Energy Meter EM24 manual

1. Introduction and usage

This document is the manual for the three phase max 65 A per phase Energy Meter. As shown in the picture above.

https://www.victronenergy.com/accessories/wired-ac-sensor

The Energy Meter can be used for four things:

1. Grid meter, and used as control input for an ESS System (1).
2. Measure the output of a PV Inverter
3. Measure the output of a AC Genset
4. (deprecated) ~~Grid meter, used as control input for a~~ Hub-4 system

(1) In case the meter is used as a grid meter in a single phase installation, it is possible to use the second phase to measure the output of a PV Inverter.

The meter is connected to the Color Control GX. There are two options in its wiring:

1. Direct connection, either using the RS485 to USB interface with 1.8m cable length, or the 5.0m cable.
2. Wireless connection via Zigbee

The REL200100000 is the EM24DINAV93XISX from Carlo Gavazzi. Other EM24 models from Carlo Gavazzi can also be used, as the communication is the same. For example the EM24DINAV53DISX, which uses Current Transformers and can therefore work in systems > 63A per phase, has been tested and works. Note that this model is not stocked by Victron Energy, we recommend to purchase it locally.

2. AC Wiring and front selector

3-phase diagram:

When used to measure a PV Inverter, terminals 1, 4 and 7 should face the PV inverter to ensure correct direction of current and power.

single phase single function diagram:

Note the jumper between terminals 1 and 4. You do not need this connection if you have the version AV2 of the sensor:

The diagram shows the wiring when used as a grid meter.

To measure a single phase PV inverter in a 3-phase system, connect all 3 phases to the grid phasing terminals (3, 6 and 9). Now you can chose on which phase you want the PV inverter by connecting the L1 line of the PV inverter to terminal 1, 4 or 7.

single phase dual function diagram:

In this diagram, a single meter is used to both measure the grid and a single phase PV Inverter.

On the CCGX go to the grid meter in the Wired AC sensor settings. Make sure 'Phase type' is set to 'Single phase' and 'PV inverter on phase 2' is enabled.

Front selector

Change the front selector so it is not in the locked state. This will allow it to be automatically configured by the rest of the system the meter. The front selector is located next to the display as indicated in this image:



3. Connection to CCGX

Option A: wireless Zigbee connection

Step 1.

Connect the Zigbee to USB converter to the CCGX using the supplied USB cable. A few seconds after connecting, the active LED should be on and the TX/RX LED should be blinking (the converter takes its power from the CCGX, so the CCGX needs to be switched on as well).



Step 2.

Connect the Zigbee to RS485 converter to the EM24 energy meter:

Zigbee Converter	Energy meter
GND	Terminal 43
A	Terminal 42
B	Terminal 41





Step 3.

Make sure only one Zigbee device is powered up right now: the Zigbee to USB converter connected to the CCGX. Power down all others. *If you don't do this, the Zigbee to RS485 converter may be connected permanently to another Zigbee device.*

Step 4.

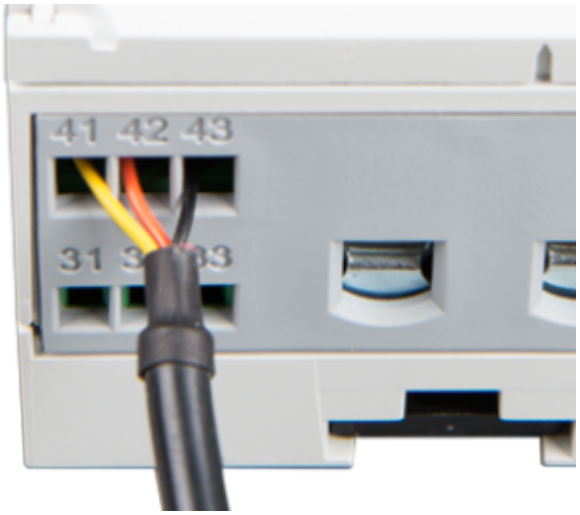
Connect the 12V DC power supply to the Zigbee to RS485 converter. When the power is switched on, check the LEDs again.

Option B: Wired connection to CCGX

Connect the Energy Meter to the CCGX using the USB to RS485 cable. The RS485 to USB interface cable between the CCGX and the Energy Meter can be extended up to 100 meters; make sure that the extensions of the Data+ (orange) and Data- (yellow) wires form a twisted pair.

RS485 Converter	Energy meter
Yellow	Terminal 41
Orange	Terminal 42
Black	Terminal 43

The red, green and brown wire coming out of the USB to RS485 cable are not used



4. Configuration

After proper connection and powering up, the meter will be visible on the CCGX in the Settings → Energy Meters menu:

The menu lists every meter found. And in the gray box at the right side it shows the configured function.

After selecting a meter, see its detailed settings:

5. Multiple Energy Meters in one system

There are 3 options to connect multiple Energy Meters:

1. Each wired to a separate RS485-USB converter. Which are then each plugged into a separate USB socket on the CCGX.
2. 2 meters wired on to one RS485-USB converter. In this case the modbus address of the additional meter needs to be changed, so each is unique. See chapter 6.
3. Wireless connection: the additional meter is connected to an additional Zigbee to RS485 converters. There is then no second Zigbee to USB interface required. It is necessary to change of the modbus address of one of the AC sensors, see chapter 6.

Besides adding an extra sensor, it is also possible, in a single phase installation, to use the, unused, second phase to measure the output of the PV Inverter. See see the AC Wiring chapter in this manual.

6. Changing the modbus address

1. Press the joystick down until until the display shows 'Pass'. The joystick on the right side on the display, above the front selector).
2. Press the joystick down again and release immediately.
3. Press the joystick right several times until 'Address' appears. Press the joystick down. Now you can adjust the address by pressing the joystick up and down. Set it to 2.
4. Press down again. 'Baudrate' appears.
5. Press down again twice. 'Address' appears again.
6. Press right until 'End' appears.
7. Press down. The display now shows measurements again.

Note that only one extra Energy meter can be added: the systems works only with address 1 (the default) and 2.

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