

# INSTALLER'S MANUAL

## AQ-LITH<sup>®</sup> EnergyRack PT PYLONTECH

### &

## 3x Victron MultiPlus-II / Quattro

### Three-phase Victron installation

this manual is valid for the following kits

1x	<b>SOL/VIC3R3T1</b>	kit for retrofit solution with VICTRON 3x3kVA with GX , CT for mains measurement and meter for PV measurement
1x	<b>SOL/VIC3R5T1</b>	kit for retrofit solution with VICTRON 3x5kVA with GX , CT for mains measurement and meter for PV measurement
1x	<b>SOL/VIC3R8T1</b>	kit for retrofit solution with VICTRON 3x8kVA with GX , CT for mains measurement and meter for PV measurement
1x	<b>SOL/VIC3R10T1</b>	kit for retrofit solution with VICTRON 3x10kVA with GX , CT for mains measurement and meter for PV measurement
1x	<b>SOL/VIC6R8T2</b>	kit for retrofit solution with VICTRON 2x3x8kVA with GX , CT for mains measurement and meter for PV measurement
1x	<b>SOL/VIC9R8T3</b>	kit for retrofit solution with VICTRON 3x3x8kVA with GX , CT for mains measurement and meter for PV measurement
1x	<b>SOL/VIC12R8T4</b>	kit for retrofit solution with VICTRON 4x3x8kVA with GX , CT for mains measurement and meter for PV measurement

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### 1 Introduction

This manual is intended to assist in the installation of an AQ- LITH® three-phase battery storage system. It should only be installed by persons qualified in electricity and installation techniques.



The installer must always ensure that the contents of this manual comply with the installation in question and with the latest local legislation such as the AREI, etc.



This manual is for support purposes only. Following a training course (approved by us) is necessary for the correct installation and commissioning of a battery storage system.



**It is necessary to read this manual thoroughly before installing or using any battery.**

**Before installing a battery storage system, always check the conditions for a grid study and the resulting additional safety measures.**

## 2 General information

### 2.1 Contact details Battery Supplies

- Nijverheidslaan +50/56, 8540 Deerlijk, Belgium
- Helpdesk 056 / 434 906
- Email: [info@batterysupplies.be](mailto:info@batterysupplies.be) info@batterysupplies.be and [helpdesk.electronics@tvh.com](mailto:helpdesk.electronics@tvh.com)
- Web: <https://batterysupplies.be/>

### 2.2 Type of manual

This manual is an **installation guide** intended to assist a licensed installer in setting up and commissioning a Battery Supplies battery storage system.

### 2.3 Intended use

The EnergyRack from Battery Supplies is a storage battery intended to store excess solar energy and use it later with the added capability of grid support services and for ups function or for peakshaving capabilities .

The EnergyRack is not suitable for powering life-supporting medical devices and applications. Modifications to this product may only be made with the written consent of Battery Supplies. Without such consent, the warranty will no longer apply. Battery Supplies will not be responsible in case of injury or damage caused by such modifications.

Battery Supplies batteries ( EnergyBox/ EnergyRack) should only be used with Victron inverters.

### 3 Safety



This section contains all the safety information that must be observed during the installation and use of a home battery. To avoid device damage or injury, this section should be carefully read.

#### 3.1 Environmental requirements

- Do not expose the battery to temperatures above 50°C
- Do not place the battery near external heat sources
- Do not expose the battery to moisture or liquids
- Do not expose the battery to corrosive gases or liquids
- Do not expose the battery to direct sunlight for extended periods
- Do not allow power connectors to come into unwanted contact with conductive materials
- Place the battery in a safe environment, away from children or animals
- Place the battery in an environment with minimal dust and dirt



**Failure to meet the environmental requirements can have a negative impact on the operation and life of the product.**

#### 3.2 Precautions for operation

- Never remove the battery housing
- Never touch the battery with wet hands
- Do not drop or dent the battery.
- Never puncture the battery cells or battery housing
- Never place the battery in series
- Always respect the polarity of the power connectors on the battery
- Before installation, remove any jewellery or items that could cause a short circuit.
- Never short-circuit the power connectors
- Store the battery according to the guidelines in this manual
- Ensure proper and reliable earthing

- Disconnect the connection between inverter and battery and then disconnect the battery before servicing, installing or cleaning it.
- Continued use of a damaged battery may cause serious injury
- The battery should never be covered, painted,...
- Never connect the solar panels directly to the battery
- Never connect the battery directly to the AC mains

### 3.3 Emergency situations

#### **Switch off the power supply and the battery in an emergency!**

- Wet batteries: if the battery is wet or submerged , do not let people near the battery. Contact Battery Supplies for further steps.
- Fire: **never extinguish with water!** Only use a dry powder extinguisher and, if possible, move the battery to a safe place.
- Leaking battery: if electrolyte leaks from the battery, avoid all contact with this leaking gas and/or liquid. If anyone did come into contact, take the following steps immediately:
  - o Eyes: immediately flush eyes with water for 15 min and seek medical attention.
  - o Skin: game and wash touched skin with soap and water. Seek medical attention.
  - o Ingestion: try to vomit and seek medical attention.
- Damaged battery: damaged batteries are extremely dangerous and should be treated with due care. These should no longer be used. Contact Battery Supplies for further steps.

### 3.4 Personal protective equipment (PPE)

It is recommended to wear the protective equipment below when working with a battery storage system.

- Insulated gloves
- Safety glasses
- Safety shoes





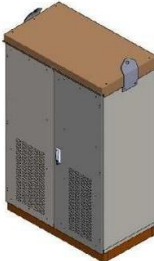
### 4 Overview of components

This first part of "component overview" describes the products provided in the kit. A second part describes the items that must be provided by you, the installer, yourself. This information should help you get an overview of the additional costs you will have to incur to complete the installation.




#### 4.1 Parts list batteries

The kits batteries contain the following parts :





	BATnr	artikel	SOL/48ER15PT	SOL/48ER20PT	SOL/48ER29PT	SOL/48ER48PT	SOL/48ER77PT
	BAT/51035	PYLONTECH module US5000 4,8 kWh	3	4	6	10	16
	BAT/50936	kast 600x600x700H met 19" rack 12U voor 3 modules. IP20	1(*)				
	BAT/51152	kast 581x510x858mm H 31 kg met 16U 19" rack voor 4 modules, IP20	0(*)	1			
	BAT/51151	kast 700x600x2297mmH met 19" rack 38U 95 kg voor 10 modules met ventilator en thermostaat, afneembare hijsogen. IP54			1	1	
	BAT/51122	kast 1200x700x2103 mm H 145 kg voor 16 modules, plaats voor 3 LYNX distributoren met 2 ventilatoren en 2 thermostaten. Met afneembare hijsogen. IP54					1

(\*) tot einde voorraad, dan vervangen door BAT/51152

	BATnr	artikel	SOL/48ER15PT	SOL/48ER20PT	SOL/48ER29PT	SOL/48ER48PT	SOL/48ER77PT
	BAT/51119	vermogenkabel rood met snelkoppeling Pylontech en kabeloog - 3 m	1	2	3	5	8
	BAT/51120	vermogenkabel zwart met snelkoppeling Pylontech en kabeloog - 3 m	1	2	3	5	8
	BAT/50742	zekeringhouder voor MEGA Fuse Victron 6pos		1			
	BAT/50768	busbar 250A 6pos		1			
	BAT/49641	LYNX distributor busbar en zekeringhouder 4 pos			2	2	3
	BAT/50217	mega fuse 125A		2	3	5	8
	BAT/51118	communicatiekabel victron - Pylontech type A - 5m	1	1	1	1	1
	BAT/50774	cat6A netwerk kabel 5m - om linkse en rechtse rack te verbinden					1

### 4.2 Parts list kits inverters

Inverter kits contain the following components

	BATnr	artikel	SOL/VIC3R3T1	SOL/VIC3R5T1	SOL/VIC3R8T1	SOL/VIC3R10T1	SOL/VIC6R8T2	SOL/VIC9R8T3	SOL/VIC12R8T4
	BAT/49013	multiplus II 48V 3 kVA	2x						
	BAT/49148	multiplus II 48V 3 kVA GX	1x						
	BAT/49663	multiplus II 48V 5 kVA		2x					
	BAT/49839	multiplus II 48V 5 kVA GX		1x					
	BAT/50112	quattro 48V 8 kVA			3x		6x	9x	12x
	BAT/49040	quattro 48V 10 kVA				3x			
	BAT/50113	cerbo GX			1x	1x	2x	3x	4x

	BATnr	artikel	SOL/VIC3R3T1	SOL/VIC3R5T1	SOL/VIC3R8T1	SOL/VIC3R10T1
	<b>BAT/50256</b>	patch kabel CAT6A 1,5 m	<b>2x</b>	<b>2x</b>	<b>3x</b>	<b>3x</b>
	<b>BAT/50217</b>	mega fuse 125A	<b>3x</b>	<b>3x</b>		
	<b>BAT/50271</b>	mega fuse 200A			<b>3x</b>	
	<b>BAT/51144</b>	mega fuse 250A				<b>3x</b>

Please note, the 77 kWh battery (SOL/48ER77) combined with the 30kVA inverter kit (SOL/VIC3R10T1) is the largest single combination. If you want larger capacities, several separate sets of batteries and inverters are set up. The batteries are NOT connected in parallel but the inverters are connected on the AC side.

This set-up also requires an additional EMS controller AQ-LITH® so that all batteries are controlled in the same way. The AQ-SMART® should be ordered separately.

### 4.3 Energy meters

Most setups also require energy meters for :

- measurement of the grid, this is necessary for increasing self-consumption
- for measurement of the separate PV inverters, this is purely as a visual complement to the graphs on the Victron VRM portal

These energy meters are not included in the kits because the choice is vast.


Below is an overview of the possible meters and must be ordered separately. For the RS485 version, the RS485-USB adapter must also be ordered. With the Ethernet version, the meter must be connected to a free Ethernet port near the meter. This Ethernet port must be in the same domain as the Ethernet port connected to the Victron GX controller.

Only one grid energy meter is needed, even if multiple Energyracks are installed.

	met RS485 aansluiting	met ethernet aansluiting
monofasige uitvoering, voor stromen <65A	ET 112 : BAT/49149	
uitvoering 3x230 en 3x400V, voor stromen <65A	EM24 DINAV23XISX : BAT/49982	EM24DIN AV2 3X E1 X : BAT/51187
uitvoering 3x400V, voor stromen >65A (*)	EM24 DIN.AV5.3D.IS.X : BAT/50228	EM24 DIN AV5 3X E1 X : BAT/50840
steeds bij te bestellen : RS485/USB adaptor	BAT/49630	
optioneel: USB-HUB bij 2 meters en ingebouwde GX	BAT/50857	

(\*) bij stromen >65A worden current transformers CT) geplaatst op de vermogenkabels en apart aangesloten op de meter. Deze CT's zijn niet inbegrepen en worden door de installateur zelf gezocht op de lokale markt. Secundaire stroom 5A  
meer info op [www.gavazzionline.com/pdf/EM24DINDS.pdf](http://www.gavazzionline.com/pdf/EM24DINDS.pdf)

### 4.4 Provided by installer (not in KIT)

<p>Victron Energy Interface MK3-USB</p>	<p>Interface to connect your PC to the Multiplus-II via the VE.bus (one-time purchase by installer)</p>	
<p>DC cables (red and black)</p>	<p>Cables to connect the three Multiplus-II devices to the battery.</p>	<p>Different lengths can be ordered on request.</p>
<p>CTs (3x)</p>	<p>Current Transformer for energy meter (5A)</p>	<p>These CTs must be adapted to the local installation!</p>
<p>Wiring AC side</p>	<p>To connect all devices according to the diagrams.</p>	<p>Use the correct cross-sections in accordance with local legislation.</p>
<p>AC side circuit breakers</p>	<p>All circuit breakers on the AC side of the set-up are not provided in the kit. Also the fuses to protect the power meter! (3*315mA and 1* 50ma)</p>	

### 5 Technical Data Sheet: Victron MultiPlus-II (GX)

The latest information, certificates and drawings can be found at this link

<https://www.victronenergy.nl/inverters-chargers/multiplus-ii>

MultiPlus-II GX	24/3000/70-32	48/3000/35-32	48/5000/70-50
PowerControl & PowerAssist	Yes		
Transfer switch	32 A		50 A
Maximum AC input current	32 A		50 A
Auxiliary output	Yes (32 A)		
<b>INVERTER</b>			
DC Input voltage range	19 – 33 V	38 – 66 V	
Output	Output voltage: 230 VAC ± 2 % Frequency: 50 Hz ± 0,1 % (1)		
Cont. output power at 25 °C (3)	3000 VA	5000 VA	
Cont. output power at 25 °C	2400 W	4000 W	
Cont. output power at 40 °C	2200 W	3700 W	
Cont. output power at 65 °C	1700 W	3000 W	
Maximum apparent feed-in power	3000 VA	5000 VA	
Peak power	5500 W	9000 W	
Maximum efficiency	94 %	95 %	96 %
Zero load power	13 W	11 W	18 W
Zero load power in AES mode	9 W	7 W	12 W
Zero load power in Search mode	3 W	2 W	2 W
<b>CHARGER</b>			
AC Input	Input voltage range: 187-265 VAC Input frequency: 45 – 65 Hz		
Charge voltage 'absorption'	28,8 V	57,6 V	
Charge voltage 'float'	27,6 V	55,2 V	
Storage mode	26,4 V	52,8 V	
Maximum battery charge current (4)	70 A	35 A	70 A
Battery temperature sensor	Yes		
<b>GENERAL</b>			
Interfaces	BMS-Can, USB, Ethernet, VE.Direct, Wi-Fi		
External AC current sensor (optional)	50 A	100 A	
Programmable relay (5)	Yes		
Protection (2)	a – g		
VE.Bus communication port	For parallel and three phase operation, remote monitoring and system integration		
General purpose com. port	Yes, 2x		
Remote on-off	Yes		
Operating temperature range	-40 to +65 °C (fan assisted cooling)		
Humidity (non-condensing)	max 95 %		
<b>ENCLOSURE</b>			
Material & Colour	Steel, blue RAL 5012		
Protection category	IP22		
Battery-connection	M8 bolts		
230 V AC-connection	Screw terminals 13 mm <sup>2</sup> (6 AWG)		
Weight	19 kg	30 kg	
Dimensions (hwxwd) mm	506 x 275 x 147	565 x 323 x 148	
<b>STANDARDS</b>			
Safety	EN-IEC 60335-1, EN-IEC 60335-2-29, EN-IEC 62109-1, EN-IEC 62109-2		
Emission, Immunity	EN 55014-1, EN 55014-2 EN-IEC 61000-3-2, EN-IEC 61000-3-3 IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3		
Uninterruptible power supply	IEC 62040-1		
Anti-islanding	Please consult the certificates on our website.		
1) Can be adjusted to 60 Hz	3) Non-linear load, crest factor 3:1		
2) Protection key:	4) At 25 °C ambient		
a) output short circuit	5) Programmable relay which can be set for general alarm, DC under voltage or genset start/stop function.		
b) overload	AC rating: 230 V / 4 A, DC rating: 4 A up to 35 VDC and 1 A up to 60 VDC		
c) battery voltage too high			
d) battery voltage too low			
e) temperature too high			
f) 230 VAC on inverter output			
g) input voltage ripple too high			

### 6 Technical data sheet: PYLONTECH US5000

Model	US2000C	US3000C	US5000	
<b>Basic Parameters</b>				
Nominal Voltage (Vdc)	48	48	48	
Nominal Capacity(kWh)	2.4	3.55	4.8	
Usable Capacity(kWh)	2.28	3.37	4.56	
Dimension(mm)	442*410*89	442*410*132	442*420*161	
Weight(kg)	22.5	32	39.7	
	(Recommend)	25	37	80*
Charge/	(Max. Continuous)	25	37	100*
Discharge	(Peak 1)	50~89@60sec	74~89@60sec	101~120@15min
Current(A)	(Peak 2)	90~200@15sec	90~200@15sec	121~200@15sec
Communication Port	RS485,CAN			
Single string quantity(pcs)	16	16	16	
Working Temperature/	Charge	0~50		
Working Temperature/	Discharge	-10~50		
Shelf Temperature/	-20~60			
Short current/duration time	<4000A/2ms	<4000A/2ms	<2000A/1ms	
IP rating	IP20			
Cooling type	Natural			
Humidity	5% ~ 95%(RH) No Condensation			
Altitude(M)	<4000			
Design life	15+ Years (25 /77 )	15+ Years (25 /77 )	15+ Years (25 /77 )	
Cycle Life	>8,000 25	>8,000 25	> 8,000 25	

The latest information and installation manual can be found at this link

[https://en.pylontech.com.cn/view\\_pdf/web/viewer.html?file=/A\\_Upload/upload\\_file/20220510074000\\_2997.pdf&fname=AU-US5000+user+manual.pdf](https://en.pylontech.com.cn/view_pdf/web/viewer.html?file=/A_Upload/upload_file/20220510074000_2997.pdf&fname=AU-US5000+user+manual.pdf)



## 7 Installation

We strongly recommend checking out this Victron guide, it gives all the info on cable sections and all the necessary features and tips for a DC power system

[https://www.victronenergy.com/upload/documents/The\\_Wiring\\_Unlimited\\_book/43562-Wiring\\_Unlimited-pdf-en.pdf](https://www.victronenergy.com/upload/documents/The_Wiring_Unlimited_book/43562-Wiring_Unlimited-pdf-en.pdf)

The diagrams below serve as an overview to clearly show the scope of an installation. Before you start connecting, you should carefully read the safety instructions for the battery and the Victron Multiplus-II-GX.

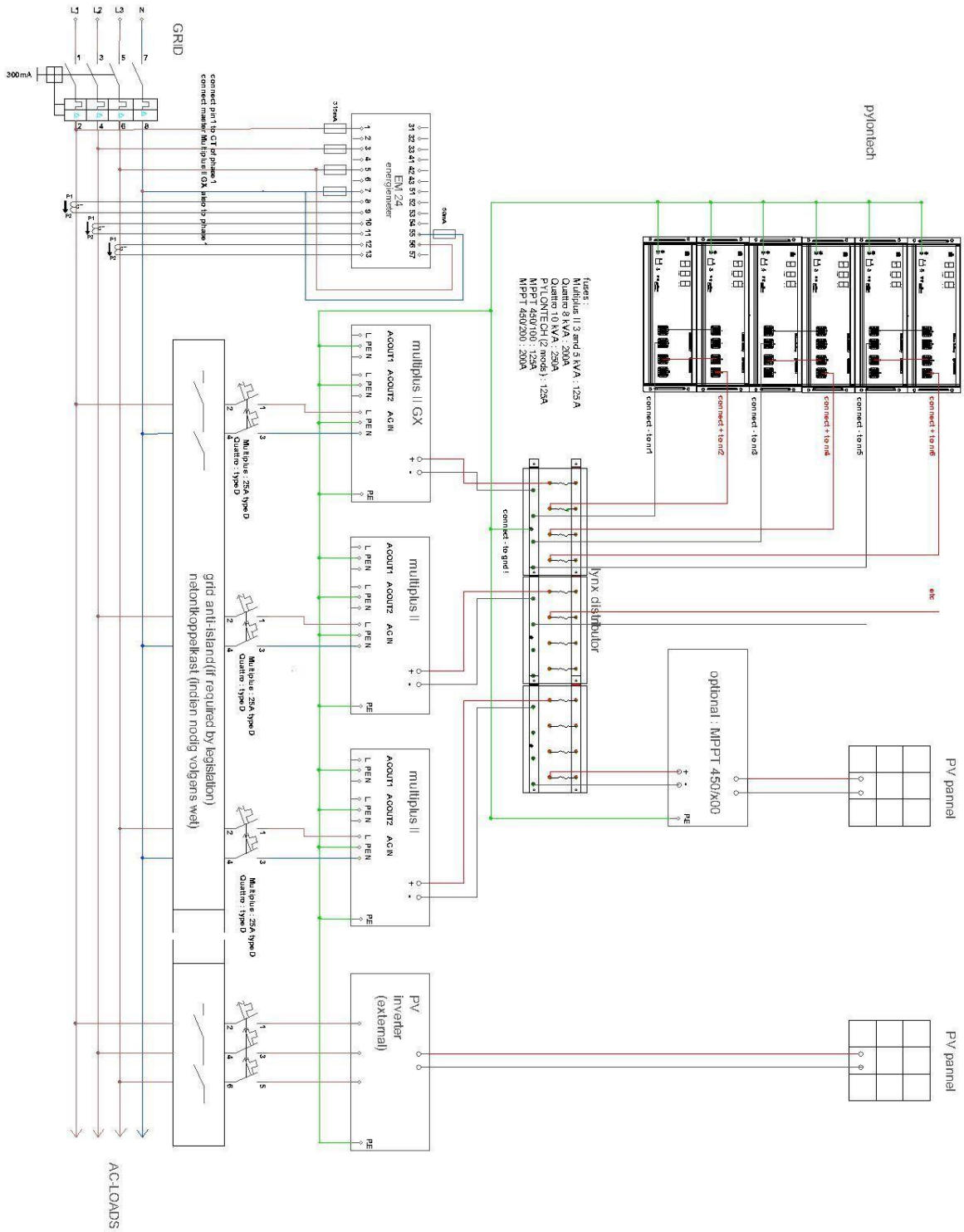


Attached diagrams are principle diagrams. The installer is responsible for choosing the correct safety components according to local application(s) and current legislation. **Check whether a mains study/disconnection relay is mandatory according to the SYNERGRID directive**

### 7.1 Schedule

The diagrams apply up to max 77 kWh battery (SOL/48ER77) in combination with the inverter kit of max 30kVA (SOL/VIC3R10T1) If you want larger capacities, then several separate sets of batteries and inverters are set up. The batteries are NOT connected in parallel but the inverters are connected on the AC side.

This setup also requires an additional EMS controller AQ-LITH® so that all batteries are controlled in the same way.

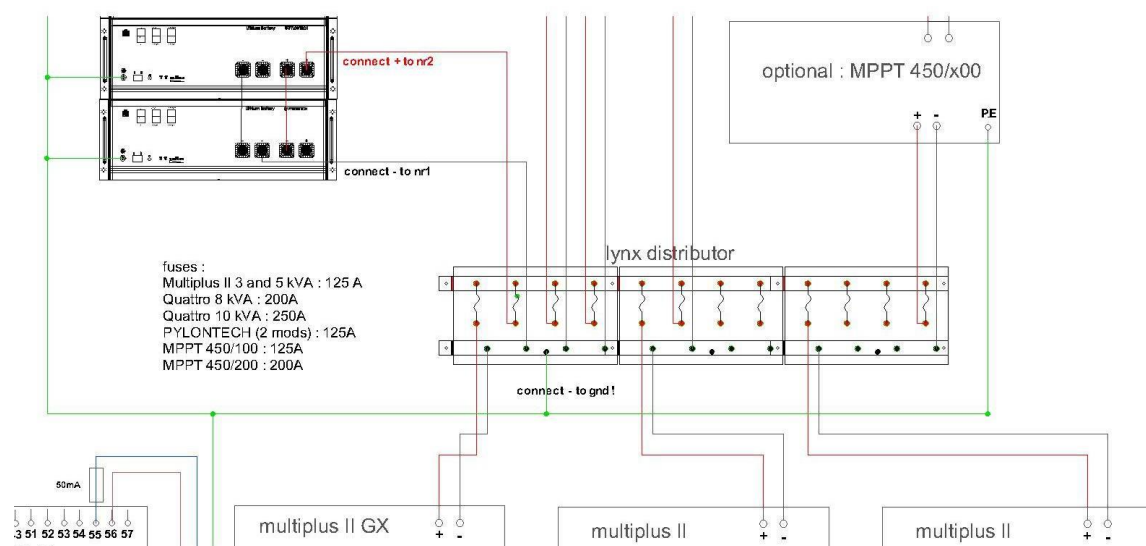


### 7.2 Connecting earthing cables

Always start with the earthing cables : all the victron devices, the pylontech modules, the cabinet, possibly the MPPT and importantly, also the MIN side of the battery. The easiest way is to take a clamp from the LYNX bus bar for this.

### 7.3 Connecting the LYNX inverter or fuse box

Insert fuses in Victron fuse box or LYNX distributor. Connect the DC cable between busbars and victron inverters. It is recommended to alternate the connection of inverters and batteries so that the currents are neatly distributed between busbars. Make sure no pinions are trapped between the busbar and cable lug or fuse. Tighten the nuts on the Victron inverters and busbars to 14 Nm using a torque spanner. Caution, insufficient tightening of these nuts will lead to bad contacts, increased internal resistance and local heating/heating.



### 7.4 Inserting and connecting the battery

The **EnergyRack should** be stored in a dry place at a constant temperature (20-25°C) and out of the sun. Too high or low temperatures may adversely affect battery life and operation.

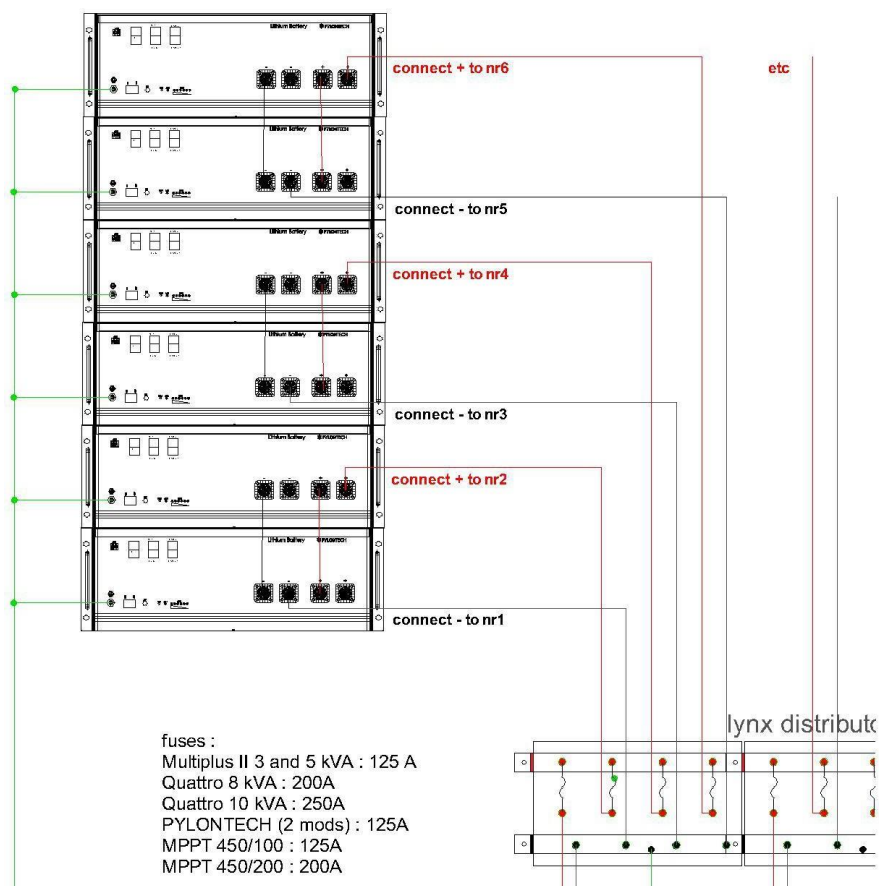
The cabinets arrive empty, the higher cabinets are supplied with removable lifting lugs. Remove these lifting eyes after placing the empty cabinet in place. The cabinet can then be filled with the Pylontech modules. Attention, the modules weigh more than 40 kg, take into account the applicable rules of ergonomics.

If the cabinet contains a fan, connect it to the thermostat provided and connect to an appropriate circuit breaker.

Then click all the shortcuts in the modules. Respect the colours. Make sure you hear a clear 'click' when inserting the shortcut.

Connect the MIN cable to the odd modules and the LYNX bus bar, the PLUS cable to the even modules and the LYNX bus bar. Do not shorten the cables, they should be the same length.

Do not press the start button of the modules yet



### 7.5 Install and connect inverters

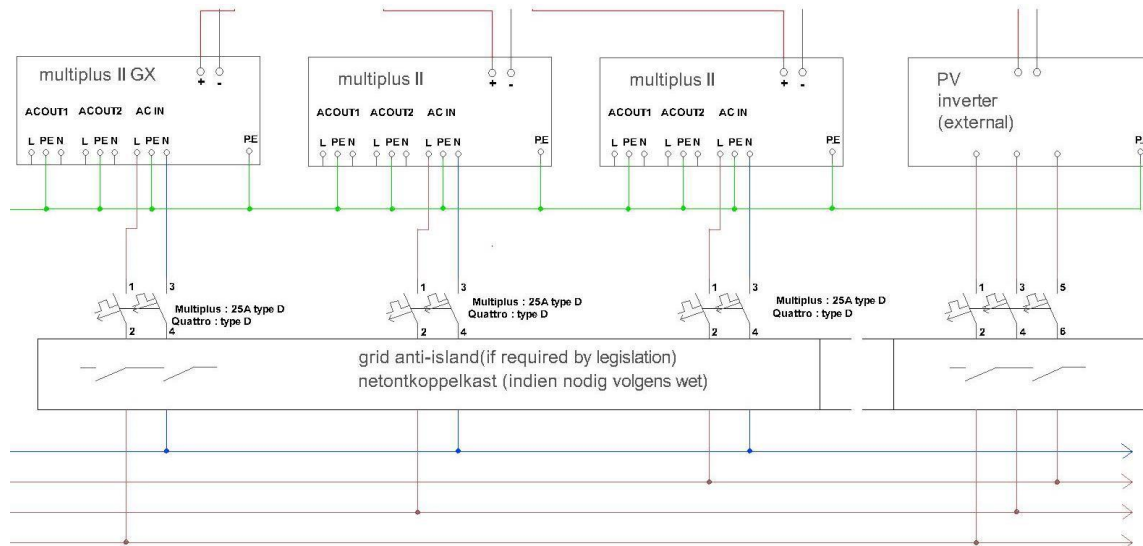
**Victron** units should be hung on the wall. It is important to leave at least 15cm of free space on all sides of these units so that the ventilation of the units is not impeded. Do not place the inverters in a closed cabinet or cover them. Never hang the inverters directly above the battery. Do not place the inverters TOP of each other. It is best to place the inverters as close to the battery as possible to minimise cable losses. Hang the inverters in a cool place because too high temperatures reduce the maximum power of the inverters (see datasheet at the back) . The inverters should be placed in a dry and well-ventilated room (IP21)

Place the master Victron (that's the one with the GX) on phase 1. This is the same phase that is also connected on the energy meter to phase 1 (terminal1)

Connect the three inverters via the AC-in connection as shown on the diagram. Make sure each unit is connected to a different phase and remember which unit hangs on which phase.

Use type D circuit breakers as large start-up currents can occur during start-up of the Victron.

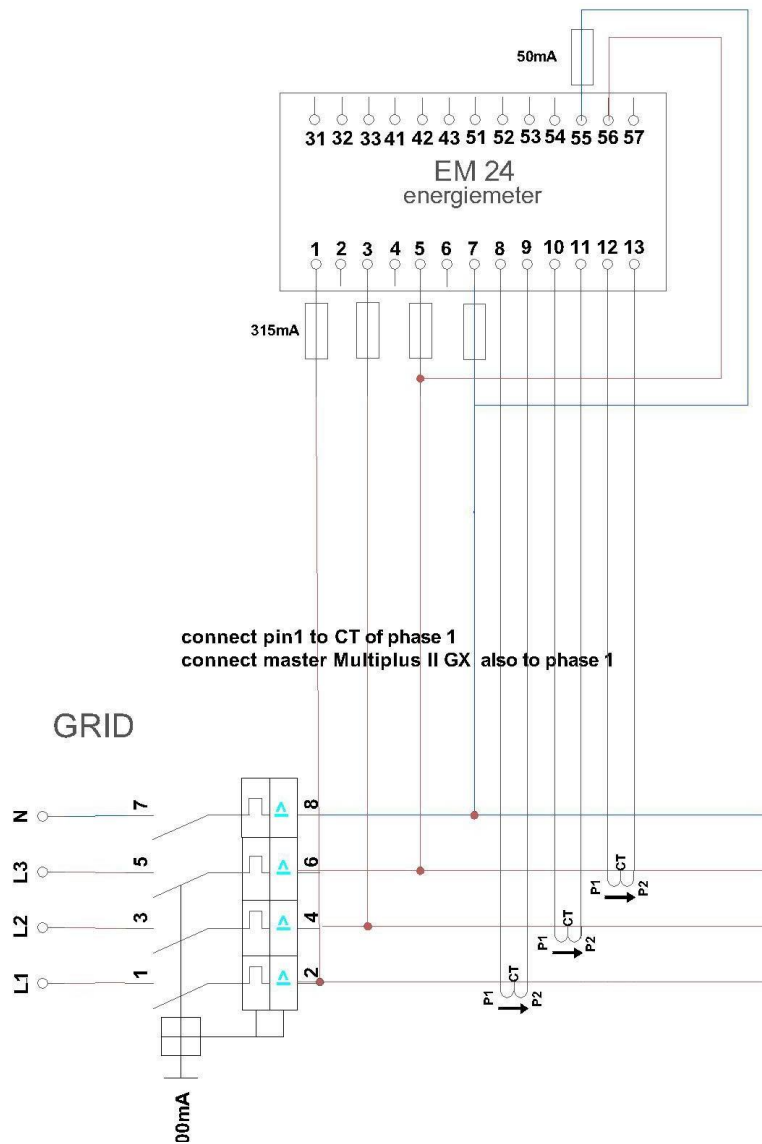
Do not connect the inverters to the grid yet!



### 7.6 Installing and connecting the energy meter

The **energy meter** is placed between the digital meter and the ALSB. The meter should be able to measure all energy to and from the grid.

Fit the energy meter and CTs according to the diagram provided. Please consult the manual of the Carlo Gavazzi EM 24 for correct installation of this device. The energy meter will be connected to the internet. It is best to install a separate circuit breaker to power the meter. Connect the energy meter to the internet. The GX must be on the same network as the energy meter. Check that the arrow on the CT faces the consumers. Check that the CT's primary current is higher or equal to the maximum current that can be supplied by the grid. The secondary current should be equal to 5A.



Installing and connecting Ct's requires some knowledge and experience. Incorrect placement/removal of these CTs can cause damage to the CTs themselves as well as the energy meter.  
**Always short-circuit CTs!!!**

If you are using an RS485 meter, connect the RS485-USB adaptor as follows. Attention, connect the RS485 side first, only then plug the USB into the Victron.  
Connection to the energy meter.

Function	Color thread	Clamp EM24	Clamp EM530	Clamp ET340
DATA-	Yellow	41	9	9
DATA+	Orange	42	8	8
GND	Black	43	10	10

EM 24 manual: [www.productselection.net/MANUALS/UK/em24\\_IS\\_im\\_use.pdf](http://www.productselection.net/MANUALS/UK/em24_IS_im_use.pdf)









To set the EM24 correctly, the power supply must be switched on again. For a 3-phase grid with neutral conductor, only 1 setting needs to be adjusted, namely the CT ratio.

### Example calculation of CT ratio:

Primary current: 100A      Secondary current 5A

CT ratio=  $100A/5A = 20$  -> this value already have to be entered as follows:

Set selector with arrow to '1' instead of 'lock'

Step	Action	Button
1	Power on the energy analyzer	
2	Press the joystick for at least 3 seconds	
3	In the <b>PASS?</b> page, select the correct password (default 0)	
4	Confirm operation	
5	Scroll pages until <b>Ct rAtio</b>	
6	Enter the editing mode	
7	Select 20	
8	Confirm operation	
9	Scroll pages until <b>End</b> to exit	

## 7.7 Connecting the data cables

Connect the patch cables between the various battery modules between LINKPORT 0 and 1  
 Connect the dedicated CAN cable type A with the pin configuration below between GX and the master module. The master module is the module where there is no patch cable in the LINKPORT0

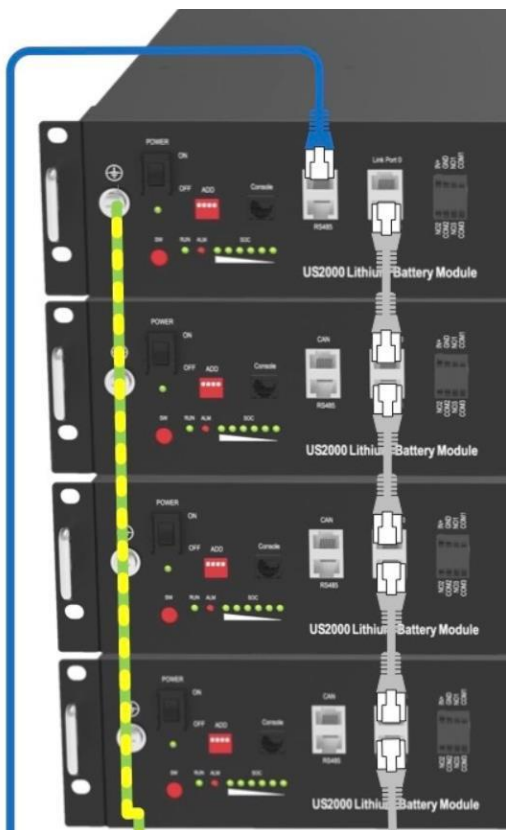
On the module side, it must be in A/CAN

On the MULTIPLUS II GX side, it must be in VE.CAN

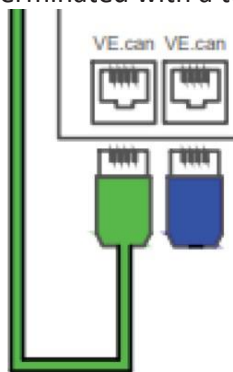
### 3.1 Type A

Function	Victron VE.Can side	Battery side
GND	Pin 3	Pin 6
CAN-L	Pin 8	Pin 5
CAN-H	Pin 7	Pin 4

The DIP switches must be set to 000



On the MULTIPLUS II GX or the separate CERBO GX, the second VE.can input must be terminated with a terminator (blue). This terminator is supplied with the Victron



Connect the three MULTIPLUS II devices by using two patch cables on the VE.bus port  
 Connect the MULTIPLUS II GX or the CERBO GX to the internet on the Ethernet port  
 Connect the energy meter to the internet, making sure it is on the same network as the GX  
 Optional: connect the AQ-SMART® to the internet, making sure it is on the same network as the GX

Optional : connect the VE-direct cable between the MPPT and the GX. If several MPPTs are used, they are also connected to each other with the VE-direct cable

The Victron also comes with an external temperature sensor. It is not used in this setup.



### 7.8 Startup

First switch on the batteries using the switch on the modules

Then press the master module's red SW button, now all other modules should light up

On start-up, replacement or expansion, the SOC and voltage may not match evenly. In that case, it is important to keep the system in this state for at least 15 minutes until all SOC LEDs match. These may differ by max 1 LED



Then switch on the circuit breakers of the Victron devices

Then set the Victrons' switch to 'I' (bottom right)

Now the Victron devices and the GX need to be programmed, see appendix A.

Remember to register PYLONTECH modules after installation to obtain full warranty

<http://www.pylontech.com.cn/service/support>

### 8 FAQ

#### 8.1 How do I know if my CTs are measuring in the right direction?

Switch off the PV inverter so that there is no more generation. The grid measurement values should then be positive numbers (positive=take from the grid, negative=injection into the grid). If negative values can be read on a phase after switching off the PV inverter, this CT must be turned up.

#### 8.2 My battery only wants to charge and not discharge?

Make sure all buttons at the bottom of the Victrons are set to position 1 and not position 2. In position 2, the Victron will only serve as a charger and not as an inverter.

#### 8.3 My battery won't discharge or charge?

The battery must be charged when it is first used. In the VRM portal under remote control, select ESS mode: Keep batteries charged.

Hold this for a few hours and then reset the setting to optimised with batterylife.

#### 8.4 Remote system reboot

When an installation reacts strangely or has crashed, the installation can be rebooted from the VRM portal. To do this, within the VRM portal, go to remote console-> settings-> general-> and choose REBOOT. It takes a while before a connection to Victron can be established again (max 10 min).

#### 8.5 Error message 'AC-in not available '

In the VRM portal, go to remote console -> settings-> system setup-> and under ac-input 1, choose grid.

#### 8.6 My battery only discharges to 50-60-70-... percent?

This is part of the batterylife algorithm that aims to maximise the life of your battery. The aim is to keep the battery at a higher charge level during the winter months as this is beneficial for cell life.

As a result, the battery is more likely to work between 70-90 per cent SOC in winter instead of between 20-40 per cent. So it does the same amount of work but in a regime that is much more favourable to the lithium cells incorporated in the battery.

For more info: 6. Controlling depth of discharge (victronenergy.com)

8.7 I regularly get error message 'high DC ripple ' on VRM portal

This error message indicates voltage failures in the connection between battery and inverter. It is usually due to a bad connection. Retighten all the nuts on the connection

8.8 Error message ground relay test failed error 11 #8"

The voltage between N and earthing is wrong

- Have you connected the phase and N correctly on the Victron. Reverse these
- Is the earthing resistance OK? Is the earthing connected properly

8.9 Error #24

Check that the N star point is indeed properly connected to the N terminal of each Victron.

Measure the voltage between the N connections of the Victrons, this should always be 0.

Measure the voltage of all the phases with the N connection of the first Victron, they should always be 230V.

8.10 Energy meter gives highly fluctuating power readings

Carlo Gavazzi EM24 Ethernet Energy Meter 09:28			
AC Phase L1	241.2 V	41.9 A	-1592.0 W
AC Phase L2	240.6 V	45.3 A	264.0 W
AC Phase L3	240.8 V	36.7 A	-840.0 W

Although the currents and voltages are very stable, the power part varies very much. If the power is divided by the voltage and current, you arrive at a very poor cosphi.

Cause: presumably the voltage of phase1 is measured on phase 1 but the current sensor of phase 1 is on a different phase. This causes an incorrect cosphi value. Check the connection of the EM24 energy meter as in the electrical diagram in chapter 7.1

## 9 Support from Battery Supplies

### 9.1 Design and construction support

Send an e-mail to [helpdesk.electronics@tvh.com](mailto:helpdesk.electronics@tvh.com) or contact +32/ (0)56 43 49 06

### 9.2 System start-up

Ask our specialist to check the installation, update it, insert the parameters, test the system and also provide training if required. This intervention is carried out on your behalf. If you wish to make use of this support, please contact [service@batterysupplies.be](mailto:service@batterysupplies.be) for scheduling.

### 9.3 Problems after start-up

Send an e-mail to [helpdesk.electronics@tvh.com](mailto:helpdesk.electronics@tvh.com) or contact +32/ (0)56 43 49 06. If you wish us to help you remotely, please add us on the VRM portal. See APPENDIX - 3. Inviting the customer or other users

## 10 Extended warranty

PYLONTECH batteries come with a 7-year warranty as standard.

You can extend this warranty period for free if you register the products immediately after installation at the following link:

<https://en.pylontech.com.cn/service/support>

The installer or end customer is responsible for registering this warranty extension.

Contact Battery Supplies for detailed warranty conditions

The Victron inverters have a standard warranty of 5 years. If you would like an additional 5-year warranty extension, it is best to do this after installation of the goods. Note down all data of the chargers such as type and serial number and fill them in on the web form

<https://batterysupplies.be/en/extended-warranty-victron>. Battery Supplies will then take the necessary steps with Victron for the warranty extension. Afterwards you will receive the invoice. The cost for the extension is 10% of the purchase price plus an administrative cost of 25EUR.

### APPENDIX : updating and setting Victron inverters



Updating and setting Victron inverters in a three-phase grid is not straightforward.

Keep in mind that the first start-up will probably not be flawless.

That is why we always advise you to ask for our help after installing the battery and inverter. Our specialist will then visit you to check the installation, update it, insert the parameters, test the system and also provide training if required. This intervention is done in direction. If you wish use this support, please contact [service@batterysupplies.be](mailto:service@batterysupplies.be) for scheduling.

If you still wish to programme the installation yourself, please refer to the links below. Keep in mind that incorrect programming can cause irreparable damage. Programming is very complex and can only be done by an installer trained and experienced by Victron Energy.

[https://www.victronenergy.com/live/battery\\_compatibility:pylontech\\_phantom](https://www.victronenergy.com/live/battery_compatibility:pylontech_phantom)

[https://www.victronenergy.com/live/ve.bus:manual\\_parallel\\_and\\_three\\_phase\\_systems](https://www.victronenergy.com/live/ve.bus:manual_parallel_and_three_phase_systems)

<https://professional.victronenergy.com/accounts/login/?next=/online-training/>

The guide below may also help. Keep in mind that Victron regularly changes its platform so the content may quickly seem outdated

## 1 System update

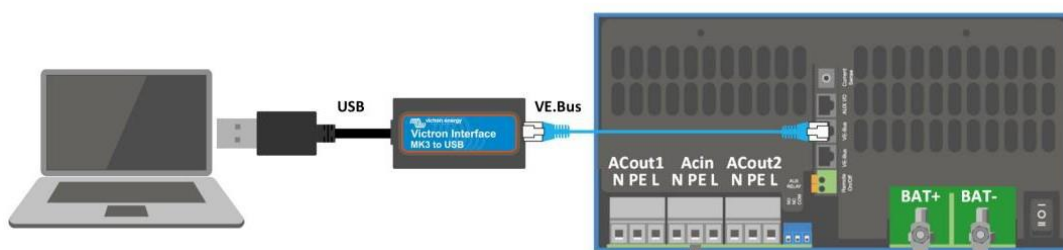
Following programmes should be installed:

- VictronConnect: [https://www.victronenergy.com/panel-systems-remote-monitoring/victronconnect#victronconnect-downloadsVictron Energy](https://www.victronenergy.com/panel-systems-remote-monitoring/victronconnect#victronconnect-downloadsVictron%20Energy)
- VeConfiguration tools: <https://www.victronenergy.com/support-and-downloads/software>

To connect the inverters three-phase, all three must have the same firmware. The devices' firmware can be updated via the VictronConnect programme (downloadable from Victron energy's website).

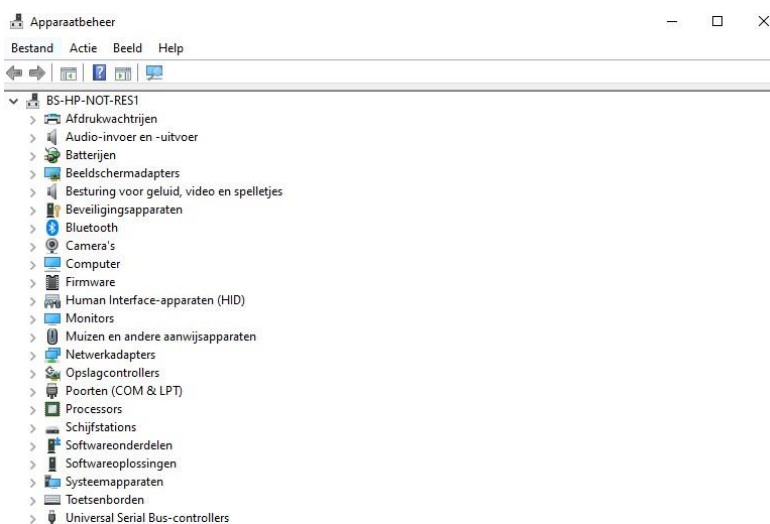
**To update the firmware tomorrow, the three inverters will not yet be interconnected by VE-bus cables.**

Before the firmware can be updated, a few steps need to be followed. First of all, the MultiPlus must be connected to the computer in question via an MK3-USB interface.



On first use, the drivers for this interface must be installed. To do this, first open the "VeConfig" application. (Make sure the interface is already connected to the PC via the USB input) Go to special and choose USB drives. Click Yes and choose an appropriate folder to save them. The drivers are NOT yet installed by this.

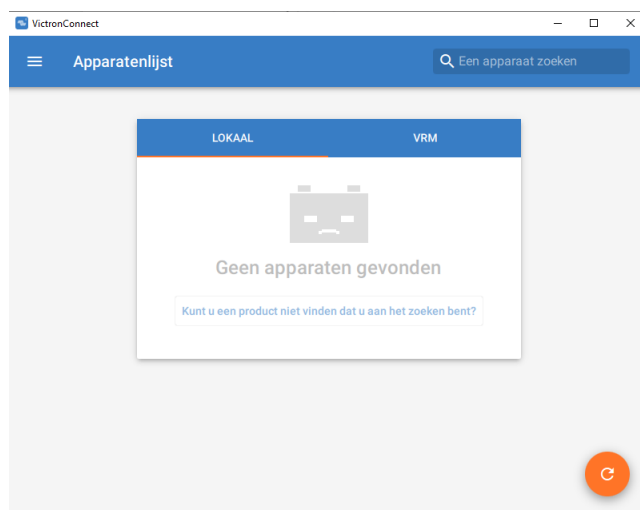
Then go to "device management" on your PC.



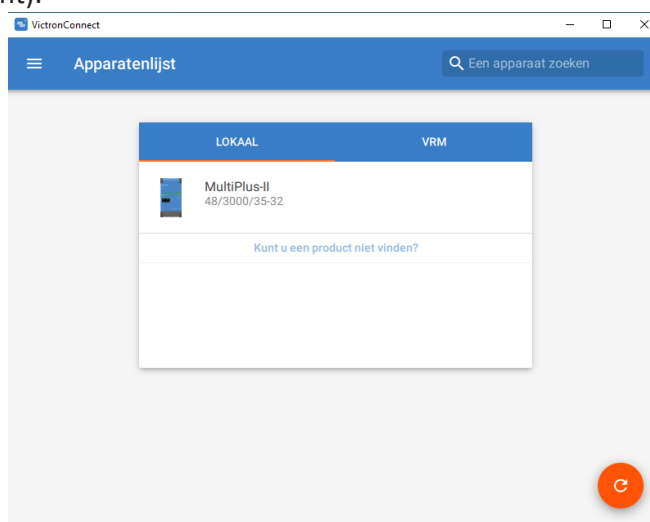
Under ports, choose the USB Serial Port. With a right-click, you can then install the driver. To do this, select the appropriate folder (just chosen yourself).

This drive installation is only necessary the first time.

With the driver installed and the first device connected, it is time to open the Victron Connect app. The home screen is shown below.

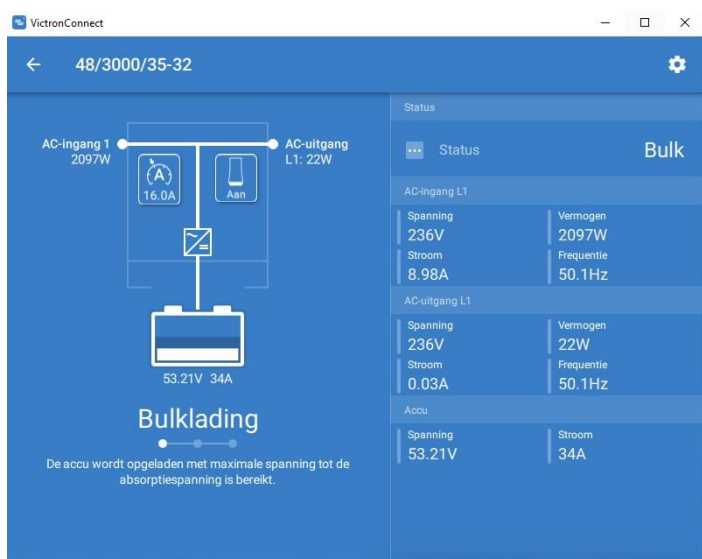


Now connect the first MultiPlus to your PC via the interface according to the diagram on the previous page. When the MultiPlus is connected to the computer, after refreshing the programme (orange button at the bottom right), it will show up in the 'local' list under the name MultiPlus-II or MultiPlus-II-GX (disconnect the Mod-bus connections to any other devices for a moment).



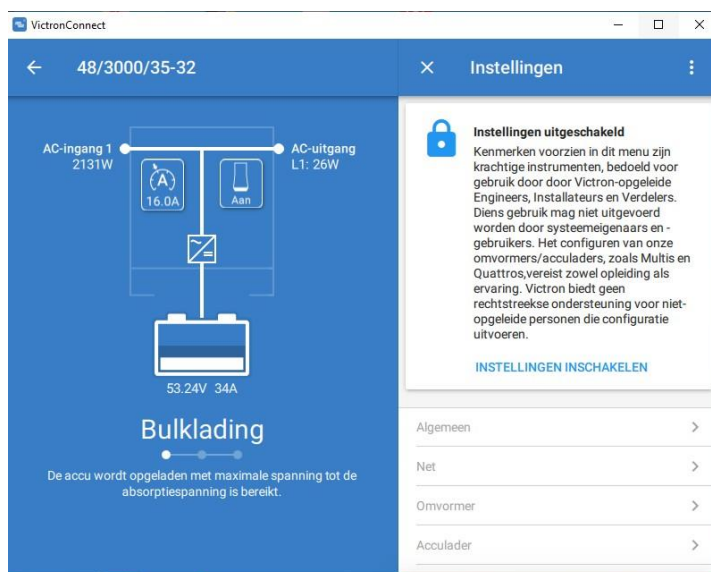
When the MultiPlus is clicked in the list of devices, the screen below is displayed. This image shows various parameters of the installation.



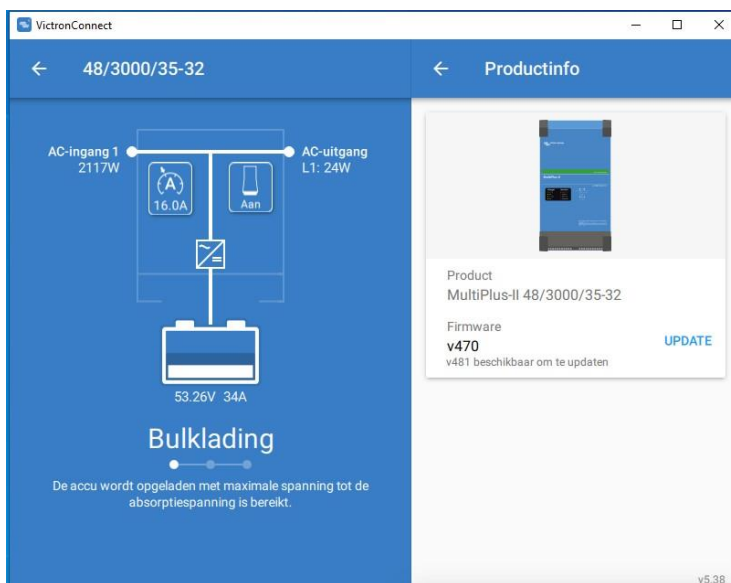


Then click on the gear icon in the top right corner.

However, to adjust the inverter's settings, they must first be enabled, this is done via 'enable settings'. The password to be entered is the same for each installation. **Password: zzz**



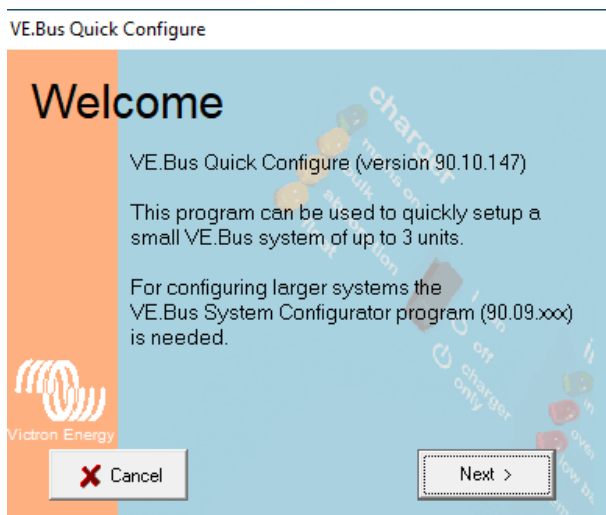
Once the password is entered, you can adjust all the settings. To update the firmware, click on the icon consisting of three dots at the top right. Once you have done this, you can see the current firmware version of the device and, if the firmware is not up-to-date, update it. Updating the firmware must be done separately from each MultiPlus device, therefore these steps must be repeated for each MultiPlus.



After the three units have the latest Firmware, the VictronConnect programme may be closed and all Mod-bus cables between the various Multipluses reconnected.

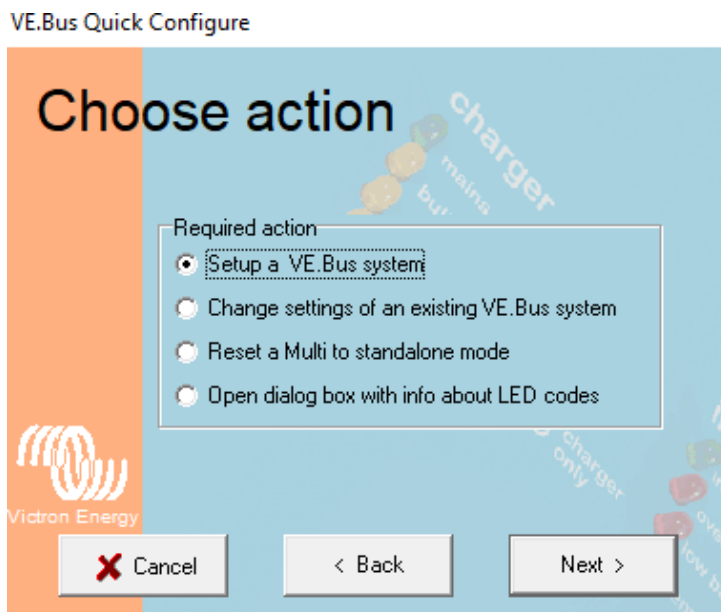
## 2 Loading parameters with MK3-USB interface

Now open the programme: "VE.Bus Quick Configure" again downloadable from the victron website. Make sure all Mod-bus cables are connected and that 1 of the units is also connected to your PC via the MK3 interface. Make sure all units are off. The battery and the circuit breakers to the devices may be switched on. The startup screen is shown below.



If the programme asks for an update, be sure to install it. Then click on "Next".

Then select: "Setup a VE.bus system". If you want to make changes to an existing installation, select: "Change settings of an existing VE.Bus system". Then click "next" again. As configuration, select : "Three phase" and click "next" again. Select the appropriate COM



port (find the option: "scan for existing ports"). Then click on "next" again. The programme will now ask you to make sure that all devices are switched off. Click "next" and you should see the screen below.

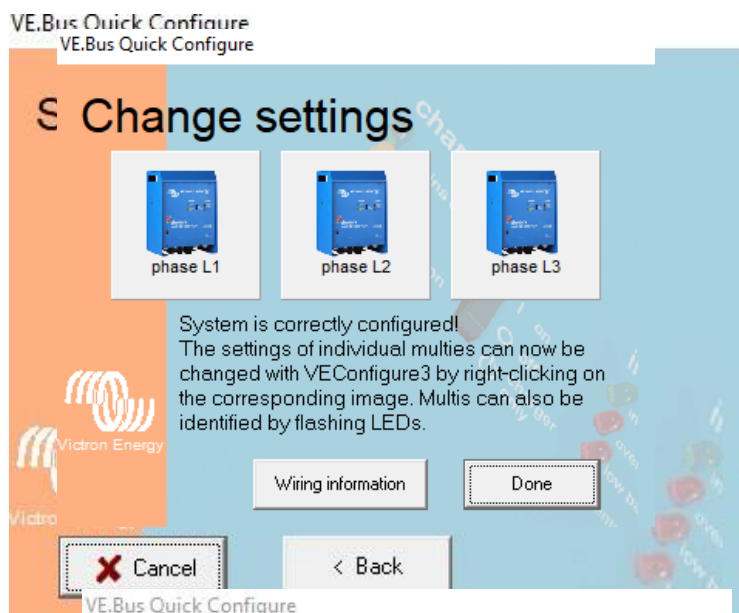
Now switch on the device connected to the first phase of the mains connection. Always set the devices to stage 1 and not stage 2 (charging only).



De fasen van het net moeten correct overeenkomen met de aansluiting op de energiemeters en met de aansluiting van de omvormers zelf anders zal de installatie niet werken.

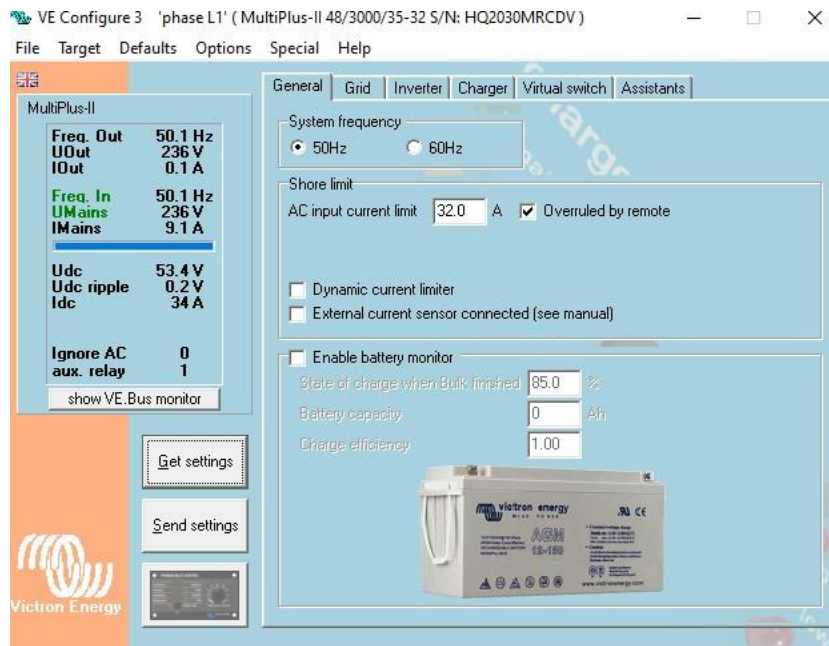
The device is connected and paired to the first stage when the above image appears on your screen.

Now switch on the inverter on the second phase and then also the last Multiplus II sitting on the third phase. If everything went correctly, three devices should now be connected and



assigned to the corresponding phase.

Right-click on the first inverter to open the Ve Configure Multi. After all the information has been retrieved from the Victron, you will see the screen below.



On the charger tab, change

Charger tab

Parameter	Setting
Battery type	Lithium
Charge curve	Fixed
Absorption voltage	52.0 V
Float voltage	51.0 V
Absorption time	1 Hr

On the inverter tab, change

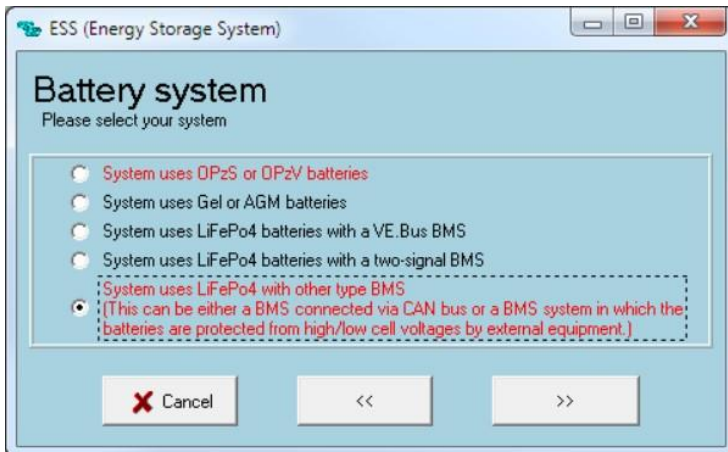
Charger tab

Parameter	Setting
Battery type	Lithium
Charge curve	Fixed
Absorption voltage	52.0 V
Float voltage	51.0 V
Absorption time	1 Hr

Note: make sure to double check the float voltage after completing Assistants, and if necessary set it back to 51.0 V.

On the assistants tab, change

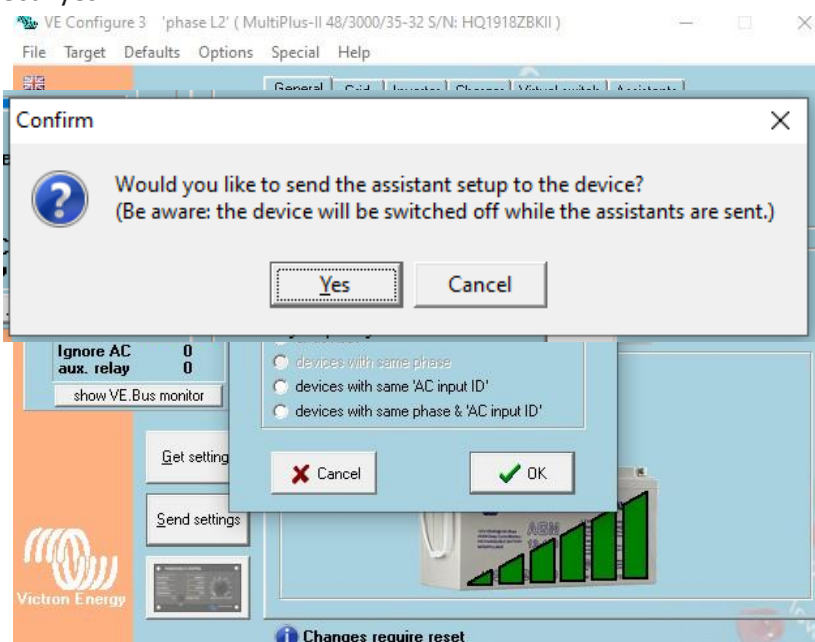
- Adding an assistant 'ESS'



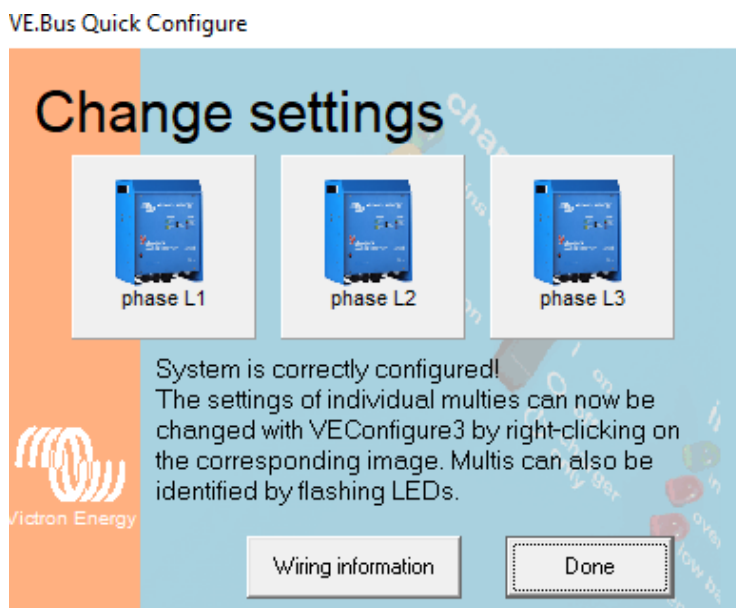
ESS Parameter	Settings
Sustain voltage.	48V
Dynamic cut-off values	set all values to 46V.
Restart offset:	1.2V (Default)

ATTENTION: Before forwarding the configuration to the Multiplus, go to the GRID tab and check that the correct "Grid code standard" is selected. This may need to be changed depending on firmware updates and the installation location. Changing the "grid code standard" requires a password: TPWMBU2A4GCC  
Then click on "Send setting".

Select the options as shown below and continue with "ok". When the message below is displayed, select "yes".



You may then close the window and you will be shown the screen below again.



Now repeat the above steps for the second and third inverters. Then close the programme via "Done". All operating parameters are now in the devices and the connection via the interface may be disconnected from the PC.

### 3 VRM portal - ESS settings

For the system to work properly, some important settings still need to be made in the internal software, which controls the MultiPlus-II GX. This can be accessed in two ways. Preferably it is accessed online, but then an internet connection is required. For this, see chapter 5.1.

Without an Internet connection, it should be accessed locally, as indicated in section 5.2.

**Note: Make sure all devices are switched on.**

#### a. Connect via VRM Online Portal

This method requires an internet connection via an Ethernet cable. The computer, tablet or smartphone used should also be connected to the internet.

Steps:

1. Connect the MultiPlus-II GX to the internet via an Ethernet cable. This cable should be connected to the (only) Ethernet port on the device.

2. Check if the network connection to the Multiplus-II GX is operational by illuminating the green-orange status LEDs on the Ethernet port. An IP address should be visible on the blue display, after navigating.
3. Register or log in to VRM Portal. A new installation can be added to this account via the "Add installation" button.


Add installation

Note: It is possible to add a second account (with possible limited rights) to the system.

Example: installer (full management) + customer (view only)

4. Enter the VRM Portal ID to connect to the system, found on the sticker on the device and with the manual.
5. Open the Remote Console via the options on the left-hand side of the page.
6. Go to chapter "5.3 Settings".

### b. Settings

1. Open the menu by clicking on 
2. You will first find a list of connected devices. Check if all power meters are detected. Continue to "Settings" via the arrows.  
Note: it is possible to set this screen in Dutch in the "Display & Language" menu option.
3. Check if "Date & Time" are correct.
4. Check the Firmware version. Check for online updates and install the latest version. **Then disable automatic updates.**
5. Make sure that the "Remote Console" menu option on VRM (possibly on LAN) is always enabled. Deactivating this option may render the MultiPlus-II GX inaccessible! Setting a password may cause other users to lose access to this screen.
6. Settings menu option "System Setup":

System name	(self-selection)
AC Input 1	Grid
AC Input 2	Not Available
Monitor for grid failure	Disabled
Battery monitor	Automatic
Has DC System	<input type="checkbox"/>

7. "DVCC" is enabled  .

Limit charge current	<input type="checkbox"/>
----------------------	--------------------------



Limit managed battery charge voltage	<input checked="" type="checkbox"/>
Maximum charge voltage	53.2V
SVS , STS, SCS	<input type="checkbox"/> (all switch off)

### 8. Settings menu option "ESS":

Fashion	Optimized (with BatteryLife)
Grid metering	External meter
Inverter AC output in use	<input type="checkbox"/> if the UPS function is redundant. <input checked="" type="checkbox"/> if the UPS function is desired (AC OUT 1 connected).
Multiphase regulation	Total of all phases
Minimum SOC (unless grid fails)	20%
Limit charge power	<input type="checkbox"/>
Limit inverter power	<input type="checkbox"/>
grid setpoint	50W up to 30 kWh batteries, otherwise 300W

### 9. Settings menu option "Energy meters":

On VRM, go to Settings - services - modbus TCP - set '**enable**'  
 Go back  
 Go to Settings - modbus tcp devices - automatic scanning - set '**enable**'  
 Press to scan '  
 Go back to main screen, there you will find the meter

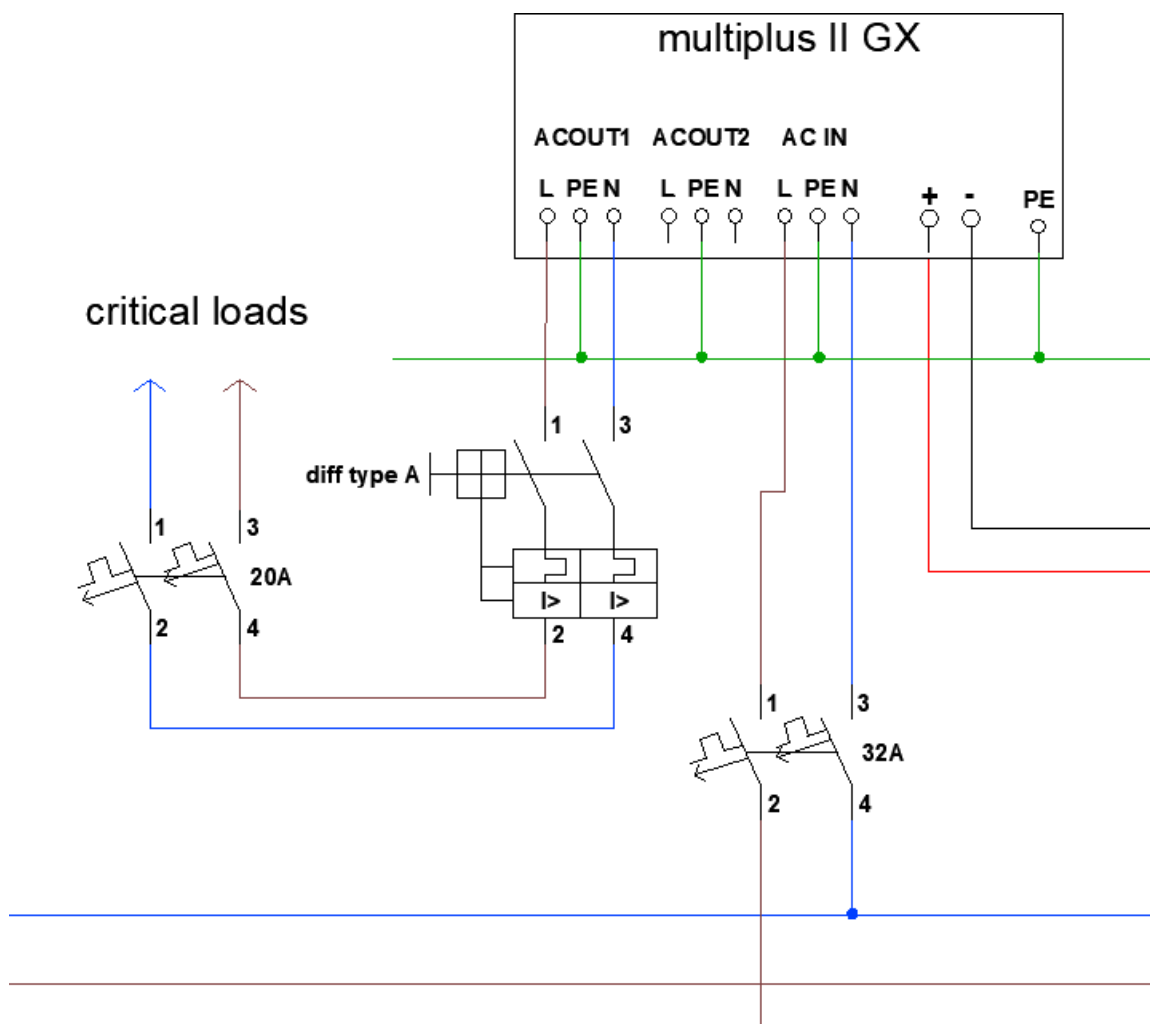
Device List		16:50
BATTSUPP	100% 53.90V 0.0A	>
Carlo Gavazzi EM24 Ethernet Energy Meter	2744.0 W	>
MultiPlus-II 48/5000/70-50	Passthru	>
Notifications		>
Settings		>

Press and set the energy meter:

Setup		16:51
Role	Grid meter	
Phase configuration	3P.n	
Switch position	Unlocked (1)	
Pages		Menu

## 4 UPS function

The victron Multiplus II can supply power to some circuits in case of an electricity failure. These circuits should be connected to the output of the Multiplus itself. Make sure that the maximum load of these circuits does not exceed the maximum capacity of the inverter (see Victron datasheet part 1 manual).



## 5 Invite customer or other users

On the vrm portal, other users can be added so that the customer can monitor the installation via the "Victron Connect" app. Follow the steps below in the vrm portal to add the customer:

- Make sure you have chosen the right installation.
- Go to: "Settings" -> "users"
- Click at the bottom in blue on: "invite user" and add the customer via his email address



NEVER give your customer "full control" otherwise they may make adjustments that will counteract the operation of the unit or even damage inverters and battery.

Next, the customer will be asked to create his own account. If it then downloads the application on its smartphone and logs in, the customer will be able to follow the installation.

**If you would like remote support from Battery Supplies, you can add us as a user. Please use the email address '[support.solar@batterysupplies.be](mailto:support.solar@batterysupplies.be)'. Give us full rights.**