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Innovator of Testing Equipment



**TNE TECH  
CO.,LTD**

***Photovoltaic Module***

***Solar Radiation***

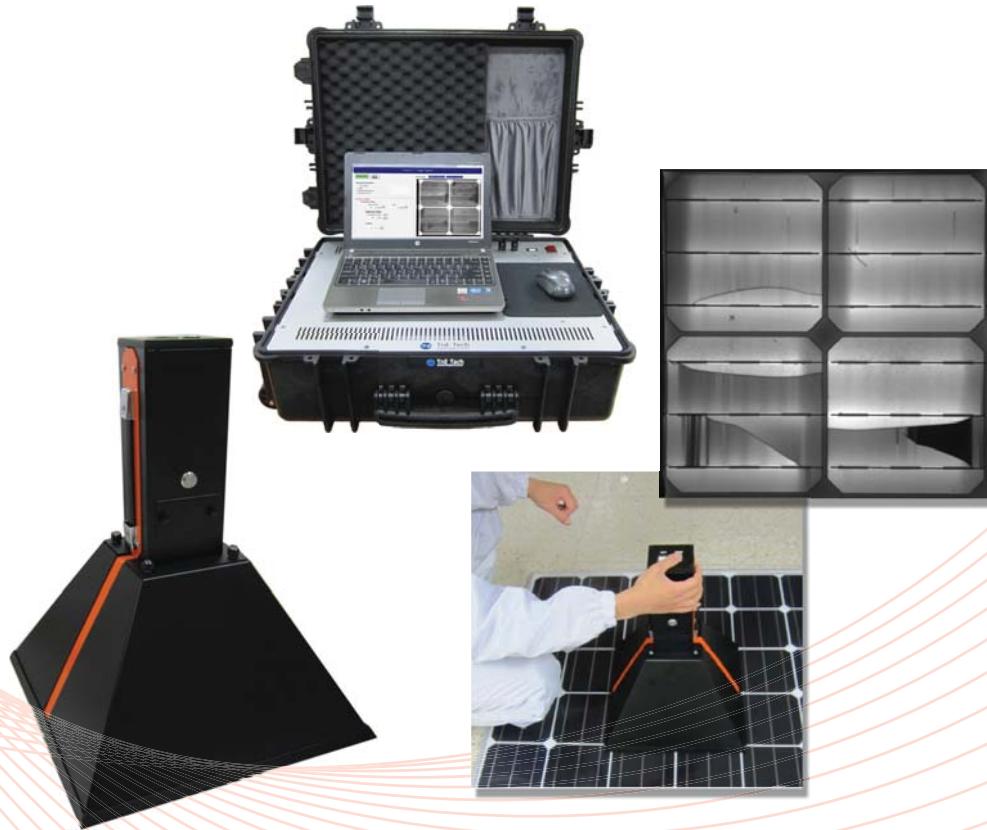
***Automotive***

***Environmental Energy***



# PV Module Portable EL Tester

- 4M Pixel NIR Camera
- Day Light EL Test
- High Performance
- Transportable EL Tester
- Control Software



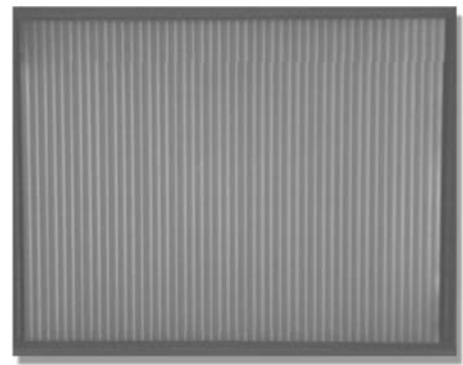


# PV Module Portable EL Tester

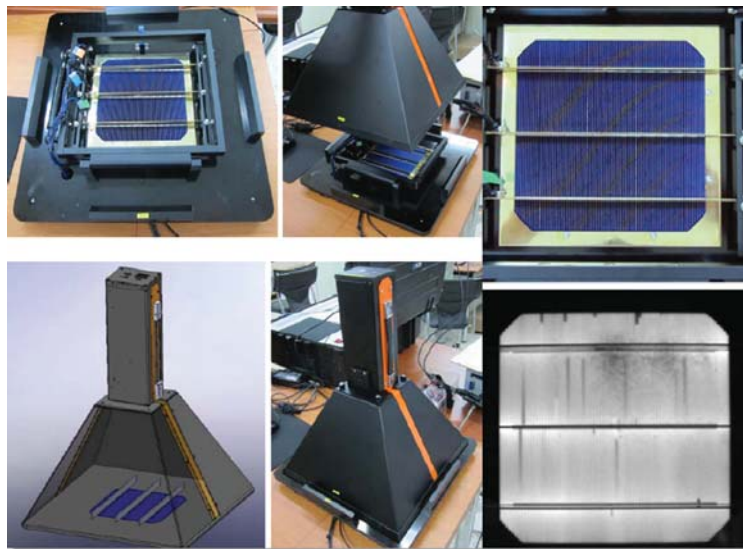
## c-Si Module EL Test



## Thin Film EL Test



## Solar Cell EL Test





# PV Module Portable EL Tester

## Specification

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### Specification

#### EL Camera Unit

- Pixel Resolution: 2048pixel x 2048 pixel, 4M Pixel
- Cell Size: 5.5 $\mu$ m
- QE at 950nm: 10%
- Image Grap Time : 100ms ~ 10s
- Band pass Filter & Low pass Filter
- SWIR Lens
- Operating temperature: +5 °C ~ +45 °C
- Potable Switch & Trigger Unit
- PV Module Dark NIR mount : 4Cell Measurement

#### Main Control Power Unit

- Max. power: 600W
- Voltage range: 0 ~ 60V
- Current range: 0 ~ 10A
- Remote sensing

#### Note PC and System Software

#### Option

Built – in Battery

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## Contact

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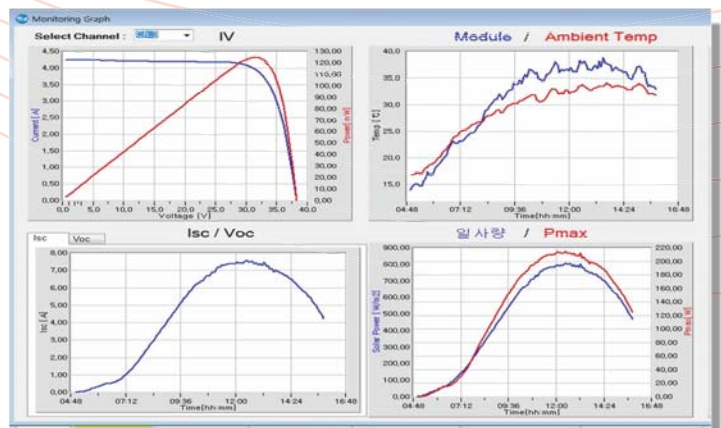
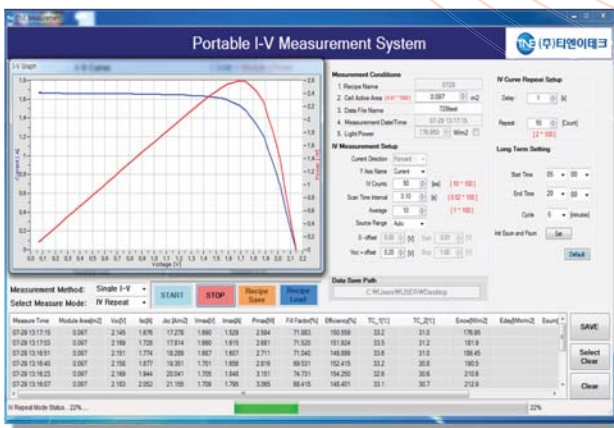
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# PV Module Outdoor Test System

- Multi Channel I-V Measurement
- Multi Channel MPPT Load
- Temperature & Irradiance Measurement
- Wireless Interface
- Control Software
- Easy Operation





# PV Module Outdoor Test System

**4Ch Outdoor  
MPPT I-V Tracer**  
(300V / 12A / 4Ch)



**2Ch MPPT I-V Tracer**  
(300V / 12A / 2Ch)



**Portable I-V Tracer**  
(600V / 12A / 1Ch)



**Module Mounting Frame**





# PV Module Outdoor Test System

## Specification

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### Specification

#### 4 Ch MPPT I-V Tracer

- I-V Measurement Channel: 4Ch / 400W, 300V, 12A
- Mode: I-V Sweep Mode, MPPT Mode
- PV Temperature & irradiance Measurement Unit
- Module Connection: 4Wire Connection
- AL Heat Sink
- Data Interface: LAN, RS-485

#### Weather Station

- Wind Dir, Speed
- Atmosphere Temperature and Humidity
- Solar Radiation

#### Main Server

- System Control Software
- PV Power & weather data record
- Daily & Monthly Report
- I-V Data Viewer
- UPS System

#### PV Module Mount frame

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## Contact

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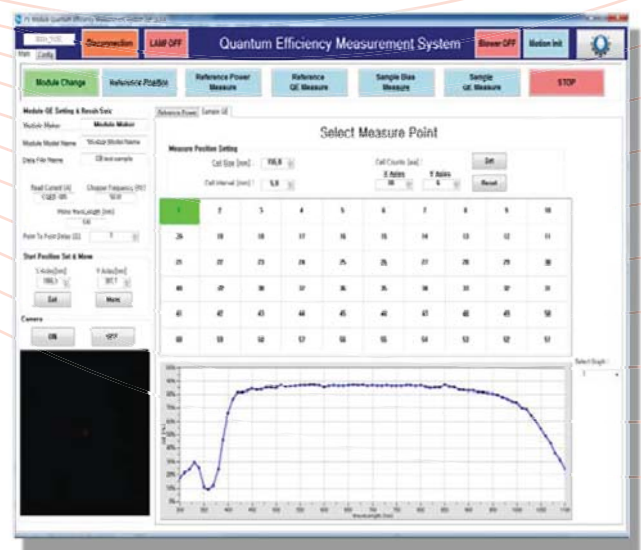
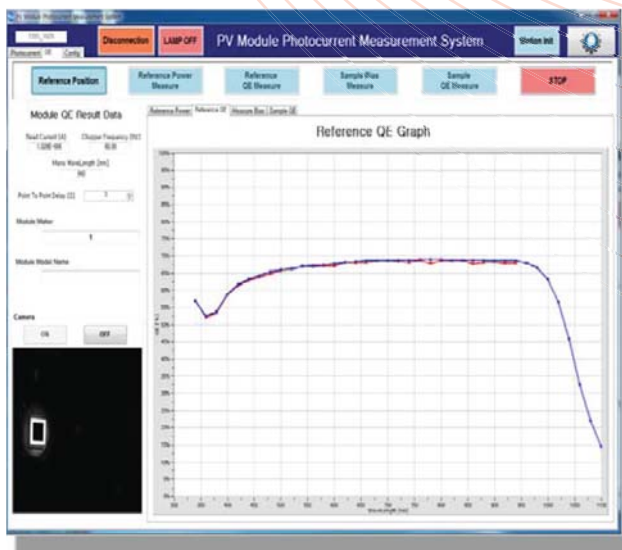
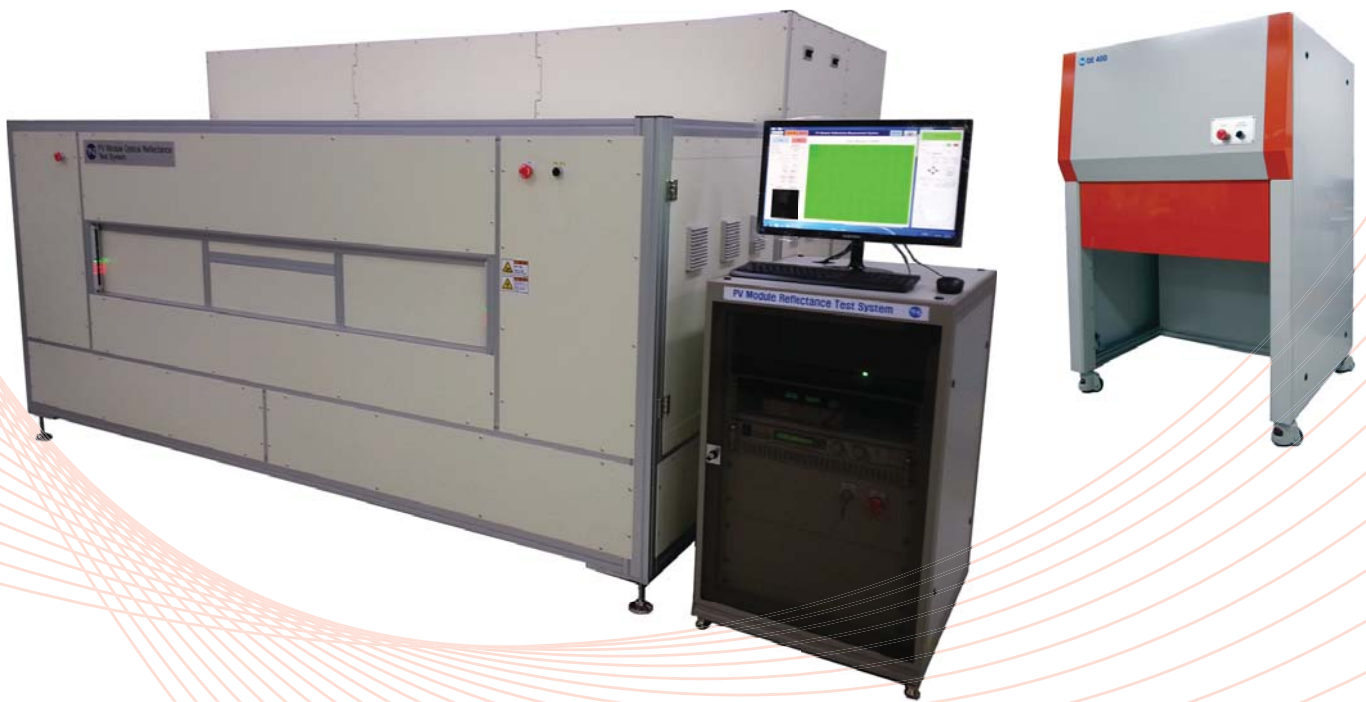
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# PV Module Spectral Response Test System

- Spectral Response Test for Large Size PV Module
- Spectral QE Measurement
- Automatic Measurement System
- Easy Operation
- High performance

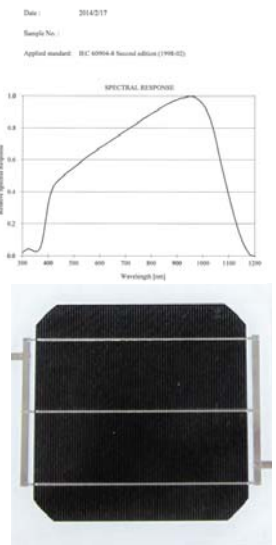
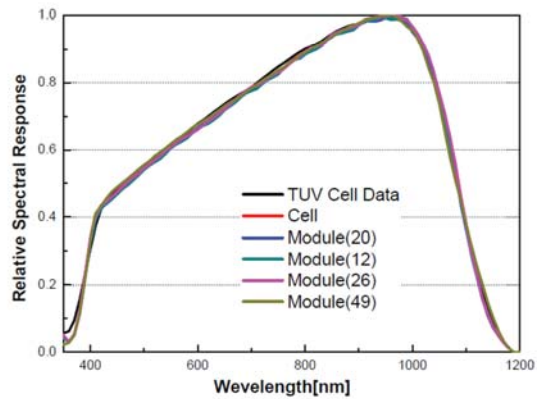






# PV Module Spectral Response Test System

## Cell & Module Spectral Response Data



## Bias Lamp & Sample loading



## Specification

### Specification

	QE 2000	QE 400
Sample Size	1,200mm x 2,000mm	400mm x 400mm
Measurement Item	Spectral QE, SR	
	Active area > 10mm	
Main light source	Wavelength range : 280 ~1,100 nm (280nm~1500nm Option)	
	Frequency range : 1 ~5kHz	
Surface bias light source	Light intensity : 0~ 0.3 sun	
X-Y Auto Moving Stage	1,250mm x 2,050mm	450mm x 450mm

## Contact

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# Complex Environmental Chamber

**Solar Simulator (1,200mm x 2,000mm)**

**Temperature & Humidity Chamber**

**Light Induced Degradation Test(LID)**

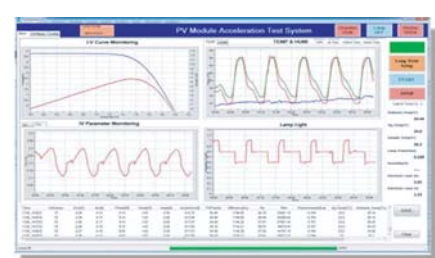
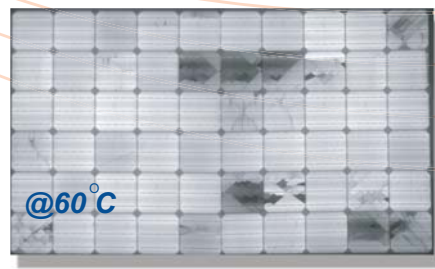
**Potential Induced Degradation Test(PID)**

**I-V Measurement**

**High Temperature EL Inspection**



**EB-2000**





# Complex Environmental Chamber

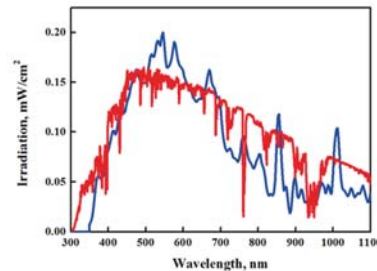
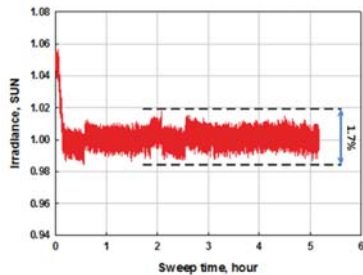
## TNE - EB Series



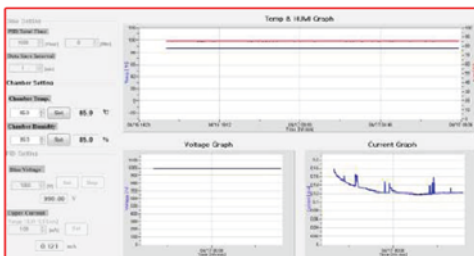
## TNE - LB Series



## Class A Stability & Near Class A Spectral Mismatch



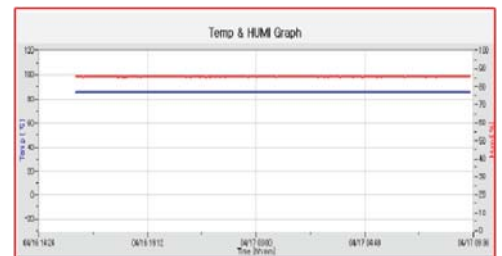
Auto tracking sensor



PID Test



LID Test



Demp Heat



## Specification

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### Specification

#### Continuous Sola Simulator

- Lamp : Metal Halide
- Spectral Mismatch : Class B, Near Class A
- Non-uniformity of irradiance: Class B @ 2,000 mm x 1,200mm (EB-2000)  
450 mm x 450mm (EB-400)
- Temporal instability of irradiance : Class A
- Light Intensity : 0.6 SUN ~ 1.2 SUN, Electrical dimming,  
2SUN~3SUN Customizing available

#### Temperature & Humidity Range

- Temperature Range: -40°C ~ +90°C @ Dark, -20°C ~ +90°C @ 1SUN
- Humidity Range : ~90%

#### MPPT I-V Tracer

- 300V, 15A, 400W
- I-V Sweep Mode, MPPT Mode

#### Module Temperature & irradiance Measurement Unit

#### Option

- EL Test : 8M Pixel
  - Potential Induced Degradation : 6kV
  - Bypass diode test
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## Contact

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# UV Irradiation Systems



Global UV Testing System

Acceleration UV Testing System  $200 \text{ W/m}^2 @ 280\text{nm} \sim 400\text{nm}$

Temperature & Humidity Chamber

Programmable Irradiance Dimming

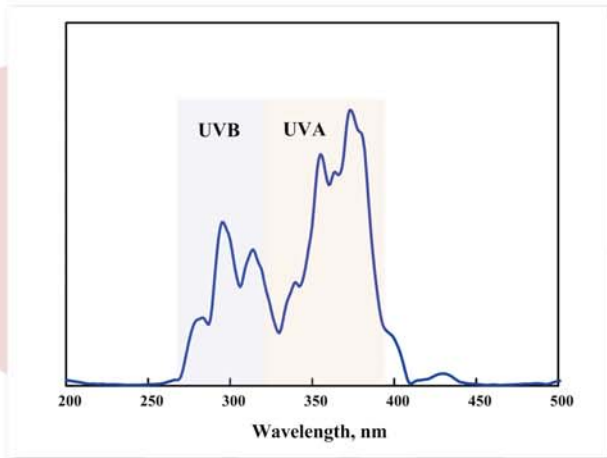


**UA 2000**  
*Acceleration UV Test System*

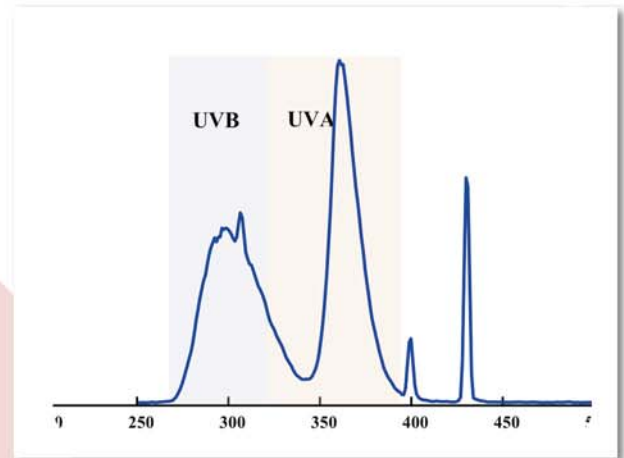
**UT 2000**  
*UV Aging System*



# UV Irradiation Systems



Acceleration UV Lamp Spectrum



UV Aging Lamp Spectrum

## Specification

	Acceleration UV Test System		UV Aging System
	UA 2000	UA 400	UT 2000
<b>Lamp</b>	Metal Halide, 2kW x 6EA	Metal Halide, 2kW 1EA	Fluorescent Lamp
<b>Irradiation intensity, W/m<sup>2</sup></b>	150 ~200		60~90
<b>Spectrum range</b>	280nm ~ 400nm		280nm ~ 385nm
<b>UVA to UVB ratio, %</b>	30 : 70		40 : 60
<b>Irradiation Area</b>	1,200mm x 2,000mm	400mm x 400mm	1,000mm x 2,000mm
<b>Electrical Dimming</b>	Possibility to dim the light between 50 to 100%		
<b>Spatial Homogeneity</b>	± 15 %		
<b>Temperature Control (Custom designed)</b>	10°C ~ 80°C		

Innovator of Testing Equipment



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