

# Model PVIV-VAC-CHUCK

## Basic PVIV Vacuum Chuck



## User's Manual

Oriel<sup>®</sup> Instruments



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## 1 INTRODUCTION

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Oriel Instruments offers the PVIV-VAC-CHUCK vacuum chuck for use with the Oriel Instruments I-V Test System and Solar Simulators. This assembly positions and holds a variety of sample shapes and sizes for testing. It has been designed to easily incorporate a vacuum pump and electrical contact probes.

Included items with the chuck:

- PN 90026536: Vacuum chuck assembly
- PN SP-3: 3" Post qty 4
- PN VPH-3-P: Vertical Post Holder qty 4
- PN PS-F: Clamping fork qty 4
- PN 84-20-006: Tubing, 1/8" ID x 1/4" OD PVC
- PN A1JD0824QAZB: Soc Head Cap Screw 8-32 qty 4
- PN A1JD1420QAZB: Soc Head Cap Screw 1/4-20 qty 4
- PN 90-11-052: Allen Wrench 2mm
- PN 90-11-047: Allen Wrench 9/64
- PN 90-11-049: Allen Wrench 3/16
- PN 90009203: Cable BNC to Double Banana Plug

The following accessories are sold separately (refer to Section 6 for more information):

- PN PVIV-VAC-PUMP(-220V): Vacuum Pump
- PN PVIV-PROBE-KIT: Electrical Contact Probes
- PN- PVIV-XA: PVIV Measurement Systems in 1, 3, 5 or 10 Amp configurations

### VACUUM CHUCK FEATURES

- Handles sample sizes up to 6 inch x 6 inch (156mm x 156mm)
- 3 vacuum rings to accommodate samples of varying size
- Compatibility with PVIV-PROBE-KIT

## 2 VACUUM CHUCK ASSEMBLY

Description	Qty	Item
VACUUM PLATE	1	1
VALVE SHUTOFF	1	2
SOC HD 8-32 X 3/4	4	3
TUBING 1/4 IN	10 ft	4
CABLE TIE	2	(optional)
HOLDER, POST	4	6
FORK, CLAMPING	4	7
POST (SP-3)	4	8 (Remove 8-32 set screw using 90-11-052)
WRENCH 9/64	1	9 (for item #3)
SOC HD 1/4-20 X 5/8	4	10 (Mtg screws)
WRENCH 3/16	1	- (for item #10)

Use item #3 (screws) to attach item#8 (use 8-32 tapped hole) using item #9 (wrench)

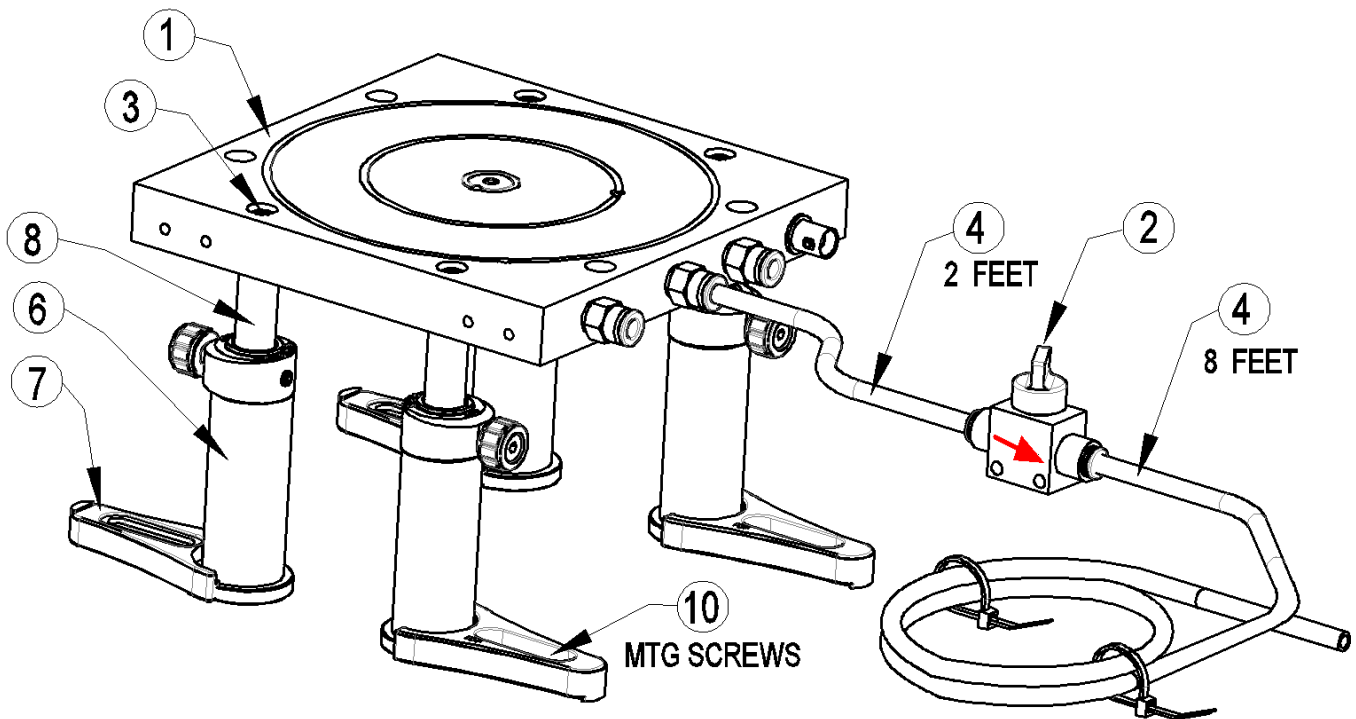


Figure 1: Vacuum Chuck Assembly

### 3 BASIC INSTALLATION

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#### LOCATION OF ACCESSORIES

If purchased, position the vacuum pump in a location where the AC mains are easily accessible. Refer to the instruction manual that came with the vacuum pump and follow the guidelines for installation and operation of this product.

#### SETTING UP THE CHUCK

The PVIV-VAC-CHUCK is shipped with the support posts unassembled.

Refer to Figure 7 for overall product dimensions of the PVIV-VAC-CHUCK. Mounting clamps for the posts are provided for securing the chuck to an optical table.

Note: some components are not shown for clarity.



Figure 2: PVIV-VAC-CHUCK

## MOUNTING WITH NEWPORT SOLAR SIMULATORS

The sample cell must be located at the correct working distance from the PVIV system's light source output. The vacuum chuck or light source may need to be raised vertically to achieve this.

The vacuum chuck also needs to be positioned properly to the center of the illuminated area of the solar simulator. To achieve this, position the unit so the thermistor is centered under the output lens and adjust the height according to the table below.

The following table shows how to mount the PVIV-VAC-CHUCK to the appropriate location with all Newport solar simulator models. If you are mounting the solar simulator and chuck to a standard optical table please use the appropriate clamps (BC-5, not included). Refer to the following table to determine the mounting dimensions. If you are using a metric optical table, some metric adaptors are included for the posts. You may need to provide your own metric screws.

Family	Model #	Output Beam Size	Solar Simulator Working Distance	To get to solar simulator working distance (Height)	Dimension "A" Figure 3
AAA	94023A	2" x 2"	12" +/- 0.5"	No additional mounting equipment required	10.0"
	94043A	4" x 4"	6" +/- 0.5"	No additional mounting equipment required	10.0"
	94063A	6" x 6"	7" +/- 0.5"	Use 2" posts (SP-2) to lower the vacuum chuck	14.43"
	94083A	8" x 8"	15" +/- 0.5"	Use 1" posts (SP-1) to lower the vacuum chuck	7.37"
	94123A	12" x 12"	12" +/- 0.5"	No additional mounting equipment required	6.0"
	94123A-CPV	12" x 12"	4" +/- 0.5"	No additional mounting equipment required	6.0"
ABA	94022A	2" x 2"	2" +/- 0.5"	Use 2" (SP-2) posts to lift the vacuum chuck	5.375"
	94042A	4" x 4"	6" +/- 0.5"	No additional mounting equipment required	10.335"
	94062A	6" x 6"	7" +/- 0.5"	Use 1" (SP-1) posts to lower the vacuum chuck	14.715"

	94082A	8" x 8"	15" +/- 0.5"	Use 1" (SP-1) posts to lower the vacuum chuck	9.87"
ABB	94011A(-ES)	1.5" X 1.5"	7" +/- 0.5"	No additional mounting equipment required	7.21"
	94021A	2" x 2"	2" +/- 0.5"	Use 2" (SP-2) posts to lift the vacuum chuck	5.375"
	94041A	4" x 4"	6" +/- 0.5"	No additional mounting equipment required	10.335"
	94061A	6" x 6"	7" +/- 0.5"	Use 1" (SP-1) posts to lower the vacuum chuck	14.715"
	94081A	8" x 8"	15" +/- 0.5"	Use 1" (SP-1) posts to lower the vacuum chuck	9.87"
UV	SOL-UV-2	2 x 2"	4" +/- 0.5"	No additional mounting equipment required	10.0"
	SOL-UV-4	4" x 4"	4" +/- 0.5"	No additional mounting equipment required	10.0"
	SOL-UV-6	6" x 6"	6" +/- 0.5"	No additional mounting equipment required	10.0"

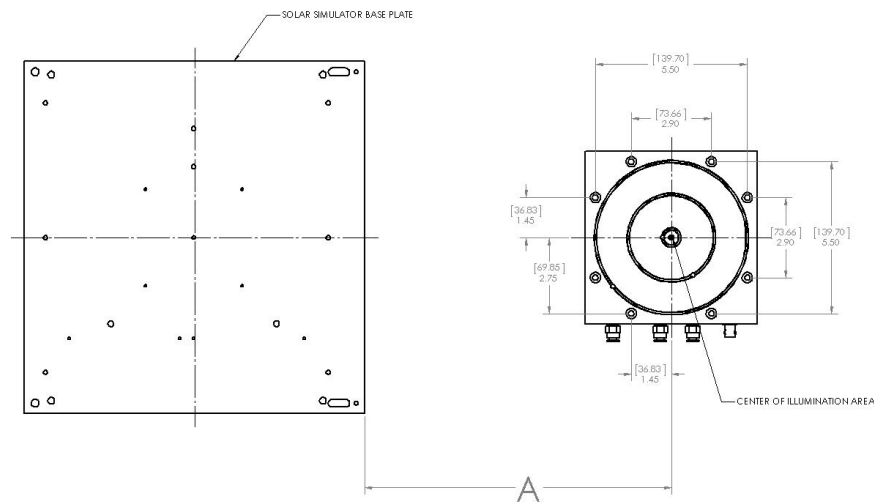


Figure 3: Chuck Position Relative to Newport Solar Simulators

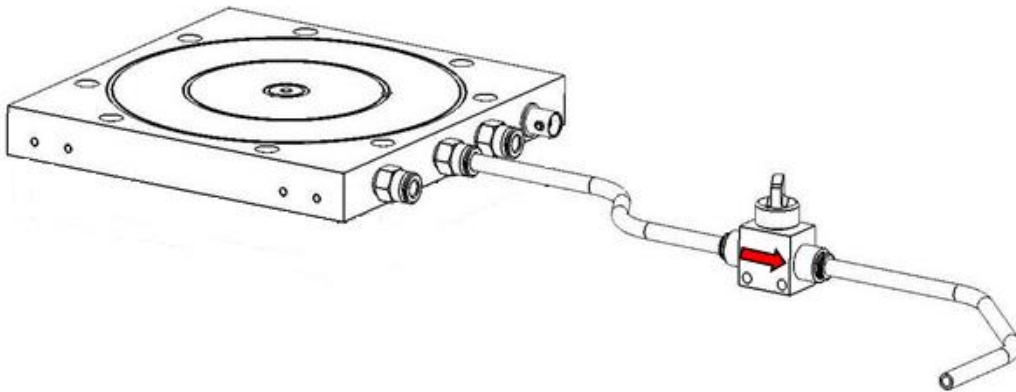
## VACUUM PLATE CONNECTIONS

Oriel supplies PVC tubing, a brass barb fitting, and a shutoff valve for use with a vacuum pump (sold separately as PVIV-VAC-PUMP). A 220V model is also available for applicable geographic regions. Refer to Section 8 for specifications. It is the customer's responsibility to note the specifications of their vacuum pump and ensure that these items are compatible with that particular model of pump.

The shutoff valve should be located where it can be conveniently accessed for ease of sample removal from the vacuum plate.

The valve must be oriented so that the arrow is oriented as shown in Figure 4. When the valve knob is set to the SHUT position, the vacuum holding the sample in place is automatically released (there is no exhaust port).

Ensure that the tubing is not kinked when connecting it from the vacuum pump to the vacuum plate. The connector which the vacuum line tubing is attached to the vacuum plate depends upon the sample size being tested. Refer to Figure 5 for details.



**Figure 4: Valve Orientation**



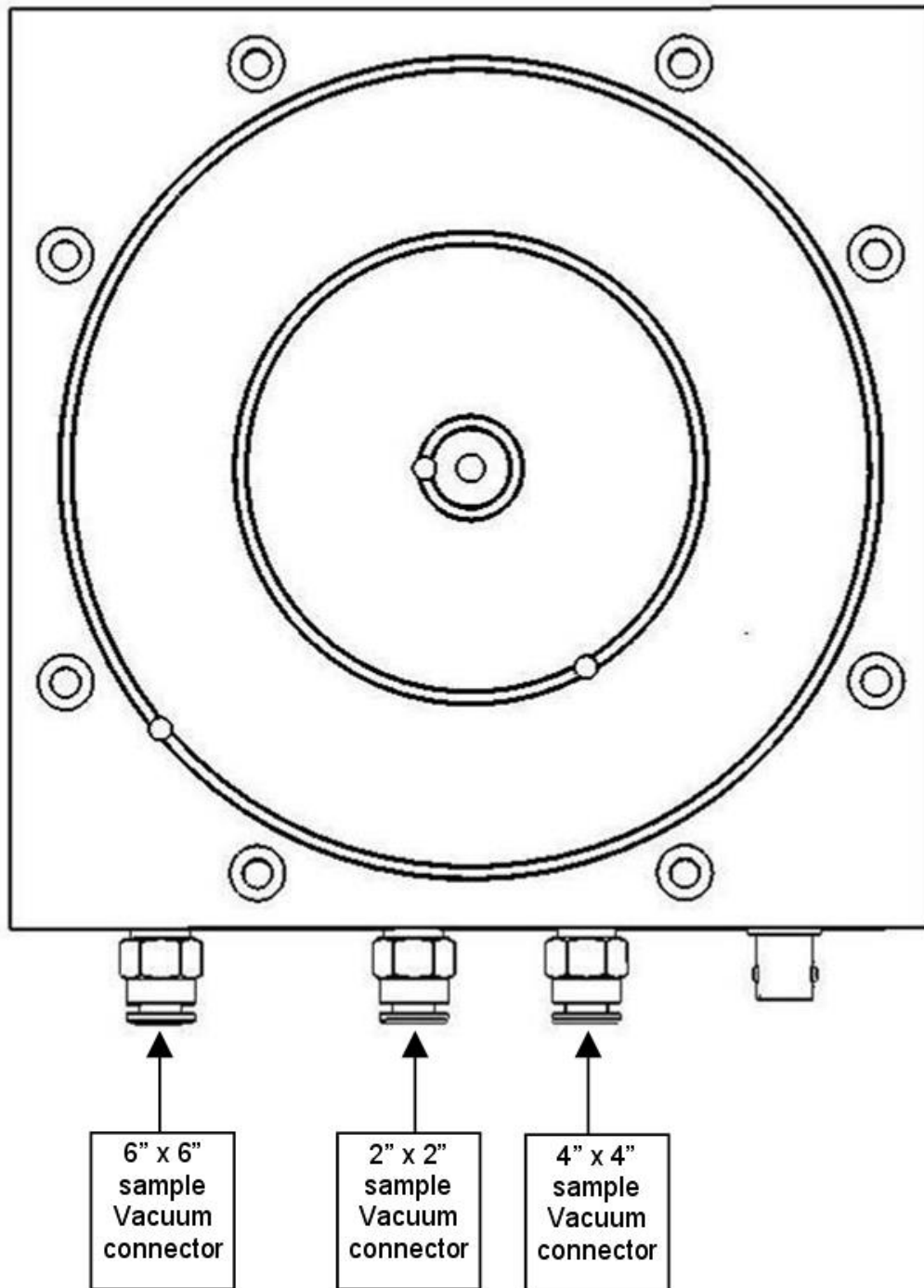


Figure 5: Vacuum Plate Connections

## 4 SAMPLE AND REFERENCE CELL POSITIONING

Prior to use, ensure that the thermistor in the center of the vacuum chuck is able to move up and down freely when gently pressed with a finger. This NTC (negative temperature coefficient) thermistor has a value of 10K ohms at 25°C. It is wired to the female BNC connector located on the side of the vacuum chuck, as shown in Figure 6.

With the valve knob set to SHUT, start the vacuum pump. Center the sample to be tested on the vacuum plate. When satisfied with its location on the plate, turn the valve knob to the OPEN position to allow the vacuum to hold the sample in place.

In order to remove the sample when testing is complete, turn the valve knob to the SHUT position. The vacuum will be released, allowing the sample to be removed from the plate.

Note that vacuum may be applied and released using the pump controls, if the vacuum pump being used is equipped with that feature.

To mount the reference cell on the chuck, use four #8-32 x 3/4" lg socket head cap screws centered on the thermistor

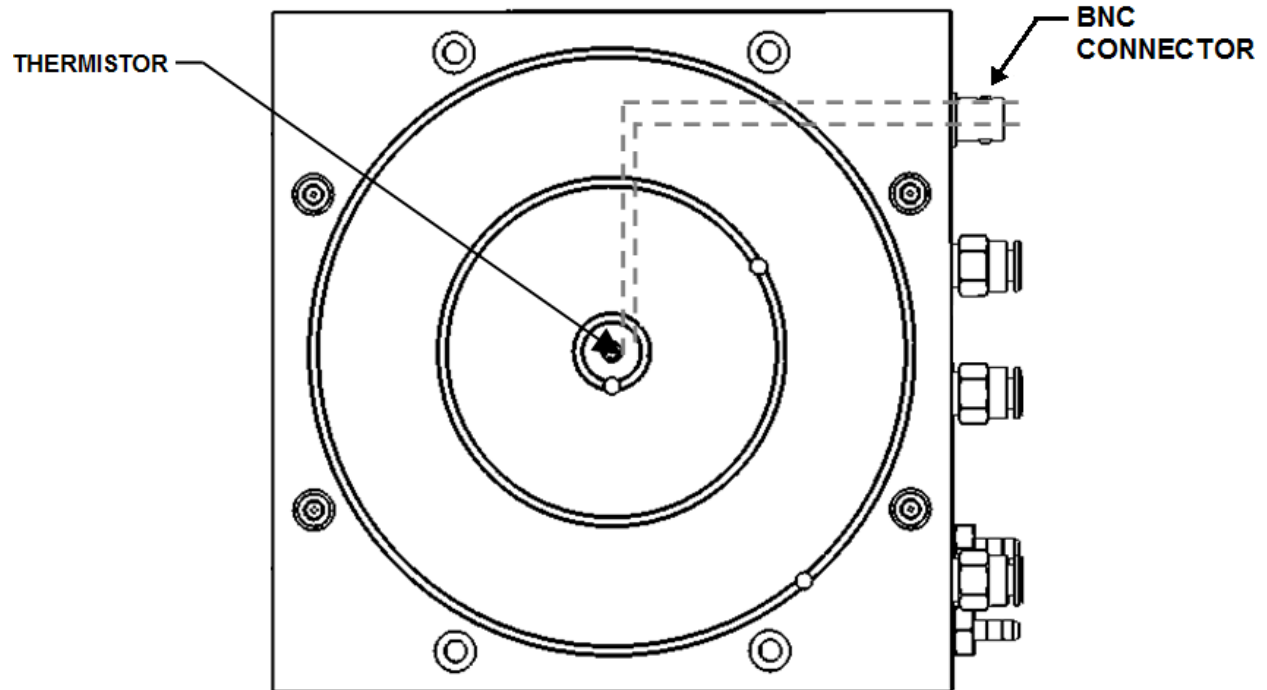


Figure 6: Thermistor

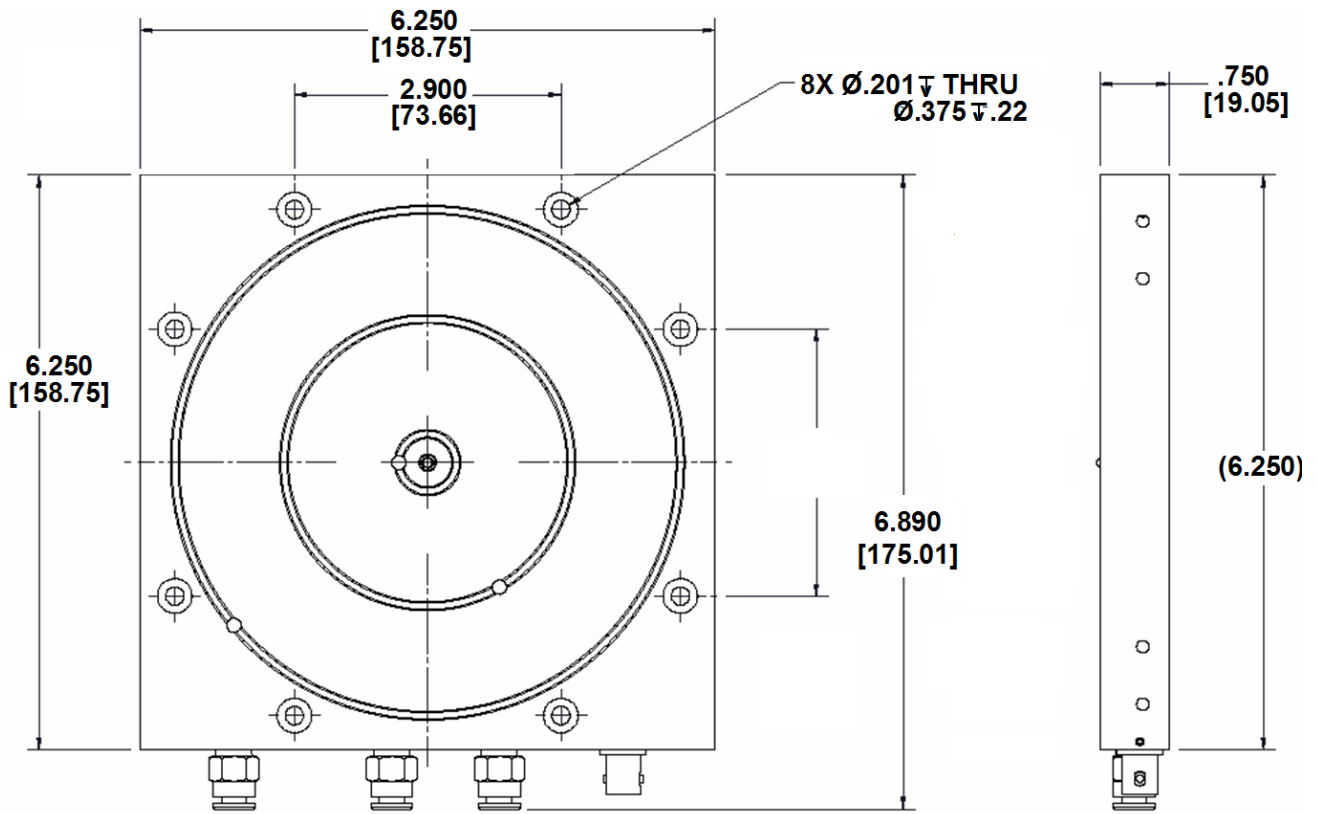


Figure 7: Dimensions

## **5 TEST SETUP**

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Connection to the PVIV system is achieved using the cables and connectors included with the PVIV kit.

Oriel Instruments offers an electrical contact probe, model PVIV-PROBE-KIT, which is designed to work with this vacuum chuck. Each assembly contains one (1) magnet-mounted electrical probe with X-Y micro-positioning control. Refer to the manual included with the probe kit for assembly and installation instructions.

The reference cell offered by Oriel Instruments includes its own meter, thermocouple and interconnection cable. Refer to the reference cell manual for details on its usage.

## **6 CARE AND MAINTENANCE**

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This assembly is designed to support the weight of a test sample and the associated test equipment, such as probes and wiring. It is not intended to support heavy loads. Do not place any other items on top of the vacuum chuck assembly. Mechanical damage to the stage caused by overloading is not covered under warranty.

Monitor the condition of all tubing and wiring, particularly in the areas where they are exposed to light from the source. Replace these items if they begin to show signs of wear or UV degradation.

When the unit is stored, contaminants cannot be allowed to enter the cooling plate ports and tubing.

Refer to the manuals provided with the vacuum pump, probe kit and PVIV system for information regarding their usage, maintenance and storage.

If the system is to be moved, put into storage, or needs to undergo maintenance, the tubing going to the vacuum pump will need to be removed. Turn off all equipment. Release the vacuum in the entire vacuum line by using the shutoff / relief valve.

If this product is to be shipped to Oriel Instruments for servicing or return, notify the person issuing the RMA number of the type of cooling liquid that was used in this unit. Material safety data sheets for this liquid must be provided. If any assembly is shipped to Oriel without this information, it will be returned, unopened, to the sender.

## 7 OPTIONAL ACCESSORIES AND REPLACEMENT PARTS

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The PVIV system has been designed to operate with the accessories listed below. Oriel Instrument cannot guarantee system performance if other products are substituted. Refer to Section 8 for specifications.

Part Number	Description
PVIV-VAC-PUMP	Vacuum Pump, 110 VAC / 60 Hz
PVIV-VAC-PUMP-220	Vacuum Pump, 220 VAC / 50 Hz
PVIV-PROBE-KIT	Electrical Contact Probe Kit
90023529	Valve, Shutoff / Relief
84-20-006	PVC Tubing, 1/8 ID x 1/4 OD (available in 1 ft increments)
100783 (optional)	Double test lead, banana plug to mini-grabber, 36" length

For replacement connectors, please contact Oriel Instruments. Note that for installation, Teflon® tape will be required, which is not provided.

Oriel cannot guarantee field-repaired product performance. For guarantee, this item must be returned to Oriel for servicing.

## 8 SPECIFICATIONS

### VACUUM CHUCK SPECIFICATIONS

Model PVIV-VAC-CHUCK

Sample Size	6 inch square maximum
Vacuum Plate Material	Nickel plated aluminum
Vacuum Requirement	150 mm Hg minimum
Weight	1.5 kg (does not include packaging)
Cable (90009203)	BNC male to dual pin tip plugs, 5 feet long
	Operating Voltage: 30 VAC / 60 VDC maximum
	Operating Temperature: +50°C maximum
Tubing, Vacuum	1/4 OD clear PVC, 10 feet long
Valve, Vacuum Shutoff	90023529
Connector, Thermistor	BNC female conn
Connectors, Vacuum	KGH conn accepts 1/4" OD tubing, quantity (3)

### PROBE SPECIFICATIONS

Specifications for the probe assembly are included for reference only. Refer to the instruction manual that came with this item for more details. In the event of discrepancies between this manual and the probe assembly manual, the probe assembly manual takes precedence.

Model PVIV-PROBE-KIT

Probe quantity per kit	1
Probe base quantity per kit	1
Positioning (coarse)	Magnetic
Positioning (fine)	X-Y joystick, Z adjustment knob
Positioner material	Delrin
Arm material	Brass
Probe tip material	Beryllium copper
	[other materials available as a special order]
Bracket material	Zinc plated steel
Probe tip diameter	125 µm standard [other sizes available]
Arm length	4.75" long x .087 diameter
Tip dimensions	.025" shank diameter, .75" long, 12 µm diameter tip
Magnetic mount dimensions	1.75" long x .44" wide
Overall Dimensions	3.75" high x .44" wide x 5" long at maximum arm extension
Wire length	18"
Connector	Pin tip plug, .080 inch (2 mm) diameter
Maximum current	3 amps per probe, when using the standard probe tip
Weight	1 lbs (does not include packaging)

## VACUUM PUMP SPECIFICATIONS

Specifications for the vacuum pumps are included for reference only. Refer to the instruction manual that came with this item for more details. In the event of discrepancies between this manual and the vacuum pump manual, the vacuum pump manual takes precedence.

### Model PVIV-VAC-PUMP

Motor	100 - 110 VAC, 60 Hz, 1/8 HP
Vacuum	650 mm Hg max
Power Consumption	65 Watts
Current	0.7 Amps max
Sound Level	50 dB approx
Flow Rate	20 lpm (at 0 mm Hg) to 2 lpm (at 600 mm Hg)
Port Thread	5/16"
Coupler	Hose barb reducer from 5/16 ID to 1/8 ID tubing
Tubing	5/16" ID PVC, 1 foot long
Dimensions	11" x 6.5" x 6"
Weight	7.7 lbs (does not include packaging)
Discharge	Oil free
Connection/coupler	Barded for use with 1/4" ID tubing

### Model PVIV-VAC-PUMP-220

Motor	220 - 240 VAC, 50 Hz, 1/8 HP
Vacuum	650 mm Hg max
Power Consumption	60 Watts
Current	0.3 Amps max
Sound Level	50 dB approx
Flow Rate	17 lpm (at 0 mm Hg) to 1.5 lpm (at 600 mm Hg)
Port Thread	5/16"
Coupler	Hose barb reducer from 5/16 ID to 1/8 ID tubing
Tubing	5/16" ID PVC, 1 foot long
Dimensions	11" x 6.5" x 6"
Weight	7.7 lbs (3.5 kg) (does not include packaging)
Discharge	oil free
Connection/coupler	Barded for use with 1/4" ID tubing

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## 9 WARRANTY AND SERVICE

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### CONTACTING ORIEL® INSTRUMENTS

Oriel® Instruments belongs to MKS Newport Corporation's family of brands. Thanks to a steadfast commitment to quality, innovation, hard work and customer care, Newport is trusted the world over as the complete source for all photonics and laser technology and equipment.

Founded in 1969, Newport is a pioneering single-source solutions provider of laser and photonics components to the leaders in scientific research, life and health sciences, photovoltaics, microelectronics, industrial manufacturing and homeland security markets.

MKS Newport Corporation proudly serves customers across Canada, Europe, Asia and the United States through 9 international subsidiaries and 24 sales offices worldwide. Every year, the Newport Resource catalog is hailed as the premier sourcebook for those in need of advanced technology products and services. It is available by mail request or through Newport's website. The website is where one will find product updates, interactive demonstrations, specification charts and more.

To obtain information regarding sales, technical support or factory service, United States and Canadian customers should contact Oriel Instruments directly.

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Sales: [orielPV.sales@newport.com](mailto:orielPV.sales@newport.com)  
Technical assistance & Repair Service: [orielPV.service@newport.com](mailto:orielPV.service@newport.com)

Customers outside of the United States must contact their regional representative for all sales, technical support and service inquiries. A list of worldwide representatives can be found on Oriel's website: <http://www.newport.com/b/oriel-instruments>

### REQUEST FOR ASSISTANCE / SERVICE

Please have the following information available when requesting assistance or service:

- Contact information for the owner of the product.
- Instrument model number (located on the product label).
- Product serial number and date of manufacture (located on the product label).
- Description of the problem.

To help Oriel's Technical Support Representatives diagnose the problem, please note the following:

- Is the system used for manufacturing or research and development?
- What was the state of the system right before the problem?
- Had this problem occurred before? If so, when and how frequently?
- Can the system continue to operate with this problem, or is it non-operational?
- Were there any differences in the application or environment before the problem occurred?



## **REPAIR SERVICE**

This section contains information regarding factory service for this product. The user should not attempt any maintenance or service of the system beyond the procedures outlined in this manual. This product contains no user serviceable parts other than what is noted in this manual. Any problem that cannot be resolved should be referred to Oriel Instruments.

If the instrument needs to be returned for service, a Return Material Authorization (RMA) number must be obtained prior to shipment to Oriel Instruments. This RMA number must appear on both the shipping container and the package documents.

Return the product to Oriel Instruments, freight prepaid, clearly marked with the RMA number and it will either be repaired or replaced at Oriel's discretion.

Oriel is not responsible for damage occurring in transit. The Owner of the product bears all risk of loss or damage to the returned Products until delivery at Oriel's facility. Oriel is not responsible for product damage once it has left the facility after repair or replacement has been completed.

Oriel is not obligated to accept products returned without an RMA number. Any return shipment received by Oriel without an RMA number may be reshipped by Newport, freight collect, to the Owner of the product.

## **NON-WARRANTY REPAIR**

For Products returned for repair that are not covered under warranty, Newport's standard repair charges shall be applicable in addition to all shipping expenses. Unless otherwise stated in Newport's repair quote, any such out-of-warranty repairs are warranted for ninety (90) days from date of shipment of the repaired Product.

Oriel will charge an evaluation fee to examine the product and determine the most appropriate course of action. Payment information must be obtained prior to having an RMA number assigned. Customers may use a valid credit card, and those who have an existing account with Newport Corporation may use a purchase order.

When the evaluation had been completed, the owner of the product will be contacted and notified of the final cost to repair or replace the item. If the decision is made to not proceed with the repair, only the evaluation fee will be billed. If authorization to perform the repair or provide a replacement is obtained, the evaluation fee will be applied to the final cost. A revised purchase order must be submitted for the final cost. If paying by credit card, written authorization must be provided that will allow the full repair cost to be charged to the card.

## **WARRANTY REPAIR**

If there are any defects in material or workmanship or a failure to meet specifications, notify Oriel Instruments promptly, prior to the expiration of the warranty.

Except as otherwise expressly stated in Oriel's quote or in the current operating manual or other written guarantee for any of the Products, Oriel warrants that, for the period of time set forth below with respect to each Product or component type (the "Warranty Period"), the Products sold hereunder will be free from defects in material and workmanship, and will conform to the applicable specifications, under normal use and service when correctly installed and maintained. Oriel shall repair or replace, at Oriel's sole option, any defective or nonconforming Product or part

thereof which is returned at Buyer's expense to Oriel facility, provided, that Buyer notifies Oriel in writing promptly after discovery of the defect or nonconformity and within the Warranty Period. Products may only be returned by Buyer when accompanied by a return material authorization number ("RMA number") issued by Oriel, with freight prepaid by Buyer. Oriel shall not be responsible for any damage occurring in transit or obligated to accept Products returned for warranty repair without an RMA number. Buyer bears all risk of loss or damage to the Products until delivery at Oriel's facility. Oriel shall pay for shipment back to Buyer for Products repaired under warranty.

#### WARRANTY PERIOD

All Products (except consumables such as lamps, filters, etc) described here are warranted for a period of twelve (12) months from the date of shipment or 3000 hours of operation, whichever comes first.

Lamps, gratings, optical filters and other consumables / spare parts (whether sold as separate Products or constituting components of other Products) are warranted for a period of ninety (90) days from the date of shipment.

#### WARRANTY EXCLUSIONS

The above warranty does not apply to Products which are (a) repaired, modified or altered by any party other than Oriel; (b) used in conjunction with equipment not provided or authorized by Oriel; (c) subjected to unusual physical, thermal, or electrical stress, improper installation, misuse, abuse, accident or negligence in use, storage, transportation or handling, alteration, or tampering, or (d) considered a consumable item or an item requiring repair or replacement due to normal wear and tear.

#### DISCLAIMER OF WARRANTIES; EXCLUSIVE REMEDY

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES. EXCEPT AS EXPRESSLY PROVIDED HEREIN, ORIEL MAKES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, STATUTORY OR OTHERWISE, REGARDING THE PRODUCTS, SOFTWARE OR SERVICES. NEWPORT EXPRESSLY DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE FOR THE PRODUCTS, SOFTWARE OR SERVICES. THE OBLIGATIONS OF ORIEL SET FORTH IN THIS SECTION SHALL BE ORIEL'S SOLE LIABILITY, AND BUYER'S SOLE REMEDY, FOR BREACH OF THE FOREGOING WARRANTY. Representations and warranties made by any person including distributors, dealers and representatives of Oriel / Newport Corporation which are inconsistent or in conflict with the terms of this warranty shall not be binding on Oriel unless reduced to writing and approved by an expressly an authorized officer of Newport.

#### **LOANER / DEMO MATERIAL**

Persons receiving goods for demonstrations or temporary use or in any manner in which title is not transferred from Newport shall assume full responsibility for any and all damage while in their care, custody and control. If damage occurs, unrelated to the proper and warranted use and performance of the goods, recipient of the goods accepts full responsibility for restoring the goods to their original condition upon delivery, and for assuming all costs and charges.

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Any change will be reflected in future printings.

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Part No. PVIV-TC-VAC