CUSTOMERS REFERENCE

ZEALWE TECH

Catalog of PV Test Products

ZEALWE TECH, Improve Your Quality

Address：9th Building,55# Bixi Road,Minhang District,Shanghai,200245,China.

Tel：+86 21 54322103 Hotline:4008269956

E-mail：info@zealwe.cn

Web：en.zealwe.cn

Zip code：200245

ZEALWE CN website

ZEALWE EN website

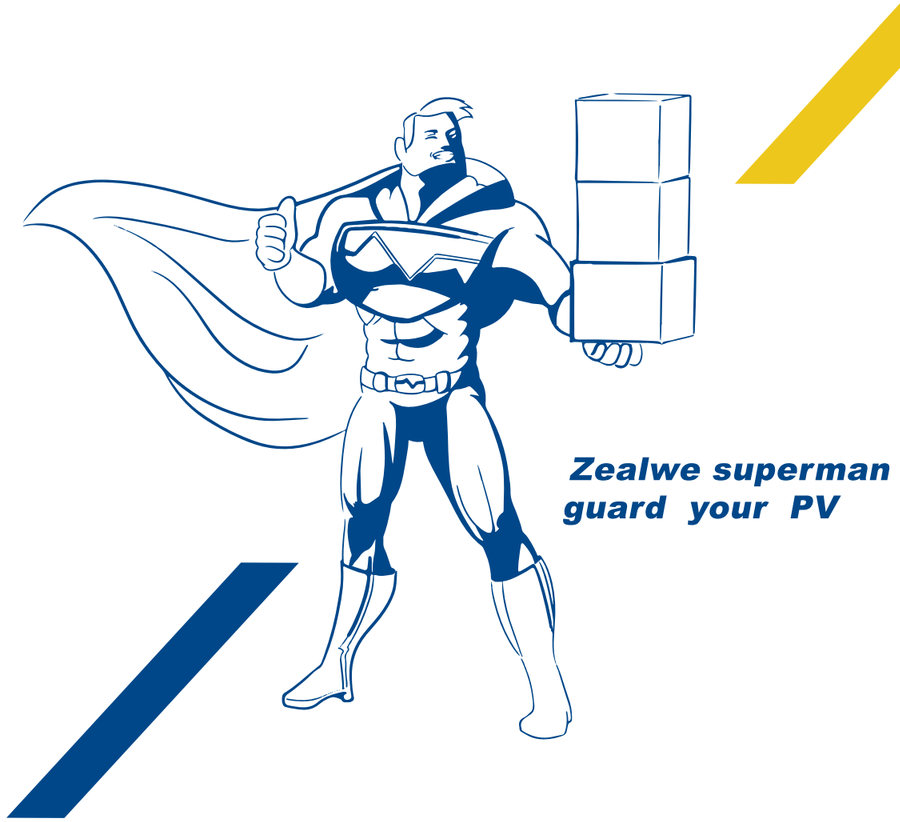
Shanghai High-Tech Enterprises
Specialized and Sophisticated Enterprises

ISO 14001:2015 ISO 9001:2015
ISO 45001:2018

Expert in PV Testing Solutions

www.zealwe.cn

ABOUT ZEALWE



Zealwe Technology Co., Ltd

As the "PV guarder", we offer turn-key solution of photovoltaic laboratory, Photovoltaic test equipments and Anti-PID solution. We are helping our customer to "improve power quality and power production" and devoting ourselves to develop the solar energy to main energy.

We are certificated by ISO9001, ISO14001 and ISO45001 standard. We are also certificated by Shanghai high-tech committee.

As the supplier of high-quality photovoltaic Lab turnkey projects and test equipment in PV industry, our products are widely praised by third-party test institutions, Solar cell suppliers, material suppliers and many other customers.

PV LABORATORY TURNKEY REFERENCE

As the prime contractor, we have successfully established(installed) several PV testing laboratories, e.g., TTL Lab in Jiaxing, Zhejiang Province, ERDA Lab in India, CGN Lab in Suzhou, NOA Lab in Shanghai, etc.

PV INDUSTRY STANDARDS REFERENCE

PV module test standard

IEC 61215	Terretrial photovoltaic(PV) modules-Degign qualification and type approval
IEC 61730	Photovoltaic(PV) module safety qualification
UL 1703	STANDARD FOR SAFETY Flat-Plate Photovoltaic Modules and Panels
IEC 61853	Photovoltaic(PV) module Performance Testing and Energy Rating
IEC TS 62804	Photovoltaic(PV) module-Test methods for the detection of potential-induced degradation
IEC 61701	Salt mist corrosion testing of phohovoltaic(PV) modules
IEC TS 63126	Guidelines for qualifying PV modules, components and materials for operation at high temperatures
IEC TS 62782	Photovoltaic (PV) modules - Cyclic (dynamic) mechanical load testing
UL 790	STANDARD FOR SAFETY Standard Test Methods for Fire Tests of Roof coverings
IEC 62716	Photovoltaic (PV) modules - Ammonia corrosion testing
IEC 62979	Photovoltaic modules - Bypass diode - Thermal runaway test
IEC 61646	Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval
IEC 60904	Photovoltaic devices
IEC 62938	Photovoltaic (PV) modules - Non-uniform snow load testing
IEC 60891	Potovoltaic devices-Procedures for temperature and irradiance corrections to measured I-V characteristics
CNAS-CL01-A021	Guidance on the Application of Testing and Calibration Laboratories Competence Accreditation Criteria in the Field of Photovoltaic products Testing
IEC 60068	Environmental testing requirement
ISO 11925	Reaction to fire tests — Ignitability of products subjected to direct impingement of flame
IEC 60529	Degrees of protection provided by enclosures (IP Code)
IEC 61345	UV test for photovoltaic (PV) modules
IEC 62941	Terrestrial photovoltaic (PV) modules – Quality system for PV module
IEC 63049	Terrestrial photovoltaic (PV) modules – Guidelines for effective quality
IEC 63342	Light and elevated temperature induced degradation(LeTID) test for c-Si Photovoltic(PV) modules
IEC TS 63209	Extended-stress testing of photovoltaic modules for risk analysis
IEC 62759-1	Photovoltaic(PV) modules-Transportation testing-Part 1: Transportation and shipping of module package units
IEC TS 62915	Photovoltaic(PV) modules-Type approval, design and safety qualification-Retesting
IEC TS 63163	Terrestrial photovoltaic(PV) modules for consumer products-Design qualification and type approval
IEC TS 63140	Photovoltaic(PV) modules-Partial shade endurance testing for monolithically integrated products
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories
IECEE OD-5014	Instrument Accuracy Limits

Spare parts and materials test standards

GB/T 37410-2019	Technical specifications of junction box for terrestrial solar-photovoltaic modules
GB/T 33765-2017	DC connector for terrestrial photovoltaic systems
IEC 62788	Measurement procedures for materials used in photovoltaic modules
GB/T 31034-2014	Insulating back sheet for crystalline silicon terrestrial photovoltaic(PV) modules
GB/T 29848-2013	Ethylene-vinyl acetate copolymer(EVA) film for encapsulant solar module
GB/T 29595-2013	Sealant material in terrestrial photovoltaic (PV) modules - Silicone sealant
IEC 62790	Junction boxes for photovoltaic modules-Safety requirements and tests
IEC 60270	High-voltage test techniques - Partial discharge measurements
GB/T 37408-2019	Technical requirements for photovoltaic gird-connected inverter

Inverter test standard

GB/T 37409-2019	Testing specification for photovoltaic grid-connected inverter
GB/T 34936-2017	Technical requirement of combiner box for photovoltaic power station
GB/T 34933-2017	Technical code for combiner box test of photovoltaic power station
NB/T 42142-2018	Technical specification of photovoltaic grid-connected micro inverter
CNCA/CTS0006	Safety of power converters for use in PV power systems
CGC/GF004	Technical Specification of Grid-connected PV inverter
IEC 62109	Safety of power converters for use in photovoltaic power systems
IEC 61000	Electromagnetic compatibility (EMC)
UL 1741	STANDARD FOR SAFETY Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources
IEC TS 61836	Solar photovoltaic energy systems-Terms, definitions and symbols

Solar power plant standard

IEC 62852	Connectors for DC-application in photovoltaic systems - Safety requirements and tests
IEC 62446	Photovoltaic(PV) systems-Requirements for testing, documentation and maintenance
GB50794	Code for construction of PV power station
JB/T 13390	Infrared line scanning thermometer
CNCA/CTS0016	Guideline of Performance Testing and Quality Assessment for Grid-connected PV Power Plants
CQC33-461239	Solar Product Certification Rules for Power Converters for use in Photovoltaic Power Systems
GB/T 19064	Solar home system specifications and test procedure
GB/T 37663	Outdoor empirical test requirements for distributed photovoltaic in warm damp climate
IEC 60364-7-712	Low voltage electrical installations - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
IEC 61724	Photovoltaic system performance
GB/T 16895.32	Electrical installations of buildings - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
IEC 60664	Insulation coordination for equipment within low-voltage systems
CGC/GF003.1:2009(CNCA/CTS0004)	Basic acceptance requirements for grid-connected PV systems
IEC 61829:1995	Crystalline silicon photovoltaic(PV) array-On-site measurement of I-V characteristics
IEC 62116	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
IEEE 1547-2018	IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces
GB24460	Generic technical specification of solar photovoltaic(PV) lighting installation
CGC/GF 002	Technical Specifications of PV Combiner Box
IEC 62124	Photovoltaic (PV) stand alone systems - Design verification
GB/T19964	Technical requirements for connecting photovoltaic power station to power system
Q/GDW 617	Technical rule for photovoltaic power station connected to Power Grid
GB/T50866	Design code for photovoltaic power station connecting to power system
GB/T 19939	Technical Requirements for Crid Connection of PV System
NB/T 32004	Technical Specification of PV grid-connected inverter
CGC/GF 035	Technical specification for China efficiency of grid connected PV inverters
EN50530	Overall efficiency of grid connected photovoltaic inverters
NFPA70-NEC-2017.690/691	Natinal Electrical Code-2017.690-Solar Photovoltaic(PV) Systems/691-Large-Scale Photovoltaic(PV) Electric Power Production Facility
JG/T 490-2016	General specification of bracket for solar photovoltaic system
IEC62108	Concentrator photovoltaic (CPV) modules and assemblies - Design qualification and type approval

Test standard for energy storage system

IEC 61427	Secondary cells and batteries for renewable energy storage - General requirements and methods of test
GB/T 36276-2018	Lithium ion battery for electrical energy storage
GB/T 22473-2008	Lead-acid storage batteries used for energy storage
GB/T 36280-2018	Lead-carbon battery for electrical energy storage
GB/T 34120-2017	Technical Specification for power conversion system of electrochemical energy storage system
GB/T 34133-2017	Testing code for power converter of electrochemical energy storage system
GB/T 34131-2017	Technical standard for battery management system of electrochemical energy storage station

PV INDUSTRY STANDARDS REFERENCE

PV module test standard

IEC 61215	Terretrial photovoltaic(PV) modules-Degign qualification and type approval
IEC 61730	Photovoltaic(PV) module safety qualification
UL 1703	STANDARD FOR SAFETY Flat-Plate Photovoltaic Modules and Panels
IEC 61853	Photovoltaic(PV) module Performance Testing and Energy Rating
IEC TS 62804	Photovoltaic(PV) module-Test methods for the detection of potential-induced degradation
IEC 61701	Salt mist corrosion testing of phohovoltaic(PV) modules
IEC TS 63126	Guidelines for qualifying PV modules, components and materials for operation at high temperatures
IEC TS 62782	Photovoltaic (PV) modules - Cyclic (dynamic) mechanical load testing
UL 790	STANDARD FOR SAFETY Standard Test Methods for Fire Tests of Roof coverings
IEC 62716	Photovoltaic (PV) modules - Ammonia corrosion testing
IEC 62979	Photovoltaic modules - Bypass diode - Thermal runaway test
IEC 61646	Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval
IEC 60904	Photovoltaic devices
IEC 62938	Photovoltaic (PV) modules - Non-uniform snow load testing
IEC 60891	Potovoltaic devices-Procedures for temperature and irradiance corrections to measured I-V characteristics
CNAS-CL01-A021	Guidance on the Application of Testing and Calibration Laboratories Competence Accreditation Criteria in the Field of Photovoltaic products Testing
IEC 60068	Environmental testing requirement
ISO 11925	Reaction to fire tests — Ignitability of products subjected to direct impingement of flame
IEC 60529	Degrees of protection provided by enclosures (IP Code)
IEC 61345	UV test for photovoltaic (PV) modules
IEC 62941	Terrestrial photovoltaic (PV) modules – Quality system for PV module
IEC 63049	Terrestrial photovoltaic (PV) modules – Guidelines for effective quality
IEC 63342	Light and elevated temperature induced degradation(LeTID) test for c-Si Photovoltic(PV) modules
IEC TS 63209	Extended-stress testing of photovoltaic modules for risk analysis
IEC 62759-1	Photovoltaic(PV) modules-Transportation testing-Part 1: Transportation and shipping of module package units
IEC TS 62915	Photovoltaic(PV) modules-Type approval, design and safety qualification-Retesting
IEC TS 63163	Terrestrial photovoltaic(PV) modules for consumer products-Design qualification and type approval
IEC TS 63140	Photovoltaic(PV) modules-Partial shade endurance testing for monolithically integrated products
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories
IECEE OD-5014	Instrument Accuracy Limits

Spare parts and materials test standards

GB/T 37410-2019	Technical specifications of junction box for terrestrial solar-photovoltaic modules
GB/T 33765-2017	DC connector for terrestrial photovoltaic systems
IEC 62788	Measurement procedures for materials used in photovoltaic modules
GB/T 31034-2014	Insulating back sheet for crystalline silicon terrestrial photovoltaic(PV) modules
GB/T 29848-2013	Ethylene-vinyl acetate copolymer(EVA) film for encapsulant solar module
GB/T 29595-2013	Sealant material in terrestrial photovoltaic (PV) modules - Silicone sealant
IEC 62790	Junction boxes for photovoltaic modules-Safety requirements and tests
IEC 60270	High-voltage test techniques - Partial discharge measurements
GB/T 37408-2019	Technical requirements for photovoltaic gird-connected inverter

Inverter test standard

GB/T 37409-2019	Testing specification for photovoltaic grid-connected inverter
GB/T 34936-2017	Technical requirement of combiner box for photovoltaic power station
GB/T 34933-2017	Technical code for combiner box test of photovoltaic power station
NB/T 42142-2018	Technical specification of photovoltaic grid-connected micro inverter
CNCA/CTS0006	Safety of power converters for use in PV power systems
CGC/GF004	Technical Specification of Grid-connected PV inverter
IEC 62109	Safety of power converters for use in photovoltaic power systems
IEC 61000	Electromagnetic compatibility (EMC)
UL 1741	STANDARD FOR SAFETY Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources
IEC TS 61836	Solar photovoltaic energy systems-Terms, definitions and symbols

Solar power plant standard

IEC 62852	Connectors for DC-application in photovoltaic systems - Safety requirements and tests
IEC 62446	Photovoltaic(PV) systems-Requirements for testing, documentation and maintenance
GB50794	Code for construction of PV power station
JB/T 13390	Infrared line scanning thermometer
CNCA/CTS0016	Guideline of Performance Testing and Quality Assessment for Grid-connected PV Power Plants
CQC33-461239	Solar Product Certification Rules for Power Converters for use in Photovoltaic Power Systems
GB/T 19064	Solar home system specifications and test procedure
GB/T 37663	Outdoor empirical test requirements for distributed photovoltaic in warm damp climate
IEC 60364-7-712	Low voltage electrical installations - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
IEC 61724	Photovoltaic system performance
GB/T 16895.32	Electrical installations of buildings - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
IEC 60664	Insulation coordination for equipment within low-voltage systems
CGC/GF003.1:2009(CNCA/CTS0004)	Basic acceptance requirements for grid-connected PV systems
IEC 61829:1995	Crystalline silicon photovoltaic(PV) array-On-site measurement of I-V characteristics
IEC 62116	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
IEEE 1547-2018	IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces
GB24460	Generic technical specification of solar photovoltaic(PV) lighting installation
CGC/GF 002	Technical Specifications of PV Combiner Box
IEC 62124	Photovoltaic (PV) stand alone systems - Design verification
GB/T19964	Technical requirements for connecting photovoltaic power station to power system
Q/GDW 617	Technical rule for photovoltaic power station connected to Power Grid
GB/T50866	Design code for photovoltaic power station connecting to power system
GB/T 19939	Technical Requirements for Crid Connection of PV System
NB/T 32004	Technical Specification of PV grid-connected inverter
CGC/GF 035	Technical specification for China efficiency of grid connected PV inverters
EN50530	Overall efficiency of grid connected photovoltaic inverters
NFPA70-NEC-2017.690/691	Natinal Electrical Code-2017.690-Solar Photovoltaic(PV) Systems/691-Large-Scale Photovoltaic(PV) Electric Power Production Facility
JG/T 490-2016	General specification of bracket for solar photovoltaic system
IEC62108	Concentrator photovoltaic (CPV) modules and assemblies - Design qualification and type approval

Test standard for energy storage system

IEC 61427	Secondary cells and batteries for renewable energy storage - General requirements and methods of test
GB/T 36276-2018	Lithium ion battery for electrical energy storage
GB/T 22473-2008	Lead-acid storage batteries used for energy storage
GB/T 36280-2018	Lead-carbon battery for electrical energy storage
GB/T 34120-2017	Technical Specification for power conversion system of electrochemical energy storage system
GB/T 34133-2017	Testing code for power converter of electrochemical energy storage system
GB/T 34131-2017	Technical standard for battery management system of electrochemical energy storage station

CONTENT

IEC61215

IEC61730

Others

Visual inspection tester

Meet the standards：IEC61215-MQT01, IEC61730-MST01

Datasheet

Model	ZW-VIT
Bracket material	Aluminum profile
Number of drawers	4
The countertop material	Anti slip & Anti-static board
Light source	Fluorescent lamp or LED lamp
Color rendering index	>90%
Spot Area	Customized
Illuminance value	⩾ 1000 Lux
Illuminometer measurement range	0.1 to 20000 Lux
Resolution	0.1Lux
Accuracy	± (3% rdg+0.5% F.S)
Fixed bracket for safety equipment	Optional
Camera	Optional
Other accessories	Optional

Introduction

Visual defects may have negative influence on the module function. Make note of and/or photograph the nature and position of any cracks bubbles or delaminations may worsen and adversely affect the module performance. Record any other relevant information regarding origin of failure and associated test.

ZW-VIT series product, meet the visual inspection test specified in MQT01 item in IEC61215 and MST01 item in IEC61730 standard.

Features

- The aluminum profile with caster structure is convenient for turnover, installation and disassembly.
- Flexible configuration, other devices can be placed.
- Antistatic composite tabletop, wear-resistant, non-slip, and antistatic.
- Fluorescent lamps have high color rendering index, long service life and are easy to replace.
- Four drawers can be used to place test instruments and documents.

Application Reference

Outdoor test system

Meet the standards：IEC61215-MQT02、MQT04、MQT05、MQT06、MQT07、MQT08、MQT09、MQT19，IEC61730-MST02、MST03、MST21，UL1703-19、20，IEC61853

Introduction

The test system meet the outdoor test specified in IEC61215, IEC61730, IEC61853 standards. Evaluate the outdoor performance and compare the performance of difference technical product.

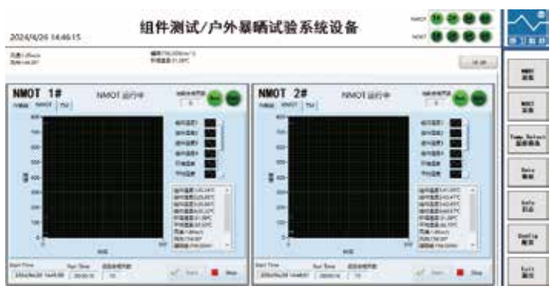
Features

- Monitoring environmental parameters such as irradiance, ambient temperature, wind speed, wind direction;
- For NMOT testing, the computer screens data, simulates curves, and obtains NMOT data. Set recording conditions to meet the standards. The location of environmental sensors shall be installed according to IEC61730 . Set up brackets, blackboards and layout temperature testing lines according to IEC requirements.
- For temperature test, different position temperature could be monitored;
- Compare and analyze the differences in power generation between different components by scanning the IV curve of the electronic load or collecting DC power from the inverter.
- By scanning the IV curve of the component and calculating the power of STC based on temperature, irradiance, wind speed, and other data, evaluate the long-term attenuation of the component during operation.
- By long-term tracking of IV curve data, calculate the temperature coefficients of various parameters of the components.
- By long-term tracking of IV curve data and combining it with parameters such as irradiance and temperature, performance under low irradiance can be obtained.

Datasheet

Model		ZW-OTS
Pyranometer		SMP3(Kip&zonne)
Anemometer	Wind speed	0-40m/s
	Wind speed resolution	0.01m/s
	Wind direction range	0-359.9°
	Wind direction resolution	0.1°
Ambient	Range	-40～80°C
	Accuracy	±1°C
	Resolution	0.1°C
Module temerpature	Range	-50～200°C
	Accuracy	±2°C
	Resolution	0.1°C
Inverter (micro inverter)	Maximum voltage	60V
	MPPT voltage range	16~48V
	Maximum current	23A
	Rated power	750W
Frame	Material	C shape steel
	Base	Removable cement block or Customized
	NMOT support	Optional
	TT support	Optional
Computer		ADVANTECH

Software Reference



Hipot tester

Meet the standards：IEC61215-MQT03，IEC61730-MST16，UL1703-21、26

Introduction

The insulation between internal live part in the solar module and the external part is very important. ZW-HIT series instrument is applied to output high voltage between the internal part and external part with insulation inspection and wet leakage inspection function.

Features

- LCD screen display
- Hipot& insulation could be tested;
- Some program could be preset.
- R232/R485 communication is optional;
- Optional for computer control and recording

Datasheet

Hipot function	Output Voltage	0.1-12KV(VDC)
	Voltage resolution	1V
	Voltage accuracy	3%+5V
	Max current	5mA
	Current resolution	1μA
Insulation function	Current resolution	3%
	Voltage range	500～2500 (VDC)
	Resistance range	100KΩ-99GΩ
	Resistance accuracy	2%+3@(100KΩ-10GΩ)/ 20%@(10GΩ-99GΩ)
Insulation test table		Optional
IPC		Optional

Steady Sun simulator

Meet the standards：IEC61215-MQT09、MQT19

Introduction

The ZW-SSS series products are steady-state solar source simulator systems developed for hot spot testing, and can also perform component stability testing

Features

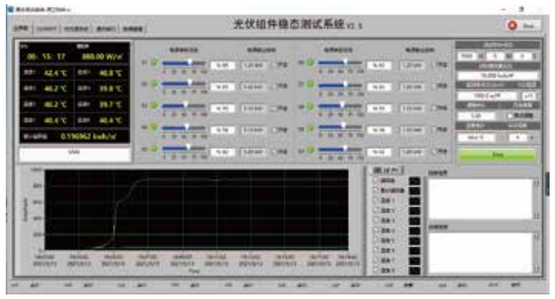
- Spectral mismatch, irradiation non-uniformity, and irradiation instability must meet at least BBA level standards.
- The irradiance range reaches 700-1300W/m2;
- The component temperature can be controlled between 20-80°C;
- Each light source has a separate control system, EPS control;
- IV scanning system, testing the IV curve and performance of components;
- Manual control of irradiance or automatic control based on irradiance intensity values;
- Industrial computer control and recording, Windows 10 operating system, can effectively control and record for a long time.

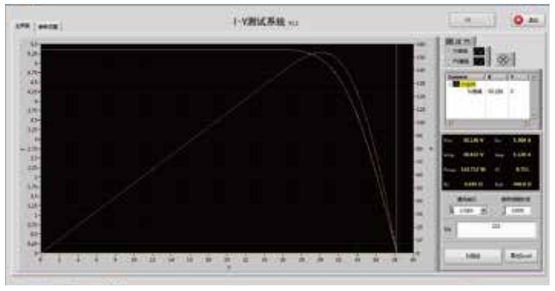
Steady Sun simulator

Datasheet

Model	ZW-SSS01	ZW-SSS02
Outer box structure	With thermal insulation material	Without thermal insulation material
Temperature control	compressor	strong ventilation
Temperature range	20～80°C	50±10°C
Temperature uniformity	±2°C	±10°C
Lamp type	Metal halide lamp	
Spectrum mismatch	B class	
Light uniformity	B class	
Light stability	A	
Lamp warranty	⩾1000h/⩾2500h	
Pyranometer	SMP3	
IV tracker	Optional	
Dual axis uniformity scanning	Optional	
Infrared thermal imager	Optional	
Micro inverter	750W	
Temperature range	0～300°C	
Temperature resolution	0.1°C	
Temperature accuracy	±2°C	
IPC	ADVANTECH	

Software Reference





Application Reference

UV preconditioning chamber

Meet the standards：IEC61215-MQT10, IEC61730-MST54

Features

- Adopting special technology, high UV intensity, and short testing time;
- Each lamp is separately controlled by each EPS.
- The UV irradiance, temperature can be monitored and recorded.
- Inverter is applied to track the max power point of the solar module (MPPT)
- IPC with Window 10 operation system and19'' display are applied to monitoring, recording the data. All the data could be stored in the hard disc as CSV/EXEL/PDF/JPG format.

Introduction

There are EVA, Silica Gel, backsheet, junction box, cable, which are composed of polymer material, in encapsulation part of solar module. The material may be worsen after UV exposure. ZW-UVC series product could offer steady UV light on the solar module to evaluate the anti UV aging function.

Software Reference and Application Reference

Datasheet

Model	ZW-UVC
Cabinet material	thermal insulation material
Temperature control	Compressor
Temperature range	60～80°C
Temperature uniformity	±5°C
UVB/UVA+UVB	3%～10%
Light uniformity	≤15%
Irradiance	≤250W/m^2
Lamp warranty	≥1000h / ≥2500h
UV Radiometer	UVA+UVB
UV Spectrometer	Optional
Dual axis uniformity scanning	Optional
Mppt tracker	750W
Thermocouple range	0～100°C
Temperature resolution	0.1°C
Temperature accuracy	±2°C
IPC	ADVANTECH

Environment chamber

Meet the standards：IEC61215-MQT10、MQT11、MQT12, IEC61730-MST37、MST51、MST52、MST53、MST55、MST56, UL1703-34、35、36

Features

- Perfect air circulation system to make the temperature uniform in the chamber;
- Pressure relief design to avoid deformation of the chamber;
- Shock absorption and noise absorption are designed in compressor region to decrease the noise;
- Large observation windows to expand the effective visual range
- Customized with unique structural design and enable the entire machine to disassemble and relocate
- Multi-functional database storage & analysis, Ethernet connection, USB, 232 interface
- VRF control(Variable Refrigerant Flow) technology is applied to sustain the low consumption; In the low-temperature without the heater participant, through PID+PWM to adjust both the flow rate & direction of the refrigerant, and the three-way flow rate of the refrigeration pipeline, cold bypass pipeline, and hot bypass pipeline, to achieve automatic and constant temperature, achieving a 40% energy reduction under low-temperature conditions.

Introduction

The environment chamber could be applied to determine the ability of the module to withstand thermal mismatch, fatigue and other stresses caused by repeated changes of temperature, the ability of the module to withstand the effects of high temperature and humidity followed by sub-zero temperatures, the ability of the module to withstand the effects of long-term penetration of humidity.

Software Reference

Datasheet

Model	ZW-EC01	ZW-EC02	ZW-EC03
Temperature range	-50～120°C		RT+10～120°C
Temperature uniformity	≤2.0°C		
Temperature fluctuation	≤1.0°C		
Temperature deviation	≤2.0°C		
Temperature ramp up rate	Linear 1.67-3.3°C/min @(-40～105°C), full load		Average 2°C/min
Temperature decreasing rate	Linear 1.67-3.3°C/min @(105～-40°C), full load		Average 0.8°C/min
Humidity range	/	20～95%RH	
Humidity fluctuation	/	+2～-3%@(>75%RH) & ±5%@(≤75%RH)	
Humidity deviation	/	≤±3%RH	
Compressor	Bitzer / Bock		Copeland/Without chiller
Humidity sensor	/	Wet ball gauze or Electronic type for optional	
Chamber material	With/without thermal insulation materia		

Current continuity testing system

Meet the standards: IEC61215-MQT10、MQT11、MQT16、MQT20、MQT22, IEC61730-MST26、MST34、MST51、MST52, UL1703-28、35、36、41, IEC62782

Introduction

In some test, like TC test, HF test, Letid test, Mechanical load test, Bending test, Reverse over current test, etc., current should be applied in the solar module. The ZW-PS series product is designed to offer current as per the IEC standard specified.

Datasheet

Model	ZW-PS01	ZW-PS02
Voltage range	0～100V	
Voltage resolution	0.01V	
Voltage accuracy	0.2%+40mV	
Current1 range	1A～100A(Optional)	
Current1 resolution	0.01A	
Current1 accuracy	0.2%+30mA	
Current2 range	200mA	
Current2 resolution	1mA	
Current2 accuracy	0.2%+4mA	
Insulation voltage range	/	100V
Insulation current range	/	0～1mA
Insulation current resolution	/	1uA
Insulation current accuracy	/	±5‰
Grounding resistance range	/	0～1Ω
Grounding resistance resolution	/	1mΩ
Grounding resistance accuracy	/	±5‰
Temperature range	-50～200°C	
Temperature resolution	0.1°C	
Temperature accuracy	±2°C	

Features

- IPC controls the output of voltage and current, with segmented current control and high accuracy
- Voltage and current data and curves can be displayed in real-time, recorded and saved for a long time;
- The power supply controlled separately and easy to expand other functions

Software Reference

Robustness of terminations tester

Meet the standards: IEC61215-MQT14, IEC61730-MST42, UL1703-22、29

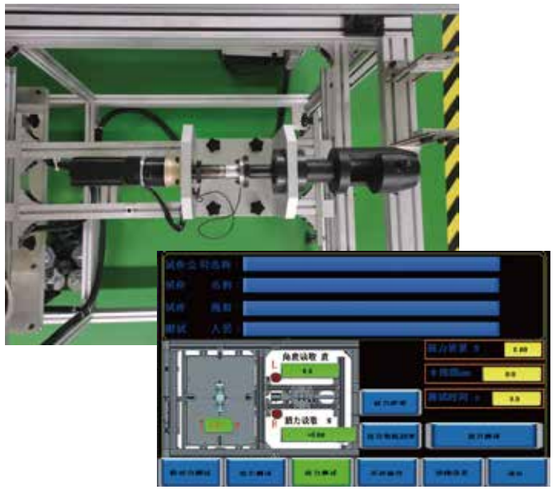
Introduction

The terminations of the solar module, and the attachment of the cables to the body will withstand stresses that are likely to be applied during normal assembly or handling operations.

ZW-TRT series product is designed for test retention and the cord anchorage function of the termination.

Torque test

- Force driver：Motor
- Test time：1min (Programmable)
- Display the torque force, angle.



Pull test

- Motor offer the driver
- Force: 30N(Standard), 42N, 55N, 70N, 80N, 89N, 90N, 100N, 115N, 156N(Optional)
- Frequency: 1s;
- Pull times: 54 times(Programmable);
- Displacement: Manual measurement

Retention test

- Apply 40N at the center point of the box to prevent torque from being applied to the junction box
- Holdup time: 10±1s
- Force driver: Weight;
- Timer: Stopwatch.

Wet leakage current tester

Meet the standards: IEC61215-MQT15, IEC61730-MST17, UL1703-27

Introduction

ZW-WLT is designed to evaluate the insulation of the module under wet operating conditions and verify that moisture from rain, fog, dew or molten snow does not enter the active parts of the module circuitry, where it might cause corrosion, a ground fault or a safety hazard.

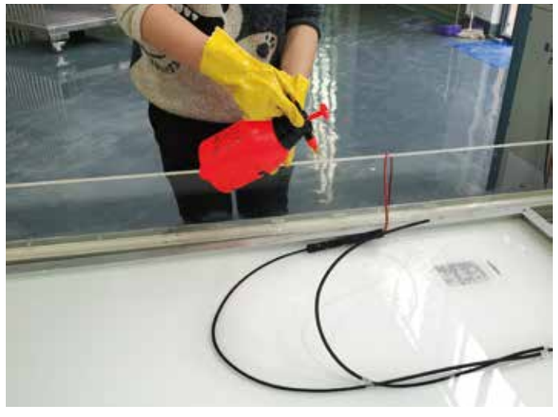
Features

- Water temperature could be controlled by heater & chiller;
- Resistivity could be monitored by conductivity sensor;
- Equipped with an insulation tester, it can perform voltage and leakage tests on components;
- The trough is made of PMMA which the inside could be observed during test.
- Aluminum alloy profile bracket, with universal brake casters installed at the bottom
- The bottom is equipped with a drainage valve for easy cleaning;
- Equipped with overload, overcurrent, and overvoltage alarms

Datasheet

Model	ZW-WLT
Trough material	PMMA
Trough thickness	20mm
Trough capacity	customized
Voltage resistance	0.1～12KV/0.1～15KV
Insulation voltage	500～2500V
Voltage accuracy	3%
Voltage resolution	0.1V
Insulation resistance	100KΩ～99GΩ
Resistance accuracy	±(2%+3dig)@(100kΩ～999MΩ)/ ±(5%+3dig)@(1.00GΩ～9.99GΩ)/ ±(20%+3dig)@(10GΩ～99GΩ)
Temperature control range	22±2°C
Heating power	2KW
Cooling power	1.5HP
Temperature accuracy	±1°C
Conductivity range	1.0～2000μS/cm (equal to 500～1000000Ω · cm)
Resistivity Deviation	±1.0%FS
Conductivity testing repeatability	±0.2%FS
Temperature range	0～50°C
Temperature resolution	0.1°C
Temperature accuracy	±1°C

Application Reference



Hail tester

Meet the standards: IEC61215-MQT17

Introduction

As applications of solar cells become wider, more problems appear with solar products. Solar energy will be easily damaged by natural disasters such as hails during its application. This test apparatus is designed as per clause MQT17 in IEC61215 standard, which can simulate the outdoor hail impact. Hail is simulated by ice ball.

Features

- The ice ball launcher is movable;
- The ice ball is launched vertically;
- The speed of the ice ball can be monitored with a velometer system;
- The ice ball is launched by compressed air and the pressure is adjustable;
- A variety of fixtures are provided to adapt to the modules of different structures;
- The ice ball launch point can be pre-set and checked by infrared rays;
- Ice ball molds are applied to produce ice ball as per the standard;
- The equipment has a waste ice ball collection tank below the module (optional);
- The equipment is provided with protective measures to prevent ice balls from splashing(optional).
- Touch screen control and recording(optional).

Datasheet

Model		ZW-HT
Support and moving system	Area	Customized
	Main architecture	8080 aluminum profile
	Launch direction	Vertically
	Distance between launcher and module	＜100cm
	X axis moving distance	Customized
	X axis moving speed	⩽45mm/s
	Y axis moving distance	Customized
	Y axis moving speed	⩽27mm/s
	Broken hail collector	Included
	Impact surface protection	Included
	Other surface protection	Optional
Launcher and Ice ball mould	Diameter	25mm, 35mm, 45mm /55mm, 65mm, 75mm
Electronic balance	Weight range	0-300g
	Weight accuracy	± 0.01g
Caliper	Size range	0-100mm
	Size accuracy	±0.02mm
Freeze chamber	Temperature range	-10±5°C
Storage chamber	Temperature range	-4±2°C

Software Reference

Mechanical load tester

Meet the standards: IEC61215-MQT16、MQT20, IEC61730-MST34, UL1703-41, IEC62782

Air Bag Load

Features

- Adopting dual chamber, with components placed between two chambers. Contact surface between component and chamber is made of highly elastic thin film, ensuring the pressure is in close contact with components surface and the applied force is uniform
- The air pressure control system precisely controls the air pressure inside the air chamber and transmits it to the surface of the component

Software Reference

- The number of cycles, testing time, and current magnitude can be set:
- Recordable deformation parameters;
- The current of the monitoring component can be recorded in real time, with real-time curves and exported data;
- Aluminum architecture, convenient for disassembly and installation;
- High precision data acquisition to ensure data accuracy

Datasheet

Model	ZW-MLT0101	ZW-MLT0202	ZW-MLT0204
Frame	Sandbag	Cylinder	Airbag
Front pressure	0～5400Pa	0～10000Pa	0～10000Pa
Back pressure	0～2400Pa	0～6000Pa	0～10000Pa
Frequency@1000Pa	/	3～7cycles/min	
Pressure uniformity	⩽5%@full surface	⩽5%@between cylinder	⩽5%@full surface
Pressure deviation	⩽5%		
Deformation sensor	±200mm		
Deformation accuracy	±0.1mm		
Voltage range	Customized		
Current range	Customized		
Test area	Customized		
Compressed air flow rate	/	⩾2.4m^3/min@0.8MPa	

Mechanical load tester

Cylinder load

Features

- Load application method: The cylinder drives the suction cup to press and suck;
- Mechanical load material and structure: made of aluminum alloy hot extruded profiles, movable aluminum alloy frame;
- Each suction cup structure includes a cylinder, suction cup, pressure gauge, etc., making control more convenient;
- IPC control and recording, with large data storage capacity;
- Pressure, tension, holding time, number of cycles, cycle frequency, and current magnitude can be pre-set;
- The pressurization time can be set;
- It can record and store the forward pressure, reverse pressure, deformation, temperature, cycle times, current values during the testing process, and the data can be exported through EXCEL;
- The gas source is equipped with a safety valve and a status warning light. In the event of a test failure, the equipment will sound an alarm and stop testing;

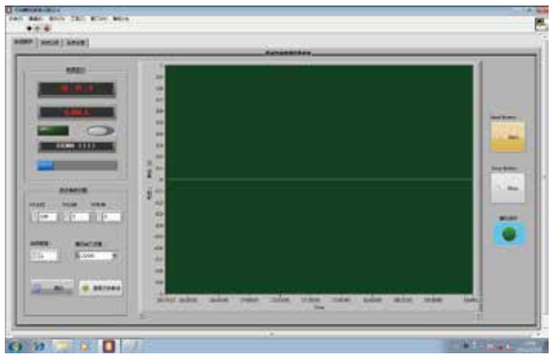
Software Reference

Sandbag load

Features

- The scheme adopts modular design, and users can choose and integrate components according to their needs;
- The current of the monitoring component can be recorded in real time, with real-time curves. If the current decreases, an alarm can be triggered and data can be exported;
- Deformation tester, testing component deformation;
- Portable sandbag structure, easy to transport;
- Aluminum profile architecture, convenient for disassembly and installation;
- Controlled by an industrial computer, it can record test data and save it in Excel format;
- Equipped with an electronic scale for measuring the weight of sandbags.

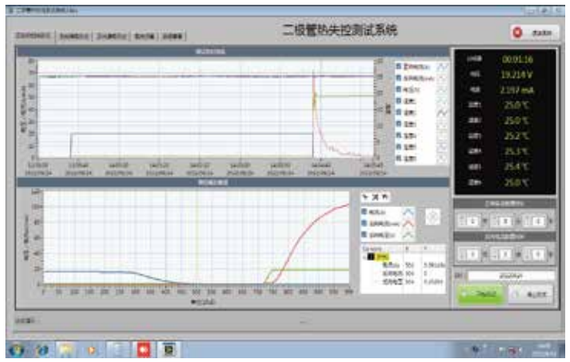
Software Reference

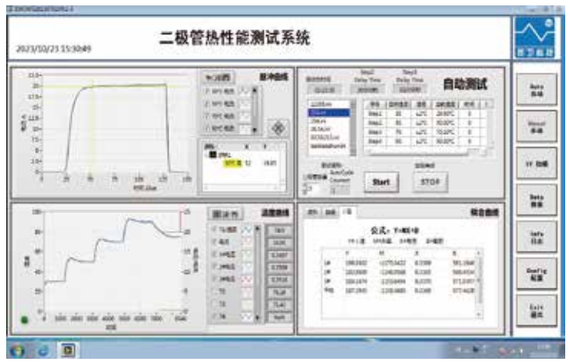


Diode test system

Meet the standards：IEC61215-MQT18, IEC61730-MST07、MST25, IEC62979

Software Reference





Introduction

Bypass diode in the solar module is applied to prevent Hot spot issue.The important function of the bypass diode is forward conduction and reverse cut-off function. The ZW-BD test system is designed to evaluate the diode thermo and runaway feature.

Features

- Control the current output pulse time of the power supply to be less than 1ms;
- Control the power supply to output a constant current;
- During the pulse current stage, collect parameters such as pulse current, diode voltage drop, junction box temperature, etc;
- Automatically simulate the relationship between VD and TJ using the least squares method;
- Obtain VD data at 75 °C and ID=Isc, and calculate the TJ value at 75 °C;
- All data can be exported in EXCEL format for easy data processing and analysis;
- Can test the forward volt ampere characteristics of diodes;
- By using a fast circuit converter, fast switching between forward and reverse voltage circuits can be achieved within 10ms.

IEC61215

Diode test system

Datasheet

Model		ZW-BD02	ZW-BD03
Pulse current power supply	Pulse time	⩽1ms	/
	Current time	⩽50A	/
Forward current power supply	Current range	⩽50A	⩽50A
Reverse voltage power supply	Voltage range	/	⩽100V
	Current range	/	⩽10A
	Reverse time	/	⩽10ms
Voltage sensor	Voltage range	0-2V	⩽100V
	Voltage accuracy	⩽1.5%	
Leakage current sensor	Current range	/	0-1A/0-1mA
	Current resolution	/	1mA/1uA
	Current accuracy	/	0.2%+2mA/0.2%FS+2uA
Thermocouple	Temperature range	0-250°C	
	Temperature accuracy	±2°C	
	Temperature repeatability	0.5°C	
Data logger	Sampling frequency	800HZ～6MHZ	
	resolution	16bit	
	Higher frequency Oscilloscope	Optional	
Chamber (Optional)	Temperature range	10-120°C	RT+10-120°C
	Temperature uniformity	±2°C	±2°C
	Temperature stability	±2°C	±2°C
	Internal size(larger size is optional)	500mm*450mm*450mm	
	Compressor	Included	without

IEC61215

PID test system

Meet the standards：IEC61215-MQT21, IEC62804

Introduction

ZW-PID test system could offer voltage to evaluate the module design's ability to withstand degradation from applied system voltage, also known as Potential Induced Degradation(PID).

Features

- The grounding of the component frame not only simulates the actual situation, but also prevents potential dangers caused by high voltage in the frame during the testing process;
- For each component, a 4-wire testing method is used, with 2 high-voltage wires and 2 grounding wires.
- he high-voltage line is connected to the interior of the component through a junction box, and the grounding wire is connected to the frame or connected to other effective positions;
- Simultaneous display of multiple voltages, leakage currents, and insulation resistance;
- Real time monitoring of voltage, leakage current, and insulation resistance curves;
- Multiple voltage levels can be individually programmed and set according to specific needs;
- Voltage forward and reverse programmable settings, with individual settings for any channel;
- Simulate the positive or negative grounding of the system;
- Industrial computer control, Windows 10 operating system. Display the test results on the screen and record the data during the test;
- Can input component serial number, testing time period, and testing name to query historical data and curves;
- Set alarm parameters separately, such as overcurrent alarm and undervoltage alarm.

Datasheet

Model	ZW-PID02	ZW-PID03
Channel	Customized	Customized
Output	All channel parallel connected	Each channel separately controlled
Positive voltage	2000V/3000V	
Negative voltage	-2000V/-3000V	
Voltage resolution	1V	
Voltage accuracy	0.5%FS	
Current range@ every channel	0-1mA	
Current resolution	1uA	1uA(10nA optional)
Current accuracy	0.5%FS	5uA@(1uA～1mA)/ 20nA@(10nA～1uA)
IPC	ADVANTECH	
Thermocouple	Optional	
Hygrometer	Optional	

Software Reference

IEC61730

Bending tester

Meet the standards：IEC61215-MQT22

Introduction

This device is developed for the bending test requirements of MQT20 clause in IEC61215 standard. The purpose of this device is to verify that the components will not be damaged when bent in the direction and curvature radius specified by the customer. If the manufacturer specifies multiple directions, testing will be conducted in the most stringent direction. It can be tested on actual components or on equivalent samples.

Features

- Touch computor is applied to control and record the test;
- Cylinder is designed customized.
- Rotation speed could be preset and controlled;
- Cycle time could be preset and controlled;
- Current continuity could be monitored;
- Environment temperature could be monitored.

Datasheet

Model		ZW-BT
Support	Suitable module size	2500mm*1500mm(L*W)
	Dimension	2800mm*1800mm*1500mm (L*W*H)
	Material	Aluminum
Rotate system	Cylinder diameter	customized
	Rotate speed	⩽2m/min
Power supply	Voltage range	0-100V
	Voltage resolution	0.1V
	Voltage accuracy	±1.5%FS
	Current range	0-1A
	Current resolution	0.001A
	Current accuracy	±1.5%FS
Thermocouple	Temperature range	0-100°C
	Temperature accuracy	⩽±2°C
	Temperature repeatability	⩽±0.5°C
	Temperature Resolution	0.1°C

Accessibility tester

Meet the standards：IEC61730-MST11

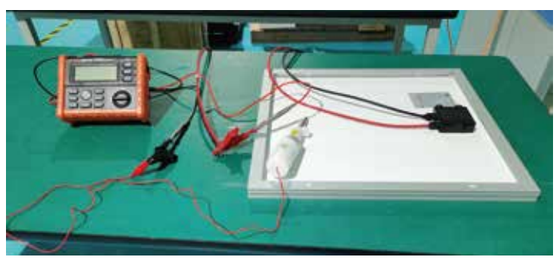
Introduction

As an electrical product, solar modules have high insulation requirements. If the insulation is not good, electric shock may occur when the operator touches them, causing danger.

Datasheet

Model	ZW-AT
For angles ranging (on angles)	0～ -10°
Centerline size	0～-0.05mm(within25mm)/ ±0.2 mm(over25mm)
Structural	Connections should be allowed to be in the same plane and direction
Consistent pressure	passing through a 90 ° angle (0-10 ° error)
	10N, 20N, 30N, 40N, 50N
Test voltage	50V,100V,250V,500V,1000V
Resistance range	0.01MΩ～10.00GΩ

Application Reference



Durability of markings

Meet the standards：IEC61730-MST05

Introduction

This equipment is a testing machine designed for friction resistance and is applicable to the MST05 clause in the IEC61730 standard. The abrasion resistance tester can use erasers, artificial sweat, steel wool, or alcohol to rub the surface of the sample to determine its abrasion resistance

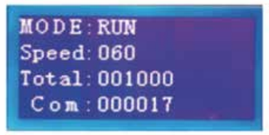
Features

- Apply different rubbing head, like cloth, rubber or steel wool.
- Rubbing distance could be adjust by special adjuster.
- Rubbing frequency, cycle could be preset by button.
- Rubbing force could be realized by applied some weights.
- Parameter could be displayed on LCD screen and rubbing test could by controlled by PLC as per the preset parameter.

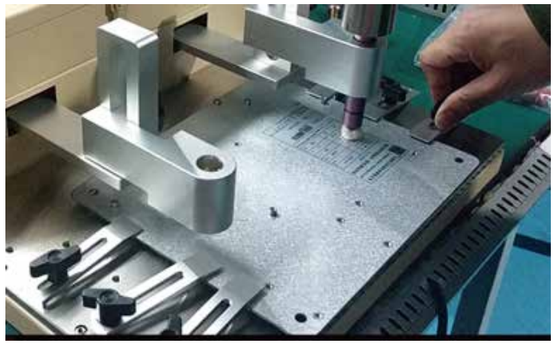
Datasheet

Model	ZW-DMT
Working station	2
Weight	⩽1025g (25g, 50g, 100g, 200g, 500g)
Moving distance	10-100mm (adjustable)
Moving speed	1～120 cycle/min
Sample size	Steel wool testing head（10mm * 10mm）

Software Reference



Application Reference



Sharp edge tester

Meet the standards：IEC61730-MST06

Introduction

ZW-SET product is designed to verify the accessible PV module surfaces is smooth and free from sharp edges, burrs, etc., which may damage the insulation of conductors or pose a risk of injury.

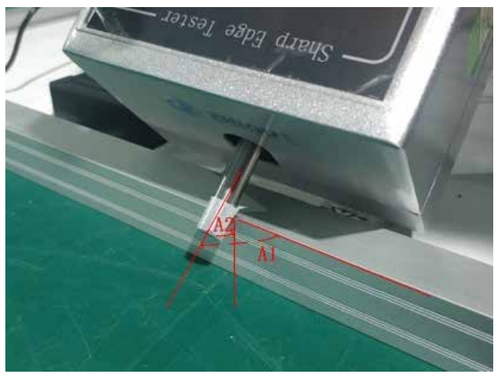
Datasheet

Model	ZW-SET
Mandrel surface roughness	Ra⩽0.40μm
Rockwell hardness of mandrel surface	＞40
Mandrel diameter	9.53±0.12mm
Mandrel rotation speed	23±4mm/s
Mandrel pressure	6N
Mandrel rotation scope	360°
PTFE (Polytetrafluoroethylene) tape thickness	0.066mm～0.090mm
PTFE tape width	⩾6mm

Features

- The equipment is portable and can operated at different angle;
- The mandrel can rotate by 360°;
- During the rotation of the mandrel, the pressure on the mandrel is constant and stable;
- Multiple trigger modes (foot pedal, handle, button) provided, easy to operate;

Application Reference



Cut susceptibility tester

Meet the standards：IEC61730-MST12

Introduction

The ZW-CST tester is designed according to IEC 61730, UL1703, ASTM E2685-2009 standards,to determine whether any front and rearsurface of the PV module made of polymeric materials are capable ofwithstanding routine handling during installation and maintenancewithout exposing personnel to the danger of electric shock.

Features

- Touch screen control and display;
- Scratcher internal drive motor;
- The scratching device meets the standards of IEC61730, UL1703, and ASTM E2685-2009;
- Powered by a motor, the speed is continuously adjustable, ensuring that the shearing vehicle can pull through the components at a speed of (150 ± 30) mm/s;
- Meet the testing requirements for components with dimensions of 2500mm * 1500mm.

Datasheet

Model	ZW-CST
Distance between pivot and weight center	150mm
Distance between pivot and cut point	170mm
Cut material	Carbon steel
Cut thickness	0.64mm±0.05mm
Horizontal angle	140°
Cut angle	90°±2°
Weight of cut point	8.9N±0.5N
Cut radius	0.115±0.025mm

Software Reference

Application Reference and Detail

Continuity test of equipotential bonding tester

Meet the standards：IEC61730-MST13, UL1703-25

Introduction

ZW-CETB is designed to verify the continuous path between accessible conductive parts that are in direct contact with each other(e.g. parts of a metallic frame).

Features

- 4 wires structure. Two wires is are for current flow and two wire are for voltage inspection;
- Current value, test time could be preset;
- Resistance could be calculated and High resistance be alarm could be recorded and highlight signed;

Datasheet

Model	ZW-CTEB
Current range	10-60A
Current resolution	0.01A
Current accuracy	±2% +3digit
Voltage range	0-6V
Voltage ripple	20mV
Resistance range	0.00uΩ ～ 600.00mΩ
Resistance resolution	0.01mΩ@(600.00mΩ ～ 100.00mΩ); 0.001mΩ@(99.999mΩ ～ 10.000mΩ); 0.1uΩ@(9.9999mΩ ～ 1.0000mΩ); 0.01uΩ@(999.99uΩ ～ 0.00uΩ);
Resistance accuracy	±2% +3digit
Endurance time	0.5s ～ 999.9s(0.0s means continue testing)
Endurance time resolution	0.1s
Endurance time accuracy	±(0.1%setting+0.05s)

Screw connections tester

Meet the standards：IEC61730-MST33

Introduction

Components such as screws and nuts transmitting contact pressure or which are likely to be tightened by the user shall be tightened and loosened five times. Screws and nuts of insulating material shall be removed completely during each operation of loosening of the screws. ZW-SCT is designed to apply torque to verify the screw or nut is good quality.

Features

- Suitable for a variety of screw structures.
- Suitable for a variety of screw materials.
- Digital torque reading.
- Clockwise and counterclockwise operation.
- Peak hold and follow mode.
- LED indication.
- Four types of engineering units (N-m, ft-lb, in-lb, kgf -cm) could be opted.
- 50 records can be stored.
- Can use rechargeable battery.

Datasheet

Model	ZW-SCT01	ZW-SCT03
Operation	Manually	Computer controlled
Torque range	0.3～6 N · m /1.5～30N · m/6.8～135 N · m	
Resolution	0.001 N · m/0.01 N · m/0.1 N · m	
CW Accuracy	±3%	
CCW Accuracy	±4%	

Impulse voltage tester

Meet the standards：IEC61730-MST14

Introduction

ZW-IVT is designed to verify the capability of insulation of the PV module to withstand over-voltages of atmospheric origin.

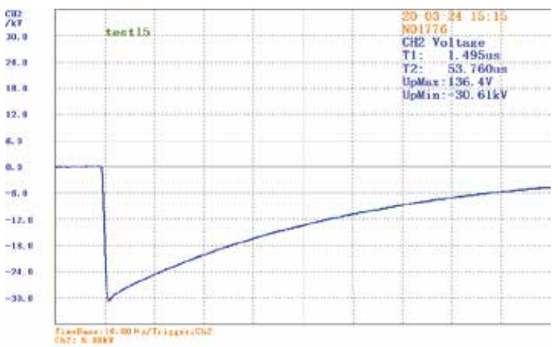
Features

- Output polarity: alternating positive and negative;
- High voltage real-time monitoring display, automatic protection program for high voltage loss of control, and equipment shutdown;
- High voltage abnormality automatically enters the protection program and the equipment stops running;
- By changing the internal circuit combination, different sizes of solar cell modules can be met;
- Front panel LED indicator, 7-inch touch screen display;
- IPC records and displays, communicates with oscilloscope, automatically calculates rising edge and falling edge along time for data recording and storage.

Datasheet

Model		ZW-IVT
Impulse voltage supply	Voltage range	3KV to 30KV +/-3%
	Rising edge time	1.2 μs +/-30 %
	Falling edge half-life	50 μs +/-20 %
	Load	Metal thin film fully packing on the solar module
Oscilloscope	Real-time sampling frequency	1.0GSa/S
	Bandwidth	70MHZ
	Peak detection	3.5ns
Voltage divider	Input voltage	1kV～40kV
	Type	Resistance type
	Time responsibility	⩽100nS
	Voltage divide ratio(around)	200:1
Attenuation probe	Attenuation ratio	10:1
	Input impedance	200MΩ
	Bandwidth	100MHZ

Software Reference



Peel and lap shear strength tester

Meet the standards：IEC61730-MST35、MST36

Introduction

It shall provide confidence regarding the durability of the adhesion between different layers of rigid-to-flexible or flexible-to flexible constructions or rigid-to-rigid bonded assemblies for cemented joints of the PV module stack. ZW-PT is designed to qualify insulation as a cemented joint.

Features

- Touch screen controller and PLC are applied to control the test process and record.
- Module fixing frame is designed for module or laminator.
- 3 axis structure is designed for peel test.
- 3 axis moving speed could be preset to control the peel angle(typical angle is 90°).
- 3 axis moving distance, direction of 3 axis could be preset.
- 3 axis start point could be preset to peel different place on the sample.
- Force and curve could be displayed on the screen.
- Lower clamp is fixed and applied with the clamp on Z axis for lap shear strength test; then, the X axis speed and Y axis speed should be 0 and Z axis speed should no more than 0.8mm/s.

Datasheet

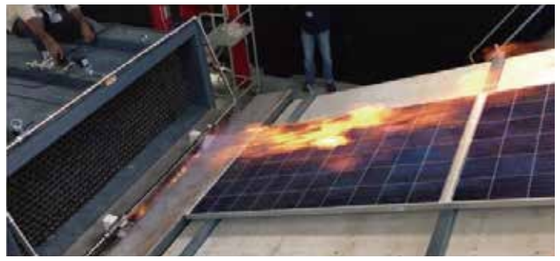
Model		ZW-PT
Sample size	L*W	2500*1500mm
3 axis system	Moving direction	X/Y/Z
	X axis moving distance	0-2500mm
	Y axis moving distance	0-1500mm
	Z axis move distance	0-150mm
	X axis moving speed	0-100mm/min
	Y axis moving speed	0-100mm/ min
	Z axis moving speed	0-100mm/ min
Force sensor	Pulling force	0-500N
	Accuracy	+/-(0.2% FS+1 digit)
	Overload capacity	120% FS
	Peel angle	0～180°

Software Reference

Application Reference

Fire tester

Meet the standards：IEC61730-MST23, UL1703-31



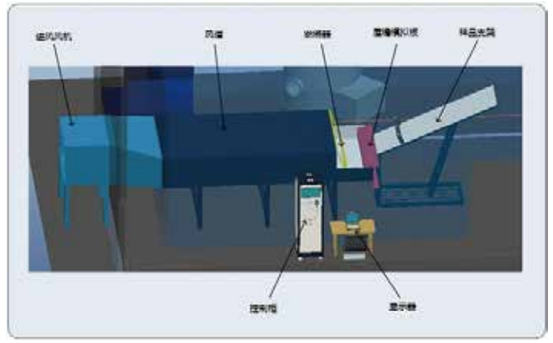
Introduction

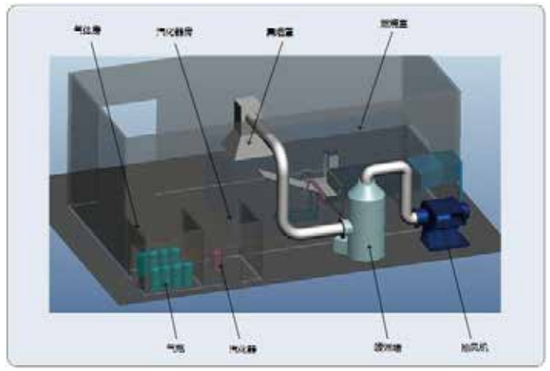
ZW-FT tester is designed to evaluate the fire-resistance characteristics when exposed to a fire source originating from outside the PV module, which may include the building on which they are installed or into which they are integrated, or from an adjacent building.

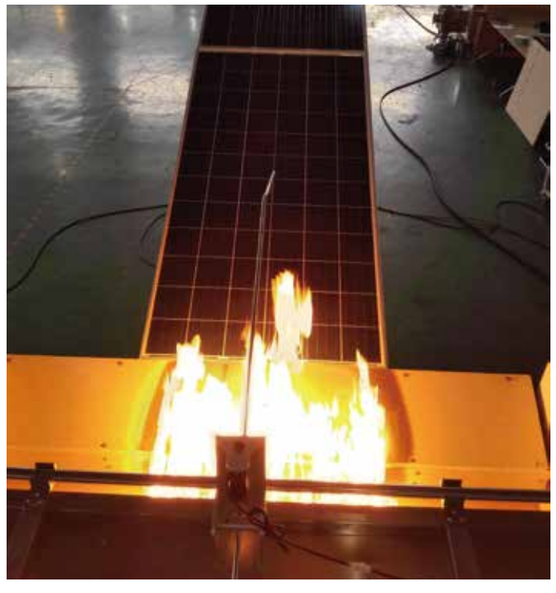
Datasheet

Model	ZW-FT
Blower	Included
Air Velocity sensor	Included
Wind Tunnel	Included
Nozzle burner	Included
Rack/deck/platform	Included
Baffle	Included
Angle indicator	Included
Thermocouple	Included
Steel cylinder	Included
Vaporizer& Gas tube	Included
Gas flow meter	Included
Gas supply auto switch	Included
Back flash arrestor	Included
Smoke hood	Included
Spray tower	Included
Extraction Blower	Included
Oven container	Included
Thermal resistance heater	Included
Brand holder	Included
Brand clip	Included
Wood block	Included
Wood block conditioning Chamber	Included
Camera	Included
IPC	Included

Structure Diagram and Application Reference







Ignitability tester

Meet the standards：IEC61730-MST24

Introduction

ZW-IC is designed to determine the ignitability of PV modules by direct small flame impingement under zero impressed irradiance by external heat sources using vertically oriented test specimens.

Features

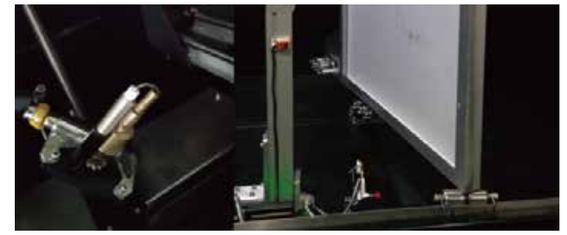
- Touch screen is applied with PLC to control the test automatically;
- With smoke inspector and audible and visual alarm;
- With temperature and humidity sensor to monitor the environment condition;
- 3 axis moving system is applied to control the burner up & down, front & back, rotate;
- Angle of burner could be adjusted between 90° and 45°;
- Solar module could be rotated 360°;
- Light height could be controlled by gas flow meter.

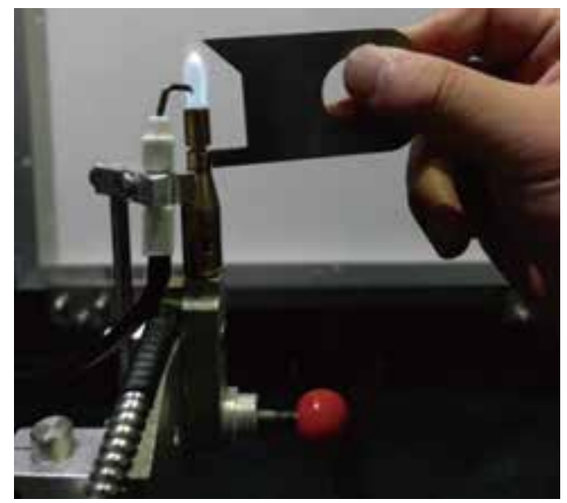
Datasheet

Model	ZW-IC02	ZW-IC03
Internal size	1.7m×1.88m×2.84m	1.7m×0.8m×2.84m
Max module size	2.5m*1.5m*0.05m	
Vertical wind speed	⩽0.2m/s	
Horizontal wind speed	⩽0.1m/s	
Burner	3 axis	1 axis
Rotation of solar module	0-360°	/
Bottom exposure	40cm	

Software Reference

Application Reference





Reverse current overload tester

Meet the standards：IEC61730-MST26, UL1703-28

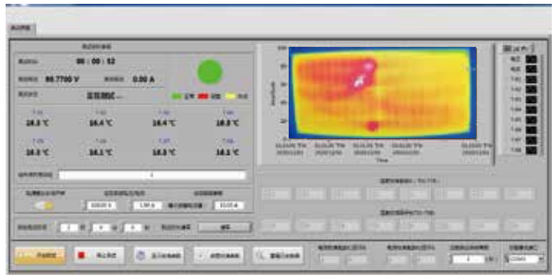
Introduction

PV Modules contain electrically conductive material contained in an insulating system. Under reverse current fault conditions the electrical conductors and the cells of the PV module are forced to dissipate energy as heat prior to circuit interruption by an over-current protector installed in the system. ZW-RCOT product is designed to determine the acceptability of the risk of ignition or fire from this condition.

Features

- Power supply is applied to offer content current into the module;
- Current & timing could be preset.
- Wooden panel and issue paper are applied to wrap the module;
- Current could be monitored during the test;
- Current curve could be displayed on the screen.
- Infrared thermal imager records the video and temperature during the testing process

Software Reference



Datasheet

Model		ZW-RCOT03	ZW-RCOT06
Power supply	Voltage range	0～100V	
	Voltage accuracy	0.5%+0.5%FS	
	Current range	0～100A	
	Current accuracy	0.5%+0.5%FS	
Wooden panel	Thickness	19mm	
	Thermal conductivity	⩽0.5 W/(m·K)	
Rice paper	Density	12 g/m ^{2} ～30 g/m ^{2}	
Table	Size	Customized	
Data collection	Computer	Included	
Infrared thermal imager	Pixel	Higher than 640*480	
	Thermal sensitivity	⩽0.1K@30℃	
	Measurement error	⩽±2℃	
	Measurement range	-20~650℃	
	Spectral response	7-14um	

Module breakage tester

Meet the standards：IEC61730-MST32, UL1703-30

Introduction

ZW-MBT evaluates the impact resistance of components by simulating the situation of impact, or the possibility of surface injury to people after component breakage

Features

- Micro computer with touch screen are applied to control the test and display the date;
- Motor lifting impact ball, height controllable;
- After hitting the ball to a certain height, a release delay can be set;
- Cylinder is set to avoid secondary impact;
- Test data as CSV format file could be copied by USB.

Datasheet

Model	ZW-MBT
Frame	100mm*200mm
Moment of inertia	187cm ^{4}
Impact height	0～1200mm
Impact height deviation	⩽30mm
Module size	Customized
Impactor weight	45 kg±0.1kg

Software Reference

Application Reference

LETID testing system

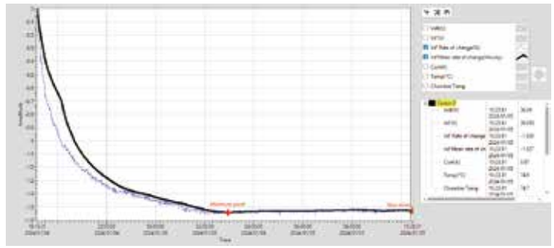
Meet the standards：IEC63342

Introduction

A LeTID testing system designed for the IEC63342 standard. Under specific temperature and humidity conditions, it can apply 2 * (Isc Imp) current to components to monitor their dark voltage and trends.

Features

- Adopting a four wire power supply, the voltage acquisition channel and current channel are set separately;
- Good human-machine interface, using high-quality industrial control computers to ensure long-term stable operation of the equipment. It can monitor specific data such as current and temperature, retrieve the current and temperature curves of the entire process, and output and print them in Excel spreadsheets;
- Can record dark voltage, separately record the temperature corrected dark voltage of each component, and display the real-time evolution of dark voltage data;
- Capable of determining the stopping conditions for testing, and can automatically stop testing when the standard stopping conditions are met;
- Can output a test report, displaying the dark voltage change rate and mean change rate, and marking the minimum and stop points;
- The equipment is equipped with sound and light alarm function. After an alarm occurs, the equipment will automatically shut down.

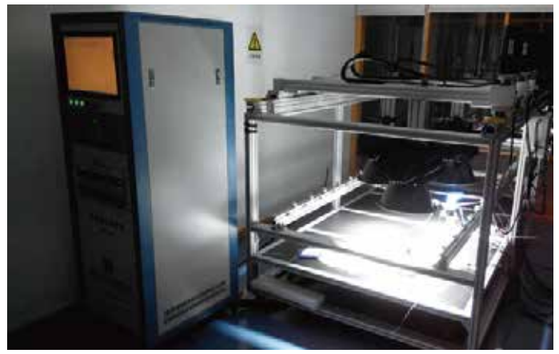


Datasheet

- Voltage range：0-70V;
- Accuracy：≤0.05%+10mV
- Power regulation rate: Voltage: ≤0.01%+1mV
  Current: ≤0.01%+0.25mA;
- Load adjustment rate: voltage regulation≤0.01%+1mV,
  current regulation≤0.01%+0.25mA;
- Current range: 0-3A;
- Accuracy≤0.1%+2mA;

Hot Spot Durability (UL) Testing System

Meet the standards：UL1703-39



Introduction

This test is conducted by locally applying light to test the durability of hot spot solar cells and verify the aging performance of solar modules.

Features

- The entire testing process is controlled by an industrial computer, automatically achieving 100 cycles of testing.
- By implementing automatic control, the brightness of the light source can be automatically adjusted to ensure stable battery cell current output.
- Real time recording of voltage, current, and temperature parameters of battery cells, and real-time display of all data curves.
- The infrared heater and lighting equipment can be moved longitudinally through a slide rail and laterally through a conveyor belt, accurately positioned on the selected battery cells.

Datasheet

Model		ZW-ULHSET
Heater	power	150W
	irradiance	＜50W/m ^{2}
Light source	type	metal halide lamp
	Spectral matching degree	B
Thermocouple	Testing range	0～300°C
	Testing accuracy	±2°C
	resolution	0.1°C

Salt spray chamber

Meet the standards：UL1703, IEC60068

Introduction

This equipment is designed according to salt spray test in IEC61701. It's suitable for accelerating salt mist corrosion test of industrial products such as electronic devices, product parts, protective layer of metal materials, etc. It can quickly and conveniently reproduce the corrosion process of sprayed and untreated metal surfaces.

Datasheet

Model	ZW-SPC
Internal dimension	Customized
Temperature Range	RT+5°C～+60°C
Temperature Uniformity	≤±2°C
Temperature Fluctuation	≤±1°C
Humidity Range	30～100%
Humidity Fluctuation	±5%
Salt settlement	1-2ml/80cm^3.h adjustable
Salt density	5%±0.5%
Spray method	Continuous or break, controllable
Bottom load-bearing capacity	≤2T

Non-uniform snow load tester

Meet the standards：IEC62938

Introduction

The framed PV module with frames protruding beyond the front glass surface on the lower edge after intended installation and as such creates an additional barrier to snow sliding down from modules. ZW-NUSLT is designed to determine mechanical non-uniform-load limit of a framed PV module.

Features

- Touch screen is applied to control and record the test;
- Several weight element could be loaded to make up different load;
- Module installation angle could be adjusted;
- Deformation testers are applied to monitor the deformation of the module;
- Current continuity could be monitored;
- Environment temperature could be monitored.

Datasheet

Model		ZW-NUSLT
Support	Module size	Customized
	Material	Aluminum
	Angle	30°～60°
Weight	Material	Stainless steel+PTFE bottom
Deformer sensor	Range	±200mm
	Resolution	0.01mm
	Accuracy	±0.1mm
Power supply	Voltage range	0-100V
	Current range	0-1A
Thermocouple	Temperature range	0-100°C

Ammonia chamber

Meet the standards：IEC62716

Introduction

This chamber is designed according to IEC62716 standard. The ammonia chamber applies ammonia gas to accelerate the corrosion of materials or products under certain temperature environment, so as to reproduce the damage degree of materials or products within a certain time range. The equipment can be used to assess the anti-corrosion ability of materials and their protective layers, and the quality comparison of similar protective layers, as well as the anti-corrosion ability of some products. The product is suitable for the corrosion gas test of parts, electronic components, protective layer of metal materials and industrial products.

Datasheet

Model	ZW-MCD
Internal Dimension	Customized
Temperature Range	RT+5°C～+60°C
Temperature Uniformity	⩽±2°C
Temperature Fluctuation	⩽±1°C
Humidity Range	75～100% Ammonia experiment
Humidity Fluctuation	±5%
Ammonia Density	0.1%-1%(normally,6670PPM)
Ammonia Density Fluctuation	±10%
Ammonia Density in Exhaust	⩽10ppm
Testing range of ammonia concentration sensor	0～10000PPM
Ammonia testing accuracy	0.1ppm

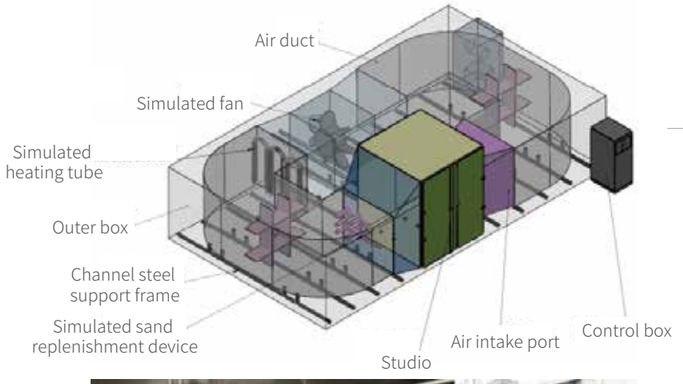
The sand test chamber

Meet the standards：IEC60068

Introduction

This chamber is designed according to IEC 60068-2-68 standard. The sand test chamber is driven by a high-power fan to blow a certain concentration of sand dust over the surface of the test samples at a certain flow rate, so as to evaluate the ability of these test samples (equipment) to resist the penetration effect of dust particles under the action of dry sand or dusty atmosphere, the ability to resist the abrasion or blocking effect of gravel, and the ability to store and operate.

Structure Diagram and Application Reference



Internal placement of components　Sand collector　Air duct

Datasheet

Model		ZW-STC
General	Sample size	Customized
	Working dimension	3 times the sample
	Wind Speed	⩽29m/s
	Sand Density	＜11g/m³
Temperature and humidity	Temperature sensor	PT100
	Temperature range	0-200°C
	Temperature resolution	0.1°C
	Temperature accuracy	±2°C
	Humidity sensor	Wet bulb gauze
	Humidity range	10-100%RH
	Humidity resolution	1%
	Humidity accuracy	5%
	Cooling system	Cooling(Chiller) power
	Heating system	304 stainless steel heater
Sand system	Jet Fan	Transport device
	Sand density sensor	Pipe type, 0-20g/m3
	Fresh air inlet	Self-balance inlet + Filter grid
	Over pressure outlet	Self-balance inlet + Filter grid
	Wind speed sensor range	0-40m/s
	Wind speed accuracy	0.1m/s
	Sand feeder	Steel controllable feeder
	Sand tank	200L, 304 stainless steel
	Speeder	Frequency control
	Collector	Replaceable polyester dust-proof filter bag
	Electric pusher	6000N

EL tester

Introduction

This equipment is designed to check the EL(Electro luminance) picture.

Features

- The component testing area can reach 2500mm*1500mm, suitable for all crystalline silicon photovoltaic modules and amorphous silicon thin film modules;
- Program control the current. Preset the current and voltage;
- EL picture could be saved according to serial number;
- Equipped with an emergency stop function
- The program automatically controls the on/off of the sample current, non charged loading, to avoid voltage shock to the sample
- Cylinder is applied to open and close the door;
- Computer control, fully Chinese dialogue interface, special requirements can be customized for free

Datasheet

Model		ZW-EL
Camera	Resolution	24 million pixel
	Photo time	10-60S
	Quantity	Customized
Power supply	Voltage range	0-80V
	Current range	0-20A
Chamber	Material	60/30 Aluminum
	Opening mode	Cylinder open

Software Reference

Application Reference

Component on-site comprehensive testing platform

Introduction

Developed for on-site testing of solar cell products, which reduces testing costs and shortens testing cycles.

Datasheet

Model	ZW-MIVT
Inspection vehicle	Included
Cable reel	Included
Alternator	Included
Carriage	Included
Air conditioner	Included
Balance pillar	Included
Lift frame	Included
IV Testing System	Included
EL tester	Included
Withstand voltage tester	Included
Grounding continuity tester	Included
Power Quality Tester	Optional
Power analyzer (inverter efficiency)	Optional
Portable battery string power tester	Optional
Portable insulation resistance tester	Optional
Infrared thermal imager	Optional
Multimeter	Included
Tool set	Included

Software Reference

Application Reference