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Installation and Operating Instructions

ZeverCom

zeversolar

Contents

| | |
|------------------------------------------------|----|
| 1. About this Manual..... | 3 |
| 1.1 Scope of Application..... | 3 |
| 1.2 Target Reader | 3 |
| 1.3 Abbreviations | 3 |
| 2. Introduction..... | 4 |
| 2.1 Product Overview..... | 4 |
| 2.2 Function and Features | 5 |
| 2.3 Scope of Application..... | 5 |
| 2.4 Scope of Delivery | 5 |
| 2.5 Environment | 6 |
| 2.6 Safety Symbols | 6 |
| 3. Indication | 7 |
| 3.1 LED Indication..... | 7 |
| 3.2 LCD Indication..... | 8 |
| 4. Installation | 9 |
| 4.1 Location..... | 9 |
| 4.2 Installation..... | 9 |
| 5. Connection..... | 11 |
| 5.1 Preparation..... | 11 |
| 5.2 Connection Area..... | 11 |
| 5.3 Connecting the Power | 12 |
| 5.4 Connecting the Inverter..... | 12 |
| 5.5 Connecting the energy meter | 14 |
| 5.6 Connecting the Multi-Function Switch | 16 |
| 5.7 Connecting to the Ethernet..... | 16 |
| 5.8 *Connecting to the WiFi..... | 19 |
| 6. Web Server | 21 |
| 6.1 Visiting the Web Server | 21 |
| 6.2 Home..... | 22 |
| 6.3 Ethernet | 22 |
| 6.4 Advanced..... | 23 |
| 6.5 *Wireless | 32 |

Contents

| | |
|-----------------------------------------------|----|
| 7. Solarcloud | 34 |
| 7.1 Account Registration | 34 |
| 7.2 Create a PV plant..... | 36 |
| 7.3 Browse PV plant | 38 |
| 7.4 Add a ZeverCom/ZeverCom WiFi..... | 38 |
| 7.5 PV plant Sharing | 39 |
| 7.6 Configuration Report..... | 39 |
| 7.7 Mobile device Monitoring | 40 |
| 8. Trouble Shooting | 42 |
| 8.1 LED Indication | 42 |
| 8.2 LED Indication of Network Interface | 42 |
| 8.3 LCD Indication | 43 |
| 8.4 FAQ..... | 44 |
| 9. Technical Parameters..... | 45 |
| 10. Disposal | 47 |
| 11. Contact Us | 48 |

1. About this Manual

This manual contains a detailed description of the ZeverCom/ZeverCom WiFi, including precautions, methods of installation and operating instructions.

The specifications described in this document apply to the current version of the product. We reserve the right to make changes or to update our product to introduce new functions and overall 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 ZeverCom/ZeverCom WiFi firmware version 15430-408R+15429-407R 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 2.5. Please read this manual carefully before installing.

1.3 Abbreviations

Table 1-1: Abbreviations

| Abbreviation | Designation |
|--------------|-------------------------------------|
| E-Today | Daily Energy |
| E-Total | Total Energy |
| LAN | Local Area Network |
| WAN | Wide Area Network |
| WLAN | Wireless Local Area Network |
| DHCP | Dynamic Host Configuration Protocol |
| DNS | Domain Name Server |
| PV | Photovoltaic |
| Pac | Alternating Current Output Power |

2. Introduction

The monitoring system plays an important role in the PV plant. Users can view the PV Plants power generation data and fault information to avoid unnecessary loss of power and non-scheduled downtime. Users can also maximize the energy generating efficiency according to power generating data and reports.

2.1 Product Overview

The ZeverCom/ZeverCom WiFi collects the inverter's data and events in the PV plant. When an Internet connection is present, the ZeverCom/ZeverCom WiFi will upload the collected data to the Solarcloud to facilitate on-line web monitoring and data analysis.

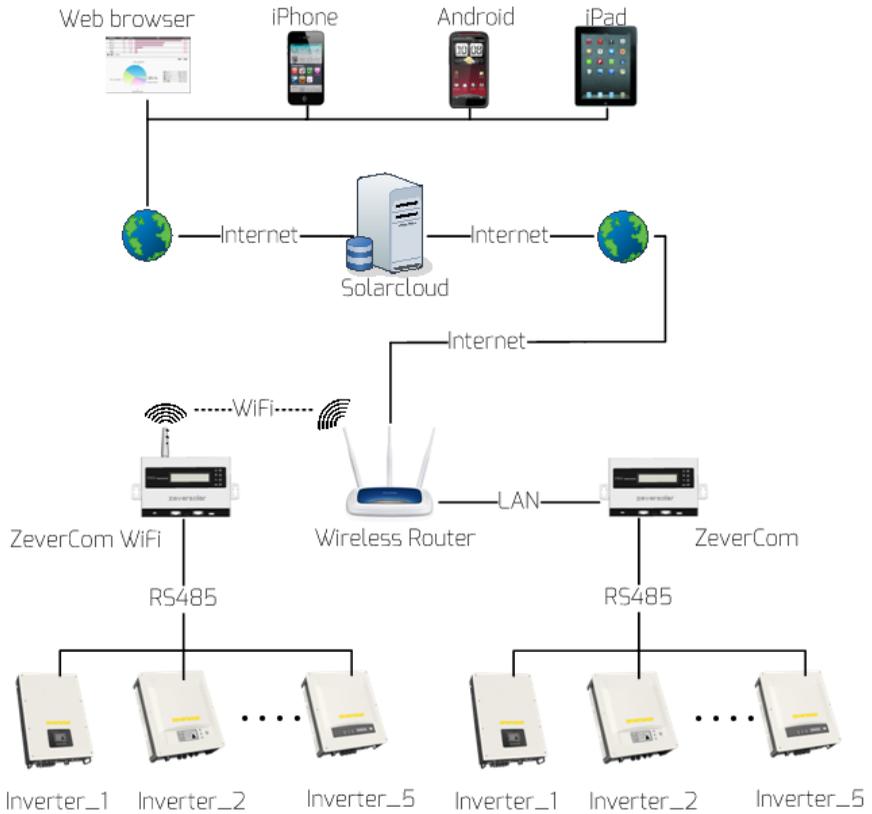


Fig.2-1: System structure

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

2.2 Function and Features

- PV Plant monitoring via the Solarcloud
- Communicates with up to 5 inverters
- Standard RS485 interface
- Remote monitoring via Ethernet or WiFi
- Power Management Capability
- Integrated Multi-Function Switch
- 5 days of storage
- Online firmware updating

2.3 Scope of Application

The ZeverCom/ZeverCom WiFi is self powered when connected to the following inverters:

- Eversol TL1500 to TL3000
- Evershine TL3680 to TL5000

For all other string inverter models an external power supply is required. Please see section 9. Technical Parameters for the power supply specification.



The sections marked with an * apply to the ZeverCom WiFi.

2.4 Scope of Delivery

Upon opening the packing box of the ZeverCom/ZeverCom WiFi you will see the following components, as shown in Table 2-1.

Table 2-1: Components included in the scope of delivery

| Component | Quantity |
|------------------------------|----------|
| ZeverCom/ZeverCom WiFi | 1 |
| Quick Installation Guide | 1 |
| Warranty card | 1 |
| 2-pole plug | 2 |
| Wall anchors and bolts | 2 |
| Antenna (WiFi version) | 1 |
| Power supply Unit (optional) | 1 |

Please check carefully that all of the components are found inside the packing box. Please contact your distributor or local sales representative if a component is missing.

2.5 Environment

- The ZeverCom/ZeverCom WiFi operational ambient temperature is -10 ° C to 60 ° C
- Do not allow the ZeverCom/ZeverCom WiFi to become damp or wet during use
- Sudden disconnection of power to the ZeverCom/ZeverCom WiFi or disconnection of the RS485 cable under normal operation can lead to data loss

2.6 Safety Symbols

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



Information

Provides information about installation or use.



Notice

Indicates the instructions must be followed in the correct order to prevent problems.



Warning

Indicates the instructions must be followed in order to prevent serious problems or injuries.

3. Indication

3.1 LED Indication

The ZeverCom/ZeverCom WiFi displays the operating status to the user via LEDs. The LED indicator panel is showed in Fig.3-1.

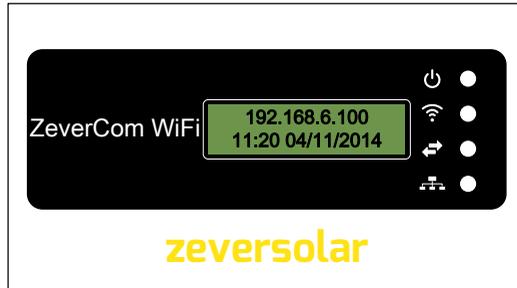


Fig. 3-1: LED indicator panel

The meanings of the LEDs are shown in the following Table 3-1.

Table 3-1: LEDs overview

| LED designation | Status | Explanation |
|-------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------|
|  | Glowing green | ZeverCom/ZeverCom WiFi is supplied with voltage |
| | Off | ZeverCom/ZeverCom WiFi is not supplied with voltage |
|  | Glowing yellow | A WiFi connection has been established between the ZeverCom WiFi and WLAN router. |
| | Flashing yellow | ZeverCom WiFi is sending or receiving data. |
| | Off | ZeverCom WiFi WiFi connection between ZeverCom WiFi and router has not been established |
|  | Flashing green | ZeverCom/ZeverCom WiFi is sending active power limitation instructions to the inverter |
|  | Flashing green | 3.1.2 ZeverCom/ZeverCom WiFi is sending data to the inverter |
| | Flashing red | ZeverCom/ZeverCom WiFi is receiving data from the inverter |

Indication

3.2 LCD Indication

The LCD of the ZeverCom/ZeverCom WiFi displays information to the user, for example the status of the connection to the Solarcloud, date&time and IP address. Each information screen is displayed for 2 seconds. The various information screens are shown in Table 3-2.

Table 3-2: Information Screens shown on the LCD

| LCD indication | Description |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 192.168.6.100 11:20 04/11/2014 | ZeverCom/ZeverCom WiFi's IP address, time and date |
| Disconnected Solarcloud | ZeverCom/ZeverCom WiFi is not connected to the Solarcloud |
| Connected Solarcloud | ZeverCom/ZeverCom WiFi is connected to the Solarcloud |
| Total INV:05 Online INV:03 | "Total INV:05" is the total number of inverters connected to the ZeverCom/ZeverCom WiFi since the ZeverCom/ZeverCom WiFi was powered on |
| | "Online INV:03" is the number of inverters being currently monitored by the ZeverCom/ZeverCom WiFi |
| PMU-R Updating Firmware | ZeverCom/ZeverCom WiFi is updating firmware |

For example, if the ZeverCom/ZeverCom WiFi is connected to the Solarcloud, the LCD displays "Connected Solarcloud". If ZeverCom/ZeverCom WiFi is not connected to the Solarcloud, the LCD displays "Disconnected Solarcloud". The normal information shown on the LCD is described in table 3-2. For further information about the LCD indication, please refer to section "8.3 LCD Indication".

4. Installation

4.1 Location

The ZeverCom/ZeverCom WiFi should be installed indoors as extreme temperatures, immersing in water, fire and strong impacts will damage the ZeverCom/ZeverCom WiFi.

To take advantage of the ZeverCom/ZeverCom WiFi's self-powered feature the maximum length of the RS485 cable between the ZeverCom/ZeverCom WiFi and the inverter is 20m. Should a separate power supply unit be used, the maximum length is then increased to 1000m.

If the ZeverCom WiFi has the WiFi option, the antenna should be assembled as per Fig. 4-1. Please ensure that the signal strength between the WLAN router and the ZeverCom WiFi is strong enough to ensure a reliable wireless connection. Please refer to section 5.6 for the WiFi setup instructions. If the ZeverCom WiFi is connected to the WLAN router, the yellow WiFi LED will illuminate.



Fig. 4-1: Assemble the antenna

4.2 Installation

The ZeverCom/ZeverCom WiFi should be mounted on a wall as follows:

Step1: Select a suitable place for mounting.

Step2: Mark the positions of the drill holes on the wall (spacing of drill holes: 154mm).

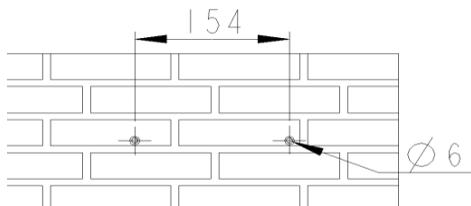


Fig. 4-2: Mark the holes

Installation

Step3: Drill the holes (diameter: 6mm, depth: at least 30mm).

Step4: Remove dust that may have accumulated from the drill holes.

Step5: Insert the screw anchors into the drill holes using a rubber mallet.

Step6: Screw in the screws until they protrude by 5mm.

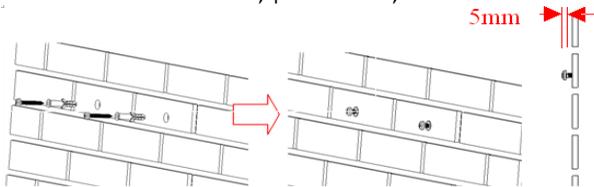


Fig. 4-3: Screw in the screws

Step7: Hang the ZeverCom/ZeverCom WiFi on the screws.

Step8: Tighten the screws.

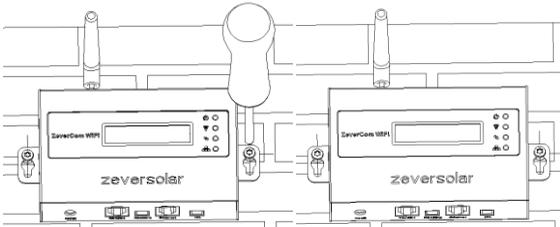


Fig. 4-4: Tighten the screws

5. Connection

5.1 Preparation

Table 5-1: Cables and wiring

| Type | Requirements | Maximum length |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Network cable | <ol style="list-style-type: none"> 1. Comply with the standards for structured cabling according to EIA/TIA-568. 2. Shielded Ethernet cable (CAT-5E or higher). 3. UV resistant if used outdoors. | 100m |
| RS485 cable | <ol style="list-style-type: none"> 1. Comply with the standards for structured cabling according to EIA/TIA-568. 2. Shielded Ethernet cable (CAT-5E or higher). 3. UV resistant if used outdoors. | 1000m |
| Multi-Function Switch cable | <ol style="list-style-type: none"> 1. The maximum switching voltage is 60Vdc and the current is 1Adc. 2. External cable diameter: from 5 to 17mm. 3. Conductor cross-section: from 0.14 to 1.5mm². 4. The default status of the switch is disconnected. | NA |



Remember to connect the Ethernet cable to the Ethernet port (RJ45 LAN connectors) and not to the RS485 port.

5.2 Connection Area

The ZeverCom/ZeverCom WiFi collects inverter(s) data and events, and uploads them to the Solarcloud via the Internet. This section shows how to connect with the inverter and Solarcloud.

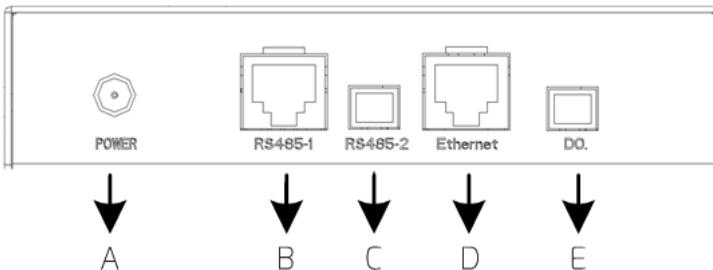


Fig. 5-1: Overview of the connection area

The description of the connection area is shown in the following Table 5-2.

Connection

Table 5-2: Function and Description of the connection area

| Item | Function | Description |
|------|---------------------|--------------------------|
| A | Power socket | Connect to power supply |
| B | RS485 port 1 | Connect to inverters |
| C | RS485 port 2 | Connect to energy meter |
| D | Ethernet port | Connect to router/switch |
| E | Digital output port | Multi-Function Switch |

5.3 Connecting the Power

Requirements:

- Connect the RS485 cable directly to the ZeverCom/ZeverCom WiFi.
- The maximum cable length for self powered operation is 20m.

If the RS485 cable between the Zevercom/ZeverCom WiFi and the inverter is more than 20m, a separate power supply unit is required.

Connect the power supply unit to the Power socket (Item A in Fig. 5-1). Plug the other end into a power outlet, and check that the power LED light turns on as shown in Fig. 3-1(LED indicator panel).



If a separate power supply unit is used, it must satisfy the following requirements:

1. EMC directive and low voltage directive of the European parliament.
 2. Output voltage between 7.5Vdc and 12Vdc and output current at least 500mA.
 3. DC output polarity \ominus — \bullet — \oplus .
-

5.4 Connecting the Inverter

This section describes how to connect the ZeverCom/ZeverCom WiFi to the inverter(s):

Step 1: For PV Plants with more than one inverter, connect each inverter in a daisy chain configuration, shown in Fig. 5-2, with the RS485 cable.

Step 2: Connect the inverter closest to the ZeverCom/ZeverCom WiFi to the RS485 port of the ZeverCom/ZeverCom WiFi (Item B in Fig. 5-1) as shown in Fig. 5-2.



Fig. 5-2: Connection to the inverter

The pin order of the RJ45 socket and plug used by the RS485 port of the ZeverCom/ZeverCom WiFi is shown in Fig. 5-3.

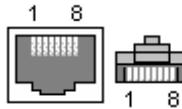


Fig. 5-3: Socket and plug definition of RJ45

The RS485 pin assignment of the RJ45 socket is shown in Table 5-3.

Table 5-3: RJ45-RS485 pin assignment

| Pin | Signal description |
|-----|--------------------|
| 1 | RX+ |
| 2 | RX- |
| 3 | TX+ |
| 4 | GND |
| 5 | GND |
| 6 | TX- |
| 7 | +7V |
| 8 | +7V |



1. The RS485 port between the ZeverCom/ZeverCom WiFi and the inverter (Item B in Fig. 5-1) uses the RJ45 socket. Please make sure to use the correct port.
2. The maximum communication distance of the whole RS485 bus is 1000m. Communication quality beyond this length is not guaranteed and can also be influenced by the quality of the RS485 cable.

Connection

5.5 Connecting the energy meter

ZeVerCom/ZeVerCom WiFi can connect to an energy meter for monitoring the exported power of a PV plant, which can be used for active power limitation. The ZeVerCom/ZeVerCom WiFi currently supports the MINI POWER SDM630DC EASTRON energy meter. For the energy meter wiring details please refer to the SMART MIN POWER SDM630DC "USER MANUAL 2013 V1.1".

The energy meter must be connected at the grid connection point, as shown in Fig. 5-4.

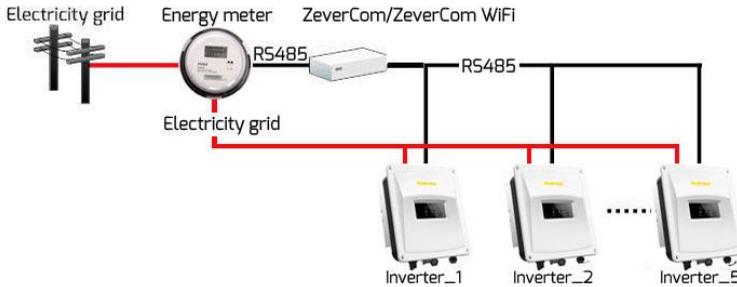


Fig. 5-4: Connect with the energy meter

The energy meter is connected to the RS485-2 port of ZeVerCom/ZeVerCom WiFi (Item D in Fig. 5-1), as shown in Fig. 5-5.

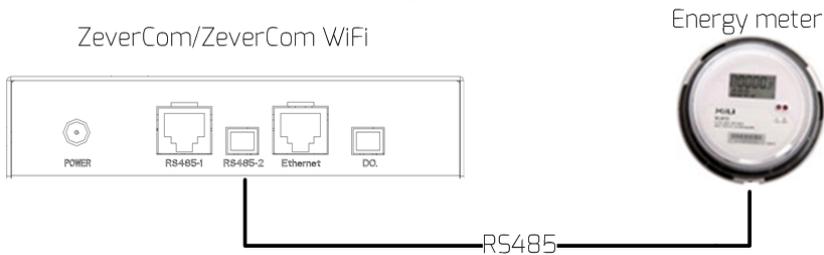


Fig.5-5: Connection Energy Meter

The pin order of the RS485-2 port of the ZeVerCom/ZeVerCom WiFi is shown in Fig. 5-6.



Fig. 5-6: Socket definition

The RS485-2 pin assignment is shown in Table 5-4.

Table 5-4: RS485-2 pin assignment

| Pin | Signal description |
|-----|--------------------|
| 1 | RS485-A |
| 2 | RS485-B |



1. The maximum communication distance of the whole RS485 bus is 1000m. The communication quality beyond this length is not guaranteed and can also be influenced by the quality of the RS485 cable.

For information on how to set the parameters, please refer to the “Active Power Limitation” section of “6.4.1 Power Management”

Connection

5.6 Connecting the Multi-Function Switch

The ZeverCom/ZeverCom WiFi is equipped with a Multi-function Switch with configurable activation. It is a controlled relay which can be used as an external alarm output or used to control different types of devices (light, sound, etc.). An external voltage source is required when controlling lights, sounds or other appliances.

The default status of the relay is open which can be connected to a normally open contact. When using this function it should comply with the following requirements:

- Maximum Voltage: DC 60V.
- Maximum Current: 1A.
- External cable diameter: from 5 to 17mm.
- Conductor cross-section: from 0.14 to 1.5mm².

For example, if there is an inverter error or if E-Today and total Pac reaches the set value, the switch will close. The switch closed condition can be configured by the web server (please refer to section 6.4.2 Advanced). The connection diagram is shown in Fig. 5-7.

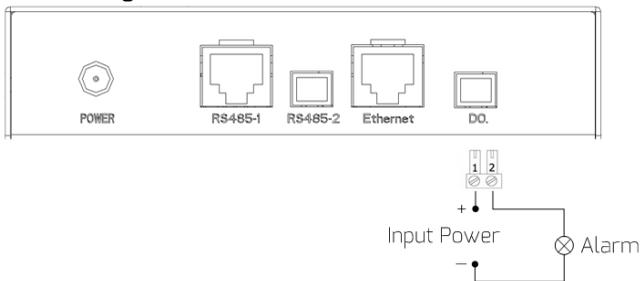


Fig. 5-7: Connection between switch and external devices

5.7 Connecting to the Ethernet

The ZeverCom/ZeverCom WiFi requires an Internet connection in order to provide remote monitoring. The connection between the ZeverCom/ZeverCom WiFi and the Internet is shown in Fig. 5-8.



The ZeverCom/ZeverCom WiFi uses port #6655 and #80 to communicate with the Solarcloud. Both of these two ports must be opened otherwise the ZeverCom/ZeverCom WiFi cannot connect to the Solarcloud and upload data.

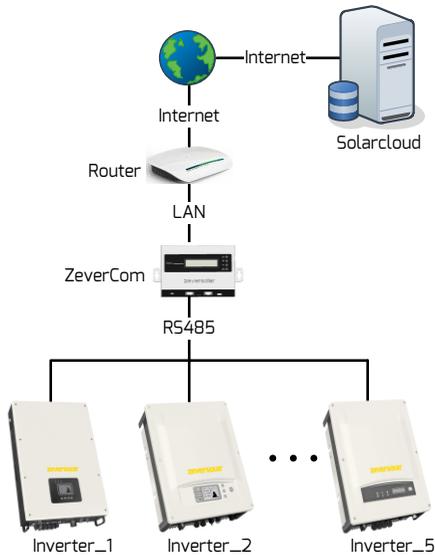


Fig. 5-8: Network connection

The ZeverCom/ZeverCom WiFi is connected to the network by simply connecting the network cable from the router to the Ethernet port of ZeverCom/ZeverCom WiFi (Item D in Fig. 5-1), as shown in Fig. 5-9.

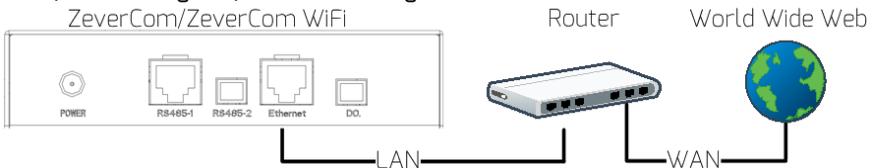


Fig. 5-9: ZeverCom/ZeverCom WiFi linked network

The ZeverCom/ZeverCom WiFi obtains an IP address from the router via DHCP automatically and displays it on the LCD. The time it takes to connect to the network depends on the network communication conditions.

Connection



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



If the IP address of the ZeverCom/ZeverCom WiFi is different from the network segment assigned by the router,

Trouble shooting:

1. Make sure the DHCP service of router has been activated.
 2. Check the connection between the ZeverCom/ZeverCom WiFi and the router.
 3. Check whether the ZeverCom/ZeverCom WiFi is using a fix IP address.
 4. If the ZeverCom/ZeverCom WiFi cannot obtain an IP address from the router, it will use 169.254.*.*(* symbol is a random number) as the default IP address.
-

5.8 *Connecting to the WiFi

If users use the ZeverCom WiFi's WiFi to connect to the router for remote monitoring, the connection diagram is shown in Fig. 5-10.

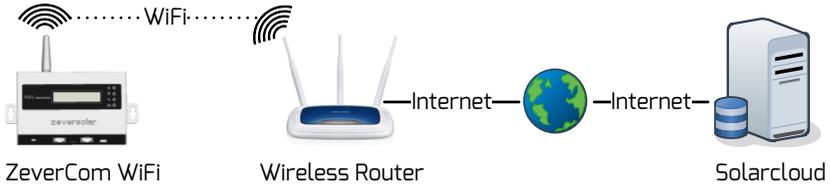


Fig. 5-10: WiFi connection

In order to achieve remote monitoring reliably, the following steps must be taken.

Step1: Power on the ZeverCom WiFi and open the mobile device or laptop's WLAN page to find the ZeverCom WiFi's wireless access point. The new access point of the ZeverCom WiFi's WiFi called ZEVERSOLAR -XXXX is displayed, as shown in Fig. 5-11. Connect to the access point using the mobile device or laptop and enter the password as "zeversolar" when prompted.



Fig. 5-11WLAN connection page



1. "XXXX" stands for the last four digits in the serial number.

Step2: Start the web browser and enter <http://160.190.0.1>. The internal website opens.

Connection

Step3: Select the wireless page and select a router in the [Wireless Network] area to connect. The Password/Security Key dialog box opens, as shown in Fig. 5-12.



Fig. 5-12 connecting to wireless network

Step4: Enter the password of the wireless local network that you wish to connect to. Do not enter the password of the router.

Step5: After approximately three minutes the WiFi of the ZeverCom WiFi will connect to the wireless local network. The status indicator on the Wireless page should display the  icon and the yellow WiFi LED should now illuminate, as shown in Fig. 5-13.

Wifi Connected

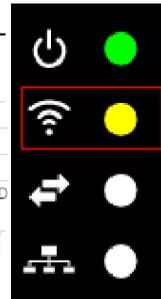
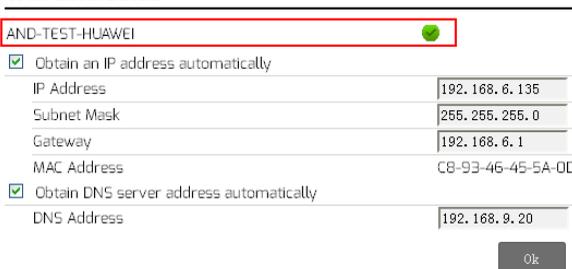


Fig. 5-13 WiFi Connection Instructions

6. Web Server

Information about the ZeverCom/ZeverCom WiFi and the inverters connected to the ZeverCom/ZeverCom WiFi can be viewed via the ZeverCom/ZeverCom WiFi's internal web pages. These can also be used to configure the power control and network parameters.

The ZeverCom/ZeverCom WiFi's built-in web server interface structure is shown in Fig. 6-1.

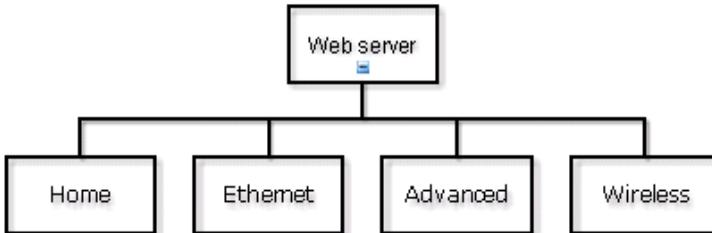


Fig. 6-1: Structural hierarchy of the web server

6.1 Visiting the Web Server

6.1.1 Connecting via Ethernet

Input the IP address of the ZeverCom/ZeverCom WiFi (shown on the LCD display) in the browser's address bar. For example, if the IP address shown on the ZeverCom/ZeverCom WiFi is 192.168.6.107, then enter 192.168.6.107 in the browser's address bar and press the Enter key to display the ZeverCom/ZeverCom WiFi's internal web page, as shown in Fig. 6-2.

6.1.2*Connecting via WiFi

If you want to connect to the ZeverCom WiFi via WiFi, please refer to section 5.8. Once connected to the ZeverCom WiFi enter "160.190.0.1" in the browser's address bar, press the Enter key to display the ZeverCom/ZeverCom WiFi's internal web page, as shown in Fig. 6-2.

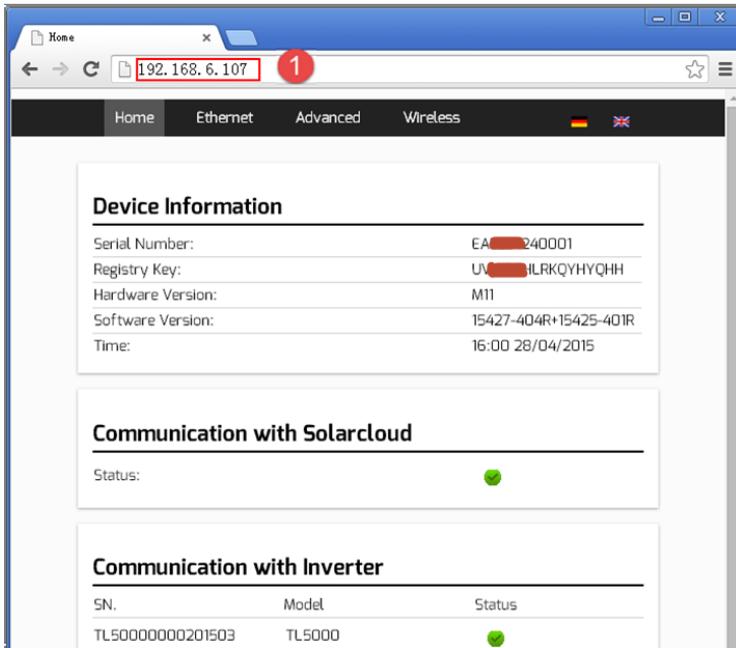


Fig. 6-2: ZeverCom/ZeverCom WiFi Web Server

6.2 Home

This page shows the information and state of the ZeverCom/ZeverCom WiFi equipment. It also shows the state of the connected inverter's which is shown in Fig. 6-2.

If the inverter is working normally, it shows a green icon; otherwise the red icon will be shown along with the error code.

6.3 Ethernet

Clicking the "Ethernet" tab takes you to the Ethernet page of the ZeverCom/ZeverCom WiFi's internal web page. From this page set the Ethernet parameters can set by either using a static IP address or obtaining the IP address automatically.

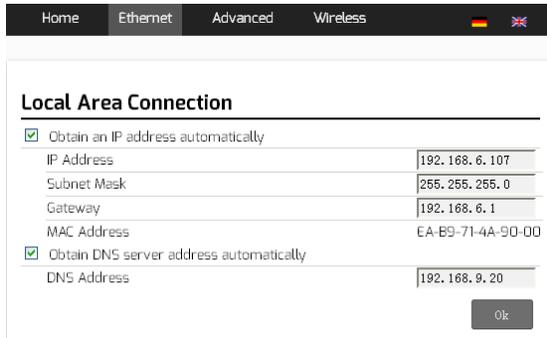


Fig. 6-3: Ethernet page

6.4 Advanced

The Advanced web page shows the advanced settings of the ZeveCom/ZeveCom WiFi. For example the Multi-Function Switch and output Power limit function can be configured. In addition the ZeveCom/ZeveCom WiFi's firmware can be upgraded from this webpage.

6.4.1 Power Management

The ZeveCom/ZeveCom WiFi will regulate the active power of the inverter(s) according to the value of the installed PV module capacity or the installed inverter capacity or the energy meter reading, which are set by the user. To enter these values please see Fig. 6-4.

a) Active Power Limit

There are three modes of active power limitation which can be selected with five values that can be entered depending on which mode is selected.

Active Power Limit

| | | | |
|-----------------------------------------------|-------------------------------------|----|----------------------------------------------------------------|
| Solar DC Capacity | <input type="text" value="8000"/> | Wp | |
| Inverter AC Capacity | <input type="text" value="8000"/> | W | |
| <input checked="" type="radio"/> Output power | <= <input type="text" value="100"/> | % | Limit output power based on the installed Solar DC capacity |
| <input type="radio"/> Output power | <= <input type="text" value="100"/> | % | Limit output power based on the installed inverter AC capacity |
| <input type="radio"/> Output power | <= <input type="text" value="100"/> | W | Limit output power based on the energy meter reading |

Fig. 6-4: Set Active Power Limitation Method

Web Server

The following ways will introduce how to configure the three kinds of power limitation.

- Based on the installed Solar DC capacity
In this method the AC output of the PV system will not exceed a set percentage of the installed solar DC capacity. For example, if a 20 % limitation on a 1,5 kWp PV system connected to an Eversol TL2000 (2 kWac inverter) has been set then the AC output will not exceed 1.2 kWac.

The Fig.6-5 shows the system diagram of power limitation based on the installed solar DC capacity

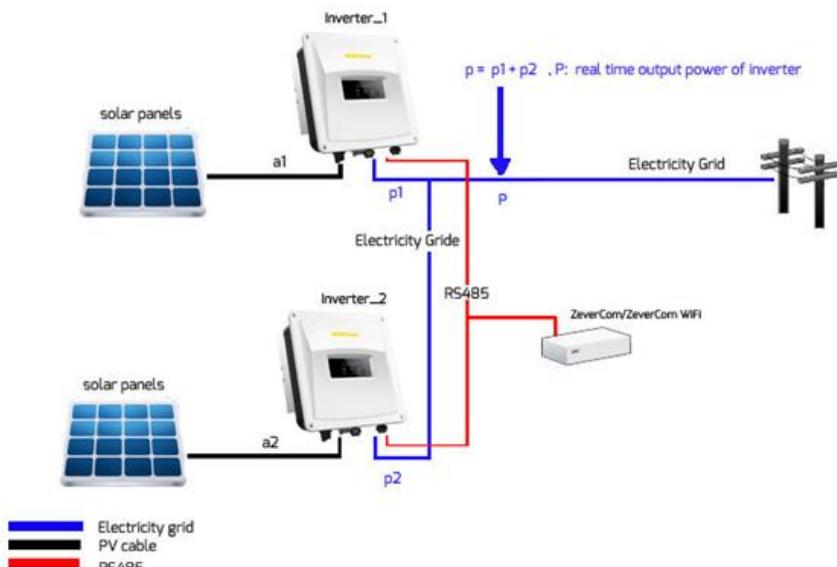


Fig. 6-5 System diagram based on the installed solar DC capacity

For this method, position 1 in Fig. 6-6 should be ticked.

For correct operation of this method there are three parameters that must be entered, please refer to Fig. 6-6:

- Item A – installed solar DC capacity of PV system in Wp;
- Item B – total inverter AC capacity of PV system in W;
- Item C – Limitation value of solar DC capacity in %.

Click the “OK” button in the bottom-right of this web page to ensure the setting parameters take effect.

Active Power Limit

Solar DC Capacity **a** 8000 Wp $a=a1+a2$

Inverter AC Capacity **b** 8000 W $b=Rated\ Power(INV_1)+Rated\ Power(INV_2)$

1 **c** \leq 100 % Limit output power based on the installed Solar DC capacity

Output power \leq 100 % Limit output power based on the installed inverter AC capacity

Output power \leq 100 W Limit output power based on the energy meter reading

The Fig. 6-6Set parameters based on the installed solar DC capacity

The “output power” value is multiplied by value c when $P \geq a \cdot c$,

Table 6-1:Parameter definitions

| Parameter | Definition |
|-----------|------------------------------------------------------------------------|
| a | The combined peak power of the PV array (Wp) |
| b | The sum of the rated powers of all inverters in the PV plant (Wac) |
| c | The Percentage of output power limitation based on parameter a |
| P | The sum of the real time output power of all inverters in the PV plant |

Parameter b: This parameter is the key value of power limitation, please ensure that it is correct

■ Based on the Installed Inverter AC Capacity

In this method the AC output of the PV system will not exceed a set percentage of the installed inverter AC capacity regardless of the installed DC capacity. For example, if a 20 % limitation on a 2 kWp PV system connected to an Eversol TL2000 (2 kWac inverter) has been set then the AC output will not exceed 1.6 kWac.

Fig. 6-6 is shows the system diagram of power limitation based on the installed AC (inverter) capacity

For this method position 2 in Fig. 6-7, should be ticked.

For correct operation of this method there are two parameters that must be entered, please refer to Fig. 6-7:

Web Server

Item B – total inverter AC capacity of PV system in W;

Item D – Limitation value of AC capacity in %.

Click the “OK” button in bottom-right of this web page to ensure the setting parameters take effect.

Active Power Limit

Solar DC Capacity Wp

Inverter AC Capacity **b** W **b=Rated Power(INV_1)+Rated Power(INV_2)**

Output power <= % Limit output power based on the installed Solar DC capacity

2 Output power **d** <= % Limit output power based on the installed inverter AC capacity

Output power <= W Limit output power based on the energy meter reading

The Fig. 6-7Set parameters based on the installed solar DC capacity

The “output power” value is value b multiplied by value d when $P \geq b \cdot d$.

Table 6-2:Parameter definitions

| Parameter | Definition |
|-----------|------------------------------------------------------------------------|
| b | The sum of the rated power of all inverters in the PV plant (Wac) |
| d | The percentage of power output limitation based on parameter b |
| P | The sum of the real time output power of all inverters in the PV plant |

Parameter b: This parameter is the key value of power limitation, please ensure that it is correct

■ Power Limitation Based on the Energy Meter Reading

In this method the export power of the PV system at the point of connection will not exceed the value that is set in the energy meter. For example, if a 1 kWac export limit has been set in the energy meter then a 2 kWp PV system connected to an Eversol TL2000 (2 kWac inverter) will reduce its AC output to ensure that the export power at the point of connection will not exceed 1 kWac.

Fig. 6-8 shows the system diagram of power limitation based the energy meter reading. Currently, only the Eastron SDM630DC energy meter is supported.

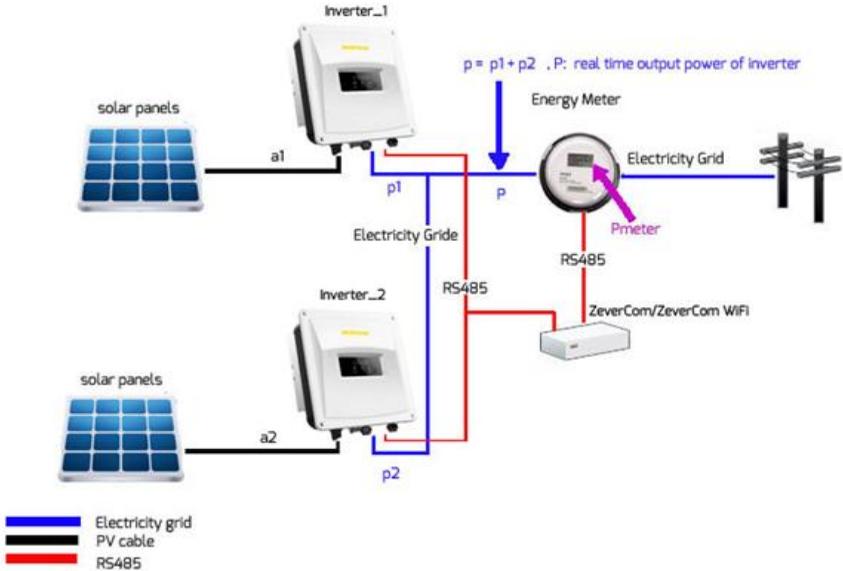


Fig. 6-8 System diagram based on the energy meter reading

For this method position 3 in Fig. 6-9 should be ticked.

For correct operation of this method there are two parameters that must be entered, please refer to Fig. 6-9:

Item B – total inverter AC capacity of PV system in W;

Item E – Limitation value of AC capacity in W.

Click the “OK” button in bottom-right of this web page to ensure the setting parameters take effect.

| | | | |
|--------------------------------------------------------|-----------------|----|----------------------------------------------------------------|
| <input checked="" type="checkbox"/> Active Power Limit | | | |
| Solar DC Capacity | 8000 | Wp | |
| Inverter AC Capacity | b 8000 | W | b=Rated Power(INV_1)+Rated Power(INV_2) |
| <input type="radio"/> Output power | <= 100 | % | Limit output power based on the installed Solar DC capacity |
| <input type="radio"/> Output power | <= 100 | % | Limit output power based on the installed inverter AC capacity |
| 3 <input checked="" type="radio"/> Output power | e <= 100 | W | Limit output power based on the energy meter reading |

The Fig. 6-9 Set parameters based on the energy meter reading

The “output power” value is e when $P \geq P_{meter}$

Table 6-3: The indicator of the Item

| Parameter | Definition |
|-----------|-----------------------------------------------------------------------------------|
| b | The sum of the rated power of all inverters in the PV plant (W_{ac}) |
| e | The desired maximum amount of export power at the point of connection in W_{ac} |
| P | The sum of the real time power of all inverters in the PV plant (W_{ac}) |
| Pmeter | The power reading of the energy meter |

Parameter b: This parameter is the key value of power limitation, please ensure that it is correct

b) Reactive Power Limit

There are four modes of reactive power limitation which can be selected.

- Cos(phi) fix mode: In this mode, the ZeverCom/ZeverCom WiFi will regulate the reactive power of inverter according to the Cos(phi) value which is set by the user. Enter the Cos(phi) value and choose the phase as shown in Fig. 6-10.

Fig. 6-10: Cos(phi) fix mode

- Cos(phi) variable mode: In this mode, the ZeverCom/ZeverCom WiFi will produce a curve according to the “P/Pn”, “Cos(phi)” and the phase of points 1,2,3 and 4, and will regulate the reactive power according to this curve, as shown in Fig. 6-11.

Fig. 6-11: Cos(phi) variable mode

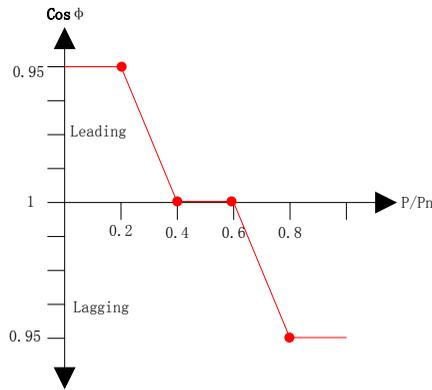


Fig. 6-12 Cos(phi) variable Curve

- Q fix mode: In this mode, the ZeverCom/ZeverCom WiFi will regulate the reactive power of the inverter according to the Q value which is set by the user. You need to input the Q value and choose the phase as shown in Fig. 6-13.

Choose Mode

Q % (0~100%) Phase

Fig. 6-12: Q fix mode

- Q variable mode: In this mode, the ZeverCom/ZeverCom WiFi will produce a curve according to the “U/Un”, “Q value” and phase position of points 1,2,3 and 4, and will regulate the reactive power according to this curve, as shown in Fig. 6-14.

Choose Mode

| | | | | | | | |
|---------------|----------------------------------|------------|---|----------------------------------|------------|-------|--------------------------------------|
| Point 1: U/Un | <input type="text" value="96"/> | % (0-120%) | Q | <input type="text" value="50"/> | % (0~100%) | Phase | <input type="text" value="Lagging"/> |
| Point 2: U/Un | <input type="text" value="100"/> | % (0-120%) | Q | <input type="text" value="100"/> | % (0~100%) | Phase | <input type="text" value="Leading"/> |
| Point 3: U/Un | <input type="text" value="108"/> | % (0-120%) | Q | <input type="text" value="100"/> | % (0~100%) | Phase | <input type="text" value="Leading"/> |
| Point 4: U/Un | <input type="text" value="112"/> | % (0-120%) | Q | <input type="text" value="50"/> | % (0~100%) | Phase | <input type="text" value="Leading"/> |
| Response time | <input type="text" value="5"/> | s (0~60s) | | | | | |

Fig. 6-14: Q variable mode

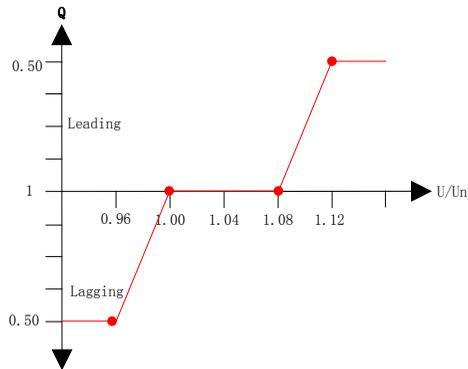


Fig. 6-15: Q variable Cure

To cancel the output power limit function untick the checkbox and click the “OK” button.



Please ensure that the inverter supports the Output Power Limit function.

6.4.2 Multi-Function Switch

The ZeverCom/ZeverCom WiFi is equipped with a Multi-Function Switch that can be used to control an external device. The switches close condition can be set from this section.

Multi-function Switch

- Disable
- Close the switch in case an error occurred
- Close the switch according to E-Today and Pac
 - E-Today >= kWh
 - Pac > W

Fig. 6-16: Multi-Function Switch page

6.4.3 Updating Firmware

The firmware of the ZeverCom/ZeverCom WiFi can also be updated. Enter the Advanced page and click the “choose file” in the Update Firmware section to select the new firmware and then click the “OK” button to update.

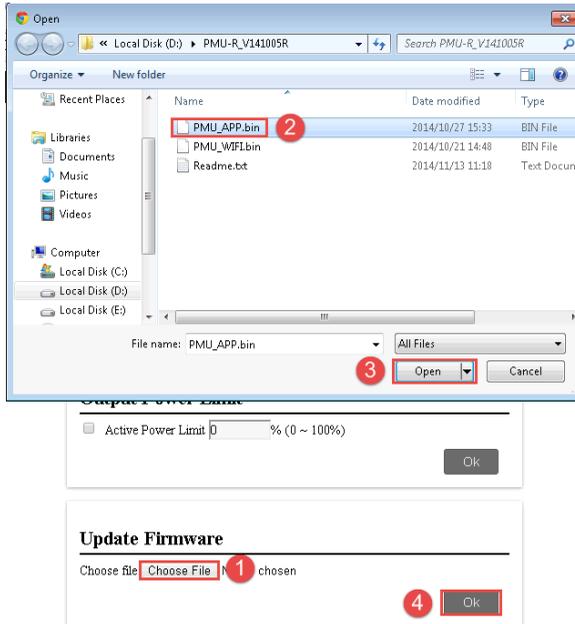


Fig. 6-17: Update Firmware

6.4.4 Restart

Enter the Advanced page of the ZeverCom/ZeverCom WiFi and click the “OK” button at the Restart section to restart the device.



Fig. 6-18: Restart ZeverCom/ZeverCom WiFi

Web Server

6.4.5 Restore to Factory

Enter the Advanced page of the ZeverCom/ZeverCom WiFi and click the “OK” button in the Restore to Factory section to restore all the parameters of the ZeverCom/ZeverCom WiFi to the factory settings.

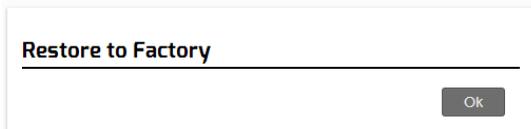


Fig. 6-19: Restore to Factory



This operation will delete all user data

6.5 *Wireless

This page shows the list of wireless Networks that ZeverCom/ZeverCom WiFi can connect to. If you want to change the connected WiFi network, please refer to section 5.8.

Wireless Network:

| | | |
|-----------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| D-Link_DIR_615 |  |  |
| 1234567 |  |  |
| zeversolar-ef |  |  |
| ZEVERSOLAR-3F-1 |  |  |
| HETAO |  |  |
| ZTE-9340E0 |  |  |
| Zeversolar-SZ |  |  |
| jerrylaptop |  |  |
| ZEVERSOLAR-0024 |  |  |

Refresh

Fig. 6-20 Wireless Network

The wireless network IP information is shown as below Fig 6-19. This refers to the “Ethernet” section.

Wifi Connected

| | |
|---------------------------------------------------------------------------------------------------|-------------------|
| AND-TEST-HUAWEI  | |
| <input checked="" type="checkbox"/> Obtain an IP address automatically | |
| IP Address | 192.168.6.135 |
| Subnet Mask | 255.255.255.0 |
| Gateway | 192.168.6.1 |
| MAC Address | C8-93-46-45-5A-0D |
| <input checked="" type="checkbox"/> Obtain DNS server address automatically | |
| DNS Address | 192.168.9.20 |
| <input type="button" value="Ok"/> | |

Fig. 6-21: Wireless IP information

7. Solarcloud

The Solarcloud is a cloud service platform for users provided by Zeversolar. The ZeverCom/ZeverCom WiFi transfers the operation data to the Solarcloud server via the Internet to enable the users to monitor their PV plants and inverters remotely through a computer or a mobile device.

You can visit Solarcloud via the following website on a PC:

<http://solarcloud.zeversolar.com>. For the Android application, search for “Solarcloud” in Google play to download and install Solarcloud for on your mobile device. For the iPhone or iPad application, search for “Solarcloud” in the App store of the Apple Corporation and install it on your iPhone or iPad.



To monitor the PV plant and inverter with Solarcloud, the ZeverCom/ZeverCom WiFi and Internet must be functioning normally.

7.1 Account Registration

Users who use Solarcloud for the first time are required to register an account in Solarcloud. Monitoring can then be performed after the user has registered.

Step 1: Input <http://solarcloud.zeversolar.com> in the browser and open the main page of Solarcloud as shown in Fig. 7-1.



Fig. 7-1: Registration and login page

Step 2: Click the button marked with a “1” in Fig .7-1, click “Register” to enter the registration page, and register a user account according to the prompts.

Step 3: After the registration has been completed, Solarcloud will send an activation email. Activate your Solarcloud account according to the information in the email. If there is no activation mail in your inbox, please check your spam box.



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

1. The email was identified as junk mail. Please check the spam folder. If the email from Solarcloud was identified as 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.

7.2 Create a PV plant

Step1: Enter <http://solarcloud.zeversolar.com> in the address bar of the browser and open the home page of Solarcloud as shown in Fig. 7-1.

Step2: Input your user name and password in the area marked with a "1" in Fig. 7-1 to login to Solarcloud. If the login is successful you will enter the web page with a PV plant list as shown in Fig. 7-2.



Fig. 7-2: Setting up a new PV plant

Step3: Click Position 1 in Fig. 7-2 to enter the PV plant establishing page as shown in Fig. 7-3. Follow the prompts on the page to establish a PV plant.

Device Information

* Serial Number:

* Registry Key:

Serial number and Registry key can be found on the label of Monitor, as shown below.



Plant Info

* Plant Name:

Installed Capacity: KW

Commissioning:

Company/Organization:

* Country: Please Sel Please select a country.

* State: Please Sel Please select State / Province

* City:

Street/No.:

Zip Code:

Longitude: E ° ' "

Latitude: N ° ' "

Altitude: m

Angle of Inclination: °

* CO2 Avoided Factor: 0.8 Kg/YWh

* Currency: \$

* Yield Factor: 0.7 [\$/YWh]

1 * Timezone: (UTC+08:00) Beijing, Chongqing, Hong Kong, Urumqi

Field marked with an asterisk(*) are required.

OK

Fig. 7-3: Enter the ZeverCom/ZeverCom WiFi 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 in Position 1 shown in Fig. 7-3.



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

7.3 Browse PV plant

You can enter any PV plant by clicking the plant list. This allows you to view the power generation data of the PV plant as well as inverter events. The menu structure is shown in Fig. 7-4:

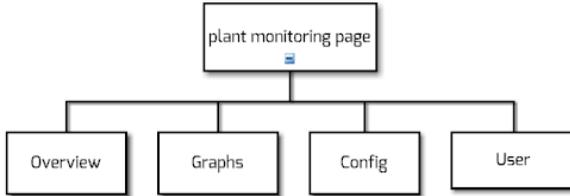


Fig. 7-4: Menu structure of PV plant monitor page

7.3.1 Overview

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

7.3.2 Graphs

This menu provides detailed graphs such as power& energy, yield and CO₂ avoided of each inverter in the PV plant.

7.3.3 Config

In this menu, you can check all of the detailed information of the ZeverCom/ZeverCom WiFi and the inverter and also add or remove ZeverCom/ZeverCom WiFi and inverters. In addition, email addresses can be configured to share information about the PV plant to other users.

7.3.4 User

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

7.4 Add a ZeverCom/ZeverCom WiFi

A ZeverCom/ZeverCom WiFi can be added to a PV plant as follows:

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

Step2: Enter the serial number and registry key of the ZeverCom/ZeverCom WiFi into the textbox shown in Fig. 7-5.

Fig. 7-5: Add more ZeverCom/ZeverCom WiFi to the PV plant

Step3: Click the “Add monitor” button and the new ZeverCom/ZeverCom WiFi will be added.

7.5 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.

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

| Account | First Name | Last Name | Plant Config | Device Management | Report Config | |
|------------------------|------------|-----------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| long...@zeversolar.com | | ma | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| ...@zeversolar.com | Zever | Solar | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| ...@zeversolar.com | | Yang | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| ...@zeversolar.com | | solar | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

Fig. 7-6: PV plant sharing

Step2: Click , an “Add a shared user window” will appear; enter the user account that needs to be shared.

Step3: In the check box in Fig. 7-6, you can configure the authorities of the shared users.

7.6 Configuration Report

Solarcloud can email you the daily and monthly operation state of the PV plant, including the amount of generated energy, yield, CO₂ emission reduction and other information. In addition it can also inform you of 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. 7-7. Next input the email address in the text box, separate addresses with “;” if you are entering more than one email address. Select a time to send the email every day in “Send Report at” option.

| | | | |
|----------------|------------------------------------------------------------------------|---------|---------------------|
| Daily | | Monthly | Event |
| Status | <input checked="" type="radio"/> Active <input type="radio"/> Inactive | | |
| E-mail | <input type="text" value="...@zeversolar.com;...@zeversolar.com"/> | | (separate with ";") |
| Send Report at | Daily | 21:00 | |
| Send Report | | Save | |

Fig. 7-7: Activate the configuration report

Step3: After the above steps, click the “Save” button to save your settings, then click “Send Report” button to send to an email immediately.



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

7.7 Mobile device Monitoring

After installing Solarcloud on your mobile device, you can retrieve information about the PV plant anytime whenever you have an Internet connection. Follow these steps to monitor your PV plant on your mobile device:

Step1: Search for “Solarcloud” in Google play to download and install the Solarcloud APP on your mobile device on the 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. 7-8: Solarcloud interface on smart phone

8. Trouble Shooting

8.1 LED Indication

Some faults can be identified by looking at the LEDs.

| LED | Status | Description | Solutions |
|-----------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
|  | Off | Power supply is abnormal | Check the power supply. Make sure the power supply outlet is normal |
|  | Off | The ZeverCom WiFi's WiFi cannot connect to the router | Please check the router is functioning as normal. Ensure the Wifi has been set in accordance with section 5.6 |
|  | Green off | System error | Restart ZeverCom/ZeverCom WiFi |
| | Red light does not flash after green light flashed | Inverter did not send data to ZeverCom/ZeverCom WiFi | Check that the connection between inverter and ZeverCom/ZeverCom WiFi is not damaged or disconnected |

8.2 LED Indication of Network Interface

| LED | Status | Description | Solutions |
|------------------------|----------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Yellow light(link) | Off | No connection established | Check whether the connection between router and ZeverCom/ZeverCom WiFi is normal. Ensure the router is turned on. |
| | On | Connection established | NA |
| Green light (activity) | off | Communication is abnormal | Check whether the connections between router/switch and ZeverCom/ZeverCom WiFi are normal. |
| | Flashing | Data is being transmitted or received | NA |

8.3 LCD Indication

The LCD information of the ZeverCom/ZeverCom WiFi can help with troubleshooting as follows:

| Display | Solutions |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 169.254.1.100 11:20 04/11/2014 | The ZeverCom/ZeverCom WiFi cannot obtain IP from router, please check the Ethernet cable or the router. |
| Total INV:05 Online INV:03 | Two inverters connected to the ZeverCom/ZeverCom WiFi are not being monitored. Check whether the RS485 cable is normally connected or restart the ZeverCom/ZeverCom WiFi. |
| WAN Abnormal Check Network | The ZeverCom/ZeverCom WiFi cannot be connected with Solarcloud. Please check the connection between the ZeverCom/ZeverCom WiFi and the Internet. |
| INV SN. Empty | The inverter connected to the ZeverCom/ZeverCom WiFi 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 ZeverCom/ZeverCom WiFi is blank. Please contact our after-sales service personnel. |
| Non-existent SN. | Confirm whether the SN on the label of ZeverCom/ZeverCom WiFi 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 ZeverCom/ZeverCom WiFi has not been added to your PV plant in Solarcloud. Please add the ZeverCom/ZeverCom WiFi into your plan as described in section 7.4. |
| The IP address shown in the ZeverCom/ZeverCom WiFi is not in the same network segment as the IP address distributed by the router. | <ol style="list-style-type: none"> 1. Confirm whether the Internet cable connection between the ZeverCom/ZeverCom WiFi and the router is normal. 2. Confirm whether the DHCP of the Router is activated. 3. Restart the ZeverCom/ZeverCom WiFi. |
| The time displayed on the LCD of the ZeverCom/ZeverCom WiFi is incorrect. | Adjust the time zone of PV plant in Solarcloud to the time zone you are in. |

8.4 FAQ

Q1. How can I confirm whether all the inverters are connected to the ZeverCom/ZeverCom WiFi?

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

Method 2: In the home menu of built-in web server in the ZeverCom/ZeverCom WiFi, check whether the number of online inverters is the same as the number of inverters connected to the ZeverCom/ZeverCom WiFi. Refer to section 6.2.

Q2. How can I confirm whether the ZeverCom/ZeverCom WiFi is successfully connected to Solarcloud?

Check the LCD on the ZeverCom/ZeverCom WiFi. If it shows "Connected Solarcloud", it means the ZeverCom/ZeverCom WiFi is successfully connected to the Solarcloud. "Disconnected Solarcloud" means the ZeverCom/ZeverCom WiFi is disconnected from the Solarcloud.

Q3. Why can't I open the web page of the ZeverCom/ZeverCom WiFi's web server?

Check whether the IP address displayed on the LCD of ZeverCom/ZeverCom WiFi 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 ZeverCom/ZeverCom WiFi to login.

9. Technical Parameters

| | | |
|----------------------------------------|-----------------------------------------|----------------------------------|
| Model | A10081-10 | A10081-00 |
| Electrical Data | | |
| Power supply | DC: 7.5V~12V, Max. 0.3A | DC: 7.5V~12V, Max. 0.3A |
| Max. power consumption | 2.5W | 1.5W |
| Communication | | |
| Communicate with the inverter | 4-wires RS485 | 4-wires RS485 |
| Communicate with energy meter | 2-wires RS485 | 2-wires RS485 |
| Communicate with router | Ethernet | Ethernet |
| Number of directly connected inverters | Max. 5 | Max. 5 |
| WiFi communication | 2.4GHz 802.11 b/g/n WEP/WPA/WPA2 PSK | -- |
| Interface | | |
| Multi-Function Switch | Digital output port | Digital output port |
| Ethernet | 10/100 Mbit/s, RJ45 (for Router) | 10/100 Mbit/s, RJ45 (for Router) |
| RS485-1 | 4-wires | 4-wires |
| RS485-2 | 2-wires | 2-wires |
| Max. communication range | | |
| RS485 | 1000m | 1000m |
| Ethernet | 100m | 100m |
| Mechanical data | | |
| Dimensions (W x H x D) in mm | 138x87.5x31mm | 138x87.5x31mm |
| Weight | 260g | 230g |
| Installation | Wall, Indoor | Wall, Indoor |
| Environmental conditions | | |
| Operation | -10°C to +60°C | -10°C to +60°C |
| Storage and shipment | 9.1.1 -30°C to +80°C | 9.1.2 -30°C to +80°C |

Technical Parameters

| | | |
|-----------------------------|---------------------------------|---------------------------------|
| 9.1.3 Relative air humidity | 9.1.4 5% to 95%, non-condensing | 9.1.5 5% to 95%, non-condensing |
| 9.1.6 Protection class | 9.1.7 IP20 | 9.1.8 IP20 |

10. 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.

11. Contact Us

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

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