



Leading the World in PV Test Solutions

光伏测试解决方案的领导者

www.seawardsolar.com

The Seaward Solar range of electrical safety test solutions enables PV installers to meet all testing and certification requirements safely and efficiently.

SEAWARD光伏产品中电气安全测试方案可以让光伏组件安装者能够满足所有测试和认证所要求的安全和高效

Our market-defining range of PV test and measurement equipment makes meeting the requirements of IEC 62446 quicker and easier. From site-survey to commissioning tests and periodic inspection, Seaward Solar has it covered.

我们所定义的光伏测试测量设备能够快速和简单地满足 IEC 62446的要求

Specialised test equipment for PV installations has been long-anticipated within the industry. We have responded with a range of products specifically designed to meet the needs of solar installers.

专门的用于PV现场安装的测试设备已经在业内期待很久。我们已经采取了一系列的产品专门设计用于满足太阳能安装的需要。

The PV150 installation tester improves safety and efficiency for solar PV installers when carrying out the required commissioning tests. It combines all of the tests into a handheld unit, making testing easier and much faster.

PV150安装测试仪提高了安全性和效率，针对光伏组件安装者在现场执行要求的测试时

To complement the PV150, the Solar Survey range of multifunction irradiance meters offer a uniquely versatile solution to site-surveys; featuring compass bearing, inclination and temperature measurements in addition to irradiance.

作为PV150的补充，SOLAR SURVEY系列产品多功能辐照度表提供了一个独特的通用解决方案用于场地调研；除了辐照度测量外，还具备了罗盘方位、倾角和温度测量能力

The software program, SolarCert Elements has been developed to enable easy completion of certificates through manual data entry or USB download from the PV150 tester.

软件SOLARCERT ELEMENTS的开发使得认证检测可以简单的就完成，可以通过手动数据输入或通过USB方式把数据从PV150中导出

Once PV systems are installed, the Solar Power Clamp is ideal for advanced power analysis for efficiency measurements and troubleshooting.

当光伏系统安装完成后，光伏功率钳表完美地用于光伏系统功率分析的效率测量和故障判断

With our complete range of PV electrical test equipment, you can be sure we have a solution for you.

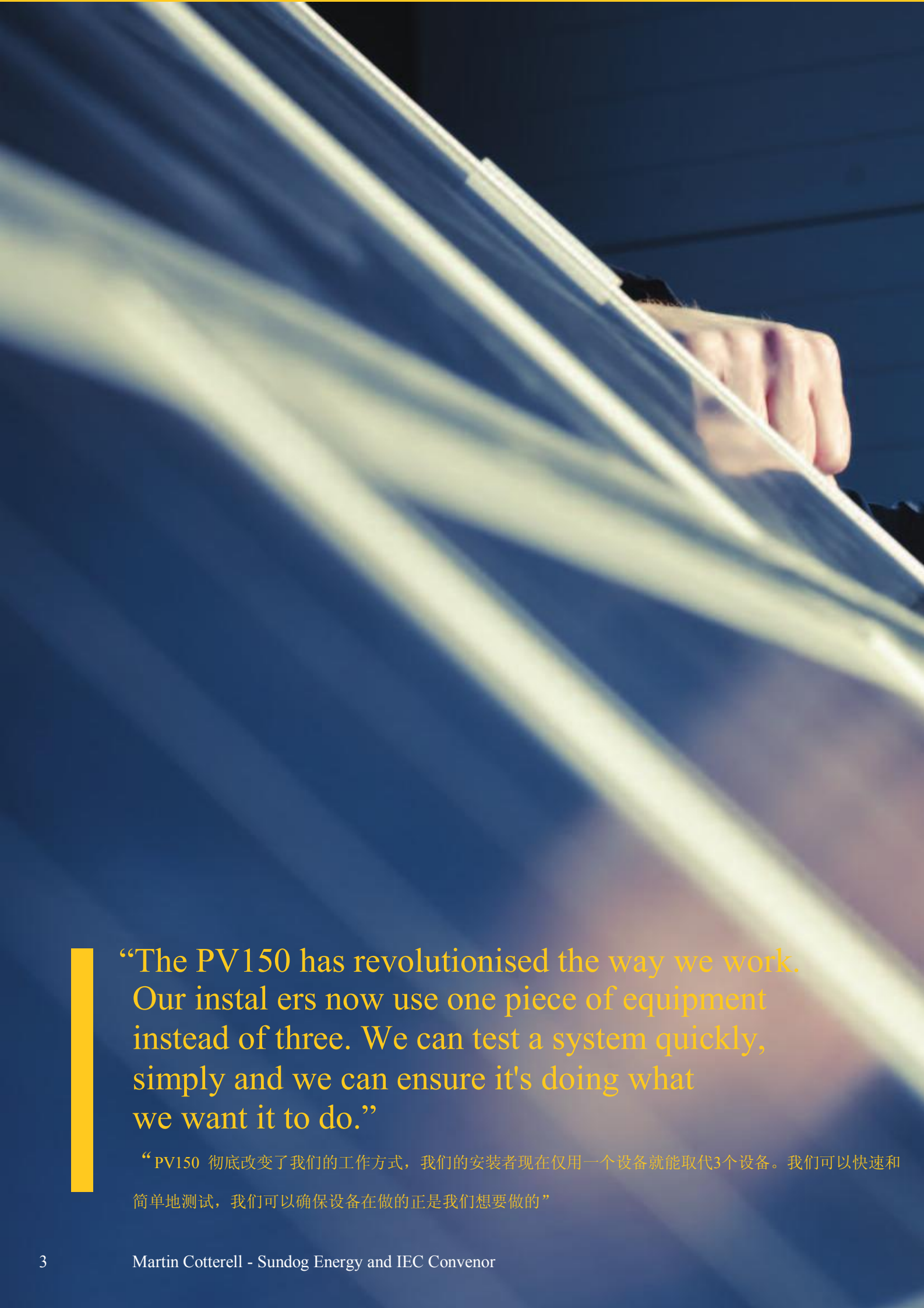
我们有完整的光伏电气测量设备，你可以放心我们可以提供解决方案给你

SolarCert Software

Survey 100/200R
Irradiance Meters

AC/DC
Power Clamp

PV150 Installation Tester



“The PV150 has revolutionised the way we work. Our installers now use one piece of equipment instead of three. We can test a system quickly, simply and we can ensure it's doing what we want it to do.”

“PV150 彻底改变了我们的工作方式，我们的安装者现在仅用一个设备就能取代3个设备。我们可以快速和简单地测试，我们可以确保设备在做的正是我们想要做的”



SOLAR
www.seawardsolar.com

Solar PV Installation.

21

4 step commissioning process.

4步 任务流程

1.

2.

■ ■
■ ■

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Solar Survey 100/200R Irradiance Meters SOLAR SURVEY 100/200R 辐照度计

- Irradiance is measured using a reference cell to offer a more representative reading
采用参考组件进行辐照度测量可以提供更具代表的数值
- The Solarlink™ feature of the Solar Survey 200R enables irradiance to be measured and displayed on the PV150 tester via wireless connectivity
SOLAR SURVEY 200R的SOLARLINK 功能使得辐照度可以通过无线的传输方式被测量和显示在PV150上
- Measures inclination and roof tilt 可以同时测量倾角和屋顶倾斜
- Measures ambient air and module temperature 可以测量环境和组件温度

Solar Installation PV150 Test Kit SOLAR INSTALLATION PV150 测试套装

- Includes the comprehensive PV150 multifunction tester which combines all MCS electrical tests
包含一套完整的PV150多功能测试仪 含所有MCS电气测试
- Connects wirelessly with the Solar Survey 200R to display irradiance measurement on its screen
- USB port enables direct download of test readings into certification software
可通过USB端口直接把测量数据导入到认证软件中
可无线连接SOLAR SURVEY 200R 显示辐照度测量值



- AC/DC current clamp supplied to enable current measurement

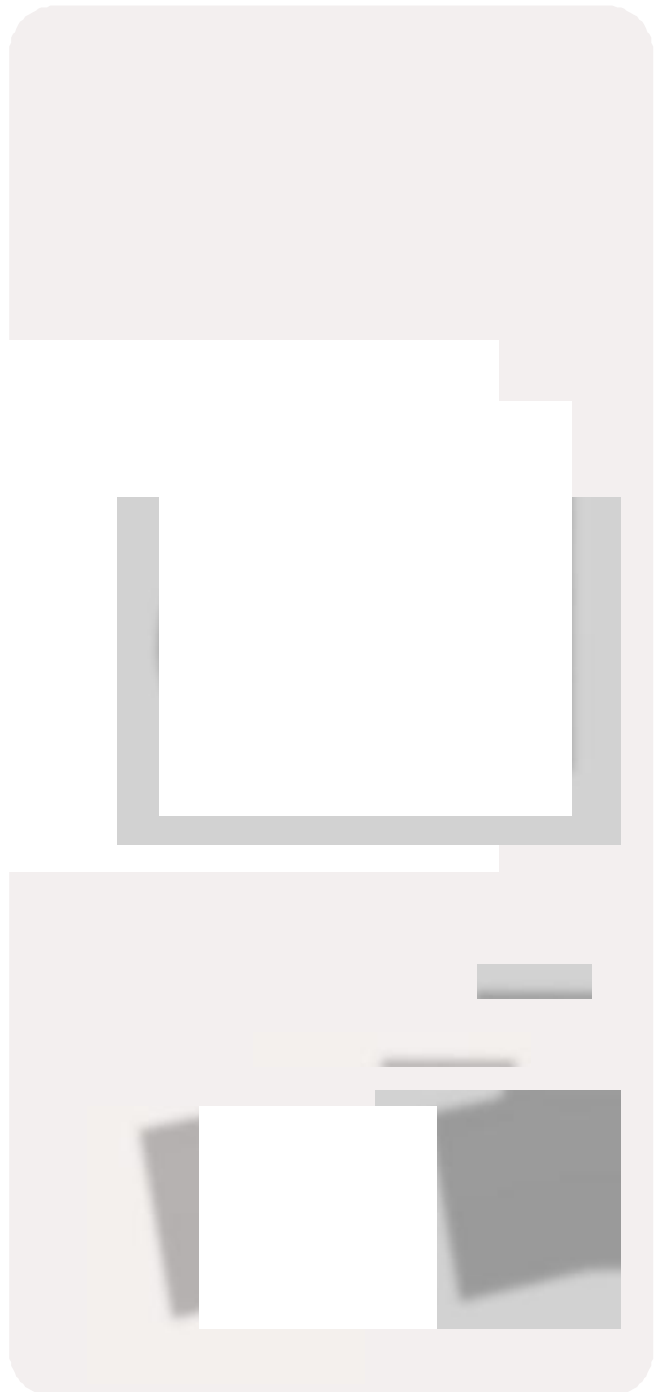
AC/DC 电流钳可用于电流测量

- Test adaptors supplied to enable safe and simple connection to most major PV modules
测试适配器可安全 简单的连接到大多数的光伏组件

Test Adaptors and Solar Tags 测试适配器和太阳能标签

- Specialist DC warning and full PV system markers for labelling and identification on PV systems
专业的直流警告标识，所有光伏系统都有标签记号和识别记号
- A range of test leads and adaptors are available

一系列的测试插头和适配器可供选择



3

4



3. System Documentation 系统文件

There is a requirement to record the results of the commissioning tests along with other system information. For record-keeping and traceability purposes these have to be handed over to the client.

有要求要把记录测试任务的结果与其他系统信息合并在一起。为了实现记录和可追溯性目的这些必须移交给客户

4. Performance Maintenance & Diagnostics 性能维护和诊断

To ensure optimal return on investment and power output, it is important to check the efficiency of inverters as part of system inspection and testing.

为了确保最佳的投资回报和输出功率，检查逆变器的效率是很重要的系统检查和测试的一部分

SolarCert Elements

Manual data entry into professional IEC 62446 certificate and report templates
手动数据输入到专业的IEC62446证书和报告模板

Download test results from PV150 and Solar Survey 200R via USB

通过USB的方式将测试结果从PV150和SOLAR SURVEY 200R

中下载下来

Stores system documentation

存储系统文件

Print, email or save documentation

打印，邮件或保存文档

PV Inspection Test Report & Certificate Pads

光伏检测测试报告和认证证书

High quality carbon copy test report and certificate pads for handwritten certification.

高质量的副本文件报告与证书模板用于手写的认证证书



Solar Power Clamp 光伏功率电流钳

Advanced AC/DC power analysis tool used for maintenance, troubleshooting and efficiency measurement on PV systems
先进的AC/DC功率分析工具用于光伏系统的维护，诊断和效率测量

Power factor measurement and harmonic analysis up to the 25th harmonic enables analysis of the inverter's performance
功率因素测量和最高25次的谐波分析用于逆变器性能分析

Solar Survey 100/200R Irradiance Meters

SOLAR SURVEY 100/200R 辐照度计

These meters help to identify deviations in irradiance and temperature from the module manufacturer's standard test conditions (STC) to determine how this will affect I-V curve tracing.

这些表计帮助验证来自组件厂家提供的STC下的辐照度和温度偏差，来判断是如何影响I-V曲线跟踪的

The Solar Installation PV150.

The most technical y advanced and safest solar PV installation tester on the market. With USB and wireless Solarlink™ connectivity.

PV150光伏安装测试仪

市场上技术最先进和最安全的光伏安装测试仪。拥有USB和无线的SOLARLINK 连接方式

The new PV150 combines all PV electrical test functions required to meet IEC 62446 into one safe, easy-to-use, hand-held device.

新款PV150集合了满足IEC62446所有光伏电气测试功能要求，是一台安全可靠，简单易用的手持式设备

The addition of USB and wireless Solarlink™ connectivity make the PV150 the most versatile PV tester on the market.

额外添加的USB和无线连接功能SOLARLINK让PV150成为市场上最全面的光伏测试设备

Using Seaward Solarlink™, the PV150 can capture and record real-time irradiance, ambient temperature and PV module temperature measurements from the Solar Survey 200R wirelessly. This means you can take all measurements, as required by the IEC 62446 standard, simultaneously.

使用SEAWARD SOLARLINK，PV150通过与SOLAR SURVEY 200R无线连接 可以抓取和记录实时辐照度值，环境温度和组件温度。这意味着你可以同步地获得IEC 62446标准要求的所有测量值。

It has increased memory size of up to 200 complete test records and USB download to PC for complete traceability and report/certificate creation. It's also able to measure DC power whilst the PV system is operational.

PV150已经增加了内存容量 可以存最大200个完整测试数据 可以通过USB下载数据到PC用于完整曲线跟踪和报告/证书的创建。

PV150也可以测量直流功率当光伏系统在运作时。

Solarlink™ Connectivity

Key features and functions

主要特点和功能

- Combines all commissioning tests required by IEC 62446
包含了所有IEC62446要求的测试项目
- Featuring new Seaward Solarlink™
新的SEAWARD SOLARLINK功能
- Increased memory capacity: up to 200 records
增加了内存容量: 最大200个记录
- USB download to PC
USB下载数据到PC
- Simple, safe, user interface
简单 安全 用户友好界面
- Single key testing and Measurement
单键测试和测量
- Safe test connections with energised PV arrays
与光伏阵列安全测试连接
- Direct connection to PV modules
直接与光伏组件连接
- Earth/ground continuity measurement
接地连续性测量
- Earth test lead null (up to 10ohms) for long test-leads
接地测试导线电阻归零 (最大10Ω) 用于长的测试导线
- PV string open circuit voltage measurement up to 1000V DC
Uoc 开路电压最大1000V DC
- Open circuit voltage polarity indication
Uoc 极性测试显示
- PV string short circuit current measurement up to 15A DC
Isc短路电流最大15A DC
- PV array insulation test at 250/500/1000V
光伏阵列绝缘电阻测试电压 250/500/1000V
- Rugged and robust
坚固耐用

PV System Electrical Commissioning Tests



光伏系统电气测试项目

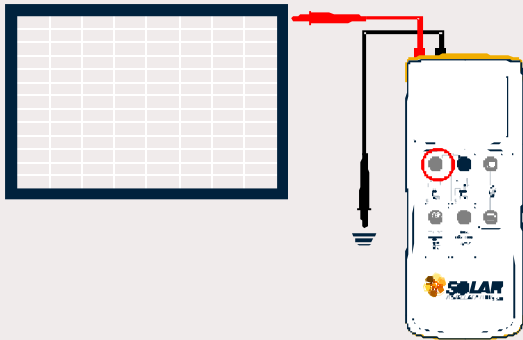
The PV150 enables simple, safe and fast testing of photovoltaic systems to IEC 62446 and various state regulations as shown below

PV150可以让IEC62446和不同国家规定下的光伏系统测试变的简单 安全和快速
请看如下示意图:

5.4.2 Earth/ground Continuity 接地连续性

Where protective earthing and/or equipotential bonding conductors are fitted, such as bonding of the array frame, the continuity should be tested.

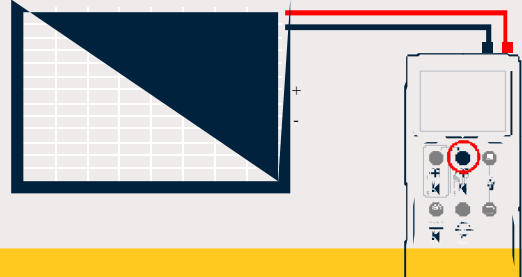
在保护接地和等电位连接导体安装的地方，例如阵列的绑定连接处，需要测量接地连续性



5.4.5.2 PV String Short Circuit Current 光伏组串Isc

Short circuit of current is measured to ensure correct installation and operation of each PV string. Measured values should be compared with expected values. For systems with multiple identical strings, values should be within 5% of other PV strings in array.

测量Isc是为了保证每个光伏组串的正确安装和操作。测量值必须和期望值做比较。由于系统是由多个完全相同的组串组串，测量值必须保证与阵列中其他组串偏差在5%内



5.4.3 Polarity Test 极性测试

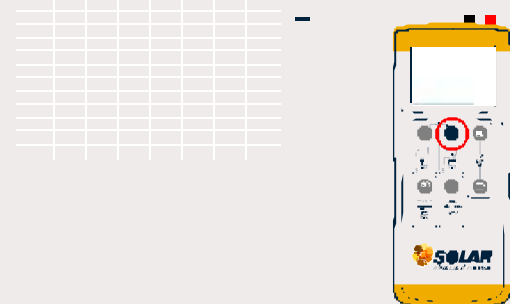
For reasons of safety and prevention of damage to other equipment in the system, the polarity of all DC cables should be verified before other tests are performed. The PV150 does this automatically as part of the PV String Open Circuit Voltage test.

为了安全和避免损害到系统其他设备，所有DC线缆的极性必须在其他测试之前确认完成。PV150可在测量Uoc时自动完成极性测试

5.4.4 PV String Open Circuit Voltage 光伏组串Uoc

Measured to ensure correct installation and operation of each PV string. Measured values should be compared with expected values. For systems with multiple identical strings, values should be within 5% of other PV strings in array.

测量Uoc是为了保证每个光伏组串的正确安装和操作。测量值必须和期望值做比较。由于系统是由多个完全相同的组串组串，测量值必须保证与阵列中其他组串偏差在5%内

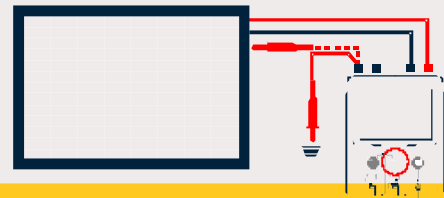


5.4.7 Array Insulation Resistance 阵列绝缘电阻

Measured from the array positive and negative to ground and compared with minimum acceptable values specified by national requirements and IEC 62446. 阵列正负极对地测得的电阻值 然后和IEC 62446标准要求的最小可接受值比较

Test voltage is selected according to the PV system voltage ($V_{oc} \times 1.25$), this determines the minimum acceptable values; 测试电压根据光伏系统电压 ($U_{oc} \times 1.25$) 来选择, 这决定了最小接受值:

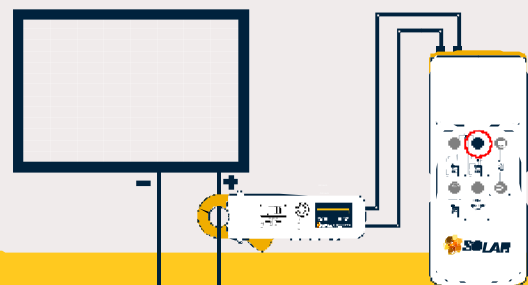
- 250V is used for systems less than 120V 250V 用于小于120V的系统
- 500V for systems between 120V and 500V 500v用于120v和500v之间的系统
- 1000V for systems over 500V. 1000v用于500v以上的系统



5.4.5.3 PV String Operational Current 光伏组件操作电流

Operational current is measured with the system in normal operation mode and compared with the expected value. For systems with multiple identical strings, values should be within 5% of other PV strings in array. 操作电流是系统正常运转模式下测得的 测量值需和期望值做比较。

由于系统是由多个完全相同的组串组串，测量值必须保证与阵列中其他组串偏差在5%内



The Solar Installation PV150 Test Kit. Helping you meet installation and commissioning safety requirements.

PV150 光伏安装测试套装帮助你满足安装和试运行的安全要求

Effective commissioning of PV installations requires confirmation of the system safety and performance. The Solar PV150 test kit is an efficient, cost effective means of demonstrating compliance with IEC 62446. An array's electrical safety and performance can now be determined quickly, easily and most importantly when you're dealing with a DC current, in complete safety.

光伏系统安装的有效运转要求系统安全和性能的确证，PV150光伏测试套件是一个高效、节约成本的能够证明符合IEC62446的有效手段

The Kit comprises: 套件包含:

- PV150 Installation Tester PV150 安装测试仪
- 2 x MC4 Test Lead Adaptors 2* MC4 测试导线适配器
- 2 x Sunclix Test Lead Adaptors 2*Sunclix 测试导线适配器
- Red Test Lead (with test probe & detachable alligator clip) 红色测试导线 (包含测试探头和可分开的鳄鱼夹)
- Black Test Lead (with test probe & detachable alligator clip) 黑色测试导线 (包含测试探头和可分开的鳄鱼夹)
- AC/DC Current Clamp AC/DC 电流钳
- Carry Case 手提箱
- Support CD Rom CD光盘
- UKAS Calibration Certificate UKAS 校准证书 编号: 388A913
Part No: 388A913

Solar Installation PV150 Test Kit in detail

PV150测试套装详细说明

The AC/DC Current Clamp AC/DC电流钳

A compact instrument capable of providing accurate measurement of AC or DC currents in conductors up to 22mm in diameter. It connects directly to the PV150 and can be used to measure currents up to 40A AC or DC. It's ideal for operational tests on PV systems. When used with the PV150 installation tester, AC and DC currents can be measured from 0.5A to 40.0A.

一个紧凑仪器能够提供AC或DC电流精确的测量，导体直径最大22mm。它直接连接到PV150，用于测量最大40A AC或DC电流。它是光伏系统运转测试的理想选择。当和PV150一起使用时，AC和DC电流可以测量0.5A—40A

Support CD-Rom CD光盘

This includes an instructional video on how to use the PV150, a full operating manual and a trial version of SolarCert Elements software. 光盘中包含如何使用PV150的操作视频，完整操作手册和SOLARCERT ELEMENTS软件适用版

Carry Case 手提箱

A rugged holdall with enough room to hold all test leads as well as the PV150 and AC/DC clamp.

一个坚固有足够的空间来放置所有测试导线，PV150和AC/DC钳子的手提旅行袋

MC4 & Sunclix Test Adaptors MC4&Sunclix 测试适配器

The test adaptors supplied as standard are fitted with MC4 test connectors which allow direct connection to PV systems or panels fitted with MC4 connectors. Other test adaptors are available as optional accessories. The Sunclix leads connect directly to PV modules or strings fitted with Sunclix plugs and sockets. 测试适配器装配了标准MC4测试插头 允许直接连接到光伏系统或是组件板上的MC4插头。其余的测试适配器可作为可选配件。Sunclix 导线直接连接到装配有Sunclix接插头的光伏组件或是组串上

Specification: 产品规格

EARTH/GROUND CONTINUITY 接地连续性

Display Range 显示范围	0.00 to 199
Measuring Range 测量范围	0.01 to 199
Resolution 分辨率	0.01 maximum
Open Circuit Test Voltage 开路测试电压	4VDC, nominal
Short Circuit Test Current 短路测试电流	>200mA (as per IEC 61557-4)
Test Lead Compensation 测试导线补偿	Null out up to 10
User Protection 使用者保护	Warning and test inhibited if 30V AC/DC detected at inputs 警告和控制测试如果探测到输入有30V AC/DC

INSULATION RESISTANCE 绝缘电阻

Display Range 显示范围	0.05M to 199M
Measuring Range 测量范围	0.05M to 199M
Resolution 分辨率	0.01M maximum
Open Circuit Test Voltage 开路测试电压	250V, 500V, 1000VDC (as per IEC 61557-2)
Short Circuit Test Current 短路测试电流	>1mA, <2mA s/c as per IEC 61557-2
Visible Warning 可视警告	30V AC or DC at inputs

OPEN CIRCUIT VOLTAGE U_{oc}

Display Range 显示范围	0.0VDC to 1000VDC
Measuring Range 测量范围	5.0VDC to 1000VDC
Resolution 分辨率	0.1V maximum
Enunciators 提示音	DC voltage polarity correct or reversed DC电压极性正确或相反

SHORT CIRCUIT CURRENT I_{sc}

Display Range 显示范围	0.0A – 15.00A
Measurement Range 测量范围	0.5A – 15.00A
Resolution 分辨率	0.01A

OPERATING CURRENT (USING AC/DC CURRENT CLAMP) 工作电流 (使用AC/DC电流钳)

Display Range 显示范围	0.0A – 40A
Measurement Range 测量范围	0.5A – 40A
Resolution 分辨率	0.1A max

DC OPERATING POWER DC 运行功率

Display range 显示范围	0.0kW – 40.0kW
Measurement ranges 测量范围	0.1kW – 40.0kW
Resolution 分辨率	0.1kW

DATALOGGING AND CONNECTIVITY 数据记录和通讯连接

Datalogging 数据记录	Up to 200 complete test datasets 最大可存200个完整测试数据 Download utility software included 包含下载工具软件
Connectivity 通讯连接	Compatible with SolarCert Elements software (version 1.1) 兼容SolarCert Elements软件 (版本1.1) USB download to PC USB下载数据到PC Wireless 'Solarlink™' to Solar Survey 200R (range c. 100m / 330 ft) 无线通讯SOLARLINK到SOLAR SURVEY 200R (范围 c. 100m / 330 ft)

GENERAL SPECIFICATIONS 通用规格

Display 显示	Custom LCD with backlight 自定义LCD背光
Power Supply 供电	6 x 1.5V Alkaline LR06
Battery Life 电池使用时间	>1000 test sequences > 1000次测试
Auto Power Down 自动关机	After 1 minute 一分钟后

ADDITIONAL INFORMATION 附加信息

Warranty Period 保修时间	2 years 2年
Calibration Interval 校准周期	1 year 1年

UKAS Calibration Certificate supplied as standard UKAS 校准证书随机标配

Solarlink™ Test Kit. Solarlink™ 测试套件

A complete solution to the testing and measurement requirements of IEC 62446.

符合IEC62446测试测量要求的完整解决方案

The Solarlink™ Test Kit meets all of the commissioning test requirements of IEC 62446. It combines the PV150 installation test kit with the advanced Solar Survey 200R irradiance meter. Solarlink测试套件满足所有IEC62446的测试要求。它集合了PV150安装测试套件和先进的SOLAR SURVEY 200R 辐照度计

The kit includes all of the necessary equipment to measure the electrical safety and performance of PV systems as well as irradiance. Additionally, the kit is integral to conducting site-surveys for potential installations; providing the information needed to calculate estimated annual solar irradiation and system yields of PV and solar thermal systems.

这个套件包含了所有测量光伏系统电气安全和性能参数所需的设备，另外还有辐照度。除此之外，这个套件能够整体的进行潜在安装地点的实地勘察调研；提供相关信息用于计算大概的每年太阳能辐照度，光伏系统和太阳能热系统的收益

See page 10 for the PV150 specification. See page 14 for the Survey 200R Irradiance Meter specifications.

Kit Includes 套件包含

- | | |
|--|--|
| ■ PV150 solar installation Tester
PV150安装测试仪 | ■ Red and Black Test leads, with test probe with detachable alligator clips
红黑色测试导线（包含测试探头和可分开的鳄鱼夹） |
| ■ Solar Survey 200R irradiance meter
SOLAR SURVEY 200R 辐照度计 | |
| ■ AC/DC current clamp
AC/DC电流钳 | |
| ■ Rugged carry bag
坚固型手提包 | |
- Part No:
- 2 x MC4 test lead Adaptors
2*MC4测试导线适配器
 - 2 x Sunclix test lead Adaptors
2*Sunclix 测试导线适配器

Key features and functions 主要特点和功能

- The comprehensive PV150 tester conducts all of the electrical tests required by IEC 62446 at the touch of a button.
PV150综合测试仪能够进行所有的IEC62446要求的电气测试
- Solarlink™ connectivity between the PV150 tester and the Solar Survey 200R irradiance meter enables irradiance to be displayed and for irradiance, module and ambient temperature to be recorded within the PV150 in real-time as electrical tests are conducted.
SOLARLINK连接PV150和SOLAR SURVEY 200R辐照度计，它可以让辐照度，组件温度和环境温度显示在PV150上并可以实时记录保存下来。
- USB download of stored test results and irradiance measurements speeds up the completion of documentation and improves traceability of results.
用USB下载所存的测试结果和辐照度值，可以加速文档的制作和提高结果的可追溯性
- Solar Survey 200R measures irradiance using a monocrystalline PV cell for a more representative reading over real operating conditions.
SOLAR SURVEY 200R 使用单晶光伏电池片测量辐照度，这种电池片在现场操作环境里的读数更具代表性
- If combined with SolarCert Elements software, the Solarlink™ Test Kit represents the complete solution in PV commissioning, containing all that is needed for testing and documenting installations to the requirements of IEC 62446.
如果集合了SOLARCERT ELEMENTS 软件，solarlink测试套件代表了符合IEC62446测试和文件要求的完整解决方案



- Quick Start Guides 快速使用指南
- Support CD-Rom CD光盘
including instructional
video guide 包含使用操作视频
- PV150 UKAS Calibration
Certificate PV150UKAS 校准证书
- Solar Survey 200R
Calibration Certificate SOLAR SURVEY 200R 校准证书
- Solarlink™ Test Kit with SolarCert Elements software - 388A915
- Solarlink™ Test Kit without SolarCert Elements software - 388A918



Solar Survey 100/200R

Irradiance Meters. SOLAR SURVEY 100/200R 辐照度计

The tools required to ensure optimum conditions for every system you instal .

这个测量工具可以保证最优条件给每个你安装的光伏系统

The Solar Survey series of multifunction irradiance meters are the perfect tools for conducting comprehensive solar site surveys. SOLAR SURVEY 多功能辐照度计系列是进行完整的光伏现场查看调研的完美工具

The 200R now features a wireless link to the Solar PV150 installation tester, called Seaward Solarlink™.

200R 支持无线连接到PV150, 这种方式我们称为 SEARWARD SOLARLINK

Seaward Solarlink™ allows the Solar Survey 200R to give the PV150 real-time irradiance, ambient temperature and PV module temperature measurement results simultaneously to commissioning tests being conducted as required by IEC 62446 standards. Results can be downloaded from the PV150 into the SolarCert Elements software.

SEAWARD SOLARLINK 允许200R实时地把辐照度 环境温度和组件温度测量结果传递到PV150 并同时按照IEC62446标准要求进行测试。数据结果可以从PV150下载到SOLARCERT ELEMENTS 软件

Both 100 and 200R incorporate a display hold feature which enables readings to be captured in difficult locations. The Solar Survey 200R has the added benefit of a large internal memory, real-time clock for data logging purposes and USB interface for download to a PC.

100和200R都包含了数值显示保持功能 支持在不同位置可获取数值。200R额外增加了功能 如大容量内部存储 实时时钟用于数据记录和USB下载数据到PC

With their high specification, these irradiance meters measure the sun's energy simply and quickly. They display the information in either W/m^2 or $BTU/hr-ft^2$ making them ideal for both solar photovoltaic and thermal applications.

因为有了高规格参数, 使这些辐照度计测量太阳的能量变得简单和快速。他们显示信息用 W/m^2 或 $BTU/hr-ft^2$ 使得他们成为太阳能光伏和热能应用的理想工具

Irradiance measurements are made using a photovoltaic reference cell giving a more representative measurement of solar energy and greater accuracy and repeatability compared to irradiance meters which use simple photo-diodes.

辐照度测量是使用光伏参考电池板 这样可以给出一个更具代表性的测量结果, 相比使用传统简单的发光二极管 精度和重复性更好

What distinguishes the compact, rugged Solar Survey 100 and 200R as truly versatile and indispensable instruments are their unique additional features of digital compass, digital tilt meter and dual channel temperature measurement.

区分紧凑坚固型的SOLAR SURVEY 100和200R 作为真正全能和不可或缺的仪器是它们独特的附加功能 数字罗盘 数字式倾角仪和双通道温度测量

These features let the operator rapidly identify the best location for harnessing the sun's energy. Dual channel temperature allows the installer to accurately and quickly measure ambient and module temperature, which are used to identify deviations from standard test conditions and thus ensure accurate I-V curve tracing.

这些功能帮助操作者快速地确认利用太阳能的最佳位置。双通道温度允许操作者能够准确快速地测量环境和组件温度，这个是用于确认与STC的偏差这样可以保证I-V 曲线追踪的结果

Key features and functions 主要特点和功能

- Suitable for both photovoltaic and solar thermal installations
适合光伏和太阳能安装
- Measures irradiation as required by IEC 62446
辐照度测量按照IEC62446
- 200R features Seaward Solarlink™ for simultaneous measuring
200R具有SEAWARD SOLARLINK功能可同时测量和传输
- Built-in compass and inclinometer
measure roof orientation and pitch
内建罗盘和倾角计测量屋顶方向和倾斜
- Dual channel temperature measurement
双通道温度测量
- Built-in data logger and USB interface
(Solar Survey 200R model only)
内建数据记录和USB方式
(仅SOLAR SURVEY 200R型号有)
- Rugged, robust and hand-held
坚固，结实，手持便携

Survey 100 Part No: 396A910
Survey 200R Part No: 396A914

Specification: 规格

IRRADIANCE 辐照度

Display Range 显示范围	0 – 1500 W/ m ² or 0 – 500 BTU/hr-ft ²
Measurement Range 测量范围	100 – 1250 W/m ² or 30 – 400 BTU/hr-ft ²
Resolution 分辨率	1 BTU/hr-ft ² / 1W/m ²

TEMPERATURE 温度

Display Range 显示范围	-30°C to +125°C
Measurement Ranges 测量范围	-30°C to +125°C
Resolution 分辨率	1°

COMPASS BEARING 罗盘方位

Display Range 显示范围	0° to 360°
Measurement Ranges 测量范围	0° to 360°
Resolution 分辨率	1°

INCLINOMETER 倾斜角

Display Range 显示范围	0° to 90°
Measurement Ranges 测量范围	0° to 90°
Resolution 分辨率	1°

DATALOGGING AND CONNECTIVITY (SURVEY 200R ONLY) 数据记录和连接方式 (只有SURVEY 200R)

Datasets 数据集	5000
Sample Rate 采样率	1 to 60 minutes (user definable 用户自定义)
Datalogging 数据记录	Download utility software included 包含下载工具软件 Compatible with SolarCert Elements software (version 1.1) 兼容SOLARCERT ELEMENTS软件 (版本1.1)
Connectivity 连接	USB download to PC USB方式下载数据到PC Wireless 'Solarlink™' to PV150 (range c. 100m / 330 ft) 无线'SOLARLINK'技术到PV150 (范围大约100m / 330 ft)

GENERAL SPECIFICATIONS 常规规格

Display 显示	Custom LCD 定制LCD
Power Supply 供电	2AA Alkaline Batteries 2AA碱性电池
Battery Life 电池周期	>20,000 Readings >20,000次读书
Auto power down 自动关机	After 2 minutes 2分钟后

SERVICEABILITY

Warranty 质保	2 years 2年
Calibration 校准	1 year 1年

Calibration Certificate supplied 提供校准证书

Solar Power Clamp. 光伏功率钳表

Advanced power analysis tool for fast and easy efficiency measurements.

先进的功率分析工具能够快速简单地进行效率测量

The Solar Power Clamp is a feature-packed Power Analyser designed to enable maintenance, troubleshooting and efficiency measurements on photovoltaic systems.

光伏功率钳表被设计成一个功能强大的功率分析工具 用于光伏系统的维护故障分析和效率测量

The Power Clamp simplifies and speeds up the process of determining the efficiency of PV systems. It can quickly measure current and voltage at both the AC and DC sides of the inverter, giving a true RMS reading of the power whilst the system is operational.

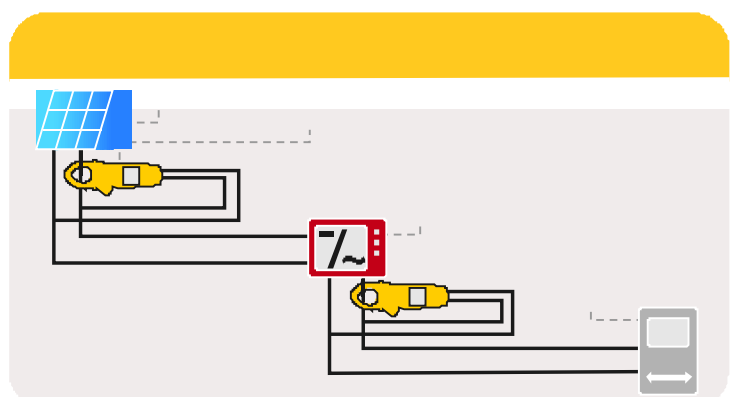
功率钳表简化和加速了确定光伏系统效率的流程。它可以快速测量逆变器的AC和DC两端的电流和电压，给出系统运转时功率的真有效值读数

The Solar Power Clamp can be used when installing a PV system to ensure the inverter is operating correctly or for maintenance and troubleshooting on the PV system after commissioning.

光伏功率钳表可被用于光伏系统安装时确认逆变器工作是否正确，或是用于维护和安装后的故障排除。

In addition to power and efficiency measurements, the harmonic analysis function of the Solar Power Clamp can be used as a means of detecting faults within the inverter.

除了功率和效率的测量，光伏功率钳表的谐波分析功能是逆变器故障查找的方法之一



As PV systems have a lifetime of over 25 years, periodic inspection and testing is necessary to ensure that they are operating efficiently. Most inverters have a lifetime much shorter than that of the entire system and so require particular attention as part of system inspection, and testing, to ensure optimal system return on investment and power output.

由于光伏系统的生命周期在25年以上，定期检查和测试是有必要的，可以保证系统在高效的工作。大多数逆变器的生命周期要短于其整个系统，所以要求特别关注系统检查和测试这个部分 可以确保最优系统和投资回报和输出功率。

Key features and functions 主要特点和功能

- High performance instrument for measuring AC and DC power
高水平的AC/DC功率测量
- Includes MC4 test leads for DC power measurements (others available)
MC4测试线缆用于DC功率测量 (其他可选)
- Power factor measurement and harmonic analysis up to 25th harmonic for inverter performance analysis
功率因素测量和25次谐波分析用于逆变器性能分析
- Rugged, robust and handheld, with active backlight and inbuilt cable illuminating torch – ideal for use in confined and/or dark spaces
坚固，结实，手持便携，背光显示和内置线缆照明手电筒-狭窄和黑暗空间使用的理想选择
- Full clamp-on multimeter capabilities
钳形万用表全部功能

Energy and Efficiency

Solar Panels

Power Clamp

Inverter

Reader

kW_s

Part No: 396A961

Specification:规格

Accuracy is \pm (% reading + number of digits) AT 23°C \pm 5°C < 80%RH 精度 \pm (% 读数 + 字数) 在23°C \pm 5°C < 80%RH

ACTIVE POWER 有功功率

Function功能	Range 范围	Accuracy 精度
ACW / DCW 交直流功率	0.000kW – 599.9kW	A, error*V, reading + V, error *A, reading

VOLTAGE 电压

Function功能	Range范围	Basic Accuracy基本精度
DCV直流电压	0.00 – 999.9V	\pm (0.7% + 2dgt)
ACV交流电压	0.00 – 999.9V	\pm (1.0% + 5dgt)
LPF (ACV)功率因素	0.00 – 999.9V	\pm (1% + 5dgt) @ 50Hz - 500Hz \pm (5% + 5dgt) @ >60Hz - 400Hz

Resolution (all)分辨率 0.01 V

CURRENT 电流

Function功能	Range范围	Accuracy精度
DCA直流电流	0.00A – 99.99A 100.0A - 599.9A	\pm (1.5% + 0.2 A) \pm (1.5% + 5dgt)
ACA交流电流	0.10A – 599.9A	\pm (1.5% + 5dgt) 50Hz - 60 Hz \pm (2% + 5dgt) >60Hz - 500 Hz
LPF功率因素	0.10A – 599.9A	\pm (1.5% + 5dgt) 50Hz - 60 Hz
ACA		\pm (5% + 5dgt) >60Hz - 500 Hz

PEAK HOLD : PEAK MAX / PEAK MIN

峰值保持：最大峰值/最小峰值

Function功能	Range 范围	Accuracy精度
ACV交流电压	140.0V 140.0V	\pm (3.0% + 15dgt)
ACA交流电流	140.0A 850A	\pm (3.0% + 15dgt)

FREQUENCY 频率

Function功能	Range范围	Accuracy精度
Frequency频率	20.00Hz - 9.999kHz	\pm (0.5% + 3dgt)

TOTAL HARMONIC DISTORTION总谐波畸变率

Function功能	Range 范围	Accuracy 精度
ACA /ACV交直流电 压电流	0.1 – 99.9%	\pm (3.0% + 10dgt)
Resolution分辨率	0.1%	

Harmonic Order谐波次数	Range范围	Accuracy精度
H01 ~ H12	0.1 – 99.9%	\pm (5% + 10dgt)
H13 ~ H25	0.1 – 99.9%	\pm (10% + 10dgt)
Resolution分辨率	0.1%	

INRUSH CURRENT 浪涌电流

Function功能	Range范围	Accuracy 精度
ACA交流电流	0.00A - 99.99A 100.0A - 599.9A	\pm (2.5% + 0.2A) \pm (2.5% + 5dgt)

POWER FACTOR 功率因数

Range范围	Resolution分辨率	Basic Accuracy基本精度
-1.00 - 1.00	0.01	\pm 3° \pm 1dgt

RESISTANCE, CONTINUITY & DIODE 电阻 连续性 二极管

Function功能	Range范围	Accuracy 精度
Resistance电阻	0.0 - 999.9 1.00k - 99.99 k	\pm (1.0% + 5dgt) \pm (1.0% + 3dgt)
Continuity连续性	0.0 - 999.9	\pm (1.0% + 5dgt)
Diode二极管	0.40 ~ 0.80V	\pm 0.1V

CAPACITANCE 电容

Function 功能	Range 范围	Accuracy 精度
Capacitance 电容	0.000 μ F - 4000 μ F	\pm (1.9% + 8dgt)
Resolution分辨率	0.001 μ F max	

GENERAL 常用

Safety 安全	IEC 61010
Power Requirement 单节9V电池供电	单节9V电池供电
Battery life 电池周期	~ 100 hours (alkaline battery)100小时 (碱性电池)
Size 尺寸	87 mm (W) x 239 mm (L) x 51 mm (H)

ADDITIONAL INFORMATION 附加信息

Warranty Period 质保周期	2 years
Calibration Interval 校准间隔	1 year

SolarCert Software.SOLARCERT软件 Easy-to-use Software for Solar PV Test Reporting and Certification. 易于使用的软件用于光伏测试报告 和认证证书

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SolarCert Elements is an easy to use, fast and functional software program. It's another Seaward total solution, designed to help you test, report and certificate in virtually every Solar PV testing situation. You can use SolarCert's manual data entry program to record and store data from each Solar PV installation you test. And now, using the PV150 installation tester, you can download the results into the software for added simplicity.

SOLARCERT ELEMENTS是一款易于使用，快速和功能性的软件程序。这是SEAWARD的另一个完整方案，设计用于帮助你测试，报告和发布证书在几乎所有的光伏测试条件下。你可以使用SOLARCERT的手动输入数据程序记录存储数据从你测试过的每一个光伏系统。现在，使用PV150安装测试仪，你可以下载数据结果到软件用于添加内容。

Finding individual pieces of measurement data is easy, as is viewing and printing records. With SolarCert, you can also access professional test and inspection reports as well as produce commissioning and performance verification documents.

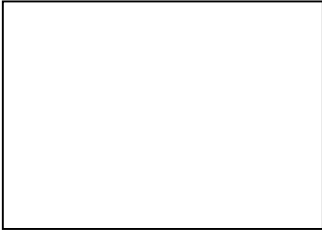
可以简单地找到单笔测量数据，查看和打印记录。用SOLARCERT,你同样可以进入专业的测试和检查报告，也可以生成试运行和性能验证文件。

Part No: 393A910

How SolarCert software helps your business

SOLARCERT 软件是如何帮助你的

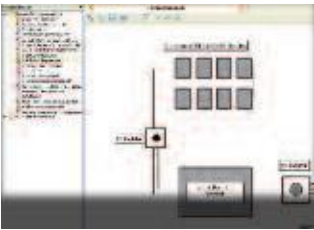
- Produces PV system verification report, PV array test reports and PV system inspection reports, as recommended by various national schemes and the international standard IEC 62446
生成光伏系统验证报告，光伏阵列报告，光伏系统检查报告，依照不同国家方案和IEC62446国际标准
- Generates professional reports and certificates生成专业报告和证书
- Intuitive, easy to use 直观的，易于使用
- Searches, views and prints records检索，查看和打印记录
- Saves to PDF format保存成PDF格式
- Improves efficiency and productivity提高效率和生产力
- Provides full traceability提供完整的可追溯性
PV Inspection Test Reports & PV System Verification
Certificate pads for hand written records are also available
光伏检查测试报告和系统验证
提供手写记录的证书模板



Step-by-step checklist for compiling reports 一步一步的清单列表来编译报告

- An easy-to-follow checklist gives installers peace of mind that all items
- required for a client handover pack are included in each project file, and
- makes compiling the correct information easier.
- 一个浅显易懂的清单列表让安装人员放心所有项目客户所要求的上交内容都包含在每个项目文件中，使得编译正确的信息更加简单

Create installation diagrams 创建安装图



- Easily create clear and concise representations of the PV circuit design
- with the schematic capture feature. Drag and drop components to create be
- spoke diagrams for each installation.
- 简单地创建清楚简明的带图形捕捉功能的光伏电路设计示意图。
- 拖放组件创建需要的每个安装的图

Search for existing client handover packs easily 简单地搜索现有客户移交的文件包

- searching for past projects and client handover packs is easy with the built-in search function.
- 利用内建的搜索功能可以简单地搜索过去的项目和客户移交的文件包

Customise certificates and reports 定制证书和报告

- Within SolarCert Elements, PV test certification and reports can be
- customised with your company logo. Enabling professional looking
- documents to be very easily produced.
- 使用SolarCerts Elements，光伏测试证书和报告可以定制放置公司的商标。有专业样子的文件很容易被生成。

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