

Rules for installing batteries on Azzurro ZCS storage or hybrid systems

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This document aims at guiding the user on how to correctly select and install batteries supplied by ZCS for use with its storage or hybrid systems. It provides details on the correct positioning and mounting of the batteries and clearly illustrates the limitations regarding the installation conditions. Failure to comply with these limitations will invalidate the warranty conditions.

1. Constraints relating to the installation site of the batteries and general rules

All batteries supplied by ZCS have a protection rating of IP20 and therefore are not designed for outdoor installation. The batteries must be installed indoors or inside cabinets/compartments with the following requirements:

- Completely closed or adequately protected;
- Controlled relative humidity or, in any case, must be able to prevent the formation of condensation with appropriate ventilation systems;
- A temperature range as limited as possible. A range of 0°C- 40°C is recommended;
- No possibility of flooding or the battery coming into contact with liquids, even accidentally.



Attention

Attention: failure to comply with the above conditions will lead to the voiding of the system's warranty.

Other general installation recommendations to make maintenance easier:

- When mounted on a wall with a wall bracket, batteries should not be positioned at heights greater than 1.8 metres for access and maintenance reasons.
- The batteries must be installed in such a way as to ensure that the power and communication contacts, any configuration dialswitches and service access connectors (RS485, RS232, CAN, LAN, etc.) must be easily accessible for maintenance or inspection.
- Install the batteries so that the serial ports and all the LED indicators or power switches are easily visible or accessible.

2. Possible use of non-ZCS batteries

ZCS does not accept the installation of battery models other than those supplied and tested as compatible.

	<p>Attention: Installation of battery models other than those supplied by ZCS will void the warranties</p>
Attention	

ZCS will also verify whether the batteries installed were supplied by ZCS itself. If this is not the case, ZCS cannot guarantee full compatibility of batteries supplied by third parties with its systems. If the batteries installed are models identical to those supplied by ZCS but not supplied by ZCS, the warranty will only cover the connected inverter and for a period of 2 years.

	<p>Attention: Installation of batteries of the correct model, but not supplied by ZCS, excludes the possibility of extending the warranty on the inverter beyond 2 years.</p>
Attention	

3. Constraints on adding battery modules at different times

Storage batteries are modular by definition and the configurations can be changed by adding or removing battery modules during the life of the system. The limits on the maximum or minimum number of battery modules to be installed for each inverter remain valid for the entire life of the system. These limits are explained in the ZCS technical documentation. The addition of one or more battery modules must be carried out within one calendar year from the commissioning of the system (commissioning is considered to be the initial start-up of the system and not the connection by the grid operator). The additions must be carried out in accordance with the technical instructions provided by ZCS. Please contact ZCS before making any changes or additions to existing systems.

	<p>Attention: The addition of battery modules more than one calendar year after commissioning may result in malfunctions for which ZCS shall not be responsible.</p>
Attention	

These technical rules must be followed in the event of temporary removal of the batteries from the system for analysis, external charging or factory upgrades.

4. Constraints for cabling and installation distances from inverters

The materials supplied by ZCS must be considered as a single system, although inverters, batteries and cables can be ordered separately. ZCS supplies suitable ready-made cables for each battery or group of batteries without the need for crimping / splicing / modification. For each battery model or associated inverter, ZCS supplies cables of different codes, characteristics and lengths. For installations other than those listed in this guide, ZCS may supply non-standard cables if contacted prior to the construction of the system and during the design phase and when calculating the spaces and distances.

Splices of cable sections, replacement of connectors, connections to switchboards or intermediate switches as well as other modifications will not be accepted by ZCS for safety reasons or because they may affect the proper functioning of the system. At the time of the request for assistance or analysis of the fault, ZCS will request pictures of the installation to determine whether the conditions for the application of the warranty are met.



Attention

Attention: Any installation made with cables or wires not supplied by ZCS or modifying these cables or wires in any way will automatically void the warranty of the entire system.

5. Installation of batteries with 3000SP single-phase hybrid inverters or storage systems

This section outlines the requirements and recommendations for installing batteries of various models with the inverters listed below:

- Model 1PH HYD3000/3600/4000/4600/5000/6000 ZSS
- Model 3000SP

5.1. Constraints for installation with Pylontech batteries

Multiple Pylontech models are available that are compatible with each other and can be used with single-phase hybrid inverters or storage systems. The models supplied by ZCS are:

- Model US2000
- Model US2000B
- Model US2000C

Please refer to the documentation at www.zcsazzurro.com for the battery characteristics. These batteries can be installed in special boxes, on special brackets or in racks. The installation distances must take into account that the cables supplied have the following dimensions:

- **Connection cable between inverters and batteries - 2m to be ordered separately**
- **Battery parallel connection cable - 2m battery cable included, 0.6m or 1.5m cables can be ordered separately**

	<p>Attention: When designing and positioning the components, please note the maximum length of the cables supplied. ZCS shall not be liable for any faults caused by cables that are too short or too long</p>
<p>Attention</p>	

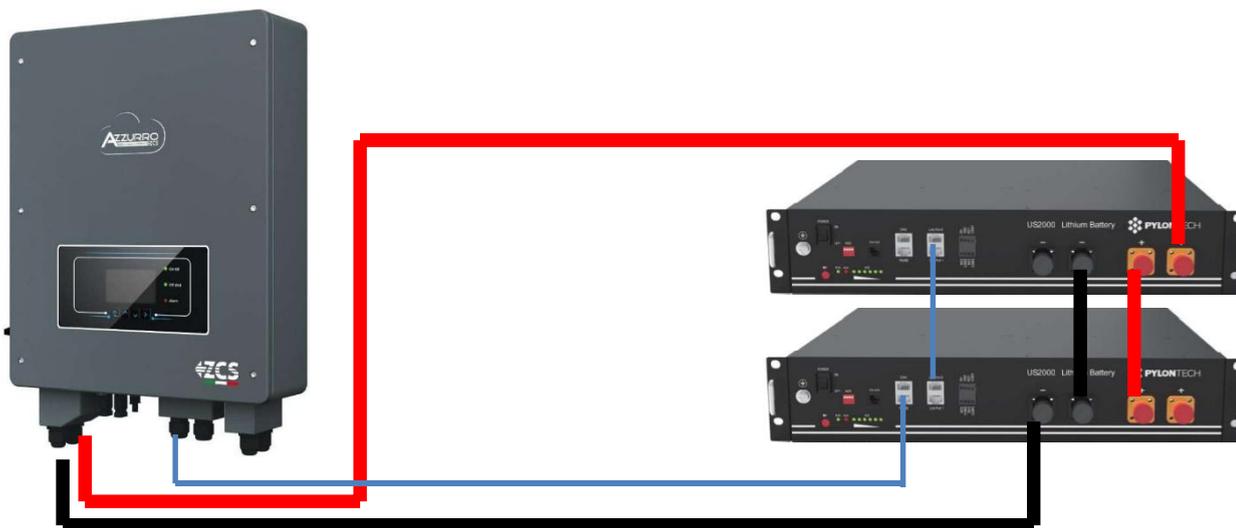


Figure 1 - example of connections with two batteries

If Pylontech batteries are used in conjunction with these inverter models, a maximum of 8 batteries can be connected in parallel. Please refer to the quick start guide and related manuals at www.zcsazzurro.com for all technical details regarding the connections, settings and configurations.

5.2. Constraints for installation with Wecco batteries

Multiple Wecco models are available that are compatible with each other and can be used with single-phase hybrid inverters or storage systems. The models supplied by ZCS are:

- Model 4k4
- Model 5k3 LV

Please refer to the documentation at www.zcsazzurro for the battery characteristics. These batteries can be installed individually on the ground or stacked in a tower or mounted on a wall using the bracket supplied.

The installation distances must take into account that the cables supplied have the following dimensions:

- **Connection cable between the inverters and batteries - 2.5m battery cable included for 4k4 models, 2.5m cable to be ordered separately for 5k3 models**
- **Battery parallel connection cable - 2.5m battery cable included for 4k4 models, 2.5m cable to be ordered separately for 5k3 models**



Attention

Attention: When designing and positioning the components, please note the maximum length of the cables supplied. ZCS shall not be liable for any faults caused by cables that are too short or too long



Figure 2 - example of connections with two batteries

If Weco batteries are used in conjunction with these inverter models, a maximum of 5 batteries can be connected in parallel. Please refer to the quick start guide and related manuals at www.zcsazzurro.com for all technical details regarding the connections, settings and configurations.

5.3. Constraints for installation with ZSX5000 batteries

Please refer to the documentation at www.zcsazzurro.com for the battery characteristics.

These batteries can be installed individually on the ground or mounted on a wall using the bracket supplied.

The installation distances must take into account that the cables supplied have the following dimensions:

- **Connection cable between inverters and batteries - 2m to be ordered separately**
- **Battery parallel connection cable - 1.5m to be ordered separately**

	<p>Attention: When designing and positioning the components, please note the maximum length of the cables supplied. ZCS shall not be liable for any faults caused by cables that are too short or too long</p>
<p>Attention</p>	



Figure 3 - example of connections with two batteries

If ZSX5000 batteries are used in conjunction with these inverter models, a maximum of 4 batteries can be connected in parallel. Please refer to the quick start guide and related manuals at www.zcsazzurro.com for all technical details regarding the connections, settings and configurations. Installing 4 of these batteries requires one of the exact positions shown below in relation to the inverter.



Figure 4 – distribution of four ZSX5000 batteries allowed

6. Installing batteries with three-phase hybrid inverters

This section outlines the requirements and recommendations for installing batteries of various models with the inverters listed below:

- Model 3PH HYD5000/6000/8000/10000/15000/20000 ZSS

6.1. Constraints for installation with Pylontech batteries

Only the following Pylontech batteries can be installed on these inverter models:

- Model 48050

These must be installed in series and a BMS must be provided at the head of the series. The Battery Management Systems available are:

- BMS500 for use on series of 4 to 8 batteries
- BMS1000 for use on series of 9 to 12 batteries

Please refer to the documentation at www.zcsazzurro for the battery and BMS characteristics. These batteries can only be installed in special racks to create the series. The installation distances must take into account that the cables supplied have the following dimensions:

- **Connection cable between inverters and batteries - 2m or 5m to be ordered separately**
- **Series Battery Connection cable - 0.2m battery cable included**

 <p>Attention</p>	<p>Attention: When designing and positioning the components, please note the maximum length of the cables supplied. ZCS shall not be liable for any faults caused by cables that are too short or too long</p>
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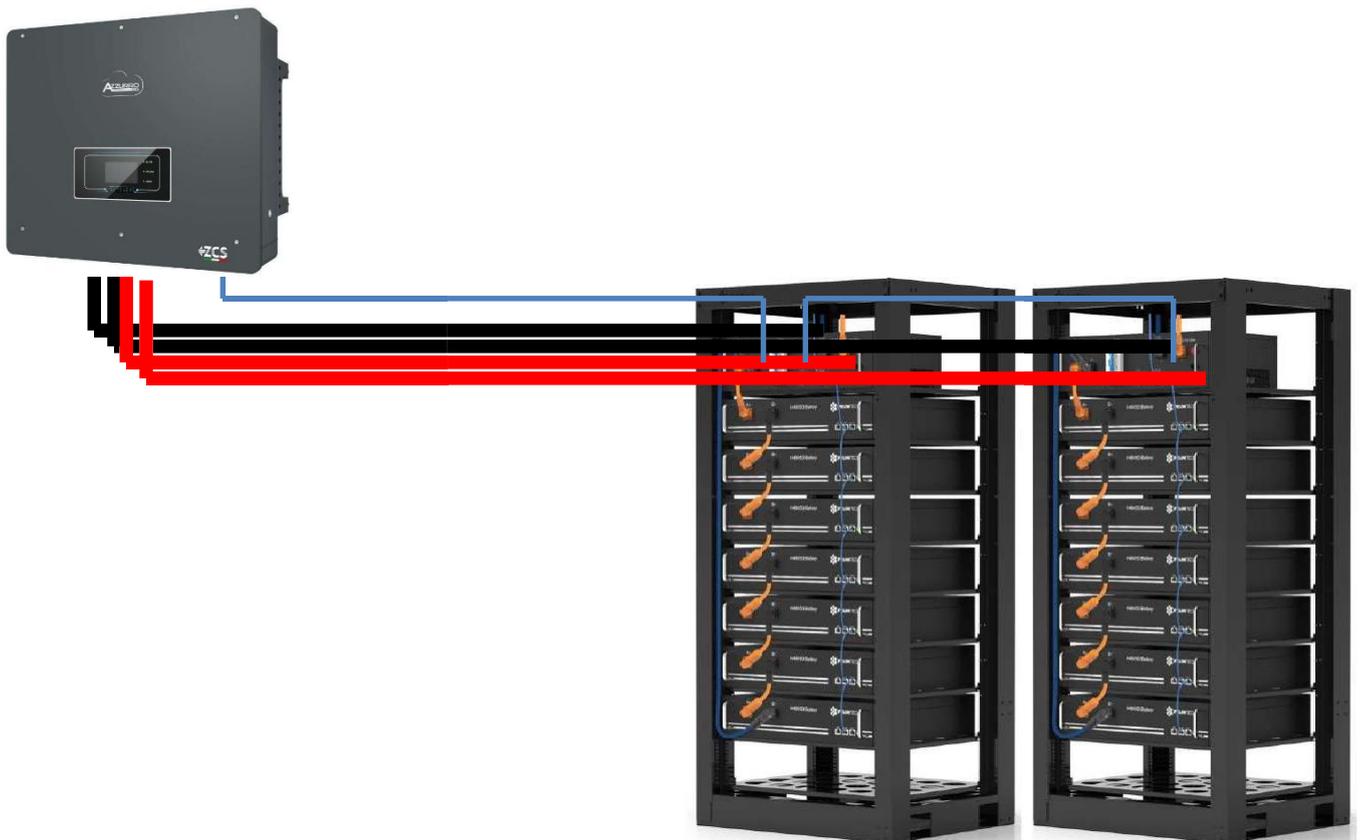


Figure 5 - example of connections with two battery towers

If Pylontech batteries are used in conjunction with these inverter models, a minimum of 4 batteries can be connected in series, while a maximum of 12 batteries can be installed for each tower. Please refer to the quick start guide and related manuals at www.zcsazzurro.com for all technical details regarding the connections, settings and configurations.

6.2. Constraints for installation with Weco batteries

Only the following Weco batteries can be installed on these inverter models:

- Model 5k3 HV

These must be connected in series and a HV BOX must be provided at the head of the series. Please refer to the documentation at www.zcsazzurro.com for the battery and HV BOX characteristics. These batteries can only be installed **stacked**. Different types of installation are not accepted as standard and should be avoided (please contact ZCS before planning for different or special requirements).



Attention

Attention: Installations of these non-stacked batteries must be specifically requested from ZCS prior to installation.

The installation distances must take into account that the cables supplied have the following dimensions:

- **Connection cable between inverters and batteries - 5m included in HV BOX**
- **Series battery connection cable - 0.2m battery cable included**
- **Connection cable between physical towers - 2m included in HV BOX**



Attention

Attention: When designing and positioning the components, please note the maximum length of the cables supplied. ZCS shall not be liable for any faults caused by cables that are too short or too long

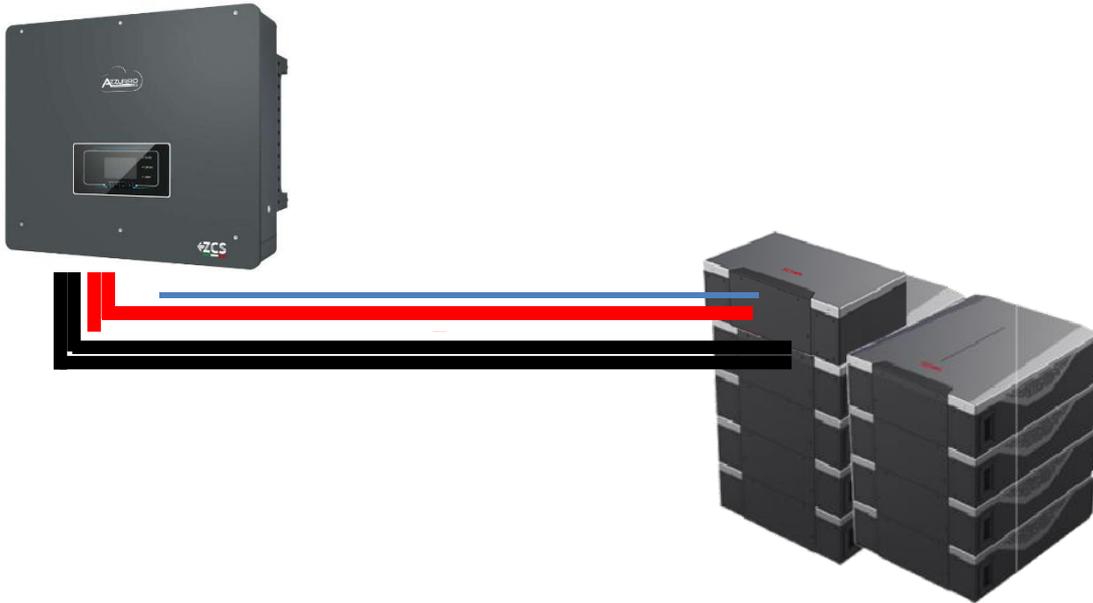


Figure 6 - example of connections with 1 battery tower divided into 2 physical towers

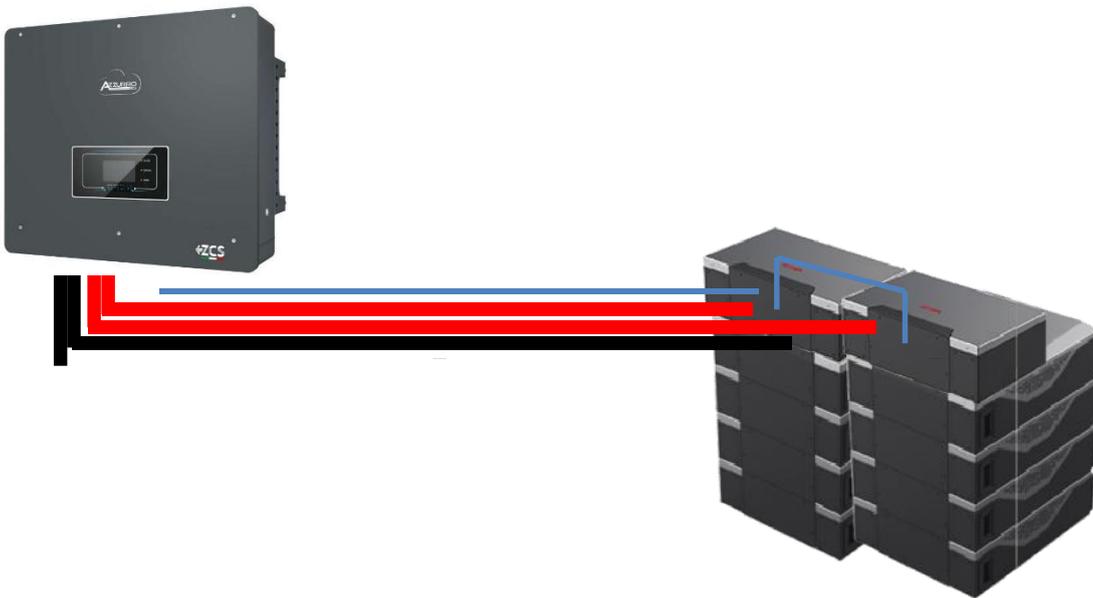


Figure 7 - example of connections with 2 logical towers





Figure 8 - example of non-stacked installation (not allowed, please contact ZCS before designing such as installation)

Physical towers can be built by stacking up to a maximum of 7 battery modules + HV BOX. If there are 8 or more batteries on the same logical tower, it is necessary to divide it into two physical towers.

7. Summary tables

This section summarises the cable codes in the various cases and the maximum lengths in the different installation cases.

7.1. 3000SP single-phase hybrid or storage + Pylontech

No. of batteries	Inverter connection cable (power cables only)	Length	Parallel cables between batteries (power and communication cables)	Length
1	ZST-CABLE-KIT	2m	-	-
2-8			Included in battery pack	0.2m
			ZST-CABLE-0.6M	0.6m
	ZST-CABLE-1.5M	1.5m		

7.2. Single-phase hybrid or 3000SP storage + Weco 4k4

No. of batteries	Inverter connection cable (power and communication cables)	Length	Parallel cables between batteries (power and communication cables)	Length
1	Included in battery pack	2.5m	-	-
2-5			Included in battery pack	2.5m

7.3. 3000SP single-phase hybrid or storage + Weco 5k3

No. of batteries	Inverter connection cable (power and communication cables)	Length	Parallel cables between batteries (power and communication cables)	Length
1	ZST- LV-KIT	2.5m	-	-
2-5			ZST- LV-KIT	2.5m

7.4. 3000SP single-phase hybrid or storage + ZSX5000

No. of batteries	Inverter connection cable (power cables only)	Length	Parallel cables between batteries (power and communication cables)	Length
1	ZST-CABLE-KIT	2m	-	-
2-4			ZST-CABLE-1 5M	1.5m

7.5. Three-phase hybrid + Pylontech

No. of batteries	Inverter connection cable (power and communication cables)	Length	Parallel cables between batteries (power and communication cables)	Length
4-12	ZST-PYL-CABLE-2M	2m	Included in battery pack	0.2m
4-12	ZST-PYL-CABLE-5M	5m		

7.6. Three-phase hybrid + Weco

No. of batteries	Inverter connection cable (power and communication cables)	Length	Parallel cables between batteries (power and communication cables)	Length
4-11	Included in HV BOX pack	5m	Included in battery pack	0.2m

The HV BOX also includes a 2-metre cable for interconnecting the physical towers.