



MT-EL-H1709M

PV Module/Solar String Electro-luminescence (EL) Tester



- Fully optimized for solar panel/string EL inspection
- Upgradable for in-line inspection integration
- Cooled system ensures long-term using
- Up to 2.8-Mpixel high sensitivity CCD imaging
- Built-in application specific image enhancement
- Customization on request

CSC-EL0902-A01-1
Doc No.: CSC-MTEL1709M
Ver.1.0a

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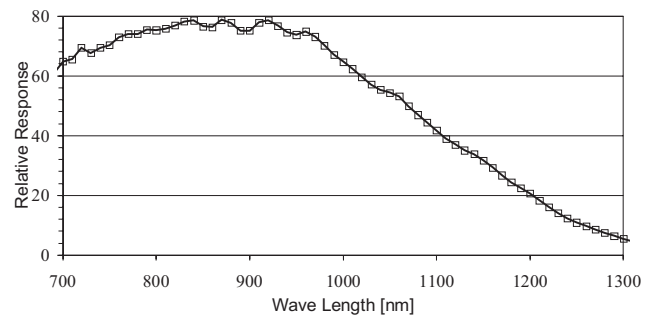
E-mail: info@camels.com.tw

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PV Module/Solar String EL Tester

The NexShot™ 3M EL are high-resolution & high-sensitivity custom-designed cameras target photovoltaic luminescent applications. Employing low-noise 2/3-inch progressive scan CCD sensors and optimized lens for imaging in the 0.7-to-1.7-um spectral range, high data rate and clear images are assured even very weak intensity of the electroluminescent (EL) emission.

Spectral Sensitivity Characteristics of CAMELS NexShot3M EL



Camera Key Features

- 2/3-inch progressive scan mega-pixel CCD
- Excellent near-infrared response
- Thermoelectric-cooled with forced air
- High image quality even at the short exposure times
- USB 2.0 interface with 480Mb/s throughput
- Built for tough industrial environments
- FPGA-based camera DSP/controller
- Class 100 clean-room assembly



Camera Specifications

Camera Model	NexShot3M-1.4M EL
Sensor Type	Progressive Scan Monochrome CCD
Sensor Size	2/3-inch
Resolution	1,392 x 1,040
Imaging Area	10.2mm(H)x8.3mm(V)
Pixel Size	6.45x6.45µm
Scan Type	Progressive Scan
Max. Frame Rate	10fps
PC Interface	USB 2.0
Output Format	8/12-bit/pixel
Lens Mount	C-mount
Housing	Anodizing Aluminum with Heat Sinks
Power Requirement	USB Bus Power
Operating Temperature	5 to 30°C
Operating Humidity	30% to 90% RH

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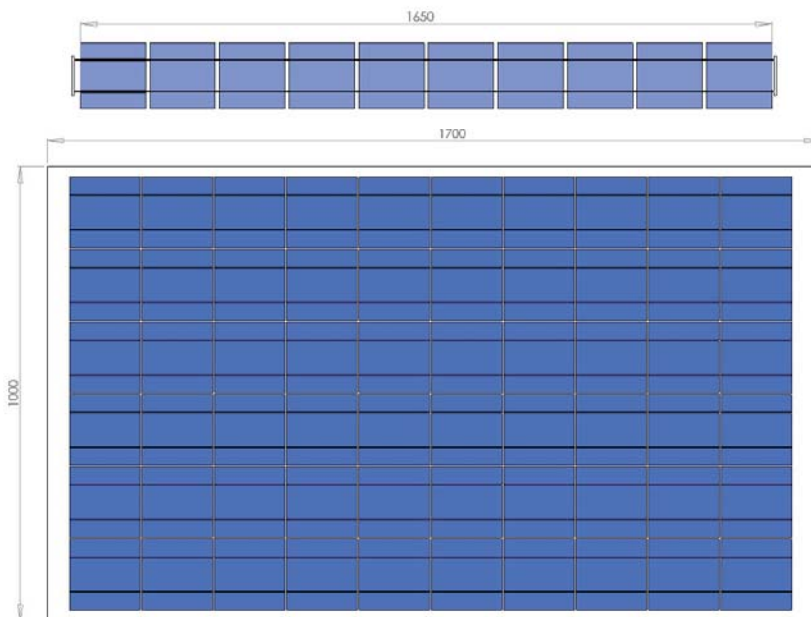
PV Module/Solar String EL Tester

System Specification

Product Number	MT-EL-H1709M
Application	PV Panel/Cell String inspection
Type	Manual
Dimension	Test table: 1.8(L)x1.2(D)x1.0(H)m Contrl unit: 0.6(L) x 0.5(D) x 1.0(H)m
Weight	Around 150Kg
Power	Around 110V/4A
Hardware	EL camera x1 Imaging lens optics x1 DC power supply x1 Vision controller x1 1-D laser barcode line scanner x1 (option)
Mechanical	Equipment body x1 Control unit x1 Test jig for PV module x1 Test jig for PV string x1 (option)
Software	GUI, image enhancement, auto defect detection (option)
Max Target Size	1,700 x 1,000 mm



Max Target Size



For cell string test:

We recommend the cell string would not exceed 1,650mm length.

For PV module test:

We recommend the PV module size would not exceed 1,700x1,000mm.

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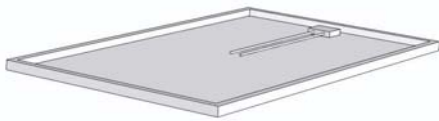
MT-EL-H1709M

PV Module/Solar String EL Tester

Application of In-line/Off-line PV Module Inspection:

The MT-EL-H1709M can be used to make sure there is no internal damage of the PV module after the string tabbing, rework, and lamination processes.

PV Module

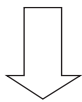


Solar String

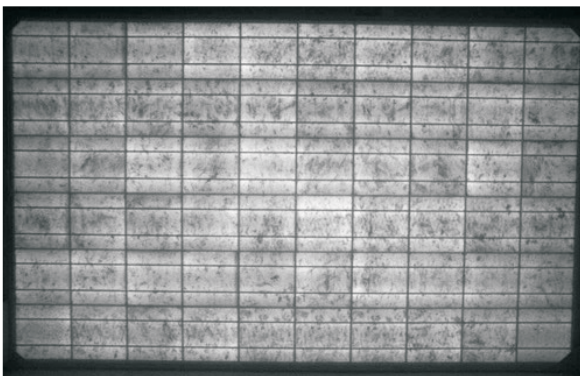


Inspection steps:

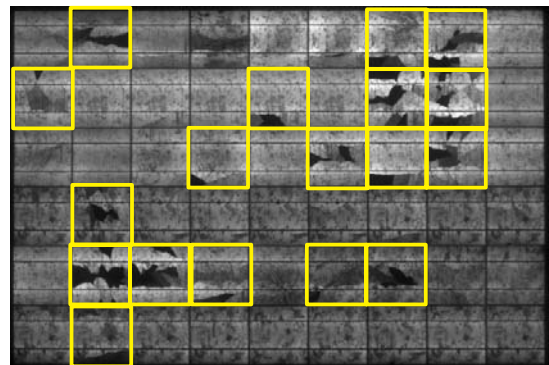
1. Place PV module or string onto test table
2. Connect the cable (for module) or test jig (for string)
3. Wait seconds then get the EL picture
4. Judge defect by human eyes
5. Scan bar-code or key-in file name
6. Save the picture



An EL image sample of good PV module



An EL image sample of defective PV module



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EL Tester Application	Lab	Panel Factory	Cell/Panel Factory	Panel Factory
Model	MT-EL-H1708M	MT-EL-H1709M	MT-EL-H1708I	MT-EL-H1709I
Type of measurement	Electroluminescence			
Environment	Dark box	Dark Chest	General	General
Max target size (mm ²)	200x200 ^{*1}	2,000x1,100/ 1,700x1,000	200x200 ^{*1}	2,000x1,100/ 1,700x1,000
Working distance ^{*2} (cm)	46	89/73	100	89/73
Automation	Manual ^{*3}	Manual	Inline	Inline
Imaging system				
Type of camera	Cooled CCD			
Resolution	1.4 MP	2.8/1.4 MP	1.4 MP	2.8/1.4 MP
NIR Lens	Yes	Yes	Yes	Yes
NIR filter	–	–	Yes	Yes
Exposure time (typical)	3s	3s	1s	3s
Cooling method	TE w/ forced air			
System utilities				
Power supply	Fixed	Fixed	Programmable	Programmable
Vision processor	Yes	Yes	Yes	Yes
Software pack ^{*4}	Standard or Advanced	Standard or Advanced	Advanced	Advanced
Metal housing	Yes	Yes	–	–
System dimensions (mm ³)	465x465x730	Customized	130x125x55 ^{*5}	130x125x55 ^{*5}
Warranty, delivery, price				
Warranty	1 year	2 years	2 years	2 years
Time of delivery	2 weeks	1-2 months	1-2 months	1-2 months
Price	Call for pricing	Call for pricing	Call for pricing	Call for pricing

Notes:

1. upscale is possible
2. from first lens element to object distance
3. research & offline inspection
4. check more on software pack page
5. camera size



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