FIMER

VSN2025-01 DataLogger

Product Manual

About This Document

Purpose

This document introduces the DataLogger and Switch in terms of installation, electrical connections, system operation, maintenance, and troubleshooting. Readers should understand the features, functions, and safety precautions of the DataLogger and Switch provided in this document before installing and operating the them.

Intended Audience

This document is intended for operating personnel and qualified electricians of photovoltaic (PV) and energy storage plants.

Symbol Conventions

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

Symbol	Description
	**WARNING** Indicates a hazard with a **high level** of risk which, if not avoided, will result in death or serious injury.
	**ATTENTION** Indicates a hazard with a **medium/ low** level of risk which, if not avoided, could result in serious or moderate injury.
	Supplements the important information in the main text. **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 01 (2026-05-27)

This issue is the first official release.

EN

Table of Content

1. Safety Information

Statement

Before transporting, storing, installing, operating, using, and/or maintaining the equipment, read this document, strictly follow the instructions provided herein, and follow all the safety instructions on the equipment and in this document. In this document, "equipment" refers to the products, software, components, spare parts, and/or services related to this document; "the Company" refers to the manufacturer (producer), seller, and/or service provider of the equipment; "you" refers to the entity that transports, stores, installs, operates, uses, and/or maintains the equipment.

The **Warning**, **Attention**, and **Note** statements described in this document do not cover all the safety precautions. You also need to comply with relevant international, national, or regional standards and industry practices. **The Company shall not be liable for any consequences that may arise due to violations of safety requirements or safety standards concerning the design, production, and usage of the equipment.**

The equipment shall be used in an environment that meets the design specifications. Otherwise, the equipment may be faulty, malfunctioning, or damaged, which is not covered under the warranty. The Company shall not be liable for any property loss, personal injury, or even death caused thereby.
Comply with applicable laws, regulations, standards, and specifications during transportation, storage, installation, operation, use, and maintenance.

Do not perform reverse engineering, decompilation, disassembly, adaptation, implantation, or other derivative operations on the equipment software. Do not study the internal implementation logic of the equipment, obtain the source code of the equipment software, violate intellectual property rights, or disclose any of the performance test results of the equipment software.

The Company shall not be liable for any of the following circumstances or their consequences:

- The equipment is damaged due to force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weather conditions.
- The equipment is operated beyond the conditions specified in this document.
- The equipment is installed or used in environments that do not comply with international, national, or regional standards.
- The equipment is installed or used by unqualified personnel.
- You fail to follow the operation instructions and safety precautions on the product and in the document.
- You remove or modify the product or modify the software code without authorization.
- You or a third party authorized by you cause the equipment damage during transportation.
- The equipment is damaged due to storage conditions that do not meet the requirements specified in the product document.
- You fail to prepare materials and tools that comply with local laws, regulations, and related standards.
- The equipment is damaged due to your or a third party's negligence, intentional breach, gross negligence, or improper operations, or other reasons not related to the Company.

1.1 Personal Safety

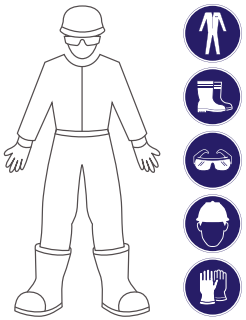
⚠ **WARNING –** Ensure that power is off during installation. Do not install or remove a cable with power on. Transient contact between the core of the cable and the conductor will generate electric arcs or sparks, which may cause a fire or personal injury.

⚠ **WARNING –** Non-standard and improper operations on the energized equipment may cause fire, electric shocks, or explosion, resulting in property damage, personal injury, or even death.

⚠ **WARNING –** Before operations, remove conductive objects such as watches, bracelets, bangles, rings, and necklaces to prevent electric shocks.

⚠ **WARNING –** During operations, use dedicated insulated tools to prevent electric shocks or short circuits. The dielectric withstanding voltage level must comply with local laws, regulations, standards, and specifications.

Personal protective equipment



General Requirements

- Do not stop protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment.
- If there is a likelihood of personal injury or equipment damage during operations, immediately stop, report the case to the supervisor, and take feasible protective measures.
- Do not power on the equipment before it is installed or confirmed by professionals.
- In the case of a fire, immediately leave the building or the equipment area and activate the fire alarm or call emergency services. Do not enter the affected building or equipment area under any circumstances.

Personnel Requirements

- Only professionals and trained personnel are allowed to operate the equipment.
  - Professionals: personnel who are familiar with the working principles and structure of the equipment, trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, maintenance
  - Trained personnel: personnel who are trained in technology and safety, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves and other people
- Personnel who plan to install or maintain the equipment must receive adequate training, be able to correctly perform all operations, and understand all necessary safety precautions and local relevant standards.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Personnel who will perform special tasks such as electrical operations, working at heights, and operations of special equipment must possess the required local qualifications.
- Only authorized professionals are allowed to replace the equipment or components (including software).
- Only personnel who need to work on the equipment are allowed to access the equipment.

1.2 Electrical Safety

⚠ **WARNING –** Non-standard and improper operations may result in fire or electric shocks.

⚠ **WARNING –** Prevent foreign matter from entering the equipment during operations. Otherwise, equipment short-circuits or damage, load power derating, power failure, or personal injury may occur.

⚠ **ATTENTION –** For the equipment that needs to be grounded, install the ground cable first when installing the equipment and remove the ground cable last when removing the equipment.

General Requirements

- Follow the procedures described in the document for installation, operation, and maintenance. Do not reconstruct or alter the equipment, add components, or change the installation sequence without permission.
- Obtain approval from the national or local electric utility company before connecting the equipment to the grid.
- Before installing or removing power cables, turn off the switches of the equipment and its upstream and downstream switches.
- If any liquid is detected inside the equipment, disconnect the power supply immediately and do not use the equipment.
- Before performing operations on the equipment, check that all tools meet the requirements and record the tools. After the operations are complete, collect all of the tools to prevent them from being left inside the equipment.
- Before installing power cables, check that cable labels are correct and cable terminals are insulated.
- When installing the equipment, use a torque tool of a proper measurement range to tighten the screws. When using a wrench to tighten the screws, ensure that the wrench does not tilt and the torque error does not exceed 10% of the specified value.
- If the equipment has multiple inputs, disconnect all the inputs and wait until the equipment is completely powered off before performing operations on the equipment.
- Check equipment connections periodically, ensuring that all screws are securely tightened.
- Only qualified professionals can replace a damaged cable.
- Do not scrawl, damage, or block any labels or nameplates on the equipment. Promptly replace labels that have worn out.
- Do not use solvents such as water, alcohol, or oil to clean electrical components inside or outside of the equipment.

Grounding

- Ensure that the grounding impedance of the equipment complies with local electrical standards.
- Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check its electrical connection to ensure that it is reliably grounded.
- Do not work on the equipment in the absence of a properly installed ground conductor.
- Do not damage the ground conductor.
- For the equipment that uses a three-pin socket, ensure that the ground terminal in the socket is connected to the protective ground point.
- If high touch current may occur on the equipment, ground the protective ground terminal on the equipment enclosure before connecting the power supply; otherwise, electric shock as a result of touch current may occur.

Cabling Requirements

- When selecting, installing, and routing cables, follow local safety regulations and rules.
- When routing power cables, ensure that there is no coiling or twisting. Do not join or weld power cables. If necessary, use a longer cable.
- Ensure that all cables are properly connected and insulated, and meet specifications.
- Ensure that the slots and holes for routing cables are free from sharp edges, and that the positions where cables are routed through pipes or cable holes are equipped with cushion materials to prevent the cables from being damaged by sharp edges or burrs.
- Ensure that cables of the same type are bound together neatly and straight and that the cable sheath is intact. When routing cables of different types, ensure that they are away from each other without entanglement and overlapping.

1.3 Environment Requirements

⚠ **WARNING –** Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.

⚠ **WARNING –** Do not place the equipment near heat sources or fire sources, such as smoke, candles, heaters, or other heating devices. Overheat may damage the equipment or cause a fire.

⚠ **ATTENTION –** Install the equipment in an area far away from liquids. Do not install it under areas prone to condensation, such as under water pipes and air exhaust vents, or areas prone to water leakage, such as air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits.

General Requirements

- Ensure that the equipment is stored in a clean, dry, and well ventilated area with proper temperature and humidity and is protected from dust and condensation.
- Keep the installation and operating environments of the equipment within the allowed ranges. Otherwise, its performance and safety will be compromised.
- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, performing outdoor installation, and opening doors) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Do not install the equipment in an environment with direct sunlight, dust, smoke, volatile or corrosive gases, infrared and other radiations, organic solvents, or salty air.
- Do not install the equipment in an environment with conductive metal or magnetic dust.
- Do not install the equipment in an area conducive to the growth of microorganisms such as fungus or mildew.
- Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference.
- After installing the equipment, remove the packing materials such as cartons, foam, plastics, and cable ties from the equipment area.

1.4 Mechanical Safety

⚠ **WARNING –** When working at heights, wear a safety helmet and safety harness or waist belt and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.

⚠ **ATTENTION –** Ensure that all necessary tools are ready and inspected by a professional organization. Do not use tools that have signs of scratches or fail to pass the inspection or whose inspection validity period has expired. Ensure that the tools are secure and not overloaded.

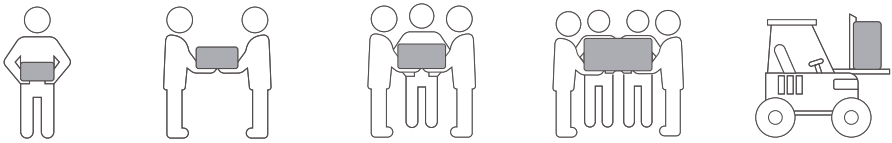
⚠ **ATTENTION –** Do not drill holes into the equipment. Doing so may affect the sealing performance and electromagnetic containment of the equipment and damage components or cables inside. Metal shavings from drilling may short-circuit boards inside the equipment.

General Requirements

- Do not perform operations such as arc welding and cutting on the equipment without evaluation by the Company.
- Do not install other devices on the top of the equipment without evaluation by the Company.
- Use correct tools and operate them in the correct way.

Moving Heavy Objects

- Be cautious to prevent injury when moving heavy objects.



< 18 kg (< 40 lbs)	18-32 kg (40-70 lbs)	32-55 kg (70-121 lbs)	55-68 kg (121-150 lbs)	> 68 kg (> 150 lbs)

- If multiple persons need to move a heavy object together, determine the manpower and work division with consideration of height and other conditions to ensure that the weight is equally distributed.
- If two persons or more move a heavy object together, ensure that the object is lifted and landed simultaneously and moved at a uniform pace under the supervision of one person.
- Wear personal protective gears such as protective gloves and shoes when manually moving the equipment.
- To move an object by hand, approach to the object, squat down, and then lift the object gently and stably by the force of the legs instead of your back. Do not lift it suddenly or turn your body around.
- Move or lift the equipment by holding its handles or lower edges. Do not hold the handles of modules that are installed in the equipment.
- Do not quickly lift a heavy object above your waist. Place the object on a workbench that is half-waist high or any other appropriate place, adjust the positions of your palms, and then lift it.
- Move a heavy object stably with balanced force at an even and low speed. Put down the object stably and slowly to prevent any collision or drop from scratching the surface of the equipment or damaging the components and cables.
- When moving a heavy object, be aware of the workbench, slope, staircase, and slippery places. When moving a heavy object through a door, ensure that the door is wide enough to move the object and avoid bumping or injury.
- When transferring a heavy object, move your feet instead of turning your waist around. When lifting and transferring a heavy object, ensure that your feet point to the target direction of movement.

2. Product Overview

2.1 DataLogger

2.1.1 Networking

Functions

The DataLogger monitors and manages PV systems and energy storage systems (ESSs). It converges all ports, converts protocols, collects and stores data, and centrally monitors and maintains the devices in the systems.

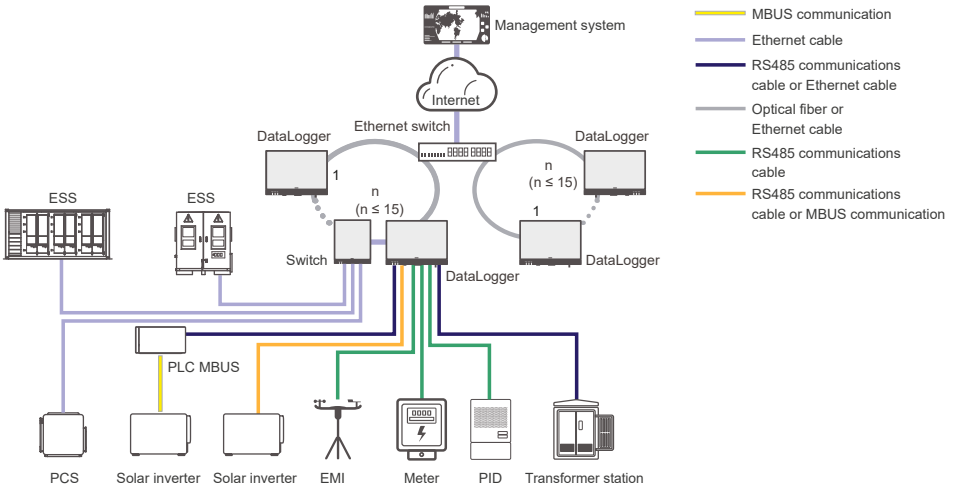
Networking Application

The DataLogger is applicable to PV systems and ESSs. It supports the following:

- RS485 networking, which enables the DataLogger to connect to:
  - Devices such as inverters and PID modules.
  - Third-party inverters, environment monitoring instruments (EMIs), Transformer Stations, and Meters that use the Modbus RTU protocol.
  - Meters that use the DL/T645 protocol.
  - Devices that use the IEC 103 protocol.
- Ethernet networking, which enables the DataLogger to connect to the inverters, Power Control System (PCS), String ESSs, PLC MBUS, and Transformer Stations.
- PLC MBUS networking, which enables the DataLogger to connect to inverters and PID-PVBOXs that support PLC MBUS communication.
- Dual-plane redundancy networking to provide reliable transmission.
- Connection to management systems:
  - Connects to a management system or a third-party device that uses the Modbus-TCP protocol.
  - Connects to a management system or a third-party device that uses the IEC 104 protocol in the LAN.
  - Connects to a management system or a third-party device that uses the GOOSE protocol.

Typical Networking Scenarios

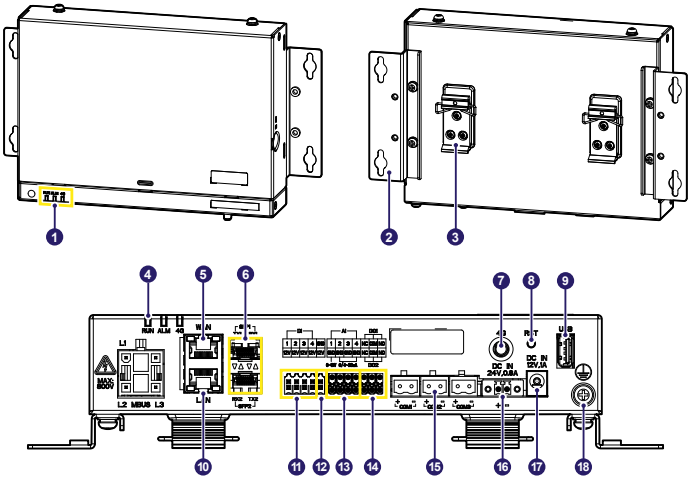
The DataLogger supports the following northbound wired networks: Optical Fiber or Ethernet network.



NOTE

- In a fiber ring configuration a maximum of 15 DataLoggers can be connected in a single loop. In a star configuration (fiber or ethernet), multiple DataLoggers can be connected over Ethernet switches.
- The fiber channel switch must support and enable the standard RSTP, and the bridge priority of the switch must be higher than 0x8000 of the DataLogger (recommended value: 0x7000; a smaller value indicates a higher bridge priority). For details about how to configure the RSTP and bridge priority of the switch, contact the vendor. If the switch does not support the RSTP, the fiber ring topology must be changed to a chain or star topology.
- When the DataLogger connects to an Ethernet switch over optical fibers, the maximum communication distance is 12 km (with the 100M optical module) or 10 km (with the 1000M optical module). The maximum communication distance is 100 m when an Ethernet cable is used for connection.
- Multiple fiber ring networks can be connected to the management system over Ethernet switches.

2.1.2 Appearance



(1) LED indicators	(2) Mounting ear	(3) Guide rail clamp
(4) PLC MBUS port	(5) GE port (WAN)	(6) SFP ports
(7) Antenna port (This function is not supported by certain models.)	(8) RST button	(9) USB port
10) GE port (LAN)	(11) DI ports	(12) 12 V output power port
(13) AI ports	(14) DO ports	(15) COM ports
(16) 24 V input power port	(17) 12 V input power port	(18) Protective ground point

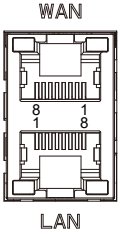
Indicators

Indicator	Status		Description
Running indicator (RUN) 	Green off		The DataLogger is not powered on.
	Blinking green slowly (on for 1s and then off for 1s)		The communication with the management system is normal.
	Blinking green fast (on for 0.125s and then off for 0.125s)		The communication with the management system is interrupted.
Alarm/Maintenance indicator (ALM) 	Alarm status	Red off	No system alarm is raised.
		Blinking red slowly (on for 1s and then off for 4s)	The system raises a warning alarm.
		Blinking red fast (on for 0.5s and then off for 0.5s)	The system raises a minor alarm.
		Steady red	The system raises a major alarm.
	Maintenance status	Green off	No local maintenance is in progress.
		Blinking green slowly (on for 1s and then off for 1s)	Local maintenance is in progress.
		Blinking green fast (on for 0.125s and then off for 0.125s)	Local maintenance failed.
		Steady green	Local maintenance succeeds.

NOTE – If an alarm and local maintenance happen concurrently, the alarm/maintenance indicator shows the local maintenance state first. After local maintenance ends, the indicator shows the alarm state.

Communications Ports

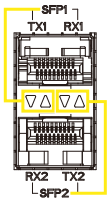
- GE ports: Ethernet ports, including one WAN port and one LAN port

Appearance	GE Port		Description
	Pins	PIN1	1+
		PIN2	1–
		PIN3	2+
		PIN4	3+
		PIN5	3–
		PIN6	2–
		PIN7	4+
		PIN8	4–
	Indicators	Green indicator	If the indicator is steady green, the line is normal.
		Yellow indicator	If the indicator blinks yellow, data communication is normal.

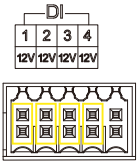
- SFP ports: include two Ethernet optical ports (SFP1 and SFP2), support access of 100M/1000M SFP or eSFP optical modules, and implement ring networking using RSTP or STP.

NOTE – 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.

– The SFP1 and SFP2 ports are Ethernet optical ports and work on the same network segment as the WAN port.

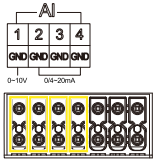
Appearance	SFP Port		Description
	SFP1	TX1	Transmit port
		RX1	Receive port
	SFP2	RX2	Receive port
		TX2	Transmit port
	Indicators	Green indicator	If the indicator is steady green, the line is normal.
		Yellow indicator	If the indicator blinks yellow, data communication is normal.

- DI ports: digital input ports, which are used to connect to DI power grid scheduling commands or alarm signals.

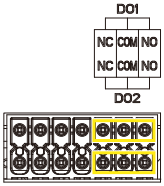
Appearance	DI Port		Description
	DI1	1 12V	Can connect to four passive dry contact signals.
	DI2	2 12V	
	DI3	3 12V	
	DI4	4 12V	

EN

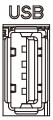
- AI ports: analog input ports, which are used to connect to AI power grid scheduling commands or environment monitoring sensors.

Appearance	AI Port		Description
	AI1	1	Supports one channel of voltage-type (0–10 V) AI signals.
		GND	
	AI2	2	Support three channels of current-type (0–20 mA or 4–20 mA) AI signals.
		GND	
	AI3	3	
		GND	
	AI4	4	
		GND	

- DO ports: digital output ports, supporting two relay outputs. A DO port supports a maximum of 12 V signal voltage.

Appearance	DO Port		Description
	DO1	NC	• The NC/COM is a normally closed contact. • The NO/COM is a normally open contact.
		COM	
		NO	
	DO2	NC	
		COM	
		NO	

- USB port: supports USB2.0 for connecting to a USB flash drive.

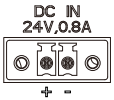
Appearance	USB Port	Description
	USB	After a USB flash drive is inserted into the USB port, you can perform local maintenance operations on the DataLogger, such as software upgrade and data export.

- COM ports: RS485 communications port, supporting three independent RS485 channels and the access of devices that comply with the Modbus RTU, IEC 103, or DL/T645 protocol.

Appearance	COM Port		Description
	COM1, COM2, and COM3	+	RS485A, RS485 differential signal+
		–	RS485B, RS485 differential signal–

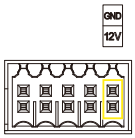
Power Ports

- Input power ports: There are two input power ports.

Appearance	Input Power Port		Description
	12 V input power port	DC IN 12 V, 1 A	DC2.0 input port, which supports 12 V DC input and is used to connect to a power adapter.
	24 V input power port	DC IN 24 V, 0.8 A	2-pin cord end terminal, which supports 24 V DC input. When the device connects to the power supply through the 12 V input power port, this port can be used as the 12 V output power port.

- 12 V output power port: There is one 12 V output power port. Its maximum output capability is 0.1 A. The port is used to drive the coil of the intermediate relay in the export limitation or audible and visual alarm scenario.

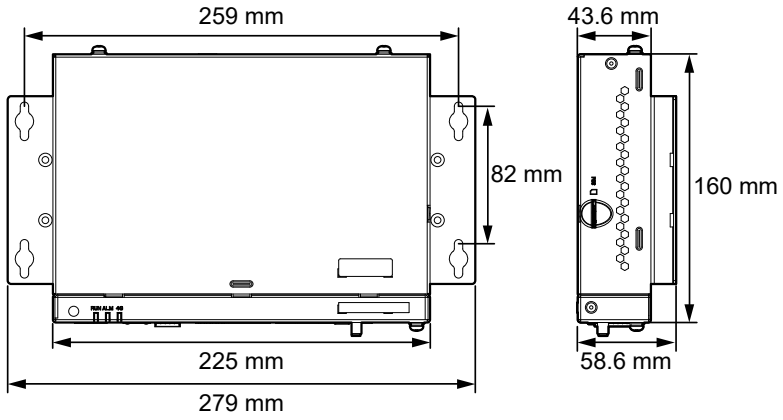
NOTE – Select the intermediate relay with a free-wheeling diode in the coil. Otherwise, the device may be damaged.

Appearance	Output Power Port		Description
	12 V output power port	GND	Power supply–
		12V	Power supply+

RST Button

Operation	Function Description
Hold down the button for 10s to 20s.	If you hold down the RST button for 10s to 20s, the DataLogger enters the safe mode. In this case, the device configuration parameters are retained, but personal privacy and sensitive data, including the login password and email address, are cleared.
Hold down the button for more than 60s.	Within 3 minutes after the DataLogger is powered on, wait until the RUN indicator blinks slowly and hold down the RST button for more than 60s. When the RUN indicator is on again, the DataLogger restarts and restores its factory settings.

Dimensions



2.2 Switch

2.2.1 Networking

Functions

The Switch monitors and manages PV systems and ESSs, with the primary function of extending ports for the DataLogger.

Networking Application

The Switch is applicable to PV systems and ESSs. It supports Ethernet networking to connect the ESSs and DataLogger.

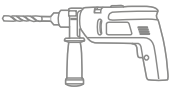
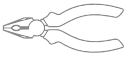
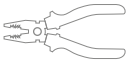
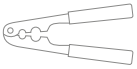
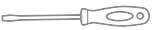
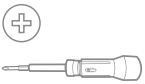
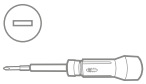
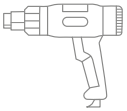
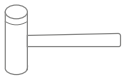
Feature	TP-Link Omada IES206G	PLANET IGS-5225-4T2S-V3
Product Class	Industrial Easy Managed Switch	Industrial L2+ Managed Switch
Ethernet Ports	4× 1G RJ45	4× 1G RJ45
Fiber Ports	1× Combo RJ45/SFP + 1× SFP	2× 1G/2.5G SFP
Total Ports	6	6
Switching Capacity	12 Gbps	14 Gbps
Packet Forwarding	8.93 Mpps	~10.4 Mpps
Layer Support	L2	Advanced L2+
VLAN Support	Yes (802.1Q, Port VLAN, MTU VLAN)	Yes (advanced VLAN support)
STP/RSTP	Yes	Yes + MSTP
QoS	Basic QoS	Advanced QoS
Link Aggregation	Static only	Static + LACP
IGMP Snooping	Yes	Yes
Routing Features	No	Static IPv4 routing
Industrial Temp	-40°C to 75°C	-40°C to 75°C
Redundant Power	Yes (dual DC input)	Yes (dual DC input)
Alarm Relay	Yes	Yes
Surge Protection	6 kV	6 kV ESD/EFT protection
Enclosure	IP40 Aluminum	IP30 Metal
Mounting	DIN rail / wall	DIN rail
Fanless	Yes	Yes
Management	Web GUI + Omada Cloud	Web GUI, CLI, SNMP
Cloud Management	Omada SDN	No native cloud ecosystem
SNMP	Limited/basic	Full SNMP support
CLI Access	No	Yes
Industrial Protocols	Basic industrial focus	Better OT/SCADA integration
Cybersecurity Features	Basic	ACLs, DHCP Snooping, 802.1X, TACACS+
Best Fit	**Small industrial edge deployments**	**Advanced industrial/enterprise OT networks**

3. Device Installation

3.1 Checking Before Installation

Check Item	Criteria
Outer packaging	The outer package is intact. If it is damaged or abnormal, do not unpack it and contact your dealer.
Deliverables	Check the quantity of deliverables against the Packing List in the packing case. If any component is missing or damaged, contact your dealer.

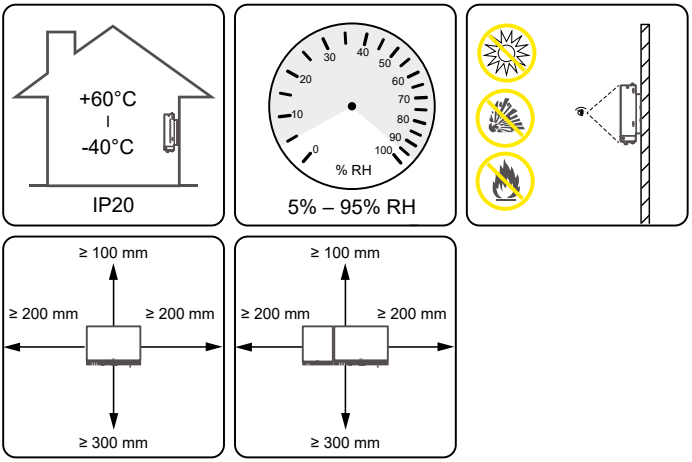
3.2 Tools

Type	Tool			
Installation	 Hammer drill	 Diagonal pliers	 Wire stripper	 Crimping tool
	 RJ45 crimping tool	 Flat-head screwdriver	 Phillips insulated torque screwdriver	 Flat-head insulated torque screwdriver
	 Utility knife	 Cable cutter	 Vacuum cleaner	 Marker
	 Measuring tape	 Cable tie	 Heat gun	 Multimeter
	 Heat shrink tubing	 Level	 Rubber mallet	
PPE	 Insulated gloves	 Safety goggles	 Dust mask	 Insulated shoes

3.3 Installation Requirements

NOTE – Do not install the DataLogger in areas with flammable and explosive materials and direct sunlight.
– The DataLogger shall be installed at a proper height to facilitate operation and maintenance.

Installation position



3.4 Installing the DataLogger

The DataLogger can be wall-mounted or guide rail-mounted.

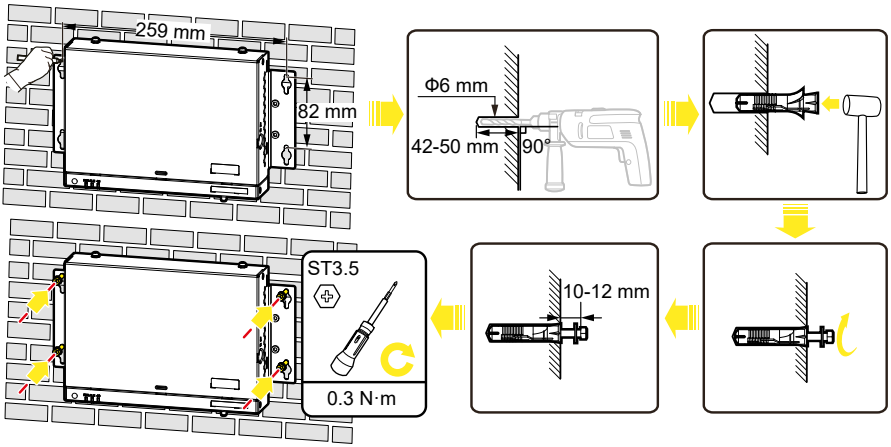
Wall-mounted Installation

ATTENTION – Avoid drilling holes into the water pipes and power cables buried in the wall.

ATTENTION – Install a device on a flat and secure interior wall.

ATTENTION – When wall-mounting the DataLogger, ensure that the cable connection area faces downwards for ease of cable connection and maintenance.

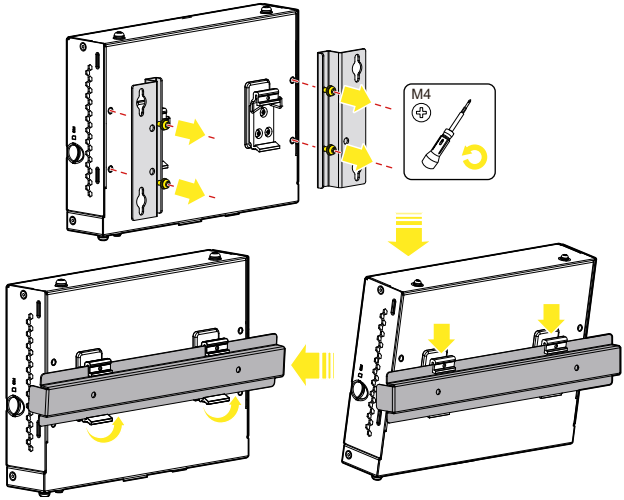
ATTENTION – You are advised to use the tapping screws and expansion tubes delivered with the device.



Guide Rail-mounted Installation

Prepare a 35 mm standard guide rail by yourself. Ensure that the guide rail:

- Has sufficient length for securing the DataLogger. The recommended effective length is 230 mm or greater.
- Has been secured before you install the DataLogger.



3.5 Installing a Power Adapter

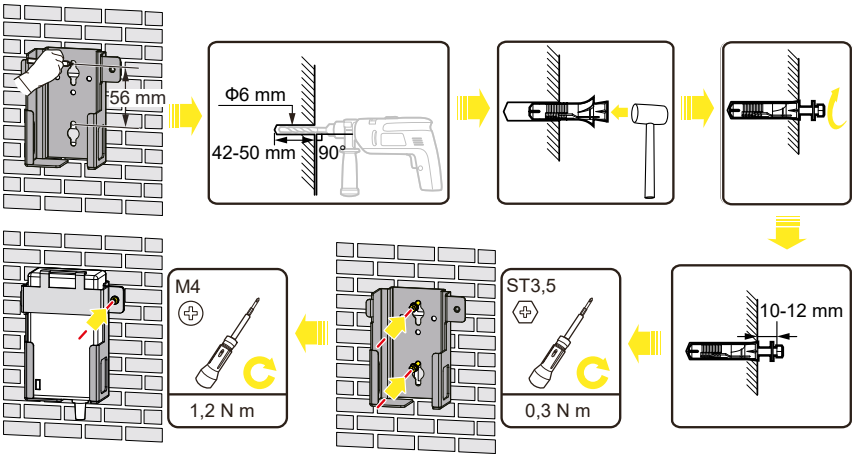
A power adapter can be installed on a wall or flat surface.
If the DataLogger requires a power adapter for power supply, install a power adapter.

Wall-mounted Installation

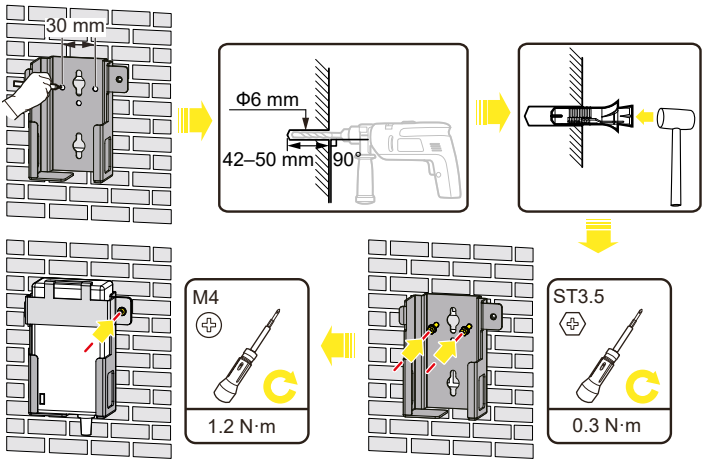
It is recommended that the power adapter be installed on the right side of the DataLogger. Keep the AC power cable port upward.

⚠ **ATTENTION –** Avoid drilling holes into the water pipes and power cables buried in the wall.

Wall-mounted installation (mode 1)



Wall-mounted installation (mode 2)



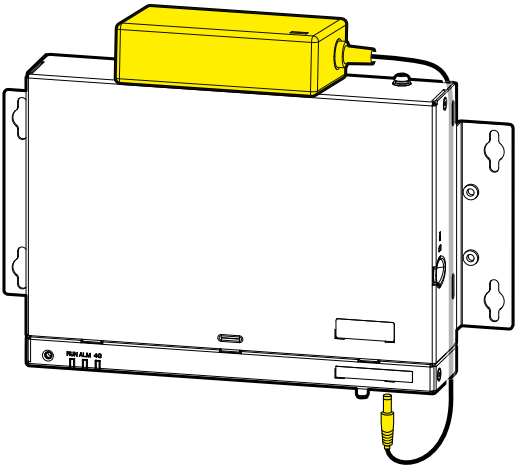
Flat Surface-mounted Installation

Install the power adapter on a flat surface. This section describes how to install the power adapter on the top of the DataLogger.

STEP 1 Place the power adapter horizontally on the top of the DataLogger.

NOTE – Ensure that the power adapter indicator faces upward or outward.
– Ensure that the adapter is securely installed.

STEP 2 Plan the cable route of the power adapter



4. Cable Connections

4.1 Connecting Cables to the DataLogger

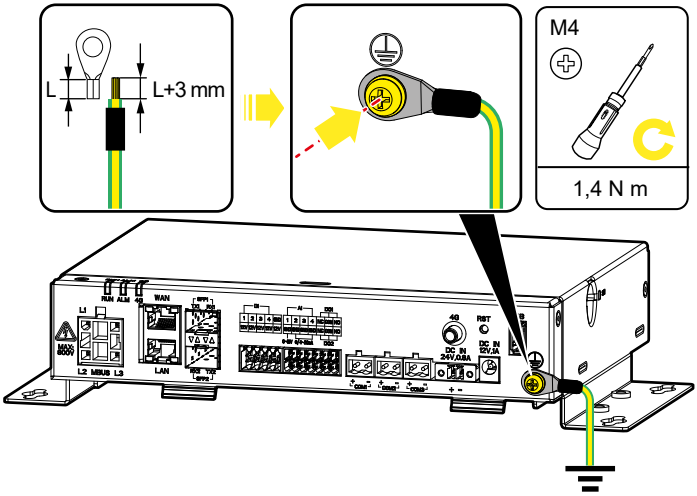
4.1.1 Preparing Cables

Type	Recommended Cable Specifications
PE cable	Outdoor copper-core cable with a cross-sectional area of 4–6 mm2 or 12–10 AWG
RS485 communications cable	Two-core or multi-core outdoor shielded cable with a cross-sectional area of 0.2–2.5 mm2 or 24–14 AWG
(Optional) PLC MBUS cable	Delivered with the DataLogger 1.5 m long
DI signal cable	Two-core or multi-core cable with a cross-sectional area of 0.2–1.5 mm2 or 24–16 AWG
Output power cable	
AI signal cable	
DO signal cable	
Network cable	Delivered with the DataLogger, 2.2 m long. If the delivered network cable is too short, you are advised to prepare a network cable of Cat 5e or higher specifications and shielded RJ45 connectors.
(Optional) 24 V input power cable	Two-core cable with a cross-sectional area of 0.2–1.5 mm2 or 24–16 AWG

4.1.2 Connecting a PE Cable

Procedure

STEP 1 Connect a PE cable.



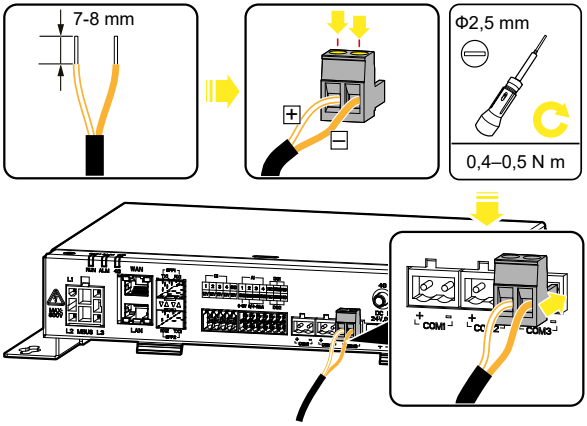
4.1.3 Connecting an RS485 Communications Cable

Context

- The DataLogger can connect to RS485 communications devices, such as an inverter, an EMI, a Meter, and a PID module over the COM port.
- Ensure that RS485+ is connected to COM+ of the DataLogger and RS485– is connected to the COM– of the DataLogger.

Procedure

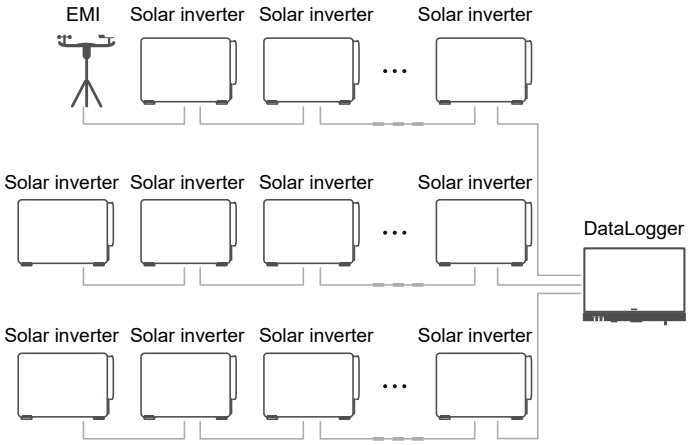
STEP 1 Connect an RS485 communications cable.



Port	Silk Screen	Description
COM1, COM2, and COM3	+	RS485A, RS485 differential signal+
	–	RS485B, RS485 differential signal–

STEP 2 If devices need to be cascaded, cascade the devices and then connect them to the DataLogger.

NOTE
- You are advised to connect fewer than 30 devices to each RS485 route.
- The baud rate, communications protocol, and parity mode of all devices on an RS485 cascading link must be the same as those of the COM port on the DataLogger.



4.1.4 Connecting an PLC MBUS Cable

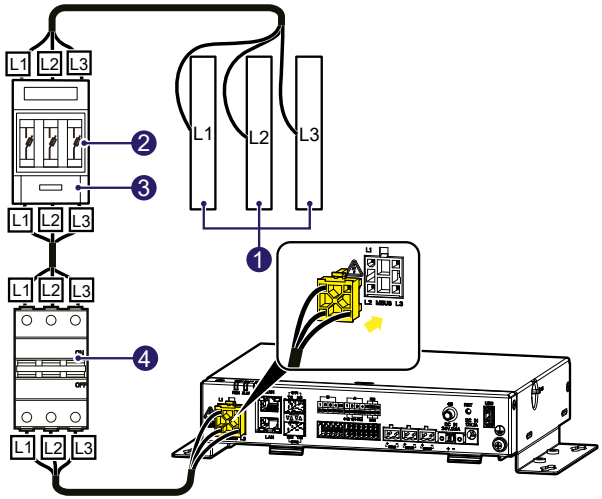
Context

- If both the DataLogger and the inverter support PLC MBUS, the DataLogger can be connected to the inverter through an AC power cable. In this case, you do not need to connect the RS485 communications cable to the inverter.
- If the DataLogger uses an AC power cable as the communications cable, a miniature circuit breaker (MCB) and a fuse switch disconnector need to be installed to prevent device damage in the case of short circuits.

NOTE
- If the inverter uses both PLC MBUS and RS485 for communication, choose **Settings** > **Comm. Param.** > **RS485**, and set **Protocol to Modbus-Control**. If this step is not performed, the power grid dispatching function will be affected.
- The total rated power of the PV system connected to the PLC MBUS port of the DataLogger must be greater than 75 kW. The distance between the device and the residential area must be greater than 30 m. Overhead cabling is prohibited.

Procedure

STEP 1 Connect an PLC MBUS cable.



Components

No.	Component	Specifications	Quantity
1	Busbar L1/ L2/L3	-	1
2	Fuse	• When the rated AC voltage on the low-voltage side of the Transformer Station is less than or equal to 500 V, the rated voltage of the fuse shall be greater than or equal to 500 V; when the rated AC voltage on the low-voltage side of the Transformer Station is greater than 500 V and less than or equal to 800 V, the rated voltage of the fuse shall be greater than or equal to 800 V. • When the rated AC voltage on the low-voltage side of the Transformer Station is less than or equal to 500 V, the rated current of the fuse shall be greater than or equal to 6 A; when the rated AC voltage on the low-voltage side of the Transformer Station is greater than 500 V and less than or equal to 800 V, the rated current of the fuse shall be greater than or equal to 32 A.	3
3	Fuse switch disconnector	• When the rated AC voltage on the low-voltage side of the Transformer Station is less than or equal to 500 V, the rated voltage of the fuse switch disconnector shall be greater than or equal to 500 V; when the rated AC voltage on the low-voltage side of the Transformer Station is greater than 500 V and less than or equal to 800 V, the rated voltage of the fuse switch disconnector shall be greater than or equal to 800 V. • When the rated AC voltage on the low-voltage side of the Transformer Station is less than or equal to 500 V, the rated current of the fuse switch disconnector shall be greater than or equal to 6 A; when the rated AC voltage on the low-voltage side of the Transformer Station is greater than 500 V and less than or equal to 800 V, the rated current of the fuse switch disconnector shall be greater than or equal to 32 A. The fuse switch disconnector has three poles.	1

No.	Component	Specifications	Quantity
4	MCB	• When the rated AC voltage on the low-voltage side of the Transformer Station is less than or equal to 500 V, the rated voltage of the MCB shall be greater than or equal to 500 V; when the rated AC voltage on the low-voltage side of the Transformer Station is greater than 500 V and less than or equal to 800 V, the rated voltage of the MCB shall be greater than or equal to 800 V. • When the rated AC voltage on the low-voltage side of the Transformer Station is less than or equal to 500 V, the rated current of the MCB shall be greater than or equal to 6 A and less than or equal to 32 A; when the rated AC voltage on the low-voltage side of the Transformer Station is greater than 500 V and less than or equal to 800 V, the rated current of the MCB shall be 32 A.	1

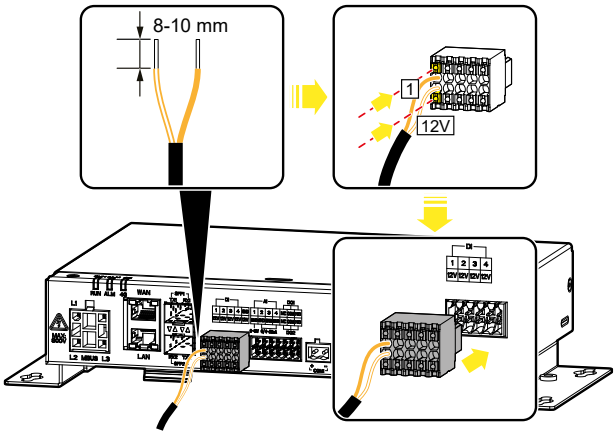
4.1.5 Connecting a DI Signal Cable

Context

The DataLogger can receive DI signals such as remote power grid scheduling commands and alarms over DI ports. It can only receive passive dry contact signals. It is recommended that the signal transmission distance be less than or equal to 10 m.

Procedure

STEP 1 Connect a DI signal cable.



Port		Silk Screen	Description
DI	DI1	1	Can connect to four passive dry contact signals.
		12V	
	DI2	2	
		12V	
	DI3	3	
		12V	
	DI4	4	
		12V	

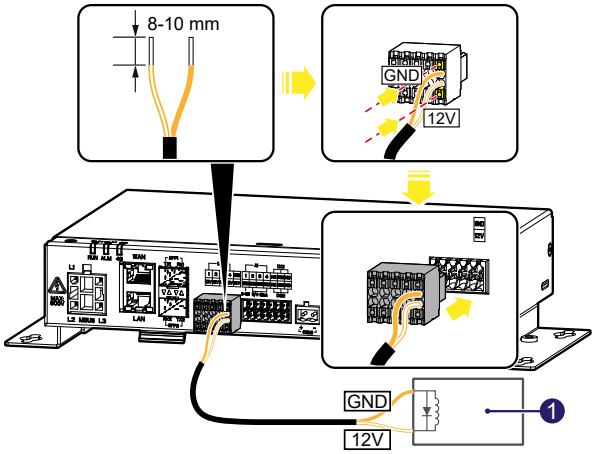
4.1.6 Connecting the Output Power Cable

Context

In the export limitation or audible and visual alarm scenario, the DataLogger can drive the coil of the intermediate relay through the 12 V output power port. It is recommended that the transmission distance be less than or equal to 10 m.

Procedure

STEP 1 Connect the output power cable.



(1) Intermediate relay

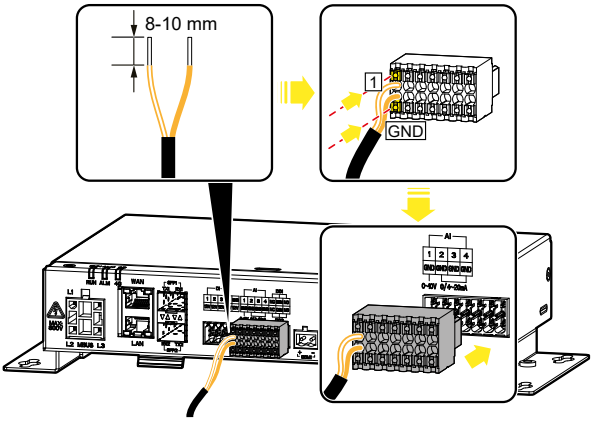
4.1.7 Connecting the AI Signal Cable

Context

The DataLogger can receive AI signals from EMIs over AI ports. It is recommended that the signal transmission distance be less than or equal to 10 m.

Procedure

STEP 1 Connect the AI signal cable.



Port		Silk Screen	Description
AI	AI1	1	Supports 0–10 V input voltage.
		GND	
	AI2	2	Support 0–20 mA or 4–20 mA input current.
		GND	
	AI3	3	
		GND	
	AI4	4	
		GND	

NOTE – AI ports 1, 2, 3, and 4 are for AI+ signals, and the GND port is for AI– signals.

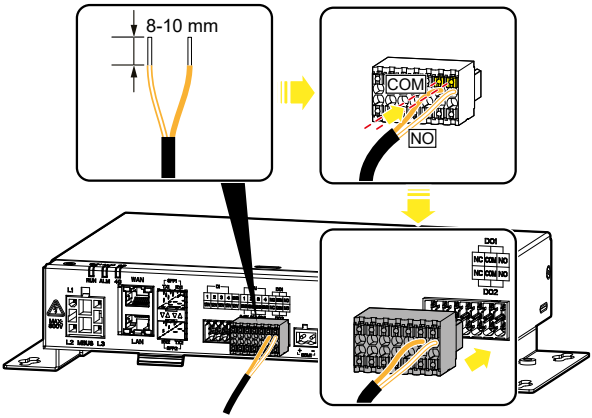
4.1.8 Connecting the DO Signal Cable

Context

The DO port supports a maximum of 12 V signal voltage. The NC/COM is a normally closed contact, while the NO/COM is a normally open contact. It is recommended that the signal transmission distance be less than or equal to 10 m.

Procedure

STEP 1 Connect the DO signal cable.



4.1.9 Connecting the Ethernet Cable

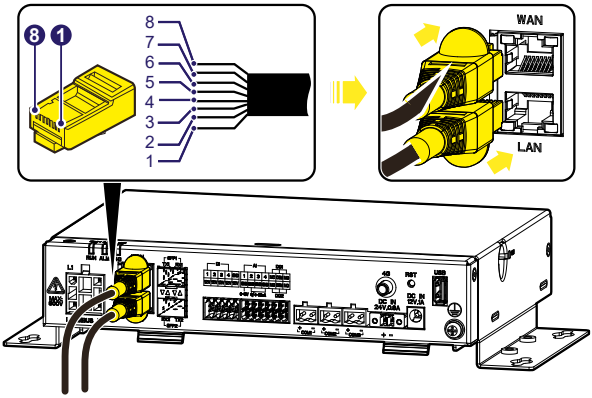
Context

- The DataLogger can connect to an Ethernet switch, router, or PC over a WAN port.
- The DataLogger can be connected to the Switch or a PC over the LAN port.

Procedure

STEP 1 Connect the Ethernet cable.

NOTE – When crimping the network cable, ensure that the shielding layer of the cable is securely connected to the metal shell of the RJ45 connectors.



(1) White-and-orange	(4) Blue	(7) White-and-brown
(2) Orange	(5) White-and-blue	(8) Brown
(3) White-and-green	(6) Green	

4.1.10 Connecting Fiber Jumpers

Context

The DataLogger can connect to devices such as the ATB through optical fibers.

Procedure

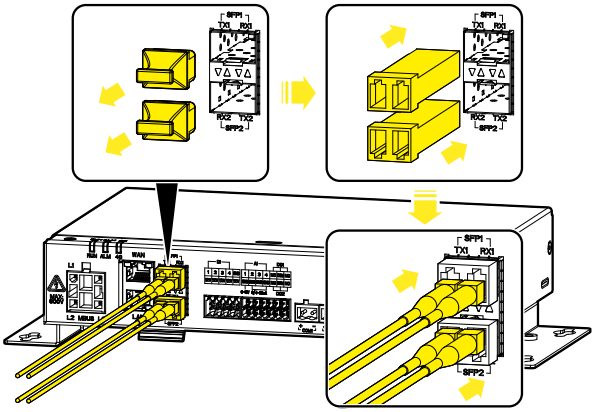
STEP 1 Insert optical modules into the SFP1 and SFP2 ports of the DataLogger.

NOTE – Optical modules are optional. Configure the 100M or 1000M optical module based on the peer port of the optical switch. SFP or eSFP optical modules should be used. The transmission distance supported by the 100M optical module should be less than or equal to 12 km, and the transmission distance supported by the 1000M optical module should be less than or equal to 10 km.

– When inserting an optical module into the SFP1 port, verify that the side with a label faces upward. When inserting an optical module into the SFP2 port, verify that the side with a label faces downward.

– In dual-plane redundancy networking, SFP1 and SFP2 can connect to the northbound monitoring system (IEC104) of the DataLogger at the same time.

STEP 2 Connect the fiber jumpers delivered with the optical modules to the ports on the optical modules.



Follow-up Procedure

Disconnection can be performed in reverse order.

NOTE
- When removing a fiber jumper, press down the clip first.
- When removing an optical module, pull it out by the handle. Ensure that the interval between removing and inserting an optical module is greater than 0.2s.

4.1.11 Connecting the 24 V Input Power Cable

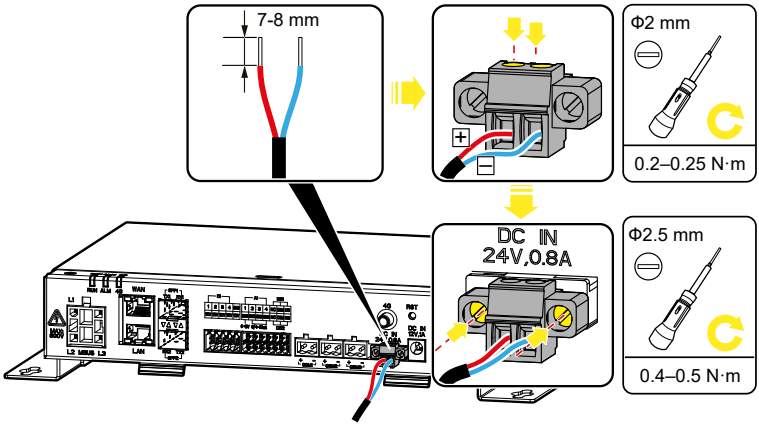
Context

The 24 V input power cable needs to be connected in the following scenarios:

- Scenario 1: The 24 V DC power supply is used.
- Scenario 2: The DataLogger connects to the power supply through the 12 V input power port, and the 24 V input power port functions as the 12 V output power port to supply power to devices.

Procedure

STEP 1 Connect the input power cable.

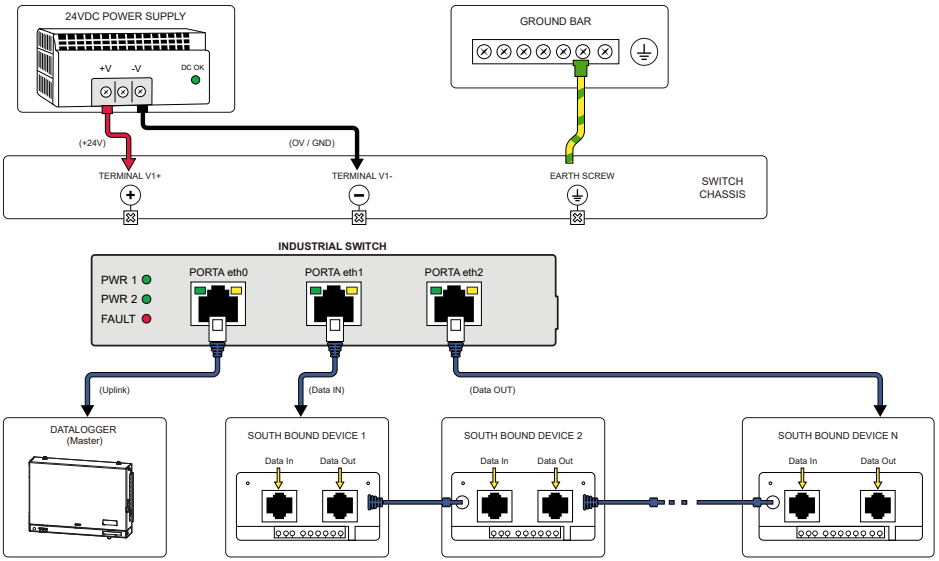


4.2 Connecting Cables to the Switch

Context:

- Proper DC power wiring for industrial network switch.
- Earth grounding of the switch chassis for safety/noise protection.
- Industrial Ethernet network topology where:
- Datalogger acts as the master/uplink device.
- Multiple south-bound field devices are connected through the switch and daisy-chained together.

⚠ **WARNING –** Make sure the power supply matches the specifications of the selected industrial switch



5. System Operation

5.1 Check Before Power-On

No.	Expected Result
1	The DataLogger and Switch are installed correctly and securely.
2	All cables are connected securely.
3	Power cables and signal cables are routed according to the requirements for routing electrical and ELV cables and in compliance with the cable routing plan.
4	Cables are bound neatly, and cable ties are spaced evenly, secured properly, and face the same direction.
5	There is no unnecessary adhesive tape or cable ties on cables.

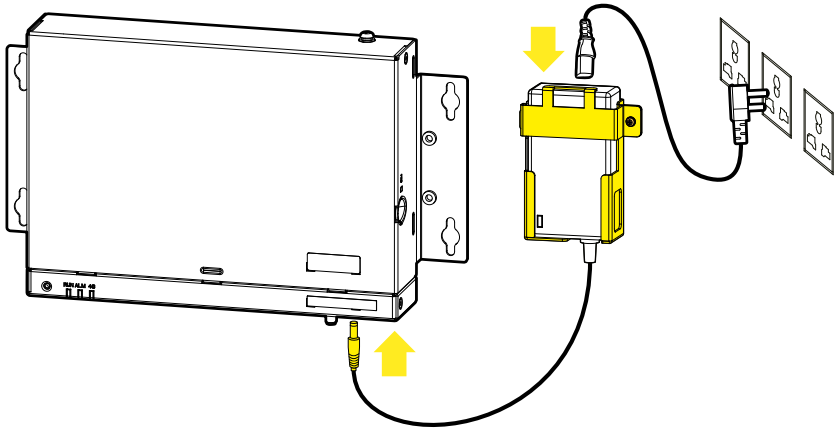
5.2 Powering On the System

STEP 1 Connect the power supply.

- **Method 1**: When a power adapter is used, connect the power adapter cable and turn on the switch on the AC socket side.

NOTE
– The rated input voltage of the power adapter is 100–240 V AC, and the rated input frequency is 50/60 Hz.
– Select an AC socket that matches the power adapter.

Power supply through the power adapter



- **Method 2**: When a DC power supply is used, check that the cable between the DC power supply and the DataLogger as well as the Switch is connected properly, and turn on the upstream power switch of the DC power supply.

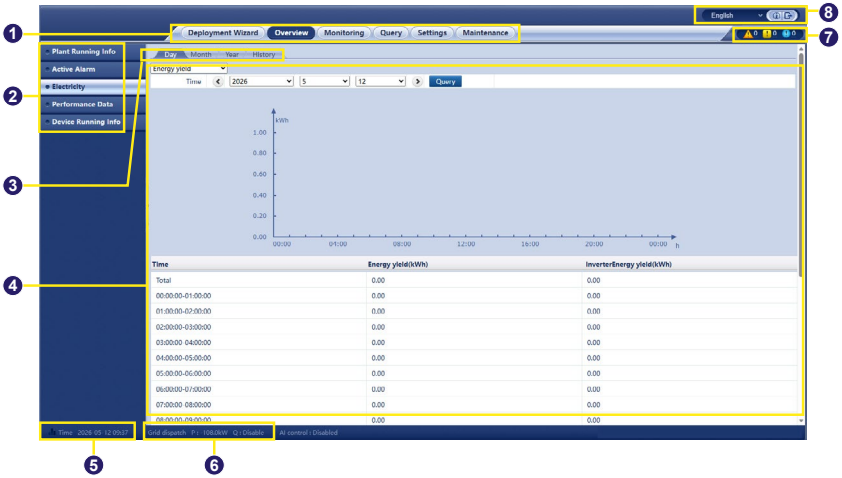
STEP 2 When PLC MBUS is used for communication, turn on all the upstream switches of the PLC MBUS port.

6. WebUI Operations

6.1 Introduction to WebUI

NOTE
- The web user interface (WebUI) figures in this document are for reference only. The actual WebUI may vary.
- The parwameter names, value ranges, and default values are subject to change. The actual display may vary.
- Delivering a reset, shutdown, or upgrade command to the inverter and PCS may cause the inverter and PCS to disconnect from the grid, which affects the energy yield.
- Only professionals are allowed to set the grid parameters, protection parameters, feature parameters, and power adjustment parameters of the inverter and PCS. If the power grid parameters, protection parameters, and feature parameters are incorrectly set, the inverter and PCS may disconnect from the power grid. If the power adjustment parameters are incorrectly set, the inverter and PCS may fail to connect to the power grid as required. In these cases, the energy yield will be affected.
- Only professionals are allowed to set the power grid scheduling parameters of the DataLogger. Incorrect settings may cause the plant to fail to connect to the power grid as required, which affects the energy yield.

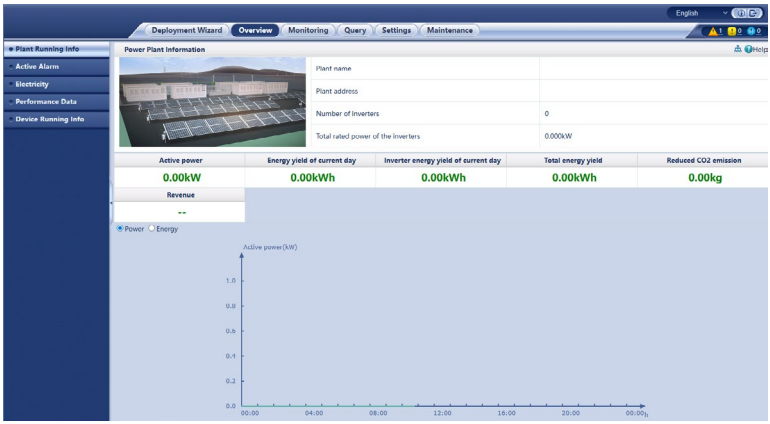
6.1.1 WebUI Layout



No.	Function	Description
1	First-level menu	Choose the corresponding first-level menu before you perform any operation over the WebUI.
2	Second-level menu	Under the first-level menu, choose the device to be queried or the parameter to be set under the second-level menu.
3	Third-level menu	• After choosing a second-level menu, choose a third-level menu to access the query or setting page. • There are no third-level menus under certain second-level menus.
4	Details page	Displays details of the queried information or parameter setting.
5	System time	Displays the current system time.
6	Power grid scheduling status	Displays the current power grid scheduling mode and scheduling value of the system.
7	Alarm icon	Displays the severities and number of active system alarms. You can click a number to access the alarm page.
8	Display language	Selects the display language or chooses to log out.

EN

Plant running information (without battery or Meter)



No.	Parameter	Description
1	Active power	Total active power of inverters
2	Energy yield of current day	Total energy yield of inverters on the current day
3	Total energy yield	Total energy yield of inverters
4	Reduced CO2 emission	(Total energy yield – Total power supply from grid) x CO2 emission reduction coefficient. If the result is negative, the value is zero.
5	Revenue	(Total energy yield – Total power supply from grid) x Revenue coefficient. If the result is negative, the value is zero.

Plant running information (with Meter but without battery)

No.	Parameter	Description
1	Active power	Total active power of inverters
2	Reactive power	Vector sum of the reactive power of inverters: Positive value indicates that power is transmitted to the grid and negative value indicates that power is transmitted from the grid.
3	Load power	Vector sum of the active power and grid-tied active power

No.	Parameter	Description
4	Grid-tied active power	Active power of the feed-in meter: Positive value indicates purchasing electricity and negative value indicates selling electricity.
5	Grid-tied reactive power	Reactive power of the feed-in meter: Positive value indicates that power is transmitted from the grid and negative value indicates that power is transmitted to the power grid.
6	Energy yield of current day	Total energy yield of inverters on the current day
7	Daily consumption	Energy yield of current day + Daily supply from grid – Daily feed-in to grid – Today's power supply from grid
8	Daily feed-in to grid	Current total negative active energy of the feed-in meter – Total negative active energy at 00:00 on the current day
9	Daily supply from grid	Current total positive active energy of the feed-in meter – Total positive active energy at 00:00 on the current day
10	Total energy yield	Total energy yield of inverters

Plant running information (with battery but without Meter)

No.	Parameter	Description
1	Active power	Vector sum of the active power of inverters and PCSs: Positive value indicates that energy is generated through the inverter and negative value indicates that energy is stored through the rectifier.
2	Reactive power	Vector sum of the reactive power of inverters and PCSs: Positive value indicates that power is transmitted to the grid and negative value indicates that power is transmitted from the grid.
3	Energy yield of current day	Total energy yield of inverters and PCSs of the current day
4	Today's power supply from grid	Total power supplied from the grid to inverters and PCSs of the current day

EN

Plant running information (with Meter and battery)

No.	Parameter	Description
1	Active power	Vector sum of the active power of inverters and PCSs: Positive value indicates that energy is generated through the inverter and negative value indicates that energy is stored through the rectifier.
2	Reactive power	Vector sum of the reactive power of inverters and PCSs: Positive value indicates that power is transmitted to the grid and negative value indicates that power is transmitted from the grid.
3	Load power	Vector sum of the active power and grid-tied active power
4	Grid-tied active power	Active power of the feed-in meter: Positive value indicates purchasing electricity and negative value indicates selling electricity.
5	Grid-tied reactive power	Reactive power of the feed-in meter: Positive value indicates that power is transmitted from the grid and negative value indicates that power is transmitted to the power grid.
6	Energy yield of current day	Total energy yield of inverters and PCSs of the current day
7	Today's power supply from grid	Total power supplied from the grid to inverters and PCSs of the current day
8	Daily consumption	Energy yield of current day + Daily supply from grid – Daily feed-in to grid – Today's power supply from grid
9	Daily supply from grid	Current total positive active energy of the feed-in meter – Total positive active energy at 00:00 on the current day

6.2 Device Commissioning

Prerequisites
- Device and cable installation has been checked according to the specifications and requirements of PV and energy storage plants.
- Devices in the PV and energy storage plants and the DataLogger are powered on.
- You have obtained the IP address of the DataLogger as well as the user name and password used for logging in to the WebUI.

Context
After installing or replacing a device or DataLogger, you need to set device parameters and add the device.

6.2.1 Preparations and WebUI Login

Prerequisites
- The operating system of Windows 7 or later is supported.
- Browser: Chrome 52, Firefox 113, or a later version is recommended.
- It is recommended that a maximum of two users log in to the WebUI at the same time.

Procedure

STEP 1 Connect the network cable between the network port of the PC and the WAN or LAN port of the DataLogger.
It is recommended that the PC be connected to the LAN port of the DataLogger.

STEP 2 Set the IP address for the PC on the same network segment as the DataLogger IP address.

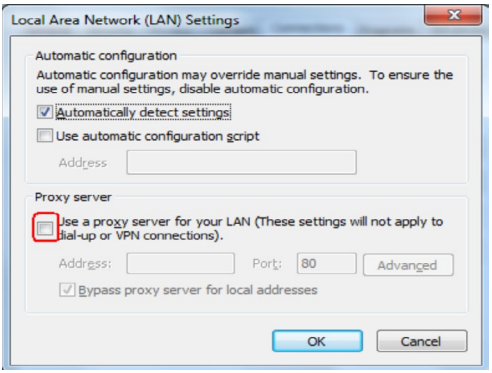
Connected Port	Item	DataLogger Default Value	Example PC Setting
LAN port	IP address	192.168.8.10	192.168.8.11
	Subnet mask	255.255.255.0	255.255.255.0
	Default gateway	192.168.8.1	192.168.8.1
WAN port	IP address	192.168.0.10	192.168.0.11
	Subnet mask	255.255.255.0	255.255.255.0
	Default gateway	192.168.0.1	192.168.0.1

NOTE
- When the IP address of the WAN port is in the network segment from 192.168.8.1 to 192.168.8.255, set the default gateway to 192.168.8.1 and the IP address of the LAN port to 192.168.3.10. If the connected port is a LAN port, you need to adjust the network configuration of the PC.
- It is recommended that the PC be connected to the LAN port of the DataLogger or the GE port of the Switch. When the PC is connected to the GE port of the Switch, adjust the network configuration of the PC to the configuration mode when the PC is connected to the LAN port of the DataLogger.
- You are advised to set the same subnet mask for all Ethernet ports. If different subnet masks are required, set different network IDs. Otherwise, the WebUI may fail to be accessed.

STEP 3 Set LAN parameters.

NOTE
- If the DataLogger is connected to a LAN and a proxy server has been configured, you need to cancel the proxy server configurations.
- If the DataLogger is connected to the Internet and the PC is connected to the LAN, do not cancel the proxy server configurations.

1. Open Internet Explorer.
2. Choose **Tools** > **Internet Options**.
3. Click the **Connections** tab and then click **LAN settings**.
4. Clear **Use a proxy server for your LAN**.



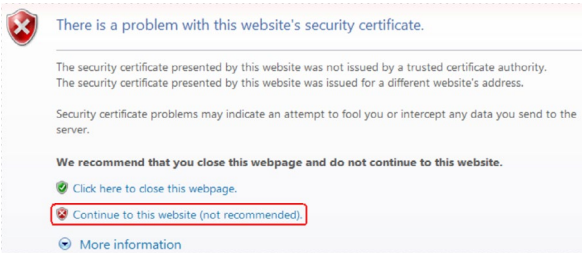
5. Click **OK**.

STEP 4 Log in to the DataLogger WebUI.

1. In the address box of a browser, enter **https://XX.XX.XX.XX** (*XX.XX.XX.XX* is the IP address of the DataLogger) and press **Enter**. The login page is displayed. If you log in to the WebUI for the first time, a security risk warning is displayed. Click **Continue to this website** to log in to the WebUI.

NOTE – It is recommended that users use their own certificates. If the certificate is not replaced, the security risk warning will be displayed during each login.
– After logging in to the WebUI, you can import a certificate under Maintenance > Security Settings > Network Security Certificate.
– The imported security certificate needs to be bound to the DataLogger IP address. Otherwise, the security risk warning will still be displayed during login.
– If an error message “ERR_INSUFFICIENT_RESOURCES” is displayed for the browser during login, the browser resources are insufficient. Clear the cache and restart the browser.
– If an error message “ERR_CONNECTION_TIMED_OUT” is displayed for the browser during login, perform the following troubleshooting operations:
– Check whether the browser proxy is abnormal. If yes, set the browser proxy according to step 3.
– Check whether the IP address of another device conflicts with that of the DataLogger. If yes, assign a new IP address.

Security risk warning



2. Select a desired language.
3. Select **installer** in **User Name**, set the login password as prompted, and click **Log In**.

NOTE – Update the DataLogger software as required.
– To ensure account security, protect the password by changing it periodically, and keep it secure. Your password might be stolen or cracked if it is left unchanged for extended periods. If you lose the password, the device must be restored to its factory settings. In these cases, the Company shall not be liable for any loss caused to the plant.
– You will be locked out for 10 minutes after five consecutive failed password attempts in 5 minutes.
– A dialog box with recent login information is displayed after login. Click OK.
– If the password of a non-administrator account is lost, you must reset the password using an administrator account. The administrator resets the password and enters the initial password. The non-administrator user logs in to the system using the initial password provided by the administrator. After the login, the user is forced to change the password.
– If the password of an administrator account is lost, hold down the RST button on the DataLogger for 10–20s to enter the safe mode. After the DataLogger enters the safe mode, the device parameter settings are retained. Personal privacy and sensitive data, including login passwords and email addresses, will be deleted.

4. Choose **Monitoring** > **Logger(Local)** > **About** to view the DataLogger software version and check whether software upgrade is needed.
5. (Optional) To upgrade the DataLogger software version, contact the Company’s engineers to obtain the upgrade package and guide and complete the upgrade accordingly.

NOTE – After the software upgrade is complete, the DataLogger automatically restarts. Log in to the DataLogger WebUI again 3 minutes later.

Follow-up Procedure

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.

6.2.2 Commissioning Using the Deployment Wizard

Context

The deployment wizard allows you to set basic DataLogger parameters, connect devices, Meters, and EMIs, configure battery control, management system, and third-party management system, third-party devices, and microgrid parameters.
After the Switch communicates with the DataLogger properly, the DataLogger automatically identifies the Switch.
The device name of the Switch is **Module(M1)**, and the corresponding port is **M1.port**.

Procedure

NOTE – During parameter setting, click Previous, Next, or Skip as required. For details, see Help on the page.

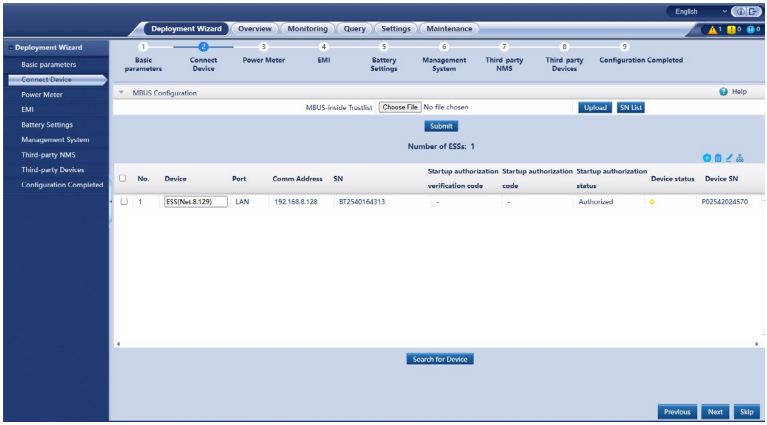
STEP 1 Click **Deployment Wizard** and set basic parameters.

- Set basic parameters.

- Select a communication mode based on the site requirements.

STEP 2 Connect devices.

- Set the startup authorization code of the ESS. Enter the startup authorization code and click ✎ to complete the startup authorization for the ESS. Otherwise, the ESS cannot be started. Contact the device vendor or its authorized supervision service provider to apply for a startup authorization code through the Power Partner app.
- Click **Search for Device** to search for devices.



NOTE – Do not perform the upgrade during **Search for Device**.

– Device search and cable connection check are performed separately. Click Search for Device to start device search (not applicable to third-party devices) and address allocation. After the device search is complete, click Wiring inspection to check cable connections.

- After the cable connection check is complete, if a cable connection alarm is generated, you can click the alarm icon ⚠ to view the corresponding alarm information.
- If an alarm is generated when the cable connection check fails, click the alarm icon ⚠ to view the alarm cause and handling suggestions. After the fault is rectified, check the cable connections again.
- After the cable connection check and device search are complete, click 品 to view the corresponding topology information.
- After a device is added or deleted, you need to click Search for Device again in Deployment Wizard. Otherwise, the system topology will not be updated.

• Set parameters such as **Grid Code** and **Working mode**.

Setting array parameters

Parameter	Description	Remarks
Scenario under Arrays Operation Scenario	• In the on-grid scenario, set this parameter to **On-grid**. • In the off-grid scenario, set this parameter to **Off-grid**. • In the on/off-grid switching scenario, set this parameter to **On/Off-grid**.	-
Standby mode under The subarray hot standby mode	When there is no scheduling, the PCS enters the hot standby mode based on the battery status to reduce system loss. • **Zero-power operation**: no hot standby • **Seamless hot standby**: After the PCS enters the hot standby mode, the relay on the AC side will not be disconnected. The reactive power of the ports needs to be supplemented.	-
Hot standby reactive power compensation under The subarray hot standby mode	This parameter is displayed when **Standby Mode** is set to **Seamless hot standby**. The default value is Disable. If this parameter is set to **Enable**, the PCS enters the hot standby reactive power compensation mode.	-
Insulation resistance detection under Periodic insulation resistance test	Specifies whether to enable insulation resistance detection.	-
Detection start time under Periodic insulation resistance test	Specifies the start time for the insulation resistance detection function.	This parameter is displayed when **Periodic insulation resistance test** is set to **Enable**.
Detection interval under Periodic insulation resistance test	Specifies the insulation resistance detection interval.	

Setting inverter parameters

Parameter	Description
Grid code	Set this parameter based on the grid code of the country or region where the device is used.
Working mode	Set the working mode of the inverter based on the actual scenario.
Microgrid compatibility	The default value is Disable. The recommended settings are as follows: • If **Working mode** is set to **VSG** for the inverter or **Scenario** is set to **On-grid**, set this parameter to **Disable**. • If **Working mode** is set to **PQ** for the inverter and the inverter works in a microgrid that uses a diesel generator or other voltage sources, set this parameter to **Enable**.

Setting ESS parameters

Parameter	Description	Remarks
Grid code	Set this parameter based on the grid code of the country or region where the devices are used.	-
Working mode	• If **Scenario** is set to **On-grid**, set this parameter to **PQ** or **VSG**. • If **Scenario** is set to **Off-grid**, set this parameter to **VSG**. • If **Scenario** is set to **On/Off-grid**, set this parameter to **PQ** or **VSG**.	-

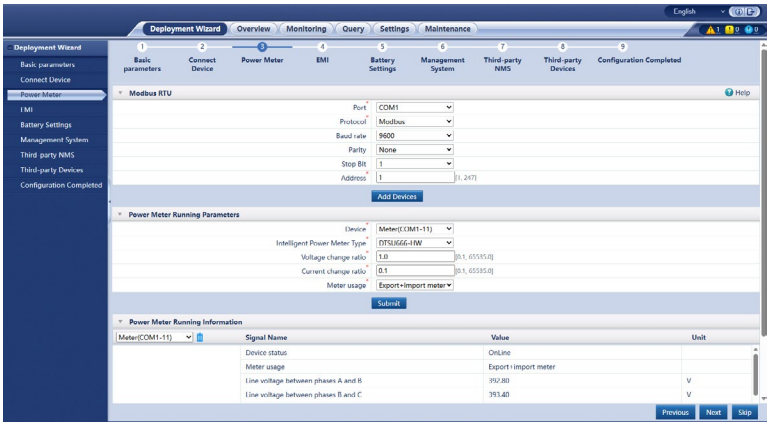
Parameter	Description	Remarks
Microgrid compatibility	The default value is Disable. The recommended settings are as follows: • If **Working mode** is set to **VSG** for the PCS or **Scenario** is set to **On-grid**, set this parameter to **Disable**. • If **Working mode** is set to **PQ** for the PCS and the PCS works in a microgrid that uses a diesel generator or other voltage sources, set this parameter to **Enable**.	-
Auto switching between working modes	This parameter is applicable only in on-grid or on/off-grid mode. • **Disable**: On/Off-grid switching cannot be performed automatically. • **Enable**: On/Off-grid switching can be performed automatically and the PCS does not need to be shut down before the switching.	-
Charge/discharge rate under Power Baseline	Set **Charge/discharge rate**. Other parameters under **Power Baseline** will be automatically generated.	-
Active power baseline (kW) under Power Baseline	Set the lower limit of the maximum apparent power, which is also used as the baseline for active power scheduling.	**Active power baseline** shall be smaller than **Apparent power baseline**.
Apparent power baseline (kVA) under Power Baseline	Set the upper limit of the maximum active power, which is also used as the baseline for reactive power scheduling.	-
Maximum Overload Active Power (kW) under Power Baseline	Specifies the maximum overload active power for grid forming.	-
Maximum Overload Apparent Power (kVA) under Power Baseline	Specifies the maximum overload apparent power for grid forming.	
Rated power reference under Power Baseline	Set the rated capacity of the device.	-

NOTE – For PCSs on the same DC bus, ensure that the settings of Working mode and Microgrid compatibility under Basic parameters are the same.

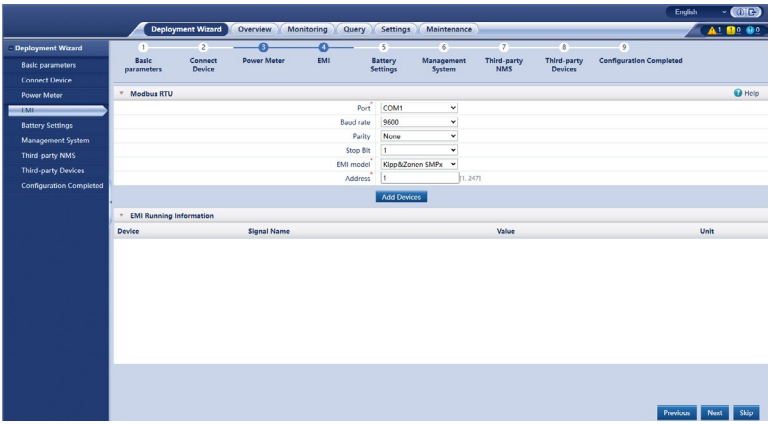
- Load a license.
- For details about how to load a license, see 7.3.6 License Management.

STEP 3 Connect to Meters.

Setting meter parameters

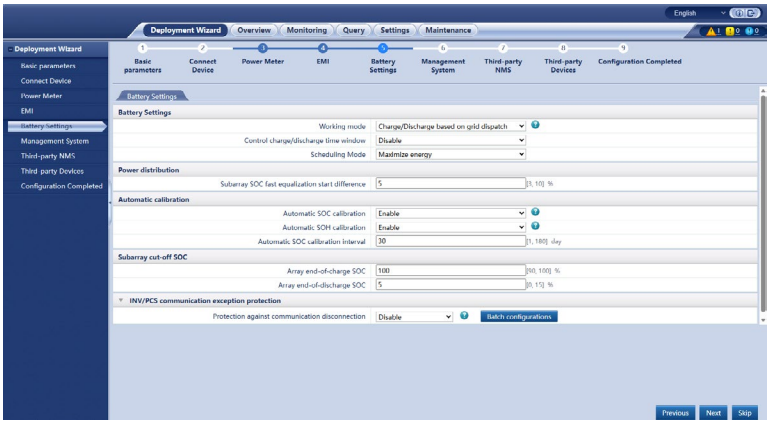


STEP 4 Connect to **EMIs**.



STEP 5 Configure battery settings. This step is required only for the energy storage scenarios.

- Set the battery control **Working Mode**.



Battery control working modes

Working Mode	Mode Description
No control	The DataLogger directly delivers the external scheduling power limit. No other power scheduling control is performed. The power is automatically controlled by the device.
Maximum self-consumption	• This mode applies to areas where the electricity price is high, or areas where the FIT subsidy is low or unavailable. The PV+ESS system generates sufficient PV power for loads and uses the surplus PV power to charge the ESS (if the PV power is insufficient for loads, the TOU mode is recommended). • PV power is preferentially supplied to loads, and the surplus power is used to charge the ESS. If the ESS is fully charged or is being charged at full power, the surplus power is fed to the grid. When PV power is insufficient or no PV power can be generated at night, the ESS discharges power to loads. This improves the self-consumption rate and energy self-sufficiency rate, and reduces electricity costs. The grid cannot charge the ESS but can supply power to loads. • The DataLogger performs ESS scheduling based on the power limit for external scheduling and the preceding policies.

Working Mode	Mode Description
Fully fed to grid	• This parameter applies only to distributed scenarios. • This mode maximizes the PV energy fed to the grid. When the PV output power in the daytime is greater than the maximum output capacity of the inverter, the surplus PV power is used to charge the ESS. When the PV output power is less than the maximum output capacity of the inverter, the ESS discharges energy to the inverter to maximize the energy fed from the inverter to the grid. The grid cannot charge the ESS. • The DataLogger directly delivers the external scheduling power limit. **NOTE – Fully fed to grid** is displayed only in distributed energy storage scenarios.
TOU	• It is applicable to the PV+ESS system and ESS-only system where peak to valley electricity prices are different and Meters are available. • You can manually set the charge and discharge time segments. For example, if you set the low electricity price period at night as the charge time, the system charges the batteries at the maximum power during the charge time. If you set the high electricity price period as the discharge time, batteries can discharge only during the discharge time based on the actual load power, reducing electricity costs. • Click **Add** to set the charge and discharge time segments. A maximum of 14 time segments can be set. During the charge time, the grid can charge the batteries. During the discharge time, the batteries can supply power to the loads. In other time segments, the batteries do not discharge. The PV system and grid supply power to loads, and the PV system can charge the batteries. • In some countries, the grid is not allowed to charge batteries. In such case, this mode cannot be used. • The DataLogger performs ESS scheduling based on the power limit for external scheduling and the preceding policies.
TOU (fixed power)	• It is applicable to the PV+ESS system and ESS-only system where peak to valley electricity prices are different and Meters are unavailable. • You can manually set the charge and discharge time segments. For example, if you set the low electricity price period at night as the charge time, the system charges the batteries at the fixed power during the charge time. If you set the high electricity price period as the discharge time, batteries can discharge only during the discharge time at the fixed power, reducing electricity costs. • Click **Add** to set the charge and discharge time segments. A maximum of 14 time segments can be set. During the charge time, the grid can charge the batteries. During the discharge time, the batteries can supply power to the loads. In other time segments, the batteries do not discharge and are not charged. • In some countries, the grid is not allowed to charge batteries. In such case, this mode cannot be used. • The DataLogger performs ESS scheduling based on the power limit for external scheduling and the preceding policies.
Charge/Discharge based on grid dispatch	• This mode applies to utility-scale plant scheduling scenarios where the northbound controller delivers active power scheduling commands. • The purpose of scheduled discharge is to meet the active power scheduling target value at the grid access point. PV energy is preferred. If the generated PV energy is insufficient, the batteries discharge and the energy is fed to the grid based on the active power scheduling target value. If the generated PV energy is sufficient, the energy is fed to the grid based on the active power scheduling target value, and the surplus PV energy is used to charge the batteries. • The purpose of scheduled charge is to meet the active power scheduling target value at the grid access point. If the battery charge power is insufficient or the PCS limits the power, the grid charges the batteries with the maximum capability. If the batteries are not fully charged when the scheduling target value is met, the PV power is used to charge the batteries.
Custom	• This mode applies to utility-scale plant (with ESSs) scheduling scenarios. Customers can control the battery discharge power. • Non-discharge period: The batteries cannot discharge and can be charged based on the scheduling command. • Discharge period: If **Adaptive discharge power** is enabled, the control logic is the same as that for scheduled charge and discharge. The battery charge and discharge power is determined by the upper-layer scheduling command. If **Adaptive discharge power** is disabled, the battery discharge power is fixed to the reference value set by the customer. In this case, the upper-layer scheduling command controls only the PV inverters but not the batteries.

Running parameters in each battery control working mode

Working Mode	Parameter	Description
Maximum self-consumption	Active power threshold of grid during battery discharge	Set the grid power threshold at the grid connection point for loads when the load power is greater than the PV power.
	Adjustment deadband	Set the precision of the grid power at the grid connection point. This parameter affects the power value range at the grid connection point. If the actual grid power threshold at the grid connection point is within this range, i.e. [Active power threshold of grid during battery discharge – Adjustment deadband, Maximum grid power during battery discharge + Adjustment deadband], the grid power requirement at the grid connection point is met.
TOU	Preferred use of surplus PV power	• **Charge**: When the PV power is greater than the load power, the surplus PV energy is used to charge the batteries. After the maximum charge power is reached or the batteries are fully charged, the surplus PV energy is fed to the grid. • **Fed to grid**: When the PV power is greater than the load power, the surplus PV energy is preferentially fed to the grid. When the maximum output power of the device is reached, the surplus energy is used to charge the batteries. This setting is applicable to the scenario where the FIT is higher than the electricity price. The grid cannot charge the batteries.
	Maximum power for charging batteries from grid	Set the maximum power at which the grid charges the batteries.
	Active power threshold of grid during battery discharge	Set the grid power threshold at the grid connection point for loads when the load power is greater than the PV power.
	Adjustment deadband	Set the precision of the grid power at the grid connection point. This parameter affects the power value range at the grid connection point. If the actual grid power threshold at the grid connection point is within this range, i.e. [Active power threshold of grid during battery discharge – Adjustment deadband, Maximum grid power during battery discharge + Adjustment deadband], the grid power requirement at the grid connection point is met.
	Start time	Set the start time and end time of charge and discharge. A maximum of 14 time segments can be set. You can set a cycle by week by clicking the buttons corresponding to **Mon**. through **Sun**. in the **Repeat** box. The buttons are blue by default, indicating being selected. After you click it, the button turns gray.
	End time	
	Charge/Discharge	
	Repeat	
TOU (fixed power)	Start time	Set the start time, end time, and power of charge and discharge. A maximum of 14 time segments can be set. You can set a cycle by week by clicking the buttons corresponding to **Mon**. through **Sun**. in the **Repeat** box. The buttons are blue by default, indicating being selected. After you click it, the button turns gray.
	End time	
	Charge/Discharge	
	Charge/Discharge power (kW)	
	Repeat	

Working Mode	Parameter	Description
Charge/Discharge based on grid dispatch	Array end-of-charge/ discharge SOC derating	The default value is **Disable**. The default value is recommended. Set this parameter as required. After array end-of-charge/discharge SOC power derating is enabled, the DataLogger performs derating based on the preset gradient to prevent abrupt power change of the array at the end-of-charge/ discharge SOC.
	Control charge/ discharge time window	The default value is **Disable**. The default value is recommended. Set this parameter as required. You can set the time segment for charge forbidden, discharge forbidden, charge, and discharge only after the control charge/ discharge time window is enabled.
	Start time	Set the start time, end time, and power of charge forbidden, discharge forbidden, charge, and discharge. A maximum of 14 time segments can be set. You can set a cycle by week by clicking the buttons corresponding to **Mon**. through **Sun**. in the **Repeat** box. The buttons are blue by default, indicating being selected. After you click it, the button turns gray.
	End time	
	Charge/Discharge	
	Charge/Discharge power (kW)	
	Repeat	
Custom	ESS discharge start time	Set the start time of battery discharge. During the period from the start time to the end time, the batteries can be charged and can discharge. Beyond the period, the batteries cannot discharge and can only be charged.
	ESS discharge end time	Set the end time of battery discharge. During the period from the start time to the end time, the batteries can be charged and can discharge. Beyond the period, the batteries cannot discharge and can only be charged.
	Adaptive discharge power	• **Enable**: PV power supply is preferred. If the PV power is insufficient, the batteries supply power to loads; if the PV power is sufficient, the system outputs at the target value and the surplus PV power is used to charge the batteries. • **Disable**: Batteries discharge based on the discharge power set on the GUI.
	Reference discharge power	Set the battery discharge power during the discharge period.

- Set the power allocation parameter.

Parameter	Description
Difference threshold for starting array SOC rapid equilibrium	The default value is 5%. The default value is recommended. Set this parameter as required. When the SOC difference between racks in the array is greater than the value of Difference threshold for starting array SOC rapid equilibrium, the rapid equilibrium algorithm is enabled.

- Set the automatic calibration functions.

Parameter	Description
Automatic SOC calibration	• If this parameter is set to **Enable**, automatic charge and discharge calibration is allowed for battery racks. The ESS periodically calibrates the SOC rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. • If this parameter is set to **Disable**, automatic charge and discharge calibration is not allowed for battery racks.
Automatic SOC calibration interval	Set the automatic SOC calibration interval. This parameter is displayed when **Automatic SOC calibration** is set to **Enable**. If the battery SOC stays in the range of 10% to 99% most of the time, for example, in the microgrid scenario, the recommended online calibration interval is less than or equal to 30 days. If the battery SOC stays in the range of 40% to 60% most of the time, for example, in the frequency regulation scenario, the recommended online calibration interval is less than or equal to 180 days. If the battery SOC stays below 10% or at 100% most of the time, for example, in the peak shaving scenario, the recommended online calibration interval is less than or equal to 180 days.

Parameter	Description
Automatic SOH calibration	• If this parameter is set to **Enable**, the ESS periodically calibrates the SOH rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged and discharged. Then, the battery capacity will be calculated. The charge and discharge response will be affected during the calibration. Suggestion: During SOH calibration, after the system is fully charged, maintain the charge command for 30 to 60 minutes. After the discharge is complete, maintain the discharge command for 30 to 60 minutes. • If this parameter is set to **Disable**, automatic SOH calibration is not allowed for battery racks.

- Set the array end-of-charge SOC and end-of-discharge SOC. You can set these parameters in DataLogger V300R023C10SPC500 and later versions.

Parameter	Description
Array end-of-charge SOC	The default value is 100%. The default value is recommended. Set this parameter as required.
Upper limit of SOC for array charge	The default value is 100%. The default value is recommended. Set this parameter as required.
SOC for array charge limit	The default value is 95%. The default value is recommended. Set this parameter as required.
SOC for array discharge limit	The default value is 10%. The default value is recommended. Set this parameter as required.
Lower limit of SOC for array discharge	The default value is 5%. The default value is recommended. Set this parameter as required.
Array end-of-discharge SOC	The default value is 5%. The default value is recommended. Set this parameter as required.

NOTE – When submitting the parameters, ensure that: Array end-of-charge SOC ≥ Upper limit of SOC for array charge ≥ SOC for array charge limit and Array end-of-discharge SOC ≤ Lower limit of SOC for array discharge ≤ SOC for array discharge limit

- Configure INV/PCS communication exception protection.

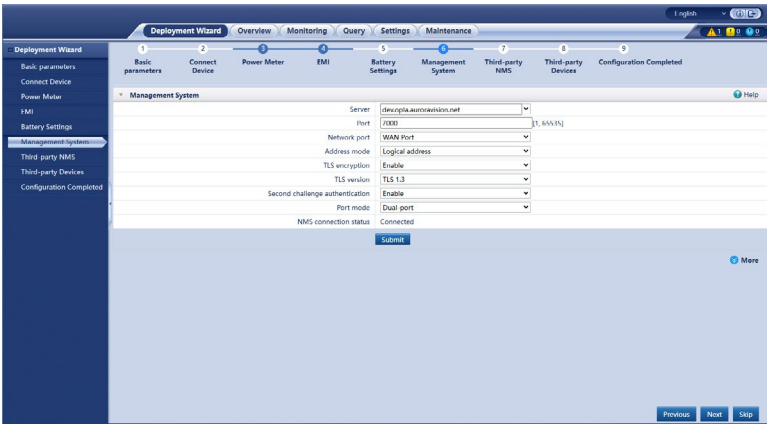
Parameter	Description
Protection against communication disconnection	Specifies whether to enable protection against communication disconnection.

- Set PCS insulation resistance detection.

Setting parameters related to PCS insulation resistance detection

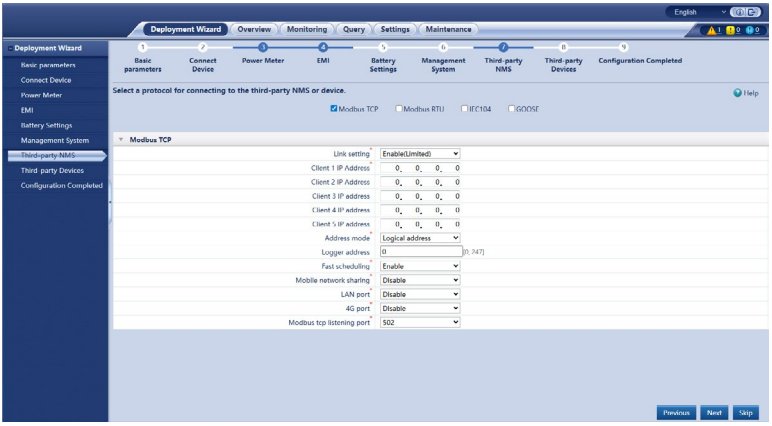
Parameter	Description
Detection start time	Specifies the start time for the PCS insulation resistance detection function.

STEP 6 Configure the **Management System**.



STEP 7 For third-party NMS access, select a protocol based on the actual third-party NMS protocol.

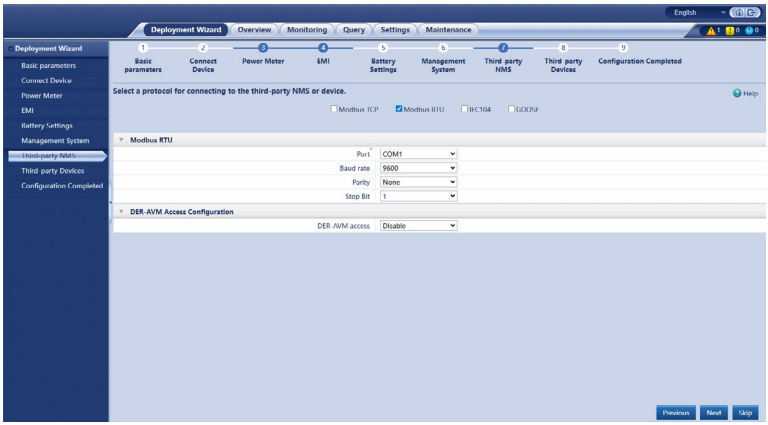
- If the DataLogger connects to a third-party management system over Modbus TCP, **set Modbus TCP parameters** and click **Next**.



Parameter	Description	Remarks
Link setting	To use this function, set this parameter to Enable(Limited) or Enable(Unlimited). • If this parameter is set to **Enable(Limited)**, the DataLogger can connect to a maximum of five preset third-party management systems. • If this parameter is set to **Enable(Unlimited)**, the DataLogger can connect to a maximum of five valid IP address (third-party management systems) in the same network segment.	-
Client N IP Address	Set this parameter based on the IP address of the third-party management system.	• This parameter is displayed when **Link setting** is set to **Enable(Limited)**. • N is 1, 2, 3, 4, or 5.

Parameter	Description	Remarks
Address mode	The value can be **Communication address** or Logical address. If the communications address of the device connected to the DataLogger is unique, you are advised to select **Communication address**. In other cases, you must select **Logical address**.	• This parameter is displayed when **Link setting** is set to **Enable(Limited)** or **Enable(Unlimited)**. • The fast scheduling function of the Modbus TCP interface is mutually exclusive with the GOOSE fast scheduling function. The fast scheduling function of only one protocol takes effect at a time.
Logger address	Set this parameter to the communication address of the DataLogger.	
Fast scheduling	• Set this parameter to **Enable** to enable the fast scheduling function of the DataLogger Modbus TCP interface. • Set this parameter to **Disable** to disable the fast scheduling function of the DataLogger Modbus TCP interface.	

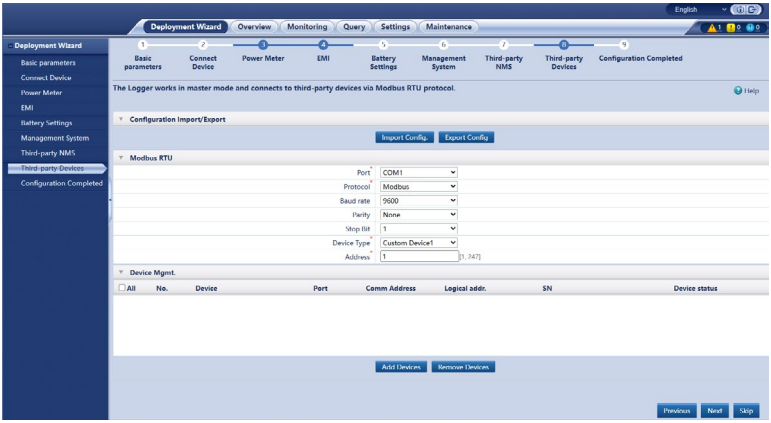
- If the DataLogger connects to a third-party management system over Modbus RTU, **set Modbus RTU parameters** and click **Next**.



Parameter	Description
Port	Set the connected COM port based on the actual cable connections.
Baud rate	Set this parameter based on the baud rate of the connected device. The value can be **1200**, **2400**, **4800**, **9600**, **19200**, or **115200**.
Parity	Set this parameter based on the parity mode of the connected device. The value can be **None**, **Odd parity**, or **Even parity**.
Stop Bit	Set this parameter based on the stop bit of the connected device. The value can be **1** or **2**.

NOTE – If IEC104 or GOOSE needs to be used to connect to a third-party management system, choose **Settings** > **Comm. Param.** > IEC104 or GOOSE after completing the deployment wizard.

STEP 8 Connect to **Third-party devices**.



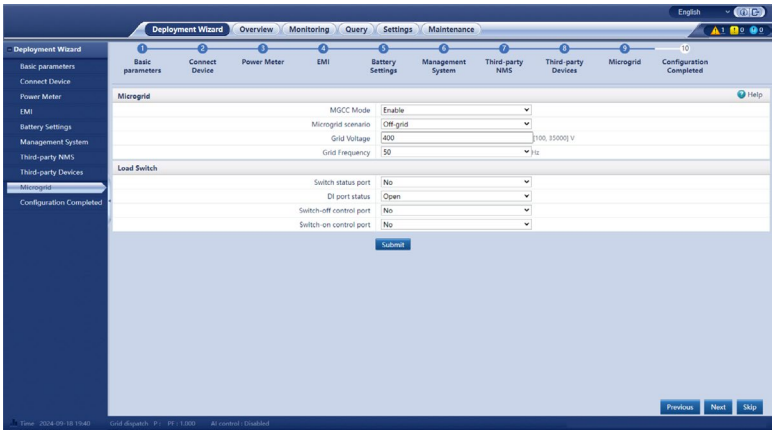
STEP 9 If the microgrid control function is implemented by the DataLogger, perform this step. Otherwise, skip this step.

1. Select **Yes** or **No** in the **Do you want to connect the relay protection device?** dialog box based on the actual situation. If a relay protection device is connected, set **Yes** and set the relay protection device parameters.

Relay protection device parameters

Parameter	Description
Port	Set the COM port connected to **Relay protection device** based on the actual cable connections.
Baud rate	Set the baud rate, parity, stop bit, and address of **Relay protection device** to be consistent with the communications parameters of the relay protection device.
Parity	
Stop Bit	
Address	
Device Type	Set this parameter to **Relay protection device**.
Device model	Set this parameter based on the actual model.

2. Set **microgrid** parameters.



Microgrid parameters

Parameter	Description	Remarks
MGCC Mode under Microgrid	The default value is Disable. • **Enable**: The MGCC mode is enabled. • **Disable**: The MGCC mode is disabled.	When **MGCC Mode** is enabled, Modbus TCP, IEC 104, and GOOSE settings are disabled and the DataLogger does not respond to scheduling commands from the EMS. (Set **Working mode** to **Charge/Discharge based on grid dispatch on the Battery Control** tab page and set **Active power control mode** to **Remote communication scheduling** on the **Power Adjustment** tab page.) Enable this function only when the EMS is not required. If you forcibly enable both the MGCC mode and the Modbus TCP, IEC 104, and GOOSE settings, the microgrid may be unstable.
Microgrid scenario under Microgrid	• **Off-grid**: In the off-grid scenario, set this parameter to **Off-grid**. • **On-grid/Off-grid (PQ/VSG)**: In the on/off-grid (PQ/VSG) scenario, set this parameter to **On-grid/Off-grid (PQ/VSG)**. • **On-grid/Off-grid (VSG)**: In the on/off-grid (VSG) scenario, set this parameter to **On-grid/Off-grid (VSG)** only after the relay protection device is successfully connected.	This parameter is displayed when **MGCC Mode** is set to **Enable**. • If **Microgrid scenario** is set to **Off-grid**, **Scenario** under **Arrays Operation Scenario** shall be set to **Off-grid**. • If **Microgrid scenario** is set to **On-grid/Off-grid (PQ/VSG)** or **On-grid/Off-grid (VSG)**, **Scenario** under **Arrays Operation Scenario** shall be set to **On/Off-grid**.

• If **Microgrid scenario** is set to **On-grid/Off-grid (PQ/VSG)**, refer to the following parameter description.

Parameter	Description
Switch status port under On/Off-grid switch	Set these parameters based on the actual cable connections. **DI port status** can be set to **Open** or **Close**. If the actual status of the on/off-grid switch is inconsistent with the displayed status, change the setting of **DI port status**.
DI port status under On/Off-grid switch	
Switch-off control port under On/Off-grid switch	Set the DO port for turning off the on/off-grid switch.
Switch-on control port under On/Off-grid switch	Set the DO port for turning on the on/off-grid switch.
DI port under Grid Failure Detection	Set the DI port to which the the grid failure detection device is connected and the DI port status.
DI port status under Grid Failure Detection	
On/Off-grid switching mode under On/Off-grid switching	• **No control**: All the operations involved in the on/off-grid switching are manually performed. If the customer needs to repair the equipment, you are advised to set this parameter to **No control**. • **Auto**: The on/off-grid switching will be performed automatically based on the status of the mains power. When you set **On/Off-grid switching mode** to this mode, an immediate on/off-grid switching may be triggered, depending on the status of the mains power. • **Manual**: You need to manually turn on or off the on/off-grid switch at the grid connection point.

• If **Microgrid scenario** is set to **On-grid/Off-grid (VSG)**, refer to the following parameter description.

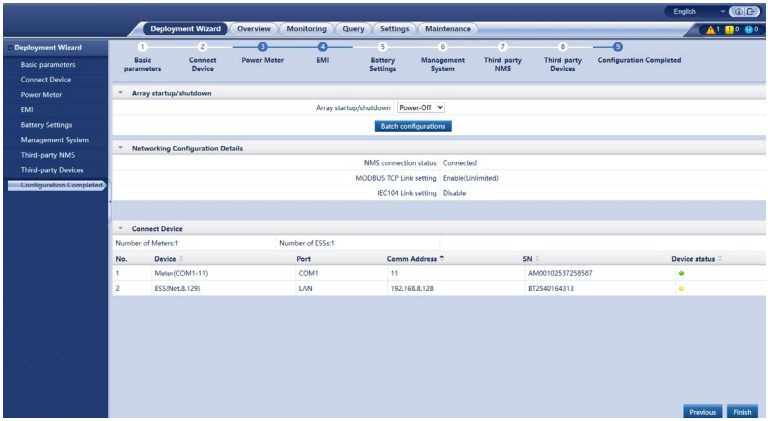
Parameter	Description
Genset start/stop control port under Genset	• If the genset is controlled by the DataLogger, set the DO port that controls genset startup and shutdown based on the actual cable connections. • If the genset is controlled by the ATS, set this parameter to **No**.
Auto switching to on-grid under Automatic Off-grid to On-grid Switching	• **Enable**: Enable the function of automatic switching from off-grid to on-grid state. • **Disable**: Disable the function of automatic switching from off-grid to on-grid.

- If **Microgrid scenario** is set to **Off-grid**, refer to the following parameter description.

Parameter	Description
Switch status port under Load Switch	Set these parameters based on the actual cable connections. If you need to modify the parameters after the settings are submitted, the automatic control function of the load switch may fail. This function can be restored only after the DataLogger is restarted or the black start is successful in the off-grid scenario **DI port status** can be set to **Open** or **Close**. If the actual status of the load switch is inconsistent with **Status**, change the setting of **DI port status**.
DI port status under Load Switch	
Switch-off control port under Load Switch	Set the DO port for turning off the load switch.
Switch-on control port under Load Switch	Set the DO port for turning on the load switch.

- After the microgrid parameter settings are complete, click **Submit**.

STEP 10 Set **Array startup/shutdown** based on the site requirements. The configuration is complete.



6.3 Parameter Settings

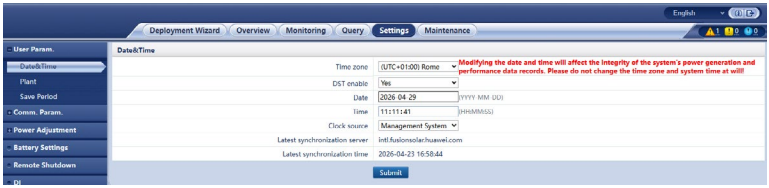
NOTE – If the parameters listed in this section have been set in Deployment Wizard, ignore the corresponding settings.

– If the PV and energy storage plants do not contain certain devices, such as Meters, EMIs, IEC 103 devices, custom devices, and IEC 104 devices, ignore the corresponding settings.

– If you modify a parameter that may cause the device to restart, such as Grid Code, Output mode, or Isolation settings, wait about 20s after the device restarts and then set other parameters. Otherwise, the parameter setting may fail.

6.3.1 Setting User Parameters

Set user parameters and click **Submit.**



Date&Time

Parameter	Description
Local time zone	Select a time zone based on the region where the plant is located.
DST enable	Set this parameter as required. **NOTE** – This parameter is unavailable for zones without DST.
Date	Set this parameter to the local date.
Time	Set this parameter to the local time.
Clock source	• Set this parameter as required. • The value can be **NTP**, **Management System**, **IEC104**, or **Modbus TCP**. If there is no management system, ignore the corresponding setting.

NOTE – After the date and time are set, the date and time of all the inverters connected to the DataLogger are updated accordingly. Ensure that the settings are correct.

– Changing the date and time affects the recording of system energy yield and performance data. Do not change the time zone or system time unless necessary.

Plant

Parameter	Description
Plant name	Set this parameter as required.
Plant address	**NOTE** – In the English half-width status, you cannot enter any of the following characters: <>:,'`?()#&\$|%+;~^"
Plant owner	
Plant owner address	
Country/Region	Select a country/region based on the region where the PV plant is located.

Revenue

NOTE – This parameter can be set only in the PV scenario.

Parameter	Description
Currency	Set this parameter as required. The value can be **EUR**, **GBP**, **USD**, **CNY**, or **JPY**.
Electricity price/kWh	Set this parameter to the local electricity price, which is used to calculate the converted revenue of the energy yield.
CO2 emission reduction coefficient	Set this parameter based on the local standard.

Save Period

Parameter	Description
Performance data save period	Set this parameter to the save period of performance data. After the setting, the data will be displayed accordingly on the performance data page.

6.3.2 Setting Parameters for Connecting to the Management System

Procedure

STEP 1 Set up a network connection.

If the DataLogger connects to the management system over a wired network, choose **Settings** > **Comm. Param.** > **Wired Network**, set the parameters for wired network ports, and click **Submit**.

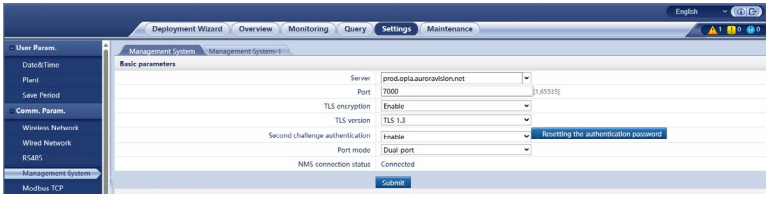
Parameter	Description	Remarks
WAN/LAN/SFP1/ SFP2	The quantity of Ethernets for the DataLogger is determined by the settings of WAN/LAN/SFP1/SFP2 network ports, and the network ports are allocated to corresponding Ethernets. Ethernet 1, Ethernet 3, and Ethernet 4 are northbound networks, and Ethernet 2 is the southbound network. Cable connections to physical ports on the DataLogger must match the parameter settings to ensure normal southbound and northbound communication. The parameter settings are as follows: • Ethernet1/Ethernet2/Ethernet1/Ethernet1 • Ethernet2/Ethernet2/Ethernet1/Ethernet1 • Ethernet1/Ethernet1/Ethernet1/Ethernet1 • Ethernet1/Ethernet2/Ethernet2/Ethernet2 • Ethernet1/Ethernet2/Ethernet3/Ethernet3 • Ethernet1/Ethernet2/Ethernet3/Ethernet4	For example, if this parameter is set to **Ethernet1/Ethernet2/Ethernet3/ Ethernet3**, the network is divided into three independent Ethernets: Ethernet 1, Ethernet 2, and Ethernet 3. Ethernet 1 and Ethernet 3 are northbound networks. Ethernet 1 corresponds to the WAN port, and Ethernet 3 corresponds to the SFP1 and SFP2 ports. They can connect to the management system and other northbound devices. Ethernet 2 is the southbound network and corresponds to the LAN port. It can connect to southbound devices such as the inverter, ESS, and PCS.
DHCP	The WAN port of the DataLogger supports IP address obtaining using DHCP and automatic registration.	-
IP Address	Set this parameter based on the plant plan.	If the IP address is changed, use the new IP address to log in again.
Subnet mask	Set this parameter based on the actual subnet mask of the LAN where the DataLogger is located.	-
Default gateway	Set this parameter based on the actual gateway of the LAN where the DataLogger is located.	-
Primary DNS server	You can ignore this parameter if the DataLogger connects to the LAN. Set this parameter to the IP address of the LAN router when the DataLogger connects to the public network (for example, connecting to the cloud management system, email server, or third-party FTP server; a domain name is used as the server address).	Only Ethernet 1 supports the DNS server.
Secondary DNS server	In normal cases, you can ignore this parameter. If the primary DNS server cannot resolve the domain name, the secondary DNS server is used.	

STEP 2 **Choose Settings** > **Comm. Param.** > **Management System** and set management system parameters.

- **Method 1**: When the DataLogger connects to a management system using the encrypted Modbus TCP protocol, set management system parameters and click **Submit**.

NOTE – After the NMS is connected to the DataLogger based on the settings in Management System, another third-party NMS can be connected based on the settings in Management System-1 to obtain data from the DataLogger and configure the DataLogger.

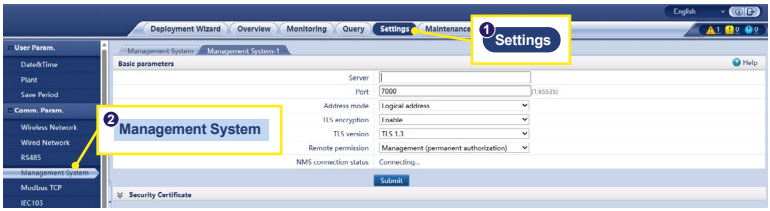
Setting management system parameters



Management system parameters

Parameter	Description
Server	Set this parameter to the IP address or domain name of the **Management System**.
Port	Set this parameter based on the connected **Management System**.
Address mode	The value can be **Communication address** or **Logical address**. If the communications address of the device connected to the DataLogger is unique, you are advised to select **Communication address**. In other cases, you must select **Logical address**.
TLS encryption	Retain the default value **Enable**. **NOTE –** If this parameter is set to **Disable**, data exchange between the DataLogger and the management system will not be encrypted, which poses security risks.
TLS version	Set this parameter based on the connected **Management System**. TLS1.2 or a later version is recommended.
Second challenge authentication	It is recommended that this parameter be set to Enable. • **Enable**: Users can perform configuration operations on the management system. • **Disable**: Users have only the permission to view data, and user data may be stolen. Exercise caution when using this function.
Security Certificate	Optional. Set this parameter only when the certificate has expired or the customer needs to use their own certificate.

Setting management system-1 parameters

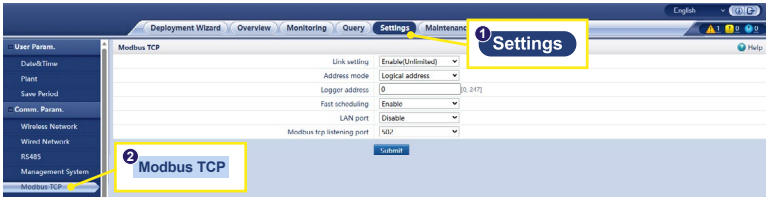


Management system-1 parameters

Parameter	Description
Server	Set this parameter to the IP address or domain name of **Management System-1**.
Port	Set this parameter based on the connected **Management System-1**.
Address mode	The value can be **Communication address** or **Logical address**. If the communications address of the device connected to the DataLogger is unique, you are advised to select **Communication address**. In other cases, you must select **Logical address**.
TLS encryption	Retain the default value **Enable**. **NOTE –** If this parameter is set to **Disable**, data exchange between the DataLogger and the management system will not be encrypted, which poses security risks.
TLS version	Set this parameter based on the connected **Management System**-1. TLS1.2 or a later version is recommended.
Remote permission	**Monitoring only**, **Management (permanent authorization)**, and **Management (temporary authorization)** are supported. When the remaining authorization time becomes 0, the system automatically switches to the monitoring-only mode.

- **Method 2:** When the DataLogger connects to a third-party management system using the unencrypted Modbus TCP protocol, set Modbus TCP parameters and click **Submit**.

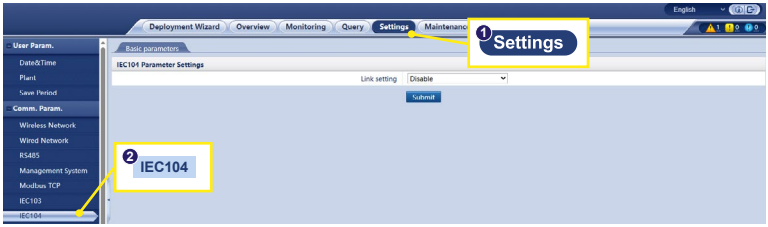
Setting Modbus TCP parameters



Parameter	Description
Link setting	Modbus TCP is a universal standard protocol used to connect to a third-party management system. Because there is no security authentication mechanism, data transmitted over this protocol is not encrypted. To reduce network security risks, the function of connecting to a third-party management system using Modbus TCP is disabled by default. This protocol can transmit the running data and control commands of plants, which may cause user data breach and control permission theft. Therefore, exercise caution when using this protocol. Users are liable for any loss caused by connecting to a third-party management system (non-secure protocol) using this protocol. Users are advised to take mitigation measures at the plant level to reduce security risks. To use this function, set this parameter to **Enable(Limited)** or **Enable(Unlimited)**. • If this parameter is set to **Enable(Limited)**, the DataLogger can connect to a maximum of five preset third-party management systems. • If this parameter is set to **Enable(Unlimited)**, the DataLogger can connect to a maximum of five third-party management systems with a valid IP address.
Client N IP Address **NOTE –** N is 1, 2, 3, 4, or 5.	If **Link setting** is set to **Enable(Limited)**, set this parameter based on the IP address of the third-party management system.
Address mode	The value can be **Communication address** or **Logical address**. If the communications address of the device connected to the DataLogger is unique, you are advised to select **Communication address**. In other cases, you must select **Logical address**.
Logger address	Set this parameter to the communications address of the DataLogger.

- **Method 3**: When the DataLogger connects to a third-party management system over IEC 104, set IEC 104 parameters and click **Submit**.

Setting IEC 104 parameters



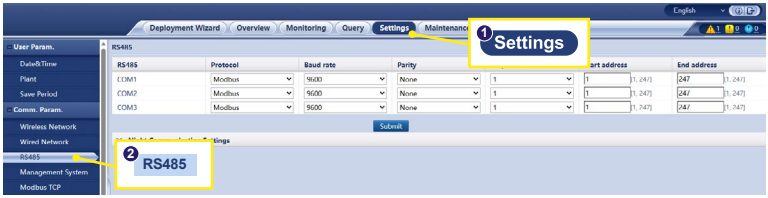
Tab	Parameter	Description
Basic parameters	Link setting	IEC 104 is a universal standard protocol used to connect to a third-party management system. Because there is no security authentication mechanism, data transmitted over this protocol is not encrypted. To reduce network security risks, the function of connecting to a third-party management system using IEC 104 is disabled by default. This protocol can transmit the running data and control commands of plants, which may cause user data breach and control permission theft. Therefore, exercise caution when using this protocol. Users are liable for any loss caused by connecting to a third-party management system (non-secure protocol) using this protocol. Users are advised to take mitigation measures at the plant level to reduce security risks. To use this function, set this parameter to **Enable(Limited)** or **Enable(Unlimited)**. • If this parameter is set to **Enable(Limited)**, the DataLogger communicates with the management system of the specified IP address, that is, using a whitelist. • If this parameter is set to **Enable(Unlimited)**, the DataLogger sets the segments and common forwarding tables of teleindication and telemetering through **Common Configuration**.
	Common address	Set this parameter as required.
IEC104-N	IEC104-N IP	If **Link setting** is set to **Enable(Limited)**, set this parameter based on the IP address of the third-party management system.
	Active/Standby mode	Active/Active: Both links can send data changes and response commands. Active/Standby: The active link sends data changes and response commands, and the standby link only transmits keepalive messages.
	Teleindication default segment	Set this parameter as required. **NOTE** – After the IEC 104 configuration file exported from the DataLogger and the IEC 104 information files of various device types provided together with the software version are correctly configured in a third-party management system, the third-party management system will be able to monitor devices connected to the DataLogger over IEC 104.
	Telemetry default segment	
	Forwarding Table	
Common Configuration	Teleindication default segment	If **Link setting** is set to **Enable(Unlimited)**, set these parameters as required. **NOTE** – After the IEC 104 configuration file exported from the DataLogger and the IEC 104 information files of various device types provided together with the software version are correctly configured in a third-party management system, the third-party management system will be able to monitor devices connected to the DataLogger over IEC 104.
	Telemetry default segment	
	Forwarding Table	

NOTE – Choose **Settings** > **Other Parameters**, and set **IEC104 Push Data Period** to specify the interval for the DataLogger to push data to a third-party management system over IEC104. If IEC104 Push Data Period is set to 0s, there is no limit on the interval at which the DataLogger sends IEC104 data.

EN

6.3.3 Setting RS485 Communications Parameters

Set RS485 parameters and click **Submit**.



NOTE – When the Switch is connected to the DataLogger, the device name of the Switch is Module(M1), and the corresponding port is M1.COM.

RS485

Protocol, **Baud rate**, **Parity**, and **Stop Bit** must be set to the same values for the devices connected to the same COM port.

Parameter	Description
Protocol	Set this parameter based on the protocol type of the connected device. The value can be **Modbus**, **IEC103**, **DL/T645**, **Modbus-Slave**, or **Modbus-Control**. **NOTE –** When the DataLogger serves as a slave node to interconnect with a third-party device over Modbus-RTU, set **Protocol** to **Modbus-Slave**. **NOTE –** When the connected inverter performs rapid power grid scheduling using both PLC MBUS and RS485, set **Protocol** to **Modbus-Control**.
Baud rate	Set this parameter based on the baud rate of the connected device. The value can be **1200**, **2400**, **4800**, **9600**, **19200**, or **115200**.
Parity	Set this parameter based on the parity mode of the connected device. The value can be **None**, **Odd parity**, or **Even parity**.
Stop Bit	Set this parameter based on the stop bit of the connected device. The value can be 1 or 2.
Start address	1 ≤ Start address ≤ Communication address of the connected device ≤ End address ≤ 247 The address segments of COM ports can overlap.
End address	**NOTE –** The start and end addresses have no impact on the devices that have been connected.

Night Communication Settings

If device information query is not required at night, enable **Night silent**.

Parameter	Description
Night silent	Specifies whether the night silent mode is enabled.
Enter time	Specifies the time for entering the night silent mode.
Exit time	Specifies the time for exiting the night silent mode.
Wakeup period	Specifies the wakeup period for the night silent mode.

6.3.4 Setting SPPC Communications Parameters

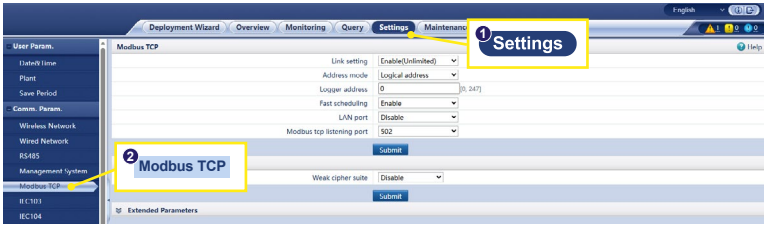
Choose **Settings** > **Comm. Param.** > **SPPC**, set the SPPC parameters, and click **Submit**.

Parameter		Description
SPPC	SPPC IP	IP address of the SPPC. If the SPPC address is not configured, the DataLogger obtains the SPPC address through the automatic discovery process. You can set the IP address to 0.0.0.0 and the port number to 65535 to manually start automatic device discovery.
	SPPC port number	Port number used by the DataLogger to connect to the SPPC.
	Connection Status	Status of the SPPC connection.
Security Certificate	Upload CA certificate file	Update the CA certificate file. A CA certificate is a root certificate obtained from a CA. It is also called a trust certificate and is used to verify the identity certificate of the peer end.
	Upload local certificate file	Update the local certificate file. This is an identity certificate obtained from a CA. It is also called a device certificate and contains the public key of a device. During the establishment of a link with the peer end, the peer end uses its CA certificate to verify the validity and parses the certificate to obtain the public key of the local end.
	Upload key file	Update the key file. The secret key file is a certificate private key and is used by itself. After a link is established with the peer end, the secret key file is used to encrypt and send data.
	Enable key password	Whether to encrypt the key file. If this function is enabled, set **Key password** and **Confirm key password**.

6.3.5 Setting Parameters for the Slave DataLogger

STEP 1 Log in to the slave DataLogger WebUI, set Modbus TCP parameters, and click **Submit**.

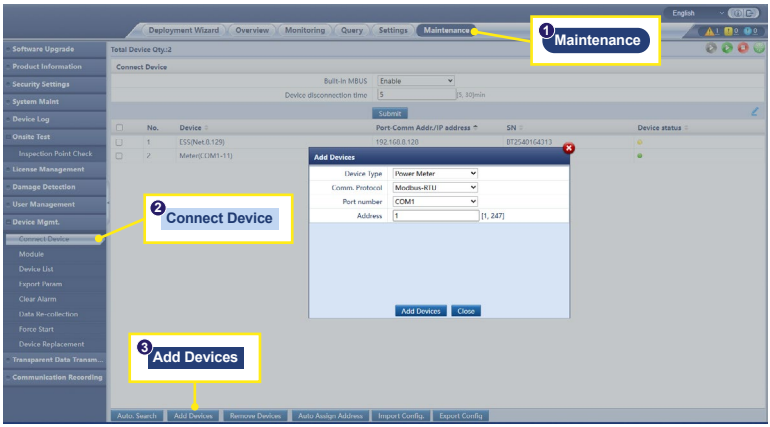
Setting Modbus TCP parameters



Parameter	Description
Link setting	Set this parameter to **Enable(Limited)**.
Client N IP Address	Set this parameter to the IP address of the master DataLogger.
Address mode	The value can be **Comm. Address** or **Logical address**. If the communications address of the device connected to the slave DataLogger is unique, you are advised to select **Communication address**. In other cases, you must select Logical address.
Logger address	Set this parameter to the communications address of the slave DataLogger.
Fast scheduling	The default value is **Enable**. • Set this parameter to **Enable** to enable the fast scheduling function of the DataLogger Modbus TCP interface. • Set this parameter to **Disable** to disable the fast scheduling function of the DataLogger Modbus TCP interface.
Modbus TCP listening port	The default value is **502**. The value can be set to **1502** based on site requirements.

STEP 2 Log in to the WebUI of the master DataLogger, set access parameters for the slave DataLogger, and click **Add Devices**.

Setting access parameters



Parameter	Description
Device Type	Set this parameter to **Logger**.
IP address	Set this parameter to the IP address of the slave DataLogger.

6.3.6 Setting GOOSE Communications Parameters

Choose **Settings** > **Comm. Param.** > **GOOSE**, set the GOOSE parameters, and click **Submit**.

Basic Parameters

Parameter	Description	Remarks
Connection	The default value is **Disable.** • Set this parameter to **Enable** to enable GOOSE communication for the DataLogger. • Set this parameter to **Disable** to disable GOOSE communication for the DataLogger.	-
Data reporting	The default value is **Disable**. • Set this parameter to **Enable** to enable the function of reporting GOOSE messages from the DataLogger to the peer device. • Set this parameter to **Disable** to disable the function of reporting GOOSE messages from the DataLogger to the peer device.	This parameter is displayed when **Connection** is set to **Enable**.
Data receiving	The default value is **Disable**. • Set this parameter to **Enable** to enable the GOOSE message receiving function of the DataLogger. • Set this parameter to **Disable** to disable the GOOSE message receiving function of the DataLogger.	
Network port	**WAN** or **SPF** is supported. The default value is **WAN**. This parameter specifies the type of the network port used by the DataLogger to send and receive GOOSE messages. Set this parameter based on the actual networking scenario.	
Fast scheduling[1]	The default value is **Disable**. • Set this parameter to **Enable** to enable the fast scheduling function of the DataLogger GOOSE interface. • Set this parameter to **Disable** to disable the fast scheduling function of the DataLogger GOOSE interface.	

NOTE – [1]: The GOOSE fast scheduling function is mutually exclusive with the fast scheduling function of the Modbus TCP interface. The fast scheduling function of only one protocol takes effect at a time.

Configuration File Import/Export

- This parameter is displayed when **Connection** is set to **Enable**.
- You can contact the vendor to obtain the CID files of the DataLogger and the peer controller. Compress the CID files of the DataLogger and the peer controller into a .zip configuration package, and click **Import Config.** Import the configuration package. After the configuration is parsed successfully, the **Device name**, **Controller type**, **Controller name**, **Configuration status**, and **Last import time** are displayed.

  If the configuration file is imported and parsed successfully, the configuration status is **Configured**. If the configuration file import fails, contact the vendor of the peer controller to obtain the correct CID file.

Message Indicating Failed Configuration	Description	Suggestion
Import failed. The configuration file is incomplete.	The CID file of the local or peer device is missing.	Contact the vendor of the peer controller to obtain the correct CID file.
Import failed. The configuration file is not for this device.	The file does not match the vendor or the device type.	
Import failed. Unable to parse the configuration file.	The CID file format is incorrect. Parsing failed or no matching signal is found.	

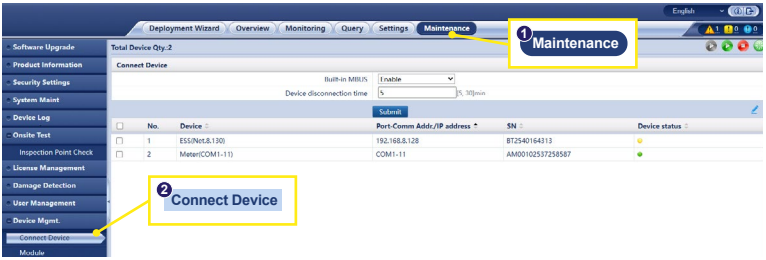
- Click **Export Config**. to obtain the CID file of the current DataLogger version. The CID file is exported at the same time if it has been imported successfully.

6.3.7 Setting PLC MBUS Parameters

6.3.7.1 Setting Parameters for a Built-in PLC MBUS Module

Procedure

STEP 1 Set access parameters.



Parameter	Description
Built-in PLC MBUS	• When the DataLogger communicates with the inverter using a built-in PLC MBUS module, set this parameter to **Enable**. • When the DataLogger communicates with the inverter and third-party device only over RS485, set this parameter to **Disable**.
Device disconnection time	Specifies the device disconnection time.

STEP 2 Set networking parameters.

Tab	Parameter	Description
Running Param.	Anti-crosstalk	Set this parameter t**o Enabl**e. When the transformer station number and winding number of the inverter are the same as those of the PLC MBUS, or the inverter SN is in the SN list, the inverter can connect to the DataLogger over an PLC MBUS network.
	Network frequency band	Set this parameter based on site requirements.
	Box-type transformer No.	Set this parameter based on the number of the transformer station connected to the DataLogger.
	Winding No.	In the scenario of multi-split transformer stations, set this parameter based on the winding number of the transformer station connected to the DataLogger.
	Networking	• When the DataLogger communicates with the inverter over PLC MBUS, set **Networking** to **Enable**. • When the DataLogger communicates with the inverter only over RS485, set **Networking** to **Disabl**e.
	Power settings	This parameter is used to adjust the transmit power of PLC MBUS signals. A larger value indicates higher transmit power and better networking capabilities. The default value is **8** (**NA** is displayed). You can set this parameter based on actual requirements.
	Transmit mode	• Set this parameter to **Single-phase** in the rapid power grid scheduling scenario and to **Three-phase** in other scenarios. • If this parameter is set to **Single-phase**, ensure that the PLC MBUS three-phase AC power cable connection of the DataLogger is the same as that of the inverter. Otherwise, the inverter communication may be disconnected or some commands may be lost.
	Fast control frame type	• This parameter specifies the frame type used by the PLC MBUS module for rapid power grid scheduling. • The PLC MBUS module adaptively selects **FC frame** or **Common frame**.
	Fast scheduling	• Set this parameter based on the actual networking. • If the fast scheduling function is required, set this parameter to **Enable**. • If the fast scheduling function is not required, set this parameter to **Disable**.
SN List	-	• Maintain the inverter SN list. • You can click **Synchronize** to synchronize the transformer station number and winding number of the PLC MBUS module to the inverters in the SN list. **NOTE** – If PLC MBUS networking is used, an SN list, that is, a whitelist, must be set for inverters. – The inverter whitelist can be set one by one or in batches. – One by one: Click **Add**, enter the SN of the corresponding inverter, and click **Submit**. **NOTE** – In batches: **Method 1**: If the whitelist is set for the first time, click **Template**, download the .zip package to the local PC, decompress it, and enter the SNs of multiple inverters in the .csv file by referring to the format of the template. Click **Import** to import the modified .csv file, and then click **Submit**. **Method 2**: If the whitelist is not set for the first time, click E**xport**, download the .zip package to the local PC, decompress it, and add the SNs of multiple inverters to the .csv file based on the format of the exported .csv file. Click Import to **import** the modified .csv file, and then click **Submit**.

6.3.7.2 Setting Parameters for an External PLC MBUS Module

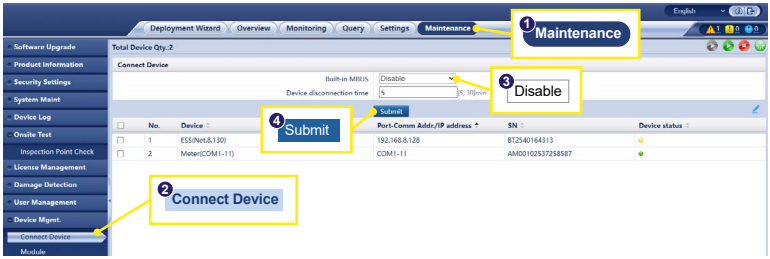
Set parameters for an external PLC MBUS based on the model of the connected device.

Setting Parameters for an External PLC MBUS Module

Procedure

STEP 1 (Optional) If the PLC MBUS module is installed in the Transformer Station, set **Built-in MBUS** to **Disable** on the DataLogger, as shown in figure. If the preceding conditions are not met, skip this step.

Setting parameters for a built-in PLC MBUS module

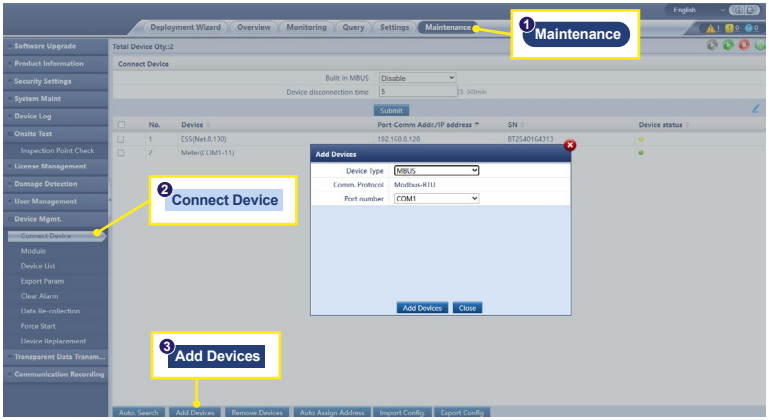


STEP 2 Set access parameters.

- If FE communication is selected for the PLC MBUS module, a device is automatically added.
- If RS485 communication is selected for the PLC MBUS module, add a device as follows:

- **Method 1**: Click **Auto. Search** to connect to the PLC MBUS module.
- **Method 2**: Click **Add Devices**, set access parameters, and click **Add Devices**.

Setting access parameters for an external PLC MBUS module



Parameter	Description
Device Type	Set this parameter to **PLC MBUS**.
Port number	Set this parameter to the COM port connected to the PLC MBUS module.

STEP 3 Set networking parameters.

Setting parameters for external PLC MBUS networking

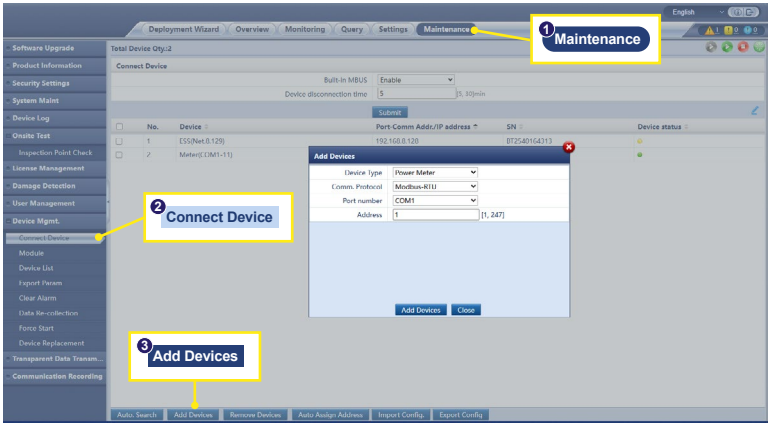
Tab	Parameter	Description
Running Param.	Baud rate	Retain the default value **115200** to achieve better communication performance. This parameter is set only when the PLC MBUS communication mode is set to RS485.
	Anti-crosstalk	Set this parameter to **Enable**. When the transformer station number and winding number of the inverter are the same as those of the PLC MBUS, or the inverter SN is in the SN list, the inverter can connect to the DataLogger over an PLC MBUS network.
	Box-type transformer No.	Set this parameter based on the number of the transformer station connected to the DataLogger.
	Winding No.	In the scenario of multi-split transformer stations, set this parameter based on the winding number of the transformer station connected to the DataLogger.
	Networking	• When the DataLogger communicates with the inverter over PLC MBUS, set **Networking** to **Enable**. • When the DataLogger communicates with the inverter only over RS485, set **Networking** to **Disable**.
	Power settings	This parameter is used to adjust the transmit power of PLC MBUS signals. A larger value indicates higher transmit power and better networking capabilities. The default value is 8 (NA is displayed). You can set this parameter based on actual requirements.
	Fast scheduling	Set this parameter based on the actual networking. • If the fast scheduling function is required, set this parameter to **Enable**. • If the fast scheduling function is not required, set this parameter to **Disable**.
	Network frequency band	Retain the default value. If you have any questions, contact the supplier or technical support.
SN List	-	• Maintain the inverter SN list. • You can click **Synchronize** to synchronize the transformer station number and winding number of the PLC MBUS module to the inverters in the SN list. **NOTE** – If PLC MBUS networking is used, an SN list, that is, a whitelist, must be set for inverters. – The inverter whitelist can be set one by one or in batches. – One by one: Click Add, enter the SN of the corresponding inverter, and click Submit. – In batches: **Method 1**: If the whitelist is set for the first time, click Template, download the .zip package to the local PC, decompress it, and enter the SNs of multiple inverters in the .csv file by referring to the format of the template. Click Import to import the modified .csv file, and then click Submit. – **Method 2**: If the whitelist is not set for the first time, click Export, download the .zip package to the local PC, decompress it, and add the SNs of multiple inverters to the .csv file based on the format of the exported .csv file. Click Import to import the modified .csv file, and then click Submit.

6.3.8 Setting Inverter Parameters

Procedure

STEP 1 **Choose Maintenance** > **Connect Device** and set access parameters.

- **Method 1**: Click **Auto**. **Search** to connect to the inverter.
- **Method 2**: Click **Add Devices**, set access parameters, and click **Add Devices**.



Parameter	Description
Device Type	Set the device type.
Connection mode	• If the inverter uses the PLC MBUS for communication, set this parameter to **PLC MBUS**. • If the inverter uses RS485 for communication, set this parameter to the COM port connected to the inverter.
Address	Set this parameter to the communications address of the inverter.

STEP 2 Choose **Monitoring** > **Inverter** > **Running Param.**, set running parameters, and click **Submit**.

NOTE – Before setting the running parameters of the inverter, ensure that the DC side of the inverter is energized.

6.3.8.1 Running Parameters

Grid Parameters

Parameter	Description
Grid code	Set this parameter based on the grid code of the country or region where the inverter is used and the inverter application scenario.
Isolation	Set the working mode of the inverter based on the grounding status on the DC side and the connection to the power grid.
Output mode	Specifies whether the inverter output has a neutral wire based on the application scenario.
V-phase grounded	The default value is **Disable**. Set this parameter to **Enable** when the phase wire from the transformer to the inverter is grounded.
PQ mode	If this parameter is set to **PQ mode 1**, the maximum AC output power equals the maximum apparent power. If this parameter is set to **PQ mode 2**, the maximum AC output power equals the rated output power.
Auto start upon grid recovery	Specifies whether to allow the inverter to automatically start after the power grid recovers. • **Enable**: The inverter automatically starts when the power grid recovers from a fault or outage. • **Disable**: The inverter does not automatically start when the power grid recovers from a fault or outage. The inverter starts only after a startup command is delivered.

Parameter	Description
Grid connection duration after power grid recovery (s)	Specifies the time after which the inverter begins restarting after the power grid recovers.
Grid reconnection voltage upper limit (V)	The standards of certain countries and regions require that after the inverter shuts down for protection due to a fault, if the power grid voltage is higher than **Grid reconnection voltage upper limit**, the inverter is not allowed to reconnect to the grid.
Grid reconnection voltage lower limit (V)	The standards of certain countries and regions require that after the inverter shuts down for protection due to a fault, if the power grid voltage is lower than **Grid reconnection voltage lower limit**, the inverter is not allowed to reconnect to the grid.
Grid reconnection frequency upper limit (Hz)	The standards of certain countries and regions require that after the inverter shuts down for protection due to a fault, if the power grid frequency is higher than **Grid reconnection frequency upper limit**, the inverter is not allowed to reconnect to the grid.
Grid reconnection frequency lower limit (Hz)	The standards of certain countries and regions require that after the inverter shuts down for protection due to a fault, if the power grid frequency is lower than **Grid reconnection frequency lower limit**, the inverter is not allowed to reconnect to the grid.
Reactive power compensation (cosφ-P) trigger voltage (%)	Specifies the voltage threshold for triggering reactive power compensation based on the cosφ-P curve.
Reactive power compensation (cosφ-P) exit voltage (%)	Specifies the voltage threshold for exiting reactive power compensation based on the cosφ-P curve.

Protection Parameters

Parameter	Description
Insulation resistance protection (MΩ)	To ensure device safety, the inverter detects the insulation resistance of the input side with respect to ground when it starts a self-check. If the detected value is less than the preset value, the solar inverter does not connect to the grid.
Unbalance voltage protection (%)	Specifies the inverter protection threshold when the power grid voltage is unbalanced.
Phase protection point (°)	The Japanese standard requires that during passive islanding detection, the protection should be triggered if an abrupt voltage phase change is detected.
Phase angle offset protection	The standards of certain countries and regions require that the inverter needs to be protected when the phase angle offset of the power grid three phases exceeds a certain value.
10 minute OV protection (V)	Specifies the 10-minute overvoltage protection threshold.
10 minute OV protection time (ms)	Specifies the 10-minute overvoltage protection duration.
Level-N OV protection (V)	Specifies the level-N grid overvoltage protection threshold.
Level-N OV protection time (ms)	Specifies the level-N grid overvoltage protection duration.
Level-N UV protection (V)	Specifies the level-N grid undervoltage protection threshold.
Level-N UV protection time (ms)	Specifies the level-N grid undervoltage protection duration.
Level-N OF protection (Hz)	Specifies the level-N grid overfrequency protection threshold.
Level-N OF protection time (ms)	Specifies the level-N grid overfrequency protection duration.
Level-N UF protection (Hz)	Specifies the level-N grid underfrequency protection threshold.
Level-N UF protection time (ms)	Specifies the level-N grid underfrequency protection duration.

NOTE – N is 1, 2, 3, 4, 5, or 6.

Feature Parameters

Parameter	Description	Remarks
MPPT multi-peak scanning	When the inverter is used in scenarios where PV strings are greatly shaded, set this parameter to **Enable**, and then the inverter will perform MPPT scanning at regular intervals to locate the maximum power.	-
MPPT multi-peak scan interval (min)	Specifies the MPPT scanning interval.	This parameter is displayed when **MPPT multi-peak scanning** is set to **Enable**.
RCD enhancement	RCD refers to the residual current of the inverter to the ground. To ensure device and personal safety, RCD should be limited to the specified value in the standard. If an AC switch with a residual current detection function is installed outside the inverter, set this function to **Enable** to reduce the residual current generated when the inverter is running, thereby preventing the AC switch from misoperations.	-
Night-time reactive power output	In some specific application scenarios, a power grid company requires that the inverter can perform reactive power compensation at night to ensure that the power factor of the local power grid meets requirements.	This parameter is displayed when **Isolation** is set to **Input ungrounded (with TF)**.
PID protection at night	When the inverter outputs reactive power at night and this parameter is set to **Enable**, the inverter will shut down automatically if it detects abnormal status of the PID voltage compensation.	-
Strong adaptability	If the power grid short-circuit capacity or PV plant installed capacity is less than 3, the power grid quality will be affected if the power grid impedance is too high, which may cause the inverter to malfunction. In this case, if the inverter is required to work properly, set this parameter to **Enable**.	-
Power quality optimization mode	If this parameter is set to **Enable**, the inverter output current harmonics will be optimized.	
PV module type	This parameter can be set to different types of PV modules, especially concentrating PV (CPV) modules. You can configure CPV modules to determine the shutdown duration of the inverter. If the CPV modules are shaded, the power drops drastically to 0 and the inverter shuts down. The energy yield would be affected since it takes too long for the power to resume and inverter to restart. The parameter does not need to be set for crystalline silicon and thin film PV modules.	• If this parameter is set to **Crystalline silicon** or **Film**, the inverter automatically detects the power of PV modules when they are shaded and shuts down if the power is too low. • When CPV modules are used: - If this parameter is set to **CPV 1**, the inverter can quickly restart in 60 minutes if the input power of PV modules drops drastically due to shading - If this parameter is set to **CPV 2**, the inverter can quickly restart in 10 minutes if the input power of PV modules drops drastically due to shading.
PID compensation direction	When the external PID module compensates the PID voltage for the PV system, set **PID compensation direction** to the actual compensation direction of the PID module so that the inverter can output reactive power at night.	**PID compensation direction** must be consistent with **PV module compensation voltage direction** of the PID module.
Built-in PID running mode	Specifies the operation mode of the inverter built-in PID.	-
PID nighttime off-grid repair	Specifies whether to enable the PID nighttime off-grid repair.	If **PID running mode** is not set to **Disable**, the parameter can be set.
PID daytime off-grid repair	Specifies whether to enable the PID daytime off-grid repair.	

Parameter	Description	Remarks
String connection mode	Specifies the connection mode of PV strings.	• When PV strings connect to the inverter separately (all PV strings separated), there is no need to set this parameter. The inverter can automatically detect the connection mode of the PV strings. • When the inverter is connected to all parallel PV strings (connected to each other in parallel outside the inverter), set this parameter to **All PV strings connected**.
Automatic OFF due to communication interrupted	The standards of certain countries and regions require that the inverter must shut down after the communication is interrupted for a certain time.	If **Automatic OFF due to communication interrupted** is set to **Enable** and the inverter communication is interrupted for a specified time (set by **Communication interruption duration**), the inverter will automatically shut down.
Communication interruption duration (min)	Specifies the duration for determining communication interruption. Used for automatic shutdown for protection in case of communication interruption.	-
Automatic ON due to communication resumed	If this parameter is set to **Enable**, the inverter automatically starts after communication recovers. If this parameter is set to **Disable**, the inverter needs to be started manually after communication recovers.	This parameter is displayed when **Automatic OFF due to communication interrupted** is set to **Enable**.
Soft start/boot time (s)	Specifies the duration for the power to gradually increase when the inverter starts.	-
Shutdown gradient (%/s)	Specifies the power change speed when the inverter shuts down.	-
AFCI	The North American standard requires that the inverter should have DC arc detection function.	-
AFCI detection adaptive mode	Adjusts the sensitivity of arc detection.	This parameter is displayed only when **AFCI** is set to **Enable**.
AFCI self-test	Sends the AFCI self-check command manually.	-
Current error during the scan (A)	To prevent inaccurate I-V curve scanning of PV strings caused by sunlight change, the current change of PV strings that operate properly should be monitored. When the current exceeds the specified value, it is determined that the sunlight changes. Perform I-V curve scanning again.	-
OVGR associated shutdown	If this parameter is set to **Enable**, the inverter shuts down after receiving the OVGR signal. If this parameter is set to **Disable**, the inverter does not shut down after receiving the OVGR signal.	This parameter is displayed if the Japanese grid code is selected.
Dry contact function	Identifies the dry contact signals from the DataLogger.	Set this parameter to **OVGR** for OVGR signals, and set it to **NC** for other signals. This parameter is displayed if the Japanese grid code is selected.
Commanded shutdown hold after power recovery	The standards of certain countries and regions require that if the inverter is shut down after receiving a command and powered on again after power recovers, it should still be in commanded shutdown state.	-

Parameter	Description	Remarks
Night-time hibernation	The inverter monitors PV strings at night. If this parameter is set to **Enable**, the monitoring function of the inverter will hibernate at night to reduce power consumption.	-
PLC MBUS communication	For inverters that support RS485 communication and PLC MBUS communication, you are advised to set this parameter to Disable to reduce power consumption.	-
RS485-2 communication	If this parameter is set to **Enable**, the RS485-2 port can be used. If the port is not used, you are advised to set this parameter to **Disable** to reduce power consumption.	-
Delay upgrade	This parameter 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.	After the inverter starts to upgrade, if **Delay upgrade** is set to **Enable**, the upgrade package is loaded first. After the PV power supply recovers and the activation conditions are met, the inverter automatically activates the upgrade.
String monitor	The inverter monitors PV strings in real time. If any PV string is abnormal (such as the PV string is shaded or the electric energy yield decreases), the inverter generates an alarm to remind maintenance personnel to maintain the PV string in a timely manner.	If PV strings are often shaded, you are advised to set **String monitor** to **Disable** to prevent false alarms.
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.	This parameter is displayed when **String monitor** is set to **Enable**.
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.	
OFF at 0% power limit	If this parameter is set to **Enable**, the inverter shuts down after receiving the 0% power limit command. If this parameter is set to **Disable**, the inverter does not shut down after receiving the 0% power limit command.	-
Maximum apparent power (kVA)	Specifies the output upper threshold for the maximum apparent power to adapt to the capacity requirements of standard and customized inverters.	If the maximum active power equals the value of Smax_limit, this parameter is not displayed.
Maximum active power (kW)	Specifies the output upper threshold for the maximum active power to adapt to different market requirements.	-
Tracker controller	Selects a controller vendor.	-
Adjust total energy yield (kWh)	Specifies the initial energy yield of the inverter. This parameter is used in inverter replacement scenarios. Set the initial energy yield of the new inverter to the total energy yield of the old inverter to ensure continuous statistics of cumulative energy yield.	-
Duration for determining short-time grid disconnection (ms)	The standards of certain countries and regions require that the inverter should not disconnect from the power grid if the power grid experiences a short-time failure. After the fault is rectified, the inverter output power needs to be quickly restored.	-
Buzzer	If this parameter is set to **Enable**, the buzzer sounds when the DC input cable is incorrectly connected. If this parameter is set to **Disable**, the buzzer does not sound when the DC input cable is incorrectly connected.	-
LVRT	LVRT is short for low voltage ride-through. When the grid voltage is abnormally low for a short time, the inverter cannot disconnect from the power grid immediately and has to work for some time.	-

Parameter	Description	Remarks
Threshold for triggering LVRT (V)	Specifies the threshold for triggering LVRT. The threshold settings should meet the local grid standard.	This parameter is displayed when **LVRT** is set to **Enable**.
LVRT compensation power factor of reactive power in positive sequence	During LVRT, the inverter needs to generate positive-sequence reactive power to support the power grid. This parameter is used to set the positive-sequence reactive power generated by the inverter. For example, if you set **LVRT compensation power factor of reactive power in positive sequence** to **2**, the increment of positive-sequence reactive current generated by the inverter is 20% of the rated current when the AC voltage decreases by 10% during LVRT. If you set **LVRT compensation power factor of reactive power in positive sequence** to **0**, the increment of positive-sequence reactive current generated by the inverter is 0 regardless of how much the AC voltage decreases during LVRT.	
LVRT compensation power factor of reactive power in negative sequence	During LVRT, the solar inverter needs to generate negative-sequence reactive power to support the power grid. This parameter is used to set the negative-sequence reactive power generated by the solar inverter. For example, if you set **LVRT compensation power factor of reactive power in negative sequence to 2, the increment of negative-sequence** reactive current generated by the inverter is 20% of the rated current when the AC voltage decreases by 10% during LVRT. If you set LVRT compensation power factor of reactive power in negative sequence to 0, the increment of negative-sequence reactive current generated by the inverter is 0 regardless of how much the AC voltage decreases during LVRT.	
Percentage of LVRT reactive current limiting	During LVRT, the device needs to limit the reactive current. For example, if you set Percentage of **LVRT reactive current limiting** to **50**, the reactive current upper limit of the device is 50% of the rated current during LVRT.	
Threshold of LVRT zero-current mode	When **Zero current due to power grid fault** is set to **Enable**, if the power grid voltage is less than the value of **Threshold of LVRT zero-current mode** during LVRT, the zero current mode is used. Otherwise, the mode configured in LVRT mode is used.	
LVRT mode	Sets LVRT mode. The options are **Zero-current mode**, **Constant current mode**, **Reactive power priority mode**, and **Active power priority mode**.	
HVRT	HVRT is short for high voltage ride-through. When the grid voltage is abnormally high for a short time, the inverter cannot disconnect from the power grid immediately and has to work for some time.	-
Threshold for triggering HVRT (V)	Specifies the threshold for triggering HVRT. The threshold settings should meet the local grid standard.	This parameter is displayed when **HVRT** is set to **Enable**.
HVRT compensation power factor of reactive power in positive sequence	During HVRT, the inverter needs to generate positive-sequence reactive power to support the power grid. This parameter is used to set the positive-sequence reactive power generated by the inverter. For example, if you set **HVRT compensation power factor of reactive power in positive** sequence to **2**, the increment of positive-sequence reactive current generated by the inverter is 20% of the rated current when the AC voltage increases by 10% during HVRT.	
HVRT compensation power factor of reactive power in negative sequence	During HVRT, the inverter needs to generate negative-sequence reactive power to support the power grid. This parameter is used to set the negative-sequence reactive power generated by the inverter. For example, if you set **HVRT compensation power factor of reactive power in negative sequence** to **2**, the increment of negative-sequence reactive current generated by the inverter is 20% of the rated current when the AC voltage increases by 10% during HVRT.	

Parameter	Description	Remarks
VRT exit hysteresis threshold	Specifies the LVRT/HVRT recovery threshold.	• This parameter is displayed when **LVRT** or **HVRT** is set to **Enable**. • LVRT recovery threshold = LVRT threshold + VRT exit hysteresis threshold • HVRT recovery threshold = HVRT threshold – VRT exit hysteresis threshold
LVRT undervoltage protection shield	Specifies whether to shield the undervoltage protection function during LVRT.	This parameter is displayed when **LVRT** is set to **Enable**.
Grid voltage protection shield during VRT	Specifies whether to shield the undervoltage protection function during LVRT or HVRT.	This parameter is displayed when **LVRT** or **HVRT** is set to **Enable**.
VRT active current limiting (%)	Specifies the percentage of the maximum active current to the rated current during fault ride-through (FRT).	-
VRT active power recovery gradient	Specifies the recovery rate when the active current recovers to the value at the moment before FRT.	-
Grid voltage trip triggering threshold (%)	Specifies the LVRT or HVRT threshold for triggering a transient voltage jump of a power grid. A transient voltage jump indicates that the inverter cannot immediately disconnect from the power grid when the power grid is abnormal due to transient changes.	This parameter is available when **Grid code** is set to **VDE 4120**.
Zero current due to power grid fault	Certain countries and regions have requirements on the output current during high/low voltage ride-through. In this case, set this parameter to **Enable**. After this parameter is set to **Enable**, the output current is less than 10% of the rated current during high/low voltage ride-through.	This parameter is displayed when **LVRT** or **HVRT** is set to **Enable**.
Active islanding protection	Specifies whether to enable the active islanding protection function.	-
Passive islanding protection	Specifies whether to enable the passive islanding protection function.	This parameter is displayed if the Japanese grid code is selected.
Voltage rise suppression	The standards of certain countries and regions require that when the output voltage exceeds a certain value, the inverter must suppress voltage rise by outputting reactive power and reducing active power.	-
Voltage rise suppressing reactive power adjustment point (%)	The standards of certain countries and regions require that the inverter generate a certain amount of reactive power when the output voltage exceeds a certain value.	• This parameter is displayed when **Voltage rise suppression** is set to **Enable**. • The value of **Voltage rise suppressing active power derating point** must be greater than that of **Voltage rise suppressing reactive power adjustment point**.
Voltage rise suppressing active power derating point (%)	The standards of certain countries and regions require that the active power of the inverter be derated according to a certain slope when the output voltage exceeds a certain value.	
Voltage rise suppression P-U curve	The standards of certain countries and regions require that the P-U curve be set.	This parameter is displayed when **Voltage rise suppression** is set to **Enable**.
Voltage rise suppression Q-U curve	The standards of certain countries and regions require that the Q-U curve be set.	
Frequency change rate protection	Set this parameter to **Enable** to protect the inverter when the grid frequency changes too fast.	-
Frequency change rate protection threshold (Hz/s)	Specifies the frequency change rate protection threshold.	This parameter is displayed when **Frequency change rate protection** is set to **Enable**.
Frequency change rate protection duration (s)	Specifies the frequency change rate protection duration.	

Parameter	Description	Remarks
Soft start time after grid failure (s)	Specifies the time for the power to gradually increase when the inverter restarts after the power grid recovers.	-
CT anomaly detection	If this parameter is set to **Enable**, the inverter automatically checks whether CT cables are disconnected or connected in reverse polarity and reports an alarm to the DataLogger.	-
Churn mode	If this parameter is set to **Enable**, the BackupBox switches to this mode (off-grid mode) when the grid fails.	-
Reserved backup capacity	When Churn mode (off-grid mode) is set to **Enable** and the battery SOC reaches this value, the battery stops discharging to ensure that the SOC is above this value.	The association is displayed when **Churn mode** (off-grid mode) is set to **Enable**.
Grid-tied/Off-grid switching mode	If this parameter is set to Automatic, the system switches to the off-grid mode when the grid fails, and switches to the grid-tied mode when the grid recovers.	
Switch to off-grid	This parameter is displayed only when Grid-tied/Off-grid switching mode is set to Manual. To manually switch to off-grid mode, select the box on the left and click Submit.	
Voltage in independent operation	AC operating voltage level of the inverter in off-grid mode can be 101 V or 202 V.	
Auto recovery from string-to-ground short-circuit protection	• If this parameter is set to **Enable**, the **String Short-Circuited to Ground** alarm is automatically cleared after fault recovery. • If this parameter is set to **Disable**, the **String Short-Circuited to Ground** alarm cannot be automatically cleared. You need to manually clear the alarm.	-
Microgrid compatibility	The default value is **Disable**. If the inverter and diesel generator run in parallel, set this parameter to **Enable**. When Microgrid compatibility is set to **Enable**, the grid-connected current source inverter supports a higher ratio of PV to energy storage in addition to the feature of the original country grid code.	If this parameter is set incorrectly, the inverter may run abnormally.
Grid phase loss adaptability	This function is used to keep the inverter operating in on-grid mode when an open phase fault occurs. By default, this function is enabled for China's national standards and disabled for other standards.	This parameter applies only to some models. The actual display may vary. • **Positive-sequence reactive current limit during asymmetric LVRT (%)** and **Compensation angle during ZVRT** are displayed only when **LVRT** is set to **Enable**. • **Reactive current limit during HVRT (%)** is displayed only when **HVRT** is set to **Enable**.
Positive-sequence reactive current limit during asymmetric LVRT (%)	During asymmetric LVRT, the device needs to limit the positive-sequence reactive current.	
Negative-sequence reactive current limit during VRT (%)	During asymmetric LVRT, the device needs to limit the negative-sequence reactive current.	
Reactive current limit during HVRT (%)	During HVRT, the device needs to limit the reactive current.	
Min. active current during VRT (%)	During VRT, the device needs to limit the min. active current.	
Compensation angle during ZVRT	By default, this function is enabled for China's national standards and disabled for other standards.	

Parameter	Description	Remarks
Reactive current compensation bias during LVRT	Specifies the percentage of the reactive compensation current in the rated current during LVRT. The default value is **0.0**, and the value range is [–100.0, 100.0].	This parameter applies only to some models. The actual display may vary. • **Reactive current compensation bias during LVRT** and **Power dispatching hold time after LVRT** are displayed only when **LVRT** is set to **Enable**. • **Reactive current compensation bias during HVRT** and **Power dispatching hold time after HVRT** are displayed only when **HVRT** is set to **Enable**.
Reactive current compensation bias during HVRT	Specifies the percentage of the reactive compensation current in the rated current during HVRT. The default value is **0.0**, and the value range is [–100.0, 100.0].	
Power dispatching hold time after LVRT	Specifies the delay for the device to stop the power dispatching response after LVRT. After the stopping state ends, the device starts to respond to the dispatching command. The default value is **5000**, and the value range is [0, 60000].	
Power dispatching hold time after HVRT	Specifies the delay for the device to stop the power dispatching response after HVRT. After the stopping state ends, the device starts to respond to the dispatching command. The default value is **5000**, and the value range is [0, 60000].	
Anti-rollback	The default setting is **Enable**. **Enable**: Enable the anti-rollback function. **Disable**: Disable the anti-rollback function.	• This parameter applies only to some models. The actual display may vary. • If the parameter is set to **Enable**, the software cannot be rolled back to the source version during the software upgrade to prevent vulnerabilities in the source version from being exploited.
PV module short-circuit current	The value ranges from 8.0 A to 20.0 A, with one decimal place reserved. The single-side short-circuit current of the connected PV module under STC is available in the PV module parameters.	-
PV module bifaciality factor	The value ranges from 1.0 to 1.1, with one decimal place reserved. Select 1.0 for monofacial PV modules and 1.1 for bifacial PV modules.	-
DC switch quick-break protection threshold	The value ranges from –10.0 to –30.0. When the inverter detects that the backfeed current exceeds the setting, it immediately triggers disconnection.	-

Power Adjustment

Parameter	Description	Remarks
Remote power schedule	If this parameter is set to **Enable**, the inverter responds to the scheduling command from the remote port. If this parameter is set to Disable, the inverter does not respond to the scheduling command from the remote port.	-
Schedule instruction valid duration (s)	Specifies the validity period of the scheduling instruction. When this parameter is set to **0**, the scheduling instruction takes effect permanently.	When this parameter is set to **0**, the scheduling instruction takes effect permanently.
Maximum apparent power (kVA)	Specifies the output upper threshold for the maximum apparent power to adapt to the capacity requirements of standard and customized inverters.	If the maximum active power equals the value of Smax_limit, this parameter is not displayed.
Maximum active power (kW)	Specifies the output upper threshold for the maximum active power to adapt to different market requirements.	-
Shutdown at 0% power limit	If this parameter is set to **Enable**, the inverter shuts down after receiving the 0% power limit command. If this parameter is set to **Disable**, the inverter does not shut down after receiving the 0% power limit command.	-
Active power change gradient (%/s)	Specifies the change rate of the inverter active power.	-
Fixed active power derated (kW)	Specifies the active power output of the inverter by fixed value.	This parameter is displayed when **Remote power schedule** is set to **Enable**.

Parameter	Description	Remarks
Active power percentage derating (%)	Adjusts the active output power of the inverter by percentage. If this parameter is set to 100, the inverter provides the maximum output power.	This parameter is displayed when **Remote power schedule** is set to **Enable**. If this parameter is set to **100**, the inverter provides the maximum output power.
Reactive power change gradient (%/s)	Specifies the change rate of the inverter reactive power.	-
Plant active power gradient (min/100%)	Specifies the rate of active power rise due to irradiance changes.	-
Filter duration for average active power (ms)	Specifies the period of active power rise due to irradiance changes. This parameter is used with **Plant active power gradient**.	-
PF(U) voltage detection filter time (s)	Specifies the time for filtering the grid voltage in the PF-U curve.	-
Reactive power adjustment time (s)	Specifies the adjustment time for the reactive power to reach the target value during reactive power adjustment.	-
Power factor	Specifies the power factor of the inverter.	This parameter is displayed when **Remote power schedule** is set to **Enable**.
Reactive power compensation (Q/S)	Specifies the reactive power output by the inverter.	
Reactive power compensation at night (Q/S)	During the reactive power compensation at night, the reactive power is scheduled by percentage.	-
Night-time reactive power output	In some specific application scenarios, a power grid company requires that the inverter can perform reactive power compensation at night to ensure that the power factor of the local power grid meets requirements.	This parameter is displayed when **Isolation** is set to **Input ungrounded (with TF)**.
Apply nighttime reactive power parameters	If this parameter is set to **Enable**, the inverter outputs reactive power based on the setting of **Reactive power output at night**. Otherwise, the inverter executes the remote scheduling command.	This parameter is displayed when **Reactive power output at night** is set to **Enable**.
Reactive power compensation at night (kVar)	During the reactive power compensation at night, the reactive power is scheduled by fixed value.	This parameter is displayed when **Reactive power output at night** and **Apply nighttime reactive power parameters** are set to **Enable**.
Overfrequency-caused power derating	If this parameter is set to **Enable**, when the power grid frequency exceeds the frequency threshold for triggering overfrequency-caused power derating, the active power of the inverter is derated based on a certain gradient.	-

Parameter	Description	Remarks
Frequency threshold for triggering overfrequency-caused power derating (Hz)	The standards of certain countries and regions require that the output active power of the inverter be derated when the power grid frequency exceeds a certain value.	• This parameter is displayed when **Overfrequency derating** is set to **Enable**. • When setting this parameter, ensure that the following condition is met: **Frequency for exiting overfrequency derating** ≤ **Frequency for triggering overfrequency derating** < **Cutoff frequency of overfrequency derating**.
Frequency threshold for exiting overfrequency-caused power derating (Hz)	Specifies the frequency threshold for exiting overfrequency-caused power derating.	
Frequency threshold for stopping overfrequency-caused power derating (Hz)	Specifies the frequency threshold for stopping overfrequency-caused power derating.	
Power threshold for stopping overfrequency-caused power derating (%)	Specifies the power threshold for stopping overfrequency-caused power derating.	
Frequency detection filter time (ms)	Specifies the frequency detection filter time.	
Gradient of overfrequency-caused power derating (%/s)	Specifies the rate of overfrequency-caused power derating.	
Gradient of power recovery from overfrequency-caused derating (%/min)	Specifies the power recovery rate for overfrequency-caused power derating.	
Voltage derating	If this parameter is set to **Enable**, when the grid voltage exceeds the voltage derating start point, the active power of the inverter is derated based on a certain gradient.	-
Voltage derating start point (V)	Specifies the start point for voltage derating.	• This parameter is displayed when **Voltage derating** is set to **Enable**. • When setting this parameter, ensure that the following condition is met: **Voltage derating start point** < **Voltage derating stop point**.
Voltage derating stop point (V)	Specifies the stop point for voltage derating.	
Voltage derating cut-off power (V)	Specifies the cut-off power for voltage derating.	
Protection upon communication failure	In the inverter export limitation scenario, if this parameter is set to **Enable**, the inverter will derate according to the active power derating percentage when the communication between the inverter and the DataLogger or Dongle is disconnected for a period longer than **Communication disconnection detection time**.	-
Communication disconnection detection time (s)	Specifies the detection time for protection upon a communication failure between the inverter and the DataLogger or Dongle.	This parameter is displayed when **Communication disconnection fail-safe** is set to **Enable**.
Active power output limit for fail-safe (%)	Specifies the derating value of the inverter active power by percentage.	
Apparent power baseline (kVA)	Adjusts the apparent output baseline of the inverter.	The apparent power baseline must be greater than or equal to the active power baseline.
Active power baseline (kW)	Adjusts the active output baseline of the inverter.	-
Frequency-based control	The standards of certain countries and regions require that if the power grid frequency fluctuates around the rated value, the inverter needs to fine-tune the active power output based on **Frequency-based adjustment** ratio to help stabilize the power grid frequency. In this case, set this parameter to **Enable**.	-

Parameter	Description	Remarks
Frequency-based adjustment ratio	Specifies the adjustment ratio of the active power output.	This parameter is displayed when Frequency-based control is set to **Enable**.
Underfrequency-caused power raising	The standards of certain countries and regions require that if the power grid frequency is lower than **Frequency threshold for triggering underfrequency-caused power raising**, the inverter needs to increase the active power output to increase the power grid frequency. In this case, set this parameter to **Enable**.	-
Frequency threshold for triggering underfrequency-caused power raising (Hz)	Specifies the frequency threshold for triggering underfrequency-caused power raising.	This parameter is displayed when **Underfrequency-caused power raising is** set to **Enable**.
Gradient of underfrequency-caused power raising (%/min)	Specifies the power recovery rate for underfrequency-caused power raising.	
Frequency threshold for stopping underfrequency-caused power raising (Hz)	Specifies the frequency threshold for stopping underfrequency-caused power raising.	
Power threshold for stopping underfrequency-caused power raising (%)	Specifies the power threshold for stopping underfrequency-caused power raising.	
Frequency threshold for exiting underfrequency-caused power raising (Hz)	Specifies the frequency threshold for exiting underfrequency-caused power raising.	
Insulation resistance inspection during reactive power output at night	• **Enable**: Enable the function of insulation resistance inspection during reactive power output at night. • **Disable**: Disable the function of insulation resistance inspection during reactive power output at night.	• This parameter applies only to some models. The actual display may vary. • This parameter is displayed when **Reactive power output at night** is set to **Enable**. • If this parameter is set to **Enable**, the device automatically detects the status every night. During the detection, the device automatically resets.

PV String Access Detection

- PV string access detection applies to large-scale commercial ground PV plants with PV strings facing the same direction.
- In AC or DC power limiting scenarios:
  - If the PV string access type has not been identified, **PV string N access status** will be displayed as **Disconnection**. The PV string access type can be identified only when the solar inverters restore to the non-power limiting state and the current of all connected PV strings reaches the **startup current**.
  - If the PV string access type has been identified, when a certain PV string connected to the 2-in-1 terminals is lost, no alarm will be generated. If a certain PV string connected to the 2-in-1 terminals is restored, the access type cannot be identified. You can determine whether both 2-in-1 PV strings are restored only when the PV string current reaches **Startup current for 2-in-1 detection**.
- After setting the parameters, you can go to the Running Info. tab page to check whether the PV string connection status is normal.

Parameter description

Parameter	Description
PV String Access Detection	**PV String Access Detection** is set to **Disable** by default. After solar inverters are connected to the power grid, set **PV String Access Detection** to **Enable**.

Parameter	Description
Startup current	When the current of all connected PV strings reaches the preset value, the PV string access detection function is enabled. **NOTE** – Startup current setting rules: – Startup current = I_{sc} (S_{tc}) x 0.6 (rounded up). For details about I_{sc} (S_{tc}), see the PV module nameplate. – Default startup current (5 A): applicable to the scenarios where the short-circuit current I_{sc} (S_{tc}) is greater than 8 A for the monocrystalline and polycrystalline PV modules.
Startup current for 2-in-1 detection	When the current of a PV string reaches **Startup current for 2-in-1 detection**, the PV string is automatically identified as **2-in-1**. You are advised to retain the default settings.
PV string N access type **NOTE** – *N* is the DC input terminal number of the solar inverter.	Set this parameter based on the type of the PV string connected to DC input terminal N of the solar inverter. Currently, the options are as follows: Automatic identification (default value), Disconnection, Single PV string, and 2-in-1. You are advised to retain the default value. If the value is incorrectly set, the PV string access type may be incorrectly identified and alarms may be generated by mistake for the PV string access status.

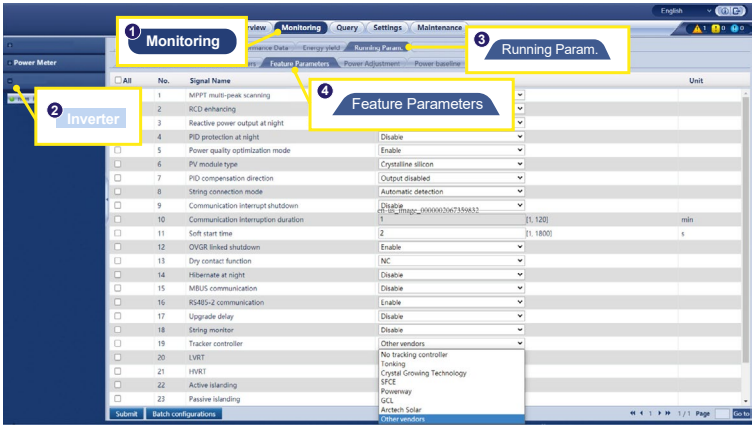
6.3.8.2 Tracking System

If a PV string uses a tracking system with a controller, set tracking system parameters on the **Tracking System** tab page.

Procedure

STEP 1 Before setting the tracking system parameters, you need to set **Tracker controller** in **Feature Parameters** on the **Running Param.** tab page. Select the corresponding vendor based on the information about the tracker controller. If the vendor is not in the list, select **Other vendors**.

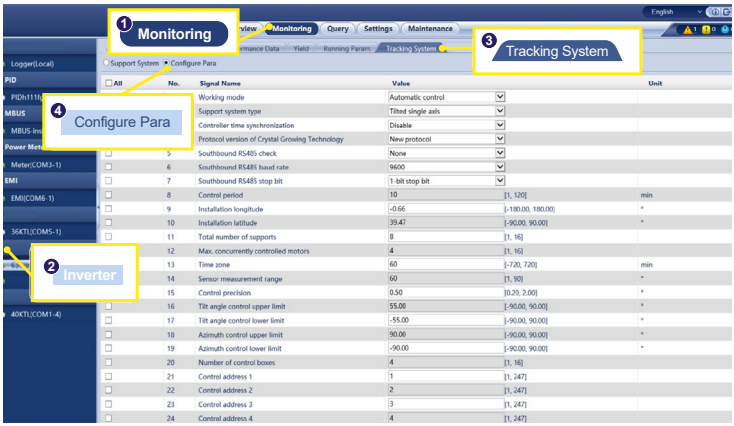
NOTE – This section uses Other vendors as an example.



STEP 2 On the **Tracking System** tab page, select **Configure Para**.

EN

Setting configuration parameters (tracking system)



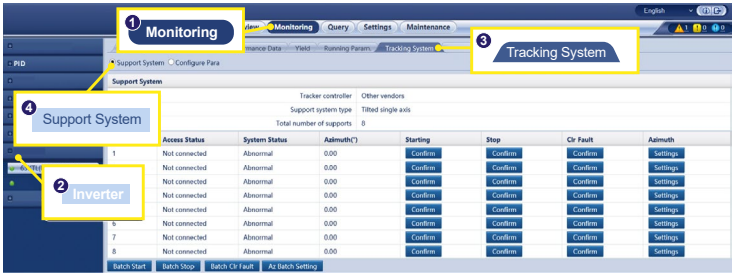
Parameter	Description
Working mode	Six working modes are supported: **Automatic control**, **Manual control**, **Maintenance mode**, **Wind mode**, **Snow mode**, and **Rain mode**. Set **Working mode** based on the actual operating status of the inverter.
Support system type	Four types of trackers are supported: **Tilted single axis**, **Horizontal single axis**, **Vertical single axis**, and **Dual axis**. **NOTE –** The tracker type can be set only when **Tonking** or **Crystal Growing Technology** is selected. For other vendors, the tracker type is automatically selected based on the inverter configuration.
Controller time synchronization	This parameter can be set to **Enable** or **Disable**. After this parameter is set to **Enable**, the time is synchronized with the tracking system every 15 minutes.
Protocol version of Crystal Growing Technology	When **Crystal Growing Technology** is selected, you can set this parameter to **New protocol** or **Old protocol** based on the site requirements.
Southbound RS485 check	This parameter can be set to **None**, **Odd parity**, or **Even parity**.
Southbound RS485 baud rate	This parameter can be set to **4800**, **9600**, **19200**, or **115200**.
Southbound RS485 stop bit	This parameter can be set to **1-bit stop bit** or **2-bit stop bit**.
Control period	When **Tonking** is selected, you can set the period for refreshing the target angle.
Installation longitude	The longitude and latitude can be set.
Installation latitude	
Total number of supports	The inverter obtains the number of supports under each control box based on the configured number and addresses of the control boxes, and calculates and obtains the total number of supports. **NOTE –** This parameter can be set only when **Tonking** or **Crystal Growing Technology** is selected.
Max. concurrently controlled motors	When **Tonking** is selected, this parameter can be set.
Time zone	The time zone can be set.
Sensor measurement range	When **Tonking** is selected, this parameter can be set.
Control precision	When **Tonking** is selected, this parameter can be set.

Parameter	Description
Tilt angle control upper limit	These parameters can be set only when **Work mode** is set to **Manual control**.
Tilt angle control lower limit	
Azimuth control upper limit	
Azimuth control upper limit	
Number of control boxes	Set this parameter based on the number of control boxes connected to the inverter. **NOTE** – This parameter can be set only when **Other vendors** is selected.
Control address 1–16	Set this parameter based on the communication address of the control box. **NOTE** – This parameter can be set only when **Other vendors** is selected.

STEP 3 On the **Tracking System** tab page, check **Total number of supports** under **Support System** and check whether **Access Status** and **System Status** are normal.

NOTE – Check whether the value of **Total number of supports** is the same as that in **Configure Para**.
– If **Working mode** in **Configure Para** is set to **Manual control**, you can manually set parameters such as **Starting**, **Stop**, **Clr Fault**, and **Azimuth** under **Support System**.

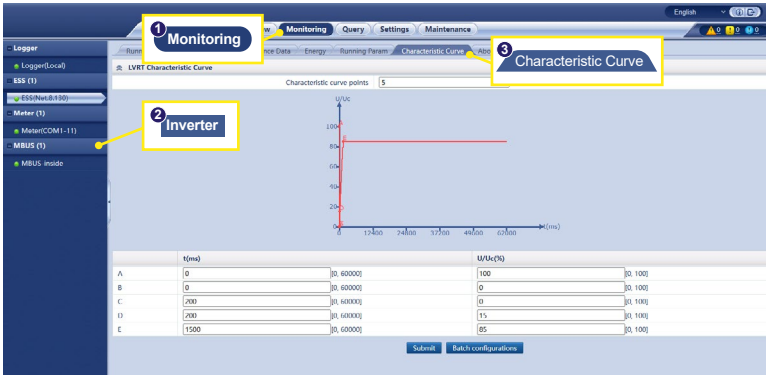
Support system (tracking system)



6.3.8.3 Characteristic Curves

The web software versions corresponding to the WebUI screenshots in this document are V300R001C00SPC050. The screenshots are for reference only.

STEP 1 Set characteristic curve parameters and click **Submit**.



Characteristic Curve Name	Description	Remarks
LVRT Characteristic Curve	Configure this characteristic curve based on the power grid standard.	The DataLogger supports only the characteristic curve configuration for LVRT that lasts no more than 60s. If the power grid standard requires that the duration of LVRT be greater than 60s, **LVRT Characteristic Curve** is not displayed for the grid code.
[Voltage Rise Suppression]Q-U curve	1. Set **Voltage Rise Suppression** to **Enable**. 2. Configure this characteristic curve based on the power grid standard.	-
[Voltage Rise Suppression]P-U curve	1. Set **Voltage Rise Suppression** to **Enable**. 2. Configure this characteristic curve based on the power grid standard.	-
HVRT characteristic curve	Set the high voltage ride-through capability of the device.	• This parameter applies only to some models. The actual display may vary. • This parameter is displayed only when **HVRT** is set to **Enable**.

6.3.8.4 Battery

This section describes how to query or set battery parameters when the inverter is connected to a battery.

Battery Information

Parameter	Description
Working status	Indicates the current working status of the battery, which can be **Offline**, **Idle**, **Running**, **Faulty**, or **Hibernating**.
Working mode	Indicates the current working mode of the inverter battery control.
Charge/Discharge power	Total charge and discharge power of all batteries connected to the inverter.
SOC	Indicates the power status of all batteries connected to the inverter.
Bus voltage	Indicates the voltage on the DC bus of the battery.
Bus current	Indicates the current on the DC bus of the battery.
Rated capacity	Total rated capacity of all batteries connected to the inverter. The rated capacity refers to the total amount of energy discharged by the batteries in normal conditions.
Current-day charge capacity	Total energy charged into the batteries on the current day.
Current-day discharge capacity	Total energy discharged from the batteries on the current day.
Total charge	Total energy charged into the batteries.
Total discharge	Total energy discharged from the batteries.

Energy Storage Unit

Parameter	Description
Firmware version	Software version of the DC/DC module.
SN	Serial number of the DC/DC module.
Working status	Indicates the current working status of the energy storage unit, which can be **Offline**, **Idle**, **Running**, **Faulty**, or **Hibernating**.
Rated capacity	Total amount of energy discharged by the energy storage unit in normal conditions.
Voltage	Voltage of the energy storage unit.
Current	Current of the energy storage unit.
Internal temperature	Temperature inside the energy storage unit.
SOC	Indicates the power status of the energy storage unit.

Parameter		Description
Charge/Discharge power		Indicates the charge or discharge power of the energy storage unit.
Current-day charge capacity		Total energy charged into the energy storage unit on the current day.
Current-day discharge capacity		Total energy discharged from the energy storage unit on the current day.
Total charge		Total energy charged into the energy storage unit.
Total discharge		Total energy discharged from the energy storage unit.
Battery model		Model of the energy storage unit.
Battery pack	Firmware version	Software version of the battery pack.
	SN	Serial number of the battery pack.
	Working status	Indicates the current working status of the battery pack, which can be **Offline**, **Idle**, **Running**, **Faulty**, or **Hibernating**.
	Voltage	Voltage of the battery pack.
	Charge/Discharge power	Indicates the charge or discharge power of the energy storage unit.
	Highest temperature	Indicates the highest temperature detected in the battery pack.
	Lowest temperature	Indicates the lowest temperature detected in the battery pack.
	SOC	Power status of the battery pack.
	Total discharge	Total energy discharged from the battery pack.

Configurable Parameters

Parameter	Description
Energy Storage Unit	Displays or sets the battery model. The system automatically identifies and displays the correct model. Generally, you do not need to manually modify the information.
Maximum charge power	Sets the maximum power for battery charging.
Maximum discharge power	Sets the maximum power for battery discharging.
Charge from AC	If this parameter is set to **Enable**, the batteries can be charged from the power grid.
Maximum charge power of grid	Sets the maximum power for charging the batteries from the power grid.
Charge cutoff capacity	When the SOC of the battery reaches this value, charging stops.
Max. depth of discharge	When the SOC of the battery reaches this value, discharging stops.
Grid charge cutoff SOC	When the SOC of the battery reaches this value, the grid stops charging the battery.

Charge/Discharge

Parameter	Description
Charge/Discharge	Forced charge/discharge operation, which can be **Charge**, **Discharge**, or **Stop**.
Mode Settings	To enter the forced charge/discharge mode, set **Duration** or **Target SOC**.
Duration	Sets the duration of forced charge/discharge. When the time is reached, the forced charge/discharge stops automatically. This parameter is displayed when **Mode Settings** is set to **Duration**.
Target SOC	Sets the target SOC for forced charge/discharge. When the SOC reaches this value, the forced charge/discharge stops automatically. This parameter is displayed when **Mode Settings** is set to **Target SOC**.
Charged energy	Charged energy in this forced charge/discharge
Discharged energy	Discharged energy in this forced charge/discharge

6.3.9 Setting PCS Parameters

Procedure

Choose Monitoring > **PCS** > **Running Param**, set running parameters, and click **Submit**.

NOTE – Before setting the running parameters of the PCS, ensure that the DC side is energized.

– The parameter list provided in this document includes all configurable parameters which may vary depending on scenarios. The actual display may vary.

Grid Parameters

Parameter	Description	Remarks
Grid code	Set this parameter based on the grid code of the country or region where the devices are used.	After this parameter is set, the device restarts.
Voltage level	Set the voltage level of the power grid.	-
Frequency level	Set the frequency level of the power grid.	-
Output mode	Specifies the supported power grid types.	After this parameter is set, the device restarts.
Isolation setting	Specifies the device grounding status on the DC side and the connection to the power grid.	
Auto start upon grid recovery	Specifies whether to allow the device to automatically start after the power grid recovers.	-
Grid connection duration after power grid recovery (s)	Specifies the time after which the device begins restarting after the power grid recovers.	-
Quick startup for short-time grid disconnection	Specifies whether to allow the device to quickly start after the power grid recovers from a short-time failure.	-
Duration for determining short-time grid disconnection (ms)	The standards of certain countries and regions require that the device not disconnect from the power grid if the power grid experiences a short-time failure. After the fault is rectified, the device output power needs to be quickly restored.	This parameter is displayed when **Quick startup after short-time grid disconnection** is set to **Enable**.
Soft start time after grid failure (s)	Specifies the time for the power to gradually increase when the device restarts after the power grid recovers.	-
Grid reconnection voltage upper limit (V)	According to the standards of certain countries and regions, grid reconnection is not allowed when the grid voltage is higher than the maximum voltage for grid reconnection.	-
Grid reconnection voltage lower limit (V)	According to the standards of certain countries and regions, grid reconnection is not allowed when the grid voltage is lower than the minimum grid voltage for grid reconnection.	-
Grid reconnection frequency upper limit (Hz)	According to the standards of certain countries and regions, grid reconnection is not allowed when the grid frequency is higher than the maximum grid frequency for grid reconnection.	-
Grid reconnection frequency lower limit (Hz)	According to the standards of certain countries and regions, grid reconnection is not allowed when the grid frequency is lower than the minimum grid frequency for grid reconnection.	-
Upper voltage threshold (V) for grid connection	According to the standards of certain countries and regions, initial grid connection is not allowed when the grid voltage is higher than the maximum voltage for grid connection.	-
Lower voltage threshold (V) for grid connection	According to the standards of certain countries and regions, initial grid connection is not allowed when the grid voltage is lower than the minimum voltage for grid connection.	-
Upper frequency threshold (Hz) for grid connection	According to the standards of certain countries and regions, initial grid connection is not allowed when the grid frequency is higher than the maximum frequency for grid connection.	-
Lower frequency threshold (Hz) for grid connection	According to the standards of certain countries and regions, initial grid connection is not allowed when the grid frequency is lower than the minimum frequency for grid connection.	-
Grid automatic reconnection time	Specifies the time after which the device begins restarting after the power grid recovers.	-

Protection Parameters

Parameter	Description	Remarks
Insulation resistance protection threshold (MΩ)	To ensure device safety, the device detects the insulation resistance of the DC side to the ground when it starts a self-check. If the detected value is less than the preset value, the device does not connect to the grid nor start. Value range: [0.05, 1.5].	-
Active islanding protection	Specifies whether to enable the active islanding protection function.	-
Passive islanding protection	Specifies whether to enable the passive islanding protection function.	-
Unbalance voltage protection (%)	Specifies the device protection threshold when the power grid voltage is unbalanced.	-
Phase protection threshold (°)	The Japanese standard requires that during passive islanding detection, the protection be triggered if an abrupt voltage phase change is detected.	-
Phase angle offset protection	The standards of certain countries and regions require that the device be protected when the phase angle offset of the power grid three phases exceeds a certain value.	-
10-minute UV protection	Specifies the 10-minute undervoltage protection threshold.	-
10-minute UV protection time	Specifies the 10-minute undervoltage protection duration.	-
10 minute OV protection (V)	Specifies the 10-minute overvoltage protection threshold. Value range: [800, 1000] V.	-
10 minute OV protection time (ms)	Specifies the 10-minute overvoltage protection duration.	-
Level-N OV protection (V)	Specifies the level-N grid overvoltage protection threshold.	• N can be 1, 2, 3, 4, 5, or 6. • Level-1 overvoltage protection threshold ≤ Level-2 overvoltage protection threshold ≤ Level-3 overvoltage protection threshold ≤ Level-4 overvoltage protection threshold ≤ Level-5 overvoltage protection threshold ≤ Level-6 overvoltage protection threshold • Duration threshold for level-1 overvoltage protection ≥ Duration threshold for level-2 overvoltage protection ≥ Duration threshold for level-3 overvoltage protection ≥ Duration threshold for level-4 overvoltage protection ≥ Duration threshold for level-5 overvoltage protection ≥ Duration threshold for level-6 overvoltage protection • Level-1 undervoltage protection threshold ≥ Level-2 undervoltage protection threshold ≥ Level-3 undervoltage protection threshold ≥ Level-4 undervoltage protection threshold ≥ Level-5 undervoltage protection threshold ≥ Level-6 undervoltage protection threshold • Duration threshold for level-1 undervoltage protection ≥ Duration threshold for level-2 undervoltage protection ≥ Duration threshold for level-3 undervoltage protection ≥ Duration threshold for level-4 undervoltage protection ≥ Duration threshold for level-5 undervoltage protection ≥ Duration threshold for level-6 undervoltage protection
Level-N OV protection time (ms)	Specifies the level-N grid overvoltage protection duration.	
Level-N UV protection (V)	Specifies the level-N grid undervoltage protection threshold.	
Level-N UV protection time (ms)	Specifies the level-N grid undervoltage protection duration.	
Frequency change rate protection	If this parameter is set to **Enable**, the device is protected when the power grid frequency changes too fast.	-

Parameter	Description	Remarks
Frequency change rate protection threshold (Hz/s)	Specifies the frequency change rate protection threshold.	This parameter is displayed when **Frequency change rate protection** is set to **Enable**.
Duration threshold (s) for frequency change rate protection	Specifies the frequency change rate protection duration.	
Level-N OF protection (Hz)	Specifies the level-N grid overfrequency protection threshold.	• N can be 1, 2, 3, 4, 5, or 6. • Level-1 overfrequency protection threshold ≤ Level-2 overfrequency protection threshold ≤ Level-3 overfrequency protection threshold ≤ Level-4 overfrequency protection threshold ≤ Level-5 overfrequency protection threshold ≤ Level-6 overfrequency protection threshold • Duration threshold for level-1 overfrequency protection ≥ Duration threshold for level-2 overfrequency protection ≥ Duration threshold for level-3 overfrequency protection ≥ Duration threshold for level-4 overfrequency protection ≥ Duration threshold for level-5 overfrequency protection ≥ Duration threshold for level-6 overfrequency protection • Level-1 underfrequency protection threshold ≥ Level-2 underfrequency protection threshold ≥ Level-3 underfrequency protection threshold ≥ Level-4 underfrequency protection threshold ≥ Level-5 underfrequency protection threshold ≥ Level-6 underfrequency protection threshold • Duration threshold for level-1 underfrequency protection ≥ Duration threshold for level-2 underfrequency protection ≥ Duration threshold for level-3 underfrequency protection ≥ Duration threshold for level-4 underfrequency protection ≥ Duration threshold for level-5 underfrequency protection ≥ Duration threshold for level-6 underfrequency protection
Level-N OF protection time (ms)	Specifies the level-N grid overfrequency protection duration.	
Level-N UF protection (Hz)	Specifies the level-N grid underfrequency protection threshold.	
Level-N UF protection time (ms)	Specifies the level-N grid underfrequency protection duration.	

Feature Parameters

Parameter	Description	Remarks
Working mode	The default value is PQ. • If **Scenario** is set to **On-grid**, set this parameter to **PQ**. • If **Scenario** is set to **Off-grid**, set this parameter to **VSG**. • If **Scenario** is set to **On/Off-grid**, set this parameter to **PQ** or **VSG**.	• After this parameter is set, the device shuts down. • The parameter setting can be modified only in the deployment wizard.
Working mode switching delay	Specifies the delay time for online switching between VSG and PQ.	-
Microgrid compatibility	The default value is **Disable**. If the PCS and diesel generator run in parallel and the PCS works in PQ mode, set this parameter to **Enable**. When **Microgrid compatibility** is set to **Enable**, the grid-connected current source PCS supports a higher ratio of PV to energy storage in addition to the feature of the original grid code.	If this parameter is set incorrectly, the PCS may run abnormally.
Output impedance enhancement	After **Output impedance enhancement** is enabled, you can set **Frequency to which output impedance enhancement applies** to increase the output impedance at this frequency.	-
Frequency to which output impedance enhancement applies	Specifies the frequency to which output impedance enhancement applies.	This parameter is displayed when **Output impedance enhancement** is set to **Enable**.
Insulation resistance detection mode	Set this parameter to **Enable** or **Disable**.	-

Parameter	Description	Remarks
Power control priority	• If this parameter is set to **Active power first**, the device preferentially ensures active power output. • If this parameter is set to **Reactive power first**, the device preferentially ensures reactive power output.	-
Overload Enhanced Mode	The default value is **Disable**. If this parameter is set to **Enable**, the power overload capability will be enabled for a short period of time.	-
Soft start time (s)	Specifies the duration for the power to gradually increase until the device starts.	-
Shutdown gradient (%/s)	Specifies the power change rate until the device shuts down.	-
Shutdown at 0% power limit	• If this parameter is set to **Enable**, the device shuts down after receiving the 0% power limit command. • If this parameter is set to **Disable**, the device does not shut down after receiving the 0% power limit command.	-
Anti-rollback	The default setting is **Enable**. • **Enable**: Enable the anti-rollback function. • **Disable**: Disable the anti-rollback function.	• This parameter applies only to some models. The actual display may vary. • If the parameter is set to **Enable**, the software cannot be rolled back to the source version during the software upgrade to prevent vulnerabilities in the source version from being exploited.
Delayed upgrade	• **Enable**: The upgrade can be delayed. • **Disable**: The upgrade can be performed immediately. The upgrade may fail if the update conditions are not met.	-
O&M via USB connection	Specifies the USB O&M port status: **Always on**, **Off in idle state**, or **Always off**.	-
USB wakeup	Used to remotely wake up the USB O&M port. After being idle for 4 hours, the port is automatically disabled.	-
Safety mode	Set this parameter to **On** or **Exit**.	-
Communication interruption duration	Specifies the duration for determining communication interruption between the device and the DataLogger.	-
Protection upon communication failure	If this parameter is set to **Enable**, the device performs protection based on the preset power when its communication with the DataLogger is interrupted for a period longer than **Communication disconnection detection time**.	-
Communication disconnection detection time (s)	Specifies the detection time for protection upon a communication failure between the device and the DataLogger or Dongle.	This parameter is displayed when **Protection upon communication failure** is set to **Enable**.
Active power mode when communication fails	Specifies the protection mode of the active power after the communication is interrupted. The value can be **Percentage** or **Fixed value**.	
Active power threshold (%) when communication fails [high precision]	Specifies the active power threshold in percentage (high precision).	This parameter is displayed when **Protection upon communication failure** is set to **Enable** and **Active power mode when communication fails** is set to **Percentage**.
Active power threshold (kW) when communication fails [high precision]	Specifies the active power threshold as a fixed value (high precision).	This parameter is displayed when **Protection upon communication failure** is set to **Enable** and Active power mode when communication fails is set to **Fixed value**.

Parameter	Description	Remarks
Reactive power mode when communication fails	Specifies the protection mode of the reactive power after the communication is interrupted. The value can be **Q/S** or **Power factor**.	This parameter is displayed when **Protection upon communication failure** is set to **Enable**.
Reactive power threshold (PF) when communication fails	Specifies the Q/S threshold (%) of the reactive power.	This parameter is displayed when **Protection upon communication failure** is set to **Enable** and **Reactive power mode when communication fails** is set to **Power factor**.
Reactive power threshold (Q/S) when communication fails [high precision]	Specifies the power factor threshold of the reactive power (high precision).	This parameter is displayed when **Protection upon communication failure** is set to Enable and **Reactive power mode when communication fails** is set to **Q/S**.
Harmonic optimization type	Specifies harmonic voltage or harmonic current as the object of power quality optimization. The default value is **Harmonic voltage**.	This parameter is displayed when **Scenario** is set to **On-grid** and **Working mode** is set to **VSG**.
Standby mode	When there is no scheduling, the PCS enters the hot standby mode based on the battery status to reduce system loss. • **Zero-power operation**: no hot standby • **Seam hot standby**: After the PCS enters the hot standby mode, the relay on the AC side will be disconnected. • **Seamless hot standby**: After the PCS enters the hot standby mode, the relay on the AC side will not be disconnected. The reactive power of the ports needs to be supplemented.	Set this parameter as required.

Parameter	Description	Remarks
Per unit armature resistance	The default value is **2**. Specifies the resistance per unit value for armature windings of the virtual synchronous generator.	This parameter is displayed when **Working mode** is set to **VSG**.
Per unit armature inductive reactance	The default value is **1**. Specifies the inductive reactance per unit value for armature windings of the virtual synchronous generator.	**NOTE –** This parameter must be set by professional personnel. Improper settings may cause device exceptions.
Off-grid VSG inertia time constant	The default value is **0.9**. Specifies the time required for the virtual rotor of the virtual synchronous generator to reach the rated speed from the static state under the rated torque.	
P-F adjustment coefficient	The default value is **1.8**. Specifies the frequency deviation corresponding to the rated active power of the virtual synchronous generator.	
Q-V adjustment coefficient	The default value is **1.2**. Specifies the voltage deviation corresponding to the rated reactive power of the virtual synchronous generator.	
P-V adjustment coefficient	The default value is **0**. Specifies the voltage deviation corresponding to the rated active power of the virtual synchronous generator.	
Q-F adjustment coefficient	The default value is **1**. Specifies the frequency deviation corresponding to the rated reactive power of the virtual synchronous generator.	
VSG output voltage correction coefficient	The default value is **100**. Corrects the deviation caused by the transformer ratio error.	
VSG output frequency correction coefficient	The default value is **100**. Corrects the PCS output frequency deviation.	
VSG frequency damping coefficient	The default value is **7.2**. Specifies the power factor that prevents the frequency change of the virtual synchronous generator.	
VSG excitation time constant	The default value is **0**. Specifies the time required for the excitation of the virtual synchronous generator to reach the rated voltage.	
VSG excitation damping coefficient	The default value is **0**. Specifies the power factor that prevents the voltage change of the virtual synchronous generator.	
Wired carrier synchronization	Enables or disables wired carrier synchronization. The default value is **Disable**.	-
Delay compensation for wired carrier synchronization	The default value is **0.5**. Specifies the value of delay compensation for wired carrier synchronization.	This parameter is displayed when **Wired carrier synchronization** is set to **Enable**.
Wired power frequency synchronization	Enables or disables wired power frequency synchronization. The default value is **Disable**.	-
Delay compensation for wired power frequency synchronization	The default value is **0.5**. Specifies the value of delay compensation for wired power frequency synchronization.	This parameter is displayed when **Wired power frequency synchronization** is set to **Enable**.
LVRT	LVRT is short for low voltage ride-through. When the grid voltage is abnormally low for a short time, the device cannot disconnect from the power grid immediately and has to work for some time.	-

Parameter	Description	Remarks
LVRT triggering threshold (V)	Specifies the threshold for triggering LVRT. The threshold settings should meet the local grid standard.	This parameter is displayed when **LVRT** is set to **Enable**.
Positive-sequence reactive power compensation factor in LVRT	During LVRT, the device needs to generate positive-sequence reactive power to support the power grid. This parameter is used to set the positive-sequence reactive power generated by the device. For example, if you set this parameter to 2, the increment of positive-sequence reactive current generated by the device is 20% of the rated current when the AC voltage decreases by 10% during LVRT.	
Negative-sequence reactive power compensation factor in LVRT	During LVRT, the device needs to generate negative-sequence reactive power to support the power grid. This parameter is used to set the negative-sequence reactive power generated by the device. For example, if you set this parameter to 2, the increment of negative-sequence reactive current generated by the device is 20% of the rated current when the AC voltage decreases by 10% during LVRT.	
LVRT active current maintenance coefficient	Specifies the active current proportional coefficient before and during LVRT.	
LVRT reactive current limiting (%)	During LVRT, the device needs to limit the reactive current. For example, if you set this parameter to 50, the reactive current upper limit of the device is 50% of the rated current during LVRT.	
Threshold of LVRT zero-current mode	If **Zero-current mode on power grid fault** is enabled and the power grid voltage is less than **Threshold of LVRT zero-current mode** during LVRT, the zero-current mode is used. Otherwise, the mode set in LVRT mode is used.	
LVRT mode	Specifies the LVRT mode. The options are **Zero-current mode**, **Constant current mode**, **Reactive power priority mode**, and **Active power priority mode**.	
Positive-sequence reactive current limit during asymmetric LVRT (%)	During asymmetric LVRT, the device needs to limit the positive-sequence reactive current.	
Compensation angle during ZVRT	By default, this function is enabled for China's national standards and disabled for other standards.	
Reactive current compensation bias during LVRT	Specifies the percentage of the reactive compensation current in the rated current during LVRT.	
Power dispatching hold time after LVRT	Specifies the delay for the device to stop the power dispatching response after LVRT. After the stopping state ends, the device starts to respond to the dispatching command.	
LVRT characteristic curve	Specifies the LVRT capability of the device.	-
LVRT in grid forming mode	Specifies whether to enable **LVRT in grid forming mode**.	This parameter is displayed when **LVRT** is set to **Enable, Working mode** is set to **VSG**, and **Scenario** is set to **On-grid**.

Parameter	Description	Remarks
LVRT priority in grid forming mode	Set this parameter to **Voltage regulation first** or **Frequency regulation first**.	This parameter is displayed when **LVRT** is set to **Enable, Working mode** is set to **VSG, Scenario** is set to **On-grid**, and **LVRT in grid forming mode** is set to **Enable**.
Voltage regulation type of LVRT in grid forming mode	Set this parameter to **Reactive power regulation or Reactive current regulation**.	
Voltage regulation coefficient of LVRT in grid forming mode	Specifies the voltage-reactive droop coefficient during LVRT.	
Minimum LVRT duration in grid forming mode	Specifies the minimum duration of LVRT.	
Negative-sequence reactive current limit during VRT (%)	During asymmetric LVRT, the device needs to limit the negative-sequence reactive current.	This parameter is displayed when **LVRT** or **HVRT** is set to **Enable**.
Min. active current during VRT (%)	During voltage ride-through (VRT), the device needs to limit the min. active current.	
Deactivate grid voltage protection during HVRT/ LVRT	Specifies whether to shield the voltage protection function during LVRT or HVRT.	
VRT exit hysteresis threshold	Specifies the LVRT/HVRT recovery threshold. • LVRT recovery threshold = LVRT threshold + VRT exit hysteresis threshold • HVRT recovery threshold = HVRT threshold – VRT exit hysteresis threshold	
VRT active current limiting (%)	Specifies the percentage of the maximum active current to the rated current during fault ride-through (FRT).	
VRT active power recovery gradient	Specifies the recovery rate when the active current is restored to the value at the moment before fault ride-through.	
Zero-current mode on power grid fault	Specifies whether to enable the function of working in zero-current mode upon a power grid fault.	
Grid voltage trip triggering threshold	This parameter can be set only for the VDE4120.	
HVRT	HVRT is short for high voltage ride-through. When the grid voltage is abnormally high for a short time, the device cannot disconnect from the power grid immediately and has to work for some time.	-

Parameter	Description	Remarks
HVRT triggering threshold (V)	Specifies the threshold for triggering HVRT. The threshold settings should meet the local grid standard.	This parameter is displayed when **HVRT** is set to **Enable**.
Positive-sequence reactive power compensation factor in HVRT	During HVRT, the device needs to generate positive-sequence reactive power to support the power grid. This parameter is used to set the positive-sequence reactive power generated by the device. For example, if you set this parameter to 2, the increment of positive-sequence reactive current generated by the device is 20% of the rated current when the AC voltage increases by 10% during HVRT.	
Negative-sequence reactive power compensation factor in HVRT	During HVRT, the device needs to generate negative-sequence reactive power to support the power grid. This parameter is used to set the negative-sequence reactive power generated by the device. For example, if you set this parameter to 2, the increment of negative-sequence reactive current generated by the device is 20% of the rated current when the AC voltage increases by 10% during HVRT.	
Reactive current limit during HVRT (%)	During HVRT, the device needs to limit the reactive current.	
Reactive current compensation bias during HVRT	Specifies the percentage of the reactive compensation current in the rated current during HVRT.	
Power dispatching hold time after HVRT	Specifies the delay for the device to stop the power dispatching response after HVRT. After the stopping state ends, the device starts to respond to the dispatching command.	
HVRT characteristic curve	Specifies the HVRT capability of the device.	
HVRT in grid forming mode	Specifies whether to enable **HVRT in grid forming mode**.	This parameter is displayed when **HVRT** is set to **Enable, Working mode** is set to **VSG**, and **Scenario** is set to **On-grid**.
HVRT priority in grid forming mode	Set this parameter to **Reactive power first** or **Active power first**.	This parameter is displayed when **HVRT** is set to **Enable**, **Working mode** is set to **VSG**, **Scenario** is set to **On-grid**, and **HVRT in grid forming mode** is set to **Enable**.
Voltage regulation type of HVRT in grid forming mode	Set this parameter to **Reactive power regulation** or **Reactive current regulation**.	
Voltage regulation coefficient of HVRT in grid forming mode	Specifies the voltage-reactive droop coefficient during HVRT.	
Minimum HVRT duration in grid forming mode	Specifies the minimum duration of HVRT.	
Grid phase loss adaptability	This function is used to keep the inverter operating in on-grid mode when an open phase fault occurs. By default, this function is enabled for China's national standards and disabled for other standards.	-
Voltage rise suppression	The standards of certain countries and regions require that the device suppress voltage rise by outputting reactive power and reducing active power when the output voltage exceeds a certain value.	-

Parameter	Description	Remarks
Reactive power adjustment threshold (%) for voltage rise suppression	The standards of certain countries and regions require that the device generate a certain amount of reactive power when the output voltage exceeds a certain value.	• This parameter is displayed when **Voltage rise suppression** is set to **Enable**. • The value of **Active power derating threshold for voltage rise suppression** must be greater than that of **Reactive power adjustment threshold for voltage rise suppression**.
Active power derating threshold (%) for voltage rise suppression	The standards of certain countries and regions require that the active power of the device be derated based on a certain gradient when the output voltage exceeds a certain value.	
P-U characteristic curve	The device adjusts P/Pn (the ratio of the active power to the rated power) in real time based on **U/Un(%)** (the ratio of the actual power grid voltage to the rated power grid voltage).	
P-U characteristic curve adjustment time	Specifies the time from the response to the end of the adjustment based on the P-U curve.	
Frequency-based control	The standards of certain countries and regions require that if the power grid frequency fluctuates around the rated value, the device needs to fine-tune the active power output based on **Frequency-based adjustment ratio** to help stabilize the power grid frequency. In this case, set this parameter to **Enable**.	-
Frequency Adaptation	The default value is **Disable**. If this parameter is set to **Enable**, the PCS should not be in the discharging state when the power grid frequency is higher than a certain threshold; and the PCS should not be in the charging state when the power grid frequency is lower than a certain threshold.	-
Frequency-based adjustment ratio	Specifies the adjustment ratio of the active power output.	This parameter is displayed when **Frequency-based control** is set to **Enable**.
Frequency-based adjustment ratio [high precision]	Specifies the adjustment ratio of the active power output.	
Response deadband of frequency-based control	Specifies the threshold for triggering frequency-based control. For example, if this parameter is set to 0.1 Hz, the frequency-based control is not triggered when the frequency is within reference frequency±0.1 Hz.	
Power change gradient of frequency-based control	Specifies the active power change gradient of frequency-based control.	
Power change limit of frequency-based control	Specifies the lower and upper limits for active power adjustment in frequency-based control.	
Upper power change limit of frequency-based control	Specifies the upper limit for active power adjustment in frequency-based control.	
Lower power change limit of frequency-based control	Specifies the lower limit for active power adjustment in frequency-based control.	
Delay response time of frequency-based control	Specifies the delay response time of frequency-based control.	
Overfrequency-caused power derating	If this parameter is set to **Enable**, when the power grid frequency exceeds the frequency threshold for triggering overfrequency-caused power derating, the active power of the device is derated based on a certain gradient.	-

Parameter	Description	Remarks
Frequency threshold for stopping overfrequency-caused power derating (Hz)	Specifies the frequency threshold for stopping overfrequency-caused power derating.	• This parameter is displayed when **Overfrequency-caused power derating** is set to **Enable**. • When setting this parameter, ensure that the following condition is met: **Frequency threshold for exiting overfrequency-caused power derating** < **Frequency threshold for triggering overfrequency-caused power derating** < **Frequency threshold for stopping overfrequency-caused power derating**.
Power threshold for stopping overfrequency-caused power derating (%)	Specifies the power threshold for stopping overfrequency-caused power derating.	
Frequency threshold for triggering overfrequency-caused power derating (Hz)	The standards of certain countries and regions require that the output active power of the device be derated when the power grid frequency exceeds a certain value.	
Frequency threshold for exiting overfrequency-caused power derating (Hz)	Specifies the frequency threshold for exiting overfrequency-caused power derating.	
Gradient of overfrequency-caused power derating (%/s)	Specifies the rate of overfrequency-caused power derating.	
Gradient of power recovery from overfrequency-caused derating (%/min)	Specifies the power recovery rate for overfrequency-caused power derating.	
Underfrequency-caused power raising	The standards of certain countries and regions require that if the power grid frequency is lower than **Frequency threshold for triggering underfrequency-caused power raising**, the device needs to increase the active power output to increase the power grid frequency. In this case, set this parameter to **Enable**.	-
Gradient of underfrequency-caused power raising (%/min)	Specifies the power recovery rate for underfrequency-caused power raising.	• This parameter is displayed when **Underfrequency-caused power raising** is set to **Enable**. • The setting must meet the following condition: **Frequency threshold for stopping underfrequency-caused power raising** < **Frequency threshold for triggering underfrequency-caused power raising** < **Frequency threshold for exiting underfrequency-caused power raising**
Frequency threshold for stopping underfrequency-caused power raising (Hz)	Specifies the frequency threshold for stopping underfrequency-caused power raising.	
Power threshold for stopping underfrequency-caused power raising (%)	Specifies the power threshold for stopping underfrequency-caused power raising.	
Frequency threshold for triggering underfrequency-caused power raising (Hz)	Specifies the frequency threshold for triggering underfrequency-caused power raising.	
Frequency threshold for exiting underfrequency-caused power raising (Hz)	Specifies the frequency threshold for exiting underfrequency-caused power raising.	
Delay of underfrequency-caused power raising	Specifies the delay from the time when the underfrequency-caused power raising function is triggered to the time when the function takes effect.	
Frequency detection filter time (ms)	Specifies the frequency detection filter time.	This parameter is displayed when **Frequency-based control**, **Underfrequency-caused power raising**, or **Overfrequency-caused power derating** is set to **Enable**.
Recovery delay of frequency-based active power derating	Specifies the exit delay time after the frequency reaches the frequency threshold for exiting overfrequency-caused power derating.	
Execution delay of frequency-based active power derating	Specifies the execution delay time of overfrequency-caused power derating after the frequency reaches the frequency threshold for triggering overfrequency-caused power derating.	
Hysteresis of frequency-based active power derating	Specifies whether to enable the hysteresis of overfrequency-caused power derating.	

Parameter	Description	Remarks
Active power frequency regulation coefficient in grid forming mode	Specifies the ratio of the per unit value of the active power variation to the per unit value of the frequency variation for the frequency regulation.	-
Active power frequency regulation deadband in grid forming mode	Specifies the preset frequency of the frequency regulation deadband.	-
Upper limit of active power variation for frequency regulation in grid forming mode (%)	Specifies the maximum percentage of the active power variation for the frequency regulation. The upper limit can be set to the per unit value of **Active Power Baseline**.	-
Lower limit of active power variation for frequency regulation in grid forming mode (%)	Specifies the minimum percentage of the active power variation for the frequency regulation. The lower limit can be set to the per unit value of **Active Power Baseline**.	-
Reactive power voltage regulation baseline in grid forming mode	Specifies the reactive voltage regulation baseline in grid forming mode, which is used for voltage regulation command control.	-
Reactive power voltage regulation coefficient in grid forming mode	Set this parameter to the ratio of the per unit value of the reactive power variation to the per unit value of the root mean square voltage variation for the voltage regulation.	-
Reactive power voltage regulation deadband in grid forming mode	Set **Reactive power voltage regulation deadband in grid forming mode**.	-
Upper limit of reactive power variation for voltage regulation in grid forming mode (%)	Specifies the maximum percentage of the reactive power variation for the frequency regulation. The upper limit can be set to three times the per unit value of **Apparent Power Baseline**.	-
Lower limit of reactive power variation for voltage regulation in grid forming mode (%)	Specifies the minimum percentage of the reactive power variation for the frequency regulation. The lower limit can be set to three times the per unit value of **Apparent Power Baseline**.	-
Inertia time constant in grid forming mode	Specifies the time required for the virtual rotor of the GFM-related virtual synchronous generator to reach the rated speed from the static state under the rated torque.	-
Frequency damping deadband	Specifies the deadband frequency for the GFM frequency damping function. The frequency damping function takes effect only when the frequency is beyond the specified range.	-
Frequency damping coefficient	Specifies the damping coefficient for the GFM frequency damping function.	-
Power damping coefficient	Specifies the damping coefficient for the GFM frequency damping function.	-
GFM Virtual PSS	Specifies whether to enable the GFM virtual PSS.	-

Parameter	Description	Remarks
Virtual PSS low frequency oscillation damping enhancement gain	Specifies the enhanced damping gain required by the virtual PSS to implement low-frequency oscillation damping.	This parameter is displayed when **GFM Virtual PSS** is set to **Enable**.
Virtual PSS low frequency oscillation damping phase compensation center frequency	Specifies the center frequency for phase compensation required by the virtual PSS to implement low-frequency oscillation damping.	
Virtual PSS Low Frequency Oscillation Damping Compensation Phase	Specifies the phase for phase compensation required by the virtual PSS to implement low-frequency oscillation damping.	
Virtual PSS Low Frequency Oscillation Damping DC Blocking Time Constant	Specifies the time constant for DC blocking required by the virtual PSS to implement low-frequency oscillation damping.	
Virtual PSS Low Frequency Oscillation Damping Output Type	Specifies the type of power that needs to be damped by the virtual PSS to implement low-frequency oscillation damping.	
Virtual PSS Low Frequency Oscillation Damping Output Power Limiting	Specifies the percentage of the output power limit to the rated power required by the virtual PSS to implement low-frequency oscillation damping.	
Virtual PSS Low Frequency Oscillation Damping Trigger Deadband	Specifies the frequency deadband of the output damping power triggered by the virtual PPS to implement low-frequency oscillation damping.	
Virtual impedance excitation control in grid forming mode	Specifies whether to enable **Virtual impedance excitation control in grid forming mode**.	-
Excitation virtual impedance in grid forming mode	Specifies the per unit impedance of virtual impedance excitation control in grid forming mode.	This parameter is displayed when **Virtual impedance excitation control in grid forming mode** is set to **Enable**.
GFM wideband oscillation damping	Specifies whether to enable **GFM wideband oscillation damping**.	-
Broadband oscillation damping start frequency	Specifies the start frequency for the wideband oscillation damping function.	This parameter is displayed when **GFM wideband oscillation damping** is set to **Enable**.
Wideband oscillation damping compensation phase center frequency	Specifies the center frequency for phase compensation required for the wideband oscillation damping function.	
Wideband oscillation damping compensation phase	Specifies the phase to be compensated at the center frequency of phase compensation required for the wideband oscillation damping function.	
Wideband oscillation damping enhanced resistor	Specifies the enhanced resistance for the wideband oscillation damping function.	
Broadband oscillation damping cut-off frequency	Specifies the cut-off frequency for the wideband oscillation damping function.	
Inertia response in grid following mode	Specifies whether to enable **Inertia response in grid following mode**.	-

Parameter	Description	Remarks
Inertia time constant in grid following mode	Specifies the time required for the simulated synchronous generator to reach the rated speed from the static state under the rated torque.	This parameter is displayed when **Inertia time constant in grid following mode** is set to **Enable**.
Inertia frequency deadband in grid following mode	When the absolute value of the current frequency variation is greater than the configured frequency variation deadband, the device outputs the inertia power in grid following mode.	
Inertia frequency change rate threshold in grid following mode	When the absolute value of the current frequency change rate is greater than the configured frequency change rate threshold, the device outputs the inertia power in grid following mode.	
Hysteresis threshold for inertia frequency change rate in grid following mode	When the absolute value of the current frequency change rate is less than the frequency change rate threshold minus the frequency change rate hysteresis threshold, the device stops outputting the inertia power in grid following mode.	
Upper limit of inertia active power change in grid following mode	Specifies the upper limit (percentage) of inertia active power variation in grid following mode. The upper limit can be set to the per unit value of the rated power.	
Lower limit of inertia active power change in grid following mode	Specifies the lower limit (percentage) of inertia active power change in grid following model. The lower limit can be set to the per unit value of the rated power.	
Automatic voltage control for extremely weak grids	Specifies whether to enable automatic voltage control for extremely weak power grids.	-

Power Adjustment

Parameter	Description
Power control priority	• If this parameter is set to **Active power first**, the device preferentially ensures active power output. • If this parameter is set to **Reactive power first**, the device preferentially ensures reactive power output.
Remote power scheduling	If this parameter is set to **Enable**, the device responds to the scheduling instruction from the remote port. If this parameter is set to **Disable**, the device does not respond to the scheduling instruction from the remote port.
Schedule instruction valid duration (s)	Specifies the validity period of the scheduling instruction.
Plant active power gradient	Specifies the rate of active power rise due to irradiance changes.
Average active power filtering time	This parameter is used together with **Plant active power gradient**. When the active power increases due to irradiance changes, the device increases the active power output in a stepwise pattern. This parameter is used to adjust the time step of the active power change.
Active power change gradient (%/s)	Specifies the change rate of the device active power.
Reactive power change gradient (%/s)	Specifies the change rate of the device reactive power.
Power factor	Specifies the power factor of the device.
Reactive power compensation (Q/S) [high precision]	Specifies the reactive power of the device.
Q-U characteristic curve	The device adjusts Q/S (the ratio of the output reactive power to apparent power) in real time based on **U/Un(%)** (the ratio of the actual power grid voltage to the rated power grid voltage).
Q-U characteristic curve mode	Specifies the reactive power compensation mode of the device output.
Delay for Q-U characteristic curve to take effect	Specifies the delay time for Q-U adjustment.

Parameter	Description
Power percentage for triggering Q-U scheduling	Specifies the reference apparent power in percentage. When the actual apparent power of the device is greater than the value of this parameter, the Q-U characteristic curve scheduling function is enabled.
Power percentage for exiting Q-U scheduling	Specifies the P/Pn when the device exits the Q-U scheduling.
Minimum PF of Q-U characteristic curve	Specifies the minimum power factor for Q-U adjustment.
Q-P characteristic curve	The device adjusts Q/Pmax (the ratio of the reactive power to the maximum active power) in real time based on **P/Pmax** (the ratio of the active power to the maximum active power).
PF-U characteristic curve	The device adjusts the power factor in real time based on **U/Un(%)** (the ratio of the actual power grid voltage to the rated power grid voltage).
PF-U voltage detection filter time	Specifies the time for filtering the grid voltage in the PF-U curve.
cosφ-P/Pn characteristic curve	The device adjusts the output power factor cosφ in real time based on P/Pn(%).
cosφ-P/Pn trigger voltage	Specifies the voltage threshold for triggering reactive power compensation based on the cosφ-P curve.
cosφ-P/Pn exit voltage	Specifies the voltage threshold for exiting reactive power compensation based on the cosφ-P curve.
Reactive power adjustment time	Specifies the adjustment time for the reactive power to reach the target value during reactive power adjustment.

Power Baseline

Parameter	Description	Remarks
Rated power reference	Set the rated capacity of the device.	-
Apparent power baseline	Specifies the apparent power baseline for power scheduling. The value cannot be greater than the maximum apparent power.	**Active power baseline** shall be smaller than **Apparent power baseline**.
Active power baseline	Specifies the active power baseline for power scheduling. The value cannot be greater than the maximum active power.	
Maximum overload apparent power	Specifies the maximum overload active power for grid forming.	-
Maximum overload active power	Specifies the maximum overload apparent power for grid forming.	-

Adjustment

Parameter	Description
Total energy yield adjustment	A calibrating coefficient for the total energy yield to ensure that the reported energy yield is consistent with the actual energy yield at the grid connection point
Adjusted total power supply from grid	A calibrating coefficient for the total power supply from the grid to ensure that the reported amount of power supplied from the grid is consistent with the actual power supply at the grid connection point

6.3.10 Setting ESS Parameters

Procedure

Choose **Monitoring** > **ESS** > **Running Param**, set running parameters, and click **Submit**.

Basic Parameters

Parameter	Description	Remarks
Exhaust fan control module self-test time	Time when the exhaust function is self-tested every day	This parameter is displayed when the number of exhaust fans is greater than 0.
Exhaust fan control module self-test	After the self-test is started, the exhaust fan will be running for a period of time to check its exhaust function. If the exhaust fan does not meet the requirements, the system cannot start.	
Exhaust fan control	After started, the exhaust fan will automatically stop in at least 1 hour. If a combustible gas alarm is generated, the exhaust fan cannot be stopped. The exhaust fan cannot be manually started after the fire response is triggered until the fire alarm is cleared or 24 hours later.	
High-temperature alarm threshold of air conditioner in control unit cabin	Set **High-temperature alarm threshold of air conditioner in control unit cabin**.	-
Low-temperature alarm threshold of air conditioner in control unit cabin	Set **Low-temperature alarm threshold of air conditioner in control unit cabin**.	-
Temperature control mode of control unit cabin	Specifies whether the air-cooled air conditioner is scheduled by the PCS (automatic) or manually controlled (manual).	-
Running mode of air conditioner in control unit cabin	Set **Running mode of air conditioner in control unit cabin**.	-
Air conditioner on/off control in control unit cabin	Specifies whether to control the air conditioner in the control unit cabin.	-
DC busbar high temperature alarm	Specifies whether to enable **DC busbar high temperature alarm**.	-
Power-off upon DC busbar overtemperature	Specifies whether to enable **Power-off upon DC busbar overtemperature**.	-
DC busbar high temperature alarm threshold	Specifies the high temperature alarm threshold for external power cables connected to the container.	-
Threshold for power-off upon DC busbar overtemperature	Specifies the threshold for power-off due to overtemperature of external power cables connected to the container.	-
Shutdown due to Battery Cabin Door Open	Specifies whether to enable the function of shutdown when the battery cabin door is opened.	-
Shutdown delay upon fire suppression system fault	Specifies the delay for shutdown after a TRSD fault occurs.	-
Power Overload Mode	Specifies whether to enable the power overload mode.	-
Power overload enhancement mode	Specifies whether to enable the power overload enhancement mode. If this parameter is set to **Enable**, the power overload capability is enabled for a short period of time.	-
Associate AC auxiliary power supply with EPO	Specifies whether to enable the function of disconnecting the AC auxiliary power supply when it is associated with EPO.	-

Temperature Control System

Parameter	Description	Remarks
Silent mode	Set this parameter to **Off** or **On**. If the silent mode is enabled, the noise of the entire cabinet can be reduced.	-
Max. Diagnostic Mode Duration	Specifies the maximum duration of the diagnostic mode. The system automatically exits the diagnostic mode when the specified duration is reached.	-
Coolant replacement interval	Specifies the interval for coolant replacement.	-
Refrigerant system 1 compressor preheating	Specifies whether to start compressor preheating for refrigerant system 1.	-
Refrigerant system 2 compressor preheating	Specifies whether to start compressor preheating for refrigerant system 2.	-
Clear total switching times of multi-way valve	To recalculate the total switching times of multi-way valve, select this parameter and click **Submit**.	-
Dust removal by reverse rotation	Set **Dust removal by reverse rotation** based on the site requirements.	-
Dust removal interval	Set **Dust removal interval** based on the site requirements.	-
Recover auxiliary power supply for liquid cooling	Set **Auxiliary power supply recovery for liquid cooling** to restore the power supply to the liquid thermal management system (LTMS) after certain alarms are generated.	-
Clear total runtime of circulating pump 1	To recalculate the total runtime of the circulating pump, select this parameter and click **Submit**.	-
Clear total air filter usage time	To recalculate the total usage time of the air filter, select this parameter and click **Submit**.	-
Clear total runtime of outdoor fan 1	To recalculate the total runtime of outdoor fan 1, select this parameter and click **Submit**.	-
Clear total runtime of outdoor fan 2	To recalculate the total runtime of outdoor fan 2, select this parameter and click **Submit**.	-
Clear total runtime of outdoor fan 3	To recalculate the total runtime of outdoor fan 3, select this parameter and click **Submit**.	-
Clear compressor 1 total runtime	To recalculate the total runtime of compressor 1, select this parameter and click **Submit**.	-
Clear compressor 2 total runtime	To recalculate the total runtime of compressor 2, select this parameter and click **Submit**.	-
Clear total runtime of EEV 1	To recalculate the total runtime of EEV 1, select this parameter and click **Submit**.	-
Clear total runtime of EEV 2	To recalculate the total runtime of EEV 2, select this parameter and click **Submit**.	-
Clear total runtime of electric heater	To recalculate the total runtime of the electric heater, select this parameter and click **Submit**.	-
Liquid cooling mode	Set this parameter to **Automatic**, **Diagnostic Mode**, or **Maintenance mode**. **Automatic**: The LTMS is automatically controlled. **Diagnostic Mode**: The operating status of the LTMS is diagnosed. **Maintenance mode**: Choose this mode when coolant needs to be refilled or drained.	-

Parameter	Description	Remarks
Maintenance mode	Set this parameter to **Standby**, **Refilling**, or **Draining**. The default value is **Standby**. **Standby**: Wait for refilling coolant into or draining coolant from the liquid cooling pipe system. **Refilling**: Refill coolant into the liquid cooling pipe system. **Draining**: Drain coolant from the liquid cooling pipe system.	When you select **Refilling**, the following dialog box is displayed: After refilling is started, wait until the refilling process is complete so that the LTMS can run properly. Manual operations have been performed according to the manual. Are you sure you want to continue? When you select **Draining**, the following dialog box is displayed: After draining is started, you need to drain all the coolant and refill coolant so that the LTMS can run properly. Manual operations have been performed according to the manual. Are you sure you want to continue?
Confirm valve opening	Specifies whether to confirm valve opening.	-
Confirm coolant replacement	If the coolant needs to be replaced, select this parameter and click **Submit**.	-
Diagnostic Mode	Set this parameter to **Manual** or **Auto**. **Manual**: Some components of the LTMS are manually controlled. **Auto**: The status of the LTMS is checked automatically.	-
Battery temperature control mode for diagnosis	Diagnose the functions of the components involved in the following battery temperature control modes: • **Self-circulating** • **Natural cooling** • **Active cooling** • **Waste heat recovery** • **Heat pump heating** • **Mixed heating** • **Electric heating** C&I scenario: All modes are applicable. Utility scenario: Only **Self-circulating**, **Natural cooling**, **Active cooling**, and **Electric heating** are applicable.	This parameter is displayed only when **Diagnostic Mode** is set to **Manual**.
Compressor 1 setting status	Specifies the control speed for compressor 1.	This parameter is displayed when **Liquid cooling mode** is set to **Diagnostic Mode**, **Diagnostic Mode** is set to **Manual**, and one of the following conditions is met: • **Battery temperature control mode for diagnosis** is set to **Active cooling**, **Heat pump heating**, or **Mixed heating**. • **Internal environment dehumidifying control mode for diagnosis** is set to **On**. • **Internal environment temperature control mode for diagnosis** is set to **Active cooling**.
Compressor 2 setting status	Set the control speed for compressor 2.	
Electric heater setting status	Set this parameter to **Off** or **On**.	This parameter is displayed when Liquid cooling mode is set to **Diagnostic Mode**, **Diagnostic Mode** is set to **Manual**, and **Battery temperature control mode for diagnosis** is set to **Mixed heating** or **Electric heating**.

Parameter	Description	Remarks
Setting status of circulating pump 1	Specifies the control speed for circulating pump 1.	This parameter is displayed when Liquid cooling mode is set to **Diagnostic Mode**, **Diagnostic Mode** is set to **Manual**, and either of the following conditions is met: ● C&I scenario: **Battery temperature** control mode for diagnosis is set to **Self-circulating, Natural cooling**, **Active cooling**, **Heat pump heating**, or **Mixed heating**. ● Utility-scale scenario: **Battery temperature control mode for diagnosis** is set to **Self-circulating**, **Natural cooling**, **Active cooling**, or **Mixed heating**.
Outdoor fan 1 setting status	Specifies the control speed for outdoor fan 1.	This parameter is displayed when **Liquid cooling** mode is set to **Diagnostic Mode**, **Diagnostic Mode** is set to **Manual**, and **Battery temperature control mode for diagnosis** is set to one of the following values: • **Self-circulating** • **Natural cooling** • **Active cooling** • **Heat pump heating** • **Mixed heating**
Outdoor fan 2 setting status	Specifies the control speed for outdoor fan 2.	
Outdoor fan 3 setting status	Specifies the control speed for outdoor fan 3.	
Setting status of liquid refill pump	Specifies the status of the liquid refill pump.	This parameter is displayed when **Liquid cooling** working mode is set to **Diagnostic Mode**, **Diagnostic Mode** is set to **Manual**, and **Battery temperature control mode for diagnosis** is set to **Self-circulating**.
Setting status of electric control box mixed-flow fan	Specifies the status of the mixed-flow fan in the electric control box.	-
Setting status of drive cooling fan 1	Specifies the status of drive cooling fan 1.	-
Setting status of drive cooling fan 2	Specifies the status of drive cooling fan 2.	-

6.3.10.1 Setting ESR Parameters

Procedure

Choose **Monitoring** > **ESS** > **ESR** > **Running Param**, set running parameters, and click **Submit**.

Basic Parameters

Parameter	Description
Battery cluster insulation resistance protection threshold	Set **Battery cluster insulation resistance protection threshold**.
Threshold for active balancing	Set **Threshold for active balancing**.
Activate balancing module	Set **Activate balancing module**.
Location information	Set **Location information**.

Adjustment

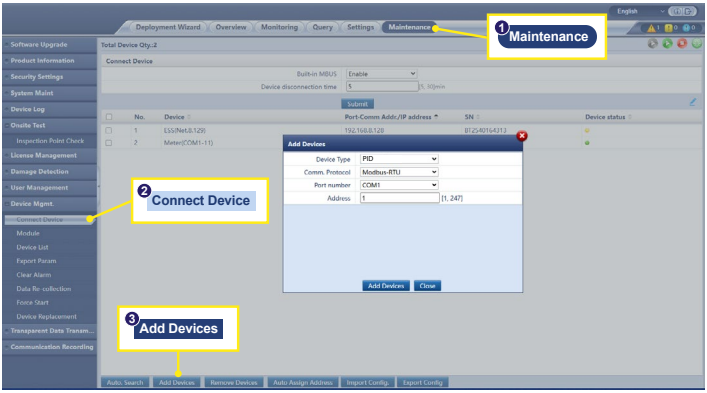
Parameter	Description
Total charged energy calibration	Calibrate the total charged energy.
Total discharged energy calibration	Calibrate the total discharged energy.

6.3.11 Setting PID Module Parameters

Procedure

STEP 1 Set access parameters.

- **Method 1**: Click **Auto. Search** to connect to the PID module.
- **Method 2**: Click **Add Devices**, set access parameters, and click **Add Devices**.



Device access parameters

Parameter	Description	Remarks
Device Type	Set this parameter to **PID**.	-
Port number	If the PID-PVBOX uses PLC MBUS for communication, set this parameter to **PLC MBUS**. If the PID module uses RS485 for communication, set this parameter to the COM port connected to the PID module.	-
Address	Set this parameter to the communications address of the PID module. • If the PID module is used as a standalone component, the default communications address is **1**. • If the SACU is configured with one PID module, the default communications address is **199**. • If the SACU is configured with two PID modules, the default communications addresses are **199** and **200**.	• The default baud rate of the PID module is **115200**. • The baud rate of the PID module shall be the same as that of the RS485 COM port on the DataLogger. If they are inconsistent, choose **Settings** > **Comm. Param.** > **RS485** and change the baud rate of the COM port connected to the PID module.

NOTE – If no device is found, check whether the RS485 communications cable is securely connected.

NOTE – If no device is found, check whether the baud rate of the PID module is consistent with that of the RS485 COM port on the DataLogger. If they are inconsistent, choose **Settings** > **Comm. Param.** > **RS485** and change the baud rate of the COM port connected to the PID module. The default baud rate of the PID module is 115200.

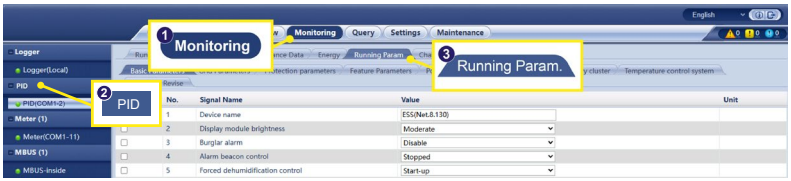
STEP 2 (Optional) Apply for and load the PID license. Perform this step if you need to use the PID module to detect the ground insulation resistance. Otherwise, skip this step.

a. Choose **Maintenance > License Management > License application**, select the PID device for which a license is to be applied, click **Export License Appli File**, and purchase a license file from the supplier.

b. Choose **Maintenance > License Management > License loading**, click **Upload License**, select the PID device to which the license file is to be loaded, and click **Load License**.

NOTE – Choose **Monitoring** > **PID** > About and check whether the value of PN is 02350XQD-001. If yes, the Insulation monitoring function of the PID module is supported. If not, the function is not supported.

STEP 3 Set running parameters and click **Submit**.



Set PID running parameters based on the model of the connected device.

6.3.11.1 Setting PID Module Parameters

Setting PID running parameters

Tab	Parameter	Description
Running Param.	Offset mode	Specifies the offset mode of the PID module. • **Disabled**: The PID module is not required. • **N/PE**: The PID module is required to output voltage from the grid.
	PV module compensation voltage direction	Specifies the compensation direction of the PID module. • PV– po: The voltage between the PV– and the ground is increased to a value greater than 0 V through voltage compensation. • Select PV– po for P-type PV modules or the N-type PV modules that comprise the cells whose positive and negative polarities are on different sides. For example, P-type PV modules, HIT, CIS, thin-film PV modules, and CdTe PV modules meet the requirement for PV– positive offset. • PV+ ne: The voltage between the PV+ and the ground is decreased to lower than 0 V through voltage compensation. • Select PV+ ne for the N-type PV modules that comprise the cells whose positive and negative polarities are on the same side. **NOTE** – When designing a PV plant, the design institute and user should confirm with the PV module vendor about the direction of voltage compensation for the anti-PID effect of PV modules.
	Working mode	Specifies the working mode of the PID module. • **Automatic**: In normal mode, the PID module operates automatically after the PID module, inverter, and DataLogger communicate with each other properly. • **Manual**: In commissioning mode, no inverter needs to be connected. The PID module can run independently and is used for commissioning only. **NOTE** – Compensation offset voltage is displayed and can be set only when Working mode is set to **Automatic**. – Output voltage (manual) is displayed and can be set only when Working mode is set to Manual. – Before the first power-on, to check whether the PID module functions properly, it is recommended that Working mode be set to Manual. If the PID module functions properly, set Working mode to **Automatic**.

Compensation offset voltage	Specifies the PV-ground compensation offset voltage after the PID module works stably in automatic mode. The absolute value ranges from 0 V to 500 V, and the default value is 50 V. • If PV module compensation voltage direction is set to PV– po, this parameter indicates the positive voltage between the PV– and the ground. The compensation range is 0 V to +500 V. • If PV module compensation voltage direction is set to PV+ ne, this parameter indicates the negative voltage between the PV+ and the ground. The compensation range is –500 V to 0 V. • If **Compensation offset voltage** is 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 plant. The output voltage amplitude is also related to the maximum system DC-to-ground withstand voltage and maximum output voltage. • After this parameter is set, wait until the PID module runs properly and use a multimeter to measure the voltage between the PV input terminal of the inverter and the ground. (PV– po: the voltage between the PV– and the ground is greater than or equal to 0 V; PV+ ne: the voltage between the PV+ and the ground is less than or equal to 0 V.)
Output voltage (manual)	Specifies the step-up voltage when the working mode is manual. The value of this parameter ranges from 0 V to 800 V. It is recommended that the commissioning output voltage for a 1000 V/1100 V inverter be set to a value ranging from 50 V to 400 V, and that the commissioning output voltage for the 1500 V inverter be set to a value ranging from 50 V to 600 V. **NOTE – Maximum output voltage** can be displayed and set based on the actual networking if there is no battery in the network.
Maximum output voltage	The value of this parameter ranges from 0 V to 800 V. The default value is 500 V. For a 1500 V inverter, the recommended value is 800 V. For a 1000 V/1100 V inverter, the value ranges from 0 V to 550 V. The parameter value indicates the maximum DC step-up voltage between PV and the ground. For a 1500 V inverter, the value ranges from 0 V to 800 V. The parameter value indicates the maximum DC step-up voltage between PV and the ground. **NOTE – Maximum output voltage** can be displayed and set based on the actual networking if there is no battery in the network.
Maximum system DC-to-ground withstand voltage	Specifies the voltages between the PV side and the ground and between the AC side and the ground in automatic mode. The value of this parameter ranges from 500 V to 1500 V. Specifies the lower threshold of the maximum voltage range between the inverter DC side (including the inverter, PV module, cable, SPD, and switch) and the ground. The default value is 1000 V. For a 1500 V inverter, the recommended value is 1500 V. **NOTE – Maximum system DC-to-ground withstand voltage** can be displayed and set based on the actual networking if there is no battery in the network.
IMD access	Specifies whether the PID module and insulation monitor device (IMD) can operate in cycle mode. • Select **Enable** if you allow the PID module and IMD to operate in cycle mode. • Select **Disable** if you forbid the access of IMDs. **NOTE –** This parameter can be displayed and set only when **Insulation monitoring** is set to **Disable**. **– Periodic PID runtime** and **Periodic IMD runtime** can be displayed and set only when IMD access is set to **Enable**.
Periodic PID runtime	Specifies the running duration of the PID module when the PID module and IMD operate in cycle mode. The value of this parameter ranges from 60 min to 480 min. The IMD is shut down when the PID module is running.
Periodic IMD runtime	Specifies the running duration of the IMD when the PID module and IMD operate in cycle mode. The value of this parameter ranges from 15 min to 480 min. The PID module is standby when the IMD is running.

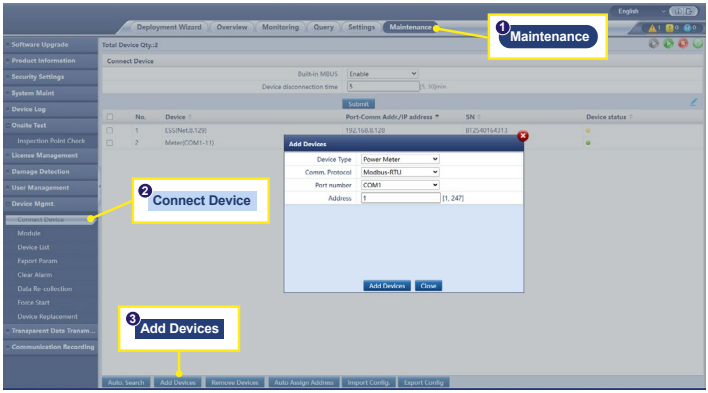
	Insulation monitoring	If no IMD is configured in the actual networking, you are advised to purchase and load the PID license. After the license is successfully loaded, set **insulation monitoring** to **Enable** to enable the PID-to-ground insulation resistance detection function. If you do not need this function, set this parameter to **Disable**. **NOTE** – IMD access is shielded only when this parameter is set to **Enable**. – System-to-ground insulation resistance is displayed only when this parameter is set to **Enable**. – System-to-ground resistance alarm threshold, System-to-ground resistance warning threshold, System-to-ground impedance detection time, Trigger ACB tripping upon IMD alarm, and Corresponding transformer winding can be displayed and set only when Insulation monitoring is set to **Enable**. – In the PV-only scenario, if Insulation monitoring is set to **Enable**: Choose **Monitoring** > **Inverter** > **Running Param.** > **Feature Parameters** and check whether **PID protection at night** is set to **Enable**. If it is set to **Disable**, manually set it to **Enable**. Choose **Monitoring** > **Inverter** > **Running Param.** > **Feature Parameters** and check whether the setting of **PID compensation direction** is consistent with that of **PV module compensation voltage** direction in **Monitoring** > **PID** > **Running Param.**. If the settings are inconsistent, change the setting of **PID compensation direction**.
	System-to-ground resistance alarm threshold	Specifies the alarm threshold for the system-to-ground resistance of the PID module. When the resistance is less than this threshold, the PID module will generate an alarm. The recommended value ranges from 5.0 kΩ to 50.0 kΩ. The default value is 8.0 kΩ. System-to-ground resistance alarm threshold < System-to-ground resistance warning threshold.
	System-to-ground resistance warning threshold	Specifies the warning threshold for the system-to-ground resistance of the PID module. When the resistance is less than this threshold, the PID module will generate a warning. The recommended value ranges from 5.0 kΩ to 50.0 kΩ. The default value is 10.0 kΩ. System-to-ground resistance alarm threshold < System-to-ground resistance warning threshold.
	System-to-ground impedance detection time	Specifies the system-to-ground impedance detection time. When the impedance is lower than the detection point for a period longer than the detection time, an alarm or warning is generated. The value of this parameter ranges from 10s to 1800s. The default value is 100s.
	Trigger ACB tripping upon IMD alarm	Specifies whether to trigger ACB tripping for the transformer station when a system-to-ground resistance alarm is generated. Set this parameter to **Disable** or **Enable** based on the actual application scenario. If this parameter is set to **Enable**, the entire system shuts down when a system-to-ground resistance alarm is generated.
	Corresponding transformer winding	Configure the winding number of the transformer station corresponding to the current PID module. Select **Low-voltage cabinet A** or **Low-voltage cabinet B** based on the actual application scenario.
Running Info.	System-to-ground insulation resistance	When the system-to-ground insulation resistance is lower than the system-to-ground resistance alarm threshold and warning threshold, the system generates an alarm.

6.3.12 Setting Meter Parameters

6.3.12.1 Setting DL/T645 Meter Parameters

Procedure

STEP 1 Set access parameters and click **Add Devices**.



Parameter	Description
Device Type	Set this parameter to **Meter**.
Comm. Protocol	Set this parameter to **DL/T645**.
Port number	Set this parameter to the COM port connected to the meter.
Address	Set this parameter to the communications address of the meter.
Table ID	Set this parameter to the meter ID.

STEP 2 Choose **Monitoring** > **Meter** > **Running Param.**, set running parameters, and click **Submit**.

Parameter	Description
Protocol version	Select **DL/T645-2007 or DL/T645-1997** based on the protocol version of the meter.
Number of lead bytes	Retain the default value unless otherwise specified.
Voltage change ratio Current change ratio	• Set this parameter to **1** if the meter uploads the primary value. • Set this parameter based on the actual transformer ratio if the meter uploads the secondary value. **NOTE** – If both the Meter and the DataLogger support the settings of the voltage transformer ratio and current transformer ratio, you can only set them either on the Meter or the DataLogger. You are advised to set these parameters on the Meter.
Meter usage	Meters include export+import meters, production meters, consumption meters, charger meters, and external production meters. • **Export+import meter**: used for grid-connection point control. Each array allows only one export+import meter to be connected. • **Production meter**: PV output meter. Multiple production meters can be connected. • **Consumption meter**: load consumption meter. Multiple consumption meters can be connected. • **Charger meter**: charger consumption meter. Multiple charger meters can be connected. This parameter can be configured only in V300R023C00SPC160 and later versions. • **Ext. production meter**: third-party PV output meter. Multiple external production meters can be connected.

Parameter	Description
Meter access direction	This switch is used when the physical wiring of the meter is reversely connected. You can adjust the software switch to avoid wiring reconstruction of the meter. Only the following three scenarios are supported. If **Meter access** direction is incorrectly set, data will be incorrectly reported. • **Positive**: The default value is **Positive**, which applies to the scenario where cables are correctly connected to the meter. • **Reverse**: If the meter is reversely connected and the NMS does not support reverse connection, set this parameter to **Reverse**. The DataLogger automatically adjusts the power and other data of the meter to ensure data accuracy for the plant and meter. • **Reverse_Report raw data**: If the meter is reversely connected and the NMS supports reverse connection[1], set this parameter to **Reverse_Report raw data**. This parameter is valid only for **Export+import meter**. The DataLogger reports the original data of the meter to the NMS, and the NMS adjusts the data such as power.

NOTE – [1]: If cables are reversely connected to the meter and the NMS can correctly display the real-time data of the meter, it is considered that the NMS supports reverse connection. That is, the NMS reverses the active power, reactive power, power factor, phase A active power, phase B active power, and phase C active power, replaces the total positive active energy and total negative active energy with each other, and replaces the total positive reactive energy and total negative reactive energy with each other.

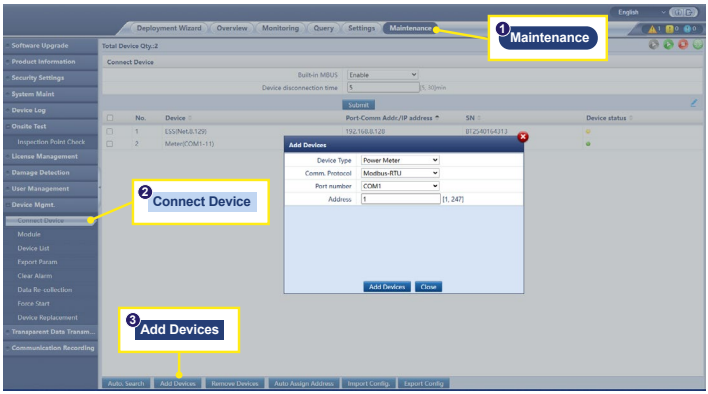
NOTE – When **Meter access direction** is set to **Positive** or **Reverse**, **Electric meter power direction** must be set to **Positive**. **Electric meter power direction** is set in the grid connection with limited power under active power control and power closed-loop control under reactive power control.

NOTE – When **Meter access direction** is set to **Reverse**_Report raw data, **Electric meter power direction** must be set to **Reverse**. **Electric meter power direction** is set in the grid connection with limited power under active power control and power closed-loop control under reactive power control.

6.3.12.2 Setting Modbus-RTU Meter Parameters

Procedure

STEP 1 Set access parameters and click **Add Devices**.



Parameter	Description
Device Type	Set this parameter to **Meter**.
Comm. Protocol	Set this parameter to **Modbus-RTU**.
Port number	Set this parameter to the COM port connected to the meter.
Address	Set this parameter to the communications address of the meter.

STEP 2 Choose **Monitoring** > **Meter** > **Running Param.**, set meter parameters, and click **Submit**.

- When the model of the connected meter is in the Intelligent **Meter Type drop-down list**, set the parameters as follows.

Parameter	Description
Intelligent Meter Type	Set this parameter to the corresponding meter model.
Voltage change ratio Current change ratio	• Set this parameter to **1** if the meter uploads the primary value. • Set this parameter based on the actual transformer ratio if the meter uploads the secondary value. **NOTE –** If both the Meter and the DataLogger support the settings of the voltage transformer ratio and current transformer ratio, you can only set them either on the Meter or the DataLogger. You are advised to set these parameters on the Meter.
Meter usage	Meters include export+import meters, production meters, consumption meters, charger meters, and external production meters. • **Export+import meter**: used for grid-connection point control. Each array allows only one export+import meter to be connected. • **Production meter**: PV output meter. Multiple production meters can be connected. • **Consumption meter**: load consumption meter. Multiple consumption meters can be connected. • **Charger meter**: charger consumption meter. Multiple charger meters can be connected. This parameter can be configured only in V300R023C00SPC160 and later versions. • **Ext. production meter**: third-party PV output meter. Multiple external production meters can be connected.
Meter access direction	This switch is used when the physical wiring of the meter is reversely connected. You can adjust the software switch to avoid wiring reconstruction of the meter. Only the following three scenarios are supported. If Meter access direction is incorrectly set, data will be incorrectly reported. • **Positive**: The default value is **Positive**, which applies to the scenario where cables are correctly connected to the meter. • **Reverse**: If the meter is reversely connected and the NMS does not support reverse connection, set this parameter to **Reverse**. The DataLogger automatically adjusts the power and other data of the meter to ensure data accuracy for the plant and meter. • **Reverse_Report raw data**: If the meter is reversely connected and the NMS supports reverse connection[1], set this parameter to **Reverse_Report raw data**. This parameter is valid only for **Export+import meter**. The DataLogger reports the original data of the meter to the NMS, and the NMS adjusts the data such as power.

NOTE – [1]: If cables are reversely connected to the meter and the NMS can correctly display the real-time data of the meter, it is considered that the NMS supports reverse connection. That is, the NMS reverses the active power, reactive power, power factor, phase A active power, phase B active power, and phase C active power, replaces the total positive active energy and total negative active energy with each other, and replaces the total positive reactive energy and total negative reactive energy with each other.

NOTE – When Meter access direction is set to **Positive or Reverse,** Electric meter power direction must be set to **Positive**. Electric meter power direction is set in the grid connection with limited power under active power control and power closed-loop control under reactive power control.

NOTE – When Meter access direction is set to **Reverse_Report raw data**, Electric meter power direction must be set to **Reverse**. Electric meter power direction is set in the grid connection with limited power under active power control and power closed-loop control under reactive power control.

• If the connected meter is of another model, set the parameters as follows.

Parameter	Description
Intelligent Meter Type	Set this parameter to **Other**.
Read function code	Read holding register 03H and Read input register 04H are supported. Set this parameter based on the vendor's protocol.
Read mode	**Multiple read** and **Single read** are supported.
Word order	**Big endian** and **Little endian** are supported. Set this parameter based on the vendor's protocol.
Start address	When **Read mode** is set to **Multiple read**, set the start address.
End address	When **Read mode** is set to **Multiple read**, set the end address.
Voltage change ratio Current change ratio	Set this parameter to **1** if the meter uploads the primary value. Set this parameter based on the actual transformer ratio if the meter uploads the secondary value.

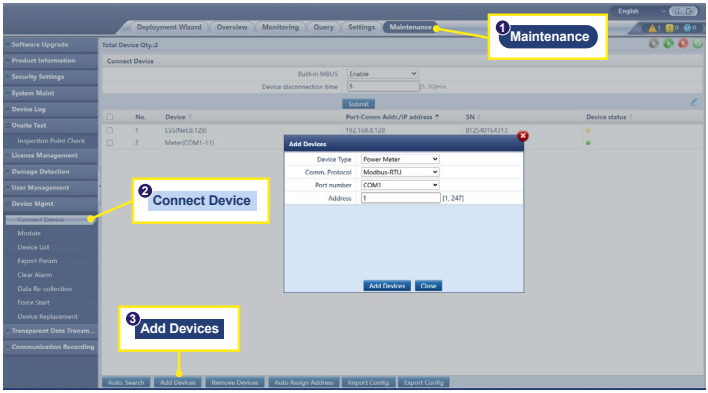
Parameter	Description
Signal parameters **NOTE –** Signal parameters include **Signal Name**, **Signal address**, **Number of Registers**, **Gain**, **Data Type**, and **Unit**.	Set this parameter based on the vendor's protocol. **NOTE –** If the Meter can collect a certain signal, set **Signal address** to the address of the corresponding register. If not, set **Signal address** to **65535**.

6.3.13 Setting EMI Parameters

6.3.13.1 Setting Modbus-RTU EMI Parameters

Procedure

STEP 1 Set access parameters and click **Add Devices**.



Parameter	Description
Device Type	Set this parameter to **EMI**.
Connection mode	Set this parameter to **Modbus-RTU**.
Port number	Set this parameter to the serial number of the COM port connected to the EMI.
Address	Set this parameter to the communications address of the EMI.

STEP 2 Choose **Monitoring** > **EMI** > **Running Param.**, set running parameters and click **Submit**.

- If the model of the connected EMI is displayed in the EMI model drop-down list box, set parameters as follows.

Parameter	Description
EMI model	Set this parameter to the model of the connected EMI.
Synchronize Environment Data	You are advised to retain the default value **Disable**. **NOTE –** When this parameter is set to **Enable**, the DataLogger transmits the wind speed and direction data to the inverter in a PV plant with the tracking system.
Threshold of fast synchronization of wind speeds	• This parameter can be manually set. The value ranges from 15.0 to 30.0. • When the actual wind speeds collected by all running EMIs are within the threshold of fast synchronization of wind speeds, all EMIs synchronize the real-time wind speeds to inverters every minute by default. The inverters forward the real-time wind speeds to trackers. • When the actual wind speed collected by any running EMI exceeds the threshold, all running EMIs will send the real-time wind speeds five times at an interval of 10s. After that, the real-time wind speeds are synchronized to the inverters every minute.
Master/Slave	When the DataLogger connects to multiple EMIs, set one of them to **master mode**. The solar inverter performance data displayed is the data of the EMI in **master mode**.

- If the connected EMI is a split EMI that supports Modbus-RTU, set parameters as follows.

Parameter	Description
EMI model	Set this parameter to **Sensor(ADAM)**.
Synchronize Environment Data	You are advised to retain the default value **Disable**. **NOTE –** When this parameter is set to **Enable**, the DataLogger transmits the wind speed and direction data to the inverter in a PV plant with the tracking system.
Master/Slave	When the DataLogger connects to multiple EMIs, set one of them to master mode. Both the inverter performance data and plant performance data pages display data on the EMI in master mode. **NOTE –** If a single EMI is set to **master mode** or **slave mode**, the EMI data is displayed in both the inverter performance data and plant performance data pages. – When the DataLogger connects to multiple EMIs, only one EMI can be set to **master mode**. If multiple EMIs are set to **master mode**, only the last configuration takes effect, that is, the last EMI works in **master mode** and the other EMIs are automatically switched to **slave mode**. – If multiple EMIs are connected to the DataLogger and these EMIs are set to **slave mode**, the performance data of the first connected EMI is displayed in both the inverter performance data and plant performance data pages.
Read function code	Set this parameter to **Read holding register 03H** or **Read holding register 04H** based on the protocol adopted by the vendor.
Data reporting mode	Set this parameter to **Integer** or **Floating point** based on the protocol adopted by the vendor.
Word ordering	Set this parameter to **Big endian** or **Little endian** based on the protocol adopted by the vendor.
Read mode	The value can be **Multiple read** or **Single read**.
Start address	If **Read mode** is set to **Multiple read**, set the start address for reading.
End address	If **Read mode** is set to **Multiple read**, set the end address for reading.
Signal parameters **NOTE –** Signal parameters include **Signal Name**, **Signal address**, **Lower Thres.**, **Upper Thres.**, **Spec**, **Start (mV/mA)**, **End (mV/mA)**, and **Unit**.	Set this parameter based on the vendor's protocol. **NOTE –** If the EMI can collect a signal, set **Signal address** for the signal to the corresponding register address. If the EMI cannot collect a signal, set **Signal address** for the signal to **65535**.

- If the connected EMI is of another model, set parameters as follows.

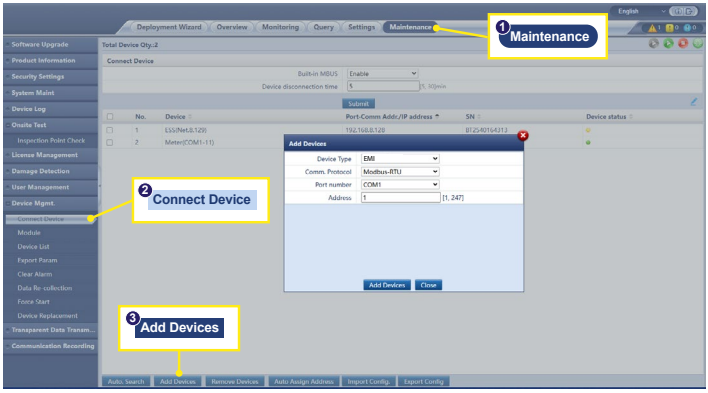
Parameter	Description
EMI model	Set this parameter to **Other**.
Synchronize Environment Data	You are advised to retain the default value Disable. **NOTE –** When this parameter is set to **Enable**, the DataLogger transmits the wind speed and direction data to the inverter in a PV plant with the tracking system.
Master/Slave	When the DataLogger connects to multiple EMIs, set one of them to **master mode**. The solar inverter performance data displayed is the data of the EMI in **master mode**.
Read function code	Set this parameter to **Read holding register 03H** or **Read holding register 04H** based on the protocol adopted by the vendor.
Data reporting mode	Set this parameter to **Integer** or **Floating point** based on the protocol adopted by the vendor.
Word ordering	Set this parameter to **Big endian** or **Little endian** based on the protocol adopted by the vendor.
Read mode	The value can be **Multiple read** or **Single read**.
Start address	If **Read mode** is set to **Multiple read**, set the start address for reading.
End address	If **Read mode** is set to **Multiple read**, set the end address for reading.

Parameter	Description
Signal parameters **NOTE –** Signal parameters include **Signal Name**, **Signal address**, **Gain**, **Offset**, and **Unit**.	Set this parameter based on the vendor's protocol. **NOTE –** If the EMI can collect a signal, set **Signal address** for the signal to the corresponding register address. If the EMI cannot collect a signal, set **Signal address** for the signal to **65535**.

6.3.13.2 Setting AI EMI Parameters

Procedure

STEP 1 Set access parameters and click **Add Devices**.



Parameter	Description
Device Type	Set this parameter to **EMI**.
Connection mode	Set this parameter to **AI**.
Address	Set this parameter to the communication address of the EMI.

STEP 2 Choose **Monitoring** > **EMI**(**AI**) > **Running Param.**, set running parameters and click **Submit**.

Parameter	Description
Synchronize Environment Data	You are advised to retain the default value **Disable**. **NOTE –** When this parameter is set to **Enable**, the DataLogger transmits the wind speed and direction data to the inverter in a PV plant with the tracking system.
Master/Slave	When the DataLogger connects to multiple EMIs, set one of them to master mode. The solar inverter performance data displayed is the data of the EMI in **master mode**.
Signal parameters **NOTE –** Signal parameters include **Signal Name**, **Port number**, **Lower Thres.**, **Upper Thres.**, **Start (V/mA)**, **End (V/mA)**, and **Unit**.	Set these parameters as required. **NOTE –** When you need to change the configured port number, set **Port number** to **No** first, then to the required port number.

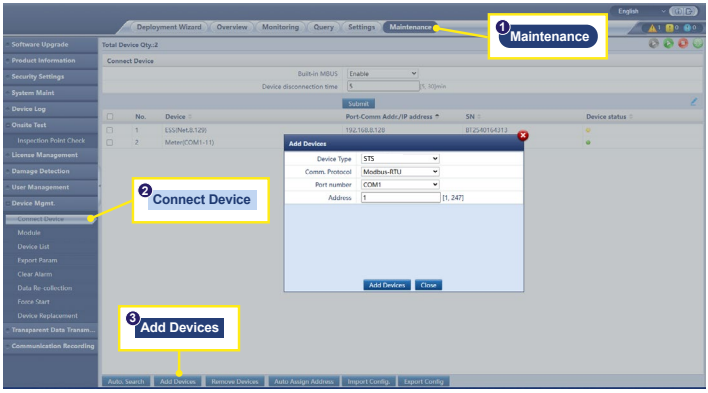
STEP 3 If **Port number** is set to the number of the connected PT port, click **PT T Correction** to correct the temperature.

6.3.14 Setting Transformer Station Parameters

The Transformer Station can be connected to the DataLogger over RS485 or FE. If the Transformer Station is connected to the DataLogger over RS485, you need to manually add the device and set access parameters. If the Transformer Station is connected over FE, the DataLogger automatically identifies the Transformer Station.

Procedure

STEP 1 (Optional) If the Transformer Station connects to the DataLogger over RS485, click **Add Devices** and set access parameters.



Parameter	Description
Device Type	Set this parameter to Transformer Station.
Port number	Set this parameter to the number of the COM port connected to the Transformer Station.
Address	Set this parameter to the communications address of the Transformer Station.

STEP 2 Choose **Monitoring** > **Transformer Station**, set device monitoring parameters, and click **Submit**.

Tab	Function	Description
Teleindication	Views the status parameters of the device, such as the switched-on or switched-off state.	-
Telemetering	Views the real-time data of the device, such as the voltage.	-
Telecontrol	Sets status control parameters, such as the parameter for controlling switch-on or switch-off.	Set this parameter as required.
Performance Data	Views or exports the performance data of the device.	-
Running Param.	Sets the standby signals for teleindication, telemetering, and teleadjust.	Set this parameter as required.
Active Alarm	Queries active alarms.	-
About	Queries communication information.	-

Running parameters and associated telemetering/teleindication signals

No.	Running Parameter	Description	Associated Teleindication Signal	Associated Telemetering Signal
1	Transformer Station model	Ensure that the configured Transformer Station model is correct.	-	-
2	Ring main unit model	Set this parameter based on the actual configuration.	• Switch-on/Switch-off of load switch of ring main unit/ incoming line cabinet G1 • Switch-on/Switch-off of earthing switch of ring main unit/incoming line cabinet G1 • Switch-on/Switch-off of load switch of ring main unit/ incoming line cabinet G3 • Switch-on/Switch-off of earthing switch of ring main unit/incoming line cabinet G3	-
3	Medium-voltage relay protection model	Set this parameter based on the actual configuration.	High-configuration relay protection power loss alarm (associated with the high-configuration relay protection model) **NOTE –** The main control teleindication signal uploaded by the relay protection is associated with the relay protection model.	**NOTE –** The main control telemetering signal uploaded by the relay protection is associated with the relay protection model.
4	ACB for low-voltage cabinet A	Set this parameter based on the actual configuration.	• ACB switch-on/switch-off in low-voltage cabinet A • Fault-induced ACB tripping in low-voltage cabinet A • Remote operation of ACB in low-voltage cabinet A	-
5	ACB for low-voltage cabinet B	Set this parameter based on the actual configuration.	• ACB switch-on/switch-off in low-voltage cabinet B • Fault-induced ACB tripping in low-voltage cabinet B • Remote operation of ACB in low-voltage cabinet B	-
6	Mixed-flow fan for low-voltage cabinet A	Select **Yes** or **No** based on the actual configuration.	-	-
7	Mixed-flow fan for low-voltage cabinet B	Select **Yes** or **No** based on the actual configuration.	-	-
8	Maximum fan speed	Set this parameter based on the actual configuration.	-	-
9	IMD for low-voltage cabinet	Select **Yes** or **No** based on the actual configuration.	• IMD Warning in Low-Voltage Cabinet A • IMD Alarm in Low-Voltage Cabinet A • IMD Warning in Low-Voltage Cabinet B • IMD Alarm in Low-Voltage Cabinet B	-

No.	Running Parameter	Description	Associated Teleindication Signal	Associated Telemetering Signal
10	ACB tripping triggered by IMD alarm	This parameter is displayed when **IMD for low-voltage cabinet** is set to **Yes**. Disable or Enable this parameter as required.	-	-
11	ACB tripping triggered by low-voltage room end door opening	Disable or Enable this parameter as required. **NOTE** – The Transformer Station supports the function of **ACB tripping triggered by low-voltage room end door opening**. You can choose **Monitoring** > **Transformer Station** > **Running Param.** > **Settings** on the DataLogger to set this parameter to **Enabled** or **Disabled**.	-	-
12	Primary current of CT for low-voltage cabinet	Current range: 2500 A/3000 A/3500 A/4000 A	-	-
13	Secondary current of CT for low-voltage cabinet	Current range: 1 A/5 A		
14	PT for low-voltage cabinet	Select **Yes** or **No** based on the actual configuration.	-	-
15	Primary voltage of PT for low-voltage cabinet	• This parameter is displayed when **PT for low-voltage cabinet** is set to **Yes**. • Voltage range: 480 V/550 V/800 V/1000 V	-	-
16	Secondary voltage of PT for low-voltage cabinet	• This parameter is displayed when **PT for low-voltage cabinet** is set to **Yes**. • Voltage range: 100 V/400 V	-	-
17	Heater startup humidity in low-voltage cabinet	Humidity range: 15% to 100%	-	-
18	Heat exchanger fan startup humidity in low-voltage cabinet	Humidity range: 15% to 100%	-	-
19	Alarm threshold for high temperature in low-voltage cabinet	Temperature range: 0°C–85°C	-	-
20	Tripping threshold for high temperature in low-voltage cabinet	• Temperature range: 0°C–85°C • The setting must be greater than or equal to the alarm threshold for high temperature.	-	-
21	Heat exchanger in medium-voltage room	Select **Yes** or **No** based on the actual configuration.	-	-

No.	Running Parameter	Description	Associated Teleindication Signal	Associated Telemetering Signal
22	Heat exchanger fan startup humidity in medium-voltage room	This parameter is displayed when **Heat exchanger in medium-voltage room** is set to **Yes**.	-	-
23	Alarm threshold for high temperature in medium-voltage room	Temperature range: 0°C–85°C	-	-
24	Tripping threshold for high temperature in medium-voltage room	• Temperature range: 0°C–85°C • The setting must be greater than or equal to the alarm threshold for high temperature.	-	-
25	Auxiliary transformer type	Select Single-phase for the 3 kVA and Three-phase for the 50 kVA.	-	-
26	Auxiliary transformer CT	Select **Yes** or **No** based on the actual configuration.	-	• Auxiliary transformer current I_a • Auxiliary transformer current I_b • Auxiliary transformer current I_c • Auxiliary transformer active power P • Auxiliary transformer reactive power Q • Auxiliary transformer power factor cosφ • Positive active energy of auxiliary transformer • Positive reactive energy of auxiliary transformer • Negative reactive energy of auxiliary transformer
27	Primary current of auxiliary transformer CT	• This parameter is displayed when **Auxiliary transformer CT** is set to **Yes**. • Current range: 5 A/10 A/15 A/20 A/25 A/50 A/100 A/150 A/200 A/250 A/300 A		
28	Secondary current of auxiliary transformer CT	• This parameter is displayed when **Auxiliary transformer CT** is set to **Yes**. • Current range: 1 A/5 A		
29	Maintenance-free dehumidifier	Select Yes or **No** based on the actual configuration.	• Maintenance-free dehumidifier heating • Maintenance-free dehumidifier fault	Humidity in transformer cabinet
30	Humidity threshold for dehumidifier to start heating	This parameter is displayed when the **Maintenance-free dehumidifier** is set to **Yes**.		
31	Interval for dehumidifier to start heating			
32	Heating duration of dehumidifier			
33	Temperature rise threshold for starting dehumidifier			
34	Temperature drop threshold for starting dehumidifier			
35	Transformer winding temperature indicator	Select **Yes** or **No** based on the actual configuration.	• Transformer high winding temperature • Transformer ultra-high winding temperature	Transformer winding temperature

No.	Running Parameter	Description	Associated Teleindication Signal	Associated Telemetering Signal
36	Automatic mode of circuit breaker for transformer cabinet G2	Select **Yes** or **No** based on the actual configuration.	Automatic mode of circuit breaker for transformer cabinet G2	-
37	Harmonic monitoring for low-voltage cabinet	Enable or Disable this parameter as required.	-	This parameter is associated with the total harmonic and single harmonic data.
38	Frequency level	50 Hz/60 Hz	-	-
39	Overfrequency/ Underfrequency alarm	Enable or Disable this parameter as required. It is enabled by default.	-	-
40	Overfrequency alarm margin	Set this parameter based on the actual configuration.	-	-
41	Overfrequency alarm delay	This parameter is displayed when Overfrequency/ Underfrequency alarm is enabled. Set this parameter based on the actual configuration.	-	-
42	Underfrequency alarm margin	Set this parameter based on the actual configuration.	-	-
43	Underfrequency alarm delay	This parameter is displayed when Overfrequency/ Underfrequency alarm is enabled. Set this parameter based on the actual configuration.	-	-
44	ACB tripping caused by overfrequency/ underfrequency	Disable or Enable this parameter as required. It is disabled by default.	-	-
45	Overfrequency trip margin	Set this parameter based on the actual configuration.	-	-
46	Overfrequency trip delay	This parameter is displayed when ACB tripping caused by overfrequency is enabled. Set this parameter based on the actual configuration.	-	-
47	Underfrequency trip margin	Set this parameter based on the actual configuration.	-	-
48	Underfrequency trip delay	This parameter is displayed when ACB tripping caused by underfrequency is enabled. Set this parameter based on the actual configuration.	-	-
49	UPS	Select **Yes** or **No** based on the actual configuration.	• UPS AC power failure alarm • Other UPS alarms	-
50	DC LV Panel	Select Yes or **No** based on the actual configuration.	DC LV Panel door opening	-
51	Quantity of distribution transformers	Set this parameter based on the actual configuration.	• Switch-on of MCCB for distribution transformer n • Distribution transformer n heat exchanger fault • Distribution transformer cabinet door opening	-

STEP 3 Choose **Settings** > **Other Parameters** and set **Transformer Station overtemperature protection** as required.

6.3.15 Setting IEC103 Device Parameters

Description

IEC 103-based devices support transparent transmission. When the DataLogger connects to the management system, it transparently transmits IEC 103 device data to the management system without parsing the data.

Transparent Transmission Mode

STEP 1 Set IEC103 parameters and click **Submit**.

Parameter	Description
IEC103 port No.	Set this parameter based on the COM port connected to the device.
IEC103 address	Set this parameter to the IEC103 device address.
IEC103 IP	Set this parameter to the IP address of the management system.

STEP 2 Choose **Settings** > **Other Parameters** and check that **Data forwarding** is set to **Enable**.

NOTE
- If Data forwarding is set to Enable, the DataLogger transparently transmits information about unconnected devices to the management system without parsing device data.
- If Data forwarding is set to Disable, the DataLogger does not transmit information about unconnected devices to the management system.

6.3.16 Setting Custom Device Parameters

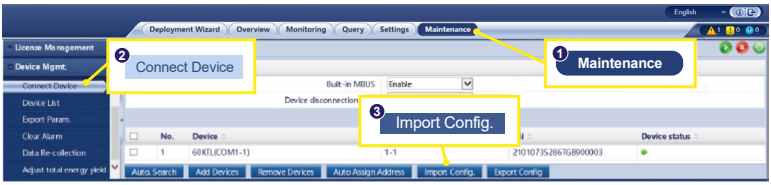
Context

The DataLogger can connect to third-party devices supporting the Modbus RTU protocol, such as transformer stations and EMIs. The protocol information points vary depending on vendors. Therefore, you need to configure a protocol information file in .cfg format. To connect devices to the DataLogger, the supplier or the Company's engineers need to modify the parameters in the device configuration table file delivered with the version based on device requirements, generate a protocol information file in .cfg format, and import the file to the DataLogger.

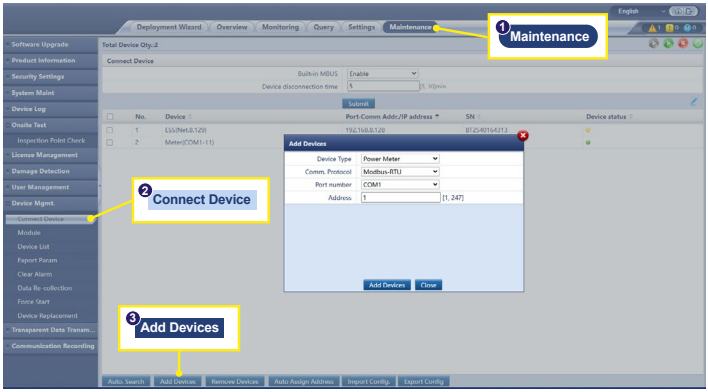
The supported device types are **Custom Device1** to **Custom Device10**. The corresponding configuration file names are **modbus_equip_custom_1.cfg** to **modbus_equip_custom_10.cfg**. Multiple devices of the same type can be connected.

Procedure

STEP 1 Configure the protocol information point file in .cfg format and import the file to the DataLogger.



STEP 2 Click **Add Devices** and set access parameters.



Parameter	Setting
Device Type	Currently, **Custom Device1** to **Custom Device10** are supported. Set this parameter based on the configuration import file. For example, if you import **modbus_equip_custom_1.cfg**, select **Custom Device1**.
Port number	Set this parameter to the number of the COM port connected to the custom device.
Address	Set this parameter to the communications address of the custom device.

STEP 3 Set monitoring parameters and click **Submit**.

Tab	Function	Setting
Running Info.	Displays the running information about the custom device.	-
Teleindication	Displays the device status, such as the switch status.	-
Telemetering	Displays the real-time analog data of the device, such as the voltage.	-
Telecontrol	Allows users to set status control parameters, such as the parameter for controlling switch-on or switch-off.	Set this parameter as required.
Teleadjust	Allows users to set analog parameters, such as voltage protection parameters.	Set this parameter as required.

6.3.17 Setting IMD Parameters

Context

The DataLogger connects to an IMD over RS485.

NOTE – Ensure that cables are correctly and securely connected to the IMD according to the IMD user manual. If cables are incorrectly connected or in poor contact, the IMD cannot work properly and the insulation resistance detection function fails.

Procedure

STEP 1 Choose **Maintenance** > **Device Mgmt.** > **Connect Device** > **Add Devices** to set access parameters.

Parameter	Description
Device Type	Set this parameter to **IMD**.
Port number	The IMD uses RS485 for communication. Set the COM port connected to the IMD based on site requirements.
Address	Set the IMD communications address based on site requirements.
Model of equipment	Set this parameter based on the actual model.

STEP 2 View IMD running information.

6.3.18 Setting Relay Parameters

Context

A relay protection device is an important test tool to ensure the safe and reliable operation of the system. A relay protection device must be configured in the On-grid/Off-grid (VSG) scenario when microgrid control is implemented by the DataLogger.

Procedure

STEP 1 Add the device.

- **Method 1**: Choose **Maintenance** > **Device Mgmt.** > **Connect Device.** The **Connect Device** page is displayed. Click **Add Devices** and set related parameters.

- **Method 2**: Select Yes in the **Do you want to connect the relay protection device?** dialog box under **Microgrid** in **Deployment Wizard**. Set relay protection device parameters.

Relay protection device parameters

Parameter	Description
Port	Set the COM port connected to **Relay protection device** based on the actual cable connections.
Baud rate	Set the baud rate, parity, stop bit, and address of **Relay protection device** to be consistent with the communications parameters of the relay protection device.
Parity	
Stop Bit	
Address	
Device Type	Set this parameter to **Relay protection device**.
Device model	Set this parameter to **Easergy P3U30**.

STEP 2 Choose **Monitoring** > **RELAY** > **Telecontrol**, set telecontrol parameters for the relay protection device, and click **Submit**.

Parameter	Description
PCC Breaker Off Preset	Turns off the on/off-grid switch. To turn off the switch, enable **PCC Breaker Control Execute**.
PCC Breaker On Preset	Turns on the on/off-grid switch. To turn on the switch, enable **PCC Breaker Control Execute**.
PCC Breaker Control Execute	0: Disables the function of turning on or off the on/off-grid switch remotely by the relay protection device. 1: Enables the function of turning on or off the on/off-grid switch remotely by the relay protection device.

6.4 Setting Battery Control Parameters

Battery Settings

Choose **Settings** > **Battery Settings** to set the working mode.

Battery control working modes

Working Mode	Mode Description
No control	The DataLogger directly delivers the external scheduling power limit. No other power scheduling control is performed. The power is automatically controlled by the device.
Maximum self-consumption	• This mode applies to areas where the electricity price is high, or areas where the FIT subsidy is low or unavailable. The PV+ESS system generates sufficient PV power for loads and uses the surplus PV power to charge the ESS (if the PV power is insufficient for loads, the TOU mode is recommended). • PV power is preferentially supplied to loads, and the surplus power is used to charge the ESS. If the ESS is fully charged or is being charged at full power, the surplus power is fed to the grid. When PV power is insufficient or no PV power can be generated at night, the ESS discharges power to loads. This improves the self-consumption rate and energy self-sufficiency rate, and reduces electricity costs. The grid cannot charge the ESS but can supply power to loads. • The DataLogger performs ESS scheduling based on the power limit for external scheduling and the preceding policies.
Fully fed to grid	• This parameter applies only to distributed scenarios. • This mode maximizes the PV energy fed to the grid. When the PV output power in the daytime is greater than the maximum output capacity of the inverter, the surplus PV power is used to charge the ESS. When the PV output power is less than the maximum output capacity of the inverter, the ESS discharges energy to the inverter to maximize the energy fed from the inverter to the grid. The grid cannot charge the ESS. • The DataLogger directly delivers the external scheduling power limit. **NOTE – Fully fed to grid** is displayed only in distributed energy storage scenarios.

Working Mode	Mode Description
TOU	• This mode applies to the ESS-only system where electricity prices at peak and off-peak hours are different and Meters are available. • You can manually set the charge and discharge time segments. For example, if you set the low electricity price period at night as the charge time, the system charges the batteries at the maximum power during the charge time. If you set the high electricity price period as the discharge time, batteries can discharge only during the discharge time based on the actual load power, reducing electricity costs. • Click **Add** to set the charge and discharge time segments. A maximum of 14 time segments can be set. During the charge time, the grid can charge the batteries. During the discharge time, the batteries can supply power to the loads. In other time segments, the batteries do not discharge. The PV system and grid supply power to loads, and the PV system can charge the batteries. • In some countries, the grid is not allowed to charge batteries. In such case, this mode cannot be used. • The DataLogger performs ESS scheduling based on the power limit for external scheduling and the preceding policies.
TOU (fixed power)	• It is applicable to the PV+ESS system and ESS-only system where peak to valley electricity prices are different and Meters are unavailable. • You can manually set the charge and discharge time segments. For example, if you set the low electricity price period at night as the charge time, the system charges the batteries at the fixed power during the charge time. If you set the high electricity price period as the discharge time, batteries can discharge only during the discharge time at the fixed power, reducing electricity costs. • Click **Add** to set the charge and discharge time segments. A maximum of 14 time segments can be set. During the charge time, the grid can charge the batteries. During the discharge time, the batteries can supply power to the loads. In other time segments, the batteries do not discharge and are not charged. • In some countries, the grid is not allowed to charge batteries. In such case, this mode cannot be used. • The DataLogger performs ESS scheduling based on the power limit for external scheduling and the preceding policies.
Charge/ Discharge based on grid dispatch	• This mode applies to utility-scale plant scheduling scenarios where the northbound controller delivers active power scheduling commands. • The purpose of scheduled discharge is to meet the active power scheduling target value at the grid access point. PV energy is preferred. If the generated PV energy is insufficient, the batteries discharge and the energy is fed to the grid based on the active power scheduling target value. If the generated PV energy is sufficient, the energy is fed to the grid based on the active power scheduling target value, and the surplus PV energy is used to charge the batteries. • The purpose of scheduled charge is to meet the active power scheduling target value at the grid access point. If the battery charge power is insufficient or the PCS limits the power, the grid charges the batteries with the maximum capability. If the batteries are not fully charged when the scheduling target value is met, the PV power is used to charge the batteries.
Custom	• This mode applies to utility-scale plant (with ESSs) scheduling scenarios. Customers can control the battery discharge power. • Non-discharge period: The batteries cannot discharge and can be charged based on the scheduling command. • Discharge period: If **Adaptive discharge power** is enabled, the control logic is the same as that for scheduled charge and discharge. The battery charge and discharge power is determined by the upper-layer scheduling command. If **Adaptive discharge power** is disabled, the battery discharge power is fixed to the reference value set by the customer. In this case, the upper-layer scheduling command controls only the PV inverters but not the batteries.

Running parameters in each battery control working mode

Working Mode	Parameter	Description
Maximum self-consumption	Active power threshold of grid during battery discharge	Set the grid power threshold at the grid connection point for loads when the load power is greater than the PV power.
	Adjustment deadband	Set the precision of the grid power at the grid connection point. This parameter affects the power value range at the grid connection point. If the actual grid power threshold at the grid connection point is within this range, i.e. [Active power threshold of grid during battery discharge – Adjustment deadband, Maximum grid power during battery discharge + Adjustment deadband], the grid power requirement at the grid connection point is met.

Working Mode	Parameter	Description
TOU	Preferred use of surplus PV power	• **Charge**: When the PV power is greater than the load power, the surplus PV energy is used to charge the batteries. After the maximum charge power is reached or the batteries are fully charged, the surplus PV energy is fed to the grid. • **Fed to grid**: When the PV power is greater than the load power, the surplus PV energy is preferentially fed to the grid. When the maximum output power of the device is reached, the surplus energy is used to charge the batteries. This setting is applicable to the scenario where the FIT is higher than the electricity price. The grid cannot charge the batteries.
	Maximum power for charging batteries from grid	Set the maximum power at which the grid charges the batteries.
	Active power threshold of grid during battery discharge	Set the grid power threshold at the grid connection point for loads when the load power is greater than the PV power.
	Adjustment deadband	Set the precision of the grid power at the grid connection point. This parameter affects the power value range at the grid connection point. If the actual grid power threshold at the grid connection point is within this range, i.e. [Active power threshold of grid during battery discharge – Adjustment deadband, Maximum grid power during battery discharge + Adjustment deadband], the grid power requirement at the grid connection point is met.
	Start time	Set the start time and end time of charge and discharge. A maximum of 14 time segments can be set. You can set a weekly cycle by clicking the buttons corresponding to **Mon**. through **Sun**. in the Repeat box. The buttons are blue by default, indicating being selected. After you click it, the button turns gray.
	End time	
	Charge/Discharge	
	Repeat	
TOU (fixed power)	Start time	Set the start time, end time, and power of charge and discharge. A maximum of 14 time segments can be set. You can set a weekly cycle by clicking the buttons corresponding to **Mon**. through **Sun**. in the Repeat box. The buttons are blue by default, indicating being selected. After you click it, the button turns gray.
	End time	
	Charge/Discharge	
	Charge/Discharge power (kW)	
	Repeat	

Working Mode	Parameter	Description
Charge/Discharge based on grid dispatch	Array end-of-charge/discharge SOC derating	The default value is **Disable**. The default value is recommended. Set this parameter as required. After array end-of-charge/discharge SOC power derating is enabled, the DataLogger performs derating based on the preset gradient to prevent abrupt power change of the array at the end-of-charge/discharge SOC.
	Control charge/discharge time window	The default value is **Disable**. The default value is recommended. Set this parameter as required. You can set the time segment for charge forbidden, discharge forbidden, charge, and discharge only after the control charge/discharge time window is enabled. This function applies only to PV+ESS collaborative control. • PV+ESS array: In PV+ESS collaborative control, the target value configured for the ESS charge/discharge time window takes precedence over the scheduling command. • PV+ESS array: In PV+ESS independent control, the scheduling command takes precedence over the target value configured for the ESS charge and discharge time window. • ESS-only array: The scheduling instruction takes precedence over the target value configured for the ESS charge and discharge time window.
	Start time	Set the start time, end time, and power of charge forbidden, discharge forbidden, charge, and discharge. A maximum of 14 time segments can be set. You can set a weekly cycle by clicking the buttons corresponding to **Mon**. through **Sun**. in the Repeat box. The buttons are blue by default, indicating being selected. After you click it, the button turns gray.
	End time	
	Charge/Discharge	
	Charge/Discharge power (kW)	
	Repeat	
	Protection against communication disconnection	The default value is Disable. The default value is recommended. Set this parameter as required. **NOTE –** In the utility-scale ESS low-voltage coupling scenario, the PV+ESS capacity exceeds the transformer station capacity. You are advised to set this parameter to **Enable**.
Custom	ESS discharge start time	Set the start time of battery discharge. During the period from the start time to the end time, the batteries can be charged and can discharge. Beyond the period, the batteries cannot discharge and can only be charged.
	ESS discharge end time	Set the end time of battery discharge. During the period from the start time to the end time, the batteries can be charged and can discharge. Beyond the period, the batteries cannot discharge and can only be charged.
	Adaptive discharge power	• **Enable**: PV power supply is preferred. If the PV power is insufficient, the batteries supply power to loads; if the PV power is sufficient, the system outputs at the target value and the surplus PV power is used to charge the batteries. • **Disable**: Batteries discharge based on the discharge power set on the GUI.
	Reference discharge power	Set the battery discharge power during the discharge period.

Choose **Settings** > **Battery Settings** to set power allocation.

Parameter	Description
Difference threshold for starting array SOC rapid equilibrium	The default value is 5%. The default value is recommended. Set this parameter as required. When the SOC difference between racks in the array is greater than the value of **Difference threshold for starting array SOC rapid equilibrium**, the rapid equilibrium algorithm is enabled.

Choose **Settings** > **Battery Settings** to set dispatch control. The scheduling mode applies only to the C&I scenario and is displayed when the C&I ESS is connected.

Parameter	Description
Scheduling Mode	The default value is Maximize energy. • **Maximize energy**. If ESSs with different rates are used together in C&I scenarios, the power is allocated based on the minimum rate. • **Maximize power**. If ESSs with different rates are used together in C&I scenarios, the power is allocated based on the maximum power.

Choose **Settings** > **Battery Settings** to set automatic calibration for battery control.

Parameter	Description
Automatic SOC calibration	• If this parameter is set to **Enable**, automatic charge and discharge calibration is allowed for battery racks. The ESS periodically calibrates the SOC rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. • If this parameter is set to **Disable**, automatic charge and discharge calibration is not allowed for battery racks.
Automatic SOC calibration interval	Set the automatic SOC calibration interval. This parameter is displayed when **Automatic SOC calibration** is set to **Enable**. If the battery SOC stays in the range of 10% to 90% most of the time, for example, in the microgrid scenario, the recommended online calibration interval is less than or equal to 30 days. If the battery SOC stays in the range of 40% to 60% most of the time, for example, in the frequency regulation scenario, the recommended online calibration interval is less than or equal to 180 days. If the battery SOC stays below 10% or at 100% most of the time, for example, in the peak shaving scenario, the recommended online calibration interval is less than or equal to 180 days.
Automatic SOH calibration	• If this parameter is set to **Enable**, the ESS periodically calibrates the SOH rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged and discharged. Then, the battery capacity will be calculated. The charge and discharge response will be affected during the calibration. Suggestion: During SOH calibration, after the system is fully charged, maintain the charge command for 30 to 60 minutes. After the discharge is complete, maintain the discharge command for 30 to 60 minutes. • If this parameter is set to **Disable**, automatic SOH calibration is not allowed for battery racks.

Choose **Settings** > **Battery Settings** to set the array end-of-charge SOC and array end-of-discharge SOC.

Parameter	Description
Array end-of-charge SOC	The default value is 100%. The default value is recommended. Set this parameter as required.
Upper limit of SOC for array charge	The default value is 100%. The default value is recommended. Set this parameter as required.
SOC for array charge limit	The default value is 95%. The default value is recommended. Set this parameter as required.
SOC for array discharge limit	The default value is 10%. The default value is recommended. Set this parameter as required.
Lower limit of SOC for array discharge	The default value is 5%. The default value is recommended. Set this parameter as required.
Array end-of-discharge SOC	The default value is 5%. The default value is recommended. Set this parameter as required.

NOTE – When submitting the parameters, ensure that: Array end-of-charge SOC ≥ Upper limit of SOC for array charge ≥ SOC for array charge limit and Array end-of-discharge SOC ≤ Lower limit of SOC for array discharge ≤ SOC for array discharge limit

Capacity Control

Choose **Settings** > **Battery Settings** > **Capacity Control** and set related parameters.

- **Peak shaving** limits the maximum peak power at the grid connection point. In some areas, electricity fees depend on both volumetric charge and demand charge. The **Peak shaving** function allows you to lower the peak demand purchased from the grid during peak hours, reducing electricity fees. **Peak shaving** applies to areas where demand charges are collected. The peak shaving function allows you to lower the peak power purchased from the grid in **Maximum self-consumption** or **TOU** mode during peak hours, reducing electricity fees.
- **Power boost limit** is designed to limit the maximum peak current at the grid connection point. By doing so, it ensures that the electric current purchased from or sold to the grid does not exceed the maximum peak current at the grid connection point. This control is essential because if the electric current exceeds the maximum peak current, it may trigger the system's overcurrent protection mechanism, potentially causing the transformer to trip.

NOTE – The **Power boost limit** function is ineffective during the update of the DataLogger and ESS.

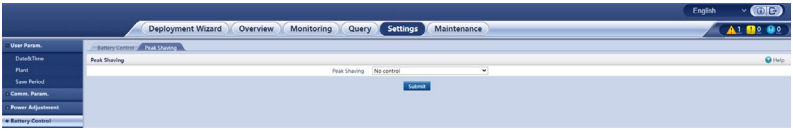
Capacity control parameters

Parameter	Description
Peak shaving	**No control**: The peak shaving function is disabled. **Active power limit**: The active power purchased from the grid cannot exceed the preset capacity limit. **Apparent power limit**: The apparent power purchased from the grid cannot exceed the preset capacity limit.
Power boost limit	**No control**: The power boost limit function is disabled. **Current Limit**: The current of electricity purchased from or sold to the grid cannot exceed the preset current limit.
Maximum Peak Current	This parameter is displayed when Power boost limit is set to Current Limit. Specifies the maximum peak current at the grid connection point. The default value is 30000 A. Set this parameter based on the maximum peak current for power purchase or sales at the grid connection point.
Backup power SOC for capacity control	Specifies the backup power SOC for capacity control. The value of this parameter affects the peak shaving capability. A larger value indicates stronger peak shaving capability.
PV power limit when Meter fails	Specifies the active power limit of the inverter when the export+import meter communication is abnormal. You can manually change the active power percentage of the inverter as required.
PCS power limit when Meter fails	Specifies the active power limit of the PCS when the export+import meter communication is abnormal. You can manually change the active power percentage of the PCS as required.
Start time End time Maximum peak power	Set **Maximum peak power** based on the start time and end time. The peak power is configured based on electricity prices in different time segments. You are advised to set the peak power to a low value when the electricity price is high. A maximum of 14 time segments can be set.

Peak Shaving

In some areas, electricity fees depend on both volumetric charge and demand charge. The Peak shaving function allows you to lower the peak demand purchased from the grid during peak hours, reducing electricity fees. In distributed scenarios, the Peak Shaving must be used in maximum self-consumption or TOU mode.

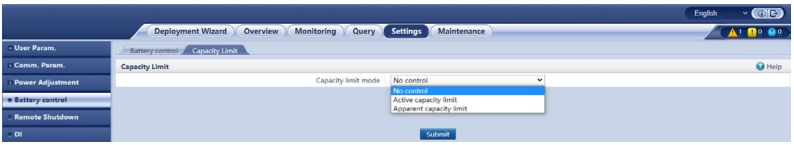
Choose **Settings** > **Battery Settings** and set **Peak Shaving**.



Parameter	Description	Remarks
Peak Shaving	• No control: The peak shaving function is disabled. • Active power limit: The active power purchased from the grid cannot exceed the preset capacity limit. • Apparent power limit: The apparent power purchased from the grid cannot exceed the preset capacity limit.	If **Peak Shaving** is set to No control, other parameters are not displayed.
Backup power SOC for peak shaving	ESS backup power SOC for peak shaving. The value of this parameter affects the peak shaving capability. A larger value indicates stronger peak shaving capability.	
PV power limit when Meter fails	Set the active power limit of the inverter when the feed-in meter communication is abnormal. You can manually change the active power percentage of the inverter as required.	
PCS power limit when Meter fails	Specifies the active power limit of the PCS when the export+import meter communication is abnormal. You can manually change the active power percentage of the PCS as required.	
Start time End time Maximum Power	• Set the peak power range based on the start time and end time. The peak power is configured based on electricity prices in different time segments. You are advised to set the peak power to a low value when the electricity price is high. • A maximum of 14 time segments can be set.	

Capacity Limit

Choose **Settings** > **Battery Settings** and set the capacity limit.



Parameter	Description	Remarks
Capacity Limit	• No control: The capacity of the grid-connection point is not limited. The inverter and PCS run according to the preset control policy. • Active capacity limit: The active power of the grid-connection point for purchasing or feeding power cannot exceed the preset capacity limit. • Apparent capacity limit: The apparent power of the grid-connection point for purchasing or feeding power cannot exceed the preset capacity limit.	If Capacity Limit is set to **No control**, other parameters are not displayed.
Maximum active capacity	Set this parameter according to the charging capacity in the demand contract of the grid company. Once set, the active power of the grid-connection point for purchasing or feeding power cannot exceed the preset value.	This parameter is displayed only when **Capacity Limit** is set to **Active capacity limit**.
Maximum apparent capacity	Set this parameter according to the charging capacity in the demand contract of the grid company. Once set, the apparent power of the grid-connection point for purchasing or feeding power cannot exceed the preset value.	This parameter is displayed only when **Capacity Limit** is set to **Apparent capacity limit**.
PV power limit when Meter fails	Set the active power limit of the inverter when the feed-in meter communication is abnormal. You can manually change the active power percentage of the inverter as required.	-
PCS power limit when Meter fails	Specifies the active power limit of the PCS when the export+import meter communication is abnormal. You can manually change the active power percentage of the PCS as required.	-

NOTE – If the capacity limit is met 24 hours a day, the ratio of the ESS/PCS to the load power must be properly set to ensure that the ESS/PCS have sufficient capacity to meet the capacity limit.

– When the ESS is used only for capacity limit, you can set the charge window to 24 hours by setting TOU without setting the

discharge window or non-charge/discharge window.

- When the capacity limit is enabled in TOU mode, the charge/discharge time set in the TOU window must cover 24 hours a day. Capacity limit is not supported in non-charge/discharge time.
- The overload capability of transformers, power distribution switches, and cables must be greater than the sum of the maximum charge current and maximum load current of the ESS.

Battery Parameters

If the PCS is powered off, you are advised to preset PCS running parameters on this tab page.

Choose **Settings** > **Battery Settings** > **Battery parameters** to set PCS parameters in batches.

After Array parameter synchronization is set to Enable, if Auto switching between working modes, Working mode switching delay, Working mode, and VSG parameters are set and submitted, the corresponding parameters under **Monitoring** > **PCS** > **Running Param**. are read-only.

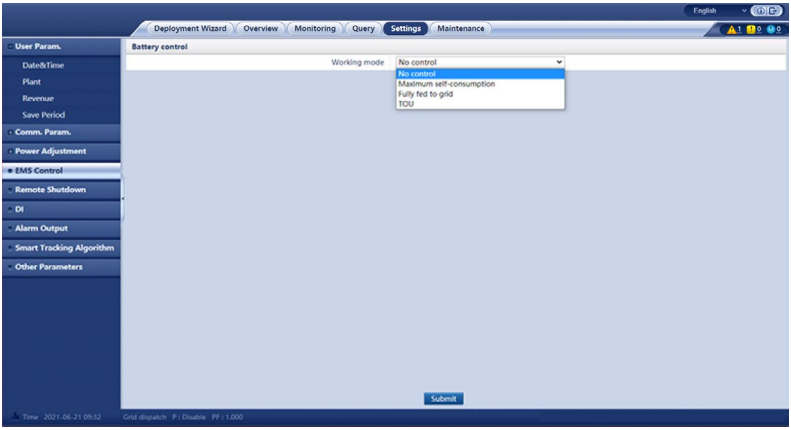
Parameter	Description	Remarks
Array parameter synchronization	The default value is **Disable**. Disable: The function of array parameter synchronization is disabled. Parameters related to the array are not displayed. Enable: The function of array parameter synchronization is enabled. If the parameter values of the PCS are different from those configured on this page, the parameter values configured on this page will be synchronized for the PCS.	Other battery parameters are displayed only when **Array parameter synchronization** is set to **Enable**.
Auto switching between working modes	This parameter is applicable only in on-grid or on/off-grid mode. • **Disable**: On/Off-grid switching cannot be performed automatically. • **Enable**: On/Off-grid switching can be performed automatically and the PCS does not need to be shut down before the switching.	-
Working mode switching delay	The default value is **60**. Time for other instructions to take effect during PCS working mode switching The value range is [10, 300] (unit: s).	-
Working mode	The default value is **PQ**. • PQ: In the on-grid scenario, set this parameter to **PQ**. • VSG: In the off-grid scenario, set this parameter to **VSG**.	-

Parameter	Description	Remarks
Per unit armature resistance	The default value is 2. Specifies the resistance per unit value for armature windings of the virtual synchronous generator. The value of this parameter ranges from 0.0% to 5.0%.	• This parameter is displayed when **Working mode** is set to **VSG**. • This parameter must be set by professional personnel. Improper settings may cause device exceptions.
Per unit armature inductive reactance	The default value is 1. Specifies the inductive reactance per unit value for armature windings of the virtual synchronous generator. The value of this parameter ranges from 0.0% to 5.0%.	
VSG inertia time constant	The default value is 1. Specifies the time required for the virtual rotor of the virtual synchronous generator to reach the rated speed from the static state under the rated torque. The value of this parameter ranges from 0.0s to 20.0s.	
P-F adjustment coefficient	The default value is 1. Specifies the frequency deviation corresponding to the rated active power of the virtual synchronous generator. The value of this parameter ranges from 0.5% to 5.0%.	
Q-V adjustment coefficient	The default value is 3. Specifies the voltage deviation corresponding to the rated reactive power of the virtual synchronous generator. The value of this parameter ranges from 0.3% to 10.0%.	
P-V adjustment coefficient	The default value is 0. Specifies the voltage deviation corresponding to the rated active power of the virtual synchronous generator. The value of this parameter ranges from 0% to 10.0%.	
Q-F adjustment coefficient	The default value is 0. Specifies the frequency deviation corresponding to the rated reactive power of the virtual synchronous generator. The value of this parameter ranges from 0.5% to 5.0%.	
VSG output voltage correction coefficient	The default value is 100. Corrects the deviation caused by the transformer ratio error. The value of this parameter ranges from 90.0% to 110.0%.	
VSG output frequency correction coefficient	The default value is 100. Corrects the PCS output frequency deviation. The value of this parameter ranges from 90.0% to 110.0%.	
VSG frequency damping coefficient	The default value is 7.2. Specifies the power factor that prevents the frequency change of the virtual synchronous generator. The value of this parameter ranges from 1.0% to 10.0%.	
VSG excitation time constant	The default value is 0. Specifies the time required for the excitation of the virtual synchronous generator to reach the rated voltage. The value of this parameter ranges from 0s to 100s.	
VSG excitation damping coefficient	The default value is 0. Specifies the power factor that prevents the voltage change of the virtual synchronous generator. The value of this parameter ranges from 0% to 20000%.	
Active power (%)	The default value is 100. Adjusts the active output power of the device by percentage. The value of this parameter ranges from –100.0% to 100.0%.	This parameter is delivered once before the PCS is started. The configuration can be modified by choosing **Monitoring** > **PCS** > **Running Param**.
Reactive power compensation (Q/S)	The default value is 0. Specifies the reactive power of the device. The value of this parameter ranges from –100.0% to 100.0%.	

6.5 Setting EMS Control Parameters

Procedure

To set the battery working mode, choose **Settings** > **EMS Control**.



Battery control working modes

Working Mode	Mode Description
No control	The DataLogger directly delivers the power limit for external scheduling. No other power scheduling control is performed. The power is automatically controlled by the device.
Maximum self-consumption	• This mode applies to areas where the electricity price is high, or areas where the FIT subsidy is low or unavailable. The PV+ESS system generates sufficient PV power for loads and uses the surplus PV power to charge the ESS (if the PV power is insufficient for loads, the TOU mode is recommended). • PV power is preferentially supplied to loads, and the surplus power is used to charge the ESS. If the ESS is fully charged or is being charged at full power, the surplus power is fed to the grid. When PV power is insufficient or no PV power can be generated at night, the ESS discharges power to loads. This improves the self-consumption rate and energy self-sufficiency rate, and reduces electricity costs. The grid cannot charge the ESS but can supply power to loads. • The DataLogger performs ESS scheduling based on the power limit for external scheduling and the preceding policies.
Fully fed to grid	• This parameter applies only to distributed scenarios. • This mode maximizes the PV energy fed to the grid. When the PV output power in the daytime is greater than the maximum output capacity of the inverter, the surplus PV power is used to charge the ESS. When the PV output power is less than the maximum output capacity of the inverter, the ESS discharges energy to the inverter to maximize the energy fed from the inverter to the grid. The grid cannot charge the ESS. • The DataLogger directly delivers the power limit for external scheduling.
TOU	• It is applicable to the PV+ESS system and ESS-only system where peak to valley electricity prices are different and Meters are available. • You can manually set the charge and discharge time segments. For example, if you set the low electricity price period at night as the charge time, the system charges the batteries at the maximum power during the charge time. If you set the high electricity price period as the discharge time, batteries can discharge only during the discharge time based on the actual load power, reducing electricity costs. • Click **Add** to set the charge and discharge time segments. A maximum of 14 time segments can be set. During the charge time, the grid can charge the batteries. During the discharge time, the batteries can supply power to the loads. In other time segments, the batteries do not discharge. The PV system and grid supply power to loads, and the PV system can charge the batteries. • In some countries, the grid is not allowed to charge batteries. In such case, this mode cannot be used. • The DataLogger performs ESS scheduling based on the power limit for external scheduling and the preceding policies.

Running parameters in each battery control working mode

Working Mode	Parameter	Description
Maximum self-consumption	Tracking load	• **Enable**: The device output changes with the load so that the output is approximately equal to the load. • **Disable**: The device outputs power as much as possible. However, the output power is still affected by parameters such as external scheduling.
	Battery reverse current protection	• **Enable**: If the battery feeds power to the grid while discharging, the system sends a standby command to the battery to eliminate the reverse power. When the battery needs to discharge power, the system sends a running command to the battery. • **Disable**: If reverse battery power is detected at the grid-connection point, the reverse power is eliminated by reducing the battery output power. The battery standby command is not delivered.
	Active power threshold of grid during battery discharge	Set the grid power threshold at the grid connection point for loads when the load power is greater than the PV power.
	Adjustment deadband	Set the precision of the grid power at the grid connection point. This parameter affects the power value range at the grid connection point. If the actual grid power threshold at the grid connection point is within this range, i.e. [Active power threshold of grid during battery discharge – Adjustment deadband, Maximum grid power during battery discharge + Adjustment deadband], the grid power requirement at the grid connection point is met.
TOU	Tracking load	• **Enable**: The device output changes with the load so that the output is approximately equal to the load. • **Disable**: The device outputs power as much as possible. However, the output power is still affected by parameters such as external scheduling.
	Battery reverse current protection	• **Enable**: If the battery feeds power to the grid while discharging, the system sends a standby command to the battery to eliminate the reverse power. When the battery needs to discharge power, the system sends a running command to the battery. • **Disable**: If reverse battery power is detected at the grid-connection point, the reverse power is eliminated by reducing the battery output power. The battery standby command is not delivered.
	Preferred use of surplus PV power	• **Charge**: When the PV power is greater than the load power, the surplus PV energy is used to charge the batteries. After the maximum charge power is reached or the batteries are fully charged, the surplus PV energy is fed to the grid. • **Fed to grid**: When the PV power is greater than the load power, the surplus PV energy is preferentially fed to the grid. When the maximum output power of the device is reached, the surplus energy is used to charge the batteries. This setting is applicable to the scenario where the FIT is higher than the electricity price. The grid cannot charge the batteries.
	Maximum power for charging batteries from grid	Set the maximum power at which the grid charges the batteries.
	Active power threshold of grid during battery discharge	Set the grid power threshold at the grid connection point for loads when the load power is greater than the PV power.
	Adjustment deadband	Set the precision of the grid power at the grid connection point. This parameter affects the power value range at the grid connection point. If the actual grid power threshold at the grid connection point is within this range, i.e. [Active power threshold of grid during battery discharge – Adjustment deadband, Maximum grid power during battery discharge + Adjustment deadband], the grid power requirement at the grid connection point is met.
	Start time	Set the start time and end time of charge and discharge. A maximum of 14 time segments can be set. You can set a weekly cycle by clicking the buttons corresponding to **Mon**. through Sun. in the **Repeat** box. The buttons are blue by default, indicating being selected. After you click it, the button turns gray.
	End time	
	Charge/Discharge	
	Repeat	

6.6 Setting Microgrid Control Parameters

- **Microgrid Control** is displayed only when the DataLogger model is DataLogger.
- To modify microgrid control parameters, contact professional plant operation and management personnel or the Company's engineers.

6.6.1 On-grid/Off-grid (PQ/VSG)

STEP 1 Choose **Settings** > **Microgrid Control** > **General Configuration** and set general configuration parameters.

Parameter	Description
MGCC Mode under Microgrid	This parameter is displayed as Enable. You can change the setting only through the deployment wizard.
Microgrid scenario under Microgrid	This parameter is displayed as On-grid/Off-grid (PQ/VSG). You can change the setting only through the deployment wizard.
Switch status port under On/Off-grid switch	Set these parameters based on the actual cable connections. DI port status can be set to Open or Close. If the actual status of the on/off-grid switch is inconsistent with the displayed status, change the setting of DI port status.
DI port status under On/Off-grid switch	
Switch-off control port under On/Off-grid switch	Set the DO port for turning off the on/off-grid switch.
Switch-on control port under On/Off-grid switch	Set the DO port for turning on the on/off-grid switch.
DI port under Grid Failure Detection	Set the DI port to which the the grid failure detection device is connected and the DI port status.
DI port status under Grid Failure Detection	

STEP 2 Choose **Settings** > **Microgrid Control** > Dispatch Control to set dispatch control parameters.

Dispatch control parameters

Tab	Parameter	Description
Control Policy	Automatic black start after irradiance restoration	Specifies whether to enable automatic black start after irradiance restoration. • **Enable**: During off-grid operation, automatic black start is performed after the irradiance restores. • **Disable**: Automatic black start is not performed after the irradiance restores.
	Automatic PCS recovery	Specifies whether to enable the function of automatic recovery in case of abnormal PCS shutdown. • **Enable**: During off-grid operation, when the DataLogger detects that the PCS shuts down abnormally and causes microgrid power failure, the DataLogger automatically attempts to black start to restore the power supply. • **Disable**: When the PCS shuts down abnormally, the DataLogger does not perform automatic black start.
Control Policy	End-of-charge SOC (off-grid)	Set the maximum SOC for charge in off-grid mode. The default value 90% is recommended. The value range is [85, 98]%.
	End-of-discharge SOC (off-grid)	Set the minimum SOC for discharge in off-grid mode. The default value 10% is recommended. The value range is [10, 20]%.
	Min PV voltage for black start	After the solar irradiance recovers, the inverter PV voltage increases. If the PV1 voltage of an inverter is greater than or equal to **Min PV voltage for black start**, the black start function may be enabled.
	Minimum estimated power for black start	Specifies the minimum estimated power for black start. In the on/off-grid scenario, the default value is 70% of the rated power of the connected ESS. The value ranges from 5% to 70%.
Off-grid charging control	Real-time SOC (%)	The output power of the inverter is controlled based on the current battery SOC to meet the battery charge power adjustment target. The value of Real-time SOC (%) ranges from End-of-discharge SOC (off-grid) to End-of-charge SOC (off-grid). The value range of Allowed Charge Power (%) is [0, 70]%.
	Allowed Charge Power (%)	

Tab	Parameter	Description
Power Backup	Off-grid power backup	• **Enable**: The off-grid power backup function is enabled. When the SOC is less than or equal to **Min. SOC for off-grid power backup**, the ESS stops discharging to maintain sufficient power for off-grid operation. • **Disable**: The off-grid power backup function is disabled.
	Min. SOC for off-grid power backup (%)	This parameter is displayed when Power Backup is set to Enable. In on-grid mode, set Min. SOC for off-grid power backup (%). The default value 40% is recommended. The value range is [20, 90]%. The precision is 1%.
	Prioritize off-grid power backup	This parameter is displayed when Power Backup is set to Enable. • **Enable**: When this function is enabled, if the current SOC is less than or equal to **Min. SOC for off-grid power backup**, the ESS stops discharging and is charged by PV power preferentially. In this case, the current on-grid ESS scheduling policy becomes invalid. • **Disable**: This function is disabled.
	Draw power from grid for off-grid power backup	This parameter is displayed when Prioritize off-grid power backup is set to Enable. • **Disable**: The ESS is not allowed to obtain power from the grid for off-grid power backup. • **Allow**: The ESS is allowed to obtain power from the grid for off-grid power backup.
	Charge power for off-grid power backup (kW)	This parameter is displayed when **Draw power from grid for off-grid power backup** is set to **Allow**. Set the power for charging from the grid during off-grid power backup. The default value is 100 kW, and the value range is [0.000, 50000.000] kW.

STEP 3 Choose **Settings** > **Microgrid Control** > **On/Off-grid switching**, and set on/off-grid switching parameters.

On/Off-grid switching parameters

Tab	Parameter	Description
General Configuration	Automatic microgrid adaptability control	• **Enable**: When the system switches from on-grid to off-grid mode, the microgrid adaptability of the inverter is automatically enabled. When the system switches from off-grid to on-grid mode, the microgrid adaptability of the inverter is automatically disabled. • **Disable**: The automatic microgrid adaptability control function is disabled. The microgrid adaptability of the inverter is not automatically set during on/off-grid switching.
	On/Off-grid switching mode	• **No control**: All the operations involved in the on/off-grid switching are manually performed. If the customer needs to repair the equipment, you are advised to set this parameter to **No control**. • **Auto**: The on/off-grid switching will be performed automatically based on the status of the mains power. When you set **On/Off-grid switching mode** to this mode, an immediate on/off-grid switching may be triggered, depending on the status of the mains power. • **Manual**: You need to manually turn on or off the on/off-grid switch at the grid connection point.
Off-grid to On-grid	Off-grid to on-grid under Manual On-grid/ Off-grid Switching	If On/Off-grid switching mode is set to Manual, click Off-grid to on-grid before switching from off-grid to on-grid mode. After the PV+ESS system shuts down, turn on the on/off-grid switch locally. After the switch is turned on, the PV+ESS system automatically restarts.

Tab	Parameter	Description
On/Off-grid switch control	On/Off-grid switch control	This function is used to check the status of the on/off-grid switch. Before the check, the array shall be shut down. • **Close**: The on/off-grid switch is turned on, switching the system from off-grid to on-grid state. Click **Off-grid to on-grid** before switch-on. • **Open**: The on/off-grid switch is turned off, switching the system from on-grid to off-grid state. **NOTE** – In the on/off-grid (PQ/VSG) scenario, the on/off-grid switching will be performed according to the status of the on/off-grid switch only when **On/Off-grid switching mode** is set to **Auto** or **Manual**. – In the on/off-grid (PQ/VSG) scenario, the **Close** and **Open** buttons are available only when the DO ports of **Switch-off control port** and **Switch-on control port** under **On/Off-grid switch** are configured. – When the on/off-grid switch is on, the **Close** button is grayed out, and the **Open** button is available. – When the on/off-grid switch is in invalid state, the **Close** and **Open** buttons are grayed out.

6.6.2 On-grid/Off-grid (VSG)

STEP 1 Choose **Settings** > **Microgrid Control** > **General Configuration** and set general configuration parameters.

General configuration parameters

Parameter	Description
MGCC Mode under Microgrid	This parameter is displayed as Enable. You can change the setting only through the deployment wizard.
Microgrid scenario under Microgrid	If this parameter is set to On-grid/Off-grid (VSG), you can change the setting only through the deployment wizard.
Genset start/stop control port under Genset	If the genset is controlled by the DataLogger, set the DO port that controls genset startup and shutdown based on the actual cable connections. If the genset is controlled by the ATS, set this parameter to **No**.

STEP 2 Choose **Settings** > **Microgrid Control** > Dispatch Control to set dispatch control parameters.

Dispatch control parameters

Tab	Parameter	Description
Control Policy	Automatic black start after irradiance restoration	Specifies whether to enable automatic black start after irradiance restoration. • **Enable**: During off-grid operation, automatic black start is performed after the irradiance restores. • **Disable**: Automatic black start is not performed after the irradiance restores.
	Automatic PCS recovery	Specifies whether to enable the function of automatic recovery in case of abnormal PCS shutdown. • **Enable**: During off-grid operation, when the DataLogger detects that the PCS shuts down abnormally and causes microgrid power failure, the DataLogger automatically attempts to black start to restore the power supply. • **Disable**: When the PCS shuts down abnormally, the DataLogger does not perform automatic black start.

Tab	Parameter	Description
Control Policy	End-of-charge SOC (on-grid)	Set the maximum SOC for charge in on-grid mode. The default value 90% is recommended. The value range is [85, 98]%.
	End-of-charge SOC (off-grid)	Set the maximum SOC for charge in off-grid mode. The default value 90% is recommended. The value range is [85, 98]%.
	End-of-discharge SOC (off-grid)	Set the minimum SOC for discharge in off-grid mode. The default value 10% is recommended. The value range is [10, 20]%.
	Min PV voltage for black start	After the solar irradiance recovers, the inverter PV voltage increases. If the PV1 voltage of an inverter is greater than or equal to **Min PV voltage for black start**, the black start function may be enabled.
	Minimum estimated power for black start	Specifies the minimum estimated power for black start. In the on/off-grid scenario, the default value is 70% of the rated power of the connected ESS. The value ranges from 5% to 70%.
Off-grid charging control	Real-time SOC (%)	The output power of the inverter is controlled based on the current battery SOC to meet the battery charge power adjustment target. The value of Real-time SOC (%) ranges from End-of-discharge SOC (off-grid) to End-of-charge SOC (off-grid). The value range of Allowed Charge Power (%) is [0, 70], in %.
	Allowed Charge Power (%)	
Genset Control	Genset Auto Control	• **Enable**: Enable the automatic control of genset startup and shutdown. If the ESS is shut down, the genset automatically starts to supply power to loads. • **Disable**: Disable the automatic control of genset startup and shutdown.
	Genset Manual Control	• **Power-On**: Manually start the genset. • **Power-Off**: Manually shut down the genset.
Power Backup	Off-grid power backup	• **Enable**: The off-grid power backup function is enabled. When the SOC is less than or equal to **Min. SOC for off-grid power backup**, the ESS stops discharging to maintain sufficient power for off-grid operation. • **Disable**: The off-grid power backup function is disabled.
	Min. SOC for off-grid power backup (%)	This parameter is displayed when **Power Backup** is set to **Enable**. In on-grid mode, set **Min. SOC for off-grid power backup** (%). The default value 40% is recommended. The value range is [20, 90]%. The precision is 1%.
	Prioritize off-grid power backup	This parameter is displayed when Power Backup is set to Enable. • **Enable**: When this function is enabled, if the current SOC is less than or equal to **Min. SOC for off-grid power backup**, the ESS stops discharging and is charged by PV power preferentially. In this case, the current on-grid ESS scheduling policy becomes invalid. • **Disable**: This function is disabled.
	Draw power from grid for off-grid power backup	This parameter is displayed when **Prioritize off-grid power backup** is set to **Enable**. • **Disable**: The ESS is not allowed to obtain power from the grid for off-grid power backup. • **Allow**: The ESS is allowed to obtain power from the grid for off-grid power backup.
	Charge power for off-grid power backup (kW)	This parameter is displayed when **Draw power from grid for off-grid power backup** is set to **Allow**. Set the power for charging from the grid during off-grid power backup. The default value is 100 kW, and the value range is [0.000, 50000.000] kW.

NOTE – Array end-of-charge SOC > End-of-charge SOC (on-grid) or End-of-charge SOC (off-grid) ≥ Backup power SOC for peak shaving ≥ Min. SOC for off-grid power backup > End-of-discharge SOC (off-grid) > Array end-of-discharge SOC

STEP 3 Choose **Settings** > **Microgrid Control** > **On/Off-grid switching**, and set on/off-grid switching parameters.

On/Off-grid switching parameters

Tab	Parameter	Description
On-grid to Off-grid	Switch to Off-grid under Planned switching control	After the planned switching control is started, the on/off-grid switch is turned off and the system enters off-grid state.

Tab	Parameter	Description
Off-grid to On-grid	Auto switching to on-grid under Automatic Off-grid to On-grid Switching	• **Enable**: If the mains voltage is stable, the system automatically switches from off-grid to on-grid state after the synchronization of the relay protection device is successful. • **Disable**: Disable the function of automatic switching from off-grid to on-grid.
	Setting value of high voltage under Criteria of Stable Grid	Set the allowed error range of the mains voltage. If the voltage is within [Setting value of high voltage, 110]% of the rated voltage, the voltage is considered stable.
	Continuous power available for under Criteria of Stable Grid	Set the minimum time for which the mains voltage remains stable.
	Max switching time under Conditions for Off-grid to On-grid Switching	Set the maximum time for switching from off-grid to on-grid. **Max switching time** must be greater than the maximum duration for the synchronization check of the relay protection device.
	Off-grid to on-grid under Manual On-grid/Off-grid Switching	Set **Auto switching to on-grid** to **Disable**. To switch from off-grid to on-grid, click Off-grid to on-grid first. When the mains voltage is stable, synchronization will be performed. After the synchronization is successful, the on/off-grid switch is turned on and the system enters on-grid state.
On/Off-grid switch control	On/Off-grid switch control	This function is used only to check the status of the on/off-grid switch. Before the check, the array shall be shut down. • **Close**: The on/off-grid switch is turned on and the system checks whether the relay protection device has correctly controlled the switch-on. • **Open**: The on/off-grid switch is turned off and the system checks whether the relay protection device has correctly controlled the switch-off. **NOTE** – In the on/off grid (VSG) scenario, if the relay protection device is offline, the **Close** and **Open** buttons are grayed out. – When the on/off-grid switch is off, the **Close** button is available, and the **Open** button is grayed out. – When the on/off-grid switch is on, the **Close** button is grayed out, and the **Open** button is available. – When the on/off-grid switch is in invalid state, the **Close** and **Open** buttons are grayed out.

6.6.3 Off-Grid

STEP 1 Choose **Settings** > **Microgrid Control** > **General Configuration** and set general configuration parameters.

General configuration parameters

Parameter	Description
MGCC Mode under Microgrid	This parameter is displayed as Enable. You can change the setting only through the deployment wizard.
Microgrid scenario under Microgrid	This parameter is displayed as Off-grid. You can change the setting only through the deployment wizard.
Switch status port under Load Switch	Set these parameters based on the actual cable connections. If you need to modify the parameters after the settings are submitted, the automatic control function of the load switch may fail. This function can be restored only after the DataLogger is restarted or the black start is successful in the off-grid scenario. DI port status can be set to Open or Close. If the actual status of the load switch is inconsistent with Status, change the setting of DI port status.
DI port status under Load Switch	
Switch-off control port under Load Switch	Set the DO port for turning off the load switch.
Switch-on control port under Load Switch	Set the DO port for turning on the load switch.

STEP 2 Choose **Settings** > **Microgrid Control** > **Dispatch Control** to set dispatch control parameters.

Dispatch control parameters

Tab	Parameter	Description
Control Policy	Automatic load connection/shedding	Specifies whether to enable automatic load connection/shedding. If the battery SOC falls below the specified threshold, the load switch trips automatically to reduce loads. After the battery SOC rises above the threshold, the loads are automatically restored.
	Automatic black start after irradiance restoration	Specifies whether to enable automatic black start after irradiance restoration. • **Enable**: During off-grid operation, automatic black start is performed after the irradiance restores. • **Disable**: Automatic black start is not performed after the irradiance restores.
	Automatic PCS recovery	Specifies whether to enable the function of automatic recovery in case of abnormal PCS shutdown. • **Enable**: During off-grid operation, when the DataLogger detects that the PCS shuts down abnormally and causes microgrid power failure, the DataLogger automatically attempts to black start to restore the power supply. • **Disable**: When the PCS shuts down abnormally, the DataLogger does not perform automatic black start.
Control Policy	End-of-charge SOC (off-grid)	Set the maximum SOC for charge in off-grid mode. The default value 90% is recommended.
	SOC threshold for stopping load shedding	The default value 30% is recommended. If the SOC is greater than or equal to **SOC threshold for stopping load shedding**, the load switch is automatically turned on to supply power to loads. If you manually turn on or off the load switch, the automatic control function of the load switch will be automatically disabled. This function can be restored only after the DataLogger is restarted or the black start is successful in the off-grid scenario.
	SOC threshold for starting load shedding	The default value 20% is recommended. If the SOC is less than or equal to **SOC threshold for starting load shedding**, the load switch is automatically turned off to reduce the ESS discharge power. If you manually turn on or off the load switch, the automatic control function of the load switch will be automatically disabled. This function can be restored only after the DataLogger is restarted or the black start is successful in the off-grid scenario.
	End-of-discharge SOC (off-grid)	Set the minimum SOC for discharge in off-grid mode. The default value 10% is recommended.
	Min PV voltage for black start	After the solar irradiance recovers, the inverter PV voltage increases. If the PV1 voltage of an inverter is greater than or equal to **Min PV voltage for black start**, the black start function may be enabled.
	Minimum estimated power for black start	Specifies the minimum estimated power for black start. In the off-grid scenario, the default value is 10% of the rated power of the connected ESS. The value ranges from 5% to 70%.
Charging	Real-time SOC (%)	The output power of the inverter is controlled based on the current battery SOC to meet the battery charge power adjustment target. The value of **Real-time SOC (%)** ranges from **End-of-discharge SOC (off-grid)** to **End-of-charge SOC (off-grid)**. The value range of **Allowed Charge Powe**r (%) is [0, 70], in %.
	Allowed Charge Power (%)	
Load control	Manual Load Control	This function is used to check the load switch status. Before the check, the array shall be shut down. • **Close**: Loads are connected. • **Open**: Loads are disconnected. **NOTE** – In the off-grid scenario, the **Close** and **Open** buttons are available only when the DO ports of **Switch-off control port** and **Switch-on control port** under **Load Switch** are configured. – When the load switch is off, the **Close** button is available, and the **Open** button is grayed out. – When the load switch is on, the **Close** button is grayed out, and the **Open** button is available. – When the load switch is in invalid state, the **Close** and **Open** buttons are grayed out.

NOTE – Array end-of-charge SOC > End-of-charge SOC (off-grid) ≥ SOC threshold for stopping load shedding > SOC threshold for starting load shedding > End-of-discharge SOC (off-grid) > Array end-of-discharge SOC

6.6.4 Black Start

Choose **Settings** > **Microgrid Control** > **Black Start** to view the black start status and perform black start manually.

NOTE – For manual black start, before clicking Starting under Settings > Microgrid Control > Black Start, ensure that Current Battery SOC is higher than 2%. Otherwise, black start may fail.

Parameter	Description
Current Battery SOC	View the current battery SOC.
Black Start Progress	View the black start progress.
Status	• Black start failed. Cause: All ESSs are offline. • Black start failed. Cause: No ESS is available for black start. • Black start failed. Cause: No PCS is available for black start. • Black start failed. Cause: No PCS is prepared for black start. • Black start failed. Cause: No PCS has established the voltage for black start. • Manual black start in progress • Automatic black start in progress: The current battery SOC is higher than **Min. Battery SOC for Black Start**. - When **MGCC Mode** is set to **Enable**, **Microgrid scenario** is set to **On-grid/Off-grid (PQ/VSG)**, and **On/Off-grid switching mode** is set to **Auto**, black start is automatically triggered if the mains triggers the on/off-grid switching. - When **MGCC Mode** is set to **Enable**, **Microgrid scenario** is set to **On-grid/Off-grid (PQ/VSG)**, and **On/Off-grid switching mode** is set to **Manual**, black start is automatically triggered if you turn off on-grid/off-grid switch locally to trigger the on/off-grid switching manually. - When **MGCC Mode** is set to **Enable**, if the voltage on the PCS AC side is abnormal (less than 30% of the rated voltage on the PCS AC side) and the PCS is shut down abnormally, black start is automatically triggered. - When **MGCC Mode** is set to **Enable** and **Microgrid scenario** is set to **Off-grid**, if the solar irradiance recovers for inverters and no PCS is running, turn off the load switch and then the black start is automatically triggered. • Black start succeeded

6.7 Setting Feature Parameters

PCS Insulation Resistance Detection

The PCS insulation resistance detection function periodically triggers PCS startup and shutdown to check whether the system has a risk of low insulation resistance.

Choose **Settings** > **Feature Parameters** and set the PCS insulation resistance detection parameter. If a dialog box **You are advised to change the insulation resistance detection time to the optimal time** (XX:XX) is displayed, you are advised to click **Confirm** and go to the **Feature Parameters** page to manually set **Detection start time** to the optimal time.

Setting parameters related to PCS insulation resistance detection

Parameter	Description
Detection start time	Specifies the time when the PCS insulation resistance detection function is enabled. The default value is 02:00.

6.8 Power Grid Scheduling

6.8.1 Power Adjustment Description

According to standard requirements, the DataLogger can reliably adjust power for the connected inverters/PCS in real time to ensure that the plant can respond to requirements of the power grid company in a timely manner.

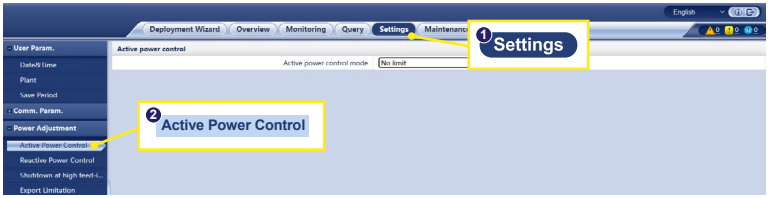
NOTE
- To ensure that the DataLogger will deliver scheduling commands to the connected inverters or PCS, you must select the active or reactive power control mode before adjusting the active or reactive power for a PV plant.
- If Active power control mode is set to No limit or Reactive power control mode is set to No output, the DataLogger does not send scheduling commands to the connected inverters or PCS.

6.8.2 Setting Active Power Control

If the plant has requirements of power limitation, the power grid scheduling personnel should limit the active power or disable all the active power for the plant, that is, to enable the active power derating mode.

STEP 1 Choose **Monitoring** > **Inverter/PCS** > **Running Param.** > **Power Adjustment.** On the page that is displayed, check that **Remote power schedule** is set to **Enable**.

STEP 2 Set the parameters for active power control and click **Submit**.



No Limit

Parameter	Description
Active power control mode	If this parameter is set to No limit, the device operates at full load, and the PCS limits the power based on the energy storage control policy.

DI Active Scheduling

NOTE
- When setting this function, ensure that the user-defined DI port is not occupied. Otherwise, the setting will fail.
- When setting this function, ensure that the DataLogger is correctly connected to a ripple control receiver. (In Germany and some other European areas, a ripple control receiver is used to convert a power grid scheduling signal to a dry contact signal, in which a dry contact is needed.)
- When both Remote communication scheduling and DI are enabled, the control with a lower active power percentage value is preferentially responded.

Parameter	Description
Active power control mode	Set this parameter to **DI active scheduling**.
Remote communication scheduling	Set this parameter to **Start-up**, DI active scheduling and remote communication scheduling work at the same time.
DI **NOTE** – DI parameters include **DI1**, **DI2**, **DI3**, **DI4**, and **Percentage(%)**.	• Supports 16 levels of percentages. • "√" indicates a low level. When the four DI ports of the DataLogger are connected, the ports are low-level ports. When not connected, the ports are high-level ports. • The percentage levels of DI1–DI4 must differ from each other. Otherwise, an exception will occur during command parsing. • If the actual input DI signal is inconsistent with that configured on the WebUI, the DataLogger controls the inverter to work at full power and the **Abnormal Active Schedule** alarm is raised.

Percentage Fixed-Value Limitation (Open Loop)

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

Parameter	Description
Active power control mode	Set this parameter to **Percentage fixed-value limitation** (open loop) to control the maximum output power of the devices by time segment.
Start time Percentage(%)	If the device is required to run with specified maximum power in certain periods of a day, add records based on site requirements. When multiple time points are set, the device will run with the maximum power specified for the time point that is earlier than and the closest to the current system time. For example, if you add 00:00:00 and 12:00:00 on the WebUI and the current system time is 14:30:00, the device will run with the maximum power specified for 12:00:00.

Remote Communication Scheduling

The management system or independent power adjustment device sends scheduling commands to the DataLogger over the communications port that supports Modbus TCP, GOOSE, or IEC 104, without the need of user configuration or operation. The DataLogger can automatically switch between scheduling modes and send scheduling commands.

Parameter	Description
Active power control mode	Set this parameter to **Remote communication scheduling**. The DataLogger parses the scheduling command delivered by the upper-layer management system to valid instruction data that can be identified by the devices in the plant and delivers the data to all devices connected to the DataLogger. As the **Remote communication scheduling** mode has a higher priority, the DataLogger automatically changes **Active power control mode to Remote communication scheduling** after receiving a scheduling command from the upper-layer management system.
Schedule strategy	The value can be **Disable**, **Strategy 1**, **Strategy 2** or **Strategy 3**. The default value is **Strategy 1**. • **Disable**: The DataLogger controls the device to work at full load and will not receive scheduling commands sent by the management system. • **Strategy 1**: Open-loop scheduling policy. That is, the DataLogger evenly allocates the power value from the scheduling command and delivers the average value to each device, which then operates at the specific power. The adjustment value delivered by the DataLogger is constant. If **Adjustment coefficient** is set, the power value will be sent to the device after being multiplied by the preset coefficient. • **Strategy 2**: Customized functions for specific plants. Set **Overshoot**, **Adjustment period**, and **Adjustment deadband** based on the scheduling requirements of the power plant. - **Overshoot**: Indicates the maximum overshoot percentage during adjustment. If a plant cannot reach the preset target value due to factors such as insufficient sunlight, the set target value is the current value plus the overshoot. - **Adjustment period**: Indicates the time required from adjustment instruction delivery to device response to the instruction and the detection of the preceding actions by the DataLogger. - **Adjustment deadband**: Indicates the percentage of the adjustment deviation value to the rated output capacity. In the adjustment deadband, strategy 2 does not deliver control instructions but still detects the deviation in real time. • **Strategy 3**: In the feed-in limitation scenario of the master and slave DataLoggers, set this parameter to **Strategy 3** for the slave DataLogger.
Adjustment coefficient	Coefficient for calculating the target value of active power adjustment. The default value is 1.000.
Shutdown upon communication exceptions	The default value is **Disable**. If this parameter is set to **Enable**, the DataLogger shuts down the device after the DataLogger has failed to receive remote communication scheduling commands for a period longer than the set value of **Time for communication exception detection**.
Time for communication exception detection (s)	The default value is 300. This parameter is used only for shutdown protection when the communication is abnormal. If the DataLogger has failed to receive remote communication scheduling commands for a period longer than the set value, the communication is determined as abnormal.
Automatic startup upon communication recovery	The default value is **Enable**. If this parameter is set to **Enable**, the device automatically starts if remote communication scheduling commands can be received normally again after a communication exception occurs.

Parameter	Description
Limit solar inverter power upon active power scheduling timeout	The default value is **Disable**. If this parameter is set to **Enable**, the DataLogger controls the device in the following ways after the DataLogger has failed to receive remote communication scheduling commands for a period longer than the set value of Active power scheduling timeout threshold for triggering solar inverter power limiting. • Limit the active power of the inverter based on the value of **Power (in percentage of rated power) of solar inverter in case of active power scheduling timeout**. • Limit the active power of the ESS based on the value of **Power (in percentage of rated power) of ESS in case of active power scheduling timeout**.
Active power scheduling timeout threshold for triggering solar inverter power limiting (s)	The default value is **300.0**. This parameter is used only for active power limiting protection when the communication is abnormal. If the DataLogger has failed to receive remote communication scheduling commands for a period longer than the set value, active power limiting protection is started.
Power (in percentage of rated power) of solar inverter in case of active power scheduling timeout (%)	The default value is **0.0**. After **Limit solar inverter power upon active power scheduling timeou**t is enabled, if the DataLogger has failed to receive remote communication scheduling commands for a period longer than the set value of **Active power scheduling timeout threshold for triggering solar inverter power limiting**, the DataLogger limits the active power of the inverter based on the set value of this parameter.
Power (in percentage of rated power) of ESS in case of active power scheduling timeout (%)	The default value is **0.0**. After **Limit solar inverter power upon active power scheduling timeou**t is enabled, if the DataLogger has failed to receive remote communication scheduling commands for a period longer than the set value of **Active power scheduling timeout threshold for triggering solar inverter power limiting**, the DataLogger limits the active power of the ESS based on the set value of this parameter.
Filter same scheduling commands	• **Enable**: The DataLogger filters the same scheduling commands delivered in the northbound direction. • **Disable**: The DataLogger does not filter the same scheduling commands delivered in the northbound direction.

NOTE – If the communication between the DataLogger and the scheduling backend is disconnected and the communication exception protection parameters are not set to Enable, the active power is controlled based on the scheduling command sent before the disconnection.

Export Limitation (kW)

NOTE – You are advised to choose Settings > Export Limitation and enable the function of limiting feed-in power.

– To enable this function, you need to set meter, inverter/PCS, and export limitation parameters. This section describes how to set export limitation parameters.

– Before setting the parameters, ensure that the Meter is correctly connected to the DataLogger.

STEP 1 Set export limitation parameters and click **Submit**.

Parameter	Description
Active power control mode	Set this parameter to **Export Limitation(kW)**.
Start control	When this parameter is set to **Yes**, the power limiting function takes effect.
Electric meter power direction	• **Positive**: default value. - Cables are correctly connected to the meter. - If cables are reversely connected to the meter and the NMS does not support reverse connection[1], set **Meter access direction**[2] to **Reverse** and **Electric meter power direction** to **Positive**. • **Reverse**: applicable to export+import meters. If cables are reversely connected to the meter and the NMS supports reverse connection, set **Meter access direction** to **Reverse_Report raw data** and **Electric meter power direction** to **Reverse**.
Limitation mode	• Total power: controls the total power at the grid-connection point to limit the power fed to the power grid. • Single-phase power: controls the power of each phase at the grid-connection point to limit the power fed to the power grid.

Parameter	Description
Maximum grid feed-in power	Indicates the maximum power that the device can feed into the power grid. Suggestion: Set this parameter based on the feed-in threshold allowed by the power grid company. • Upper limit: **50000**. • Lower limit: - If **Peak Shaving** is set to **Active power limit** or **Apparent power limit**, the lower limit is determined by the value of **Peak Power**. (You can view the value after choosing **Settings** > **Battery Settings** > **Capacity Control**.) For example, if **Peak Power** is set to **50**, the lower limit is **–50**. - If **Peak Shaving** is set to **No control**, the lower limit is **–1000**.
Power lowering adjustment period	Specifies the period for lowering the device output power.
Maximum protection time	Specifies the maximum duration from the time when the DataLogger detects feed-in to the time when the device output power reaches 0. Suggestion: Set this parameter based on the maximum feed-in duration allowed by the power grid company.
Power raising threshold	When the power supply from the grid reaches this threshold, the devices start to raise their output power. The recommended value of this parameter is 1% to 2% of Pn. Pn is the total rated power of devices and can be queried on the overview page of the DataLogger.
Three-phase imbalance control[3]	The default value is **Disable**. If this parameter is set to **Enable**, three-phase independent control is used.
PV Power Limit Upon Communication Failure	Set the inverter output power percentage when communication between the DataLogger and the meter is abnormal.
PCS Power Limit Upon Communication Failure	Set the PCS output power percentage when communication between the DataLogger and the meter is abnormal.
Switch-off with 0% power limit	Set whether the DO port is allowed to control switch-off.
Switch-off control port	Set this parameter to the DO port that controls switch-off.
Switch-on control port	Set this parameter to the DO port that controls switch-on.
Switch-off state feedback port	Set this parameter to the DI port that reports the switch-off status.
Switch-on state feedback port	Set this parameter to the DI port that reports the switch-on status.

NOTE – [1]: If cables are reversely connected to the meter and the NMS can correctly display the real-time data of the meter, it is considered that the NMS supports reverse connection. That is, the NMS reverses the active power, reactive power, power factor, phase A active power, phase B active power, and phase C active power, replaces the total positive active energy and total negative active energy with each other, and replaces the total positive reactive energy and total negative reactive energy with each other.

NOTE – [2]: **Meter access** direction is set in the meter running parameters.

NOTE – [3]: If the three-phase imbalance control function is enabled or disabled, the PCS will restart. If this parameter is set to **Enable**, ensure that the following condition is met: Maximum load phase power – Minimum load phase power < 1/3 x Rated array ESS power.

STEP 2 Verify that the DataLogger can remotely turn on and off circuit breakers in scenarios with circuit breakers.

- Click **Switch off** and check that the circuit breaker is switched off properly.
- Click **Switch on** and check that the circuit breaker is switched on properly.

Remote Output Control

STEP 1 Synchronize the clock source of the server.

Path	Parameter	Description
Settings > **User Param.** > **Date&Time**	Clock source	Set this parameter to **NTP**.
	Synchronization server	Set this parameter to the IP address or domain name of the server for time synchronization.
	NTP synchronization test	You can click this button to check the time synchronization status.

STEP 2 Set remote output control parameters.

Path	Parameter	Description
Settings > **Active Power Control**	Active power control mode	Set this parameter to **Remote output control**.
	Control area	Set this parameter to the area where the remote output control function is used. To enable the function in some areas, the license needs to be imported and enabled.
	Output control duration	Set this parameter to the time required for the device to change its output power from 0% to 100% or from 100% to 0%.
	PV plant ID	Set this parameter to the PV plant ID.
	Remote output control server	Set this parameter to the IP address or domain name of the server.
	Enable certificate	Determine whether to import and enable a certificate based on the actual situation.
	Selling surplus power	• **Disable**: The inverter output power is controlled by the DataLogger according to the remote output control command issued by the power company. The output power of the PV plant cannot exceed the active power scheduling value issued by the power company. • **Enable**: When the load power is less than or equal to the remote output control command, the inverter output power is determined according to the remote output control command. Power can be bought or sold at the grid-connection point. When the load power is greater than the remote output control command, the DataLogger automatically adjusts the inverter output power to achieve zero-power at the grid-connection point, that is, power cannot be sold at the grid-connection point.
	PV module capacity	Set this parameter to the capacity of PV modules connected to the plant.
	Plant AC capacity	Set this parameter to the AC capacity of the limited feed-in power from the plant.

NOTE – If the connection between the DataLogger and the server is abnormal, click Submit and then Import to import the output control file in .data format obtained from the website of the power company to the DataLogger.

– After the DataLogger connects to the server, you can export the relevant file.

6.8.3 Setting Reactive Power Control

Large-scale plants are required to adjust the voltage at the grid-connection point. Power grid scheduling personnel enable a plant to absorb or add reactive power at the grid-connection point, that is, to enable the reactive power compensation, based on the real-time reactive power transmission status in the power grid.

STEP 1 Choose **Monitoring** > **Inverter/PCS** > **Running Param.** > **Power Adjustment.** On the page that is displayed, check that **Remote power schedule** is set to **Enable**.

STEP 2 Set the parameters for reactive power control and click **Submit**.

No Output

Parameter	Description
Reactive power control mode	If the plant is not required to adjust the voltage at the grid-connection point or perform reactive power compensation, device can run with pure active output power. In this case, set this parameter to **No output**.

DI Reactive Scheduling

NOTE
- When setting this function, ensure that the user-defined DI port is not occupied. Otherwise, the setting will fail.
- DataLogger scenario: Before setting this function, ensure that the DataLogger is properly connected to the ripple control receiver.
- DataLogger+Switch scenario: Before setting this function, ensure that the Switch is properly connected to the ripple control receiver.

DataLogger scenario

Parameter	Description
Reactive power control mode	Set this parameter to **DI reactive scheduling**.
DI **NOTE** – DI parameters include **DI1**, **DI2**, **DI3**, **DI4**, and **Power factor**.	• Supports 16 levels of power factors. • "√" indicates a low level. When the four DI ports of the DataLogger are connected, the ports are low-level ports. When not connected, the ports are high-level ports. • The percentage levels of DI1–DI4 must differ from each other. Otherwise, an exception will occur during command parsing. • If the actual input DI signal is inconsistent with that configured on the WebUI, the DataLogger controls the device to work at full power and the **Reactive Power Scheduling Instruction Exception** alarm is raised.

DataLogger+Switch scenario

Parameter	Description
Reactive power control mode	Set this parameter to DI reactive scheduling.
DI **NOTE** – The DI parameters include **M1.DI1**, **M1.DI2**, **M1.DI3**, **M1.DI4**, and **Percentage**.	Supports 16 levels of percentages. "√" indicates a low level. When the four DI ports of the Switch are connected, the ports are low-level ports. When not connected, the ports are high-level ports. The percentage levels of M1.DI1 to M1.DI4 must differ from each other. Otherwise, an exception will occur during command parsing. If the actual input DI signal is inconsistent with that configured on the WebUI, the DataLogger controls the device to work at full power and the **Reactive Power Scheduling Instruction Exception** alarm is raised.

NOTE
- Before connecting the Switch to the DataLogger, if DI reactive scheduling has been configured for the DI port and the scheduling signal needs to be connected to the Switch, delete the DI configuration and reconfigure it.
- In the scenario where the DataLogger and Switch are combined, if the Switch is removed and the scheduling signal needs to be connected to the DataLogger, delete the DI configuration and reconfigure it.

Reactive Power Fix Control

Parameter	Description
Reactive power control mode	If the array is required to generate constant reactive power at a specified time, set this parameter to **Reactive power fix control**.
Start time Reactive power(kVar)	If the device is required to run with specified maximum power in certain periods of a day, add records based on site requirements. When multiple time points are set, the device will run with the maximum power specified for the time point that is earlier than and the closest to the current system time. For example, if you add 00:00:00 and 12:00:00 on the WebUI and the current system time is 14:30:00, the device will run with the maximum power specified for 12:00:00.

Power Factor Fix Control

Parameter	Description
Reactive power control mode	If the plant is required to generate a constant power factor at the grid-connection point and the device is required to adjust the real-time reactive power based on the preset power factor, set this parameter to **Power factor fix control**.
Start time Power factor	If the device is required to run with the specified power in certain periods of a day, add records based on site requirements. When multiple time points are set, the device will run with the power specified for the time point that is earlier than and the closest to the current system time. For example, if you add 00:00:00 and 12:00:00 on the WebUI and the current system time is 14:30:00, the device will run with the power specified for 12:00:00.

Q-U Characteristic Curve

If the remote reactive power control command is not available, you can configure the characteristic curve as a substitute. The DataLogger delivers the values configured for the characteristic curve to the inverter or PCS, which then operates according to the configuration. The DataLogger no longer adjusts the values.

NOTE – Configure the characteristic curve under instructions from professionals to ensure that the inverter or PCS works properly.

In the Q-U characteristic curve control mode, the inverter or PCS dynamically adjusts the ratio Q/S of output reactive power to apparent power in accordance with the ratio U/Un(%) of the actual grid voltage to the rated grid voltage.

Parameter	Description
Reactive power control mode	Set this parameter to **Q-U characteristic curve**.
Reactive power adjustment time	Specifies the change interval of the reactive power at the grid-connection point.
Trigger power percentage	Under a specific grid code, the characteristic curve takes effect only when the actual output active power of the device is greater than the specified value.
Exit power percentage	Under a specific grid code, the characteristic curve becomes invalid when the actual output active power of the device is less than the specified value.
Limit value for minimum PF	Limits the actual minimum PF when the Q-U characteristic curve takes effect.
Characteristic curve points	Specifies the number of points on the characteristic curve. The characteristic curve supports a maximum of 10 valid points.
U/Un(%) Q/S	When configuring the curve, ensure that the U/Un(%) value of a point is greater than the U/Un(%) value of the previous point. Otherwise, the message indicating invalid input will be displayed.

cosφ-P/Pn Characteristic Curve (Inverter/PCS)

If the remote reactive power control command is not available, you can configure the characteristic curve as a substitute. The DataLogger delivers the values configured for the characteristic curve to the inverter or PCS, which then operates according to the configuration. The DataLogger no longer adjusts the values.

NOTE – Configure the characteristic curve under instructions from professionals to ensure that the inverter or PCS works properly.

In the cosφ-P/Pn characteristic curve control mode, the inverter or PCS dynamically adjusts the power factor cosφ in accordance with the P/Pn (%) based on the VDE-4105 and BDEW German standards.

Parameter	Description
Reactive power control mode	Set this parameter to **cosφ-P/Pn characteristic curve (inverter)** or **cosφ-P/Pn characteristic curve (PCS)**.
Reactive power adjustment time	Specifies the change interval of the reactive power at the grid-connection point.
Characteristic curve points	Specifies the number of points on the characteristic curve. The characteristic curve supports a maximum of 10 valid points.
P/Pn(%) cosφ	When configuring the curve, ensure that the P/Pn(%) value of a point is greater than the P/Pn(%) value of the previous point. Otherwise, the message indicating invalid input will be displayed.

Q-U Hysteresis Curve (CEI0-16)

If the remote reactive power control command is not available, you can configure the characteristic curve as a substitute. The DataLogger delivers the values configured for the characteristic curve to the inverter or PCS, which then operates according to the configuration. The DataLogger no longer adjusts the values.

NOTE – Configure the characteristic curve under instructions from professionals to ensure that the inverter or PCS works properly.

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 inverter or PCS in accordance with the ratio of the actual voltage to the rated voltage. The target value of reactive power adjustment should be in the form of Q/S.

Parameter	Description
Reactive power control mode	Set this parameter to **Q-U hysteresis curve(CEI0-16)**.
Reactive power adjustment time	Specifies the change interval of the reactive power at the grid-connection point.
Trigger power percentage	Under a specific grid code, the characteristic curve takes effect only when the actual output active power of the device is greater than the specified value.
Exit power percentage	Under a specific grid code, the characteristic curve becomes invalid when the actual output active power of the device is less than the specified value.
Limit value for minimum PF	Limits the actual minimum PF when the Q-U characteristic curve takes effect.
U/Un(%) Q/S	When configuring the curve, ensure that the U/Un(%) value of a point is greater than the U/Un(%) value of the previous point. Otherwise, the message indicating invalid input will be displayed. When configuring the curve, ensure that the Q/S values at points A and B are the same and set in sequence, and that the Q/S values at points C and D are the same and set in sequence. Otherwise, a message indicating invalid input is displayed.

Remote Communication Scheduling

The management system or independent power adjustment device sends scheduling commands to the DataLogger over the communications port that supports Modbus TCP or IEC 104, without the need of user configuration or operation. The DataLogger can automatically switch between scheduling modes and send scheduling commands.

Parameter	Description
Reactive power control mode	As the R**emote communication scheduling** mode has a higher priority, the DataLogger automatically changes **Reactive power control mode** to **Remote communication scheduling** after receiving a scheduling command from the upper-layer management system. If this parameter is set to **Remote communication scheduling**, the DataLogger parses the scheduling command delivered by the upper-layer management system to valid instruction data that can be identified by the devices in the plant and delivers the data to all devices connected to the DataLogger.

Parameter	Description
Shut down solar inverter upon reactive power scheduling timeout	The default value is **Disable**. If this parameter is set to **Enabled** , the DataLogger shuts down the device after the DataLogger has failed to receive remote communication scheduling commands for a period longer than the set value of **Reactive power scheduling timeout threshold for triggering solar inverter shutdown**.
Reactive power scheduling timeout threshold for triggering solar inverter shutdown	The default value is **300**. This parameter is used only for shutdown protection when the communication for reactive power scheduling is abnormal. If the DataLogger has failed to receive remote communication scheduling commands for a period longer than the set value, the communication is determined as abnormal.
Start up solar inverter upon recovery from reactive power scheduling timeout	The default value is **Enable**. If this parameter is set to **Enable**, after a reactive power signal timeout occurs, if the reactive power signal recovers, the device automatically starts.
Limit solar inverter power upon reactive power scheduling timeout	The default value is Disable. If this parameter is set to **Enable**, the DataLogger controls the device in the following ways after the DataLogger has failed to receive remote communication s**cheduling commands for a period longer than the set value of Reactive power scheduling timeout threshold for triggering solar inverter power limitin**g. • Limit the reactive power of the inverter based on the value of **Q/S during power limiting of solar inverter in case of reactive power scheduling timeout**. • Limit the reactive power of the PCS based on the value of **Q/S during power limiting of ESS in case of reactive power scheduling timeout**.
Reactive power scheduling timeout threshold for triggering solar inverter power limiting (s)	The default value is **300.0**. This parameter is used only for reactive power limiting protection when the communication is abnormal. If the DataLogger has failed to receive remote communication scheduling commands for a period longer than the set value, reactive power limiting protection is started.
Q/S during power limiting of solar inverter in case of reactive power scheduling timeout (%)	The default value is **0.000**. After **Limit solar inverter power upon reactive power scheduling timeou**t is enabled, if the DataLogger has failed to receive remote communication s**cheduling commands for a period longer than the set value of Reactive power scheduling timeout threshold for triggering solar inverter power limitin**g, the DataLogger limits the reactive power of the inverter based on the set value of this parameter.
Q/S during power limiting of ESS in case of reactive power scheduling timeout (%)	The default value is **0.000**. After **Limit solar inverter power upon reactive power scheduling timeou**t is enabled, if the DataLogger has failed to receive remote communication s**cheduling commands for a period longer than the set value of Reactive power scheduling timeout threshold for triggering solar inverter power limitin**g, the DataLogger limits the reactive power of the ESS based on the set value of this parameter.

NOTE – If the communication between the DataLogger and the scheduling backend is disconnected and the communication exception protection parameters are not set to Enable, the reactive power is controlled based on the scheduling command sent before the disconnection.

Power Factor Closed-Loop Control (Old Policy)

NOTE – Before setting the parameters, ensure that the Meter is correctly connected to the DataLogger.

Parameter	Description
Reactive power control mode	Set this parameter to **Power factor closed-loop control (old policy)**.
Target power factor	Specifies the target value for the adjustment power factor of the Meter.
Adjustment period	Specifies the interval for sending adjustment commands by the DataLogger.
Adjustment deadband	Specifies the adjustment power factor precision. **NOTE –** This parameter is valid only when the power factor of the Meter is greater than 0.9.

Power Factor Closed-Loop Control

To improve the revenue, a distributed plant needs to reduce or avoid the power factor surcharge by performing distributed reactive power compensation. To enable the function, set the related parameters.

NOTE – You are advised to choose **Settings** > **Reactive Power Compensation** to enable reactive power compensation.

– For versions earlier than DataLogger V300R023C00SPC160, before setting the parameters, ensure that the license for reactive power compensation has been loaded on the **Maintenance** > **License Management** page.

– Before setting the parameters, ensure that the Meter is correctly connected to the DataLogger.

Parameter	Description
Reactive power control mode	Set this parameter to **Power factor closed-loop control**.
Electric meter power direction	• **Positive**: default value. - Cables are correctly connected to the meter. - If cables are reversely connected to the meter and the NMS does not support reverse connection[1], set **Meter access direction**[2] to **Reverse** and **Electric meter power direction** to **Positive**. • **Reverse**: applicable to export+import meters. If cables are reversely connected to the meter and the NMS supports reverse connection, set **Meter access direction** to **Reverse_Report raw data** and **Electric meter power direction** to **Reverse**.
Meter	Set this parameter to **meter**.
Target power factor	Specifies the target value for the adjustment power factor of the Meter. The target value shall be larger than the appraisal value of the plant power factor.
Adjustment period	Specifies the interval for sending adjustment commands by the DataLogger.
Adjustment deadband	Specifies the adjustment power factor precision. **NOTE** – This parameter is valid only when the power factor of the Meter is greater than 0.9.
Reactive compensation delay	Specifies the delay time for starting the distributed power factor compensation if the current power factor is lower than the target power factor.

NOTE – **[1]**: If cables are reversely connected to the meter and the NMS can correctly display the real-time data of the meter, it is considered that the NMS supports reverse connection. That is, the NMS reverses the active power, reactive power, power factor, phase A active power, phase B active power, and phase C active power, replaces the total positive active energy and total negative active energy with each other, and replaces the total positive reactive energy and total negative reactive energy with each other.

NOTE – **[2]**: **Meter access direction** is set in the meter running parameters.

NOTE – When the DataLogger receives a remote reactive power scheduling command from the plant, it automatically changes Reactive power control mode to Remote communication scheduling. If power factor closed-loop control is required, set Reactive power control mode to Power factor closed-loop control and set the target power factor correctly.

PF-U Characteristic Curve

If the remote reactive power control command is not available, you can configure the characteristic curve as a substitute. The DataLogger delivers the values configured for the characteristic curve to the inverter or PCS, which then operates according to the configuration. The DataLogger no longer adjusts the values.

NOTE – Configure the characteristic curve under instructions from professionals to ensure that the inverter or PCS works properly.

In the PF-U characteristic curve control mode, the inverter or PCS dynamically adjusts the PF at the device port based on the ratio U/Un(%) of the actual grid voltage to the rated grid voltage.

Parameter	Description
Reactive power control mode	Set this parameter to **PF-U characteristic curve**.
Characteristic curve points	• Specifies the number of points on the characteristic curve. • The characteristic curve supports a maximum of 10 valid points.
U/Un(%)	When configuring the curve, ensure that the U/Un(%) value of a point is greater than the U/Un(%) value of the previous point. Otherwise, the message indicating invalid input will be displayed.
PF	

Q-P Characteristic Curve

If the remote reactive power control command is not available, you can configure the characteristic curve as a substitute. The DataLogger delivers the values configured for the characteristic curve to the inverter or PCS, which then operates according to the configuration. The DataLogger no longer adjusts the values.

NOTE – Configure the characteristic curve under instructions from professionals to ensure that the inverter or PCS works properly.

In the control mode of the Q-P characteristic curve, the inverter or PCS adjusts the ratio Q/Pn of the output reactive power to the rated power based on the ratio P/Pn of the current active power to the rated power.

Parameter	Description
Reactive power control mode	Set this parameter to **Q-P characteristic curve**.
Reactive power adjustment time	Specifies the change interval of the reactive power at the grid-connection point.
Characteristic curve points	• Specifies the number of points on the characteristic curve. • The characteristic curve supports a maximum of 10 valid points.
P/Pn Q/Pn	When configuring the curve, ensure that the P/Pn value of a point is greater than that of the previous point. Otherwise, the "Invalid input" message will be displayed.

6.8.4 Setting Parameters for Shutdown at High Feed-in Power

NOTE – This section applies to V300R001C00 only.

The power grid company requires plants to limit or reduce the output power of a PV system when it is too high. If the output power cannot be limited to the range within the specified time, all inverters must be shut down.

STEP 1 Set parameters for shutdown at high feed-in power and click Submit.

Shutdown at high feed-in power

Parameter	Description
Shutdown at high feed-in power	• The default value is **Disable**. • If this parameter is set to **Enable**, the inverter shuts down for protection when the grid-connection point power exceeds the threshold and remains in this condition for the specified time threshold.
Upper feed-in power threshold for inverter shutdown	• Upper limit: **5000** • Lower limit: - If **Maximum grid feed-in power** is set to a negative value, the lower limit is **Maximum grid feed-in power**. - If **Maximum grid feed-in power** is set to a positive value, the lower limit is **0**.
High feed-in power duration threshold for triggering inverter shutdown	The default value is 20. This parameter specifies the duration threshold of high feed-in power for triggering inverter shutdown. • When **High feed-in power duration threshold for triggering inverter shutdown** is set to 5, **Shutdown at high feed-in power** takes precedence. • When **High feed-in power duration threshold for triggering inverter shutdown** is set to **20**, **Export Limitation(kW)** takes precedence (when **Active power control mode** is set to **Export Limitation(kW)**).

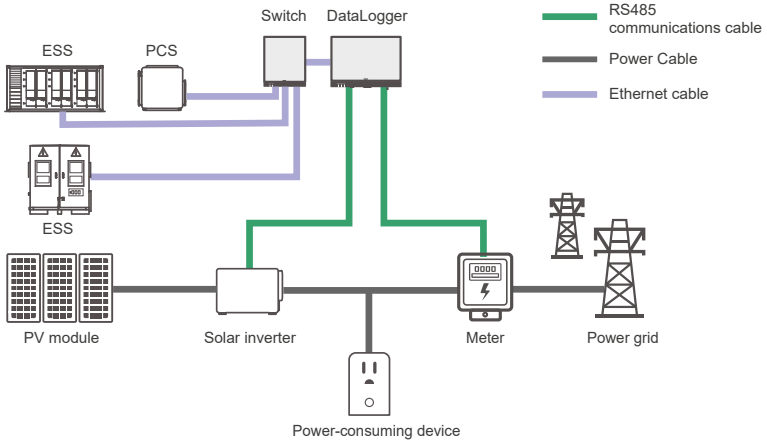
6.8.5 Setting Export Limitation Parameters

Context

When the PV and energy storage plant generates power for self-consumption, reverse current may feed into the power grid if the loads cannot consume all the power. In this case, you can set the export limitation parameters on the WebUI to prevent reverse current.

- Scenario without a circuit breaker: The reverse current feeding into the power grid can be eliminated by sending a command from the DataLogger to adjust the inverter/PCS output power.

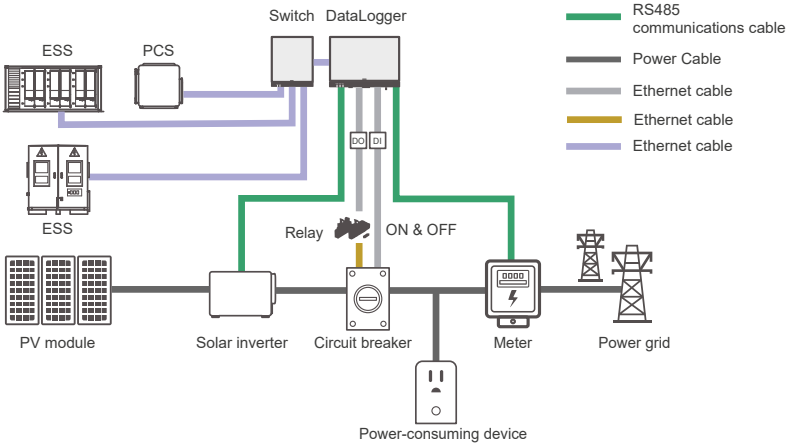
Network diagram (without a circuit breaker)



- Scenario with a circuit breaker: When the reverse current feeding into the power grid cannot be eliminated by sending a command from the DataLogger to adjust the inverter or PCS output power, and **Maximum protection time** is exceeded, the DataLogger controls the DO port to drive the relay to switch off the circuit breaker. When the DI port detects that the circuit breaker is switched off, the DO port and relay on the DataLogger will be switched off, and the DataLogger will restore to the initial state.

NOTE – Connect the DO ports in series to the 12 V power supply loop of the relay coils. You are advised to use the 12 V output power port on the DataLogger to power the relay coils. You can also prepare a 12 V power supply.

Network diagram (with a circuit breaker)



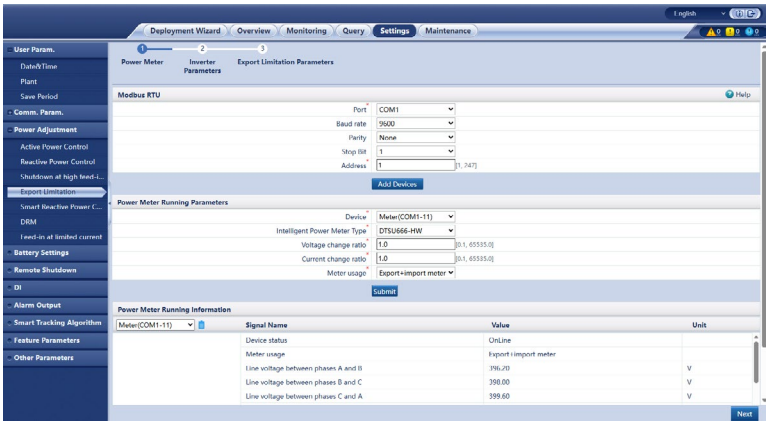
⚠ **ATTENTION** – In the scenario with a circuit breaker, place the power supply to the DataLogger at the upstream of the circuit breaker to avoid the DataLogger power-off after the DO port switches off the circuit breaker.

Procedure

STEP 1 Set parameters as prompted. For details, click **Help** on the page.

NOTE – Click Previous and Next as required.
– For details about the running parameters of Meters, see 6.3.12.2 Setting Modbus-RTU Meter Parameters.

Setting export limitation parameters



EN

6.8.6 Setting Parameters for Reactive Power Compensation

Context

The reactive power compensation algorithm obtains the power data of the Meter at the grid-connection point through the DataLogger, performs intelligent algorithm analysis, adjusts the reactive output power of the inverter or PCS, optimizes the power factor of the grid-connection point, and reduces or avoids power factor charge to increase the energy yield of the plant.

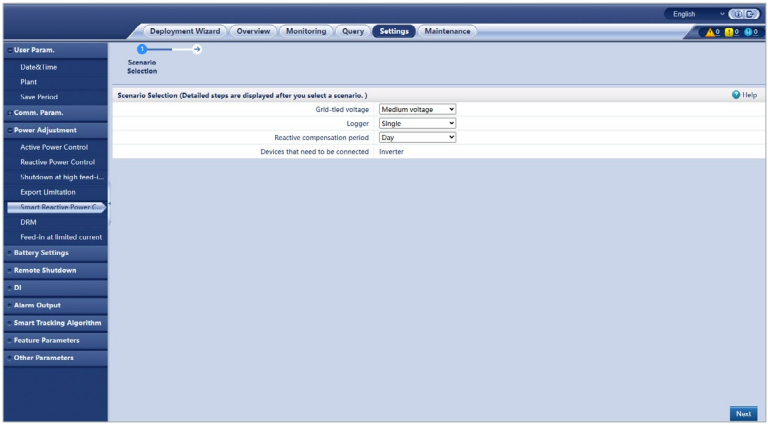
NOTE – Before setting the parameters, ensure that the inverter or PCS is connected to the DataLogger.

– If a Meter is connected to the DataLogger, the Meter access procedure in the wizard is only used as a check guide. If no Meter is connected to the DataLogger, add a Meter by following the wizard.

Procedure

STEP 1 Set parameters as prompted. For details, click **Help** on the page.

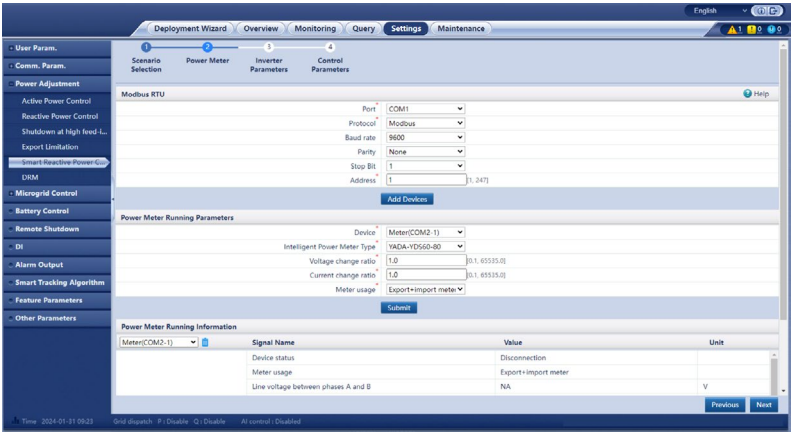
Setting parameters for reactive power compensation (scenario selection)



NOTE – When the DataLogger receives a remote reactive power scheduling command from the plant, it automatically changes Reactive power control mode to Remote communication scheduling. If power factor closed-loop control is required, set Reactive power control mode to Power factor closed-loop control and set the target power factor correctly.

NOTE – For details about the running parameters of Meters, see 6.3.12.2 Setting Modbus-RTU Meter Parameters.

Setting parameters for reactive power compensation (Meter)

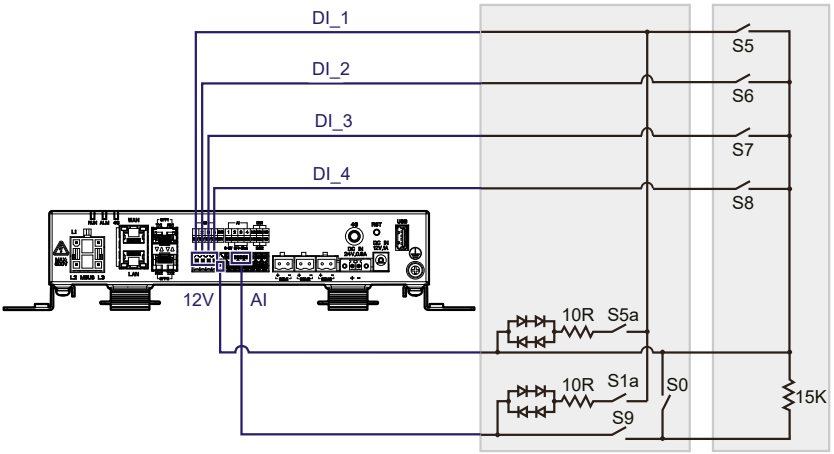


6.8.7 Setting DRM Parameters

Context

According to Australian standards, the inverters must pass the Demand Response Modes (DRM) certification.

Wiring diagram for the DRM function



DRM requirements

Mode	DataLogger Port	Requirement	Remarks
DRM0	AI2–AI4	• When S0 is turned on, the inverters shut down. • When S0 is turned off, the inverters are connected to the power grid.	-
DRM5	DI1	When S5 is turned on, the inverters do not output active power.	When two or more DRM modes are used at the same time, the strictest requirement must be met.
DRM6	DI2	When S6 is turned on, the output active power of the inverters does not exceed 50% of the rated power.	
DRM7	DI3	When S7 is turned on, the output active power of the inverters does not exceed 75% of the rated power, and the inverters consume the maximum reactive power.	
DRM8	DI4	When S8 is turned on, the output active power of the inverters recovers. **NOTE** – The inverters output active power based on the percentage set on the DataLogger.	

Procedure

STEP 1 Choose **Settings** > **Power Adjustment** > **Active Power Control** to check the **Active power control** mode.

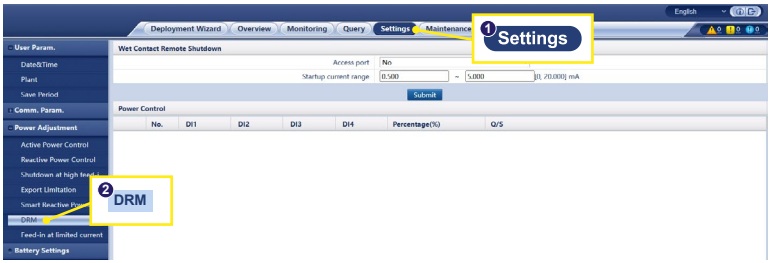
- When setting DRM0 parameters, you can set **Active power control** mode to any value.
- When setting DRM5–DRM8 parameters: Set **Active power control** mode to **No limit**.

STEP 2 Choose **Settings** > **Power Adjustment** > **Reactive Power Control** and ensure that **Reactive power control** mode is set to **No output**.

STEP 3 Choose **Settings** > **Remote Shutdown** and ensure that **Access port** is set to **No**.

STEP 4 Set DRM parameters and click **Submit**.

Setting DRM parameters



Parameter	Description
connection port	Set the parameter to the AI port for DRM signals.
Startup current range	If the current of the AI port is within the setting range, inverters are turned on. Otherwise, inverters are turned off.
Power Control	Set DI parameters based on the DRM requirements.

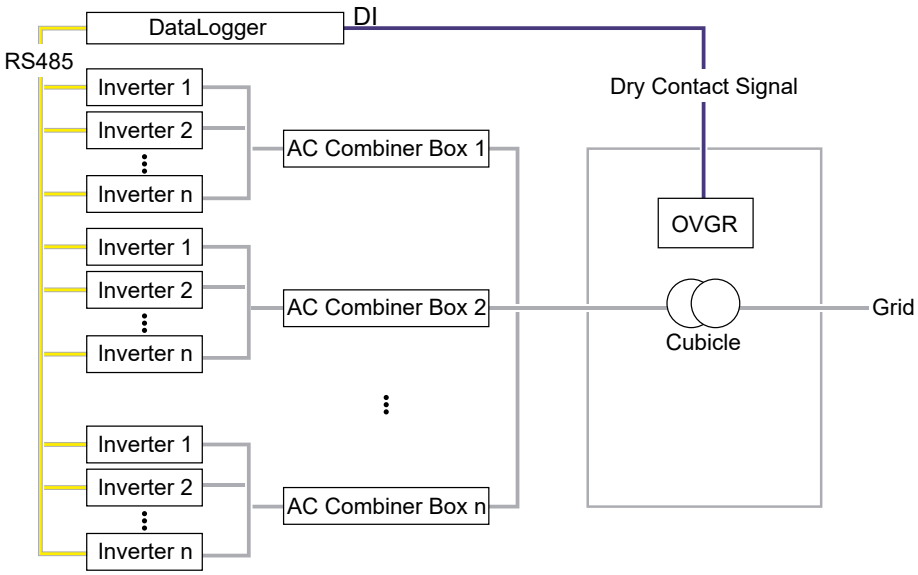
6.8.8 Setting Remote Shutdown

6.8.8.1 Setting Dry Contact Remote Shutdown

Context

The DataLogger has four DI ports, and the OVGR can connect to any DI port. The DataLogger shuts down the inverter over OVGR signals.

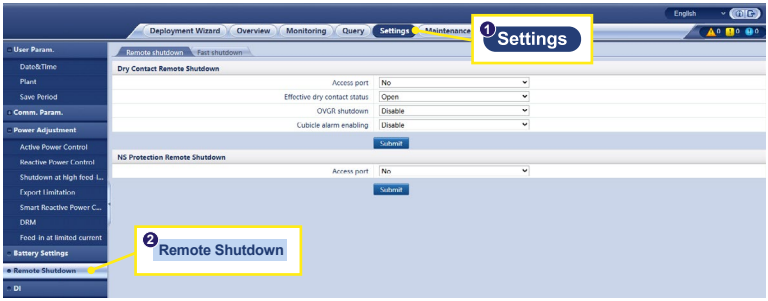
Networking



NOTE – When setting this function, ensure that the user-defined DI port is not occupied. Otherwise, the setting will fail.

Procedure

STEP 1 Set **dry contact remote shutdown** parameters.

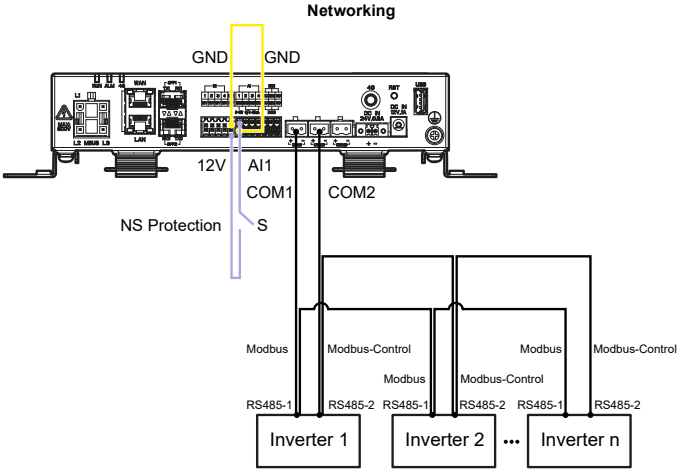


Parameter	Description
Access port	Set the parameter to the DI port connected to OVGR signals.
Effective dry contact status	The value can be **Open** or **Close**. **NOTE** – If OVGR shutdown is enabled and this parameter is set to **Close**, the DataLogger sends an inverter shutdown command only when the corresponding DI port is in the **Close** state.
OVGR shutdown	Specifies whether to enable shutdown over OVGR.
Cubicle alarm enabling	If this parameter is set to **Enable**, the **Abnormal Cubicle** alarm is generated when the dry contact signal is effective and the Cubicle is abnormal.

6.8.8.2 Setting NS Protection Remote Shutdown

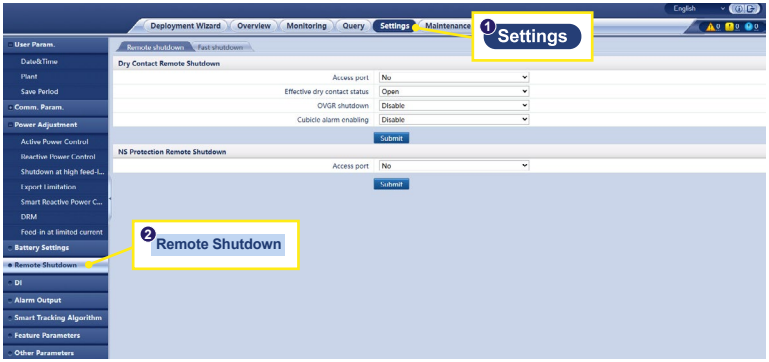
Context

- The NS protection function applies to areas complying with the VDE 4105 standard. Choose **Monitoring** > **Running Param**. > **Grid Parameters** and set **Grid Code** to **VDE-AR-N-4105** or **SWITZERLAND-NA/EEA:2020-LV230**.
- The NS protection device is connected to the AI1 port and 12V output power port of the DataLogger. The DataLogger shuts down the inverter over the voltage change detected at the AI1 port. When the NS protection device is disconnected, the AI1 port voltage is 0 V, and the inverter shuts down. When the NS protection device is connected again, the AI1 port voltage is 12 V, and you need to start the inverter manually.



Procedure

STEP 1 Set NS protection remote shutdown parameters.



Parameter	Description
Access port	Set the parameter to AI1 port connected to AI signals. The DataLogger shuts down the inverter over the voltage change detected at the AI1 port.

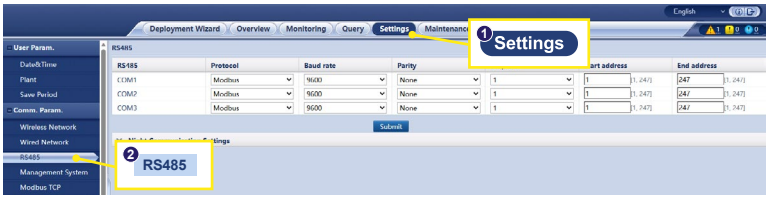
STEP 2 Set the protocol type of the RS485 communications parameters. Protocol of the COM1 port is set to Modbus by default, and that of the COM2 port should be set to Modbus-Control. Set Baud rate, Parity, Stop Bit, Start address, and End address based on the actual situation.

a. If only one inverter is connected to the DataLogger, connect the COM1 port on the DataLogger to the RS485-1 port on the inverter, and connect the COM2 port on the DataLogger to the RS485-2 port on the inverter.

b. If inverters are cascaded, connect the COM1 port on the DataLogger to the RS485-1 port on the inverter, and connect the COM2 port on the DataLogger to the RS485-2 port on the inverter. Connect the RS485-1 and RS485-2 ports on one inverter to the RS485-1 and RS485-2 ports on the other inverter, respectively.

NOTE – Because there are many types of inverters, the RS485-1 port may be named RS485_1, 485B1, or 485A1. The RS485-2 port may be named RS485_2, 485B2, or 485A2.

Setting RS485 parameters



6.8.9 Setting Feed-in at Limited Current

- This function applies only to the C&I scenarios in the United Kingdom.
- To use the **Feed-in at limited current** function, at least one of the following conditions must be met:
  - The active power control mode is **No limit** or **Export Limitation(kW)**.
  - The battery control working mode is **No control**, **Maximum self-consumption**, or **TOU**.
  - Power boost limit for battery control is configured.
  - Peak shaving for battery control is configured.

Procedure

Choose **Settings** > **Power Adjustment** > **Feed-in at limited current.** Click **Previous** and **Next** as required.

NOTE – For details about the running parameters of meters, see Setting Modbus-RTU Meter Parameters.

STEP 1 Set inverter or PCS parameters and click Batch configurations.

Description	Description
Communication disconnection fail-safe	If this parameter is set to **Enable**, the inverter or PCS performs protection based on the preset power when its communication with the DataLogger is interrupted for a period longer than **Communication disconnection detection time**.
Active power limit when communication fails (%)	Set this parameter to 0.0.
Communication disconnection detection time (s)	Set the duration threshold to 5s for determining the communication disconnection between the inverter or PCS and the DataLogger or Dongle.

STEP 2 Set parameters for feed-in at limited current and click **Submit**.

Parameter	Description	Remarks
Feed-in at limited current	The default value is **Disable**. • If this parameter is set to **Disable**, feed-in at limited current will be unavailable. • If this parameter is set to **Enable**, feed-in at limited current will be available.	If the feed-in current exceeds **Max. feed-in current(A)** for 15 seconds, the device will shut down and an alarm will be reported. After the device has been shut down for 4 hours, manually restart the device to restore feed-in at limited current. The alarm will be automatically cleared.
Max. feed-in current(A)	Set the maximum current fed to the grid at the grid connection point.	These parameters are displayed after **Feed-in at limited current** is set to **Enable**.
Max. grid supply current(A)	Set the maximum current supplied from the grid at the grid connection point.	

7. Device Maintenance

7.1 Routine Maintenance

- Ensure that the DataLogger is free from strong electromagnetic interference.
- Ensure that the DataLogger is away from heat sources.
- Regularly clean the DataLogger.
- Regularly check that cables are secured.

7.2 Troubleshooting

No.	Fault	Cause	Suggestion
1	The DataLogger cannot be powered on.	1. The DC output power cable for the power adapter is not connected the 12V IN port of the DataLogger. 1. The power cable is not connected to the AC input power port of the power adapter. 2. The AC input power cable is not connected to the AC socket. 3. The power adapter is faulty. 4. The DataLogger is faulty.	1. Connect the DC output power cable for the power adapter to the 12V IN port of the DataLogger. 2. Check that the power cable is connected to the AC input power port of the power adapter. 3. Check that the power cable is connected to the AC socket. 4. Replace the power adapter. 5. Contact your vendor.
2	The DataLogger cannot find any device.	1. The COM ports are not connected to devices, or the cables are loose, disconnected, or reversely connected. 2. The RS485 communications parameters are not correctly set, and the inverter address is beyond the search range preset on the DataLogger. 3. The devices that cannot be detected automatically, such as the EMI and Meter, are not manually added. 4. There are devices with duplicate addresses. 5. The network port does not connect to any devices or the network cables are loose.	1. Check the RS485 cable connection. If the cable is loose, disconnected, or reversely connected, reconnect it firmly. 2. Check the RS485 communications parameter settings. Ensure that the baud rate and communication address are set correctly and that the inverter address is within the search range of the DataLogger. 3. Manually add the devices that cannot be detected automatically, such as the EMI and Meter. 4. Addresses are automatically assigned to all devices to ensure that no duplicate address exists. Then restart the automatic search. 5. Check the network cable connection. If the cable is loose, reconnect it firmly. 6. Contact your vendor.
3	The communication for PLC MBUS networking failed.	1. The inverter and DataLogger do not support PLC MBUS. 2. The AC power cable is loose, disconnected, or reversely connected. 3. The upstream circuit breaker for the AC power cable is turned off. 4. In PLC MBUS networking, **Built-in PLC MBUS** or **Networking** is set to **Disable**. 5. The DataLogger is faulty.	1. Check whether the inverter and DataLogger support PLC MBUS. 2. Check the AC power cable. If it is loose, disconnected, or reversely connected, reconnect it firmly. 3. Check that the upstream circuit breaker for the AC power cable is turned on. 4. Set **Built-in PLC MBUS** and **Networking** to **Enable**. 5. Contact your vendor.
4	The device status is displayed as disconnected on the DataLogger.	1. The cable between the device and the DataLogger 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 communications cable and network cable between the device and the DataLogger. If the cables are loose, reconnect them firmly. 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, search for the device again or manually add the device. 5. If the device has been removed, perform the **Remove Devices** operation on the **Device Mgmt.** page.

No.	Fault	Cause	Suggestion
5	The EMI fails in communication.	1. The RS485 communications cable between the EMI and the DataLogger is connected incorrectly, loose, or disconnected. 2. The EMI is not powered on. 3. The EMI and DataLogger use different RS485 communications parameter settings. 4. The EMI parameters are incorrectly set.	1. Check the cable connection. If the cable is loose or disconnected, reconnect it firmly. 2. Power on the EMI. 3. Check that the RS485 communications parameters of the EMI are correctly. 4. Log in to the WebUI and ensure that the EMI parameters are set correctly.
6	The DataLogger cannot communicate with the management system.	1. The DataLogger is not connected to the PC, or the cable is loose or disconnected. 2. The network parameters are incorrectly set. 3. The management system parameters are incorrectly set.	1. Check that the Ethernet port of the DataLogger is correctly connected to the PC or a router. 2. Check that the network parameters are correctly set. 3. Check that the management system parameters are correctly set.
7	The communication for RS485 networking failed.	1. The RS485 communications cable is incorrectly connected, loose, or disconnected. 2. The device is not powered on. 3. The RS485 communications parameters are incorrectly set.	1. Terminal block connection: Check that the RS485 communications cable is connected to the correct port of the terminal block. 2. RJ45 network port connection: Check that the RJ45 connector is properly crimped and that each wire is connected to the correct pin. 3. Check that the RS485 ports of other devices are connected to the correct ports of the DataLogger. 4. Check the RS485 cable connection. If the cable is loose, disconnected, or reversely connected, reconnect it firmly. 5. Power on the DataLogger and its connected device. 6. Check the RS485 communications parameter settings. 7. Contact your vendor.
8	An EMI fails to be added over the AI port (another device has already been connected to the port).	1. A device with the same communications address has been connected to the PLC MBUS port. 2. Duplicate addresses are not allowed.	1. Choose **Maintenance > Device Mgmt. > Connect Device > Auto Assign Address** or **Maintenance > Device Mgmt. > Device List > Modify Device Info** to modify the communications address of the device with the same address connected to the PLC MBUS port, and then add the EMI again. 2. Change the communications address of the EMI and add it again.

7.3 WebUI Maintenance Operations

7.3.1 Upgrading the Device Firmware Version

Context

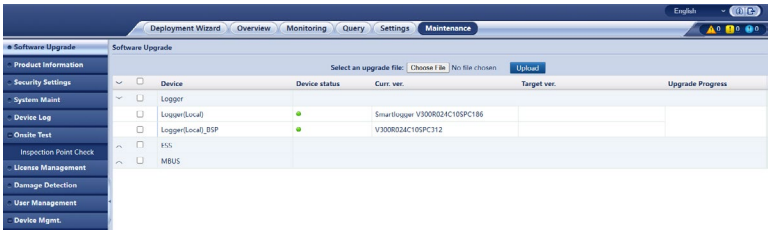
You can upgrade the software of the DataLogger, inverter, PCS, String ESS, PLC MBUS module, or PID module on the WebUI.

Procedure

STEP 1 Choose **Maintenance** > **Software Upgrade**. The **Software Upgrade** page is displayed.

STEP 2 Upload the software upgrade package and click **Software Upgrade**. Contact the Company's engineers to obtain the software upgrade package.

Software upgrade



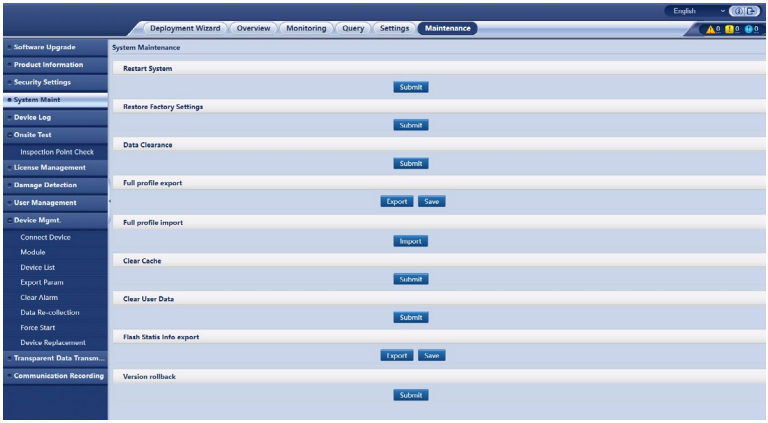
NOTE
- Before upgrading the PCS and inverter, ensure that the DC side is powered on.
- The size of the file to be uploaded must be less than 80 MB. Otherwise, the page will be abnormal.
- Devices of different types can be upgraded by one click after the software package is uploaded.
- The Stop Upgrade function applies only to the devices waiting to be upgraded.
- If the active power control mode is set to Grid connection with limited power or Remote communication scheduling, and the reactive power control mode is set to Power factor closed-loop control or the working mode of Battery Control is enabled, you are advised to upgrade the software when inverters and PCSs are disconnected from the grid. Otherwise, power control may be abnormal or the upgrade may fail.

7.3.2 Setting Security Parameters

Parameter	Description
Change Password	Change the password for the current login user to log in to the WebUI.
Automatic logout time	After this parameter is set, a user is automatically logged out if the user does not perform any operation within the period specified by this parameter.
WebUI Security Certificate	You are advised to use the existing network security certificate and key. If the browser displays the "ERR_SSL_SERVER_CERT_BAD_FORMAT" error, use another browser (such as Firefox) or replace the certificate.
Update Key	Specifies the key update interval.
User Lockout	Set **Detection period**, **Maximum login attempts**, and **Lockout duration**.
Certificate Alarm Time	• **Test interval**: specifies the interval for checking whether a digital certificate is about to expire. • **Early-warning time**: specifies the time when a warning is generated before a digital certificate expires.
Module Security Certificate	Load the network security certificate of the module. If the private key file has a password, select **Enable key password** and enter the key password obtained from the certificate provider.
Communication Settings	Specifies whether to enable communication using an expired certificate. If this parameter is set to **Enable**, the DataLogger can communicate with the Switch. After the certificate expires, set this parameter to **Disable** to prevent the DataLogger from communicating with the Switch to ensure network security.
South Equip Security Certificate	Load the security certificate of southbound equipment. If the private key file has a password, select **Enable key** password and enter the key password obtained from the certificate provider.
WEB TLS Setting[1]	Enables or disables the TLS 1.0 and 1.1 function.
Intrusion Detection	If this parameter is set to **Starting up**, when intrusion events such as abnormal user login and key file tampering are detected, you can choose **Query** > **Security Events** to query the exception records.

Parameter	Description
Service Management	Starts or stops Modbus remote communication networking.
Anti-rollback	The default setting is **Enable**. • **Enable**: Enable the anti-rollback function. • **Disable**: Disable the anti-rollback function. When this parameter is set to **Disable**, a dialog box **Disabling the anti-rollback function does not restrict the rollback of the software version**. **The rollback may cause historical problems. Are you sure you want to continue?** is displayed. If you click **Confirm**, the submission continues. If you click **Cancel**, the submission is canceled.

7.3.3 Sending a System Maintenance Command



Function	Description
Restart System	Resets the DataLogger, which will automatically shut down and restart.
Restore Factory Settings	• Only accounts with the administrator permission (**installer**) can restore the factory settings. • After the factory settings are restored, all configured parameters (except the current date, time, and communication parameters) are restored to their factory default values. The running information, alarm records, and system logs are not changed. Exercise caution when deciding to perform this operation.
Data Clearance	Clears all historical data of the DataLogger.
Full profile export	Before replacing the DataLogger, export the DataLogger configuration file to a local PC.
Full profile import	After replacing the DataLogger, import the local configuration file to the new DataLogger. After the import is successful, the DataLogger restarts for the configuration file to take effect. Ensure that the parameters on the Settings tab page and the parameters for the built-in PLC MBUS are correctly set.
Clear Cache	You can clear the temporary files and upgrade package files stored on the DataLogger through **Clear Cache**.
Clear User Data	Clears user data and restarts the device. You need to log in again after the restart. ⚠ **ATTENTION –** Clearing user data will delete all data in the system. Exercise caution when performing this operation.

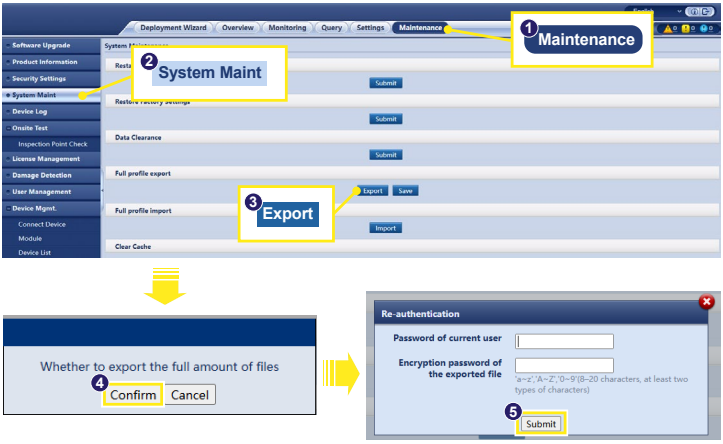
EN

7.3.3.1 Exporting All Configuration Files

Procedure

STEP 1 Choose **Maintenance** > **System Maint**. and click **Export** under **Full profile export**.

NOTE – In the Re-authentication dialog box, enter Password of current user and set Encryption password of the exported file.



STEP 2 After the export is successful, click **Confirm**. Click **Save** under **Full profile export** to save all configuration files.

7.3.3.2 Importing All Configuration Files

Procedure

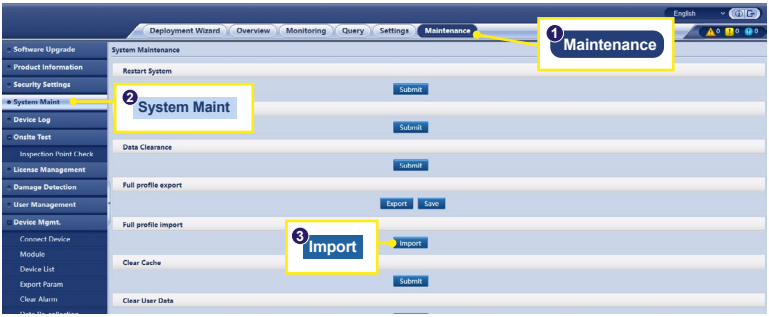
STEP 1 Choose **Maintenance** > **System Maint**., and click **Import** under **Full profile import**

NOTE – In the Re-authentication dialog box, enter Password of current user and set Decryption password of the imported file.

NOTE – If no encryption password is set for the exported all configuration files, deselect Decryption password of the imported file in the Re-authentication dialog box.

– If an encryption password is set for the exported all configuration files, set Decryption password of the imported file in the Re-authentication dialog box.

– When a faulty DataLogger is replaced with a new DataLogger, certificate-related files are not exported among all configuration files. After all configuration files are imported, you need to reload a third-party certificate if needed.

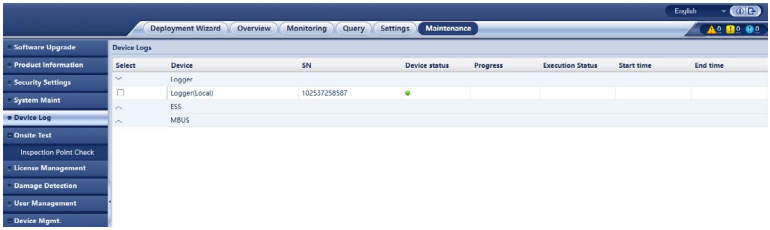


STEP 2 Click Select **File**, select the exported all configuration files, and then click **Import**.

7.3.4 Exporting Device Logs

Procedure

STEP 1 Access the device log page.



STEP 2 Select the device whose logs are to be exported and click **Export Log**.

NOTE
- Logs of two or more types of devices cannot be exported at a time.
- ESS log: Select an ESS and click Export Log. In the dialog box that is displayed, select Battery logs. You can click the plus sign to select batteries.
- If the active power control mode is set to Grid connection with limited power or Remote communication scheduling, and the reactive power control mode is set to Power factor closed-loop control or the working mode of Battery Control is enabled, you are advised to export logs when inverters and PCSs are disconnected from the grid. Otherwise, power control may be abnormal or the log export may fail.
- For an Transformer Station connected over RS485, only performance data can be exported, and device logs cannot be exported.

STEP 3 Observe the progress bar and wait until the log export is complete.

STEP 4 The file is automatically saved to the default download location of the browser. You can specify a download location by changing the default one of the browser.

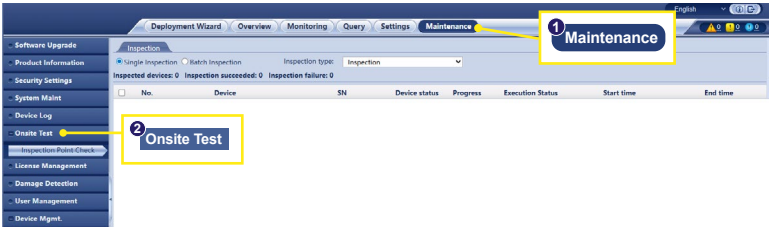
7.3.5 Starting an Onsite Test

Context

After an inverter is put into use, you need to periodically check its health to detect potential risks and problems.

Procedure

STEP 1 Start an onsite test.



Tab	Function	Description
Inspection	Check the health status of the inverter.	1. If **Single Inspection** is selected, select the device to be inspected. If **Batch Inspection** is selected, you do not need to select a device. 2. Set **Inspection type**. 3. Click **Start Inspection**. 4. Observe the progress bar and wait until the inspection is complete. 5. After the inspection is successful, click **Log archiving** to download the inspection log.

Tab	Function	Description
Spot-check	Start a spot-check. **NOTE –** The spot-check function is available only for a device whose grid code is set to the Japanese standard.	1. Select the device to be spot-checked. 2. Click **Start Spot-Check**. 3. Perform a spot-check test onsite. 4. After the spot-check test is complete, click **Stop Spot-Check**.
Alarm Test	Simulates an inverter alarm.	1. Choose **Device model** > **Device** name to select the device for which the alarm test is to be performed. 2. Click an alarm name to deliver an alarm command. The alarm icon is green by default and turns red after the command is delivered. 3. Click **Clear Alarm** to clear all alarms. **NOTE –** After alarms are cleared, the DataLogger collects alarm data again.

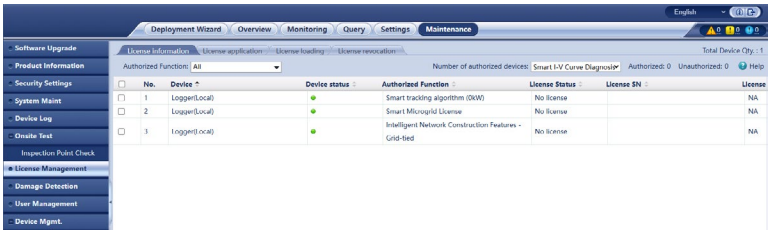
7.3.6 License Management

Context

- The I-V Curve Diagnosis, string monitoring, and Tracker Control Algorithm (SDS), microgrid control software, and grid forming feature – on-grid can be used only after licenses are purchased.
- The license files for I-V Curve Diagnosis and string monitoring are stored in the inverter. The license files for the SDS, microgrid control software, and grid forming feature – on-grid are stored in the DataLogger. Each license uniquely matches a device SN.
- License management allows you to view the license information and obtain the current license status. Before a device is replaced, the current device license needs to be revoked so that a revocation code can be generated and used for applying for a new device license.
- The size of the license file imported to the DataLogger must be less than 1 MB. Otherwise, the page will be abnormal.

Procedure

STEP 1 Access the **License Management** page.



Tab	Function	Description
License information	Displays the license information.	1. Select the name of the device whose license details are to be exported. 2. Click **Export Details**.
License application	Exports the license application file.	1. Select the name of the device whose license is to be applied. 2. Click **Export License Appli File**. 3. Purchase a license and obtain the license file from technical support engineers.
License loading	Loads the obtained license to the corresponding device.	1. Click **Upload License**. 2. Select the name of the device whose license is to be loaded. 3. Click **Load License**.
License revocation	Revokes a license or exports the revocation code file.	1. Select the name of the device whose license is to be revoked. 2. Click Revoke License. 3. Click Export Revo Code File.

NOTE – When importing a license file, ensure that the file name extension is .dat or .zip.

7.3.7 Managing the Switch

Context

When replacing the Switch, you need to manually remove the device on the WebUI.

Procedure

STEP 1 Choose **Maintenance** > **Device Mgmt**. > **Switch.**

STEP 2 Select the device to be removed and click to remove it.

NOTE – is used to change the secondary authentication password of the Switch.

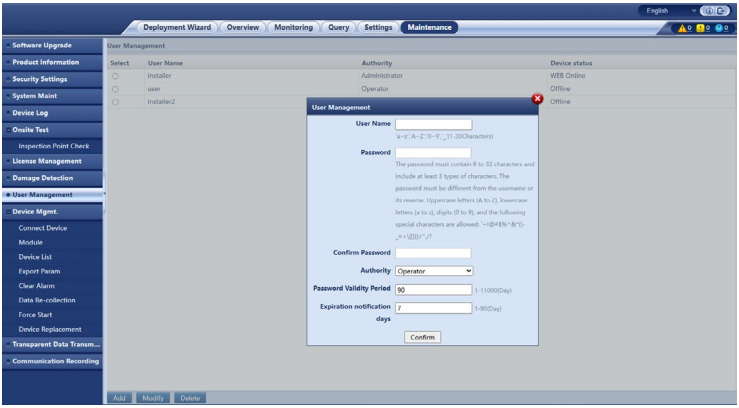
7.3.8 Managing Users

Context

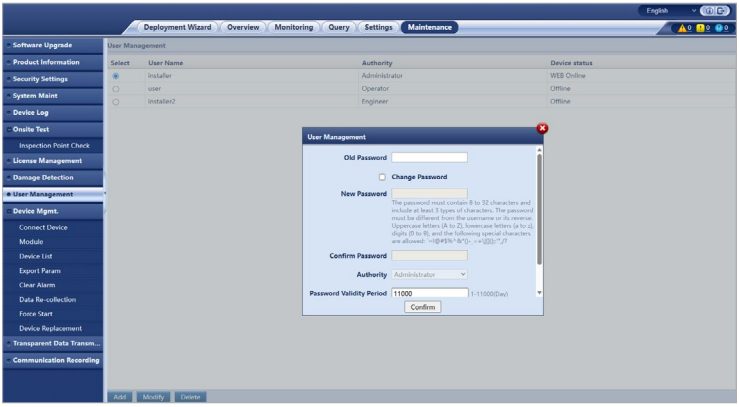
You can add, modify, and delete users after logging in as **installer**.

Procedure

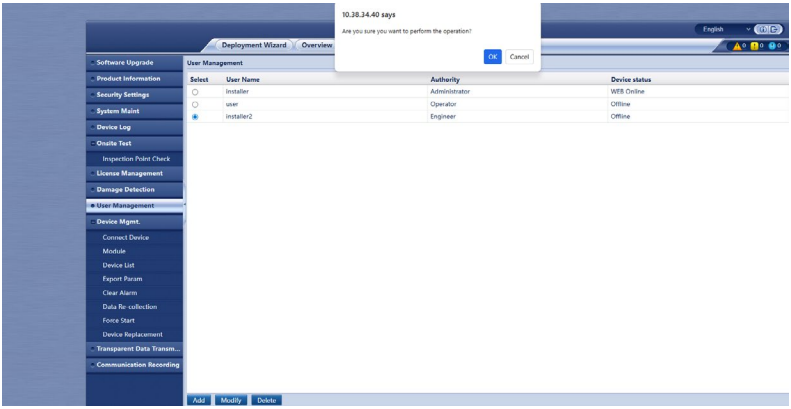
STEP 1 Add a user.



STEP 2 Modify a user.



STEP 3 Delete a user.



7.3.9 Collecting Performance Data

Context

You can re-collect performance data of the solar inverter, PCS, CMU, and ESU as well as daily, monthly, and yearly energy yields (also referred to as data re-collection).

Procedure

STEP 1 Choose **Maintenance** > **Device Mgmt.** > **Data Re-collection**.

STEP 2 Select the type of the data to be collected and set the collection period.

STEP 3 Select the name of the device whose data is to be collected and click **Collect Data**.

STEP 4 Wait until all data is gathered. On the **Monitoring** page, query the collection result.

7.3.10 Adjusting the Total Energy Yield

STEP 1 Tap **Monitoring** and select the device whose total energy yield needs to be adjusted.

STEP 2 Choose **Running Param** > **Electricity Revise**, set **Adjust total energy yield** and **Adjusted total power supply from grid**, and click **Submit**.

7.3.11 Force Start

Context

- The force start function is mainly used in the scenario when the ESS needs to be forcibly started and then charged because it has been overdischarged before the initial deployment of the array. Before force start, ensure that the array is shut down.
- During the force start operation, each PCS charges the ESS at 50 kW power. Ensure that the AC power meets the requirement. If the AC power is restricted, you are advised to charge the ESS in batches and disconnect the auxiliary power supply and power circuits of the devices that do not need to be charged.
- To use the force start function, prepare an external power supply for the system and set Working mode to PQ under Monitoring > PCS > Running Param. > Feature Parameters.
- When you force start the ESS, the ESS functions are restricted because no deployment operation is performed. In this case, the ESS supports only battery charging and cannot be scheduled by the upper-layer controller.

Procedure

STEP 1 Choose **Maintenance** > **Device Mgmt.** > **Force Start** and click **Starting up**. This operation will interrupt ongoing services in the array. Exercise caution when performing this operation.

STEP 2 Start the insulation resistance detection procedure. If the detection is successful, force start is initiated. Otherwise, force start fails.

NOTE – The array-level force start operation lasts 180 minutes. The DataLogger needs to maintain the array-level force start state. The default status is idle. After a force start task is started, the DataLogger periodically collects the SOC value of each battery rack. If the SOC value is lower than 50%, the DataLogger remains in the Force starting... state. If the SOC value of each battery rack is greater than or equal to 50% or the protection duration for force start exceeds the upper limit, the DataLogger restores the force start state to idle.

– Do not perform deployment topology operations during a force start. Perform the operations after the force start is complete.

– You can stop a force start task. In this case, devices in the array stop force start and return to the original status. If the system does not need to be started, shut down the system.

– After an array-level force start task is started, if new devices are connected and cannot be automatically started or some devices restart, the DataLogger delivers a force start command at an interval of 5 minutes to ensure that the devices can identify the force start state.

– If the PCS performs multiple force starts in a short period, the forced starts may fail. It is recommended that the interval between two force starts be 10 minutes.

7.3.12 Device Replacement

Procedure

STEP 1 Choose **Maintenance** > **Device Mgmt.** > **Device Replacement**. The device replacement page is displayed.

STEP 2 After setting the parameters, click **Submit**.

Operate Type	Device Type	Description	Remarks
Replace Device	• CMU • IBCU • ESC • PCS	• The DC topology is automatically updated. • The AC topology is automatically updated. • Parameters are automatically backed up and imported to new devices (supported only by the CMU and IBCU). • The replacement relationship is reported to the management system, and the IEC 104 configuration is automatically adapted.	• **Replace Device** can be performed only for offline devices. • When performing **Replace Device** and **Add Devices** , ensure that the entered device SN corresponds to the the correct device type. Otherwise, the topology information will be disordered. In that case, you need to perform commissioning using the deployment wizard again to update the topology. • When performing **Replace Device**, do not delete the offline device to be replaced from the device list or delete the communication networking relationship. • When replacing an ESC, ensure that all ESCs and PCSs except the ESC to be replaced are online. • If **Add Devices**, **Replace Device**, or **Delete Device** fails for multiple times, you are advised to perform commissioning using the deployment wizard again to update the topology.
Add Device	• IBCU • PCS	• The DC topology is automatically updated. • The AC topology is automatically updated.	
Delete Device	• IBCU • PCS	• The DC topology is automatically updated. • The AC topology is automatically updated. • The device list is automatically updated.	

7.3.13 Communication Records

The DataLogger supports the function of exporting communication records.
Set Choose port, **Protocol Selection**, and **Record time**. Click **Start** to start the communication records. Click **Export** to stop and export communication records.

Parameter	Description
Choose port	Select the port of the communication records.
Protocol Selection	Select the protocol type of the connected device. **IEC104** and **ModbusTCP** are supported. **NOTE** – IEC 104 or Modbus TCP can be selected only when the port is WAN, LAN, SFP1, or SFP2.
Record time	Set the duration of the communication records. The duration range of the communication records is [5, 30] minutes.

7.4 Device Replacement

7.4.1 Exporting Configuration Files from the DataLogger WebUI

STEP 1 Before replacing the DataLogger, export the DataLogger configuration file to a local PC. Perform operations by referring to 7.3.3.1 Exporting All Configuration Files.

STEP 2 Power off the DataLogger, remove its cables, and label the cables.

STEP 3 Install a new DataLogger, reconnect the cables, and power on the DataLogger.

STEP 4 Log in to the WebUI and import the exported configuration files from the local PC to the new DataLogger. Perform operations by referring to 7.3.3.2 Importing All Configuration Files.

STEP 5 After the import is successful, the DataLogger restarts for the configuration file to take effect. Ensure that the parameters on the settings tab page and the parameters for the built-in PLC MBUS are correctly set.

7.5 Device Disposal

If the DataLogger reaches the end of its service life, dispose of it according to local regulations for the disposal of electrical equipment.

8. FAQ

8.1 How Do I Set FTP Parameters?

Context

- The FTP function is used to access a third-party NMS. The DataLogger can report the configuration information and running data of the managed plant system through FTP.
- FTP is a universal standard protocol without any security authentication mechanism. Data transmitted by FTP is not encrypted. To reduce network security risks, the IP address of the connected third-party FTP server is left blank by default. This protocol can transmit the running data of PV plants, which may cause user data breach. Therefore, exercise caution when using this protocol. Users are liable for any loss caused by the enabling of the FTP protocol (non-secure protocol). Users are advised to take mitigation measures at the plant level to reduce security risks.

Procedure

STEP 1 Choose **Settings** > **Comm. Param.** > **FTP**, set FTP parameters, and click **Submit**.

Parameter	Description
FTP server	Set this parameter to the domain name or IP address of the FTP server.
User name	Set this parameter to the user name for logging in to the FTP server.
Password	Set this parameter to the password for logging in to the FTP server.
Remote directory	After you set this parameter, a subdirectory of the same name is created in the default data upload directory (specified by the FTP server).
Data reporting	Specifies whether data can be reported.
File format	Format 1, Format 2, Format 3, and Format 4 are supported. **NOTE** – **Format 2** has two more information points than **Format 1**: E-Day (current-day energy yield) and E-Total (total energy yield). **Format 3** has more information points than **Format 1** and **Format 2**: Meter, PID module, user-defined device, and DataLogger data. **Format 4** has more information points than **Format 3**: active and reactive power of Meters.
File name	Set this parameter to the format of the file name.
Time format	Set this parameter to the time format.
Reporting mode	The value can be **Cyclic** or **Fixed time**. • **Cyclic**: Periodically reports data. **Reporting interval** specifies the interval for reporting data. **File mode** specifies whether all data or only the incremental data of a day is reported each time. • **Fixed time**: Reports data at a specified time. **Fixed time** specifies the time for reporting data.

NOTE – You can click Start report test to check whether the DataLogger can report data to the FTP server.

Troubleshooting

NOTE – If an error code is not listed in the following table, provide the DataLogger run logs and contact technical support.

Error Code	Troubleshooting Suggestion	Error Code	Troubleshooting Suggestion
0x1002	Configure the FTP server address.	0x1003	1. Check whether the IP address of the DNS server is correct. 2. Check whether the domain name of the third-party FTP server is correct.
0x1004	Configure the user name of the FTP account.	0x1005	Configure the user name of the FTP account.
0x3001	1. Check whether the FTP server address is correct. 2. Check whether the third-party FTP server is working properly.	0x3002	1. Check whether the user name of the FTP account is correct. 2. Check whether the password of the FTP account is correct.
0x3007	Check whether the third-party FTP server allows the client to upload data.	0x3008	Ensure that the DataLogger data upload directory exists on the third-party FTP server.

Error Code	Troubleshooting Suggestion	Error Code	Troubleshooting Suggestion
Others	Provide DataLogger run logs and contact technical support.	-	-

8.2 How Do I Set Email Parameters?

Context

- The DataLogger can send emails to inform users of the current energy yield, alarms, and device status of the plant, helping users understand the operating status of the plant in a timely manner.
- When using this function, ensure that the DataLogger can connect to the configured email server and the Ethernet parameters and email parameters are correctly set for the DataLogger.

Procedure

STEP 1 Choose **Settings** > **Comm. Param.** > **Email**, set Email parameters, and click **Submit**.

Parameter	Description
SMTP server	Set this parameter to the domain name or IP address of the SMTP server.
Encryption mode	Set this parameter to the email encryption mode.
SMTP port	Set this parameter to the email sending port.
Weak cipher suite	-
User Name	Set this parameter to the user name for logging in to the SMTP server.
Password	Set this parameter to the password for logging in to the SMTP server.
Email language	Set this parameter to the language for sending emails.
Send address	Set this parameter to the email address for sending emails.
Receive address N **NOTE** – N is 1, 2, 3, 4, or 5.	Set this parameter to the email address for receiving emails.
Energy yield	Specifies whether to send energy yield data by email and the time for sending emails.
Alarms	Specifies whether to send alarms by email and the severity of the alarms to be sent.

NOTE – You can click Send test mail to check whether the DataLogger can successfully send emails to users.

Troubleshooting

NOTE – If an error code is not listed in the following table, provide the DataLogger run logs and contact technical support.

Error Code	Suggestion	Error Code	Suggestion
0x2002	1. Check whether the DNS server address is correct. 2. Check whether the domain name and the IP address of the SMTP server are correct. 3. Check whether the network communication between the management system and the DNS server is normal.	0x2003	1. Try again later. 2. Check whether the domain name and the IP address of the SMTP server are correct.

Error Code	Suggestion	Error Code	Suggestion
0x200b	1. Check whether the DNS server address is correct. 2. Check whether the domain name and the IP address of the SMTP server are correct.	0x4016	1. Try again later. 2. Check whether the IP address of the DNS server is correct. 3. Check whether the domain name and the IP address of the SMTP server are correct.
0x406e	Confirm the encryption mode and port supported by the email box, and check whether they are correct.	0x8217	1. Check whether the user name and password are correct. 2. Log in to the email box of the email sender and start the SMTP service. 3. Log in to the email box of the email sender and start the third-party client license code function.
0xa003	Check whether the domain name and the IP address of the SMTP server are correct.	0xa005	Enter the user name correctly.
0xa006	Enter the password correctly.	0xe002	Configure the domain name and the IP address of the SMTP server correctly.
0xe003	Configure the addresses for sending and receiving emails correctly.	Others	Provide DataLogger run logs and contact technical support.

8.3 How Do I Use DI Ports?

- The DataLogger provides four DI ports, which support DI active scheduling, DI reactive scheduling, DRM, remote shutdown, and input of correlated alarms.
- For details about DI active scheduling, DI reactive scheduling, DRM, and remote shutdown, see 6.8 Power Grid Scheduling.

NOTE – Before setting the corresponding function, ensure that the DI port is not set for other purposes. Otherwise, the setting will fail.

Alarm Input

When a valid level is delivered into a DI port, an alarm is raised. You can set the alarm name and severity.

STEP 1 Choose **Settings** > **DI** and associate alarms with DI ports.

Parameter	Description
Activation Status	If this parameter is set to **Activated** for a DI port, you can set the function of the DI port. Otherwise, you cannot set the function of the DI port.
Dry Contact Status	Specifies the valid input status of a DI port.
Alarm Generation	Specifies whether to allow alarm generation.
Alarm Severity	Specifies the alarm severity.
Trigger Shutdown	Specifies whether to deliver a solar inverter remote shutdown command.
Trigger Startup	Specifies whether to deliver a solar inverter remote startup command.
Alarm Name	Specifies the alarm name.
Startup Delay	Specifies the delay time for the automatic startup of the solar inverter after **Trigger Startup** is set to **Enable**.

8.4 How Do I Use DO Ports?

The DataLogger provides two DO ports, which support the reset of external routers, audible and visual alarming for grounding faults, and output of correlated alarms.

NOTE – Before setting the corresponding function, ensure that the DO port is not set for other purposes. Otherwise, the setting will fail.

Audible and Visual Alarm for Grounding Fault

Connect one DC power cable of the audible and visual alarm to a DO port on the DataLogger, and power on or off the audible and visual alarm by connecting or disconnecting the DO dry contact to implement audible and visual alarming for grounding faults.

STEP 1 Connect one DC power cable of the audible and visual alarm to the DO port (COM/NO) on the DataLogger.

STEP 2 Choose **Settings** > **Alarm Output** and associate **Low Insulation Resistance** with the DO port.

Alarm Output

After a solar inverter alarm is associated with a DO port, the alarm signal is delivered from the DO port when the solar inverter raises the alarm.

STEP 1 Choose **Settings** > **Alarm Output** and associate solar inverter alarms with the DO port.

NOTE – If the DataLogger is restarted or powered off after the function is enabled, the DO port status may change and the alarm output may be abnormal.

8.5 How Do I Change a Device Name?

Procedure

STEP 1 Choose **Maintenance** > **Device Mgmt.** > **Device List**.

STEP 2 Modify the device name based on the actual situation, select the modified entry, and click **Modify Device Info**.

NOTE – You can also export device information to a .csv file, modify the file, and import the modified file to modify device information.

8.6 How Do I Change the Communications Address?

The DataLogger allows you to change the communications addresses of devices on the **Connect Device** or **Device List** page.

Changing the Communications Address on the Connect Device Page

STEP 1 Choose **Maintenance** > **Device Mgmt**. > **Connect Device.**

STEP 2 Click **Auto Assign Address**, set the start address for assignment, and confirm the address assignment.

STEP 3 Confirm the address adjustment, adjust the device address as required, and click **Address Adjustment**.

STEP 4 Confirm to search for the device again.

STEP 5 After the search is complete, click **Close**.

Changing the Communications Address on the Device List Page

STEP 1 Choose **Maintenance** > **Device Mgmt**. > **Device List.**

STEP 2 Change the device communications address and device name based on the site requirements, select the modified entries, and click **Modify Device Info**.

STEP 3 Choose **Maintenance** > **Device Mgmt**. > **Connect Device** and click **Auto. Search**.

STEP 4 After the search is complete, click **Close**.

8.7 How Do I Export Inverter Parameters?

Context

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

Procedure

STEP 1 Choose **Maintenance** > **Device Mgmt** > **Export Param.**

STEP 2 Select the name of the device whose parameters are to be exported, and click **Export**.

STEP 3 Observe the progress bar and wait until the export is complete.

STEP 4 After the export is successful, click **Log archiving** to save the file.

8.8 How Do I Clear Alarms?

Context

You can clear all active and historical alarms for the selected device and re-collect alarm data.

Procedure

STEP 1 Choose **Maintenance** > **Device Mgmt**. > **Clear Alarm.**

STEP 2 Select the name of the device whose alarms are to be cleared, click Submit, and choose All, Locally synchronized alarms, or Alarms stored on devices to clear alarms.

NOTE – If alarms are cleared for the DataLogger, you must reset alarms on the management system. Otherwise, the management system cannot obtain the alarm information collected by the DataLogger after the alarms are cleared.

8.9 How Do I Enable the AI1 Port to Detect SPD Alarms?

Context

In the array controller application scenario, the AI1 port on the DataLogger can be connected to the SPD alarm output to raise an alarm when the SPD is faulty.

Procedure

STEP 1 Choose **Settings** > **Other Parameters** and set **AI1 SPD detection alarm** to **Enable**.

8.10 How Do I Identify the Meter Wiring Direction on the DataLogger?

- Correct wiring: When the plant feeds electricity to the grid, the active power of the meter is a negative value. When the plant draws electricity from the grid, the active power of the meter is a positive value.
- Reverse wiring: When the plant feeds electricity to the grid, the active power of the meter is a positive value. When the plant draws electricity from the grid, the active power of the meter is a negative value. Negative wiring may occur.

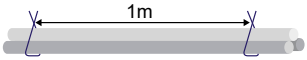
8.11 Resetting Password

Role	Description
Administrator	If you hold down the RST button for 10s to 20s, the DataLogger enters the safe mode. In this case, the device configuration parameters are retained, but personal privacy and sensitive data, including the login password and email address, are cleared.
Non-administrator	The password of a non-administrator account must be reset using the administrator account. The administrator resets the password and enters the initial password. The user logs in to the system using the initial password provided by the administrator. After the login, the user is forced to change the password.

9. Technical Specifications

9.1 Technical Specifications of the DataLogger

Device Management

Parameter	Specifications
Number of solar inverters	A maximum of 150 inverters can be connected.
Communications mode	RS485, ETH, PLC MBUS (optional), SFP (optional)
Maximum communication distance	• RS485: 1000 m • ETH: 100 m • PLC MBUS (multi-core cable): 1000 m; PLC MBUS (single-core cable): 400 m (The three-phase cables must be bound at 1 m intervals)  • Optical fiber (single-mode, 1310 nm optical module): 10,000 m (with the 1000M optical module); 12,000 m (with the 100M optical module)

Common Specifications

Parameter	Specifications
Power adapter	• AC input: 100–240 V, 50/60 Hz • DC output: 12 V, 2 A
DC power supply	24 V, 0.8 A
Power consumption	• DataLogger: 9 W • DataLogger+Switch: 10 W • 15 W (maximum)
Dimensions (W x H x D)	• 259 mm x 160 mm x 59 mm (including mounting ears) • 225 mm x 160 mm x 44 mm (excluding mounting ears)
Net weight	2 kg
Operating temperature	–40°C to +60°C
Storage temperature	–40°C to +70°C
Relative humidity	5%–95% RH
IP rating	IP20
Installation mode	Installed on a wall or guide rail
Highest operating altitude	4000 m
Pollution degree	2
Corrosion level	Class B

Ports

Parameter	Specifications
Ethernet electrical port (WAN and LAN)	2 PCS; 10M/100M/1000M auto-sensing
Ethernet optical port (SFP)	2 PCS; supports 100M/1000M SFP/eSFP optical modules
PLC MBUS port	1 PCS; supports a maximum AC input voltage of 800 V
RS485 port (COM)	3 PCS; supported baud rates: 1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s, 19,200 bit/s, and 115,200 bit/s

Parameter	Specifications
USB	USB2.0
Output power port	One port; DC output: 12 V, 0.1 A
Digital input (DI)	Four ports; passive dry contact signal access
Digital output (DO)	Two ports; relay dry contact outputs, with NO or NC contacts; 12 V/0.5 A signal voltage
Analog input (AI)	Four ports; AI1: 0–10 V voltage (passive); AI2–AI4: 4–20 mA or 0–20 mA input current (passive)

NOTE – The WLAN hardware module of DataLogger is retained, but the WLAN functionality is disabled, and it does not support connecting to Data Logger 's WLAN via the mobile app.

9.2 Technical Specifications of the Switch

Device Management

Item	Specifications
Communications mode	RS485, ETH
Maximum communication distance	• RS485:1000 m • ETH: 100 m

Common Specifications

Item	Specifications
DC power supply	• DC 12 V: DC 2.0 power socket male connector • DC 24 V: cord end terminal
Power consumption	Typical: 4 W; maximum: 5 W
Dimensions (H x W x D)	• Including mounting ears: 160 mm x 179 mm x 59 mm • Without mounting ears: 160 mm x 125 mm x 44 mm
Net weight	1 kg
Operating temperature	–40°C to +60°C
Storage temperature	–40°C to +70°C
Humidity	5%–95% RH
Ingress protection rating	IP20
Installation mode	Installed on a wall or guide rail
Maximum operating altitude	4000 m
Pollution level	Level 2
Corrosion level	Class B

Ports

Item	Specifications
Ethernet electrical port (GE)	Four 10M/100M/1000M auto-sensing ports
RS485 port (COM)	Three ports; supported baud rates: 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19,200 bps, 115,200 bps
Output power port	One port; DC output: 12 V, 0.1 A
Digital input (DI)	Four ports; passive dry contact signal access
PT port (PT)	Two ports; support the access of signals from a 3-wire or 2-wire PT100/PT1000 temperature sensor
Analog input (AI) port	Four ports; AI1: 0–10 V voltage (passive); AI2–AI4: 4–20 mA or 0–20 mA input current (passive)

10. Port No. List

- If a third-party management system connects to the DataLogger over Modbus TCP, the DataLogger port number is 502, which is used to query and set data between the DataLogger and the third-party management system.
- If a third-party management system connects to the DataLogger over IEC104, the DataLogger port number is 2404, which is used to query and set data between the DataLogger and the third-party management system.
- If the DataLogger connects to a third-party FTP server over FTP, the common port number is 21, which is used to periodically upload performance data to the third-party FTP server.
- If the DataLogger connects to a third-party email server over SMTP, the common port number is 25, 465, or 587, which is used to send emails to the email server.
- If the DataLogger connects to a third-party NTP server over NTP, the common port number is 123, which is used for time synchronization with the NTP server.
- If the DataLogger connects to a remote output server of Japan Electric Power Company over HTTPS, the common port number is 443, which is used to synchronize the scheduling table with the electric power company.

11. Acronyms and Abbreviations

A	
AC	Alternating Current
AI	Analog Input
AO	Analog Output
APP	Application
B	
BMU	Battery Monitoring Unit
C	
COM	Communication
CPE	Customer Premises Equipment
CMU	Central Monitoring Unit
D	
DC	Direct Current
DI	Digital Input
DO	Digital Output
E	
EMI	Environmental Monitoring Instrument
ETH	Ethernet
ESU	Energy Storage Unit
ESC	Rack Controller
ESR	Battery Rack
ESM	Battery Pack
G	
GE	Gigabit Ethernet
GND	Ground
H	
HVAC	Heating, Ventilation and Air Conditioning
L	
LAN	Local Area Network
LED	Light-emitting Diode
LTE	Long Term Evolution
M	
MBUS	Monitoring bus
N	
NC	Normally Closed
NO	Normally Open
P	
POE	Power over Ethernet
PCS	PCS
R	
RST	Reset
RSTP	Rapid Spanning Tree Protocol
S	
SFP	Small Form-factor Pluggable
STP	Spanning Tree Protocol
SOC	State of Charge
SOH	State of Health
T	
TCU	Temperature Control Unit
U	
USB	Universal Serial Bus
W	
WAN	Wide Area Network
WEEE	Waste Electrical and Electronic Equipment

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