深圳市联立太阳能有限公司

Shenzhen LianliSolar Co., Ltd.

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Specification Certificate

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LL SOLAR

Shenzhen Lianli Solar Co., Ltd.

Contact: Wen Liyou Phone: 18818680843 Fax: 0755-29020246

Customer Part Number:

Product Name: LL-110W Solar Panel (Neutral)

Product Specifications: LL-YT110W,18.68V, 4 - fold

Product Model: LL-YT110W 18.68V MC4, 2 m cable / includes neutral-colored packaging box

Link Material No.:

Operating environment: Outdoor

Version: A.0

Date: June 23,2026

Standard Framework: The purpose of establishing this specification is to provide both the manufacturer and the user with clear standards for the product, and to enable acceptance inspections in accordance with the procedures set forth therein; any content not expressly included in this specification may be supplemented or amended upon mutual agreement between the parties.

Preparation	Chen Shulin	Review	Diao Guocai	Confirmed	Du Anqiang

Customer Acknowledgment Section

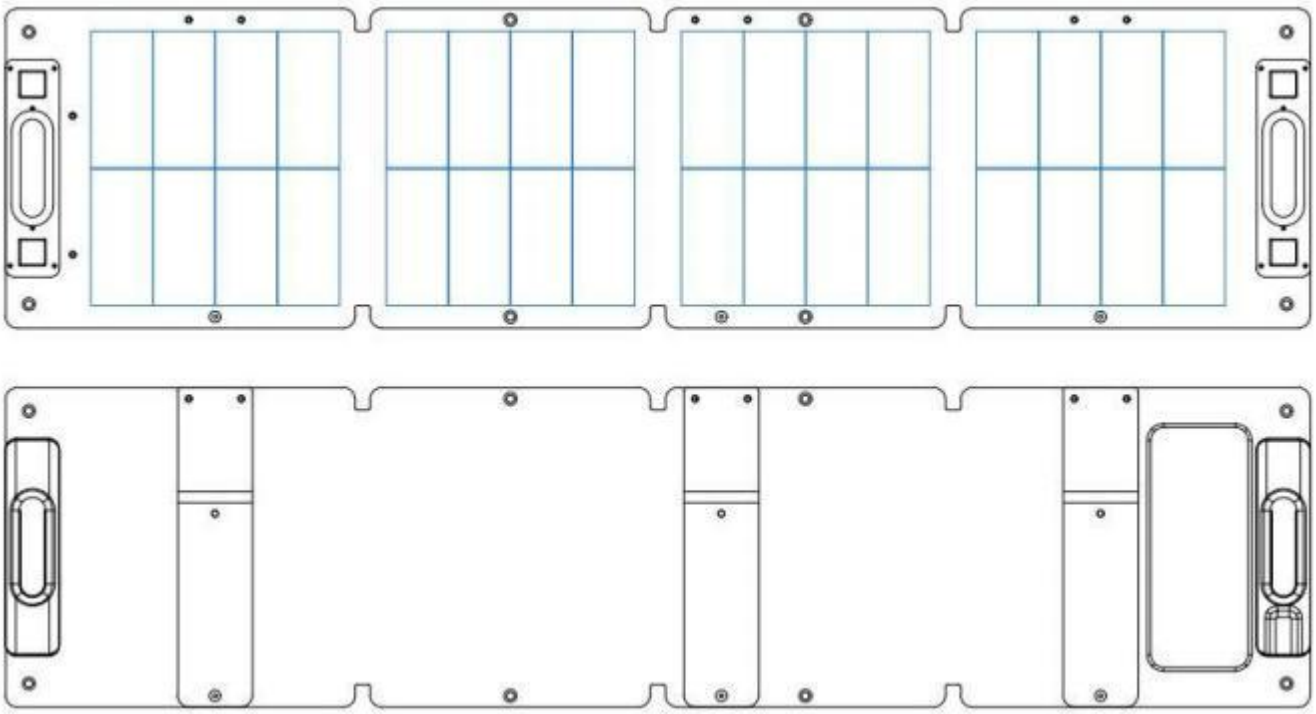
Signed:

Date:

Note:*Upon your review, approval, and signing in the "Customer Acknowledgment" section of the "Specification Confirmation Letter," our company hereby confirms that your company accepts the full contents ofthis "Specification Confirmation Letter."*

Document Revision History					
Version Number	Revisions	Person who made the change	Reviewer	Approver	Effective Date
A.0	Initial Offering	Chen Shulin	Diao Guocai	Du Anqiang	2026.6.23

1、 Renderings of the Front and Back Sides of the Bare Solar Panel:



(Figure 1-1) Renderings of the front and back sides of the solar panel

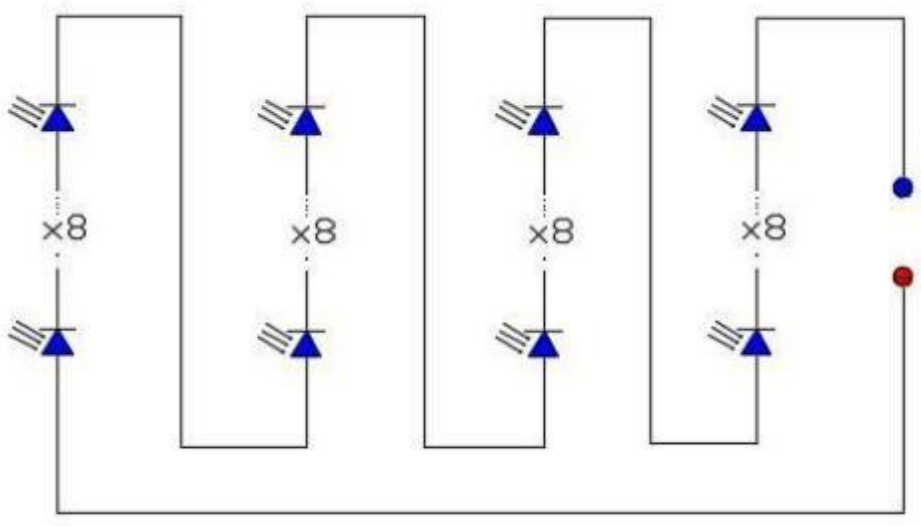
2、 Actual Image of the Solar Panel



(2-1) Actual Image of the Folded Front View

3、 How the Solar Panels Operate:

Solar panel operating principle: 32 panels connected in series



(Figure 3-1) Schematic diagram of the working principle of solar panels

4、 Electrical Performance Parameters of Bare Solar Panels

Output power (@STC)	≥111.8W	
Open-circuit voltage (@STC):	23.6V	±5%
Standard operating voltage (@STC):	19.3V	±5%
Standard operating current (@STC):	5.77A	±5%
Short-circuit current (@STC):	6.04A	±5%
Cell conversion efficiency (%):	≥25%	

Electrical Performance Parameters of Solar Panel Wiring Output

Output power (@STC)	≥109W	
Open-circuit voltage (@STC):	23.6V	±5%
Standard operating voltage (@STC):	18.68V	±5%
Standard operating current (@STC):	5.84A	±5%
Short-circuit current (@STC):	6.1A	±5%
Solar cell conversion efficiency (%):	≥25%	

Note: STC: ① Standard Tested Condition: AM = 1.5, 25 °C, 1000 W/㎡

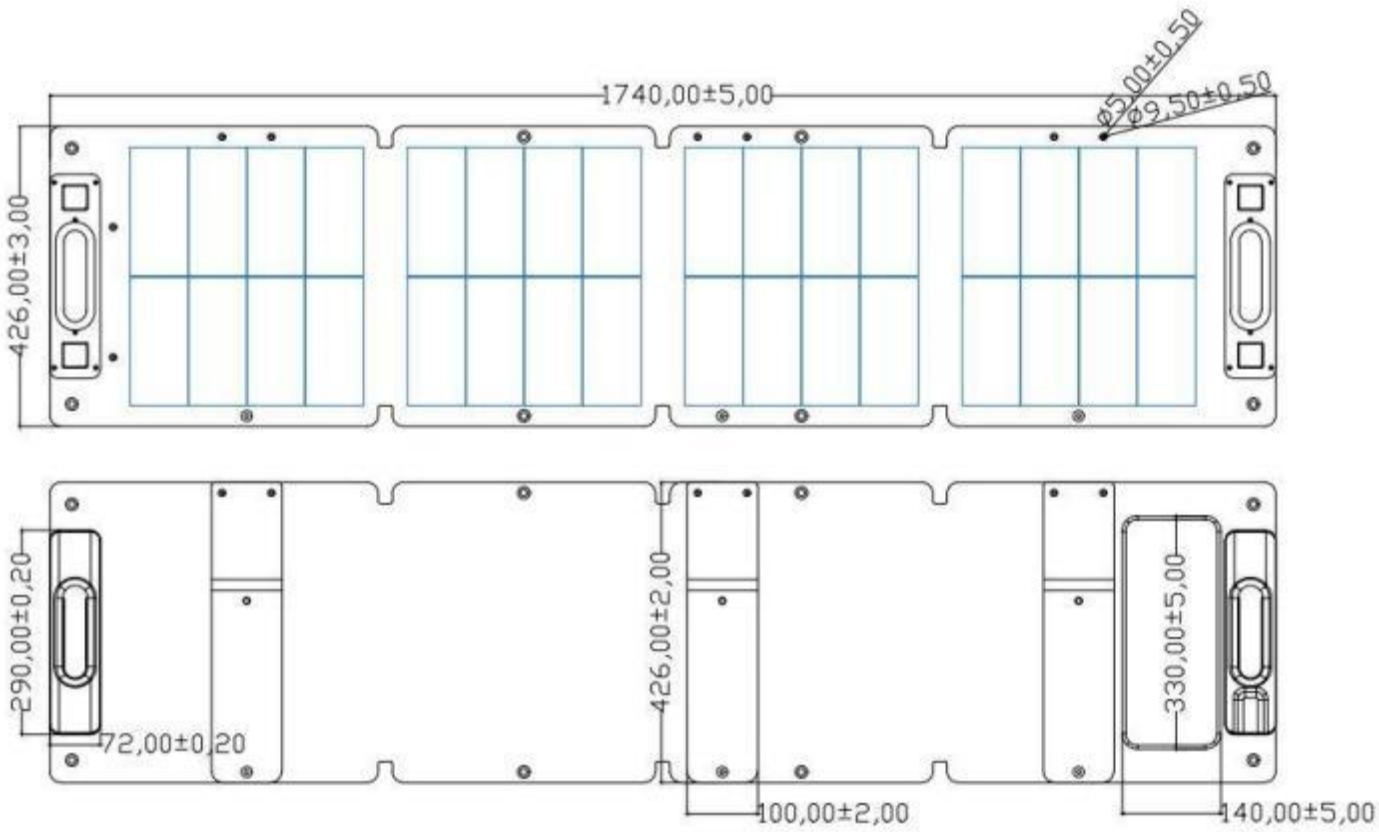
②Simulated light source (halogen lamp) test conditions: light source intensity: 40,000 lux ±5%;

③Load mode:Load tester constant voltage test mode (CV)

5、 Dimensions and Specifications of Finished Solar Panels (Cutting Process: Machine Cutting)

Expanded dimensions:	1740 ×426 ×27± 5mm
Folded dimensions:	475 ×426 ×42± 5mm
Weight of solar panels (including interconnect cables):	3.02 ±0.5kg

Dimensions:



(Figure 5-1) Solar panel specification and dimension diagram

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6、 Solar Panel Composition and Material Specifications

Materials for solar panels: composite material, photovoltaic welding tape, solar cells, EVA, braided copper tape, ETFE film, interlayer fabric, back-side waterproof fabric, snap fasteners, mother-and-child screw fasteners, gun-black buttons, handle housing, wires, elastic bands, wire packaging. Composite material:

Photovoltaic welding tape:	0.7 × 0.18 mm
Woven copper tape:	175/0.07
Solar cell:	0.18 mm, 182×10 BB(BC) monocrystalline solar cell wafer
EVA:	0.45mm
ETFE:	0.02 mm, polished surface
Lined fabric:	0.3 mm
Back fabric:	0.4 mm
Black stud for corns:	Inner diameter: 10 mm; outer diameter: 16.5 mm
Black dual-screw fastener:	Shaft diameter: 5 mm; shaft length: 3 mm; cap diameter: 9.5 mm
Black button on the gun:	Matching face fastener, 15 mm diameter
Handle housing:	Clip-type, 290 × 72 × 42 mm

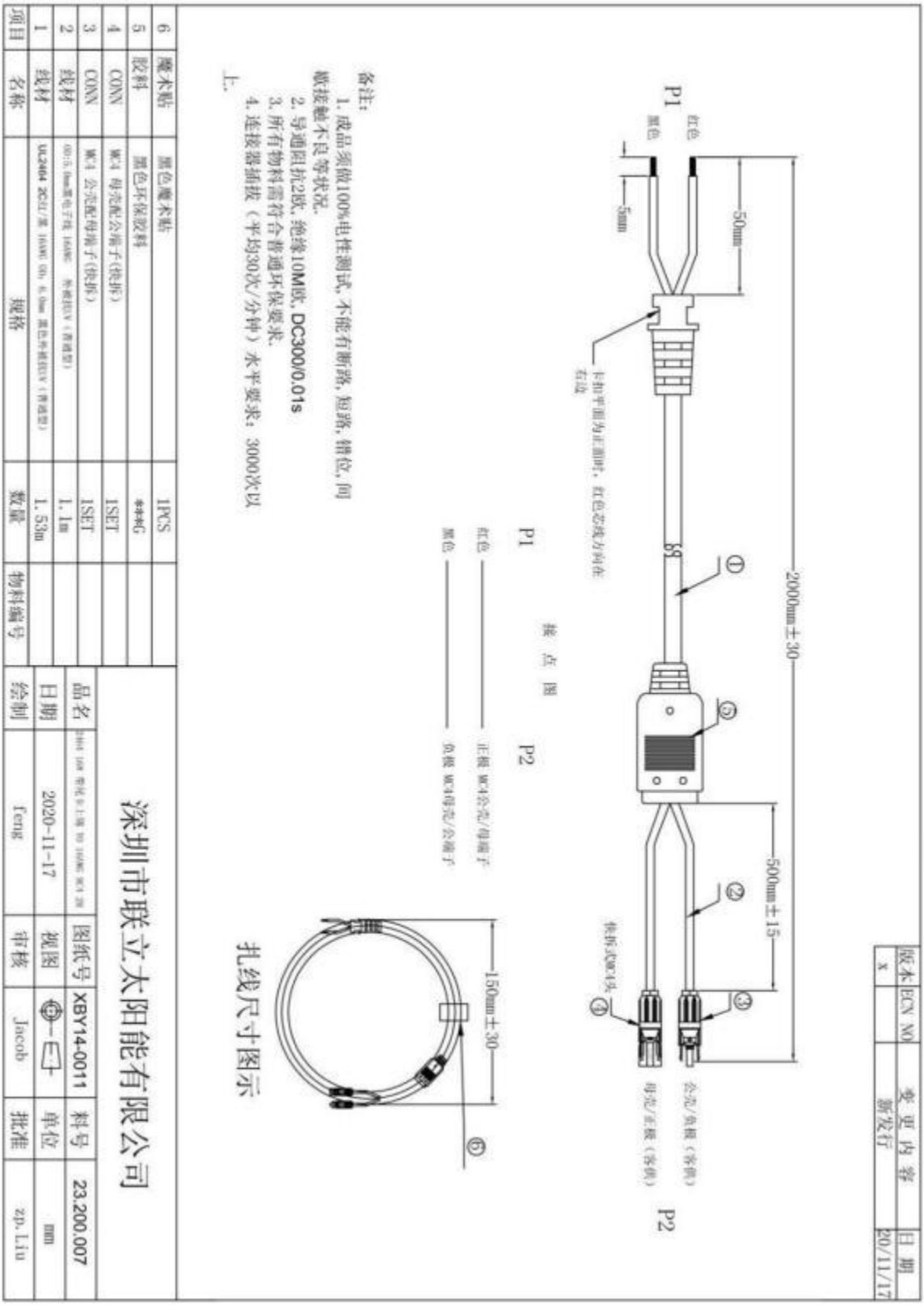
Wire: Total length: 2 m; 2464-16AWG; one end: SR stripped, 50 mm, 5 mm soldered; 0.5 m of dual-core wire; OD: 5.0 mm black wire;

MC4 female connector (positive-to-positive, negative-to-negative); UV-resistant.

(See Figure 6-1 on the next page for the wire diagram)

In-stent base plate:	1.2 mm
elastic band:	Herringbone structure, woven strip 420 mm + elastic band 100 mm, nylon fabric edging
Wire bundle:	330 × 140mm
1-to-4 cable:	Total length: 0.56 m; 1 male-to-4 female cable; 16 AWG (5.0 single branch); MC4 connector (male, black wire) + female connector (female, red wire) – 1 male to 4 female; compatible with 7909 male connector, 5521 male connector, or 30A red/black Anderson (one-piece) connectors / XT60; UV-resistant.
Seal sticker:	Circular transparent adhesive tape, 4 cm in diameter;
Neutral-colored cardboard box:	512.5*466*83mm, 250G precision bull + K9A9;
Neutral outer casing:	532.5*481*98mm K838K; (single unit)
Thermal paper:	80*60 mm;
Corner protection:	Orange corner protectors;

Wireway drawings: (See Figure 6-1)



项目	名称	规格	数量	物料编号
6	魔术贴	黑色魔术贴	1PCS	
5	胶料	黑色环保胶料	**#G	
4	CONN	MC4 母壳配公端子(免拆)	1SET	
3	CONN	MC4 公壳配母端子(免拆)	1SET	
2	线材		1. 1m	
1	线材	UL3464	1. 53m	

Neutral paper box illustration: (Fig. 6-2)

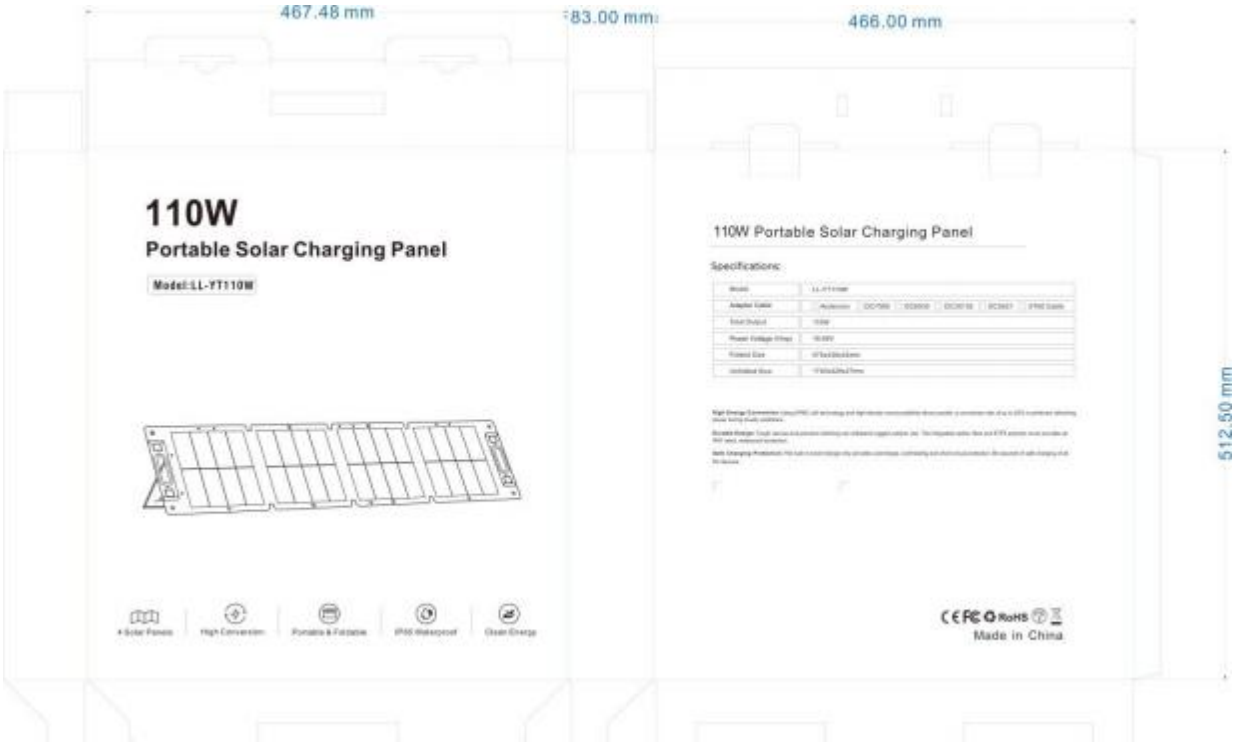
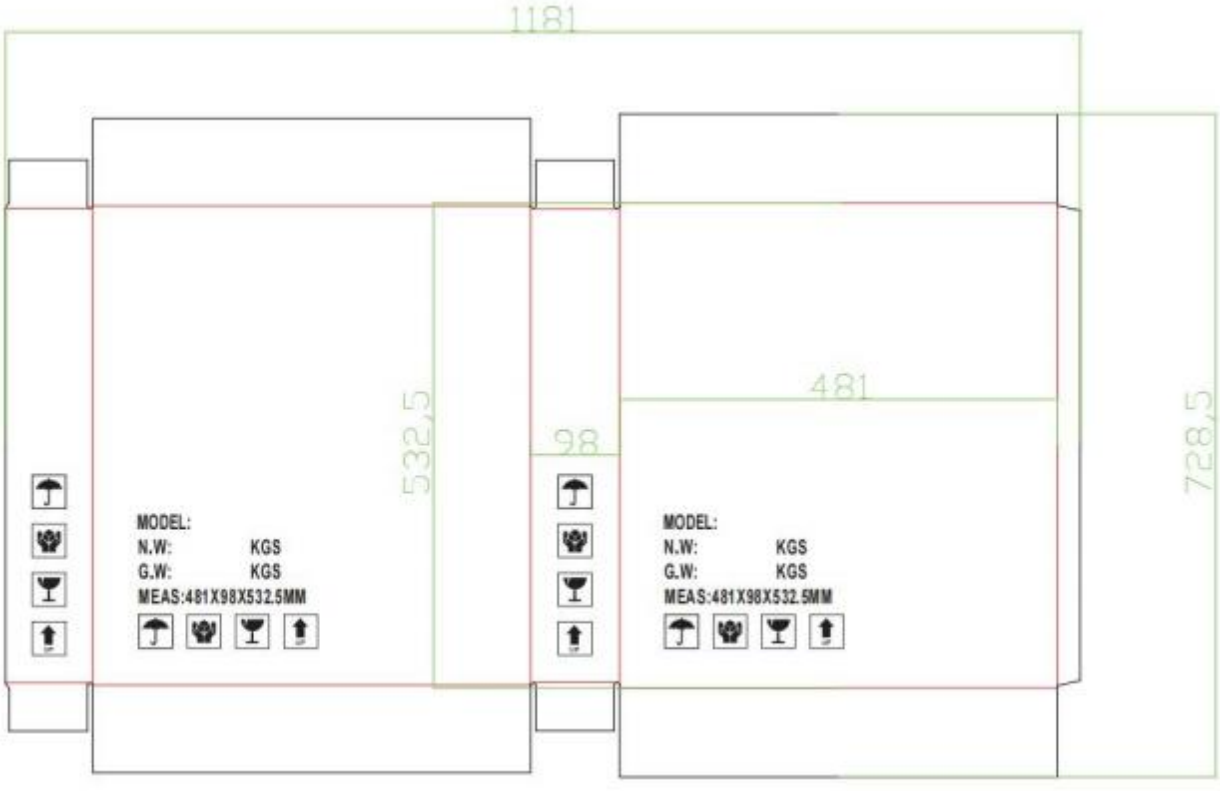


Illustration of the Neutral Outer Casing: (Fig. 6-3)



7、 Packaging Method and Surface Finish:

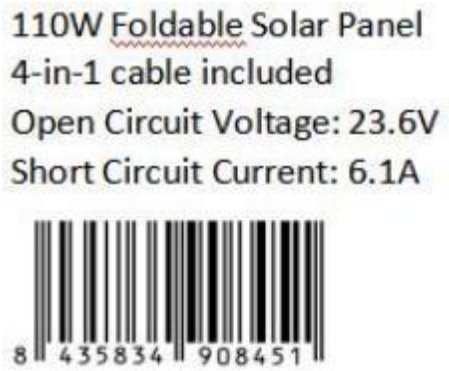
1 . Packaging method: multi-layer material hot-press molding

2 . Surface finish of solar panels: Front side: glossy ETFE; Back side: waterproof fabric (see Figure 7-1)



3 . Apply silicone sealant inside the power strip;

4 . Schematic diagram of label content: (Fig. 7-2)



8、 Warranty Period:

1. Component warranty period: 1 year.

9、 Standard Test Methods and Operating Environment for Electrical Performance Testing of Solar Cells

1 After the solar panels have been laminated, the primary step is to conduct a power performance test.

2 Solar radiation intensity: 1000 W/m² or customer-provided sample;

3 .Temperature: 25 °C;

4 Humidity: 10–90%;

5 .Air quality: AM1.5;

10、 Operating Power Test

1. Adjust the lighting to match the client's sample lighting requirements.
2. Test using an IV tester
3. Adjust the light intensity every 2 hours.

11、 Operating and Storage Environmental Conditions

1. Storage conditions: room temperature, humidity not exceeding 60%.
2. For use in outdoor environments under direct sunlight without shading.
3. Operating ambient temperature: -20 °C to 60 °C
4. Soldering iron temperature: 380 ± 20 °C
5. The spot welding duration shall not exceed 3 seconds, and the interval between multiple spot welding operations shall be no less than 30 seconds.

12、 Visual Inspection Requirements

Note: During visual inspection, hold the product parallel to the line of sight, maintain a viewing distance of 50 cm, tilt it at 45 °, and rotate it left and right by 15°; if no obvious defects are detected within 5 seconds, the product shall be deemed qualified.

Parameter description: L: Length; W: Width; H: Height; D: Distance; N: Quantity; ⊙: Diameter

1 . Single panel: no significant color difference under indoor lighting;

2 The silicon wafers are neatly arranged;

3 . Silicon wafer edge chipping and corner defects: L ≤ 3.5 mm, W ≤ 3.5 mm, N ≤ 8;

4. Dirt spots on the wafer surface: ⊙ ≤4 mm, N ≤ 8;

5. Scratch test: L ≤ 10 mm, D ≤ 100 mm, N ≤ 5;

6. No significant highlights: W ≤ 1.5 mm, N ≤ 6, D ≤ 50 mm;

7. Contamination of cell gaps; spot area: ⊙≤1.5 mm, N≤8, D≤10 mm;

8. Tin slag, bubbles, and foreign particles within the adhesive: ⊙ ≤ 2.5 mm, D ≤ 10 mm, N ≤ 6;

9 For the laser cutting process, the dimensional tolerance for length and width is ±5 mm.

In the event of any dispute regarding the above standards, the limit samples mutually confirmed by both parties shall prevail.

13、 Packaging Method

1. Package Contents: Solar Panels, Wiring Cables, Instruction Manual, and Color-Coded Box Packaging;

2. Packaging dimensions: 475×426×42 mm Weight: 3.02±0.5 kg

Color box dimensions: 512.5 x 466 x 83 mm Weight: 0.45 ± 0.1 kg

Outer box dimensions: 532.5 × 481 × 98 mm (per unit) Weight: 0.61±0.1 kg

The marking is as follows:

VST	
ORDER NO.:	LL260612
MODEL NO.:	SOLARPANEL-FOLDABLE-110W
Quantity per carton:	1 piece
CTN.: NO.:	1 OF **
GROSS WEIGHT:	4.28 kg
CTN. Dimensions:	5 3.3 × 4.8.1 × 9.8 cm



3. Instruction Manual (TBD)