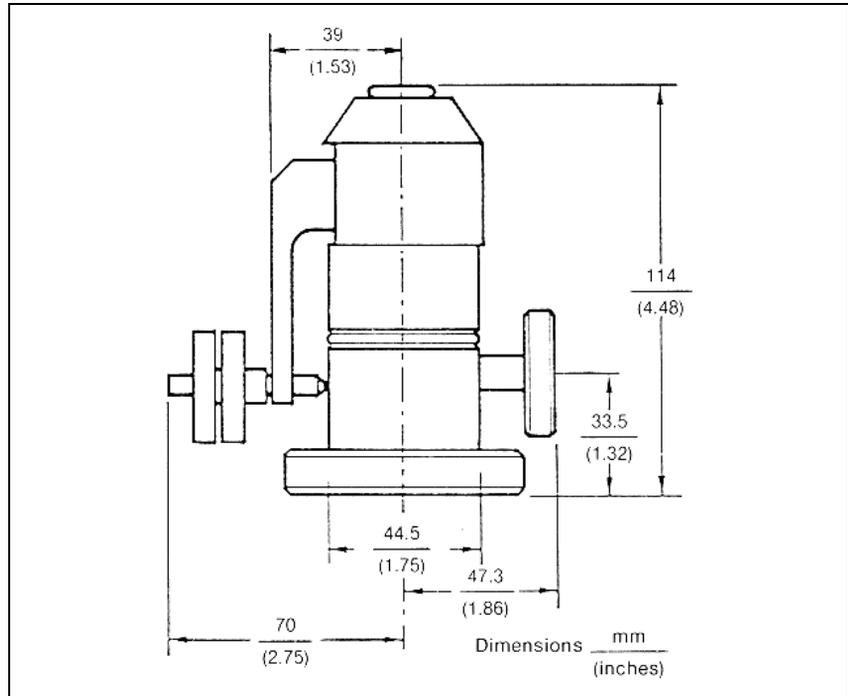


Figure 3 Variable leak valve outline

## Flange Connection

The valve is shipped in a closed, leak-tight position, lubricated and ready for installation.

The ConFlat flange on which the variable leak valve is mounted mates with any 2 /4 inch O.D. ConFlat flange.

1. Place a new copper gasket (Agilent part no. 953-5014) between the two ConFlat flanges.
2. Lubricate and install bolts and nuts.  
Use Fel-Pro C-100 high temperature lubricant on screw threads and under the nuts.
3. Tighten each nut 180° apart in sequence to 5 to 8 ft-lbs torque. This will partially close the gap between the flange faces. Repeat the sequential tightening two more cycles.
4. The copper gaskets are partially sheared in making the seal and the bolts should be tightened until the flange faces meet.
5. Leak-check the connection.

## Inlet Gas Connection

The connection is made through standard Mini-Con- Flat flanges.

A Mini-ConFlat flange-to-flare-fitting adapter kit (Agilent part no. 951-5117) is provided as an option.

1. Place a new copper gasket (Agilent part no. 953-5014) between the two ConFlat flanges.
2. Lubricate and install bolts and nuts.  
Use Fel-Pro C-100 high temperature lubricant on screw threads and under the nuts.
3. Tighten each nut 180 ° apart in sequence to 5 to 8 ft-lbs torque. This will partially close the gap between the flange faces. Repeat the sequential tightening two more cycles.
4. The copper gaskets are partially sheared in making the seal and the bolts should be tightened until the flange faces meet.
5. Leak-check the connection.

## Use

### WARNING!



The main danger of explosion in vacuum equipment occurs during backfilling from pressurized gas cylinders.

Explosions cause flying debris which may cause serious personal injury or death and destroy equipment.

The following precautions must be exercised when admitting gas into a vacuum system:

1. Check that the leak valve is in the closed position before admitting gas into the backfill line.
2. Always use a pressurized relief valve in the backfill line.

### CAUTION!

Never operate the valve without knowing the relationship of the stop position to the point of leak tight closure. The point at which the valve closes cannot be felt by the operator and severe overdriving may fracture the sapphire.

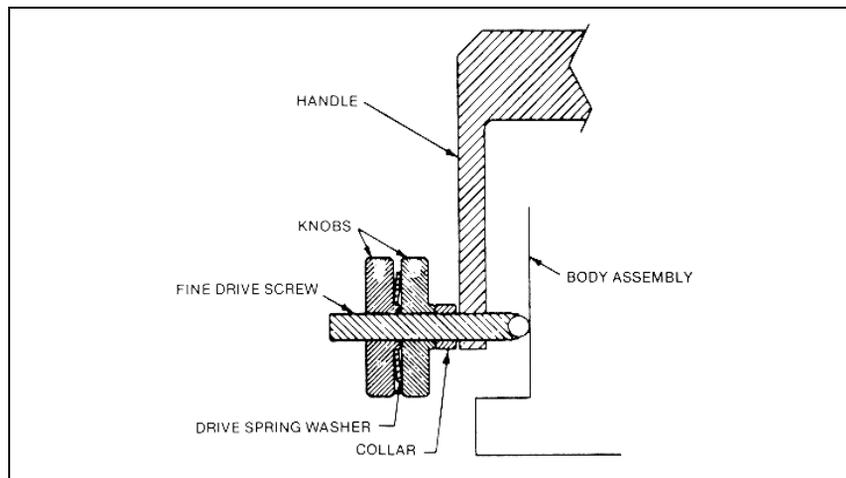


Figure 4 Knob adjustment

## 1 Instructions for Use To Establish a New Stop Position

The valve is received in a closed, leak-tight position. The adjusting knurled knobs are tightened against the handle.

During normal operation, the knobs are locked together with respect to the fine-drive screw. To open a leak, turn both knobs together a minimum of two full turns counterclockwise. To close a leak, turn the knobs together until the collar bottoms against the handle (the stop position has been reached).

### To Establish a New Stop Position

Each time a seal is made, the valve's captured metal gasket is compressed. High temperature bakeout accelerates the compression of the gasket. If no change is made to the position of the knobs on the fine-drive screw, the point of closure will gradually come closer to the point at which the knobs and collar butt against the handle. Eventually the stop will be engaged before a leak-tight closure is made. When this happens, a new stop position must be established.

1. The valve must be attached to a leak detector or the system must be equipped with gauging adequate to determine when no leak exists.
2. With the knobs tightened against the handle, unlock the knobs from each other by holding the inner knob and turning the outer knob counterclockwise about four turns.
3. Turn the inner knob counterclockwise until it is locked tight against the outer knob.
4. Turn the two locked knobs clockwise until the valve closes as indicated on the leak detector or system gauging.
5. Turn the knobs clockwise two additional turns past the point of closure.
6. Loosen the knobs from each other without allowing the screw to turn. Turn the inner knob clockwise until the collar is against the handle, then turn the outer knob clockwise until it locks against the inner knob. The knobs are now in position to return to and stop at a point two turns past closure.
7. After the stop has been adjusted several times, the handle must be reset as described in para. "Maintenance".

## To Set Stop Position at any Leak Rate

The stop position can be adjusted to provide any desired leak rate.

1. Open the valve to the desired leak rate as determined by a leak detector, vacuum gauge, or other experimental means.
2. Loosen the knobs from each other without allowing the fine-drive screw to turn.
3. Turn the inner knob clockwise until the collar stops against the handle. Turn the outer knob clockwise until it locks against the inner knob.
4. The valve can now be opened to larger leak rates and when returned to the stop position will provide a leak of this pre-set rate.

### NOTE

The valve cannot be closed leak-tight with the stop set in this manner. To close the valve, follow the procedure outlined in the preceding paragraph.

---

## Operating at Low Leak Rates

When the valve operates with leak rates of  $1 \times 10^{-9}$

Torr-litres/sec and smaller, condensable vapours and contaminants reduce the leak opening. The valve must be baked to  $250^{\circ}$  in the open position and under vacuum for 30 minutes to drive off these internally adsorbed vapours. See the paragraph "Bakeout procedure".

For operation at leak rates of  $3 \times 10^{-10}$  Torr-litres/sec and lower, in addition to the bakeout described above, the inlet gas must be free of condensable vapours. Use a dry gas or pass the inlet gas through a drying agent such as a liquid nitrogen cold trap. A molecular sieve trap can be used for drying the gas but a filter must be employed to assure that no particles of sieve enter the valve.

## Changes in Leak Rate with Variation in Room Temperature

Changes in room temperature will cause changes in leak rate - as the temperature rises, the leak rate increases. A leak setting should be made in the range of interest and then mild heat applied to raise the temperature of the valve to the maximum expected value. If the resulting change in leak rate is not acceptable to the intended experiment, some means of temperature control should be used.

## Bakeout Procedure

### Bakeout in Open Position

- a No special steps are required to bake the leak valve in the open position.
- b A leak that has been set with the valve at room temperature will increase due to thermal expansion as the valve is heated during bakeout. Monitoring of system pressure and readjustment of the leak is necessary if a constant leak is desired during temperature cycling.

## Bakeout in Closed Position

- a The valve must be overdriven three turns past closure (normal setting is two turns) to compensate for differential expansion of materials during bakeout.
- b To prepare the valve for bakeout, follow the procedure described in para. "To establish a new stop position" with the following exceptions: in steps 5 and 6, substitute "three turns" for the "two turns" specified.

## Operation After Bakeout

- a Bakeout in the closed position to 250 °C and above will increase the size of leak for a given setting of the knobs. A full three turns may not be required to open a leak after bakeout. Length of bakeout and elapsed time at temperature will both affect the amount of change.
- b If the stops are to be readjusted, follow the procedure described in steps "a" and "b" above.

### CAUTION!

After each bakeout cycle, before opening or closing the valve, tighten the outer knob against the inner one and lubricate the threads of the fine drive screw with Fel-Pro C-100. After every three bakeouts over 300°C, disassemble and lubricate the drive mechanism as described in the following para. "Lubrication instructions".

---

## To Use as a Roughing Valve

The variable leak valve can be used as a roughing valve when pumping small vacuum systems (some litres volume). The valve must be opened to its maximum conductance for this operation.

Connect a roughing pump to the inlet gas fitting. Where available, install a molecular sieve or liquid nitrogen trap in the line between the pump and valve to reduce contamination from mechanical pump oil vapours.

## Adjustment of Handle Position

As described previously, continual reduction in gasket height necessitates resetting of the stop position and eventual readjustment of handle position. When the angle between the handle and body at point of closure has changed from its original parallel (approximate) position to an angle of  $\pm 5^\circ$ , the valve should be readjusted. This adjustment will maintain a proper relationship between handle travel and the size of the leak.

1. Set handle.  
Turn the locked knobs counterclockwise until the valve handle is approximately parallel to the side of the valve body.
2. Close valve using roughing screw as follows.
  - a Carefully remove the hole cover from the top of the valve.

### CAUTION!

Do not exceed 8 ft.-lbs. or torque or the sapphire may be fractured.

- b With a  $5/16$ " Allen wrench, tighten the roughing screw to 6 ft.-lbs. of torque.
- c Replace the hole cover.
- d The valve should now be leak-tight, but this can be determined reliably only with a leak detector. If the valve leaks across the seal, refer to the following paragraph.
- e Adjust knobs as follows.
- f Turn the knobs together counterclockwise until a leak is generated.
- g Turn the knobs clockwise until the valve is closed leak-tight.
- h Turn the knobs two additional turns clockwise to provide the proper amount of overdrive.
- i Loosen the knobs without allowing the fine-drive screw to turn then turn the inner knob clockwise until the collar is against the handle. Lock the outer knob against the inner one.
- j Two counterclockwise turns of both knobs together should open a leak.

## If Valve Will not Close Leak-Tight

If the valve is not leak-tight across the sapphire-gasket seal after the knobs have been turned to the stop position, one of several problems may be the cause.

1. The gasket has been compressed and the stops must be reset.
2. The valve, sapphire, and/or gasket are contaminated and need cleaning.
3. The gasket is scratched, nicked, or compressed beyond further use and must be replaced.
4. The sapphire is fractured and must be replaced.

The following procedures should be followed in the order listed.

- a Follow the steps outlined in para. "To establish a new stop position".  
If the valve is still not leak tight, proceed to step "b" below.
- b Disassemble, clean, and inspect the sealing components. Particles, oxide on the gasket, or other contaminants may prevent the valve from closing leak-tight. Disconnect the valve from other components and disassemble. Inspect and clean the valve, sapphire, and gasket as described in the following steps.

## Disassemble

Refer to the figure "Variable leak valve assembly drawing".

- a Turn both knobs counterclockwise four turns.
- b Carefully remove the pressed-in hole cover (11) and with a 5/16" Allen wrench loosen the roughing screw two turns.
- c Use a clean 1/4" Allen wrench to remove the gasket assembly (1). The thread is normal right hand and 20-25 ft.-lbs. of torque will be required to loosen it.
- d Clean the sapphire removal tool with acetone, insert it into the hole that held the gasket assembly, and engage the fingers of the tool with the slots on the periphery of the sapphire assembly.

**If Valve Will not Close Leak-Tight**

- e** Turn the valve and tool upside down and turn the tool counterclockwise to remove the sapphire assembly. Four full turns will disengage the threads.
- f** Maintain the upside down position of valve and tool, and lower the tool and sapphire assembly from the valve.

## Inspect and Clean Sapphire

- a** Check the sapphire to be sure that it has no cracks or chips. Any fractures will require replacement of the sapphire assembly.
- b** Check the cleanliness of the polished face by viewing light reflected from its surface. Flush the face with acetone (CP grade recommended) and wipe off any film or grease. Be sure that no particles remain on the sapphire when ready for re-assembly.

## Inspect and Clean Valve Body

- a** Check the valve body for any loose particles of other contaminants.
- b** Remove any contaminants by flushing acetone through the inlet gas fitting while holding the valve upright.
- c** Blow out the valve with a clean, dry gas through the inlet gas fitting.

**CAUTION!**

Do not use compressed air to blow out the valve. The possible high content of particles, water vapour, and oil will contaminate the valve. Re-cleaning and possible gasket replacement may then be required.

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## Inspect and Clean Gasket Assembly

- a Inspect the copper alloy gasket to be sure that it is clean, smooth, free of oxide, and protrudes above the surface of the gasket collar by at least 0.002 inch. A hand lens or microscope will facilitate inspection of the surface.
- b If the top surface of the gasket is scored, scratched, or nicked, the gasket assembly must be replaced.
- c If the copper portion of the assembly does not protrude at least 0.002 inch above the collar, the gasket assembly must be replaced.
- d Oily films or other residue should be removed using acetone.
- e Oxide or other slight surface imperfections can generally be removed by polishing with a very fine rouge paper. When polishing, rotate the gasket assembly about its centre axis to avoid leaving scratches that cross the sealing surface. Clean the gasket with acetone after polishing.
- f Keep the gasket free of contamination while awaiting reassembly.

## Re-Install Sapphire Assembly

- a Hold the sapphire removal tool upright and attach the sapphire assembly to the tool engaging the four slots. Be certain that the tool is clean.
- b With the valve in the upside down position, carefully insert the tool and sapphire into the valve. Turn the tool clockwise to engage the threads. Only light finger pressure is required to tighten the assembly into the valve properly.

**CAUTION!**

Do not overtighten the sapphire assembly with the removal tool. Heavy tightening can cause the tool to raise a burr in the slots of the sapphire assembly. These burrs can prevent subsequent removal of the sapphire assembly from the valve.

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## Re-Install Gasket Assembly

- a To avoid contamination, hold the valve in the upright position. Install the gasket assembly and tighten finger-tight.
- b Tighten the gasket assembly to 22 to 24 ft.-lbs. of torque. Check that the Allen wrench is clean before use.

**NOTE**

Install the valve on the vacuum system as soon as possible after re-assembly to avoid particle contamination. If storage is necessary, place valve in a clean polyethylene bag and close the bag securely. Avoid setting the valve on dusty surfaces.

---

## Leak-Check and Adjust Closure

Reset the handle position, roughing screw and knobs, and leak-check the valve as described in para. “Adjustment of handle position”.

## Lubrication Instructions

Fel-Pro C-100 is recommended for lubrication. After each bakeout cycle, lubricate the threads of the fine-drive screw. After every three bakeouts at temperatures over 300°C, disassemble the drive mechanism and lubricate it. Use the SST brush to remove flaky or caked-on lubricant before re-lubrication.

Refer to the figure “Variable leak valve assembly drawing”.

1. Open the valve by turning both knobs four counterclockwise turns.
2. Withdraw the two Phillips head screws on the upper part of the valve body and remove the cover.
3. Remove the roughing screw (10). Lubricate its threads and the spherical socket.
4. Insert the two Phillips head screws that held the cover into the two pivot rods and, using the screws as handles, pull out the rods.
5. Lift out the handle. Its sides have been sprayed with a semipermanent coat of molybdenum-disulphide. The lubricant in most cases will not require replenishing. If the user judges that re-lubrication is necessary, a small amount of Fel-Pro C-100 should be applied to each side of the handle where it guides in the body.
6. Remove the rod assembly and lubricate both ends. Replace it.
7. Lubricate the pivot rod holes in the handle. Do not lubricate the pivot rod holes in the body.
8. Reassemble the handle and pivot rods.
9. Replace the roughing screw, valve cover, and two small screws.
10. Follow the procedure specified in para. "Adjustment of handle position" to close the valve and adjust the drive mechanism for proper operation.

## Loss of Sensitivity at High Leak Rates

Repeated bakeouts at 450°C will result in partial annealing and a loss of tension in the spring washers that provide the force to open the valve. This will be evidenced by decreasing sensitivity of control at high leak rates. This is not a common situation, but may occur after months of use under high-temperature conditions. Replacement of the spring washers and adjustment are required.

1. Disassemble drive mechanism.
  - a Open the valve four counterclockwise turns of the knobs.
  - b Withdraw the two Phillips head screws on the upper part of the valve body and remove the cover.
  - c Remove the roughing screw.
  - d Remove the two pivot rods by grasping each with a screw. Lift out the handle.
2. Replace spring washers.
  - e With a 3/4" hex-socket wrench, remove the nut above the spring washers.
  - f Remove and replace the spring washers.
  - g Replace the 3/4" hex nut.
3. Adjust tension.
  - h With a 1/4" hex-socket-wrench, tighten the nut above the spring washers just enough so that there is no clearance between the washers and the nut.
4. Reassemble.
  - i Replace the handle, pivot rods, roughing screw, and cover.
  - j Repeat the closure adjustment to reposition the handle and knobs.

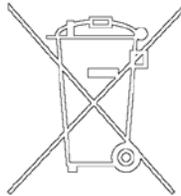
## Disposal

### Meaning of the "WEEE" logo found in labels

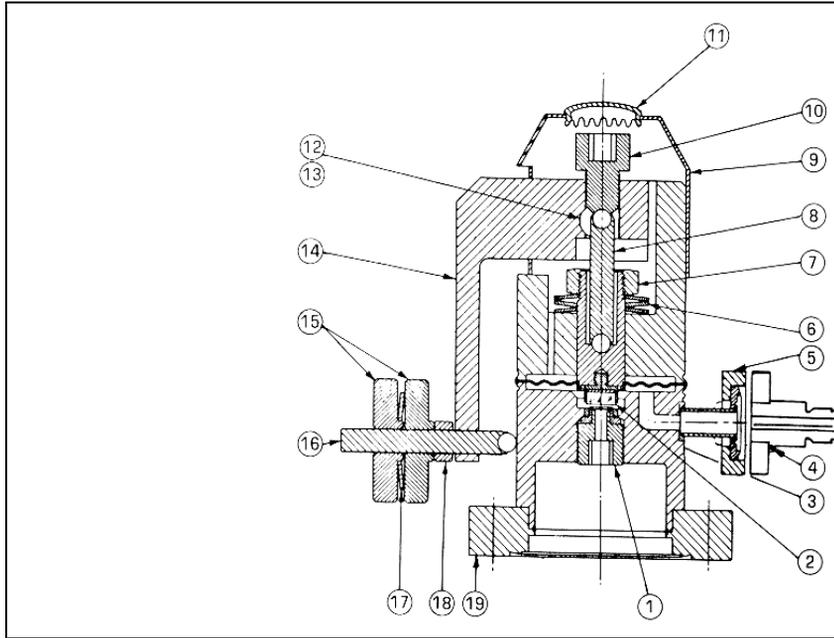
The following symbol is applied in accordance with the EC WEEE (Waste Electrical and Electronic Equipment) Directive.

This symbol (**valid only in countries of the European Community**) indicates that the product it applies to must NOT be disposed of together with ordinary domestic or industrial waste but must be sent to a differentiated waste collection system.

The end user is therefore invited to contact the supplier of the device, whether the Parent Company or a retailer, to initiate the collection and disposal process after checking the contractual terms and conditions of sale.



## Replacement Parts



**Figure 5** Variable leak valve assembly drawing

Please refer to the preceding figure

**Tab. 2**

Ref. item	Description	Q.ty req.d	Part Number
1*	Gasket assembly	1	953-5050
2*	Sapphire assembly	1	953-0072
6*	Spring washer	3	
7	Nut	1	
8	Rod assembly	1	
9	Cover	1	
10	Roughing screw	1	
11	Hole cover	1	

<b>Ref. item</b>	<b>Description</b>	<b>Q.ty req.d</b>	<b>Part Number</b>
12	Pivot rod	2	
13	Pan head screw, 8-32 x 1/4 lg	2	
14*	Handle	1	
15*	Knob	2	
16*	Fine drive screw assembly	1	
17*	Fine drive spring washer	1	
18*	Collar	1	
---*	Sapphire removal tool	1	SR0061417400
---*	5/16" Allen wrench	1	
---*	1/4" Allen wrench	1	
---*	SST brush	1	
---*	High temperature lubricant Fel-Pro C-100	1	
	Repair Kit		962-0014

\* This item is part of Repair Kit 962-0014.

## Accessories

Tab. 3

Description	Part Number
Mating ConFlat flange 2 3/4" -rotatable	F0275-0150-RCE
Mating ConFlat flange 2 3/4" –non-rotatable	F0275-0150-NCE
Copper gasket for 2 3/4" CFF – Pkg./10	FG-0275-CI
Screw and nuts for 2 3/4" CFF – Pkg./25	FB-0275-CI
Mating Mini-ConFlat flange 1 1/3" - rotatable	F0133-0075-RCEW
Mating Mini-ConFlat flange 1 1/3" – non-rotatable	F0133-0075-NCE
Copper gasket for 1 1/3" – pkg./10	FG-0133-CI
Screw and nuts for 1 1/3" – pkg./25	FB-0133-C
Flare fitting adapter kit	951-5117
Consists of:	Q.ty
• Adapter flare – Mini-ConFlat	1
• Mini flange screws 8-32"	6
• Nut for mini flange 8-32"	6
• Gasket for mini flange	10
• Fitting nut (28629886-00)	1
• Fitting sleeve (28629887-00)	1



# Agilent Technologies

## Vacuum Products Division

Dear Customer,

Thank you for purchasing an Agilent vacuum product. At Agilent Vacuum Products Division we make every effort to ensure that you will be satisfied with the product and/or service you have purchased.

As part of our Continuous Improvement effort, we ask that you report to us any problem you may have had with the purchase or operation of our products. On the back side you find a Corrective Action request form that you may fill out in the first part and return to us.

This form is intended to supplement normal lines of communications and to resolve problems that existing systems are not addressing in an adequate or timely manner.

Upon receipt of your Corrective Action Request we will determine the Root Cause of the problem and take the necessary actions to eliminate it. You will be contacted by one of our employees who will review the problem with you and update you, with the second part of the same form, on our actions.

Your business is very important to us. Please, take the time and let us know how we can improve.

Sincerely,

Giampaolo LEVI

Vice President and General Manager  
Agilent Vacuum Products Division

**CUSTOMER REQUEST FOR CORRECTIVE / PREVENTIVE / IMPROVEMENT ACTION**

TO: AGILENT VACUUM PRODUCTS DIVISION TORINO – QUALITY ASSURANCE

FAX N°: XXXX-011-9979350

ADDRESS: AGILENT TECHNOLOGIES ITALIA S.p.A. – Vacuum Products Division –

Via F.Ili Varian, 54 – 10040 Leini (TO) – Italy

E-MAIL: [vpd-qualityassurance\\_pdl-ext@agilent.com](mailto:vpd-qualityassurance_pdl-ext@agilent.com)

NAME _____	COMPANY _____	FUNCTION _____
ADDRESS: _____		
TEL. N° : _____	FAX N° : _____	
E-MAIL: _____		
PROBLEM / SUGGESTION : _____ _____ _____ _____		
REFERENCE INFORMATION (model n°, serial n°, ordering information, time to failure after installation, etc.): _____ _____ _____		
		DATE _____
CORRECTIVE ACTION PLAN / ACTUATION (by AGILENT VPD) _____ _____ _____ _____ _____		LOG N° _____

XXX = Code for dialing Italy from your country (es. 01139 from USA; 00139 from Japan, etc.)



**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>

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

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>



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 - Does not spin freely - Does not reach full speed - Mechanical Contact - Cooling defective	- Noise - Vibrations - Leak - Overtemperature - Clogging	- Vertical - Horizontal - Upside-down - Other: ..... Power:                   Rotational Speed: Current:                Inlet Pressure: Temp 1:                 Foreline Pressure: Temp 2:                 Purge flow: OPERATING TIME:

**ION PUMPS/CONTROLLERS**

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

**VALVES/COMPONENTS**

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

**LEAK DETECTORS**

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

**INSTRUMENTS**

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

**SCROLL AND ROTARY VANE PUMPS**

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

**DIFFUSION PUMPS**

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

## Sales and Service Offices

### United States

**Agilent Technologies  
Vacuum Products Division**  
121 Hartwell Avenue  
Lexington, MA 02421 - USA  
Tel.: +1 781 861 7200  
Fax: +1 781 860 5437  
Toll-Free: +1 800 882 7426

### Benelux

**Agilent Technologies Netherlands B.V.  
Vacuum Products Division**  
Herculesweg 8  
4338 PL Middelburg  
The Netherlands  
Tel.: +31 118 671570  
Fax: +31 118 671569  
Toll-Free: 00 800 234 234 00

### Canada

**Central coordination through: Agilent Technologies  
Vacuum Products Division**  
121 Hartwell Avenue  
Lexington, MA 02421 - USA  
Tel.: +1 781 861 7200  
Fax: +1 781 860 5437  
Toll-Free: +1 800 882 7426

### China

**Agilent Technologies (China) Co. Ltd  
Vacuum Products Division**  
No.3, Wang Jing Bei Lu,  
Chao Yang District,  
Beijing, 100102  
China  
Tel.: +86 (10) 6439 7718  
Toll-Free: 800 820 6556

### France

**Agilent Technologies France  
Vacuum Products Division**  
7 Avenue des Tropiques  
Z.A. de Courtaboeuf - B.P. 12  
91941 Les Ulis cedex - France  
Tel.: +33 (0) 1 69 86 38 84  
Fax: +33 (0) 1 69 86 29 88  
Toll free: 00 800 234 234 00

### Germany and Austria

**Agilent Technologies  
Vacuum Products Division Alsfelder Strasse 6 Postfach 11  
14 35**  
64289 Darmstadt – Germany  
Tel.: +49 (0) 6151 703 353  
Fax: +49 (0) 6151 703 302  
Toll free: 00 800 234 234 00

### India

**Agilent Technologies India Pvt. Ltd.  
Vacuum Product Division**  
G01. Prime corporate Park,  
230/231, Sahar Road, Opp. Blue Dart Centre,  
Andheri (East), Mumbai – 400 099.India  
Tel: +91 22 30648287/8200  
Fax: +91 22 30648250  
Toll Free: 1800 113037

### Italy

**Agilent Technologies Italia S.p.A.  
Vacuum Products Division**  
Via F.lli Varian 54  
10040 Leini, (Torino) - Italy  
Tel.: +39 011 997 9111 Fax: +39 011 997 9350  
Toll-Free: 00 800 234 234 00

### Japan

**Agilent Technologies Japan, Ltd.  
Vacuum Products Division**  
8th Floor Sumitomo Shibaura Building  
4-16-36 Shibaura Minato-ku Tokyo 108-0023 - Japan  
Tel.: +81 3 5232 1253  
Fax: +81 3 5232 1710  
Toll-Free: 0120 655 040

### Korea

**Agilent Technologies Korea, Ltd.  
Vacuum Products Division**  
Shinsa 2nd Bldg. 2F 966-5 Daechi-dong  
Kangnam-gu, Seoul  
Korea 135-280  
Tel.: +82 2 3452 2452  
Fax: +82 2 3452 2451  
Toll-Free: 080 222 2452

### Mexico

**Agilent Technologies  
Vacuum Products Division**  
Concepcion Beistegui No 109 Col Del Valle  
C.P. 03100 – Mexico, D.F.  
Tel.: +52 5 523 9465  
Fax: +52 5 523 9472

### Singapore

**Agilent Technologies Singapore Pte. Ltd,  
Vacuum Products Division**  
Agilent Technologies Building,  
1 Yishun Avenue 7,  
Singapore 768923  
Tel : (65) 6215 8045  
Fax : (65) 6754 0574

### Southeast Asia

**Agilent Technologies Sales Sdn Bhd  
Vacuum Products Division**  
Unit 201, Level 2 uptown 2,  
2 Jalan SS21/37, Damansara Uptown  
47400 Petaling Jaya,  
Selangor, Malaysia  
Tel : +603 7712 6106  
Fax: +603 6733 8121

### Taiwan

**Agilent Technologies Taiwan Limited  
Vacuum Products Division (3F)**  
20 Kao-Shuang Rd.,  
Pin-Chen City, 324  
Taoyuan Hsien , Taiwan, R.O.C.  
Tel. +886 34959281  
Toll Free: 0800 051 342

### UK and Ireland

**Agilent Technologies UK, Ltd.  
Vacuum Products Division**  
6 Mead Road Oxford Industrial Park  
Yarnton, Oxford OX5 1QU – UK  
Tel.: +44 (0) 1865 291570  
Fax: +44 (0) 1865 291571  
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### Other Countries

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Vacuum Products Division**  
Via F.lli Varian 54 10040 Leini, (Torino) -  
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Tel.: +39 011 997 9111  
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Toll-Free: 00 800 234 234 00

### Customer Support & Service

#### **NORTH AMERICA:**

Toll Free: 800 882 7426, Option 3  
vpl-ra@agilent.com

#### **EUROPE:**

Toll Free: 00 800 234 234 00  
vpt-customer@agilent.com

#### **PACIFIC RIM:**

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

#### **Worldwide Web Site, Catalog and Order**

##### **On-line:**

[www.agilent.com](http://www.agilent.com)  
Representative in most countries  
12/10

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