

Setting "Zero Feed-In" mode for 3.3-12KTL-V1 inverters

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1 Table of revisions

<i>Rev.</i>	<i>Dated created</i>	<i>Author</i>	<i>Description/modifications</i>
00	17/05/2023	F.M.	First issue

2 Purpose

This document contains the technical connection and configuration instructions for correctly enabling the "Zero Feed-in" mode for a system comprising one 3.3- 12KTL-V1 inverter. For systems comprised of multiple inverters from different ranges, please refer to the documentation relating to the "COMBOX" device at www.zcsazzurro.com.

3 Required devices and minimum configurations

3.1 Example of a system with a single inverter

The following devices are required in order to correctly configure the "Zero Feed-In" mode where the production plant consists of only one inverter from the 3.3-12KTL-V1 range:

- a) ZCS 3.3-12KTL-V1 inverter.
- b) DTSU666 meter with CTs supplied by ZCS (or commercial CTs with 5A secondary).
- c) (Alternatively to point b)) ARPC (Anti Reverse Power Control) device supplied by ZCS fitted with three suitable CT sensors.
- d) Connection cables for DTSU666 Meter or ARPC (not supplied by ZCS).

3.1.1 Connections with single inverter and DTSU666 Meter

In this case, the DTSU666 meter must be positioned as shown in the logical block diagram below

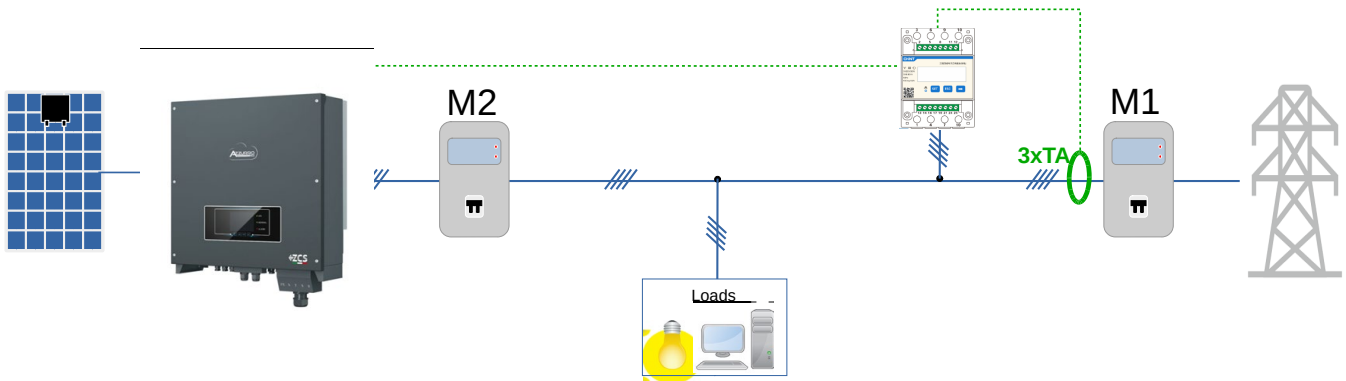



Figure 1 - logical position of the DTSU666 meter

In this case, the meter must be placed close to the import/export meter (M1) in order to measure all incoming and outgoing flows (or in a logically equivalent position).

	<p>CT or meter connections in positions other than those indicated may compromise the proper functioning of the "Zero Feed-In" mode</p>
<p>Attention</p>	

Once the correct positioning of the meter has been established and the voltmeters and CTs have been connected, the meter can be configured by following these steps



1 2 3

Figure 2 - Meter Legend

1. Press to:
 - "Confirm"
 - "Move cursor" (to enter digit)
2. Press to "go back"
3. Press to "add"

1. Press SET, the word CODE will appear



2. Press SET again, the number "600" will appear:



3. Enter the number "701":
 - a. From the first screen where the number "600" appears, press the "→" key once to write the number "601".
 - b. Press "SET" twice to move the cursor left, highlighting "601";
 - c. Press the "→" key again until the number "701" is written (701 is the code for accessing the settings).

Note: In case of an error, press "ESC" and then "SET" again to reset the required code.



4. Confirm by pressing SET until you enter the settings menu.
5. Enter into the following menus and set the parameters indicated:
 - a. **CT:**
 - i. Press SET to enter the menu
 - ii. Enter "40" (in the case of sensors supplied by ZCS 200/5, or the correct transformation ratio of the CTs used):



1. From the first screen where the number “1” appears, press the “→” key several times until the number “10” is written.
2. Press SET once to move the cursor left, highlighting “10”
3. Press the “→” key several times until the number “40” is written

Note: In case of error, press “SET” until the digit for thousands is highlighted and then press “→” until only the number “1” appears; at this point, repeat the procedure described above.

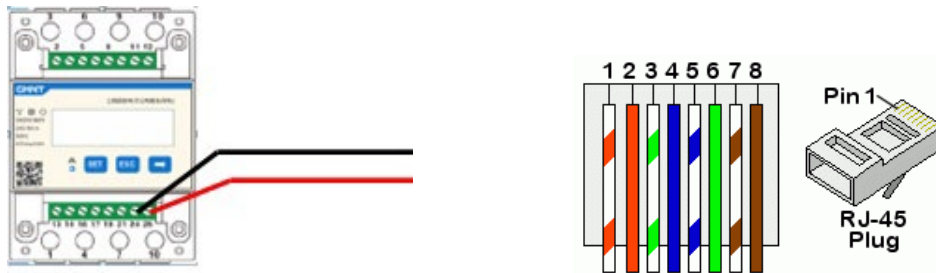


iii. Press “ESC” to confirm and “→” to scroll to the next setting.

b. ADDR:

- i. Leave address 01 (default setting) so that the inverter assigns the data sent by the meter as the power relating to the exchange.

After the meter has been configured, the communication of the meter can be connected to the inverter according to the attached diagram:



Pin Meter	Pin RS485 inverter connector
24	4
25	5

Figure 3 – meter - Inverter communication connections



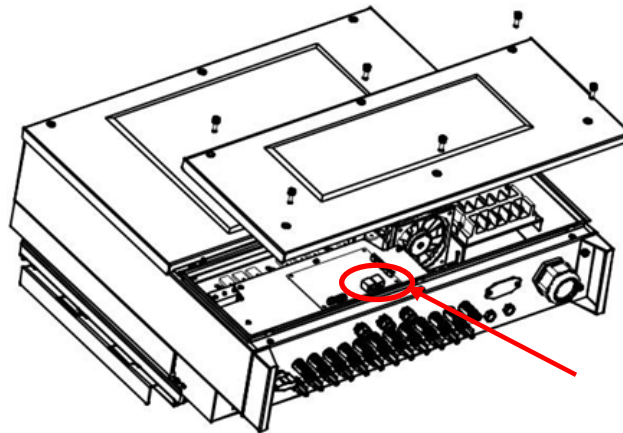


Figure 4 – Position of RS485 connectors on the inverter


Connect PIN 24 of the meter to PIN 4 of the RJ45 connector to be connected to the inverter's RS485 port and PIN 25 to PIN 5. Use a twisted and shielded CAT5 or CAT6 cable for the connection. If the distance between the meter and inverter is greater than 50 m, it is recommended to use a terminating resistor of 120ohm (0.25W) between PINs 24 and 25 of the meter.

3.1.2 Inverter checks and configuration with a single inverter and DTSU666 meter

Once the connections have been made and the meter and inverter have been switched on, it is necessary to configure the presence of the meter from the inverter display.

Perform a preliminary check of the inverter software versions by entering the menu:
"system info" -> "service code" (password required: 0715)

The minimum firmware version compatible with the presence of the meter is version 2.52.

 <p>Attention</p>	<p>Earlier firmware versions do not allow connecting the meter, and consequently, correctly configuring the "Zero Feed-in" function. For earlier firmware versions, update the inverter as indicated in the appropriate procedures in the manuals or on the website www.zcsazzurro.com</p>
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Enter the menu:

"Settings" -> "Set ElecMeter" (password 0001) and select "Enable"

Enter the menu:

"Settings"->"Set Derat" (password 0001) and select "Enable", select "Set ElecM Mode" to set the desired input power value



Note


The set power value can also differ from 0kW, in which case the inverter will adjust itself so that the three-phase power fed into the grid never exceeds the set value.


Switch off the inverter and meter.

3.1.3 Functional checks with a single inverter and DTSU666 meter

After restarting the meter and inverter, the functionality check can be carried out. The following procedure allows an accurate check of the functioning of the set mode.

- 1) Only switch on the meter with the PV inverter switched off, making sure that there are active loads on the system. Loads of at least 1kW per phase are recommended for accurate measurements. On the meter display, scroll through using the “->” key to see the information and check that:
 - a) The ‘P_t’ values are negative and equal to the total consumption
 - b) The ‘P_A’, ‘P_B’ and ‘P_C’ values are negative and equal to the consumption for each phase
 - c) The ‘F_A’, ‘F_B’ and ‘F_C’ values are close to 1 or at least > 0.8
 These checks ensure the correct connection of the CT sensors and the correct cyclic direction of the phases
- 2) Switch on the inverter
- 3) Wait 300 seconds for the inverter to start
- 4) Wait for the system to enter production mode. If the potential production is higher than the active loads, the inverter production will be capped to a level that prevents any of the three phases from feeding power into the grid.
- 5) On the meter display, scroll using the “->” key to check the ‘P_A’, ‘P_B’ and ‘P_C’ values, noticing that one or more of these three values fluctuate but remain close to 0W.
- 6) On the other hand, if the potential output is lower than the loads present, disconnect the loads, even if they are only on one phase, and then repeat the checks in point 5).

	<p>If one of the phases has no active load connected and the "Zero Feed-in" mode is set to 0kW, the inverter will not produce any power. This is to avoid feeding current into the grid on that phase</p>
Note	

	<p>If the "Zero Feed-In" mode is set to 0kW, the output of the inverter might be slightly lower than the total load due to the unbalancing of the inverter itself. This prevents power from being fed into all three phases. This would always result in a slight withdrawal from the grid. This condition is perfectly normal and technically correct</p>
Note	

3.1.4 Connections with single inverter and ARPC

In this case, the ARPC device must be positioned as shown in the logical block diagram below

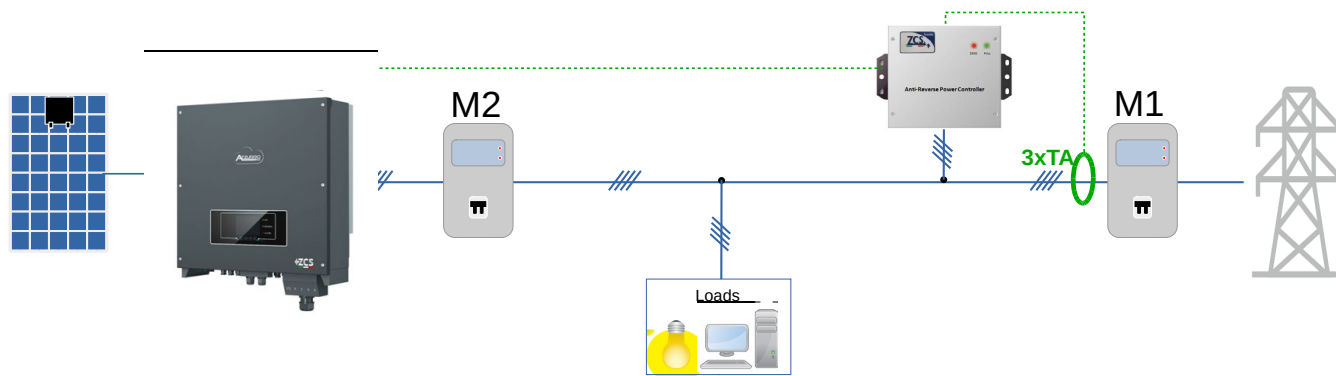


Figure 5 - logical position of the ARPC device

In this case, the ARPC device must be placed close to the import/export meter (M1) in order to measure all incoming and outgoing flows (or in a logically equivalent position).

	<p>CT or ARPC connections in positions other than those indicated may compromise the proper functioning of the "Zero Feed-In" mode</p>
<p>Attention</p>	

Once the ARPC device has been correctly positioned and the voltmeters and CTs have been connected according to the instructions in the manual supplied with the device, the ARPC and the inverter can be connected.

Connect the appropriate connectors of the ARPC and inverter according to the table

ARPC Pin	Inverter 'INx' connector pin
COM	GND
RY1	IN1
RY2	IN2
RY3	IN4
RY4	IN4

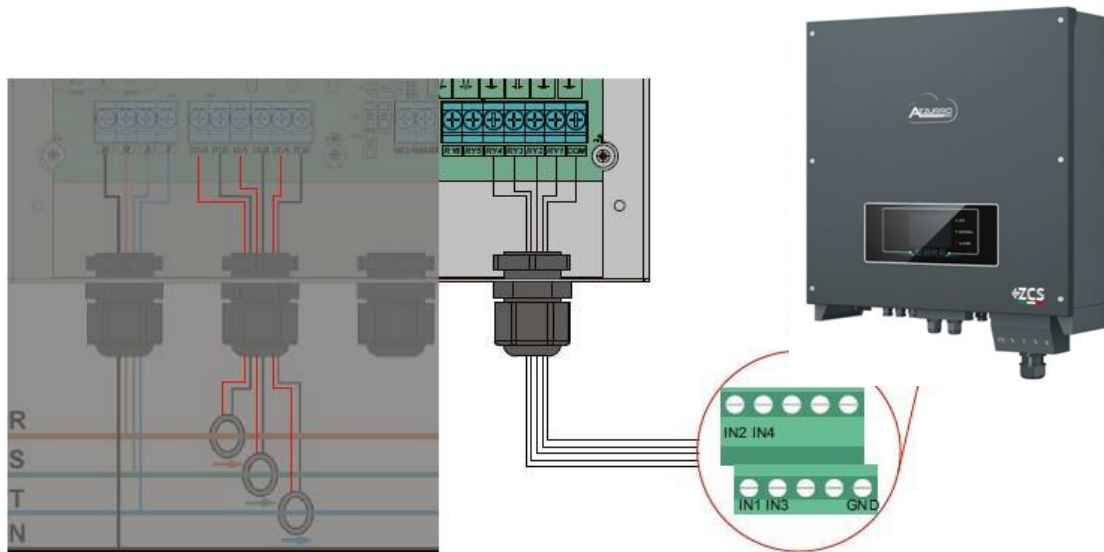



Figure 6 – Communication connections of ARPC device

3.1.5 Inverter checks and configuration with a single inverter and ARPC

Once the connections have been made and the ARPC and inverter have been switched on, it is necessary to configure the presence of the ARPC from the display.

Enter the menu:

"Settings" -> "Set Derat" (password 0001) and select "Enable", select "Set CT Mode"

 Note	<p>The set power value cannot differ from 0kW; this value is pre-set on the ARPC device. If it is necessary to set a feed-in value other than 0kW, this setting must be done by ZCS before the device is sent</p>
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Switch off the inverter


3.1.6 Functional checks with a single inverter and ARPC

After restarting the inverter, the functionality check can be carried out. The following procedure allows an accurate check of the functioning of the set mode.



- 1) Switch on the inverter
- 2) Wait 300 seconds for the inverter to start
- 3) Wait for the system to enter production mode. If the potential production is higher than the active loads, the inverter production will be capped to a level that prevents any of the three phases from feeding power into the grid.
- 4) Check the status of the LEDs on the ARPC device:
 - a) Green LED steady on -> ARPC correctly powered and no active limitation
 - b) Red LED flashing and green LED off -> ARPC commanding power limitation
 - c) Red LED steady on -> Incorrect wiring of ARPC sensors
- 5) On the other hand, if the potential output is lower than the loads present, disconnect the loads, even if they are only on one phase, and then repeat the checks in point 5).

	<p>If one of the phases has no active load connected and the "Zero Feed-in" mode is set to 0kW, the inverter will not produce any power. This is to avoid feeding current into the grid on that phase</p>
Note	

	<p>If the "Zero Feed-In" mode is set to 0kW, the output of the inverter might be slightly lower than the total load due to the unbalancing of the inverter itself. This prevents power from being fed into all three phases. This would always result in a slight withdrawal from the grid. This condition is perfectly normal and technically correct</p>
Note	