Zeversolar Service Line

540-00107-00

Installation and Operating Instructions

Power Monitoring Unit

zeversolar

Contents

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1. About this Manual

This manual has a detailed description of the Power Monitoring Unit (PMU), including precautions, methods of installation and operating instruction.

The specifications described in this document apply to the current version of the product. We reserve the right to make changes due to the introduction update of new functions and improvements. This specification is subject to change without prior notice. Please contact ZEVERSolar to confirm the latest revision.

1.1 Scope of Application

This manual applies to the PMU, firmware version 12W144**-360R and later versions.

1.2 Target Reader

This manual is intended for authorized skilled installers, who have knowledge of electrical safety. Safety warnings can be found in section "3.3 Safety Symbols". Please read this manual carefully before installing.

1.3 Abbreviations

Table 1-1: Abbreviation

Abbreviation	Designation
PMU	Power Monitoring Unit
E-Today	Energy Generated Today
E-Total	Total Generated Energy
RRCR	Radio Ripple Control Receiver
LAN	Local Area Network
WAN	Wide Area Network
DHCP	Dynamic Host Configuration Protocol
NC	Not Connect
PV	Photovoltaic
EEG	Renewable Energy Sources Act
BDEW	The German Association of Energy and Water Industries

2. Introduction

The monitoring system plays an important role in the PV plant, being the means through which users can view the power generation data and fault information of the PV plant to avoid unnecessary damage. Users can also maximize the energy generating efficiency according to power generating data and report. In addition, the monitoring system is the interface between the PV plant and the network operator, which enables the PV plant to respond to power control instruction from the network operator.

2.1 Product Overview

The PMU collects inverter data and events in the PV plant to facilitate user data analysis. In the meantime, PMU uploads the collected inverter data to the web portal Solarcloud via the internet.

Regulations such as the EEG and BDEW require that PV plants can be controlled by the network operator. The PMU receives the power control instructions from the network operator and transmits these instructions to the inverters.
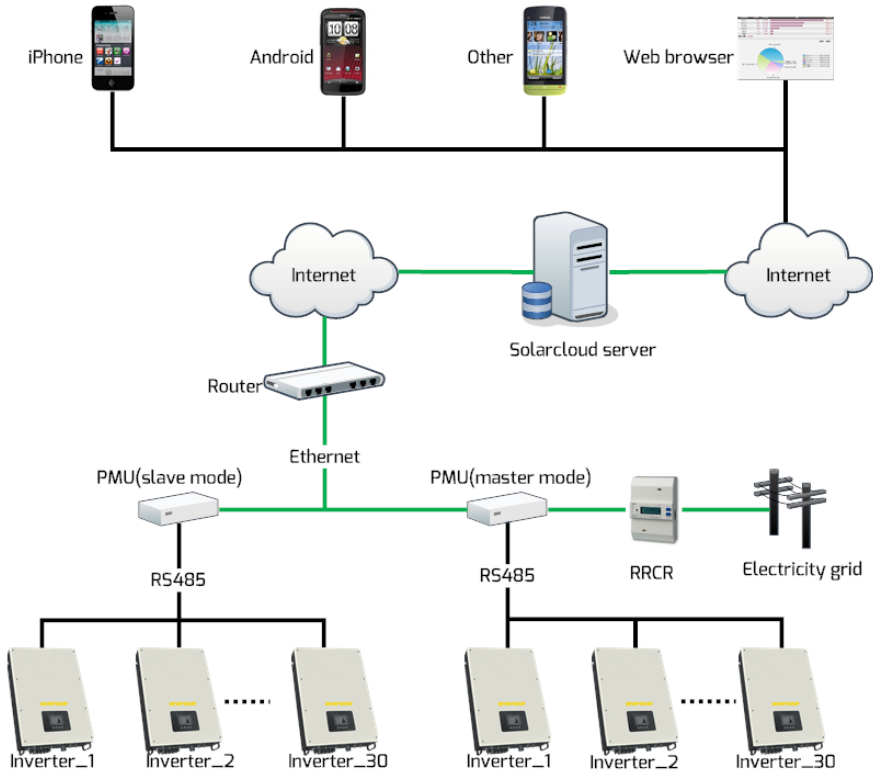
Fig.2-1: System structure

In the system structure shown in Fig. 2-1, the PMU connects to the inverters via an RS485 bus and collects the inverter data, which is then uploaded to Solarcloud for remote monitoring.

RRCR sends the power control instructions of the network operator to the PMU, which instructs the inverters to adjust the output power according to the power control instructions.

2.2 Function and Feature

A monitoring system can be built using the PMU including the following functions and features:

- Receive the power control instructions of the network operator and perform it.
- Record data and events of the inverters for the user to view and analyze.
- Report the yield and problems to the specified user.
- Display the status, yield and events of the current plant.
- Remotely monitor the plant to view data and events of the inverter.
- Provide yield and events for user via e-mail.
- Integrated web server.
- Low power consumption.

2.3 Scope of Delivery

Open the packing box of PMU. You will see the following components, as shown in Table 2-1.

Table 2-1: Components included in scope of delivery

Component	Quantity
Power adapter	1
PMU	1
User manual	1
Warranty card	1
Wall plug	2
Screw (ST4×25)	2
6-Pin connector	1

Please check all of the components carefully in the packing box. If something is missing, please contact the dealer at once.

3. General information

This section will introduce you to the application scope of this product, the factors that will affect its proper use, and the meaning of warning symbols that you will encounter in this manual.

3.1 Scope of Application

PMU can be used with ZEVERsolar brand inverters.

3.2 Environment

- The PMU can be used at temperatures of 0 ° C to 50 ° C.
- Do not allow the PMU to become damp or wet during use.
- Cutting off the power of PMU or disconnecting the RS485 cable in normal work can lead to data loss.

3.3 Safety Symbols

Please pay attention to the following safety symbols in the manual:

Information: Provides some information about installation or use.

Caution: Indicates the contents must be followed in order to prevent problems.

Warning: Indicates the contents must be followed in order to prevent serious problems or injuries.

4. Indication

4.1 LED Indication

PMU displays the operating status to the user with LEDs. The LED indicator panel is showed in Fig.4-1.

Fig. 4-1: LED indicator panel

The meanings of the LEDs are shown in the following Table 4-1.

Table 4-1: LED overview

LED	Status	Meaning
Power	On	Power on
	Off	Power off
JA	Flashing	PMU is sending instructions for active power limitation
JR	Flashing	PMU is sending instructions for the reactive power set point
COMM	Green flashing	An instruction is being sent to the inverters
	Red flashing	An instruction is being received from an inverter

4.2 LCD Display

The LCD of the PMU displays the IP address automatically obtained from the router, the date and time, and the status of the connection to Solarcloud. Each interface shows for ten seconds. The LCD display is shown in Fig. 4-2.
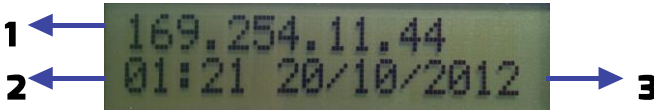

Fig. 4-2: LCD display

The meaning of each field of the LCD display is shown in the following Table 4-2.

Table 4-2: LCD display fields

No.	Example	Description
1	169.254.11.44	IP address
2	01:21	Current time
3	20/10/2012	Current date

If PMU is connected to Solarcloud, the LCD displays "Connected Solarcloud". If PMU is not connected to Solarcloud, the LCD displays "Disconnected Solarcloud". The normal information shown on the LCD display is described in table 4-3. There is more information that the LCD can display, please refer to section "09.3 LCD Indication".

Table 4-3: The normal information on the LCD display

LCD display	Description
169.254.11.44 **10:21 30/10/2013**	PMU's IP address, time and date.
Disconnected **Solarcloud**	PMU is not connected to Solarcloud.
Software Version **12W13C30-355R**	PMU's software version.
Connected INV 18 **Online INV 17**	"Connect INV 18" is the total number of inverters connected to the PMU since the PMU was turned on,
	"Online INV 17" is the number of inverters being currently monitored by the PMU.
Connected **Solarcloud**	PMU has connected to Solarcloud. Monitoring can be done remotely.

5. Installation

5.1 Location

The PMU should be installed indoors. In addition, extreme temperatures, immersing in water, fire and strong impacts will damage the PMU.

5.2 Installation

The PMU should be mounted on a wall as follows:

- Step 1: Drill two holes using a Φ6 bit for installing screws at the selected installation position. The distance between the two holes is shown in Fig. 5-1. Keep the drill bit vertical to the wall, and don't shake the drill to keep the holes straight. The holes should be at least 30mm deep. After clearing the dust from the holes, measure the net depth of the holes.
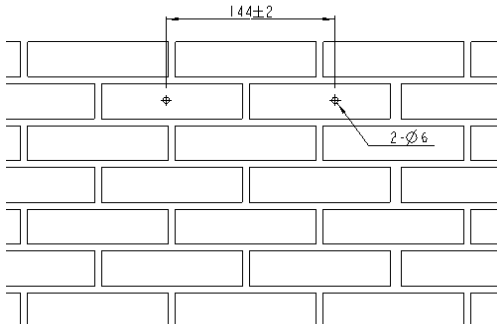

Fig.5-1: Drill the holes

- Step 2: Insert the wall plugs by using a rubber hammer, and insert the self-tapping screws into the wall plugs until they extend 5mm from the wall as shown in Fig. 5-2.
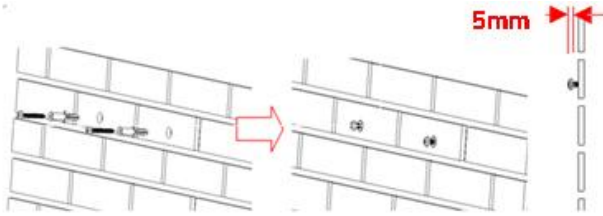
Fig. 5-2: Inserting the screws

- Step 3: Hang the PMU on the screw heads by tilting it slightly as shown in Fig. 5-3.
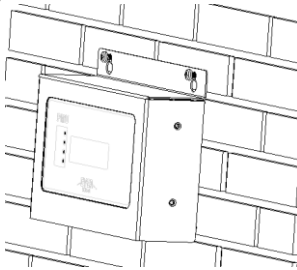

Fig. 5-3: Hang the PMU

- Step 4: Finally, tighten the two screws as shown in Fig. 5-4.

Fig. 5-4: Tighten the screws

6. Connection

The PMU is a gateway which connects the inverter with the Solarcloud web portal via Ethernet. This section explains how to set up the connection between Solarcloud and the PMU, as well as the connection between the PMU and the inverters.

6.1 Preparation

Before starting, cables need to be prepared as shown in Table 6-1.

Table 6-1: Preparation before starting

Wire	Usage	Requirement	Maximum length
Network cable	Used for connection of PMU with router	1. The wire sequence is according to the EIA/TIA 568A standard. 2. The cable must beCAT5E or better and UV resistant, if used outdoors.	100m
RS485 cable	Used for connection of PMU with inverter.	1. The wire sequence is according to the EIA/TIA 568A standard. 2. The cable must be CAT5E or better STP (shielded twisted pair). 3. If the cable is used outdoors, it must be UV resistant.	1000m
5-core cable	Used for connection of PMU with RRCR.	5-core wire, diameter of each core is between AWG24-AWG16.	3m

> If you use the power control function of the PMU, you should connect the PMU to the RRCR via a 5-core wire and set the PMU to master mode.

6.2 Connection Area

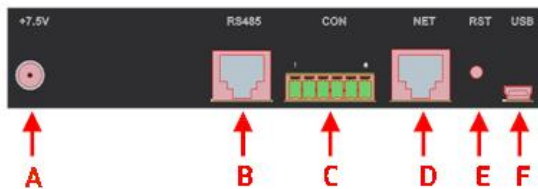Fig. 6-1 shows the connection interfaces of the PMU to other devices.

Fig. 6-1: Connection area

The function of each interface in Fig. 6-1 is shown in Table 6-2.

Table 6-2: Interface function description

Port	Filament	Description	Function
A	+7.5V	Power interface	Connect to power adapter
B	RS485	RS485 interface	Connect to inverter
C	CON	Power control instruction receiving port	Connect to RRCR
D	NET	Ethernet interface	Connect to router
E	RST	Restart interface	Restart PMU
F	USB	USB interface	Connect to PC for maintenance purposes

6.3 Connect the Inverter

This section describes how to connect the PMU to the inverters:

Step 1: Connect the inverter. Cascade the inverter with the RS485 cable shown in Fig. 6-2.

Step 2:Connect the inverter with the PMU. Connect the inverter closest to the RS485 interface of the PMU (as the port B in Fig. 6-1) as shown in Fig. 6-2.

Fig. 6-2: Connect with the inverter

The pin order of the RJ45 socket and plug used by the RS485 of the PMU is shown in Fig. 6-3.
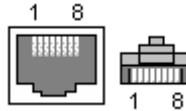

Fig. 6-3: Socket and plug definition of RJ45

The definition of the signal in each pin of the RJ45 socket is shown in Table 6-3.

Table 6-3: RJ45 pin description

Pin	Signal description
1	RX+
2	RX-
3	TX+
4	NC
5	NC
6	TX-
7	NC
8	NC

1. The RS485 port between the PMU and the inverter (port B in Fig. 6-1) uses the RJ45 socket. Please make sure to use the correct position.
2. The maximum communication distance of the whole RS485 bus is 1000m. Communication quality beyond this length is not guaranteed, because it depends on the quality of the RS485 cable.

6.4 Connect the Network

PMU needs to connect the Ethernet in order to provide remote monitoring. The connection between the PMU and the Ethernet is shown in Fig. 6-4.

PMU use network port 6655 and 80 communicate with Solarcloud, those two ports must be opened, or this reason maybe lead to PMU can't connect to Solarcloud and upload data.
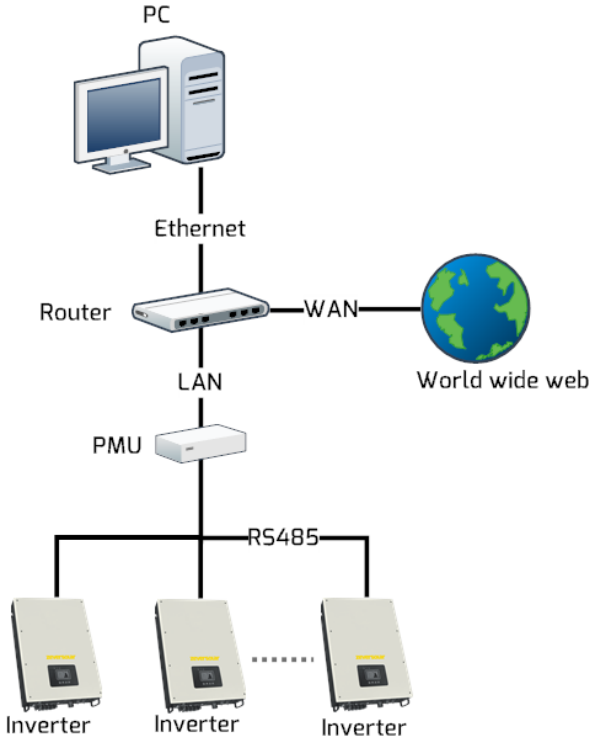
Fig. 6-4: Network connection

The PMU is connected to the network by simply connecting the network cable from the router to the network port of PMU (port D in Fig. 6-1), as shown in Fig. 6-5.
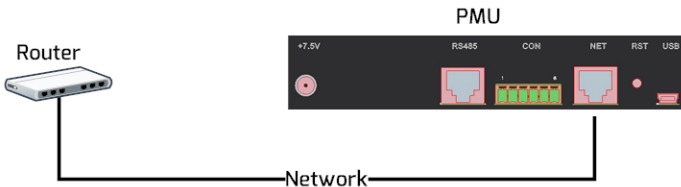

Fig. 6-5: PMU linked network

PMU obtains an IP address from the router via DHCP automatically and displays it on the LCD. The time necessary to connect to the network depends on the network communication status.

> The router needs to support DHCP services and the DHCP services must be activated.

> If the IP address of the PMU is different from the network segment assigned by the router, then the PMU did not obtain the correct IP address from the router.
>
> Troubleshooting methods:
> 1. Make sure the DHCP service of router has been activated.
> 2. Check the connection between the PMU and the router.
> 3. If the PMU cannot obtain an IP address from the router, the PMU will use 169.254.*.*(* symbol is a random number) as the default IP address. In this case the LCD of the PMU will display 169.254.*.* as the IP address.

6.5 Connect to the RRCR

One PMU can connect to up to 30 inverters, and the PMU connected to the RRCR must be set to master mode. In this way power control instructions can be sent from the network operator to the inverters, so that the PMU can achieve active power limitation and reactive power set point. The system connection is showed in Fig. 6-6.
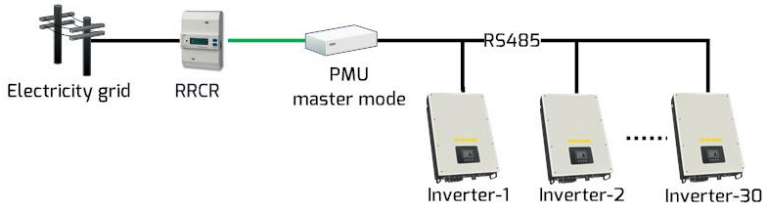
Fig. 6-6: PMU connects directly to the inverters

If more than 30 inverters are connected, another PMU must be added to the system. The PMU connected directly to the RRCR must be set to master mode, and the other PMUs must be in slave mode. Please refer to section "7.7 Power Management" to set the mode. The system connection is shown in Fig. 6-7.
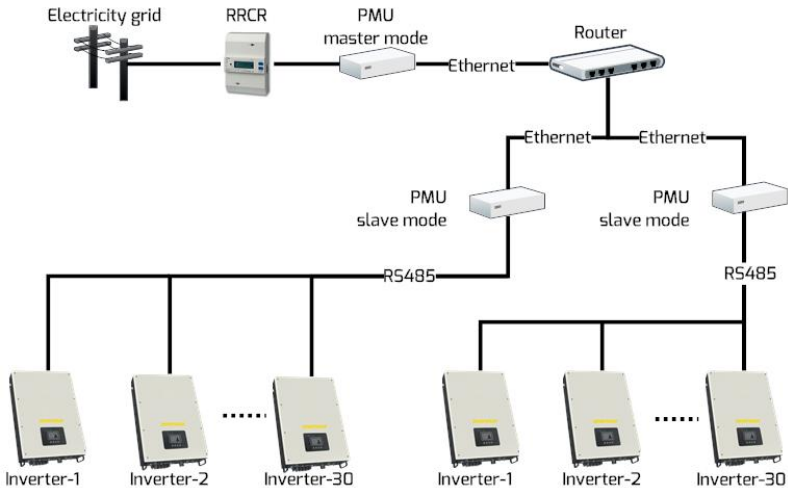

Fig. 6-7: Multiple PMUs connected to the inverters

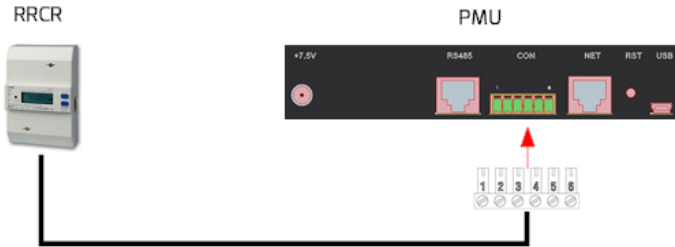The RRCR is connected to the CON port of the PMU (port C in Fig. 6-1), as shown in Fig. 6-8.

Fig. 6-8: Connect to RRCR

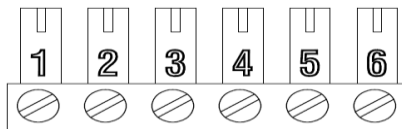Pin order of the 6-pin connector is showed in Fig. 6-9.

Fig. 6-9: Pin order of the 6-pin connector

The pin definition is shown in Table 6-4.

Table 6-4: Pin description

Pin	Description
1	+5V
2	Default 100%
3	Default 60%
4	Default 30%
5	Default 0%
6	NC

The default value for each relay of the RRCR in the control of active power limitation is K1 = 100 %, K2 = 60 %, K3 = 30 %, K4 = 0 %. These values can be changed as described in section "7.7 Power Management".

Before connecting with the RRCR, please refer to the specification of the RRCR. Each relay of the RRCR must be connected to the corresponding pin of the terminal as shown in Fig. 6-10.
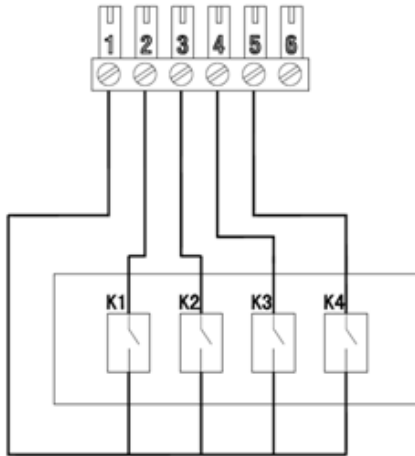

Fig. 6-10: Connection between PMU and RRCR

1. The PMU must only be connected to a RRCR by certified electrician. Wrong connections may destroy the PMU or the RRCR.
2. Please read the RRCR manual carefully before connecting.

6.6 Connect to the Power

Connect the power adapter from the box with the Power Port (port A in Fig. 6-1). Plug the other end into a power outlet, check that the LED (Power) light turns on as shown in Fig. 4-1, and watch the PMU start to work.

1. If another adapter is used, please confirm that the a complies with the EU low-voltage electrical applianc guideline and the EMC guideline.
2. If another adapter is used, please confirm that the o voltage is 7.5V and the output current not less than 500mA.

7. Web Server

Information about the PMU and the inverters connected to the PMU can be viewed by means of the PMU's internal web pages. These can also be used to configure power control and network parameters.

Enter the IP address of the PMU (shown on the LCD display) in the browser's address bar. For example, if the IP address shown on the PMU is 192.168.6.34, then input 192.168.6.34 in the browser's address bar (Step 1 in Fig. 7-1), press Enter to display the PMU's built-in web page, as shown in Fig. 7-1.
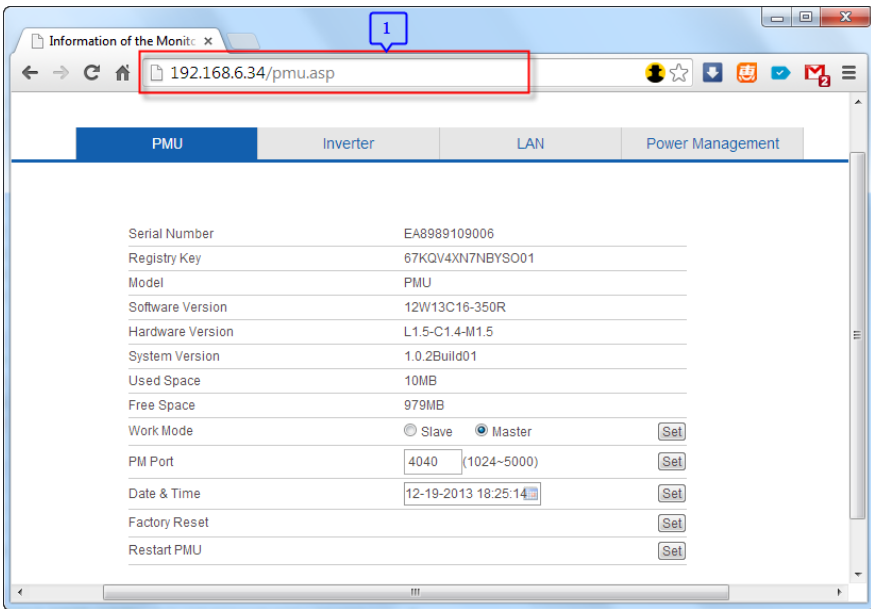

Fig. 7-1: web server

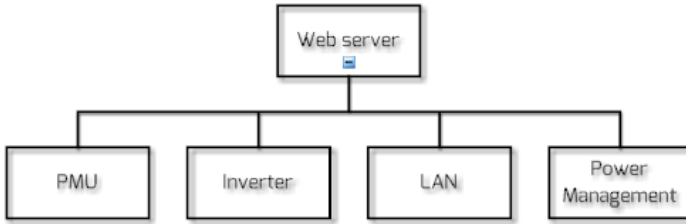The PMU's built-in web server interface structure is shown in Fig. 7-2.

Fig. 7-2: Structural hierarchy of the web server

7.1 PMU

This page shows the information and state of the PMU equipment. Some parameters of the PMU can also be configured on this page as shown in Fig. 7-3.

Fig. 7-3: PMU information

The information on this page is described in Table 7-1.

Table 7-1: Description in PMU page

Object	Description
Serial Number	A unique identifier to distinguish the PMU.
Registry Key	Registry key of the PMU used to create the PV plant in Solarcloud.
Model	PMU model number.
Software Version	Software version number of the PMU.
Hardware Version	Hardware version number of the PMU.
Used Space	Used space of internal memory of the PMU.
Free Space	Unused space of internal memory of the PMU.
Work Mode	Master/slave mode, refer to 7.1.1.
PM Port	Power control port of the PMU, refer to 7.1.2.
Date & Time	The current date and time of the PMU.
Factory Reset	Factory Reset, refer to 7.1.3.
Restart PMU	Restart PMU, refer to 7.1.4.

7.2 Work Mode

The PMU has master and slave mode, the main distinction being that master mode is used when power control is needed. Under master mode, PMU can receive power control instructions from an external RRCR and send the instruction to the inverters and other slave PMUs in the same network segment.

In slave mode, the PMU cannot receive power control instructions directly from an external RRCR, but only from the master PMU in the same network segment. The slave PMU will send the instructions to the inverters it is connected with.

The method of setting PMU work mode is showed in Fig. 7-4. After selecting the mode, click on "Set" and wait for about 3 minutes.

The PMU will restart automatically. Refresh the page in the browser manually in order to see the modified information.

Work Mode	○ Slave ◉ Master	Set

Fig. 7-4: Set work mode of PMU

1. After the work mode is changed successfully, the PMU needs about 3 minutes to restart.
2. The PM Port of the slave PMU must be the same as the master PMU in the same network segment, in order to receive power control instructions from the master PMU. Refer to PM Port in section 7.1.2.
3. Slave mode is the default mode of the PMU.

7.3 PM Port

It is possible to have more than one master PMU in the same network segment, but in order to avoid interference of power control instructions, the PM Ports must be set to different values.

As shown in Fig. 7-5, the router is connected to four PMUs at the same time, the two PMUs on the left side are set to master mode and slave mode respectively, and their PM Ports are set to 3000, while the two PMUs on the right side are set to master mode and slave mode as well, but their PM Ports are set to 4000. In this way PMU 1 can only receive power control instructions from PMU 2, and PMU 4 can only receive power control instructions from PMU 3.
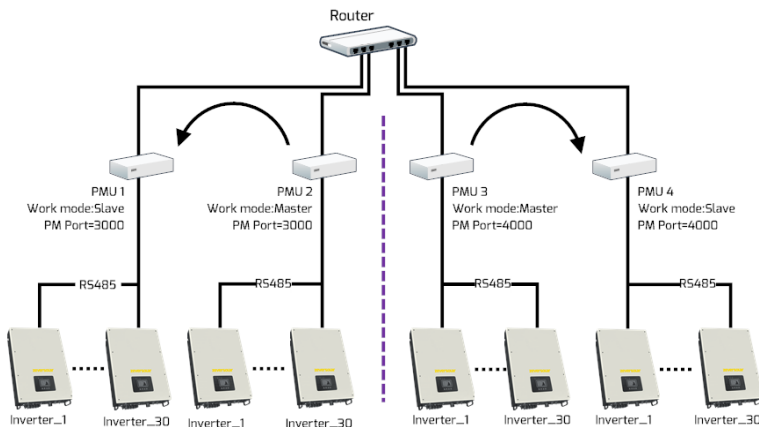
Fig. 7-5: PMUs under master mode achieve power control

> After the PM Port is changed successfully, the PMU will restart automatically in 3 minutes.

7.4 Factory Reset

If a factory reset is performed, all the user data will be cleared and are not retrievable. After the reset, PMU will restart automatically in 3 minutes.

7.5 Inverter

Click "Inverter" and the menu will enter the inverter information page, as shown in Fig. 8-4. This page displays the information of all the inverters connected to the PMU since it was started, including serial number, status, type, daily generated energy and the total generated energy. When "Status" is "Online", it means that the inverter is currently being monitored by the PMU. When "Status" is "Offline", it means that the inverter is not currently being monitored as shown in Fig. 7-6.

NO.	SN.	Model	Status	E_Today(KWh)	E_Total(KWh)
1	SX00210000000025	TLC017K	Online	0	0
2	SX017K0000000013	TLC017K	Online	0	0
3	0000000000000021	TLC017K	Online	97.9	97.9
4	0000000000000022	TLC017K	Online	99.2	99.2
5	SX00210000000016	TLC017K	Online	0	0
6	SX00210000000018	TLC017K	Online	0	0
Total				197.1	197.1

Fig. 7-6: Information of inverter

If the inverter works normally and is connected to the PMU with an RS485 cable and the "Status" is "Offline", it means that this inverter is not being monitored by the PMU. Please check whether there are problems with the RS485 communication cable or connection to the PMU or inverter.

7.6 LAN

Click the LAN menu and open the LAN page which shows the network configuration information of the PMU.

Obtain an IP address automatically: if this is selected ☑ , the PMU will obtain the network configuration information such as IP address, Subnet Mask and Gateway etc. automatically from the router, thus simplifying your settings. The router must have its DHCP function activated for this to work.

If you need to set a static IP address manually for PMU, leave the "Obtain an IP address automatically" field ☐ unselected, and then you can set the desired IP Address, Subnet Mask and Gateway. After all the settings are finished, click "Save" and they will take effect as shown in Fig. 7-7.

Fig. 7-7: Network parameters configuration

> To allow the PMU to obtain an IP address automatically, the DHCP function of the router connected to the PMU must be started.

7.7 Power Management

Both the EEG and BDEW regulations require power management functions of PV plant. The PMU can receive power control instructions from the RRCR and the PMU will send this instruction to the inverters. This functionality can be set up as follows:

Step 1: First, the PMU that is connected to the RRCR must be in master mode (PMU 1 shown in Fig. 7-8). The other PMUs are in slave mode (PMU 2 and PMU 3 shown in Fig. 7-8). Secondly, the PM Port of each PMU must be set to the same value. After the setting is successfully finished, wait for the PMU to restart.
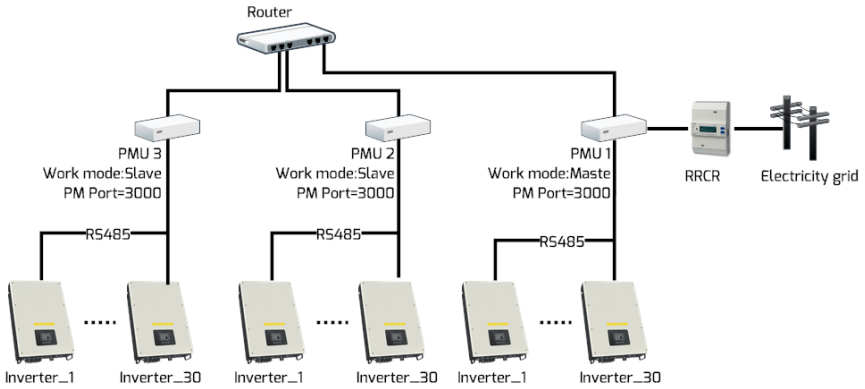
Fig. 7-8: Use PMUs to achieve power control

Step 2: Refresh the browser, and the "Power Management" menu will appear. As shown in Fig. 7-9, click the "Power Management" menu to display the "Power Management" page. Input "user" in the Username textbox, and "password" in the Password textbox, and click "Submit" to enter the power management configuration page, as shown in Fig. 7-10.

Fig. 7-9: Power management login page

Fig.7-10: Power management configuration page

Step 3: In Active Power Management options on the power
management configuration page, choose "Active" to activate the
function of power management as shown in Position 1 of Fig. 7-10.

After activating this function, the PMU will send the power
control instruction which it received from the RRCR to the inverter
and to the other slave PMUs in the same network segment (PMU 2
and PMU 3 as shown in Fig. 7-8). The slave PMU will send all the
power control instructions to the inverters connected to it.

If you choose "Inactive" to disable this function, the PMU will not
receive power control instructions from the RRCR, and the inverters
will not receive power control instructions.

Under the following two conditions, the inverter will
work according to the last power control instruction:
1. If the Active Power Management is switched from
Active to Inactive, the PMU will stop sending power
control instructions immediately.
2. If the RS485 cable accidentally breaks or the
inverter cannot receive new power control
instructions because of another problem.

Step 4: Choose the mode of power management (as shown in Position 2 of Fig. 7-10) from "Choose Model" options in Power Management page. There are five modes of power management, and the specific meaning of each working mode is as follows:

- Ripple Control Mode: Under this mode, the PMU will send power control instructions to the inverters according to the status of RRCR and the settings of the "Configuration Parameters". The specific operations of "Configuration Parameters" are shown in "Step 5".
- Cos(phi) fix mode: Under this mode, the PMU will regulate the reactive power of inverter according to the Cos(phi) value set by the user. You need to input the Cos(phi) value and choose the phase in Location 1 of Fig. 7-11.
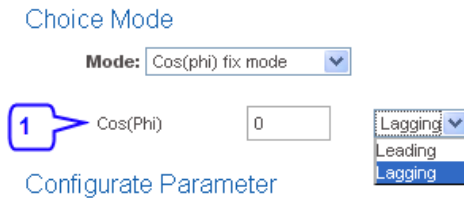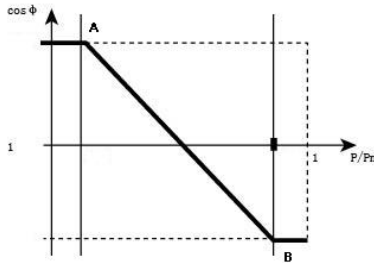

Fig. 7-11: Cos(phi) fix mode

- Cos(phi) variable mode: Under this mode, the PMU will produce a curve according to the "P/Pn", "Cos(phi)" and phase of points A and B, and to adjust reactive power according to this curve, as shown in Fig. 7-12.

Fig. 7-12: Cos(phi) variable mode

- Q fix mode: Under this mode, the PMU will regulate the reactive power of the inverter according to the Q value set by the user. You need to input the Q value and choose the phase position in Location 1 of Fig. 7-13.
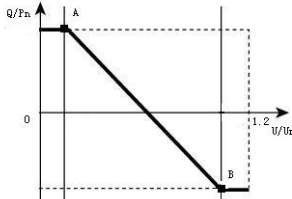

Fig. 7-13: Q fix mode

- Q variable mode: Under this mode, the PMU will produce a curve according to the "U/Un", "Q value" and phase position of points A and B, and to adjust reactive power according to this curve, as shown in Fig. 7-14.

Fig. 7-14: Q variable mode

Under the four modes of Cos(phi) fix mode，Cos(phi) variable mode, Q fix mode, Q variable mode, PMU does not receive the instructions from the RRCR.

Step 5:K1，K2，K3，K4 represent the four switching signals of RRCR, ✅means that the switch is closed. ❌means that the switch is opened. The four switches of RRCR can combine to make 16 different status values, and each status has an activating choice. Selected means activated, as shown in Fig. 7-15.

Fig.7-15: Status of configuration

When the PMU is not connected to the RRCR, K1 to K4 will show four ⊗, which means that all four switches are disconnected.

After a status is activated, you can set the operating mode. Through the Operating Mode, you can select the corresponding operating modes, as shown in Fig. 7-15. The meaning of each operating mode is as follows.

Fig. 7-16: Operating mode

- **Effective power control**：If this mode is selected, the PMU only regulates the active power P(%) according to received signals. Therefore, you only have to configure P(%), as shown in Fig. 7-17.
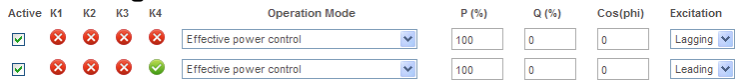
Fig. 7-17: Configuration of the value
of long-distance active power

- **Active power limitation and Q set point**：If this mode is selected, the PMU only regulates the active power P(%) and the Q value according to received signals. Therefore, you only need to configure P(%) and the Q value, as shown in Fig. 7-18.
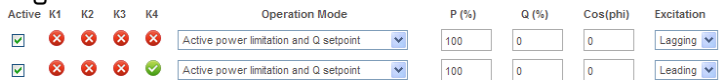

Fig. 7-18: Configuration of the value of
long distance active power and the Q value

- **Active power limitation and Cos(phi) set point**：If this mode is selected, the PMU only regulates the active power P(%) and the Cos(phi) value according to the received signals. Therefore, you only have to configure P(%), the Cos(phi) value and the phase position, as shown in Fig. 7-19.

Fig. 7-19: Configuration of the value of the long distance active power and the Cos(phi) value

Step 6: Fallback is used to decide whether to send or what kind of power control instruction to send when the PMU detects that K1-K4 are inactive.

If Fallback is not activated, then the PMU will not send any power control instructions if it detects that K1-K4 are inactive. In this case the inverters will maintain the status of the previous power control until inverters restart.

If Fallback is activated and the PMU detects that K1-K4 are inactive, the PMU will send the power control instructions according to the Fallback configuration.

"Time" means delay time, which means entering the "Fallback" status after waiting a certain period of time. Every time you change and save the time value of "Fallback", the system will restart the timing from 0, as shown in Fig. 7-20.

Fig. 7-20: Configuration of the value of long distance active power and Cos(phi) value

Step 7: Click the Save button and the PMU will save all the configurations of this page. After successful saving, the PMU will manage the power according to the user's configuration.

1. The corresponding settings of power management must be operated by qualified engineers. Wrong connection or configuration may destroy the PMU or the RRCR or disrupt the power grid.
2. PMU has sixteen kinds of configuration status. For the specific configuration status, please refer to

the requirements of the network operator.

3. PMU offers five kinds of reactive power requirement modes, please refer to the requirements of network operator to decide which mode to use.

8. Solarcloud

Solarcloud is a cloud service platform for users provided by ZEVERSolar. PMU transfers the operation data to the Solarcloud server via the internet to enable the users to monitor their PV plant and inverter remotely through a computer or a smart-phone.

You can visit Solarcloud via the following website on a PC: *http://solarcloud.zeversolar.com*. For the Android application, search for "Solar cloud" in Google play and download and install Solarcloud for Android on your smart-phone. For the iPhone or iPad application, search for "Solarcloud" on App store of Apple Corporation and install it on your iPhone or iPad.

> To monitor the PV plant and inverter with Solarcloud, the PMU and internet must be normally functioning.

8.1 Account Registration

Users who use Solarcloud for the first time need to register an account in Solarcloud. Monitoring can be performed after the user login.

Step 1: Input *http://solarcloud.zeversolar.com* in the browser and open the main page of Solarcloud as shown in Fig. 8-1.

Fig. 8-1: Registration and login page

Step 2: Click the button marked with a "2" in Fig .8-1, click "Register" to enter the registration page, and register a user account according to the prompts.

Step 3: After you have finished all the registration information, Solarcloud will send an activation mail to the email folder that you used to register. Activate your Solarcloud account according to the information in the mail. If there is no activation mail in your mail box, please check your spam box.

If you did not receive an email from Solarcloud, it could be:

1. The email was identified as a junk mail. Please check if it is in a spam folder. If the email from Solarcloud was identified as a junk mail, please add the address of Solarcloud into your white list to avoid future emails from Solarcloud being identified as junk mail.

2. You may have input an email address which is different from the one you used for registration. Please confirm if the email was sent to another email address. Please reregister if you entered an unknown email address when entering account information.

8.2 Create a PV plant

Step1: Input http://solarcloud.zeversolar.com in the address bar of the browser and open the home page of Solarcloud as shown in Fig. 8-1.

Step2: Input your user name and password in the area marked with a "1" in Fig. 8-1 to login to Solarcloud. After you login successfully, you will enter the page with a PV plant list as shown in Fig. 8-2.
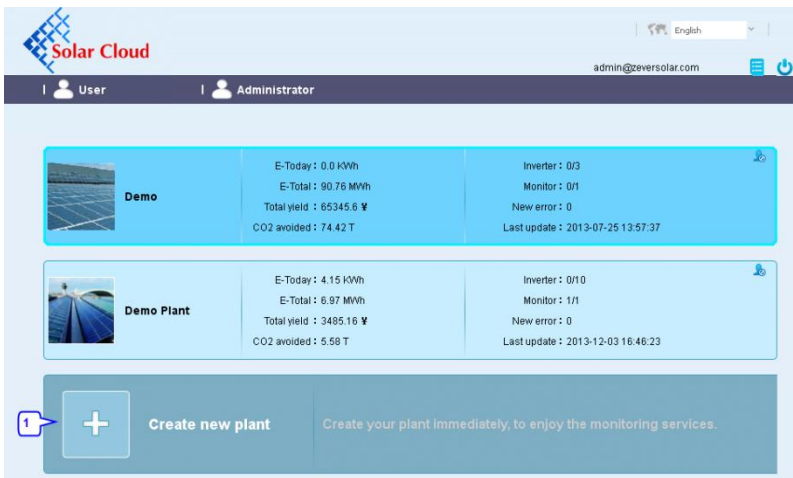
Fig. 8-2: Setting up a new PV plant

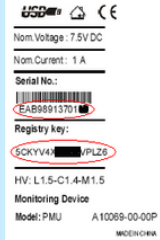Step3: Click Position 1 in Fig. 8-2 to enter the PV plant establishing page as shown in Fig. 8-3. Follow the prompts on the page to establish a PV plant.

Fig. 8-3: Input PMU and PV plant information
to finish the creation of PV plant

During PV plant creation, it is very important to choose the correct time zone. Please select the correct time zone where the PV plant is located at Position 1 shown in Fig. 8-3.

When establishing a PV plant, it is necessary to input the serial number and registry number of the PMU. This information can be found on the PMU label.

8.3 Browse PV plant

You can enter any PV plant by clicking it in the list of plants. This allows you to view the power generation data and report of this PV plant as well as inverter events. The menu structure is shown in Fig. 8-4:
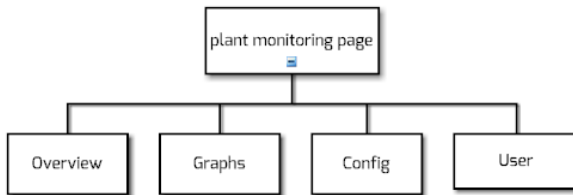
Fig. 8-4: Menu structure of PV plant monitor page

8.3.1 Overview

This menu provides information such as E-Today, E-Total and Yield of the entire PV plant. It also provides the power generation diagram and events of the PV plant.

8.3.2 Graphs

This menu provides detailed graphs such as power generation, generating capacity, Yield, CO_2 avoided of each inverter in the PV plant.

8.3.4 Config

In this menu, you can check all the detailed information of PMU and inverter, and also add or remove PMUs and inverters. In addition, you can configure email addresses to share information about the PV plant.

8.3.5 User
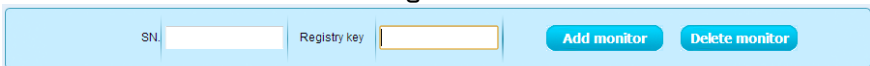
Here you can modify your user information and the login password of Solarcloud.

8.4 Add PMU

A PMU can be added to a PV plant as follows:

Step1: Login to Solarcloud and enter Config→Device Management page.

Step2: Input the serial number and registry key of the PMU to be added in the text box shown in Fig. 8-5.

SN. ____ Registry key ____ Add monitor Delete monitor

Fig. 8-5: Add more PMUs to the PV plant

Step3: When you finished your input, click Add monitor and the PMU will be added.

8.5 PV plant Sharing

Your PV plant can be shared with other Solarcloud users, to enable other users to view your PV plant. You can also configure the sharing authority when sharing it. The method is showed below:

Step1: Login Solarcloud and enter Config→Shared Config page.

Account	First Name	Last Name	Plant Config	Device Management	Report Config	
long...... @zeversolar.com		ma	☑	☑	☑	⊗
......@zeversolar.com	Zever	Solar	☑	☑	☑	⊗
......@zeversolar.com		Yang	☐	☐	☐	⊗
......@zeversolar.com		solar	☐	☐	☑	⊗
			⊕			

Fig. 8-6: PV plant sharing

Step2: Click ⊕, an "Add a shared user window" will pop up; input the user account that needs to be shared.

Step3: In the check box in Fig. 8-6, you can configure the authorities of the shared users.

8.6 Configuration Report

Solarcloud can email you daily and monthly operation state of the PV plant, including the amount of generated electricity , earnings, CO_2 emission reduction and other information, meanwhile it can also inform you about the events of the PV plant by email. This function can be configured as follows:

Step1: Login to Solarcloud and enter Config→Report Config page.

Step2: First click "Active" to activate this function as shown in Fig. 8-7. Next input the email address in the text box, separate addresses with ";" if you are inputting more than one email address. Then select a time to send the email every day in Send Report at option.

Fig. 8-7: Activate the configuration report

Step3: After the above steps, click the "Save" button to save your settings, then click "Send Report" button to have Solarcloud send you an immediate email to the defined email address.

> The way of monthly report setting is similar to daily report setting method.

8.7 Phone Monitoring

After installing Solarcloud on your smart-phone or other mobile device, you can get information about the PV plant anytime whenever you are in range.

It is easy to monitor the PV plant by smart-phone; you just need to operate according to the following steps:

Step1: Search "Solarcloud" in Google play to download and install it on your smart-phone with Android system. Or search "Solarcloud" in the App Store of Apple Inc., download Solarcloud and install it on your iPhone or iPad.

Step2: Login with your registered account. Using the navigation menu, you can view the power generation data and events in different pages.

Fig. 8-8: Solarcloud interface on smart-phone

9. Trouble Shooting

9.1 LED Indication

Some faults can be identified by looking at the LEDs.

LED	Status	Description	Solutions
Power	off	Power supply is abnormal	Check power supply. Make sure the power supply of outlet is normal
COMM	Green off	System error	Restart PMU
	Red light does not flash after green light flashed	Inverter did not send data to PMU	Check that the connection between inverter and PMU is not damaged or disconnected

9.2 LED Indication of Network Interface

LED	Status	Description	Solutions
Yellow light(link)	off	No connection established	Check whether the connection between router and PMU is normal, make sure the router is turned on
	on	Connection established	NA
Green light (activity)	off	Communication is abnormal	Check whether the connections between PC, router and PMU are normal.
	Flashing	Data is being transmitted or received	NA

9.3 LCD Indication

The LCD display information of the PMU can help with trouble shooting as follows:

Display	Solutions
Login Timeout Solarcloud	The PMU cannot be connected to Solarcloud. Please resolve the connection problem between the PMU and the internet.
WAN Abnormal Check Network	The PMU cannot be connected with Solarcloud. Please debug the connection problem between the PMU and the internet.
INV SN. Empty	The inverter connected to the PMU has no serial number. Please contact our after-sales service personnel.
INV SN. Invalid	More than one connected inverter has the same serial number. Please contact our after-sales service personnel.
INV SN. Space	The serial number of the inverter connected to the PMU is blank. Please contact our after-sales service personnel.
Non-existent SN.	Confirm whether the SN on the label of PMU is the same as that displayed in the built-in Web server. If not, please contact our after-sales service personnel.
PMU Unbind Solarcloud	The PMU is not added to your plant in Solarcloud. Please add the PMU into your plan as described in section 8.4.
Login Self Solarcloud	Please contact our after-sales service personnel.
Login Other Solarcloud	Please contact our after-sales service personnel.
Login Unknow Solarcloud	Please contact our after-sales service personnel.

Connected INV 21 **Online INV 16**	Five inverters connected to the PMU are not being monitored. Check whether the RS485 cable is normally connected or restart the PMU.
The IP address shown in PMU is not in the same network segment with the IP address distributed by the router.	1. Confirm whether the internet cable connection between the PMU and the router is normal. 2. Confirm whether the DHCP of the Router is activated. 3. Restart the PMU.
The time displayed on the LCD of the PMU is incorrect.	Adjust the time zone of PV plant in Solarcloud to the time zone you are in.

9.4 FAQ

Q1. How can I confirm whether all the inverters are connected to the PMU?

Method 1: Check the LCD display on the PMU. The "Online INV*"on the LCD display of PMU shows the number of inverters currently being monitored. Check whether this number is the same as the number of inverters connected to this PMU through the RS485 cable.

Method 2: In the Inverter menu of built-in web server in the PMU, check whether the number of online PMUs is the same as the number of inverters connected to the PMU. Refer to section 7.2.

Q2. How can I confirm whether the PMU is successfully connected to Solarcloud?
Check the LCD display on the PMU. If it shows "Connected Solarcloud", it means the PMU is successfully connected to

Solarcloud. "Disconnected Solarcloud" means the PMU is disconnected from Solarcloud.

Q3. Why can't I open the web page of the PMU's web server? Check whether the IP address displayed on the LCD of PMU and the IP address of the computer are in the same network segment. If not, please use a computer that is in the same network segment with the PMU to login.

10. Technical Parameters

Electrical Data	
Power supply	DC，7.5V/1A
Max. power consumption	3W
Communication	
Communicate with the inverter	4-wires RS485
Communicate with router	Ethernet
Number of directly connected inverters	Max.30
The number of connected PMUs	Max.10
Interface	
Power management	4 digital input ports (for RRCR)
Ethernet	10/100 Mbit/s, RJ45 (for Router)
RS485	4-wires
USB	Mini USB-B(for Debug)
Max. communication range	
RS485	1000 m
Ethernet	100 m
Power Manager	3 m
Mechanical data	
Dimensions (W x H x D) in mm	182x47x130 mm
Weight	870g
Installation	Wall, Indoor
Environmental conditions	
Operation	0℃ to +50℃
Storage and shipment	-20℃ to +60℃
Relative air humidity	5% to 90%, non-condensing
Protection class	IP20

11. Disposal

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your old equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment.

The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

12. Contact us

If you have any technical problems concerning our products, please contact ZEVERSolar service.

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