



# USER'S MANUAL



## SINGLE-PHASE STRING INVERTERS

1PH 3000TLM-6000TLM-V3



**ZUCCHETTI**  
Centro Sistemi



# Grid-connected inverter 1PH 3000TLM-6000TLM-V3 User Manual



# Table of Contents

|      |                                                      |    |
|------|------------------------------------------------------|----|
| 1.   | Preliminary safety instructions .....                | 8  |
| 1.1. | Safety instructions .....                            | 8  |
| 1.2. | Symbols and icons .....                              | 12 |
| 2.   | Product features .....                               | 14 |
| 2.1. | Product presentation .....                           | 14 |
| 2.2. | Description of functions .....                       | 16 |
| 2.3. | Electrical block diagram .....                       | 17 |
| 2.4. | Efficiency and derating curve .....                  | 18 |
| 3.   | Installation .....                                   | 19 |
| 3.1. | Installation process .....                           | 19 |
| 3.2. | Checks before installation .....                     | 20 |
| 3.3. | Installation tools .....                             | 21 |
| 3.4. | Installation position .....                          | 24 |
| 3.5. | Moving the 1PH 3000TLM-6000TLM-V3 inverter .....     | 26 |
| 3.6. | Installing the 1PH 3000TLM-6000TLM-V3 inverter ..... | 27 |
| 4.   | Electrical connections .....                         | 28 |
| 4.1. | Electrical connections .....                         | 29 |
| 4.2. | Connecting PNGD cables (grounding) .....             | 30 |
| 4.3. | Connecting the DC input power cables .....           | 31 |
| 4.4. | Connecting the AC output power cables .....          | 37 |
| 4.5. | Connecting the communication cables .....            | 41 |
| 5.   | Commissioning the inverter .....                     | 44 |
| 5.1. | Safety inspection before commissioning .....         | 44 |
| 5.2. | Starting the inverter .....                          | 44 |
| 6.   | Operating interface .....                            | 46 |
| 6.1. | Operating panel and display .....                    | 46 |
| 6.2. | Main interface .....                                 | 47 |

|         |                                                                  |     |
|---------|------------------------------------------------------------------|-----|
| 6.3.    | Main menu.....                                                   | 50  |
| 6.4.    | Updating Inverter Software .....                                 | 57  |
| 7.      | Troubleshooting and maintenance .....                            | 59  |
| 7.1.    | Troubleshooting.....                                             | 59  |
| 7.2.    | Maintenance .....                                                | 72  |
| 8.      | Uninstalling .....                                               | 73  |
| 8.1.    | Uninstallation steps.....                                        | 73  |
| 8.2.    | Packaging.....                                                   | 73  |
| 8.3.    | Storage .....                                                    | 73  |
| 8.4.    | Disposal .....                                                   | 73  |
| 9.      | Technical specifications .....                                   | 74  |
| 10.     | Monitoring system.....                                           | 75  |
| 10.1.   | External Wi-Fi adapter.....                                      | 75  |
| 10.1.1. | Installation .....                                               | 75  |
| 10.1.2. | Configuration .....                                              | 76  |
| 10.1.3. | Verification .....                                               | 85  |
| 10.1.4. | Troubleshooting.....                                             | 89  |
| 10.2.   | Ethernet adapter.....                                            | 94  |
| 10.2.1. | Installation .....                                               | 94  |
| 10.2.2. | Verification .....                                               | 96  |
| 10.2.3. | Troubleshooting.....                                             | 98  |
| 10.3.   | 4G adapter .....                                                 | 99  |
| 10.3.1. | Installation .....                                               | 99  |
| 10.3.2. | Verification .....                                               | 102 |
| 10.4.   | Datalogger .....                                                 | 105 |
| 10.4.1. | Preliminary notes on how to configure the datalogger .....       | 105 |
| 10.4.2. | Electrical connections and configuration.....                    | 106 |
| 10.4.3. | ZSM-DATALOG-04 AND ZSM-DATALOG-10 DEVICES .....                  | 110 |
| 10.4.4. | WI-FI CONFIGURATION.....                                         | 110 |
| 10.4.5. | Ethernet configuration.....                                      | 110 |
| 10.4.6. | Checking that the datalogger has been configured correctly ..... | 117 |

|           |                                                                                           |     |
|-----------|-------------------------------------------------------------------------------------------|-----|
| 10.4.7.   | ZSM-RMS001/M200 and ZSM-RMS001/M1000 Devices .....                                        | 120 |
| 10.4.7.1. | Mechanical description and Datalogger interface .....                                     | 120 |
| 10.4.7.2. | Connecting the Datalogger to the inverters.....                                           | 121 |
| 10.4.7.3. | Internet connection via Ethernet cable.....                                               | 121 |
| 10.4.7.4. | Connecting the power supply and battery pack to the Datalogger .....                      | 121 |
| 10.4.7.5. | Connecting the LM2-485 PRO cell irradiance and temperature sensor to the datalogger ..... | 122 |
| 10.4.8.   | Configuring the Datalogger .....                                                          | 123 |
| 10.4.8.1. | Configuring the Datalogger on the ZCS Azzurro portal.....                                 | 125 |
| 10.4.8.2. | Network configuration.....                                                                | 126 |
| 10.4.9.   | Local monitoring.....                                                                     | 127 |
| 10.4.9.1. | Requirements for installation of local monitoring.....                                    | 127 |
| 10.4.9.2. | Features of local monitoring.....                                                         | 128 |
| 11.       | Warranty terms and conditions .....                                                       | 129 |

**General instructions**

This manual contains important safety instructions that must be followed during installation and maintenance of the equipment.

**Please keep these instructions!**

This manual must be considered an integral part of the equipment, and must be available at all times to everyone who interacts with the equipment. The manual must always accompany the equipment, even when it is transferred to another user or plant.

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**Technical support**

ZCS offers a support and technical consultancy service accessible by sending a request directly from the website <https://www.zcsazzurro.com/it/support>.

The following toll-free number is available for the Italian territory: 800 72 74 64.

## Preface

### General information

Please read this manual carefully before installation, use or maintenance.

This manual contains important safety instructions that must be followed during installation and maintenance of the system.

- **Scope**

This manual describes the assembly, installation, electrical connections, commissioning, maintenance and troubleshooting of the following AZZURRO inverters:

**1PH 3000TLM-V3 / 1PH 3680TLM-V3 / 1PH 4000TLM-V3 / 1PH 4600TLM-V3 / 1PH 5000TLM-V3 / 1PH 6000TLM-V3**

Keep this manual so that it is accessible at all times.

- **Recipients**

This manual is intended for qualified technical personnel (installers, technicians, electricians, technical support personnel or anyone who is qualified and certified to operate a photovoltaic system), who are responsible for installing and starting the inverter in the photovoltaic system and for operators of the photovoltaic system.

- **Symbols used**

This manual provides information for safe operation and uses certain symbols to ensure the safety of personnel and materials, and for efficient use of the equipment during normal operation. It is important to understand this information to avoid accidents and damage to property. Please take note of the following symbols used in this manual.

|                                                                                     |                                                                                                                                             |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Danger: indicates a hazardous situation which, if not resolved or avoided, could result in serious personal injury or death</b></p>   |
| <p><b>Danger</b></p>                                                                |                                                                                                                                             |
|  | <p><b>Warning: indicates a hazardous situation which, if not resolved or avoided, could result in serious personal injury or death.</b></p> |
| <p><b>Warning</b></p>                                                               |                                                                                                                                             |

|                                                                                   |                                                                                                                                                                 |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Caution:</b> indicates a hazardous situation which, if not resolved or avoided, could result in minor or moderate personal injury.</p>                    |
| <p><b>Caution</b></p>                                                             |                                                                                                                                                                 |
|  | <p><b>Attention:</b> indicates a potentially hazardous situation which, if not resolved or avoided, could result in damage to the system or other property.</p> |
| <p><b>Attention</b></p>                                                           |                                                                                                                                                                 |
|  | <p><b>Note:</b> provides important tips on the correct and optimal operation of the product.</p>                                                                |
| <p><b>Note</b></p>                                                                |                                                                                                                                                                 |

# 1. Preliminary safety instructions



## Note

If you have problems or questions regarding the reading and understanding of the following information, please contact Zucchetti Centro Sistemi S.p.A. through the appropriate channels.

## General information in this chapter

### Safety instructions

It mainly highlights the safety instructions to be followed during installation and use of the equipment.

### Symbols and icons

Introduces the main safety symbols on the inverter.

## 1.1. Safety instructions

Installation of 1PH 3000TLM-6000TLM-V3 on-grid inverter must conform with laws, regulations, codes and standards applicable in the jurisdiction.

Before installing and adjusting the produce, please read all of instructions, cautions and warnings in this manual

Before connecting the product to the electrical utility grid, contact the local utility company for allowance. Also, this connection must be made only by qualified electrician.

If the failure persists, please contact the nearest authorized maintenance center. If you don't know which service center is closest to you, please contact your local distributor. Don't repair the product by yourself, which may lead serious injury or damage.

### Qualified personnel

When inverter is working, it contains lethal voltages and went hot in some area. Improper installation or maloperation could cause serial damage and injury. To reduce the risk of personal injury and to ensure the safe installation and operation of the product, only a qualified electrician is allowed to execute transportation, installation, commissioning and maintenance. Zucchetti Centro Sistemi S.p.A. does not take any responsibility for the property destruction and personal injury because of any incorrect use.

### Label and Symbols

1PH 3000TLM-6000TLM-V3 has type label attach the side of product which contact important information and technical data, the type label must permanent attached to the product.

1PH 3000TLM-6000TLM-V3 has warning symbol attached the product which contact information of safety operation. The warning symbol must permanent attached to the product.

### Installation location requirement

Please install the inverter according to the following section. Place inverter in an appropriate bearing capacity objects (such as solid brick wall, or strength equivalent mounting surface, etc.) and make sure inverter vertical placed. A proper installation location must have enough space for fire engine access in order for maintenance if faulty occur. Ensure the inverter is installed in a wall ventilated environment and have enough air-cooling cycle. Air humidity should less than 90%.

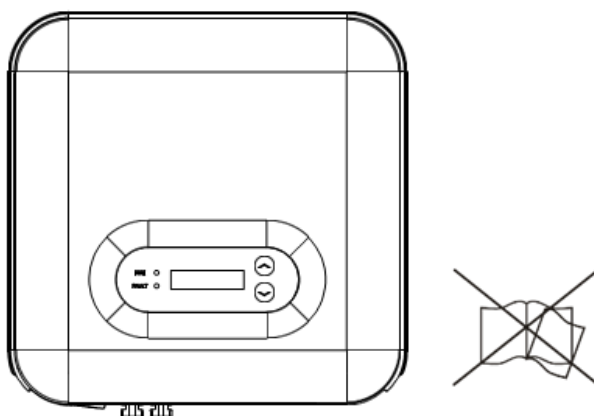


Figure 1 – Do not lose or damage this manual

### Transportation Requirement

Inverter is in the good electrical and physical condition when it ship out from factory. During transport, inverter must be placed in its original package or other proper package. Transportation company should responsible for any damage during transport period.

If you find any packing problems that may cause the damage of inverter or any visible damage, please notice the responsible transportation company immediately. You can ask your installer or Zucchetti Centro Sistemi S.p.A. for help is necessary.

### Electrical Connection

Please comply with all the current electrical regulations about accident prevention in dealing with the current inverter.

|                                                                                     |                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <p>Before connecting the mains power, be sure to disconnect the photovoltaic modules by disconnecting all the DC switches of the generator. When exposed to the sun, the photovoltaic panels produce a voltage that can be dangerous!</p> |
| <b>Danger</b>                                                                       |                                                                                                                                                                                                                                           |
|    | <p>All installation operations must be carried out by a professional electrician, who must:</p> <ul style="list-style-type: none"> <li>• be prepared.</li> <li>• carefully read this manual and understand its contents.</li> </ul>       |
| <b>Warning</b>                                                                      |                                                                                                                                                                                                                                           |
|   | <p>Before connecting the inverter to the grid, make sure that all the necessary permits have been obtained from the local grid operator and that all the electrical connections are made by a professional electrician.</p>               |
| <b>Attention</b>                                                                    |                                                                                                                                                                                                                                           |
|  | <p>Do not remove the information label or open the inverter. Otherwise, ZCS will not provide any warranty or maintenance.</p>                                                                                                             |
| <b>Note</b>                                                                         |                                                                                                                                                                                                                                           |

## Operation

|                                                                                   |                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Contact with the electrical grid or the terminal of the equipment may cause electrocution or fire!</p> <ul style="list-style-type: none"> <li>• Do not touch the terminal or the conductor connected to the electrical grid.</li> <li>• Follow all the instructions and safety requirements relating to the mains connection.</li> </ul> |
| <b>Danger</b>                                                                     |                                                                                                                                                                                                                                                                                                                                             |
|  | <p>Some internal components reach very high temperatures when the inverter is in operation. Wear protective gloves!</p>                                                                                                                                                                                                                     |
| <b>Attention</b>                                                                  |                                                                                                                                                                                                                                                                                                                                             |

## Maintenance and repair

|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>• Before carrying out any repairs, disconnect the inverter from the mains network (AC side) and from the photovoltaic system (DC side).</li> <li>• After switching off the AC and DC switches, wait 5 minutes before carrying out any repairs or maintenance on the inverter!</li> </ul>                                                                                              |
| <b>Danger</b>                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                              |
|  | <ul style="list-style-type: none"> <li>• The inverter should start working again after any faults have been fixed. For any repairs, contact your local authorised service centre;</li> <li>• Do not disassemble the internal components of the inverter without permission. This will void the warranty. Zucchetti Centro Sistemi S.p.A. shall not be responsible for any damage or loss caused by these actions.</li> </ul> |
| <b>Attention</b>                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                              |

## EMC/Noise Level

Electromagnetic compatibility (EMC) refers to that on electrical equipment functions in a given electromagnetic environment without any trouble or error, and impose no unacceptable effect upon the environment. Therefore, EMC represents the quality characters of an electrical equipment.

- The inherent noise-immune character: immunity to internal electrical noise.

- External noise immunity: immunity to electromagnetic noise of external system.
- Noise emission level: influence of electromagnetic emission upon environment.

|                                                                                                    |                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br><b>Danger</b> | <p><b>Electromagnetic radiation from inverter may be harmful to health!</b></p> <p><b>Please do not continue to stay away from the inverter in less than 20cm when inverter is working</b></p> |
|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

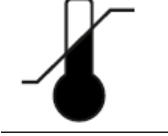
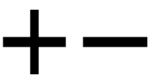
## 1.2. Symbols and icons

### Safety signals

|                                                                                                         |                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br><b>Caution</b>     | <p><b>Pay attention to possible burns due to hot parts.</b></p> <p><b>Only touch the screen or press the keys while the inverter is in operation.</b></p>                                                                                             |
| <br><b>Attention</b> | <p><b>The PV strings should be connected to the ground in accordance with the local regulations!</b></p> <p><b>To ensure the safety of the system and people, the inverter and photovoltaic strings must be securely connected to the ground.</b></p> |
| <br><b>Warning</b>   | <p><b>Ensure the correct DC input voltage; which must be below the maximum allowable DC voltage. Overvoltage can cause permanent damage to the inverter or other faults which are not covered by the warranty!</b></p>                                |

## Symbols on the inverter

Some safety symbols are located on the inverter. Read and understand the contents of the symbols before installing the inverter.

|                                                                                     |                                                                                                                                                                      |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | After disconnect with the DC side, there is a residual voltage in the inverter, operator should wait for 5 minutes to ensure the capacitor is completely discharged. |
|    | Beware of high voltage                                                                                                                                               |
|    | Beware of high temperatures                                                                                                                                          |
|   | Complies with the European Standards (CE)                                                                                                                            |
|  | Ground connection point                                                                                                                                              |
|  | Read this manual before installing the inverter.                                                                                                                     |
|  | Indication of the allowable temperature range                                                                                                                        |
|  | Positive and negative polarities of the input voltage (DC).                                                                                                          |

## 2. Product features

### General information in this chapter

#### Product description and dimensions

The field of use and overall dimensions of the 1PH 3000TLM-6000TLM-V3 inverters are indicated in this section.

#### Description of functions

Describes how the 1PH 3000TLM-6000TLM-V3 inverters and their internal operating modules work.

#### Efficiency curve

Describes the efficiency curves of the inverter.

### 2.1. Product presentation

#### Field of use

1PH 3000TLM-6000TLM-V3 is a transformer-less on grid PV inverter, that converts the direct current of the PV panels to the grid-compliant, three-phase current and feeds into the utility grid.

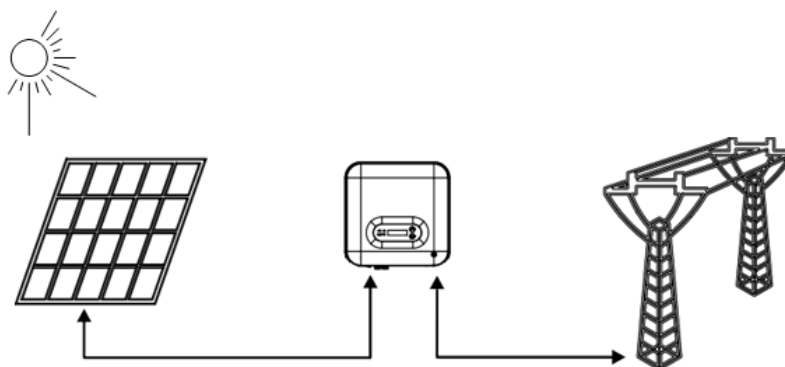


Figure 2 – Grid-connected photovoltaic system

1PH 3000TLM-6000TLM-V3 may only be operated with PV arrays (photovoltaic module and cabling) for on grid condition. Do not use this product for any other or additional purposes. Any damage or property loss due to any use of the product other than described in this section, Zucchetti Centro Sistemi S.p.A. will not take the responsibility. DC input of the product must be PV module, other source such like DC sources, batteries will against the warranty condition and Zucchetti Centro Sistemi S.p.A. will not take the responsibility.

## Product Dimensions

The choice of optional parts of inverter should be made by a qualified technician who knows the installation conditions clearly.

## Dimensions Description

LxWxH=349\*344\*164mm

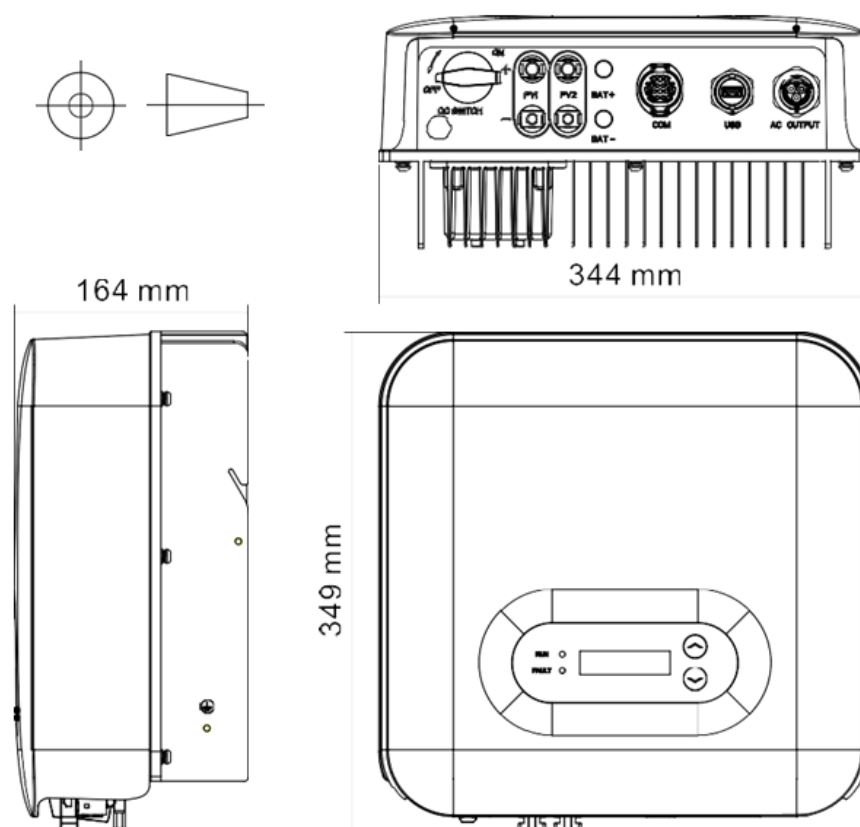


Figure 3 – Front and side view of the inverter

**Note:** 1PH 3000TLM-6000TLM-V3 supports 2-channel PV string input.

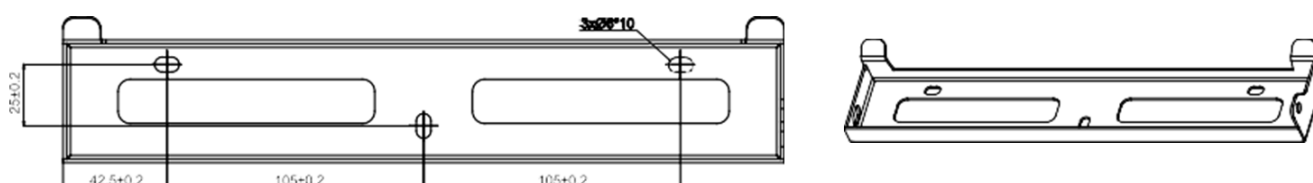


Figure 4 - Bracket dimensions

## Labels on the equipment

**Note:** label must NOT be hidden with objects and extraneous parts (rags, boxes, equipment, etc.); they must be cleaned regularly and kept visible at all times.

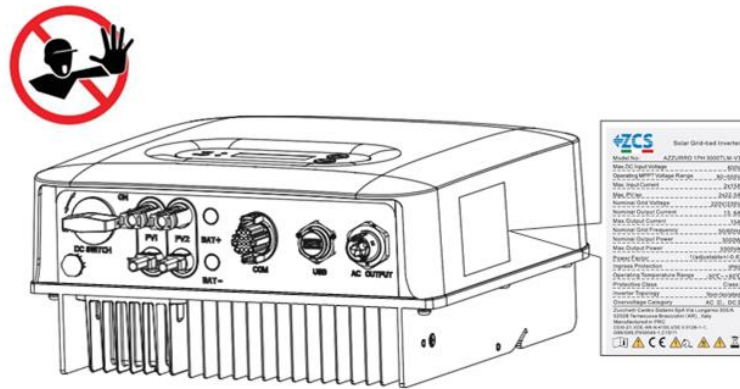


Figure 5 – Do not remove the label on the side of the inverter

## 2.2. Description of functions

DC power generated by PV arrays is filtered through Input Board then enter Power Board. Input Board also offer functions such as insulation impedance detection and input DC voltage/ current detection. DC power is converted to AC power by Power Board. AC power is filtered through Output Board then AC power is fed into the grid. Output Board also offer functions such as grid voltage/ output current detection, GFCI and output isolation relay. Control Board provides the auxiliary power, controls the operation state of inverter and shows the operation status by Display Board. Display Board displays fault code when inverter is abnormal operation conditions. At the same time, Control Board can trigger the replay to protect the internal components.

## Function Module

### A. Energy management unit

Remote control to start/ shunt down inverter through an external control.

### B. Feeding reactive power into the grid

The inverter is able to produce reactive power thus to feed it into the grid through the setting of the phase shift factor. Feed-in management can be controlled directly by APP or through a RS485 interface.

### C. Limited the active power fed into grid

USB interface for uploading the firmware, remotely uploading by using USB acquisition stick (WIFI/Ethernet/GPRS) is also available.

### Figure 6 – Schematic diagram

## 2.4. Efficiency and derating curve



Figure 7 - Power efficiency curve

### 3. Installation

#### General information in this chapter

This chapter describes how to install the 1PH 3000TLM-6000TLM-V3 inverter.

#### Installation notes:

|                                                                                    |                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | <ul style="list-style-type: none"> <li>• DO NOT install 1PH 3000TLM-6000TLM-V3 inverters near flammable materials.</li> <li>• DO NOT install 1PH 3000TLM-6000TLM-V3 inverters in an area where flammable or explosive materials are stored.</li> </ul>              |
| <b>Danger</b>                                                                      |                                                                                                                                                                                                                                                                     |
|   | <p>The housing and heat sink may become very hot while the inverter is running, DO NOT install the inverter in places where they may be touched inadvertently.</p>                                                                                                  |
| <b>Warning</b>                                                                     |                                                                                                                                                                                                                                                                     |
|  | <ul style="list-style-type: none"> <li>• Consider the weight of the inverter when handling and transporting the inverter.</li> <li>• Choose an appropriate mounting position and surface.</li> <li>• Assign at least two people to install the inverter.</li> </ul> |
| <b>Attention</b>                                                                   |                                                                                                                                                                                                                                                                     |

#### 3.1. Installation process

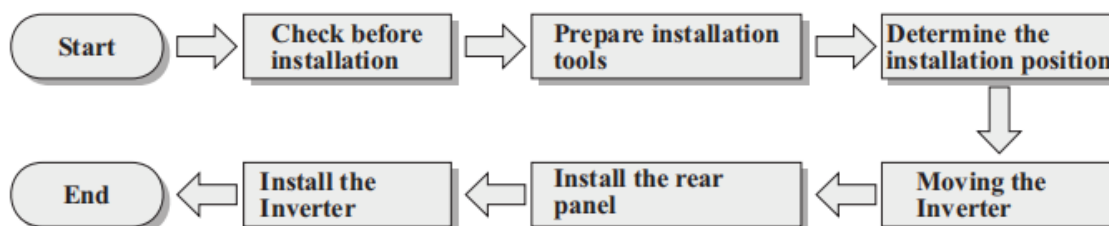


Figure 3 - Installation steps

## 3.2. Checks before installation

### Checking the outer packaging

Packaging materials and components may be damaged during transport. Therefore, please check the materials of the outer packaging before installing the inverter. Check the surface of the box for external damage such as holes or tears. If any kind of damage is found, do not open the box containing the inverter and contact the supplier and transport company as soon as possible.

It is recommended to remove the packaged materials from the box 24 hours before installing the inverter.

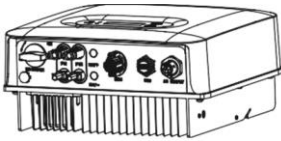
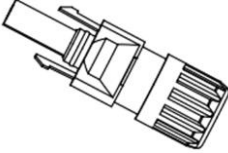
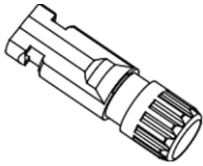
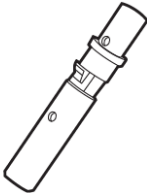
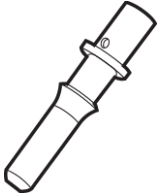
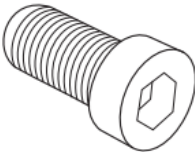
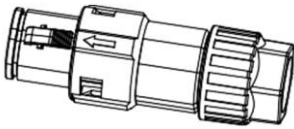
### Checking the product

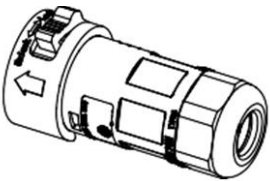
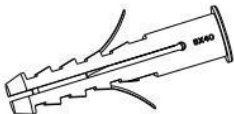
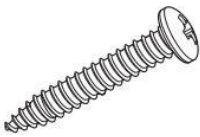
After removing the inverter from its packaging, check that the product is intact and complete. If any damage is found or components are missing, contact the supplier and transport company.

### Contents of the packaging

Carefully check the contents of the packaging before installation, making sure that no element inside the packaging is missing or damaged.

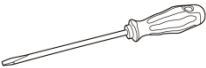
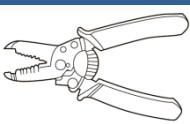
The package should contain the following components:

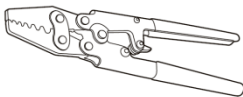
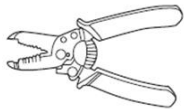
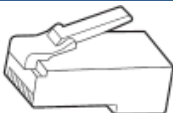
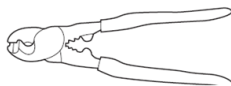
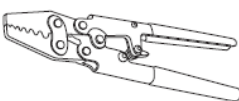
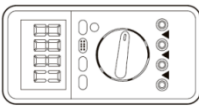
|                                                                                                                                     |                                                                                                                                     |                                                                                                                       |                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
|  <p>1x Photovoltaic inverter</p>                 |  <p>1x mounting bracket</p>                      |  <p>2x PV+ Input terminals</p>    |  <p>2x PV- Input terminals</p>              |
|  <p>2x metal terminals for + DC power cables</p> |  <p>2x metal terminals for - DC power cables</p> |  <p>2x M6x12 hexagonal screws</p> |  <p>1x COM 16pin Communication Terminal</p> |

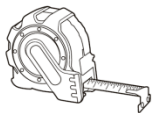
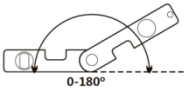
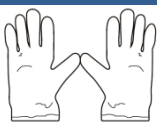
|                                                                                                            |                                                                                                         |                                                                                                             |                                                                                                                    |
|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <br>1x AC output terminal | <br>3x Expansion bolts | <br>3x Self-tapping screw | <br>1x Warranty<br>Registration |
| <br>1x user manual        | <br>2x warranty card   |                                                                                                             |                                                                                                                    |

### 3.3. Installation tools

The following tools are required for installation of the inverter and electrical connections; therefore, they must be prepared before installation.

| No. | Tool                                                                                |                                     | Function                                                |
|-----|-------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------|
| 1   |  | Drill<br>Recommended drill bit: 6mm | To drill holes in the wall for fixing the bracket       |
| 2   |  | Screwdriver                         | To screw and unscrew screws for the various connections |
| 3   |  | Wire stripper                       | To prepare the cables for wiring                        |

|    |                                                                                     |                     |                                                                                                |
|----|-------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------|
| 4  |    | 5mm Allen Wrench    | To screw the inverter to the wall-mounting bracket and to open the front cover of the inverter |
| 5  |    | RJ45 crimping tool  | To crimp the RJ45 connectors for the communication cables                                      |
| 6  |    | Rubber hammer       | To insert the expansion plugs into the wall holes                                              |
| 7  |    | MC4 removal tool    | To remove the DC connectors from the inverter                                                  |
| 8  |   | Diagonal pliers     | To cut and tighten the cable ends                                                              |
| 9  |  | Wire stripping tool | To remove the outer sheath of the cables                                                       |
| 10 |  | RJ45                | 2 pieces                                                                                       |
| 11 |  | Cable cutter        | To cut the power cables                                                                        |
| 12 |  | Crimping tool       | To crimp the power cables                                                                      |
| 13 |  | Multi-meter         | To check the voltage and current values                                                        |

|    |                                                                                     |                 |                                              |
|----|-------------------------------------------------------------------------------------|-----------------|----------------------------------------------|
| 14 |    | Marker pen      | To mark the wall for better fixing precision |
| 15 |    | Measuring tape  | To measure distances                         |
| 16 |    | Level           | To make sure the bracket is level            |
| 17 |    | ESD gloves      | Protective clothing                          |
| 18 |    | Safety goggles  | Protective clothing                          |
| 19 |  | Protection mask | Protective clothing                          |

### 3.4. Installation position

Select an appropriate location to install the product to make sure the inverter can work in a high efficiency condition. When selecting a location for the inverter, consider the following:

Note: install vertical or backward tilt within 0-15°, Do not install forward or upside down!

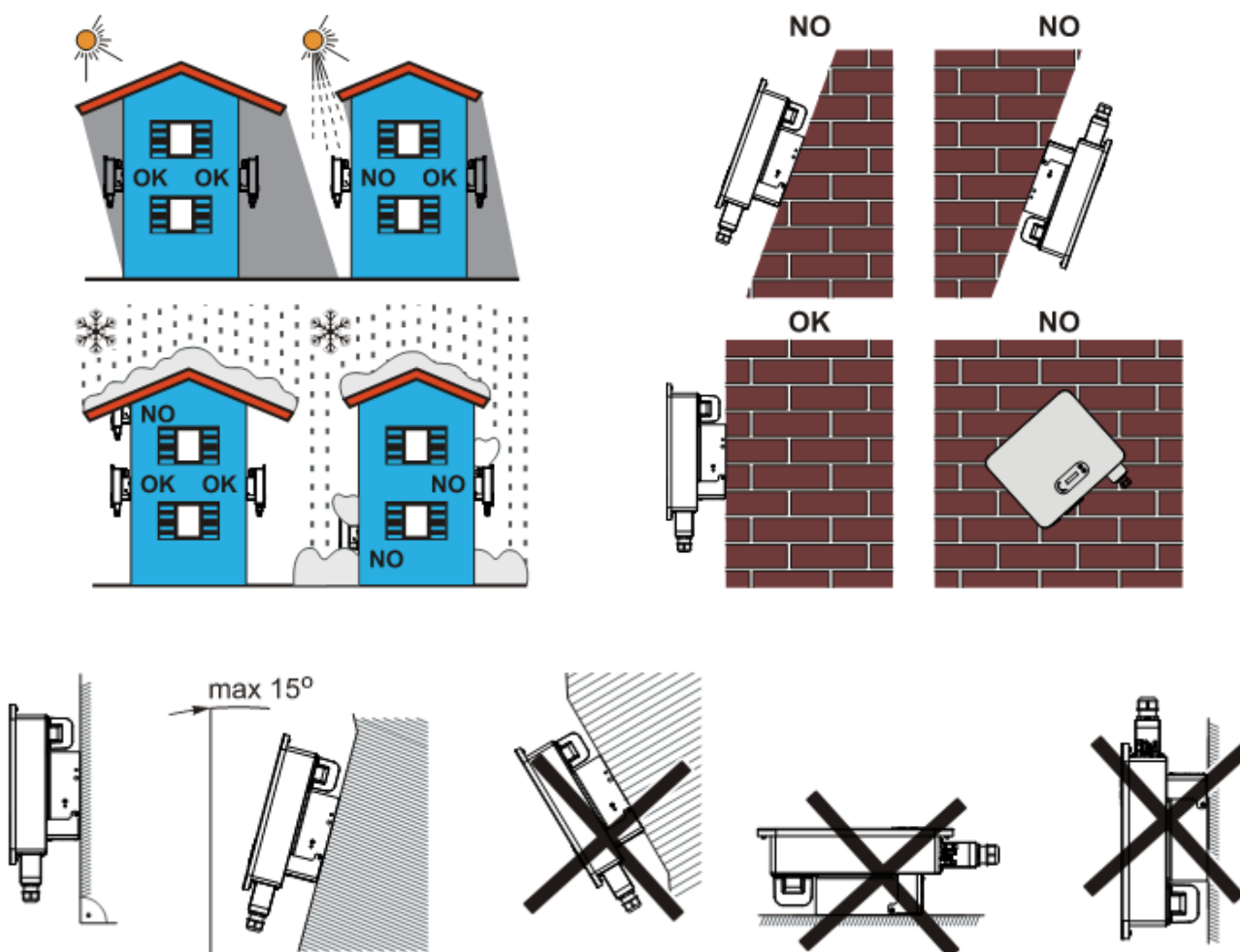


Figure 4 – Requirements for installing a single inverter

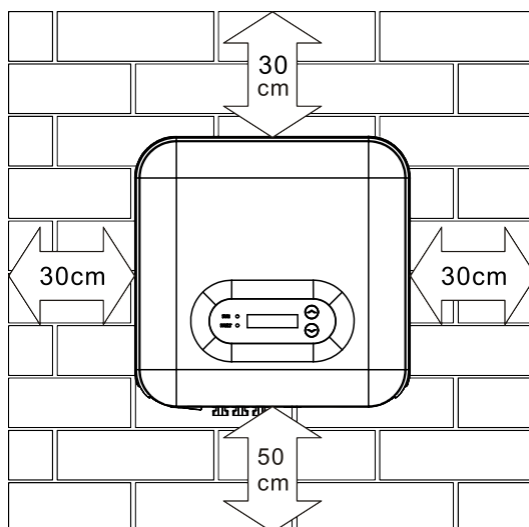


Figure 10 - Clearance for single inverter

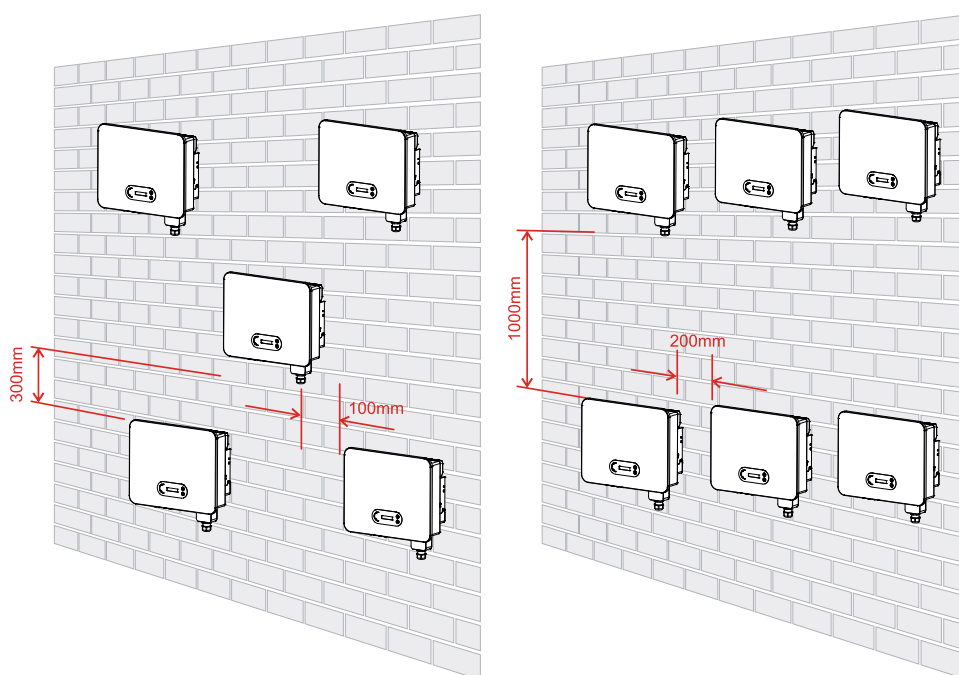


Figure 11 - Clearance for multiple inverters

**Note:** For safety reasons, Zucchetti Centro Sistemi Spa and/or its partners may not carry out any technical repairs or maintenance work, or move the inverter from and to the ground if it is installed at a height of more than 180 cm from the ground.

Inverters installed at higher heights must be moved to the ground before they can be repaired or serviced.

### 3.5. Moving the 1PH 3000TLM-6000TLM-V3 inverter

Unload the inverter from package, horizontally move to the install position. When open the package, at least two operators insert the hands to the back of heat sink part.

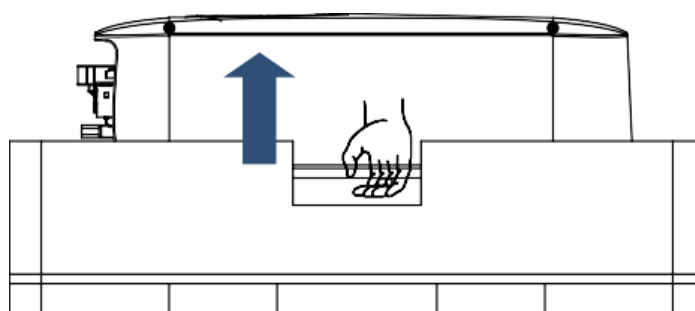


Figure 5 - Removing the polystyrene protections

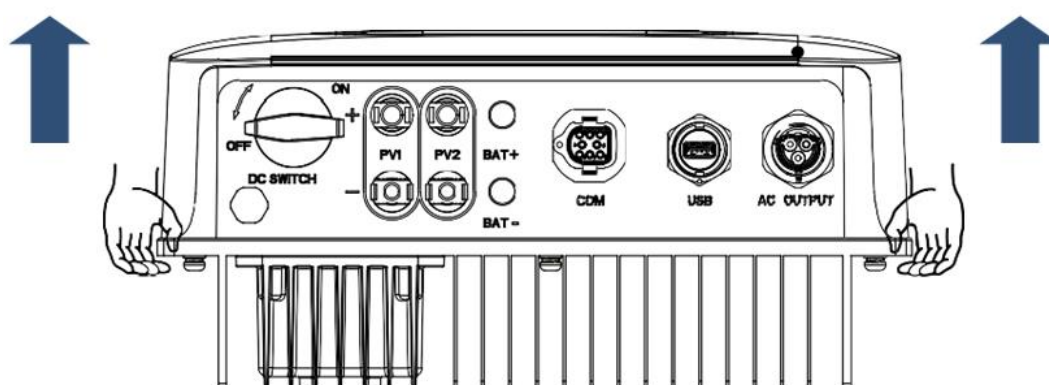


Figure 6 - Removing the inverter from its packaging



#### Attention

- To prevent damage and personal injury, hold the inverter firmly when moving, as it is a heavy piece of equipment.
- Do not position the inverter with the input/output terminals in contact with other surfaces, as these are not designed to support the weight of the inverter. Always position the inverter horizontally.
- When placing the inverter on the floor, make sure to place a support under the unit to protect its front door.

### 3.6. Installing the 1PH 3000TLM-6000TLM-V3 inverter

- 1) Placed the rear panel on the mounting wall, determine the mounting height of the bracket and mark the mounting poles accordingly. Drilling holes by using Hammer Drill, keep the hammer drill perpendicular to the wall and make sure the position of the holes should be suitable for the expansion bolts.
- 2) Insert the expansion bolt vertically into the hole.
- 3) Align the mounting bracket with the position of the holes and fix it to the wall using the most suitable screws and flat washers, tightening them properly.
- 4) Lift the inverter and hang it on the rear panel, and fixing both side of inverter with M6 screw (accessories).
- 5) User can use a lock to block the inverter in case of stealing (Optional).

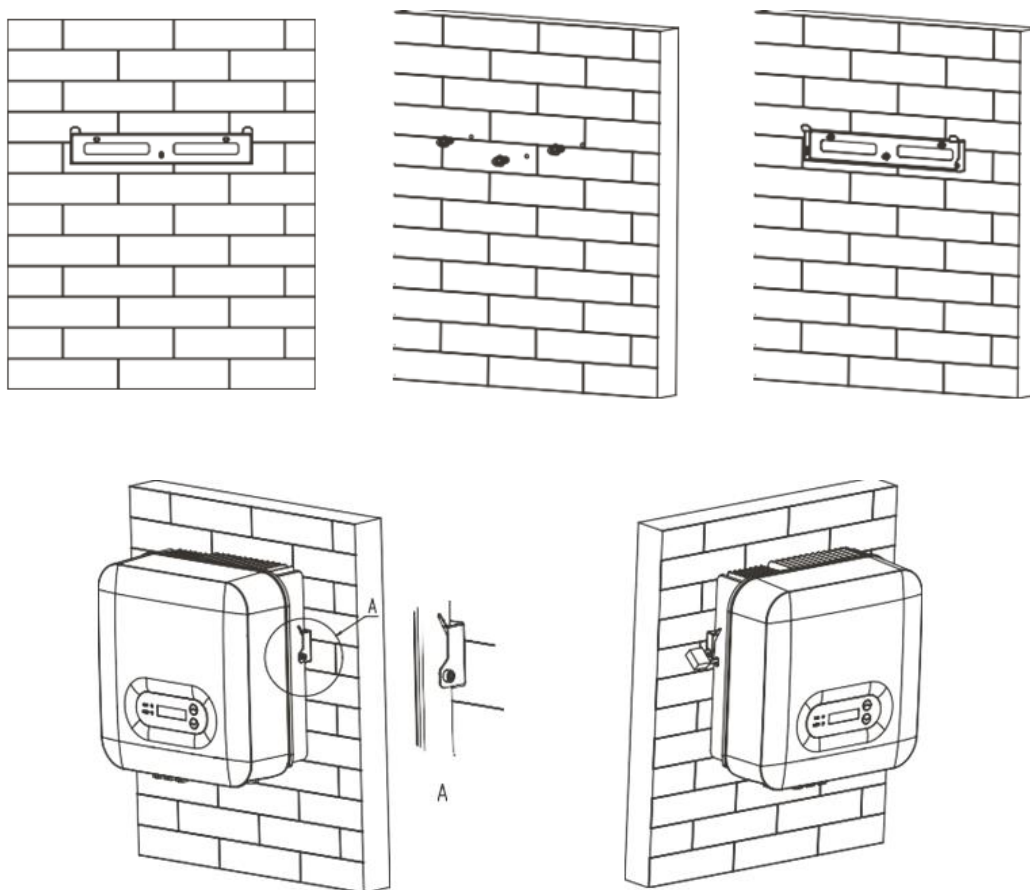


Figure 7 - Steps for mounting the inverter on the wall

## 4. Electrical connections

### General information in this chapter

This chapter describes the electrical connections of the 1PH 3000TLM-6000TLM-V3 inverter. Carefully read this section before connecting the cables.

**NOTE:** Before making any electrical connections, ensure that the DC and AC circuit breakers are open. Remember that the accumulated electrical charge remains in the inverter capacitor after the DC and AC circuit breakers have been switched off. Therefore, it is necessary to wait at least 5 minutes to allow the capacitor to discharge completely.

|                                                                                     |                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <p>The inverter must be installed and serviced by professional technicians or electricians.</p>                                                                                                                                                                                                                                                        |
| <p>Attention</p>                                                                    |                                                                                                                                                                                                                                                                                                                                                        |
|   | <p>The PV modules generate electricity when exposed to sunlight, which can pose a risk of electric shock. Before connecting the DC input power cord, be sure to disconnect the strings via the appropriate circuit breakers.</p>                                                                                                                       |
| <p>Danger</p>                                                                       |                                                                                                                                                                                                                                                                                                                                                        |
|  | <p>The maximum open-circuit voltage of the photovoltaic string must be less than 600 V.</p> <p>The 1PH 3000TLM-6000TLM-V3 has 2 two independent input channels (MPPT); all the photovoltaic modules connected to them must be of the same model and brand, and must be positioned with the same orientation (solar azimuth and inclination angle).</p> |
| <p>Note</p>                                                                         |                                                                                                                                                                                                                                                                                                                                                        |

The connected PV modules must have an IEC 61730 Class A rating.

| The connected panel must meet the standard IEC61730A |                |                               |
|------------------------------------------------------|----------------|-------------------------------|
| String<br>Model                                      | IscPV(maximum) | Maximum output<br>current (A) |
| 1PH 3000TLM-V3                                       | 22.5A/22.5A    | 15A                           |
| 1PH 3680TLM-V3                                       |                | 16A                           |
| 1PH 4000TLM-V3                                       |                | 20A                           |
| 1PH 4600TLM-V3                                       |                | 23A                           |
| 1PH 5000TLM-V3                                       |                | 25A                           |
| 1PH 6000TLM-V3                                       |                | 29A                           |

**Note:** In the above table, the first value of IscPV is for MPPT1, the second value of IscPV is for MPPT2.

#### 4.1. Electrical connections

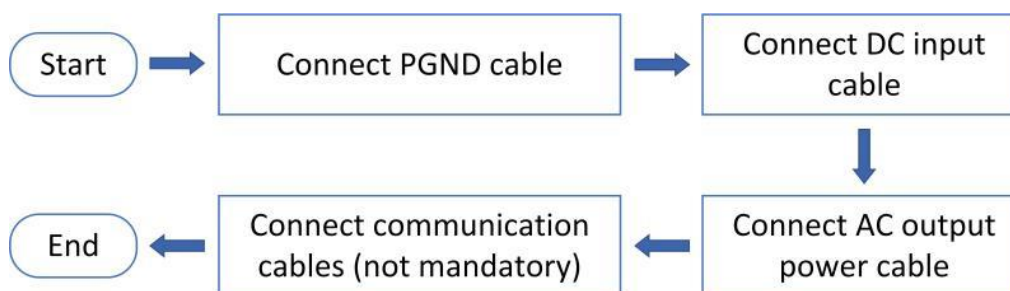


Figure 8 – Steps for connecting the cables

## 4.2. Connecting PNGD cables (grounding)

Connect the 1PH 3000TLM-6000TLM-V3 inverter to the ground electrode using ground protection cables (PGND).

|                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>Attention</b></p> | <p>The inverter does not have a transformer, therefore the positive and negative polarities of the photovoltaic string do NOT need to be grounded. Otherwise, the inverter may fail. All non-current-carrying metal parts (such as the PV module frame, PV rack, housing of the combiner box, and housing of the inverter) in the PV power system must be connected to the ground.</p> |
|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Prerequisites:

Prepare the grounding cable (recommend greater than 4mm<sup>2</sup> yellow-green outdoor cable).

### Procedure:

- 1) Remove the insulation layer with an appropriate length using a wire stripper.

**Note:** L2 is approximately 2-3 mm longer than L1.

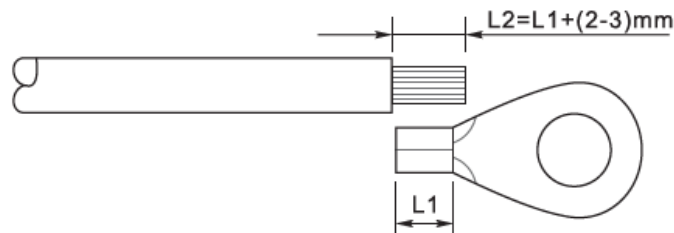


Figure 9 - Preparing the ground cable (1)

- 2) Insert the exposed wires in the OT terminal and crimp them using a crimping tool.

**Note 1:** L3 is the length between the insulation layer of the ground cable and the crimped part. L4 is the distance between the crimped part and the conductor wires protruding from the crimped part.

**Note 2:** The cavity formed after the conductor has been crimped must completely wrap the conductor wires. The core of the wire must be in close contact with the terminal.

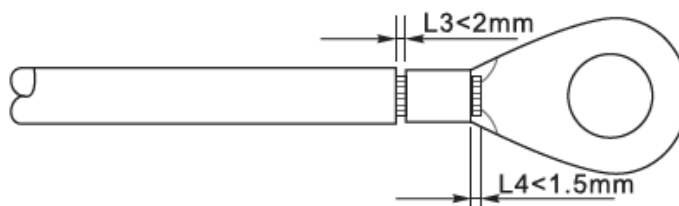


Figure 107 - Preparing the ground cable (2)

- 3) Install the crimped OT terminal and flat washer using the M6 screw in the hole located on the inverter heatsink, as shown in the figure; tighten the screw to a torque of 5 Nm using an Allen key.

**Note:** To ensure the anti-corrosion performances of the ground terminals, apply silica gel on them after connecting the ground cable.

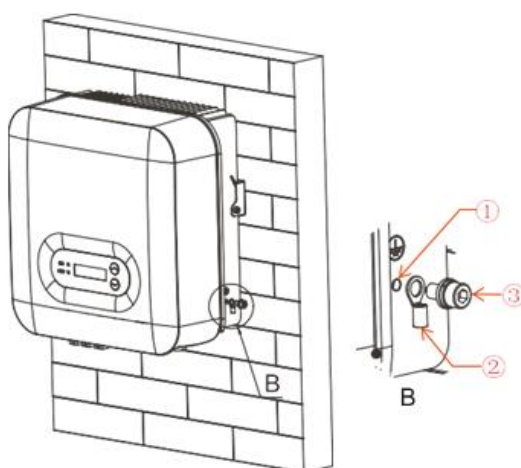


Figure 18 - Inverter external grounding instruction diagram

### 4.3. Connecting the DC input power cables

Connect the 1PH 3000TLM-6000TLM-V3 inverter to the photovoltaic strings using DC input power cables. Select the input mode: the 1PH 3000TLM-6000TLM-V3 inverter has two MPPTs, which can function either independently or in parallel, depending on how the system was designed. The user can choose the appropriate MPPT operating mode.

**Note**

Depending on the type of inverter, select the appropriate accessories (cables, fuse holder, fuse, switch, etc.). The open-circuit voltage of the photovoltaic system must be lower than the maximum allowable DC input voltage of the inverter.

The positive and negative poles of the panels on the inverter must be connected separately. The power cable must be suitable for photovoltaic applications.

## Note

Both MPPT inputs of the inverter should be populated, even if the system only has one string. If the strings are arranged in parallel, it is recommended to use a Y or T connection cable to double the input currents from the PV array and to populate all the MPPT inputs of the inverter, as shown in the figure. If the string arrangement is independent, simply connect the two strings to the two MPPTs of the inverter.



Figure 11 – Y-branch connection cable for solar panels



### Note

- Check the polarity of the PV string to ensure the correct connection of the cables to the string.
- Do not connect the positive or negative polarities of the PV string to the ground.

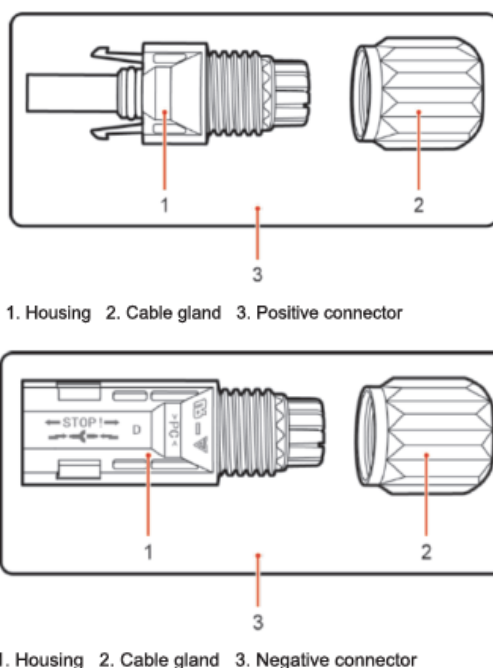
|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <p>Make sure that the following information is observed. Otherwise, there is a risk of fire.</p> <ul style="list-style-type: none"> <li>• The modules connected in series in each string must have the same brand and model.</li> <li>• The open-circuit voltage for each string must be less than or equal to 600 V DC.</li> <li>• The short circuit current for each input must be less than or equal to 22.5 A DC</li> <li>• The output power for each PV string must be less than or equal to the maximum input power allowable for 1PH 3000TLM-6000TLM-V3 inverters.</li> <li>• The positive and negative terminals of the PV strings must be connected respectively to the positive and negative inputs of the input terminal block.</li> </ul> |
| <b>Attention</b>                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|   | <ul style="list-style-type: none"> <li>• Before connecting the power supply, be sure to disconnect the generator's DC switch. When exposed to the sun, the photovoltaic generator produces a voltage that can be dangerous!</li> <li>• Before connecting the power supply, make sure that the voltage of the DC cables is within the permissible operating range, below 60 V DC, and that the DC circuit breaker switch is open. Otherwise, the high voltage may cause serious damage.</li> </ul>                                                                                                                                                                                                                                                     |
| <b>Danger</b>                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|  | <ul style="list-style-type: none"> <li>• If the 1PH 3000TLM-6000TLM-V3 inverter is connected directly to the grid, make sure that the PV strings are not grounded.</li> <li>• If the DC voltage has a non-zero value between the positive terminal of the PV strings and the ground, the PV strings are subject to insulation faults. Fix the fault before connecting the cables.</li> <li>• If the photovoltaic string is to be grounded, installed a three-phase four-wire insulation transformer on the output side and disable the ISO detection function. In the event of grounding of the string, if an isolation transformer is not installed, the inverter will be damaged.</li> </ul>                                                        |
| <b>Note</b>                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Context

| Cross section (mm <sup>2</sup> / AWG) |                   | Outer diameter of cable (mm) |
|---------------------------------------|-------------------|------------------------------|
| Range                                 | Recommended value |                              |
| 4.0-6.0 / 11-9                        | 4.0 / 11          | 4.5 – 7.8                    |

**Table 1 – Recommended specifications for DC input cables**

The DC input connectors (MC4) are classified into positive and negative connectors, as shown in the figures below.



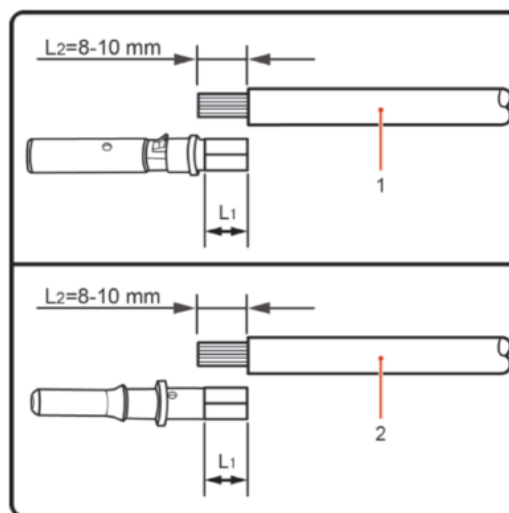
**Figure 12 – Positive (1) and Negative (2) MC4 connectors**

## Note

The positive and negative metal terminals are packed together with the positive and negative connectors, respectively. Separate the positive and negative metal terminals after unpacking the inverter so as to avoid confusing the polarities.

## Procedure

- 1) Remove the cable glands from the positive and negative connectors.
- 2) Remove an appropriate length of the insulation layer from the positive and negative power cables by using a wire stripper, as shown in the figure.

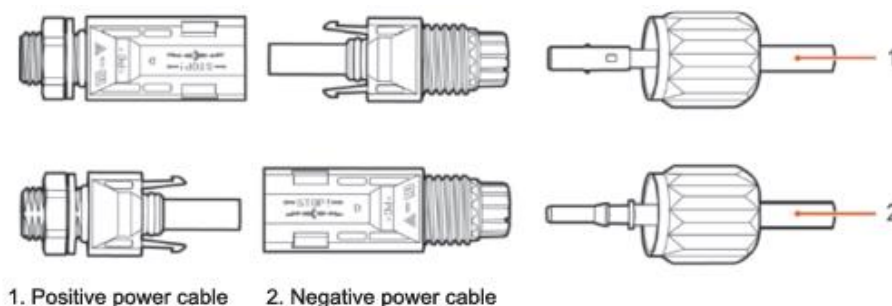


1. Positive power cable 2. Negative power cable

**Figure 13 - Connecting the DC input power cables (1)**

**Note:** L2 is approximately 2 or 3 mm longer than L1.

- 3) Insert the positive and negative power cables in the corresponding cable glands.
- 4) Insert the stripped positive and negative power cables in the positive and negative metal terminals respectively, and crimp them using a suitable tool. Make sure that the cables are secured so that they cannot be pulled out with a force of less than 400 N.



1. Positive power cable 2. Negative power cable

**Figure 14 - Connecting the DC input power cables (2)**

- 5) Insert the crimped power cables in the corresponding seats until you hear a “click” sound. At that point, the power cables will snap into place.
- 6) Replace the cable glands on the positive and negative connectors and rotate them against the insulation covers.
- 7) Insert the positive and negative connectors in the corresponding DC input terminals of the inverter until you hear a “click” sound, as shown in the figure.

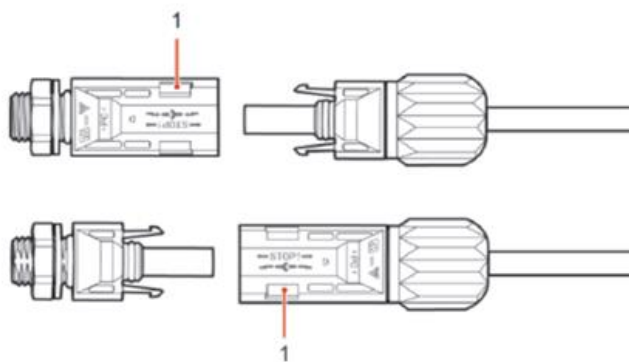


Figure 15 - Connecting the DC input power cables (3)

**Note:** Insert the caps into the unused DC connectors.

### Removal procedure

To remove the positive and negative connectors from the inverter, insert a removal tool in the bayonet coupling and press the tool with adequate force, as shown in the figure below.

|                                                                                                           |                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>Warning</b></p> | <p><b>Before removing the positive and negative connectors, make sure that the inverter's circuit breaker is switched off. If not, the direct current may cause an electric arc that could result in a fire</b></p> |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

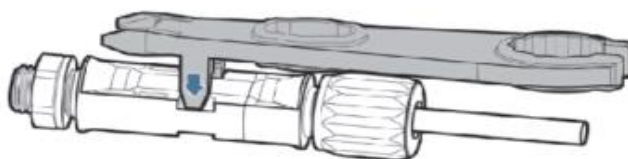


Figure 16 - Removing the DC connector

#### 4.4. Connecting the AC output power cables

Connect the inverter to the AC power distribution network or power grid using AC power cables.

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>Do not use the same AC circuit breaker for multiple inverters.</li> <li>Do not install loads between the inverter and the AC circuit breaker.</li> <li>The switch used as a disconnection device should always be operational and ready to operate.</li> <li>In Italy, each grid-connected photovoltaic system with a power output of more than 11.08 kW must be equipped with an external interface device (SPI)</li> </ul> |
| <b>Warning</b>                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

##### Context

All the AC power cables used for the inverter must be 3-pole outdoor cables. For easier installation, use flexible cables. The table lists the recommended specifications for cables and circuit breakers.

| Type                           | 1PH 3000TLM-V3      | 1PH 3680TLM-V3      | 1PH 4000TLM-V3      | 1PH 4600TLM-V3       | 1PH 5000TLM-V3       | 1PH 6000TLM-V3       |
|--------------------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| Cross section area of Cu cable | $\geq 6\text{mm}^2$ | $\geq 6\text{mm}^2$ | $\geq 6\text{mm}^2$ | $\geq 10\text{mm}^2$ | $\geq 10\text{mm}^2$ | $\geq 10\text{mm}^2$ |
| Switch                         | 20A                 | 25A                 | 25A                 | 32A                  | 32A                  | 32A                  |

Table 2 – Recommended specifications for AC output cables

**Note:** For safety reasons, make sure to use suitably sized cables, otherwise the current may cause overheating or overloading, which could result in a fire.

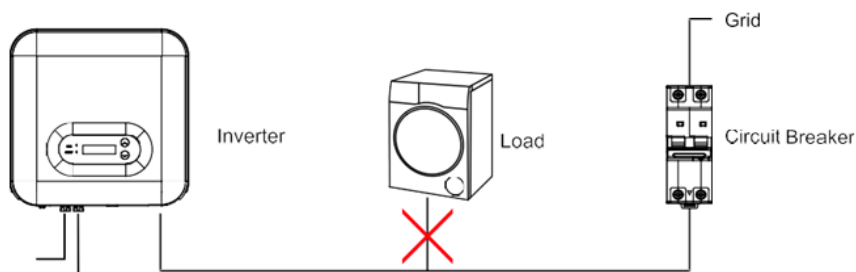
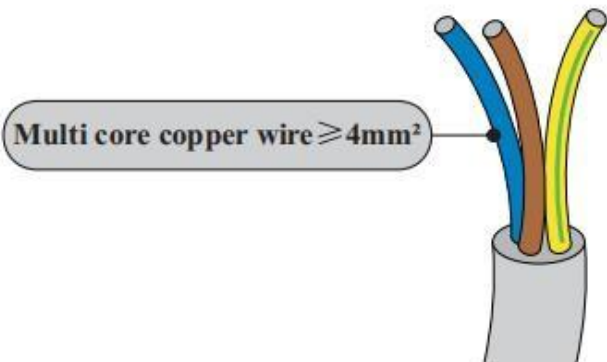


Figure 17 – Do not connect loads between the inverter and circuit breaker

## Multi-core copper cables



The cross-section of the power line must be sized in order to prevent unwanted disconnections of the inverter from the grid due to high impedance of the cable connecting the inverter to the point of supply. In addition, the AC cable must be correctly sized to ensure that the loss of power on the cable is less than 1% of the rated power and to ensure the proper functioning of the anti-islanding protection. The cable length from the inverter to the grid should not exceed 100 metres.

The figure below shows the relationship between the power loss in the cable, its length and the cross-section area.

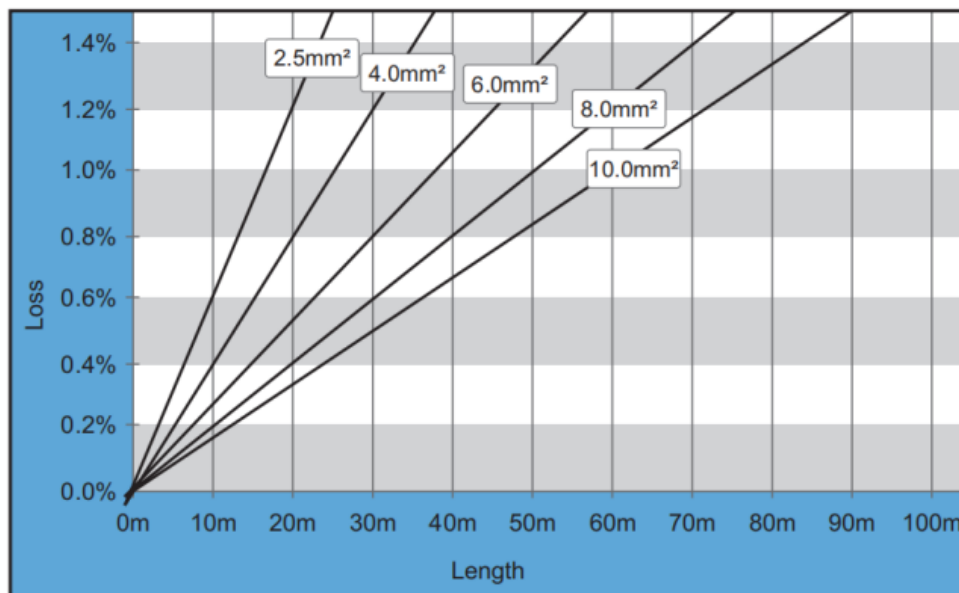


Figure 26 - Relation between cable length, cross section area and power loss

The 1PH 3000TLM-6000TLM-V3 inverters are three-phase output inverters that fully comply with the local grid connection requirements and safety standards.

The inverters are equipped with AC output connectors with IP65 protection suitable for photovoltaic use; customers must provide their own AC output cable connections.

## Cable connection procedure

- 1) Identify the suitable cables as shown in table 2 and remove an appropriate length of the protective sheath, as shown in the figure (A: 30~50 mm B: 6~8 m).

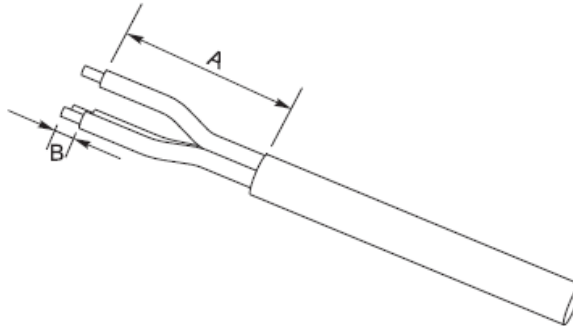


Figure 18 - Connecting the AC output cables (1)

- 2) Disassemble the AC connector as shown in the figure below; insert the AC output cable (with its stripped insulation layer as shown in step 1) through the PG waterproof cable gland.

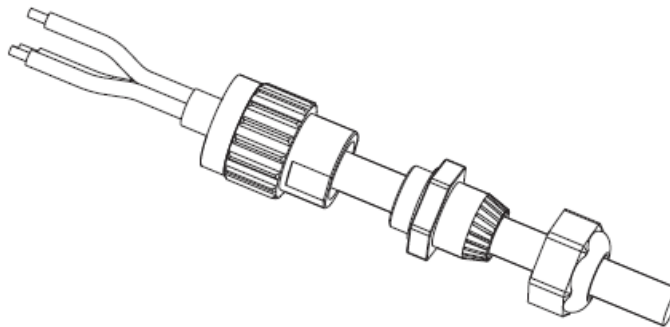
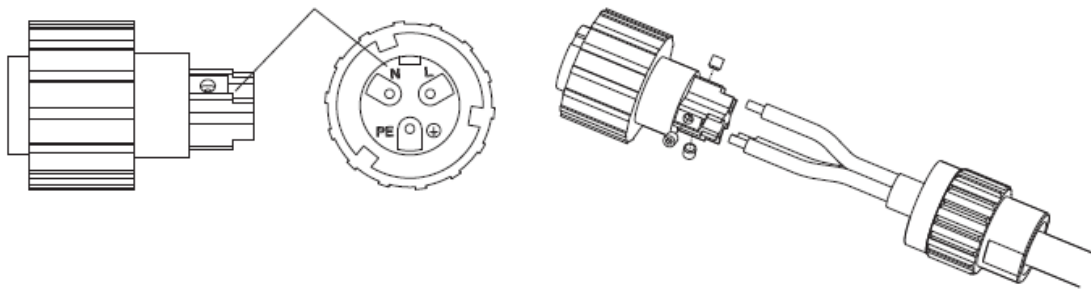


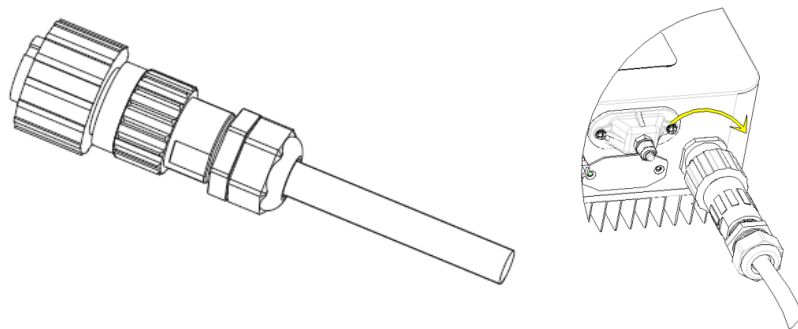
Figure 19 - Connecting the AC output cables (2)

- 3) Connect the AC power cable according to the following criteria:
  - Connect the ground wire (yellow-green) to the hole labelled "PE", and tighten the cable with an Allen key;
  - Connect the line wire (brown) to the hole labelled "L", and tighten the cable with an Allen key;
  - Connect the neutral wire (blue) to the hole labelled "N", and tighten the cable with an Allen key;



**Figure 20 - Connecting the AC output cables (3)**

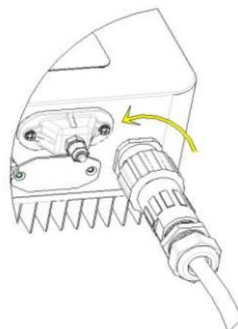
- 4) Secure the clamping cable gland by rotating it in a clockwise direction, as shown below; make sure that all the wires are securely connected
- 5) Connect the AC output connector to the output terminal of the inverter; turn the AC connector in a clockwise direction until the fixing device reaches its intended position, as shown below:



**Figure 21 - Connecting the AC output cables (4)**

### Cable disconnect procedure

Disconnect the AC connector from the output terminal of the inverter, turning it in an anti-clockwise direction until the fixing device reaches its intended position, as shown below:



**Figure 22 - Disconnecting the AC output cables**

## 4.5. Connecting the communication cables

The 1PH 3000TLM-6000TLM-V3 inverters have two communication interfaces, the RS485 interface and Wi-Fi interface, as shown in the figure below.

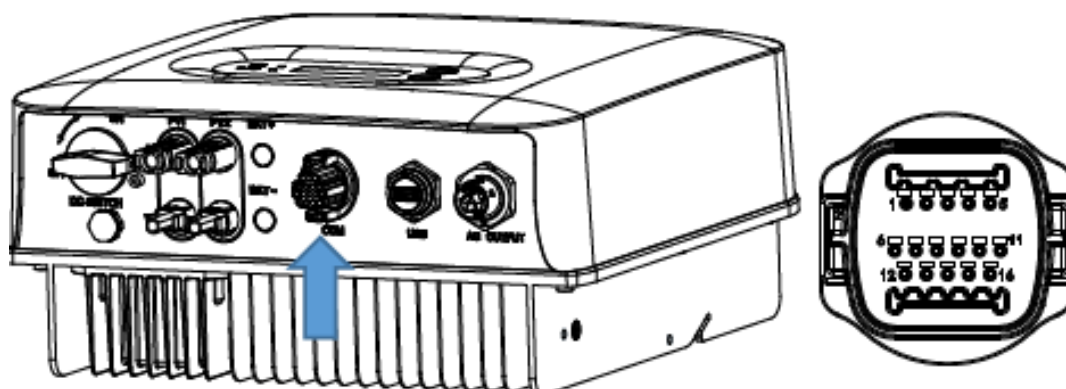


Figure 23 – Bottom view of the 1PH 3000TLM-6000TLM-V3 inverter

## Connecting the RS485 communication cables

| PIN | Definition | Function                    | Note                                                                                                                                       |
|-----|------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | RS485-2TX+ | RS485 differential signal + | RS485 wired communication                                                                                                                  |
| 2   | RS485-2TX+ | RS485 differential signal + |                                                                                                                                            |
| 3   | RS485-1TX- | RS485 differential signal - |                                                                                                                                            |
| 4   | RS485-1TX- | RS485 differential signal - |                                                                                                                                            |
| 5   | RS485+     | RS485 differential signal + | Communication with DDSU meter                                                                                                              |
| 6   | RS485-     | RS485 differential signal - |                                                                                                                                            |
| 7   | GND.S      | DRMS port logical IO        | Logical interfaces (DRMS) apply to the following network standards:<br><br>Australia (AS4777), European General (50549), Germany (VDE4105) |
| 8   | DRM0       |                             |                                                                                                                                            |
| 9   | DRM1/5     |                             |                                                                                                                                            |
| 10  | DRM2/6     |                             |                                                                                                                                            |
| 11  | DRM3/7     |                             |                                                                                                                                            |
| 12  | DRM4/8     |                             |                                                                                                                                            |

|    |     |                           |                           |
|----|-----|---------------------------|---------------------------|
| 13 | N/A | N/A                       | N/A                       |
| 14 | N/A | N/A                       | N/A                       |
| 15 | CT+ | Current sensor - positive | Connection with CT sensor |
| 16 | CT- | Current sensor - negative |                           |

Figure 24 – Com port pin definitions

## CT interface

There are two ways to get grid current information:

- Plan A: CT(default);
- PlanB: Meter +CT.

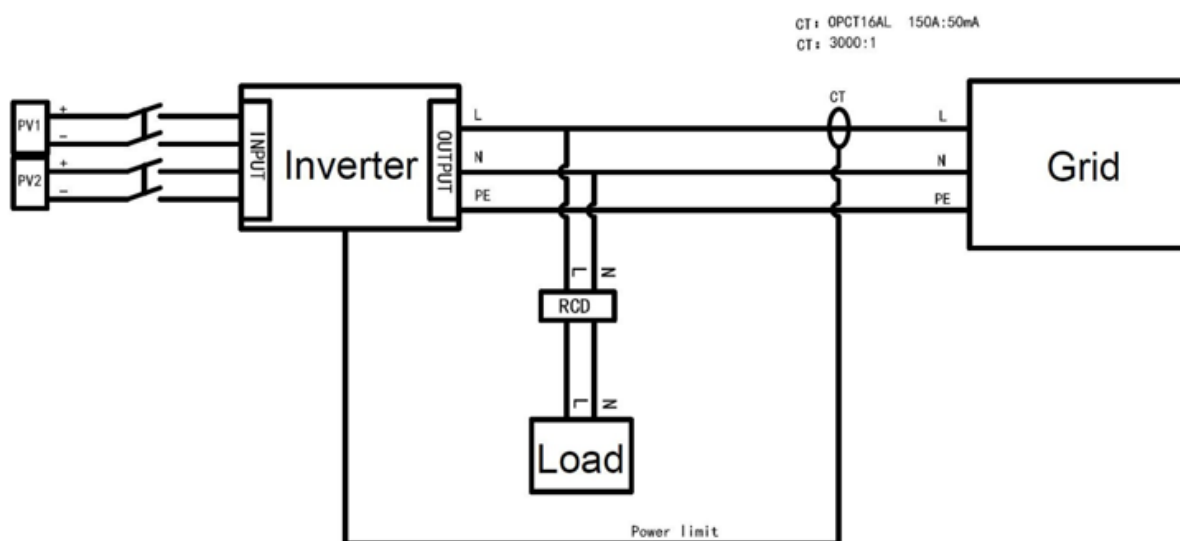


Figure 25 – Plan A: CT(default)

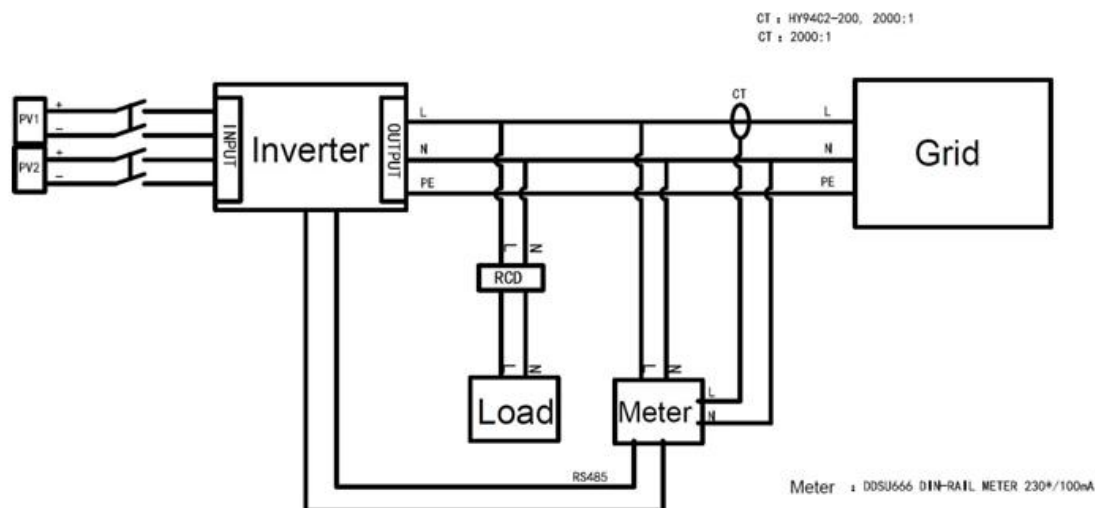


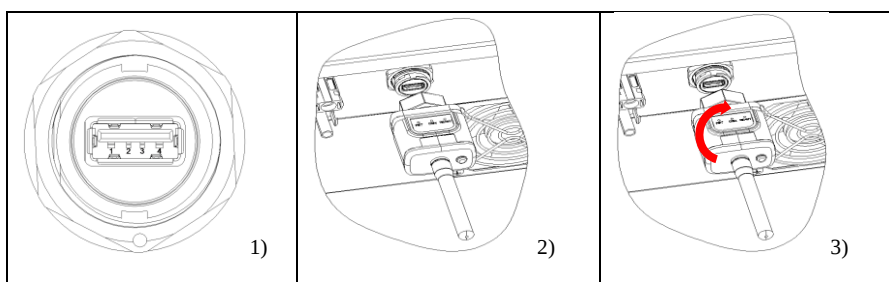
Figure 26 – PlanB: Meter +CT

## USB Port

Port Description :

|          |                                                       |                                                           |
|----------|-------------------------------------------------------|-----------------------------------------------------------|
| USB port | USB flash disk access                                 | Use for updating the software                             |
|          | USB acquisition stick (WIFI / GPRS / Ethernet) access | Use for remote data acquisition and upgrading of inverter |

Procedure :



## 5. Commissioning the inverter

### 5.1. Safety inspection before commissioning

|                                                                                   |                                                                                                      |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
|  | <p><b>Make sure that the DC and AC voltages fall within the range permitted by the inverter.</b></p> |
| <p><b>Attention</b></p>                                                           |                                                                                                      |

- **Photovoltaic strings**

Before turning on the inverter, it is necessary to examine the photovoltaic string. Check the open-circuit voltage of each photovoltaic panel and compare it with the data in the technical datasheet.

- Make sure that the open-circuit voltage of each PV string corresponds to the technical data;
- Make sure that the positive and negative polarities are correct.

- **DC Connection**

Make sure that the DC switch of the inverter is off. Use the multi-meter to check the voltage and current on the DC side; check the DC cable, make sure that the positive and negative poles are not inverted, and are consistent with the positive and negative poles of the photovoltaic string; otherwise, the inverter may suffer irreparable damage. Compare the voltage of each string connected to the same MPPT; if the difference is more than 3%, the PV string may be damaged. The maximum DC voltage (if the minimum operating temperature allowable is reached) should be less than 1100 V. Make sure that all the photovoltaic strings are securely connected to the input of the inverter.

- **AC Connection**

Make sure that the AC switch of the inverter is off. Check that the phases of the inverter are correctly connected to the grid (R, S, T, N, PE). Check that the type of AC grid in which the inverter is installed is correct (TN-C, TN-S, TT). Check that the voltage of each phase is within the correct range. If possible, measure the THD; if there is too much distortion, the inverter may not operate properly.

- **Installing the front cover and the clamping screws**

### 5.2. Starting the inverter

- 1) Turn ON the DC switch both on the field panel and on the photovoltaic inverter (if present); wait for the screen to turn on.
- 2) Turn ON the AC switch installed on the wall.  
When the photovoltaic string generates enough direct current, the inverter will start automatically. The word “normal” shown on the screen indicates the correct functioning of the inverter.
- 3) Set the correct country code.

**Note:** Different grid operators in different countries require different specifications regarding the grid connections of PV inverters. Therefore, it is very important to select the correct country code according to the requirements of the local authorities.

If in doubt, consult the system engineer or a qualified electrician.

Zucchetti Centro Sistemi S.p.A. shall not be held responsible for any consequences resulting from the incorrect selection of the country code.

If the inverter indicates the presence of any faults, refer to Troubleshooting and maintenance chapter of this manual or contact the Zucchetti Centro Sistemi S.p.A. technical support.

## 6. Operating interface

### General information in this chapter

This section describes the display and its operation, as well as the buttons and LED indicators of the 1PH 3000TLM-6000TLM-V3 inverters.

### 6.1. Operating panel and display

#### Buttons and LED indicators



Figure 36 - LCD display with buttons and LED indicators

#### Main buttons:

- “^” Short press UP button = go up
- “^” Long press UP button = exit menu or current interface
- “v” Short press DOWN button = go down
- “v” Long press DOWN button = enter menu or current interface

#### Indicator lights:

- “RUN” Green light ON = “Normal state”
- “RUN” Green light flashing = Counting down or checking
- “FAULT” Red light ON = Recoverable or unrecoverable faulty

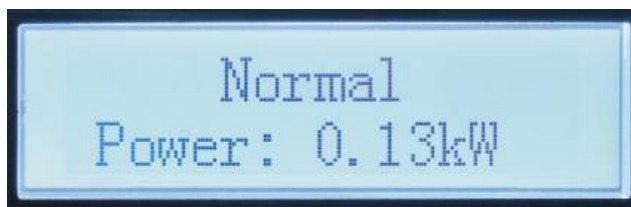
## 6.2. Main interface

LCD interface indicated inverter status, alarm information, communication connection, PV input current and voltage, grid voltage, current and frequency, today generation, total generation.

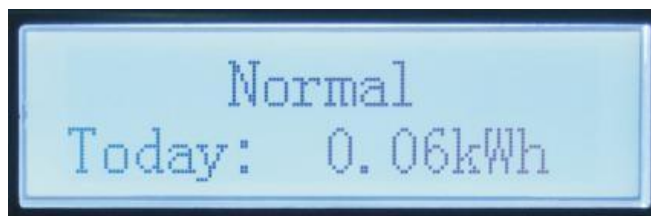
Inverter working status, PV input voltage and current.



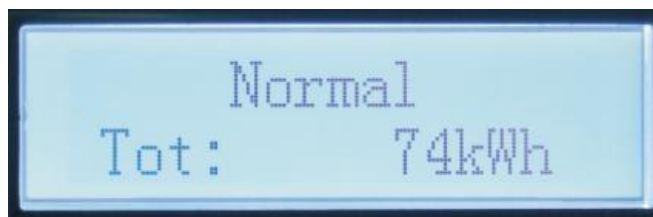
Inverter working status, PV generated power.



Inverter working status, today generated electricity.



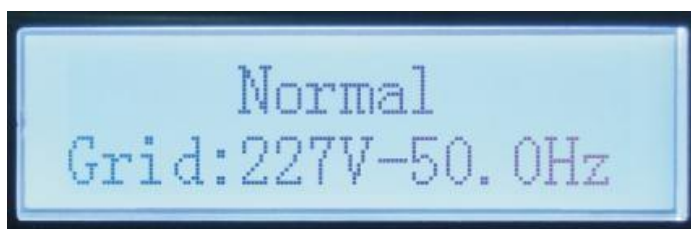
Inverter working status, total generated electricity.



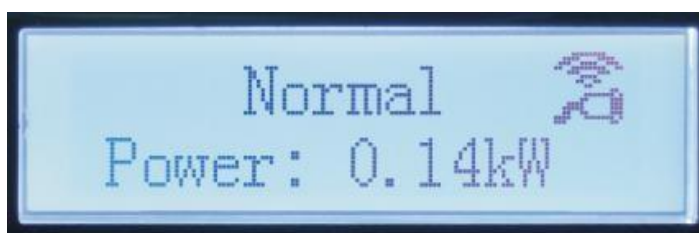
Inverter working status, grid voltage and current.



Inverter working status, grid voltage and frequency.



Inverter working status, USB status.



Inverter faulty alarm.



When control board successfully connected with communication board, the LCD display the current state of the inverter, display as shown in the figure below.



Inverter states includes: wait, check, normal and fault.

**Inverter statuses include:**

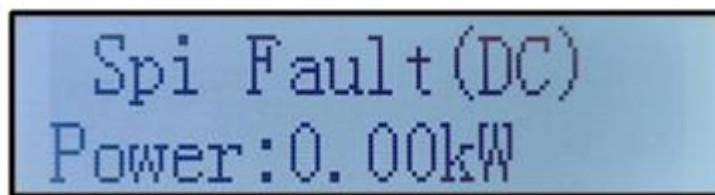
**Wait:** the inverter is waiting for the control status at the end of the reconnection time. In this state, the PV voltage must be higher than 250 V, the grid voltage value must be between the minimum and maximum permissible limits, as should the other grid parameters; otherwise, the inverter will go into an error state.

**Check:** the inverter is checking the insulation resistance, relays and other safety requirements. It also runs a self-test to ensure that the software and hardware of the inverter are functioning properly. The inverter switches to the error state or permanent error state if an errors occur.

**Normal:** The inverter is functioning normally and is feeding power into the grid; the inverter will go into a permanent error state if any faults are found.

**Fault:** Fault State: Inverter has encountered recoverable error. It should recover if the errors disappear. If Fault State continues; please check the inverter according error code.

When the control board and communication board connection fail, the LCD display interface as shown in the figure below.



### 6.3. Main menu

Long press the down button under standard interface to enter into main interface, Main interface including below information:

|        |                             |
|--------|-----------------------------|
| Normal | -----Long press DOWN button |
|        | 1.Enter Setting             |
|        | 2.Event List                |
|        | 3.SystemInfo                |
|        | 4.Display Time              |
|        | 5.Software Update           |

#### (A) Enter setting Interface as below

|                 |                             |
|-----------------|-----------------------------|
| 1.Enter Setting | -----Long press DOWN button |
|                 | 1.Set time                  |
|                 | 2.Clear Energy              |
|                 | 3.Clear Events              |
|                 | 4.Set Safety Para           |
|                 | 5.On-Off Control            |
|                 | 6.Set Energy                |
|                 | 7.Set Address               |
|                 | 8.Set Input mode            |
|                 | 9.Set Language              |
|                 | 10.Set Reflux P             |
|                 | 11.EnDRMs                   |
|                 | 12.IV Curve Scan            |

|  |                         |
|--|-------------------------|
|  | <b>13.Autotest Fast</b> |
|  | <b>14.Autotest STD</b>  |

Long press the button to Enter the main interface of "1. Enter Setting" and long press to enter the setting menu. You can select the content you want to set by short pressing the button.

Note1: Some settings need to enter the password (the default password is 0001), when entering the password, short press to change the number, long press to confirm the current number, and long press after entering the correct password. If "password error, try again" appears, you will need to re-enter the correct password.

- **Date and time**

Set the system time for the inverter.

- **Clear Energy**

Clean the inverter of the total power generation.

- **Clear Events**

Clean up the historical events recorded in the inverter.

- **Safety Parameters**

User can modify the Safety parameters of the machine through the USB flash disk, and the user needs to copy the parameter information that needs to be modified into the USB flash disk card in advance.

**Note:** to enable this feature, please contact the technical support .

| Code |     | Country                 | Code |     | Country         |
|------|-----|-------------------------|------|-----|-----------------|
| 000  | 000 | Germany VDE4105         | 018  | 000 | EU EN50438      |
|      | 001 | Germany BDEW            |      | 001 | EU EN50549      |
|      | 002 | Germany VDE0126         | 019  | 000 | IEC EN61727     |
| 001  | 000 | Italia CEI-021 Internal | 020  | 000 | Korea           |
|      | 001 | Italia CEI-016 Italia   | 021  | 000 | Sweden          |
|      | 002 | Italia CEI-021 External | 022  | 000 | Europe General  |
|      | 003 | Italia CEI0-21 In Areti | 024  | 000 | Cyprus          |
| 002  | 000 | Australia               | 025  | 000 | India           |
|      | 001 | Australia AU-WA         | 026  | 000 | Philippines     |
|      | 002 | Australia AU-SA         | 027  | 000 | New Zealand     |
|      | 003 | Australia AU-VIC        | 028  | 000 | Brazil          |
|      | 004 | Australia AU-QLD        |      | 001 | Brazil LV       |
|      | 005 | Australia AU-VAR        |      | 002 | Brazil 230      |
|      | 006 | Australia AUSGRID       |      | 003 | Brazil 254      |
|      | 007 | Australia Horizon       | 029  | 000 | Slovakia VSD    |
| 003  | 000 | Spain RD1699            |      | 001 | Slovakia SSE    |
| 004  | 000 | Turkey                  |      | 002 | Slovakia ZSD    |
| 005  | 000 | Denmark                 | 033  | 000 | Ukraine         |
|      | 001 | Denmark TR322           | 035  | 000 | Mexico LV       |
| 006  | 000 | Greece Continent        | 038  | 000 | Wide-Range-60Hz |
|      | 001 | Greece island           | 039  | 000 | Ireland EN50438 |
| 007  | 000 | Netherland              | 040  | 000 | Thailand PEA    |
| 008  | 000 | Belgium                 |      | 001 | Thailand MEA    |
| 009  | 000 | UK G59/G99              | 042  | 000 | LV-Range-50Hz   |
|      | 001 | UK G83/G98              | 044  | 000 | South Africa    |
| 010  | 000 | China                   | 046  | 000 | Dubai DEWG      |
|      | 001 | China Taiwan            |      | 001 | Dubai DEWG MV   |
| 011  | 000 | France                  | 107  | 000 | Croatia         |
|      | 001 | France FAR Arrete23     | 108  | 000 | Lithuania       |
| 012  | 000 | Poland                  |      |     |                 |

- **On-Off Control**

Inverter on-off local control.

- **Set Energy**

Set the total power generation. You can modify the total power generation through this option.

- **Set address**

Set the address (when you need to monitor multiple inverters simultaneously). Default 01.

The Address indicates the address used by the inverter to send its data to the monitoring server. Address 01 is used for single inverters; to extend the monitoring to multiple inverters, use progressive communication addresses.

Note: make sure that the address entered is never 00, because this setting would exclude the possibility of communication between the inverter and the Wi-Fi network or RS485 port.

- **Set Input mode**

1PH 3000TLM-6000TLM-V3 has 2 MPPT circuit, each MPPT circuit can work interdependently, or divided into parallel mode. User can change the setting according to the configuration.

- **Set Language**

Set the inverter display language.

- **Set Reflux P**

Enable or disable the anti-reflux function of the inverter, and set the reflux power. This function need to be used with external CT.

- **EnDRMs**

Enable or disable logical interfaces.

- **IV Curve Scan**

Shadow scanning, when the component is blocked or abnormal, causing multiple power peaks, by enabling this function, the peak point of maximum power can be tracked.

- **Autotest Fast**



|    |                                 |                                |
|----|---------------------------------|--------------------------------|
| OK | Start Autotest                  | Long press the “√”<br>to start |
|    | Testing 59.S1...                |                                |
|    | ↓                               | Wait                           |
|    | Test 59.S1 OK!                  |                                |
|    | ↓                               | Wait                           |
|    | Testing 59.S2...                |                                |
|    | ↓                               | Wait                           |
|    | Test 59.S2 OK!                  |                                |
|    | ↓                               | Wait                           |
|    | Testing 27.S1...                |                                |
|    | ↓                               | Wait                           |
|    | Test 27.S1 OK!                  |                                |
|    | ↓                               | Wait                           |
|    | Testing 27.S2...                |                                |
|    | ↓                               | Wait                           |
|    | Test 27.S2 OK!                  |                                |
|    | ↓                               | Wait                           |
|    | Testing 81>S1...                |                                |
|    | ↓                               | Wait                           |
|    | Test 81>S1 OK!                  |                                |
|    | ↓                               | Wait                           |
|    | Testing 81>S2...                |                                |
|    | ↓                               | Wait                           |
|    | Test 81>S2 OK!                  |                                |
|    | ↓                               | Wait                           |
|    | Testing 81<S1...                |                                |
|    | ↓                               | Wait                           |
|    | Test 81<S1 OK!                  |                                |
|    | ↓                               | Wait                           |
|    | Testing 81<S2...                |                                |
|    | ↓                               | Wait                           |
|    | Test 81<S2 OK!                  |                                |
|    | ↓                               | Long press the “√”             |
|    | Auto Test OK!                   |                                |
|    | ↓                               | Short press the “√”            |
|    | 59.S1 threshold 253V 900ms      |                                |
|    | ↓                               | Short press the “√”            |
|    | 59.S1: 228V 902ms               |                                |
|    | ↓                               | Short press the “√”            |
|    | 59.S2 threshold 264.5V<br>200ms |                                |



|                                  |                     |
|----------------------------------|---------------------|
| ↓                                | Short press the “√” |
| 59.S2: 229V 204ms                |                     |
| ↓                                | Short press the “√” |
| 27.S1 threshold 195.5V<br>1500ms |                     |
| ↓                                | Short press the “√” |
| 27.S1: 228V 1508ms               |                     |
| ↓                                | Short press the “√” |
| 27.S2 threshold 34.5V 200ms      |                     |
| ↓                                | Short press the “√” |
| 27.S2: 227V 205ms                |                     |
| ↓                                | Short press the “√” |
| 81>.S1 threshold 50.5Hz<br>100ms |                     |
| ↓                                | Short press the “√” |
| 81>.S1 49.9Hz 103ms              |                     |
| ↓                                | Short press the “√” |
| 81>.S2 threshold 51.5Hz<br>100ms |                     |
| ↓                                | Short press the “√” |
| 81>.S2 49.9Hz 107ms              |                     |
| ↓                                | Short press the “√” |
| 81<.S1 threshold 49.5Hz<br>100ms |                     |
| ↓                                | Short press the “√” |
| 81<.S1 50.0Hz 105ms              |                     |
| ↓                                | Short press the “√” |
| 81<.S2 threshold 47.5Hz<br>100ms |                     |
| ↓                                | Short press the “√” |
| 81<.S2 50.1Hz 107ms              |                     |

- **Autotest STD**

The test procedure is same as Autotest Fast, but it's much more time consuming.

## (B) Event list

Event List is used to display the real-time event records, including the total number of events and each specific ID No. and happening time. User can enter Event List interface through main interface to check details of real-time event records, Event will be listed by the happening time, and recent events will be listed in the front. Please refer to below picture. Long press the button and short press the button to turn the page in standard interface, then enter into "2. Event List" interface.

| 2. Event List     |                                                                                                      |
|-------------------|------------------------------------------------------------------------------------------------------|
| 1. Current event  | 2. History event                                                                                     |
| Fault information | 001 ID04 06150825<br>(Display the event sequence number, event ID number, and event occurrence time) |

## (C) "SystemInfo" Interface as below

|              |                             |
|--------------|-----------------------------|
| 3.SystemInfo | -----Long press DOWN button |
|              | 1.Inverter Type             |
|              | 2.Serial Number             |
|              | 3.Soft Version              |
|              | 4.Hard Version              |
|              | 5.Country                   |
|              | 6.Modbus Address            |
|              | 7.Input Mode                |
|              | 8.Remote State              |
|              | 9.Reflux Power              |

10.EnDRMs

11.Power Ratio

The user enters the main menu by long pressing the DOWN button, short press and turns the page to select menu contents, then long press the button to enter "3. SystemInfo". Turning the page down can select the system information to view.

#### (D) Display time

Long press the DOWN button and short press the button to turn the page in the standard user interface to enter into "4. Display Time", then long press the DOWN button to display the current system time.

#### (E) Software Update

User can update software by USB flash disk, Zucchetti Centro Sistemi S.p.a. will provide the new update software called firmware for user if it is necessary, the user needs to copy the upgrade file to the USB flash disk.

### 6.4. Updating Inverter Software

1PH 3000TLM-6000TLM-V3 inverter offer software upgrade via USB flash drive to maximize inverter performance and avoid inverter operation error caused by software bugs.

**Step 1** : turn off AC circuit breaker and DC switch, remove the communication board cover as below figure. If the RS485 line has been connected, please release the waterproof nut first and make sure the communication line is no longer the force. Then remove the waterproof cover.

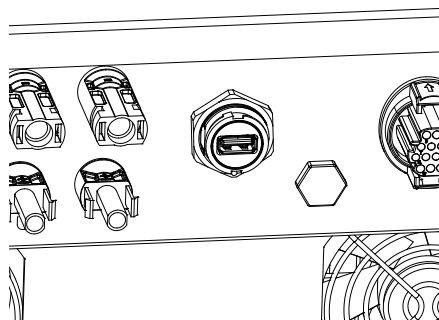


Figure 37 - Remove communication board cover

**Step 2 :** Insert USB into computer.

**Step 3 :** Zucchetti Centro Sistemi S.p.a. service team will send the software code to user, after user receive the file, please decompressing file and cover the original file in USB flash drive.

**Step 4 :** Insert USB flash disk into the USB port of inverter.

**Step 5 :** Then turn on DC switch, screen show “recoverable fault” (as AC circuit breaker still open, inverter cannot detect grid power, so it may show “recoverable fault” )

**Step 6 :** Long press “DOWN” button to enter the menu, then short press “DOWN” button to find "5. Software Update" in the LCD display, long press “DOWN” button to enter input password interface.

**Step 7 :** Input the password, if password is correct, and then begin the update process.

**Step 8 :** System update main DSP, slave DSP and ARM in turns. If main DSP update success, the LCD will display “Update DSP1 Success”, otherwise display "Update DSP1 Fail"; If slave DSP update success, the LCD will display "Update DSP2 Success", otherwise display "UpdateDSP2 Fail".

**Step 9 :** After the update is completed, turn off the DC breaker, wait for the LCD screen extinguish, then recover the communication waterproof and then turn on the DC breaker and AC breaker again, the inverter will enter the running state. User can check the current software version in SystemInfo>>3.SoftVersion.

**Note:** If screen shows “Communication fail” , “Update DSP1 fail” , “Update DSP2 fail” please turn off the DC switch, wait for the LCD screen turn off, then turn on the DC switch again, then Continue to update from step 5.

## 7. Troubleshooting and maintenance

### 7.1. Troubleshooting

This section contains information and procedures on how to troubleshoot any faults and errors that may occur during operation of the 1PH 3000TLM-6000TLM-V3 inverter.

**If you have any problems with the inverter, please follow these steps.**

- Check the warning messages and error codes on the information panel of the inverter. Record them before carrying out any further operation.
- If the inverter does not display any errors, perform the following checks:
  - Is the inverter located in a clean, dry and properly ventilated place?
  - Is the DC switch closed?
  - Are the cables correctly sized and as short as possible?
  - Are the input/output connections and the cables in good condition?
  - Are the configuration settings correct for the type of installation?
  - Are the display panel and flat communication cable correctly connected and not damaged?

Follow the steps below to display the recorded alarms:

Press “Menu/Back” to enter the main menu from the standard interface. Select “Event List” in the menu screen, then press “OK” to access the list of alarms and errors.

#### Information on event list

| Error code | Error name | Error description               | Possible solution                                                                                                                                                                                                                                                                                                                           |
|------------|------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ID01       | GridOVP    | The grid voltage is too high.   | If the alarm occurs occasionally, the probable cause is that the electric grid is in an abnormal state.<br><br>The inverter will automatically return to its normal operating state when the electrical grid is restored to its normal state.<br><br>If the alarm occurs frequently, check whether the grid voltage/frequency is within the |
| ID02       | GridUVP    | The grid voltage is too low.    |                                                                                                                                                                                                                                                                                                                                             |
| ID03       | GridOFP    | The grid frequency is too high. |                                                                                                                                                                                                                                                                                                                                             |

|             |                |                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------|----------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID04</b> | GridUFP        | The grid frequency is too low.                 | <p>correct range. If not, contact technical support. If so, check the AC circuit breaker and the AC wiring of the inverter.</p> <p>If the voltage/frequency is within the acceptable range and the AC wiring is correct while the alarm occurs repeatedly, contact Technical Support to change the grid overvoltage, undervoltage, over-frequency and under-frequency protection points after obtaining approval from the local grid operator.</p> |
| <b>ID05</b> | GFCIFault      | Faulty automatic differential circuit breaker. | <p>If the fault occurs occasionally, the possible cause is that the external circuits are abnormal occasionally. inverter automatically returns to normal operating status after the fault is rectified. If the fault occurs frequently and lasts a long time, check whether the insulation resistance between the PV array and earth(ground) is too low, then check the insulation conditions of PV cable.</p>                                    |
| <b>ID06</b> | OVRT           | OVRT faulty                                    | <p>There are internal faults of inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact technical support.</p>                                                                                                                                                                                                                                           |
| <b>ID07</b> | LVRT           | LVRT faulty                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>ID08</b> | IslandFault    | Islanding faulty                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>ID09</b> | GridOVPIstant1 | Grid instantaneous voltage too high 1          |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|             |                     |                                        |                                                                                                                                                                                                          |
|-------------|---------------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID10</b> | GridOVPIstant2      | Grid instantaneous voltage too high 2  |                                                                                                                                                                                                          |
| <b>ID11</b> | VGridLineFault      | Grid Line voltage Faulty               |                                                                                                                                                                                                          |
| <b>ID12</b> | InvOVP              | Inverter overvoltage                   |                                                                                                                                                                                                          |
| <b>ID17</b> | HwADFaultIGrid      | The grid current sampling error        |                                                                                                                                                                                                          |
| <b>ID18</b> | HwADFaultDCI        | The DCI sampling error                 |                                                                                                                                                                                                          |
| <b>ID19</b> | HwADFaultVGrid(DC)  | Grid voltage sampling faulty (DC side) |                                                                                                                                                                                                          |
| <b>ID20</b> | HwADFaultVGrid(AC)  | Grid voltage sampling faulty (AC side) |                                                                                                                                                                                                          |
| <b>ID21</b> | GFCIDeviceFault(DC) | Current leakage sampling (DC side)     | <p>There are internal faults of inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact technical support.</p> |
| <b>ID22</b> | GFCIDeviceFault(AC) | Current leakage sampling (AC side)     |                                                                                                                                                                                                          |
| <b>ID23</b> | HwADFaultIdcBranch  | Current Branch sampling faulty         |                                                                                                                                                                                                          |
| <b>ID24</b> | HwADFaultIdc        | DC input current sampling faulty       |                                                                                                                                                                                                          |

|             |                       |                                                                                |                                                                                                                                                                                                          |
|-------------|-----------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID29</b> | ConsistentFault_GFCI  | The GFCI sampling value between the master DSP and slave DSP is not consistent |                                                                                                                                                                                                          |
| <b>ID30</b> | ConsistentFault_Vgrid | The Grid voltage sampling value between the master and slave is not consistent |                                                                                                                                                                                                          |
| <b>ID31</b> | ConsistentFault_DCI   | 3 lines' DCI consistency error                                                 | <p>There are internal faults of inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact technical support.</p> |
| <b>ID33</b> | SpiCommFault(DC)      | SPI Communication Faulty (DC side)                                             |                                                                                                                                                                                                          |
| <b>ID34</b> | SpiCommFault(AC)      | SPI Communication Faulty (AC side)                                             |                                                                                                                                                                                                          |
| <b>ID35</b> | SChip_Fault           | Chip Faulty (DC side)                                                          |                                                                                                                                                                                                          |
| <b>ID36</b> | MChip_Fault           | Chip Faulty (AC side)                                                          |                                                                                                                                                                                                          |
| <b>ID37</b> | HwAuxPowerFault       | Auxiliary power fault                                                          |                                                                                                                                                                                                          |
| <b>ID41</b> | RelayFail             | Relay faulty                                                                   | <p>Please check whether the resistance to ground of PV string is too low and whether the insulation of PV cable is damaged. If no, please contact technical support.</p>                                 |
| <b>ID42</b> | IsoFault              | Low isolation faulty                                                           |                                                                                                                                                                                                          |
| <b>ID43</b> | PEConnectFault        | Ground faulty                                                                  |                                                                                                                                                                                                          |

|             |                     |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------|---------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID44</b> | PvConfigError       | Input mode incorrect                   | Please check the wiring of PV string, whether each PV input is independent. If no, please contact technical support.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>ID45</b> | CT Disconnect       | CT Fault                               | Please check the wiring of input, output and communication according to the user's manual. If no, please contact technical support.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>ID46</b> | ReversalConnection  | Input reverse connection error         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>ID47</b> | Reserved            | Reserved                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>ID48</b> | SNTypeFault         | SN doesn't match Type                  | It is internal fault of inverter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>ID49</b> | Reserved            | Reserved                               | <p>Ensure the installation position and installation method meet the requirements of this user manual.</p> <p>Check whether the ambient temperature of the installation position exceeds the upper limit. If yes, improve ventilation to decrease the temperature.</p> <p>Check whether the inverter has dust and dust, whether there are foreign matters blocking the fan at the air inlet. If so, please improve the ventilation and heat dissipation of the environment. It is recommended that the inverter should be cleaned once every half a year.</p> |
| <b>ID50</b> | TempFault_HeatSink1 | Heat sink1 over-temperature protection |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>ID51</b> | Reserved            | Reserved                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>ID52</b> | Reserved            | Reserved                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>ID53</b> | Reserved            | Reserved                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>ID54</b> | Reserved            | Reserved                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

|             |                      |                                               |                                                                                                                                                                                                   |
|-------------|----------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID55</b> | Reserved             | Reserved                                      |                                                                                                                                                                                                   |
| <b>ID57</b> | TempFault_Env1       | environment temperature1 protection           |                                                                                                                                                                                                   |
| <b>ID58</b> | Reserved             | Reserved                                      |                                                                                                                                                                                                   |
| <b>ID59</b> | TempFault_Inv1       | Model 1 over-temperature protection           |                                                                                                                                                                                                   |
| <b>ID60</b> | Reserved             | Reserved                                      |                                                                                                                                                                                                   |
| <b>ID61</b> | Reserved             | Reserved                                      |                                                                                                                                                                                                   |
| <b>ID65</b> | VbusRmsUnbalance     | Unbalanced RMS value of bus voltage           | There are internal faults of inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact technical support. |
| <b>ID66</b> | VbusInstantUnbalance | Unbalanced instantaneous value of bus voltage |                                                                                                                                                                                                   |
| <b>ID67</b> | BusUVP               | Bus undervoltage during grid connection       | If the configuration of the PV array is correct, could be the sun irradiation is too low. Once sun irradiation back to normal, inverter will work back normal.                                    |
| <b>ID68</b> | BusZVP               | Bus voltage is low                            | There are internal faults of inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact technical support. |
| <b>ID69</b> | PVOVP                | PV overvoltage                                |                                                                                                                                                                                                   |

|             |                 |                                                              |                                                                                                                                                                                                          |
|-------------|-----------------|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID70</b> | Reserved        | Reserved                                                     |                                                                                                                                                                                                          |
| <b>ID71</b> | LLCBusOVP       | LLCBUS overvoltage                                           |                                                                                                                                                                                                          |
| <b>ID72</b> | SwBusRmsOVP     | Inverter bus voltage overvoltage software                    |                                                                                                                                                                                                          |
| <b>ID73</b> | SwBusInstantOVP | Inverter bus voltage instantaneous value overvoltagesoftware |                                                                                                                                                                                                          |
| <b>ID81</b> | Reserved        | Reserved                                                     | <p>There are internal faults of inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact technical support.</p> |
| <b>ID82</b> | DciOCP          | Dci overcurrent faulty                                       |                                                                                                                                                                                                          |
| <b>ID83</b> | SwOCPInstant    | Output instantaneous current protection                      |                                                                                                                                                                                                          |
| <b>ID84</b> | SwBuckBoostOCP  | BuckBoost software overcurrent                               |                                                                                                                                                                                                          |
| <b>ID85</b> | SwAcRmsOCP      | Output RMS current protection                                |                                                                                                                                                                                                          |
| <b>ID86</b> | SwPvOCPInstant  | PV overcurrent software protection                           |                                                                                                                                                                                                          |
| <b>ID87</b> | IpvUnbalance    | PV parallel unbalance                                        |                                                                                                                                                                                                          |

|              |                |                                   |                                                                                                                                                                                                          |
|--------------|----------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID88</b>  | IacUnbalance   | Output current unbalance          |                                                                                                                                                                                                          |
| <b>ID89</b>  | AFCIFault      | Arc Fault                         |                                                                                                                                                                                                          |
| <b>ID97</b>  | HwLLCBusOVP    | LLC hardware overvoltage          |                                                                                                                                                                                                          |
| <b>ID98</b>  | HwBusOVP       | Inverter bus hardware overvoltage |                                                                                                                                                                                                          |
| <b>ID99</b>  | HwBuckBoostOCP | BuckBoost hardware overcurrent    |                                                                                                                                                                                                          |
| <b>ID100</b> | Reserved       | Reserved                          | <p>There are internal faults of inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact technical support.</p> |
| <b>ID102</b> | HwPVOC         | PV hardware overcurrent           |                                                                                                                                                                                                          |
| <b>ID103</b> | HwACOC         | AC output hardware overcurrent    |                                                                                                                                                                                                          |
| <b>ID110</b> | Overload1      | Overload Protection 1             |                                                                                                                                                                                                          |
| <b>ID111</b> | Overload2      | Overload Protection 2             |                                                                                                                                                                                                          |
| <b>ID112</b> | Overload3      | Overload Protection 3             |                                                                                                                                                                                                          |
|              |                |                                   |                                                                                                                                                                                                          |

|              |                  |                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------|------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID113</b> | OverTempDerating | Overttemperature derating                  | <p>Ensure the installation position and installation method meet the requirements of this user manual.</p> <p>Check whether the ambient temperature of the installation position exceeds the upper limit.</p> <p>If yes, improve ventilation to decrease the temperature.</p> <p>Check whether the inverter has dust and dust, whether there are foreign matters blocking the fan at the air inlet. If so, please improve the ventilation and heat dissipation of the environment. It is recommended that the inverter should be cleaned once every half a year.</p> |
| <b>ID114</b> | FreqDerating     | Frequency derating                         | <p>If it occurs frequently, please check whether the grid voltage and grid frequency are within the allowable range of the inverter; if not, please contact the customer service of Zucchetti Centro Sistemi S.p.a.; if yes, please check whether the connection between the circuit breaker at the AC side and the output cable is normal.</p>                                                                                                                                                                                                                      |
| <b>ID115</b> | FreqLoading      | Frequency loading                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>ID116</b> | VoltDerating     | Voltage derating                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>ID117</b> | VoltLoading      | Volatge loading                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>ID124</b> | Reserved         | Reserved                                   | <p>There are internal faults of inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact technical support.</p>                                                                                                                                                                                                                                                                                                                                                             |
| <b>ID125</b> | Reserved         | Reserved                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>ID129</b> | unrecoverHwAcOCP | Output overcurrent hardwarepermanent fault |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|              |                        |                                              |                                                                                                                                                                                                          |
|--------------|------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID130</b> | unrecoverBusOVP        | Bus overvoltage permanent fault              |                                                                                                                                                                                                          |
| <b>ID131</b> | unrecoverHwBusOVP      | Bus overvoltage hardware permanent fault     | <p>There are internal faults of inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact technical support.</p> |
| <b>ID132</b> | unrecoverIpvUnbalance  | PV unbalance current permanent fault         |                                                                                                                                                                                                          |
| <b>ID133</b> | Reserved               | Reserved                                     |                                                                                                                                                                                                          |
| <b>ID134</b> | unrecoverAcOCPInstant  | Output transient overcurrent permanent fault |                                                                                                                                                                                                          |
| <b>ID135</b> | unrecoverIacUnbalance  | Output current imbalance permanent fault     |                                                                                                                                                                                                          |
| <b>ID137</b> | unrecoverPvConfigError | Input mode configuration permanent fault     |                                                                                                                                                                                                          |
| <b>ID138</b> | unrecoverPVOCPIInstant | Input overcurrent permanent fault            |                                                                                                                                                                                                          |
| <b>ID139</b> | unrecoverHwPVOCPI      | Input hardware overcurrent permanent fault   | <p>There are internal faults of inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact technical support.</p> |
| <b>ID140</b> | unrecoverRelayFail     | Relay permanent fault                        |                                                                                                                                                                                                          |
| <b>ID141</b> | unrecoverVbusUnbalance | Bus Unbalanced permanent fault               |                                                                                                                                                                                                          |

|              |                            |                                  |                                                                                                                                                                                                          |
|--------------|----------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID142</b> | LightningProtectionFaultDC | DC SPD failure                   |                                                                                                                                                                                                          |
| <b>ID143</b> | LightningProtectionFaultAC | AC SPD failure                   |                                                                                                                                                                                                          |
| <b>ID145</b> | USBFault                   | USB Failure                      |                                                                                                                                                                                                          |
| <b>ID146</b> | WiFiFault                  | WIFI failure                     |                                                                                                                                                                                                          |
| <b>ID147</b> | BluetoothFault             | Bluetooth failure                |                                                                                                                                                                                                          |
| <b>ID148</b> | RTCFault                   | RTCClock failure                 | <p>There are internal faults of inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact technical support.</p> |
| <b>ID149</b> | CommEEPROMFault            | Communication BOARD EEPROM error |                                                                                                                                                                                                          |
| <b>ID150</b> | CommEEPROMFault            | Communication BOARD FLASH error  |                                                                                                                                                                                                          |
| <b>ID151</b> | Reserved                   | Reserved                         |                                                                                                                                                                                                          |
| <b>ID152</b> | SafetyVerFault             | Safety Version is Fault          |                                                                                                                                                                                                          |
| <b>ID153</b> | SciCommLose(DC)            | SCI communication (DC side)      |                                                                                                                                                                                                          |
|              |                            |                                  |                                                                                                                                                                                                          |

|              |                        |                                              |                                                                                                                                                                                                                                                                                                                                               |
|--------------|------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID154</b> | SciCommLose(AC)        | SCI communication (AC side)                  |                                                                                                                                                                                                                                                                                                                                               |
| <b>ID155</b> | SciCommLose(Fuse)      | SCI communication (DC current combined side) |                                                                                                                                                                                                                                                                                                                                               |
| <b>ID156</b> | SoftVerError           | Inconsistent software version                |                                                                                                                                                                                                                                                                                                                                               |
| <b>ID157</b> | Reserved               | Reserved                                     |                                                                                                                                                                                                                                                                                                                                               |
| <b>ID158</b> | Reserved               | Reserved                                     |                                                                                                                                                                                                                                                                                                                                               |
| <b>ID161</b> | ForceShutdown          | ForceShutdown                                | <p>Remote control enables. If it is not controlled by yourself, please disconnect the DC switch of the inverter, wait for 5 minutes, and then turn on the DC switch.</p> <p>Observe whether the fault has been eliminated after the inverter is restarted. If not, please contact the customer service of Zucchetti Centro Sistemi S.p.a.</p> |
| <b>ID162</b> | RemoteShutdown         | RemoteShutdown                               |                                                                                                                                                                                                                                                                                                                                               |
| <b>ID163</b> | Drms0Shutdown          | Drms0 shunt down                             |                                                                                                                                                                                                                                                                                                                                               |
| <b>ID165</b> | RemoteDerating         | RemoteDerating                               | <p>Inverter shows ID83 when remote derating. If no one operate this function, please check the connection (I/O).</p>                                                                                                                                                                                                                          |
| <b>ID166</b> | LogicInterfaceDerating | Logical interface derating                   |                                                                                                                                                                                                                                                                                                                                               |
| <b>ID167</b> | AlarmAntiRefluxing     | Anti Refluxing derating                      |                                                                                                                                                                                                                                                                                                                                               |

|              |           |             |
|--------------|-----------|-------------|
| <b>ID169</b> | FanFault1 | Fan 1 Alarm |
| <b>ID170</b> | FanFault2 | Fan 2 Alarm |
| <b>ID171</b> | FanFault3 | Fan 3 Alarm |
| <b>ID172</b> | FanFault4 | Fan 4 Alarm |
| <b>ID173</b> | FanFault5 | Fan 5 Alarm |
| <b>ID174</b> | FanFault6 | Fan 6 Alarm |
| <b>ID177</b> | Reserved  | Reserved    |
| <b>ID178</b> | Reserved  | Reserved    |
| <b>ID179</b> | Reserved  | Reserved    |
| <b>ID180</b> | Reserved  | Reserved    |
| <b>ID181</b> | Reserved  | Reserved    |

Check whether the inverter has dust and dust, whether there are foreign matters blocking the fan at the air inlet. If so, please improve the ventilation and heat dissipation of the environment. It is recommended that the inverter should be cleaned once every half a year.

|              |          |          |  |
|--------------|----------|----------|--|
| <b>ID182</b> | Reserved | Reserved |  |
|--------------|----------|----------|--|

## 7.2. Maintenance

Inverters generally do not need any daily or routine maintenance. But ensure heat sink should not be blocked by dust, dirt or any other items. Before the cleaning, make sure that the DC SWITCH is turned OFF and the circuit breaker between inverter and electrical grid is turned OFF. Wait at least for 5 minutes before the Cleaning.

### Cleaning the inverter

Use an air compressor, a soft dry cloth or soft-bristled brush to clean the inverter. Do not use water, corrosive chemical substances or aggressive detergents to clean the inverter. Disconnect the AC and DC power to the inverter before performing any cleaning operations.

### Cleaning the heatsink

Use an air compressor, a soft dry cloth or soft-bristled brush to clean the heatsink. Do not use water, corrosive chemical substances or aggressive detergents to clean the heatsink. Disconnect the AC and DC power to the inverter before performing any cleaning operations.

## 8. Uninstalling

### 8.1. Uninstallation steps

- Disconnect the inverter from the AC grid by opening the AC circuit breaker.
- Disconnect the inverter from the photovoltaic strings by opening the DC circuit breaker.
- Wait 5 minutes
- Remove the DC connectors
- Remove the AC terminals.
- Unscrew the fixing bolt of the bracket and remove the inverter from the wall.

### 8.2. Packaging

If possible, pack the inverter in its original packaging.

### 8.3. Storage

Store the inverter in a dry place where the ambient temperature is between -25 and +60°C.

### 8.4. Disposal

Zucchetti Centro Sistemi S.p.a. is not liable for the disposal of the equipment, or parts thereof, that does not take place according to the regulations and standards in force in the country of installation.



The symbol of the crossed-out wheeled bin indicates that the equipment, at the end of its useful life, must be disposed of separately from household waste.

This product must be handed over to the waste collection point in your local community for recycling.

For more information, please contact the waste collection authority in your country.

Inappropriate waste disposal could have negative effects on the environment and on human health due to potentially hazardous substances.

With your cooperation in the correct disposal of this product, you contribute to the reuse, recycling and recovery of the product, and to the protection of our environment.

## 9. Technical specifications

| TECHNICAL DATA                                     |                                                                                                               | 1PH 3000-TLM-V3 | 1PH 3680-TLM-V3 | 1PH 4000-TLM-V3 | 1PH 4600-TLM-V3 | 1PH 5000-TLM-V3 | 1PH 6000-TLM-V3 |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| DC Input data                                      |                                                                                                               |                 |                 |                 |                 |                 |                 |
| Typical DC power*                                  | 3300 W                                                                                                        | 4048 W          | 4400 W          | 5060 W          | 5500 W          | 6600 W          |                 |
| Maximum power for channel                          | 3000 W                                                                                                        |                 |                 | 3500 W          |                 |                 |                 |
| No. of independent MPPTs / No. of strings per MPPT | 2/1                                                                                                           |                 |                 |                 |                 |                 |                 |
| Maximum DC input voltage                           | 600V                                                                                                          |                 |                 |                 |                 |                 |                 |
| Start-up voltage                                   | 60V                                                                                                           |                 |                 |                 |                 |                 |                 |
| Nominal DC input voltage                           | 360V                                                                                                          |                 |                 |                 |                 |                 |                 |
| MPPT DC voltage range                              | 50V-570V                                                                                                      |                 |                 |                 |                 |                 |                 |
| DC voltage range at full load                      | 125V-520V                                                                                                     | 150V-520V       | 165V-520V       | 190V-520V       | 210V-520V       | 250V-520V       |                 |
| Maximum input current for each MPPT                | 12.5A/12.5A                                                                                                   |                 |                 |                 |                 |                 |                 |
| Maximum absolute current for each MPPT             | 15A/15A                                                                                                       |                 |                 |                 |                 |                 |                 |
| AC Output data                                     |                                                                                                               |                 |                 |                 |                 |                 |                 |
| Rated AC power                                     | 3000 W                                                                                                        | 3680 W          | 4000 W          | 4600 W          | 5000 W          | 6000 W          |                 |
| Maximum AC power                                   | 3000VA                                                                                                        | 3680VA          | 4000VA          | 4600VA          | 5000VA          | 6000VA          |                 |
| Maximum AC current                                 | 14.4A                                                                                                         | 16A             | 19.3A           | 22.2A           | 24.1A           | 28.9A           |                 |
| Connection type/Rated grid voltage                 | Single-phase L/N/PE / 220V, 230V, 240V                                                                        |                 |                 |                 |                 |                 |                 |
| Grid voltage range                                 | 180V~276V (according to the local grid standards)                                                             |                 |                 |                 |                 |                 |                 |
| Rated grid frequency                               | 50Hz/60Hz                                                                                                     |                 |                 |                 |                 |                 |                 |
| Grid frequency range                               | 45Hz~55Hz / 54Hz~66Hz (according to the local grid standards)                                                 |                 |                 |                 |                 |                 |                 |
| Total harmonic distortion                          | <3%                                                                                                           |                 |                 |                 |                 |                 |                 |
| Power factor                                       | 1 (Programmable +/-0.8)                                                                                       |                 |                 |                 |                 |                 |                 |
| Active power adjustment range (settable)           | 0~100%                                                                                                        |                 |                 |                 |                 |                 |                 |
| Grid feed-in limit                                 | Feed-in adjustable from zero to nominal power value**                                                         |                 |                 |                 |                 |                 |                 |
| Efficiency                                         |                                                                                                               |                 |                 |                 |                 |                 |                 |
| Maximum efficiency                                 | 98.2%                                                                                                         |                 | 98.4%           |                 |                 |                 |                 |
| Weighted efficiency (EURO)                         | 97.3%                                                                                                         |                 | 97.5%           |                 |                 |                 |                 |
| MPPT efficiency                                    | >99.9%                                                                                                        |                 |                 |                 |                 |                 |                 |
| Consumption at night                               | <1W                                                                                                           |                 |                 |                 |                 |                 |                 |
| Protections                                        |                                                                                                               |                 |                 |                 |                 |                 |                 |
| Internal interface protection                      | Yes                                                                                                           |                 |                 |                 |                 |                 |                 |
| Safety protections                                 | Anti-islanding, RCMU, Ground Fault Monitoring                                                                 |                 |                 |                 |                 |                 |                 |
| Reverse polarity protection DC                     | Yes                                                                                                           |                 |                 |                 |                 |                 |                 |
| DC circuit breaker                                 | Integrated                                                                                                    |                 |                 |                 |                 |                 |                 |
| Overheating protection                             | Yes                                                                                                           |                 |                 |                 |                 |                 |                 |
| Overvoltage category/Protection class              | Overvoltage Category III / Protection class I                                                                 |                 |                 |                 |                 |                 |                 |
| Integrated dischargers                             | AC/DC MOV: Type 3 Standard                                                                                    |                 |                 |                 |                 |                 |                 |
| Standard                                           |                                                                                                               |                 |                 |                 |                 |                 |                 |
| EMC                                                | EN 61000-6-2/3, EN 61000-3-2/3/11/12                                                                          |                 |                 |                 |                 |                 |                 |
| Safety standard                                    | IEC 62116, IEC 61727, IEC 61683, IEC 60068-1/2/14/30, IEC 62109-1/2                                           |                 |                 |                 |                 |                 |                 |
| Grid connection standard                           | Connection certificates and standards available on <a href="http://www.zcsazzurro.com">www.zcsazzurro.com</a> |                 |                 |                 |                 |                 |                 |
| Communication                                      |                                                                                                               |                 |                 |                 |                 |                 |                 |
| Communication interfaces                           | Wi-Fi/4G/Ethernet (optional), RS485 (proprietary protocol), USB                                               |                 |                 |                 |                 |                 |                 |
| Additional inputs or connections                   | Input for current sensor connection                                                                           |                 |                 |                 |                 |                 |                 |
| General data                                       |                                                                                                               |                 |                 |                 |                 |                 |                 |
| Allowable ambient temperature range                | -30°C...+60°C (power limit above 45°C)                                                                        |                 |                 |                 |                 |                 |                 |
| Topology                                           | Transformerless                                                                                               |                 |                 |                 |                 |                 |                 |
| Environmental protection class                     | IP65                                                                                                          |                 |                 |                 |                 |                 |                 |
| Allowable relative humidity range                  | 0%.....95% non-condensing                                                                                     |                 |                 |                 |                 |                 |                 |
| Maximum operating altitude                         | 4000m                                                                                                         |                 |                 |                 |                 |                 |                 |
| Noise level                                        | < 25dB @ 1mt                                                                                                  |                 |                 |                 |                 |                 |                 |
| Weight                                             | 10 Kg                                                                                                         |                 |                 |                 |                 |                 |                 |
| Cooling                                            | Natural convection                                                                                            |                 |                 |                 |                 |                 |                 |
| Dimensions (H x L x D)                             | 345mm x 341mm x 167mm                                                                                         |                 |                 |                 |                 |                 |                 |
| Display                                            | LCD                                                                                                           |                 |                 |                 |                 |                 |                 |
| Warranty                                           | 10 years                                                                                                      |                 |                 |                 |                 |                 |                 |

\* The typical DC power does not represent a maximum applicable power limit. The online configurator available at [www.zcsazzurro.com](http://www.zcsazzurro.com) will provide any applicable configurations.

\*\* Possible by connecting a current sensor (ZST-ACC-TA) or using a specific meter

## 10. Monitoring system

### 10.1. External Wi-Fi adapter

#### 10.1.1. Installation

Unlike the internal Wi-Fi card, the external adapter must be installed for all compatible inverters. However, the procedure is quicker and easier as there is no need to open the front cover of the inverter.

In order to monitor the inverter, the RS485 communication address must be set to 01 directly from the display.

#### Installation tools:

- Cross screwdriver
- External Wi-Fi adapter

- 1) Switch off the inverter following the procedure described in this manual.
- 2) Remove the cover for accessing the Wi-Fi connector on the bottom of the inverter by unscrewing the two cross-head screws (a), or by unscrewing the cover (b), as shown in the figure.



Figure 38 – Port for external Wi-Fi adapter

- 3) Connect the Wi-Fi adapter to the appropriate port, making sure to follow the direction of the connection and ensure correct contact between the two parts.

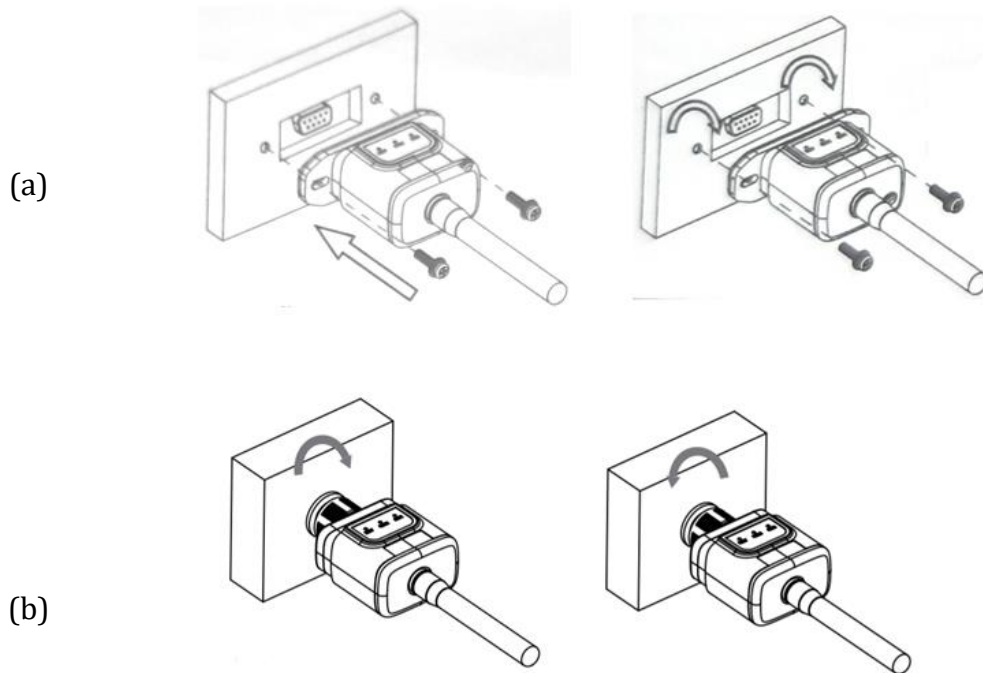


Figure 39 – Inserting and securing the external Wi-Fi adapter

- 4) Switch on the inverter by following the procedure described in the manual.

### 10.1.2. Configuration

Configuration of the Wi-Fi adapter requires the presence of a Wi-Fi network near the inverter in order to achieve stable transmission of data from the inverter adapter to the Wi-Fi modem.

#### Tools required for configuration:

- Smartphone, PC or tablet

Go to front of the inverter and search for the Wi-Fi network using a smartphone, PC or tablet, making sure that the signal from the home Wi-Fi network reaches the place where the inverter is installed.

If the Wi-Fi signal is present at the location where the inverter is installed, the configuration procedure can begin.

If the Wi-Fi signal does not reach the inverter, a system must be installed to amplify the signal and bring it to the installation location.

- 1) Activate the search for the Wi-Fi networks on your telephone or PC so that all the networks visible by your device are displayed.



Figure 40 - Search for Wi-Fi networks on iOS smartphone (left) and Android smartphone (right)

Note: Disconnect from any Wi-Fi networks to which you are connected by removing automatic access.



Figure 41 – Disabling automatic reconnection to a network

- 2) Connect to a Wi-Fi network generated by the inverter's Wi-Fi adapter (i.e. AP\_\*\*\*\*\*, where \*\*\*\*\* indicates the serial number of the Wi-Fi adapter shown on the label of the device), which operates as an access point.

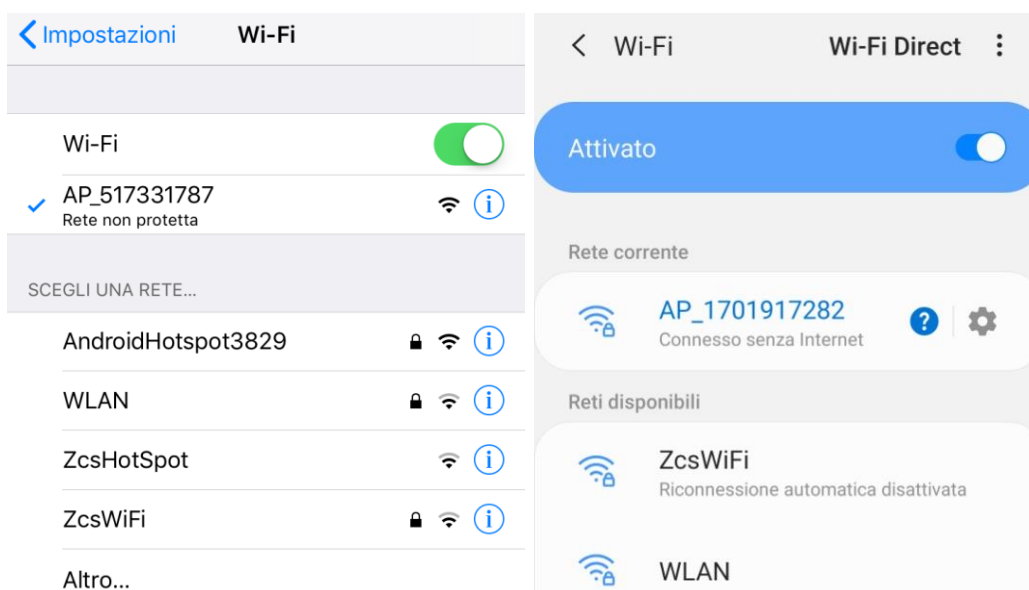


Figure 42 - Connection to Access Point for Wi-Fi adapter on iOS smartphone (left) and Android smartphone (right)

- 3) If you are using a second-generation Wi-Fi adapter, you will be prompted for a password to connect to the inverter's Wi-Fi network. Use the password found on the box or on the Wi-Fi adapter.



Figure 43 – Password of external Wi-Fi adapter

Note: To ensure that the adapter is connected to the PC or smartphone during the configuration procedure, enable automatic reconnection of the AP\_\*\*\*\*\* network.

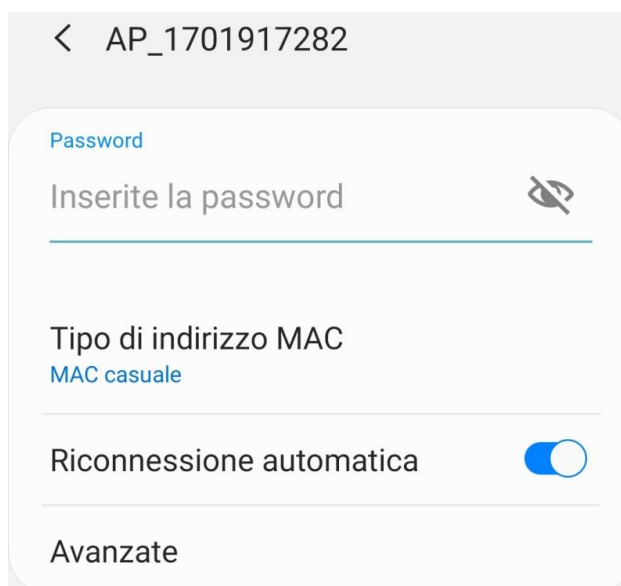


Figure 44 – Password entry prompt

Note: the Access Point is not able to provide internet access; confirm to maintain the Wi-Fi connection, even if the internet is not available



Figure 45 – Screen indicating that the Internet cannot be accessed

- 4) Open a browser (Google Chrome, Safari, Firefox) and enter the IP address 10.10.100.254 in the address bar at the top of the screen.  
In the box that appears, enter “admin” as both the Username and Password.

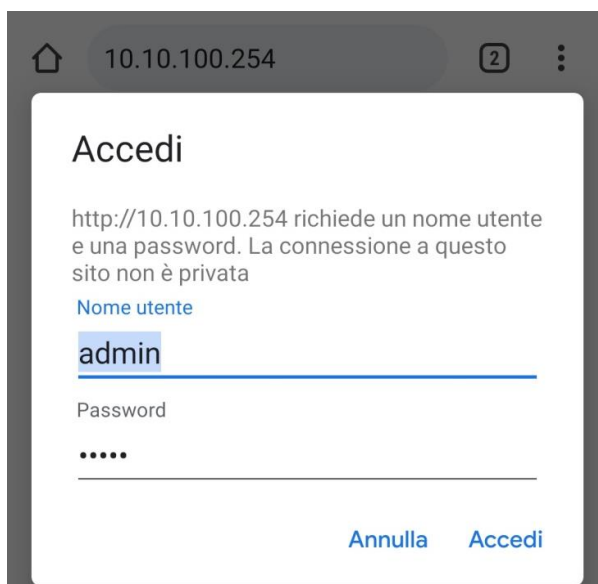
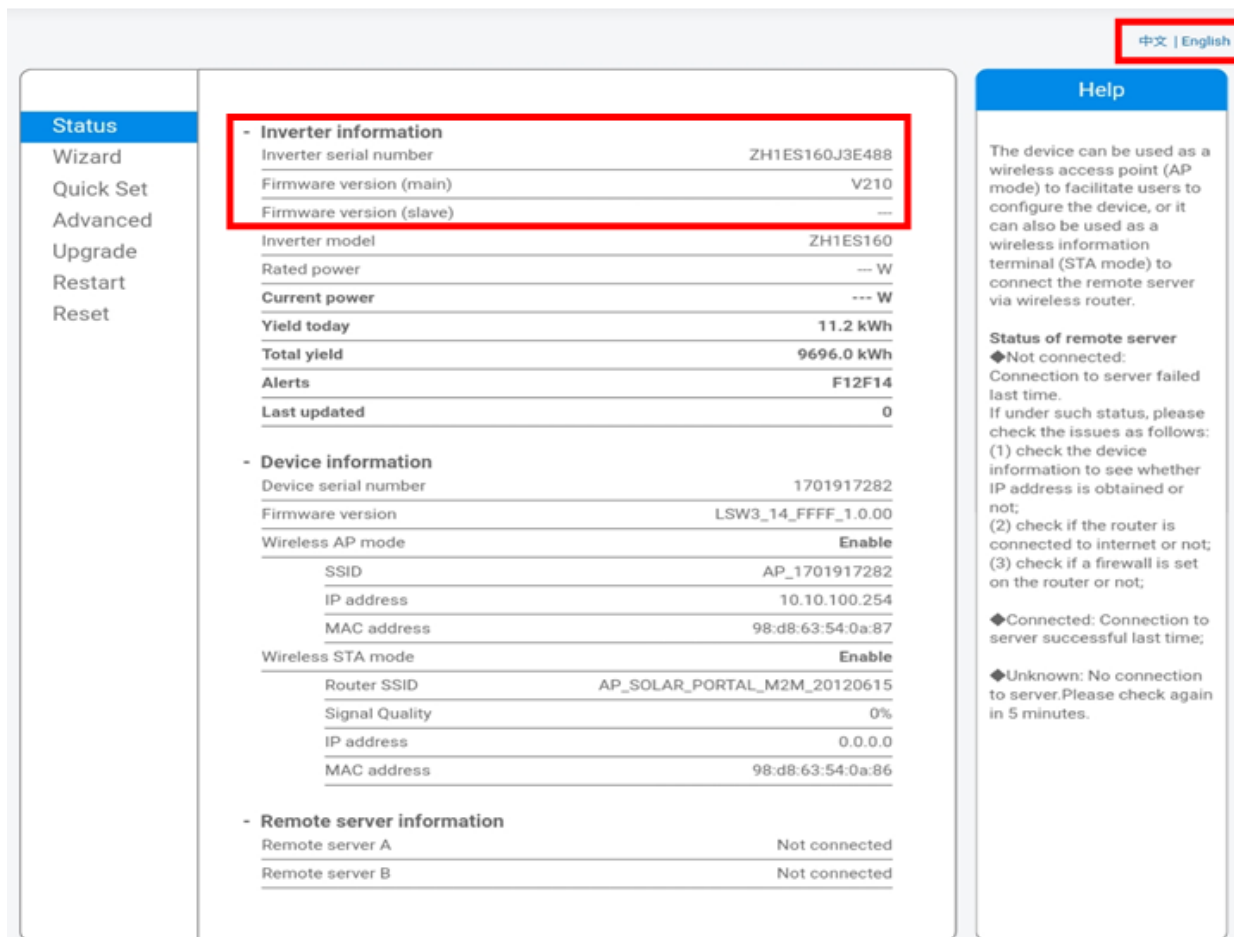


Figure 46 – Screen for accessing the web server to configure the Wi-Fi adapter

- 5) The status screen will open, showing the logger information such as the serial number and firmware version.

Check that the Inverter Information fields are filled in with the inverter information.

The language of the page can be changed using the command in the top right-hand corner.



The screenshot shows the 'Status' screen of the device. The language is set to 'English' (indicated by a red box around the language selector in the top right). The left-hand column contains navigation buttons: Status, Wizard, Quick Set, Advanced, Upgrade, Restart, and Reset. The main content area is divided into three sections:

- Inverter information** (highlighted with a red box):
 

|                          |                |
|--------------------------|----------------|
| Inverter serial number   | ZH1ES160J3E488 |
| Firmware version (main)  | V210           |
| Firmware version (slave) | ---            |
| Inverter model           | ZH1ES160       |
| Rated power              | --- W          |
| Current power            | --- W          |
| Yield today              | 11.2 kWh       |
| Total yield              | 9696.0 kWh     |
| Alerts                   | F12F14         |
| Last updated             | 0              |
- Device information**:
 

|                      |                              |
|----------------------|------------------------------|
| Device serial number | 1701917282                   |
| Firmware version     | LSW3_14_FFFF_1.0.00          |
| Wireless AP mode     | Enable                       |
| SSID                 | AP_1701917282                |
| IP address           | 10.10.100.254                |
| MAC address          | 98:d8:63:54:0a:87            |
| Wireless STA mode    | Enable                       |
| Router SSID          | AP_SOLAR_PORTAL_M2M_20120615 |
| Signal Quality       | 0%                           |
| IP address           | 0.0.0.0                      |
| MAC address          | 98:d8:63:54:0a:86            |
- Remote server information**:
 

|                 |               |
|-----------------|---------------|
| Remote server A | Not connected |
| Remote server B | Not connected |

The right-hand column contains a 'Help' section with text about using the device as a wireless access point (AP mode) or a wireless information terminal (STA mode) to connect to a remote server via a wireless router. It also includes a 'Status of remote server' section with three states: Not connected, Connected, and Unknown, each with a brief description and troubleshooting steps.

Figure 47 – Status screen

- 6) Click on the Wizard setup button in the left-hand column.
- 7) In the new screen that opens, select the Wi-Fi network to which you want to connect the Wi-Fi adapter, making sure that the Received Signal Strength Indicator (RSSI) is greater than 30%. If the network is not visible, press the Refresh button.  
 Note: check that the signal strength is greater than 30%, if not, bring the router closer or install a repeater or signal amplifier.  
 Click Next.

### Please select your current wireless network:

#### Site Survey

| SSID                                               | BSSID             | RSSI | Channel |
|----------------------------------------------------|-------------------|------|---------|
| <input checked="" type="radio"/> iPhone di Giacomo | EE:25:EF:6C:31:18 | 100  | 6       |
| <input type="radio"/> ZcsWiFi                      | FE:EC:DA:1D:C3:9  | 86   | 1       |
| <input type="radio"/> ZcsHotSpot                   | FC:EC:DA:1D:C3:9  | 86   | 1       |
| <input type="radio"/> WLAN                         | E:EC:DA:1D:C3:9   | 86   | 1       |
| <input type="radio"/> ZcsHotSpot                   | FC:EC:DA:1D:C8:A3 | 57   | 11      |
| <input type="radio"/> WLAN                         | E:EC:DA:1D:C8:A3  | 57   | 11      |
| <input type="radio"/> ZcsWiFi                      | FE:EC:DA:1D:C8:A3 | 54   | 11      |
| <input type="radio"/> WLAN                         | E:EC:DA:1D:C8:8B  | 45   | 1       |
| <input type="radio"/> ZcsWiFi                      | FE:EC:DA:1D:C8:8B | 37   | 1       |
| <input type="radio"/> ZcsHotSpot                   | FC:EC:DA:1D:C8:8B | 35   | 1       |

★Note: When RSSI of the selected WiFi network is lower than 15%, the connection may be unstable, please select other available network or shorten the distance between the device and router.

Refresh

### Add wireless network manually:

Network name (SSID)  
(Note: case sensitive)

Encryption method

Encryption algorithm

Next

1 2 3 4

Figure 48 – Screen for selecting the available wireless network (1)

- 8) Enter the password of the Wi-Fi network (Wi-Fi modem), clicking on Show Password to make sure it is correct; the password should not contain special characters (&, #, %) and spaces.  
 Note: During this step, the system is not able to ensure that the password entered is the one actually requested by the modem, therefore please make sure you enter the correct password.  
 Also check that the box below is set to Enable.  
 Then click “Next” and wait a few seconds for verification.

Please fill in the following information:

Password (8-64 bytes)  
(Note: case sensitive)   
☐ Show Password

Obtain an IP address automatically

IP address

Subnet mask

Gateway address

DNS server address

1 2 3 4

Figure 49 – Screen for entering the password of the wireless network (2)

- 9) Click “Next” again without ticking any of the options relating to the system security.

### Enhance Security

You can enhance your system security by choosing the following methods

- [Hide AP](#) ☐
- [Change the encryption mode for AP](#) ☐
- [Change the user name and password for Web server](#) ☐

1 2 3 4

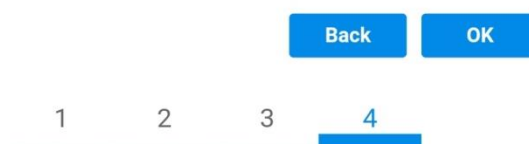
Figure 50 - Screen for setting the security options (3)

10) Click "OK".

**Setting complete!**

Click OK, the settings will take effect and the system will restart immediately.

If you leave this interface without clicking OK, the settings will be ineffective.



**Figure 51 – Final configuration screen (4)**

- 11) At this point, if the configuration of the adapter is successful, the last configuration screen will appear, and the telephone or PC will unpair from the inverter's Wi-Fi network.
- 12) Manually close the web page with the Close key on the PC por remove it from the background of the telephone.

**Setting complete! Please close this page manually!**

Please login our management portal to monitor and manage your PV system. (Please register an account if you do not have one.)

To re-login the configuration interface, please make sure that your computer or smart phone

Web Ver:1.0.24

**Figure 52 - Successful configuration screen**

### **10.1.3. Verification**

Wait two minutes after configuring the adapter and then go back to the Wi-Fi network selection screen to verify that the AP\_\*\*\*\*\* network is no longer present. The absence of the Wi-Fi network in the list will confirm the successful configuration of the Wi-Fi adapter.



**Figure 53 – Wi-Fi network search on Smartphone (iOS and Android); Access point of the Wi-Fi adapter is no longer visible**

If the Wi-Fi network is still present in the list, connect to it again and enter the status page. Check the following information:

- a. Wireless STA mode
  - i. Router SSID > Router name
  - ii. Signal Quality > other than 0%
  - iii. IP address > other than 0.0.0.0
- b. Remote server information
  - i. Remote server A > Connected

|                                    |                   |
|------------------------------------|-------------------|
| Wireless STA mode                  | Enable            |
| Router SSID                        | iPhone di Giacomo |
| Signal Quality                     | 0%                |
| IP address                         | 0.0.0.0           |
| MAC address                        | 98:d8:63:54:0a:86 |
| <b>- Remote server information</b> |                   |
| Remote server A                    | Not connected     |

Figure 54 – Status screen

## Status of LEDs present on the adapter

- Initial status:  
NET (left LED ): off  
COM (central LED): steady on  
READY (right LED): flashing on



Figure 55 - Initial status of LEDs

2) Final status:

NET (left LED): steady on

COM (central LED): steady on

READY (right LED): flashing on



**Figure 56 - Final status of LEDs**

If the NET LED does not light up or if the Remote Server A option in the Status page still shows “Not Connected”, the configuration was not successful, i.e. the wrong router password was entered or the device was disconnected during connection.

It is necessary to reset the adapter:

- Press the Reset button for 10 seconds and release
- After a few seconds, the LEDs will turn off and READY will start to flash quickly
- The adapter has now returned to its initial state. At this point, the configuration procedure can be repeated again.

The adapter can only be reset when the inverter is switched on.



Figure 57 – Reset button on the Wi-Fi adapter

#### 10.1.4. Troubleshooting

##### Status of LEDs present on the adapter

##### 1) Irregular communication with inverter

- NET (left LED): steady on
- COM (central LED ): off
- READY (right LED): flashing on



Figure 58 - Irregular communication status between inverter and Wi-Fi

- Check the Modbus address set on the inverter:

Enter the main menu with the ESC key (first key on the left), go to System Info and press ENTER to enter the submenu. Scroll down to the Modbus address parameter and make sure it is set to 01 (and in any case, other than 00).

If the value is not 01, go to “Settings” (basic settings for hybrid inverters) and enter the Modbus Address menu where the 01 value can be set.

- Check that the Wi-Fi adapter is correctly and securely connected to the inverter, making sure to tighten the two cross-head screws provided.
- Check that the Wi-Fi symbol is present in the top right-hand corner of the inverter's display (steady or flashing).



**Figure 59 – Icons on the display of LITE single-phase inverters (left) and three-phase or hybrid inverters (right)**

- Restart the adapter:
  - Press the reset button for 5 seconds and release
  - After a few seconds, the LEDs will turn off and will start to flash quickly
  - The adapter will now be reset without having lost the configuration with the router

## 2) Irregular communication with remote server

- NET (left LED ): off
- COM (central LED): on
- READY (right LED): flashing on



**Figure 60 - Irregular communication status between Wi-Fi and remote server**

- Check that the configuration procedure has been carried out correctly and that the correct network password has been entered.
- When searching for the Wi-Fi network using a smartphone or PC, make sure that the Wi-Fi signal is strong enough (a minimum RSSI signal strength of 30% is required during configuration). If necessary, increase it by using a network extender or a router dedicated to inverter monitoring.
- Check that the router has access to the network and that the connection is stable; check that a PC or smartphone can access the Internet
- Check that port 80 of the router is open and enabled to send data
- Reset the adapter as described in the previous section

If, at the end of the previous checks and subsequent configuration, Remote server A is still “Not Connected” or the NET LED is off, there may be a transmission problem at the home network level and, more specifically, that data between the router and server is not being transmitted correctly. In this case, it is advisable to carry out checks at the router level in order to ensure that there are no obstructions on the output of data packets to our server.

To make sure that the problem lies in the home router and to exclude problems with the Wi-Fi adapter, configure the adapter using the Wi-Fi hotspot function on your smartphone as a reference wireless network.

## • Using an Android mobile phone as a modem

- a) Check that the 3G/LTE connection is active on your smartphone. Go to the Settings menu of the operating system (the gear icon on the screen with a list of all the apps installed on the phone),

select “Other” from the Wireless and networks menu and make sure that the Network type is set to 3G/4G/5G.

- b) In the Android settings menu, go to Wireless & networks > Other. Select Mobile Hotspot/Tethering, and then enable the Wi-Fi mobile hotspot option; wait a few seconds for the wireless network to be created. To change the name of the wireless network (SSID) or your password, select Configure Wi-Fi hotspot.

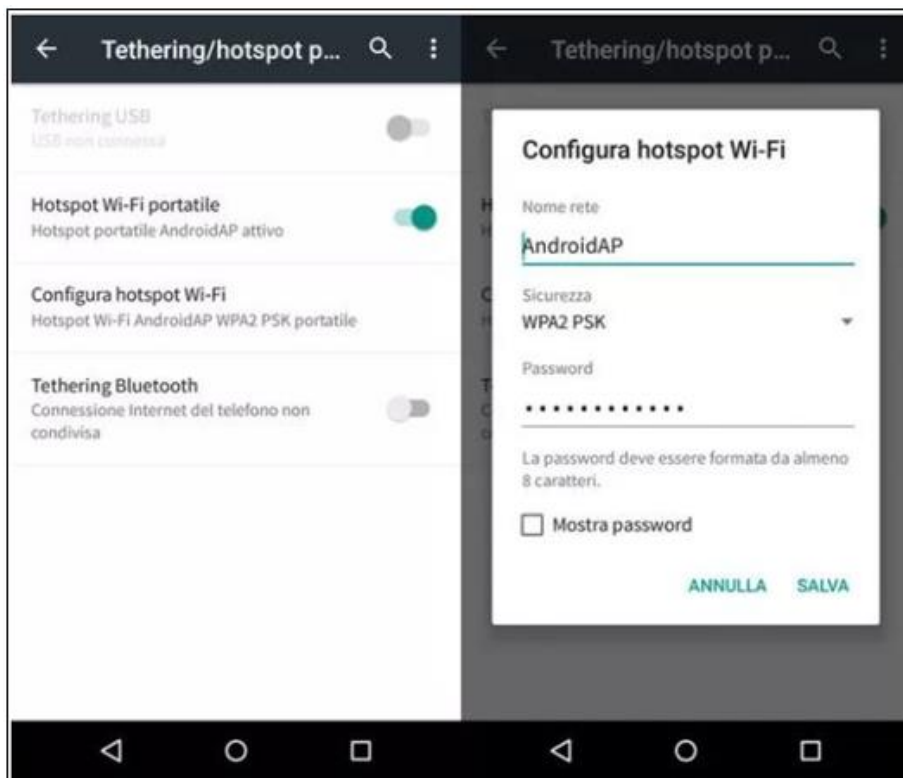


Figure 61 – Configuration of an Android smartphone as a hotspot router

## • Using an iPhone as a modem

- a) In order to share the iPhone connection, verify that the 3G/LTE network is active by going to Settings > Mobile Phone, and making sure that the “Voice and data” option is set to 5G, 4G or 3G. To enter the iOS settings menu, click the grey gear icon on the home screen of your phone.
- b) Go to the Settings menu > Personal Hotspot and turn on the Personal Hotspot option. The hotspot is now enabled. To change the password of the Wi-Fi network, select Wi-Fi password from the personal hotspot menu.

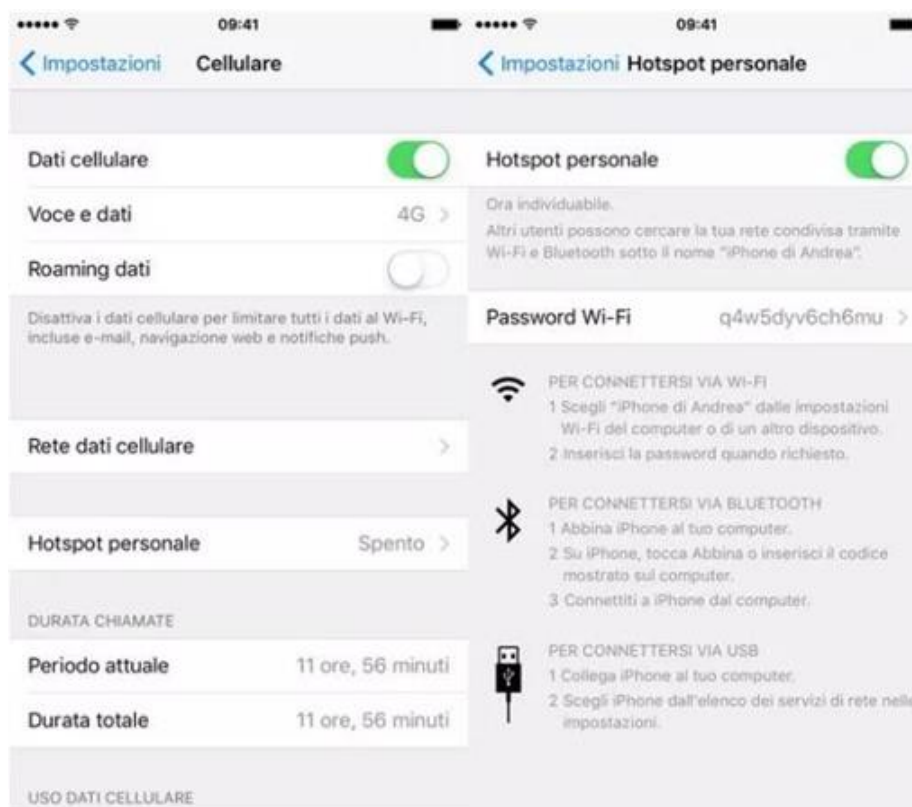


Figure 62 - Configuration of an iOS smartphone as a hotspot router

At this point, it is necessary to re-configure the Wi-Fi adapter using a PC or smartphone other than the one used as a modem.

During this procedure, when asked to select the Wi-Fi network, choose the one activated by the smartphone and then enter the password associated with it (which can be changed from the personal hotspot settings). If at the end of configuration, “Connected” appears next to “Remote Server A”, then the problem is with the home router.

It is therefore advisable to check the brand and model of the home router you are trying to connect to the Wi-Fi adapter; some router brands may have closed communication ports. In this case, contact the customer service of the router’s manufacturer and ask them to open port 80 (direct from the network to external users).

## 10.2. Ethernet adapter

### 10.2.1. Installation

Installation must be carried out for all inverters compatible with the adapter. However, the procedure is quicker and easier as there is no need to open the front cover of the inverter. Proper operation of the device requires the presence of a modem correctly connected to the network and in operation in order to achieve stable data transmission from the inverter to the server.

In order to monitor the inverter, the RS485 communication address must be set to 01 directly from the display.

#### Installation tools:

- Cross screwdriver
  - Ethernet adapter
  - Shielded network (Cat. 5 or Cat. 6) crimped with RJ45 connectors
- 1) Switch off the inverter following the procedure described in this manual.
  - 2) Remove the cover for accessing the Wi-Fi/Eth connector on the bottom of the inverter by unscrewing the two cross-head screws (a), or by unscrewing the cover (b), depending on the inverter model, as shown in the figure.



Figure 63 – Port of the Ethernet adapter

- 3) Remove the ring nut and the waterproof cable gland from the adapter to allow the network cable to pass through; then insert the network cable network into the appropriate port on the inside of the adapter and tighten the ring nut and cable gland to ensure a stable connection.

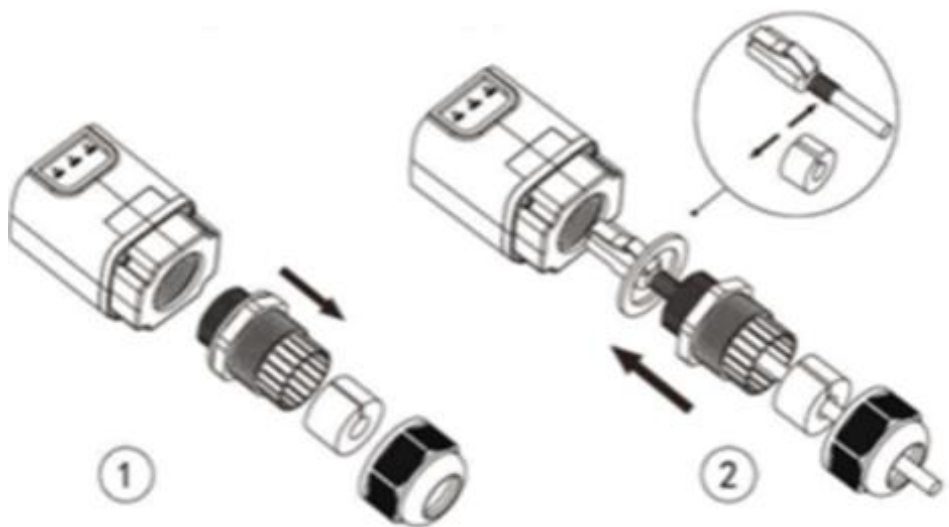


Figure 64 – Inserting the network cable inside the device

- 4) Connect the Ethernet adapter to the appropriate port, making sure to follow the direction of the connection and ensure correct contact between the two parts.

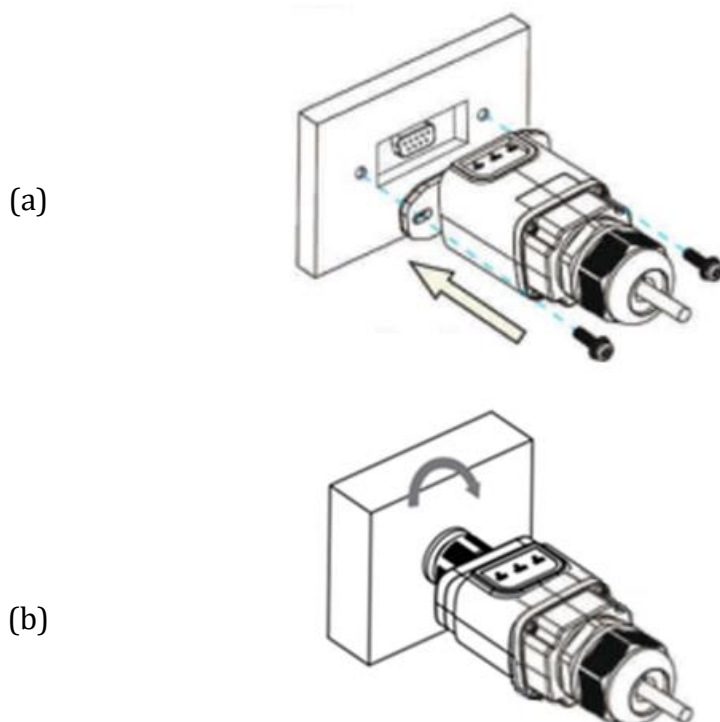
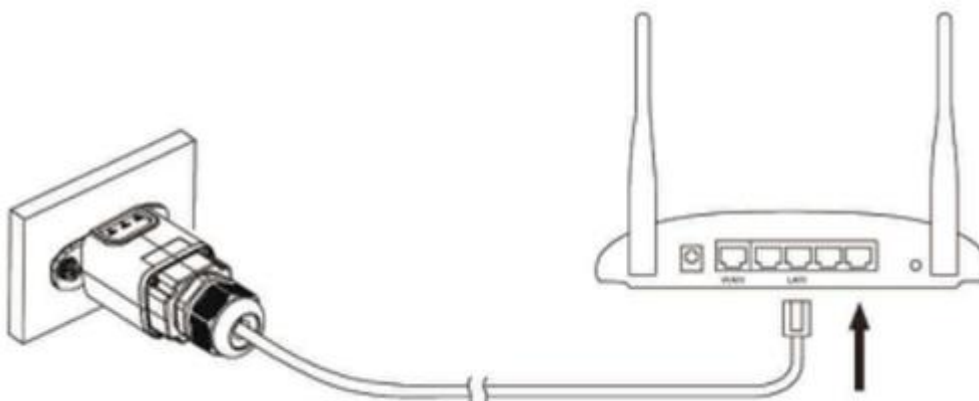


Figure 65 – Inserting and securing the ethernet adapter

- 5) Connect the other end of the network cable to the ETH output (or equivalent) of the modem or a suitable data transmission device.



**Figure 66 - Connecting the network cable to the modem**

- 6) Switch on the inverter by following the procedure described in the manual.
- 7) Unlike Wi-Fi cards, the Ethernet adapter does not need to be configured and starts transmitting data shortly after the inverter is switched on.

## 10.2.2. Verification

Wait two minutes after installing the adapter, and check the status of the LEDs on the device.

### Status of LEDs present on the adapter

- 1) Initial status:
  - NET (left LED ): off
  - COM (central LED): steady on
  - SER (right LED): flashing on



Figure 67 - Initial status of LEDs

- 2) Final status:
- NET (left LED): steady on
  - COM (central LED): steady on
  - SER (right LED): flashing on



Figure 68 - Final status of LEDs

### 10.2.3. Troubleshooting

#### Status of LEDs present on the adapter

#### 1) Irregular communication with inverter

- NET (left LED): steady on
- COM (central LED ): off
- SER (right LED): flashing on



Figure 69 - Irregular communication status between the inverter and adapter

- Check the Modbus address set on the inverter:  
Enter the main menu with the ESC key (first key on the left), go to System Info and press ENTER to enter the submenu. Scroll down to the Modbus address parameter and make sure it is set to 01 (and in any case, other than 00).  
If the value is not 01, go to "Settings" (basic settings for hybrid inverters) and enter the Modbus Address menu where the 01 value can be set.
- Check that the Ethernet adapter is correctly and securely connected to the inverter, making sure to tighten the two cross-head screws provided. Check that the network cable is correctly inserted into the device and modem, and that the RJ45 connector is correctly crimped.

#### 2) Irregular communication with remote server

- NET (left LED ): off
- COM (central LED): on
- SER (right LED): flashing on



Figure 70 - Irregular communication status between the adapter and remote server

- Check that the router has access to the network and that the connection is stable; check that a PC can access the Internet

Check that port 80 of the router is open and enabled to send data.

It is advisable to check the brand and model of the home router you are trying to connect to the Ethernet adapter; some router brands may have closed communication ports. In this case, contact the customer service of the router's manufacturer and ask them to open port 80 (direct from the network to external users).

### 10.3. 4G adapter

The ZCS 4G adapters are sold with a virtual SIM integrated into the device with data traffic fee included for 10 years, which is adequate for the proper transmission of data to monitor the inverter.

In order to monitor the inverter, the RS485 communication address must be set to 01 directly from the display.

#### 10.3.1. Installation

Installation must be carried out for all inverters compatible with the adapter. However, the procedure is quicker and easier as there is no need to open the front cover of the inverter.

### Installation tools:

- Cross screwdriver
- 4G adapter

- 1) Switch off the inverter following the procedure described in this manual.
- 2) Remove the cover for accessing the Wi-Fi/ GPRS connector on the bottom of the inverter by unscrewing the two cross-head screws (a), or by unscrewing the cover (b), depending on the inverter model, as shown in the figure.



Figure 71 – Port of the 4G adapter

- 3) Insert the 4G adapter into the appropriate port, making sure to follow the direction of the connection and ensure correct contact between the two parts. Secure the 4G adapter by tightening the two screws inside the package.

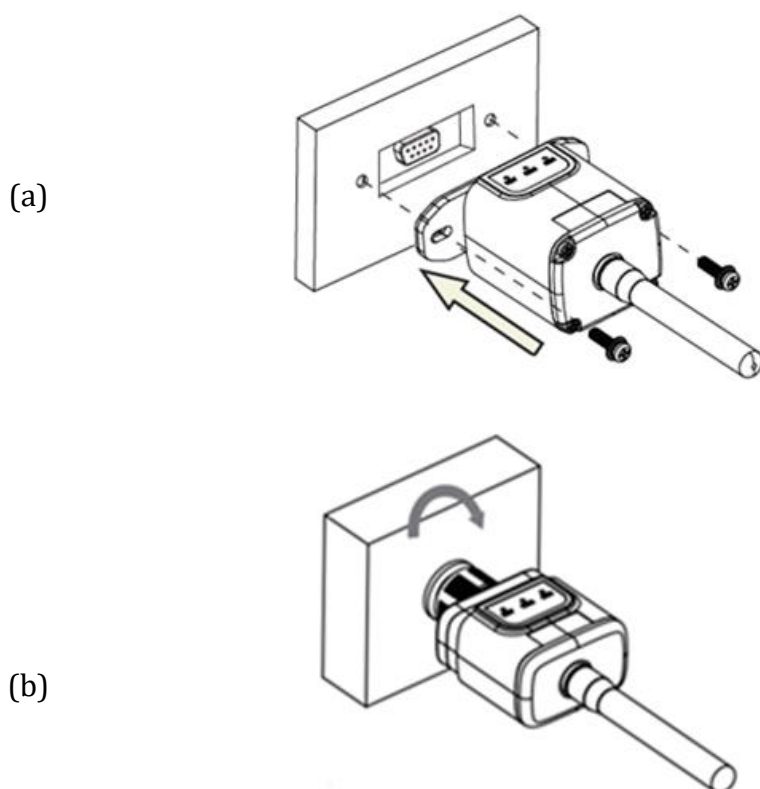


Figure 72 – Inserting and securing the 4G adapter

- 4) Switch on the inverter by following the procedure described in the manual.
- 5) Unlike Wi-Fi cards, the 4G adapter does not need to be configured and starts transmitting data shortly after the inverter is switched on.

### 10.3.2. Verification

After installing the adapter, within the next 3 minutes check the status of the LEDs on the device to ensure that the device is configured correctly.

#### Status of LEDs present on the adapter

##### 1) Initial status:

- NET (left LED ): off
- COM (central LED): flashing on
- SER (right LED): flashing on



Figure 73 - Initial status of LEDs

##### 2) Registration:

- NET (left LED): flashes rapidly for about 50 seconds; the registration process takes about 30 seconds
- COM (central LED): flashes rapidly 3 times after 50 seconds

##### 3) Final status (approx. 150 seconds after the inverter has started):

- NET (left LED): flashing on (off and on at equal intervals)
- COM (central LED): steady on
- SER (right LED): steady on



Figure 74 - Final status of LEDs

### Status of LEDs present on the adapter

#### 1) Irregular communication with inverter

- NET (left LED): on
- COM (central LED ): off
- SER (right LED): on



Figure 75 - Irregular communication status between inverter and adapter

- Check the Modbus address set on the inverter:  
 Enter the main menu with the ESC key (first key on the left), go to System Info and press ENTER to enter the submenu. Scroll down to the Modbus address parameter and make sure it is set to 01 (and in any case, other than 00).

If the value is not 01, go to “Settings” (basic settings for hybrid inverters) and enter the Modbus Address menu where the 01 value can be set.

- Check that the 4G adapter is correctly and securely connected to the inverter, making sure to tighten the two cross-head screws provided.

## 2) Irregular communication with remote server:

- NET (left LED): flashing on
- COM (central LED): on
- SER (right LED): flashing on



Figure 76 - Irregular communication status between the adapter and remote server

- Check that the 4G signal is present in the installation location (the adapter uses the Vodafone network for 4G transmission; if this network is not present or the signal is weak, the SIM will use a different network or will limit the data transmission speed). Ensure that the installation location is suitable for 4G signal transmission and that there are no obstacles that could affect data transmission.
- Check the status of the 4G adapter and that there are no external signs of wear or damage.

## 10.4. Datalogger

### 10.4.1. Preliminary notes on how to configure the datalogger

The AzzurroZCS inverters can be monitored via a datalogger connected to a Wi-Fi network present at the place of installation or via an ethernet cable connected to a modem.

The inverters are connected in a daisy chain to the datalogger via a RS485 serial line.

- Datalogger up to 4 inverters (code ZSM-DATALOG-04): allows to monitor up to 4 inverters. It can be connected to the network via an Ethernet or Wi-Fi network.
- Datalogger up to 10 inverters (code ZSM-DATALOG-10): allows to monitor up to 10 inverters. It can be connected to the network via an Ethernet or Wi-Fi network.



Figure 77 – Diagram for connecting the ZSM-DATALOG-04 / ZSM-DATALOG-10 datalogger

- Datalogger up to 31 inverters (code ZSM-RMS001/M200): allows to monitor up to 31 inverters or a system with a maximum installed power of 200kW. It can be connected to the network via an Ethernet cable.
- Datalogger up to 31 inverters (code ZSM-RMS001/M1000): allows to monitor a maximum of 31 inverters or a system with a maximum installed power of 1000kW. It can be connected to the network via an Ethernet cable.



Figure 78 – Diagram showing the operation of the ZSM-RMS001/M200 / ZSM-RMS001/M1000 datalogger

All these devices carry out the same function, i.e. they transmit data from the inverters to a web server to allow remote monitoring of the system either through the “Azzurro Monitoring” app or through the [“www.zcsazzurroportal.com”](http://www.zcsazzurroportal.com) website.

All the Azzurro ZCS inverters can be monitored using the datalogger; different models or families of inverters can also be monitored.

## 10.4.2. Electrical connections and configuration

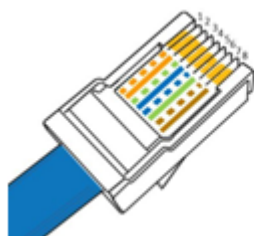
All the Azzurro ZCS inverters have at least one RS485 connection point.

The connections can be made via the green terminal block or via the RJ45 plug inside the inverter.

Use positive and negative conductors. There is no need to use a conductor for the GND. This applies to both the terminal block and the plug.

The serial line can be created using a Cat. 5 or Cat. 6 network cable, or a classic RS485 2x0.5mm<sup>2</sup> cable.

- 1) In the case of three-phase inverters, a suitably crimped network cable with a RJ45 connector can also be used:
  - a. Place the blue cable in position 4 of the RJ45 connector and the white-blue cable in position 5 of the RJ45 connector, as shown in the figure below.
  - b. Insert the connector into the 485-OUT terminal.
  - c. If there is more than one three-phase inverter, insert another connector in the 485-IN terminal to connect to the 485-OUT input of the next inverter.



| RJ 45 | Colore     | Monofase | Trifase |
|-------|------------|----------|---------|
| 4     | Blu        | TX +     | 485 A   |
| 5     | Bianco-Blu | TX -     | 485 B   |

Figure 79 – Pin out for connecting the RJ45 connector

### 2) Daisy chain

- a. Insert the blue cable into input A1 and the white-blue cable into input B1.
- b. If there is more than one three-phase inverter, insert a blue cable into input A2 and a white-blue cable into input B2 and connect them to the respective A1 and B1 inputs of the next inverter.

Some inverters have both an RS485 terminal block and RJ45 plugs. This is shown in detail in the figure below.

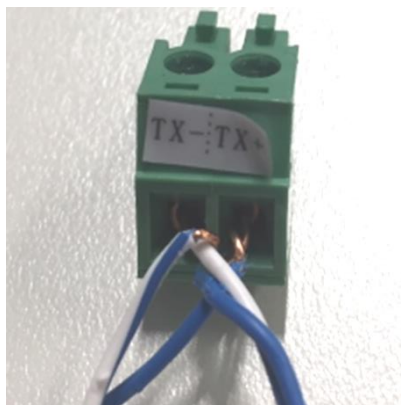


Figure 80 – Tightening the network cable to the RS485 terminal block

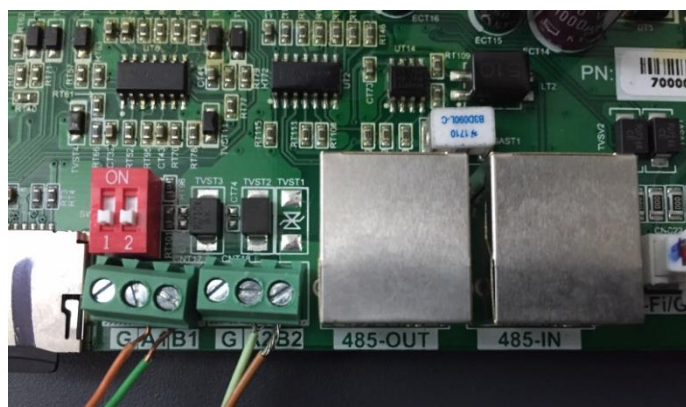


Figure 81 – Connecting the serial line via the RS485 terminal block and via the RJ45 plug

For the 3PH HYD5000-HYD20000-ZSS three-phase hybrid inverter, use only one positive and one negative of those shown in the figure below.

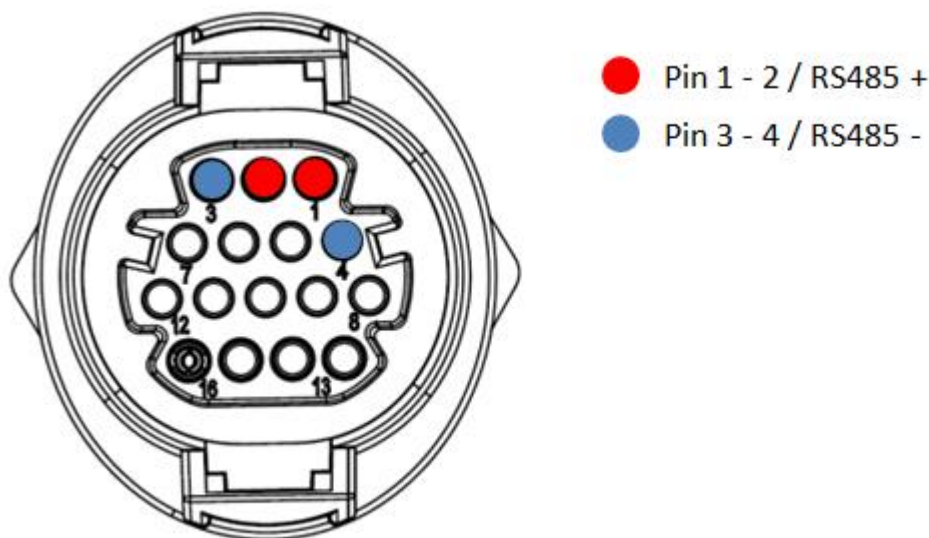


Figure 98a – Connecting the serial line via the communication connector for 3PH HYD5000-HYD20000-ZSS

For the 3PH HYD5000-HYD20000-ZSS three-phase hybrid inverter and the 3000-6000 TLM-V3 photovoltaic inverter, use only one positive and one negative of those shown in the figure below.

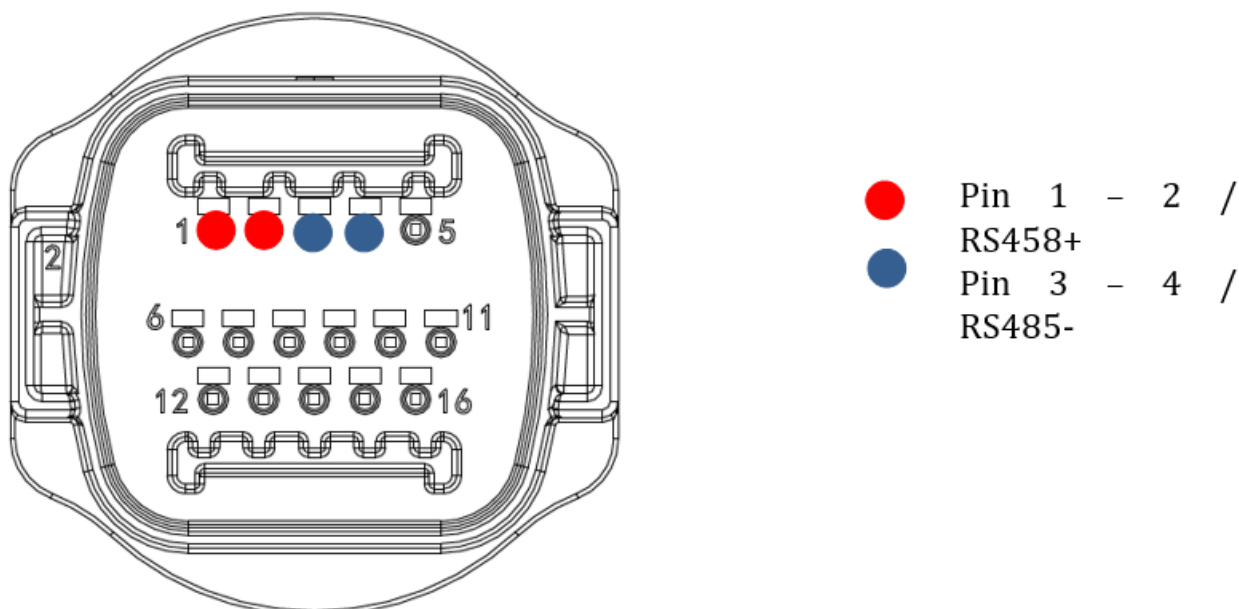
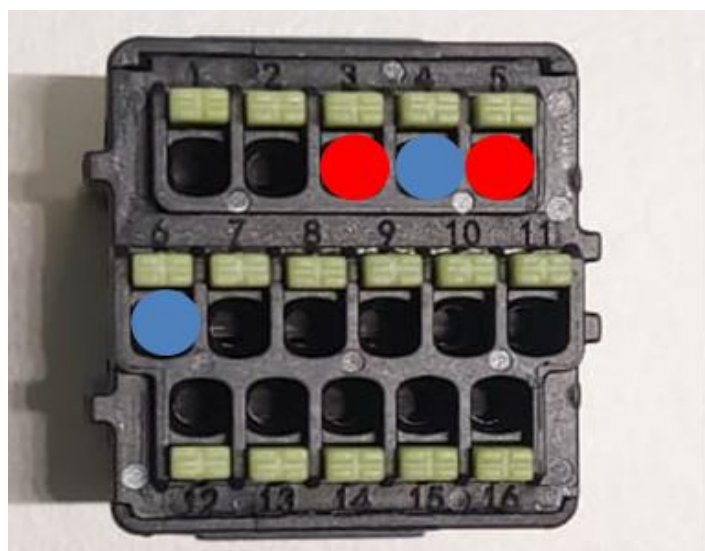


Figure 98b – Connecting the serial line via the communication connector for 1PH 3000-6000 TLM-V3, 3PH HYD5000-HYD20000-ZSS

For the 1PH HYD3000-HYD6000-ZSS-HP single-phase hybrid inverter, use only one positive and one negative of those shown in the figure below.



● Pin 3 - 5 / RS485 +  
● Pin 4 - 6 / RS485 -

Figure 98c – Connecting the serial line via the communication connector for 1PH HYD3000-HYD6000-HP

- c. Position the dip switches of the last inverter of the daisy chain as shown in the figure below for activating the 120 Ohm resistor and closing the communication chain. If there are no switches, physically connect a 120 Ohm resistor to terminate the bus.

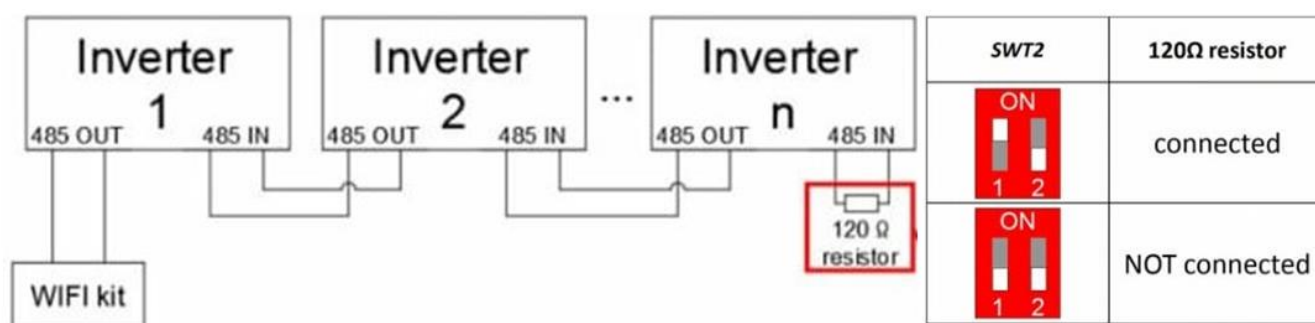


Figure 83 – Positioning of dip switches to connect the isolation resistor

- 3) Check that the RS485 icon is shown on the display of all the inverters. This indicates that the inverters are actually connected via the serial line. If this symbol does not appear, check that the

connection is correct, as indicated in this guide.



Figure 84 – RS485 symbol on the display of the inverter

- 4) Set a sequential Modbus address on each inverter connected:
  - a. Enter the “Settings” menu.
  - b. Scroll to the submenu “Modbus Address.”
  - c. Change the digits and set an increasing address on each inverter, starting from 01 (first inverter) to the last inverter connected. The Modbus address will be shown on the display of the inverter alongside the RS485 symbol. There should be no inverters with the same Modbus address.

### 10.4.3. ZSM-DATALOG-04 AND ZSM-DATALOG-10 DEVICES

The initial status of the LEDs on the datalogger will be:

- POWER steady on
- 485 steady on
- LINK off
- STATUS steady on

### 10.4.4. WI-FI CONFIGURATION

To configure the datalogger via Wi-Fi, please refer to the chapter on monitoring systems, as the configuration is similar to that of any type of Wi-Fi adapter.

### 10.4.5. Ethernet configuration

- 1) Insert the RJ45 connector of the Ethernet cable in the ETHERNET input of the datalogger.



Figure 85 – Ethernet cable connected to the datalogger

- 2) Connect the other end of the Ethernet cable to the ETH output (or equivalent) of the modem or a suitable data transmission device.
- 3) Activate the search for Wi-Fi networks on your phone or PC in order to display all the networks visible from your device.



Figure 86 - Wi-Fi network search on iOS smartphone (left) and Android (right)

Note: Disconnect from any Wi-Fi networks to which you are connected by removing automatic access.



Figure 87 - Disabling automatic reconnection to a network

- 4) Connect to a Wi-Fi network generated by the datalogger (i.e. AP\_\*\*\*\*\*, where \*\*\*\*\* indicates the serial number of the datalogger shown on the label of the device), which operates as an Access Point.
- 5) Note: To ensure that the datalogger is connected to the PC or smartphone during the configuration procedure, enable automatic reconnection of the AP\_\*\*\*\*\* network.

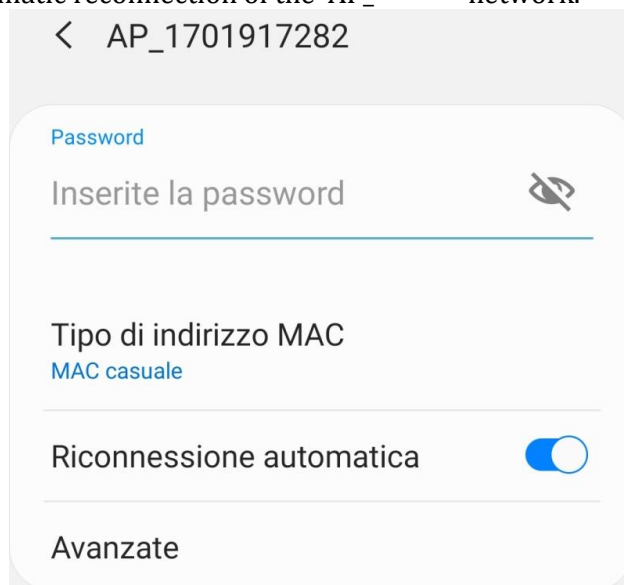


Figure 88 - Password entry prompt

Note: the Access Point is not able to provide internet access; confirm to maintain the Wi-Fi connection, even if internet is not available.



Figure 89 - Screen showing that the Internet cannot be accessed

- 6) Open a browser (Google Chrome, Safari, Firefox) and enter the IP address 10.10.100.254 in the address bar at the top of the screen.  
In the box that appears, enter “admin” as both Username and Password.



Figure 90 - Screen for logging into the web server to configure the datalogger

- 7) The status screen will open, showing the datalogger information such as serial number and firmware version.

Check that the fields relating to the Inverter Information are filled in with the information of all the inverters connected.



Status

Wizard

Wireless

Cable

Advanced

Upgrade

Restart

Reset

Device information

Device serial number808032156

Firmware versionH4.01.51MW.2.01W1.0.65(2018-02-271-D)

Wireless AP modeEnable

SSIDAP\_808032156

IP address10.10.100.254

MAC addressF0:FE:6B:C4:CC:A8

Wireless STA modeEnable

Router SSIDAP\_SOLAR\_PORTAL\_M2M\_20120615

Signal quality0%

IP address0.0.0.0

MAC addressF0:FE:6B:C4:CC:A9

Cable modeDisable

IP address

MAC address

Connected Inverter

Number0

Remote server information

Remote server AUnpingable

Help

The device can be used as a wireless access point (AP mode) to facilitate users to configure the device, or it can also be used as a wireless information terminal (STA mode) to connect the remote server via wireless router.

Figure 91 – Status Screen

- 8) Click on the Wizard setup button in the left-hand column.
- 9) Now click on the Start button to start the configuration wizard.

Dear user:

Thank you for choosing our device.  
Next, you can follow the setup wizard to complete the network setting step by step;  
or you can select the left menu for detailed settings.

★Note: Before setting, please make sure that your wireless or cable network is working.

Start

1 2 3 4 5 6 7

Figure 92 – Screen for starting (1) the Setup Wizard

10) Check the “Cable Connection” option and then click “Next.”

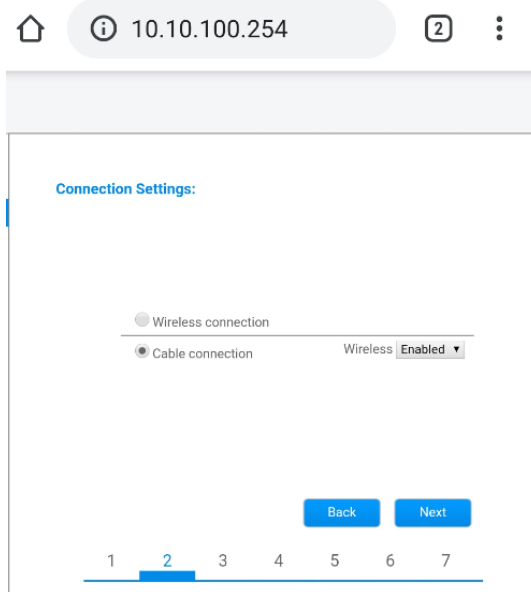


Figure 93 - Screen for the selection of “Cable connection”

11) Make sure that the “Enable” option is selected to automatically obtain the IP address from your router, then click Next.

Please fill in the following information:

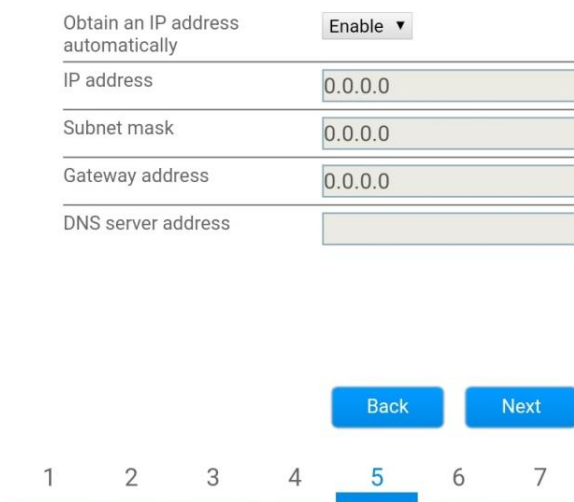


Figure 94 – Screen for automatically obtaining the IP address (5)

12) Click on Next without making any changes.

### Enhance Security

You can enhance your system security by choosing the following methods

- Hide AP ☐

---

- Change the encryption mode for AP ☐

---

- Change the user name and password for Web server ☐

Back

Next

1 2 3 4 5 **6** 7

Figure 95 - Screen for setting the security options (6)

13) Complete the configuration procedure by clicking OK, as shown in the following screen.

Configuration completed!

Click OK, the settings will take effect and the system will restart immediately.

If you leave this interface without clicking OK, the settings will be ineffective.

Back

OK

1 2 3 4 5 6 **7**

Figure 96 - Final configuration screen (7)

14) If the configuration procedure is successful, the following screen will appear:

If this screen does not appear, try refreshing the browser page.

The screen will prompt you to manually close the page; close the page from the background of your phone or from the close button on your PC.

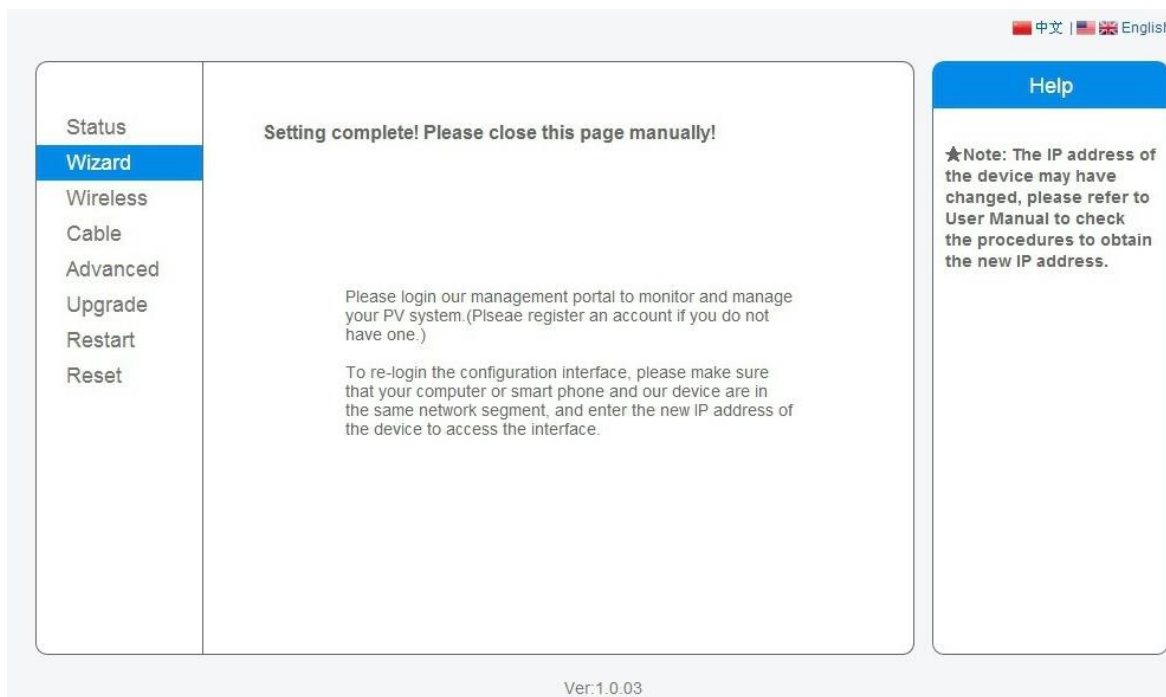


Figure 97 – Successful configuration screen

#### 10.4.6. Checking that the datalogger has been configured correctly

Wait two minutes after completing the configuration of the device.  
First of all, check that the LINK LED on the device is on and steady.



Figure 98 – LED indicating the correct configuration of the datalogger

Enter the IP address 10.10.100.254 again, and the login credentials (“admin” for both username and password). Once logged in, the Status screen will appear, where the following information can be checked:

- Check Wireless STA mode (if the datalogger has been configured via Wi-Fi)
  - Router SSID > Router name
  - Signal Quality > other than 0%

- IP address > other than 0.0.0.0
- Check Cable mode (if the datalogger has been configured via Ethernet cable)
  - IP address > other than 0.0.0.0
- Check Remote server information
  - Remote server A > Pingable

#### Device information

|                      |                                       |
|----------------------|---------------------------------------|
| Device serial number | 508263482                             |
| Firmware version     | H4.01.51MW.2.01W1.0.74(2019-03-143-D) |
| Wireless AP mode     | <b>Enable</b>                         |
| SSID                 | AP_508263482                          |
| IP address           | 10.10.100.254                         |
| MAC address          | BC:54:F9:F6:B9:74                     |
| Wireless STA mode    | <b>Enable</b>                         |
| Router SSID          | iPhone di Giacomo                     |
| Signal quality       | 100%                                  |
| IP address           | 172.20.10.10                          |
| MAC address          | BC:54:F9:F6:B9:75                     |
| Cable mode           | <b>Disable</b>                        |
| IP address           |                                       |
| MAC address          |                                       |

#### Connected Inverter

|                          |                  |
|--------------------------|------------------|
| Type                     | ZCS              |
| Number                   | 1                |
| Inverter serial number   | ZA1ES111G8R273 ▼ |
| Firmware version (main)  | V550             |
| Firmware version (slave) | ---              |
| Inverter model           | ZA1ES111         |
| Rated power              | 1 00 W           |
| Current power            | 0 W              |
| Yield today              | 0 kWh            |
| Total yield              | 0 kWh            |
| Alerts                   | F12F14           |
| Last updated             | 0 min ago        |

#### Remote server information

|                 |          |
|-----------------|----------|
| Remote server A | Pingable |
|-----------------|----------|

Figure 99 – Main status screen and checking of correct configuration

|             |                   |
|-------------|-------------------|
| Cable mode  | <b>Enable</b>     |
| IP address  | 192.168.0.177     |
| MAC address | BC:54:F9:F6:B9:77 |

Figure 100 - main status screen and checking of correct configuration

If the Remote Server A item in the Status page is still “Unpingable”, the configuration was not successful, i.e. the incorrect router password was entered or the device was disconnected during connection.

It is necessary to reset the device:

- Select the Reset button in the left-hand column
- Press the OK button to confirm
- Close the web page and enter the Status page again. At this point, the configuration procedure can be repeated again.

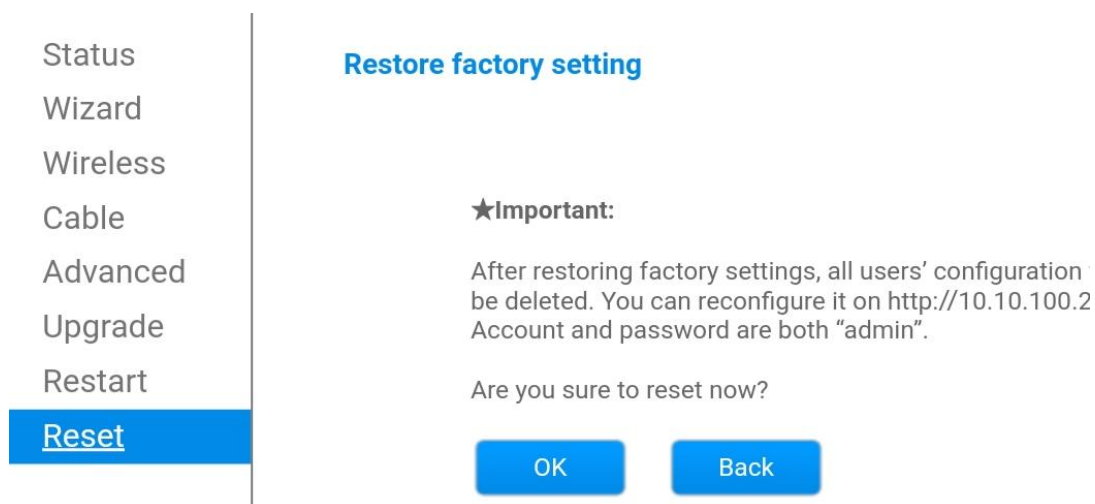


Figure 101 – Reset Screen

## 10.4.7. ZSM-RMS001/M200 and ZSM-RMS001/M1000 Devices

### 10.4.7.1. Mechanical description and Datalogger interface

**Mechanical Dimensions:** 127mm x 134 x 52 mm

**Protection rating:** IP20

The usable ports are indicated below.

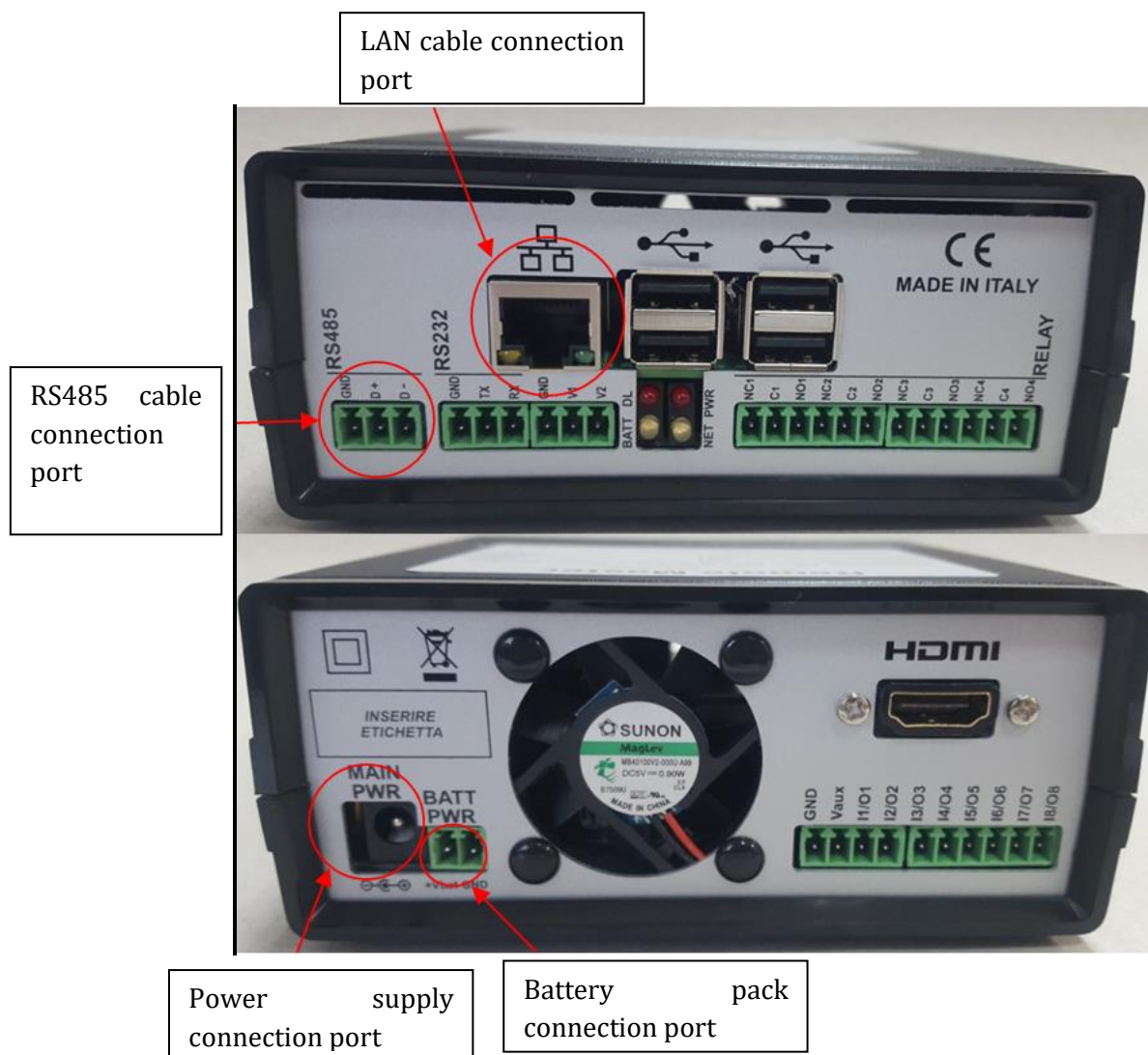


Figure 102 - Datalogger rear panel

### 10.4.7.2. Connecting the Datalogger to the inverters

A serial communication via RS485 cable is provided for connecting to the inverters.

The GND cable does not need to be connected to the inverters. Follow the connections as shown in the table below.

| Datalogger SIDE    | BUS Signal | SENSOR SIDE<br>(ZSM-IRR-TEMP-LM2) | Inverter SIDE       |
|--------------------|------------|-----------------------------------|---------------------|
| <b>D+</b> terminal | +          | RS485 <b>+IB</b> terminal         | <b>+Tx</b> terminal |
| <b>D-</b> terminal | -          | RS485 <b>-IA</b> terminal         | <b>-Tx</b> terminal |

Table 3 - Connecting the Datalogger to the inverters

### 10.4.7.3. Internet connection via Ethernet cable

In order to display the data measured and processed by the Datalogger in the portal, it is necessary to connect to the internet via LAN cable and open the following router ports:

- VPN ports: 22 and 1194
- HTTP ports: 80
- DB ports: 3050
- FTP ports: 20 and 21

The local network of the device is configured for DHCP, and it is not necessary to activate any communication port on the router. If you want to set a fixed network address, this must be provided at the time of ordering together with the gateway address.

### 10.4.7.4. Connecting the power supply and battery pack to the Datalogger

Once the RS485 Half Duplex cable has been connected, power the Datalogger by connecting the power supply unit (supplied with the datalogger) to the MAIN PWR input (12V DC - 1A).

In order to prevent possible voltage drops and/or power failures, it is recommended to also connect the battery pack, which is supplied with the datalogger. The battery pack should be connected to the +V<sub>bat</sub> and GND inputs of the BATT PWR connector, positive and negative respectively (i.e. red to the +V<sub>bat</sub> input and black to the GND input).

The battery pack (ZSM-UPS-001) can be purchased separately.

#### 10.4.7.5. Connecting the LM2-485 PRO cell irradiance and temperature sensor to the datalogger

For proper installation, make sure to connect the sensor signal cable and the power cable.



In particular, the sensor of the signal cables must be connected in a daisy chain configuration to the remaining devices on the RS485 bus, as shown in the table below.

| Datalogger SIDE    | BUS Signal | SENSOR SIDE<br>(ZSM-IRR-TEMP-LM2) | Inverter SIDE       |
|--------------------|------------|-----------------------------------|---------------------|
| <b>D+</b> terminal | +          | RS485- <b>IB</b> terminal         | <b>+Tx</b> terminal |
| <b>D-</b> terminal | -          | RS485- <b>IA</b> terminal         | <b>-Tx</b> terminal |

To supply power to the sensor, the datalogger can be directly connected to the mains power, as shown in the table below, or connected to an external +12Vdc power supply.

| Datalogger SIDE                                 | SENSOR SIDE                 |
|-------------------------------------------------|-----------------------------|
| <b>V1</b> terminal<br>(12Vdc output voltage)    | <b>RED +12V</b><br>Terminal |
| <b>GND</b> terminal<br>(GND/RTN)                | <b>BLACK 0V</b><br>Terminal |
| <b>V2</b> terminal<br>(12Vdc driveable voltage) |                             |

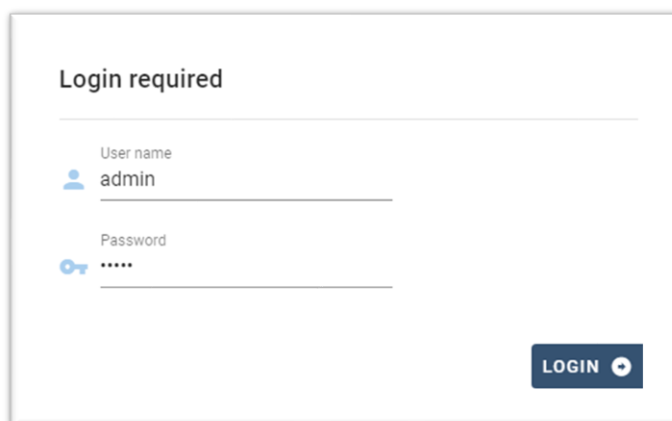
**Table 4 - Electrical connection of the sensor to the datalogger (power supply)**

A stable communication in terms of signal and power supply, up to 200m, is guaranteed by using the RS485 cable, type Te.Co. 15166 (2x2x0,22+1x0,22)st/pu.

For longer distances, a connection to the signal side of the datalogger is recommended, and a connection to the +12V power supply via an external power supply unit.

### 10.4.8. Configuring the Datalogger

Connect to the website [dlconfig.it](http://dlconfig.it) and login by entering the temporary credentials: Username = admin and Password = admin.



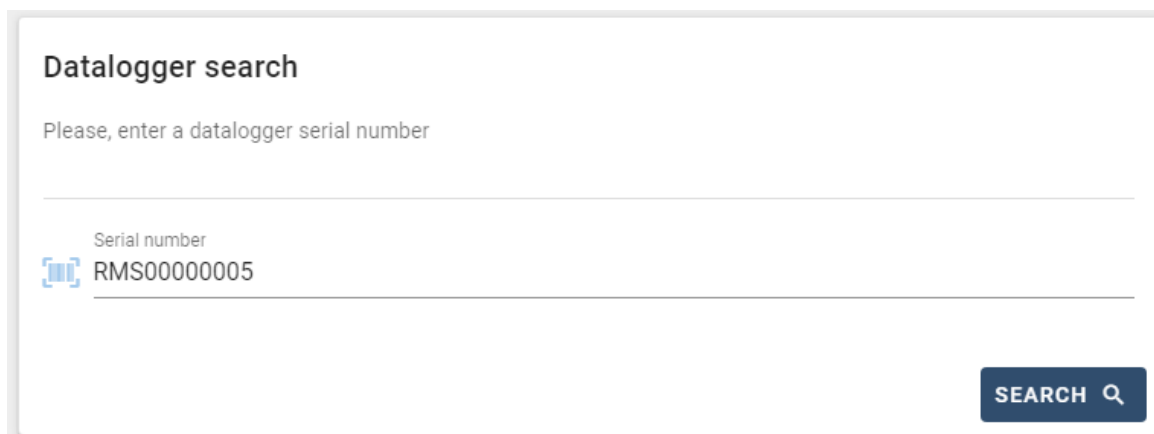
**Login required**

User name

Password

**LOGIN**

In the screen that opens, enter the serial number(S/N) of the datalogger to be configured and click "SEARCH".



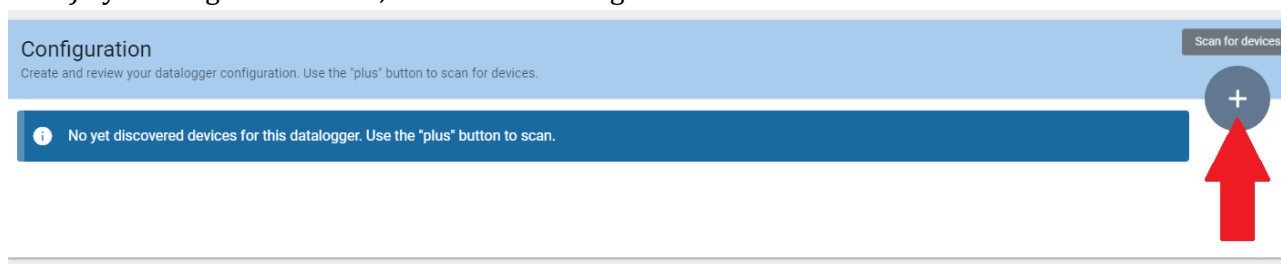
**Datalogger search**

Please, enter a datalogger serial number

Serial number

**SEARCH**

In the configuration page, you can search for any devices connected to the datalogger (inverter, meter or sensors) by clicking the + button, as shown in the figure.



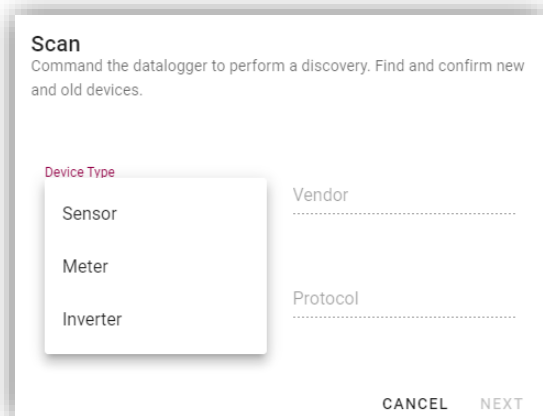
**Configuration**  
 Create and review your datalogger configuration. Use the "plus" button to scan for devices.

Scan for devices

No yet discovered devices for this datalogger. Use the "plus" button to scan.

**+**

A window will open where you can search for each type of device connected to the Datalogger, after indicating the range of addresses associated with the relative devices.



**Scan**  
 Command the datalogger to perform a discovery. Find and confirm new and old devices.

**Device Type**

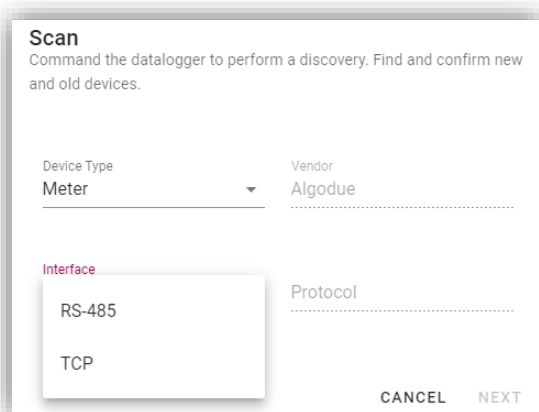
- Sensor
- Meter
- Inverter

Vendor  
 .....

Protocol  
 .....

CANCEL NEXT

If a meter is one of the devices connected to the Datalogger, select the type of Meter/Datalogger communication interface and the relative communication protocol.



**Scan**  
 Command the datalogger to perform a discovery. Find and confirm new and old devices.

Device Type  
 Meter

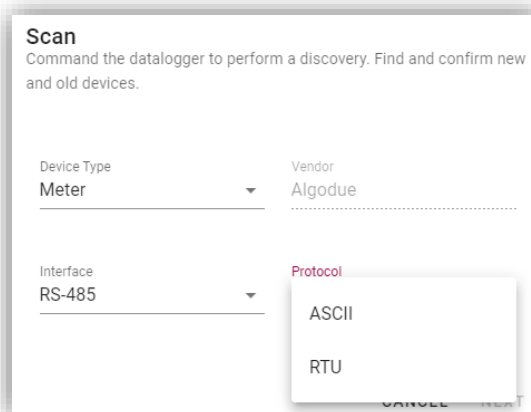
Vendor  
 Algodue

**Interface**

- RS-485
- TCP

Protocol  
 .....

CANCEL NEXT



**Scan**  
 Command the datalogger to perform a discovery. Find and confirm new and old devices.

Device Type  
 Meter

Vendor  
 Algodue

Interface  
 RS-485

**Protocol**

- ASCII
- RTU

CANCEL NEXT

Once this operation has been completed, update the new configuration by clicking “Confirm,” which will allow you to register the devices associated with the datalogger.

### Confirm changes

State
 ☐

---

Confirming new
 1

---

Total now
 1

CONFIRM

From this moment, the datalogger is correctly configured (all devices must be in the “saved” status) and therefore a new installation can be created on the ZCS Azzurro portal for associating the datalogger and the devices connected to it.

| Configuration                                                                               |           |        |           |          |                |          |        |
|---------------------------------------------------------------------------------------------|-----------|--------|-----------|----------|----------------|----------|--------|
| Create and review your datalogger configuration. Use the "plus" button to scan for devices. |           |        |           |          |                |          |        |
| Device Type                                                                                 | Direction | Vendor | Interface | Protocol | Serial number  | Slave Id | Status |
| Inverter                                                                                    |           | ZCS    | RS-485    | RTU      | ZM1ES030JC4258 | 1        | Saved  |

### 10.4.8.1. Configuring the Datalogger on the ZCS Azzurro portal

Access the ZCS Azzurro portal (<https://www.zcsazzurroportal.com>). For new users, click “Sign up now” to register on the portal by entering your email, username and password. After logging into the portal, click “Configuration Panel”, and then select the option “Create field with Datalogger.” The “Create New Field” operation will be possible only if the user’s privileges allow acquiring new fields (at the time of registration the limit will be equal to 1, an upgrade is required to increase the limit).



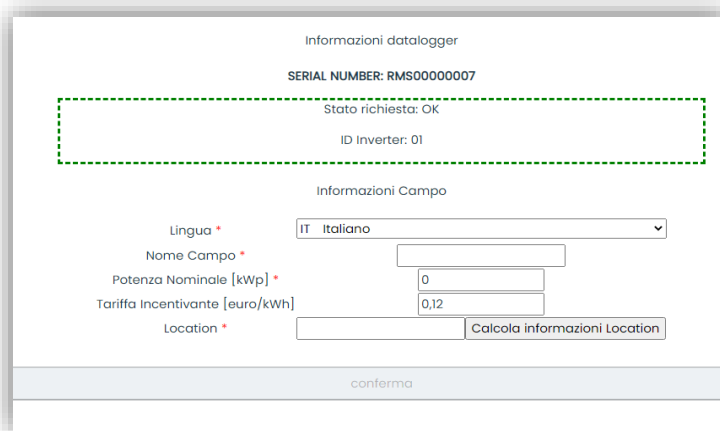
Crea campo con datalogger
 Acquisisci Campo
 Impostazioni Campo

---

Informazioni datalogger

Serial number:
 
 Check Rms

Enter the serial number (S/N) of the datalogger and click “Check RMS”. If the datalogger has been configured correctly, a screen will open where you can enter the required information relating to the field to be installed.

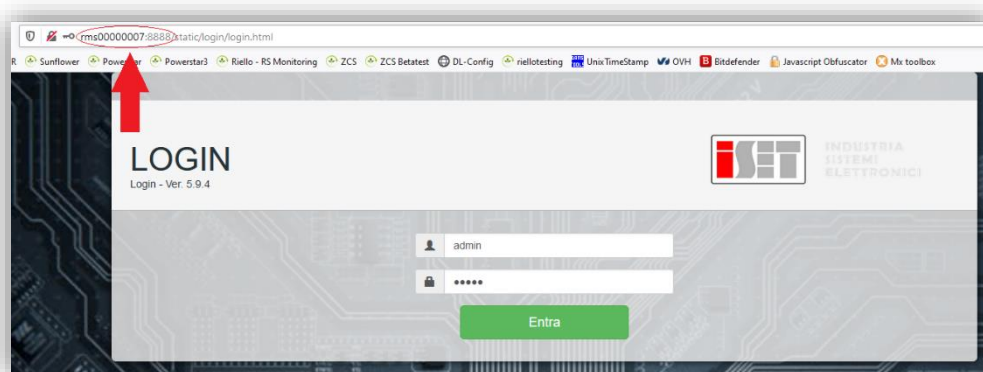


Once the “location” of the field has been entered, click “Calculate Location Information” to allow the system to obtain the latitude, longitude and time zone of the installation. Click “Confirm” to complete the configuration of the field. You only need to wait a few minutes to view the data flow on the ZCS Azzurro portal.

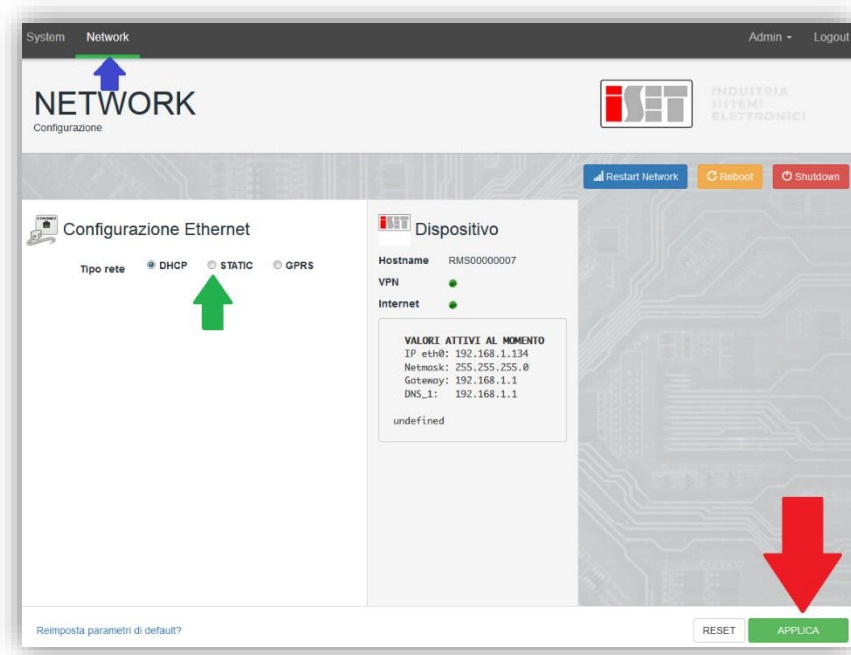
**ATTENTION: The location data is essential for the correct operation of the datalogger in the ZCS system. It is important to define it very carefully.**

### 10.4.8.2. Network configuration

At the time of purchase, the Datalogger is configured in DHCP, i.e. dynamic configuration. However, if you want to set up a static configuration for your Datalogger, you can access the internet page via the link RMSxxxxxxxx: 8888, as shown in the figure (e.g. RMS00000007).



By entering the credentials: username = admin and password = admin, you can change the configuration from dynamic to static by selecting the network window (see [blue arrow](#)) and then the “STATIC” option (see [green arrow](#)).



To complete the operation, click “Apply” (see [red arrow](#)).

## 10.4.9. Local monitoring

The datalogger makes it possible to obtain an additional monitoring system (**local monitoring**), which can be used locally on a web page (therefore, also without an internet connection) and accessed from any device present in the same local network as the datalogger.

### 10.4.9.1. Requirements for installation of local monitoring

In order to install the local monitoring system on the datalogger, the customer must ensure that:

- The datalogger is connected to the local network and to the internet (the internet connection is only required during installation and configuration of the local monitoring system).
- A static address (to be provided by the customer) with gateway and subnet mask is available for viewing the page locally.

### 10.4.9.2. Features of local monitoring

After installation and configuration, local monitoring makes it possible to monitor the fundamental parameters of the photovoltaic system, even without an internet connection, from any device connected to the same local network.

In particular, it is possible to monitor the power and energy of the inverters and the storage systems over the last 7 days. It is also possible to view alarms, and other information such as temperature, peak daily power, CO<sub>2</sub> gains and savings.

Below is an example of a local monitoring page.

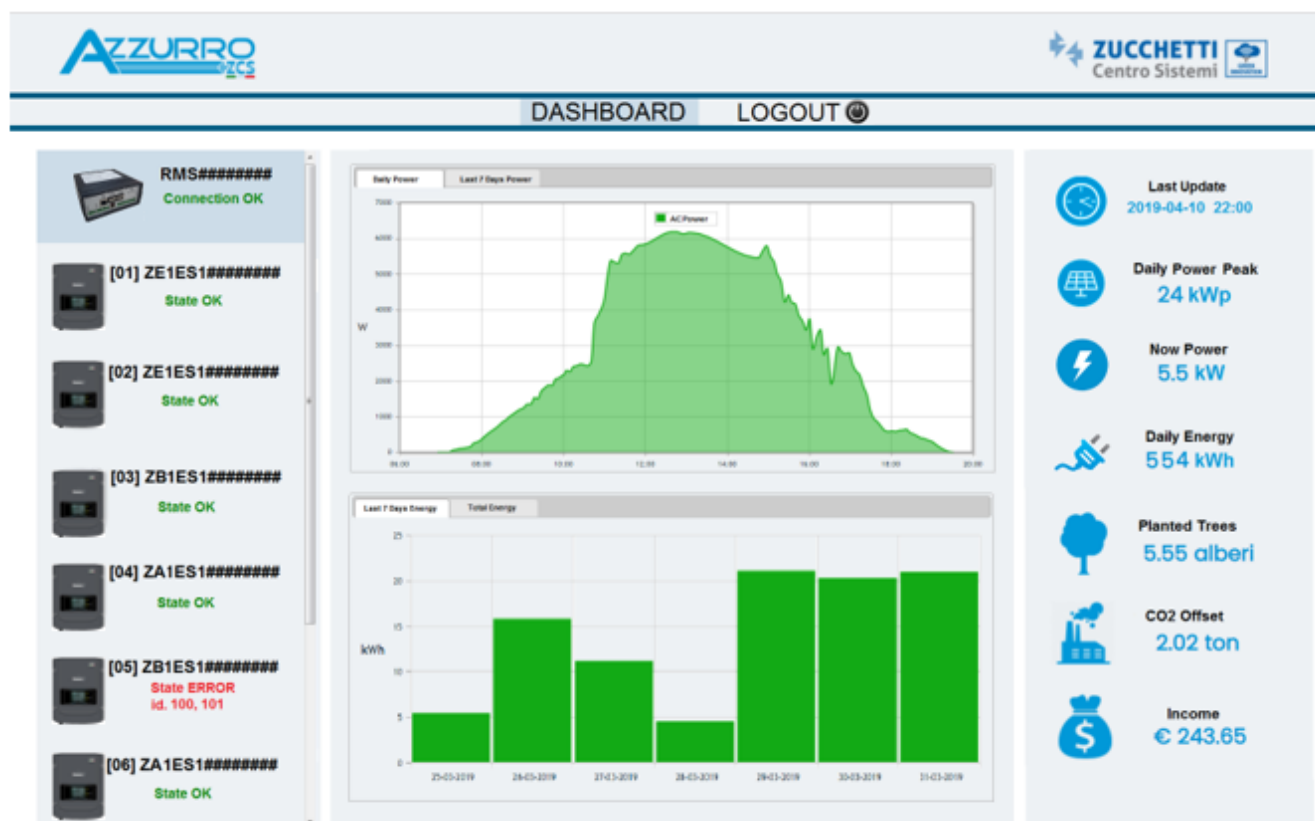


Figure 103 - Example of local monitoring page

## 11. Warranty terms and conditions

To view the Warranty Terms and Conditions” offered by ZCS Azzurro, please refer to the documentation inside the product box and on the website [www.zcsazzurro.com](http://www.zcsazzurro.com).



THE INVERTER THAT LOOKS AT THE FUTURE

**zcsazzurro.com**



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