

Thin-film photovoltaic consumer electronics application scenarios

Low-light multi-channel photovoltaic module IV+MPPT testing system

Low-Light Multi-Channel PV Module Stability Test System

MODEL: LL-MCTA-19T

Lecheng Intelligent Technology (Suzhou) Co., Ltd.

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High-throughput testing solution specifically designed for **low-light scenarios in thin-film photovoltaics**

Core Values

- 01 Industry consensus:** Perovskite, OPV and other thin-film photovoltaic technologies are being used more and more widely in the consumer electronics field.
- 02 Focused on low light:** The LL-MCT series focuses on monitoring power generation performance in low light demonstration scenarios.
- 03 Intelligent tracking:** Real-time tracking of the maximum power point through the MPPT algorithm enables high-throughput automated testing.
- 04 Accelerated R&D:** Greatly facilitates the development of thin-film photovoltaic materials and the screening of process reliability.

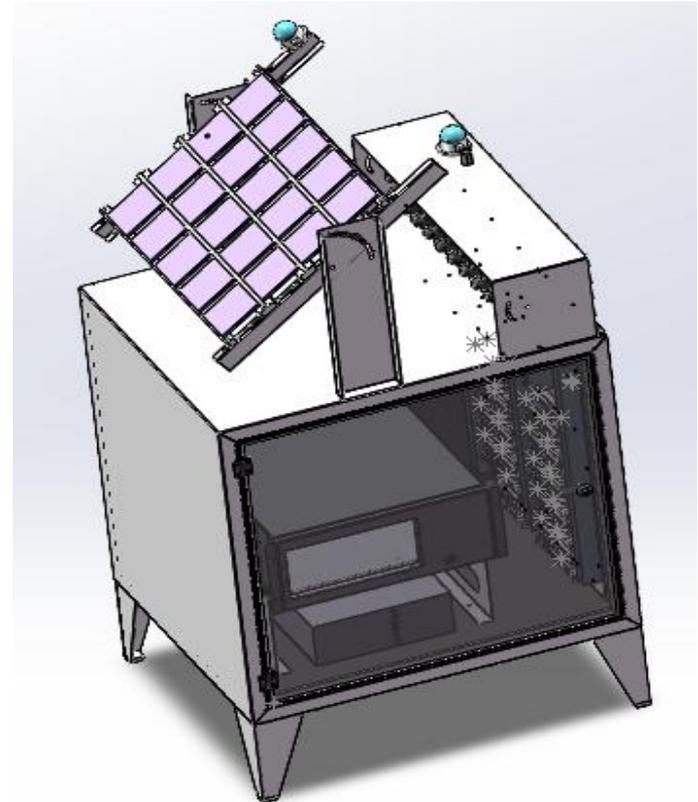
Application scenarios

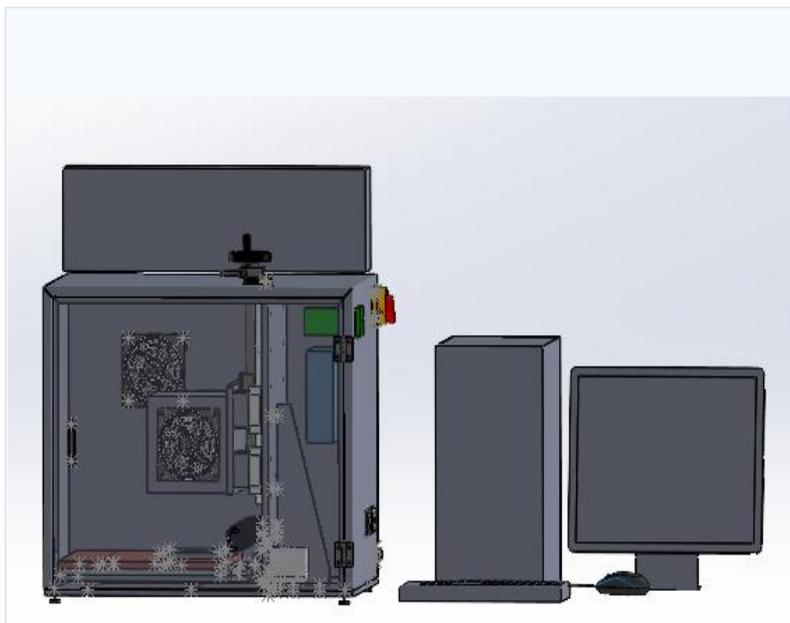
Indoor low-light environment

Consumer electronics devices

Smart Home

wearable devices





Equipment Structure

Low-light testing outdoor unit + indoor computer remote monitoring

Highly efficient integrated multi-channel test platform

- Multi-channel source table** Simultaneous testing of 19 channels, with each channel supporting 8-point rotation, significantly improves testing efficiency.
- Relay group** Automatically switch test points to achieve unattended automated testing processes.
- Environmental monitoring** It integrates real-time monitoring modules for temperature, humidity, and illuminance to ensure the traceability of test environment data.
- Data collection** Automatic saving, automatic naming, and remote transmission ensure data security.
- Control software** The system is independently developed and supports deep customization of the interface and functions.

System Composition

Multi-channel source meter testing system + relay group
+ environmental monitoring module + data acquisition system + control software

Test subjects and capabilities

Flexible testing solutions adaptable to various thin-film photovoltaic modules

Test object

Material Glass substrate/ flexible substrate thin film solar cells	Thickness range 1mm — 7.0mm
Small device size ≤25×25mm, custom 8-position box	Component size ≤100×100mm (customizable) , with lead wire

Testing capabilities

19 Number of channels (customizable)	8 o'clock Each channel circulates	20-60V (customizable) Maximum voltage
1 A Maximum current	0.1 % Measurement accuracy	20 W Channel power



Laboratory-level precision

Designed specifically for high-precision R&D scenarios, it supports comprehensive testing needs from small components to standard assemblies.

Electrical testing function

Comprehensive IV features and MPPT tracking capabilities

IV Curve Test

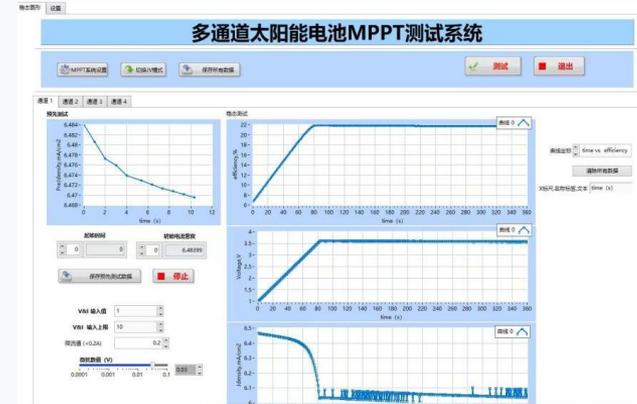
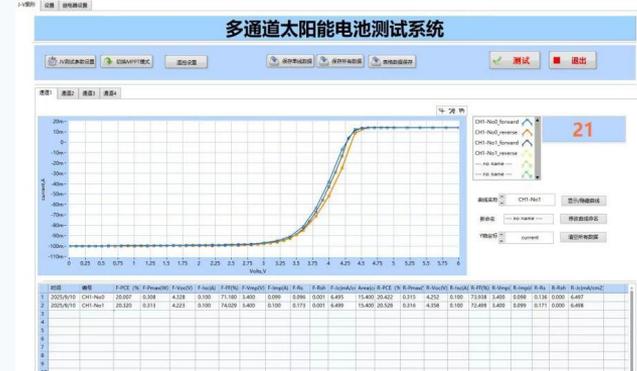
- Forward and reverse scan test modes
- 9-point fitting method (dynamic IV can be customized)
- Automatic continuous scanning and interval testing
- Independent control of each channel

MPPT tracking algorithm

- Perturbation and observation (P&O) method
- Incremental conductivity method (IncCond)
- Fixed voltage method (CV)
- Real-time tracking of maximum power point
- Timed data saving

Monitored Data

Lux	Voc	Isc	FF	PCE
Pmax	Imax	Vmax	Rs	Rsh



Multi-channel IV characteristic curves and multi-channel MPPT testing

Environmental monitoring system

Temperature monitoring

Channel configuration	4-channel independent monitoring, surface mount thermocouple
Measurement range	-40°C to 100°C
Measurement accuracy	0.1°C (real-time curve display)

Humidity monitoring

Probe type	Single probe monitoring system
Measurement range	5 - 100 RH%
Measurement accuracy	0.1 RH% (error ± 2 RH%)

Illuminance monitoring

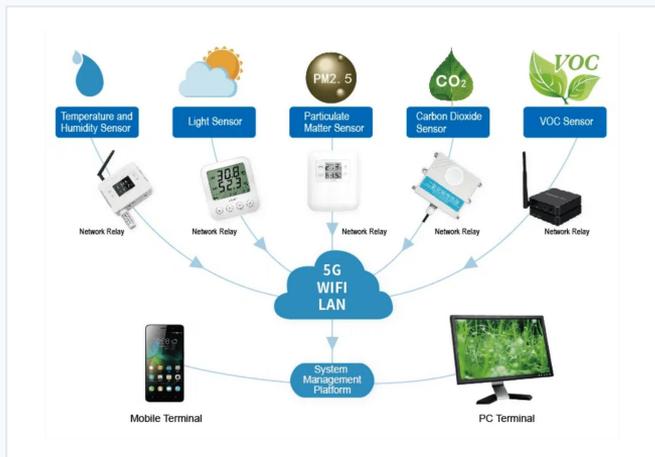
sampling frequency	2 times/second to 24 hours/time
Measurement range	0 - 200,000 Lux (three options available)
High precision	Error $\pm 4\%$ (25°C)
Function	Accumulated irradiance is calculated automatically.



Temp & Humidity Sensor



Digital Lux Meter



Intelligent integration platform

With its powerful equipment integration capabilities, it supports multi-channel parallel testing and remote data management, and can be deeply customized according to customer needs.

Independently developed intelligent testing software platform

Core Functions

- › Multi-channel IV testing: Automated continuous scanning and interval testing
- › Multi-channel MPPT testing: Real-time tracking and data logging
- › Multi-channel temperature profile monitoring: real-time display and saving
- › Small component unit: Automatic inspection and testing of individual pixel points.

Data Management

- › Automatic naming and timed saving; supports independent or unified saving for each channel
- › Remote transmission to indoor computer enables unattended monitoring.
- › Supports data export and in-depth analysis

Control ability

- › Each channel can be started and stopped independently, and parameters and temperature can be controlled independently.
- › Interface and functions can be customized according to needs.

SUPPORT CUSTOMIZATION

Technical Specifications Overview

08

Electrical parameters

Electrical Specs

Number of test channels	19 Channels (8 points/ch)
Voltage range	1 - 20 V
Current range	5 μ A - 1A
Measurement accuracy	0.1 %
Maximum channel power	20 W/CH

Environment and Plant Affairs

Env & Facility

Temperature monitoring	-40 ~ 100 °C (4 Channels)
Humidity monitoring	5 - 100 RH%
Illuminance monitoring	0 - 200,000 Lux
Light source type	Indoor and outdoor actual low light
Power requirements	220V AC, 50Hz, 10A

PRODUCT MODEL: LL-MCTA-19T

Service and Support

Comprehensive pre-sales and after-sales service guarantee

Installation and debugging

- **Delivery cycle:** Within 30 days of signing the contract
- **On-site installation:** Completed within 3 business days

Ensure the site environment is tidy, clean, and orderly.

After-sales training

- Multi-channel testing software usage training
- Test Platform Operation Specifications
- Power on/off operating procedures
- Parameter settings and control
- Basic cleaning and maintenance
- Common troubleshooting

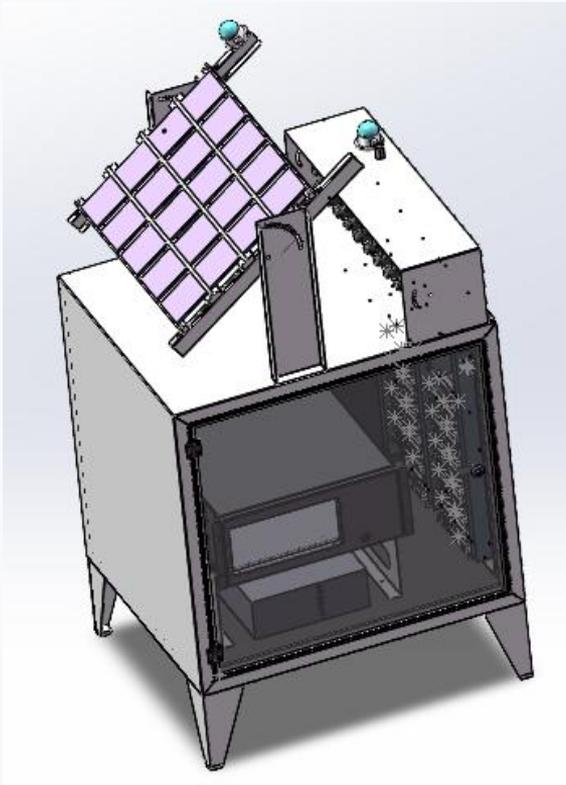
Equipment maintenance

- **Warranty period:** 12-month free warranty on the whole machine
- **Lifetime maintenance:** Lifetime repair service provided
- On-site inspection and maintenance every 3 months
- 24-hour after-sales response
- Emergency faults resolved on-site within 72 hours



Professional service team

Equipped with professional testing tools, providing standardized services



Compact design, integrated test solution

Efficient solutions to accelerate R&D process

01 High-throughput parallel testing

19 (or more) independent channels, each supporting 8-point switching, can cover 152 test points at a time, greatly improving data output efficiency.

02 Fully automated and unattended

The automated testing process, combined with remote monitoring, enables 24/7 uninterrupted operation and reduces labor costs.

03 Intelligent Algorithm Integration

It incorporates multiple MPPT tracking algorithms (perturbation observation method; incremental conductance method; fixed voltage method) to adapt to the testing needs of batteries with different characteristics and ensure data accuracy.

04 Flexible customization services

Both the hardware and software architectures adopt a modular design, which can be deeply customized according to the customer's specific experimental scenarios and special needs.

Looking forward to creating the future with you

The most professional and efficient intelligent solution
in the field of perovskite detection.

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