



欽揚科技股份有限公司
CHINUP TECHNOLOGY CO., LTD.

SCS-1200 series Cell Sorter + IV tester

Lean design, 1650 x 1890 x 2370 mm only !!



** Customization for back-contact Cells too !*

Why do we need solar cell I/V sorter :

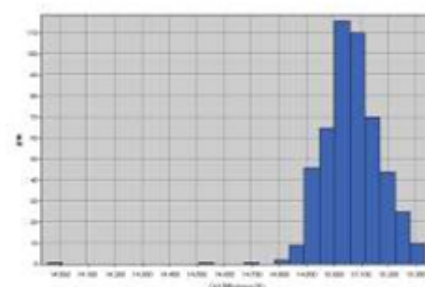
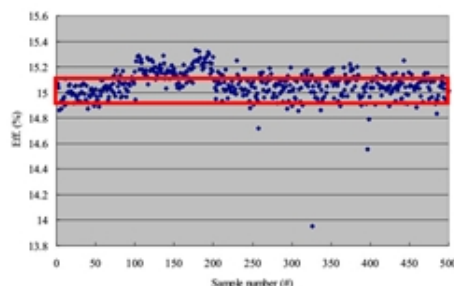
Even cell supplier already sorted the cells and classified by every 0.2% efficiency. The cell efficiency is still possible to change again due to raw material, manufacture technology, machine difference, storage and transportation.

The cell I/V sorter is a machine for PV panel manufacturing factory to inspect and auto sort the cells. The sorting result can be used to improve power loss (%) of PV panel manufacture, or the quality evidence to negotiate with cell suppliers.

An sorting example from true case:

We sample 500 pcs of solar cell from market. The sorting result shows the distribution of cell efficiency is not as stable as supplier's claim. The statistics data of 500 pcs of cells is showed below:

Sample q'ty = 500 cells
Mean Eff. (%) = 15.06%
Standard deviation = 0.11%



Sorting Process:

User loads the cells into cell loader manually and then push start button, the machine runs automatically and finish the sorting jobs.



** Option to integrate cosmetic inspection unit.*

Specifications:

IV Tester	Model	PASAN CT801	Sorter	Model	Chinup SCS-1200
	IEC Standard	IEC 60904-9		Cell loader	Two boxes, max 1000 cells per box
	Overall Class	Better than Class A		Throughput	1200 cells per hour
	Pulse Duration	4 ms		Breakage rate	< 0.2%
	Light Pulse Stability	< +/- 1%		Dimension	1890 (W) x 1650 (D) x 2370 (H) mm
	Light Distribution	AM 1.5		Weight	1100Kg
	Light Intensity	0.7 to 1.2 KW/ m ²		Power	220VAC / 60,50Hz/ 3-ph, 35A, Rating 13.4 KW
	Flashtube Lifetime	1,000,000 flashes		Pressure Air	6 kg/cm ² , 450 lt/min

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PV Module Micro-Crack Inspector

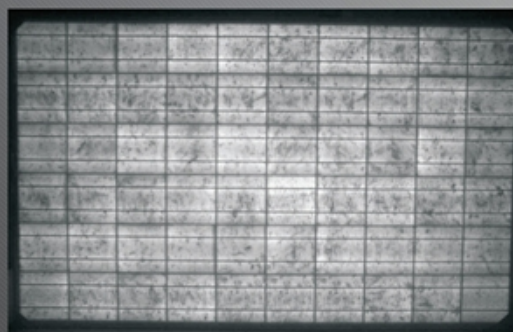


Key Features:

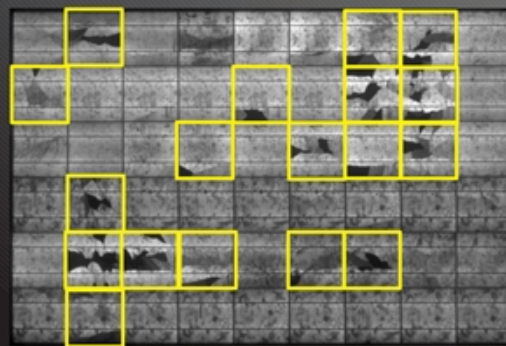
- ☐ Customize size from 1.6 x1.05 to 2.0x 1.3m
- ☐ High speed imaging time
- ☐ Able to calculate % of dark area
- ☐ Able to mark dark area in red
- ☐ Able to add arrow mark and save to file
- ☐ Support Barcode system database
- ☐ Save your comment to file



An EL image sample of good PV module



An EL image sample of defect PV module



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PV Module & String Micro-Crack Inspector

EL-MT01A

In Line PV module micro crack inspector

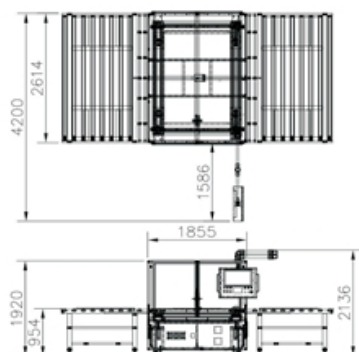
Max. test area: 2000x1300mm



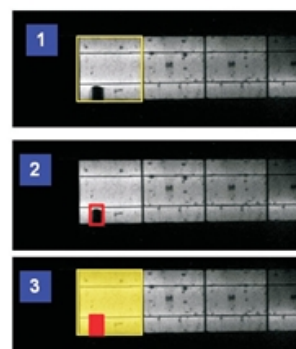
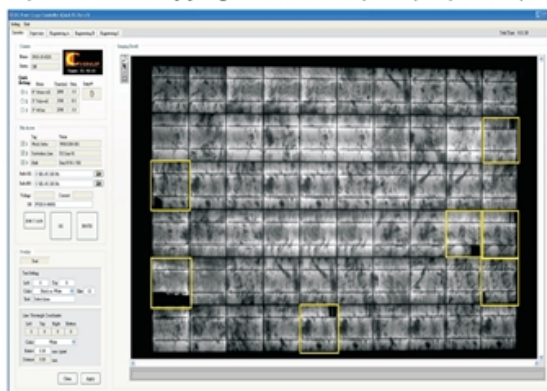
Auto contact



Dimensions:



Operator manually judges PV module pass (OK) or fail (NG)



Possible Max Lose= 4.37%

EL-MT01M-C

Off-Line PV module micro crack inspector

Max. test area: 2000x1300mm
Machine weight: 700kg (approx.)
Dimensions: 2740(L)x1700(D)x2350(H)mm
excluding control station



EL-MT01M

Off-Line PV module micro crack inspector

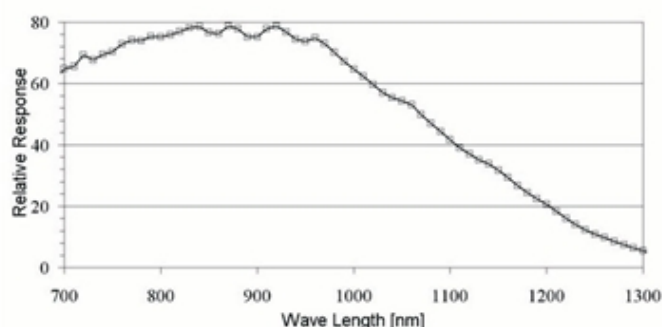
Recommended for mono-cell PV module
Max. test area: 1600x1050mm
Machine weight: 450kg (approx.)
Dimensions: 1850(L)x1400(W)x970(H)mm
excluding control station



Camera Features

- 2/3-inch CCD camera
- Resolution up to 1.4 Mega Pixels
- Camera-link interface with 480Mb/ throughput
- Built for tough industrial environments
- FPGA-based camera DSP/controller
- Class 100 clean-room assembly
- Cooling system inside
- Filter lens included

Spectral Sensitivity Characteristics



System Specifications

We listen to your demand and customize machines to meet your engineering requirements. Please contact us for more details.

Application	PV module quality inspection
Test Area	1600 x 1050 mm (5" cell, 8x12 matrix)
	2000 x 1300 mm (6" cell, 8x12 matrix) - Maximum
Max. Resolution	1390 x 1040 pixels
EL Imaging Time	3 seconds @ 5~8 Amps
Power Consumption	Maximum 1500W
Standard Software	Friendly user interface
	Operaiton/ Engineering Mode (Password Protection)
	Save serial number as file name by barcode reader
	Save test date/ time/ SN to EL image
	Enable/ Disable Cooling System
	Overlay function- Drawing on screen
	Real Time Video Mode
Hardware/ Mechanical Components	EL Camera x1
	Customerized lens and filter lens x1
	DC power supply x1 (100V/10A)
	PC system x1 (with 23" LCD)
	Wired barcode scanner x1
	Machine body x1
	Control station x1
	Contact jig for solar string x1
	Contact jig for PV module x1



EL-CT01A

Solar Cell Micro-Crack Inspector



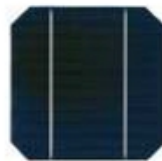
5" Mono



6" Poly



6" Mono



6" Poly
(3 bus bars)



Key Features:

- ☐ Fast adjustment for 5" and 6" cells
- ☐ Auto cell position alignment
- ☐ Software-controlled I/V input
- ☐ Auto pin up/ down contact
- ☐ High speed imaging time
- ☐ Auto fine tune EL image
- ☐ Auto calculate % of dark area
- ☐ Auto mark dark area in red
- ☐ Arrow mark and save to file
- ☐ Support Barcode system database
- ☐ Save your comment to file

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Doc No.: CCEL-CT01A
Rev.03c

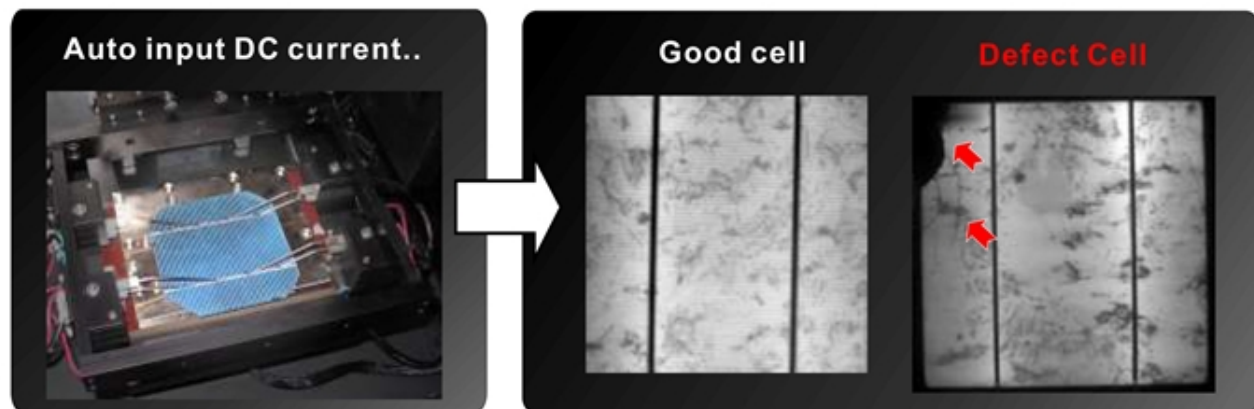
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EL-CT01A

Solar Cell Micro-Crack Inspector

Why do we need solar cell micro-crack inspector :

Most power-loss of PV panel is caused by the internal cell crack. The EL-CT01A is used to take the EL image of solar cell. By reviewing the EL image, user can judge the cell quality as easy as looking at a X-ray picture.



System Specifications

Model Number: EL-CT01A

Application	Cell quality inspection in RD or QA Lab
Type	Manual input , Auto alignment and contact
Max Test Area	200 x 200 mm (Adjustable)
Max resolution	1392 x 1040 pixels
Dimensions	Approx 1.7 (L) x 0.9 (D) x 1.8 (H) m
Weight	Approx 120Kg
Power	110V or 220V , 1500W.
Hardware/ Mechanical Components	EL Camera x1 Customized lens and filter lens x1 DC power supply x1 (50V/ 10A) PC system x1 (with 22" Full HD LCD) Machine body x1 Contact parts for 5" cells x1, and 6" cells x1
Standard Software	Muti UI (Engineering Mode, Operation Mode) Save serial number as file name by barcode reader. Save test date or comments in EL picture. Add arrow-mark to marked defect area. Enhanced high sensitivity control Enhanced back-ground noise reduction Remote control service via internet.
Option Software	Software Controlled IV Input. Save pictures to file server. Mark dark area in red.

We listen to your demand :

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EL-MT01M

PV Module Micro-Crack Inspector



Key Features:

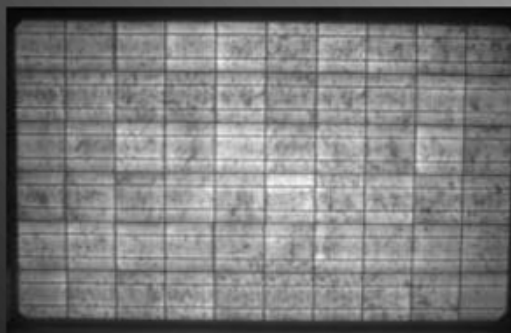
- ☐ Germany Made CCD camera
- ☐ Able to upgrade for in-line operation
- ☐ Able to upgrade to Dual Camera
- ☐ Customize size from 1.7 x1.1 to 2.0x 1.3m
- ☐ Software controlled I/V input (Option)
- ☐ High speed imaging time
- ☐ Auto fine tune EL image
- ☐ Arrow mark and save to file
- ☐ Support Barcode system database
- ☐ Save your comment to file



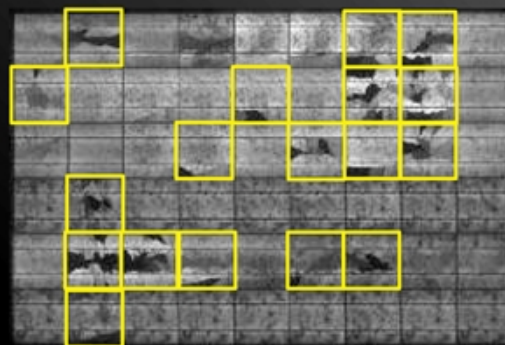
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Rev.06, 2010-03.



An EL image sample of good PV module



An EL image sample of defect PV module



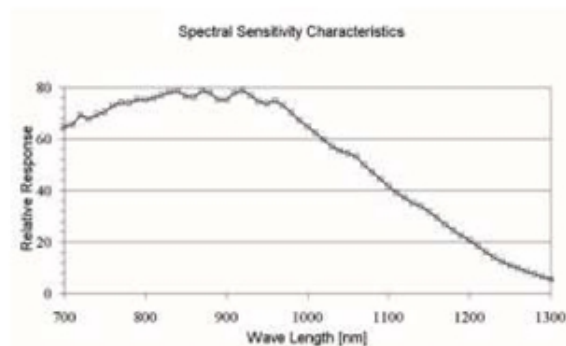
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Camera Features

- Germany made 2/3-inch CCD camera
- Resolution up to 1.4 Mega Pixels
- IEEE1394a interface with 480Mb/s throughput
- Built for tough industrial environments
- FPGA-based camera DSP/controller
- Cooling system inside
- Filter lens included

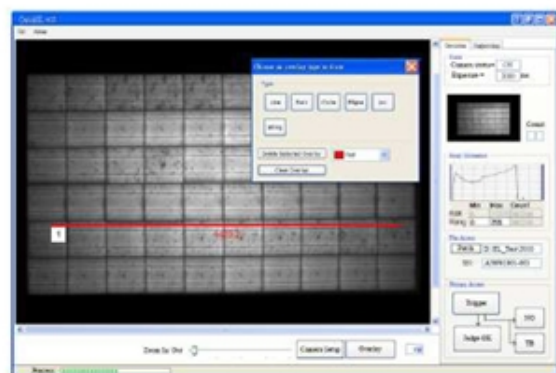


System Specifications

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Model Number: **EL-MT01M**

Application	Off-line PV module quality inspection	Hardware/ Mechanical Components	EL Camera x1
Type	Manual loading/ unloading		Customerized lens and filter lens x1
Standard Test Area	1700 x 1100 mm (6" cell, 6 x10 or 5" cell 6x12 matrix)		DC power supply x1 (60V / 10A or Option 100V/10A)
Option Test Area	2000 x 1300 mm (6" cell, 8 x12 matrix)		PC system x1 (with 22" LCD)
Max Cell Q'ty	Standard: 72 cells. Option: 96 cells.		Wired barcode scanner x1
Image Size	1360 x 1040 pixels		Machine body x1
Dimensions	Standard: approx. 1.9 (L) x 1.2 (D) x 0.9 (H) m		Control station x1
Weight	Standard: approx. 150Kg		Contact jig for solar string x1
Power	110V or 220V, 1500W.		Contact jig for PV module x1
Standard Software	Friendly user interface	Option Software	In-Line EL Tester : RS232 communication
	Operaiton/ Engineering Mode (Password Protection)		In-Line EL Tester : Multi-snap function
	Save serial number as file name by barcode reader		Dual Camera Tester : Auto combine images
	Save test date/ time/ SN to EL image		
	Enable/ Disable Cooling System		
	Overlay function- Drawing on screen		
	Real Time Video		
	Auto Image Fine Tune		



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Photovoltaic Module Production Line

Manufacturing Equipment

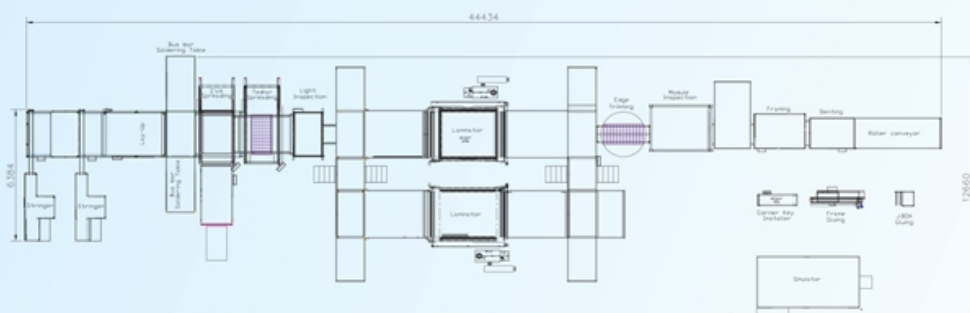
太陽能電池模組生產線



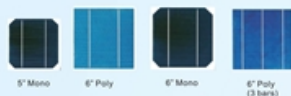


欽揚科技股份有限公司
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Photovoltaic Module Production Line for Crystalline Silicone Solar Cells 晶矽電池模組生產線



Complete In-Line Solution!



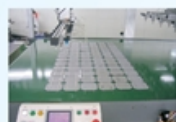
Cell I/V Sorter
Cell功率分檢機

Throughput: 1200 cells/ hour
Breakage Rate: < 0.2%
Cell Loader: Max 1000 cells/ box
IV Tester brand: PASAN, Switzerland
Overall Class: Better than class A
Light Intensity: 0.7 to 1.2 KW/m²
Lifetime: 1,000,000 flashes



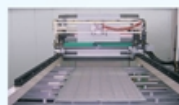
Tabbing Stringer
串焊機

Throughput: 600 cells/ hour
Breakage Rate: < 0.5%
Cell Loader: Max 1000 cells/ box
Cell Type: 5" & 6" (2 or 3 bus bars)
Ribbon Type: Lead or Lead-free
Alignment Type: CCD alignment with AOI
Soldering Type: IR lamp or Hot-air
Option: Link to Auto-Layup
Electrical Test
Micro-crack inspection



Auto Layup
自動鋪列機

Throughput: 120 strings/ hour
Breakage Rate: < 0.2%



Auto Cutting & Spreading
自動裁切鋪料機

Throughput: > 100 panels/ hour
Tolerance: +/- 1mm



Auto Laminator
層壓機

Cycle time: Nominal 15 minutes
Breakage Rate: < 0.5%
Laminating Area: 3600 x 2200 mm (regular size)
Heating Type: Heater
Temp. uniformity: +/- 2 degree C
Heating Plate: Aluminum alloy
Temp. Control: 6~36 zones
Pre-heating: Depends on laminating area
Vacuum: Dry pump, reach 1 Torr within 60sec
Cooling: Fan cooling



Edge Trimming station
修邊站

Integrate suction cups with conveyor.
Rotate the panel and finish trimming on the conveyor.



Cosmetic Inspection
自動翻面外觀檢查機

Auto turn over, turn on back light, and deliver the panel to operator.



L-Key Installing Machine
L-Key 預壓機

Throughput: < 20 seconds/ cycle



Auto Gluing Machine
自動點膠機 (鋁框)

Auto glue the aluminum frame by PLC controlled system.



Denting Machine
鋁框內角壓成機

Denting the frame inner corners to make frames firmer and stronger.



Framing Machine
裝框機

Throughput: < 180 seconds/ cycle
Max Panel Size: 1950 x 1310mm



Sun Simulator
陽光模擬測試機

Sun Simulator: PASAN, Switzerland.
Overall Class: Better than class A
Phase Duration: 10 ms
Light Phase Stability: < +/- 1%
Light Intensity: 0.7 ~ 1.2 KW/m² @ AM1.5
Load Time: 30 seconds
Max measure points: 4095 points
Max acquisition speed: 12 us/ point



EL Micro-crack Tester
EL內裂檢查機

Throughput: 3 seconds/ panel
Resolution: 1390 x 1040 pixels
Test Area: 1700 x 1100 mm-
2000 x 1300mm

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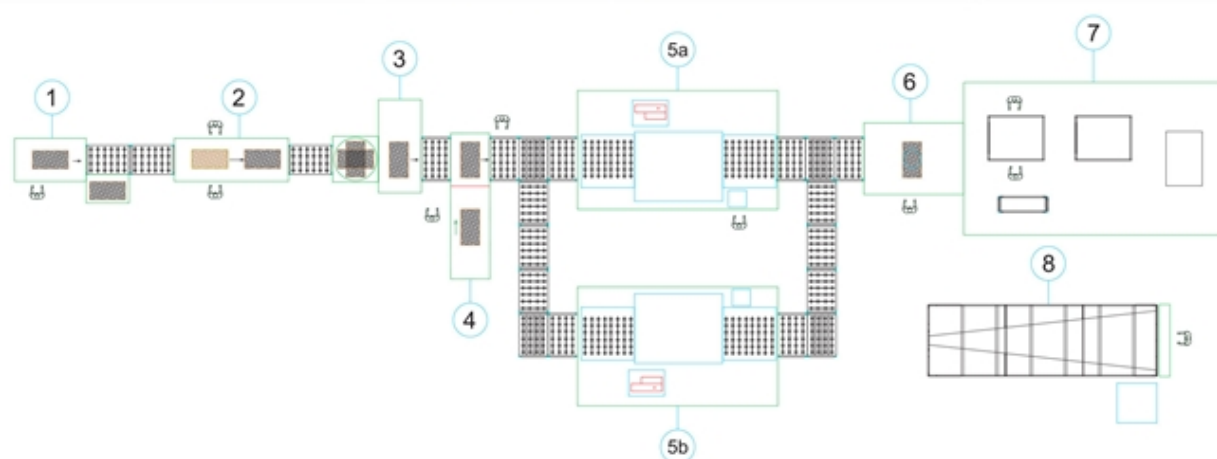
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Ver.01, 2009-09

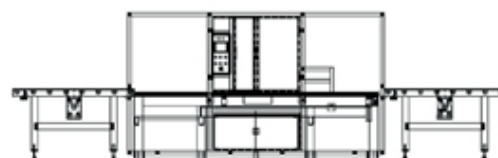
薄膜電池模組生產線

Photovoltaic Module Production Line for Thin Film Solar Cells



1. IV Tester (IV 測試機)
2. Ultrasonic Soldering (超音波焊接機)
3. EVA Spreading (EVA 層疊機)
4. Back Glass Setting (背板玻璃層疊機構)
5. Laminator (模組壓合機)
6. Manual Trimming (人工修邊區)
7. Module Framer & Junction Box Installer
(組框區+線盒接線區)
8. Simulator (模組測試機)

Ultrasonic Soldering (超音波焊接機)



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Photovoltaic Module Production Line

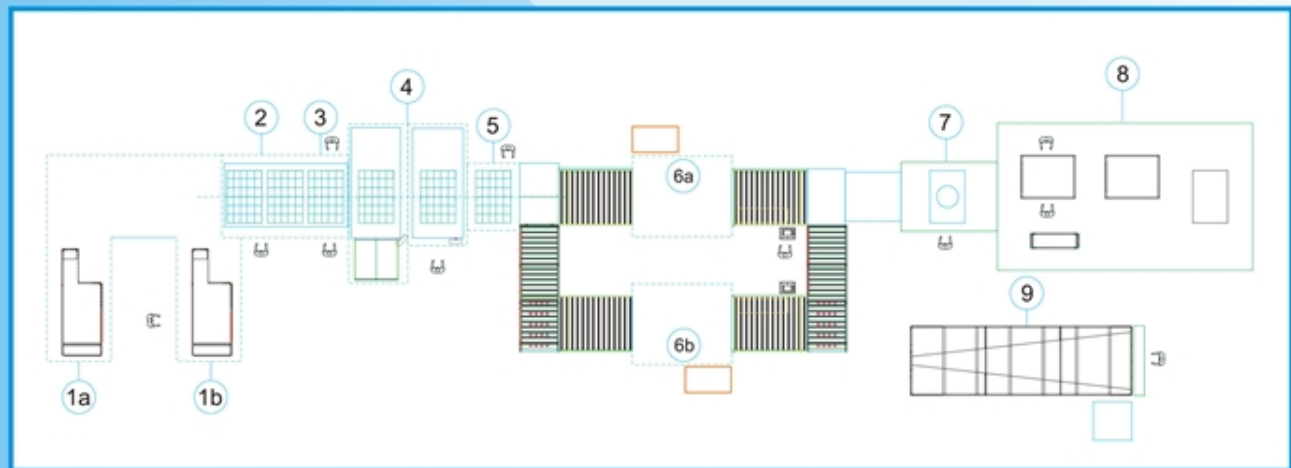
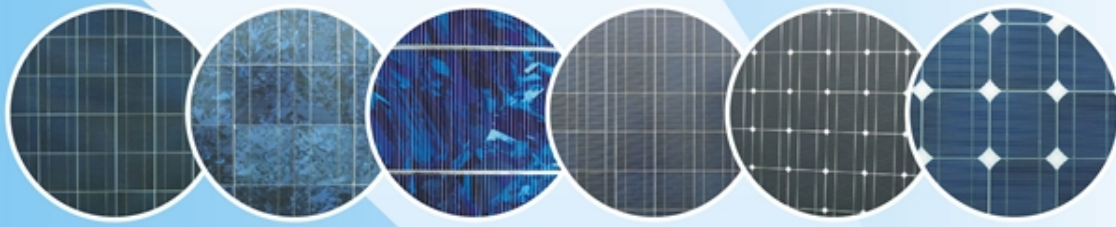
Manufacturing Equipment

太陽能電池模組生產線



晶矽電池模組生產線

Photovoltaic Module Production Line for Crystalline Silicone Solar Cells



1. Tabber and Stringer (Cell串接機)

2. Lay-Up (Cell排列機)

3. Bus Soldering (人工焊接區)

4. EVA & Tedlar Spreading
(EVA & Tedlar層疊機)

5. Inspection (人工目視檢測區)

6. Laminator (模組壓合機)

7. Edge Trimming (人工修邊區)

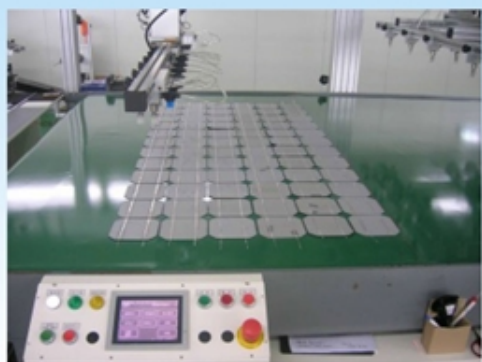
8. Module Framer & Junction Box Installer
(組框區+線盒接線區)

9. Simulator (模組測試機)

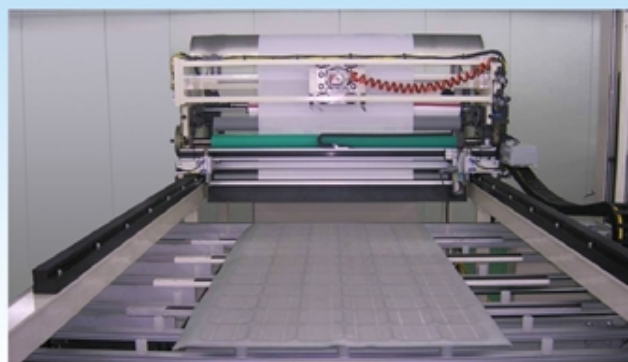
Tabber and Stringer (Cell串接機)



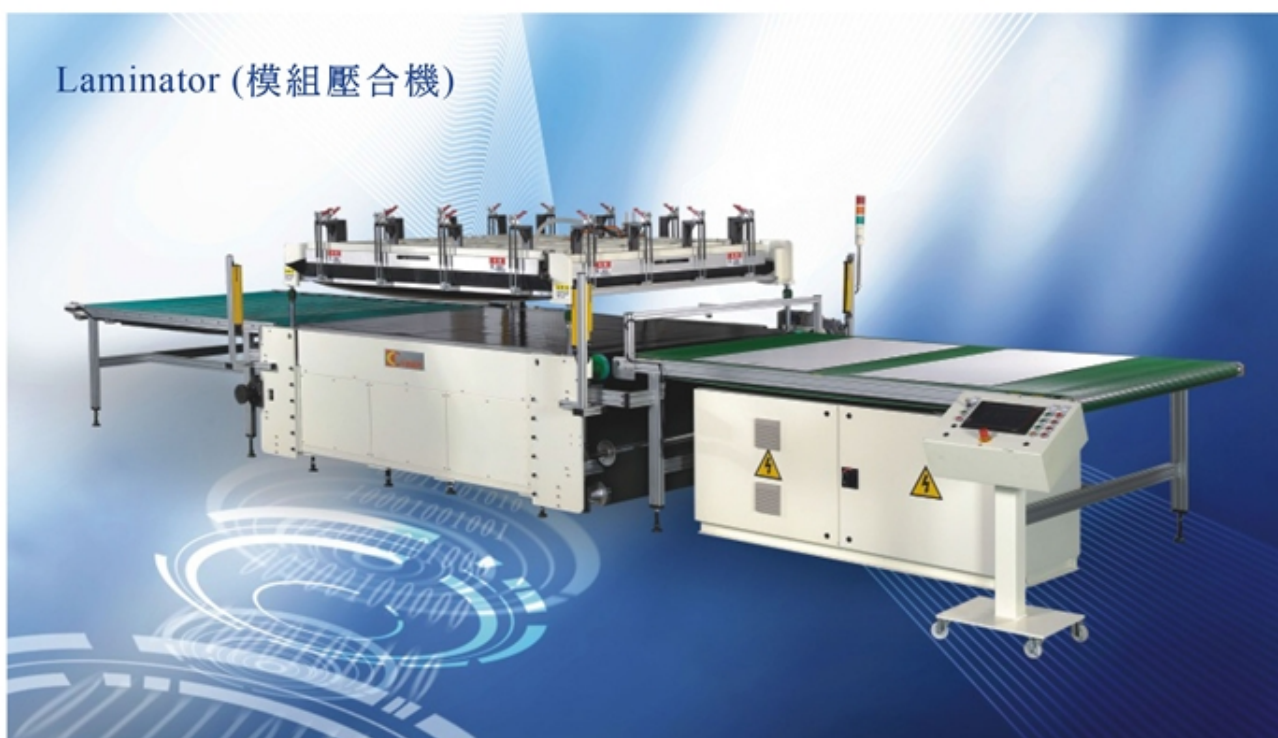
Lay-Up (Cell排列機)



EVA & Tedlar Spreading
(EVA & Tedlar層疊機)



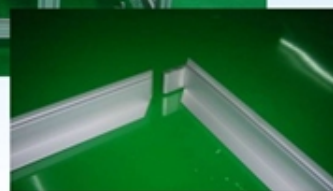
Laminator (模組壓合機)



Edge Trimming (人工修邊區)

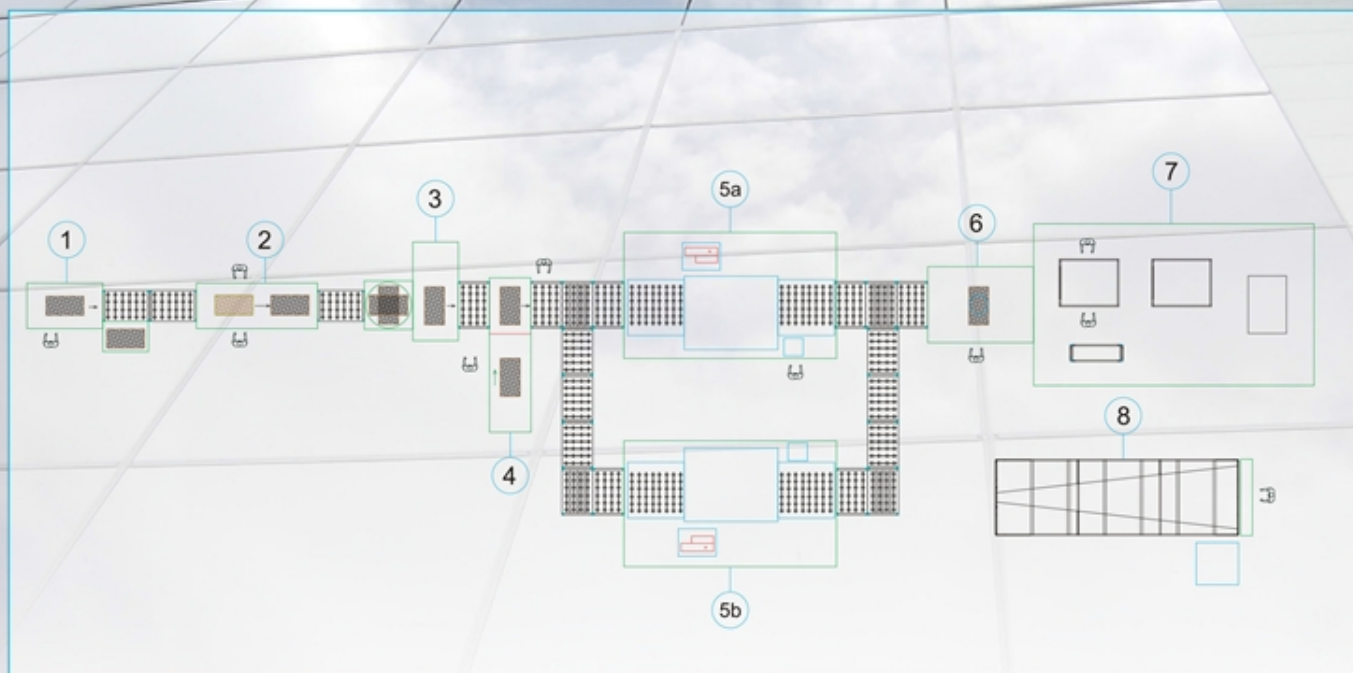


Module Framing (組框區)



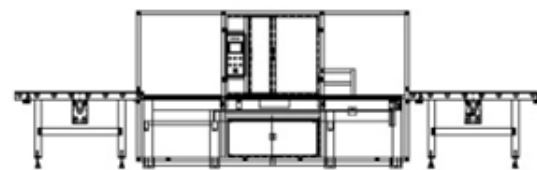
薄膜電池模組生產線

Photovoltaic Module Production Line for Thin Film Solar Cells



1. IV Tester (IV 測試機)
2. Ultrasonic Soldering (超音波焊接機)
3. EVA Spreading (EVA 層疊機)
4. Back Glass Setting (背板玻璃層疊機構)
5. Laminator (模組壓合機)
6. Manual Trimming (人工修邊區)
7. Module Framer & Junction Box Installer
(組框區+線盒接線區)
8. Simulator (模組測試機)

Ultrasonic Soldering (超音波焊接機)



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欽揚科技股份有限公司
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SSP Series EVA / BACKSHEET CUTTER



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Chinup SSP series EVA / Backsheet Cutter is designed to cut EVA and module backsheet to proper length. Off-line and In-line versions are available upon request.

Key Features:



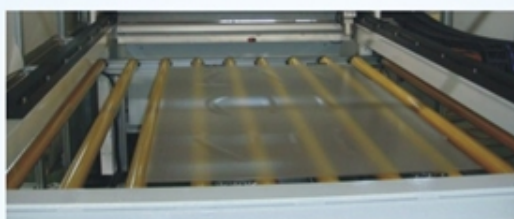
- Pneumatic driven material roll lifter, and powered unwind.
- Maximum allowed material width: 1320 mm



- Servo driven pneumatic pinch roll feeding system.
- Independent servo driven spreading unit to be synchronous with the pinch roll feed for maximum sheet length 2000mm.
- Material cut-off knife.
- Cut sheets stacking tray. Includes two trays and two carts for tray exchange. Ale to be upgraded for in-line operation.
- Mitsubishi PLC controls and touch screen operator interface.



- Punch hole on EVA or Backsheet for ribbon connecting to J-box.



- In-line operation version is available upon request .

Machine Dimensions

Length	4460 mm
Width	2420 mm
Height	2426 mm
Weight	2300 kg



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CHINUP TECHNOLOGY CO., LTD.

STS-600 series Tabbing Stringer



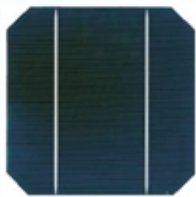
5" Mono



6" Poly



6" Mono



6" Poly
(3 bars)



* Customization for back-contact cells too.

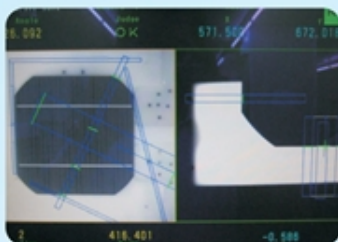
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Chinup Technology Co., Ltd.

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Doc: ver02c, 2009-10.

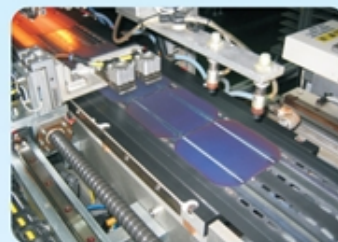
Key Features:



CCD Alignment & Inspection
Precise alignment and to inspect cell crack and chip.



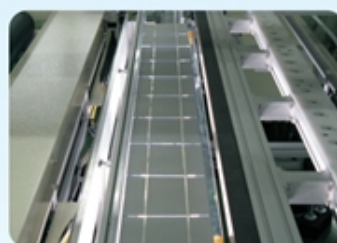
Ribbon handling tech.
Special designs are used to stretch and flatten the ribbon to assure best soldering quality and to minimize rework rate.



Multi-Steps Pre-Heating
Multi-step heating process assures best soldering quality.
Vacuum under the steel belt to hold cells stationary.



IR or Hot-Air Soldering
The non-touch soldering process minimizes stress on cells to assure lowest breakage rate and cell crack.



Electrical Test (opt.)
Customer can choose to add electric test function for the string after soldering process to make sure all strings in good connection.



Link to Auto-Layup (opt.)
For in-line production to minimize cell crack caused by manual handling.

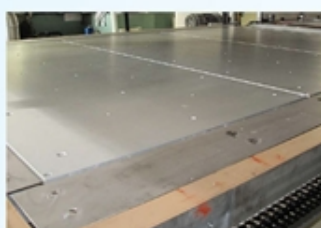
Specification:

Capability	Capacity	Up to 600 cells per hour
	Cell size	125 x 125mm and 156 x 156mm (Option for 8" cell)
	Cell thickness	180μm up to 400μm
	Bus bar pitch	52~104 mm
	Bus bar numbers	2 or 3 bus-bar printing
	Max string length	2000mm
	Max cells per string	12 cells per string
	Max gap between cells	30mm
	Min gap between cells	1.0mm
	Breakage rate	160μm ≤ 0.5% · 180μm ≤ 0.3%
Key features	Input cell	Max 1000 cells per loader, suggest 200~300pcs per loader.
	Cell alignment	CCD Alignment and AOI for cell crack and chip.
	Ribbon stretch	Yes
	Fluxing	Fluxing on ribbon
	Soldering type	Infrared Ray or Hot Air
	Soldering pins	Yes, pressure is adjustable
	Off-load	Yes, turn over the string
Machine info	System dimensions	6440 (L) x 1490 (W) x 2020 (H) mm
	Operation Interface	Industrial touch screen
	Power	AC power (Voltage upon request) , 50 or 60HZ, 3ph, 20KW
	Press Air Consumption	620 L/min



欽揚科技股份有限公司
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SML series PV Module Laminator



Precise heating control,
+/- 2 degree C !



Pin-Lift system for pre-
heating control !!



High performance,
Dry vacuum pump !!!

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Features

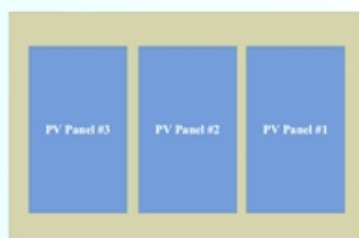
- Chinup SML Laminator can be integrated into fully-automated production line, or be operated independently.
- Quick clamping device ensures the replacement of a worn diaphragm in less than 30 minutes.
- Unique chamber block up mechanism.
- A pin-lift system to lift the laminates off the heating plate for a smooth and controlled heat transfer from the plate to the lay up.
- High performance vacuum pumps and excellent sealing of the chamber provide a fast and outstanding vacuum in the laminating chamber to ensure high laminating quality and a shorter lamination cycle.
- Cleaning brush to protect the Teflon conveyor belt in the laminator from any contamination with EVA residue.
- Light curtains protection surrounding the laminator to ensure safe operation.
- Touch screen operator interface for easy operation.

Technical Data:

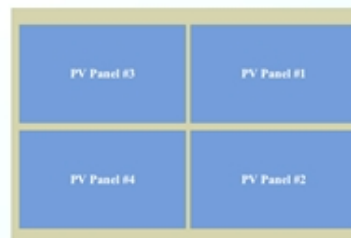
Model	SML-1517	SML-1722	SML-2124	SML-2436
Effective Lamination Area				
Max Laminate Length	1700mm	2200mm	2400mm	3600mm
Max Laminate Width	1500mm	1700mm	2100mm	2400mm
Max Laminate Thickness	25mm			
Heating Process				
Number of Controllable Temperature Zone	6~36 zones			
Max Temperature	180℃			
Temperature Uniformity	+/- 2℃			
Heating Rate	> 6℃/ min			
Chamer Open/ Close	Vertically by Pneumatic cylinders			
Pressure	0~1 Atmosphere, Adjustable.			
Press Speed	3 steps, adjustable.			
Loading/ Unloading				
Automatic Module Loading	Yes			
Transport Mechanical in Laminator	Teflon Conveyor Belt			
Automatic Module Unloading	Yes			
Release Sheet	Teflon Sheet			
Vacuum System				
Vacuum Pump	250~ 630 m ³ / hour			
Vacuum Pressure	< 100 pa			
Vacuum Speed	within 60 seconds to reach 1 torr (133 Pa)			

※The above are the basic standard specifications. Special specifications are available upon request.

SML-2436 has the widest application for PV production. It can laminate 3 or 4 standard 230W PV panels (6x10 matrix layout for 6"cell) per cycle.



*Type 1:
Laminate 3 panels
per cycle.*



*Type 2:
Laminate 4 panels
per cycle.*