

Oriel I-V Test Station



Oriel I-V Tester

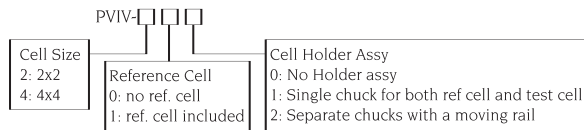
Key Features

- New! Complete I-V measurement solution for photovoltaic cells
- Works with any 2x2" or 4x4"-Inch Oriel Solar Simulator
- Easily integrated with Oriel Solar Simulators in the field
- Easy-to-use LabVIEW® based I-V characterization software
- CE mark pending

Newport's new Oriel I-V Test Station runs I-V measurements and calculates critical parameters such as short circuit current (I_{sc}), current density (J_{sc}), open circuit voltage (V_{oc}), fill factor (ff), maximum output power (P_{max}), cell efficiency (η), and other standard photovoltaic cell parameters. The station can include a source/meter, reference cell, cell holder, probing assembly, and measurement software, depending upon the configuration required. These products are designed to work with any of Newport's Oriel 2x2 and 4x4-inch standard solar simulators, and the 96000 Research Series Solar Simulator.

Configuration

The Newport I-V Tester has the following intuitive configurator you can easily order either the complete solution or the appropriate subassembly to retrofit to an existing Oriel solar simulator.



The Cell Size indicates the intended solar cell size to be used with the I-V test station. The major difference between the 2x2 option and the 4x4 is the capability of the voltage source/current meter. With the 2x2, you can get up to 3 A, while with the 4x4 you can get up to 5 A compliance current. Also, this implies the correct cell holder size, even though you can still choose not to purchase the holder.

The Reference Cell configurator indicates whether the I-V system will include the NREL (National Renewable Energy Laboratory) calibrated Newport Reference Cell, which can be a critical component in obtaining accurate I-V measurements.

The Cell Holder Assembly indicates the type of cell holder used. With option 1, the customer receives one chuck for both the Reference Cell and the cell under test. A single chuck where both the Reference Cell and the cell under test can be placed with an adapter. With the 2x2 and 4x4 option selected, the customer will receive a chuck with suitable adapter pieces for the cell size. If the Reference Cell must be available for a calibration at all times, one should consider the Cell Holder Assembly option 2, which consists of two chucks: one for the test cell and the other for the Reference Cell. Both chucks are mounted on a rail assembly. The chucks will have a mechanical register so that each chuck will move to the correct position under the solar simulator each time the chuck is moved.

Cell Holder Assembly

The basic Cell Holder can interchangeably hold either the Reference Cell or the test cell with a simple adapter piece in place. The Cell Holder is fixed in position with respect to the solar simulator beam, and only the cells on the adapter pieces move. Therefore, the cell position can be maintained with relatively high precision despite the simplicity of the design.

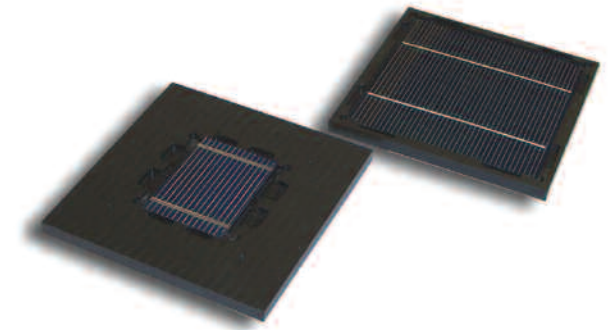


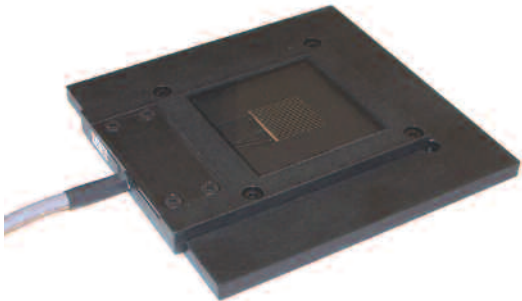
Figure 1. 2x2 (left) and 4x4-inch (right) size cell adapters. The cell is placed on top of the adapter, which sits on the holder. At the bottom is the thermal sensor that measures the temperature of the cell.

Reference Cell and Meter

The Reference Cell consists of a solar cell assembly and an electronic display where the measured solar simulator irradiance and the cell temperature are displayed. These values are entered in the software to accurately perform the I-V characterization. The Reference Cell can also be used independently of the I-V Test Station, for tuning the solar simulator power level to a desired level of the cell test condition. The Reference Cell is also available as a separate item.



Newport Reference Cell and Meter.



The reference cell in its cell holder adapter

Software

The LabVIEW based I-V measurement software is easy to understand, and easy to use. A number of critical cell performance parameters are calculated as well as displaying the raw I-V curve. Device ID and User Name can be easily entered from the main user interface, where the configuration set up and the raw data are easily saved into a tab delimited .txt file format report. The software menu also includes a Print Window function, so the measured plot can be printed.

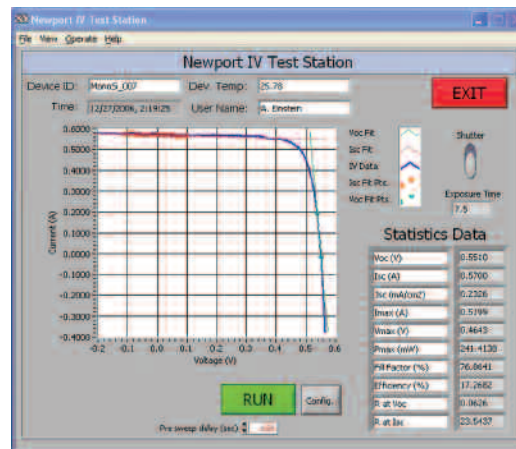


Figure 4. I-V Curve obtained by the Oriel I-V Test Station

Computer

The computer is not supplied with the Oriel I-V Test Station. Minimum system requirements to run the software are shown in Table 1.

Table 1 Minimum Computer Requirements

Operating System	Windows 2000/XP
Processor	Pentium III or Celeron 600 Mhz
Disk Space	300 MB
Memory (RAM)	512 MB
Screen Resolution	1024 X 768
Communication Ports	USB
Peripherals	CD Drive

Workstation

The workstation is not included in the I-V Tester part number PVIV-xxx. To complete the system, we recommend the model 91590 Workstation, which includes: a 30x48" Newport VH IsoStation™ Series cleanroom compatible workstation, a 2" thick breadboard with custom mounting holes, and a 19" rack mount. Custom holes are drilled so that the solar simulator and the I-V Test Station subassemblies can be easily mounted. If other types of workstations are desired, please contact Newport for other options. Note that mechanical clamps are required to mount the components on a breadboard with pre-tapped mounting holes.



Complete Oriel I-V Tester setup on a workstation. Solar simulator and workstation are sold separately. Computer is not included in the Station.

Specifications

Electric Interface	4-wire probing
Voltage range (V)	0 – 60 V (PVIV-2xx); 0 – 40 V (PVIV-4xx)
Current range (A)	0 – 3 A (PVIV-2xx); 0 – 5 A (PVIV-4xx)
Maximum Output power (W)	60 W (PVIV-2xx); 50 W (PVIV-4xx)
Voltage Accuracy (%)	0.015
Current Accuracy (%)	0.035
No. of measurement points	50 - 300, user selectable
Max. test device size (inches [cm])	4 (10)
Software	LabView based application
Measurements performed	Voc, Isc, Jsc, Vmax, Imax, Pmax, efficiency, fill factor, Rsc, Roc

Ordering Information

Model	Description
PVIV-200	Basic 2" I-V Station, no cell holding chuck
PVIV-201	2" I-V, with a single test/reference cell chuck
PVIV-202	2" I-V, with separate cell and reference cell chucks
PVIV-210	2" I-V, with reference cell, no chuck
PVIV-211	2" I-V, with reference cell and single test/ref cell chuck
PVIV-212	2" I-V, with reference cell and separate test and ref cell chucks
PVIV-400	Basic 4" I-V Station, no cell holding chuck
PVIV-401	4" I-V, with a single test/reference cell chuck
PVIV-402	4" I-V, with separate cell and reference cell chucks
PVIV-410	4" I-V, with reference cell, no chuck
PVIV-411	4" I-V, with reference cell and single test/ref cell chuck
PVIV-412	4" I-V, with reference cell and separate test and ref cell chucks
91150	Reference Cell
91545	Single cell holder, 2" cell
91556	Single cell holder, 4" cell
91567	Dual cell holders with rail for 2x2 cell
91578	Dual cell holders with rail for 4x4 cell
91590	Workstation



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