

Test Equipment Solutions Datasheet

Test Equipment Solutions Ltd specialise in the second user sale, rental and distribution of quality test & measurement (T&M) equipment. We stock all major equipment types such as spectrum analyzers, signal generators, oscilloscopes, power meters, logic analysers etc from all the major suppliers such as Agilent, Tektronix, Anritsu and Rohde & Schwarz.

We are focused at the professional end of the marketplace, primarily working with customers for whom high performance, quality and service are key, whilst realising the cost savings that second user equipment offers. As such, we fully test & refurbish equipment in our in-house, traceable Lab. Items are supplied with manuals, accessories and typically a full no-quibble 1 year warranty. Our staff have extensive backgrounds in T&M, totalling over 150 years of combined experience, which enables us to deliver industry-leading service and support. We endeavour to be customer focused in every way right down to the detail, such as offering free delivery on sales, presenting flexible technical + commercial solutions and supplying a loan unit during warranty repair, if available.

As well as the headline benefit of cost saving, second user offers shorter lead times, higher reliability and multivendor solutions. Rental, of course, is ideal for shorter term needs and offers fast delivery, flexibility, try-before-you-buy, zero capital expenditure, lower risk and off balance sheet accounting. Both second user and rental improve the key business measure of Return On Capital Employed.

We are based at Aldermaston in the UK from where we supply test equipment worldwide. Our facility incorporates Sales, Support, Admin, Logistics and our own in-house Lab.

All products supplied by Test Equipment Solutions include:

- No-quibble parts & labour warranty (we provide transport for UK mainland addresses).
- Free loan equipment during warranty repair, if available.
- Full electrical, mechanical and safety refurbishment in our 40GHz in-house Lab.
- Certificate of Conformance (calibration available on request).
- Manuals and accessories required for normal operation.
- Free insured delivery to your UK mainland address (sales).
- Support from our team of seasoned Test & Measurement engineers.
- ISO9001 quality assurance.

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PV200

Solar PV tester and I-V curve tracer

The PV200 provides a highly efficient and effective test and diagnostic solution for PV systems, carrying out all commissioning tests required by IEC 62446 and performing fast and accurate measurement of I-V curves in accordance with IEC 61829. When used in conjunction with the Solar Survey 200R irradiance meter, the PV200 measurement data can be converted to STC, using either the PVMobile app or SolarCert Elements software, allowing direct comparison with the PV module manufacturer's published data.

With direct connection to individual PV modules or strings using the supplied lead sets, tests can be conducted easily and within a matter of seconds at the press of a single button.

A high contrast display is clearly visible in direct sunlight and shows open circuit voltage, short circuit current, maximum power point voltage, current and power, as well as the fill factor of the PV module or system under test, and insulation resistance (as part of an auto sequence or a discrete probe to probe measurement). If the measured curve deviates from the expected profile, the PV200 alerts the user to this, identifying the need for further analysis.

Detailed and colour I-V and power curves, can be viewed instantly once data is transferred to the PVMobile Android app using wireless NFC connectivity. PVMobile displays measured I-V and power curves for visual analysis of the curve shape, enabling common problems such as shading, defective cells or poor electrical connections to be identified.

Key Features

- Lightweight, handheld and fast
- Affordable and efficient PV diagnostic tool
- Easy and fast push button operation
- All-in-one commissioning tests and I-V curve tracing, in accordance with international standards IEC 62446: 2016 and IEC 61829: 2015
- Instantly view detailed I-V curves in the field using the PVMobile Android app
- Convert I-V curve measurements to STC using the PVMobile app or SolarCert Elements software
- Instantly send PDF reports from the field back to the office using the PVMobile Android app
- Tests individual PV modules or strings
- Clear results display, even in direct sunlight
- Wirelessly receives irradiance and temperature measurements from Solar Survey 200R
- Full traceability of system performance
- Compatible with SolarCert Elements v2 software

Electrical/Analysis Test Functions

- I-V curve tracing, in accordance with IEC 61829
- Earth/earth continuity
- Insulation resistance (auto short circuit test and point-to-point)
- AC/DC voltage measurement
- Open circuit voltage up to 1000VDC
- Maximum power point voltage up to 1000VDC
- Short circuit current up to 15ADC
- Maximum power point current up to 15ADC
- Automatic fill factor calculation
- Operating current (using supplied current clamp) up to 40A
- DC power up to 40kW

PV200 Users

- PV system installers
- PV O&M technicians
- PV module manufacturers



**Download the
FREE PVMobile
Android app**



► **Instantly view detailed I-V and power curves in the field using the Android PVMobile app**

Simply touch an NFC-enabled Android device running the PVMobile app to your PV200. Detailed I-V characteristic measurements are transferred, allowing the I-V and power curve to be viewed in full colour detail. PVMobile also enables I-V curve correction for standard test conditions (STC 1000 W/m², 25°C) using irradiance and temperature data from the Survey 200R irradiance meter, to allow comparison with manufacturer's curve data, included in the comprehensive PVMobile database.



Find out more about the PVMobile Android app
www.seawardsolar.com/PVMobile

◀ **With the PVMobile Android app you can:**

- View I-V and power curves in full colour and high definition detail
- Pinch and zoom to observe deviations from a normal curve, and to see Mpp region in more detail
- Select points on the curve to read actual voltage and current
- Convert I-V curve measurements to STC
- Transfer PDF reports back to the office from a remote location
- View I-V curves and measurement data clearly, even in direct sunlight
- Avoid the need to take a laptop on-site
- Transfer measurement data to the PVMobile app instantly by touching your NFC-enabled Android device against the PV200



► **Lightweight, handheld and fast**

Extremely portable, lightweight and battery powered, the PV200 is easy to move around when testing several strings in a system. Commissioning tests, irradiance, temperature and I-V characteristics can all be recorded at the press of a button.*



*Irradiance and temperature measurements require Solar Survey 200R, available separately or as part of the Solarlink™ Test Kit.



► **Cost effective and efficient PV diagnostic tool**

Comprehensive measurement features with easy-to-use one button testing provides the ideal solution for periodic testing, performance analysis and fault diagnosis.

► **All-in-one commissioning tests and I-V curve tracing**

Easily carry out all performance, safety and diagnostic checks on PV systems using the same fast and simple test instrument.



► **Easy and fast push button operation**

The PV200 offers an extremely fast testing solution, carrying out all commissioning tests in a matter of seconds, for straightforward and hassle free testing of even the largest of PV systems.



► **Tests individual PV modules or strings**

Directly connect the PV200 to an individual module or a full string, and choose whether to carry out a full auto sequence test or an individual test, depending on your requirements.





► **Clear results display, even in direct sunlight**

The PV200 display screen is clearly visible even in direct sunlight, ensuring you are able to complete the testing process in the fastest time possible, and view measurements at a glance.

► **Wirelessly receive irradiance and temperature measurements from Solar Survey 200R**

Using Seaward Solarlink™ connectivity, the PV200 can wirelessly capture and record real-time irradiance, ambient temperature and PV module temperature measurements from the Solar Survey 200R multifunction irradiance meter (available as part of the Solarlink™ Test Kit). This means that all measurements can be recorded simultaneously, as required by the IEC 62446 and IEC 61829 standards.



► **Full traceability of system performance**

The PV200 has a large onboard memory which stores up to 999 sets of PV test and diagnostic data, ensuring large systems can be tested continuously, and enabling test data to be downloaded to a PC, in CSV format, for full traceability.



► **Compatible with SolarCert Elements v2 software**

When used with the optional SolarCert Elements v2 software program, test and measurement data can be stored alongside other system information to produce comprehensive records. Measured data can be converted to STC for comparison with manufacturer's data held in the comprehensive database. In addition, professional inspection and test reports can be prepared, including IEC 62446 measurements and IEC 61829 I-V curve plots.



What's in the box?	Part Number
<p>PV200 is supplied, as standard, with:</p> <ul style="list-style-type: none"> ■ PV200 PV tester and I-V curve tracer ■ AC/DC current clamp ■ 2 x MC4 test lead (red & black) ■ 2 x 1.5m 4mm test leads/probes + alligator clips ■ Type A to mini B USB cable ■ 6 x alkaline battery (AA) 1.5V ■ Quick Start Guide ■ Rugged carry bag ■ PV200 Calibration Certificate <p>Download link for entry level PC datalogger software, operating instructions, USB driver for download to PC and SolarCert Elements v2 software demo</p>	 <p style="text-align: right;">389A910</p>
<p>A PV200 Solarlink™ Test Kit is also available:</p> <ul style="list-style-type: none"> ■ PV200 PV tester and I-V curve tracer ■ Survey 200R multi-function irradiance meter with suction mount PV module temperature sensor and mounting bracket ■ SolarCert Elements v2 software ■ AC/DC current clamp ■ 2 x MC4 test lead (red & black) ■ 2 x 1.5m 4mm test leads/probes + alligator clips ■ Type A to mini B USB cable ■ 6 x alkaline battery (AA) 1.5V ■ Quick Start Guide ■ Rugged carry bag ■ PV200 Calibration Certificate <p>Download link for entry level PC datalogger software, operating instructions, USB driver for download to PC</p>	 <p style="text-align: right;">389A915 (available without software 389A918)</p>

Optional Accessories			
<p>Survey 200R irradiance meter with suction mount PV module temperature sensor (433MHz) (396A914)*</p>	<p>Suction mount PV module temperature sensor for Solar Survey 200R (396A980)</p>	<p>SolarCert Elements test reporting & certification v2 software (389A950)</p>	<p>MC4 to test probe test leads (red & black) (388A953)</p>
	 <p>Solar Survey mounting bracket (396A979)</p>		 <p>Fused test leads – 1 pair of fused red and black test probes and alligator clips (44B075)</p>
<p>MC3 test lead adaptors (396A958)</p>	<p>Solar power clamp (396A961)</p>	<p>SolarTag PV installation / DC warning labels (396A952 / 396A953)</p>	<p>Sunclix test lead adaptors (396A960)</p>
			
<p>PV inspection report pad (396A954)</p>	<p>PV array report pad (396A955)</p>	<p>PV verification certificate pad (396A956)</p>	<p>Pack of 3 PV test reports and certificate pads (396A957)</p>
			

*also available as part of PV200 Solarlink™ test kit)

Technical Specifications

Earth continuity / resistance measurement

Display range	0.00 to 199Ω
Measurement range	0.01 to 199Ω
Accuracy	±(2% rdg + 5d)
Resolution	0.01Ω maximum
Open circuit test voltage	4VDC, nominal
Test leads zero	Zero up to 10Ω, by Zero button
Number of measurements	5,000 x 1 second tests
Audible / visible warning	≥ 30VAC/DC at inputs
User protection	Test inhibited if ≥ 30VAC/DC at inputs

Insulation resistance (auto short circuit test)

Display range	0.05 - 200MΩ
Measurement range	0.05 - 200MΩ
Accuracy	±(5% rdg + 5d) 0.05 - 100MΩ ±(10% rdg + 5d) 101 - 200MΩ
Resolution	0.01MΩ maximum
Open circuit test voltage	250, 500, 1000V (as per IEC 61557-2)
Test current	1mA nominal as per IEC 61557-2
Short circuit test current	<2mA
Number of measurements	5,000 x 1 second tests
Audible / visible warning	≥ 30VAC/DC at inputs
User protection	Test inhibited if ≥ 30VAC/DC at inputs

Insulation resistance (point to point)

Display range	0.05 to 300MΩ
Measurement range	0.05 to 300MΩ
Accuracy	±(5% rdg + 5d)
Resolution	0.01MΩ maximum
Open circuit test voltage	250, 500, 1000V (as per IEC 61557-2)
Short circuit test current	<1mA
Number of measurements	5,000 x 1 second tests
Audible / visible warning	≥ 30VAC/DC at inputs
Circuitry protection	Test inhibited if ≥ 30VAC/DC at inputs

Voltage measurement (via 4mm probes)

Display range	30V – 440VAC/DC
Measurement range	30V – 440VAC/DC
Resolution	1V
Accuracy	±(5% rdg + 2d)

Vo/c voltage measurement (via PV test leads)

Display range	0.0V – 1000VDC
Measurement range	5.0V – 1000VDC
Resolution	0.1V
Accuracy	±(0.5% rdg + 2d)
Enunciators	DC voltage polarity correct or reversed

Is/c current measurement (via PV test leads)

Display range	0.0A – 15.0ADC
Measurement range	0.5A – 15.0ADC
Resolution	0.1A
Accuracy	±(1% rdg + 2d)

Operating current (via DC current clamp)

Display range	0.0A – 40.0A AC/DC
Measurement range	0.1A – 40.0A AC/DC
Resolution	0.1A
Accuracy	±(5% rdg + 2d)

DC power

Display range	0.0W – 40.0kW
Measurement range	10W – 40.0kW
Resolution	10W max
Accuracy	±(6% rdg + 2d)

I-V curve

Maximum power dissipation	10kW
Number of points	Dynamic up to 128
MPP calculation max error	±(1.5% rdg + 40w)

General Specifications

Case dimensions and weight

Weight	1.05kg
Dimensions	265 x 108 x 58mm
Display	Custom LCD with backlight
Power source	6 x 1.5V AA cells
Battery life	>1000 test sequences
Auto power down	User programmable
Onboard memory	Up to 999 complete test datasets

Connectivity

USB download to PC (CSV format)	
Wireless 'Solarlink™' to Survey 200R (433MHz) (range c. 30m / 100ft)	
NFC transfer of data to PVMobile Android App	
iOS devices not supported	

App compatibility

Compatible with Android version 4.2 Jelly Bean	
iOS devices not supported	

Software compatibility

Compatible with SolarCert Elements v2 software (English language only)	
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Services

2 year warranty (subject to terms and conditions, available at www.seaward.co.uk/register-product)	
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Go to www.calibrationhouse.com for more information about our services and calibration.

Go to www.seaward.co.uk/FAQs for free product support and resources.