SmartLogger2000-(10-C, 11-C)

User Manual

Issue	**Draft A**
Date	**2017-02-15**

Huawei Technologies Co., Ltd.

Address:	Huawei Industrial Base
	Bantian, Longgang
	Shenzhen 518129
	People's Republic of China
Website:	http://www.huawei.com
Email:	support@huawei.com

About This Document

Overview

This document introduces the SmartLogger2000-10-C/SmartLogger2000-11-C (**SmartLogger** for short) in terms of installation, cable connections, system operation and maintenance, and troubleshooting. Readers should understand the SmartLogger features, functions, and safety precautions provided in this document before installing and operating the SmartLogger.

The figures provided in this document are for reference only. The actual product appearance prevails.

You can print the document based on your requirements. Store the paper copy properly for future use. You can log in to http://support.huawei.com/carrier/, click **Product Support**, and search for **SmartLogger** to view and obtain the latest user manual.

Intended Audience

This document is intended for photovoltaic (PV) plant operators and qualified electrical technical personnel.

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Symbol	Description
⚠ NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
📖 NOTE	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

Issue Draft A (2017-02-15)

This issue is used for first office application (FOA).

Contents

1 Safety Precautions

Read the safety precautions carefully. Otherwise, human injury and equipment damage may occur.

Personnel Requirements

- Only qualified and trained electrical technicians are allowed to install and operate the SmartLogger.
- Operators should understand the components and functioning of a grid-tied PV power system, and they should be familiar with relevant local standards.

CAUTION

Read this document thoroughly before operations. Huawei shall not be liable for any consequence caused by violation of the storage, transportation, installation, and operation regulations specified in this document.

Label Protection

- Do not tamper with any signs on the SmartLogger enclosure because these signs contain important information about safe operation.
- Do not remove or damage the nameplate at the rear of the SmartLogger enclosure because it contains important product information.

Installation

- Ensure that the SmartLogger is not connected to a power supply and is not powered on before starting installation.
- Install the SmartLogger in an environment with good ventilation to ensure efficient and long-term system performance.
- Ensure that the heat dissipation holes of the SmartLogger are not blocked.
- During installation, do not touch any component inside the enclosure except the wiring terminals at the bottom.
- Install the SmartLogger in a dedicated area.

Operation

⚠️ **NOTICE**

Perform operations in strict accordance with safety precautions specified in this document and other relevant documents.

When operating Huawei equipment, you must follow the local laws and regulations.

Maintenance and Replacement

- A faulty SmartLogger requires overall maintenance. Contact the dealer if the SmartLogger is faulty.
- With sufficient knowledge of this document, maintain the SmartLogger by using proper tools and testing equipment.
- When maintaining the SmartLogger, wear electrostatic discharge (ESD) gloves and comply with ESD precautions.
- The device has multiple inputs. Switch off all inputs before maintenance.

2 Product Overview

2.1 Overview

Function

The SmartLogger is a highly integrated device dedicated for monitoring and managing the PV power system. It converges ports, converts protocols, collects and stores data, and centrally monitors and maintains devices in the PV power system.

Features

The SmartLogger provides the following features:

- Wide application
  - Industrial-grade application, wide temperature range: –40 ℃ to +60 ℃
  - High altitude: applicable at an altitude of 4000 m
- Various communication modes
  - Bluetooth

    Has a built-in Bluetooth module through which the SUN2000 APP (APP for short) connects to the SmartLogger for parameter configuration and device maintenance. The SmartLogger Bluetooth is named as **LOG+the last eight figures of the SN of the SmartLogger**.
  - Optical fiber ring switch

    Provides two 100M Ethernet optical ports that support RSTP and STP to implement fiber ring networking. If RSTP is used, fiber ring protection can be completed within 10 seconds. If STP is used, fiber ring protection can be completed within 60 seconds.
  - PLC
    - The SmartLogger-10-C has a built-in PLC CCO module through which southbound devices connect to the SmartLogger over AC power cables.
    - The built-in PLC CCO module has the maximum voltage class of 800 V AC.
  - Ethernet electrical port

    Provides two 10/100M Ethernet electrical ports that can be used as southbound ports to connect to southbound devices or used as northbound ports to connect to an NMS.

☐ NOTE

- A southbound port connects to a downstream device for collecting data and setting parameters.
- Southbound devices include the SUN2000, environmental monitoring instrument (EMI), power meter, box-type transformer, and PID module.
- A northbound port connects to an upstream NMS for uploading data.
  - RS485
    - Supports six RS485 routes and access of devices that use Modbus-RTU, IEC103, and DL/T645.
    - RS485 supports the modbus-slave mode. If RS485 is set to Modbus-Slave, the SmartLogger works in slave mode and can interwork with a third-party device, such as a data collector and a communication manager.

- Graphical data
  - In addition to displaying the electricity yield and real-time monitoring information in graphic and text format, the embedded WebUI can also display performance data of power stations and devices in tables or curves.
  - The APP displays the electricity yield and real-time monitoring information in graphic and text format.

- Centralized monitoring
  - Manages up to 200 devices in centralized mode and supports the access of up to 150 SUN2000s.
  - Allows you to monitor and manage the PV power system on the embedded WebUI, for example, viewing real-time information about power stations, devices, and faults, setting device parameters, and maintaining devices in remote mode.
  - Allows you to monitor the devices in the PV power system on the APP in real time, such as viewing information about power stations, devices, products, and faults, setting device parameters, and maintaining devices.

- Easy maintenance
  - Allows users to upgrade the firmware of the SmartLogger and export data by using a USB flash drive.
  - Allows you to upgrade the firmware of the SmartLogger, SUN2000, PLC module, and PID module, and export logs and data over the embedded WebUI.
  - Allows you to manage the devices connecting to the SmartLogger, upgrade the firmware of these devices, exports data from these devices, and classify and query alarms over the app.

- Intelligent management
  - Automatically searches for and accesses Huawei SUN2000s, PLC modules, and PID modules. If you import a parameter configuration table, the SmartLogger can access third-party devices that support Modbus-RTU and IEC103.
  - Automatically assigns RS485 addresses to the connected Huawei SUN2000s and PID modules, and allows for RS485 address adjustment based on ESNs to facilitate remote configuration and maintenance.
  - Supports remote configuration of SUN2000 parameters over the embedded WebUI and synchronizes the parameters from one SUN2000 to other SUN2000s in batches.
  - Automatically collects the data generated during the communication disconnection from the SUN2000 or manually collects the data over the embedded WebUI after the connection resumes.

- Remote maintenance

- Simultaneously connects to multiple NMSs (including Huawei and third-party NMSs) over Modbus-TCP and IEC104. Huawei NMS features centralized O&M, big data analytics, intelligent diagnosis, and mobile O&M.
        - Supports connection to a third-party NMS over File Transfer Protocol (FTP).
        - Sends electricity yield and alarms to users by emails.
- Grid scheduling
        - The SmartLogger supports various power grid scheduling modes and therefore can meet the requirements of power grid companies in different countries.
        - Implements rapid active power control and reactive power compensation for all the SUN2000s connecting to the SmartLogger.

Model Description

Model	PLC Module Configured?	Remarks
SmartLogger2000-10-C	Yes	The built-in Bluetooth module supports both Android APP and iOS APP.
SmartLogger2000-11-C	No	

☐ NOTE
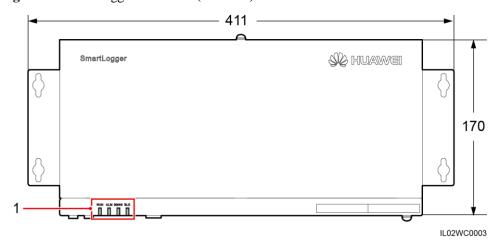
- The SmartLogger2000-10-C is integrated with the PLC central coordinator (CCO) that can work with the SUN2000 integrated with the PLC station (STA) to implement PLC networking over power cables.

- The SmartLogger2000-11-C is not integrated with the PLC CCO. If PLC networking with the SUN2000 integrated with the PLC STA is required, connect a PLC CCO to the SmartLogger2000-11-C.

- This document describes the typical networking and cable connections by using the SmartLogger2000-10-C as an example.

2.2 Appearance

Front View of the Shell

Figure 2-1 SmartLogger front view (unit: mm)

(1) Indicators

Table 2-1 Description of the LED indicators (from left to right)

Indicator (Silk Screen)	Status		Meaning
RUN indicator	Green off		The SmartLogger is not powered on.
	Blinking green at short intervals (on for 0.125s and then off for 0.125s)		The SmartLogger and NMS (Huawei NetEco or a third-party NMS) are not connected or the communication between them is interrupted.
	Blinking green at long intervals (on for 1s and then off for 1s)		The SmartLogger properly communicates with the NMS (Huawei NetEco or a third-party NMS).
Alarm/maintenance indicator (ALM)[a]	Alarm status	Red off	The SmartLogger and the devices accessing it do not generate any alarm.
		Blinking red at long intervals (on for 1s and then off for 4s)	The SmartLogger or the devices accessing it generate warnings.

Indicator (Silk Screen)	Status		Meaning
		Blinking red at short intervals (on for 0.5s and then off for 0.5s)	The SmartLogger or the devices accessing it generate minor alarms.
		Steady red	The SmartLogger or the devices accessing it generate major alarms.
	Maintenance status	Green off	No local maintenance is underway[b].
		Blinking green at long intervals (on for 1s and then off for 1s)	Local maintenance is in progress.
		Steady green	Local maintenance succeeds.
		Blinking green at short intervals (on for 0.125s and then off for 0.125s)	Local maintenance fails.
3G/4G indicator	-		Reserved.
Bluetooth indicator (BLE)	Green off		You have not logged in to the APP or login failed. The SmartLogger is not connected to the APP or the communication has been interrupted[c].
	Blinking green at long intervals (on for 1s and then off for 1s)		You have successfully logged in to the APP.
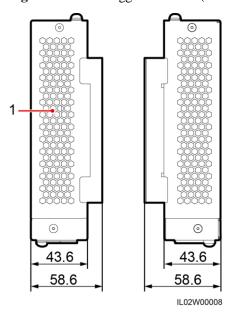
a: If an alarm and local maintenance happen concurrently, the alarm/maintenance indicator shows the near-end maintenance state first. After the USB flash drive is removed, the indicator shows the alarm state.

b: Local maintenance refers to operations performed by connecting a USB flash drive to the SmartLogger USB port, such as full data import and export using a USB flash drive.

c: After the communication between the SmartLogger and the APP fails, the disconnection is normal if the green indicator goes off immediately, and is abnormal if the indicator goes off after blinking slowly for 30s.

Side View of the Shell
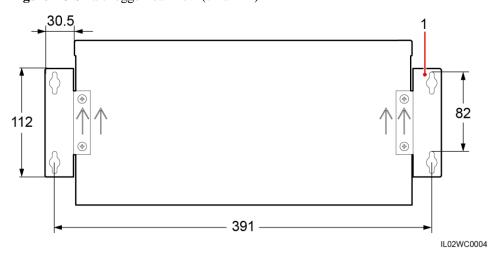
Figure 2-2 SmartLogger side view (unit: mm)

(1) Heat dissipation hole

Rear View of the Shell

Figure 2-3 SmartLogger rear view (unit: mm)

(1) Wall-mounting ears

Bottom of the Shell

Figure 2-4 Bottom view of the SmartLogger

IL02W00005
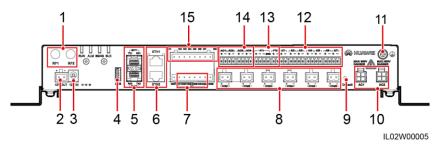
Table 2-2 Port description

No.	Port (Silk Screen)	Function	Description
1	RF1, RF2	Reserved	Reserved.
2	12V OUT	12 V DC output	Provides 12 V DC power supply with a maximum current of 100 mA.
3	12V IN	12 V DC input	Connects to a power adapter.
4	USB	USB port	Connects a USB flash drive.
5	SFP1, SFP2	Ethernet optical port	Connects to an ATB or another cascaded SmartLogger.
6	ETH1, ETH2	Ethernet electrical port	Connects to an Ethernet switch, router, POE module, or PC.
7	DO	Digital parameter output	Relay output.
8	COM1–COM6	RS485 communication	Six RS485 ports that can be connected to devices such as the SUN2000, box-type transformer, power meter, or EMI.
9	Default	Default key	Resets and restarts the Bluetooth module or resets the SmartLogger IP address to the default IP address[a]. The default IP address is 192.168.0.10.
10	AC1, AC2	AC power cable ports	• SmartLogger2000-10-C: Connects to the A/B/C three-phase input, and used for PLC with the SUN2000 over AC power cables. If PLC function is not used, you do not have to connect cables to these ports. • SmartLogger2000-11-C: left blank
11	⏚	External grounding	N/A

No.	Port (Silk Screen)	Function	Description
12	AI1–AI7	Analog input	AI1 supports 0–10 V voltage input (passive); AI2–AI7 support 0–20 mA and 4–20 mA current input (passive).
13	PT1, PT2	Analog input	• PT1 supports the connection to a three-wire or two-wire PT100/PT1000 temperature sensor. • PT2 supports the connection to only a two-wire PT100/PT1000 temperature sensor.
13	AO1–AO4	Analog output	4–20 mA and 0–20 mA current output.
14	DI1–DI8	Digital parameter input	Connects to a dry contact input.

a:
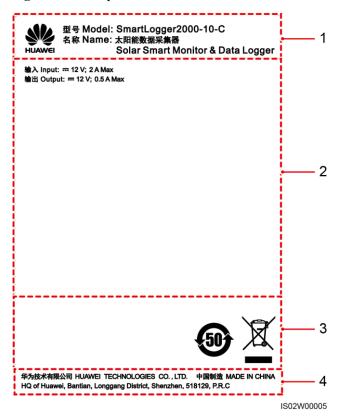
• If the APP fails to connect to the SmartLogger or you have forgotten the IP address, you can press the Default key to reset the Bluetooth module or restore the IP address to the default IP address (192.168.0.10).

• To reset and restart the Bluetooth module, press and hold down the Default key for 3–10s until the BLU indicator blinks at short intervals (0.125s on and 0.125s off) and all other indicators are off, and then release the Default key.

• To restore the IP address to the default IP address, press and hold down the Default key for more than 10s until the RUN indicator blinks at short intervals (0.125s on and 0.125s off) and all other indicators are off, and then release the Default key. The operation is valid within 5 minutes.

2.3 Nameplate Description

A nameplate is attached at the back of the SmartLogger. The content of the nameplate includes the SmartLogger model, rated power specifications, and certification marks. Figure 2-5 shows the nameplate of the SmartLogger2000-10-C.

Figure 2-5 Nameplate

型号 Model: SmartLogger2000-10-C
名称 Name: 太阳能数据采集器
Solar Smart Monitor & Data Logger

输入 Input: ⎓ 12 V; 2 A Max
输出 Output: ⎓ 12 V; 0.5 A Max

华为技术有限公司 HUAWEI TECHNOLOGIES CO.,LTD. 中国制造 MADE IN CHINA
HQ of Huawei, Bantian, Longgang District, Shenzhen, 518129, P.R.C

IS02W00005

(1) Trademark and product model	(2) Rated power specifications
(3) Compliance symbols	(4) Company name and place of manufacture

📖 **NOTE**

The nameplate figure is for reference only. The actual nameplate prevails.

Table 2-3 Compliance symbols

Symbol	Name	Meaning
(50)	Environmentally friendly use period (EFUP) label	This product does not pollute the environment during a specified period.
🗑	EU waste electrical and electronic equipment (WEEE) label	Do not dispose of the SmartLogger as household garbage. For details about how to deal with the undesirable SmartLogger, refer to 10 SmartLogger Disposal.

2.4 Typical Networking Scenarios

Fiber+RS485/PLC Networking
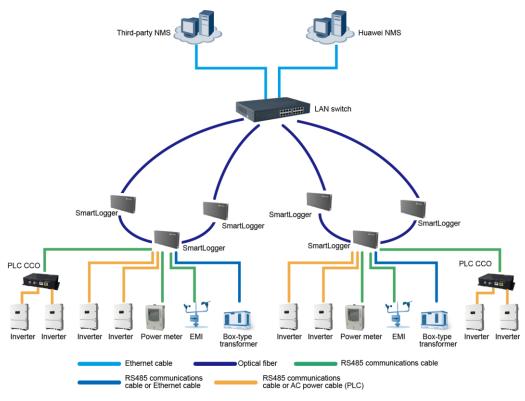
A fiber network is classified into a ring network and a star network, as shown in Figure 2-6 and Figure 2-7 respectively.

In the fiber networking, the SmartLogger connects to an inverter over an RS485 communications cable or an AC power cable, connects to a box-type transformer over an RS485 communications cable or an Ethernet network cable, and connects to southbound devices such as the EMI and power meter over RS485 communications cables.

☐ NOTE

The SmartLogger can work with the SUN2000 equipped with the PLC STA module over an embedded or external PLC CCO module to implement PLC networking over power cables.

Figure 2-6 Fiber ring network diagram

☐ NOTE

● The SmartLogger provides two 100M Ethernet optical ports to implement ring networking.

● A maximum of 16 SmartLoggers can be connected to form a fiber ring network. Each SmartLogger can connect to southbound devices such as the inverter, EMI, and power meter.

● Multiple fiber ring networks can converge over an Ethernet switch or SmartLogger and then connect to an NMS.
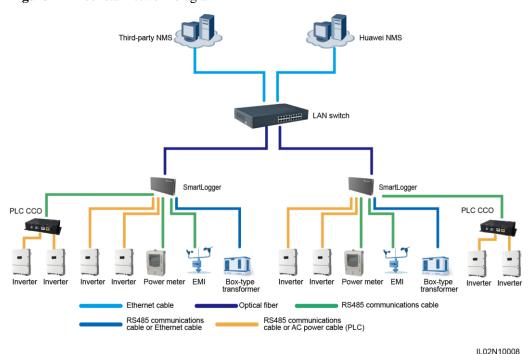
Figure 2-7 Fiber star network diagram

☐ NOTE

● Multiple SmartLoggers can converge over an Ethernet switch and then connect to an NMS.

● The SmartLogger connects to the Ethernet switch over optical fibers with the maximum communications distance of 12 km in between.

LTE+RS485/PLC Networking

Figure 2-8 shows the LTE+RS485/PLC network diagram.

In the LTE wireless networking scenario, the SmartLogger connects to an inverter over an RS485 communications cable or an AC power cable, connects to a box-type transformer over an RS485 communications cable or an Ethernet network cable, connects to southbound devices such as the EMI and power meter over RS485 communications cables, connects to a customer premises equipment (CPE) over an Ethernet electrical port, and transmits information collected from southbound devices to an NMS in wireless mode.
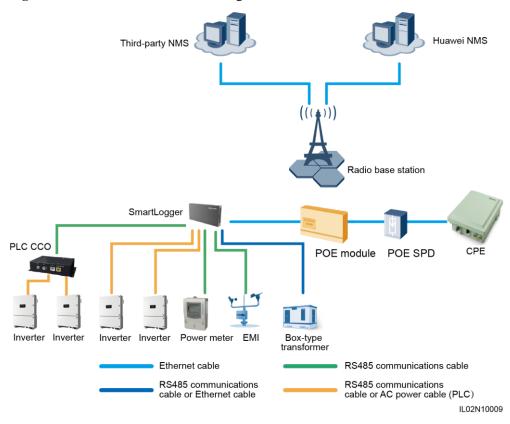
Figure 2-8 LTE+RS485/PLC network diagram

> **NOTE**
>
> - The IP addresses for the SmartLogger, CPE, and monitoring device in the box-type transformer must be in the same network segment.
> - The IP address planned for the SmartLogger needs to be imported to the third-party NMS for the NMS to proactively connect to the SmartLogger.
> - The IP address planned for the box-type transformer needs to be imported to the third-party NMS for the NMS to proactively connect to the box-type transformer.

2.5 System Wiring Diagram

Scenario with a Smart Array Controller

> **NOTE**
>
> - Huawei smart array controller, also a communication box, is an outdoor cabinet that controls the communication of the PV array in a PV plant. The cabinet can house the SmartLogger, ATB, POE module, and POE SPD.
> - This document describes the application scenario where the SmartLogger is inside the smart array controller SmartACU2000A-D-PLC.

⚠ **NOTICE**

- The general single-phase input power cable for the smart array controller needs to be prepared by the customer. You are advised to use a two-core armor copper cable with an operating voltage to the ground greater than or equal to 300 V and a cross-sectional area of 4 mm^2 for each core wire.

- The power cable from the miniature circuit breaker (MCB) to the station-service power source needs to be prepared by the customer. You are advised to use a two-core armor copper cable with an operating voltage to the ground greater than or equal to 300 V and a cross-sectional area of 4 mm^2 for each core wire.

- The PLC three-phase input power cable for the smart array controller needs to be prepared by the customer. You are advised to use a three-core armor copper cable with an operating voltage greater than or equal to 1000 V and a cross-sectional area of 10 mm^2 for each core wire. Connect this cable only in the PLC networking scenario.

- The cable from the busbar to the knife fuse switch needs to be prepared by the customer. You are advised to use a three-core, multi-strand armor cable with an operating voltage to the ground greater than or equal to 1000 V and a cross-sectional area of 10 mm^2 for each core wire. Connect this cable only in the PLC networking scenario.
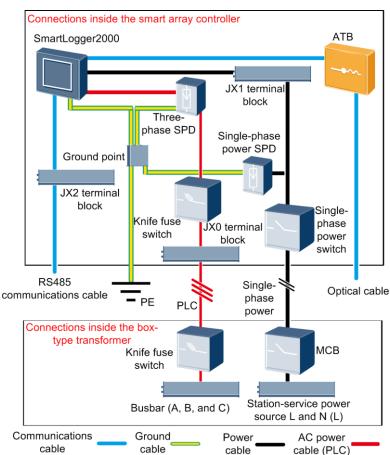
Figure 2-9 Fiber+RS485/PLC

Table 2-4 lists the components required for the fiber+RS485/PLC networking mode in the scenario with a smart array controller.

Table 2-4 Components required

Location	Component		Recommended Model or Specifications	Type	Quantity
Smart array controller	Fitting bag for fiber ring switching	Low-speed optical module	FTLF1323P1BTR-HW	Can be purchased from Huawei	2
		Optical jumper	PLCLC5S-ST3P302-HW, LC-LC-S2-L2, 3ECA1031LCLC002-01-F, or LP-LP-2S-P-SM-002		8
Box-type transformer	MCB		Rated current: 32 A; number of poles: 2	Prepared by the customer	1
	Knife switch	Fuse	Rated voltage ≥ 800 V; rated current: 32 A	Prepared by the customer	3
		Knife switch box	Rated voltage ≥ 800 V; rated current ≥ 32 A; number of poles: 3	Prepared by the customer	1
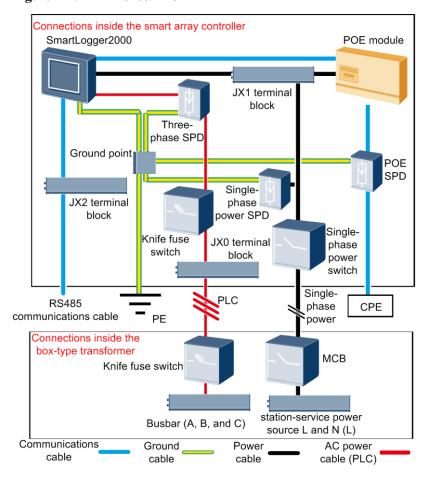
Figure 2-10 LTE+RS485/PLC

Table 2-5 lists the components required for the LTE+RS485/PLC networking mode in the scenario with a smart array controller.

Table 2-5 Components required

Location	Component		Recommended Model or Specifications	Type	Quantity
Smart array controller	POE and CPE fitting bags	POE module	N/A	Can be purchased from Huawei	1
		POE SPD	N/A	Can be purchased from Huawei	1
Outside the smart array controller and box-type transformer		CPE	N/A	Can be purchased from Huawei	1

Location	Component		Recommended Model or Specifications	Type	Quanti ty
Box-type transformer	MCB		Rated current: 32 A; number of poles: 2	Prepared by the customer	1
	Knife switch	Fuse	Rated voltage ≥ 800 V; rated current: 32 A	Prepared by the customer	3
		Knife switch box	Rated voltage ≥ 800 V; rated current ≥ 32 A; number of poles: 3	Prepared by the customer	1

Scenario Without a Smart Array Controller

⚠️ **NOTICE**

- If the SmartLogger uses an AC power cable for communication, an MCB or a knife fuse switch needs to be installed to prevent device damage in the case of short circuits.
- If the SmartLogger communicates with the SUN2000 over an AC power cable, the cable from the knife fuse switch to the MCB and the cable from the busbar to the knife fuse switch both need to be prepared by yourself. You are advised to use a three-core armored cable with the operating voltage to the ground greater than or equal to 1000 V and a cross-sectional area of a single core wire being 10 mm².
- The SmartLogger can connect to the SUN2000 over an RS485 communications cable or AC power cable. If RS485 is used, there is no need to connect an AC power cable between the SmartLogger and the MCB in the scenario without a smart array controller.
- The power cable delivered with the SmartLogger is 1 meter long, the power adapter cable is 1.5 meters long, the network cable is 2.2 meters long, and the AC power cable is 1.5 meters long. Reserve the installation positions for components based on the cable lengths.
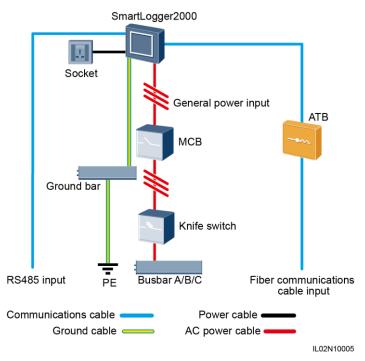
Figure 2-11 Fiber+RS485/PLC

Table 2-6 lists the components required for the fiber+RS485/PLC networking mode in the scenario without a smart array controller.

Table 2-6 Components required

Component	Recommended Model or Specifications	Type	Quantity
SmartLogger	SmartLogger2000	Can be purchased from Huawei	1

Component		Recommended Model or Specifications	Type	Quantity
ATB		CT-GZF2PJ-8 or CT-GPH-A-8	Can be purchased from Huawei	1
Fitting bag for fiber ring switching	Low-speed optical module	FTLF1323P1BTR-HW	Can be purchased from Huawei	2
	Optical jumper	PLCLC5S-ST3P302-HW, LC-LC-S2-L2, 3ECA1031LCLC002-01-F, or LP-LP-2S-P-SM-002	Can be purchased from Huawei	8
Knife switch	Fuse	Rated voltage ≥ 800 V; rated current: 32 A	Prepared by the customer	3
	Knife switch box	Rated voltage ≥ 800 V; rated current ≥ 32 A; number of poles: 3	Prepared by the customer	1
MCB		Rated voltage ≥ 800 V; rated current ≥ 32 A	Prepared by the customer	1
Socket		Matching with the power adapter	Prepared by the customer	1

☐ NOTE

Length of the cable used for connecting components depends on the survey result.
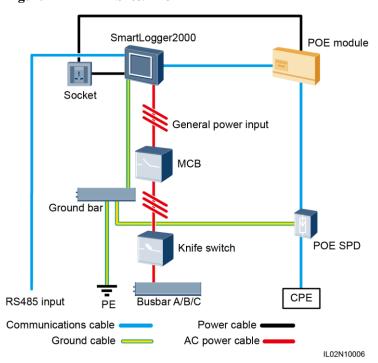
Figure 2-12 LTE+RS485/PLC

Table 2-7 lists the components required for the LTE+RS485/PLC networking mode in the scenario without a smart array controller.

Table 2-7 Components required

Component		Recommended Model or Specifications	Type	Quantity
SmartLogger		SmartLogger2000	Can be purchased from Huawei	1
POE module		POE35-54A or POE85-56A	Can be purchased from Huawei	1
POE SPD		POE-2A	Can be purchased from Huawei	1
CPE		EG860V2-C71	Can be purchased from Huawei	1
Knife switch	Fuse	Rated voltage ≥ 800 V; rated current: 32 A	Prepared by the customer	3
	Knife switch box	Rated voltage ≥ 800 V; rated current ≥ 32 A; number of poles: 3	Prepared by the customer	1
MCB		Rated voltage ≥ 800 V; rated current ≥ 32 A	Prepared by the customer	1

Component	Recommended Model or Specifications	Type	Quantity
Socket	Matching with the power adapter	Prepared by the customer	1

☐ NOTE

Length of the cable used for connecting components depends on the survey result.

3 Device Installation

3.1 Precautions

Install the SmartLogger in an appropriate position and on a suitable surface.

> ⚠ **DANGER**
>
> - Do not install the SmartLogger in areas with flammable or explosive materials.
> - Do not install the SmartLogger on flammable building materials.

3.2 Checking Before Installation

Checking the Outer Packing

Before unpacking the SmartLogger, check the outer packing for damage, such as holes and cracks. If any damage is found, do not unpack the SmartLogger and contact the dealer immediately.

Checking the Product and Accessories

After unpacking the SmartLogger, check that the product and accessories are intact and complete, and free from any obvious damage. Contact the dealer if any damage is found or any component is missing.

> 📖 **NOTE**
>
> For details about the number of accessories delivered with the SmartLogger, see the *Packing List* in the packing case.

3.3 Tools

Tool	Model	Used To
Hammer drill	Drill bit (Φ6 mm)	Drill holes in the wall when the SmartLogger is wall-mounted.
Diagonal pliers	-	Cut cable ties.
Wire stripper	-	Peel off cable jackets.
Crimping tool	H4TC0001 Manufacturer: Amphenol	Crimp cables.
RJ45 crimping tool	-	Crimp RJ45 plug connectors for communications cables.
Flat-head screwdriver	3x100	Tighten screws on the cable terminal block.

Tool	Model	Used To
Torque screwdriver	Phillips head: M4 and ST3.5	Tighten screws during device installation.
Rubber mallet	-	Hammer expansion sleeves into holes.
Utility knife	-	Remove packing.
Wire clippers	-	Cut cables.
Vacuum cleaner	-	Clean up dust after holes are drilled.
Marker	Diameter: ≤ 10 mm	Mark signs.

Tool	Model	Used To
Measuring tape	-	Measure distances.
Safety goggles	-	Protect the operator's eyes from dust during hole drilling.
Anti-dust respirator	-	Protect an operator from dust inhalation during hole drilling.
Heat gun	-	Heat-shrink a tube.
Cable tie	-	Bind cables.
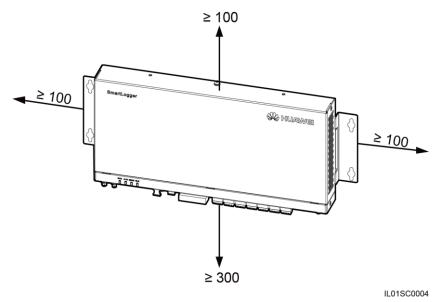
3.4 Determining the Installation Position

Comply with the following requirements when determining the installation position for the SmartLogger:

- The SmartLogger has a protection level of IP20. It cannot be installed outdoors.
- The SmartLogger should be installed in a dry environment to protect it from water.
- The ambient temperature should be within the range of –40°C to +60°C. Avoid exposing the SmartLogger to direct sunlight.

- The communications distance must not exceed 1000 m for the RS485 port, and must not exceed 100 m for the Ethernet port.

- The SmartLogger should be installed at a proper height to facilitate operation and maintenance.

- Do not place the SmartLogger upside down; otherwise, dust will fall into ports at the bottom of the SmartLogger, thereby reducing the service life.

- The installation mode and position must be suitable for the SmartLogger weight (2.39 kg) and dimensions with mounting ears (H x W x D: 411 mm x 170 mm x 58.6 mm).

- If the SmartLogger is installed on a wall or along a guide rail, the area for connecting cables should face downwards.

- Figure 3-1 and Figure 3-2 show the minimum distance between the SmartLogger and surrounding objects.

Figure 3-1 Minimum distance for wall mounting (unit: mm)
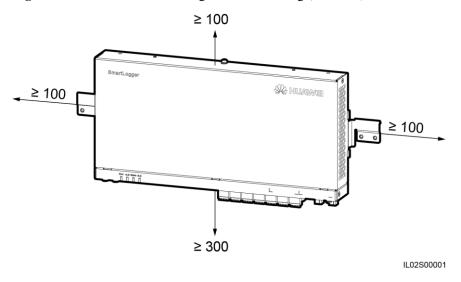
Figure 3-2 Minimum distance for guide rail mounting (unit: mm)

3.5 Installing a SmartLogger

Context

In a scenario with a smart array controller, the SmartLogger is installed before delivery. In a scenario without a smart array controller, the SmartLogger can be installed on a wall or along a guide rail.

3.5.1 Installing a SmartLogger on a Wall

Context

⚠ **NOTICE**

● Choose a solid and smooth wall to ensure that the SmartLogger can be installed securely on the wall.
● Before hanging the SmartLogger on the screws, secure the expansion sleeves, washers, and tapping screws into the wall.

Figure 3-3 Distance between the screw holes in the mounting ears for the SmartLogger (unit: mm)

IS02SC0005
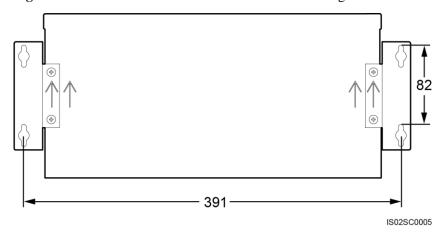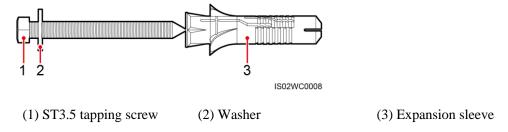
Figure 3-4 Screw assembly for wall-mounted installation

IS02WC0008

| (1) ST3.5 tapping screw | (2) Washer | (3) Expansion sleeve |

Procedure

Step 1 Determine mounting holes based on the hole positions in the mounting ears, and mark the mounting holes using a marker.
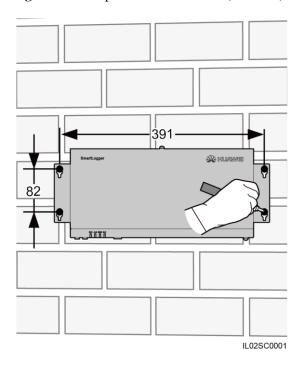
⚠ **DANGER**

Avoid drilling holes in the water pipes and power cables buried in the wall.
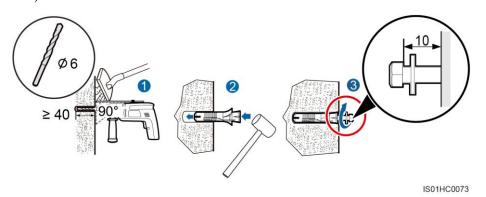
> ⚠ **NOTICE**
>
> If you need to use a ladder to install the SmartLogger on a high position, keep balance to protect yourself from falling down.

Figure 3-5 Hole positions and distance (unit: mm)

IL02SC0001

Step 2 Drill holes by using a hammer drill and install expansion sleeves, washers, and tapping screws.

Figure 3-6 Drilling holes and installing expansion sleeves, washers, and tapping screws (unit: mm)

IS01HC0073

1. Put a hammer drill with a Φ6 mm drill bit on a marked hole position vertically against the wall and drill to a depth greater than or equal to 40 mm.

⚠ **NOTICE**

● To prevent dust inhalation or contact with eyes, the operator should wear an anti-dust respirator and safety goggles when drilling holes.

● Clean up any dust in and around the holes using a vacuum cleaner and measure the hole distance. If the holes are inaccurately positioned, drill holes again.

2. Slightly tighten the expansion sleeves, vertically insert them into holes, and knock them completely into the holes by using a rubber mallet.

3. Drive the tapping screws into the expansion sleeves, and reserve 10 mm outside of the holes.

Step 3 Put the tapping screws through the SmartLogger mounting ears and washers into the mounting holes in the wall.
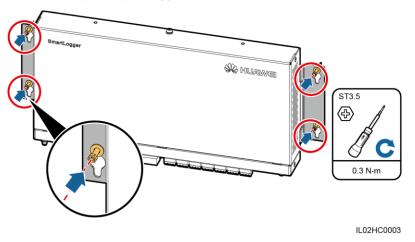
⚠ **NOTICE**

When the SmartLogger is wall-mounted, ensure that the cable connection area faces downwards for ease of cable connection and maintenance.

Step 4 Tighten the tapping screws using a torque screwdriver.

Figure 3-7 Tightening the tapping screws
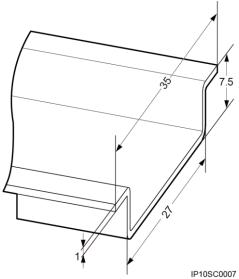
----End

3.5.2 Installing a SmartLogger Along a Guide Rail

Context

Huawei does not provide the SmartLogger guide rail. If you choose this installation mode, prepare a 35 mm standard guide rail by yourself.

Figure 3-8 Guide rail dimensions (unit: mm)

IP10SC0007

⚠ **NOTICE**
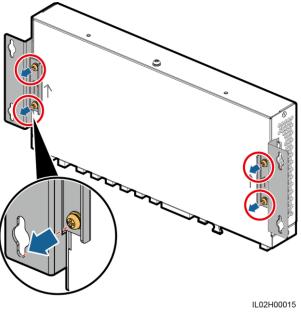
● Verify that the length of the guide rail is sufficient for securing the SmartLogger. The recommended length is 450 mm or greater. If an RS485 signal SPD needs to be installed on the guide rail, the recommended guide rail length is 600 mm or greater.

● Ensure that the guide rail is secured before installing the SmartLogger.

Procedure

Step 1 Remove the mounting ears from the SmartLogger using a Phillips screwdriver.

Figure 3-9 Removing mounting ears

IL02H00015
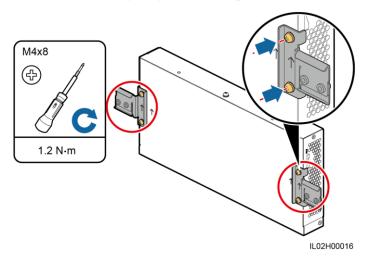
Step 2 Secure the guide rail clamps using the screws that are removed from the mounting ears.

⚠ **NOTICE**

Install the guide rail clamps exactly as shown in the figure; otherwise, you may not be able to mount the SmartLogger onto the guide rail.

Figure 3-10 Installing the guide rail clamps

M4x8

1.2 N·m

IL02H00016

Step 3 Mount the SmartLogger onto the guide rail.
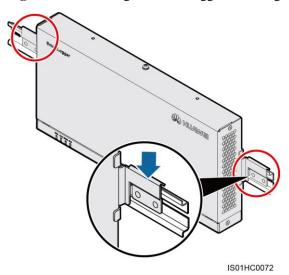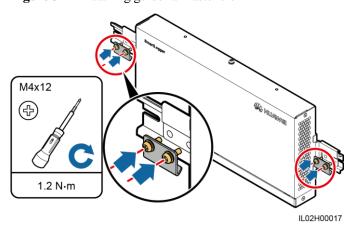
Figure 3-11 Mounting the SmartLogger onto the guide rail

IS01HC0072

Step 4 Install guide rail fasteners.

Figure 3-12 Installing guide rail fasteners

M4x12

1.2 N·m

IL02H00017

----End

4 Electrical Connection

4.1 Precautions

> **NOTE**
>
> - This section describes how to connect the SmartLogger to inverters and other devices in the scenario without a smart array controller.
> - In a scenario with a smart array controller, the SmartLogger is installed before delivery. Devices can connect to the SmartLogger over RS485 communications cables or AC power cables. For detailed operations, see the user manual for the appropriate smart array controller.

> ⚠ **NOTICE**
>
> - Ensure that all cables are connected securely.
> - The SmartLogger has no start key. Before the electrical connections for the SmartLogger are complete, do not connect a power adapter to it.

4.2 Preparing an OT Terminal

Figure 4-1 shows how to prepare an OT terminal.

Figure 4-1 Preparing an OT terminal

IS01Z00006

(1) Cable (2) Heat shrink tubing (3) OT terminal (4) Hydraulic pliers (5) Heat gun

4.3 Connecting Cables to the Terminal Block on the COM Port

Procedure
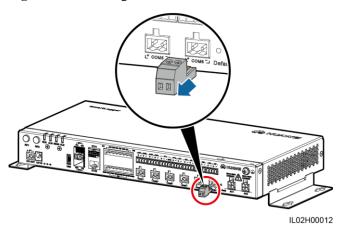
Step 1 Strip cables.

Figure 4-2 Stripping a cable (unit: mm)

IS01ZC0036

(1) Insulation layer   (2) Armored layer

Step 2 Remove the terminal block from the COM port.

Figure 4-3 Removing the terminal block

IL02H00012

📖 **NOTE**
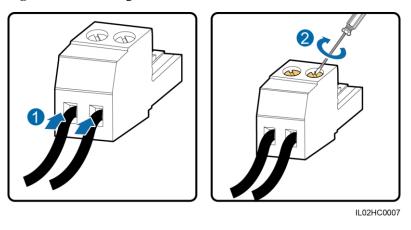
Use a flat-head screwdriver to remove the terminal block.

Step 3 Connect cables to the terminal block and secure the cables.

Figure 4-4 Connecting cables

IL02HC0007

Step 4 Insert the terminal block into the COM port.

----End

4.4 Connecting a PE Cable to the SmartLogger

Prerequisites
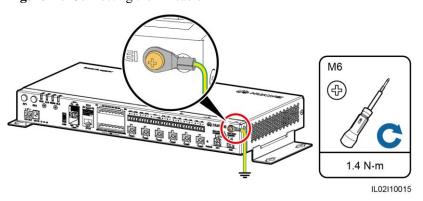
The PE cable and OT terminal are available.

- Recommended PE cable: an outdoor copper-core cable with a cross sectional area of 4–6 mm² or 12–10 AWG
- OT terminal: M6

Procedure

Step 1 Prepare an OT terminal by following the instructions in 4.2 Preparing an OT Terminal.

Step 2 Secure the PE cable using the ground screw.

Figure 4-5 Connecting the PE cable

----End

4.5 Connecting the SUN2000

4.5.1 Connection Description

The SmartLogger can be connected to the SUN2000 through an RS485 communications cable or AC power cable. Communication modes for the SUN2000 with PLC and those without PLC are different. Select an appropriate communication mode based on the actual situation.

For models with the PLC function, you can select either the PLC or RS485 communications mode. For models without the PLC function, you can select only the RS485 communications mode.

📖 **NOTE**

The RS485 and PLC communication modes are mutually exclusive.

- If the RS485 communications mode is selected, do not connect an AC power cable to the PLC power input port of the SmartLogger.
- If PLC is used, do not connect an RS485 communications cable.

4.5.2 Connecting the SUN2000 Over RS485

Context

The SmartLogger provides six COM ports for RS485 communication, as shown in Figure 4-6.

Figure 4-6 COM ports of the SmartLogger
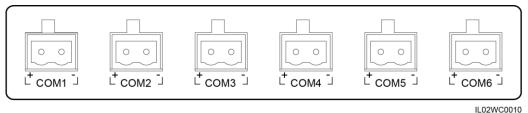
Table 4-1 COM port description

Port	Identifier	Function
COM1	+	RS485A, RS485 differential signal+
	-	RS485B, RS485 differential signal–
COM2	+	RS485A, RS485 differential signal+
	-	RS485B, RS485 differential signal–
COM3	+	RS485A, RS485 differential signal+
	-	RS485B, RS485 differential signal–
COM4	+	RS485A, RS485 differential signal+
	-	RS485B, RS485 differential signal–
COM5	+	RS485A, RS485 differential signal+
	-	RS485B, RS485 differential signal–
COM6	+	RS485A, RS485 differential signal+
	-	RS485B, RS485 differential signal–

The RS485 terminal block or RJ45 port on the SUN2000 is used for RS485 communication. There are two types of RS485 terminal blocks located in different models of SUN2000s.

- Terminal block connection
    - **Terminal block 1**

        Figure 4-7 shows the position of the terminal block in the SUN2000-50KTL. Table 4-2 describes the functions of the terminal block.
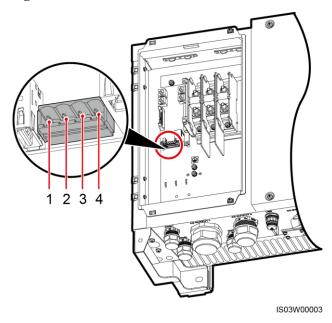
Figure 4-7 Position of the terminal block in the SUN2000-50KTL

IS03W00003

Table 4-2 Functions of the RS485 terminal block

No.	Port Definition	Function
1	RS485A IN	RS485A, RS485 differential signal+
2	RS485A OUT	RS485A, RS485 differential signal+
3	RS485B IN	RS485B, RS485 differential signal–
4	RS485B OUT	RS485B, RS485 differential signal–

    –   **Terminal block 2**

        Figure 4-8 shows the position of the terminal block in the SUN2000-33KTL/40KTL. Table 4-3 describes the functions of the terminal block.
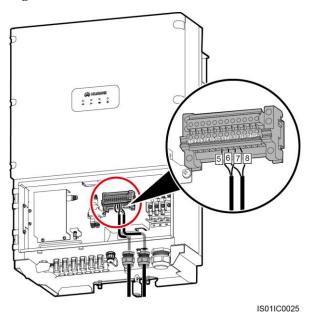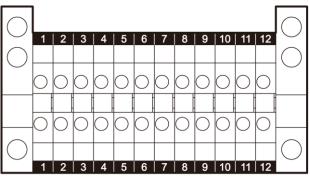
Figure 4-8 Position of the terminal block in the SUN2000-33KTL/40KTL

IS01IC0025

Figure 4-9 Terminal block

IU01ZC0001

Table 4-3 Functions of the RS485 terminal block

No.	Function	No.	Function
5	RS485A (IN), RS485 differential signal+	6	RS485A (OUT), RS485 differential signal+
7	RS485B (IN), RS485 differential signal–	8	RS485B (OUT), RS485 differential signal–

● RJ45 port connection

The RJ45 port needs to be connected using an RJ45 connector, as shown in Figure 4-10.
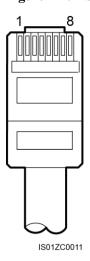
Figure 4-10 RS485 RJ45 connector of the SUN2000 (side view without the fastener)

IS01ZC0011

Table 4-4 Shielded network cable description

No.	Color	Function
1	White-and-orange	RS485A, RS485 differential signal+
2	Orange	RS485B, RS485 differential signal–
3	White-and-green	N/A
4	Blue	RS485A, RS485 differential signal+
5	White-and-blue	RS485B, RS485 differential signal–
6	Green	N/A
7	White-and-brown	N/A
8	Brown	N/A

☐ NOTE

This section describes how to connect the SUN2000-50KTL to the SmartLogger through a terminal block.

Figure 4-11 shows the connection between the SmartLogger and the SUN2000 over an RS485 communications cable.

Figure 4-11 Connecting the SmartLogger to the SUN2000

| (1) RS485A IN | (2) RS485A OUT | (3) RS485B IN | (4) RS485B OUT |

Procedure

Step 1 Prepare a cable with an appropriate length, strip a proper part of the insulation layer from one end, and connect the end to the SUN2000 terminal block.

- You are advised to use a DJYP2VP2-22 2x2x1 PC cable or a communications cable with a conductor cross-sectional area of 1 mm^2 and a cable outer diameter of 14–18 mm.
- For details about how to strip and connect the cable, see the SUN2000 user manual.

Step 2 Connect the other end of the cable to the COM port of the SmartLogger. For details, see 4.3 Connecting Cables to the Terminal Block on the COM Port.

⚠ **NOTICE**

When connecting the cable, ensure that the RS485A (IN) port and RS485B (IN) port on the SUN2000 respectively connect to the COM+ port and COM– port on the SmartLogger.

Step 3 The **Baud Rate** settings for the SUN2000 and SmartLogger must be the same.

- For details about the communications parameter settings for the SmartLogger, see 7.9.2.2 Setting RS485 Parameters or the *SUN2000 App User Manual*.
- For details about the communications parameter settings for the SUN2000, see the *SUN2000 APP User Manual*.

----End

Follow-up Procedure

Disconnection can be performed in reverse order.
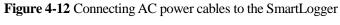
4.5.3 Connecting the SUN2000 Through AC Power Cables

Context

The SmartLogger is integrated with the PLC central coordinator (CCO) that can work with the SUN2000 integrated with the PLC station (STA) to implement power line communication (PLC) networking over power cables.

Procedure

Step 1 Connect one end of the delivered AC power cables to an MCB.

Step 2 Connect the other end of the cables to the AC1 and AC2 ports on the SmartLogger respectively.

Figure 4-12 Connecting AC power cables to the SmartLogger
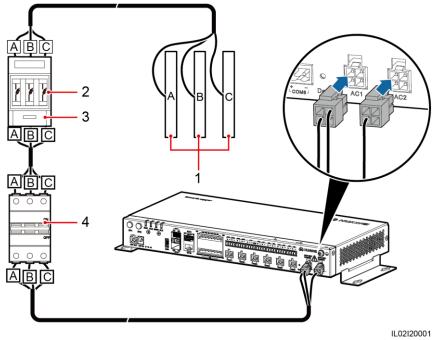
Table 4-5 describes the components shown in Figure 4-12.

Table 4-5 Components

No.	Component	Specifications	Quantity
1	Busbar A/B/C	N/A	1
2	Fuse	Rated voltage ≥ 800 V; rated current: 32 A	3
3	Knife fuse switch box	Rated voltage ≥ 800 V; rated current ≥ 32 A; number of poles: 3	1

No.	Component	Specifications	Quantity
4	MCB	Rated voltage: ≥ 800 V; rated current: ≥ 32 A	1

☐ NOTE

- If the SmartLogger communicates with the SUN2000 through PLC, no RS485 communications cable needs to be connected between them.
- After connecting cables to the AC ports, log in to the embedded WebUI and enable the PLC function in the SmartLogger. For details, see 7.10.7.1 Connecting Devices. 7.7.4.3 Networking Settings describes how to configure PLC parameters for the SmartLogger.
- The port used for PLC networking is RS485-0. The recommended **Baud Rate** for the port is **115200 bps**, which can provide optimal communications performance.

----End

Follow-up Procedure

Disconnection can be performed in reverse order.
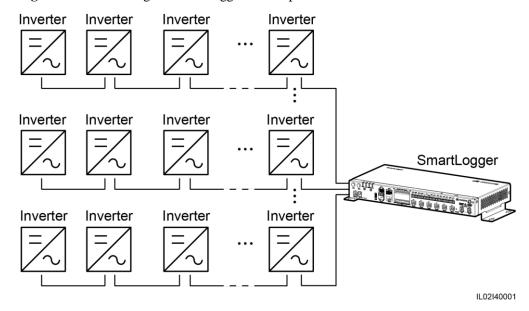
4.5.4 Connecting Multiple SUN2000s

The SmartLogger can connect to multiple SUN2000s through a daisy chain or AC power cables.

Daisy Chain Connection

In the daisy chain connection mode, the RS485OUT of one SUN2000 is connected to the RS485IN port of the next SUN2000, and the first SUN2000 is connected to the SmartLogger as described in 4.5.2 Connecting the SUN2000 Over RS485.

Figure 4-13 Connecting the SmartLogger to multiple SUN2000s
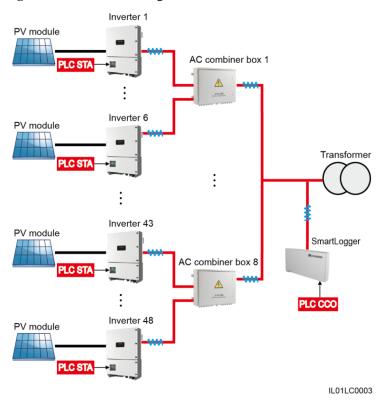
 NOTE

- Each SmartLogger can connect to a maximum of 200 devices. You are advised to connect less than 30 devices to each RS485 route. Each SmartLogger can connect to a maximum of 150 SUN2000s.

- If an EMI is to be connected, connect it at the end of the chain.

- Set **Build-out Resistor** to **Enable** under **Comm. Param.** for the SUN2000 at the end of each daisy chain. For details, see *SUN2000 APP User Manual*.

- The IP addresses for all devices in the daisy chain should be within the searching segment set in the SmartLogger and they must differ from each other. Otherwise, the communication would fail between the devices and the SmartLogger.

- You can perform the **Auto Assign Address** operation on the built-in WebUI of the SmartLogger. If an RS485 address conflict is detected for SUN2000s, the SmartLogger automatically reassigns addresses without the need for local address upgrade for the SUN2000s.

- The values of **Baud rate** for all the devices in each daisy chain should stay consistent with the baud rate of the SmartLogger.

AC Power Cable Connection

Figure 4-14 shows the method for connecting the SmartLogger to multiple SUN2000s over AC power cables.

Figure 4-14 PLC networking

 NOTE

- If the SmartLogger communicates with the SUN2000 over PLC, ensure that the SUN2000 with PLC is used.

- If the SmartLogger communicates with the SUN2000 over PLC, one SmartLogger can connect to a maximum of 80 SUN2000s over the built-in PLC CCO. If the SmartLogger is also connected to an external PLC CCO over the COM port, one SmartLogger can connect to a maximum of 150 SUN2000s.

4.6 Connecting an EMI

4.6.1 Connection Description

There are two types of EMIs. One is a standard EMI that supports Modbus-RTU, and the other is a split-type EMI that consists of various sensors.

The SmartLogger connects a standard or split-type EMI that supports Modbus-RTU over a COM port, connects to a split-type EMI composed of current or voltage-type sensors over an AI port, and connects to a PT100/PT1000 temperature sensor over a PT port. The connection mode depends on site requirements.

☐ NOTE

The recommended connection methods are as follows:

- Connect over a COM port if a COM or AI port is to be connected.
- Connect a current-type AI port if an AI port is to be connected.

One SmartLogger can manage multiple EMIs or multiple groups of EMIs.

4.6.2 Connecting the SmartLogger to an EMI That Supports Standard Modbus-RTU

Context
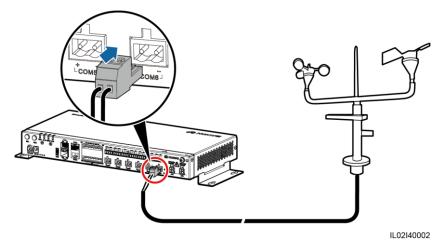
Devices from different vendors may support different protocol specifications. To normally obtain information from the connected EMI, correctly configure the protocol specifications on the WebUI of the SmartLogger based on the protocol specifications delivered by the vendor.

For the definition of the RS485 communications cable for the EMI, see the delivered operation guide.

The SmartLogger provides six RS485 communications ports. For the port descriptions, see 4.5.2 Connecting the SUN2000 Over RS485.

Figure 4-15 shows how to connect the SmartLogger to an EMI over an RS485 communications cable.

Figure 4-15 Connecting the SmartLogger to an EMI

IL02I40002

Procedure

Step 1 Connect one end of the cable delivered with the EMI to the RS485 port of the EMI.

Step 2 Connect the other end of the cable to the COM port of the SmartLogger. For details, see 4.3 Connecting Cables to the Terminal Block on the COM Port.

![NOTICE]

When connecting cables, ensure that the RS485+ and RS485- ports on the EMI respectively connect to the COM+ and COM- ports on the SmartLogger.

![NOTE]

- The EMI cannot be automatically identified. After connecting cables, log in to the embedded WebUI and manually add the EMI. For details, see 7.10.7.1 Connecting Devices. Set **Device Type** to **EMI** and **Comm.protocal** to **Modbus-RTU**.

- After adding an EMI, set its parameters. For details, see Connection over the COM Port in 7.7.5.2 Setting Running Parameters. The EMI model is **Jingzhou Yangguang (PC-4)**, **Handan (RYQ-3)**, **Kipp&Zonen SMPx** or **Lufft WSx-UMB**.

- If the SmartLogger needs to be connected to an EMI and multiple SUN2000s, connect the EMI at the end of the daisy chain, and verify that the port connected to the EMI has a unique communications address. For the daisy chain connection, see Daisy Chain Connection in 4.5.4 Connecting Multiple SUN2000s.

----End

Follow-up Procedure

Disconnection can be performed in reverse order.

4.6.3 Connecting the SmartLogger to a Split EMI

Connecting to an EMI over a COM Port

The EMI used in Europe and Southeast Asia is composed of sensors, whose signals need to be converted into RS485 signals (Modbus-RTU) over an extra analog-to-digital converter before the sensors are connected to the SmartLogger.

The analog-to-digital converter should provide an RS485 port and support the standard Modbus-RTU protocol. This section describes the connection between the SmartLogger and a split EMI through the ADAM4117 that functions as an analog-to-digital converter.

The SmartLogger provides six RS485 communications ports. For the port descriptions, see 4.5.2 Connecting the SUN2000 Over RS485.

Figure 4-16 shows how to connect the SmartLogger to a split EMI over an analog-to-digital converter.
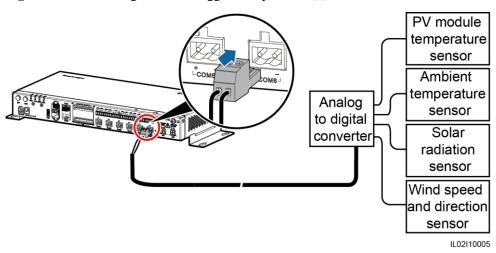
Figure 4-16 Connecting the SmartLogger to a split EMI (1)

Step 1 Prepare a cable with an appropriate length, strip a proper part of the insulation layer from one end, and connect the end to the port on the analog-to-digital converter.

- The DJYP2VP2-22 2x2x1 computer cable or a communications cable with a conductor cross-sectional area of 1 mm^2 and outer diameter of 14–18 mm is recommended.
- For detailed operations, see the document delivered with the analog-to-digital converter.

Step 2 Connect the other end of the cable to the COM port of the SmartLogger. For details, see 4.3 Connecting Cables to the Terminal Block on the COM Port.

⚠ **NOTICE**

When connecting cables, ensure that the RS485+ and RS485− ports on the analog-to-digital converter respectively connect to the COM+ and COM− ports on the SmartLogger.

Step 3 The **Baud Rate** settings for the analog-to-digital converter and SmartLogger must be the same.

- For SmartLogger communication parameter settings, see 7.9.2.2 Setting RS485 Parameters or the *SUN2000 APP User Manual*.
- For details about the communications parameter configurations for the analog-to-digital converter, see the delivered document.

Step 4 Connect each sensor to the analog-to-digital converter. For detailed operations, see the documents delivered with the analog-to-digital converter or sensors.

📖 NOTE

- The EMI cannot be automatically identified. After connecting cables, log in to the embedded WebUI and manually add the EMI. For details, see 7.10.7.1 Connecting Devices. Set **Device Type** to **EMI** and **Comm.protocal** to **Modbus-RTU**.
- After adding an EMI, set its parameters. For details, see Connection over the COM Port in 7.7.5.2 Setting Running Parameters. The EMI model is **Sensor(ADAM)**.

- If the SmartLogger needs to be connected to an EMI and multiple SUN2000s, connect the EMI at the end of the daisy chain, and verify that the port connected to the EMI has a unique communications address. For the daisy chain connection, see Daisy Chain Connection in 4.5.4 Connecting Multiple SUN2000s.

----End

Connecting to an EMI over an AI Port

The EMI used in Europe and Southeast Asia is composed of sensors that need to connect to the AI ports on the SmartLogger.

Figure 4-17 AI ports

IL02W00010
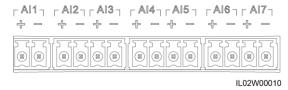
Table 4-6 AI port definitions

Port	Current/Voltage-Type	AI Signal Input Range	Remarks
AI1	Voltage-type	0–10 V (passive)	Connects to a voltage-type sensor.
AI2–AI7	Current-type	0–20 mA, 4–20 mA (passive)	Connects to a current-type sensor that needs to be energized separately.

Figure 4-18 shows how to connect the SmartLogger to a split EMI over an AI port.
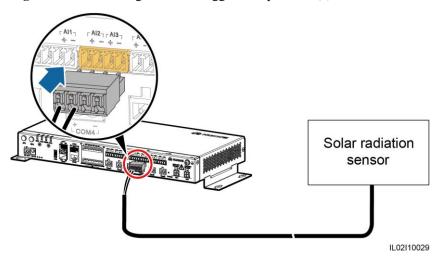
Figure 4-18 Connecting the SmartLogger to a split EMI (2)

☐ NOTE

● One sensor connects to one AI port. Figure 4-18 shows only the connection between the solar radiation sensor and the SmartLogger. Connections between other sensors and the SmartLogger are the same.

● For details about the cables and cable connection operations, see the documents delivered with the sensors. The AI port on the SmartLogger is marked + and −. Connect cables correctly according to the silk screens.

● The EMI cannot be automatically identified. After connecting cables, log in to the embedded WebUI and manually add the EMI. For details, see 7.10.7.1 Connecting Devices. Set **Device Type** to **EMI** and **Comm.protocal** to **AI**.

● After adding an EMI, set its parameters. For details, see Connection over the AI/PT Port in 7.7.5.2 Setting Running Parameters.

● If the SmartLogger needs to be connected to an EMI and multiple SUN2000s, connect the EMI at the end of the daisy chain, and verify that the port connected to the EMI has a unique communications address. For the daisy chain connection, see Daisy Chain Connection in 4.5.4 Connecting Multiple SUN2000s.

Connecting to a PT100/PT1000 Temperature Sensor over the PT Port

☐ NOTE

● The SmartLogger provides two PT ports. The PT1 port can connect to a three-wire or two-wire temperature sensor, whereas the PT2 port can connect to only a two-wire PT100/PT1000 temperature sensor (PT100/PT1000 for short).

● If the AI port has been connected to a temperature sensor, the PT port can be reserved.

● If the PT1 port connects to a two-wire PT100/PT1000 temperature sensor, you need to short-circuit the GND port to one − port using the delivered short-circuit cable.

● For details about the cables and cable connection operations, see the documents delivered with the PT100/PT1000. The PT port on the SmartLogger is marked + and −. Connect cables correctly according to the silk screens.

The PT1 port is used as an example. Figure 4-19 and Figure 4-20 show how to connect the SmartLogger to the PT100/PT1000.
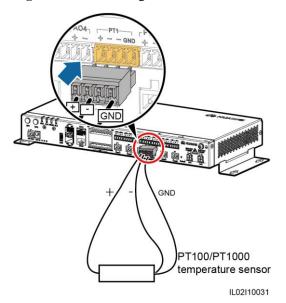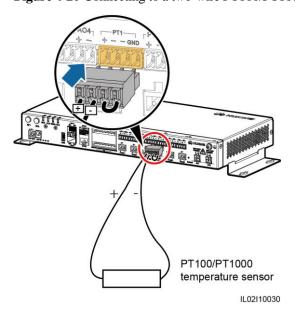
Figure 4-19 Connecting to a three-wire PT100/PT1000

Figure 4-20 Connecting to a two-wire PT100/PT1000

☐ NOTE

- The EMI cannot be automatically identified. After connecting cables, log in to the embedded WebUI and manually add the EMI. For details, see 7.10.7.1 Connecting Devices. Set **Device Type** to **EMI** and **Comm. protocol** to **AI**.

- After adding an EMI, set its parameters. For details, see Connection over the AI/PT Port in 7.7.5.2 Setting Running Parameters.

4.7 Connecting a Power Meter

Context

The SmartLogger can be connected to a power meter that supports the standard Modbus-RTU or DL/T645 protocol.

📖 NOTE

- The SmartLogger can be connected to and manage only one power meter that supports the Modbus-RTU protocol.
- The SmartLogger can be connected to and manage multiple power meters that support the DL/T645 protocol.
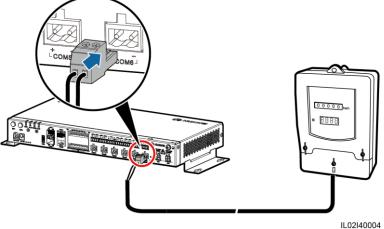
Devices from different vendors may support different protocol specifications. To obtain information from the connected power meter, correctly configure the protocol specifications on the WebUI of the SmartLogger based on the protocol specifications delivered by the vendor.

For the definition of the RS485 communications cable for the power meter, see the delivered operation guide.

The SmartLogger provides six RS485 communications ports. For the port descriptions, see 4.5.2 Connecting the SUN2000 Over RS485.

Figure 4-21 shows how to connect the SmartLogger to a power meter.

Figure 4-21 Connecting the SmartLogger to a power meter

Procedure

Step 1 Connect one end of the cable delivered with the power meter to the RS485 port of the power meter.

Step 2 Connect the other end of the cable to the COM port of the SmartLogger. For details, see 4.3 Connecting Cables to the Terminal Block on the COM Port.

⚠ **NOTICE**

When connecting cables, ensure that the RS485+ and RS485- ports on the power meter respectively connect to the COM+ and COM- ports on the SmartLogger.

◫ **NOTE**

- After connecting cables to the power meter that supports Modbus-RTU, log in to the embedded WebUI and set parameters for Modbus Meter. For details, see 7.9.2.3 Setting Power Meter Parameters.

- Devices connected to a same COM port of the SmartLogger must support the same protocol. After connecting cables, log in to the embedded WebUI and modify the COM port protocol. For details, see 7.9.2.2 Setting RS485 Parameters.

- A power meter cannot be detected automatically. You need to add this device manually. For details, see 7.10.7.1 Connecting Devices. Set **Device Type** to **Meter** and **Comm.protocal** to the protocol supported by the connected power meter.

- After modifying the protocol for a DL/T645 power meter and adding it manually, log in to the embedded WebUI to query and set parameters for DL/T645 Meter. For details, see 7.7.6 Power Meter.

----End

Follow-up Procedure

Disconnection can be performed in reverse order.

4.8 Connecting a Box-type Transformer

Context

The SmartLogger can be connected to a box-type transformer over the RS485 and Ethernet communication modes.

◫ **NOTE**

The SmartLogger provides two Ethernet electrical ports. A box-type transformer that supports Ethernet communication can be connected to the SmartLogger through an Ethernet electrical port, and then to an NMS through the northbound interface of the SmartLogger. In this connection mode, the IP addresses of the SmartLogger and the box-type transformer must be in the same network segment.

This section describes how to connect a box-type transformer that supports the Modbus-RTU or IEC103 protocol to the SmartLogger using the RS485 communication mode.

Devices from different vendors may support different protocol specifications. To obtain information from the connected box-type transformer, correctly configure the protocol specifications on the WebUI of the SmartLogger based on the protocol specifications delivered by the vendor.

For the definition of the RS485 communications cable for the box-type transformer, see the delivered operation guide.

The SmartLogger provides six RS485 communications ports. For the port descriptions, see 4.5.2 Connecting the SUN2000 Over RS485.

Figure 4-22 shows how to connect the SmartLogger to a box-type transformer over an RS485 communications cable.

Figure 4-22 Connecting the SmartLogger to a box-type transformer

Procedure

Step 1 Connect one end of the cable delivered with the box-type transformer to the RS485 port of the box-type transformer.

Step 2 Connect the other end of the cable to the COM port of the SmartLogger. For details, see 4.3 Connecting Cables to the Terminal Block on the COM Port.

⚠ **NOTICE**

When connecting cables, ensure that the RS485+ and RS485- ports on the box-type transformer respectively connect to the COM+ and COM- ports on the SmartLogger.

📖 **NOTE**

● Devices connected to a same COM port of the SmartLogger must support the same protocol.

● After connecting cables, log in to the embedded WebUI and set parameters for **Box-type Transformer**. For details, see 7.7.8 Custom Device.

----End

Follow-up Procedure

Disconnection can be performed in reverse order.

4.9 Connecting a PID Module

Context

The PID module is used to prevent PV module output power degradation due to the potential induced degradation (PID) effect in a PV power system.
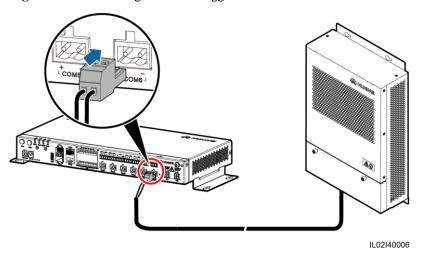
The SmartLogger can be connected to and manage only one PID module that supports the Modbus-RTU protocol.

For the definition of the RS485 communications cable for the PID module, see the delivered operation guide.

The SmartLogger provides six RS485 communications ports. For the port descriptions, see 4.5.2 Connecting the SUN2000 Over RS485.

Figure 4-23 shows how to connect the SmartLogger to a PID module.

Figure 4-23 Connecting the SmartLogger to a PID module

IL02I40006

Procedure

Step 1 Connect one end of the cable delivered with the PID module to the RS485 port of the PID module.

Step 2 Connect the other end of the cable to the COM port of the SmartLogger. For details, see 4.3 Connecting Cables to the Terminal Block on the COM Port.

⚠ **NOTICE**

When connecting cables, ensure that the brown cable (RS485A) and black cable (RS485B) of the PID module respectively connect to the COM+ and COM− ports on the SmartLogger.

Step 3 The **Baud rate** settings for the PID module and SmartLogger must be the same.

📖 NOTE

- The baud rates supported by the PID module include 4800 bit/s, 9600 bit/s, 19,200 bit/s, and 115,200 bit/s.
- The PID module supports automatic address allocation. After connecting cables, log in to the embedded WebUI and search for the PID module by clicking **Auto. Search** in 7.10.7.1 Connecting Devices.
- For details about PID parameter settings, see 7.7.7.2 Setting Running Parameters in 7.7.7 PID.
- The default RS485 communications address of the PID module is 1. To change the RS485 communications address, log in to the embedded WebUI and click **Auto Assign Address** in 7.10.7.1 Connecting Devices.

----End

Follow-up Procedure

Disconnection can be performed in reverse order.

4.10 Connecting a Ripple Control Receiver

Prerequisites

You have prepared two-core or multiple-core cables with a cross sectional area of 1.5 mm^2 (recommended).

Context

In Germany and some European areas, a ripple control receiver is used to convert a power grid dispatching signal to a dry contact signal. The dry contact is required for receiving the power grid dispatching signal.

Figure 4-24 DI ports of the SmartLogger
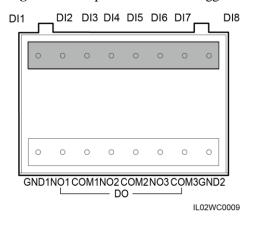
Table 4-7 DI port description

Port	Function
GND1	Dry contact input common terminal 1, used for active power derating for DI1–DI4
DI1	DI_1
DI2	DI_2
DI3	DI_3
DI4	DI_4
DI5	DI_5
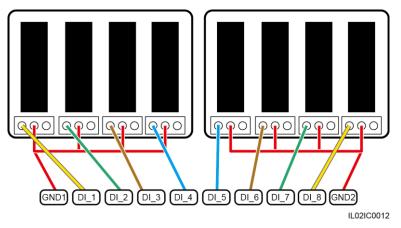
Port	Function
DI6	DI_6
DI7	DI_7
DI8	DI_8
GND2	Dry contact input common terminal 2, used for reactive power compensation for DI5–DI8

📖 NOTE

DI1–DI4 are used for active power derating, and DI5–DI8 are used for reactive power compensation.

shows how to connect the SmartLogger to a ripple control receiver.
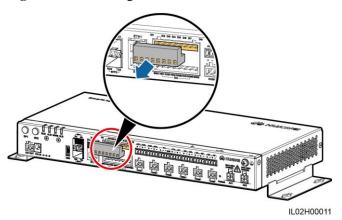
Figure 4-25 Connecting a ripple control receiver

Procedure

Step 1 Connect one end of the cable to the ripple control receiver.

Step 2 Strip 8 mm of the insulation layer at the other end of the cable.

Step 3 Remove the terminal block from the DI port.

Figure 4-26 Removing the terminal block

❏ NOTE
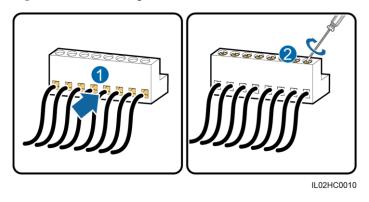
Use a flat-head screwdriver to remove the terminal block.

Step 4 Connect cables to the terminal block and secure the cables.

Figure 4-27 Connecting cables

Step 5 Insert the terminal block into the DI port.

⚠ **NOTICE**

To enable the power grid dispatching function, you need to set the corresponding parameter (for **Active Power Control** or **Reactive Power Control**) on the embedded WebUI after connecting cables. For details, see 8.1.1 Active Power Control or 8.1.2 Reactive Power Control.

----End

Follow-up Procedure

Disconnection can be performed in reverse order.

4.11 Connecting an Ethernet Network Cable

Context

- The SmartLogger provides two Ethernet electrical ports, through which the SmartLogger can connect to a third-party device.
- The SmartLogger can be connected to an Ethernet switch, router, or POE module. It can also be connected to the Ethernet electrical port of a PC directly or through a hub. Select the device to be connected based on the actual networking scenario. For details on typical scenarios, see 2.4 Typical Networking Scenarios.

Procedure

Step 1 Connect one end of the delivered network cable to the Ethernet electrical port of a device.
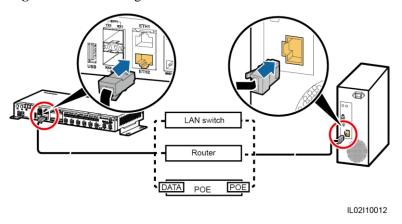
📖 **NOTE**

If the delivered cable is too short, pay attention to the following when preparing a cable:

- Select a CAT 5E or higher-class shielded network cable.
- The cable length should not exceed 100 m.

Step 2 Connect the other end of the network cable to **ETH1** or **ETH2** of the SmartLogger.

Figure 4-28 Connecting an Ethernet network cable

📖 **NOTE**

- A POE module needs to be connected to the **DATA** port of the SmartLogger.
- The default IP address of the SmartLogger is 192.168.0.10, the default subnet mask is 255.255.255.0, and the default gateway is 192.168.0.1.
- If the SmartLogger is connected to a PC directly or through a hub, set the IP addresses of the SmartLogger and PC in the same network segment. For example, if the IP address of the SmartLogger is 192.168.0.10, set the IP address of the PC to 192.168.0.11. The subnet mask and the gateway of the PC should be consistent with those of the SmartLogger.
- If the SmartLogger is connected to a PC through a networking device (such as a router), set the IP addresses of the SmartLogger and networking device in the same network segment. Set the gateway of the SmartLogger correctly so that it can communicate with the networking device.
- To enable communication between the SmartLogger and the NetEco, set NetEco parameters properly on the SmartLogger. For details, see 7.9.2.4 Setting NetEco Parameters.

----End

Follow-up Procedure

Disconnection can be performed in reverse order.

4.12 Connecting Fiber Jumpers

Context

The SmartLogger can be connected to devices such as an ATB through fiber jumpers. You can select the devices to be connected based on the actual networking scenario. For details on typical scenarios, see 2.4 Typical Networking Scenarios.

Procedure
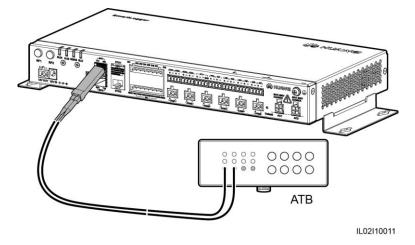
Step 1 Insert the optical module into **SFP1** or **SFP2** of the SmartLogger.

⚠ **NOTICE**

- An optical module is optional. A 100M optical module (eSFP, 1310 nm, and single mode) with transmission distance of at least 15 km is recommended.
- When inserting an optical module into the **SFP1** port, verify that the side with a handle faces upwards. When inserting an optical module into the **SFP2** port, verify that the side with a handle faces downwards.
- The optical switch used for the central control room supports RSTP and STP. To ensure the communication between the optical switch and the SmartLogger, the configured optical module must have a transmission speed of 100 Mbit/s.

Step 2 Connect the two fiber jumpers delivered with the optical module to the ports on the optical module.

Step 3 Connect the other end of the fiber jumper to the port on the ATB.

Figure 4-29 Connecting an ATB

Step 4 Determine the operating status based on the Ethernet optical port indicators.

Figure 4-30 Ethernet optical port indicators
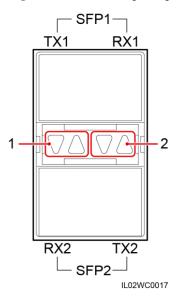
Table 4-8 Ethernet optical port indicator description

Indicator	Status	Meaning
(1) Upper port (2) Lower port	Green steady on and blinking yellow at short intervals (0.1s on and 0.1s off)	An optical module has been inserted into the Ethernet optical port.
	Green steady on and yellow off	A fiber link has been successfully established.
	Green steady on and blinking yellow at long intervals (0.1s on and 1.9s off)	Optical fiber communication is in progress.

----End

Follow-up Procedure

Disconnection can be performed in reverse order.

 NOTE

1. When removing a fiber jumper, press down the clip first.
2. When removing an optical module, press down the handle and pull the module outwards.

5 System Operation

5.1 Checking Before Power-On

To ensure that the SmartLogger can work properly after power-on, check the items listed in Table 5-1 before powering on the SmartLogger.

Table 5-1 Items to be checked for the SmartLogger before power-on

No.	Check That	Check Result
1	The SmartLogger is installed correctly and reliably.	□ Passed □ Failed
2	Ground cables of the SmartLogger are connected to ground points securely and reliably.	□ Passed □ Failed
3	The cables between the SmartLogger and other devices are connected securely and reliably.	□ Passed □ Failed
4	The RS485 communications cable is connected securely and reliably.	□ Passed □ Failed
5	The AC power cable is securely and reliably connected to the SmartLogger when the AC power cable is used for communication.	□ Passed □ Failed
6	Ports that are not used (such as RF1, RF2, Ethernet optical port, and Ethernet port) are protected by dustproof plugs.	□ Passed □ Failed
7	Routing for the power cable and signal cable meets the requirements for routing strong-current and weak-current cables and complies with the cable routing plan.	□ Passed □ Failed
8	Cables are bound neatly, and cable ties are secured evenly and properly in the same direction.	□ Passed □ Failed
9	There is no unnecessary adhesive tape or cable tie on cables.	□ Passed □ Failed

5.2 System Power-On

Prerequisites

You have performed the operations described in 5.1 Checking Before Power-On.

⚠ **NOTICE**

- When powering on the system, use the power adapter delivered with the product. The rated input of the power adapter is 100–240 V AC, and 50 Hz or 60 Hz. If adapters of other models are used, the equipment may be damaged.
- Select an AC socket that matches the power adapter.

Context
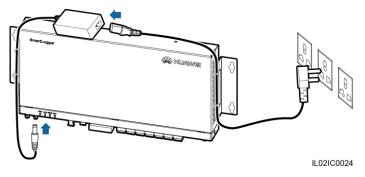
In a scenario with a smart array controller, the SmartLogger is installed before delivery, and the power cable is connected.

Procedure

Step 1 Insert the output terminal of the power adapter into the **12V IN** port of the SmartLogger.

Step 2 Insert the power cable into the power adapter.

Step 3 Insert the power cable plug into an AC socket.

In a scenario without a smart array controller, place the power adapter on the top of the SmartLogger and secure the power adapter using cable ties.

Figure 5-1 Connecting the power cable in a scenario without a smart array controller

Step 4 Switch on the circuit breaker of the AC socket.

Step 5 Switch on the upstream circuit breaker of the AC power cable.

📖 **NOTE**

Step 5 needs to be performed in the PLC networking scenario.

----End

---

6 Man-Machine Interaction

6.1 USB Flash Drive Operation

6.1.1 Exporting Data

Context

It is recommended that you use a SanDisk, Netac, or Kingston USB flash drive to ensure compatibility.

By exporting data, you can obtain active alarms, historical alarms, performance data, exception takeover logs, commissioning logs, operation logs, fault information files, and electronic labels.

Data can be exported in two methods. Select either method in practice.

Procedure

- Method 1

  a. Insert the USB flash drive into the USB port at the bottom of the SmartLogger.

  b. Log in to the app, and choose **More** > **System Maintenance** > **Generate Local Maint. Script** on the main menu page. For details, see the *SUN2000 APP User Manual*.

  📖 NOTE

  The generated boot script file is automatically saved in the root directory of the USB flash drive.

  c. Remove the USB flash drive from the USB port at the bottom of the SmartLogger, and insert the USB flash drive into the port again.

  📖 NOTE

  After the USB flash drive is connected again, the SmartLogger can automatically detect the boot script file.

  d. The SmartLogger automatically executes all commands specified in the boot script file. View the LED indicator to determine the operating status.

NOTICE

- Verify that the USB flash drive contains a boot script file; otherwise, the SmartLogger cannot execute the operations.
- If SmartLoggers have the same app login password, the boot script file generated by one SmartLogger can be imported to other SmartLoggers by using a USB flash drive.
- The initial app login password of the SmartLogger is **00000a**. Change it upon the first login.

Table 6-1 LED indicator description

Indicator (Silk Screen)	Status	Meaning
ALM	Green off	No local maintenance is in progress.
	Blinking green at long intervals (1s on and 1s off)	Local maintenance is in progress.
	Green steady on	Local maintenance succeeds.
	Blinking green at short intervals (0.125s on and 0.125s off)	Local maintenance fails.

- Method 2
    a. Insert the USB flash drive into the USB port at the bottom of the SmartLogger.
    b. Log in to the app, and choose **More** > **Device Logs** on the main menu. For details, see the *SUN2000 APP User Manual*.
    c. The SmartLogger automatically executes commands. The LED indicator status reflects the execution situation. For details, see the Table 6-1.

    ----End

6.1.2 Exporting All Files

Context

It is recommended that you use a SanDisk, Netac, or Kingston USB flash drive to ensure compatibility.

NOTE

- If the SmartLogger needs to be replaced, you can export all the files before the replacement and then import the files into the new SmartLogger to ensure data integrity.
- After exporting all files, you can view information about the SmartLogger and devices connecting to the SmartLogger.

Procedure

Step 1 Insert the USB flash drive into the USB port at the bottom of the SmartLogger.

Step 2 Log in to the app, and choose **More** > **System Maintenance** > **Generate Local Maint. Script** on the main menu page. For details, see the *SUN2000 APP User Manual*.

☷ **NOTE**

The generated boot script file is automatically saved in the root directory of the USB flash drive.

Step 3 Remove the USB flash drive from the USB port at the bottom of the SmartLogger, and insert the USB flash drive into the port again.

☷ **NOTE**

After the USB flash drive is connected again, the SmartLogger can automatically detect the boot script file.

Step 4 The SmartLogger automatically executes all commands specified in the boot script file. View the LED indicator to determine the operating status.

⚠ **NOTICE**

- Verify that the USB flash drive contains a boot script file; otherwise, the SmartLogger cannot execute the operations.
- If SmartLoggers have the same app login password, the boot script file generated by one SmartLogger can be imported to other SmartLoggers by using a USB flash drive.
- The initial app login password of the SmartLogger is **00000a**. Change it upon the first login.

Table 6-2 LED indicator description

Indicator (Silk Screen)	Status	Meaning
ALM	Green off	No local maintenance is in progress.
	Blinking green at long intervals (1s on and 1s off)	Local maintenance is in progress.
	Green steady on	Local maintenance succeeds.
	Blinking green at short intervals (0.125s on and 0.125s off)	Local maintenance fails.

----End

6.1.3 Importing All Files

Prerequisites

A USB flash drive contains a boot script file and all exported files.

Context

It is recommended that you use a SanDisk, Netac, or Kingston USB flash drive to ensure compatibility.

Procedure

Step 1 Insert the USB flash drive into the USB port at the bottom of the SmartLogger.

Step 2 Log in to the app, and choose **More** > **System Maintenance** > **Generate Local Maint. Script** on the main menu page. For details, see the *SUN2000 APP User Manual*.

> ☐ **NOTE**
>
> The generated boot script file will replace the script file generated when all files are exported in the USB flash drive.

Step 3 The SmartLogger automatically executes all commands specified in the boot script file. View the LED indicator to determine the operating status.

⚠ NOTICE

- Verify that the USB flash drive contains a boot script file; otherwise, the SmartLogger cannot execute the operations.

- A boot script file generated in a SmartLogger can be imported into other SmartLoggers. Ensure that app login password of a SmartLogger to which files are imported is consistent with that of the SmartLogger which generates the boot script file. If the app login passwords are inconsistent, you need to generate a new boot script file in the SmartLogger to which files are imported.

- The initial app login password of the SmartLogger is **00000a**. Change it upon the first login.

Table 6-3 LED indicator description

Indicator (Silk Screen)	Status	Meaning
ALM	Green off	No local maintenance is in progress.
	Blinking green at long intervals (1s on and 1s off)	Local maintenance is in progress.
	Green steady on	Local maintenance succeeds.

Indicator (Silk Screen)	Status	Meaning
	Blinking green at short intervals (0.125s on and 0.125s off)	Local maintenance fails.

----End

6.1.4 Upgrading the Application

Context

It is recommended that you use a SanDisk, Netac, or Kingston USB flash drive to ensure compatibility.

Application software can be upgraded in two methods. Select either method in practice.

Procedure

- Method 1
  a. Log in to http://support.huawei.com/carrier/, browse or search for SmartLogger on the **Product Support** tab page, and download the required upgrade package on the **Software** tab page.

📖 **NOTE**

The upgrade package is named **smartlogger2000.zip**. Store the upgrade package in the root directory of a USB flash drive, and do not decompress it.

  b. Insert the USB flash drive into the USB port at the bottom of the SmartLogger.
  c. Log in to the app, and choose **More** > **System Maintenance** > **Generate Local Maint. Script** on the main menu page. For details, see the *SUN2000 APP User Manual*.
  d. Replace the boot script file in the upgrade package with the boot script file in the USB flash drive.

📖 **NOTE**

The boot script file in the upgrade package is named **logger_lmt_mgr_cmd.emap**.

  e. Insert the USB flash drive into the USB port at the bottom of the SmartLogger. The SmartLogger automatically executes all commands specified in the boot script file. View the LED indicator to determine the operating status.

Table 6-4 LED indicator description

Indicator (Silk Screen)	Status	Meaning
ALM	Green off	No local maintenance is in progress.
	Blinking green at long intervals (1s on and 1s off)	Local maintenance is in progress.
	Green steady on	Local maintenance succeeds.

Indicator (Silk Screen)	Status	Meaning
	Blinking green at short intervals (0.125s on and 0.125s off)	Local maintenance fails.

    f.   After upgrade is complete, the SmartLogger automatically restarts.

- Method 2

    a.   Log in to http://support.huawei.com/carrier/, browse or search for SmartLogger on the **Product Support** tab page, and download the required upgrade package on the **Software** tab page.

📖 **NOTE**

The upgrade package is named **smartlogger2000.zip**. Store the upgrade package in the root directory of a USB flash drive, and do not decompress it.

    b.   Insert the USB flash drive into the USB port at the bottom of the SmartLogger.

    c.   Log in to the app, and choose **More** > **Device Update** on the main menu. For details, see the *SUN2000 APP User Manual*.

    d.   The SmartLogger automatically executes commands. The LED indicator status reflects the execution situation. For details, see the Table 6-1.

    e.   After upgrade is complete, the SmartLogger automatically restarts.

----End

6.1.5 Upgrading the BSP

Context

It is recommended that you use a SanDisk, Netac, or Kingston USB flash drive to ensure compatibility.

⚠️ **NOTICE**

For details about how to upgrade the board support package (BSP), see *SmartLogger Upgrade Guide* or contact Huawei technical support.

Procedure

Step 1 Log in to http://support.huawei.com/carrier/, browse or search for SmartLogger on the **Product Support** tab page, and download the required upgrade package on the **Software** tab page.

📖 **NOTE**

The upgrade package is named **smartlogger2000_bsp.zip**. Store the upgrade package in the root directory of a USB flash drive, and do not decompress it.

Step 2 Insert the USB flash drive into the USB port at the bottom of the SmartLogger.

Step 3 Log in to the app, and choose **More** > **System Maintenance** > **Generate Local Maint. Script** on the main menu page. For details, see the *SUN2000 APP User Manual*.

Step 4 Replace the boot script file in the upgrade package with the boot script file in the USB flash drive.

📖 **NOTE**

The boot script file in the upgrade package is named **logger_lmt_mgr_cmd.emap**.

Step 5 Insert the USB flash drive into the USB port at the bottom of the SmartLogger. The SmartLogger automatically executes all commands specified in the boot script file. View the LED indicator to determine the operating status.

Table 6-5 LED indicator description

Indicator (Silk Screen)	Status	Meaning
ALM	Green off	No local maintenance is in progress.
	Blinking green at long intervals (1s on and 1s off)	Local maintenance is in progress.
	Green steady on	Local maintenance succeeds.
	Blinking green at short intervals (0.125s on and 0.125s off)	Local maintenance fails.

Step 6 After upgrade is complete, the SmartLogger automatically restarts.

----End

6.2 NMS Operation

Using the NMS, you can perform firmware upgrade and log export for the SmartLogger. For details, see *iManager NetEco 1000S User Manual*.

6.3 App Operation

Using the app, you can perform real-time monitoring, alarm query, and device management for the SmartLogger and southbound devices connecting to the SmartLogger. For details, see *SUN2000 APP User Manual*.

7 **WebUI**

7.1 Note

⚠ **NOTICE**

● The web software version corresponding to the WebUI snapshots in this document is SmartLogger V200R001C30SPC103. The data on the WebUI snapshots is for reference only.

● When you log in to the WebUI with different identifications, parameters displayed on the operation pages vary. This document describes the operation pages displayed after you log in as **Advanced User**.

● Configurable parameters vary depending on the device model and grid code. The actual display prevails. The parameter list provided in this document includes all configurable parameters.

● The parameter names, value ranges, and default values are subject to change. The actual display prevails.

● The 1000 V and 1500 V SUN2000s have the maximum input voltages of 1000 V and 1500 V respectively. The 1100 V SUN2000 refers to the SUN2000 with the maximum input voltage of 1100 V or the SUN2000-33KTL-US/36KTL-US/40KTL-US. The maximum input voltage can be queried from the product nameplate or the appropriate user manual.

7.2 Preparations for Login

Operating Environment

The operating environment for the WebUI should meet the following requirements:

● Operating system: Windows

● Internet Explorer 8 to Internet Explorer 11, Firefox17–Firefox39, or CHROME41–CHROME45 (Window 7)

● Minimum resolution: 1024x768

☐ NOTE

- For Internet Explorer 8, the recommended release is 8.0.7601.17514 or later.
- For Internet Explorer 10, the compatible mode is recommended.

Setting the IP Address

Correctly set the IP address, subnet mask, and gateway for the SmartLogger, PC, and network devices (when connected).
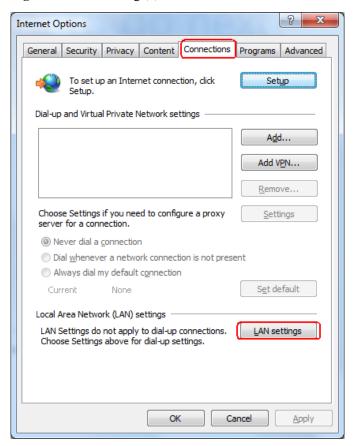
Setting the LAN

⚠ **NOTICE**
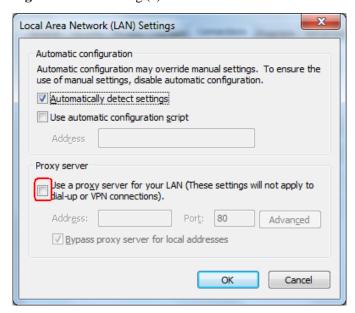
- If the SmartLogger is connected to a local area network (LAN) and a proxy server has been set, you need to cancel the proxy server settings.
- If the SmartLogger is connected to the Internet and the PC is connected to the LAN, do not cancel the proxy server settings.

Step 1 Open Internet Explorer.

Step 2 Choose **Tools** > **Internet Options**.

Step 3 Click the **Connections** tab and then click **LAN settings**.

Figure 7-1 LAN setting (1)

Step 4 Deselect **User a proxy server for your LAN**.

Figure 7-2 LAN setting (2)

Step 5 Click **OK**.

----End

Setting Internet Explorer Security
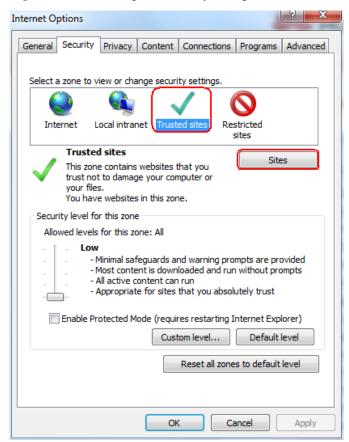
⚠️ **NOTICE**

To export fault information and operation logs, you need to set the Internet Explorer security.

Step 1 Open Internet Explorer.

Step 2 Choose **Tools** > **Internet Options**.

Step 3 Click the **Security** tab and then click **Sites** in **Trusted sites**.

Figure 7-3 Internet Explorer security setting (1)

Step 4 Enter the website address of the WebUI (enter the default IP address 192.168.0.10 of the SmartLogger for the first login), click **Add**, and then click **Close**.
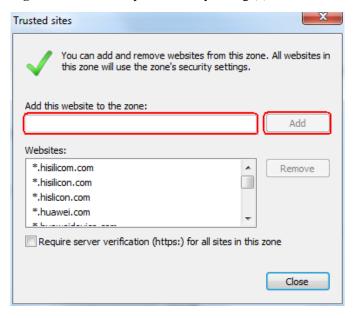
Figure 7-4 Internet Explorer security setting (2)
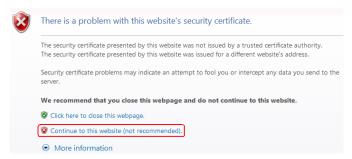
Step 5 Set **Security level for this zone** to **Medium** or **Low**.

----End

Installing a Security Certificate
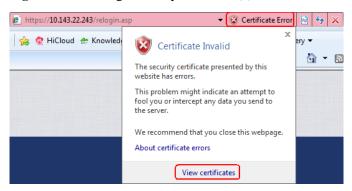
Step 1 If you log in to the WebUI for the first time, a message as shown in Figure 7-5 is displayed. Click **Continue to this website**.

Figure 7-5 Installing a security certificate (1)
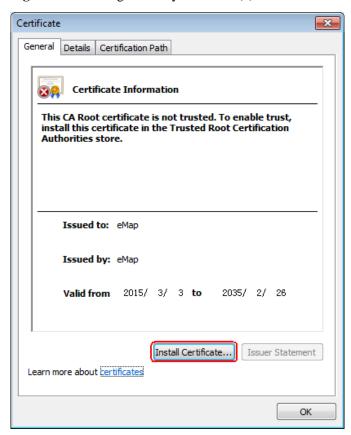
Step 2 Click **Certificate Error** on the right of the address bar and click **View certificates**.

Figure 7-6 Installing a security certificate (2)

Step 3 Click **Install Certificate**.

Figure 7-7 Installing a security certificate (3)

Step 4 Click **Next**.

Step 5 Click **Place all certificates in the following store**, and then click **Browse**.
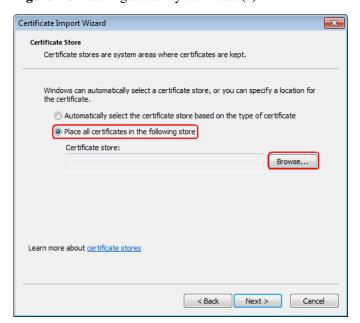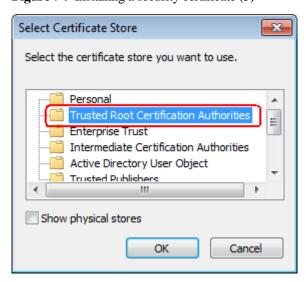
Figure 7-8 Installing a security certificate (4)

Step 6 Select **Trusted Root Certificate Authorities** and click **OK**.

Figure 7-9 Installing a security certificate (5)

Step 7 Click **Next**.

Step 8 Click **Finish**. The **Security Warning** dialog box is displayed. Click **Yes**.

Figure 7-10 Installing a security certificate (6)

Step 9 Choose **Tools** > **Internet Options**.

Step 10 Click the **Advanced** tab and deselect **Warn about certificate address mismatch**.
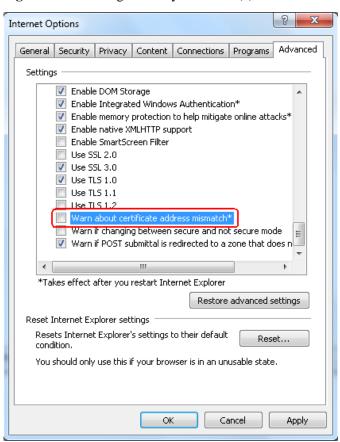
Figure 7-11 Installing a security certificate (7)

----End

7.3 Logging In to the WebUI

Context

The SmartLogger has been connected to a PC directly or over the Ethernet. For details, see 4.11 Connecting an Ethernet Network Cable.

☍ NOTE

The IP address of the SmartLogger can be obtained as follows:

- When logging in to the app for the first time, obtain information including **IP address** from **Ethernet** under **Quick Settings**.
- When logging in to the APP subsequently, choose **Settings** > **Comm. Param** > **Ethernet** to view the information.
- To restore the IP address to the default IP address, press and hold down the Default key for more than 10s until the RUN indicator blinks at short intervals (0.125s on and 0.125s off) and all other indicators are off, and then release the Default key. The operation is valid within 5 minutes.

Procedure

Step 1 Enter **https://XX.XX.XX.XX** in the address box of the browser, and press **Enter**. The login page is displayed.

Figure 7-12 Login page

☍ NOTE

XX.XX.XX.XX is the IP address for the SmartLogger. For example, the default IP address for the SmartLogger is **https://192.168.0.10**.

Step 2 Set **Language**, **User Name**, and **Password**, and then click **Log In**.

☍ NOTE

- The initial password is *Changeme* for system users **Common User**, **Advanced User**, and **Special User**.
- After the first login, change the initial password immediately to ensure account security.
- If you enter wrong passwords for six consecutive times in 5 minutes, your account will be locked out. You have to try again with the account 10 minutes later.

⚠ **NOTICE**

If any page is blank or a menu cannot be accessed after you log in to the WebUI, clear the cache, refresh the page, or log in again.

----End

7.4 Icon Description

Icon	Description	Icon	Description
	Click the About icon to query the WebUI version information.		Click the Drop-down icon to select a parameter or time.
	Click the Exit icon to log out.	⚠0 ❗0 ❗0	Click the Alarm icon to query major, minor, and warning alarms.
	Click the Increase/Decrease icon to adjust time.	▶	Click the Start icon to start the device.
	The Select icon indicates that a parameter is selected.	■	Click the Stop icon to shut down the device.
	The Select icon indicates that a parameter is not selected. Click the icon to select a parameter.	✳	Click the Reset icon to reset the device.

7.5 WebUI Layout

Figure 7-13 WebUI layout
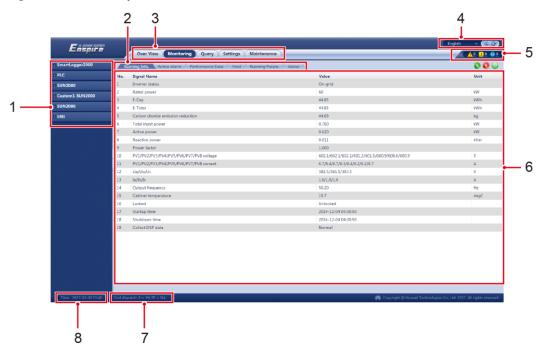
Table 7-1 WebUI layout description

No.	Function	Description
1	Secondary navigation menu	Under the primary menu, choose a secondary menu to select the device to be queried or the parameter to be set.
2	Tertiary navigation menu[a]	Under the secondary menu, choose a tertiary menu to access the query or setting screen.
3	Primary navigation menu	Click the corresponding primary menu before you perform any operation over the WebUI.
4	Display language	Select the display language or choose to log out.
5	Alarm icon	Displays the severities and number of alarms in the system. You can access the alarm page by clicking the number.
6	Details page	Displays the details of the queried information or parameter settings.
7	Power grid scheduling status	Displays the current power grid scheduling mode of the system.
8	System time	Displays the current system time.
a: There are no tertiary navigation menus under certain secondary navigation menus.		

7.6 Overview

7.6.1 Plant Running Information

Choose **Over View** > **Plant Running Info.** and query information on the displayed page.

Figure 7-14 Plant running information

📖 **NOTE**

The PV plant running information contains only the information about all the Huawei SUN2000s connected to the SmartLogger.

7.6.2 Active Alarm

Choose **Over View** > **Active Alarm** and query alarms on the displayed page.
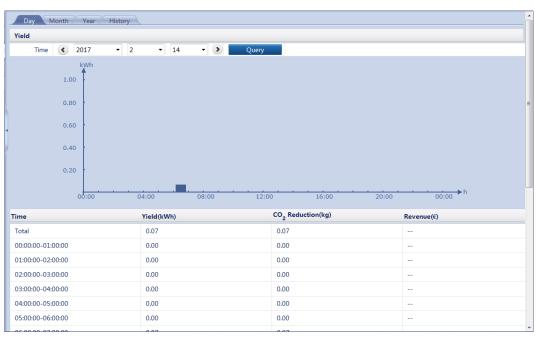
Figure 7-15 Active alarm

7.6.3 Plant Yield

Choose **Over View** > **Plant Yield** and query energy yield data on the displayed page.

Figure 7-16 Plant yield

📖 **NOTE**

You can click a tab on the tertiary navigation menu to query the energy yield data of the specified period.

![NOTICE icon] **NOTICE**
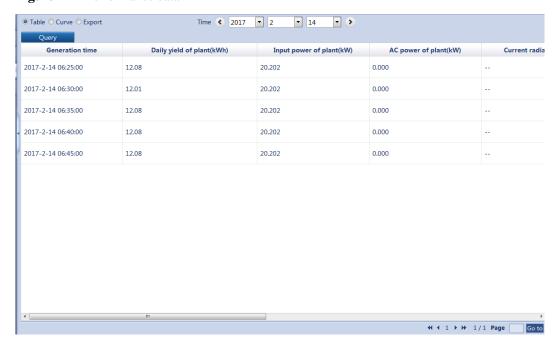
The plant yield data displayed on the SmartLogger depends on the number of connected SUN2000s.

- Daily energy yield: Data of a maximum of 150 SUN2000s can be stored for one year.
- Monthly energy yield: Data of a maximum of 150 SUN2000s can be stored for 10 years.
- Yearly energy yield: Data of a maximum of 150 SUN2000s can be stored for 10 years.
- Historical energy yield: Data of a maximum of 150 SUN2000s can be stored for 10 years.

7.6.4 Performance Data

Choose **Over View** > **Performance Data** and query related information on the displayed page.

Figure 7-17 Performance data

![NOTE icon] **NOTE**

- You can click an option in the upper left corner of the page to display the data in the specified format or export the data.
- When changing the name of the exported file after data is exported, retain the extension **.tar.gz**. Otherwise, the file will be unusable.

7.6.5 Device Running Information

Choose **Over View** > **Device Running Info.** and query device running information on the displayed page.

Figure 7-18 Device running information

7.7 Device Monitoring

7.7.1 Querying Device Status

The indicator in front of the device name indicates the current status of a device.

- If the indicator is 🟢, the SUN2000 is in the **On-grid** state, and the EMI, power meter, slave SmartLogger, PLC module, or PID module is in the **Online** state.

- If the indicator is ⚪, the SUN2000, EMI, power meter, slave SmartLogger, PLC module, or PID module is in the **Disconnection** state.

- If the indicator is 🔵, the SUN2000 is in the **Loading** state.

- If the indicator is 🟡, the SUN2000 is in the **Initializing**, **Power-Off**, **Idle**, or any other state in which it does not feed power to the power grid.

📖 **NOTE**

If a device is in the **Disconnection** state, its parameters cannot be set.

7.7.2 SmartLogger

7.7.2.1 Querying Master SmartLogger-Related Information

Choose **Monitoring** > **Logger(Local)** and query master SmartLogger-related information on the displayed page.

Figure 7-19 Querying master SmartLogger-related information

No.	Signal Name	Value	Unit
1	E-Daily	12.07	kWh
2	E-Total	834.10	kWh
3	CO2 reduction	831.60	kg
4	Input power	20.202	kW
5	Active power	0.000	kW
6	Reactive power	0.300	kVar
7	Power factor	0.999	
8	Inverter efficiency	0.00	%
9	DC current	39.0	A
10	Ia	1	A
11	Ib	1	A
12	Ic	1	A
13	Locked	Unlocked	
14	Max. value for reactive adjustment	177.9	kVar
15	Min. value for reactive adjustment	-177.9	kVar
16	Max. value for active adjustment	5077.0	kW
17	Remote scheduling (P)	NA	kW
18	Remote scheduling (Q)	NA	kVar
19	Remote scheduling (P)	NA	%
20	Remote scheduling (PF)	NA	
21	NetEco server	NA	

☐ NOTE

You can click a tab on the tertiary navigation menu to query master SmartLogger-related information.

7.7.2.2 Querying Slave SmartLogger-Related Information

Select a slave SmartLogger on the **Monitoring** tab page to query its information.

Figure 7-20 Querying slave SmartLogger-related information

No.	Signal Name	Value	Unit
1	SN	2102311HJB0246813579	
2	IP Address	10.160.191.107	
3	Online Status	OnLine	
4	Logical addr.	98	
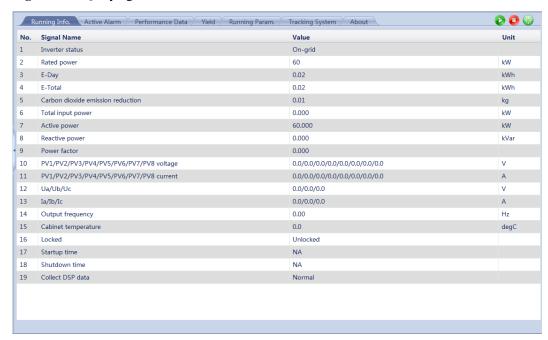
7.7.3 SUN2000

7.7.3.1 Querying Related Information

Choose **Monitoring** > **SUN2000** and query related information on the displayed page.

Figure 7-21 Querying SUN2000-related information

No.	Signal Name	Value	Unit
1	Inverter status	On-grid	
2	Rated power	60	kW
3	E-Day	0.02	kWh
4	E-Total	0.02	kWh
5	Carbon dioxide emission reduction	0.01	kg
6	Total input power	0.000	kW
7	Active power	60.000	kW
8	Reactive power	0.000	kVar
9	Power factor	0.000	
10	PV1/PV2/PV3/PV4/PV5/PV6/PV7/PV8 voltage	0.0/0.0/0.0/0.0/0.0/0.0/0.0/0.0	V
11	PV1/PV2/PV3/PV4/PV5/PV6/PV7/PV8 current	0.0/0.0/0.0/0.0/0.0/0.0/0.0/0.0	A
12	Ua/Ub/Uc	0.0/0.0/0.0	V
13	Ia/Ib/Ic	0.0/0.0/0.0	A
14	Output frequency	0.00	Hz
15	Cabinet temperature	0.0	degC
16	Locked	Unlocked	
17	Startup time	NA	
18	Shutdown time	NA	
19	Collect DSP data	Normal	

📖 NOTE

- You can click the **Running Info.** , **Active Alarm** , **Performance Data** , **Yield** or **About** tab on the tertiary navigation menu to query SUN2000-related information.
- You can click the Start, Stop, or Reset icon to send the corresponding command to the SUN2000. The login password is required if you need to send a command.

7.7.3.2 Setting Running Parameters (Advanced User)

Settings Page

Because of permission restriction, log in to the WebUI as an advanced user. Choose **Monitoring** > **SUN2000** > **Running Param.** to access the setting page.
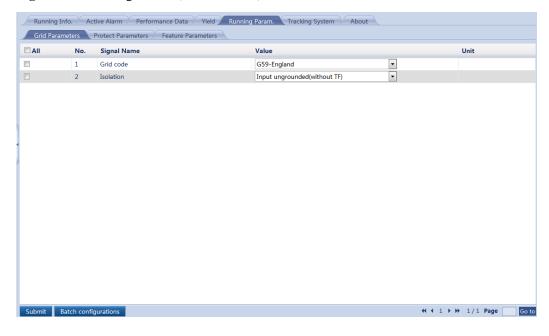
Figure 7-22 Running Param. (advanced user)

Grid Parameters

Table 7-2 Parameter description

No.	Parameter	Description	Default Value	Value Range
1	Grid code	Set this parameter based on the grid code of the country or region where the SUN2000 is used and the SUN2000 application scenario.	The default value varies with the model. The displayed value prevails.	N/A
2	Isolation	Specifies the SUN2000 working mode based on the grounding status at the DC side and the connection to the power grid.	The default value varies depending on the grid code. The displayed value prevails.	• Input grounded (with a transformer) • Input ungrounded (with no transformer) • Input ungrounded (with a transformer)

Protection Parameters

Table 7-3 Parameter description

No.	Parameter	Description	Unit	Default Value	Value Range
1	Insulation resistance protection	To ensure device safety, the SUN2000 detects the insulation resistance of the input side to the ground when it starts a self-check. If the detected value is less than the preset value, the SUN2000 does not start.	MΩ	The default value for a 1000 V SUN2000 is **0.1**, and the default value for 1100 V and 1500 V SUN2000s is **0.05**.	The value range for a 1000 V SUN2000 is [0.033, 1], and the value range for 1100 V and 1500 V SUN2000s is [0.033, 1.5].

Feature Parameters

Table 7-4 Parameter description

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
1	MPPT multi-peak scanning	When the SUN2000 is used in scenarios where PV strings are obviously shaded, enable this function. Then the SUN2000 will perform MPPT scanning at regular intervals to locate the maximum power.	N/A	Disable	• Disable • Enable	The scanning interval is set by **MPPT multi-peak scanning interval**.
2	MPPT multi-peak scanning interval	Specifies the MPPT multi-peak scanning interval.	min	15	[5, 30]	This parameter is displayed only when **MPPT multi-peak scanning** is set to **Enable**.

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
3	RCD enhancing	RCD refers to the residual current of the SUN2000 to the ground. To ensure device security and personal safety, RCD should comply with the standard. If an AC switch with a residual current detection function is installed outside the SUN2000, this function should be enabled to reduce the residual current generated during SUN2000 running, thereby preventing the AC switch from misoperations.	N/A	Disable	• Disable • Enable	N/A
4	Reactive power output at night	In some specific application scenarios, a power grid company requires that the SUN2000 can perform reactive power compensation at night to ensure that the power factor of the local power grid meets requirements.	N/A	Disable	• Disable • Enable	This parameter is configurable only when **Isolation** is set to **Input ungrounded (with a transformer)**.
5	Strong adaptability	If the value of power grid short circuit capacity/power plant installed capacity is less than 3 and the power grid impedance exceeds the upper threshold, the power grid quality will be affected and the SUN2000 may be unable to run properly. Set **Strong adaptability** to **Enable**.	N/A	Disable	• Disable • Enable	N/A

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
6	Power quality optimization mode	When the power grid is in strong adaptability mode, set **Power quality optimization mode** to **Enable** to optimize the output current harmonic of the SUN2000.	N/A	Disable	• Disable • Enable	N/A
7	PV module type	Specifies the type of PV modules.	N/A	Crystalline silicon	• Crystalline silicon • Film • CPV 1 • CPV 2	• If **PV module type** is set to **Crystalline silicon** or **Film**, the SUN2000 will run properly and will not shut down if PV modules are shaded. • If **PV module type** is set to **CPV 1**, the SUN2000 can restart quickly in 60 minutes if PV modules are shaded and the input power greatly decreases. • If **PV module type** is set to **CPV 2**, the SUN2000 can restart quickly in 10 minutes if PV modules are shaded and the input power greatly decreases.

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
8	Crystalline silicon PV compensation mode	This parameter reduces the DC voltage of PV modules to the PE by reducing the impedance of the SUN2000 input side to the PE, thereby effectively reducing PID effect of PV modules.	N/A	Output disabled	• Output disabled • P-type output • N-type output	This parameter is displayed if **PV module type** is set to **Crystalline silicon**. Set this parameter to **P-type output** for P-type PV modules and **N-type output** for N-type PV modules.
9	Communication interrupt shutdown	The standards of certain countries and regions require that the SUN2000 must shut down after the communication is interrupted for a certain time.	N/A	Disable	• Disable • Enable	If **Communication interrupt shutdown** is set to **Enable** and the SUN2000 communication has been interrupted for a specified time (set by **Communication interruption duration**), the SUN2000 will automatically shut down.
10	Communication interruption duration	Specifies the duration for determining communication interruption, and is used for automatic shutdown for protection in case of communication interruption.	min	30	[1, 120]	-
11	Communication resumed startup	If this parameter is enabled, the SUN2000 automatically starts after communication recovers. If this parameter is disabled, the SUN2000 needs to be started manually after communication recovers.	N/A	Enable	• Disable • Enable	N/A

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
12	Soft start time	Specifies the duration for the power to gradually increase when the SUN2000 starts.	s	The default value varies depending on the grid code. The displayed value prevails.	[20, 1800]	This parameter is set to **360** by default if the Australian AS4777 grid code is selected, to **300** by default if the Italian CEI0-21 or CEI0-16 grid code is selected, and to **600** by default if the Egyptian EGYPT grid code is selected.
13	AFCI	The North American standard requires the SUN2000 to provide the DC arc detection function.	N/A	Enable	• Disable • Enable	This parameter is supported by only the products marked **-US** and is set to **Enable** by default.
14	Arc detection adaptation mode	Adjusts the sensitivity of arc detection.	N/A	Moderate	• High • Moderate • Low	This parameter is displayed only when **AFCI** is set to **Enable**
15	AFCI self-test	Sends the AFCI self-check command manually.	N/A	N/A	N/A	
16	Current error during scanning	When the IV curves of PV strings are being scanned, the current change of PV strings operating properly should be monitored to avoid inaccurate scanning caused by sunlight change. If the current exceeds the specified value, it is determined that the sunlight changes, and the IV curves should be scanned again.	A	0.20	[0.00, 2.00]	N/A

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
17	OVGR linked shutdown	If this parameter is set to **Enable**, the SUN2000 shuts down after receiving the OVGR signal. If this parameter is set to **Disable**, the SUN2000 does not shut down after receiving the OVGR signal.	N/A	Enable	• Disable • Enable	This parameter is displayed after the Japanese grid code is selected.
18	Dry contact function	Identifies dry contact signals sent from the SmartLogger.	N/A	NC	• NC • OVGR	Set this parameter to **OVGR** for OVGR signals, and set it to **NC** for other signals. This parameter is displayed after the Japanese grid code is selected.
19	Hibernate at night	The SUN2000 monitors PV strings at night. If **Hibernate at night** is set to **Enable**, the monitoring function of the SUN2000 will hibernate at night, reducing power consumption.	N/A	Disable	• Disable • Enable	N/A
20	PLC communication	For SUN2000 models that support both RS485 and PLC communication, when RS485 communication is used, you are advised to set **PLC communication** to **Disable** to reduce power consumption.	N/A	Enable	• Disable • Enable	N/A

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
21	Upgrade delay	**Upgrade delay** is mainly used in the upgrade scenarios where the PV power supply is disconnected at night due to no sunlight or unstable at dawn or dusk due to poor sunlight.	N/A	Enable	• Disable • Enable	• Only the 1100 V and 1500 V SUN2000s support this parameter. • After the SUN2000 upgrade starts, if **Upgrade delay** is set to **Enable**, the upgrade package is loaded first. After the PV power supply recovers and the activation conditions are met, the SUN2000 automatically activates the upgrade.
22	String monitor	The SUN2000 monitors PV strings in real time. If any PV string is abnormal (such as the PV string is shaded or the energy yield decreases), the SUN2000 generates an alarm to remind maintenance personnel to maintain the PV string in a timely manner.	N/A	Disable	• Disable • Enable	If PV strings are easily shaded, you are advised to set **String monitor** to **Disable** to prevent false alarms.

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
23	String detection low power delay	Specifies the delay time for generating abnormal string alarms when the SUN2000 detects that a PV string is working with low power. This parameter is mainly used in the scenario where PV strings are shaded for a long time in the morning and evening, and is used to prevent false alarms.	min	180	[2, 720]	This parameter is displayed when **String monitor** is set to **Enable**.
24	String detection high power delay	Specifies the delay time for generating abnormal string alarms when the SUN2000 detects that a PV string is working with high power.	min	30	[2, 720]	
25	String detection power segment division percentage	Specifies the thresholds for determining whether a PV string is working with high power or low power. This parameter is used to distinguish the working status of PV strings.	%	50	[1, 100]	This parameter is displayed when **String monitor** is set to **Enable**.
26	String detection reference asymmetric coefficient	Specifies the threshold for determining PV string exception. The false alarms caused by fixed shadow shading can be controlled by changing this parameter.	N/A	• SUN2000-(8KTL-28KTL): 0.2 • Others: 20	• SUN2000-(8KTL-28KTL): [0.05, 1] • Others: [5, 100]	

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
27	String detection starting power percentage	Specifies the threshold for starting PV string exception detection. The false alarms caused by fixed shadow shading can be controlled by changing this parameter.	%	20	[1, 100]	
28	Shutdown at 0% power limit	If this parameter is set to **Enable**, the SUN2000 shuts down after receiving the 0% power limit command. If this parameter is set to **Disable**, the SUN2000 does not shut down after receiving the 0% power limit command.	N/A	Disable	• Disable • Enable	N/A
29	Maximum apparent power	Specifies the output upper threshold for the maximum apparent power to adapt to the capacity requirements for standard and customized transformers.	kW	Smax	[Maximum active power, Smax_limit]	If the maximum active power equals Smax_limit, this parameter is not displayed.
30	Maximum active power	Specifies the output upper threshold for the maximum active power to adapt to various market requirements.	kW	Pmax	[0.1, Pmax_limit]	For 1000 V SUN2000s, this parameter is configurable only for the SUN2000-25KTL-US, and the maximum value is 27.5 kW.
31	Tracking system controller	Selects a controller vendor.	N/A	NA	NA	N/A

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
32	Commande d shutdown hold after power recovery	The standards of certain countries and regions require that the SUN2000 remains in the commanded shutdown state after being powered off by a command and experiencing a power failure and recovery.	N/A	The default value varies depending on the grid code. The displayed value prevails.	• Disable • Enable	N/A

7.7.3.3 Setting Running Parameters (Special User)

Settings Page

Because of permission restriction, log in to the WebUI as a special user. Choose **Monitoring** > **SUN2000** > **Running Info.** to access the setting page.
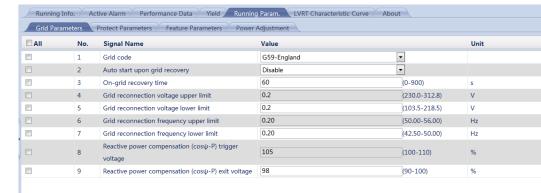
Figure 7-23 Running Param. (special user)

	No.	Signal Name	Value		Unit
☐ All					
☐	1	Grid code	G59-England		
☐	2	Auto start upon grid recovery	Disable		
☐	3	On-grid recovery time	60	(0-900)	s
☐	4	Grid reconnection voltage upper limit	0.2	(230.0-312.8)	V
☐	5	Grid reconnection voltage lower limit	0.2	(103.5-218.5)	V
☐	6	Grid reconnection frequency upper limit	0.20	(50.00-56.00)	Hz
☐	7	Grid reconnection frequency lower limit	0.20	(42.50-50.00)	Hz
☐	8	Reactive power compensation (cosψ-P) trigger voltage	105	(100-110)	%
☐	9	Reactive power compensation (cosψ-P) exit voltage	98	(90-100)	%

Submit Batch configurations

◄◄ ◄ 1 ► ►► 1 / 1 Page [ ] Go to

Grid Parameters

Table 7-5 Parameter description

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
1	Grid code	Set this parameter based on the grid code of the country or region where the SUN2000 is used and the SUN2000 application scenario.	N/A	The default value varies depending on the model. The displayed value prevails.	N/A	N/A
2	Output mode	Specifies whether the SUN2000 has an output neutral wire based on the SUN2000 application scenario.	N/A	The default value varies depending on the grid code. The displayed value prevails.	• Three-phase three-wire • Three-phase four-wire	This parameter is available only for the SUN2000-33KTL, SUN2000-36KTL, and SUN2000s whose models include **-US**.
3	PQ mode	If **PQ mode 1** is selected, the maximum AC output power equals the maximum apparent power. If **PQ mode 2** is selected, the maximum AC output power equals the rated output power.	N/A		• PQ mode 1 • PQ mode 2	This parameter is available only for the SUN2000-36KTL and SUN2000-42KTL.
4	Auto start upon grid recovery	Specifies whether to allow the SUN2000 to automatically start after the power grid recovers.	N/A	The default value varies depending on the grid code. The displayed value prevails.	• Disable • Enable	This parameter is set to **Disable** by default if the Japanese grid code is selected.
5	On-grid recovery time	Specifies the waiting time for SUN2000 restart after the power grid recovers.	s		[0, 900]	The value range is [150s, 900s] if the Japanese grid code is selected.
6	Grid reconnection voltage upper limit	The standards of certain countries and regions require that the SUN2000 must not connect to the power grid when the power grid voltage is higher than the upper limit.	V	The default value varies depending on the grid code. The displayed value prevails.	[100%Vn, 136%Vn]	Vn represents the rated voltage.

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
7	Grid reconnection voltage lower limit	The standards of certain countries and regions require that the SUN2000 must not connect to the power grid when the power grid voltage is lower than the lower limit.	V		[45%Vn, 95%Vn]	
8	Grid reconnection frequency upper limit	The standards of certain countries and regions require that the SUN2000 must not connect to the power grid when the power grid frequency is higher than the upper limit.	Hz	The default value varies depending on the grid code. The displayed value prevails.	[100%Fn, 112%Fn]	Fn represents the rated frequency.
9	Grid reconnection frequency lower limit	The standards of certain countries and regions require that the SUN2000 must not connect to the power grid when the power grid frequency is lower than the lower limit.	Hz		[85%Fn, 100%Fn]	
10	Reactive power compensation (cosψ-P) trigger voltage	Specifies the voltage threshold for triggering reactive power compensation when LVRT occurs.	%	The default value varies depending on the grid code. The displayed value prevails.	[100, 110]	N/A
11	Reactive power compensation (cosψ-P) exit voltage	Specifies the voltage threshold for exiting reactive power compensation when the SUN2000 recovers from LVRT.	%		[90, 100]	N/A

Protection Parameters

Table 7-6 Parameter description

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
1	Unbalance voltage protection	Specifies the SUN2000 protection threshold in the case of unbalanced power grid voltage.	%	The default value varies depending on the grid code. The displayed value prevails.	[0.0, 50.0]	N/A
2	Phase protection point	The Japanese standard requires that during passive islanding detection, protection should be triggered if an abrupt voltage phase change is detected.	°	6	[3, 15]	Configurable abruptly changed phase angles are 3°, 6°, 9°, 12°, and 15°, which are displayed after the Japanese grid code is selected.
3	Phase angle offset protection	The standards of certain countries and regions require that the SUN2000 needs to be protected when the three-phase angle offset of the power grid exceeds a certain value.	N/A	The default value varies depending on the grid code. The displayed value prevails.	• Disable • Enable	N/A
4	10 minute OV protection	Specifies the 10-minute overvoltage protection threshold.	V	The default value varies depending on the grid code. The displayed value prevails.	[1 x Vn, 1.36 x Vn]	Vn represents the rated voltage.
5	10 minute OV protection time	Specifies the 10-minute overvoltage protection duration.	ms		• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	
6	Level-1 OV protection	Specifies the level-1 overvoltage protection threshold.	V	The default value varies depending on the grid code. The displayed value prevails.	[1 x Vn, 1.36 x Vn]	Vn represents the rated voltage.
7	Level-1 OV protection time	Specifies the level-1 overvoltage protection duration.	ms		• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
8	Level-2 OV protection	Specifies the level-2 overvoltage protection threshold.	V	The default value varies depending on the grid code. The displayed value prevails.	[1 x Vn, 1.36 x Vn]	Vn represents the rated voltage.
9	Level-2 OV protection time	Specifies the level-2 overvoltage protection duration.	ms		• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	
10	Level-1 UV protection	Specifies the level-1 undervoltage protection threshold.	V	The default value varies depending on the grid code. The displayed value prevails.	[0.15 x Vn, 1 x Vn]	Vn represents the rated voltage.
11	Level-1 UV protection time	Specifies the level-1 undervoltage protection duration.	ms		• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	
12	Level-2 UV protection	Specifies the level-2 undervoltage protection threshold.	V	The default value varies depending on the grid code. The displayed value prevails.	[0.15 x Vn, 1 x Vn]	Vn represents the rated voltage.
13	Level-2 UV protection time	Specifies the level-2 undervoltage protection duration.	ms		• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	
14	Level-1 OF protection	Specifies the level-1 overfrequency protection threshold.	Hz	The default value varies depending on the grid code. The displayed value prevails.	[1 x Fn, 1.15 x Fn]	Fn represents the rated frequency.
15	Level-1 OF protection time	Specifies the level-1 overfrequency protection duration.	ms		• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	
16	Level-2 OF protection	Specifies the level-2 overfrequency protection threshold.	Hz	The default value varies depending on the grid code. The displayed value prevails.	[1 x Fn, 1.15 x Fn]	Fn represents the rated frequency.
17	Level-2 OF protection time	Specifies the level-2 overfrequency protection duration.	ms		• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	
18	Level-1 UF protection	Specifies the level-1 underfrequency protection threshold.	Hz	The default value varies depending	[0.85 x Fn, 1 x Fn]	Fn represents the rated frequency.

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
19	Level-1 UF protection time	Specifies the level-1 underfrequency protection duration.	ms	on the grid code. The displayed value prevails.	• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	
20	Level-2 UF protection	Specifies the level-2 underfrequency protection threshold.	Hz	The default value varies depending	[0.85 x Fn, 1 x Fn]	Fn represents the rated frequency.
21	Level-2 UF protection time	Specifies the level-2 underfrequency protection duration.	ms	on the grid code. The displayed value prevails.	• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	
22	Level-3 OV protection	Specifies the level-3 overvoltage protection threshold.	V	The default value varies depending	[1 x Vn, 1.36 x Vn]	Vn represents the rated voltage.
23	Level-3 OV protection time	Specifies the level-3 overvoltage protection duration.	ms	on the grid code. The displayed value prevails.	• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	
24	Level-4 OV protection	Specifies the level-4 overvoltage protection threshold.	V	The default value varies depending	[1 x Vn, 1.36 x Vn]	Vn represents the rated voltage.
25	Level-4 OV protection time	Specifies the level-4 overvoltage protection duration.	ms	on the grid code. The displayed value prevails.	• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	
26	Level-3 UV protection	Specifies the level-3 undervoltage protection threshold.	V	The default value varies depending	[0.15 x Vn, 1 x Vn]	Vn represents the rated voltage.
27	Level-3 UV protection time	Specifies the level-3 undervoltage protection duration.	ms	on the grid code. The displayed value prevails.	• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	
28	Level-4 UV protection	Specifies the level-4 undervoltage protection threshold.	V	The default value varies depending	[0.15 x Vn, 1 x Vn]	Vn represents the rated voltage.

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
29	Level-4 UV protection time	Specifies the level-4 undervoltage protection duration.	ms	on the grid code. The displayed value prevails.	• 1000 V SUN2000: [50, 600000] • Others: [50, 720000]	

Feature Parameters

Table 7-7 Parameter description

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
1	LVRT	When the power grid voltage is abnormally low for a short time, the SUN2000 cannot disconnect from the power grid immediately and has to work for some time. This is called LVRT.	N/A	The default value varies depending on the grid code. The displayed value prevails.	• Disable • Enable	This parameter is set to **Enable** by default if the German BDEW-MV grid code is selected.
2	LVRT threshold	Specifies the threshold for triggering LVRT.	V		[50%Vn, 92%Vn]	Vn represents the rated voltage.
3	LVRT undervoltage protection shield	Specifies whether to shield the undervoltage protection function during LVRT.	N/A	The default value varies depending on the grid code. The displayed	• Disable • Enable	N/A

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
4	LVRT reactive power compensation power factor	During LVRT, the SUN2000 needs to generate reactive power to support the power grid. This parameter is used to set the reactive power generated by the SUN2000.	N/A	value prevails.	[0, 3]	This parameter is set to **2.5** by default if the South African grid code is selected. For example, if you set **LVRT reactive power compensation power factor** to **2**, the reactive power generated by the SUN2000 is 20% of the rated power when the AC voltage drops by 10% during LVRT.
5	High voltage ride-through	When the power grid voltage is abnormally high for a short time, the SUN2000 cannot disconnect from the power grid immediately and has to work for some time. This is called HVRT.	N/A	The default value varies depending on the grid code. The displayed value prevails.	• Disable • Enable	N/A
6	Active islanding	Specifies whether to enable the active islanding protection function.	N/A		• Disable • Enable	N/A
7	Passive islanding	Specifies whether to enable the passive islanding protection function.	N/A	The default value varies depending on the grid code. The displayed value prevails.	• Disable • Enable	This parameter is displayed only after the Japanese grid code is selected.
8	Voltage rise suppression	The standards of certain countries and regions require that the active power of the SUN2000 be derated according to a certain gradient when the output voltage exceeds a certain value.	N/A		• Disable • Enable	This parameter is set to **Enable** by default if the Italian grid code CEI0-16 is selected.

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
9	Voltage rise suppression reactive adjustment point	The standards of certain countries and regions require that the SUN2000 must generate a certain amount of reactive power when the output voltage exceeds a certain value.	%	The default value varies depending on the grid code. The displayed value prevails.	[100, 115]	• This parameter is displayed when **Voltage rise suppression** is set to **Enable**. • The value of **Voltage rise suppression active derating point** must be greater than that of **Voltage rise suppression reactive adjustment point**.
10	Voltage rise suppression active derating point	The standards of certain countries and regions require that the active power of the SUN2000 be derated according to a certain gradient when the output voltage exceeds a certain value.	%		[100, 115]	
11	Frequency change rate protection	The SUN2000 triggers protection when the power grid frequency changes too fast.	N/A	The default value varies depending on the grid code. The displayed value prevails.	• Disable • Enable	N/A
12	Frequency change rate protection point	Specifies the frequency change rate protection threshold.	Hz/s		• 1100 V SUN2000: [0.1, 5] • Others: [0.1, 2.5]	N/A
13	Frequency change rate protection time	Specifies the frequency change rate protection duration.	s	The default value varies depending on the grid code. The displayed value prevails.	[0.2, 20.0]	This parameter is displayed if **Frequency change rate protection** is set to **Enable**.
14	Soft start time after grid failure	Specifies the time for the power to gradually increase when the SUN2000 restarts after the power grid recovers.	s	The default value varies depending on the grid code. The displayed value prevails.	[20, 800]	This parameter is set to **360** by default if the Australian AS4777 grid code is selected, and to **300** by default if the Brazilian ABNT NBR 16149 or South African SA_RPPs grid code is selected.

Power Adjustment Parameters

Table 7-8 Parameter description

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
1	Fixed active power derated	Adjusts the active power output of the SUN2000 in fixed values.	kW	Pmax	[0, Pmax]	Pmax represents the maximum active power. The upper threshold for the SUN2000-25KTL-US is 27.5 kW, and the upper threshold for other models of SUN2000s is Pmax.
2	Active power percentage derating	Adjusts the active power output of the SUN2000 in percentages.	%	100	[0, 100]	If this parameter is set to **100**, the SUN2000 delivers the maximum output power.
3	Power factor	Adjusts the power factor of the SUN2000.	N/A	1.000	(−1.000, −0.800]U[0.800, 1.000]	N/A
4	Trigger frequency of over frequency derating	The standards of certain countries and regions require that the output active power of the SUN2000 be derated when the power grid frequency exceeds a certain value.	Hz	The default value varies depending on the grid code. The displayed value prevails.	When the output frequency is 50 Hz, the value range is [45.00, 55.00]. When the output frequency is 60 Hz, the value range is [55.00, 65.00].	N/A
5	Quit frequency of over frequency derating	Specifies the frequency threshold for exiting overfrequency derating.	Hz		When the output frequency is 50 Hz, the value range is [45.00, 55.00]. When the output frequency is 60 Hz, the value range is [55.00, 65.00].	N/A

No.	Parameter	Description	Unit	Default Value	Value Range	Remarks
6	Recovery gradient of over frequency derating	Specifies the power recovery gradient for overfrequency derating.	%/min		[5, 20]	This parameter is set to **16** by default if the Australian AS4777 grid code is selected, and to **15** by default if the Italian CEI0-21 or CEI0-16 grid code is selected.

7.7.3.4 Setting a Tracking System
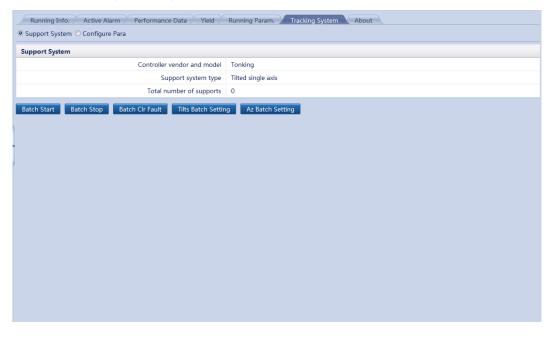
If a PV string uses a tracking system with controllers, you can set parameters for the tracking system over the WebUI.

📖 NOTE

- The parameters vary depending on the controller manufacturer. Set parameters based on site requirements.
- This function applies only to the SUN2000-30KTL-A/33KTL/40KTL, SUN2000-33KTL-JP/40KTL-JP/33KTL-US/36KTL-US/40KTL-US/36KTL/42KTL/43KTL-IN-C1/50KTL/50KTL-C1, and SUN2000-60KTL-HV-D1.

Because of permission restriction, log in as **Advanced User**. Choose **Monitoring** > **SUN2000** > **Tracking System** to access the target page.

Figure 7-24 Setting a tracking system

⊞ NOTE

You can click the Select icon in the upper left corner of the page to select a setting page.

7.7.3.5 Setting the LVRT Characteristic Curve
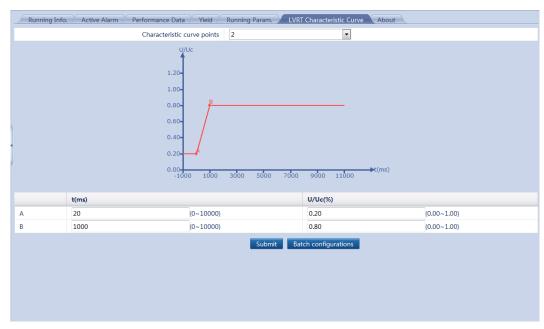
⊞ NOTE

Only the
SUN2000-33KTL-JP/40KTL-JP/33KTL-US/36KTL-US/40KTL-US/36KTL/42KTL/43KTL-IN-C1/50
KTL/50KTL-C1 and SUN2000-60KTL-HV-D1 support the LVRT characteristic curve, and other types
of SUN2000s do not have this function.

Because of permission restriction, log in as **Special User**. Choose **Monitoring** > **SUN2000** >
LVRT Characteristic Curve and set the characteristic curve on the displayed page.

Figure 7-25 Setting the LVRT characteristic curve

⊞ NOTE

After you set the LVRT characteristic curve for one SUN2000, click **Batch configurations** to
synchronize the LVRT characteristic curve settings to other SUN2000s.

7.7.4 PLC

The SmartLogger is integrated with the PLC CCO and connected to the SUN2000 that
supports the PLC function over an AC power cable. Data is transmitted over the power cable
to implement PLC networking.

⊞ NOTE

After connecting the AC power cable to the SmartLogger, set **Buil-in PLC** to **Enable**. For details, see
.

7.7.4.1 Querying Related Information

Choose **Monitoring** > **PLC** and query related information on the displayed page.
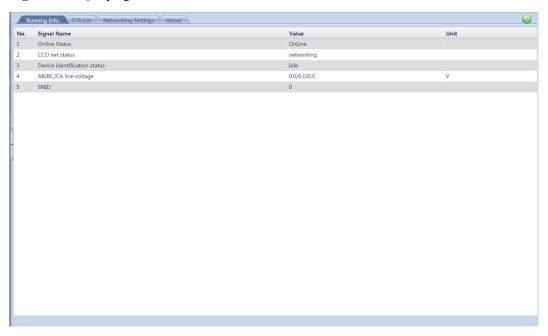
Figure 7-26 Querying PLC-related information

NOTE

You can click the **Running Info.** or **About** tab on the tertiary navigation menu to query PLC-related information.

7.7.4.2 Setting the STA List

Because of permission restriction, log in as **Advanced User**. Choose **Monitoring** > **PLC** > **STA List** and set **Baud rate** for the listed devices on the displayed page.

NOTE

The baud rate for Huawei device cannot be changed.
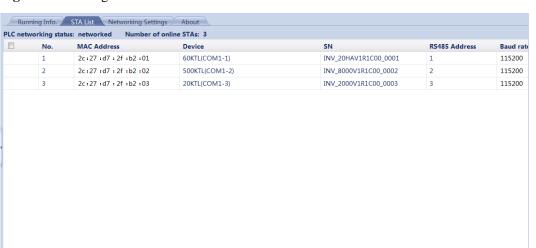
Figure 7-27 Setting the STA list

NOTE

- The STA list displays information about the SUN2000 equipped with the PLC STA module that is being connected.
- When changing the name of the exported file after the STA list is exported, retain the extension **.tar.gz**. Otherwise, the file will be unusable.

7.7.4.3 Networking Settings

Because of permission restriction, log in as **Advanced User**. Choose **Monitoring** > **PLC** > **Networking Settings**.
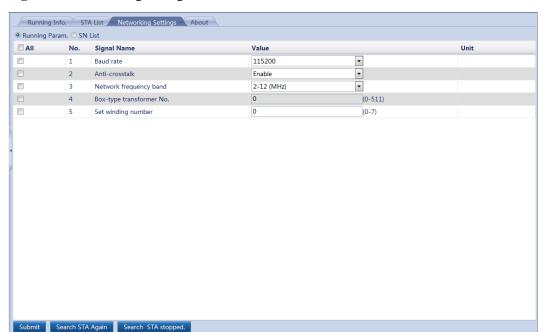
Figure 7-28 Networking Settings

> **NOTE**
> - **Baud rate** is set to **115200** by default, which provides optimal communications performance and does not need to be changed.
> - The SN list displays information about the SUN2000 equipped with the PLC STA module that can be connected. If **Anti-crosstalk** is set to **Enable**, the SUN2000 equipped with the PLC STA module displayed in the SN list can connect to the network.

7.7.5 EMI

7.7.5.1 Querying Related Information

Choose **Monitoring** > **EMI** and query related information on the displayed page.

Figure 7-29 Querying EMI-related information

> **NOTE**
>
> - You can click the ⎡Running Info.⎤, ⎡Performance Data⎤, or ⎡About⎤ tab on the tertiary navigation menu to query EMI-related information.
> - EMI performance data can be stored for a month and exported. When changing the name of the exported file, retain the extension **.tar.gz**. Otherwise, the file will be unusable.

7.7.5.2 Setting Running Parameters

Connection over the COM Port

After the SmartLogger connects to the EMI, you need to add the device manually. For details, see 7.10.7.1 Connecting Devices. **Device Type** should be set to **EMI**, and **Comm.protocal** to **Modbus-RTU**.

Devices from different vendors may support different protocol specifications. To normally obtain information from the connected EMI, correctly configure the protocol specifications on the WebUI of the SmartLogger based on the protocol specifications delivered by the vendor.

Because of permission restriction, log in as **Advanced User**. Choose **Monitoring** > **EMI** > **EMI(COMX)** > **Running Param.** and set EMI parameters.

> **NOTE**
> **X** in **COMX** indicates any digit from 1 to 6. The actual COM port to which the EMI connects prevails.

- If the EMI model is Jingzhou Yangguang (PC-4), Handan (RYQ-3), Kipp&Zonen SMPx, or Lufft WSx-UMB, choose the appropriate model from the **EMI model** drop-down list box directly.
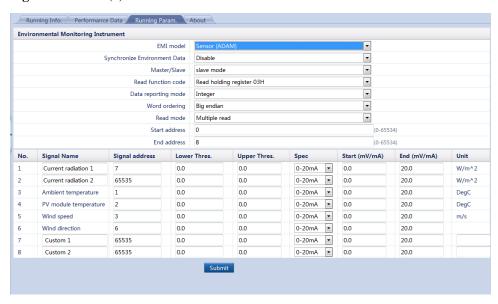
Figure 7-30 EMI (1)

📖 NOTE

- **Synchronize Environment Data**: If **Enable** is selected, wind speed and direction data will be sent to the SUN2000 in a PV plant equipped with the tracker system.
- **Master/Slave**: The SmartLogger2000-10-C and SmartLogger2000-11-C can connect to multiple EMIs. When the SmartLogger connects to multiple EMIs, set one of them to **master mode**.

- If a split EMI that supports Modbus-RTU is used, select **Sensor(ADAM)** from the drop-down list box.

Figure 7-31 EMI (2)

📖 NOTE

Correctly set the parameters in accordance with the Modbus parameters provided by the EMI vendor. Otherwise, the EMI data cannot be correctly read.

- **Synchronize Environment Data**: If **Enable** is selected, wind speed and direction data will be sent to the SUN2000 in a PV plant equipped with the tracker system.

- **Master/Slave**: The SmartLogger2000-10-C and SmartLogger2000-11-C can connect to multiple EMIs. When the SmartLogger connects to multiple EMIs, set one of them to **master mode**.

- Set **Read Mode** based on the mode supported by the EMI.

    If **Multiple read** is selected, set **Start address** and **End address** based on the acquired Modbus signal address range on the EMI.

- If the EMI can collect a certain signal, set **Signal address** for the signal to the corresponding register address. If the EMI cannot collect a certain signal, set **Signal address** for the signal to **65535**.

- If you use any other model of EMI, select **Other** from the drop-down list box and set the EMI parameters.

Figure 7-32 EMI (3)

NOTE

Correctly set the parameters in accordance with the Modbus parameters provided by the EMI vendor. Otherwise, the EMI data cannot be correctly read.

- **Synchronize Environment Data**: If **Enable** is selected, wind speed and direction data will be sent to the SUN2000 in a PV plant equipped with the tracker system.

- **Master/Slave**: The SmartLogger2000-10-C and SmartLogger2000-11-C can connect to multiple EMIs. When the SmartLogger connects to multiple EMIs, set one of them to **master mode**.

- Set **Read Mode** based on the mode supported by the EMI.

    If **Multiple read** is selected, set **Start address** and **End address** based on the acquired Modbus signal address range on the EMI.

- If the EMI can collect a certain signal, set **Signal address** for the signal to the corresponding register address. If the EMI cannot collect a certain signal, set **Signal address** for the signal to **65535**.

Connection over the AI/PT Port

After the SmartLogger connects to the EMI, you need to add the device manually. For details, see 7.10.7.1 Connecting Devices. Set **Device Type** to **EMI** and **Comm.protocal** to **AI**.

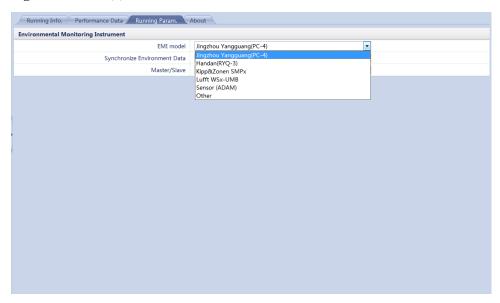Because of permission restriction, log in as **Advanced User**. Choose **Monitoring** > **EMI** > **EMI(COM0)** > **Running Param.** and set EMI parameters.

Figure 7-33 EMI (4)

No.	Signal Name	Port number	Lower Thres.	Upper Thres.	Start (V/mA)	End (V/mA)	Unit
				Running Info. Performance Data Running Param. About			
			Environmental Monitoring Instrument				
	Synchronize Environment Data		Disable				
	Master/Slave		slave mode				
1	Current radiation 1	No	0.0	0.0	0.0	20.0	W/m^2
2	Current radiation 2	No	0.0	0.0	0.0	20.0	W/m^2
3	Ambient temperature	No	0.0	0.0	0.0	20.0	DegC
4	PV module temperature	No	0.0	0.0	0.0	20.0	DegC
5	Wind speed	No	0.0	0.0	0.0	20.0	m/s
6	Wind direction	No	0.0	0.0	0.0	20.0	
7	Custom 1	No	0.0	0.0	0.0	20.0	
8	Custom 2	No	0.0	0.0	0.0	20.0	

Submit

☐ NOTE

- **Synchronize Environment Data**: If **Enable** is selected, wind speed and direction data will be sent to the SUN2000 in a PV plant equipped with the tracker system.
- **Master/Slave**: The SmartLogger2000-10-C and SmartLogger2000-11-C can connect to multiple EMIs. When the SmartLogger connects to multiple EMIs, set one of them to **master mode**.

7.7.6 Power Meter

7.7.6.1 Querying Related Information

Choose **Monitoring** > **Meter** and query related information on the displayed page.

Figure 7-34 Querying the meter information

No.	Signal Name	Value	Unit
1	Online Status	OnLine	
2	Line voltage between phases A and B	1000.00	V
3	Line voltage between phases B and C	1000.00	V
4	Line voltage between phases C and A	1000.00	V
5	Phase A current	1000.0	A
6	Phase B current	1000.0	A
7	Phase C current	1000.0	A
8	Active power	1.000	kW
9	Reactive power	1.000	kVar
10	Active electricity	1.0	kWh
11	Power factor	0.707	

⬛ NOTE

- You can click the ⬜ Running Info. , ⬜ Performance Data , or ⬜ About tab on the tertiary navigation menu to query meter information.
- The performance data of the meter can be exported. When changing the name of the exported file, retain the extension **.tar.gz**. Otherwise, the file will be unusable.

7.7.6.2 Setting Running Parameters

Because of permission restriction, log in as **Advanced User**. Choose **Monitoring** > **Meter** > **Running Info.** to access the target page.

⬛ NOTE

Set running parameters only for the power meter that supports the DL/T645 protocol.
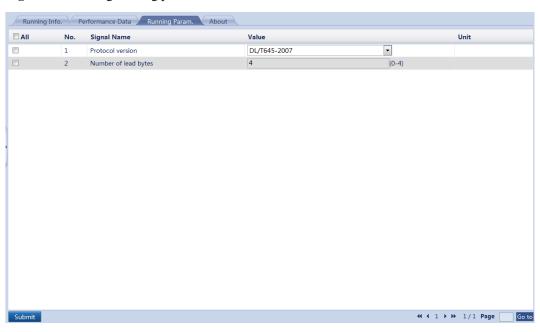
Figure 7-35 Setting running parameters

7.7.7 PID
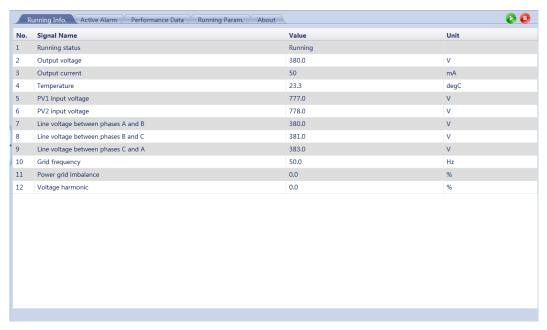
7.7.7.1 Querying Related Information

Choose **Monitoring** > **PID** and query related information on the displayed page.

📖 **NOTE**

This document describes the page displayed when the PID01 module is connected as an example.

Figure 7-36 Querying PID module-related Information

📖 **NOTE**

- You can click the [Running Info.], [Active Alarm], [Performance Data], or [About] tab on the tertiary navigation menu to query PID module-related information.
- Performance data of the PID module can be exported. When changing the name of the exported file, retain the extension **.tar.gz**. Otherwise, the file will be unusable.

7.7.7.2 Setting Running Parameters

Because of permission restriction, log in as **Advanced User**. Choose **Monitoring** > **PID** > **Running Param.** to access the target page.

Figure 7-37 Setting running parameters
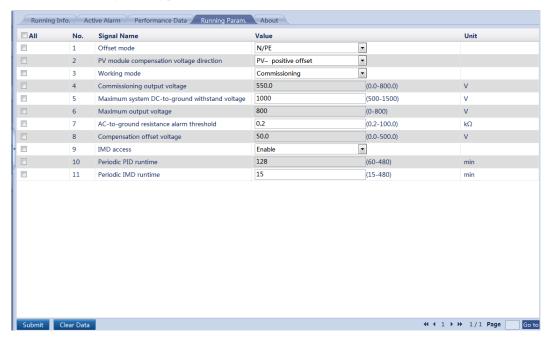
Table 7-9 Parameter description

No.	Parameter	Function	Value	Description
1	Offset mode	Specifies the offset mode of the PID module.	Disabled	Select **Disabled** if the PID module is not required.
			N/PE	• PID01: Select **N/PE** if the PID module is required to use voltage output from the inductor virtual midpoint. • SmartPID2000: Select **N/PE** if the PID module is required to use voltage output from the power grid.
			PV/PE	• PID01: Select **PV/PE** if the PID module is required to use voltage output from the negative PV terminal. This mode is applicable only to Huawei SUN8000. • SmartPID2000: N/A

No.	Parameter	Function	Value	Description
			Automatic	• PID01: For the SUN2000, **Automatic** indicates the N/PE offset mode. • SmartPID2000: N/A
2	Output enabled	Specifies whether PID module output is enabled.	Enable	Select **Enable** to enable the PID module output.
			Disable	Select **Disable** to disable the PID module output.
3	PV type	Specifies the type of the PV module used in the PV plant. For details about the PV module type, consult the manufacturer.	P-type	Select this value if the PV module type is P. In this case, the PID module output voltage is positive.
			N-type	Select this value if the PV module type is N. In this case, the PID module output voltage is negative.
4	PV/PE offset voltage	Specifies the DC output voltage when the offset mode is set to PV/PE.	N/A	It is recommended that the offset voltage be set to a value ranging from 50 V to 200 V.
5	Operation Mode	Specifies whether the PID module is currently working in normal or commissioning mode.	Commissioning	In commissioning mode, if you need to set the output mode to **PV/PE** or **N/PE**, set **Output enabled** to **Enable**. The PID module delivers output voltages based on the value of **Commiss. out.volt**. **NOTE** To check whether the PID module functions properly, it is recommended that **Operation mode** be set to **Commissioning** upon first power-on.
			Normal	In normal mode, the PID module operates automatically after the PID module, SUN2000, and SmartLogger communicate with each other properly. **NOTE** After checking that the PID module functions properly, set **Operation mode** to **Normal**.
6	Commissioning output voltage	Sets the output voltage value when **Operation Mode** or **Working mode** is set to **Commissioning**.	PID01: 0–500 V	It is recommended that the commissioning voltage for the 1000 V/1100 V SUN2000 be set to a value ranging from 50 V to 400 V.
			SartPID2000: 0–800 V	It is recommended that the commissioning output voltage for the 1000 V/1100 V SUN2000 be set to a value ranging from 50 V to 400 V, and that the commissioning output voltage for the 1500 V SUN2000 be set to a value ranging from 50 V to 600 V.

No.	Parameter	Function	Value	Description
7	Maximum DC voltage	Specifies the PV-PE voltage when the normal operation mode is used.	500–1500 V	If the PV module type is P, the parameter value indicates the highest DC voltage between PV+ and PE. If the PV module type is N, the parameter value indicates the highest DC voltage between PV– and PE.
8	Maximum output voltage	Specifies the highest output voltage of the PID module when **Operation Mode** or **Working mode** is set to **Normal** or **Commissioning**.	PID01: 0–500 V	If the offset mode is **PV/PE**, the parameter value indicates the highest DC output voltage between PV and PE. If the offset mode is **N/PE**, the parameter value indicates the highest DC output voltage between N and PE.
			SartPID2000: 0–800 V	• For the 1000 V/1100 V SUN2000, the value ranges from 0 V to 550 V. The parameter value indicates the maximum DC raise voltage between PV and the ground. • For the 1500 V SUN2000, the value ranges from 0 V to 800 V. The parameter value indicates the maximum DC raise voltage between PV and ground. The default value is 500 V. For the 1500 V SUN2000, the recommended value is 800 V.
9	IMD access	Specifies whether the PID module and insulation monitor device (IMD) can operate in cycle mode.	Enable	Select **Enable** if you allow the PID module and IMD operate in cycle mode. Only the IMDs of mainstream suppliers such as DOLD and BENDER are supported, and the IMDs must have enabled dry contacts. **NOTICE** Only when **IMD access** is set to **Enable**, can you set **Periodic PID runtime**, **Periodic IMD runtime**, and **IMD control dry contact**.
			Disable	Select **Disable** if you forbid the access of IMDs.
10	Periodic PID runtime	Specifies the operating time segment of the PID module when the PID module and IMD operate in cycle mode.	60–480 minutes	The IMD is shut down when the PID module is operating.
11	Periodic IMD runtime	Specifies the operating time segment of the IMD when the PID module and IMD operate in cycle mode.	15–480 minutes	The PID module is standby when the IMD is operating.

No.	Parameter	Function	Value	Description
12	IMD control dry contact	Dry contact No. over which the SmartLogger controls the IMD	DO1, DO2, and DO3	• PID01: Set appropriate ports based on the cable connections between the IMD and the SmartLogger. • SmartPID2000: N/A
13	PV module compensation voltage direction	Specifies the offset direction of the PID module.	PV– positive offset	Select **PV– positive offset** for PV modules of P and N-PERT types. **NOTE** For the specific PV module type, consult its manufacturer.
			PV+ negative offset	Select **PV+ negative offset** for PV modules of the N type except N-PERT.
14	Working mode	Specifies the working mode of the PID module.	Normal	In normal mode, the PID module operates automatically after the PID module, SUN2000, and SmartLogger communicate with each other properly.
			Commissioning	In commissioning mode, set **Commissioning output voltage**. The PID module delivers voltage based on the commissioning output voltage. **NOTE** To check whether the PID module functions properly, it is recommended that **Working mode** be set to **Commissioning** upon first power-on.
15	Maximum system DC-to-ground withstand voltage	Specifies the voltages between the PV side and PE and between the AC side and PE in normal mode.	500–1500 V	Specifies the lower thresholds of the maximum voltage ranges between the SUN2000 DC side (including the SUN2000, PV module, cable, SPD, and switch) and the ground and between the SUN2000 low-voltage grid-connection side (including the SUN2000, AC power cable, SPD, and switch) and the ground in a PV power system. The default value is 1000 V. For the 1500 V SUN2000, the recommended value is 1500 V.
16	AC-to-ground resistance alarm threshold	Specifies the alarm threshold for the impedance between the AC side of the PID module and the ground.	0.2–100 kΩ	You can set an alarm threshold for the impedance between the AC grid and PE for the PID module. If the detected impedance is below the threshold, the PID module will generate an alarm.

No.	Parameter	Function	Value	Description
17	Compensation offset voltage	Specifies the compensation offset voltage between PV and PE after the PID module operates stably.	0–500 V	• If **PV module compensation voltage direction** is set to **PV– positive offset**, this parameter specifies the positive voltage between PV– and the ground. • If **PV module compensation voltage direction** is set to **PV+ positive offset**, this parameter specifies the negative voltage between PV+ and the ground. **NOTE** If **Compensation offset voltage** i set to 500 V, the PID module provides the maximum output to enhance the voltage compensation effect. The output voltage amplitude of the PID module is automatically capped to ensure the safety of a PV power plant. The output voltage amplitude is also related to the maximum system DC-to-ground withstand voltage and maximum output voltage.
18	Clear Data	Clears the active alarms and historical alarms stored on the PID module.	N/A	You can select **Clear Data** to clear active alarms and historical alarms for the PID module.

7.7.8 Custom Device

The SmartLogger can connect to third-party devices supporting the Modbus-RTU protocol, such as the box-type transformer and EMI. Since the protocol specifications vary depending on vendors, you need to obtain a protocol specifications file in **.cfg** format from Huawei and import the file into the SmartLogger for successfully connecting to a third-party device.

◫ NOTE

- Custom devices cannot be detected automatically and need to be added manually. For details, see .
- The SmartLogger can connect to a maximum of five types of custom devices and can connect to multiple devices of the same type.

7.7.8.1 Querying Related Information

Select a custom device on the **Monitoring** page and query its information on the displayed page.

Figure 7-38 Querying custom device-related information

No.	Signal Name	Value	Unit
1	No.	CT02311HJB00FB000087	
2	Port number	2	
3	Physical addr.	13	
4	Logical address	12	
5	Online Status	Online	

☐ NOTE

You can click the **Running Info.** , **Teleindication** , or **Telemetering** tab on the tertiary navigation menu to query custom device-related information.

7.7.8.2 Setting Telecontrol Parameters

Because of permission restriction, log in as **Advanced User**. Select the custom device to be set on the **Monitoring** page and click the **Telecontrol** tab to access the target page.
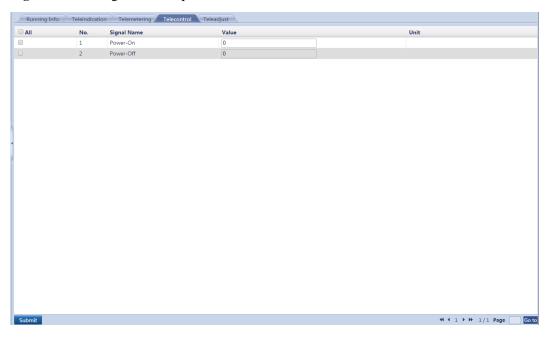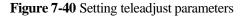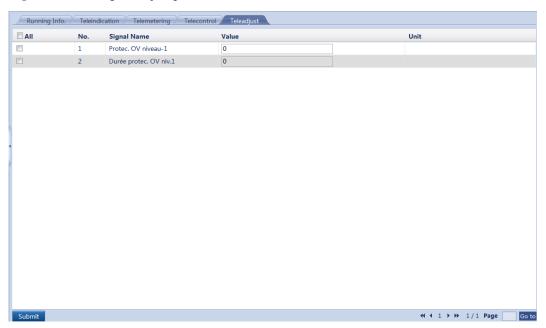
Figure 7-39 Setting telecontrol parameters

7.7.8.3 Setting Teleadjust Parameters

Because of permission restriction, log in as **Advanced User**. Choose the custom device to be set on the **Monitoring** page and click the **Teleadjust** to access the target page.

Figure 7-40 Setting teleadjust parameters

7.7.9 IEC103 Device

The SmartLogger can connect to a third-party device that supports IEC103, such as a relay protection or monitoring device like a box-type transformer. Since the protocol specifications vary depending on vendors, you need to obtain a protocol specifications file in .cfg format from Huawei and import the file into the SmartLogger for successfully connecting to a third-party device.
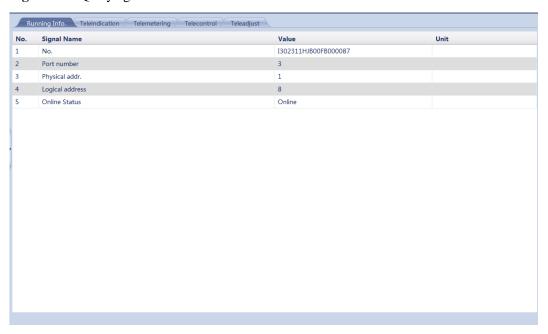
◫ NOTE

- IEC103 devices cannot be detected automatically and need to be added manually. For details, see 7.10.7.1 Connecting Devices.
- The SmartLogger can connect to a maximum of five types of IEC103 devices and can connect to multiple devices of the same type.

7.7.9.1 Querying Related Information

Select the IEC103 device on the **Monitoring** page and query its information on the displayed page.

Figure 7-41 Querying IEC103 device-related information

◫ NOTE

You can click the [Running Info.], [Teleindication], or [Telemetering] tab on the tertiary navigation menu to query IEC103 device-related information.

7.7.9.2 Setting Telecontrol Parameters

Because of permission restriction, log in as **Advanced User**. Select the IEC103 device to be set on the **Monitoring** page and click the **Telecontrol** tab to access the target page.
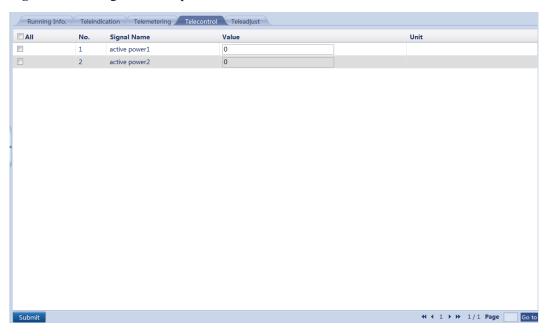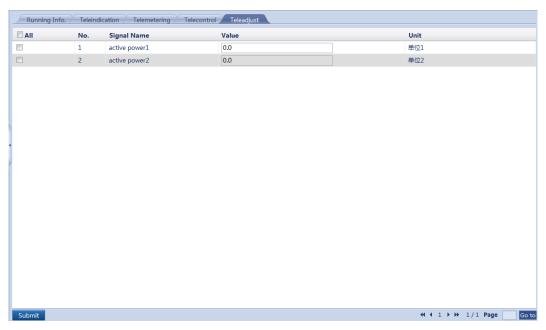
Figure 7-42 Setting telecontrol parameters

7.7.9.3 Setting Teleadjust Parameters

Because of permission restriction, log in as **Advanced User**. Select the IEC103 device to be set on the **Monitoring** page and click the **Teleadjust** tab to access the target page.

Figure 7-43 Setting teleadjust parameters
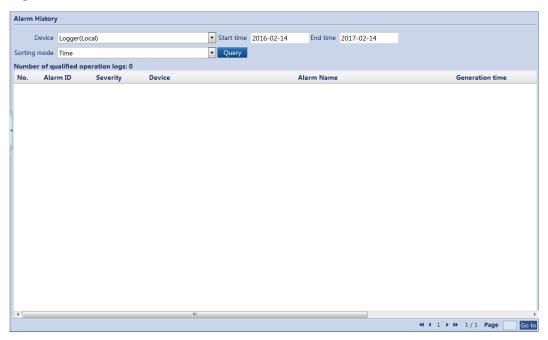
7.8 Querying Historical Data

7.8.1 Querying Historical Alarms

Choose **Query** > **Alarm History** and query alarms on the displayed page.
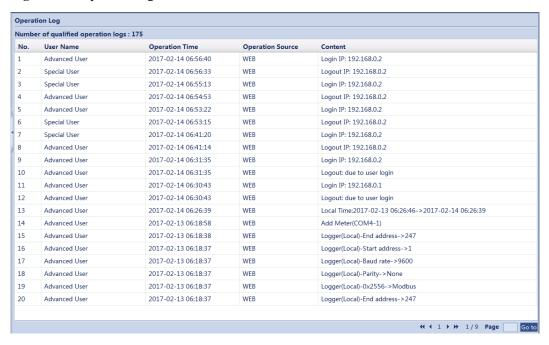
Figure 7-44 Historical alarms

7.8.2 Querying Operation Logs

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Query** > **Operation Log** and query logs on the displayed page.
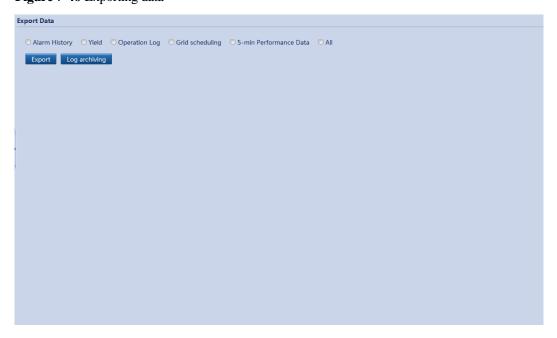
Figure 7-45 Operation log

Operation Log				
Number of qualified operation logs : 175				
No.	**User Name**	**Operation Time**	**Operation Source**	**Content**
1	Advanced User	2017-02-14 06:56:40	WEB	Login IP: 192.168.0.2
2	Special User	2017-02-14 06:56:33	WEB	Logout IP: 192.168.0.2
3	Special User	2017-02-14 06:55:13	WEB	Login IP: 192.168.0.2
4	Advanced User	2017-02-14 06:54:53	WEB	Logout IP: 192.168.0.2
5	Advanced User	2017-02-14 06:53:22	WEB	Login IP: 192.168.0.2
6	Special User	2017-02-14 06:53:15	WEB	Logout IP: 192.168.0.2
7	Special User	2017-02-14 06:41:20	WEB	Login IP: 192.168.0.2
8	Advanced User	2017-02-14 06:41:14	WEB	Logout IP: 192.168.0.2
9	Advanced User	2017-02-14 06:31:35	WEB	Login IP: 192.168.0.2
10	Advanced User	2017-02-14 06:31:35	WEB	Logout: due to user login
11	Advanced User	2017-02-14 06:30:43	WEB	Login IP: 192.168.0.1
12	Advanced User	2017-02-14 06:30:43	WEB	Logout: due to user login
13	Advanced User	2017-02-14 06:26:39	WEB	Local Time:2017-02-13 06:26:46->2017-02-14 06:26:39
14	Advanced User	2017-02-13 06:18:58	WEB	Add Meter(COM4-1)
15	Advanced User	2017-02-13 06:18:38	WEB	Logger(Local)-End address->247
16	Advanced User	2017-02-13 06:18:37	WEB	Logger(Local)-Start address->1
17	Advanced User	2017-02-13 06:18:37	WEB	Logger(Local)-Baud rate->9600
18	Advanced User	2017-02-13 06:18:37	WEB	Logger(Local)-Parity->None
19	Advanced User	2017-02-13 06:18:37	WEB	Logger(Local)-0x2556->Modbus
20	Advanced User	2017-02-13 06:18:37	WEB	Logger(Local)-End address->247

◀◀ ◀ 1 ▶ ▶▶ 1 / 9 **Page** [   ] Go to

7.8.3 Exporting Data

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Query** > **Export Data** and export data on the displayed page.

Figure 7-46 Exporting data

Export Data
○ Alarm History   ○ Yield   ○ Operation Log   ○ Grid scheduling   ○ 5-min Performance Data   ○ All
[Export] [Log archiving]

📖 **NOTE**

When changing the name of the exported file, retain the extension **.tar.gz**. Otherwise, the file will be unusable.
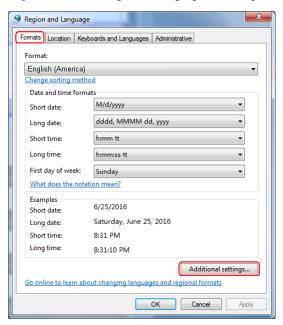
Opening the Exported File

The exported file is in CSV format and can be opened in Excel. After opening the file in Excel, the cells may not be neatly organized. Set **List separator** to **,**.

To view and change the list separator, perform the following steps:

1. Open **Control Panel** and choose **Region and Language**.
2. Under **Formats**, click **Additional settings**.

Figure 7-47 Viewing and changing the list separator (1)

3. View and change the list separator.
   – If **List separator** is **,**, click **OK**.
   – If **List separator** is not **,**, change it to **,** and click **OK**.
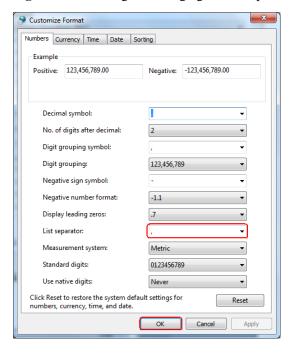
Figure 7-48 Viewing and changing the list separator (2)

7.9 Settings

7.9.1 User Parameters

7.9.1.1 Setting the Date and Time

Because of permission restriction, log in as **Common User** or **Advanced User**. Choose **Settings** > **Date&Time** to access the target page.

Figure 7-49 Setting the date and time

![NOTICE icon]

NOTICE

- The **Local time zone** parameter is unavailable for certain time zones.
- After **Date&Time** is set, the date and time of all the SUN2000s connected to SmartLogger are updated accordingly. Ensure that the settings are correct.
- Modification of **Date&Time** may affect the recording of energy yield and performance data. Therefore, do not change the time zone or system time arbitrarily.

7.9.1.2 Setting Plant Information

After you set plant information, a plant configuration file can be generated. You can upload this file to a third-party hosting website to implement remote monitoring.

Because of permission restriction, log in as **Common User** or **Advanced User**. Choose **Settings** > **Power Station** to access the target page.

Figure 7-50 Setting plant information

Plant Info.	
Plant name	
Plant address	
Plant owner	
Plant owner address	
Country	CN(China, People's Republic of)

Submit
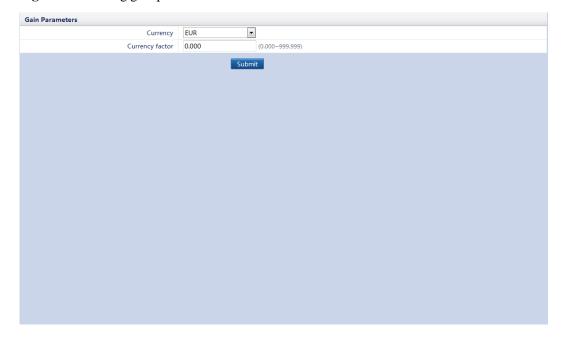
☐ NOTE

When setting plant information, you cannot successfully enter any character such as
<>:,`'?()#&\$|%+;~^" in the English half-width status.

7.9.1.3 Setting Gain Parameters

Because of permission restriction, log in as **Common User** or **Advanced User**. Choose
Settings > **Currency** to access the target page.

Figure 7-51 Setting gain parameters

Gain Parameters		
Currency	EUR	
Currency factor	0.000	(0.000~999.999)

Submit

☐ NOTE
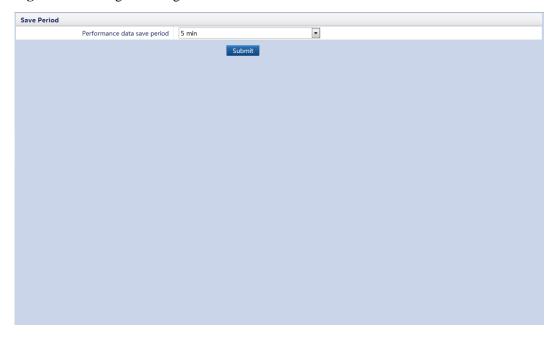
Currency factor indicates the local power price, and is used to calculate the translation gain of the energy yield.

7.9.1.4 Setting the Saving Interval

Because of permission restriction, log in as **Common User** or **Advanced User**. Choose **Settings** > **Save Period** to access the target page.

Figure 7-52 Setting the saving interval
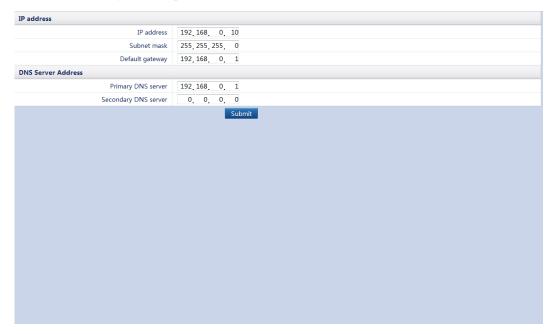
7.9.2 Communications Parameters

7.9.2.1 Setting Ethernet Parameters

Because of permission restriction, log in as **Advanced User**. Choose **Serttings** > **Ethernet** to access the target page.

Figure 7-53 Setting Ethernet parameters

> **⚠ NOTICE**
>
> If the SmartLogger connects to the Internet through a router, note the following when setting Ethernet parameters:
>
> ● Set the gateway address to the IP address of the router.
> ● Ensure that the IP address of the SmartLogger is in the same network segment as the gateway address.
> ● Set the domain name server (DNS) address to the IP address of the router or obtain the DNS address from the network provider.

> **📖 NOTE**
>
> If the IP address is changed, you need to use the new IP address to log in to the system.

7.9.2.2 Setting RS485 Parameters

Because of permission restriction, log in as **Advanced User**. Choose **Settings** > **RS485** to access the target page.
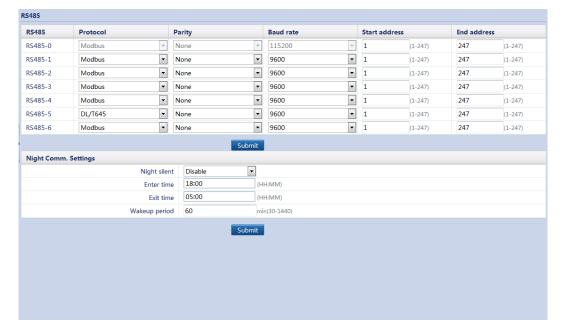
Figure 7-54 RS485 parameters

NOTE

- **RS485-0** corresponds to communications ports **AC1** and **AC2** of the PLC in the SmartLogger, and the baud rate is 115,200 bit/s by default. **RS485-1** to **RS485-6** respectively correspond to communications ports **COM1–COM6**, and the baud rate is 9600 bit/s by default. The baud rates for devices connected to the same RS485 port must be the same.

- Set the protocol supported by the RS485 port based on either the protocol supported by the connected device or the status of the device in the network. When the SmartLogger serves as a slave node to interconnect with a third-party device over Modbus-RTU, set **Protocol** to **Modbus-Slave**. When the connected SUN2000 performs rapid power grid scheduling using both PLC and RS485, set **Protocol** to **Modbus-Control**.

- **Protocol** and **Parity** must be set to the same values for all devices connected to the same RS485 port.

- 1 ≤ start address ≤ end address ≤ 247. The address segments for each RS485 port from **RS485-0** to **RS485-6** can overlap.

  If the SmartLogger communicates with the SUN2000 over an embedded PLC module, set an address segment for **RS485-0**. Otherwise, the SmartLogger will fail to access the corresponding SUN2000. If the SmartLogger does not communicate with the SUN2000 over an embedded PLC module, you do not have to set an address segment for **RS485-0**.

  Set the address range as required. A larger address range requires a longer searching time. The start and end addresses have no impact on the devices that have been connected.

7.9.2.3 Setting Power Meter Parameters

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Settings** > **Meter** to access the target page.
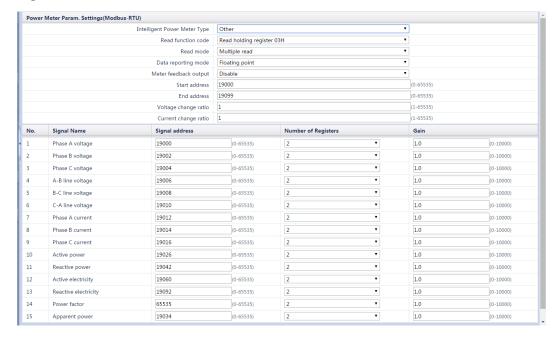
Power Meter Without Feedback of Grid Connection Data

If a power meter connected in the PV plant does not need to provide feedback of the grid connection data, set **Meter feedback output** to **Disable**.

- When the model of the connected power meter is **UMG604**, **PD510**, or **PZ96L**, select the model in the drop-down list box of **Intelligent Power Meter Type**.

● When the model of the connected power meter is any other one, select **Other** from the drop-down list box of **Intelligent Power Meter Type** and then set related parameters.

Figure 7-55 Power meter

## Power Meter with Feedback of Grid Connection Data

If a power meter is connected in the PV plant and needs to provide feedback of the grid connection data through the AO port of the SmartLogger, set **Meter feedback output** to **Enable** and then set port parameters as required.
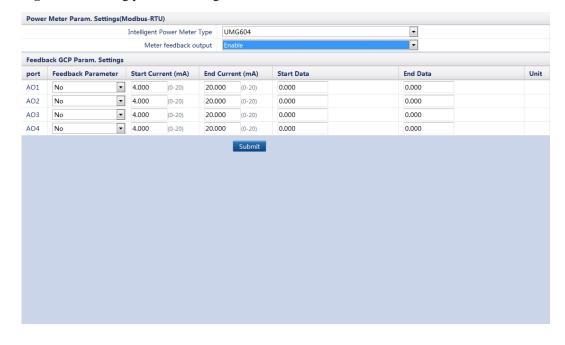
Figure 7-56 Setting parameters for grid connection data feedback

Power Meter Param. Settings(Modbus-RTU)							
Intelligent Power Meter Type		UMG604					
Meter feedback output		Enable					

Feedback GCP Param. Settings							
port	Feedback Parameter	Start Current (mA)		End Current (mA)		Start Data	End Data	Unit
AO1	No	4.000	(0-20)	20.000	(0-20)	0.000	0.000	
AO2	No	4.000	(0-20)	20.000	(0-20)	0.000	0.000	
AO3	No	4.000	(0-20)	20.000	(0-20)	0.000	0.000	
AO4	No	4.000	(0-20)	20.000	(0-20)	0.000	0.000	

Submit

☐ NOTE

- **Start current** and **End current** indicate the valid value range of signals carried by the analog output loop. The current range is less than or equal to the current range specified in the AO specifications. **Start Data** corresponds to **End Data**.

- **Start Data** and **End Data** are the valid signal value range of the selected **Feedback Parameter**. Set the two parameters based on site requirements. An excessive range results in low precision of the feedback while an insufficient range results in the incompleteness of the feedback.

- **Unit** is the unit for the selected **Feedback Parameter**. When setting **Start Data** and **End Data**, note the unit selected. Otherwise, false input and output may be generated.

7.9.2.4 Setting NetEco Parameters

To set parameters correctly, ensure that the SmartLogger can connect to the Huawei NMS such as NetEco and FusionSolar, or a third-party NMS.

You need to log in as **Advanced User** that has the permission to set the parameters. Choose **Settings** > **NetEco** to enter the page.
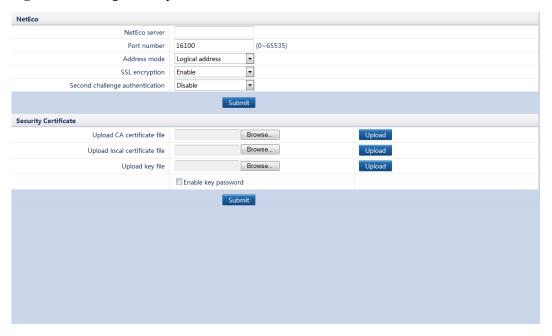
Figure 7-57 Setting NetEco parameters

NOTE

- Set **NetEco server** to the IP address or domain name of the NetEco server.

- When the SmartLogger connects to the Huawei NMS, retain the default value 16100 for **Port number**. When the SmartLogger connects to the third-party NMS, set **Port number** according to the server port enabled in a third-party NMS.

- Set **Address mode** to **Physical address** in most cases. When addresses of devices connecting to the SmartLogger over six RS485 ports are not unique, set **Address mode** to **Logical address**.

- If **SSL encryption** is set to **Disable**, data will be transmitted without being encrypted, which may result in user data theft. Therefore, exercise caution when deciding to set **SSL encryption** to **Disable**.

- If **Second challenge authentication** is set to **Disable**, the second challenge authentication result will not be verified, which may result in user data theft. Therefore, exercise caution when deciding to set **Second challenge authentication** to **Disable**.

7.9.2.5 Setting Modbus TCP Parameters

Set Modbus TCP parameters to ensure normal communication between the SmartLogger and a third-party NMS.

Because of permission restriction, log in as **Advanced User**. Choose **Settings** > **Modbus TCP** to access the target page.

Figure 7-58 Setting Modbus TCP parameters

Modbus TCP					
Link setting	Enable				
IP Whitelists	Enable				
Client 1 IP Address	0.	0.	0.	0	
Client 2 IP Address	0.	0.	0.	0	
Client 3 IP address	0.	0.	0.	0	
Client 4 IP address	0.	0.	0.	0	
Client 5 IP address	0.	0.	0.	0	
Address mode	Physical address				
SmartLogger address	0			(0-247)	
Time synchronization	Disable				
	Submit				

☐ NOTE

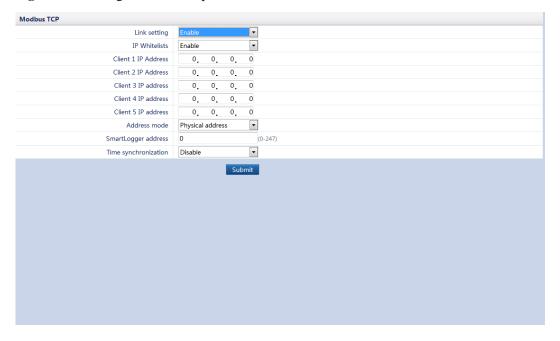- Modbus TCP is a general standard protocol without a security authentication mechanism. To reduce network security risks, the function of connecting to a third-party NMS using Modbus TCP is disabled by default. To use this function, set **Link setting** to **Enable**.

- If the function of connecting to a third-party NMS using Modbus TCP is enabled, data will be transmitted without being encrypted, which may result in user data theft. Therefore, exercise caution when deciding to enable this function.

- In most cases, **Address mode** is set to **Physical address**. If the devices connected to the six RS485 ports of the SmartLogger have duplicate addresses, you must set **Address mode** to **Logical address**.

7.9.2.6 Setting IEC103 Parameters

Third-party devices that use the IEC103 interface protocol may be connected to a PV plant. The SmartLogger can read the information about such third-party devices and upload the information to the NetEco, thereby enhancing the PV plant solutions.

As Huawei inverter devices (such as SUN2000s) support protocols different from third-party devices that use IEC103 (such as box-type transformers, combiner boxes, and inverters), they cannot be connected in series on the same RS485 bus.

If the SmartLogger connects to the NetEco, it transparently transmits IEC103 device information to the NetEco.

Because of permission restriction, log in as **Advanced User**. Choose **Settings** > **IEC103** to access the target page.

Figure 7-59 Setting IEC103 parameters

IEC103		
IEC103 port No.	No	
IEC103 address	126	(1-255)
IEC103 IP	0. 0. 0. 0	
	Submit	

◻ **NOTE**

- IEC103 is a general standard protocol without a security authentication mechanism. To reduce network security risks, the function of connecting to a third-party NMS using IEC103 is disabled by default. To use this function, set **Link setting** to **Enable**.

- Third-party devices and Huawei devices must be connected to different ports of the SmartLogger. Otherwise, the communication will be abnormal.

- The value of **IEC103 IP** must be consistent with the NetEco IP address.

7.9.2.7 Setting IEC104 Parameters

If the SmartLogger connects to a third-party NMS over the IEC104 protocol, IEC104 parameters must be correctly set to enable the third-party NMS to monitor the running status of devices connected to the SmartLogger.

Because of permission restriction, log in as **Advanced User**. Choose **Settings** > **IEC104** to access the target page.
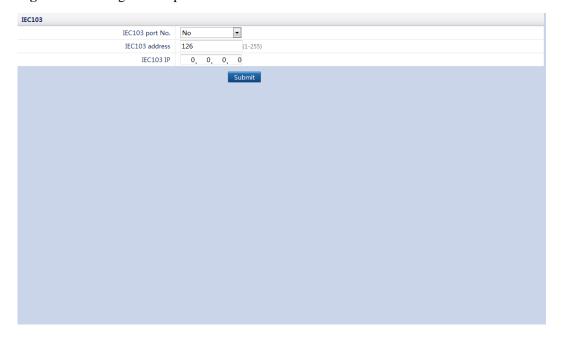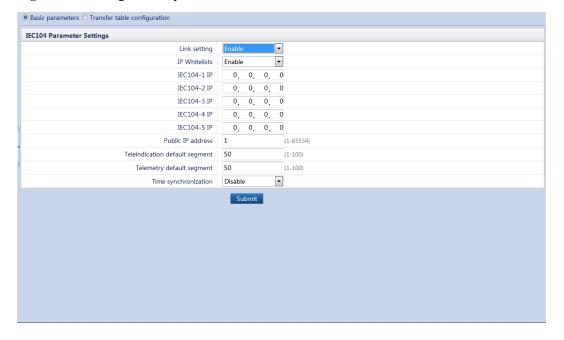
Figure 7-60 Setting IEC104 parameters

☐ NOTE

- IEC104 is a general standard protocol without a security authentication mechanism. To reduce network security risks, the function of connecting to a third-party NMS using IEC104 is disabled by default. To use this function, set **Link setting** to **Enable**.

- You can click the Select icon in the upper left corner of the page to access the required setting page.

- You can export an IEC104 configuration file in CSV format.

  After the IEC104 configuration file exported from the SmartLogger and the device type IEC104 information files delivered with devices are correctly configured on a third-party NMS, the third-party NMS will be able to monitor the devices connected to the SmartLogger over the IEC104 protocol.

7.9.3 Extended Parameters

7.9.3.1 Setting FTP Parameters

The FTP function is used to access a third-party NMS. The SmartLogger can report the configuration information and running data of the managed plant system through FTP. A third-party NMS can access Huawei devices after being configured.

Because of permission restriction, log in as **Advanced User**. Choose **Settings** > **FTP** to access the target page.

Figure 7-61 Setting FTP parameters

7.9.3.2 Setting Email Parameters

The SmartLogger can send emails to inform users of the energy yield, alarm, and equipment status information of the PV plant system, helping users to know the running conditions of the PV plant system in time.

When using this function, ensure that the SmartLogger can be connected to the configured email server and correctly set the Ethernet parameters and email parameters for the SmartLogger.

Because of permission restriction, log in as **Advanced User**. Choose **Settings** > **Email** to access the target page.
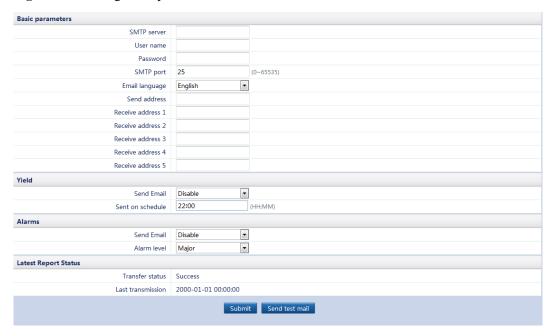
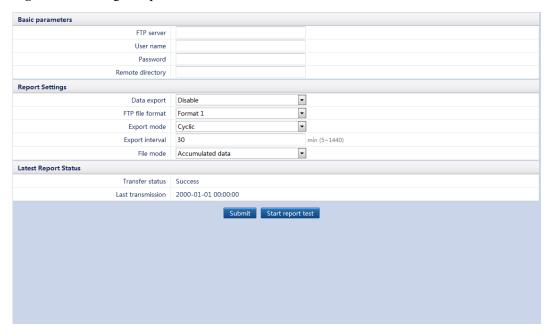**Figure 7-62** Setting email parameters

NOTE

- **SMTP Server** can be set to the domain name or IP address of the SMTP server.

  If it is set to the domain name of the SMTP server, ensure that the address of the DNS server is set correctly.

- **SMTP Port** specifies the port used for sending emails.

- **User name** and **Password** specify the user name and password used for logging in to the SMTP server.

- **Send address** specifies the sender's email address. A maximum of five addresses can be set. Ensure that the sender's email server is the same as the server specified by **SMTP server**.

- You can click **Send test mail** to check whether the SmartLogger can successfully send emails to users.

7.9.4 Port Settings

7.9.4.1 Setting DO Parameters

Context
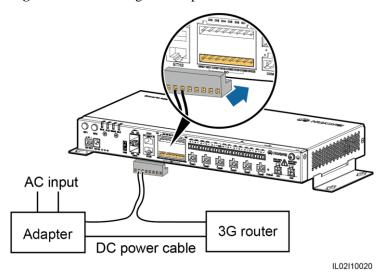
The SmartLogger provides three DO ports. If one DC power cable of the 3G router is connected to one of the DO ports in series, power on or off the wireless module by connecting or disconnecting the DO dry contact to control the reset of the 3G router.

Considering the restrictions on the current that can pass the DO ports of the SmartLogger, you need to determine the number of DO ports to be used for the control based on the maximum power supply current of the 3G router (the maximum power supply current can be calculated based on the maximum power consumption and DC power supply voltage). When the power supply current is less than 1 A and the voltage is lower than 24 V, use one DO port.

Connecting a 3G Router over a DO Port

When connecting a 3G router, cut off one DC power cable of the router, and connect the cable to a DO port of the SmartLogger.

Figure 7-63 Connecting one DO port
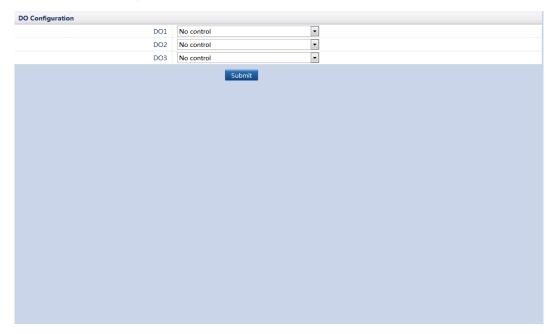
DO Configuration

After connecting the 3G router to the SmartLogger properly, you can set DO parameters over the WebUI to enable the external 3G router to automatically reset if the SmartLogger fails to connect to the NetEco, email server, or FTP server within 30 minutes.

Because of permission restriction, log in as **Advanced User**. Choose **Settings** > **DO** to access the target page.

Figure 7-64 DO configuration


7.9.4.2 Setting USB Parameters

Context

The SmartLogger has a USB port, which provides 5 V/1 A power supply. If the DC power cable of the 3G router has a standard USB connector with a maximum current of less than 1 A, it can directly connect to the USB port on the SmartLogger, power the 3G router over the SmartLogger, and disconnect the USB port power supply when the communication fails.

> ⚠ **NOTICE**
>
> If the maximum working current of the 3G router is greater than 1 A, it cannot be connected over a USB port.

Connecting a 3G Router over a USB Port

Connect the USB connector of the DC power cable for the 3G router to the USB port of the SmartLogger.
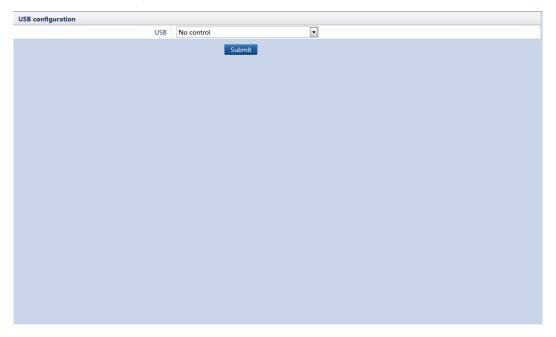
Figure 7-65 Connecting the 3G router and the SmartLogger

USB Configuration

After connecting the 3G router to the SmartLogger properly, you can set USB parameters over the WebUI to enable the external 3G router to automatically reset if the SmartLogger fails to connect to the NetEco, email server, or FTP server within 30 minutes.

Because of permission restriction, log in as **Advanced User**. Choose **Settings** > **USB** to access the target page.

Figure 7-66 USB configuration

7.9.5 Remotely Shutting Down SUN2000s in Dry Contact Mode

The SmartLogger can connect to SUN2000s over dry contacts and shut down the SUN2000s over OVGR signals.

The SmartLogger provides eight DI ports, that is, DI1(GND1) to DI4(GND1) and DI5(GND2) to DI8(GND2). An OVGR can connect to any DI port.

Figure 7-67 Networking
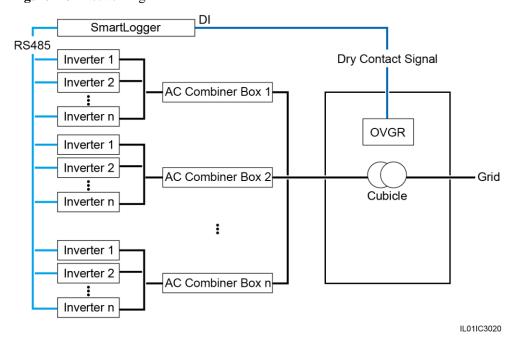
Figure 7-68 DI ports of the SmartLogger
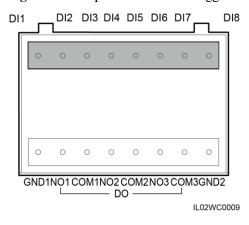
Table 7-10 DI port description

Port	Function
GND1	Dry contact input common terminal 1, used for active power derating for DI1–DI4
DI1	DI_1
DI2	DI_2

Port	Function
DI3	DI_3
DI4	DI_4
DI5	DI_5
DI6	DI_6
DI7	DI_7
DI8	DI_8
GND2	Dry contact input common terminal 2, used for reactive power compensation for DI5–DI8
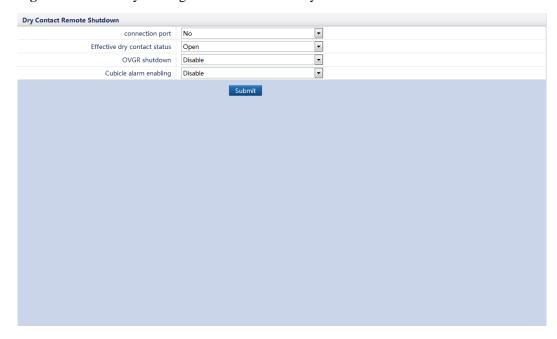
⚠ NOTICE

Before setting the function of remote shutdown over dry contacts in the following way, ensure that the involved DI port is not set in 7.9.6 Setting DI Parameters.

Because of permission restriction, log in as **Special User**. Choose **Settings** > **Dry Contact Remote Shutdown** to access the target page.

Figure 7-69 Remotely shutting down SUN2000s in dry contact mode

📖 NOTE

- The OVGR sends dry contact signals and can be connected to any DI of the SmartLogger. Set related parameters based on the actual connection. Otherwise, the functions cannot be implemented.

- **Effective dry contact status** can be set to **Close** or **Open**. If **OVGR shutdown** is set to **Enable** and **Effective dry contact status** is set to **Close**, the SmartLogger sends the SUN2000 remote shutdown command only when the DI port specified by **connection port** is **Close**.
- If **Cubicle alarm enabling** is set to **Enable**, the **Abnormal Cubicle** alarm is generated when the dry contact signal is effective and the Cubicle is abnormal.

7.9.6 Setting DI Parameters
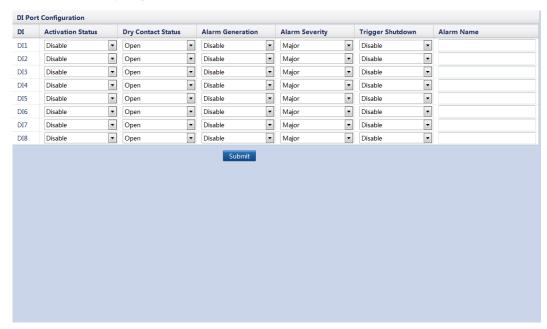
You can set parameters for DI ports over the WebUI.

- When a valid level is delivered into a DI port, an alarm is generated. You can set the alarm name and severity.
- A DI port shuts down the SUN2000 using OVGR signals.

The SmartLogger provides eight DI ports, that is, DI1(GND1) to DI4(GND1) and DI5(GND2) to DI8(GND2). For the connection method, see 4.10 Connecting a Ripple Control Receiver.

Because of permission restriction, log in as **Special User**. Choose **Settings** > **DI** to access the target page.

Figure 7-70 Setting DI parameters

- **Activation Status**: **Activated** means that you can set the function of this DI port. **Disable** means that you cannot.

📖 NOTE

If a DI port is activated, it cannot be enabled under **Dry contact remote control** in 8.2.2 Dry Contact Scheduling. If a DI port has been set to **Dry contact remote control** in 8.2.2 Dry Contact Scheduling, it cannot be set here again.

- **Dry Contact Status**: Set this parameter based on the dry contact status preset on the OVGR. For example, if the dry contact status preset on the OVGR is **Close**, set this parameter to **Close**.
- If the SmartLogger connects to SUN2000s over dry contacts, the SmartLogger shuts down the SUN2000s over OVGR signals if **Trigger Shutdown** is set to **Enable**.

If a DI port is activated, it cannot be set in 7.9.5 Remotely Shutting Down SUN2000s in Dry Contact Mode. If a DI port has been set in 7.9.5 Remotely Shutting Down SUN2000s in Dry Contact Mode, it cannot be set here again.
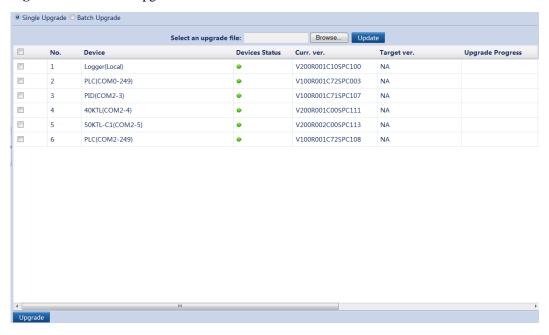
7.10 Maintenance

7.10.1 Firmware Upgrade

You can upgrade the firmware of the SmartLogger, SUN2000, PLC module, or PID module over the WebUI.

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Maintenance** > **Firmware Upgrade** to access the target page.

Figure 7-71 Firmware upgrade

Single Upgrade

1. Click **Single Upgrade**.
2. Select the name of the device that requires a firmware upgrade.

⚠️ **NOTICE**

The Single Upgrade mode does not apply to two or more types of devices each time. For example, you cannot select both the SUN2000 and PLC module.

3. Select the upgrade file.

4. Click **Upgrade**.

Batch Upgrade

📖 **NOTE**

The SUN2000s that can be upgraded in batches on the SmartLogger must be SUN2000 V100R001C11SPC409, SUN2000 V100R001C81SPC101 and its later patch versions, or SUN2000 V200R001C00 and its later patch versions.

1. Click **Batch Upgrade**.
2. Select the upgrade file.
3. Click **Upgrade**.

7.10.2 Product Information

Choose **Maintenance** > **Product Information** and query SmartLogger information on the displayed page.

Figure 7-72 Product information

7.10.3 Setting Security Parameters

Choose **Maintenance** > **Security Settings** to access the target page.
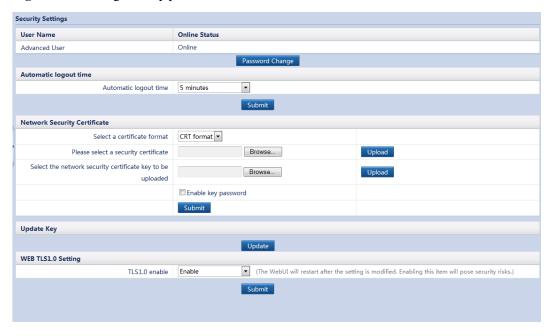
Figure 7-73 Setting security parameters

> **NOTE**
>
> - The initial password is *Changeme* for system users **Common User**, **Advanced User**, and **Special User**.
>
> - After the first login, change the initial password immediately to ensure account security.
>
> - You are advised to change the password at least once every half a year to prevent unauthorized use of your account and impact on system security.
>
> - After **Automatic logout time** is set, a user is automatically logged out if the user does not perform any operation within the specified time period.
>
> - You are advised to use the existing network security certificate and key. If a network security certificate is not available, you can export the root certificate and import the certificate to the browser.
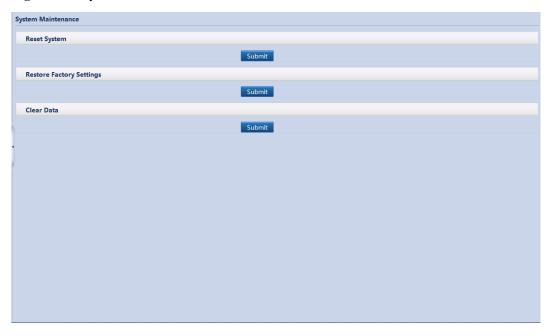
A password must meet the following requirements:

- Contain 6 to 20 characters

- A combination of at least two types of digits, uppercase letters, and lowercase letters

- Differ from the original password in at least two characters

7.10.4 System Maintenance

Because of the permission restriction, log in as **Advanced User** or **Special User**. Choose **Maintenance** > **System Maint.**.

Figure 7-74 System maintenance

📖 **NOTE**
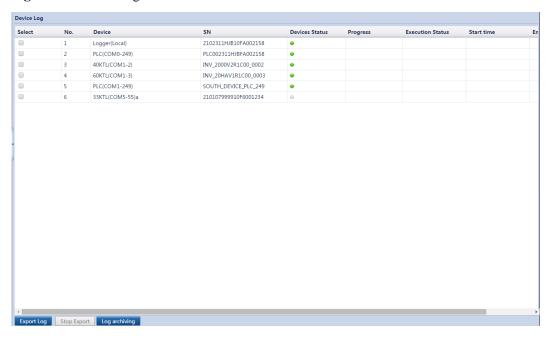
The login password is required if you need to send a system maintenance command.

7.10.5 Device Log

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Maintenance** > **Device Log** to access the target page.

Figure 7-75 Device log
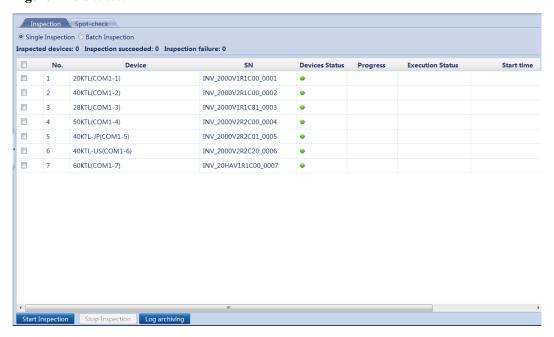
7.10.6 Site Test

After a SUN2000 is put into use, it should be inspected periodically to detect any potential risks and problems. The SmartLogger can inspect SUN2000s over the WebUI.

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Maintenance** > **Onsite Test** to access the target page.

Figure 7-76 Site test

NOTE

- The spot-check function is available only for the SUN2000 for which **Grid Code** is set to **Japan standard**.
- You can click the Select icon in the upper left corner of the page to select an inspection mode.

7.10.7 Device Management

7.10.7.1 Connecting Devices

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Maintenance** > **Connect Device** to access the target page.
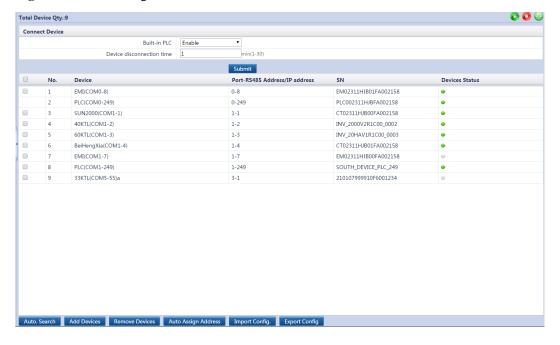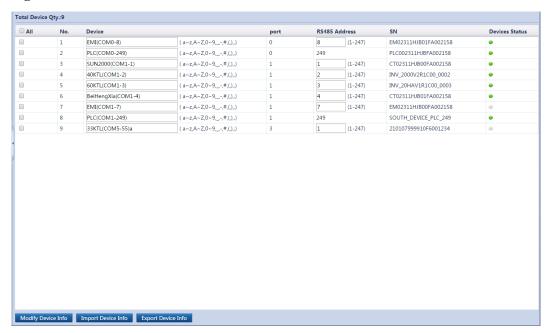
Figure 7-77 Connecting devices

NOTE

- If the SmartLogger communicates with the SUN2000 over an embedded PLC module, set **Built-in PLC** to **Enable** after setting the parameters by following the instructions in 7.9.2.2 Setting RS485 Parameters.

- Huawei equipment can be automatically detected or manually added. The EMI, power meter, slave SmartLogger, and third-party devices cannot be automatically detected. You need to add them manually. Before accessing or adding a device, set appropriate RS485 parameters by following the instructions in 7.9.2.2 Setting RS485 Parameters.

- Before manually adding an EMI connected over the COM port, set RS485 parameters correctly by following the instructions in 7.9.2.2 Setting RS485 Parameters. Then set **Device Type** to **EMI** and **Comm.protocal** to **Modbus-RTU** when adding the EMI. Before manually adding an EMI connected over the AI/PT port, you do not have to set RS485 parameters. You only have to set **Device Type** to **EMI** and **Comm.protocal** to **AI** when adding the EMI. After adding an EMI manually, correctly set the EMI parameters. For details, see 7.7.5.2 Setting Running Parameters.

- Before manually adding the Modbus or DL/T645 power meter, set RS485 parameters correctly by following the instructions in 7.9.2.2 Setting RS485 Parameters. Before manually adding the Modbus power meter, correctly set the power meter parameters. For details, see 7.9.2.3 Setting Power Meter Parameters. When adding a power meter, set **Device Type** to **Power Meter** and **Comm.protocal** to the protocol supported by the power meter.

- An accessed device can be removed manually, and a removed device can be added again.

- **Auto Assign Address** allows you to adjust device addresses based on serial numbers. If a device cannot access due to address conflict, perform this operation to assign a new device address and then access the device.

- When connecting a third-party device, you can import the configuration file and then manually add the device.

- When connecting a third-party device, you can export the configuration file.

- When changing the name of the exported file, retain the extension **.cfg**. Otherwise, the file will be unusable.

- You can click the Start, Stop, or Reset icon to send the corresponding command to all SUN2000s connected to the SmartLogger. The login password is required if you need to send a command.

7.10.7.2 Device List

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Maintenance** > **Device list** to access the target page.

Figure 7-78 Device list

Total Device Qty.:9							
All	No.	Device		port	RS485 Address		SN	Devices Status
☐	1	EMI(COM0-8)	(a~z,A~Z,0~9,_,-,#,(,),.)	0	8 (1-247)		EM02311HJB01FA002158	●
☐	2	PLC(COM0-249)	(a~z,A~Z,0~9,_,-,#,(,),.)	0	249		PLC002311HJBFA002158	●
☐	3	SUN2000(COM1-1)	(a~z,A~Z,0~9,_,-,#,(,),.)	1	1 (1-247)		CT02311HJB00FA002158	●
☐	4	40KTL(COM1-2)	(a~z,A~Z,0~9,_,-,#,(,),.)	1	2 (1-247)		INV_2000V2R1C00_0002	●
☐	5	60KTL(COM1-3)	(a~z,A~Z,0~9,_,-,#,(,),.)	1	3 (1-247)		INV_20HAV1R1C00_0003	●
☐	6	BeiHengXia(COM1-4)	(a~z,A~Z,0~9,_,-,#,(,),.)	1	4 (1-247)		CT02311HJB01FA002158	●
☐	7	EMI(COM1-7)	(a~z,A~Z,0~9,_,-,#,(,),.)	1	7 (1-247)		EM02311HJB00FA002158	○
☐	8	PLC(COM1-249)	(a~z,A~Z,0~9,_,-,#,(,),.)	1	249		SOUTH_DEVICE_PLC_249	●
☐	9	33KTL(COM5-55)a	(a~z,A~Z,0~9,_,-,#,(,),.)	3	1 (1-247)		210107999910F6001234	○

Modify Device Info | Import Device Info | Export Device Info

NOTE

You can modify the device name and address on the WebUI or export a device information file in CSV format. After modification, import the CVS file into the WebUI.

7.10.7.3 Exporting Parameters

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Maintenance** > **Export Param.** to access the target page.

Figure 7-79 Exporting data

NOTE

You can export configuration parameters of multiple SUN2000s to a .csv file. Site engineers can then check whether the SUN2000 configurations are correct in the exported file.

7.10.7.4 Resetting Alarms

If you need to clear certain or all active alarms and historical alarms and re-collect alarms, reset alarms.

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Maintenance** > **Alarm Reset** to access the target page.
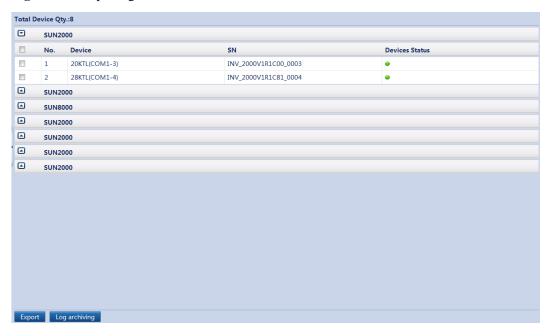
Figure 7-80 Resetting alarms

All	No.	Device	Port-RS485 Address	SN	Devices Status
☐	1	60KTL(COM1-1)	1-1	INV_20HAV1R1C00_0001	●
☐	2	500KTL(COM1-2)	1-2	INV_8000V1R1C00_0002	●
☐	3	20KTL(COM1-3)	1-3	INV_2000V1R1C00_0003	●
☐	4	28KTL(COM1-4)	1-4	INV_2000V1R1C81_0004	●
☐	5	25KTL-US(COM1-5)	1-5	INV_2000V2R1C00_0005	●
☐	6	50KTL(COM1-6)	1-6	INV_2000V2R2C00_0006	●
☐	7	40KTL-JP(COM1-7)	1-7	INV_2000V2R2C01_0007	●
☐	8	40KTL-US(COM1-8)	1-8	INV_2000V2R2C20_0008	●
☐	9	PID(COM1-152)	1-152	SOUTH_DEVICE_PID_152	●
☐	10	PID(COM1-153)	1-153	SOUTH_DEVICE_PID_153	●

Total Device Qty.:10

Submit

⚠ **NOTICE**

- If you reset alarms, all the active and historical alarms for the selected device are deleted and the SmartLogger starts to collect new alarms.

- If **Data Clear** is performed on the SUN2000, **Alarm Reset** must be performed on the SmartLogger and NMS. Otherwise, the SmartLogger cannot collect alarm information generated by the SUN2000 after data is cleared.

- If **Alarm Reset** or **Data Clear** is performed on the SmartLogger, **Alarm Reset** must also be performed on the NMS. Otherwise, the NMS cannot obtain alarm information collected by the SmartLogger after alarms are reset.

7.10.7.5 Re-collecting Performance Data

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Maintenance** > **Recollect Performance Data** to access the target page.
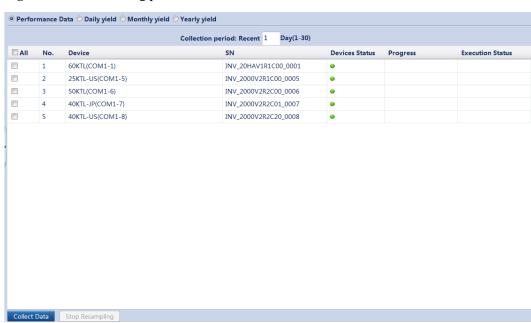
Figure 7-81 Re-collecting performance data

☐ **NOTE**

To re-collect performance data, select **Performance Data**. To re-collect daily, monthly, or yearly energy yield, select **Daily yield**, **Monthly yield**, or **Yearly yield** accordingly. The re-collection results can be queried on the **Monitoring** page.

⚠️ **NOTICE**

When you query SUN2000 performance data after the software version of the SUN2000-33KTL/40KTL is upgraded from SUN2000 V200R001C00SPC*XXX* to SUN2000 V200R001C90SPC*XXX* and performance data is re-collected, daily energy yield data generated before the upgrade cannot be queried.

7.10.7.6 Correcting the Total Energy Yield

Because of permission restriction, log in as **Advanced User** or **Special User**. Choose **Maintenance** > **Adjust total energy yield** to access the target page.

Figure 7-82 Correcting the total energy yield

All	No.	Device	Devices Status	Total energy yield(kWh)	Adjust total energy yield(kWh)	
☐	1	60KTL(COM1-1)	●	0.02	0.00	(0–42949600)
☐	2	20KTL(COM1-3)	●	834.03	0.00	(0–42949600)
☐	3	28KTL(COM1-4)	●	0.01	0.00	(0–42949600)
☐	4	25KTL-US(COM1-5)	●	0.01	0.00	(0–42949600)
☐	5	50KTL(COM1-6)	●	0.01	0.00	(0–42949600)
☐	6	40KTL-JP(COM1-7)	●	0.01	0.00	(0–42949600)
☐	7	40KTL-US(COM1-8)	●	0.01	0.00	(0–42949600)

Total Device Qty.:7

Submit

8 Power Grid Scheduling

8.1 Power Grid Dispatching Modes

Two power grid dispatching modes are available: active power control and reactive power control. Before you perform power control for a power station, set the power control mode to **Enable** and then correctly set related parameters.

8.1.1 Active Power Control

According to standard requirements, the SmartLogger can deliver remote dispatching commands in real time to connected inverters, which ensures that the PV power station can quickly respond to the requirements of the power grid company.

If the power grid or the PV power station is faulty, the power grid dispatcher should limit the active power or disable all the active power for the power station, that is, to enable the active power derating mode.

⚠ **NOTICE**

The SmartLogger controls the active power of connected inverters only when active power control is set to **Enable**.

You need to log in as **Special User** that has the permission to set the active power control. Choose **Settings** > **Active Power Control** to enter the page.
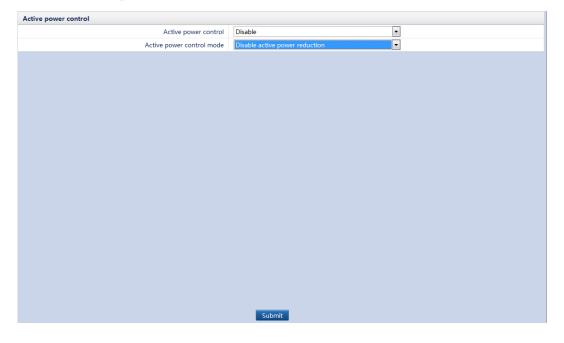
Figure 8-1 Active power control

8.1.2 Reactive Power Control

According to standard requirements, the SmartLogger can send remote dispatching commands in real time to connected inverters, which ensures that the PV power station can quickly respond to the requirements of the power grid company.

Large-scale power stations are required to adjust the voltage at the grid-connected point. Power grid dispatcher enables the power station to absorb or add the reactive power at the grid-connected point, that is, to enable the reactive power compensation, based on the real-time reactive power transmission status in the power grid.

⚠ **NOTICE**

The SmartLogger controls the reactive power of connected inverters only when reactive power control is set to **Enable**.

You need to log in as **Special User** that has the permission to set the reactive power control. Choose **Settings** > **Reactive Power Control** to enter the page.
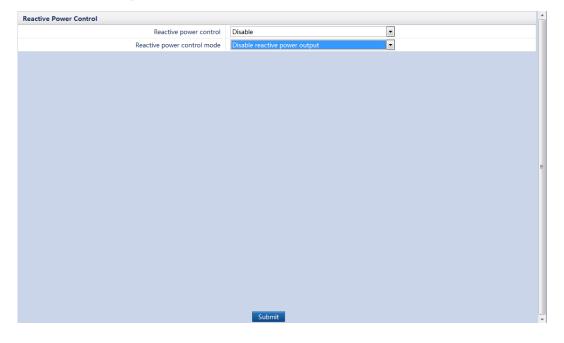
Figure 8-2 Reactive power control

8.2 Application Scenarios
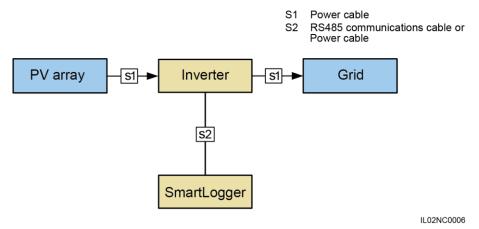
8.2.1 Local Scheduling

Local scheduling applies to a PV plant with the rated power no greater than 100 kW and less than five grid-tied SUN2000s. Because the power system is small, power grid companies have low requirements on power adjustment, which can be achieved by local control.

Some power grid companies do not require remote reactive power control for a PV plant, but require local reactive power adjustment in various modes.

Users can set the control mode over the WebUI based on the actual output characteristics of each PV plant. The SmartLogger can continuously control power output of SUN2000s according to user configurations.

Figure 8-3 Local scheduling

S1 Power cable
S2 RS485 communications cable or Power cable

IL02NC0006

Active Power Control

The SmartLogger provides simplified local active power percentage configuration as well as the local power control automation, that is, to automatically adjust the active power derating percentage in different periods of the day.

Because of permission restriction, log in as **Special User**. Choose **Settings** > **Active Power Control** to access the target page.

- If the SUN2000s are allowed to run overloaded, set **Active Power Control Mode** to **Disable active power reduction**.

⚠️ **NOTICE**

The function takes effect only when **Active Power Control** is set to **Enable**.

- If the maximum output power of the SUN2000s should be controlled, set **Active Power Control Mode** to **Percentage fix limitation**.
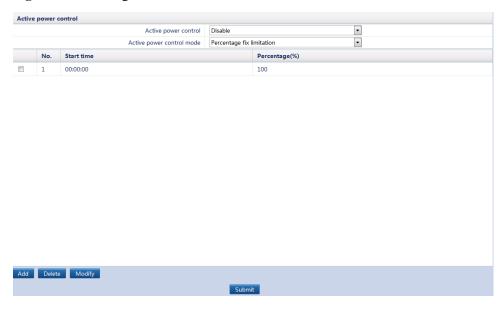
Figure 8-4 Percentage fix limitation

NOTE

- If no separate periods are required, users can set only a start time.
- If the SUN2000s should run under a specified maximum power in certain periods of the day, add records based on the site requirements and set **Start Time** and **Percentage**.
- If the SUN2000s should run at the 70% derated power, add a record and set **Percentage** to **70**.

Reactive Power Control

The SmartLogger provides simplified local reactive power parameters configuration as well as local power control automation, that is, to automatically adjust the power factor or absolute value of the reactive power compensation in different periods of the day.

Because of permission restriction, log in as **Special User**. Choose **Settings** > **Reactive Power Control** to access the target page.

- If the PV plant is not required to adjust the voltage at the grid connection point or perform reactive power compensation, SUN2000s can run with pure active power output. In this case, set **Reactive Power Control Mode** to **Disable reactive power output**.

⚠️ **NOTICE**

The function takes effect only when **Reactive Power Control** is set to **Enable**.

- If the PV plant is required to generate a specified constant reactive power within the power factor range at the grid connection point, set **Reactive Power Control Mode** to **Reactive power fix control**.
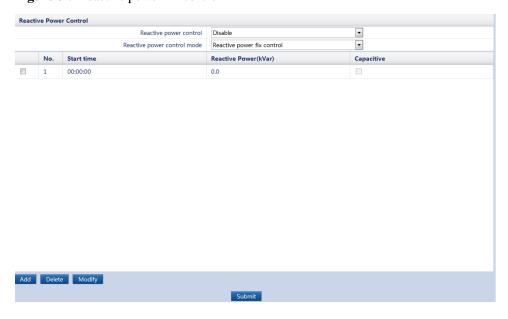
Figure 8-5 Reactive power fix control

> **NOTE**
>
> - If no separate periods are required, users can set only a start time.
> - If a "√" is under **Capacitive**, the power grid supplies capacitive reactive power to the PV plant. If no "√" is under **Capacitive**, the PV plant supplies inductive reactive power to the power grid.
> - The upper threshold for **Reactive Power** is the rated output power sum of all online SUN2000s and the lower threshold is **0**.
> - Limited by the power factor (the maximum range is 1 to 0.8), the reactive power at the grid connection point cannot stay constant when the real-time active power is small.

- If the PV plant is required to generate a constant power factor at the grid connection point and the SUN2000s are required to adjust the real-time reactive power based on the set power factor, set **Reactive Power Control Mode** to **Power factor fix control**.

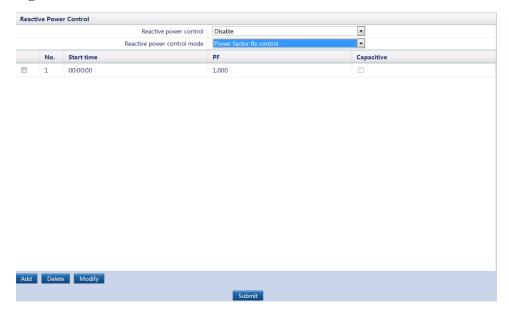**Figure 8-6** Power factor fix control

NOTE

- If no separate periods are required, users can set only a start time.
- If a "√" is under **Capacitive**, the power grid supplies capacitive reactive power to the PV plant. If no "√" is under **Capacitive**, the PV plant supplies inductive reactive power to the power grid.

- If the remote control of the reactive power is not available, the SmartLogger provides the Q-U characteristic curve, cos(Phi)-P/Pn characteristic curve, and Q-U Hysteresis curve(CEI0-16) as a substitute. The power dispatching personnel specifies the characteristic curve according to the requirements of the local power grid and grid-tied power system and sends the signal to all the connected SUN2000s in real time.

  Set **Reactive Power Control Mode** to **Q-U characteristic curve** (as shown in Figure 8-7), **cos(Phi)-P/Pn characteristic curve** (as shown in Figure 8-8), or **Q-U hysteresis curve(CEI0-16)** (as shown in Figure 8-9).

NOTE

- The Q-U characteristic curve control mode is to dynamically adjust the ratio of the output reactive power and apparent power Q/S in accordance with the ratio of the actual grid voltage to rated grid voltage U/Un (%).
- The cos(Phi)-P/Pn characteristic curve control mode is to dynamically adjust the power factor cos(Phi) in accordance with the ratio of the actual SUN2000 output power to rated SUN2000 power P/Pn (%) based on the VDE-4105\BDEW German standard.
- The Q-U Hysteresis curve(CEI0-16) control mode is the Italian standard CEI0-16 version of the Q-U characteristic curve. It dynamically adjusts the output reactive power of the SUN2000 in accordance with the ratio of the actual voltage to the rated voltage. The final value should be in the form of Q/Pn.

⚠ **NOTICE**

Set the parameters of characteristic curves under commands from professionals to ensure that the SUN2000s work properly.
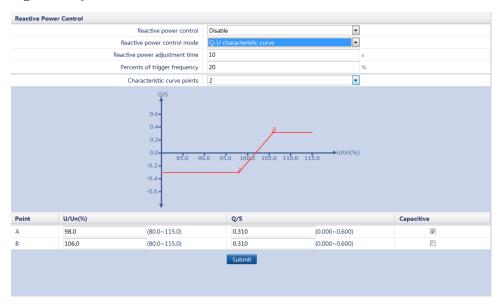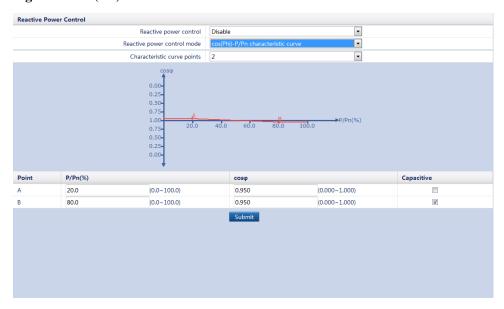

Figure 8-7 Q-U characteristic curve

Figure 8-8 cos(Phi)-P/Pn characteristic curve
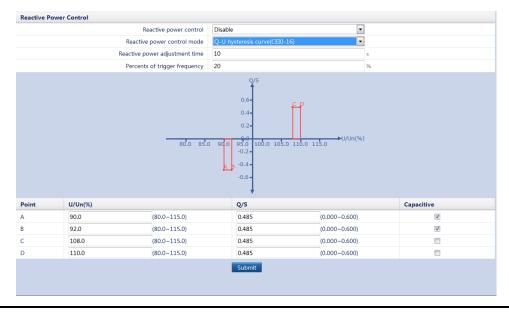
Figure 8-9 Q-U hysteresis curve (CEI0-16)

> ⚠️ **NOTICE**
>
> When you set **Q-U Hysteresis curve (CEI0-16)**, ensure that the **Capacitive** settings of A and B are consistent, the **Capacitive** settings of C and D are consistent, and the **Capacitive** settings of A and B are different from the **Capacitive** settings of C and D.

📖 **NOTE**
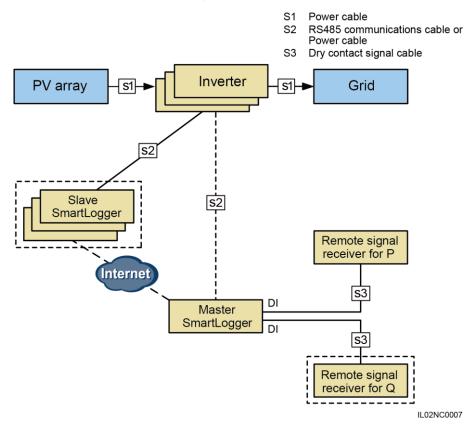
- When you set the curve, ensure that the **U/Un(%)** or **Q/Pn(%)** value of a point is larger than the **U/Un(%)** or **Q/Pn(%)** value of the previous point. Otherwise, the **Invalid input.** message is displayed.

- If a "√" is under **Capacitive**, the power grid supplies capacitive reactive power to the PV plant. If no "√" is under **Capacitive**, the PV plant supplies inductive reactive power to the power grid.

- Both the Q-U characteristic curve and cos(Phi)-P/Pn characteristic curve can support a maximum of 10 valid data points.

- Set **Reactive power adjustment time** to specify the changing intervals of the reactive power for a grid connection point. The range is 5s to 120s.

8.2.2 Dry Contact Scheduling

Dry contact scheduling applies to a PV plant with the rated power greater than 100 kW, where active power and reactive power are remotely adjusted in real time, and the power grid company requires the dry contact mode.

The SmartLogger scans all the dry contact signals sent from the power grid scheduling devices (the wireless receiver controller or power carrier communications devices), converts the signals into valid command data identifiable to the SUN2000s, and sends the data to all the SUN2000s connected to the SmartLogger.

Figure 8-10 Dry contact scheduling

S1	Power cable
S2	RS485 communications cable or Power cable
S3	Dry contact signal cable

IL02NC0007

⚠ **NOTICE**

If a slave SmartLogger is configured in the system, SUN2000s should be connected to the slave SmartLogger instead of the master SmartLogger. Otherwise, SUN2000s that connect to the master SmartLogger cannot execute the power grid scheduling command.

📖 **NOTE**

- The slave SmartLogger and remote signal receiver Q are optional devices for connection.

  If a slave SmartLogger is to be connected, you must add the slave SmartLogger over the WebUI of the master SmartLogger.

- The master SmartLogger connects to the slave SmartLogger over the Ethernet. The slave SmartLogger functions as the network device for the master SmartLogger.

  A slave SmartLogger transfers the commands sent by the master SmartLogger to devices connected to the slave SmartLogger.

- The remote signal receiver receives the scheduling commands sent by the power grid company, converts them into dry contact signals, and then sends them to the master SmartLogger.

  Remote signal receiver P receives the active power scheduling commands. Remote signal receiver Q receives the reactive power scheduling commands.

⚠ **NOTICE**

If a DI port has been set to **Activated** in 7.9.6 Setting DI Parameters, it cannot be set to **Dry contact remote control**.

Active Power Control

Because of permission restriction, log in as **Special User**. Choose **Settings** > **Active Power Control** to access the target page.

Set **Active Power Control Mode** to **Dry contact remote control**.

⚠ **NOTICE**

Ensure that the SmartLogger is properly connected to the ripple control receiver before you set **Active Power Control Mode** to **Dry contact remote control**. For details, see 4.10 Connecting a Ripple Control Receiver.

Figure 8-11 Dry contact remote control

📖 **NOTE**

- A maximum of 16 levels is supported for the active power derating percentage.
- "√" indicates low level. When connecting to GND1, the four DI ports of the SmartLogger are low-level ports. If not connected, the ports are high-level ports.
- The percentage levels of DI1–DI4 should differ from each other. Otherwise, an abnormal command is generated.
- If **Reactive power control mode** is set to **AI/DI remote control**, **Active Power Control** cannot be set to **Dry contact remote control**.

Reactive Power Control

Because of permission restriction, log in as **Special User**. Choose **Settings** > **Reactive Power Control** to access the target page.
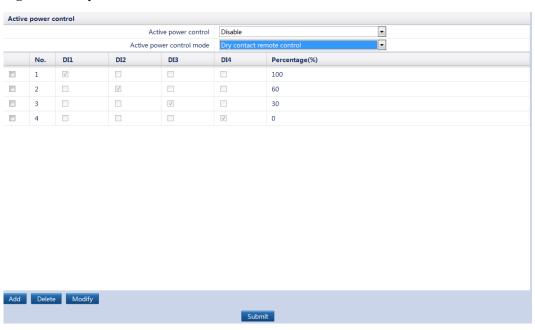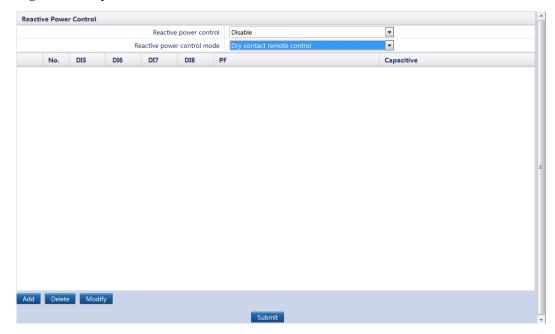
Set **Reactive Power Control Mode** to **Dry contact remote control**, as shown in Figure 8-12.

⚠ **NOTICE**

Ensure that the SmartLogger is properly connected to the ripple control receiver before you set **Reactive Power Control Mode** to **Dry contact remote control**. For details, see 4.10 Connecting a Ripple Control Receiver.

Figure 8-12 Dry contact remote control

📖 **NOTE**

- A maximum of 16 levels is supported for power factors.
- "√" indicates low level. When connecting to GND2, the four DI ports of the SmartLogger are low-level ports. If not connected, the ports are high-level ports.
- The percentage levels of DI5–DI8 should differ from each other. Otherwise, an abnormal command is generated.
- If a "√" is under **Capacitive**, the power factor is a negative value, indicating that the power grid supplies reactive power to the PV plant. If no "√" is under **Capacitive**, the power factor is a positive value, indicating that the PV plant supplies reactive power to the power grid.
- If **Active Power Control** is set to **AI remote control**, **Reactive power control mode** cannot be set to **Dry contact remote control**.
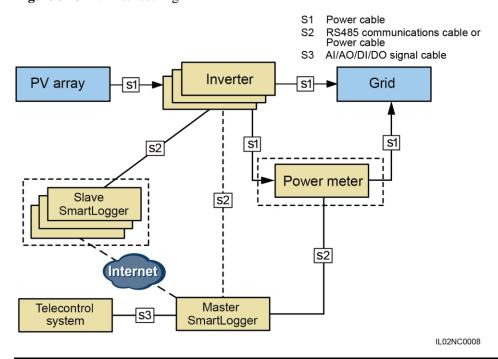
8.2.3 AI/DI Scheduling

AI/DI scheduling applies to a PV plant with high rated output power and complex networking. Power grid companies have high requirements on power adjustment in terms of remote

real-time adjustment modes, precision of adjustment commands, and communication reliability. Besides power adjustment, power grid companies also require each PV plant to provide key sampling data of grid connection points in time.

Each SmartLogger can be connected to a maximum of 200 devices, among which the number of SUN2000s cannot exceed 150. If there are too many SUN2000s to be handled by one SmartLogger in the AI/DI scheduling scenario, a certain number of slave SmartLoggers are required. The master SmartLogger receives a remote scheduling command from a power grid company over the AI/DI port, and then sends it to all slave SmartLoggers. These slave SmartLoggers broadcast the command to all SUN2000s.

Figure 8-13 AI/DI scheduling

NOTICE

If a slave SmartLogger is configured in the system, SUN2000s should be connected to the slave SmartLogger instead of the master SmartLogger. Otherwise, SUN2000s that connect to the master SmartLogger cannot execute the power grid scheduling command.

NOTE

- The master SmartLogger connects to the slave SmartLogger over the Ethernet. The slave SmartLogger functions as the network device for the master SmartLogger.

  If a slave SmartLogger is to be connected, you must add the slave SmartLogger over the WebUI of the master SmartLogger.

- The master SmartLogger forwards the scheduling commands sent by the remote terminal management system to all slave SmartLoggers. The slave SmartLoggers send the commands to the connected SUN2000s.

- The power and voltages at the grid connection point collected by the power meter are compared with the scheduling commands from the power grid company to verify that the PV plant operates in accordance with requirements of the power grid company.

Power Meter Parameter and Grid Connection Feedback Parameter Configuration

To configure the power meter parameters and grid connection feedback parameters, see 7.9.2.3 Setting Power Meter Parameters.

Active Power Control

Because of permission restriction, log in as **Special User**. Choose **Settings** > **Active Power Control** to access the target page.
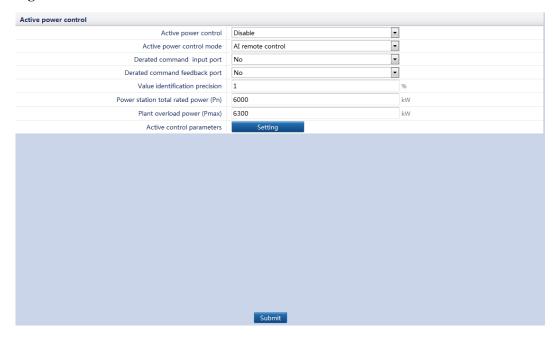
The remote scheduling command sent by the SmartLogger controls the active power output of the PV plant in analog input mode. Set **Active Power Control Mode** to **AI remote control**.

![NOTICE icon]

NOTICE

Before setting **Active Power Control Mode** to **AI remote control**, ensure that connections between the SmartLogger and the remote terminal control system are correct.

Figure 8-14 AI remote control

> **NOTE**
>
> - **Value identification precision** identifies the remote scheduling command variation threshold in the case of active power adjustment to prevent frequent control command sending due to the sampling deviation. Its setting range is 1% to 100%.
>
> - **Power station total rated power (Pn)** is the maximum on-grid power of the PV plant agreed by the PV plant and the power grid company. Confirm this parameter value with the power grid company and set it correctly.
>
> - If **Reactive power control mode** is set to **Dry contact remote control**, **Active Power Control** cannot be set to **AI remote control**.

Reactive Power Control

Because of permission restriction, log in as **Special User**. Choose **Settings** > **Reactive Power Control** to access the target page.
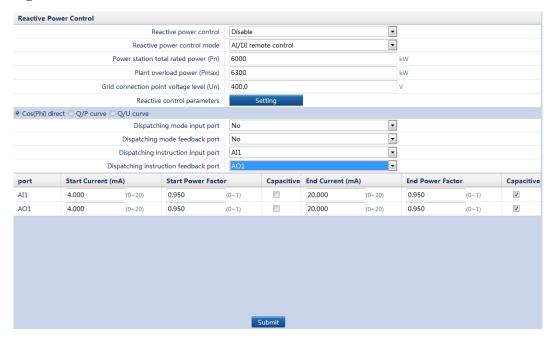
The remote scheduling command sent by the SmartLogger controls the reactive power output of the PV plant in analog input mode. Set **Reactive Power Control Mode** to **AI/DI remote control**.

⚠ **NOTICE**

Before setting **Reactive Power Control Mode** to **AI/DI remote control**, ensure that connections between the SmartLogger and the remote terminal control system are correct.

Figure 8-15 AI/DI remote control
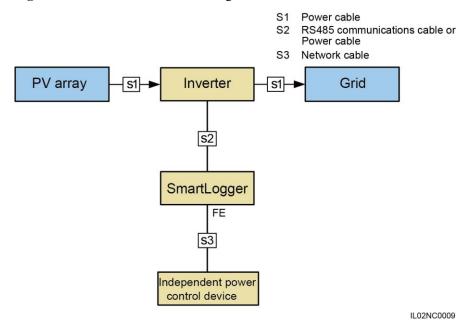
📖 **NOTE**

- **Power station total rated power (Pn)** is the maximum on-grid power of the PV plant agreed by the PV plant and the power grid company. Confirm this parameter value with the power grid company and set it correctly.

- **Grid connection point voltage level (Un)** is the voltage level at the connection point between the PV plant and the power grid. Set this parameter based on the power grid status.

- Set parameters under **Cos(Phi) direct**, **Q/P curve**, and **Q/U curve** in sequence.

- If **Active Power Control** is set to **Dry contact remote control**, **Reactive power control mode** cannot be set to **AI/DI remote control**.

8.2.4 Communication Scheduling

Communication scheduling applies to PV plants in China, where an independent power control device delivers a scheduling command to the SmartLogger over a communication port.

User configurations or operations are not required in this scenario. The SmartLogger can automatically switch to an appropriate scheduling mode and deliver the scheduling command.

Figure 8-16 Communication scheduling

Active Power Control

Because of permission restriction, log in as **Special User**. Choose **Settings** > **Active Power Control** to access the target page.

When **Active Power Control Mode** is set to **Remote scheduling**, the SmartLogger receives the scheduling commands from the upstream NMS, converts them into valid command data identifiable to the SUN2000s, and then sends the data to all the connected SUN2000s. Based on the principle of preference of remote scheduling, the SmartLogger automatically sets **Active Power Control Mode** to **Remote scheduling** after receiving a scheduling command from the upstream NMS.
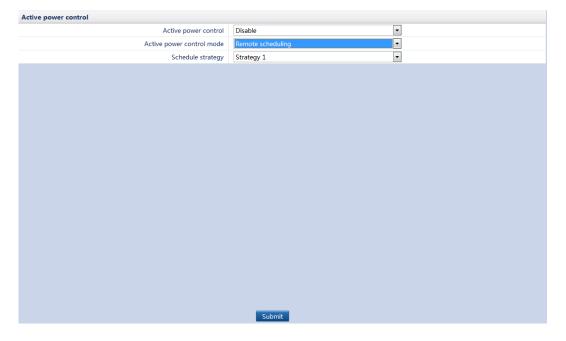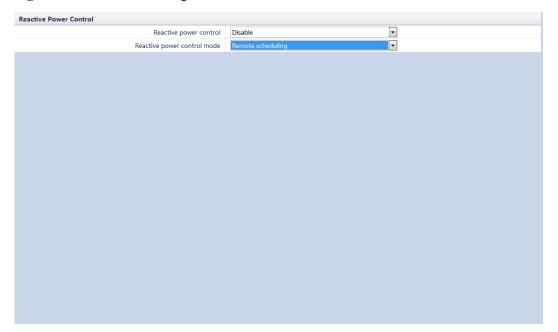
Figure 8-17 Remote scheduling

Reactive Power Control

Because of permission restriction, log in as **Special User**. Choose **Settings** > **Reactive Power Control** to access the target page.

When **Reactive Power Control Mode** is set to **Remote scheduling**, the SmartLogger receives the scheduling commands from the upstream NMS, converts them into valid command data identifiable to the SUN2000s, and then sends the data to all the connected SUN2000s. Based on the principle of preference of remote scheduling, the SmartLogger automatically sets **Reactive Power Control Mode** to **Remote scheduling** after receiving a scheduling command from the upstream NMS.

Figure 8-18 Remote scheduling

9 Device Maintenance

9.1 Routine Maintenance

- Ensure that the SmartLogger is free from strong electromagnetic interference.
- Ensure that the SmartLogger is away from heat sources.
- Ensure that the heat dissipation holes are not blocked.
- Regularly clean the SmartLogger.
- Regularly check that cables are secured.

9.2 Troubleshooting

Table 9-1 Common faults and troubleshooting methods

No.	Symptom	Possible Cause	Suggestion
1	The SmartLogger cannot be powered on.	1. The DC output power cable for the power adapter does not connect to the **12V IN** port of the SmartLogger. 2. The power cable does not connect to the AC power receiving port of the power adapter. 3. The AC input power cable does not connect to the AC socket. 4. The power adapter is faulty. 5. The SmartLogger is faulty.	1. Connect the DC output plug of the power adapter to the **12V IN** port of the SmartLogger. 2. Check that the power cable connects to the AC power receiving port of the power adapter. 3. Check that the power cable connects to the AC socket. 4. Replace the power adapter. 5. Contact the vendor or Huawei technical support.

No.	Symptom	Possible Cause	Suggestion
2	No device is found.	1. The COM port does not connect to any device, or the cable is loose, disconnected, or reversely connected. 2. The RS485 communications parameter values are incorrect. 3. The devices that cannot be detected automatically, such as the EMI and power meter, are not manually added. 4. The EMI parameters are not set correctly. 5. The inverter addresses are beyond the search range of the SmartLogger.	1. Check the RS485 cables. If they are loose, disconnected, or connected reversely, reconnect them securely and correctly. 2. Check the RS485 communications parameters and ensure that the baud rates and communication addresses are set correctly. 3. Manually add the devices that cannot be detected automatically, such as the EMI and power meter. 4. Check that the EMI parameters are set correctly. 5. Change the inverter addresses to within the search range of the SmartLogger.
3	The communication for PLC networking fails.	1. The AC power cable is loose, disconnected, or reversely connected. 2. The upstream circuit breaker for the AC power cable is switched off. 3. The SmartLogger is faulty.	1. Check the AC power cable. If it is loose, disconnected, or connected reversely, reconnect it securely and correctly. 2. Check that the upstream circuit breaker for the AC power cable is switched on. 3. Contact the vendor or Huawei technical support.
4	The communication for optical fiber networking fails.	1. The optical fiber jumper is loose, disconnected, or reversely connected. 2. The Ethernet optical port indicator is faulty. 3. The Ethernet optical port is faulty.	1. Check the optical fiber jumper. If the optical fiber jumper is loose, disconnected, or connected reversely, reconnect it securely and correctly. 2. Check that the Ethernet optical port indicator blinks normally. Contact the vendor or Huawei technical support if the indicator is abnormal. 3. Contact the vendor or Huawei technical support.
5	The device status is displayed as disconnected on the SmartLogger.	1. The cable between the device and the SmartLogger is loose or disconnected. 2. The device is powered off. 3. The baud rate or RS485 address of the device is changed. 4. The device is replaced. 5. The device is removed and not reconnected.	1. Check the cable between the device and the SmartLogger. If it is loose or disconnected, reconnect it securely. 2. Check the device connection and power on the device. 3. Check that the baud rate and RS485 address of the device are set correctly. 4. If any device is replaced, enable the SmartLogger to search for the device again or manually add the device. 5. If the device is removed from the SmartLogger, remove the device on the device management interface.

No.	Symptom	Possible Cause	Suggestion
6	Adding an EMI fails.	1. The RS485 communications cable between the EMI and the SmartLogger is connected incorrectly, loose, or disconnected. 2. The EMI is not powered on. 3. The EMI and SmartLogger use different baud rates. 4. The EMI parameters are not set correctly.	1. Check the RS485 communications cable. If it is loose or disconnected, reconnect it securely and correctly. 2. Power on the EMI. 3. Check that the EMI baud rate is set correctly. 4. Log in to the WebUI and ensure that the EMI parameters are set correctly.
7	The SmartLogger cannot communicate with the NetEco deployed on the PC.	1. The SmartLogger is not connected to the PC, or the cable is loose or disconnected. 2. Ethernet parameters are not set correctly. 3. NetEco parameters are not set correctly.	1. Check that the Ethernet electrical port or optical port of the SmartLogger correctly connects to a PC or router. 2. Check that Ethernet parameters are set correctly. 3. Check that NetEco parameters are set correctly.
8	The SmartLogger cannot communicate with the optical port of the Ethernet switch.	1. The Ethernet switch is not powered on. 2. The optical module is not inserted into the SmartLogger or is inserted incorrectly. 3. The optical jumper is loose or disconnected. 4. The optical jumper is connected reversely.	1. Check that the remote Ethernet switch is powered on. If no, power it on. 2. Check whether the optical module is inserted based on the status of the indicator for the SmartLogger optical port. If the module is not inserted, insert it. 3. Check that the optical jumper is securely connected. If the jumper is loose or disconnected, reconnect it securely. 4. Check that the transmit end (TX) of the SmartLogger optical port connects to the receive end (RX) of the Ethernet switch optical port. If the optical jumper is reversely connected, reconnect it correctly.

9.3 Alarm List

Table 9-2 describes the common alarms and the troubleshooting methods for the SmartLogger.

Table 9-2 Alarm list

Alarm ID	Alarm Name	Alarm Severity	Alarm Sub-ID	Cause	Measures
1100	Abnormal P-Control	Major	1	Under the active power **AI remote control** mode, the AI port receives currents outside the configuration range.	1. On ADAM4117, verify that the port corresponding to the AI SN in use is connected to a cable properly. If the cable is not connected firmly, is disconnected, or is not connected correctly, reconnect it firmly and correctly. 2. Access the active power **AI remote control** configuration page and check that the start and end current settings of the AI comply with the requirements of the power grid company. 3. Access the **Extended Port Settings** page and check that the current configuration of the AI number is consistent with the current specification of the ADAM4117. 4. Contact the power grid company and verify that the command data sent from the company is correct.
			2	Under the active power **AI remote control** mode, the command data of the AI port cannot be read due to the ADAM fault, power disconnection, or abnormal link.	1. Verify that the communications cable is connected correctly to the ADAM4117 module and SmartLogger. Verify that the RS485 addresses are not duplicate, and that the baud rate is the same as that of the corresponding SmartLogger port. 2. Verify that the auxiliary power supply of the ADAM4117 module is normal.
			3	Under the active power **AI remote control** mode, the feedback command data of the AO port cannot be read due to the ADAM fault, power disconnection, or abnormal link.	1. Verify that the communications cable is connected correctly to the ADAM4024 module and SmartLogger. Verify that the RS485 addresses are not duplicate, and that the baud rate is the same as that of the corresponding SmartLogger port. 2. Verify that the auxiliary power supply of the ADAM4024 module is normal.

Alarm ID	Alarm Name	Alarm Severity	Alarm Sub-ID	Cause	Measures
			4	Under the active power **Dry contact remote control** mode, the four DI ports read command combinations not configured.	1. Verify that the cables are connected correctly to the DI ports. 2. Access the active power **Dry contact remote control** configuration page and check the mapping table of the DI signal configuration. Contact the power grid company and verify that the combination configurations in the table are complete and meet the requirements of the company.
1101	Abnormal Q-Control	Major	1	Under the reactive power **AI/DI remote control** mode, the AI port receives currents outside the configuration range.	1. On ADAM4117, verify that the port corresponding to the AI SN in use is connected to a cable properly. If the cable is not connected firmly, is disconnected, or is not connected correctly, reconnect it firmly and correctly. 2. Access the reactive power **AI/DI remote control** configuration page and check that the start and end current settings of the AI comply with the requirements of the power grid company. 3. Access the **Extended Port Settings** page and check that the current configuration of the AI number is consistent with the current specification of the ADAM4117. 4. Contact the power grid company and verify that the command data sent from the company is correct.
			2	Under the reactive power **AI/DI remote control** mode, the command data of the AI port cannot be read due to the ADAM fault, power disconnection, or abnormal link.	1. Verify that the communications cable is connected correctly to the ADAM4117 module and SmartLogger. Verify that the RS485 addresses are not duplicate, and that the baud rate is the same as that of the corresponding SmartLogger port. 2. Verify that the auxiliary power supply of the ADAM4117 module is normal.

Alarm ID	Alarm Name	Alarm Severity	Alarm Sub-ID	Cause	Measures
			3	Under the reactive power **AI/DI remote control** mode, the command data of the AO port cannot be read due to the ADAM fault, power disconnection, or abnormal link.	1. Verify that the communications cable is connected correctly to the ADAM4024 module and SmartLogger. Verify that the RS485 addresses are not duplicate, and that the baud rate is the same as that of the corresponding SmartLogger port. 2. Verify that the auxiliary power supply of the ADAM4024 module is normal.
			4	Under the reactive power **Dry contact remote control** mode, the four DI ports read command combinations not configured.	1. Verify that the cables are connected correctly to the DI ports. 2. Access the reactive power **Dry contact remote control** configuration page and check the mapping table of the DI signal configuration. Contact the power grid company and verify that the combination configurations in the table are complete and meet the requirements of the company.
1102	Abnormal Meter Data	Major	1	An exception occurs when power meter data is sent to third-party scheduling devices because ADAM is faulty, powered off, or disconnected.	1. Verify that the communications cable is connected correctly to the ADAM4024 module and SmartLogger. Verify that the RS485 addresses are not duplicate, and that the baud rate is the same as that of the corresponding SmartLogger port. 2. Verify that the auxiliary power supply of the ADAM4024 module is normal.
1103	Breaker Disconnect	Major	1	The general breaker at the grid connection point is disconnected.	Check whether the disconnection is normal. If it is abnormal, contact service engineers to restore the breaker.
1104	Abnormal Cubicle	Major	1	The Cubicle device has detected an exception at the grid connection point.	When the Cubicle alarm is enabled, check whether the DI signal received by the SmartLogger is consistent with the dry contact status. If so, restart the SUN2000.

Alarm ID	Alarm Name	Alarm Severity	Alarm Sub-ID	Cause	Measures
1105	Device Address Conflict	Major	1	The SmartLogger RS485 address conflicts with the physical address (RS485 address) or logical address for the connected southbound device.	• If the SmartLogger RS485 address conflicts with the physical address for the connected southbound device, choose **Settings** > **Modbus TCP** and change the SmartLogger address, or choose **Maintenance** > **Device Mgmt.** > **Connect Device** and change the southbound device address. If the southbound device is a SUN2000, you can change its address on the app. • If the SmartLogger RS485 address conflicts with the logical address for the connected southbound device, choose **Settings** > **Modbus TCP** and change the SmartLogger address.
1106	AC SPD fault	Major	1	The SPD in the smart array controller is faulty.	• Check whether the cable to the SPD in the smart array controller is loose, disconnected, or connected in reverse. If so, reconnect the cable securely. • Check whether the SPD in the smart array controller is faulty. Replace the faulty SPD.
1107–1114	DI1 custom alarm–DI8 custom alarm	Major	1	The dry contact signal from the peripheral to the corresponding DI port on the SmartLogger is abnormal.	• Check the DI port cable connection. If the cable is loose, disconnected, or connected in reserve, reconnect it securely. • Verify that the relevant device works properly.
1115	24V power failure	Major	1	The 24 V power module in the smart array controller is faulty.	• Check whether the cable to the 24 V power module in the smart array controller is loose, disconnected, or connected in reverse. If so, reconnect the cable securely. • Check whether the 24 V power module in the smart array controller is faulty. Replace the faulty power module.

10 SmartLogger Disposal

If the service life of the SmartLogger expires, dispose of the SmartLogger according to the local disposal act for waste electric appliances.

11 Technical Specifications

Device Management

Item	SmartLogger
Maximum number of managed devices	200
Maximum number of managed inverters	150
Communication mode	Six RS485 ports, two Ethernet electrical ports, two Ethernet optical ports, and PLC
Maximum communication distance	RS485: 1000 m; Ethernet: 100 m; optical fiber: 12,000 m

Display

Item	SmartLogger
Bluetooth	SUN2000 app access
LED	Four LED indicators
WebUI	Embedded WebUI

Common Parameters

Item	SmartLogger
Power supply	100–240 V AC, 50 Hz/60 Hz
Operating frequency	2402–2480 MHz
Output Power	1 dBm (+/–3 dB)
Power consumption	Normal: 8 W; maximum: 15 W

Item		SmartLogger
Language		English, Chinese, German, Italian, French, Japanese, and Russian
Dimensions (W x H x D)	Including mounting ears	411 mm x 170 mm x 58.6 mm
	Excluding mounting ears	350 mm x 170 mm x 43.6 mm
Weight		2.39 kg
Operating temperature		–40 ℃ to +60 ℃
Storage temperature		–40 ℃ to +70 ℃
Relative humidity (non-condensing)		5%–95%
Protection level		IP20
Installation mode		Installed on a wall or guide rail, or inside Huawei smart array controller
Altitude		4000 m[a]
a: When the altitude ranges from 3000 m to 4000 m, the temperature decreases by 1 ℃ for each additional 200 m.		

Ports

Item	SmartLogger
Ethernet electrical port	10/100 M
Ethernet optical port	100 M[a]
PLC port	1
RS485	6; supported baud rates: 2400 bit/s, 4800 bit/s, 9600 bit/s, 19,200 bit/s, and 115,200 bit/s
USB	USB2.0
Digital input	8, supporting only the access from relay dry contacts
Digital output	3, relay dry contact output, normally open by default, supporting the 12 V @ 200 mA power source
Analog input	2, PT100/PT1000 port
	7[b]
Analog output port	4, 4–20 mA and 0–20 mA current output

Item	SmartLogger
a: Supports only the 100M optical module. To obtain the optical module and optical jumper (1310 nm, single-mode), you can purchase Huawei's optical ring fitting bag. b: AI1 supports 0–10 V input voltage (passive); AI2–AI7 support 0–20 mA and 4–20 mA input current (passive).	

A Product User Lists

Table A-1 Monitoring user lists

Login Mode	User Name	Initial Password
App	Common User	00000a
	Advanced User	00000a
	Special User	00000a
Web	Common User	Changeme
	Advanced User	Changeme
	Special User	Changeme
NetEco	emscomm	/EzFp+2%r6@IxSCv

Table A-2 Operating system user lists

User Name	Initial Password
enspire	Changeme
root	Changeme
prorunacc	No initial password
bin	No initial password
daemon	No initial password
nobody	No initial password
sshd	No initial password

B Certification Declaration

FCC

1. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

    – Reorient or relocate the receiving antenna.

    – Increase the separation between the equipment and receiver.

    – Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

    – Consult the dealer or an experienced radio/TV technician for help.

2. This device complies with FCC radiation exposure limits set forth for an uncontrolled environment.

3. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

> ⚠ **CAUTION**
>
> Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CE

Hereby, Huawei Technologies Co., Ltd., declares that this device is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: http://www.huawei.com

C Acronyms and Abbreviations

A

AC	alternating current
AI	analog input
AO	analog output
APP	application

C

CCO	central coordinator
COM	communication

D

DI	digital input
DO	digital output

E

EMI	environmental monitoring instrument
ETH	Ethernet

L

LED	light-emitting diode

P

PLC	power line communication

R

RSTP   Rapid Spanning Tree Protocol

S

SFP   small form-factor pluggable

STA   station

STP   Spanning Tree Protocol

W

WEEE   waste electrical and electronic equipment