



USER'S MANUAL



THREE-PHASE STRING INVERTERS

3PH 20000TL-33000TL-V2



ZUCCHETTI
Centro Sistemi



Grid-connected inverter

3PH 20000TL-33000TL-V2

User Manual



Table of Contents

1.	Preliminary safety instructions	8
1.1.	Safety instructions	8
1.2.	Symbols and icons.....	11
2.	Product features	13
2.1.	Product presentation	13
2.2.	Description of functions	17
2.3.	Module protection.....	20
2.4.	Efficiency and derating curves.....	21
3.	Installation.....	23
3.1.	Installation process	24
3.2.	Checks before installation.....	24
3.3.	Installation tools	26
3.4.	Installation position	28
3.5.	Moving the 3PH 20000TL - 33000TL-V2 inverter	30
3.6.	Installing the 3PH 20000TL - 33000TL-V2 inverter	31
4.	Electrical connections.....	33
4.1.	Electrical connections	34
4.2.	Connecting PNGD cables (grounding)	34
4.3.	Connecting the DC input power cables	36
4.4.	Connecting the AC output power cables.....	42
4.5.	Connecting the communication cables	45
5.	Commissioning the inverter	48
5.1.	Safety inspection before commissioning.....	48
5.2.	Starting the inverter	48
6.	Operating interface	50
6.1.	Operating panel and display	50
6.2.	Main interface	51

6.3.	Main menu.....	54
7.	Troubleshooting and maintenance	71
7.1.	Troubleshooting.....	71
7.2.	Maintenance	79
8.	Uninstalling	80
8.1.	Uninstallation steps.....	80
8.2.	Packaging.....	80
8.3.	Storage	80
8.4.	Disposal	80
9.	Technical specifications	82
10.	Monitoring system.....	83
10.1.	External Wi-Fi adapter.....	83
10.1.1.	Installation	83
10.1.2.	Configuration	84
10.1.3.	Verification.....	93
10.1.4.	Troubleshooting.....	97
10.2.	Ethernet adapter.....	102
10.2.1.	Installation	102
10.2.2.	Verification.....	104
10.2.3.	Troubleshooting.....	106
10.3.	4G adapter	107
10.3.1.	Installation	107
10.3.2.	Verification.....	110
10.4.	Datalogger	113
10.4.1.	Preliminary notes on how to configure the datalogger	113
10.4.2.	Electrical connections and configuration.....	114
10.4.3.	ZSM-DATALOG-04 AND ZSM-DATALOG-10 DEVICES	117
10.4.4.	WI-FI CONFIGURATION.....	117
10.4.5.	Ethernet configuration.....	117
10.4.6.	Checking that the datalogger has been configured correctly	124
10.4.7.	ZSM-RMS001/M200 and ZSM-RMS001/M1000 Devices	127

10.4.7.1.	Mechanical description and Datalogger interface	127
10.4.7.2.	Connecting the Datalogger to the inverters.....	128
10.4.7.3.	Internet connection via Ethernet cable.....	128
10.4.7.4.	Connecting the power supply and battery pack to the Datalogger	128
10.4.7.5.	Connecting the LM2-485 PRO cell irradiance and temperature sensor to the datalogger	129
10.4.8.	Configuring the Datalogger	130
10.4.8.1.	Configuring the Datalogger on the ZCS Azzurro portal.....	133
10.4.8.2.	Network configuration	134
10.4.9.	Local monitoring.....	135
10.4.9.1.	Requirements for installation of local monitoring	135
10.4.9.2.	Features of local monitoring	135
11.	Warranty terms and conditions	136

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.

Copyright statement

Copyright of this manual belongs to Zucchetti Centro Sistemi S.p.A. No part of this manual (including the software, etc.) may be copied, reproduced or distributed in any form or by any means without the permission of Zucchetti Centro Sistemi S.p.A. All rights reserved. ZCS reserves the right to final interpretation. This manual is subject to change based on feedback from users, installers or customers. Please check our website at <http://www.zcsazzurro.com> for the latest version.

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:

3PH 20000TL-V2 / 3PH 25000TL-V2 / 3PH 30000TL-V2 / 3PH 33000TL-V2



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

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

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

Before installing and using the equipment, make sure you read and understand the instructions in this manual and familiarise yourself with the relative safety symbols shown in this chapter.

Depending on national and local requirements, permission must be obtained from your local provider before connecting to the electrical grid, making sure that the connections are carried out by a qualified electrician.

Contact the nearest authorised service centre for any repairs or maintenance. Contact your distributor for information on the nearest authorised service centre. **DO NOT** carry out repairs yourself, as this may result in injury or damage.

Before installing and operating the equipment, the electrical circuit of the strings must be disconnected by opening the string circuit breaker to interrupt the high-voltage DC of the photovoltaic system. Failure to do so could result in serious injury.

Qualified personnel

Ensure that the operator has the necessary skills and training to operate the equipment. Personnel responsible for use and maintenance of the equipment must be qualified and capable of performing the activities described, and must also have appropriate knowledge on how to correctly interpret the contents of this manual. For safety reasons, this inverter can only be installed by a qualified electrician with the necessary training and/or skills and knowledge. Zucchetti Centro Sistemi S.p.A. declines all responsibility for damage to property or personal injury caused by incorrect use of the device.

Installation requirements

Install and start the inverter according to the following instructions. Place the inverter on suitable load-bearing supports with sufficient load capacity (such as walls or photovoltaic racks) and make sure that the inverter is positioned vertically. Choose a suitable location for the installation of the electrical equipment. Make sure there is sufficient space for heat dispersion and to accommodate future maintenance. Maintain adequate ventilation and ensure that there is enough air circulation for cooling.

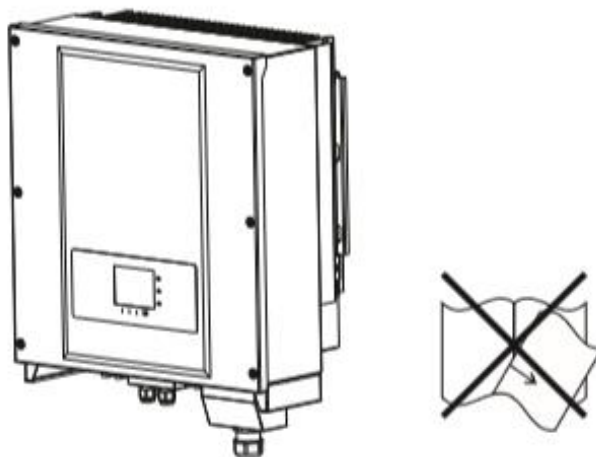



Figure 1 – Do not lose or damage this manual




Transport requirements

If you encounter problems with the packaging, or if you find any visible damage, please notify the transport company immediately. If necessary, request assistance from an installer of photovoltaic systems or from Zucchetti Centro Sistemi SpA. Transport of the equipment, especially by road, must be carried out with vehicles suitable to protect the components (in particular, electronic components) against violent knocks, humidity, vibrations, etc.



Electrical connections

Please pay attention to the electrical regulations on accident prevention when dealing with photovoltaic inverters.



	<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>
<p>Danger</p>	

	<p>All installation operations must be carried out by a professional electrician, who must:</p>
Warning	<ul style="list-style-type: none"> • be prepared. • carefully read this manual and understand its contents.
	<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>
Attention	
	<p>Do not remove the information label or open the inverter.</p>
Note	<p>Otherwise, ZCS will not provide any warranty or maintenance.</p>

Operation




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

Maintenance and repair

	<ul style="list-style-type: none"> • Before carrying out any repairs, disconnect the inverter from the mains network (AC side) and from the photovoltaic system (DC side). • After switching off the AC and DC switches, wait 5 minutes before carrying out any repairs or maintenance on the inverter!
Danger	
	<ul style="list-style-type: none"> • The inverter should start working again after any faults have been fixed. For any repairs, contact your local authorised service centre; • 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.
Attention	







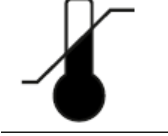

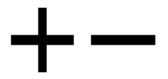
1.2. Symbols and icons

Safety signals

	<p>Pay attention to possible burns due to hot parts.</p>
Caution	<p>Only touch the screen or press the keys while the inverter is in operation.</p>
	<p>The PV strings should be connected to the ground in accordance with the local regulations!</p>
Attention	<p>To ensure the safety of the system and people, the inverter and photovoltaic strings must be securely connected to the ground.</p>
	<p>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!</p>
Warning	

Symbols on the inverter

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

	Residual voltage may be present on the inverter! Before opening the inverter, wait 5 minutes to ensure that the capacitors are 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
	Degree of protection of the equipment according to the IEC 70-1 standard (EN 60529 June 1997).
	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 3PH 20000TL - 33000TL-V2 inverters are indicated in this section.

Description of functions

Describes how the 3PH 20000TL - 33000TL-V2 inverters and their internal operating modules work.

Efficiency curve

Describes the efficiency curves of the inverter.

2.1. Product presentation

Field of use

The 3PH 20000TL - 33000TL-V2 inverters are grid-connected photovoltaic inverters equipped with a dual-channel MPPT, capable of converting the direct current generated by the photovoltaic strings into three-phase sine wave alternating current and feeding the energy to the public electricity grid. An AC circuit breaker (see related chapter) must be used as a disconnecting device and must always be easily accessible.

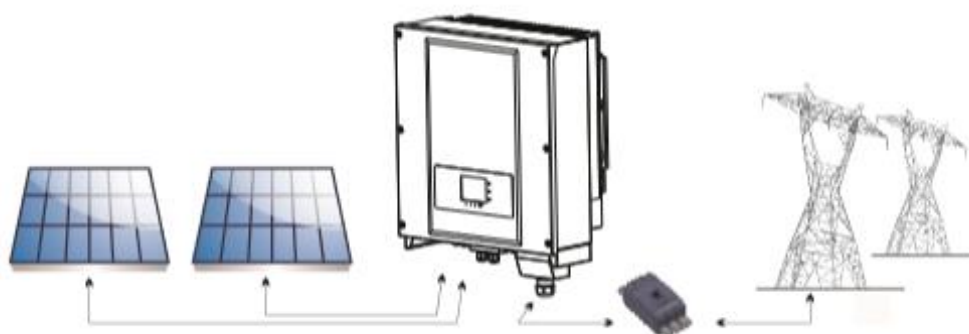


Figure 2 – Grid-connected photovoltaic system

The 3PH 20000TL - 33000TL-V2 inverters can only be used with photovoltaic modules that do not require one of the polarities to be grounded. The operating current and voltage during normal operation must not exceed the limits indicated in the technical specifications. Only photovoltaic modules can be connected to

the input of the inverter (do not connect batteries or other power supply sources). A disconnecting switch must be installed between the inverter and the grid, which must be sized for a maximum current of 63 A.

Intended networks

The 3PH 20000TL - 33000TL-V2 TL inverters are compatible with network configurations TN-S, TN-C, TN-C-S, TT, IT. For the type of TT electrical grid, the voltage between neutral and ground must be less than 30V. The figure below shows the diagrams of the grids just described.

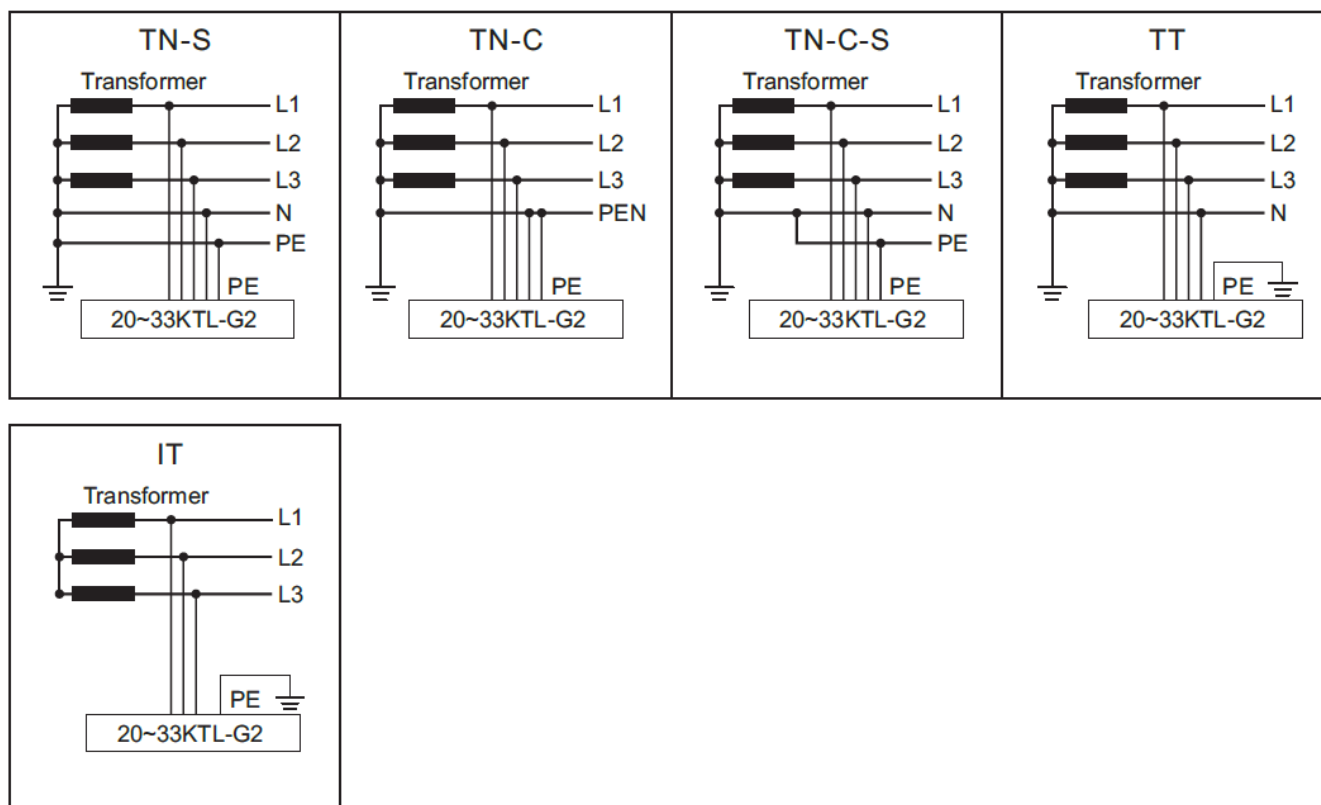


Figure 3 - Wiring diagrams of grid types on which the 3PH 20000TL - 33000TL-V2 inverter can be installed

Inverter components

- Inverter models of the 3PH 20000TL - 33000TL-V2 family are divided into four sizes according to their maximum output power (20 kW, 25 kW, 30 kW, 33 kW).

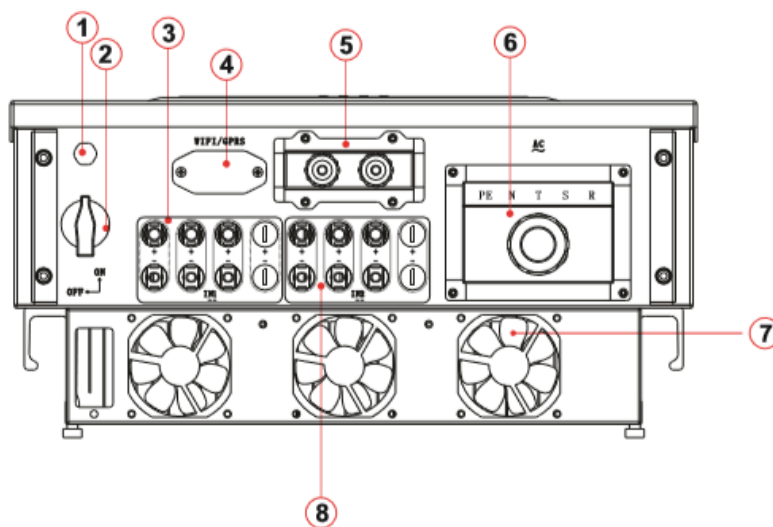


Figure 4 – Bottom view of the inverter

1. Anti-condensation valve
2. DC switch
3. DC positive pole connectors
4. Wi-Fi connector
5. RS485 cable entry
6. AC cable entry
7. Cooling fans
8. DC negative pole connectors

- The inverter model must be chosen by a qualified technician who knows the installation conditions, the devices that will be installed outdoors and the possible integration with existing systems.
- Optional components of the inverter should be chosen by a qualified technician who is familiar with the installation conditions.
- Overall dimensions: H x W x D = 666 mm x 512 mm x 254 mm

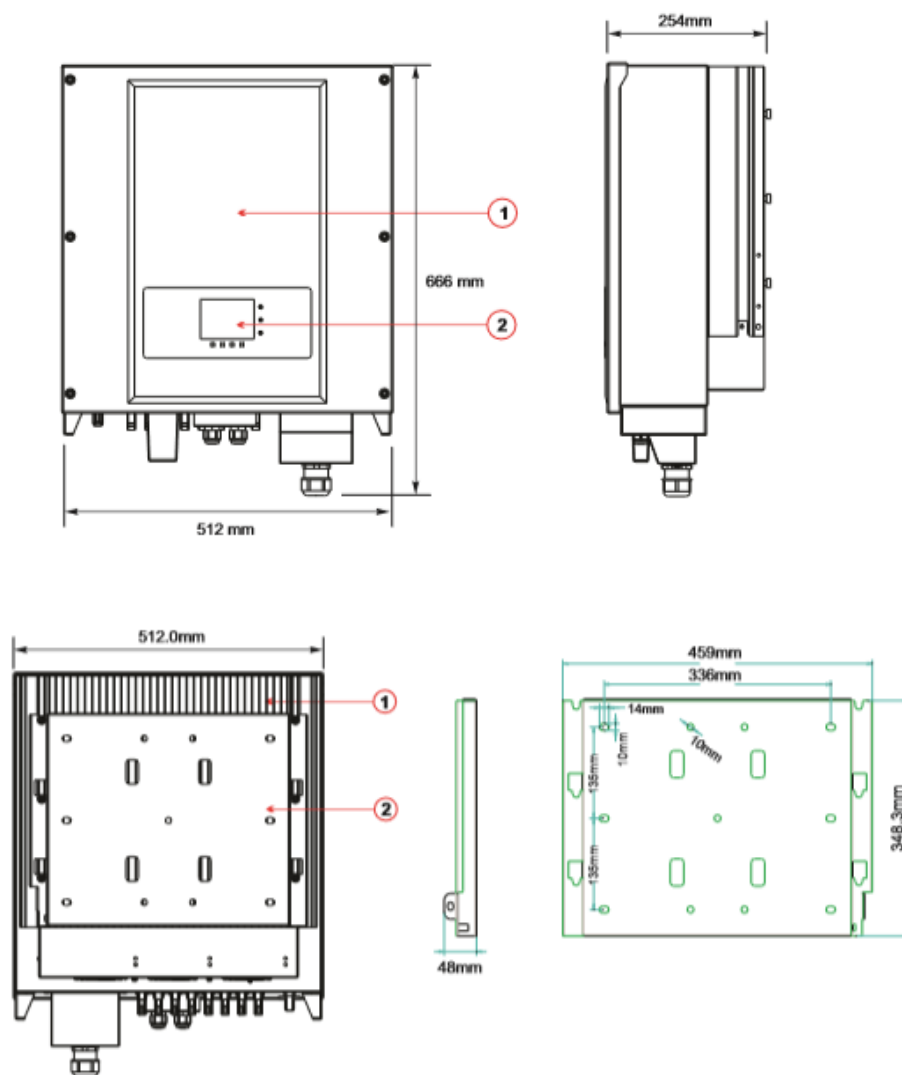
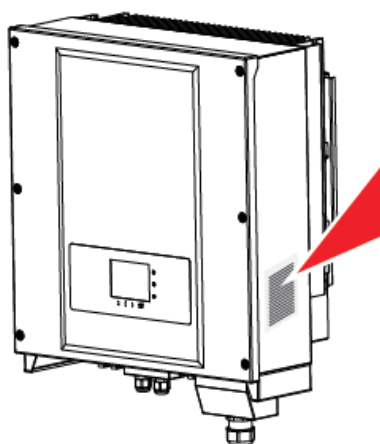






Figure 5 – Front, side and back view of the inverter and bracket



	Solar Grid-tied Inverter
Model No. AZZURRO 3PH 20000LT-2	
Max DC Input Voltage	1100V
Operating MPPT Voltage Range	230-950V
Max. Input Current	24A/24A
Max. PV Isc	30A/30A
Nominal Grid Voltage	3/N/PE 400Vac
Max Output Current	31.32A
Nominal Grid Frequency	50/60Hz
Nominal Output Power	22000VA
Max Output Power	22000VA
Power Factor	>0.99 (adjustable / >0.8)
Ingress Protection	IP69
Operating Temperature Range	-25°C ~ +60°C
Protective Class	Class II
Made in China	
Zucchetti Centro Sistemi SPA Via Lungarno 305/A 52028 Terranova Bracciolini (AR) - Italy	
Manufactured under PRC EUD-21, CEI-18, VDE-AR-N4105, IEC 16069, UL 1741, IECENCSA-1, VDE-AR-N4110, JATC-15, 712-1, VDE0128-1-1	
  	

- The communication board allows the inverter to communicate via RS485 and Wi-Fi (optional); the user can access all operating data via web portal from a PC and via APP.

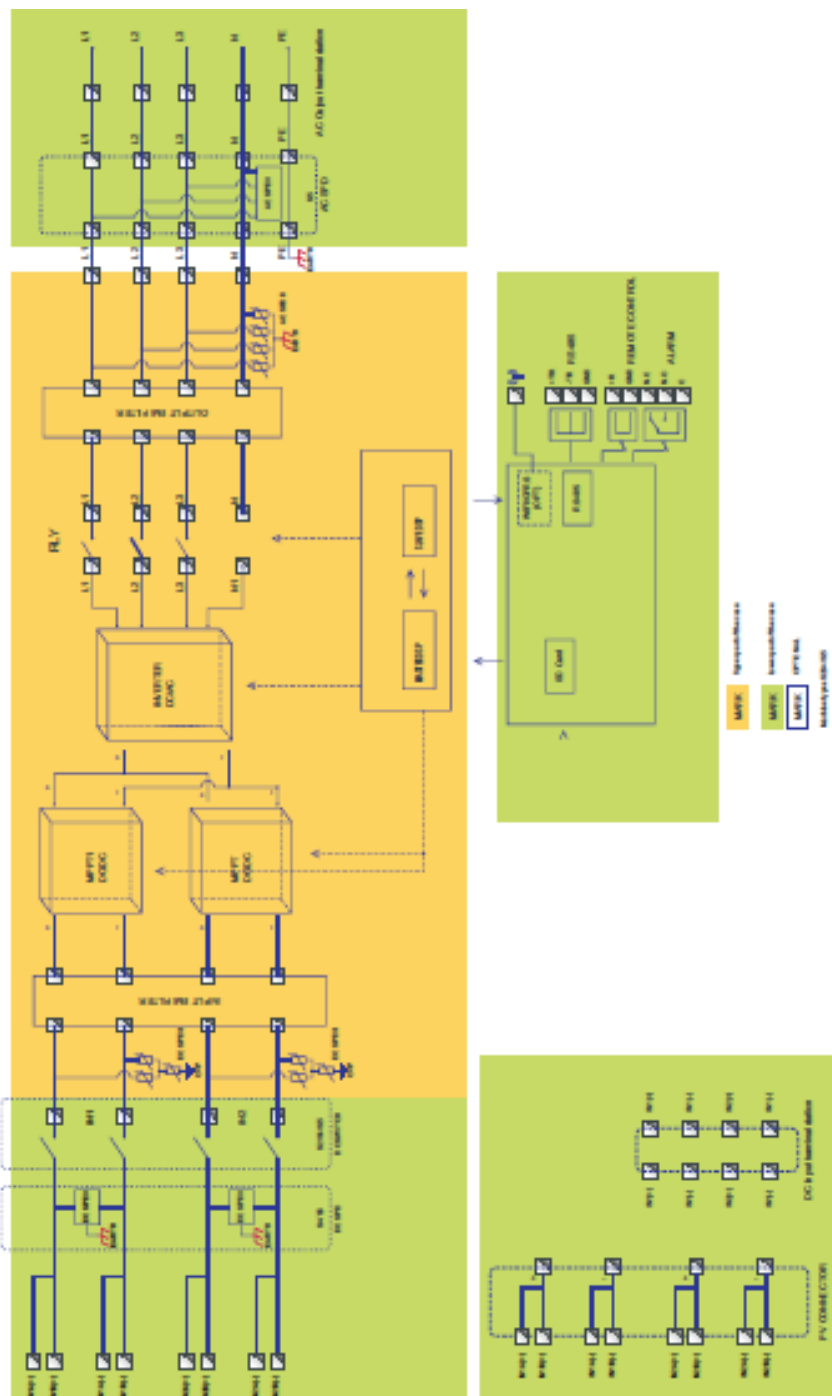


Figure 7 - Block diagram of the 3PH 20000TL - 33000TL-V2 inverters

Inverter functions

A. Configurable relay

The inverter has a configurable switching relay that can be used in various operating conditions (set in the menu). For example, it can close normally open contacts when an alarm occurs.

B. Energy management unit

B.1 Remote power on/off

This control can be used to activate/deactivate the inverter via an external (remote) control.

B.2 Feeding reactive power into the grid

The inverter is capable of generating reactive power and can then feed it into the grid by setting the Power Factor. The feed-in management can be controlled directly by the network operator via a dedicated RS485 serial interface.

B.3 Limiting the active power fed into the grid

If properly set, the inverter can limit the amount of active power fed into the grid at the desired value (expressed as a percentage). To achieve this limitation, it is necessary to use an external device (Anti-Reverse Power Controller) not included with the inverter.

B.4 Automatic power reduction when grid is over frequency

When the grid frequency exceeds the limit set, the inverter reduces the power in order to ensure the stability of the grid.

B.5 Power reduction due to environmental conditions, input and output voltage

The power reduction value and temperature of the inverter at which it occurs depends on the ambient temperature and on many operating parameters, such as: input voltage, grid voltage and power available from the photovoltaic field. The inverter can therefore reduce the power at certain times of the day and depending on the value of these parameters.

C. Data transmission

The inverter (or a group of inverters) can be monitored remotely via an advanced communication system based on a RS485 interface or via Wi-Fi.

D. Software update

A microSD card is used to update the firmware.

2.3. Module protection

A. Anti-islanding

The inverter is equipped with a protection system that automatically shuts down the system during power outages. This is called an “anti-islanding” system. This protects electrical workers when they are trying to repair lines on the grid, in compliance with the applicable national laws and regulations.

B. RCMU

The inverters are equipped with a redundancy on the reading of the ground leakage current, on both the direct and alternating current sides. The ground leakage current is measured simultaneously and independently by two different processors: it is sufficient for one of the two to detect a fault in order to trigger the protection, resulting in separation from the grid and shutdown of the operation.

C. Grid monitoring

Continuous monitoring of the grid voltage to ensure that the voltage and frequency values stay within the operating limits.

D. Internal protection of the inverter device

The inverter has all kinds of internal protections to protect the device and internal components when abnormal situations occur on the grid or DC input line.

E. Ground fault protection

The inverter must be used with photovoltaic modules connected with “floating” connections, i.e. with positive and negative terminals that are not grounded. An advanced ground fault protection circuit continuously monitors the ground connection and disconnects the inverter when a ground fault is detected. The ground fault condition is indicated by a red LED on the front panel.

2.4. Efficiency and derating curves

Efficiency curve for an Azzurro ZCS model belonging to the 3PH 20000TL - 33000TL-V2 family

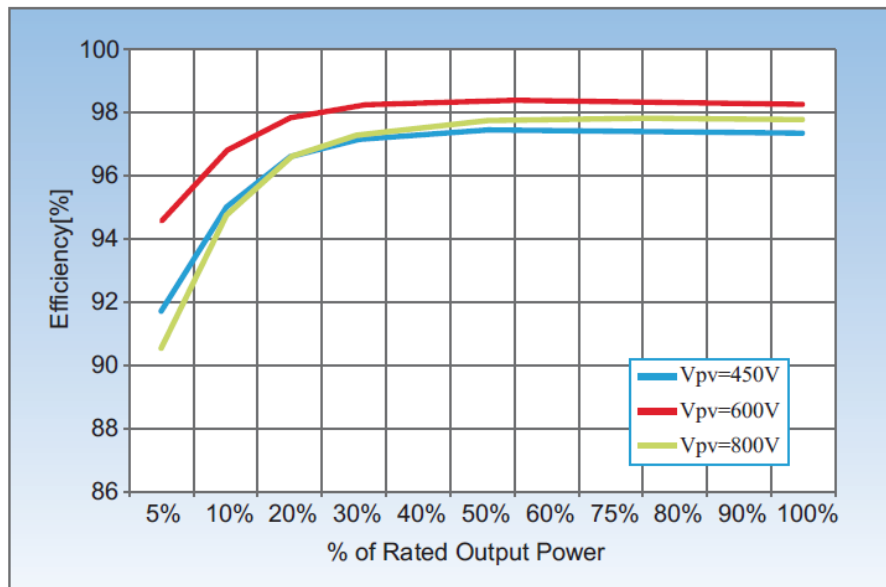


Figure 8 - Efficiency curve for an Azzurro ZCS 3PH 20000TL - 33000TL-V2 inverter

Input voltage derating curve for an Azzurro ZCS 3PH 20000TL - 33000TL-V2 inverter

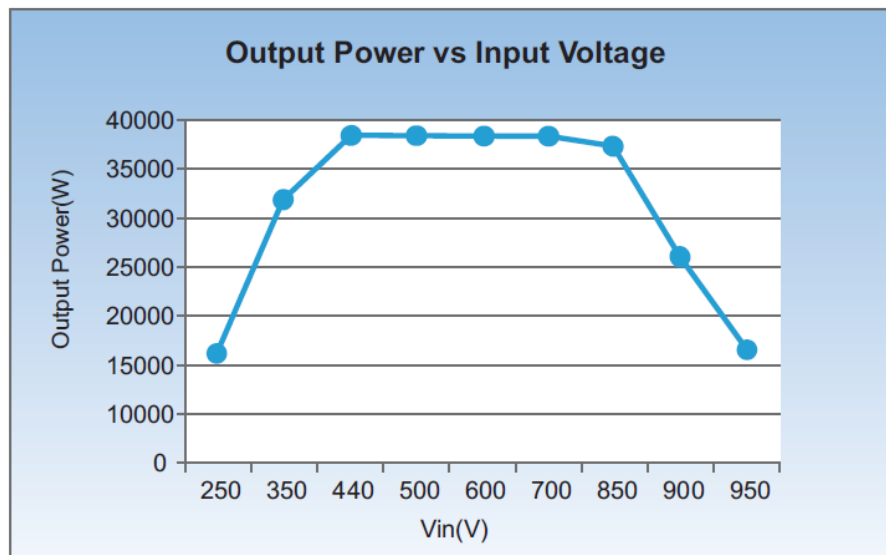


Figure 9 - Input voltage derating curve for an Azzurro ZCS 3PH 20000TL - 33000TL-V2 inverter

Output voltage derating curve for an Azzurro ZCS model belonging to the 3PH 20000TL - 33000TL-V2 family

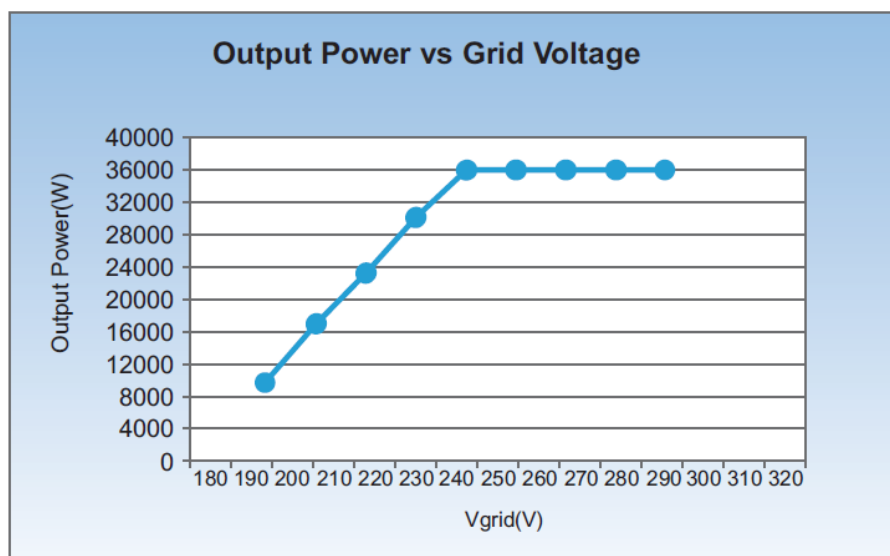





Figure 10 – Output voltage derating curve for an Azzurro ZCS inverter belonging to the 3PH 20000TL - 33000TL-V2 family

3. Installation

General information in this chapter

This chapter describes how to install the 3PH 20000TL- 33000TL-V2 inverter.

Installation notes:

	<ul style="list-style-type: none"> • DO NOT install 3PH 20000TL - 33000TL-V2 inverters near flammable materials. • DO NOT install 3PH 20000TL - 33000TL-V2 inverters in an area where flammable or explosive materials are stored.
Danger	
	<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>
Warning	
	<ul style="list-style-type: none"> • Consider the weight of the inverter when handling and transporting the inverter. • Choose an appropriate mounting position and surface. • Assign at least two people to install the inverter.
Attention	

A. Installation process

This section describes the process for installing the 3PH 20000TL - 33000TL-V2 inverter

B. Checks before installation

This section describes the checks to carry out on the outer packaging, on the inverter and its components

C. Installation tools

This section describes the tools needed to install the inverter and to make the electrical connections

D. Installation position

This section describes the characteristics of the installation site of the inverter

E. Moving the inverter

This section describes how to move the inverter to the installation position

F. Installing the inverter

This section describes the steps for mounting the inverter on the wall

3.1. Installation process



Figure 11 - 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.

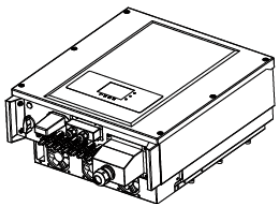
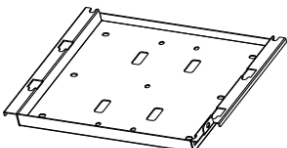
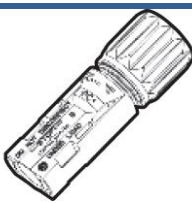

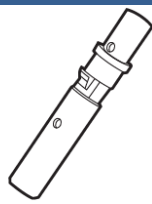
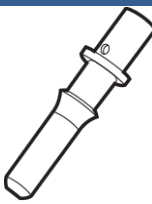
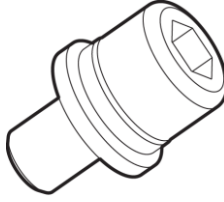
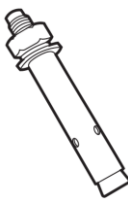




Checking the product

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

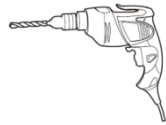
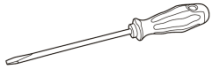
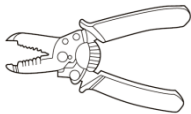


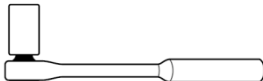
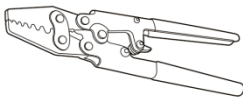

Carefully check the contents of the packaging before installation, making sure that no element inside the packaging is missing or damaged.



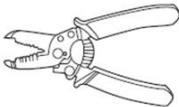
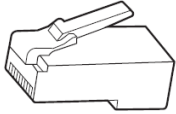

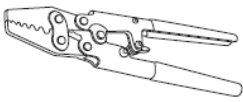
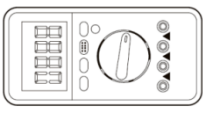

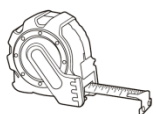
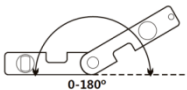
The package should contain the following components:

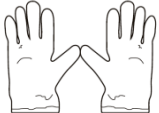


 <p>1 Photovoltaic inverter</p>	 <p>1 mounting bracket</p>	 <p>4 + Input terminals (20kW)</p> <p>6 + Input terminals (25-33 kW)</p>	 <p>4 - Input terminals (20kW)</p> <p>6 - Input terminals (25-33 kW)</p>
 <p>4 metal terminals for + DC power cables (20kW)</p> <p>6 metal terminals for + DC power cables (25-33 kW)</p>	 <p>4 metal terminals for - DC power cables (20kW)</p> <p>6 metal terminals for - DC power cables (25-33 kW)</p>	 <p>2 M6 hexagonal screws</p>	 <p>6 M8x80 screws and expansion plugs</p>
 <p>1 Warranty Registration</p>	 <p>1 user manual</p>	 <p>2 warranty</p>	 <p>1 Outgoing inspection report</p>

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 Recommended drill bit: 8mm	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
5		Adjustable spanner (opening greater than 32 mm)	To tighten the bolts
6		4 mm Allen key 6 mm Allen key	To screw the inverter to the wall-mounting bracket and to open the front cover of the inverter
7		M5 socket wrench	To tighten the bolts
8		RJ45 crimping tool	To crimp the RJ45 connectors for the communication cables
9		Rubber hammer	To insert the expansion plugs into the wall holes

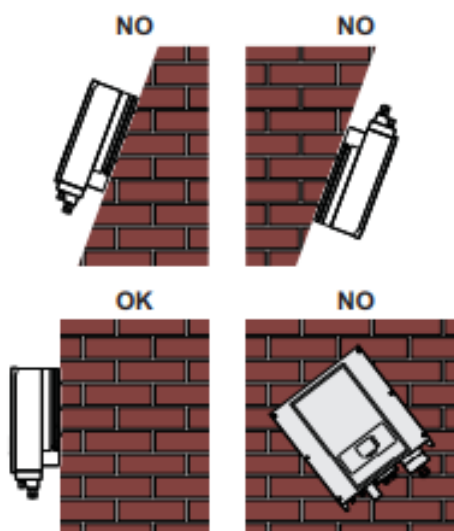
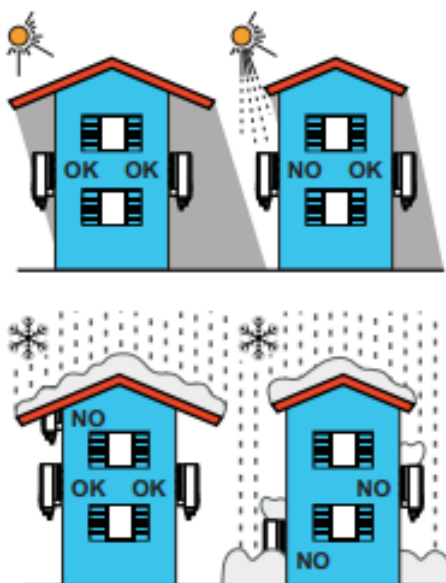
10		MC4 removal tool	To remove the DC connectors from the inverter
11		Diagonal pliers	To cut and tighten the cable ends
12		Wire stripping tool	To remove the outer sheath of the cables
13		RJ45	2 pieces
14		Cable cutter	To cut the power cables
15		Crimping tool	To crimp the power cables
16		Multi-meter	To check the voltage and current values
17		Marker pen	To mark the wall for better fixing precision
18		Measuring tape	To measure distances
19		Level	To make sure the bracket is level

20		ESD gloves	Protective clothing
21		Safety goggles	Protective clothing
22		Protection mask	Protective clothing

3.4. Installation position

Choose an appropriate installation location for the inverter.

Follow the requirements below to determine the installation position.



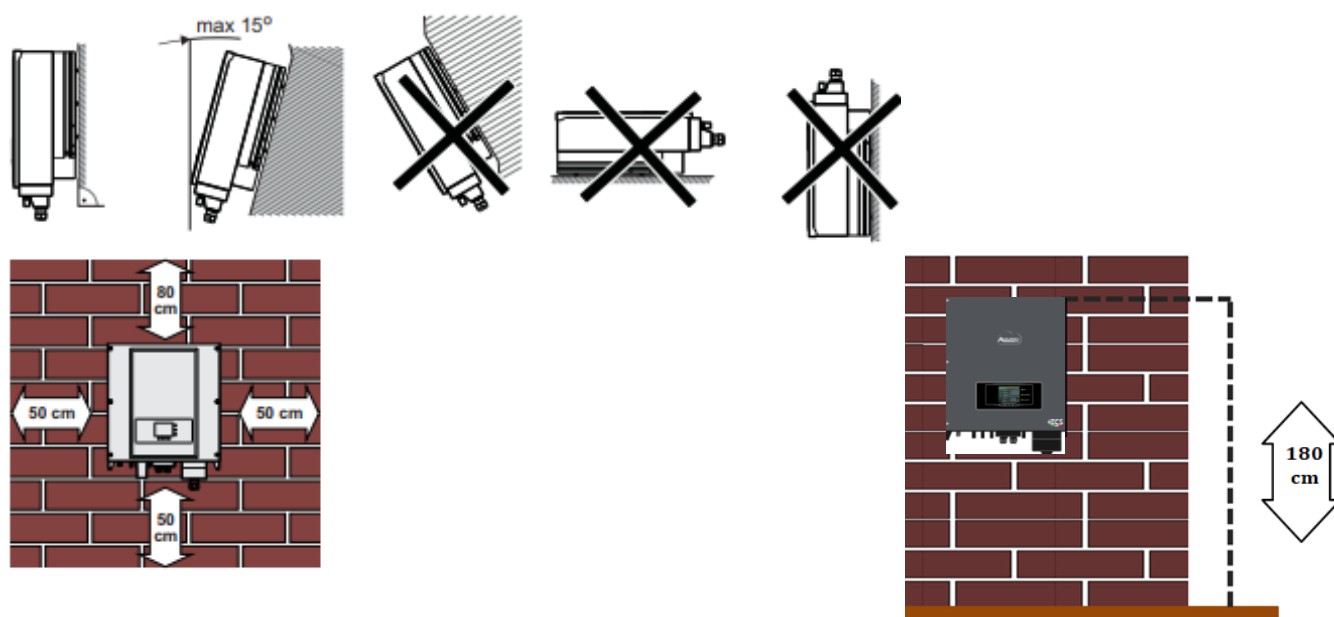


Figure 12 – Requirements for installing a single inverter

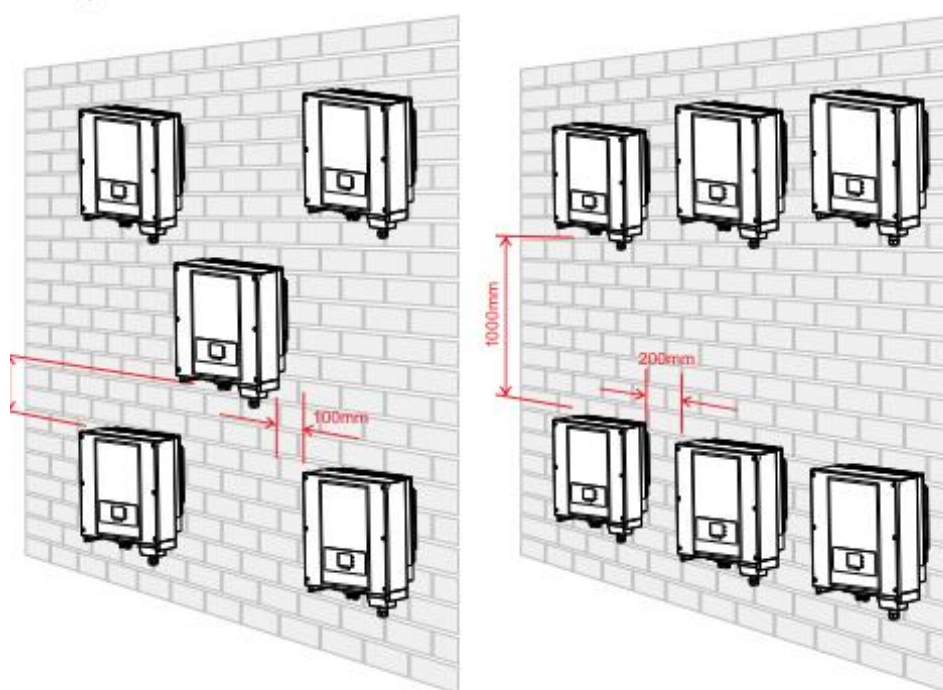


Figure 13 – Requirements for installing multiple inverters

Note: For safety reasons, ZCS 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 3PH 20000TL - 33000TL-V2 inverter

This section describes how to move the inverter correctly

- 1) When opening the packaging, insert your hands into the slots on both sides of the inverter and take a hold of it as shown in Figures below. Two people are needed to carry out this operation in order to ensure the safety of people and the correct handling of the inverter.

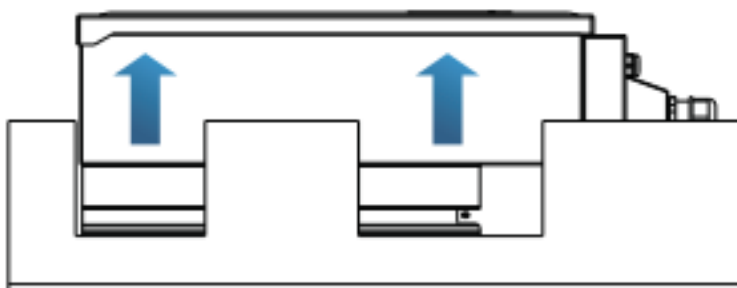


Figure 14 – Removing the polystyrene protections

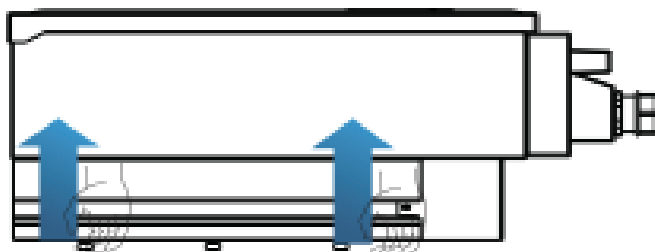


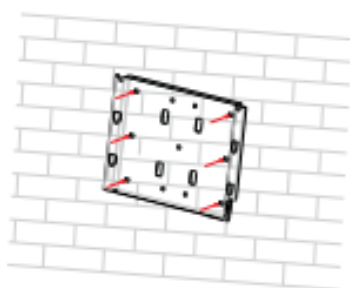
Figure 15 – Removing the inverter from its packaging

2) Lift the inverter from its packing box and move it to the installation position.

<div data-bbox="178 353 272 432" data-label="Image"> </div> <div data-bbox="156 544 293 575" data-label="Text"> <p>Attention</p> </div>	<ul style="list-style-type: none"> • 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 3PH 20000TL - 33000TL-V2 inverter

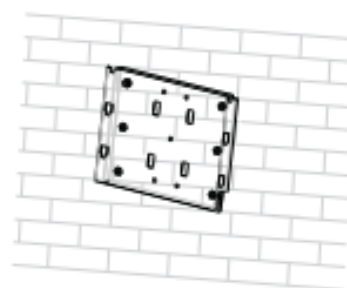
- 1) Correctly position the mounting bracket on the wall using a level to ensure that it is straight; mark the 6 holes using a suitable marker pen. Keeping the hammer drill perpendicular to the wall and avoiding any sudden movements when drilling, drill the 6 holes at the points marked on the wall using a 8 mm drill bit. In case of errors during drilling, it is necessary to reposition the holes.
- 2) Insert the plugs horizontally into the holes made, paying attention to the force and depth with which they are inserted (make sure the plug completely enters 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) Place the inverter on the mounting bracket
- 5) Secure the inverter to the mounting bracket with the M4 bolt to ensure stability.
- 6) (OPTIONAL) Depending on the customer's requirements, the inverter can be locked to the mounting bracket with a safety lock (not supplied with the kit).



Step 1



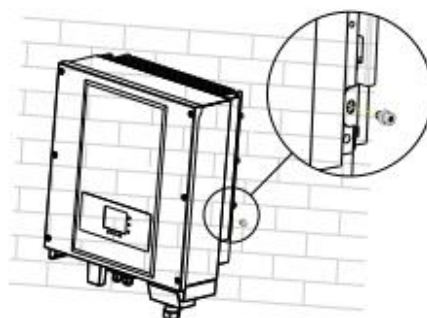
Step 2



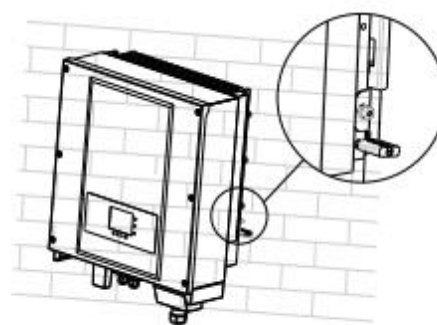
Step 3



Step 4



Step 5



Step 6




Figure 16 - Steps for mounting the inverter on the wall

4. Electrical connections

General information in this chapter

This chapter describes the electrical connections of the 3PH 20000TL – 33000TL-V2 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>
Attention	
	<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>
Danger	
	<p>The maximum open-circuit voltage of the photovoltaic string must be less than 1000 V.</p> <p>The 3PH 20000TL – 33000TL-V2 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>
Note	

Electrical connections

Describes the process for making the electrical connections

Connecting the PNGD cable (grounding)

Describes the connection of the ground cable (PGND) for the ground of the inverter

Connecting the DC input power cables

Describes the connection of the photovoltaic strings to the inverter using the DC power cables.

Connecting the AC output power cables

Describes the connection of the inverter to the AC grid using the AC power cables (following the granting of the grid connection by the distributor).

Connecting the communication cables

Describes the function of the RS485 ports and the Wi-Fi board and the relative connection methods.


4.1. Electrical connections



Figure 17 – Steps for connecting the cables

4.2. Connecting PNGD cables (grounding)

Connect the 3PH 20000TL - 33000TL-V2 inverter to the ground electrode using ground protection cables (PGND).

 Attention	<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>
---	--

Note: Connect the PGND cable before connecting the AC, DC power and communication cables. For systems with one inverter, connect the PGND cable to the ground. For systems with multiple inverters, connect the PGND cables of each inverter to the ground electrode using equipotential connections.

If the installation place is near the ground, connect the PGND cable to the ground before installing the inverter on the wall.

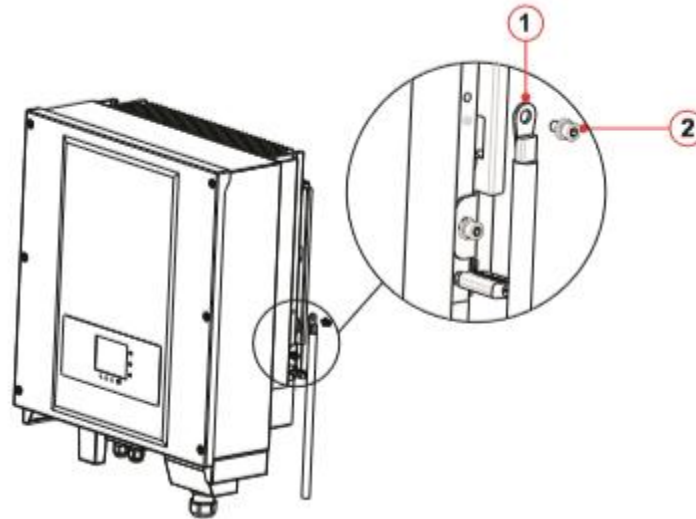


Figure 18 - Connecting the ground terminal

Prerequisites:

Prepare the PGND cables to be connected (outdoor power cables with a cross-section of 8 mm² are recommended for grounding purposes); it is recommended to use yellow-green cables for better identification.

Procedure:

- 1) Remove an adequate length of the external insulation layers using a wire stripper, as shown in Figure below.

Remove an adequate length of the external insulation layers using a wire stripper, as shown in Figure below.

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

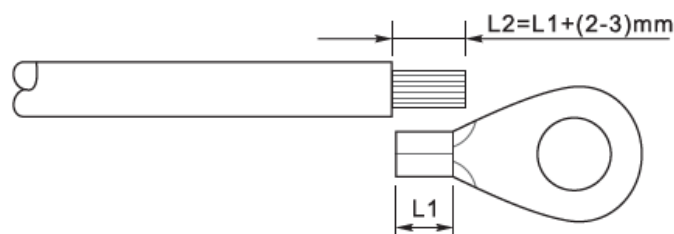


Figure 19 – Preparing the ground cable (1)

- 2) Insert the exposed wires in the OT terminal and crimp them using a crimping tool, as shown in Figure below.

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.

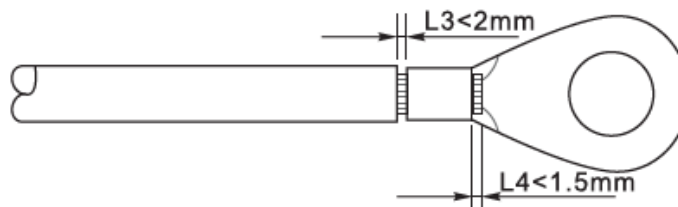


Figure 20 – Preparing the ground cable (2)

- 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.

4.3. Connecting the DC input power cables

Connect the 20-33K TL inverter to the photovoltaic strings using DC input power cables. Select the input mode: the 20-33K TL 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.

Independent mode (default):

If the strings are independent (e.g. installed on two separate flaps), the input model must be set to “independent mode.”

The setting method is described in relative section.

Parallel mode:

If the strings are connected in parallel, the input mode must be set to “parallel mode.”

The setting method is described in relative section.

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.

Model	20000TL-V2	25000TL-V2	30000TL-V2	33000TL-V2
Voltage range per MPPT	230-960 V DC	230-960 V DC	230-960 V DC	230-960 V DC
Maximum input voltage	1000 V DC			





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 21 – Y-branch connection cable for solar panels

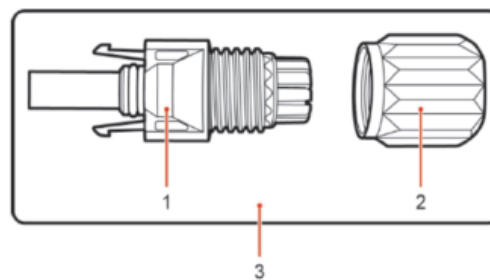
	<ul style="list-style-type: none"> • Check the polarity of the PV string to ensure the correct connection of the cables to the string.
Note	<ul style="list-style-type: none"> • Do not connect the positive or negative polarities of the PV string to the ground.
	<p>Make sure that the following information is observed. Otherwise, there is a risk of fire.</p> <ul style="list-style-type: none"> • The modules connected in series in each string must have the same brand and model. • The open-circuit voltage for each string must be less than or equal to 1000 V DC. • The short circuit current for each input must be less than or equal to 12 A DC
Attention	<ul style="list-style-type: none"> • The output power for each PV string must be less than or equal to the maximum input power allowable for 3PH 20000TL - 33000TL-V2 inverters. • The positive and negative terminals of the PV strings must be connected respectively to the positive and negative inputs of the input terminal block.
	<ul style="list-style-type: none"> • 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! • 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.
	<ul style="list-style-type: none"> • If the 3PH 20000TL - 33000TL-V2 inverter is connected directly to the grid, make sure that the PV strings are not grounded. • 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. • 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, with reference to related chapter "Insulation Resistance." In the event of grounding of the string, if an isolation transformer is not installed, the inverter will be damaged.
Note	

Context

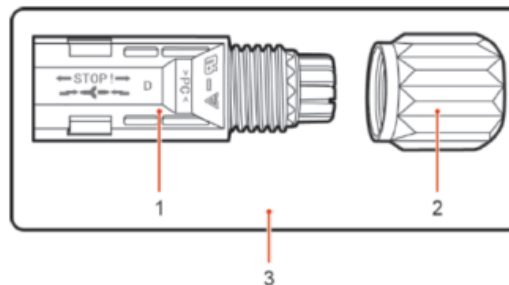
Cross section (mm ² / AWG)		Outer diameter of cable (mm)
Range	Recommended value	
4.0-6.0 / 11-9	4.0 / 11	4.5 - 7.8

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.



1. Housing 2. Cable gland 3. Positive connector



1. Housing 2. Cable gland 3. Negative connector

Figure 22 – 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.

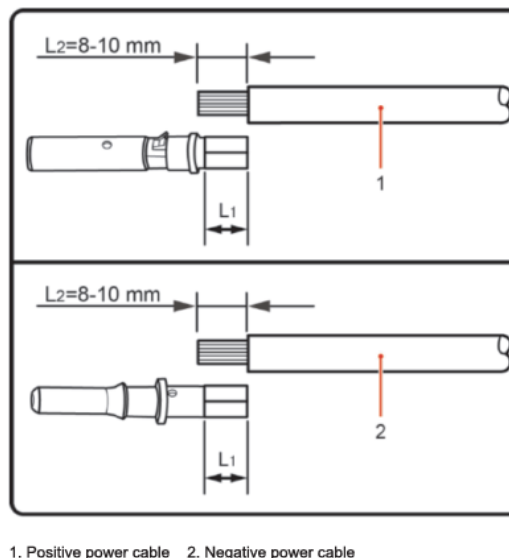


Figure 23 – Connecting the DC input power cables (1)

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, as shown in Figure below.

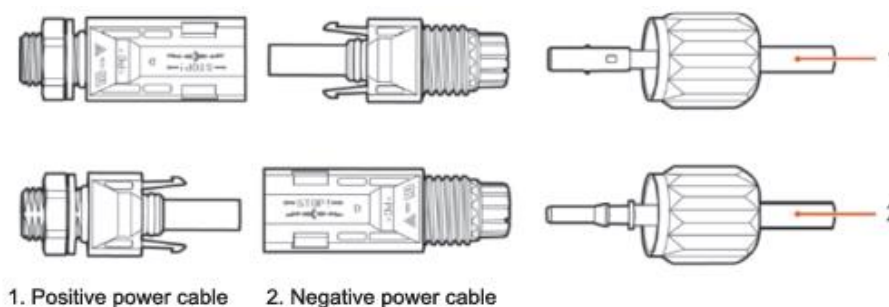


Figure 24 - Connecting the DC input power cables (2)

- 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.

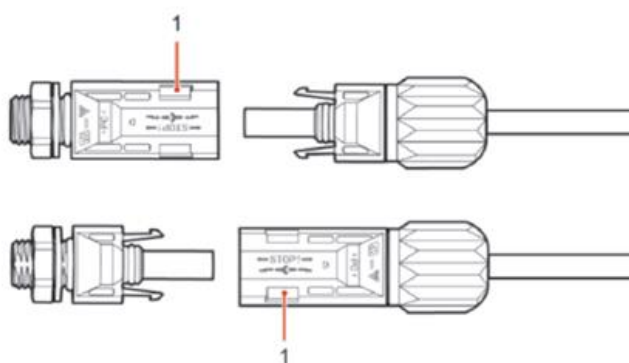



Figure 25 - Connecting the DC input power cables (3)

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>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</p>
<p>Warning</p>	

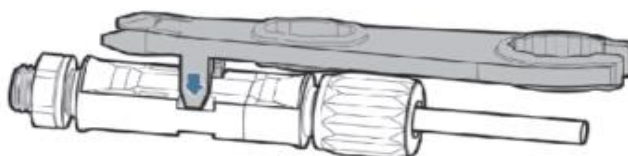



Figure 26 – Removing the DC connector

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"> • Do not use the same AC circuit breaker for multiple inverters. • Do not install loads between the inverter and the AC circuit breaker. • The switch used as a disconnection device should always be operational and ready to operate. • 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)
Warning	

Context

All the AC power cables used for the inverter must be 5-pole outdoor cables. For easier installation, use flexible cables. The table lists the recommended specifications for cables and circuit breakers.

Type	20000TL-V2	25000TL-V2	30000TL-V2	33000TL-V2
Cable (mm ²)	>10	>10	>12	>12
Switch	45A	50A	63A	63A

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.

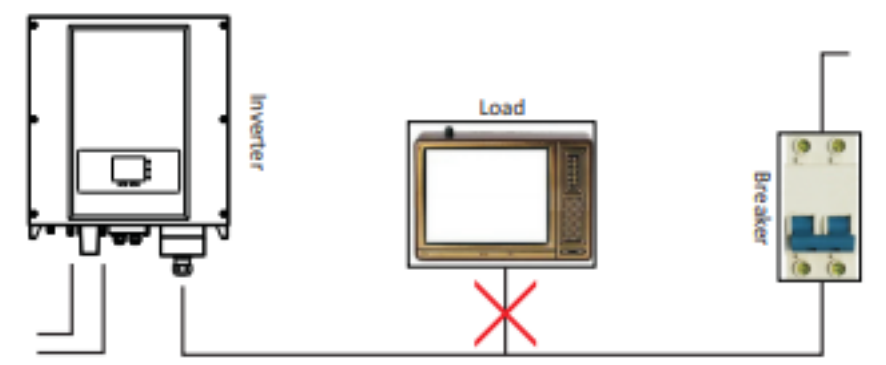
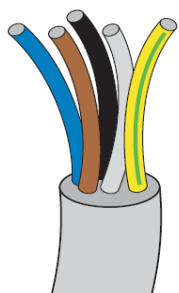


Figure 27 – Do not connect loads between the inverter and circuit breaker

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 150 metres.

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

Cross section of cable (mm ² / AWG)	Maximum length (m)			
	20000TL-V2	25000TL-V2	30000TL-V2	33000TL-V2
10 / 7	34	34	27	27

The 3PH 20000TL - 33000TL-V2 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 IP66 protection suitable for photovoltaic use; customers must provide their own AC output cable connections.

Cable connection procedure

- 1) Open the front cover on the bottom of the inverter by removing the four star screws.

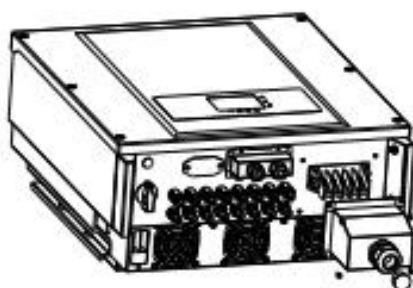


Figure 28 - Connecting the AC output cables (1)

- 2) Identify the suitable cable section as shown in the table and remove an appropriate length of the protective sheath, as shown in the figure. Then insert the AC output cable through the waterproof cable gland.

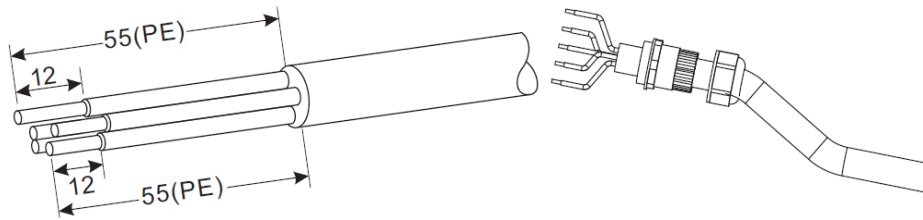


Figure 29 - Connecting the AC output cables (2)

3) Connect the AC power cable according to the following criteria and as shown in the figure:

- Connect the yellow-green (ground) cable to the terminal labelled "PE", tighten the wire using a screwdriver;
- Connect the phase R cable to the terminal labelled "R", tighten the wire using a screwdriver;
- Connect the phase S cable to the terminal labelled "S", tighten the wire using a screwdriver;
- Connect the phase T cable to the terminal labelled "T", tighten the wire using a screwdriver;
- Connect the blue (neutral) cable to the terminal labelled "N", tighten the wire using a screwdriver.

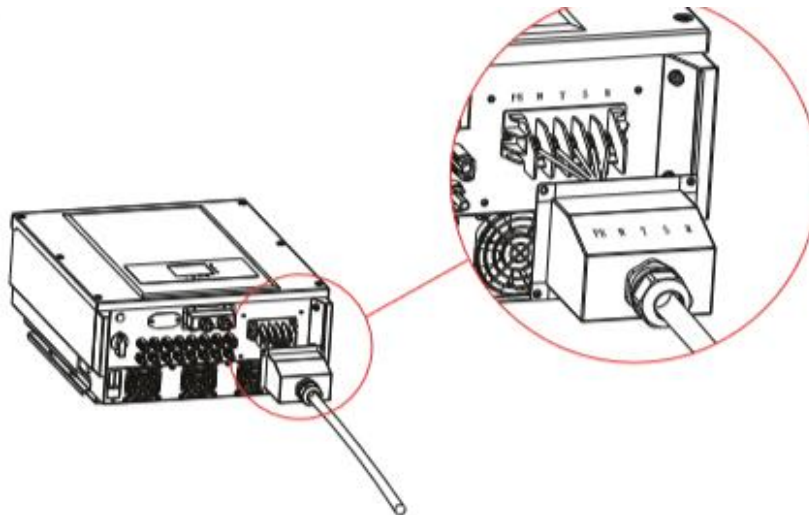


Figure 30 - Connecting the AC output cables (3)

4) Secure the clamping cable gland by turning it clockwise; make sure that all the wires are securely connected

4.5. Connecting the communication cables

The 3PH 20000TL - 33000TL-V2 inverters have two communication interfaces, the RS485 interface and Wi-Fi interface, as shown in the figure below.

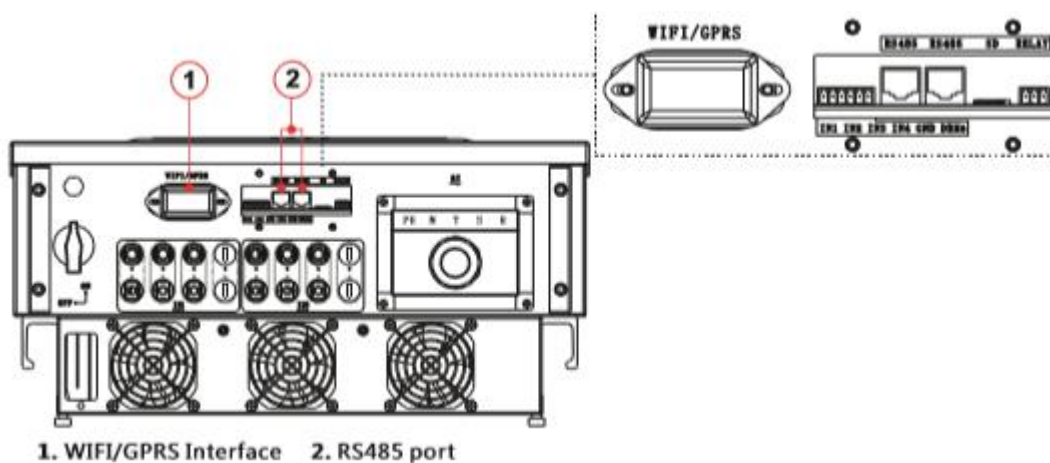


Figure 31 – Bottom view of the 3PH 20000TL - 33000TL-V2 inverter

Connecting the RS485 communication cables

When using the RS485 communication line, the inverter must be connected to the communication equipment (for example, to a data acquisition device or PC terminal).

For communication via the RS485 line, it is recommended to use AWG 24 shielded outdoor network cables with an internal resistance of less than or equal to 1.5 ohm/10m and external diameter between 4.5 mm and 7.5 mm.

The RJ45 waterproof connector is made up of six parts: plug, screw nut, seals, housing, sealing plug and cable screw nut, as shown in the figure below.

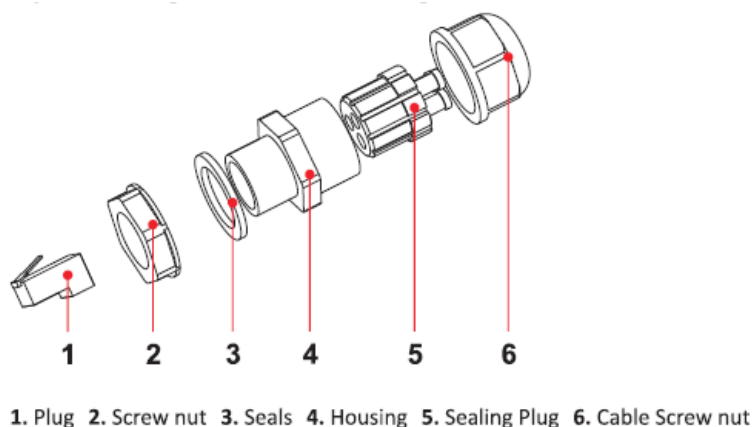
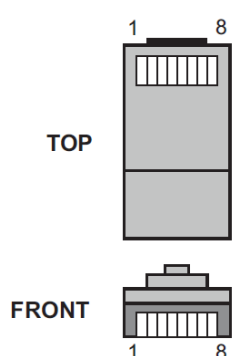


Figure 32 – Connector for communication via 485 port

When passing the communication cables, make sure that they are separated from the power cables and away from sources of interference, so as to prevent any interruptions in the communication.

Procedure

- 1) Remove an appropriate length of the outer insulation layer of the shielded network cable using a wire stripper.
- 2) Open the front cover located on the bottom of the inverter and insert the network cable into the cable gland, passing it through the external tightening nut, the seal and internal tightening nut.
- 3) Connect the stripped network cable to the respective pins on the plug, as shown below.



Number	Colour	Function
1	White and orange	RS485 B
2	Orange	RS485 A
3	White and green	RS485 A
4	Blue	RS485 A
5	White and blue	RS485 B
6	Green	RS485 B
7	White and brown	NC
8	Brown	NC

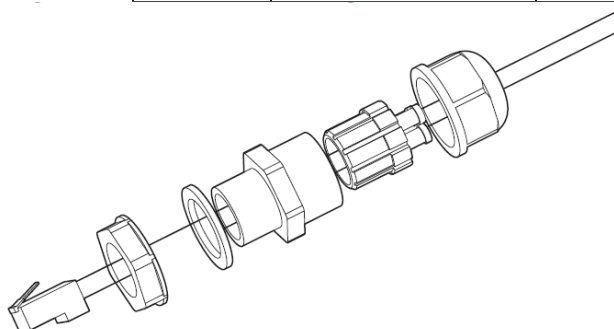


Figure 33 – Assembling the communication connector

- 4) Crimp the plug using the RJ45 crimping tool.
- 5) Insert the plug into the RS485 port on the inverter.

- 6) Insert the cable seal in the lodging and tighten the nut.

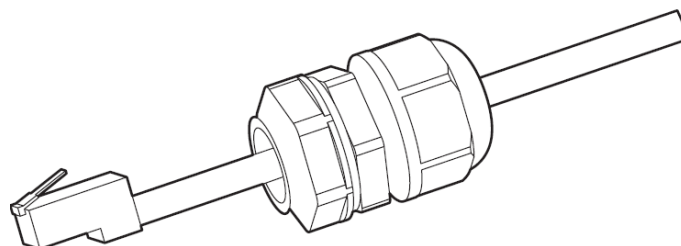



Figure 34 – Assembling the communication connector

Removal procedure

Remove the RJ45 connector from the inverter by removing the plug. Then press the clip on the RJ45 connector and pull out the RJ45 connector.

5. Commissioning the inverter

5.1. Safety inspection before commissioning

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

- **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 960 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 (refer to related chapter of this manual).

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 related 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 3PH 20000TL - 33000TL-V2 inverters.

6.1. Operating panel and display

Buttons and LED indicators

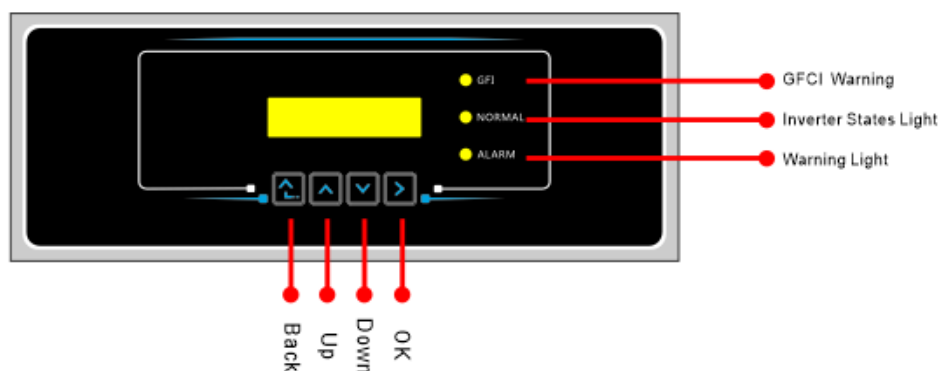


Figure 35 - LCD display with buttons and LED indicators

Main buttons:

- Menu/Back: to go back or enter the main menu.
- Up: to go up or increase the value by 1.
- Down: to go down or decrease the value by 1.
- OK/Enter: to confirm the selection and enter the menus

Indicator lights:

- Status light (GREEN)
 - Flashing: wait or status check
 - Steady: normal operation
 - Off: temporary or permanent error
- Warning light (RED)
 - Flashing: fan error
 - Steady: temporary or permanent error

- Off: normal operation
- GFCI automatic differential circuit breaker indicating light (RED)
 - Steady: GFCI fault indication (ID12: automatic differential circuit breaker fault or ID20: device fault).
 - Off: GFCI in operation (automatic differential circuit breaker) normal

6.2. Main interface

The main LCD interface is used to display the statuses of the inverter, information, configuration of parameters, etc.

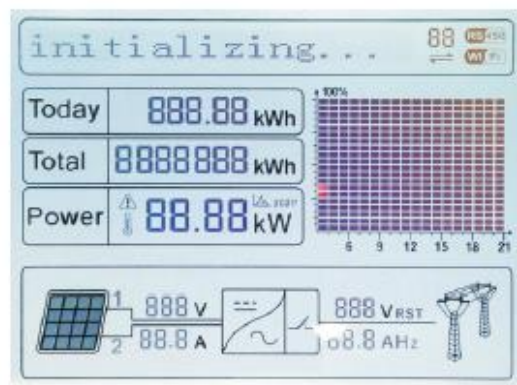


Figure 36 – Main interface of the LCD display

The LCD screen displays the power output of the inverter, the input information coming from the PV system, information relating to errors, etc.

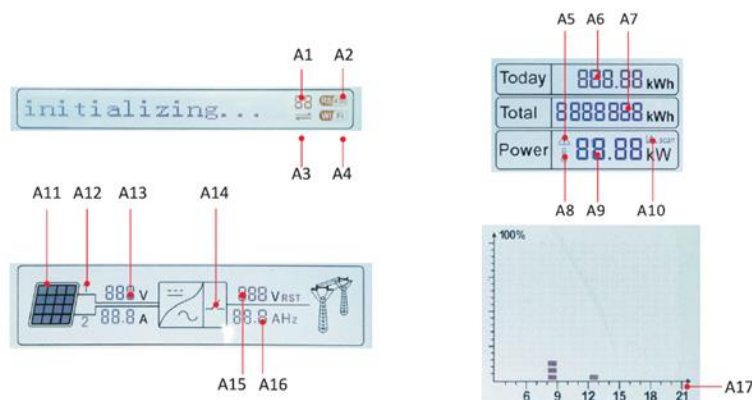


Figure 37 – Indicators in the main interface

A1 – Modbus communication address

A2 – RS485 Communication

A3 – Steady light for active RS485 communication

A4 – Wi-Fi Communication

A5 – Flashing light to indicate over-frequency and power derating status. Steady light to indicate remote control

A6 – Indicates the energy produced today

A7 – Indicates the energy produced in total

A8 – Steady light to indicate high temperature of the inverter

A9 – Output power in real time

A10 - The MPPT SCAN function is on

A11 – Steady light when the input voltage is higher than 160V

A12 – Input channel and input voltage in real time

A13 – Input voltage and current of string 1 and 2, shown alternatively every three seconds


A14 – Light is on when the state is normal

A15 - R/S/T phase voltage, shown alternatively every three seconds

A16 – R/S/T phase current and frequency, shown alternatively every three seconds

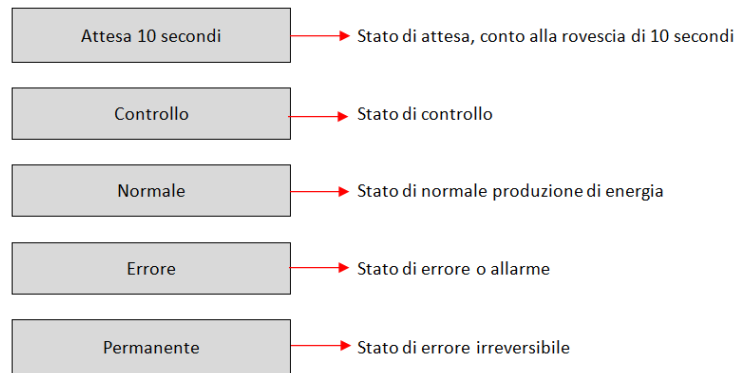
A17 – Energy produced from 3:00am to 9:00pm of the same day

When the power is turned on, ZCS INNOVATION.... appears on the screen, as shown in the figure below



ZCS INNOVATION...

when the control board is correctly connected to the communication board, the LCD screen will display the current status of the inverter, as shown in the figure below.



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.

Control: 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.

Error: the inverter has encountered a non-permanent error. If the error disappears on its own, the inverter will return to its normal state. If the error continues, please check the error code.

Permanent: the inverter has encountered a permanent error. The installer must debug this type of error according to the code found in order to bring the inverter back to its proper functioning. If the control board and communication board are not connected, the interface of the LCD display appears as shown in the figure below.

Errore comunicazione DSP

6.3. Main menu

Press the “Menu/Back” button in the main interface screen to enter the main menu, which will appear as follows:

Normale	→ Tasto Menu/Indietro
1. Impostazioni	
2. Lista Eventi	
3. Info Sistema	
4. Orario	
5. Aggiornam SW	

(A) Press the “OK” key to enter the “Settings” menu.

The “Settings” menu contains the following sub-menu:

1. Impostazioni		
1. Data e Ora	14. HZ Sicurezza	
2. Azzerà Energia	15. Isolamento	
3. Elimina Eventi	16. Test Relay	
4. Imposta Paese	17. Imp Reattiva	
5. Contr On-Off	18. Derating P(W)	
6. Comando Relay	19. Contr PE Line	
7. Abilita Paese	20. Contr P(rete)	
8. Imposta Energia	21. Scans.MPPT	
9. Indiriz Modubs	22. Imposta P(f)	
10. Imposta MPPT	23. Imposta Q(v)	
11. Lingua	24. Control 81.S1	
12. Parametrilniz	25. Autotest Fast	
13. 13. V Sicurezza	26. Autotest STD	

- **Date and time**

Select "1. Date and time" and press "OK" to enter the menu for setting the date/time. First set the date and then the time using the "Up" and "Down" keys, then press "OK" to move to the next character and confirm. The date and time are expressed in the format: 20YY - MM - DD HH:MM:SS. The display will show "OK" if the setting is correct and "Error" in case of an error. The date and time are visible in the submenu "4. Time" in the main menu.

- **Clear Energy**

Select "2. Clear Production" and press "OK" to enter the menu for deleting the energy data and in particular the energy production daily and in total, which is shown in the main interface. Press "OK" to start the procedure; the display will show "Enter PWD!", press "OK" to enter the password. Enter the password "0001" using the "Up" and "Down" keys to select the digit and "OK" to move to the next one, and confirm. If the display shows "Incorrect, try again!" press the "Back" key and enter the password again. When the password entered is correct, the inverter will delete the data relating to the energy produced and the display will show "OK" if the setting is successful.

- **Clear Events**

Select "3. Clear events" and press "OK" to enter the menu for clearing historical events, i.e. to clear all error warnings present in the "List of historical events" submenu. Press "OK" to start the procedure; the display will show "OK" if the procedure is successful.

- **Set Country**

Select "4. Set Country" and press "OK" to enter the menu for setting the national grid connection regulations. If "Setting disabled" appears, go to point "6. Enable Country" to enable this function. After enabling the function, repeat the steps described above and set the code for the desired country using the "Up" and "Down" keys, confirming with "OK"; the display will show "OK" if the operation is successful. The current country code can be checked from the "System Info" menu.

Note: The change of the country code will take effect after the next start-up of the inverter.

For more information and to know the country regulations on board the inverter, refer to the following table.

Code	Country
00	Germany VDE AR-N4105
01	CEI 0-21 Internal
02	Australia
03	Spain RD1699
04	Turkey
05	Denmark

Code	Country
12	Poland
13	Germany BDEW
14	Germany VDE 0126
15	Italy CEI 0-16
16	UK-G83
17	Greece - islands

Code	Country
24	Cyprus
25	India
26	Philippines
27	New Zealand
28	Brazil
29	Slovakia VSD

06	Greece - mainland
07	Netherlands
08	Belgium
09	UK-G59
10	China
11	France

18	EUEN50438
19	IEC EN61727
20	Korea
21	Sweden
22	General Europe
23	CEI 0-21 External

30	Slovakia SSE
31	Slovakia ZSD
32	CEI 0-21 Areti
33-49	Reserved

Table 3 – Country Codes

- **Contr On-Off**

Select “5. Contr On-Off” and press “OK” to enter the menu for setting the remote control switch. The display will show “Enter PWD!” Press “OK” to enter the password “0001” using the “Up” and “Down” keys to select the number and “OK” to move to the next digit. If the display shows “Incorrect, try again!” press the “Back” key and enter the password again. When the password has been entered correctly, you can enter the menu. Use the “Up” and “Down” keys to select the “1.Enable” or “2.Disable” option and select it with the “OK” key. If the “Enable” option is selected, you will then need to indicate how many days you want to keep the inverter switched off using the Up and Down keys, and confirming with OK. After setting the “Enable” option, contact the installer to obtain the password for restarting the inverter.

- **Relay command**

Select “6. Relay Command” and press “OK” to enter the menu for setting the relay command. Use the “Up” and “Down” keys to select the respective configuration items, as shown below. Press “OK” to select them. If the setting is successful, “OK” will be displayed; otherwise, “Error” will be displayed.

6. Relay command	
	1. Production
	2. Alarm
	3. ConfigAlarm
	4. Disab Relay

Below is a detailed definition of the configurations that can be set:

Production	<p>The relay changes over whenever it detects a connection to (or disconnection from) the grid.</p> <p>If the relay contact is normally open (or closed), the relay will remain open (or closed) until the inverter is connected to the grid; when the inverter connects to the grid and starts feeding power, the relay changes over and then closes (or opens).</p> <p>When the inverter disconnects from the grid, the relay contact returns to its standard position, i.e. open (or closed).</p>
Alarm	<p>The relay switches over whenever there is an alarm on the inverter (Error). No changeover occurs in the event of a temporary alarm.</p> <p>If the relay contact is normally open (or closed), the relay remains open (or closed) until the inverter detects an error; if the inverter detects an error, the relay changes state and therefore closes (or opens). The contact remains active with respect to its standard condition until normal operation is restored.</p>
Alarm configuration	<p>The relay switches over when it records an alarm (Error) or temporary warning which was previously selected by the user via the PC. The contact remains open (or closed) until the inverter detects an error or warning other than those selected in the menu; when the inverter displays an error or warning other than those selected, it changes state and, therefore, closes (or opens). The relay remains active with respect to its standby condition until the alarm or warning disappears.</p>
Disabling the relay	<p>The control function is not permitted.</p>

- **Enable country**

Select "7. Enable country" and press "OK" to enter the menu for enabling the selection of the country code. The display will show "Enter PWD!", press "OK" to enter the password. Enter the password "0001" using the "Up" and "Down" keys to select the number and "OK" to move to the next one, and confirm. If the display shows "Incorrect, try again!" press the "Back" key and enter the password again. When the password entered is correct, you can enter the menu.

This operation must be carried out if you want to change the Country code and it has not been changed during the last 24 hours of operation of the inverter.

- **Set Energy**

Select "8. SetEnergy" and press "OK" to enter the menu for setting the energy already produced by the photovoltaic system. The display will show "Enter PWD!" Press "OK" to enter the password "0001" using the "Up" and "Down" keys to select the number and "OK" to move to the next digit. If the display shows "Incorrect, try again!" press the "Menu/Back" key and enter the password again. When the password has been entered correctly, you can enter the menu. You can now set the amount of energy already produced by the system before installing the current inverter, which is visible from the main interface.

- **Modbus address**

Select “9. ModBusAddress” and press “OK” to enter the menu for selecting the communication address. Use the “Up” and “Down” keys to select the number and “OK” to move to the next one, and confirm. After setting the address, press “OK.”

The Modbus 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 MPPT**

Selection of the input mode: 3PH 20000TL - 33000TL-V2 inverters are equipped with two MPPTs, which can operate independently or in parallel, depending on the requirements of the system in which they are installed. The input mode can be set by the user via the LCD display.

Select “10. MPPT” and press “OK” to enter the menu for setting the input mode. Press the “Up” and “Down” keys to change the input mode between “1. Parallel” and “2. Independent,” then press “OK” to confirm. If the setting is successful, “OK” will be displayed; otherwise, “Error” will be displayed.

- **Language**

Select “11. Language” and press “OK” to enter the menu for selecting the language. Select the language using the “Up” and “Down” keys; then press “OK” to confirm. If the operation is successful, “OK” will be displayed; otherwise, “Error” will be displayed.

A faster way to change the language is to press the “Menu/Back” key and the “OK” key at the same time. In the current firmware version (V1.60), the languages available are: Chinese, English, Italian, German, French, Ukraine, Slovakia and Portuguese; future firmware updates may add new languages.

- **Initial parameters**

The user can change the start parameters directly from the LCD display. The user must first copy the TXT files to the SD card. These files can be requested from ZCS technical support.

Select “12. InitParameters” and press “OK” to enter the menu for setting the start parameters. The display will show “Enter PWD!”, press “OK” to enter the password. Enter the password “0001” using the “Up” and “Down” keys to select the digit and “OK” to move to the next one, and confirm. If the display shows “Incorrect, try again!” press the “Back” key and enter the password again. When the password entered is correct, you can enter the menu. The new start parameters will now be loaded onto the inverter automatically.

If the setting is successful, “OK” will be displayed; otherwise, “Error” will be displayed.

Attention: do not enter this menu if the microSD card is not inserted in the appropriate slot of the inverter or if the correct TXT files have not been copied to it.

- **Safety Voltage**

The user can change the value of the protection voltage directly from the LCD display. The user must first copy the TXT files to the SD card. These files can be requested from ZCS technical support.

Select “13. Safety V” and press “OK” to enter the menu for setting the protection voltage. The display will

show “Enter PWD!”, press “OK” to enter the password. Enter the password “0001” using the “Up” and “Down” keys to select the digit and “OK” to move to the next one, and confirm. If the display shows “Incorrect, try again!” press the “Back” key and enter the password again. When the password entered is correct, you can enter the menu. The new protection voltage will now be loaded on the inverter automatically.

If the setting is successful, “OK” will be displayed; otherwise, “Error” will be displayed.

Attention: do not enter this menu if the microSD card is not inserted in the appropriate slot of the inverter or if the correct TXT files have not been copied to it.

- **Safety Hz**

The user can change the value of the protection frequency directly from the LCD display. The user must first copy the TXT files to the SD card. These files can be requested from ZCS technical support.

Select “14. Safety Hz” and press “OK” to enter the menu for setting the protection frequency. The display will show “Enter PWD!”, press “OK” to enter the password. Enter the password “0001” using the “Up” and “Down” keys to select the digit and “OK” to move to the next one, and confirm. If the display shows “Incorrect, try again!” press the “Back” key and enter the password again. When the password entered is correct, you can enter the menu. The new protection frequency will now be loaded on the inverter automatically.

If the setting is successful, “OK” will be displayed; otherwise, “Error” will be displayed.

Attention: do not enter this menu if the microSD card is not inserted in the appropriate slot of the inverter or if the correct TXT files have not been copied to it.

- **Insulation**

The user can change the value of the insulation resistance directly from the LCD display. The user must first copy the TXT files to the SD card. These files can be requested from ZCS technical support.

Select “15. Insulation” and press “OK” to enter the menu for setting the insulation resistance. The display will show “Enter PWD!”, press “OK” to enter the password. Enter the password “0001” using the “Up” and “Down” keys to select the digit and “OK” to move to the next one, and confirm. If the display shows “Incorrect, try again!” press the “Back” key and enter the password again. When the password entered is correct, you can enter the menu. The new insulation resistance will now be loaded on the inverter automatically.

If the setting is successful, “OK” will be displayed; otherwise, “Error” will be displayed.

Attention: do not enter this menu if the microSD card is not inserted in the appropriate slot of the inverter or if the correct TXT files have not been copied to it.

- **Relay Test**

Select “16. Test relay” and press “OK” to enter the test menu of the relay inside the inverter. Use the “Up” and “Down” keys to select the “1.Enable” or “2.Disable” option and select it with the “OK” key. If the option “1. Enable” is selected, the relay test is performed. If the setting is successful, “OK” will be displayed; otherwise, “Error” will be displayed.

- **Reactive Power Setting**

Select "17. Reactive Set" and press "OK" to enter the menu for setting the reactive power produced. The display will show "Enter PWD!"; press "OK" to enter the password. Enter the password "0001" using the "Up" and "Down" keys to select the digit and "OK" to move to the next one, and confirm. If the display shows "Incorrect, try again!" press the "Back" key and enter the password again. When the password entered is correct, you can enter the menu. Now you can use the "Up" and "Down" keys to select the "1. Enable" or "2. Disable" option and select it with the "OK" key. If the "1. Enable" option is selected, you will be able to use the "Up" and "Down" keys to select the options "Under-excited", "Grid Manager", and "Over-excited", and you can indicate the value of the reactive power produced for each of them (expressed as the value of $\cos\phi=*. **$). If the setting is successful, "OK" will be displayed; otherwise, "Error" will be displayed.

- **Power derating**

Select "18. Derating P(W)" and press "OK" to enter the relative menu, from which you can enable the "Derating" function, i.e. the possibility to set the power produced by the inverter. The display will show "Enter PWD!"; press "OK" to enter the password. Enter the password "0001" using the "Up" and "Down" keys to select the digit and "OK" to move to the next one, and confirm. If the display shows "Incorrect, try again!" press the "Back" key and enter the password again. When the password entered is correct, you can enter the menu. Use the "Up" and "Down" keys to set the option "1. Enable" and "2. Disable" and select with the "OK" key. If the "1.Enable" option is selected, use the "Up", "Down" and "OK" keys to select the percentage value (between 0 and 100) of the maximum power that the inverter will produce; if the solar radiation allows a greater amount of energy to be produced, the inverter will carry out the necessary operations to limit the output power to the set value. If the setting is successful, "OK" will be displayed; otherwise, "Error" will be displayed.

- **Grounding check**

Select "19. Check PE Line" and press "OK" to enter the menu for checking the ground line. The display will show "Enter PWD!"; press "OK" to enter the password. Enter the password "0001" using the "Up" and "Down" keys to select the digit and "OK" to move to the next one, and confirm. If the display shows "Incorrect, try again!" press the "Back" key and enter the password again. When the password entered is correct, you can enter the menu. Now you can use the "Up" and "Down" keys to select the "1. Enable" or "2. Disable" option and select it with the "OK" key. If the option "1. Enable" is selected, the function for checking the ground line will be executed and the inverter will not start producing power if the grounding line is not present and properly connected; this setting is active by default on all three-phase inverters. If option "2. Disable" is selected, the inverter will start operating and it will produce power even without the ground connection line. If the setting is successful, "OK" will be displayed; otherwise, "Error" will be displayed.

- **P(grid) Check**

Select "20. P(grid) Check" and press "OK" to enter the relative menu, from which you can enable the "Reflux Power" function, i.e. the possibility to set the maximum power fed into the grid. The display will show "Enter PWD!"; press "OK" to enter the password. Enter the password "0001" using the "Up" and "Down" keys to select the digit and "OK" to move to the next one, and confirm. If the display shows "Incorrect, try again!" press the "Back" key and enter the password again. When the password entered is correct, you can enter the menu. Use the "Up" and "Down" keys to set the option "1. Enable" and "2. Disable" and select with the "OK" key. In this way the inverter can feed a maximum power of between 0 kW and the rated power of the inverter into the national grid, based on the solar radiation available and the domestic consumption. If the setting is successful, "OK" will be displayed; otherwise, "Error" will be displayed.

Note: To activate the Reflux Power mode in three-phase inverters, it is necessary to install the Anti Reverse Power Controller and three CT sensors, as described in the appropriate procedure. This device can be purchased from suppliers of photovoltaic materials.

The size of the inverter and power value you wish to feed into the grid must be specified at the time of purchase.

- **MPPT Scan**

Select “21. MPPT Scan” and press “OK” to enter the relative menu, from which you can enable the “MPPT Scan” function, i.e. the possibility to set the periodic search for the Maximum Power Point. Enter the password “0001” using the “Up” and “Down” keys to select the number and “OK” to move to the next one, and confirm. If the display shows “Incorrect, try again!” press the “Back” key and enter the password again. When the password entered is correct, you can enter the menu. Use the “Up” and “Down” keys to choose between the items “Set Scan Paras” and “Scan Test”. For each of the two items, you can use the “Up” and “Down” keys to set the “1. Enable” and “2. Disable” option, and then select it with the “OK” key. Entering the first menu, if the option “1. Enable” is selected, you will be able to select the “Scan Freq” i.e. the time interval in which the new MPPT will be searched (the time is expressed in ** min); with this function, the photovoltaic production will be reset every ** minutes and will return to the current maximum power point. If the setting is successful, “OK” will be displayed; otherwise, “Error” will be displayed. The second item “Scan Test” allows performing an instant test to search for the current MPPT so that the inverter moves to the condition of maximum power.

This function can be used if the shading on the panels is extensive, thus reducing their efficiency and productivity. Under optimal conditions, however, this function is not recommended, as it would limit the productivity of the inverter.

- **P(f) Setting**

Select “22. Set P(f)” and press “OK” to enter the relative menu, from which you can change the active power according to the grid frequency required by the local regulations. This function may be required by various regulations for grid-connected inverters. Use the “Up”, “Down” and “OK” keys to set the time delay expressed in seconds (*.***s) before the changed P active power will intervene.

- **Q(v) Setting**

Select “23. Set Q(v)” and press “OK” to enter the relative menu, from which you can change the reactive power according to the grid voltage required by the local regulations. This function may be required by various regulations for grid-connected inverters. Use the “Up”, “Down” and “OK” keys to set the time delay expressed in seconds (*.***s) before the changed Q reactive power will intervene.

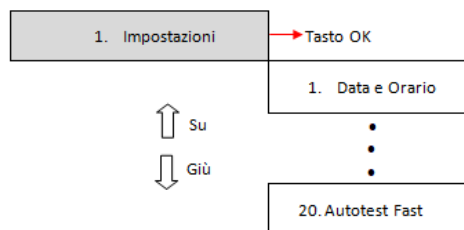
- **Control 81.S1**

Select “24. 81.S1Check” and press “OK” to enter the relative menu, from which it will be possible to enable the frequency restriction thresholds required in special cases by local regulations. Use the “Up” and “Down” keys to set the option “1. Enable 81.S1” and “2. Disable 81.S1” and select with the “OK” key. The display will show “OK” if the setting is successful.

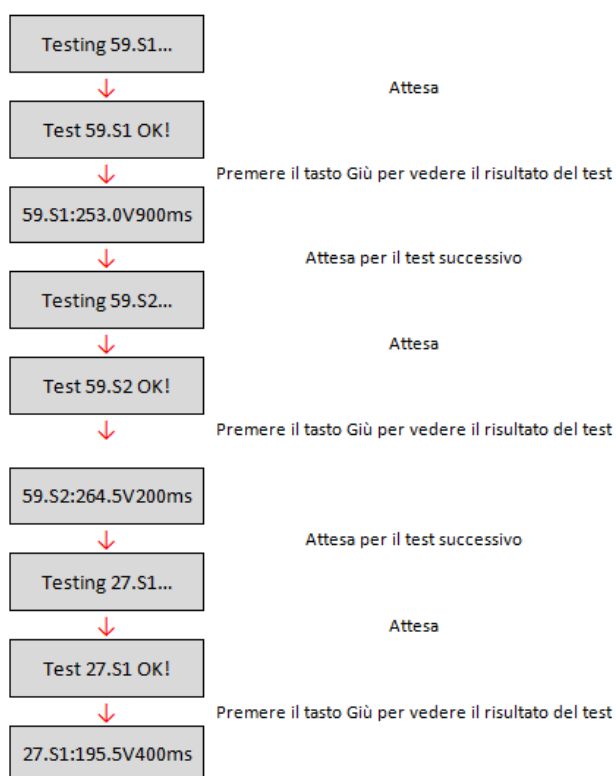
- **Fast self-test**

- 1) During normal operation of the inverter, press the “Back” key to enter the main menu.
- 2) Press the “OK” key to enter the “Settings” menu.

- 3) Press the “Up” key several times until “25. Fast self-test” is displayed on the screen.



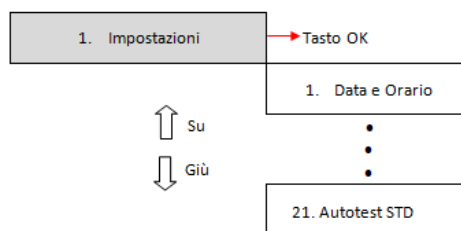
- 4) Press “OK” to start the self-test.
- 5) The self-test will now start automatically; once completed, press “Down” to display the self-test results, as shown in the figure below.



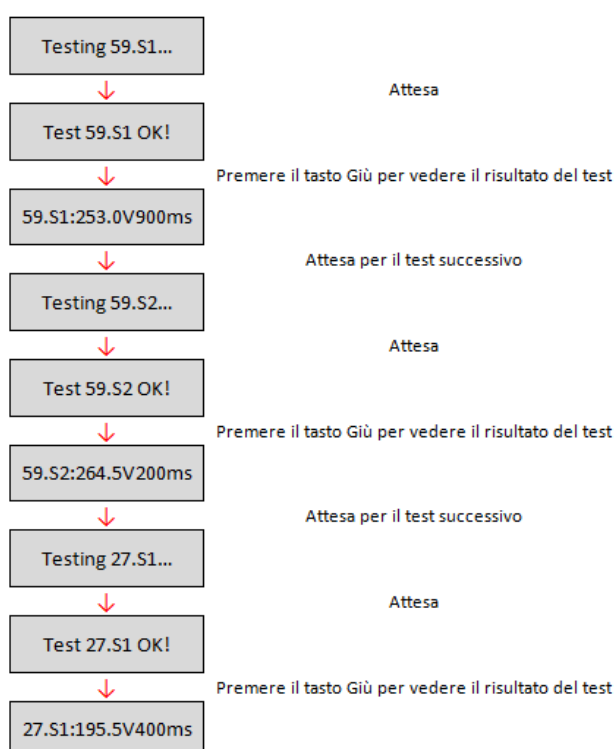


• Standard Self-test

- 1) During normal operation of the inverter, press the “Back” key to enter the main menu.
- 2) Press the “OK” key to enter the “Settings” menu.
- 3) Press the “Down” key several times until “26. Standard Self-Test” is displayed on the screen.



- 4) Press “OK” to start the self-test.
- 5) The self-test will now start automatically; once completed, press “Down” to display the self-test results, as shown in the figure below.



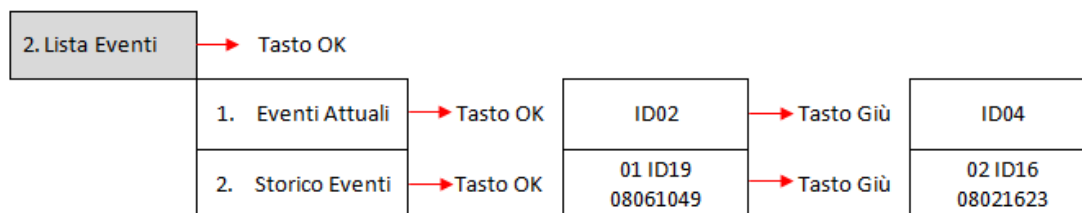


(B) Press the “OK” key to enter the “Event List” menu.

The “Event List” menu is used to display the events recorded by the inverter, both historical and in real time, showing the progressive number of the event, the identification code, the date and time of its occurrence. The user can access this interface from the LCD display to check the details of the alarms and alerts. Errors will be listed according to the date and time they occurred, so the most recent events will be listed first. For more information, refer to the figure below.

Press the “Back” key on the main interface and then the “Down” key, then enter menu “2. Event list.”

From here, select menu “1. Current Events” for the list of current events or “2. “Historical Events” for the list of historical events.



(C) Press the “OK” key to enter the “System Info” menu.

The “System Info” menu contains the following submenus:

3. Info Sistema		
1. Tipo Inverter	8. Fattore Potenza	
2. Seriale	9. Immiss P(rete)	
3. Versione SW	10. Power Ratio	
4. Versione HW	11. P(f)	
5. Paese	12. Q(v)	
6. Ingresso	13. Cod Servizio	
7. Soglie AC		

- **Inverter type**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “1. Inverter type.” Here you can see the power of the inverter model

- **Serial number**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “2. Serial number.” Here you can see the serial number of the inverter.

- **SW version**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “3. SW version.” Here you can see the software version.

- **HW version**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “4. HW version.” Here you can see the hardware version.

- **Country**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “5. Country.” Here you can see the country code that has been set.

- **Input**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “6. Input.” Here you can see the type of input of the photovoltaic strings.

- **AC Thresholds**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “7. AC Thresholds.” Here you can see the value of the voltage and frequency thresholds for the relay to trip.

- **Power factor**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “8. Power factor.” Here you can see the value of the power factor.

- **P(Grid) Feed-in**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “9. P(Grid) Feed-in.” Here you can see the value of the set value of the power fed into the grid.

- **Power Ratio**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter the “10. Power Ratio” menu. Here you can see whether this function has been enabled or not.

- **P(f)**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “11. P(f).” Here you can see the P(f) value that has been set.

- **Q(v)**

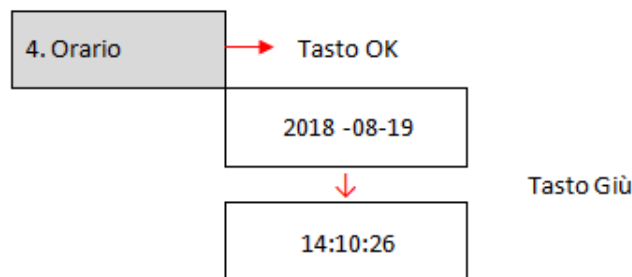
Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “12. Q(v).” Here you can see the Q(v) value that has been set.

- **Service Code**

Use the “Up” and “Down” keys in the “System Info” menu to move, and the “OK” key to enter menu “13. Service Code.” Here you can see the currently installed firmware version.

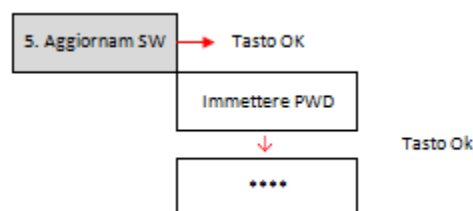
(D) Press the “OK” key to enter the “Date and Time” menu.

Press the “Back” key in the main interface and the “Up” or “Down” keys to enter the submenu “4. Date and Time”, then press “OK” to display the current date and time set on the inverter.



(E) Press the “OK” key to enter the “Update Software” menu.

Press the “Back” key in the main interface and the “Up” or “Down” keys to enter the submenu “5. Software Update”, then press “OK” to enter. The display will show “Enter PWD!.” Press “OK” to enter the password “0715” using the “Up” and “Down” keys to select the number and “OK” to move to the next digit and confirm. If the display shows “Incorrect, try again!” press the “Back” key and enter the password again. When the password has been entered correctly, you can enter the menu and start updating the firmware.



Note: you can check the firmware version currently installed on the inverter from the “Service Code” submenu found in the “System Info” menu.

IMPORTANT: Do not perform any update operation if there is no microSD card inside the inverter or if the microSD card does not contain the appropriate update files. Always make sure that the correct update files are loaded on the microSD card and that the card is correctly inserted in the appropriate slot.

Note: the microSD card is not supplied with the inverter and must be procured by the installer or customer.

The complete and detailed procedure for updating the firmware is described below.

Update requirements

- 4 GB MicroSD card
- MicroSD to SD adapter or MicroSD to USB adapter for inserting the MicroSD card into the PC.

Firmware update procedure

1. Switch off the ZCS inverter by first disconnecting the AC power supply via the switch installed on the system, and then disconnecting the DC power supply via the switch located on the side of the inverter (if equipped) or switch off the system's disconnecting switch. Wait for the display to turn off completely.
2. Unscrew the four star screws and remove the central cover found on the bottom on the inverter, taking care to have first loosened the four cable glands.
3. Extract (IF PRESENT) the MICRO SD CARD from its slot by pressing lightly on the SD CARD and pulling it out of the inverter. Alternatively, obtain the MICRO SD CARD yourself. Then insert it into the PC using the appropriate adapter.
4. Open the drive of the MICRO SD CARD and create a new folder with the name ***firmware***, making sure to match the lowercase and uppercase letters as indicated and checking that there are no spaces. Now copy the files provided by ZCS to the ***firmware*** folder.
5. Extract the MICRO SD CARD from the PC using the "safely remove hardware" procedure.
6. Insert the MICRO SD CARD in the appropriate slot of the inverter.
7. Only supply DC power to the inverter through the appropriate switch and wait a few seconds for the display to come on.
8. From the display, press the "Menu/Back" key (first from the left) to enter the menu, and then the "OK" key (fourth from the left) to enter the SOFTWARE UPDATE item. Enter the password **0715** and press "OK" again to start the update.
9. The update process will take about 3 minutes and will run automatically. The following indications will be followed:
DSP1 Update
DSP2 Update
ARM Update
10. Check that the inverter completes the update correctly and that "INITIALIZING" appears on the display; the inverter will then start normally. If the update was not successful, one of the following messages will appear on the display: "COMMUNICATE FAIL", "UPDATE DSP1 FAIL" or "UPDATE DSP2 FAIL"; in this case, switch off the inverter, wait one minute and restart the procedure from point 7.
11. Once the update has been completed successfully, it is necessary to change the country code: enter the "Settings" menu by pressing the "Menu/Back" key, then scroll down to "Set Country" and enter the country code 22.

Note: if the inverter has been running for more than 24 hours, this function must first be enabled from the “Enable Country” menu, which corresponds to item 6 of the “Settings” menu. Enter the password **0001**.

12. Switch off the inverter via the disconnecting switch on the DC line.
13. Restart the inverter by supplying DC power and enter the “set country” menu again. Set the country code according to the appropriate grid standard (e.g. for Italy: CEI-021 INT, CEI-021 EXT, CEI-016).
14. Switch off the system and restart it after waiting a few minutes, as indicated in step 13.
15. The update procedure has now been completed, and the inverter can now be connected to the AC line by connecting it to the grid; The new firmware version can be checked from the “Service Code” submenu located inside the “System Info” menu.

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 3PH 20000TL - 33000TL-V2 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.	<p>If the alarm occurs occasionally, the probable cause is that the electric grid is in an abnormal state.</p> <p>The inverter will automatically return to its normal operating state when the electrical grid is restored to its normal state.</p> <p>If the alarm occurs frequently, check whether the grid voltage/frequency is within the correct range. If not, contact technical support. If so, check</p>
ID02	GridUVP	The grid voltage is too low.	
ID03	GridOFP	The grid frequency is too high.	

ID04	GridUFP	The grid frequency is too low.	<p>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>
ID05	PVUVP	The input voltage is too low.	<p>Check whether too few PV modules have been connected in series in a PV string: therefore, the voltage (V_{mp}) of the photovoltaic string is lower than the minimum operating voltage of the inverter. In this case, adjust the number of photovoltaic modules connected in series to increase the voltage of the PV string, so that it falls within the input voltage range of the inverter.</p>
ID06	Vlvrtlow	LVRT function error	<p>Check the AC grid connections, and if they are correct, contact technical support.</p>
ID07	Vovrthigh	OVRT function error	
ID09	PvOVP	The input voltage is too high.	<p>The inverter automatically returns to its normal operating state after correct adjustment.</p> <p>Check whether too many PV modules have been connected in series in a PV string: therefore, the voltage (V_{oc}) of the photovoltaic string is greater than the minimum operating voltage of the inverter. In this case, decrease the voltage of the PV string by adjusting the number of photovoltaic modules mounted in series, making sure that it falls within the input voltage range of the inverter. The inverter</p>

			automatically returns to its normal operating state after the correct adjustments.
ID10	IpvUnbalance	The input current is not balanced.	Check the configuration of the input mode (parallel mode / independent mode) of the inverter, as indicated in relative section (C) "6. Input Mode" of this user manual; if it is incorrect, change it according to relative section (A).
ID11	PvConfigSetWrong	Incorrect input mode	
ID12	GFCIFault	Faulty automatic differential circuit breaker.	If the error occurs occasionally, the probable cause is that the external circuits have temporary faults. The inverter automatically returns to its normal operating state after the error has been fixed.
ID13	GridFault	Check the voltage and frequency of the grid	If the error occurs occasionally, the probable cause is that the grid has temporary faults. If the fault occurs frequently, check whether the mains voltage and frequency are in an acceptable range. If not, contact technical support. Otherwise, check the conditions of the AC switch and the cable harness.
ID14	HwBoostOCP	The input current is too high and has caused the hardware protection to be activated.	Check whether the input current is higher than the maximum input current of the inverters, then check the input wiring; if both are correct, contact Technical Support.
ID15	HwAcOCP	The grid current is too high and has caused the hardware protection to be activated.	ID15-ID24 are internal faults of the inverter; turn off the "DC switch", wait 5 minutes and then turn it back on again. Check that the fault is no longer present. If this is not the case, contact Technical Support.
ID16	AcRmsOCP	The grid current is too high.	
ID17	HwADFaultIGrid	Sampling error of the grid current.	
ID18	HwADFaultDCI	DCI sampling error.	
ID19	HwADFaultVGrid	Sampling error of the grid voltage.	

ID20	GFCIDeviceFault	GFCI sampling error.	
ID21	MChip_Fault	Master chip fault	
ID22	HwAuxPowerFault	Auxiliary voltage error	
ID23	BusVoltZeroFault	Current sampling error.	
ID24	IacRmsUnbalance	The output current is not balanced.	
ID25	BusUVP	The bus voltage is too low.	If the configuration of the PV string is correct (no ID05 fault present), the possible cause is that the solar radiation is too low. The inverter automatically returns to its normal operating state when the solar radiation returns to a normal level.
ID26	BusOVP	The bus voltage is too high.	ID26-ID27 are internal faults of the inverter; turn off the “DC switch”, wait 5 minutes and then turn it back on again. Check that the fault is no longer present. If this is not the case, contact Technical Support.
ID27	VbusUnbalance	The bus voltage is not balanced.	
ID28	DciOCP	The DCI is too high.	<p>Check the configuration of the input mode (parallel mode / independent mode) of the inverter, as indicated in relative section (C). “6. Input Mode” of this user manual. If it is not correct, change it according to relative section (A) “10. Configuration of the Input Mode” of this manual.</p> <p>If the input mode is correct, turn off the “DC switch”, wait 5 minutes and then turn it back on again. Check that the fault is no longer present. If this is not the case, contact Technical Support. If it is not correct, change it according to relative section (A) “10. Configuration of the Input Mode” of this manual.</p>

ID29	SwOCPIstant	The grid current is too high.	Internal faults of the inverter; turn off the “DC switch”, wait 5 minutes and then turn it back on again. Check that the fault is no longer present. If this is not the case, contact Technical Support.
ID30	SwBOCPInstant	The input current is too high.	Check whether the input current is higher than the maximum input current of the inverter, then check the input wiring; if both are correct, contact Technical Support.
ID33	Reserved	Reserved	Reserved
ID49	ConsistentFault_VGrid	The grid voltage sampling value between the master DSP and slave DSP is not suitable.	ID49-ID55 are internal faults of the inverter; turn off the “DC switch”, wait 5 minutes and then turn it back on again. Check that the fault is no longer present. If this is not the case, contact Technical Support.
ID50	ConsistentFault_FGrid	The grid frequency sampling value between the master DSP and slave DSP is not suitable.	
ID51	ConsistentFault_DCI	The current sampling value of the automatic differential circuit breaker between the master DSP and the slave DSP is not suitable.	
ID52	ConsistentFault_GFCI	The sampling value of the automatic differential circuit breaker between the master DSP and the slave DSP is not suitable.	
ID53	SpiCommLose	SPI communication between the master DSP and the slave DSP is faulty.	

ID54	SciCommLose	SCI communication between the control board and communication board is faulty.	
ID55	RelayTestFail	Relay fault.	
ID56	PvIsoFault	The insulation resistance is too low.	Check the insulation resistance between the photovoltaic string and the ground, in the event of a short circuit, rectify the fault.
ID57	OverTempFault_Inv	The temperature of the inverter is too high.	<p>Check that the installation position and the installation method meet the requirements of relative section of this user manual.</p> <p>Check if the ambient temperature in the installation location exceeds the allowed limit. If so, improve the ventilation to reduce the temperature.</p>
ID58	OverTempFault_Boost	The boost temperature is too high.	
ID59	OverTempFault_Env	The ambient temperature is too high.	
ID60	PEconnectFault	Incorrect grounding	Check that the grounding is correct.
ID61	InvTempDiffFault	The temperature difference between the three R/S/T phases is greater than 10°C	Contact Technical Support
ID65	UnrecoverHwAcOCP	The grid current is too high and has caused an irreparable hardware failure.	<p>ID65-ID70 are internal faults of the inverter; turn off the “DC switch”, wait 5 minutes and then turn it back on again. Check that the fault is no longer present. If this is not the case, contact Technical Support.</p>
ID66	UnrecoverBusOVP	The bus voltage is too high and has caused an irreparable fault.	
ID67	UnrecoverIacRmsUnbalance	The grid current is not balanced and has caused an irreparable fault.	

ID68	UnrecoverIpvUnbalance	The input current is not balanced and has caused an irreparable fault.	
ID69	UnrecoverVbusUnbalance	The bus voltage is not balanced and has caused an irreparable fault.	
ID70	UnrecoverOCPIstant	The grid current is too high and has caused an irreparable fault.	
ID71	UnrecoverPvConfigSetWrong	Incorrect input mode	Check the configuration of the input mode (parallel mode / independent mode) of the inverter, as indicated in relative section (C) "6. Input Mode" of this user manual. If it is not correct, change it according to relative section (A).
ID72-ID73	Reserved	Reserved	Reserved
ID74	UnrecoverIPVInstant	The input current is too high and has caused an irreparable fault.	ID74-ID77 are internal faults of the inverter; turn off the "DC switch", wait 5 minutes and then turn it back on again. Check that the fault is no longer present. If this is not the case, contact Technical Support.
ID75	UnrecoverWRITEEEPROM	The E E P R O M cannot be recovered.	
ID76	UnrecoverREADEEPROM	The E E P R O M cannot be recovered.	
ID77	UnrecoverRelayFail	The relay has generated a permanent fault.	
ID78-ID80	Reserved	Reserved	Reserved
ID81	OverTempDerating	The inverter has been derated because the temperature is too high.	Check that the installation position and the installation method meet the requirements of relative section of this user manual. Check if the ambient temperature in

			the installation location exceeds the allowed limit. If so, improve the ventilation to reduce the temperature.
ID82	OverFreqDerating	The inverter has been derated because the grid current is too high.	The inverter automatically reduces the output power when the frequency of the electrical grid is too high.
ID83	RemoteDerating	The inverter has been derated by the remote control	The inverter registers ID83 in case of remote derating operation. Check the wiring of the remote input and the port of the output control signal on the communication board according to relative section of this user manual.
ID84	RemoteOff	The inverter was turned off by remote control.	The inverter registers ID 84 in case of remote shutdown operation. Check the wiring of the remote input and the port of the output control signal on the communication board, according to relative section of this user manual.
ID85	UnderFrequency Derating	The inverter has been derated because the grid current is too low.	The inverter automatically reduces the output power when the frequency of the electrical grid is too low.
ID89	Reserved	Reserved	Reserved
ID90	Fan 3 Alarm	Fault on fan 3	Check the operation of the internal fan. If the fan is not working, replace it. If the error persists even after replacement, contact Technical Support.
ID91	Fan 1 Alarm	Fault on fan 1	Check the operation of the internal fan. If the fan is not working, replace it. If the error persists even after replacement, contact Technical Support.
ID92	Fan 2 Alarm	Fault on fan 2	Check the operation of the internal fan. If the fan is not working, replace it. If the error persists even after replacement, contact Technical Support.
ID93	Start-up protection alarm	Error during start up	Check the start-up protection module. If there is no damage, contact Technical Support.

ID94	The software version is unsuitable	The software between the control board and communication board is unsuitable.	Contact Technical Support to update the software.
ID95	Faulty EEPROM communication board.	The EEPROM of the communication board is faulty.	ID95-ID96 are internal faults of the inverter; turn off the “DC switch”, wait 5 minutes and then turn it back on again. Check that the fault is no longer present. If this is not the case, contact Technical Support.
ID96	Faulty RTC clock chip	The RTC clock chip is faulty.	
ID97	Invalid country code	The country code is not valid.	Check the configuration of the country, as indicated in relative section (C) “5. Country” of this user manual; if it is not correct, change it according to relative section (A) “4. Configuration of country code” of this manual.
ID98	MicroSD card fault	The microSD card is faulty, or a false contact has occurred.	Replace the SD card.
ID99-ID100	Reserved	Reserved	Reserved

7.2. Maintenance

Inverters generally do not require daily or routine maintenance. In any case, for proper long-term operation of the inverter, make sure that the heatsink for cooling the inverter has enough space to ensure adequate ventilation and that it is not obstructed by dust or other items.

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 product 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	3PH 20000TL-V2	3PH 25000TL-V2	3PH 30000TL-V2	3PH 33000TL-V2
DC input				
Typical DC power *	24000W	30000W	36000W	39600W
Maximum DC power on each MPPT	13000W	16000W	18000W	20000W
Independent MPPTs/Strings each MPPT	2/2		2/3	
Maximum DC voltage			1100V	
Start-up voltage			250V	
Nominal DC voltage			620V	
MPPT range in DC			230V-950V	
Full power range in DC	480V-850V	460V-850V	520V-850V	580V-850V
Maximum DC input current each MPPT	24A/24A	28A/28A	30A/30A	
Maximum absolute DC input current each MPPT	30A/30A	35A/35A	37.5A/37.5A	
Maximum current each string***	-		12A	
AC output				
Nominal AC Power	20000W	25000W	30000W	33000W
Maximum AC Power	22000VA	27500VA	33000VA	36300VA
Maximum AC current each phase	32A	40A	48A	53A
Type of connection/Nominal AC grid voltage	Three phase 3PH/N/PE 220V/230V/240V (PH-N); 380V/400V/415V (PH-PH) or Three phase 3PH/PE 380V/400V/415V (PH-PH)			
AC voltage range	184V~276V (PH-N); 310V~480V (PH-PH) (according to local standards)			
Nominal AC frequency	50Hz/60Hz			
AC frequency reange	45Hz~55Hz / 54Hz~66Hz (according to local standards)			
Total Harmonic Distortion (THD)	<3%			
Power factor	1 (set +/-0.8)			
Active power adjustability range	0~100%			
Active power grid injection	Possible to adjust from 0 to nominal AC power **			
Efficiency				
Maximum Efficiency	98.2%	98.4%		98.6%
Euro efficiency	98%		98.2%	
Efficiency MPPT		>99.9%		
Night time consumption		<1W		
Protections				
Internal interface protection		No		
Safety protections		Anti islanding, RCMU, Ground Fault Monitoring		
DC reverse polarity protection		Yes		
DC switch		Integrated		
Overheating protection		Yes		
Overvoltage category/Protection class		Overvoltage Category III / Protective class I		
Integrated dischargers		AC/DC MOV: Type 3 standard		
Standards				
EMC		EN 61000-6-1/2/3/4,		
Safety standards		IEC 62116, IEC 61727, IEC 61683, IEC 60068-1/2/14/30, IEC 62109-1/2		
Grid standards		Grid standards and certificates available on www.zcsazzurro.com		
Communication				
Interfaces		Wi-Fi/4G/Ethernet (optionals), RS485 (proprietary protocol), SD card		
Additional I/O		I/O inputs for Antireverse power controller device		
SD card data storage		25 years		
Environmental data				
Temperature working range		-25°C....+60°C (power derating over 45°C)		
Topology		Transformerless		
Environmental protection degree		IP65		
Humidity range		0%.....95% no condensing		
Maximum operative altitude		2000m		
Acoustic noise	< 30dB @ 1mt		< 45dB @ 1mt	
Weight		37Kg		
Cooling system	Natural cooled	FANs cooled	Convezione forzata da ventole	Convezione forzata da ventole
Dimensions (H*L*P)		666mm*512mm*254mm		
Display		LCD		
Warranty		10 years		

* Typical Dc power is not an absolute maximum rating. Online configurator available on www.zcsazzurro.com will guide the user on valid and possible configurations

** Possible using Antireverse Power Controller (ZSM-ZEROINJ)

*** Models with more than one string connectable each MPPT have internal protection diodes, currents higher than the limits could cause the failure of the diodes.

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.

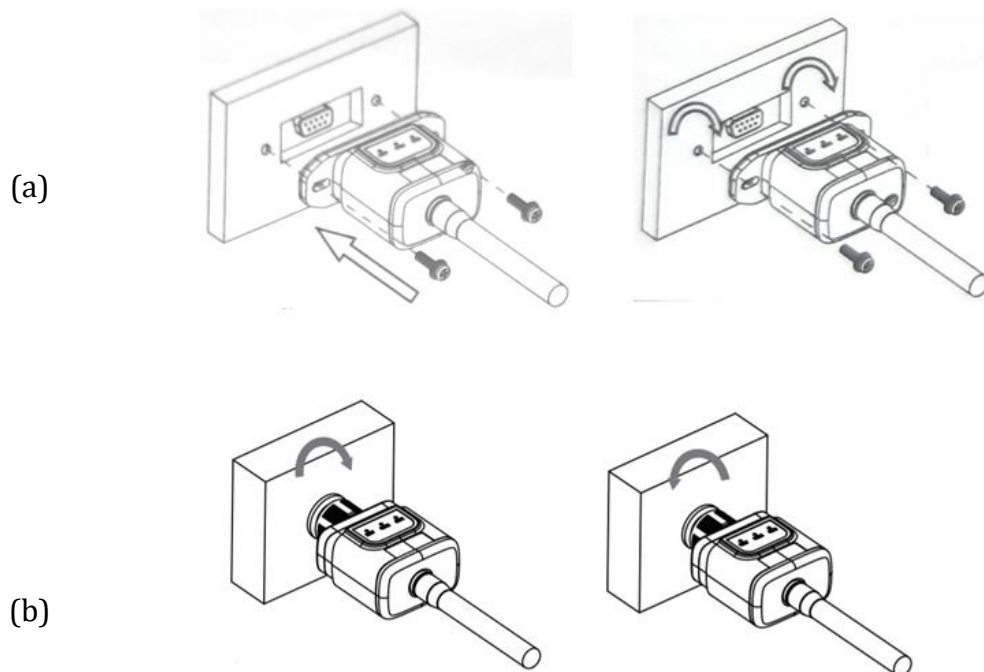


Figure 39 – Inserting and securing the external Wi-Fi adapter

- 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.

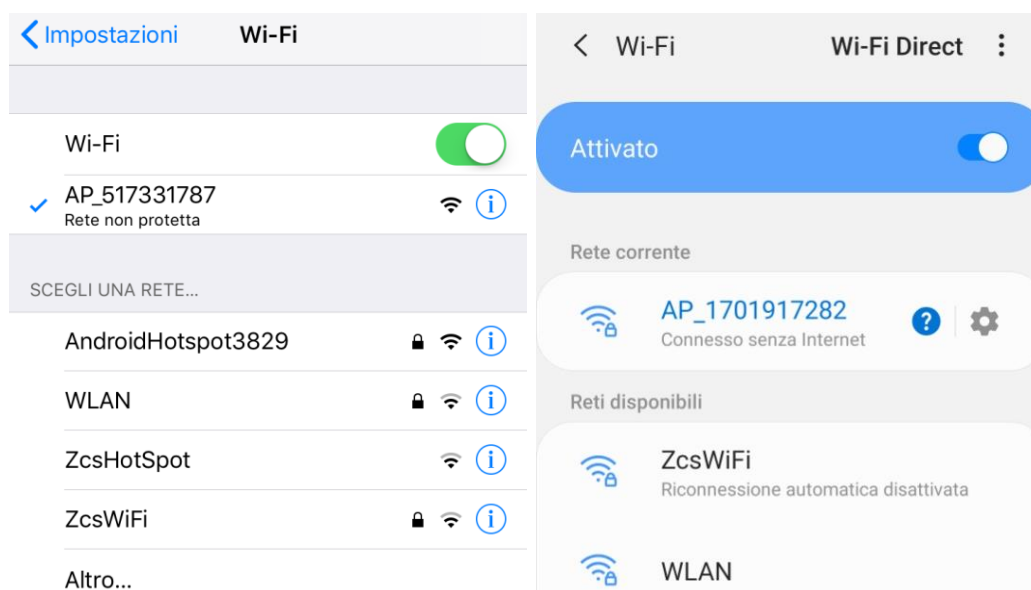


Figure 42 - Connection to Access Point for Wi-Fi adapter on iOS smartphone (left) and Android smartphone (right)

- 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.

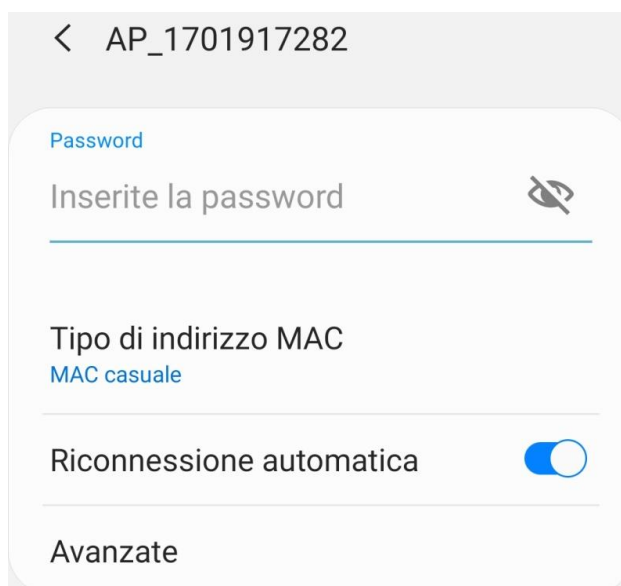


Figure 44 – Password entry prompt

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.

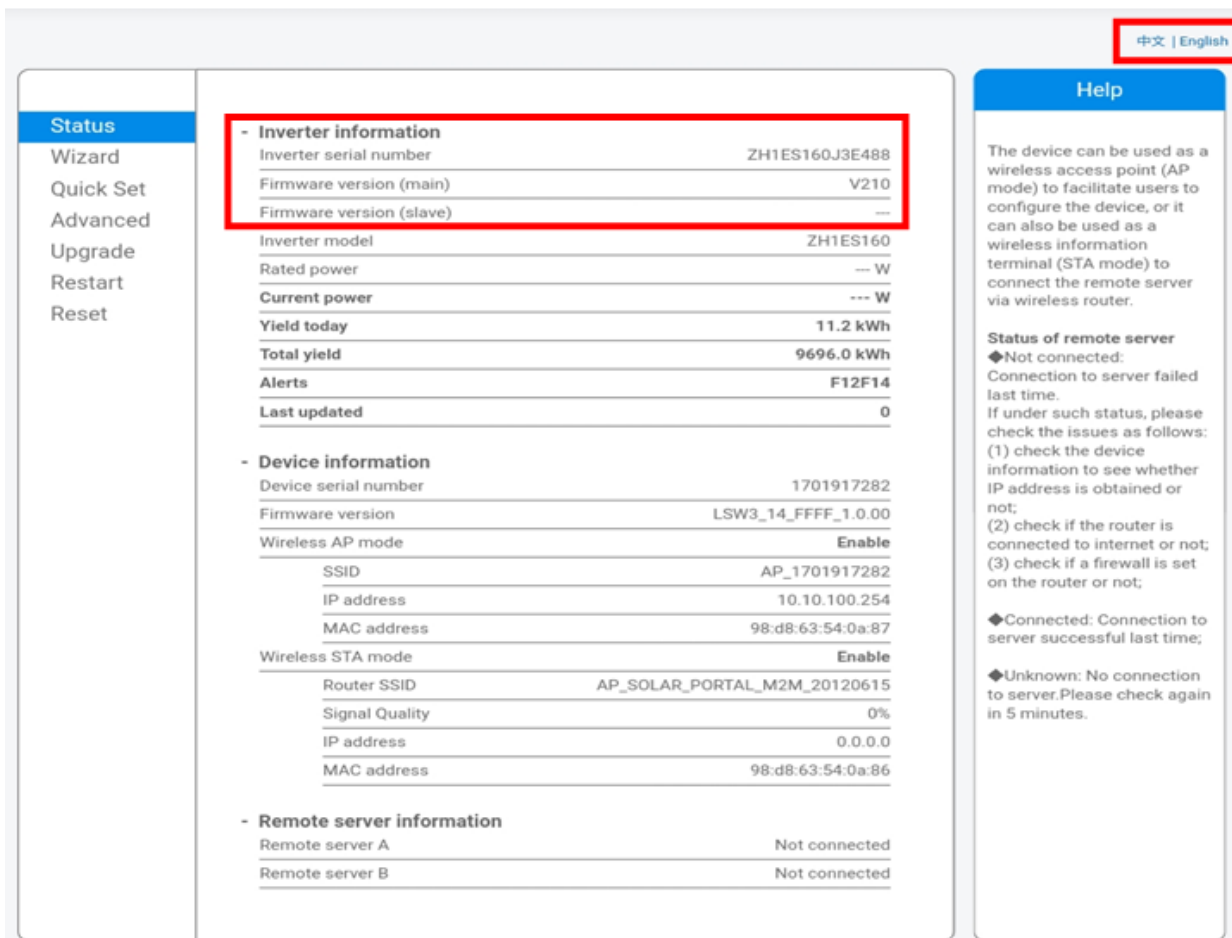


Figure 46 – Screen for accessing the web server to configure the Wi-Fi adapter

- 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.



中文 | English

Inverter information	
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

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.

Status of remote server

◆ Not connected: Connection to server failed last time.
If under such status, please check the issues as follows:
(1) check the device information to see whether IP address is obtained or not;
(2) check if the router is connected to internet or not;
(3) check if a firewall is set on the router or not;

◆ Connected: Connection to server successful last time;

◆ Unknown: No connection to server. Please check again in 5 minutes.

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.

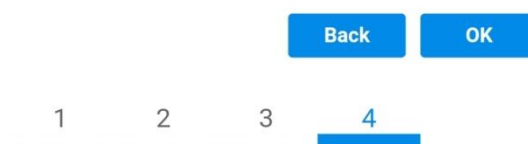


Figure 51 – Final configuration screen (4)

- 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
Remote server information	
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

- 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.
- 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.

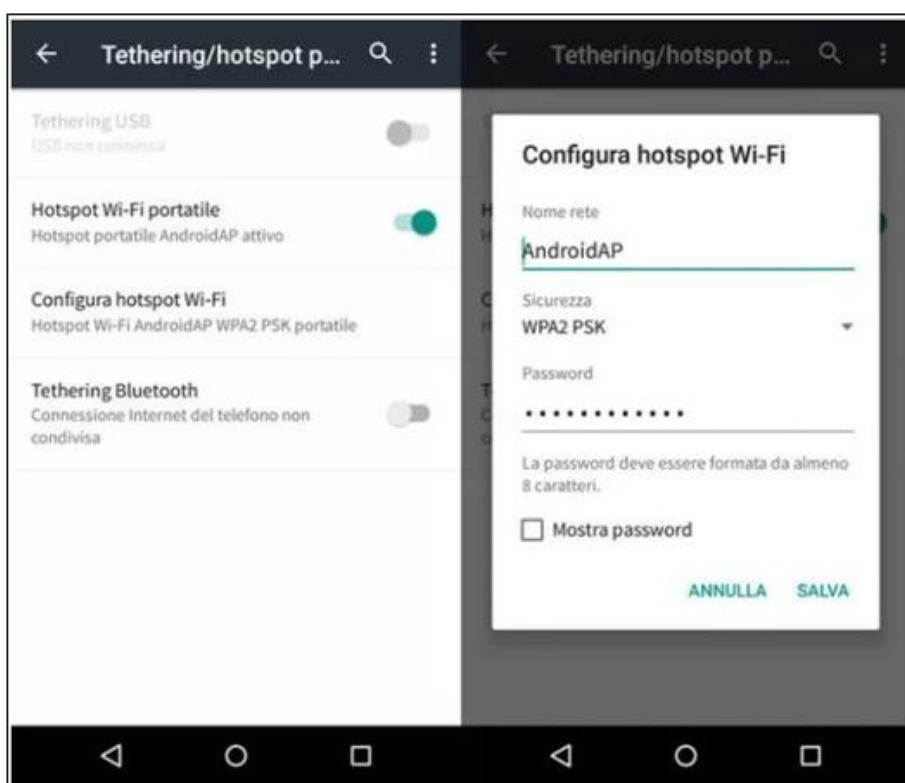


Figure 61 – Configuration of an Android smartphone as a hotspot router

• Using an iPhone as a modem

- 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.
- 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.

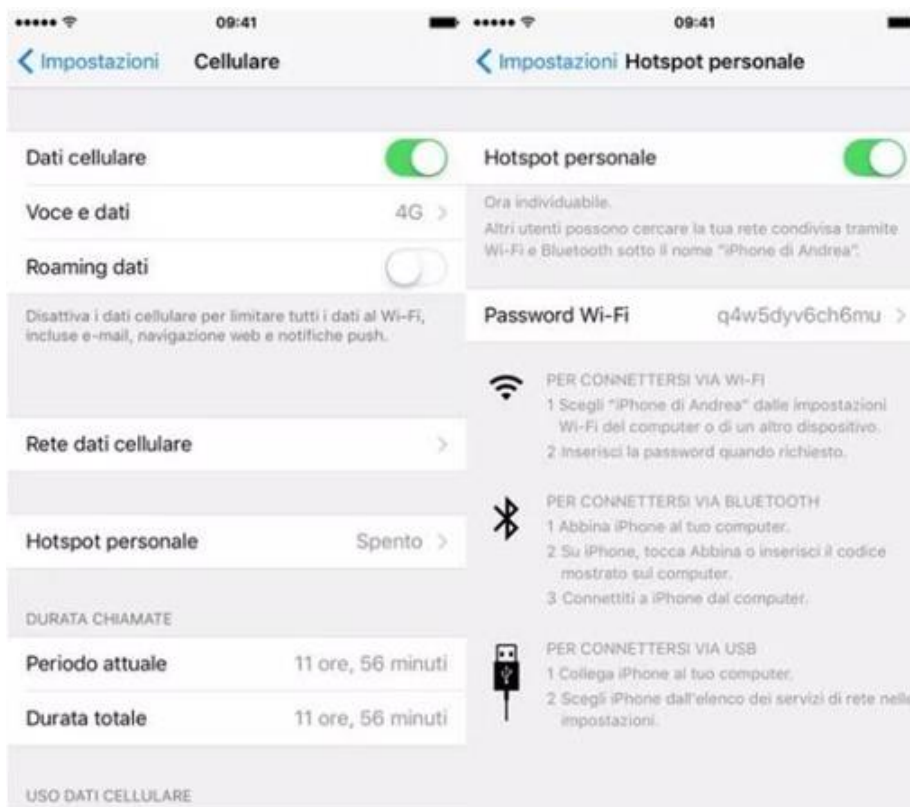


Figure 62 - Configuration of an iOS smartphone as a hotspot router

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.

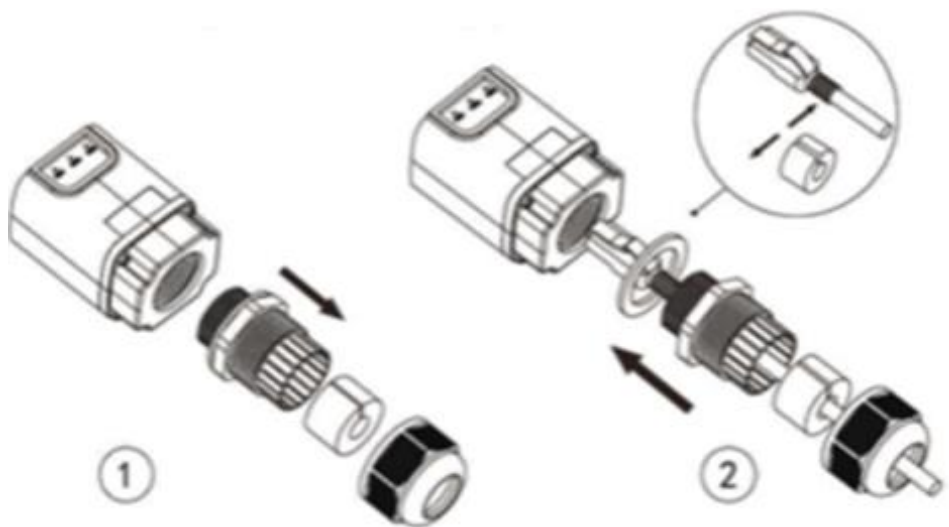


Figure 64 – Inserting the network cable inside the device

- 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.

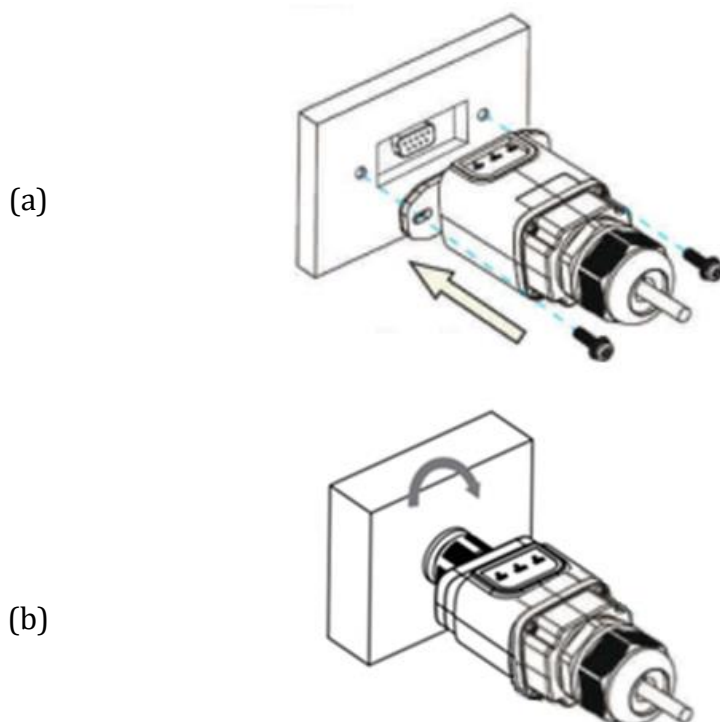


Figure 65 – Inserting and securing the ethernet adapter

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

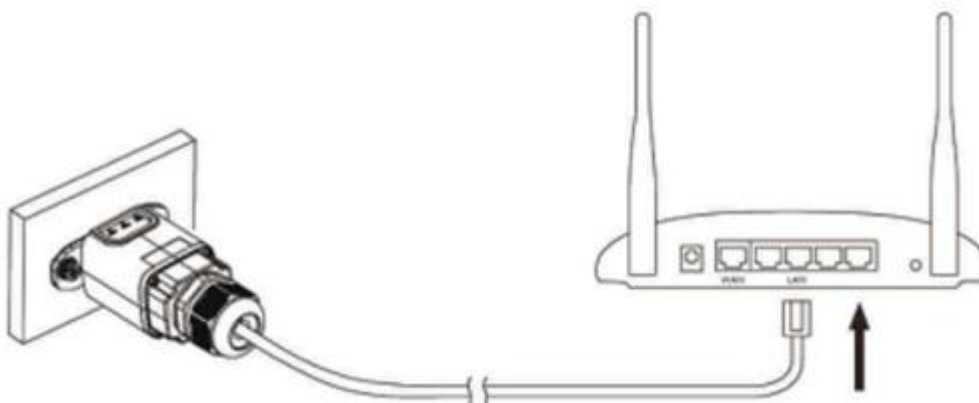


Figure 66 - Connecting the network cable to the modem

- 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.

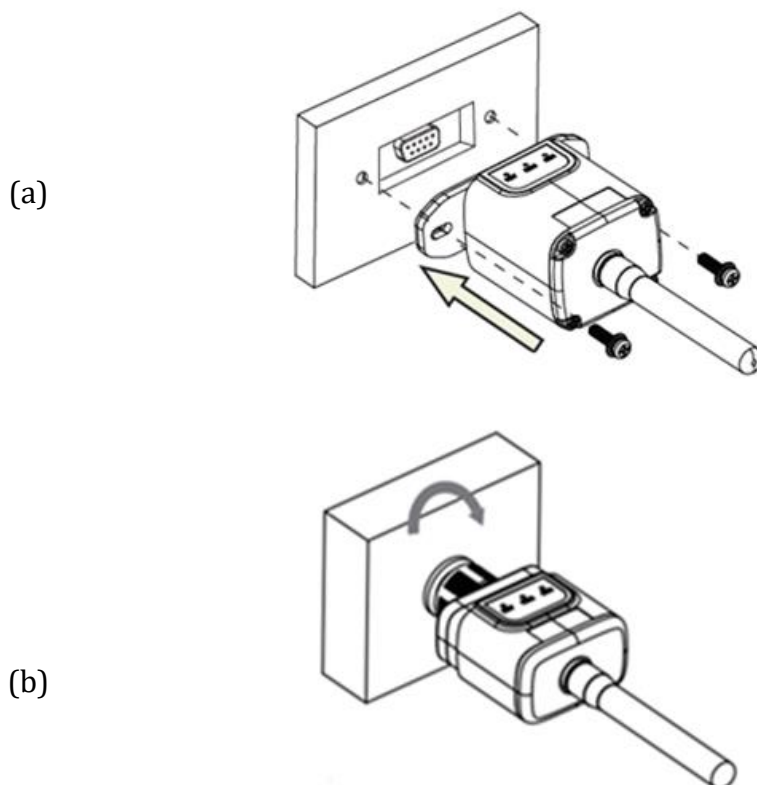


Figure 72 - Inserting and securing the 4G adapter

- 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” 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

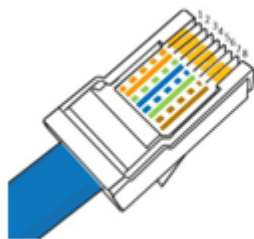
All the Azzurro ZCS inverters have at least one RS485 connection point.

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 2x0.5mm² 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.

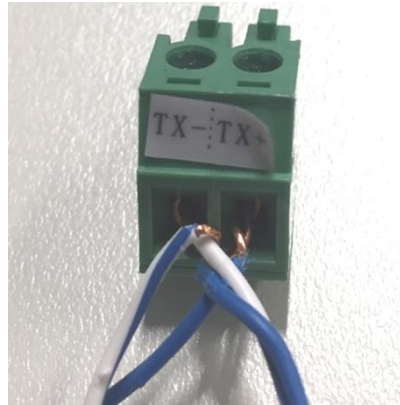


Figure 80 – Tightening the network cable to the RS485 terminal block

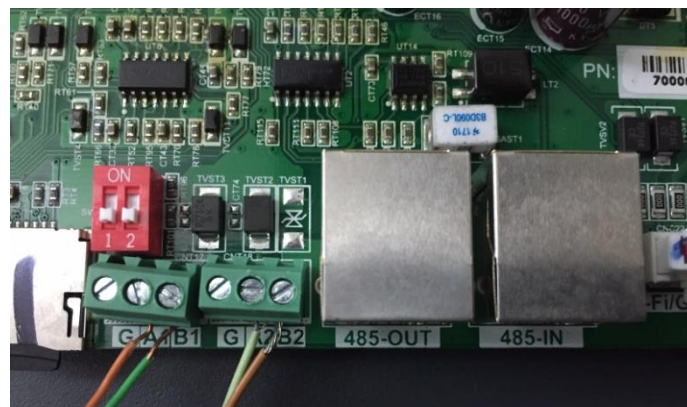
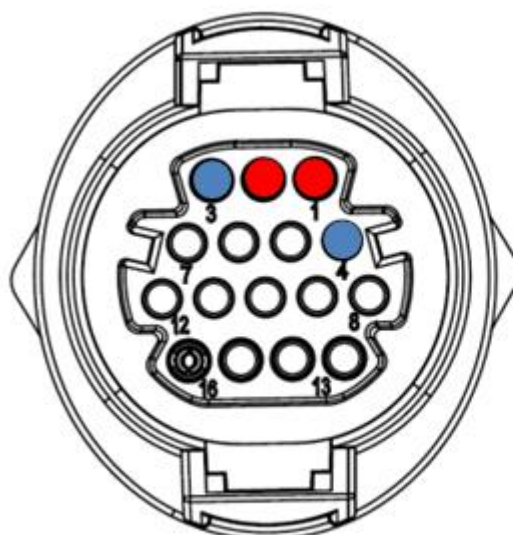


Figure 81 – Connecting the serial line via the RS485 terminal block and via the RJ45 plug

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



- Pin 1 - 2 / RS485 +
- Pin 3 - 4 / RS485 -

Figure 82 – Connecting the serial line via the communication connector for 3PH HYD5000-HYD20000-ZSS

- 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.

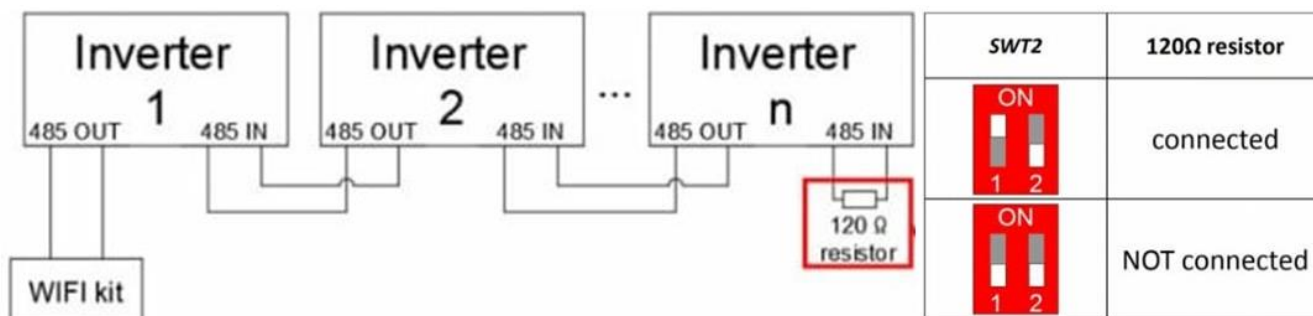


Figure 83 – Positioning of dip switches to connect the isolation resistor

- 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.

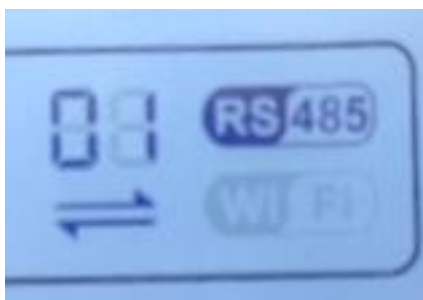


Figure 84 – RS485 symbol on the display of the inverter

- 4) Set a sequential Modbus address on each inverter connected:
- Enter the “Settings” menu.
 - Scroll to the submenu “Modbus Address.”
 - 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.

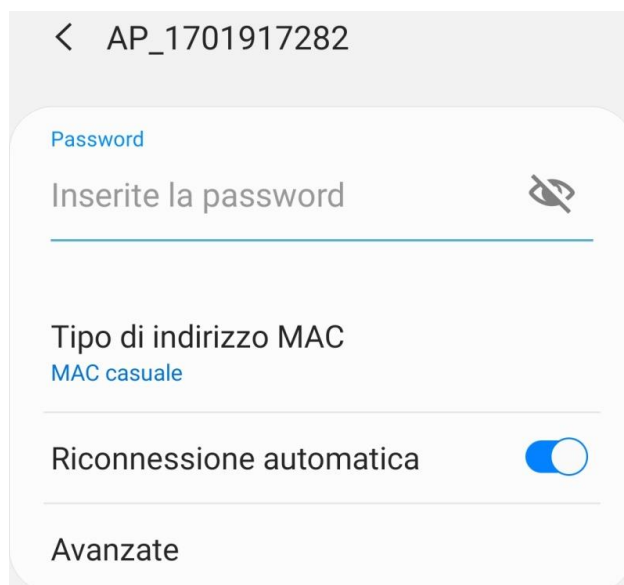


Figure 88 - Password entry prompt

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

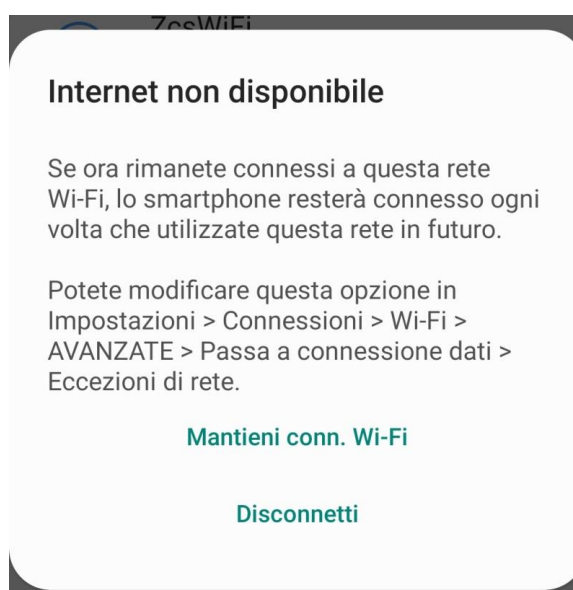


Figure 89 - Screen showing that the Internet cannot be accessed

- 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.

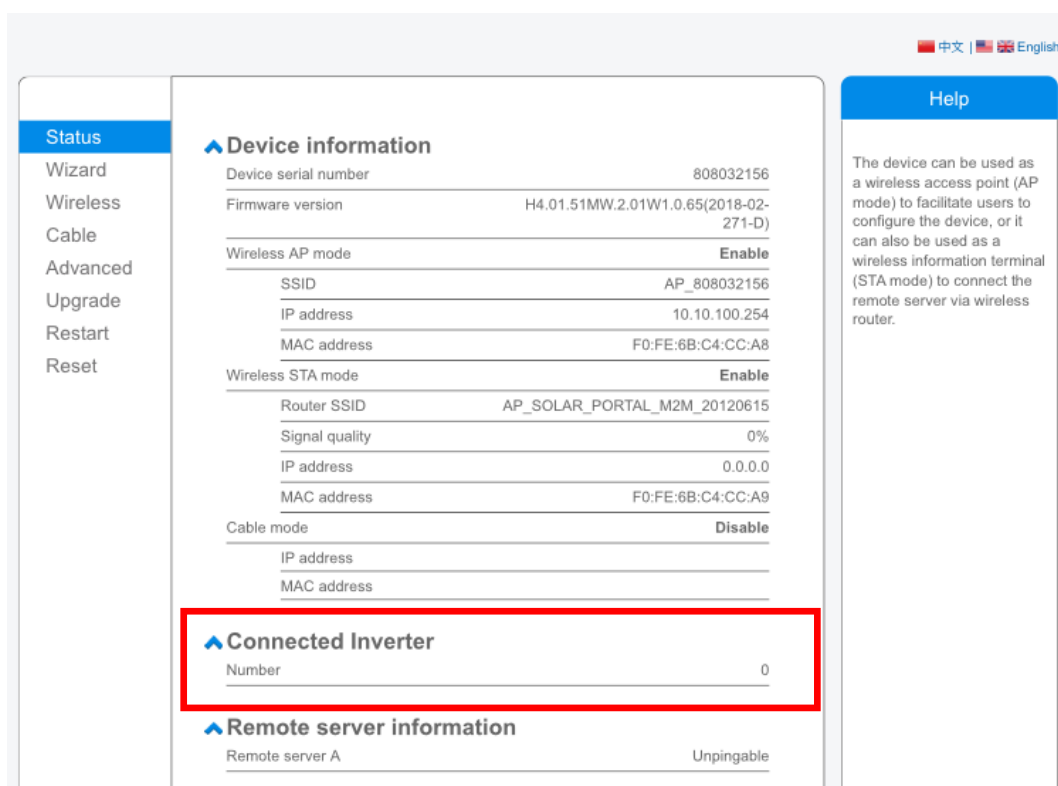


Figure 91 – Status Screen

- 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



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

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

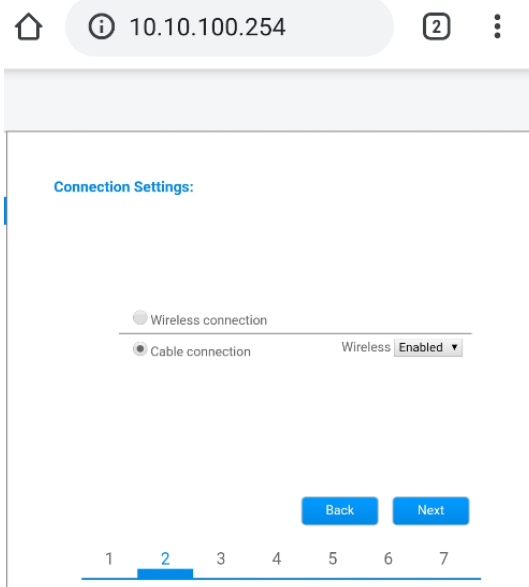


Figure 93 - Network cable connection selection screen

- 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:

Obtain an IP address automatically	Enable ▾
IP address	0.0.0.0
Subnet mask	0.0.0.0
Gateway address	0.0.0.0
DNS server address	

1 2 3 4 **5** 6 7

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	<input type="checkbox"/>
Change the encryption mode for AP	<input type="checkbox"/>
Change the user name and password for Web server	<input type="checkbox"/>

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.



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.

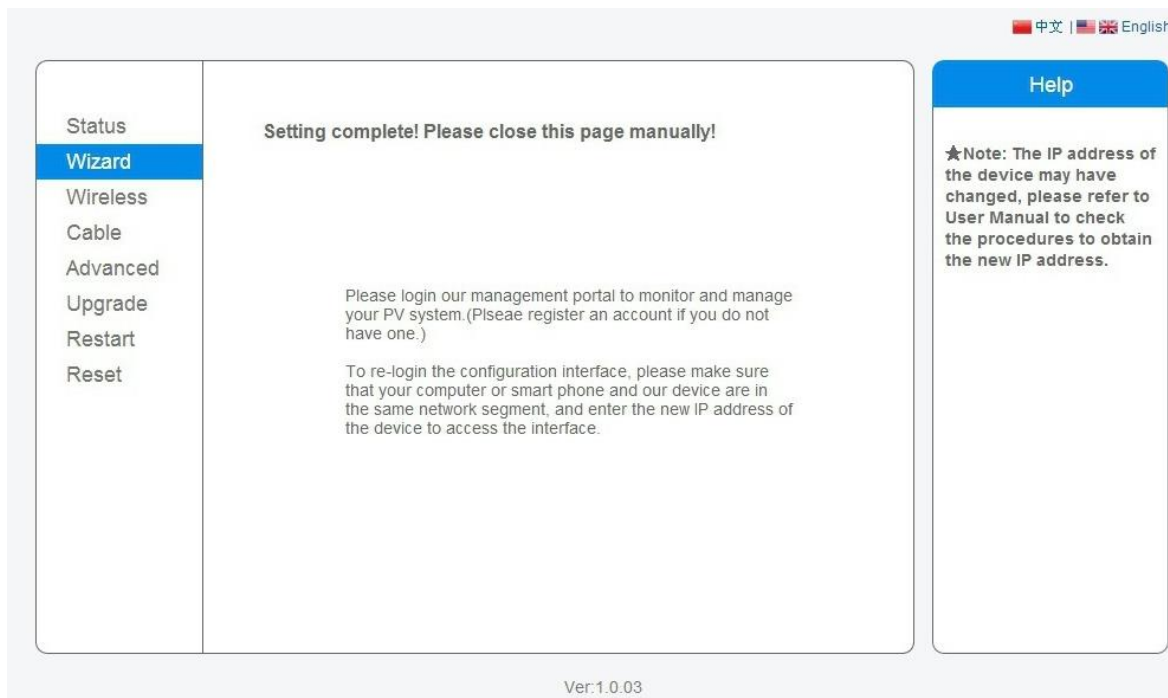


Figure 97 – Successful configuration screen

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	Enable
SSID	AP_508263482
IP address	10.10.100.254
MAC address	BC:54:F9:F6:B9:74
Wireless STA mode	Enable
Router SSID	iPhone di Giacomo
Signal quality	100%
IP address	172.20.10.10
MAC address	BC:54:F9:F6:B9:75
Cable mode	Disable
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	Enable
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.

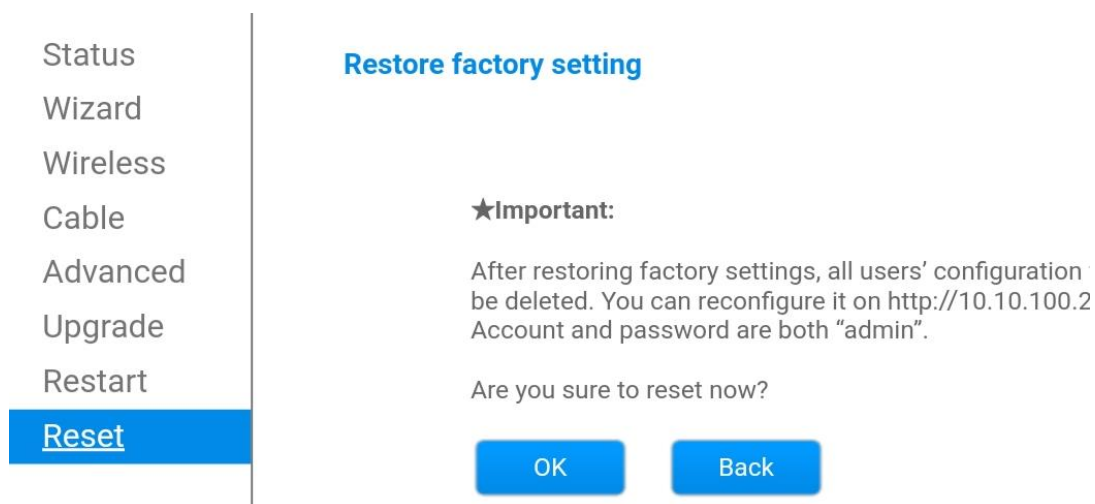


Figure 101 – Reset Screen

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.

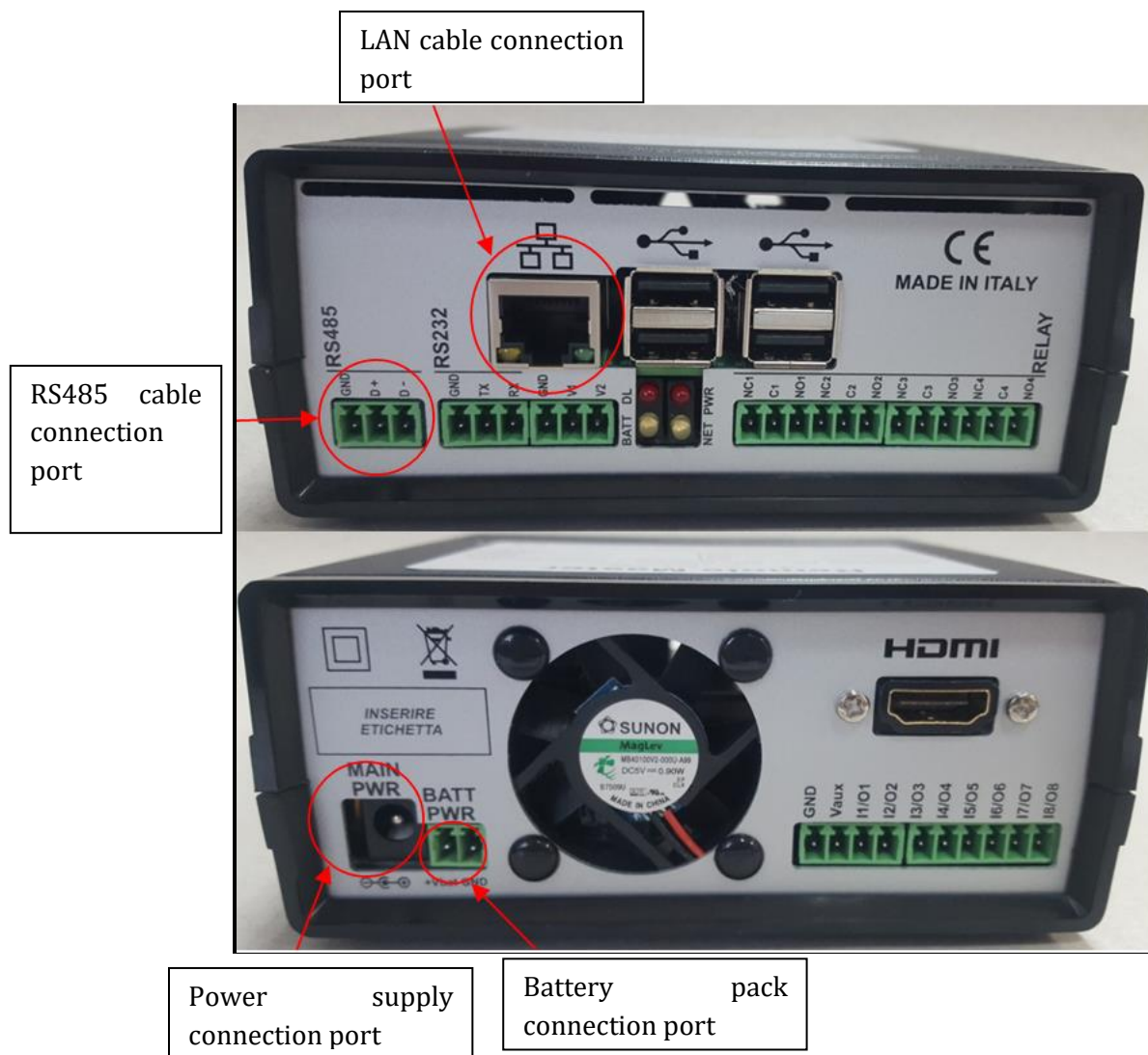


Figure 102: Datalogger rear panel

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 (ZSM-IRR-TEMP-LM2)	Inverter SIDE
D+ terminal	+	RS485- IB terminal	+Tx terminal
D- terminal	-	RS485- IA terminal	-Tx 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_{bat} and GND inputs of the BATT PWR connector, positive and negative respectively (i.e. red to the +V_{bat} 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 (ZSM-IRR-TEMP-LM2)	Inverter SIDE
D+ terminal	+	RS485 +IB terminal	+Tx terminal
D- terminal	-	RS485 -IA terminal	-Tx 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
V1 terminal (12Vdc output voltage)	RED +12V Terminal
GND terminal (GND/RTN)	BLACK 0V Terminal
V2 terminal (12Vdc driveable voltage)	

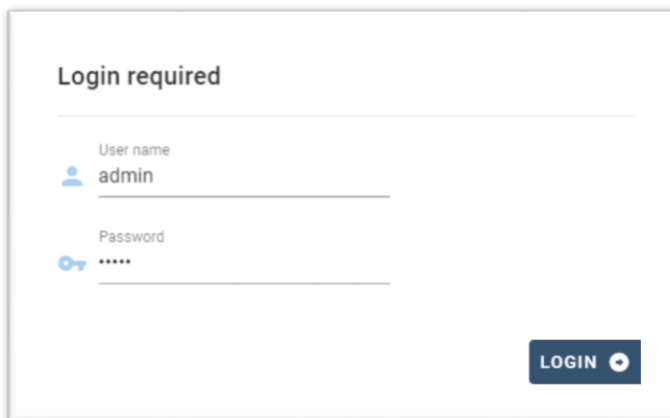
Table 4: Electrical connection of the sensor to the datalogger (power supply)

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 and login by entering the temporary credentials: Username = admin and Password = admin.





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


RMS00000005

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.


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

Scan for devices

+



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

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.

Scan for devices

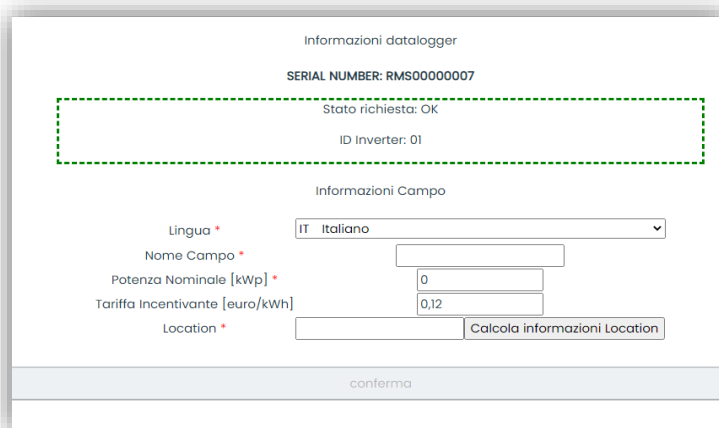
Device Type	Direction	Vendor	Interface	Protocol	Serial number	Slave Id	Status	
Inverter		ZCS	RS-485	RTU	ZM1ES030JC4258	1	Saved	

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).



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.

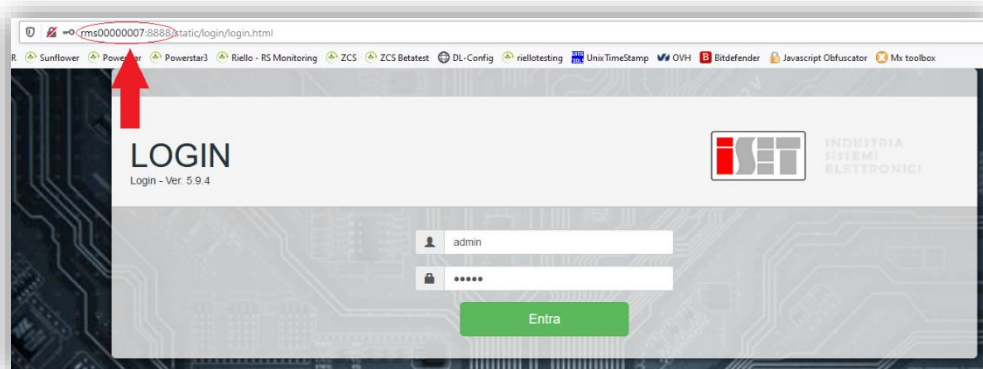


Once the “location” of the field has been entered, click “Calculate Location Information” to allow the system to obtain the latitude, longitude and time zone of the installation. Click “Confirm” to complete the configuration of the field. You only need to wait a few minutes to view the data flow on the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

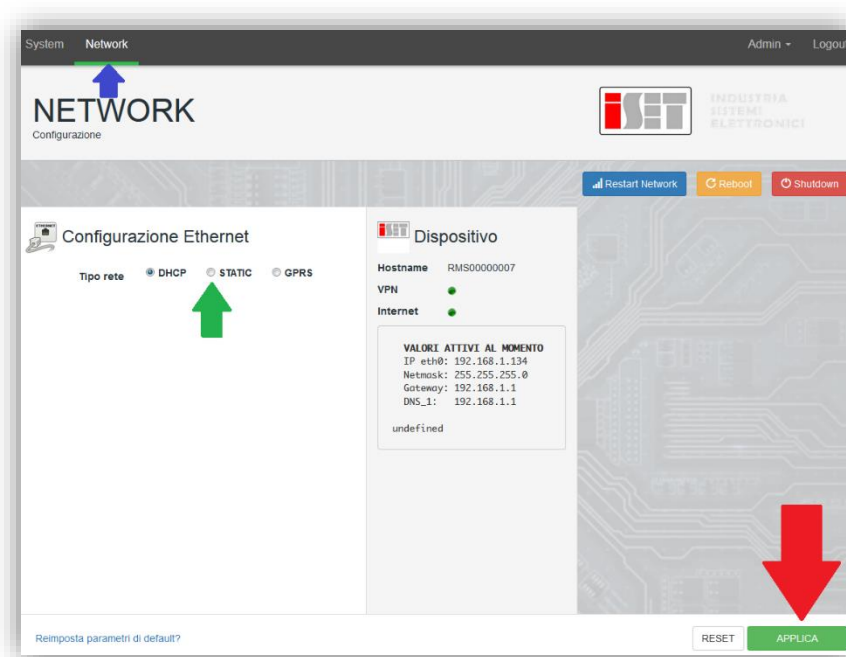
ATTENTION: The location data is essential for the correct operation of the datalogger in the ZCS system. It is important to define it very carefully.

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 RMSxxxxxxx: 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, CO₂ gains and savings.

Below is an example of a local monitoring page.

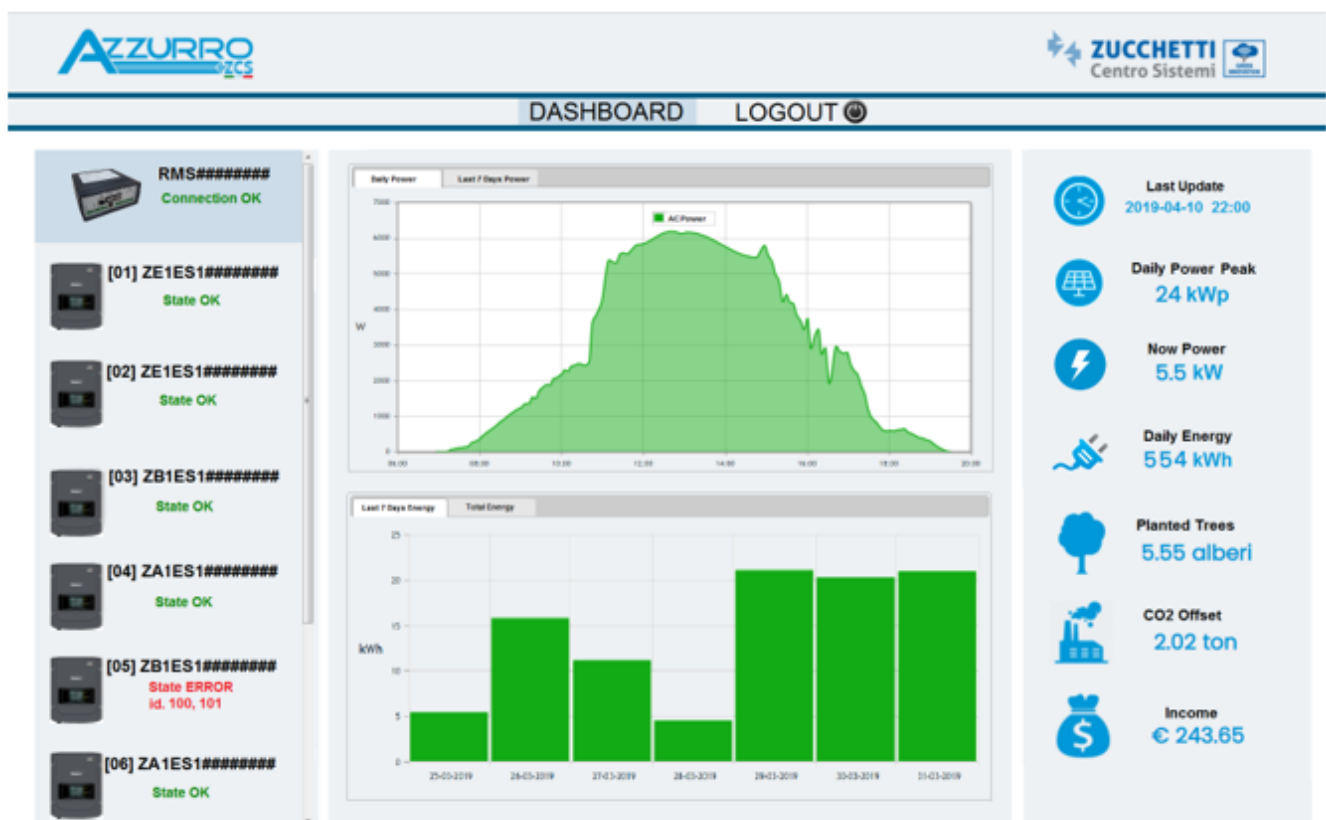


Figure 103: Example of local monitoring page

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.



THE INVERTER THAT LOOKS AT THE FUTURE

zcsazzurro.com



ZUCCHETTI
Centro Sistemi



Zucchetti Centro Sistemi S.p.A.
Green Innovation Division
Palazzo dell'Innovazione - Via Lungarno, 167
52028 Terranuova Bracciolini - Arezzo, Italy
zcscompany.com

