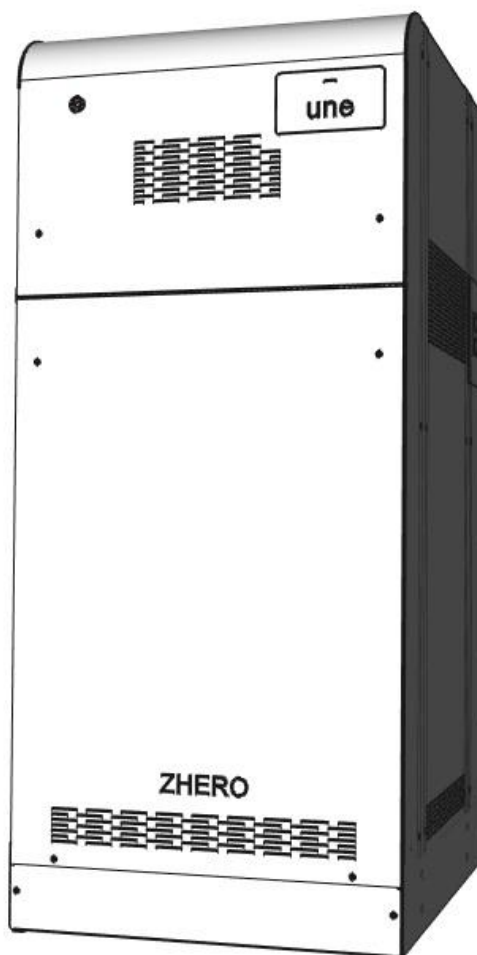


# ZHERO

1 MISSION · 0 EMISSION

## ZHERO QUICK INSTALLATION GUIDE

Single-phase series 3.0

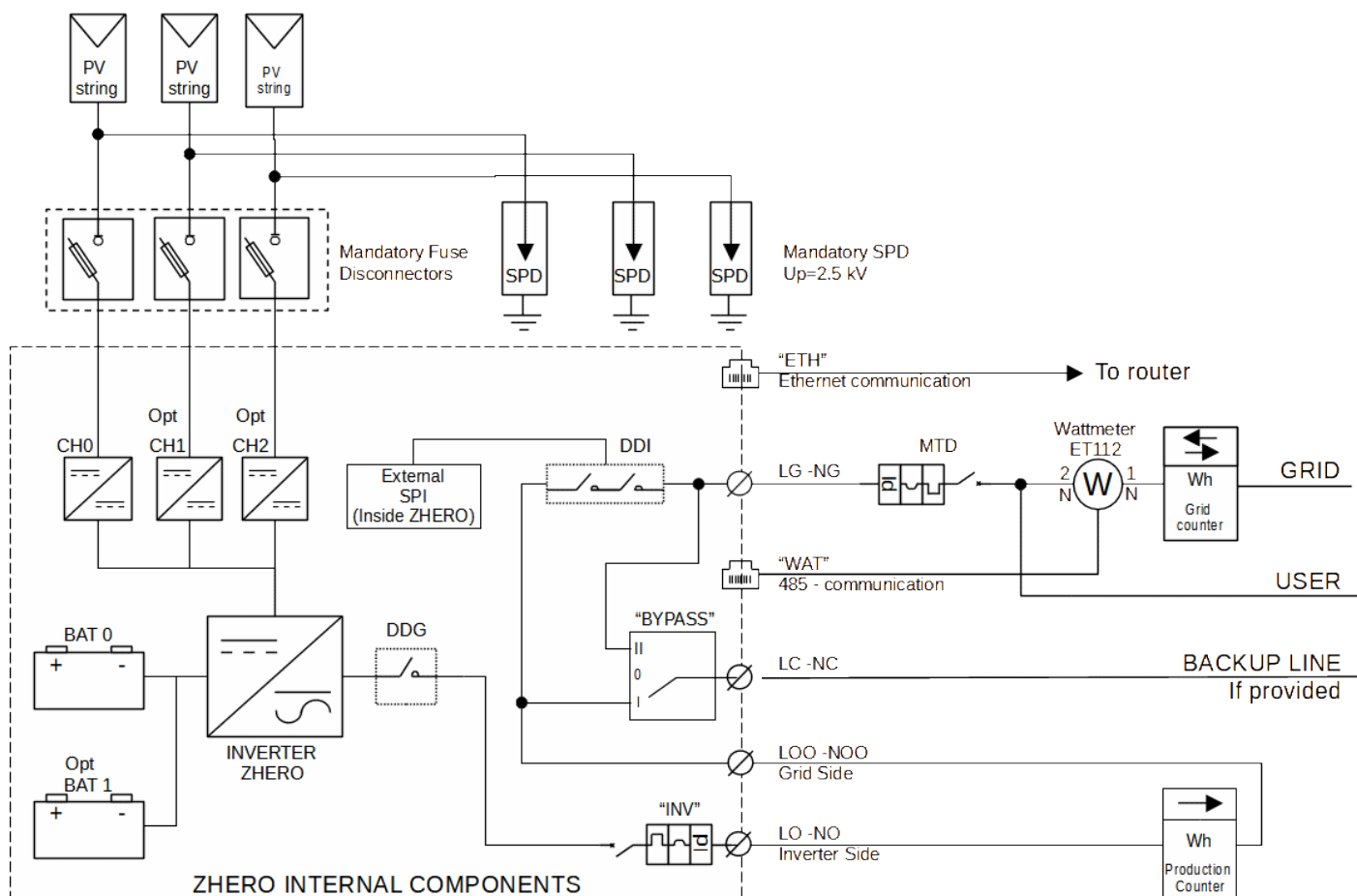


Carefully follow all the steps indicated in the ZHERO quick installation guide, at the end of the installation fill in the check boxes; the document must be delivered signed to the customer at the end of all the procedures described.

## 1. PLACEMENT OF A ZHERO

- In flat floor;
- in easily accessible places;
- in a position to ensure access to the switches;
- in a position that guarantees the space necessary to carry out maintenance operations;
- in places with air recirculation, no other regulatory compliance is required;
- In floors suitable to support the weight of UNE ZHERO.

## 2. GENERAL CONNECTION DIAGRAM OF THE MACHINE



### 3. CONNECTION BETWEEN A ZHERO AND THE PHOTOVOLTAIC GENERATOR

#### INSTALLATION

The installation consists in connecting the cables coming from the photovoltaic system to the pre-assembled MC4 of the charge controllers, paying close attention not to reverse the polarity.

To do this, remove the plate (Figure 1) by unscrewing the appropriate screws of the plate. Once the plate has been reinstalled and the cables brought inside the system, they can be connected to the regulators via the MC4 photovoltaic connector.

According to the type of regulator installed, check that the string voltage is between 90 - 180 V or 200 - 600 V.

**ATTENTION:** It is necessary to install a PV unloader (SPD), external to the machine, with Up index  $Up \leq 2.5 \text{ kV}$ .

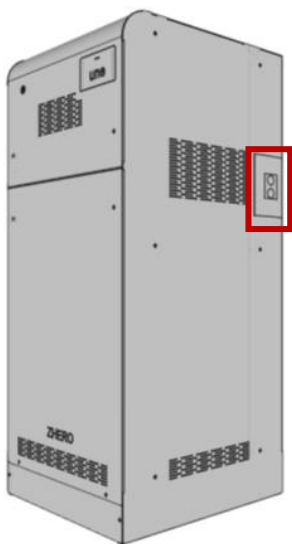


Figure 1 - MPPT inlet hatch

### 4. AC CONNECTION - A ZHERO TO MAINS DISTRIBUTOR/GENERATOR and "BACKUP"

#### INSTALLATION

Connection of the distributor / genset network entering the system (not production meter):

- **LG:** 230VAC DISTRIBUTOR / GENERATOR phase
- **NG:** Neutral DISTRIBUTOR / GENERATOR 230VAC
- **Yellow / Green terminal:** earth connection

Connection of the "backup" line (optional):

- **LC:** 230VAC Backup Phase
- **NC:** Neutral Backup 230VAC
- **Yellow / Green terminal:** earth connection

Connection of the production meter:

- **LO:** input phase to the production counter on the inverter side
- **NO:** neutral on inverter side counter input
- **LOO:** Output phase from the grid side production meter
- **NOO:** Neutral in output from the grid side production meter

In case of Off-grid application, a jumper must simply be made between LOO and LO and between NOO and NO.

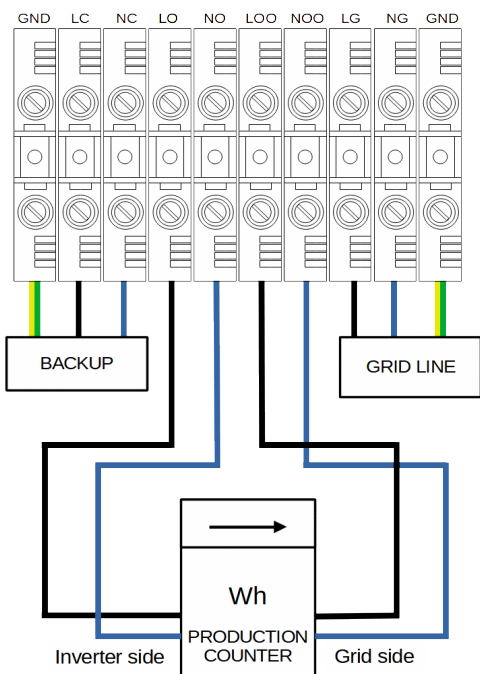


Figure 2 - ZHERO terminal block connection

## 5. CONNECTION OF THE WATTMETER AND UTILITIES (MANDATORY ON-GRID)

The connection cable of the wattmeter to the system must not exceed 50m in length.

**ATTENTION:** the wattmeter is a single-phase 230V device with a maximum current of 100A.

**ATTENTION:** in the case of three-phase systems, each ZHERO system must have its own wattmeter.

**ATTENTION:** use twisted cables; do not use Cross cables.

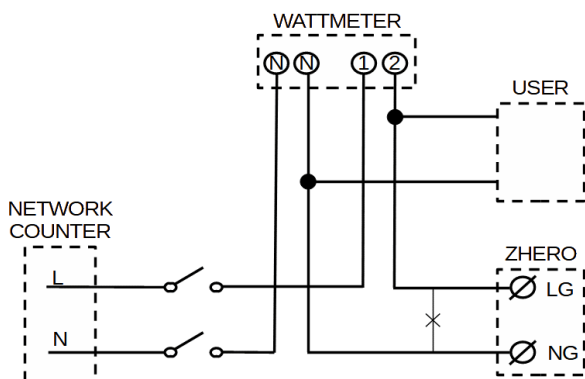


Figure 3 - Utilities and wattmeter connection diagram

### Connection of AC to the wattmeter

From the exchange counter, connect Phase and Neutral to terminals 1 and N below it:

- Connect the direct line to ZHERO in the corresponding terminals 2 and N below;
- Connect the output utilities from the wattmeter then downstream of the corresponding terminals 2 and N.

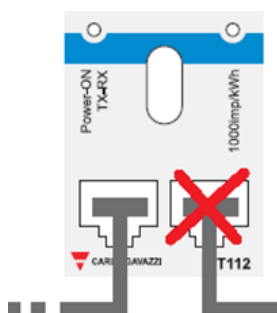


Figure 4 Wattmeter communication connection diagram

### 485 Wattmeter-ZHERO communication connection

- Connect an RJ-45 cable to the left RJ 45 input on the device as shown in the image;
- Connect the other end of the cable to the RJ-45 port on the ZHERO "WAT" panel;
- Make a jumper between terminal 3 and 5 of the wattmeter.

## 6. INTERNET CONNECTION

### Through Router



Perform the following operations on the router:

- Set the router in DHCP;
- TCP and UDP ports opening: 9090 related to the IP address associated with the ZHERO by the router (in DHCP);
- Add the URL "HTTPS: \\ portal.zherosystem.com" to the navigation exclusions

### Through range-extender



Before connecting, check that the cable connection is working.

The ethernet cable outgoing from the ZHERO system must be brought directly to the router or to a network switch connected to it as shown in the figures.

## 7. ZHERO ASSOCIATION WITH WEBSERVER

- The installer will have to request, if not already registered with his own account, his registration directly to UNE email: **assistenza@unesrl.com** that will provide him with a username and password; by accessing the portal: **https://portal.zherosystem.com** you can enter the code "WEB Activation: xxxxxx" which is located under the front cover, above the main fan and start monitoring the system.
- The end customer will have instead to register independently on the site: **https://portal.zherosystem.com** and the association by entering the same code "WEB Activation: xxxxxx".

## 8. CHECK CONNECTIONS

- Check mains voltage (230V) on terminals LG – NG but do not supply;
- Verify that the production counter is enabled;
- Check that the network is present on the wattmeter and the communication cable connected;
- Check the connection from the Internet cable to the "ETH" port;
- Check the tightening of the screws of any backup line from LC - NC;
- Verify that the photovoltaic system is enabled on entry to the system.

## 9. CONFIGURATION OF THE MAIN PANEL FOR THE FIRST STARTING

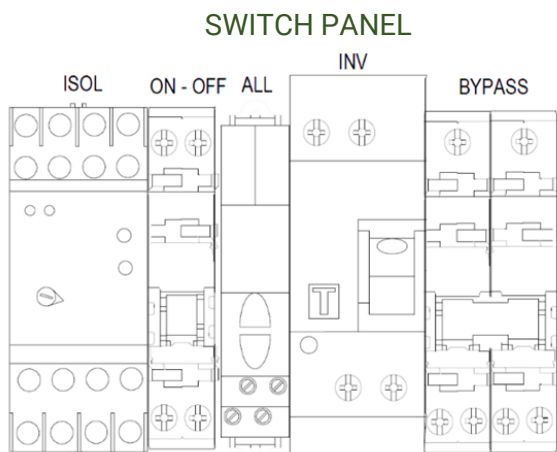


Figure 5 - UNE ZHERO main panel

### OPERATIONS

- Check that the 230 V **grid power supply** on the LG - NG terminals has been disconnected for at least 30 seconds.
- Move the "**BYPASS**" switch to **position 1** (Up) to put the loads of the LC-NC line under the backup line (if the backup line is provided);
- Enable the "**INV**" circuit breaker;
- Enable all users downstream and upstream of the system (external to the system);
- Set the "**ON-OFF**" switch to **ON**;
- Set the 230V mains power supply on the LG - NG input terminals.

### CHECKS

- Verify that the System Main Light remains green. It is advisable, after about a week, to remotely check that all devices are communicating and that the system is perfectly in line with what is expected. (Photovoltaic production, battery charging and discharging, etc).**
- Verify that the system turns on and begins to warm up the battery (this can take several minutes).

**IF THE MAIN LIGHT OF THE SYSTEM REMAINS RED, YOU WILL FIND THE POSSIBLE SOLUTIONS IN CHAPTER 10.**

## LEGEND

- ISOL:** Insulation control
- ON-OFF:** Disconnecter, allows you to turn the system on or off.
- ALL:** Alarm button, allows you to reset a system alarm that is signalled by the lighting of the red alarm lamp.
- INV:** Differential magnetothermic output from the inverter, it does not cause the interruption of the user but the blocking of the supply from the battery + photovoltaic source.
- BYPASS:** Line diverter that allows you to bypass the "backup" line covered by the system. Upwards the system is covered by backup, in the central position the line is interrupted and downwards the line is directly connected to that of the distributor.

## 10. OPERATION CHECK

### MONITORING SOFTWARE

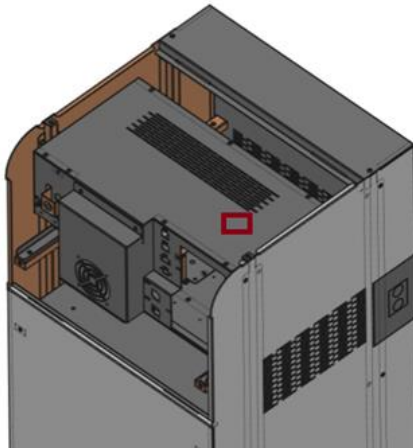


Figure 6 - location of the USB port

To verify the correct functioning of ZHERO use the **UneSrlCommunication** software.

The USB type B port for ZHERO monitoring is located in the upper left part, under the main panel, as indicated in the Figure 6.

The UneSrlCommunication software and the relative instruction manual with the legend of each alarm "**Manual - UneSrlCommunication**" can be downloaded from the site <https://unesrl.com> in the "**DOWNLOAD AREA**".

**The reading of the bits through UneSrlCommunication must be carried out from the bottom right to the left upwards.**

#### DETAIL: STATUSCYCLE ALARMS

#### VERIFY

**If only those bits are active, the system is working correctly:**

Logout		Config com	
OGBASEVARIABLESLAVE			
VARSTATUS_VERSIONS		DEBUG	
VARSTATUS_SYSTEM		VARSTATUS_DATE_TIME	
OUTPUT	INPUT	VARSTATUS_ANALOGS	BATTO
BATT1	INV0	CONT0	CONT1
STATUSCYCLE		OGBASEVARIABLESMASTER	
Agen24	0 0 0 0 0 0 0 0		
Agen16	0 1 0 0 0 1 0 0		
Agen8	1 0 0 0 0 1 0 0		
Agen0	0 0 0 0 1 0 0 0		

- Agen0 - **Bit 3** will always be active (not relevant)
- Agen8 - **bit 10** will be active until the system has finished warmup;
- Agen8 - **bit 15** will be active if the irradiation sensor is absent;
- Agen16 - **bit 18** will always be active for machine status;
- Agen16 - **bit 22** could be active (not relevant).

Figure 7 - Detail of machine states "STATUSCYCLE "

#### DETAIL: WATTMETRO COMMUNICATION

#### VERIFY

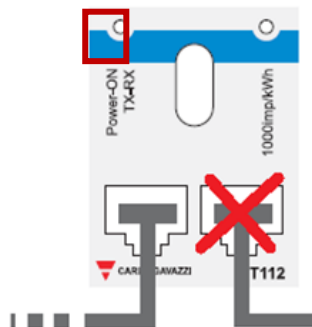


Figure 8 - Wattmeter led light indication

**To check the communication between the wattmeter and UNE ZHERO:**

- Check that the indicator light indicated in Figure 8 on the side is flashing intermittently.

### DETAIL: ALARM INVO

### VERIFY

Logout		Config com		
STATUSCYCLE		OGBASEVARIABLESMAS		
OGBASEVARIABLESSLAVE				
VARSTATUS_VERSIONS		DEBUG		
VARSTATUS_SYSTEM		VARSTATUS_DATE_TIME		
OUTPUT	INPUT	VARSTATUS_ANALOGS	BATTO	
BATT1	<b>INVO</b>	CONT0	CONT1	CONT2
Tinv (°C)	0.00			
io8	0 0 0 0 0 0 0 0			
io0	0 0 0 0 0 0 0 0			
alarms8	0 0 0 0 0 0 0 0			
alarms0	0 0 0 0 0 0 0 0			

Figure 9 - Inverter alarm details

From section INVO it is possible to specifically identify the inverter alarms. The reading must be done from the bottom right to the left to go up.

- Check that in "INVO" the bitmap alarm is all 0.

### DETAIL: ALARM MPPT

### VERIFY

Logout		Config com		
STATUSCYCLE		OGBASEVARIABLESMAS		
OGBASEVARIABLESSLAVE				
VARSTATUS_VERSIONS		DEBUG		
VARSTATUS_SYSTEM		VARSTATUS_DATE_TIME		
OUTPUT	INPUT	VARSTATUS_ANALOGS	BATTO	
BATT1	INVO	<b>CONT0</b>	<b>CONT1</b>	<b>CONT2</b>
Vpan (V)	246.2			
Vout (V)	55.3			
Iout (A)	0.2			
Pout (kW)	0.009			
Tdiss (°C)	26.3			

Figura 10 - Controller alarm details

To check the communication of the controllers, select the **CONT0**, **CONT1** and **CONT2** boxes (depending on whether you have 1 2 or 3 controllers) if it is day, check that the variables in the side column are set:

- CONT0**
- CONT1**
- CONT2**

### DETAIL: ALARM BATTERIES

### VERIFY

Logout		Config com		
BATT1	INVO	CONT0	CONT1	CONT2
STATUSCYCLE		OGBASEVARIABLESMAS		
OGBASEVARIABLESSLAVE				
VARSTATUS_VERSIONS		DEBUG		
VARSTATUS_SYSTEM		VARSTATUS_DATE TIME		
OUTPUT	INPUT	VARSTATUS_ANALOGS	<b>BATTO</b>	
Vbatt (V)	3.72			
Ibatt (A)	0.00			
Vbus (V)	55.43			
soc (Ah)	40.0			
Tbatt (C)	51.90			

Figura 11 - Battery alarms detail

To check the communication of the batteries, select the boxes **BATTO** and **BATT1** (depending on whether you have 1 or 2 batteries) and check that the data is regularly updated:

- BATTO**
- BATT1**

## 11. SUPPORT

- **System installation:** UNE is not responsible for the correct installation of the photovoltaic system and the Zhero system; any requests for assistance must be received in writing by entering all the system data and a detailed description of the anomalies, to the email address: [assistenza@unesrl.com](mailto:assistenza@unesrl.com).
- **System start:** after starting the system, in case of persistent anomaly highlighted by the main red light, carry out the checks described in chapter 10, and if the problem persists, send an email to: [assistenza@unesrl.com](mailto:assistenza@unesrl.com).
- **AUTOTEST:** no network interface self-test must be performed, already installed within the system, a request must be sent to the email: [assistenza@unesrl.com](mailto:assistenza@unesrl.com) to receive the test certificate to be used for network connection practices.
- **Manuals and documentation:** the ZHERO manual include all complete instructions for installation, use and maintenance of the same and can be downloaded from the website: **https: \\ unesrl.com in the section: "DOWNLOAD AREA"**.
- **Internet connection:** if the system is not online for more than 48 consecutive hours, before opening a technical assistance ticket, it is necessary to check that:
  - The stability and range of the connection;
  - The system is turned on;
  - Check the settings indicated in chap. 6;
  - The router's firewall is not blocking the connection (common problem);
  - The Internet service provider has not introduced some blocking and / or some filtering (frequent problem);
  - Try a system restart by turning the system off and then on again after 30 seconds.

UNE will not deal with such operations and will not consider requests for assistance regarding this issue until all of the following activities have been carried out.

- **Request for detailed technical information on the ZHERO system:** they must be sent to the following address: [tecnico@unesrl.com](mailto:tecnico@unesrl.com). Telephone consultations are not carried out.

**Thank you for choosing UNE srl products and for having carefully followed all the steps necessary for correct installation.**

**Apply installer label with telephone number for customer assistance**

Date:

Place:

Stamp and signature of the operator:

**Document to be kept by the customer**