

**Logger4000** Data Logger User Manual



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## 1 About this Manual

## 1.1 Validity

This manual is valid for the following data loggers:

Logger4000

## 1.2 Target Group

This manual is applicable to technical personnel who are responsible for the installation, operation and maintenance of the Logger4000 and to users who need to perform daily operation. Readers should have the following qualifications:

- Have some knowledge of electrical and electric cabling and mechanical knowledge; and be familiar with electrical and mechanical diagrams.
- Be familiar with the PV grid-connected power generation system and its working principle.
- Have received professional training in installing and commissioning of the electrical devices.
- Be capable of handling the danger or emergency that may occur during installation or commissioning.
- Be familiar with the national/local standards and regulations.
- Be familiar with the description in this manual.

Only personnel meeting the foregoing requirements can conduct installation, maintenance, and troubleshooting. Unauthorized personnel is prohibited to perform any operation on the device.

## 1.3 Symbol Explanations

#### Warning Label

Warning label on enclosure of the Logger4000 is as follows:



Symbols	Explanation
	Risk of electric shock! If not avoided, lethal hazard can be caused.
Ē	Firmly ground the protective ground terminal to ensure the safety of operators!
AC	Do not touch live parts until 30second after disconnection from the
7 V 2 300	sources!

#### Symbols

This manual contains important safety and operational instructions that must be accurately understood and respected during the installation and maintenance of the equipment.

To ensure the optimum use of this manual, note the following explanations of the symbols used.

#### A DANGER

DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

#### A WARNING

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

#### **A**CAUTION

CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

#### NOTICE

NOTICE indicates a situation which, if not avoided, could result in equipment or property damage.



NOTE indicates additional information, emphasized contents or tips to help you solve problems or save time.

## 1.4 How to Use This Manual

Read this manual carefully before performing operation on the device. This manual must be stored at hand and available at all times.

All rights reserved including the pictures, symbols, and markings used in this manual. Any reproduction or disclosure, even partially, of the contents of this manual is strictly prohibited without prior written authorization of SUNGROW. The content of the manual will be periodically updated or revised as per the product development. It is probably that there are changes in manuals for the subsequent module edition. If there any mismatch between the product and its manual, the actual product shall prevail and the manual of the latest version can be obtained from SUNGROW.

## 2 Safety Instructions

This chapter mainly introduces safety instructions that need to be respected during the operation of Logger4000.

The Logger4000 has been designed and tested strictly according to international safety regulations. As electrical and electronic equipment, the Logger4000 must be installed, commissioned, operated, and maintained in strict accordance with related safety instructions. Incorrect operation or misuse of the device may cause:

- · damage to personnel safety of the operators or the third party
- damage to the Logger4000 or other properties belong to the operators or the third party

Therefore, the following safety instructions must be read and always kept in mind prior to any work. All detailed work-related safety warnings and notes will be specified at the critical points in corresponding chapter.

#### **WARNING**

All operations and electrical work must only be performed by qualified personnel.

#### **Before Installation**

#### NOTICE

After receiving the device, please check if there is damage caused during transport. Contact SUNGROW or the forwarding company once any problem is found.

The related operators must be familiar with the safety instructions in this manual and other safety regulations about the installation, operation and maintenance of the Logger4000.

Move, transport, install, operate, and maintain the Logger4000 correctly and appropriately.

#### **During Installation**

#### NOTICE

The Logger4000 can only be used as described in this manual. Altering the product without authorization or using spare parts not sold or recommended by SUNGROW may lead to fire, electric shock or other damages.

#### NOTICE

Disconnect all electrical connections and the upstream input switch and make sure the Logger4000 is voltage-free during installation.

#### NOTICE

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

#### NOTICE

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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

- 1 This device may not cause harmful interference, and
- 2 This device must accept any interference received, including interference that may cause undesired operation.

Maintenance and Replacement

#### NOTICE

Do not ingest battery. Chemical burn hazard!

This product contains a coin / button cell battery. If the coin / button cell battery is swallowed, it can cause a severe internal burns in just 2 hours and can lead to death.

#### A WARNING

The maintenance of the Logger4000 can only be performed by qualified personnel from SUNGROW or other qualified personnel.

User can never maintain or replace the modules and other parts. Serious personal injury or property loss may follow if otherwise.

#### NOTICE

Never replace the internal components of the Logger4000 without authorization. SUNGROW shall not be held liable for any possible damage caused by ignorance of this warning.

## 3 Product Introduction

## 3.1 Function Description

Logger4000 is equipped with the following functions:

#### Support of Device Connection

Logger4000 can be connected to devices in the PV system via an RS485 bus, and it can be also connected to SUNGROW string inverter equipped with the PLC communication function through the PLC cable. The Logger4000 can store and process device information as well as convert data communication protocol.

#### Management of Communication Device

Logger4000 can centrally manage devices connected to it, including parameter setting, firmware upgrade, etc, which makes onsite maintenance more convenient.

#### Configuration through Web Interface

Users can set system time, network, serial port, etc. and maintain the protocol point table through the embedded Web interface of the Logger4000.

#### Switch Port Configuration

Logger4000 is designed with four Ethernet ports (FE1~FE4) through which Logger4000 can realize data exchange. It can be connected to SCADA or insight northward and to third-party devices southward.

#### Data Forwarding Service

Logger4000 can forward the collected data to SCADA, Insight and iSolarCloud.

#### Protocol Conversion Service

Logger4000 provides protocol conversion service, including converting Modbus RTU to IEC104, MQTT, ModbusTCP, etc.

#### Grid Dispatching

Logger4000 can accept and execute dispatching instructions from the grid, including remote dispatching control instructions, and analog and digital dispatching control instructions.

Logger4000 can perform active power control and reactive power regulation on the inverter connected to it.

#### Local Dispatching

Logger4000 can receive and execute local dispatching instructions, including delivering fixed value, energy meter closed-loop dispatching, etc.

#### Fast Dispatching

Logger4000 can accept and execute fast active and reactive dispatching instructions, including remote Goose instructions, to achieve reactive power control within 30ms.



#### Smart IV Curve Diagnosis

Logger4000 can perform smart IV curve diagnosis on SUNGROW inverter, and the results can be viewed on Insight, iSolarSuite, or iSolarCloud. For detailed description of the smart IV curve diagnosis, refer to the manual of iSolarCloud or Insight.

#### **Built-in MPLC**

Logger4000 has a built-in MPLC-H (Broadband Power Line Carrier Communication), which can be directly connected to the string inverter with MPLC function produced by SUNGROW.

#### 3.2 Networking Scenarios

Logger4000 can be applied to various networking scenarios. It can access the inverter, box-type transformer, meteo station and meter in the PV power generation system through RS485 bus, and can also access the string inverter with PLC function produced by SUNGROW through PLC bus.

- Logger4000 can transmit the collected device data to the background plant controller, such as Insight and SCADA, through the core switch.
- Logger4000 can also transmit the collected device data directly to iSolarCloud through the 4G router.

#### Connected to background plant controller through a core switch

Logger4000 can be connected to Insight or SCADA through a core switch, as shown below.



figure 3-1 Ring networking

When the ring networking is used, a maximum of 15 Logger4000 can be connected to a ring network.



figure 3-2 Star networking

#### Connected to iSolarCloud through a router

As shown in the figure below, the Logger4000 can be directly connected to the iSolarCloud through a router.



### 3.3 Appearance

#### 3.3.1 Appearance

Appearance of the Logger4000 is shown in the following figure.





No.	Description
А	Indicator
В	Mounting ear
С	Wiring terminal

#### Indicator

Indicator	Name	Status	Status Description
	Power supply indicator	On	Normal power supply
PWR		Off	Abnormal power supply
		Blinking	Normal operation
RUN	Running indicator	Off/On	Abnormal operation
		On	WLAN is enabled, no device connected
WLAN	WLAN indicator	Blinking	WLAN is enabled, device connected
		Off	WLAN disabled

Indicator	Name	Status	Status Description
		On	The inverter connected is faulty
FAULT	Fault indicator	Off	The inverter connected is not faulty

## 3.3.2 Dimensions



## 4 Installation Flow

The following figure shows the overall installation flow of Logger4000.



No.	Procedure	Reference chapter
1	Unpacking and inspection	"5.1 Scope of Delivery"
2	Read the user manual, especially "Safety Instructions"	"2 Safety Instructions"
3	Store the Logger4000 properly if it is not to be installed immediately	"5.4 Storage"
4	Installation location selection	"6.1 Location Selection"
5	Mechanical installation	"6 Mechanical Installation"
6	Electrical installation	"7 Electrical Connection"

No.	Procedure	Reference chapter
7	Check before commissioning	"8.1 Inspection before Commissioning"
8	Commissioning	"8.2 Commissioning Steps"

## 5 Unpacking and Storage

## 5.1 Scope of Delivery

Check the scope of delivery for completeness according to the packing list. The following items should be included.



No.	Name	Description
А	Logger4000	-
В	Documents	Quick installation guide, quality certificate, packing list, product test report, and warranty card
С	Communication terminal resistor	(Note: if there are more than 15 devices connected on the RS485 bus, it is recommended to connect a $120\Omega$ terminal resistor in parallel on the A and B lines at the head or tail end of the bus)
D	Ethernet cable	1x2m
E	Mounting ear	2
F	Bottom supporter	2
G	MPLC cable	3x1m, cable specification: 0.5mm <sup>2</sup>
Н	OT terminal	RNBL5-4
I	Nylon cable tie	Used to tie cables

No.	Name	Description
	Tapping screw assembly	8, including ST4.8x19 expansion bolts and
J		tapping screws, used for wall-mounted
		installation
		6, M4x8 cross recessed countersunk head
K	Fastener assembly	screws, used to anchor the mounting ears to the
		Logger4000

## 5.2 Identifying the Logger4000

The type and key technical parameters of the Logger4000 can be found on the nameplate. The nameplate is attached to the upper right corner of the Logger4000, shown by A in the figure below.



#### **WARNING**

The nameplate contains important parameters. Ensure it is intact and clearly legible.

### 5.3 Checking upon Receiving

The Logger4000 is thoroughly inspected and packed before delivery, but damage may be still caused during transport. Check the following items carefully once receiving the Logger4000.

- Check the scope of delivery for completeness according to "5.1 Scope of Delivery".
- Ensure that the device type is correct.
- Check the device thoroughly and ensure there are no visible damages.

If there are any problems, contact SUNGROW or the forwarding company.

#### **WARNING**

Only undamaged Logger4000 can be installed and commissioned. Before installation, ensure that:

- The Logger4000 is intact without any damages.
- Related documents, such as quick user manual, are enclosed.

#### 5.4 Storage

If the Logger4000 is not to be installed immediately after receiving, observe the following requirements to store it properly:

- The Logger4000 should be store in its original packing case and placed in a wellventilated, dry, and tidy room.
- The storage carrier should be suitable for the weight of the Logger4000.
- The storage environment should be well ventilated, dry, and without any accumulated water.
- Ambient temperature: -40°C to +70°C; relative humidity: 0~95%, no condensation.
- Take precautions to protect the device against damage due to harsh environment such as shock cooling, shock heating, and collision.
- Regularly inspect the Logger4000, usually at least once a week. Check the packing case for intactness and replace it immediately when necessary.
- Unpack and check the Logger4000 in powered on state if it has been stored more than half a year.

#### A WARNING

- The Logger4000 must be packed during storage!
- Never store the Logger4000 outdoors or in a place directly exposed to!
- No tilting or stacking!



After long-time storage, thoroughly check the Logger4000 and ensure it is undamaged before installation. If necessary, install the Logger4000 only after it has been tested by qualified personnel.

## 6 Mechanical Installation

## 6.1 Location Selection

This section is intended to guide the user in selecting an appropriate installation location.

#### Installation Location Requirements

- With the ingress of protection IP 20, the Logger4000 can be installed only indoors.
- Ambient temperature range: -30°C to +60°C. The relative humidity should not exceed 95%. If otherwise, the internal components will be damaged.
- The installation environment should be free of inflammable, explosive, and corrosive materials.



This equipment is not suitable for use in locations where children are likely to be present

#### **Requirement for Installation Clearance**

Reserve enough clearances around the Logger4000.

Before installation, make sure the wiring terminals are at the bottom of the Logger4000 to prevent the dust or particles in the air penetrating into the device, impairing the service life.

The installation location should be 1,500mm above the ground surface. Clearances of at least 500mm should be reserved around the Logger4000 for ease of maintenance. The follow figure shows the requirement for minimum clearances.



#### NOTICE

When there are external devices (such as Meteo Station) connected to the Logger4000, users should install corresponding communication SPD according to onsite conditions.

## 6.2 Installation Tools

Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site.



Knife



Mask



Wire stripper



Marker



Shoes



Wire cutter



Measuring



Electric drill(φ6)



Tube crimp

Gloves



Screwdriver



Slotted screwdriver (M2, M6)



Phillips(M4)

Rubber



Goggles

## 6.3 Installing Logger4000

The Logger4000 can be installed anywhere in the room meeting the installation environment requirements. Wall-mounted installation and rack-mounted installation are supported.

## 6.3.1 Wall-Mounted Installation

### A DANGER

Avoid drilling holes in the utility pipes and/or cables attached to back of the wall!



Turn on the vacuum cleaner and wear safety goggles and dust mask throughout the drilling process to avoid dust inhalation or contact with eyes.

Installation component parts

- Marker (beyond the delivery scope)
- Hammer drill (beyond the delivery scope)
- Bottom supporter (in the delivery scope)
- Mounting ear (in the delivery scope)
- Expansion bolt (in the delivery scope)
- Tapping screw (in the delivery scope)
- Screwdriver (beyond the delivery scope)

#### Install Mounting Ears and Bottom Supporters

Anchor the mounting ears and bottom supporters to the Logger4000 with supplied M4x8 cross recessed countersunk head screws. The fastening torque is  $1.8-2.4N \cdot m$ , and the anchoring method is as follows:



#### Mount the Logger4000 to the Wall

step 1 Mark positions for drilling holes on the installation wall. Drill the holes with a hammer drill of  $\phi$  6mm. (Note: Reserve sufficient clearances around the Logger4000.)



	0
· 19	0
42	
a	

step 2 Insert the expansion sleeve into the drilled hole, and make it completely embedded in the wall with a rubber hammer.



step 3 Insert the tap screw and mounting ear successively into the expansion sleeve, to fix the Logger4000 onto the wall.



- step 4 Fasten the tapping screw with a screwdriver by the torque of  $0.3N \cdot m$ .
  - - End

#### 6.3.2 Rack-mounted Installation

Use 1U standard rack in case of the rack-mounted installation. Installation tools and component parts

- 1U standard rack (beyond the scope of delivery)
- Electric screwdriver (beyond the scope of delivery)
- Screw (beyond the scope of delivery)
- Nut (beyond the scope of delivery)

#### Install mounting ears

Anchor the mounting ears to the Logger4000 with supplied M4x8 cross recessed countersunk head screws. The fastening torque is  $1.8-2.4N \cdot m$ , and the anchoring method is as follows:



step 1 Mark positions on the rack according to dimensions of the Logger4000.



step 2 Drill holes on the rack with a hammer drill of  $\varphi$  6mm.



step 3 Level the mounting ears with the drilled holes on the rack.



step 4 Fix the Logger4000 in the sequence of screws, mounting ears, rack, and nuts.

--End

## 7 Electrical Connection

### 7.1 Safety Instructions

#### **DANGER**

#### High voltage hazard!

The Logger4000 should be reliably ground. Never touch the AC power supply port "AC IN 100 – 277V,0.48A" and MPLC communication port "L1  $L_2$  L3" when the device is powered on.

#### NOTICE

High voltage hazard! Danger will be caused by touching the MPLC communication port immediately after powering down. Wait at least 30s to have the capacitor discharge completely.

#### NOTICE

Do not enable the rated DC input and AC input to supply power at the same time. Otherwise, the power supply may be abnormal.

#### NOTICE

The rated voltage of the slow-blow fuse is 250V and the rated current is 5A. The fuse is not replaceable.

#### NOTICE

Incorrect wiring will cause device damage or even personal injury.

#### NOTICE

All cables must be intact, well insulated, appropriately dimensioned, and firmly connected.

## 7.2 Port Introduction

The layout and identifiers of Logger4000 terminals are shown below.

Identifier	Name	Recommende- d cable	Description		
FE1~FE4	Ethernet port	-	Can be connected to the background through devices like switch and router.		
SFP1, SFP2	Fiber port	-	Function reserved		
ETH	Fast dispatch port	-	Used for fast active and reactive power control via Goose protocol		
CONSOLE	Debug port	-	Reserved		
DI	Digital input	0.75mm <sup>2</sup> outdoor anti- ultraviolet wire	Passive dry contact input port		
USB	USB port	-	Reserved		
Micro SD	SD port	-	Used for software programming (this port is only available to SUNGROW technicians)		
Debug	Debug port	-	Used for debugging of Logger4000		
RST	Reset	-	Press and hold (> 30s) to restart Logger4000 and restore factory settings Short press (< 3s), function reserved		
DO1~DO4	Digital output	0.75mm <sup>2</sup> outdoor anti- ultraviolet wire	Relay output interface Relay specification: 250Vac/ 1A or 30Vdc/1A		
PT1, PT2, Al1~Al4	Analog input	0.75mm² outdoor anti- ultraviolet wire	PT100/PT1000 detect range: -30°C~120°C Two-wire or three-wire connection method AI1~AI2: 0~10Vdc AI3~AI4: 4~20mA		

Identifier	Name	Recommende- d cable	Description
A1B1~A7B7	RS485 communication interface	2 x (0.75~1.5) mm <sup>2</sup> outdoor anti-ultraviolet twisted pair with a shielding layer	Support of 7 inputs of RS485 Can be connected to both slave device and background
IRIG-B	Inter-Range Instrumentation Group-Time Code Format B	-	Reserved
CAN	CAN communication port	-	Reserved
DC IN 24V,1.25A	DC24V power supply port	1~1.5mm <sup>2</sup> outdoor anti- ultraviolet wire	If the current is ≤1.25A, the switch mode power supply at this port requires reinforced insulation.
AC IN 100 – 277V,0.48A	AC power supply port	1~1.5mm <sup>2</sup> outdoor anti- ultraviolet wire	Connecting 100~277Vac (50/ 60Hz), current≪0.48A
Ē	Grounding hole	1~1.5mm <sup>2</sup> outdoor anti- ultraviolet wire	Connecting protective grounding cable
L1, L2, L3	MPLC communication interface	0.5mm <sup>2</sup> , cable withstand voltage:cable grounding working voltage ≥ 1000 V	Can be connected to string inverters equipped with PLC communication function

#### AC power supply port and MPLC communication interface

High voltages may be present on the AC power supply port "AC IN 100 - 277V,0.48A" and MPLC communication ports L1, L2, and L3. Therefore, before cable connection, ensure that the two ports are free of voltage and the grounding cable is reliably connected.

#### Digital input/output ports

Digital input/output ports (DI and DO1~DO4) are configured to collect node data and control node communication.

#### RS485 communication ports

For the RS485 communication ports (A1B1~A7B7), the communication distance should be no more than 1,000m.

### 7.3 Overview

The Logger4000 can be connected to:

- devices in the PV system such as the inverter, combiner box, Meteo Station, and energy meter through the RS485 port
- background devices through the Ethernet port
- · transformer or other devices through the MPLC port

## 7.4 Connecting to the Inverter

#### 7.4.1 Connecting to the Device with RS485 Port

Use an RS485 shielded twisted pair (STP) to connect any RS485 port (A1B1 – A7B7) of the Logger4000 and the RS485 communication terminal of the inverter.

#### Connecting to a Single Inverter

Insert the communication cable led from the inverter to any RS485 port (A1B1 – A7B7) of the Logger4000.



#### **Connecting to Multiple Inverters**

Multiple inverters are connected to the Logger4000 in the RS485 daisy chain manner. If more than 15 inverters are connected on the RS485 bus, it is recommended to connect a  $120\Omega$  terminal resistor in parallel on the RS485A and RS485B lines at the head or tail end of the bus.



- The Logger4000 supports 6 RS485 buses and 200 devices at most. Each RS485 bus supports 80 devices at most.
- Devices of different types must be connected to different RS485 communication ports of the Logger4000. For example, the transformer and the inverter should be connected to different RS485 communication ports of the Logger4000.
- The address of each device on the RS485 bus should be within the set address range (1 to 246) of the Logger4000 without repetition. Otherwise, communication failure occurs.
- Serial port parameters of each device on the RS485 bus should be consistent with those of the Logger4000. The serial port parameters include baud rate, data bit, stop bit, and check bit.

#### **Connection Procedure**

- step 1 Lead the RS485 communication cable from the inverter to the wiring area of Logger4000.
- step 2 Strip the protection layer of the communication cable with a wire stripper. Cable specification and stripped length are as follows:



**step 3** Assemble proper cord end terminals to communication cable whose protective layer is stripped off and crimp them with a crimping tool.



#### step 4 Crimp the wiring terminal.



#### NOTICE

- RS485A is connected to port A while RS485B is connected to port B.
- The RS485 communication cable must be the shielded twisted pair with the shielding layer single-point grounded.



When a multi-core and multi-strand copper core cable is used, the communications cable connected to an RS485 port on Logger must be pressfitted to cord end terminals of proper specification.

step 5 Connect the wiring terminal to the terminal "A1B1~A7B7" of the Logger4000.



- - End

#### 7.4.2 Connecting to the Inverter with MPLC Port

Integrated with MPLC master node, the Logger4000 can be connected to the inverter integrated with MPLC slave node and achieve MPLC communication by using existing power cable.



#### Preparation before wiring

- Disconnect the transformer from the grid.
- Disconnect the DC side of the inverter and make sure the system is in safe state.

#### Wiring method

Connect one end of the MPLC power cable in the scope of delivery to MPLC ports L1, L2, and L3 of Logger, and the other end to the three-phase ports of the circuit breaker. Port L1 of Logger must be connected to phase A of the circuit breaker, port L2 to phase B, and port L3 to phase C. The details are shown in the following figure.



The external circuit breaker is beyond the scope of delivery, and users need to prepare it by themselves if necessary.

The external circuit breaker just needs to meet the above two parameters (nominal voltage and nominal current). Other parameters, such as breaking capacity, are not mandatory requirement.

÷.

#### NOTICE

Isolation voltage of the MPLC cable should be greater than 1,000V, recommended cable specification: 0.5mm<sup>2</sup>.

MPLC cable must be connected to an additional SPD with the protection degree of 3. Otherwise, device damage may occur.

#### NOTICE

The built-in MPLC module of the Logger4000 supports AC voltage less than 1000V.

In case of MPLC communication, the distance between the Logger4000 and the inverter should be no more than 1,000m.

#### NOTICE

MPLC networking is intended for medium voltage grid-connection. If low voltage grid-connection is desired, observe the following two conditions:

- Never connect a load between the Logger4000 and the MPLC slave node.
- The distance between the Logger4000 and the load should be greater than 20m, that is, the LV grid-connection point should be more than 20m away from the nearest load distribution line. The load includes air conditioners, machines, motors, etc.

#### NOTICE

In case of MPLC communication, note that:

- Electrical connection between the inverter and its downstream transformer has been correctly performed.
- Input and output circuit breakers of the Logger, inverter, and transformer are connected.

## 7.5 Connecting to the Meteo Station

Meteo Station of the Modbus-RTU protocol can be connected to the Logger4000.

- step 1 Connect the communication cable led from the Meteo Station to the RS485 port of the Logger4000.
- **step 2** Strip the protection layer and insulation layer of the communication cable with a wire striper, as shown in the figure below.


**step 3** Assemble proper cord end terminals to communication cable whose protective layer and insulation layer are stripped off and crimp them with a crimping tool.



step 4 Connect the cable to the RS485 port of the Logger4000, as shown in the figure below.



- - End

# 7.6 Connecting to the Energy Meter

The Logger can be connected to the energy meter through the RS485 port or the Ethernet port. Specifically, refer to the table below.

Energy	Communicat-	Port	Protocol	Wiring Mothod
Meter	ion Port	Definition	Туре	
	24	RS485-A	_	
	25	RS485-B	Modbus	"7.6.1 BS/185 Cable
Wasion	26	Public		
	27	RS485-A	RIU	Connection
	28	RS485-B	-	
Aaral	21	RS485-A	Modbus	"7.6.1 RS485 Cable
Acrei	22	RS485-B	RTU	Connection"
Weidmull-	17	RS485-A		
er			Modbus	"7.6.1 RS485 Cable
EM610	16	RS485-B	RTU	Connection"

Energy	Communicat-	Port	Protocol	Wiring Mothod
Meter	ion Port	Definition	Туре	
	22	RS485-B	Modbus	"7.6.1 RS485 Cable
Janitza	23	RS485-A	RTU	Connection"
UMG604	Ethorpot	Ethorpot	Modbus	"7.6.2 Ethernet Cable
	Emernet	Emernet	TCP	Connection"

## 7.6.1 RS485 Cable Connection

- step 1 Lead the RS485 cable from the energy meter to the wiring area of the Logger4000.
- **step 2** Strip the protection layer and insulation layer of the communication cable with a wire striper, as shown in the figure below.



**step 3** Assemble proper cord end terminals to communication cable whose protective layer and insulation layer are stripped off and crimp them with a crimping tool.



step 4 Connect the cable to the RS485 port of the Logger4000, as shown in the figure below.



--End

# 7.6.2 Ethernet Cable Connection

Connect the "Ethernet" port of the energy meter and the "FE1~FE4" port of the Logger with a network cable.

# 7.7 Wiring of DI Signal

The DI port is used to access DI signals, such as remote grid dispatching instructions and alarms. Only passive dry contact signals are supported. It is recommended that the signal transmission distance not exceed 10m.

**step 1** Strip the protection layer and insulation layer of the dry contact input signal cable with a wire striper, as shown in the figure below.



step 2 Assemble proper cord end terminals to signal cable whose protective layer and insulation layer are stripped off and crimp them with a crimping tool.



**step 3** Connect the cord end terminals to the plug "DI" outside Logger4000, as shown below. Port "OV" and Port "1" are taken as an example.



- - End

# 7.8 Wiring of DO Signal

Port 1 corresponds to NO, port 2 to NC, and port 3 to COM. NO/COM is the normally open contact, and NC/COM is the normally closed contact. It is recommended that the signal transmission distance not exceed 10m.

step 1 Strip the protection layer and insulation layer of the dry contact output signal cable with a wire striper, as shown in the figure below.



step 2 Assemble proper cord end terminals to signal cable whose protective layer and insulation layer are stripped off and crimp them with a crimping tool.



step 3 Connect the cord end terminals to plugs "DO1"~"DO4" outside Logger4000, as shown below. NO contact of Port "DO1" is taken as an example.



- - End

# 7.9 Wiring of Al Signal

The AI port is used to access AI signals of devices such as environmental monitoring sensors. It is recommended that the signal transmission distance not exceed 10m.

**step 1** Strip the protection layer and insulation layer of the analog input signal cable with a wire striper, as shown in the figure below.



step 2 Assemble proper cord end terminals to signal cable whose protective layer and insulation layer are stripped off and crimp them with a crimping tool.



step 3 Connect the cord end terminals to plugs "Al1"~"Al4" outside Logger4000, as shown below. Port "Al1" is taken as an example.





Port	Identifier	Description
AI	Al1	Supported voltage input range: 0V ~ 10Vdc

Al2 Al3 Al4 Supported current input range: 4mA ~ 20mA

6

AI + is connected to AI signal +, AI - is connected AI signal -.

# 7.10 Wiring of PT Signal

Logger4000 is designed with two PT ports and supports 3-wire or 2-wire PT100/ PT1000 temperature sensor connection.

step 1 Strip the protection layer and insulation layer of the signal cable for temperature detection with a wire striper, as shown in the figure below.



step 2 Assemble proper cord end terminals to signal cable whose protective layer and insulation layer are stripped off and crimp them with a crimping tool.



step 3 Connect the cord end terminals to plugs "PT1" and "PT2" outside Logger4000, as shown below. Port "PT1" is taken as an example.



figure 7-1 3 - wire PT100/PT1000 connection



figure 7-2 2 - wire PT100/PT1000 connection

- - End

# 7.11 Connecting to the Remote Monitoring Device

The Logger4000 is equipped with four Ethernet ports: FE1~FE4. The function of the ETH1 is reserved. Access the Ethernet switch and the router through either port. This section takes connecting to an Ethernet switch as an example to illustrate the wiring steps.

step 1 Connect one end of the network cable in the scope of delivery to the Ethernet switch network port and the other end to the Ethernet port of Logger4000.



step 2 Configure network parameters.

- - End

f

- Default IP address of Ethernet ports (FE1 to FE4) : 12.12.12.12.
- If the DHCP function is enabled for Ethernet ports (FE1 to FE4), it is available to read the IP address of the Ethernet port after connecting it to a router.

# 7.12 Connecting to the AC Power Supply

The Logger4000 can be connected to a power source with voltage ranging from 100 to 277Vac.

- step 1 Lead the external power supply cable to the wiring area of the Logger4000.
- **step 2** Strip off the protective layer and insulation layer of the power cable with wire strippers, as shown below.



step 3 Assemble proper cord end terminals to power cable whose protective layer and insulation layer are stripped off and crimp them with a crimping tool.



step 4 Connect the cord end terminals to the plug "AC IN 100~277V,0.48A" outside Logger4000.



- - End



The Logger4000 can be connected to both AC power supply and DC power supply. UPS can be used as a DC backup power source.

# 7.13 Connecting to the DC Power Supply

The Logger4000 can be connected to 24Vdc external power supply. UPS can be used as a power source.

- step 1 Lead the external power supply cable to the wiring area of the Logger4000.
- step 2 Strip off the protective layer and insulation layer of the power cable with wire strippers, as shown below.



step 3 Assemble proper cord end terminals to power cable whose protective layer and insulation layer are stripped off and crimp them with a crimping tool.



step 4 Connect the cord end terminals to the plug "DC IN 24V,1.25A" outside Logger4000.



- - End

# 7.14 Earthing Connection

## **WARNING**

The grounding cable should be grounded reliably. Otherwise, lethal electric shock may occur in case of fault; and the device may be damaged due to lightning.

**step 1** Strip the protection layer and insulation layer of the grounding cable by specific length, as shown in the figure below.



step 2 Select proper OT terminal and crimp them.



**step 3** Secure the grounding cable to the grounding hole of the Logger4000, as shown in the figure below.



No.	Description	Note
А	Bolt	M4
В	OT terminal	_
С	Grounding hole	—

step 4 Fasten the screw with a wrench by the torque of  $5 \pm 1$  N  $\cdot$  m.

- - End

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# 8 Commissioning

# 8.1 Inspection before Commissioning

No.	Inspection item
1	All cables are intact, well-insulated, and appropriately dimensioned
2	All cables are connected correctly and firmly
3	The polarity of the power supply cable is correct. The grounding
	cable is reliably grounded

# 8.2 Commissioning Steps

No.	Description
	Use a network cable to connect the debugging PC to any port on
1.	Logger4000 (The default IP address of ports FE1~FE4 is
	12.12.12.12, and the virtual IP address is 14.14.14.14).
2.	Connect external power supply to power on Logger4000.
3.	Observe whether the indicator RUN at the exterior of Logger4000 flickers normally.
4.	Log in to 12.12.12.12 through Internet Explorer, Safari, or Chrome.
5.	Configure serial port parameters on the Web interface.
6	Add PV devices connected to Logger4000 to the Web interface by
0.	means of searching or manual adding.
7.	Configure IP address.
	Configure iSolarCloud address if inverter data needs to be
	uploaded to iSolarCloud.
	Accessed iSolarCloud site is "Chinese Server" by default.
8.	In mainland Chain, set the site to "Chinese Server".
	In Europe, set the site to "European Server".
	In Austrlia, set the site to "Australian Server";
	In other regions, set the site to "International Server".
	Access the Web interface of Logger4000 and check whether
9.	running data of string inverters manufactured by SUNGROW is
	normal.
10	Create power plants through iSolarCloud App, and check whether
10.	data displayed on iSolarCloud is normal.

#### Additional Information

To create power plants through iSolarCloud App, proceed as follows after downloading and installing the App:

- 1 Log in to the Web of Logger4000, and click "About" to get the QR code.
- 2 Scan the QR code with iSolarCloud App or manually enter the serial number S/N to add corresponding communication device.

For more details, refer to Quick Operation Manual of iSolarCloud App.

# 9 Web Interface

# 9.1 Running Requirements

Item	Parameter
Browser	IE11 or later, Chrome65 or later, and Safari11 or later
Min. resolution	1024x768

# 9.2 Login Steps

- step 1 Connect Logger4000 to the PC network card.
- step 2 Configure the IP addresses of the PC and the Ethernet ports (FE1~FE4) on the same network segment. If the default IP address of the Ethernet ports is 12.12.12.12, the IP address of the PC can be set to 12.12.12.X and the subnet mask is 255.255.255.0.
- **step 3** In the PC address bar, enter the IP address of the Ethernet port on Logger4000: 12.12.12.12. The default page is displayed.



In case you forget the IP of the Ethernet port, log in through the virtual IP. The virtual IP of Ethernet port is 14.14.14.14.

step 4 Select the desired language in the upper right corner of the interface, and click "Login".

User types include "general user" and "O&M user".

The general user can view basic information, real-time fault, and device monitoring information of the Logger4000.



In addition to all permissions of the general user, the O&M user has the permission to set and modify parameters of the Logger4000 and devices connected to the Logger4000.

In the following, description is given by using the O&M permission as an example.



After login for the first time, it is recommended to change the password as soon as possible. Click "O&M user" -> "Modify password" to change the password.

With the login password forgoten, contact SUNGROW and provide the device S/N as well as system time, to get the password.

- - End

# 9.3 Web Main Interface

When the "O&M user" logs into the Web for the first time, the "Help" window pops up. Follow the prompts to perform operations such as time synchronization, device connection, and forwarding configuration.

The Web main interface is as follows:

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I PU Part Name and a la se la	_		time frames	Laser against	pant formerst	time that
Anna Carlos Anna C						Phillips I links
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Televiter Realities Visions (separate		time income	-	The standard process		They made
					Cirgent's	I must be Realting Values, on put
reason and the sector sector sectors	many formers	And Description	the family.	-	Tree Page	Descent.
presidente ante ante	-			-	10100	server access to a

Item	Designation	Description
٨	Navigation monu	Display main function modules of the
A	Navigation menu	Web
В	Function display area	Display the current interface
		Display the current alarm level and alarm
С	Alarm icon	number. Users can click the icons to
		enter the corresponding alarm interface
D	Halp	Display the basic configuration steps of
D Help		the Logger4000
_		Click the button to select the desired
E	Languagemenu	language
F	User	Display the current login user

indicates the connection status of Ethernet port of Logger4000.indicates the cloud connection status of Logger4000.

# 9.4 Operation Procedure

## Prerequisite

- Finished the electrical connection.
- Log in the Web.

step 1 Configure serial ports of the Logger4000.

After logging into the Web, first configure the serial ports of the Logger4000, to ensure that the Logger4000 can normally communicate with upstream devices. Refer to the chapter"9.9.14 Interface".

step 2 Calibrate the system time.

Check whether the current system time is correct, and perform manual time synchronization or automatic time synchronization when necessary. Refer to the chapter"9.9.8 System Time".

step 3 Automatically search the device.

Devices that can be automatically searched, such as SUNGROW string inverter, can be added via the auto search function with addresses allocated automatically. Refer to the chapter "9.7.1 Device List".

step 4 Add the device. Refer to the chapter

"9.7.1 Device List".

step 5 Configure forwarding service.

After all devices have been added, configure the forwarding service of the Logger4000, to ensure that the Logger4000 can forward the data to upstream devices. Refer to the chapter"9.9.9 Forwarding Configuration", "9.9.10 IEC104", "9.9.11 MODBUS", "9.9.12 Third-party portal", "9.9.13 Forward GOOSE Service Configuration".

- - End

# 9.5 Overview

## 9.5.1 General Information

Click "Overview" -> "General information" to enter the corresponding interface.

Shortcut Menu						
		Provide Constantion	*			
Pt-Plant Value						te.
		The last free free free		C 7 mars		
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and an inclusion of the second	and and a	1000				

#### Shortcut Menu

Device setup

Support of auto search and add device functions. Click the menu to add, delete, modify, and view the device or perform auto search operation to search the device to which address will be automatically allocated. Refer to the chapter "9.7.1 Device List".

Network management

Set Ethernet parameters. Refer to the chapter "9.9.14 Interface".

Transfer configuration

Transfer the data connected by the system to the background. Refer to the chapter"9.9.9 Forwarding Configuration", "9.9.10 IEC104", "9.9.11 MODBUS", "9.9.12 Third-party portal", "9.9.13 Forward GOOSE Service Configuration".

System maintenance

Support of operations such as system upgrade, log export, and rebooting. Refer to the chapter"9.9 System".

#### **PV-plant Value**

Information such as today yield, total yield, real-time active power, and number of offline devices can be viewed.

Click the button "Exp." to view more information.

#### Inverter realtime values

Information on the inverter such as state, daily yield, active power, and reactive can be viewed.

## 9.5.2 Current Alarms

Click "Overview" -> "Current alarms" to view the device fault information. Information such as device name, alarm name, alarm type, alarm time, fault code, and fault ID can be viewed.

# 9.6 Device Monitoring

Click "Device Monitoring" to enter the corresponding interface.

Device information such as real-time values, DC data, initial parameter, protection parameter, general parameter, device instruction and device information can be viewed on this interface.

### 9.6.1 RealTime Values

Realtime information such as power generation, device state, and active power can be viewed on this interface.

- step 1 Click "Device Monitoring" -> "Realtime values" to view the corresponding information.
- step 2 Click with to select needed device type in the drop-down list.
- step 3 Select a device in the device list and view its real-time data on the right.

- - End

## 9.6.2 DC Data

step 1 Click "Device Monitoring" -> "DC data" to view the corresponding information.

step 2 Click with to select needed device type in the drop-down list.

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step 3 Select a device in the device list and view the voltage and current information of multiple MPPTs and multiple strings corresponding to the device on the right.

- - End

# 9.6.3 Initial Parameter

- step 1 Click "Device monitoring" -> "Initial parameter" to enter the corresponding interface and set initial parameters.
- step 2 Click with to select needed device type in the drop-down list.
- step 3 Select a device in the device list and set its initial parameters on the right. There are two ways to set the initial parameters: single setting and batch setting.

- - End

#### 9.6.3.1 Single setting

- step 1 Select the desired country (region) and grid type.
- step 2 Click "Setting" to set initial parameters for the single device.

- - End

#### 9.6.3.2 Batch setting

- step 1 Select the desired country (region) and grid type.
- step 2 Click "Configure synchronization".
- step 3 Select the desired devices in the pop-up device list, and click "Save" to achieve batch setting.

- - End

#### 9.6.4 Operation Parameters

- **step 1** Click "Device Monitoring" -> "Operation Parameters" to enter the interface.
- step 2 Set it in accordance with the parameter setting range on the interface.
  - Configure the parameters of a single device: enter the parameter value and click "Settings".
  - Configure parameters for multiple devices: enter parameter values and click "Configure Synchronization", then this setting will be synchronized to multiple devices.

- - End

#### 9.6.5 System Parameters

**step 1** Click "Device Monitoring" -> "System Parameters" to enter the interface.

step 2 Set the system time in combination with the parameter setting range.

- Configure the parameters of a single device: enter the parameter value and click "Settings".
- Configure parameters for multiple devices: enter parameter values and click "Configure Synchronization", then this setting will be synchronized to multiple devices.

- - End

#### 9.6.6 Protection Parameters

- step 1 Click "Device Monitoring" -> "Protection Parameters" to enter the interface and set device protection parameters.
- step 2 Set in combination with the parameter setting range.
  - Configure the parameters of a single device: enter the parameter value and click "Settings".
  - Configure parameters for multiple devices: enter parameter values and click "Configure Synchronization", then this setting will be synchronized to multiple devices.
  - - End

#### 9.6.7 Protection Parameters (Others)

- step 1 Click "Device Monitoring" -> "Protection Parameters (Others)" to enter the interface.
- step 2 Set the parameters according to the setting range.
  - Configure the parameters of a single device: enter the parameter value and click "Settings".
  - Configure parameters for multiple devices: enter parameter values and click "Configure Synchronization", then this setting will be synchronized to multiple devices.
  - - End

#### 9.6.8 Power Regulation Parameters

**step 1** Click "Device Monitoring " -> "Power Regulation Parameters" to enter the interface.

step 2 Set up in combination with the parameter setting range.

- Configure the parameters of a single device: enter the parameter value and click "Settings".
- Configure parameters for multiple devices: enter parameter values and click "Configure Synchronization", then this setting will be synchronized to multiple devices.
- - End

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#### 9.6.9 General Parameters

- step 1 Click "Device Monitoring" -> "General Parameters" to enter the interface and set general parameters of the device.
- step 2 Select "Read-back", set "Register Address", " Register Number" and "Address Type", and click [Read-back]. The current value of the device can be read.
- step 3 Select "Settings", set "Register Address, "Data Type" and "Set Value".
  - Set general parameters for a single device: Click [Settings] to complete the Settings.
  - Configure general parameters for multiple devices: Click [Configure Synchronization] to synchronize the settings to multiple devices.

- - End

## 9.6.10 Device Instruction

Click "Device monitoring" -> "Device instruction" to enter the corresponding interface. On this interface, users can boot/shutdown the device or reset all settings. Device instruction can be set in two manners: single setting and batch setting. Take the boot operation as an example for explanation.

#### 9.6.10.1 Single setting

- step 1 Select a device, click "boot", and a dialog box pops up.
- step 2 Click "Yes" to start a single device.

- - End

#### 9.6.10.2 Batch setting

- step 1 Select a device, click "boot", and a dialog box pops up.
- step 2 Click "Configure synchronization".
- step 3 Select the desired devices in the pop-up device list, and click "Save" to achieve batch setting.
- step 4 Click "Confirm" on the pop-up dialog box.

- - End

## 9.6.11 Device Information

Click "Device Monitoring" -> "Device Information" to view the corresponding information. Parameter information such as device S/N, device model, and rated active power can be viewed.

# 9.7 Device Maintenance

#### 9.7.1 Device List

The function module "Device list" is used for managing devices connected to the Logger4000 and configuring addresses for these devices. Devices can be automatically searched and added.

## 9.7.1.1 Auto search

The "Auto search" function is used for SUNGROW string inverter to which addresses will be automatically allocated.

- **step 1** Click "Device" -> "Device list" to enter the corresponding interface.
- step 2 Click the button "Auto search", and the corresponding window pops up. Select an interface type, and click "Search".
- step 3 After that, corresponding devices will be displayed.

- - End



Inverters without the SN do not support the automatic search function and device adding function.

Automatic address allocation pops up only when there is an actual address confrontation.

#### 9.7.1.2 Export

- **step 1** Click "Device" -> "Device list" to enter the corresponding interface.
- step 2 Click the button to export the device list.

- - End

#### 9.7.1.3 Import

**step 1** Click "Device" -> "Device list" to enter the corresponding interface.

step 2 Click the button to export the device list.

- step 3 Modify the names of multiple devices on the device list file on the local PC.
- step 4 Save the modification.
- step 5 Click C to select the modified device list and click "Open" to import it to the Web.

- - End

#### 9.7.1.4 Add device

step 1 Click "Device" -> "Device list" to enter the corresponding interface.

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step 2 Click "Add device", select a device type in the pop-up window, and fill in the information required.

step 3 Click "Save".

- - End

#### 9.7.1.5 Edit device

- step 1 Click "Device" -> "Device list" to enter the corresponding interface.
- step 2 Click the button <sup>O</sup> in the operation bar, to modify the name of the device connected to the Logger4000 and other parameters.
- step 3 Click "Save".

- - End

i

The "Device Name" is named in the form device model (port numbercommunication address).

Take SG36KTL-M (COM1-7) as an example. SG36KTL-M is device type, COM1 is the communication port, and 7 is the communication address.

#### 9.7.1.6 Delete device

After a device is deleted on site, the user can delete the device from the device list, to keep device consistency.

- step 1 Click "Device" -> "Device list" to enter the corresponding interface.
- step 2 Select the device to be deleted, click the button "Delete".
- step 3 Click "Confirm" in the pop-up window, to delete the device.

- - End

## 9.7.2 Firmware Update

The firmware update function is used to upgrade the SUNGROW residential inverter and string inverter.

- step 1 Click "Device" -> "Firmware update" to enter the corresponding interface.
- step 2 Click the button "Select a firmware file". Click "Local Upgrade Package" or "Online Upgrade Package" to select the upgrade file. Click "Open" to import the upgrade file, and matching devices are displayed.
- step 3 Select the device to be upgraded, and click "Upgrade".
- step 4 Complete firmware update to view current version, target version, start time, end time and other information.

- - End

6

The upgrade package supports both .sgu and .zip files, where the .zip file must be compressed by UC packaging tool. Contact SUNGROW customer service if the UC packaging tool is needed.

#### 9.7.3 Inverter Log

- **step 1** Click "Device" -> "Inverter log" to enter the corresponding interface.
- step 2 Select the device running information, and click the button is to view the export progress.
- step 3 Click "Save" to store the exported log in the local.
- step 4 Click "Cancel" and then "Confirm" on the pop-up window, to cancel the current operation.

- - End

## 9.7.4 AFCI Activation

- **step 1** Click "Device"-> "AFCI Activation" to enter corresponding interface.
- step 2 Select devices need to self-checking, click "Self-checking", and then click "Confirm" on the pop-up dialog.



The status of devices need to self-checking must be "Enable". If the status is "Disable", click we to set it to "Enable".

- step 3 Self-checking results will be displayed in the result column 7 or 8 seconds later, either pass or failure.
- step 4 Click "Clear Fault" to view relative fault clearing status on the pop-up dialog.

- - End

# 9.8 History Data

Click "History data" -> "Operation logbook" to enter the corresponding interface. On this interface, users can view history information.

# 9.9 System

### 9.9.1 Running Information

Click "System" -> "Run-info" to enter the corresponding interface. Information such as mobile network signal strength, Al voltage, DI status can be viewed.

#### 9.9.2 System upgrade

Users can upgrade Logger4000 on the Web interface.

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- step 1 Click "System" -> "System maintenance" to enter the corresponding interface.
- step 2 Click "System upgrade", "Local Update Package" or "Online Update Package", select the upgrade file, and export it to the system.
- step 3 Click "Upgrade" on the pop-up version information window. The system enters upgrade state.

- - End



The upgrade file should be in the ".zip" format.

# 9.9.3 Log export

- step 1 Click "System" -> "System maintenance" to enter the corresponding interface.
- step 2 Click the button "Log export" to enter the corresponding interface.
- step 3 Select the type of logs to be exported, and click "Confirm".

- - End

#### 9.9.4 Rebooting

- step 1 Click "System" -> "System maintenance" to enter the corresponding interface.
- step 2 Click "Rebooting" to enter the corresponding interface.
- step 3 A warning window will pop up, and click "Confirm" to continue the rebooting operation.

--End

#### 9.9.5 Reset all setting

- step 1 Click "System" -> "System maintenance" to enter the corresponding interface.
- step 2 Click "Reset all settings" to enter the corresponding interface.
- step 3 A warning window will pop up, and click "Confirm" to continue the reset all settings operation.

- - End



Restoring the factory settings refers to restoring all modified settings to the factory state and will not clear the data.

# 9.9.6 Remote Maintenance

Click "System" -> "Remote maintenance" to enter the corresponding interface.

Remote Maintenance
Enable
Remote Service Address
Chinese Server
Save
Remote Service Is Not Connected

Remote maintenance switch state	Description
Disabled	Not allow for remote maintenance on the Logger4000
Enable	Allow for remote maintenance on the Logger4000

In case the remote maintenance switch is in the "Enable" state, the remote service address needs to be set.

- Users in mainland China select "Chinese Server",
- Users in Europe select "European Server".
- Users in Australia select "Australian Server";
- Users in other regions select the "International Server".

#### 9.9.7 Message Export

- step 1 Click "System" -> "Message export" to enter the corresponding interface.
- step 2 Set parameters, including interface, serial port, and duration, and click "Start" to start recording message. The recording automatically stops when the set time reaches, or the user may manually click the button "Stop" to stop recoding message.
- step 3 Click "Export" to export the message.

- - End

#### 9.9.8 System Time

Click the "System time" to check whether the current system time is correct, synchronize the system time, and enable/disable "Inverter timing".

Click "System" -> "System time" to enter the corresponding interface.

Current Time 2020-03	-05 11:26
Clock Source	
User Define	v
Use PC Time	
Time Zone	
(UTC+08:00) Beijing	, Urum 👻
Date	
2020-03-05	
Time	
11:26:32	
Save	

- **step 1** When the option "Inverter timing" is selected, device time will be synchronized with the time of Logger4000.
- step 2 When the clock source is set to "User define", user can manually set the current system time and time zone in the following two manners:
  - Select "Use PC time" to synchronize the time of the Logger4000 with the time of the PC.
  - Click the "Time zone" pull-down-list and select the local time zone. Enter the "Date" and "Time" and click "Save" to manually set the time of the Logger4000.

It is recommended to select "User define" during debugging.

step 3 Click the "Time zone" pull-down-list and select the local time zone

Clock Source	Descriptions	
User define	User can manually set the current system time and time zone in the following two manners:	
	• Select "Use PC time" to synchronize the time of the Logger4000 with the time of the PC.	
	• Click the "Time zone" pull-down-list and select the local time zone. Enter the "Date" and "Time" and click "Save" to manually set the time of the Logger4000.	
	It is recommended to select "User define" during debugging.	
NTP	When the clock source is set to "NTP", time of all devices can be synchronized. Click the "Time zone" pull-down-list and select the local time zone. Fill in the domain, set the time interval, and click "Save". In this way, the time of the Logger4000 is synchronized with the time of the server.	
IEC104	In this way, the Logger4000 and the background must use the IEC104 communication protocol, and otherwise, this manner is invalid.	
iSolarCloud	Ensure that Logger4000 is connected to iSolarCloud. Otherwise, setting the clock source to iSolarCloud is invalid.	
MODBUS- TCP	Ensure that Logger4000 and the background use MODBUS-TCP communication protocol. Otherwise, setting the clock source to MODBUS-TCP is invalid.	

It is recommended that the top priority should be given to the IEC104 and then the iSolarCloud.

## --End

# NOTICE

Set the system time when using the Logger4000 for the first time.

#### 9.9.9 Forwarding Configuration

**step 1** Click "System" -> "Transfer configuration" to enter the corresponding interface.

step 2 Click the button to modify the forwarding configuration information of iSolarCloud.

- - End



The default iSolarCloud station is "Chinese Server". Users in mainland China select "Chinese Server", users in Europe select "European Server", and users in other regions select the "International Server".

# 9.9.10 IEC104

Configure the IEC104 forwarding service for the Logger4000 on this interface.

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Click "System" -> "Transfer configuration" -> "IEC104" to enter the corresponding interface.

#### Server Mode

In the server mode, Logger4000 is used as a Server and connected to PC server to implement data transmission and instruction delivery.



The local port is 2404.

#### White list setting

Click "White List Setting" to enter the interface.

When the option "Enable White List" is not selected, and the peer IP address is "0.0.0.0", any background devices with valid IP address can access the Logger4000. When the option "Enable White List" is selected, and peer IP address is entered, only the device with the specified IP address can access the Logger4000.

#### **Generate Point Table**

Turn on the switch of local port 2404.

Click "Generate point table", and default IEC104 point table will be automatically imported to configuration file.

#### Edit IEC104 Forwarding Point Table

- step 1 Click "Export of Configuration Tools" to export configuration tools in .xsml format to the local.
- step 2 Decompress the exported package.
- step 3 Click open the configuration tools in the decompressed folder and set the parameters in the file. After setting, click "Export"->"IEC104 CFG" on the menu bar, and a pop-up dialog box is displayed to indicate output completion. The IEC104 forwarding point table in .xml format is generated.



The IEC104 forwarding point table and the configuration tools must be stored in the same directory.

- - End

#### 9.9.10.1 Import IEC104 forwarding point table

- step 1 After editing the IEC104 forwarding point table, click <sup>O</sup> on the operation bar to enter the "Advanced Settings" interface.
- step 2 Click the button <? on the pop-up window, to import the xml file.

step 3 Click "Save".

- - End

#### 9.9.10.2 Export IEC104 Forwarding Point Table

- step 1 Click "System"->"Transfer Configuration"->"IEC104" to enter the "Server" interface by default.
- step 2 Click step

- - End

#### 9.9.10.3 Client Mode

In the client mode, Logger4000 is used as a Client and connected to PC server to implement data transmission and instruction delivery.

- step 1 Click "System" -> "Transfer Configuration" -> "IEC104" to enter the "Server" tab by default.
- step 2 Click "Client" to enter the corresponding tab.

- - End

## 9.9.10.4 Add Peer Port Information

- step 1 In Client mode, edit the IEC forwarding point table referring to "Edit IEC104 Forwarding Point Table".
- step 2 Click "Add" to enter the "Advanced Settings" interface.
- **step 3** Enter the port number of the server and the peer port, and select the remote signaling measuring point type, remote signaling time mark, and upload with a change mode.
- **step 4** Click configuration to import .xml file.
- step 5 Click "Save".

- - End

#### 9.9.11 MODBUS

Configure the MODBUforwarding service for the Logger4000 on this interface.

#### 9.9.11.1 Sever Mode

In Sever mode, Logger4000 functions as a sever. Through Modbus TCP protocol, the host computer server is connected to Logger4000 for data and instruction transmission.

- step 1 Click "System"->"Transfer Configuration"->"MODBUS" to enter the "Sever" interface by default.
- step 2 Set white list referring to "9.9.10 IEC104".

- - End

SUNGROW

#### 9.9.11.2 Client Mode

In the client mode, Logger4000 is used a Client and connected to PC server through Modbus TCP protocol to implement data transmission and instruction delivery.

- step 1 Click "System" -> "Transfer Configuration" -> "MODBUS" to enter the "Server" tab by default.
- step 2 Click "Client" to enter the corresponding tab.
- step 3 Click "Add" to enter the "Advanced Settings" interface.
- step 4 Enter the port number of the server and the peer port and click "Save".

- - End

#### 9.9.11.3 RTU Mode

In the RTU mode, Logger4000 is connected to PC server through Modbus RTU protocol to implement data transmission and instruction delivery.

- step 1 Click "System" -> "Transfer Configuration" -> "MODBUS" to enter the "Server" tab by default.
- step 2 Click "RTU" to enter the corresponding tab.
- step 3 Select serial port and enter delay time.

step 4 Click

- - End

## 9.9.12 Third-party portal

Configure the third-party cloud forwarding service for the Logger4000 on this interface.

- step 1 Click "System" -> "Transfer configuration" -> "Third-party portal" to enter the corresponding interface.
- step 2 Turn on the switch.
- step 3 Click the button <sup>9</sup> on the operation bar, so that an advanced setting window will pop up.
- step 4 Modify the configuration information and click "Save".



Set the FTP path and name it as "/FTP server directory". For example, for the name "/SUNGROW", / is the root directory, and SUNGROW is the directory where data is stored on the FTP server.

- - End

## 9.9.13 Forward GOOSE Service Configuration

"Forward GOOSE Service Configuration" is used to configure the Forward GOOSE Service of Logger4000.

step 1 Click "System"->"Transfer Configuration"->"GOOSE" to enter the "GOOSE" interface.

step 2 Click is on the operation bar to export the GOOSE data configuration file to local.

step 3 Decompress the exported package, and open the .cfg file using Excel in the package. View and modify the GOOSE data configuration file.

step 4 Save the modified GOOSE data configuration file.

step 5 Click is on the operation bar, select the modified GOOSE data configuration file, and click "Open" to import it.

- - End

# 9.9.14 Interface

Set ports of the Logger4000 on the interface. There are 7 RS485 ports (COM1~COM7) and 1 PLC port.

#### 9.9.14.1 RS485

step 1 Click "System" -> "Interface" -> "RS485" to enter the corresponding interface.

step 2 Click <sup>9</sup> to modify baud rate, parity bit, and stop bit.

Serial Port	Baud Rate	Check Bit	Stop Bit	PLC	Fast
				Access	Scheduling
					Switch
COM1~CO-	0000	Null	1	Disable/	Disable/
M7	9600			Enable	Enable

When a serial port of Logger4000 is connected to a device, the "Baud rate", "-Check bit", and "Stop bit" of the serial port must be configured the same as those of the corresponding device, so as to ensure normal communication between Logger4000 and the device.

When "PLC Access" corresponding to COM1~COM7 is set to "Enable", the baud rates of COM1~COM7 will be automatically changed to 115200. And then MPLC node parameters can be set, referring to "9.9.15 MPLC".

- - End

1

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#### 9.9.14.2 Ethernet

Perform Ethernet settings on this interface.

- **step 1** Click "System" -> "Interface" -> "Ethernet" to enter the corresponding interface.
- step 2 If auto IP allocation is <sup>()</sup>, the IP address of port ETH in invalid. Log in to the device using the virtual IP address.

Port	Default IP	Virtual IP
ETH	12.12.12.12	14.14.14.14

step 3 If the parameter "Automatically obtain IP settings (DHCP)" is set to even, fill in the information such as the IP address, subnet mask, and default gateway, and click the

button to save the operation.

- - End

#### 9.9.14.3 AI

- **step 1** Click "System" -> "Interface" -> "AI" to enter the corresponding interface.
- step 2 Select an input type, set the lower limit and upper limit, and click the button to save the operation.

Al Dort	Input Type	Lower Sampling	Upper Sampling
AIFOIL		Limit	Limit
Al1	Voltage (V)	0	10
AI2	Current (mA)	4	20
AI3	Current (mA)	4	20
AI4	Current (mA)	4	20

step 3 If there is an external IO device connected to the logger, click "External" to set the AI information of this device.

- - End

#### 9.9.14.4 DI

- step 1 Click "System" -> "Interface" -> "DI" to enter the corresponding interface.
- step 2 Set the initial status to "NO" or "NC", and click the button 📕 to save the operation.
- step 3 If there is an external IO device connected to the logger, click "External" to set the DI information of this device.

- - End

#### 9.9.14.5 DO

step 1 Click "System"->"Port Parameter"->"DO" to enter the "Built-in" interface.

- step 2 Set the initial status of DO to "NO" or "NC", and click to set "Function", "Action mode", and "Action time", Click to save the settings,
- step 3 If there is an external IO device connected to the logger, click "External" to set the DO information of this device.

- - End

## 9.9.15 MPLC

step 1 Click "System"->"MPLC" to enter corresponding interface.

step 2 Click <sup>O</sup> on the operation bar to set information of master and slave nodes.

- - End

## 9.9.16 More

step 1 Click "System" -> "Port Parameters" -> "More" to enter the interface.

step 2 Select automatic online state (enable/disable) from the drop-down list.

- When the state is set to "Enable", parameters of string inverters researched and developed by SUNGROW can be automatically added without additional operations on the Web.
- When the state is set to "Disable", automatic parameter adding is not supported.
- - End

## 9.9.17 About

Click "About" to enter the corresponding interface.

Firmware information on Logger4000 can be accessed on this interface.

 $\label{eq:scan_QR} Scan\ QR\ code\ on\ the\ interface\ with\ the\ iSolarCloud\ App,\ to\ add\ new\ Logger 4000.$ 

# 10 Grid Dispatching

# **10.1 Function Description**

Logger4000 is equipped with a power control module. The module is used to receive control instructions from the grid dispatch center and send the control instructions to the monitored inverter through the RS485 port, thereby controlling the active power, reactive power, power factor, start/stop of the inverter.

# 10.2 Power Regulation

Power regulation includes active power control and reactive power regulation.

# 10.2.1 Active Power

# 10.2.1.1 Disable

If the inverter needs to operate at full load, the active control mode should be set to "Disable".

step 1 Click "Power control" -> "Active power" to enter the active power interface.

## step 2 Set the active control mode to "Disable" and click "Save".

- - End

## 10.2.1.2 Remote Power Control

When the instruction source is IEC104 or MODBUS TCP protocol, set the active control mode to "Remote power control".

- step 1 Click "Power control" -> "Active power" to enter the active power interface.
- step 2 Set the active control mode to "Remote Power Control".
- step 3 Set remote dispatching parameters. For specific parameter description, refer to the following table.

Parameter	Description		
	Open loop control: Remote monitoring background is connected and active instruction of remote dispatching is sent to the power output port of the inverter, thereby achieving active power control.		
	Closed-loop control:		
Control method	<ul> <li>In case no Smart Energy Meter is selected, remote monitoring background is connected, active instruction of remote dispatching is used as target value, and active power compensation ratio is calculated and sent to the power output port of the inverter. Generally, this strategy is used for fast and accurate active power regulation.</li> </ul>		
	<ul> <li>In case a Smart Energy Meter is selected, remote monitoring background is connected, active instruction of remote dispatching is used as target value, active power of the meter needs to be collected and used as input parameter, and active power compensation ratio is calculated and sent to the power output port of the inverter. Generally, this strategy is used for anti-backflow or avoiding zero power feed-in.</li> </ul>		
Quant racovart time*	The Logger4000 receives the remote scheduling command and will stop querying data during this time period.		
Query recovery lime	After the remote scheduling command is		
	executed, you can continue to query the data.		
Frame delay*	The delay time of the message after the logger sends the scheduling command.		
Select energy meter/	Select Smart Energy Meter / transformer involved		
transformer**	in power regulation.		
Communication abnormality output (%)**	Communication is abnormal, and specified dispatch output value is delivered.		
Error limit (%)**	Adjustment accuracy If the ratio of the difference between the active power and the target value to the rated power is within the set error range, the target value is reached.		

table 10-1 Parameter description

Parameter	Description
Adjustment ratio (%)**	If the adjustment does not reach the set target value, increase or decrease adjustment value according to the set adjustment ratio, so as to reach the target value.
Control Cycle**	Time interval of delivering dispatching instructions Parameter range: 5~60s

The parameters noted with \* refer to the parameters that need to be set only when the Control Method is set to "Open-loop Control".

The parameters noted with \*\* refer to the parameters that need to be set only when the Control Method is set to "Closed-loop Control".

**step 4** After finishing parameter setting, click "Save" to save the operation.

- - End

## 10.2.1.3 Local Power Control

If active dispatching instruction or dispatching target value is used as dispatching input locally, the active control mode is set to "Local power control".

- **step 1** Click "Power control" -> "Active power" to enter the active power interface.
- step 2 Set the active control mode to "Local power control".
- step 3 Set local dispatching parameters. For specific parameter description, refer to the following
| Parameter            | Description  |
|----------------------|--|
|                      | Open loop control: At the start time, the locally configured active instruction is sent to the power output port of the inverter, thereby implementing active power control.   |
|                      | Closed-loop control:   |
| Control method       | • In case no Smart Energy Meter is selected, at the beginning time, the active instruction configured locally is used as target value, and active power compensation ratio is calculated and sent to the power output port of the inverter. Generally, this strategy is used for fast and accurate active power regulation.  |
|                      | • In case a Smart Energy Meter is selected, at the beginning time, active instruction configured locally is used as target value, active power of the meter needs to be collected and used as input parameter, and active power compensation ratio is calculated and sent to the power output port of the inverter. Generally, this strategy is used for anti-backflow or avoiding zero power feed-in. |
|                      | Unselected   |
| Select energy meter* | Select Smart Energy Meter involved in power regulation   |
| Construct or value   | Time interval of delivering dispatching instructions   |
|                      | Parameter range: 5~60s   |
| O Mothod             | kW: set active power value   |
|                      | %: set active power percentage   |

table 10-2 Parameter description

Note: \*Only when the control method is set to "Closed-loop control", the parameter "-Select energy meter" is settable.

step 4 Add local power control manner

Fill in "Start time" and "Percentage" (fixed value of active power), and click "Save".

### - - End

### Subsequent Operation

Delete local power control manner: select a local control manner that needs to be deleted, and click "Clear data".

### 10.2.1.4 Al Control

When using the analog signal at the AI port of the Logger4000 as the dispatching input, set the active control mode to "Analog input".

- step 1 Click "Power control" -> "Active power" to enter the active power interface.
- step 2 Set the active control mode to "Analog input".
- step 3 Set Al control parameters. For specific parameter description, refer to the following table.

table 10-3 Parameter description

Parameter	Description
	Open loop control: Active instruction controlled by Al is sent
	active power control.
	Closed-loop control:
Control method	• In case no Smart Energy Meter is selected, active instruction controlled by AI is used as target value, and active power compensation ratio is calculated and sent to the power output port of the inverter. Generally, this strategy is used for fast and accurate active power regulation.
	• In case a Smart Energy Meter is selected, active instruction controlled by AI is used as target value, active power of the meter needs to be collected and used as input parameter, and active power compensation ratio is calculated and sent to the power output port of the inverter. Generally, this strategy is used for anti-backflow or avoiding zero power feed-in.
	Unselected
Select energy meter*	Select Smart Energy Meter involved in power regulation
Control ovolo	Time interval of delivering dispatching instructions
Control cycle	Parameter range: 5~60s
Al port	AI1~AI4 available
	kW: set active power value
Q-Method	%: set active power percentage
Min.	Lower limit: 0.0
	When "Q-Method" is set to "%", the upper limit is 100.0%
Max.	When "Q-Method" is set to "kW", the upper limit is 999999
	kW
Step	The minimum difference value between two consecutive
	power dispatching instructions

Note: \*Only when the control method is set to "Closed-loop control", the parameter "-Select energy meter" is settable.

- step 4 (Optional) If AI configuration is selected, click "AI Configuration " to set voltage and current sampling parameters for the selected AI port.
- step 5 After finishing parameter setting, click "Save" to save the operation.

- - End

#### 10.2.1.5 Digital Input

When using the digital signal at the DI port of the Logger4000 as the dispatching input, set the active control mode to "Digital input".

- step 1 Click "Power control" -> "Active power" to enter the active power interface.
- step 2 Set the active control mode to "Digital input".
- step 3 Set DI control parameters. For specific parameter description, refer to the following table.

table 10-4 Parameter description

Parameter	Description
	Open loop control: Active instruction controlled by DI is sent to the power output port of the inverter, thereby achieving active power control. Closed-loop control:
Control method	• In case no Smart Energy Meter is selected, active instruction controlled by DI is used as target value, and active power compensation ratio is calculated and sent to the power output port of the inverter. Generally, this strategy is used for fast and accurate active power regulation.
	<ul> <li>In case a Smart Energy Meter is selected, active instruction controlled by DI is used as target value, active power of the meter needs to be collected and used as input parameter, and active power compensation ratio is calculated and sent to the power output port of the inverter. Generally, this strategy is used for anti-backflow or avoiding zero power feed-in.</li> </ul>
Control cyclo	Time interval of delivering dispatching instructions
	Parameter range: 5~60s

Parameter	Description
	kW: set active power value.
Q-Method	%: set active power percentage.
	Unselected
Select energy meter/ transformer*	Select energy meter/transformer involved in power regulation

Note: \*Only when the control method is set to "Closed-loop control", the parameter "-Select energy meter" is settable.

### step 4 Add digital input manner.

Select the desired DI channel, fill in the "Percentage" (fixed value of active power), and click "Save".

### - - End

### Subsequent Operation

Delete digital input manner: select a digital input manner that needs to be deleted, and click "Clear data".

### 10.2.1.6 Country Mode

If the dispatching input must be the national power dispatching instruction, the active control mode is set to "Country mode".

- step 1 Click "Power control" -> "Active power" to enter the active power interface.
- step 2 Set the active control mode to "Country mode".
- step 3 Select a country and PPC type, and click "Save".

When the country is set to "Korea", corresponding parameter description is as follows:

### table 10-5 Parameter description

Parameter	Description
PPC type	PPC device of DER-AVM type
Forwarding Modbus	From 1 to 10
ID	

When the country is set to "Japan", corresponding parameter description is as follows:

Parameter	Description
Scheduling mode	Logger4000 is connected to the power plant dispatch server
	designated by the Japan Electric Power Company to achieve
	Kyushu electric power dispatching or Hokkaido electric
	power dispatching.
	Support remote download and local import
	When it is set to "Remote download", fill in plant code and
Obtaining Schedule	server address, and import certificate, to download schedule
	from the set server address.
	When it is set to "Local import", just import the schedule file.
	Select "Plant parameter" or "Device parameter".
	When selecting "Plant parameter", set plant capacity and PV
Parameter type	module capacity further.
	When selecting "Device parameter", click "Detailed device
	parameter" to view and set device information.
	Calibrate the time as needed. Calibration range: -10~10.
	When the system time of Logger4000 < the time adjusted
	after "Time calibration", or the time of Logger1000 < the NTP
Time cellburtier	synchronization time,
lime calibration	The time validity will be displayed as "Invalid", at which time
	Logger1000 will send a stop instruction to the inverter.
	"Time validity: Invalid" will not disappear until the "Time
	calibration" or NTP synchronization operation is performed.

table 10-6 Parameter description

- - End

### 10.2.1.7 Scheduling Prohibited

Set the active control mode to "Scheduling prohibited" if the Logger4000 is prohibited to perform active dispatching on the inverter.

- step 1 Click "Power control" -> "Active power" to enter the active power interface.
- step 2 Set the active control mode to "Scheduling prohibited" and click "Save" .

- - End

### 10.2.2 Reactive Power

### 10.2.2.1 Disable

If the grid company does not need the power plant to adjust the voltage at the gridconnection point, and the inverter does not need to cooperate with the grid for reactive power compensation, the inverter keeps operating in the reactive-forbidden output state, and the Reactive control mode is set to "Disable".

- **step 1** Click "Power control" -> "Reactive power" to enter the reactive power interface.
- step 2 Set the reactive control mode to "Disable" and click "Save".

- - End

### 10.2.2.2 Remote Power Control

When the instruction source is IEC104 or MODBUS TCP protocol, set the "Reactive control mode" to "Remote power control".

- step 1 Click "Power Control" -> "Reactive Power" to enter the reactive power interface.
- step 2 Set the "Reactive Control Mode" to "Remote Power Control".
- step 3 Set remote dispatching parameters. For specific parameter description, refer to the following table.

Parameter	Description
	Open loop control: Remote monitoring background is
	connected and active instruction of remote dispatching is
	sent to the power output port of the inverter, thereby
	achieving active power control.
	Closed-loop control: Remote monitoring background is
Control mothod	connected and reactive instruction of remote dispatching
Control method	is used as target value, reactive power and power factor
	of the meter need to be collected and used as input
	parameters, and reactive power compensation ratio is
	calculated and sent to power output port of the inverter.
	Generally, this strategy is used for improving the power
	factor of the property boundary point.
	The Logger4000 receives the remote scheduling
	command and will stop querying data during this time
Query recovery time*	period.
	After the remote scheduling command is executed, you
	can continue to query the data.
Frame delay*	The delay time of the message after the logger sends the
i raine uelay	scheduling command.
Select energy meter /	Select Smart Energy Meter / transformer involved in
transformer**	power regulation
Communication	Communication is abnormal, and specified dispatch
abnormality output (%)**	output value is delivered.

Parameter	Description
	Adjustment accuracy If the ratio of the difference between
Error limit (%)**	the reactive power and the target value to the rated power
	is within the set error range, the target value is reached.
	If the adjustment does not reach the set target value,
Adjustment ratio (%)**	increase or decrease adjustment value according to the
	set adjustment ratio, so as to reach the target value.
	Forward: The reactive power direction of the inverter array
	displayed by the meter/transformer is the same as the
Reactive power	actual reactive power direction.
direction**	Backward: The reactive power direction of the inverter
	array displayed by the meter/transformer is opposite to
	the actual reactive power direction.
Control ovelo**	Time interval of delivering dispatching instructions.
	Parameter range: 5~60s

### Note:

The parameters noted with \* refer to the parameters that need to be set only when the Control Method is set to "Open-loop Control".

The parameters noted with \*\* refer to the parameters that need to be set only when the Control Method is set to "Closed-loop Control".

**step 4** After finishing parameter setting, click "Save" to save the operation.

### - - End

### 10.2.2.3 Local Power Control

If reactive dispatching instruction or dispatching target value is used as dispatching input locally, the reactive control mode is set to "Local power control".

- **step 1** Click "Power control" -> "Reactive power" to enter the reactive power interface.
- step 2 Set the "Reactive control mode" to "Local power control".
- step 3 Set local dispatching parameters. For specific parameter description, refer to the following table.

Parameter	Description
Control method	Open loop control: At the start time, the locally configured active instruction is sent to the power output port of the inverter, thereby implementing reactive power control.
	Closed-loop control: At the beginning time, reactive instruction configured locally is used as target value, reactive power and power factor of the meter need to be collected and used as input parameters, and reactive power compensation ratio is calculated and sent to power output port of the inverter. Generally, this strategy is used for
	improving the power factor of the property boundary point.
Q-Method	%: set reactive power percentage.
Select energy meter*	Select Smart Energy Meter involved in power regulation
Communication	
abnormality output (%)*	Communication is abnormal, and specified dispatch output value is delivered.
abnormality output (%)* Wiring mode*	Communication is abnormal, and specified dispatch output value is delivered. Direct connection: One Logger4000 is connected to all inverters, where all the inverters must be string inverters or central inverters.
abnormality output (%)* Wiring mode*	Communication is abnormal, and specified dispatch output value is delivered. Direct connection: One Logger4000 is connected to all inverters, where all the inverters must be string inverters or central inverters. Cascade connection: Multiple Logger4000 are cascaded, and this Logger4000 is used as the host.
abnormality output (%)* Wiring mode* Line reactive power compensation*	Communication is abnormal, and specified dispatch output value is delivered. Direct connection: One Logger4000 is connected to all inverters, where all the inverters must be string inverters or central inverters. Cascade connection: Multiple Logger4000 are cascaded, and this Logger4000 is used as the host. Compensation for reactive power losses in the line

Note: The parameters noted with \* refer to the parameters that need to be set only when the Control Method is set to "Closed-loop Control".

When selecting an energy meter, the Logger used must be the one manufactured by SUNGROW.

step 4 Add local power control manner

Fill in "Start time" and "Percentage" (PF), and click "Save".

### - - End

### Subsequent Operation

Delete local power control manner: select a local power control manner that needs to be deleted, and click "Clear data".

### 10.2.2.4 Al Control

When using the analog signal at the AI port of the Logger4000 as the dispatching input, set the reactive control mode to "Analog input".

- **step 1** Click "Power control" -> "Reactive power" to enter the reactive power interface.
- step 2 Set the reactive control mode to "Analog input".
- step 3 Set Al control parameters. For specific parameter description, refer to the following table.

Parameter	Description
Control method	Open loop control: Reactive instruction controlled by AI is sent to power output port of the inverter, thereby achieving active power control. Closed-loop control: Reactive instruction controlled by AI is used as target value and reactive power and power factor of the meter need to be collected and used as input parameters, and reactive power compensation ratio is calculated and sent to power output port of the inverter. Generally, this strategy is used for improving the power factor of the property boundary
	point.
Select energy meter*	Select Smart Energy Meter involved in power regulation.
Communication abnormality output (%)*	Communication is abnormal, and specified dispatch output value is delivered.
Control cyclo	Time interval of delivering dispatching instructions
	Parameter range: 5~60s
Al port	Al1~Al4 available
O Mathad	PF: set the power factor as the target value
Q-IVIEthod	%: set reactive power percentage
Min. / Max.	When "Q-Method" is set to "%", the parameter ranges from -100.0% to 100.0%.
	When "Q-Method" is set to "PF", the parameter ranges from -1 to -0.8 or 0.8 to 1.
Step	The minimum difference value between two consecutive power dispatching instructions
Hysteresis range**	When the parameter "Q-Method" is set to PF, dispatching output maintains to be PF $\pm$ 1

Note: The parameters noted with \* refer to the parameters that need to be set only when the Control Method is set to "Closed-loop Control" .

The parameters noted with \*\* refer to the parameters that need to be set only when the Q-Method is set to "  $\mathsf{PF}$  " .

- **step 4** (Optional) After selecting AI configuration, set parameters of the AI port, such as voltage sampling and current sampling.
- step 5 After finishing parameter setting, click "Save" to save the operation.

- - End

### 10.2.2.5 Digital Input

When using the digital signal at the DI port of the Logger4000 as the dispatching input, set the reactive control mode to "Digital input".

- **step 1** Click "Power control" -> "Reactive power" to enter the reactive power interface.
- step 2 Set the reactive control mode to "Digital input".
- step 3 Set DI control parameters. For specific parameter description, refer to the following table.

Parameter	Description
	Open loop control: Reactive instruction controlled by DI is
	sent to power output port of the inverter, thereby
	achieving active power control.
	Closed-loop control: Reactive instruction controlled by DI
Control mothod	is used as target value and reactive power and power
Control method	factor of the meter need to be collected and used as
	input parameters, and reactive power compensation ratio
	is calculated and sent to power output port of the inverter.
	Generally, this strategy is used for improving the power
	factor of the property boundary point.
Select energy meter*	Select Smart Energy Meter involved in power regulation
Communication	Communication is abnormal, and specified dispatch
abnormality output (%)*	output value is delivered.
Control cycle*	Time interval of delivering dispatching instructions
	Parameter range: 5~60s
Q-Mothod	PF: set the power factor as the target value
Q-Method	%: set reactive power percentage

Note: The parameters noted with \* refer to the parameters that need to be set only when the Control Method is set to "Closed-loop Control".

### step 4 Add digital input manner

Select the desired DI channel, fill in the "Percentage "(PF), and click "Save".

- - End

### Subsequent Operation

Delete digital input manner: select a digital input manner that needs to be deleted, and click "Clear data".

### 10.2.2.6 Country Mode

If the dispatching input must be the national power dispatching instruction, the active control mode is set to "Country mode".

- **step 1** Click "Power control" -> "Reactive power" to enter the reactive power interface.
- step 2 Set the reactive control mode to "Country mode".
- step 3 Select a country, PPC type, and instruction type, and click "Save".

- - End

### 10.2.2.7 Scheduling Prohibited

Set the reactive control mode to "Scheduling prohibited" if the Logger4000 is prohibited to perform reactive dispatching on the inverter.

- step 1 Click "Power control" -> "Reactive power" to enter the reactive power interface.
- step 2 Set the reactive control mode to "Scheduling prohibited" and click "Save".
  - - End

### 10.2.3 Emergency Button

In inverters need to be stopped in batch, select the button "Emergency button". Click "Power control" -> "Emergency button" to enter the corresponding interface.

Parameter	Description
Emergency button	Enable: The emergency button is turned on, and inverters are
	stopped in batch.
	Disable: The emergency button is turned off, and inverters are
	restored to the boot in batch.
DI port	Associated with DI5 channel

## 11 Maintenance

Due to the influence of ambient temperature, humidity, dust and vibration, the inner components of the Logger4000 will be aging and worn out. To ensure the system safety and maintain the efficiency of the Logger4000, it is necessary to carry out routine and periodic maintenance.

All measures, which can help the Logger4000 to keep good working conditions, are within the maintenance scope.

## 11.1 Safety Instructions

### A WARNING

Only qualified personnel can perform the work described in this chapter. Do not leave any screws, washers or other metallic parts inside the Logger4000 to avoid device damage.

### **WARNING**

After the Logger4000 stops, wait at least 5 minutes before performing any work on it.

### **Five Safety Rules**

Respect the following five rules throughout the maintenance or service process to ensure personnel safety.

- Disconnect the Logger4000 from all the external connections and internal power supplies.
- Ensure that the Logger4000 will not be inadvertently connected.
- Ensure that the Logger4000 is voltage free with a multimeter.
- Connect necessary grounding cables.
- Cover the electrical components with insulation cloth during operation.

## 11.2 Maintenance List

Item	Method		
	Check to make sure there is no strong EMC interference device		
	around the Logger4000		
environment	Check to make sure there is no hot source around the Logger4000.		
environment	Check to make sure there is no corrosive materials around the Logger4000		
	Check to make sure the power supply voltage is normal		
Hardware maintenance	Check to make sure the cables are connected firmly		
	Check to make sure the grounding cable is grounded properly		
System	Clean the enclosure, circuit board and the components		
cleaning	Check the heat dissipation hole and the ensure it is not covered		
<b>-</b> · · ·	Check if the screws of the control terminals are loose. Refasten		
lerminal and	them with screwdriver if necessary		
cable connection	Check if the connection copper bar or screws are discoloring		
	Visually check the wiring layout and the device terminal connection		
Software maintenance	Log in Web to check the device communication situation		
	Log in Web to check the parameter setting of the Logger4000		
	Log in Web to check the software version of the Logger4000		

# 12 Troubleshooting

## 12.1 Safety Instructions

### A DANGER

The ground cable must be grounded reliably. Otherwise, electric shock may occur to the operators!

### 12.2 Common Faults and Corrective Measures

The following table shows common faults and corresponding corrective measures. If the fault still persists after you perform the corrective measures as described in this manual, contact SUNGROW with the following information provided:

- Serial number of the Logger4000, date of manufacture, and software version
- Manufacture, type, configuration, and other information of device connected to the Logger4000
- Fault information and brief description
- Picture of the fault (if possible)

Fault	Possible cause	Corrective measure		
	1. Cable connection between	1. Check whether the PC is		
	the PC and the Logger4000 is	normally connected to the		
	abnormal.	port ETH of the Logger4000.		
Failure to log into		2. Check whether the network		
	2. PC network signal is	signal icon of the PC is		
	abnormal.	abnormal, like this 🚾.		
		3. Manually configure the IP		
	2 ID address of the DC is	address of the PC network		
	3. IP address of the PC Is	port so that it is on the same		
	incorrect.	network segment as the IP		
		address of the Logger4000.		

Fault	Possible cause	Corrective measure
	4. The PC cannot normally receive data.	4. Use the shortcut key win+R to call up the running command box and enter "- ping 12.12.12.12 (IP address of the Logger4000)", to check whether the PC can receive data packets.
	5. Confrontation with network card or anti-virus software occurs.	5. If the PC cannot receive data packets, disable other network cards, anti-virus software or fireproof wall, and try the login again.
	1. The RS485 cable connecting the device and the Logger4000 is abnormal.	1. Check the RS485 cable connecting the device and the Logger4000 and ensure it is not in short circuit, open circuit, or reverse connection between RS485 – A and RS485 – B.
Communication failure between the Logger4000 and devices connected to it	2. Configuration of the serial port is inconsistent with the RS485 parameters of the device.	2. Log into the Web, and click "System" -> "Port Parameter "-> "RS485 ", to check whether the port configuration is consistent with the RS485 parameters of the device.
	3. The current device is an inverter, and the inverter cannot be added to the Web system in automatic search manner.	3. Manually input the inverter address to add the inverter to the Web system.

Fault	Possible cause	Corrective measure		
	4. Communication connection status between the Logger4000 and the device is abnormal.	4. Log into the Web, and click "Device Monitoring", to check whether the communication status icon is like this <sup>33</sup> , and check whether repeated addresses are allocated to the same port. If the fault persists, contact SUNGROW.		
Data communication between the Logger4000 and background via ModbusRTU failed	1. The RS485 cable connecting the device and the Logger4000 is abnormal.	1. Check the RS485 cable connecting the device and the Logger4000 and ensure it is not in short circuit, open circuit, or reverse connection between RS485 – A and RS485 – B.		
	2. COM port parameter is incorrectly set on the web interface.	<ul> <li>2. Log into the Web, and click</li> <li>"System" -&gt; "Transfer</li> <li>Configuration "-</li> <li>&gt; "Modbus "-&gt; "RTU" to</li> <li>check whether the COM port</li> <li>is set to "Forwarding Is</li> <li>Prohibited".</li> <li>Check whether the serial port</li> <li>parameter is correct.</li> </ul>		
	3. Collection address of the device does not match with access address.	3. Log into the Web, and click "Device ->Device List" to ensure that "Device Address" and "Forwarding IP" are the same.		
	<ol> <li>Protocol configuration of the background is inconsistent with that of the device.</li> </ol>	<ul><li>4. Ensure that the protocol configuration of the background is consistent with that of the device.</li></ul>		
No data exchange between the and background via ModbusTCP	1. Network connection between the and background is incorrect.	1. Check that the network connection between the and the background is correct.		

Fault	Possible cause	Corrective measure
	2. Configuration of ports FE1~FE4 of the is incorrect.	2. Set the IP address of the ports FE1~FE4 of the to the one that the background needs to access.
	3. Collection address of the device does not match with forwarding address.	3. Log into the Web, and click "Settings" - > "Modbus service settings" to ensure that the collection address of the matches with the forwarding address.
	4. Protocol configuration of the background is inconsistent with that of the device.	4. Ensure that the protocol configuration of the background is consistent with that of the device.
	1. Network connection between the and background is incorrect.	1. Check that the network connection between the and the background is correct.
No data exchange between the and background via IEC104	2. IP address of the forwarding device or background IP address is incorrect.	2. Log into the Web, and click "System->Transfor Configuration->IEC104" and choose "White List Setting" to check whether it is enabled. If enabled, only IP addresses of white list setting are allowed to access the Logger4000.
	3. The communication device is abnormal.	3. Check that the communication device is normal.
	4. Background parameters are incorrectly configured.	4. Ensure that the background parameters are correctly configured.
No data exchange between the and	1. System time of the is incorrect.	1. Log into the Web, and click "System->System Time", to check whether the time is correct.
ISolarCloud	2. The ports FE1~FE4 are abnormal.	2. Users access the Internet via the port ETH.

Fault	Possible cause	Corrective measure			
	3. Communication between the and devices like inverter and combiner box is abnormal.	3. Check that the can normally communicate with devices such as inverter and combiner box.			
	1. The current inverter does not support remote upgrading function, or the upgrading file is inconsistent with the actual device type.	1. Ensure that the current inverter supports the remote upgrading function, and the sgu file is consistent with the actual device type.			
	2. The upgrading file is abnormal.	2. The upgrading file is invalid, for example, the file is encrypted or the file is named incorrectly.			
Remote inverter upgrading failed	3. The type of to-be- upgraded inverter is inconsistent with the upgrading file.	3. Check whether the type of the to-be-upgraded inverter is inconsistent with the upgrading file.			
	4. Communication connection is abnormal.	<ul> <li>4. Check whether the communication cable is correctly connected, and try to upgrade the inverter again if so.</li> <li>If the fault persists, contact SUNGROW.</li> </ul>			
	1. Communication connection is abnormal.	1. Log into the Web, and click "Monitoring", to check whether the communication status icon is normal, like this			
Remote parameter setting failed	2. The current operation mode of the inverter does not support the parameter setting.	2. Identify the current operation mode of the inverter. For example, the active power rising speed and drop speed can be set only when the speed control switch of the inverter is enabled.			

# 13 FAQ

Q1. How many types of communication ports does the Logger4000 support, what are the corresponding ports, and how to set the port parameters?

Туре	Port	Parameter setting
Ethernet		Default IP: 12.12.12.12; subnet mask: 255.255.255.0
	FE1~FE4	Gateway: 12.12.12.1
		DNS1: 1.2.4.8
		DNS2: 8.8.8.8
RS485		Default Baud rate: 9600
	A1B1~A7B7	Check bit: Null
		Data bit: 8
		Stop bit: 1
		Default Baud rate: 115200
PLC	111010	Check bit: Null
	L1,L2,L3	Data bit: 8
		Stop bit: 1

Q2. What are the forwarding protocols supported by the Logger4000?

Protocol	Description
	The Logger4000 sends the collected data of devices (-
	such as inverter, combiner box, Meteo Station) to the
ModbusRTU/ModbusTCP	background. The background allocates forwarding
	addresses to theses devices, thereby accessing and
	obtaining the data of the devices.
	1. Add or search devices on the Web interface (such
	as inverter, combiner box, Meteo Station).
IEC104	2. Export the IEC104 point table by clicking "Settings"
	-> "IEC104 service settings". The point table shows
	measuring point information of devices.

Protocol	Description
	The Logger4000 transfers the data of the collected
FTD	equipment (such as inverter, PV combiner box, Meteo
FIP	Station, etc.) to the remote monitoring system through
	the FTP protocol.
	Logger4000 transfers the data collected from devices
MOTT	(such as inverters, PV combiner box, Meteo Station,
MQTT	etc.) to the remote monitoring system through the
	MQTT protocol.

Q3. How to connect multiple Logger4000s to the background through the network?

- 1 Logger4000s closer to the Ethernet switch (< 100m) are connected to the Ethernet switch by using network cables.
- 2 Logger4000s relatively far away from the Ethernet switch (> 100m) are connected to the Ethernet switch by using routed fiber optic cables.
- 3 After cable connection, IP address of the multiple Logger4000s should be set to be within the same network segment, without repeated addresses.

# 14 Appendix A: Technical Data

Communication				
Inverter communication	RS485/MPLC			
Remote communication port	10 / 100 BaseT(X) Ethernet / RS485			
Max. Communication Distance				
RS485	1000m			
Ethernet	100m			
	Multi-core cable: 1000m			
MFEC	Single-core cable*: 400m			
Communication Ports				
RS485	7			
Fiber port	2*100/1000Base SFP			
Ethernet port	4*10/100BaseT (X)			
Fast dispatch port	1*10/100BaseT (X)			
Digital inputs	16,max 24 Vdc			
Digital outputs	4			
Built-in MPLC	1			
PT100 / PT1000	2			
	4(1 Analog input:0~10 Vdc,3 Analog input:4~20			
	mA)			
Power Supply				
AC input	100 ~ 277 Vac, 50 / 60 Hz			
DC input	24 Vdc, 1.25 A			
Power consumption	Typ. 18W			
	Max. 30W			
Ambient Conditions				
Operating Temperature	-30 °C to +60 °C			
Storage Temperature	-40 °C to +70 °C			
Relative air humidity	≤ 95 % (non-condensing)			
Elevation	≤ 4000 m			
Protection class	IP20			
Mechanical Parameters				
Dimensions (W *H *D)	440 * 44 * 224mm			
Weight	3 kg			
Installtion	Rack-mounting, wall mounting			



# 15 Appendix B: Related Drawings

### **Rack-mounted drawings**



### Wall-mounted drawings

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# 16 Appendix C: General Information

## 16.1 Quality Guarantee

SUNGROW shall service or replace the faulty product for free within the warranty period.

### Evidence

Within the warranty period, SUNGROW shall require the customer to present the purchase invoice and date. The trademark on the product shall be clearly visible, and SUNGROW shall hold no liability if otherwise.

### Exclusion of Liability

- The free warranty period for the whole machine/components has expired
- The device is damaged during transport
- The device is installed, altered, or operated incorrectly
- The device operates in an environment harsher than that described in this manual
- The fault or damage is caused due to installation, maintenance, alteration, or disassembly performed by persons not from SUNGROW
- The fault or damage caused by using non-standard components or software or using components or software not from SUNGROW
- The installation and operation do not comply with stipulations of relevant international standards
- The damage is caused by unpredictable factors

For the foregoing faults or damages, SUNGROW can provide a paid service at the request of the client after judgment.



The dimensions and parameters of the device are subject to changes without notification, and reference can be made to the latest document.

### Software Licenses

- It is prohibited to use data contained in firmware or software developed by SUNGROW, in part or in full, for commercial purposes by any means.
- It is prohibited to perform reverse engineering, cracking, or any other operations that compromise the original program design of the software developed by SUNGROW.

## 16.2 Contact Information

Should you have any question about this product, please contact us.

We need the following information to provide you the best assistance:

- Model of the device
- Serial number of the device
- Date of the device
- Fault code/name
- Brief description of the problem

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