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3.1 Firmware Requirement of LUNA2000

Device	Required Version	Production Version	Obtain FW	Current Upgrade Solution	Final Upgrade Solution	Remark
LUNA2000	FusionsolarDG V100R002C00SPC100 or later versions	FusionsolarDG V100R002C00B023 and earlier versions	Auto download via APP	Automatic forcible upgrade, (immediate activation or delayed activation)		immediate activation: 30 mins delayed activation: Auto FW upload via APP, and the activation is performed 4 hours after the APP logout
SUN2000-2-6KTL-L1	SUN2000L V200R001C00SPC106 or later versions	SUN2000L V200R001C00SPC103 and earlier versions	Auto download via APP	Automatic forcible upgrade		
SUN2000-3-12KTL-M1	SUN2000MAV100R001C00SPC131 or later versions	SUN2000MAV100R001C00SPC130 and earlier versions	Auto download via APP	Automatic forcible upgrade		
Fusionsolar APP	FusionSolar APP 5.7.003 or later versions (Blue Logo)		AppGallery QR Code			
WLAN-FE Dongle	DongleV100R001C00SPC118 or later versions (Cascaded inverters + LUNA2000) DongleV100R001C00SPC116 or later versions (Single inverter + LUNA2000)	DongleV100R001C00SPC117 and earlier versions	Auto download via APP	Option1：APP connect to WLAN of FE Dongle, Maintenance > Upgrade Option2：Remote upgrade manually	Auto upgrade remotely via FusionSolar management system, which will be delivered in Q2	The RTAC needs to upload the latest Dongle firmware to the FusionSolar management system
4G Dongle	DongleV100R001C00SPC118 or later versions (Cascaded inverters + LUNA2000) DongleV100R001C00SPC116 or later versions (Single inverter + LUNA2000)	DongleV100R001C00SPC117 and earlier versions	Local APP upgrade is not supported	Remote upgrade manually via FusionSolar management system	Auto upgrade remotely via FusionSolar management system, which will be delivered in Q2	The RTAC needs to upload the latest Dongle firmware to the FusionSolar management system

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3.1 WLAN-FE Dongle upgrade by App

Scan the QR code on the front of the smart dongle to connect to the Wi-Fi network. Note: The WLAN-FE dongle has hotspots only within 3 minutes after it is powered on.
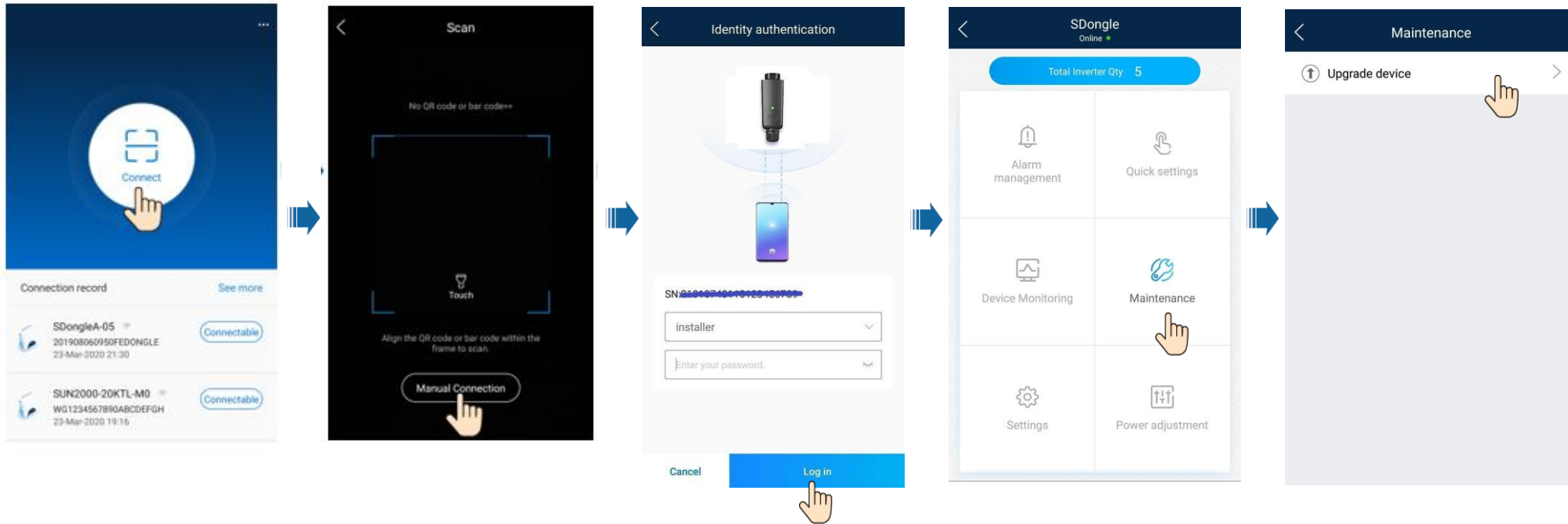
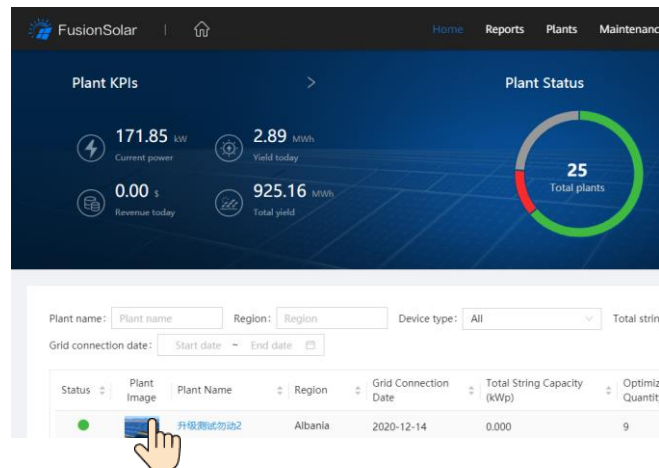# 3.1 (Optional) Upgrading Dongle Remotely

- The WLAN-FE Dongle can be locally upgraded by logging in to the WLAN hotpot using the FusionSolar APP.
- The 4G Dongle cannot be locally upgraded. You need to manually upgrade it remotely as per below steps.
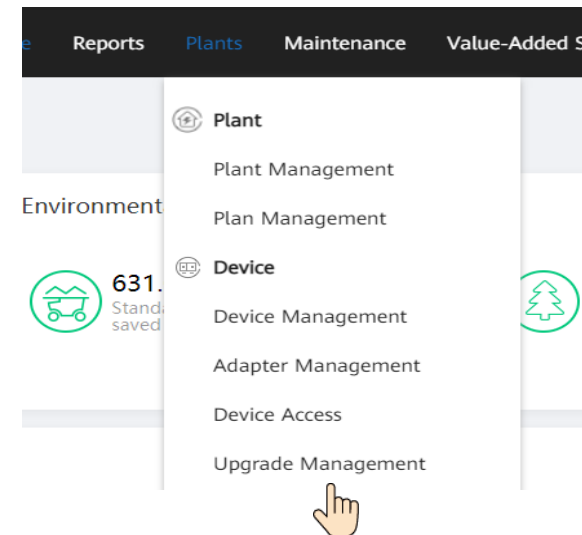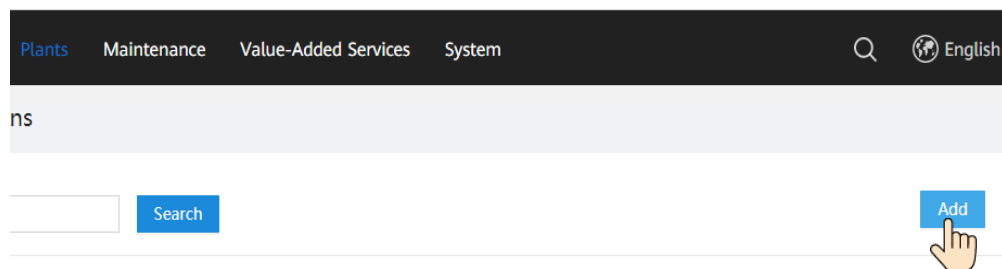
1、 Logging In to the Management System.

https://intl.fusionsolar.huawei.com
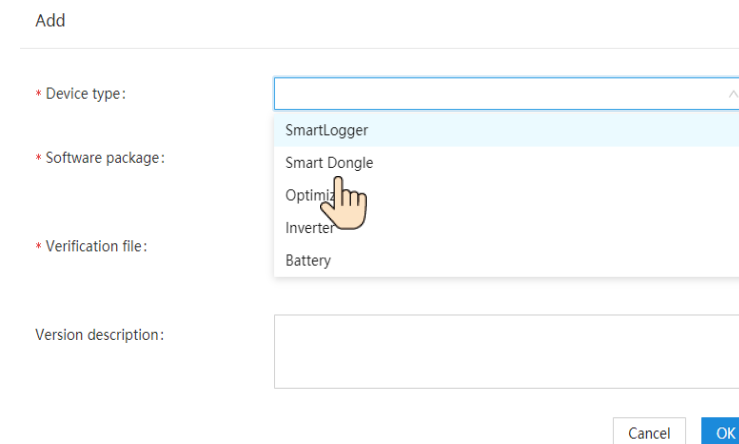
2、 Select the plant on the home page.

3、 Choose "Plant" > "Upgrade Management"
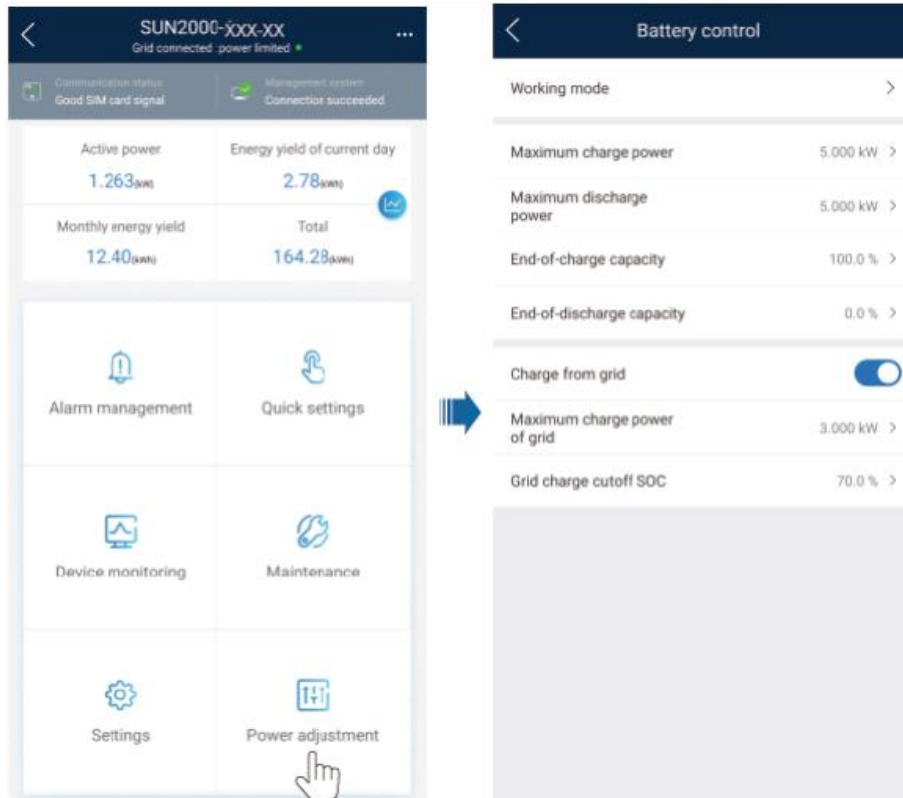
4、 Click "Add".

5、 Set Device Type "Smart Dongle".

3.2 Setting the Battery-device detection + working mode

- If the LUNA2000 power cables and signal cables are correctly installed, the inverter will detect and power on the battery automatically.
- When configured with optimizers, the battery cannot be detected before the optimizer pairing is completed.
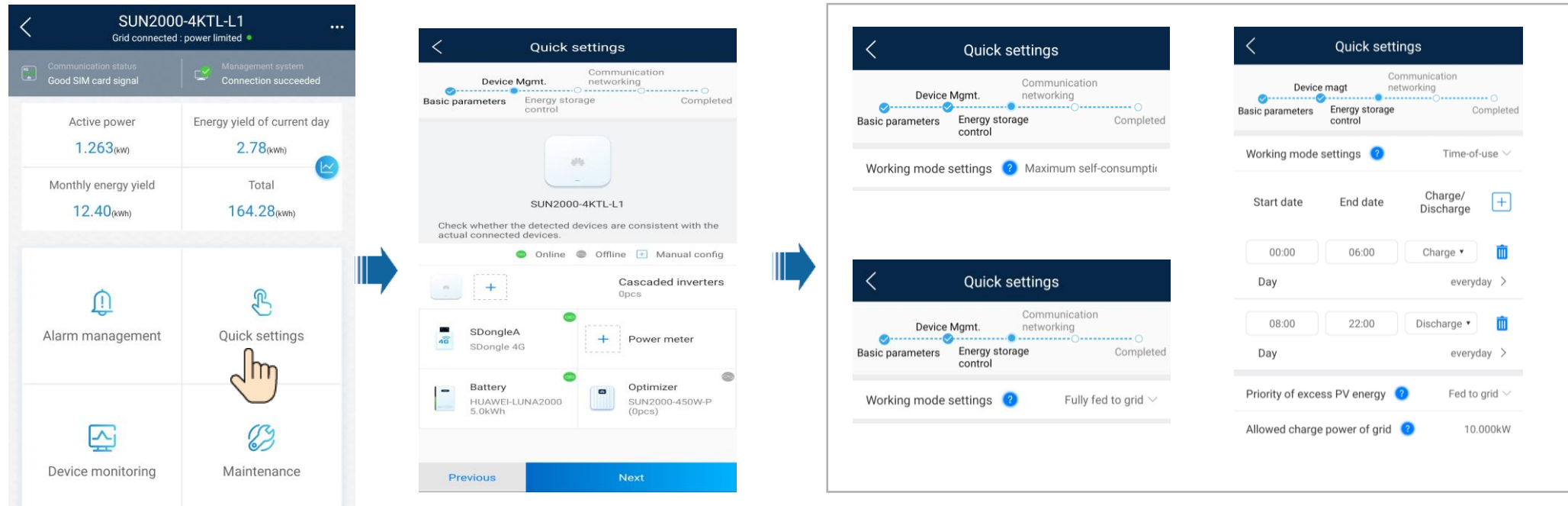
- The capacity of one battery module is 5 kWh. You can determine whether the battery modules are cascaded based on the total battery capacity displayed on the page.
- During system deployment, ensure that the cables are correctly connected and the communications cable Enable+/Enable-is correctly connected. The SUN2000 enables the battery and the indicator turns on. You do not need to press the black start button to enable the battery. Otherwise, the Enable+/Enable-cable connection between the SUN2000 and the battery cannot be verified.
- Enable+\Enable - Cable connection error: The indicator is off.
- Enable+/Enable: The cable is correctly connected. RS485+/RS485: The cable is incorrectly connected. The indicator blinks green slowly.
- Enable+/Enable: The cable connection is correct. RS485+/RS485: The cable connection is correct. The indicator is steady green.
- Alarms related to the CAN cable : 3012　Abnormal battery power control module parallel communication、3013　 Abnormal battery expansion module communication

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3.2 Setting the Battery-control parameter

Parameter	Settings	Value
Working mode	For details, see the description on the app screen.	• Maximum self-consumption (default) • Time-of-use • Fully fed to grid
Maximum charge power (kW)	Charge power of the power control module. The default value is the maximum value. You do not need to set this parameter. If only one battery expansion module is configured, the maximum charge power is 2.5 kW.	• Charge: [0, 5 kW] • Default value: 5 kW
Maximum discharge power (kW)	Discharge power of the power control module. The default value is the maximum value. You do not need to set this parameter. If only one battery expansion module is configured, the maximum discharge power is 2.5 kW.	• Discharge: [0, 5 kW] • Default value: 5 kW
End-of-charge capacity (%)	Charge capacity of the power control module. You need to set this parameter.	90%–100% Default value: 100%
End-of-discharge capacity (%)	Charge capacity of the power control module. You need to set this parameter	0%–20% Default value: 15%
Charge from grid	If **Charge from grid** function is disabled by default, comply with the grid charge requirements stipulated in local laws and regulations when this function is enabled.	• Disabled (default) • Enable
Grid charge cutoff SOC	Set the grid charge cutoff SOC.	[20%, 100%] Default value: 20%

# 3.3 Battery Working Mode – Maximum Self-Consumption

Surplus PV energy (relative load) is stored in batteries. When PV power is insufficient or no PV power is generated at night, batteries discharge to supply power to the loads, improving the self-consumption rate of the PV system and the self-sufficiency rate in the residential energy system, and reducing electricity costs.

Assume that a SUN2000-5KTL inverter has 10 kWh battery capacity. (1) PV energy flow: load > battery charging > grid connection
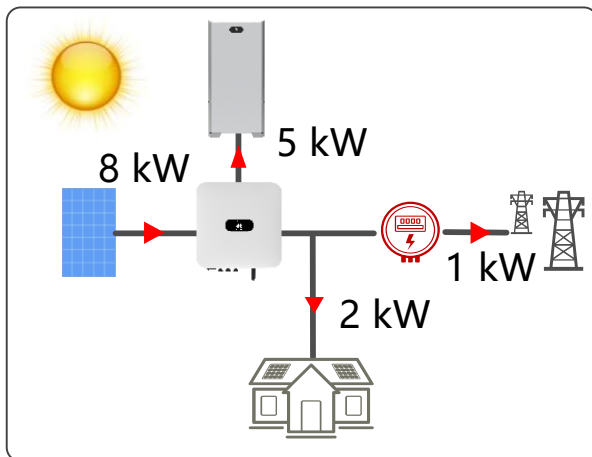
（2）Load Energy： PV output >battery discharge>Grid supply
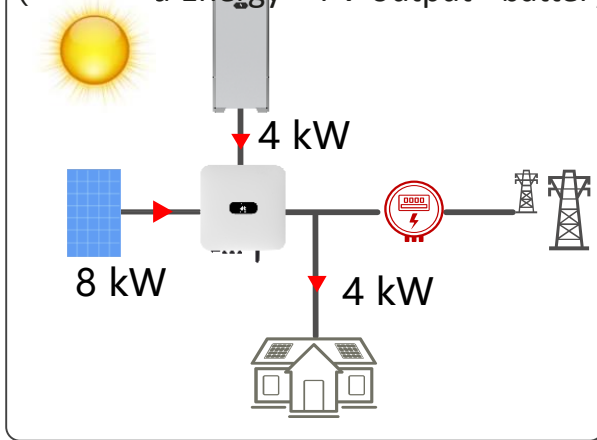
When the PV sunlight is sufficient, the PV module outputs 8 kW power, the loads consume 4 kW power, and the battery charges 4 kW power.
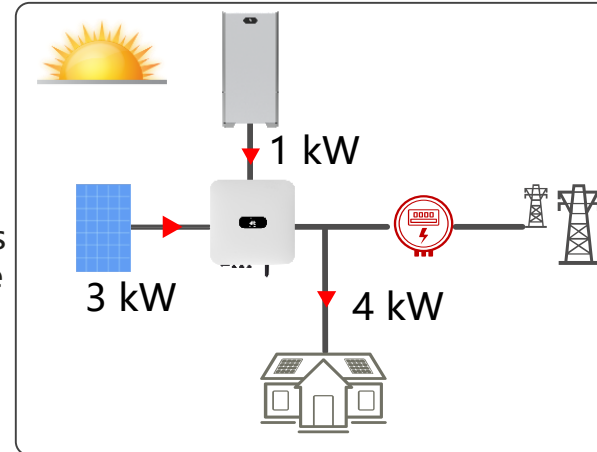
When the PV sunlight is weak, the PV module outputs 3 kW power, the loads consume 4 kW power, and the battery discharges 1 kW power to the loads.

When the PV sunlight is sufficient, the PV module outputs 8 kW power, the loads consume 2 kW power, the battery charges 5 kW power, and the inverter connects to the grid with the power of 1 kW.
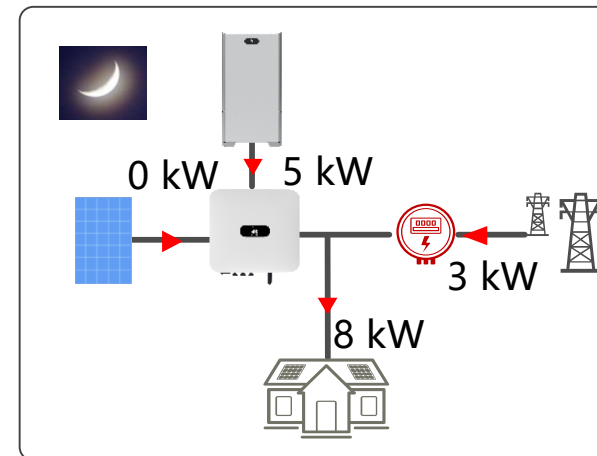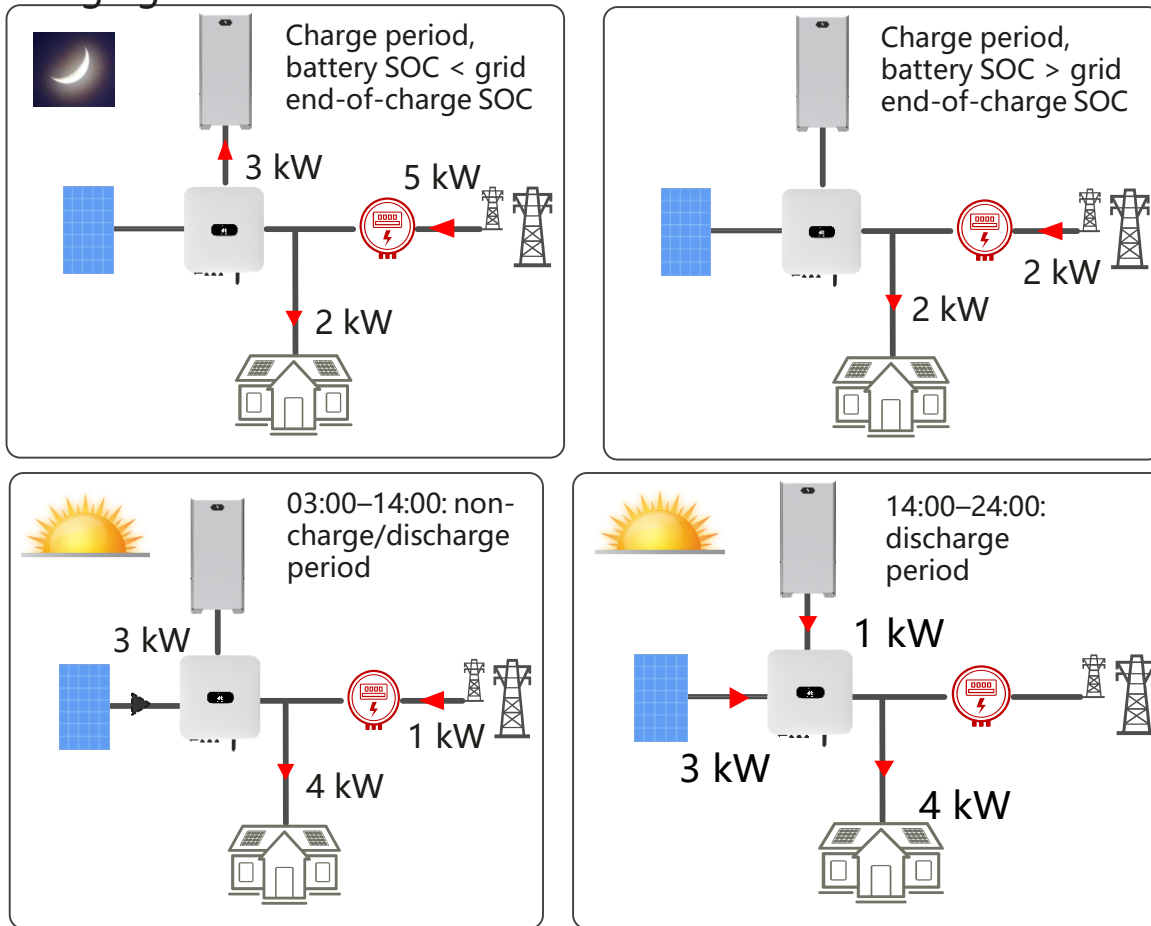
When the PV sunlight becomes weak, the PV module outputs 0 kW power, the loads consume 8 kW power, the batteries discharge 5 kW power to the loads, and the grid supplies 3 kW power.

3.4 Battery Working Mode – Time-of-Use Price

When the electricity price reaches the peak value, the battery discharges to supply power to residential loads. When the electricity price is in the off-peak period, the grid reversely charges the battery.

Assume that a SUN2000-5KTL inverter has 10 kWh battery capacity. Set the charge time period. Set 00:00 to 03:00 as the charge time period, 14:00 to 24:00 as the discharge time period, and set the surplus PV energy to be preferentially used for charging.

Charge period, battery SOC < grid end-of-charge SOC

3 kW   5 kW

2 kW

Charge period, battery SOC > grid end-of-charge SOC

2 kW

2 kW

03:00–14:00: non-charge/discharge period

3 kW

1 kW

4 kW

14:00–24:00: discharge period

1 kW

3 kW

4 kW

1. Set the low-price time at night (00:00 to 03:00) as the charge time.

2. Set 14:00–24:00 as the discharge period to supply power to loads. Non-charge/discharge period 03:00–14:00:
   a. The surplus PV energy can be used to charge the battery. The battery does not discharge. When the PV power is insufficient, the grid supplies power.
   b. The battery is not charged from the grid and cannot be discharged. When the system is switched to the backup mode, the battery can be discharged.
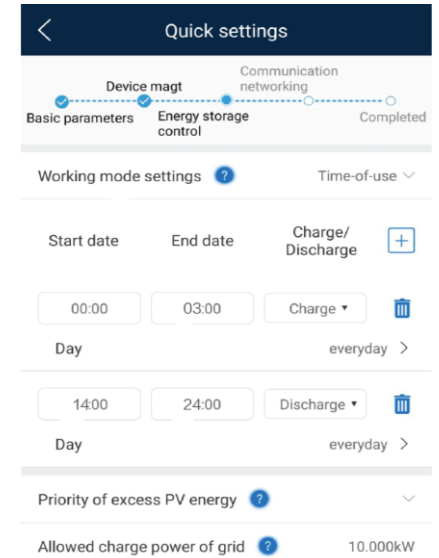
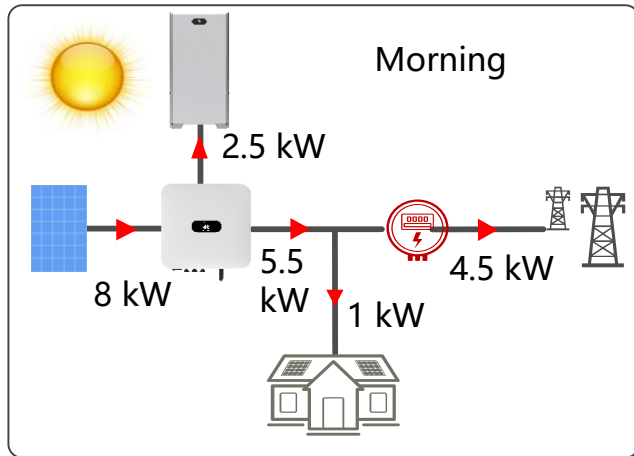**The grid-tied power setting takes precedence over the "Charge" setting.**

3.5 Battery Working Mode – Fully Fed to Grid

This mode maximizes the PV energy for grid connection. When the generated PV energy in the daytime is greater than the maximum output capability of the inverter, the battery is charged to store energy. When the PV energy is less than the maximum output capability of the inverter (5–5.5 kW), the battery discharges to maximize the output energy of the inverter to the grid. The grid-tied power setting takes precedence over the "Fully Fed to Grid" setting.

Assume that a SUN2000-5KTL inverter has 10 kWh battery capacity, and the grid-connected power is not set.

Morning

2.5 kW
8 kW → 5.5 kW
4.5 kW
1 kW

Afternoon/Night

2.5 kW
3 kW → 5.5 kW
4.5 kW
1 kW

Night

5 kW
0 kW → 5 kW
2 kW
7 kW

When the PV module generates 8 kW power, the SUN2000-5KTL inverter connects to the grid with the maximum output power of 5.5 kW, and the battery charges 2.5 kW power.
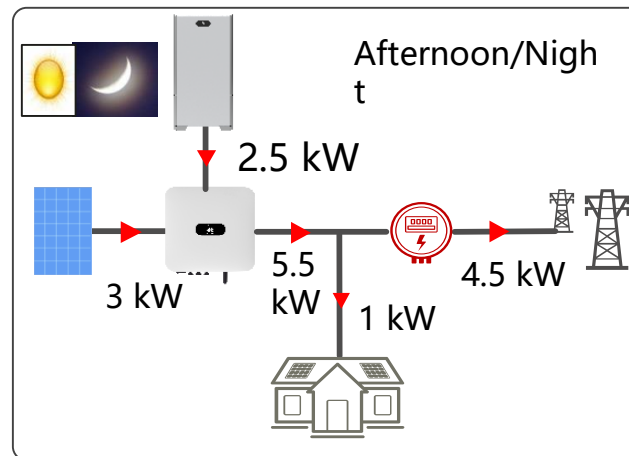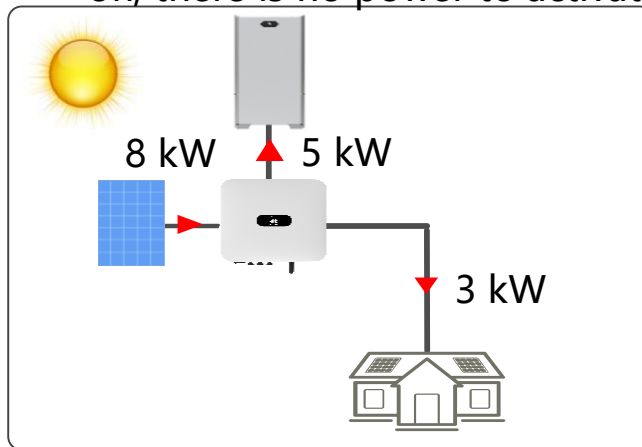
When the PV sunlight becomes weak, the PV module generates 3 kW power, the battery charges 2.5 kW power, and the inverter connects to the grid with the power of 5.5 kW.
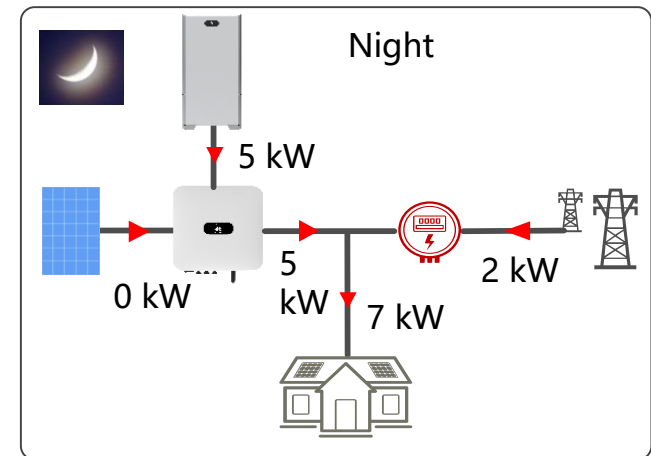
When there is no irradiation at night, the battery outputs 5 kW power, the loads consumes 7 kW power, and the grid supplies 2 kW power.

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3.6 Battery Working Mode – Pure Off-Grid

- The off-grid function can be enabled only when batteries are configured. If no battery is configured, the off-grid code cannot be set.
- The inverter works in voltage source mode and supplies stable power to loads. When the PV power generation is greater than the loads, the battery is charged. When the PV power generation is less than the loads, the battery is discharged.
- This mode applies only to single-phase inverter L1. During deployment, you can set the pure off-grid grid code to implement this mode. 220 V, 230 V, 240 V and 50/60 Hz output are supported.
- After the batteries discharge to the end-of-discharge SOC at night, the PV power generates electricity for the battery on the next day and then supplies power to loads.
- In the off-grid scenario, it's not supported to configure optimizers. When LUNA2000 discharge finished and switched off, there is no power to activate optimizers, and the inverter can't be power on automatically.

8 kW   5 kW   3 kW

When the PV sunlight is sufficient, the PV module generates 8 kW power, the battery charges 5 kW power, and the loads consumes 3 kW power.
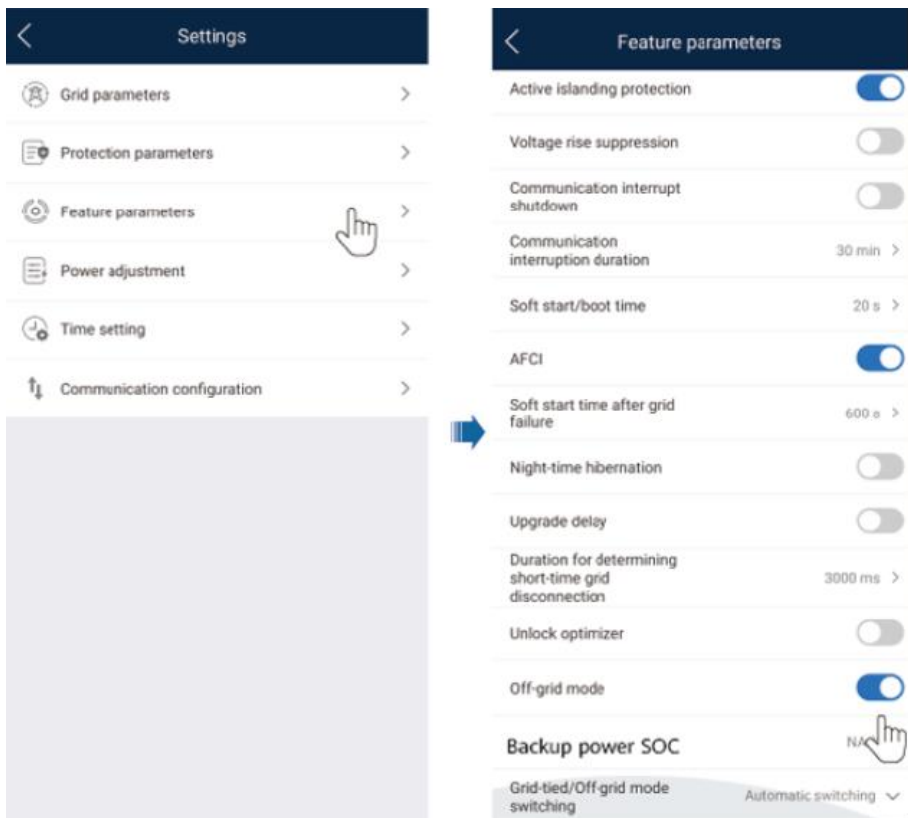
2 kW   1 kW   3 kW
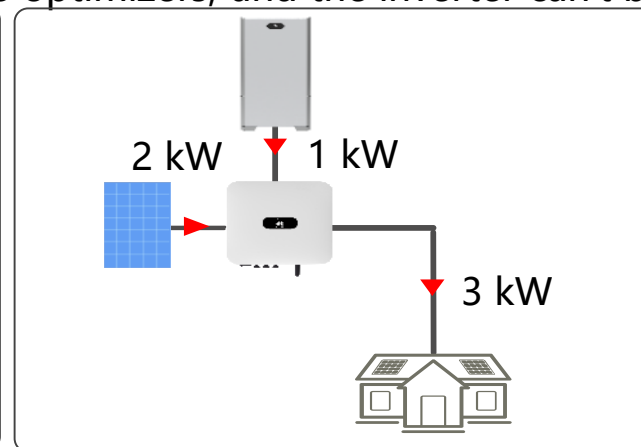
When the PV sunlight becomes weak, the PV module generates 2 kW power, the loads consume 3 kW power, and the battery supplies 1 kW power to the loads.

0 kW   3 kW   3 kW
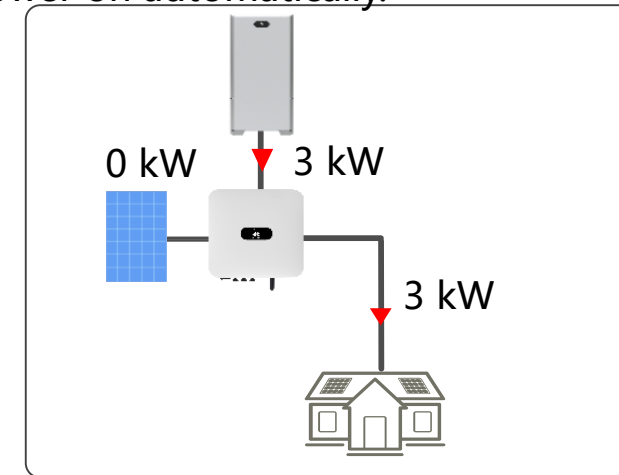
If the PV module has no output, the battery supplies 3 kW power to the loads.

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3.7 Setting the Battery Working Mode – Backup Parameter

Parameter	Description	Value
Off-grid mode	If this parameter is enabled, the Backup Box switches to the off-grid mode when the grid fails. This parameter can be set only when the Backup Box is configured. If the Backup Box is not configured, this parameter cannot be enabled. Otherwise, an alarm is generated.	• Enable • Disabled (default)
Backup power SOC	Sets the backup power SOC. In grid-tied mode, the battery does not discharge when it is discharged to the backup power SOC. When the grid fails, the battery supplies power to loads in off-grid mode until it reaches the end-of-discharge capacity. The backup power SOC must be greater than the end-of-discharge capacity.	[20% , 100%] Default value: **N/A**
Grid-tied/Off-grid mode switching	If this parameter is set to **Automatic switching**, the system switches to the off-grid mode when the grid fails, and switches to the grid-tied mode when the grid recovers. If this parameter is set to **Manual switching**, you need to log in to the app and connect to the inverter to enable the off-grid mode when the grid fails.	• Automatic switching (default) • Manual switching

3.8 Setting the Battery Working Mode-- Off-Grid

The off-grid function can be enabled only when batteries are configured. If no battery is configured, the off-grid code cannot be set.
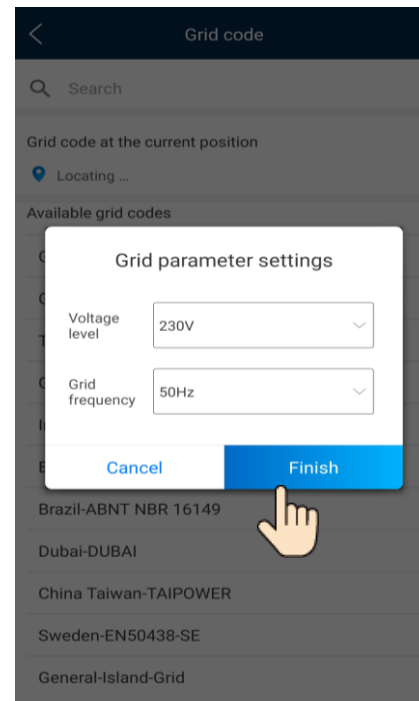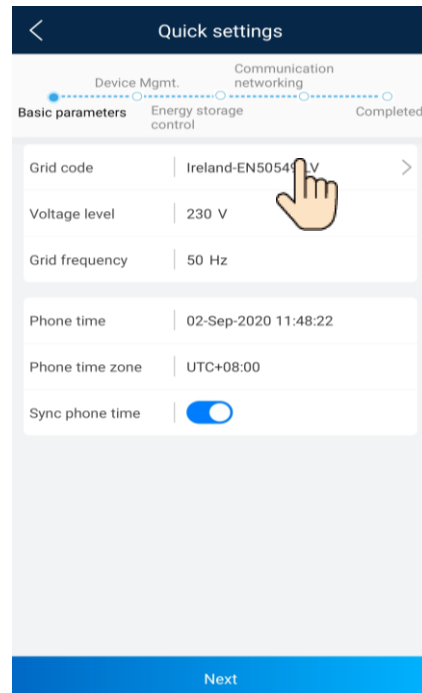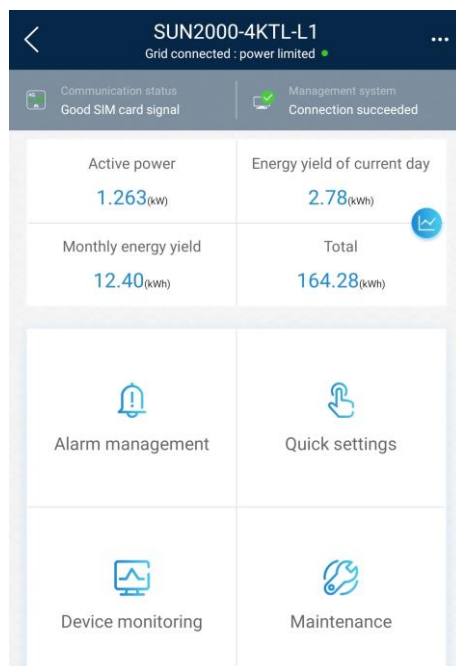
Pure off-grid scenario: Set the grid code to **Common-Island-Grid** and set the output voltage and frequency.