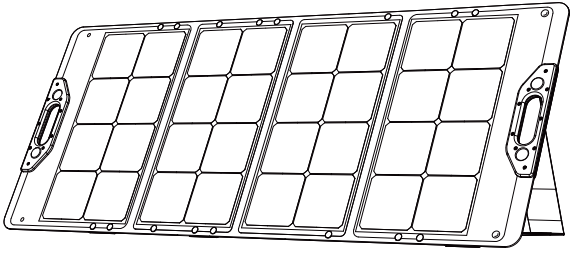
Ruko®

User Manual



RK100

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Contents

v1.0

1 Pre-Use Instructions

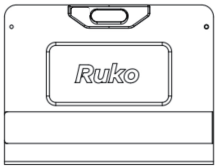
- Before using the equipment for the first time, please read the user manual carefully and keep it stored with the equipment for future reference. It is essential to follow the user manual's instructions for proper installation, connections, maintenance, and safe operation of the solar panel.

- Please note that manufacturers or retailers do not assume responsibility for losses resulting from improper usage, so strictly adhere to the user manual for proper equipment functioning.

2 Product Description

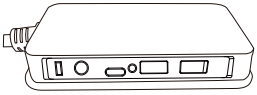
- The foldable RK100 solar panel utilizes advanced ETFE layering technology and is equipped with 32 high-efficiency solar cells. While it offers 100W full nominal power generation, the actual output is subject to various factors, such as sunlight intensity, solar panel surface temperature, sunlight angle, and shading.

2.1 What's in the Box

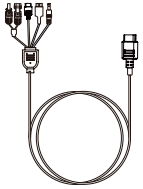


RK100 Solar Panel

User Manual



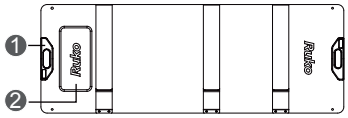
Charging Expansion Box

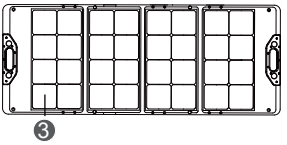


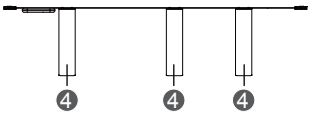
4-in-1 Solar Charge Cable

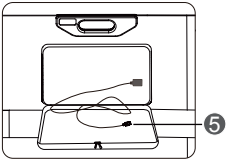
2.2 Components

2.2.1 Solar Panel



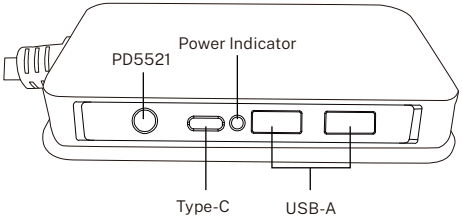






1. Carrying Handles
2. Storage Bag
3. Solar Cells
4. Adjustable Stands
5. XT60H-F Port

2.2.2 Charging Expansion Box



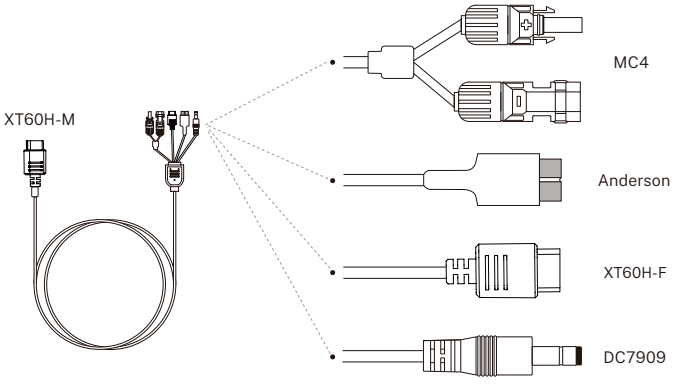
Charging Expansion Box Parameters	
Input Voltage Range	12V-30V
Output Voltage Range	3.7V-20V
Recommended Input Voltage	24V

Charging Expansion Box Interface Parameters		
Interface	Max Output Power	Output Voltage/Current Configurations
PD5521	100W	20V / 10A
USB-A	18W	5V / 3A、9V / 2A、12V / 1.5A
Type-C	15W-65W	5V / 3A、9V / 3A、12V / 3A、15V / 3A、20V / 3.25A

Type-C Interface Supported Fast Charging Protocols
BC1.2, Apple, Samsung, Qualcomm QC2.0 and QC3.0, PPS, PD2.0, PD3.0, PE2.0, Huawei Fast Charging Protocol FCP, Huawei Super Charge Protocol SCP.

Note
Power indicator lights on when the solar panel is powered and off when it's not.

2.2.3 4-in-1 Solar Charge Cable

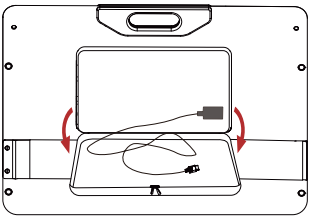


2.3 Specification

Model	RK100
Peak Power	100W
Cell Efficiency	23.5%
Materials	ETFE
Battery Type	Monocrystalline Silicon (High Efficiency)
IP Rating	IP67
Operating Voltage	18V
Operating Current	5.55A
Open Circuit Voltage	21.6V
Short Circuit Current	6.66A
Operating Temperature Range	14℉-149℉
Unfolded Dimensions	22.2×53.7×1.38in
Folded Dimensions	22.2×14.96×2.75in
Net Weight	13lb±1%
Output Interface	XT60H-F

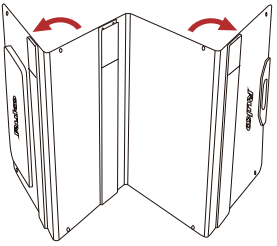
2.4 How to Use

1



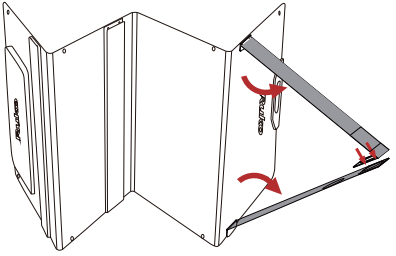
• Open the storage bag and take out the solar charge cable.

2



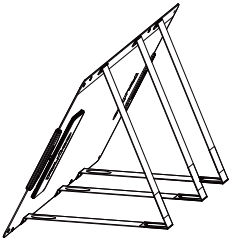
• Stand up and then unfold the solar panel.

3



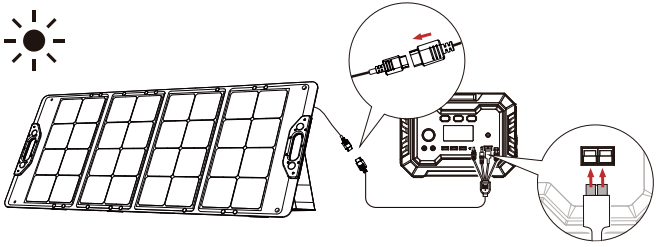
• Unfold and then fix the support stands.

❹



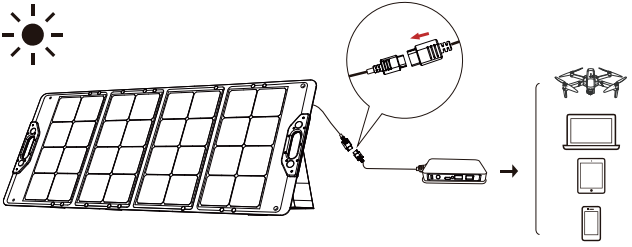
• Ensure that the solar panel is placed securely.

❺



• Charge solar generators by using the solar charger cable.

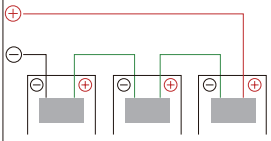
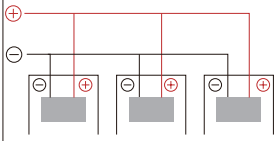
❻



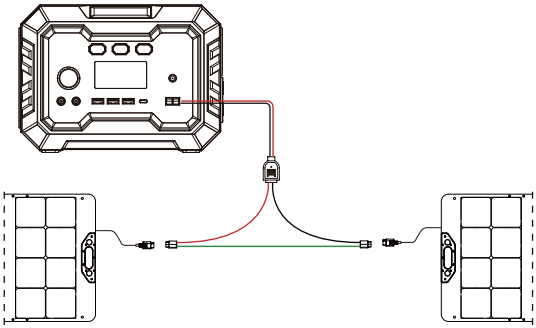
• Charge other devices by using the charging expansion box.

2.4.1 Wiring Methods of Solar Panel

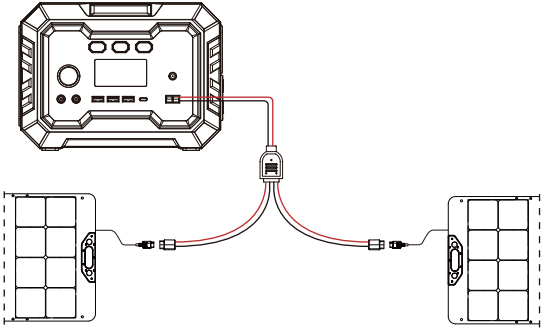
- When you need to use two or more solar panels simultaneously, there are two wiring methods you can choose from: Series and Parallel.

	Series Connection	Parallel Connection
Wiring	Positive terminal of one solar panel is connected to the negative terminal of the next solar panel, and so on. 	Positive terminal of one solar panel is connected to the positive terminal of the next solar panel, and the negative terminals are connected similarly. 
Working Principle	Voltages add up while the current remains constant.	Currents add up while the voltage remains constant.
Suitable Case	Need to increase the output voltage while keeping the current constant.	Need to increase the total output current, thus boosting the total power.
Notes	• Output voltage will exceed safe human touch or your device's charging voltage. • Please proceed with caution to avoid the risk of electric shock and damage to the device.	• Current will increase. • Please choose a parallel cable that can support the current flow.

Series Connection

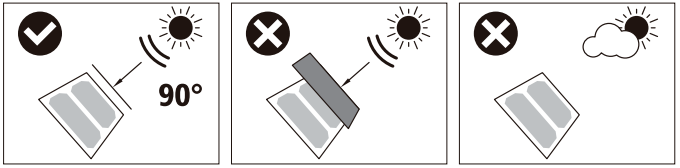


Parallel Connection



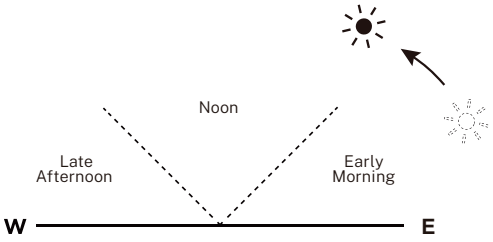
2.4.2 Placement of the Solar Panel

- For maximum solar energy efficiency, place the solar panel correctly so that it can receive sunlight at a 90° angle and keep it unshaded. Avoid shading from trees or objects, and ensure that the solar panel is fully deployed.

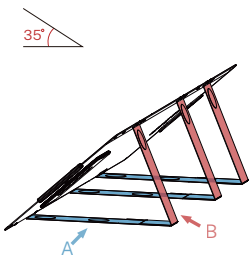


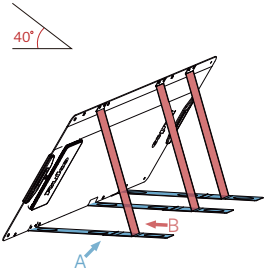
2.4.3 Angle Adjustment of Solar Panel

- The adjustable stands should be used before 10:00 am or after 2:00 pm. To use the solar panel during midday, simply place the solar panel flat on the ground.

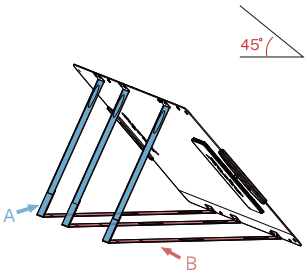


- Place the A stand on the ground to achieve angles of 35° and 40°.





- Place the B stand on the ground to achieve a 45° angle.



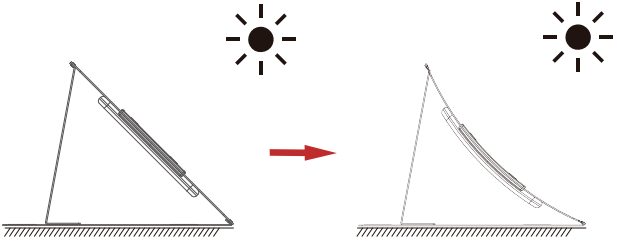
3 Safety Instructions

3.1 Precautions for Use

1. During use, ensure that all components are in proper condition.
2. Do not immerse the solar panel or its connectors in water or liquids.
3. Prevent external shocks, drops, or pressure to avoid damage to the solar cells.
4. Ensure that the charging cable is plugged into the input port correctly, and the joint is dry and clean. Otherwise, sparks or poor circuit contact may occur.
5. Operate the equipment in dry weather conditions, and avoid using it in rainy or damp environments to prevent damage.
6. During use, avoid shading the solar panel with tree shadows, buildings, and any obstructions, because they can impact power generation efficiency.
7. Ensure there are no stones or objects underneath the solar panel when it is lying flat on the ground to avoid damage.
8. Only use the equipment for charging with a compatible solar generator to avoid performance or safety issues.
9. The direct current generated by the solar panel cannot be directly used for other devices. It is necessary to utilize the provided charging expansion box to charge other devices.
10. When charging the device, prevent short circuits between positive and negative terminals to avoid device damage or electrical shock hazards.

11. When connecting multiple solar panels in series, the voltage will increase, ensure the total voltage does not to exceed the safe voltage range. Please understand circuit principles before operating.

12. During use, it's a normal situation that the solar panel would bend slightly for a period of time with an increase in temperature.



Normal Operating State

High-Temperature Operating State

3.2 Maintenance and Care

1. Fold back to its original shape before storage.
2. Do not attempt to disassemble or scratch the panel.
3. Do not step on the solar panel or place heavy objects on it.
4. Prevent corrosive substances from damaging the solar panel cells.
5. Clean gently with a damp cloth, don't rinse with water, avoiding abrasive materials.
6. Periodically inspect for damage such as cracks or scratches, and address any issues promptly.
7. Store it in a dry and secure place, away from direct sunlight, open flames, flammable materials and extreme conditions.

3.3 Disposal

- In the United States, solar panel disposal falls under e-waste regulations. Please follow federal and state guidelines for proper disposal, locate local e-waste recycling centers for responsible disposal, and consider professional e-waste disposal services for compliance with regulations. Always prioritize recycling options over landfill disposal for electronic waste.

4 FAQ

4.1 Can a 100W solar panel generate its full nominal power of 100W?

- In most cases, it's normal for a solar panel not to deliver its full nominal power. Some reasons contribute to this, and here are some suggestions for getting the full nominal power below:

1.Light Intensity

The sunlight intensity on the solar panel will affect the power output fluctuation. Using the product under bright midday sunlight is more likely to yield full nominal power output similar to test conditions compared to morning or afternoon usage.

2.Weather Conditions

Weather conditions impact sunlight exposure, such as foggy, cloudy, or rainy days. Full nominal power figures are less likely to be achieved during such conditions.

3.Surface Temperature

The panel's surface temperature affects electricity generation. Cooler panel surface generate more electricity. It's normal for solar panel to generate more power during winter than in summer. Solar panel typically reach around 60°C (140°F) during operation, leading to a reduction in conversion efficiency as every industry standard.

For instance, at 60°C (140°F) during summer, despite the higher light intensity, full nominal power can be reduced by 12%-15%, and the full nominal power can be attained only briefly.

4.Sun Angle

For optimal performance, sunlight should ideally hit panels perpendicularly. A ±10 degree deviation from the 90° angle has minimal impact on panel power.

5.Panel Shading

During use, the panel's surface should remain unblocked. Shadows, foreign objects, and even glass can considerably diminish power output.

4.2 Under normal conditions, how much power can a 100W solar panel generate?

- This primarily hinges on weather conditions. In general, on a clear day with an unclouded sky, the prevailing sunlight intensity typically ranges from 800W to 900W/m^2 (74.3W to 83.6W/ft^2). With a panel temperature of 50°C (122°F), when sunlight strikes the panel at a 90° angle, it typically generates between 70W and 90W of power.

- Nominal power ratings are established based on AM1.5 test conditions of 1000W/m^2 (92.9W/ft^2) incident sunlight intensity, midday winter sun, and a panel temperature of 25°C (77°F). Power output figures that closely approach the nominal rating are typically observed.

4.3 Can it be connected in series with other brands of 100W panels?

- Yes, it's possible to connect panels from different brands in series. However, it's not recommended if there's a significant difference in output current. Connecting panels with varying current output in series can limit the overall current output, preventing the full utilization of the 100W panel's power, the combined effect might result in a situation where 1+1<2.

- If you intend to connect multiple panels in series, it's advisable to use panels of the same specifications and sizes. Additionally, ensure that the voltage after the series connection remains within the limits supported by your equipment.

4.4 Can it be connected in parallel with other brands of 100W panels

- Yes, it can be connected in parallel with other brands of 100W panels, but cautious usage is advised. The parallel connection will double the total current of the input power. While you can parallel 100W solar panels, there is a risk that the combined current may exceed the equipment's maximum allowable current.

- Please remember that only two 100W panels can be safely connected in parallel. If you intend to parallel more than two 100W panels, ensure that your equipment's maximum allowable current supports the input current after parallel connection and that the parallel connection cables are capable of handling the maximum combined current after paralleling.

5 FCC Compliance Statement

- This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

  1. This equipment may not cause harmful interference.

  2. This equipment must accept any interference received, including interference that may cause undesired operation.

- **Warning:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

- **Note:** This equipment has been tested and found to comply with the limits for a Class A digital equipment, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment will generate, use, and radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at your own expense.

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