

CENGLISH



# EasySolar-II GX

**48/4k5/55-32 and 48/6k5/100-50**

Rev. 01 – 07/2026

This guide is also available in HTML format.

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## 1. Introduction

Victron EasySolar-II GX includes the following features:

- Powerful MultiPlus-II Inverter/Charger
- SmartSolar MPPT solar charge controller
- GX device with 2 x 16 character display

These elements are pre-wired and configured together within a single device, greatly simplifying most installations and saving time and money.

This document explains how all the components fit together, how to install the product, and what documentation to use for configuration and other details about each part.

This document explains:

- Function
- Behavior
- Technical parameters
- Limitations
- Installation instructions
- Troubleshooting procedure

You must read this document to understand how to use the product safely and reliably.

This manual applies to:

- EasySolar-II 48/4k5/55-32 MPPT 250/70 GX
- EasySolar-II 48/6k5/100-50 MPPT 250/100 GX



## 2. Safe installation

Before using the product, first read the documentation provided with this product to familiarize yourself with the safety labels and instructions. This product has been designed and tested in accordance with international standards. The product should only be used for its intended purpose.



### RISK OF ELECTRIC SHOCK

The product is used in combination with a permanent power source (battery). Even when the product is switched off, dangerous electrical voltages may be present at the input and/or output terminals. Always switch off the mains power and disconnect the battery before carrying out maintenance. If the photovoltaic panel is exposed to light, it supplies dangerously high DC voltage to the inverter. Cover or disconnect the solar panels.

The product does not contain any user-serviceable parts inside. Do not remove the front panel or operate the product until all panels are installed. All maintenance should be performed by qualified personnel.

Never use the product in areas where there is a risk of explosion of gas or dust. Check the specifications provided by the battery manufacturer to ensure that the battery is suitable for use with this product. Always follow the battery manufacturer's safety instructions.

This product is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the product by a person responsible for their safety. Children should be supervised to ensure that they do not play with the product.



Do not lift heavy objects without help.



### 2.1. Transportation and storage

When storing or transporting the product, make sure the power and battery cables are disconnected.

No liability can be accepted for damage incurred during transport if the device is not transported in its original packaging. Store the product in a dry environment; the storage temperature should be between -20°C and 60°C.

For information on transporting, storing, charging, recharging and disposing of the battery, refer to the battery manufacturer's manual. Protect the solar modules from direct sunlight during installation, e.g. by covering them.

Never touch the uninsulated ends of the cables.

Use only insulated tools.

### 2.2. Grounding

Battery grounding: this device must be installed in a system with a negative grounding.

Note: To avoid system malfunctions, use a single ground (preferably near the battery).

- Chassis Ground: A separate ground path for chassis ground is permitted because it is isolated from the positive and negative poles.
- The National Electrical Code (NEC) requires the use of an external ground fault protective device (GFPD). These MPPT chargers do not have internal ground fault protection. The negative pole of the system should be connected through the GFPD to ground at one (and only one) point.
- The charger must not be connected to grounded photovoltaic panels. (only one ground)
- The positive and negative poles of the photovoltaic array should not be grounded. Ground the frame of the photovoltaic panels to reduce the impact of lightning.



**\*\*IF SHORT-CURRENT IS INDICATED, THE BATTERY TERMINALS AND CONNECTED CIRCUITS MAY BE UNGROUNDED AND HAZARDOUS.**

### 2.3. Compliance with regulations

SIMPLIFIED EU DECLARATION OF CONFORMITY: Victron Energy BV hereby declares that the EasySolar-II GX is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: <https://ve3.nl/6d>.

UK PSTI DECLARATION OF CONFORMITY: We, Victron Energy BV, confirm that our product EasySolar-II GX complies with the safety requirements set out in Schedule 1 of the Product Safety and Telecommunications Infrastructure (Safety Requirements for Relevant Connectable Products) Regulations 2023. The official declaration of conformity can be downloaded from <https://ve3.nl/6d>

### 3. Product description

The product is based on an extremely powerful sine wave inverter, battery charger and switch in a compact housing. It is suitable for use in marine and automotive applications as well as stationary land applications.

#### 3.1. Functions common to all applications

##### 3.1.1. GX LCD display

The backlit 2 x 16 character display shows system parameters.

##### 3.1.2. BMS-Can connection

BMS-Can connection allows connection of compatible BMS batteries with 500kbps CAN-bus interface. VE.Can products such as Victron MPPT solar chargers or Lynx Shunt VE.Can are NOT supported.

##### 3.1.3. Ethernet and WiFi

Ethernet and Wi-Fi connectivity allows for local and remote system monitoring, as well as connection to Victron's free VRM portal, where long-term system performance information is available.

##### 3.1.4. Automatic and uninterrupted switching

Homes or buildings equipped with solar panels, micro-CHP or other renewable energy sources have the potential to provide autonomous energy supply that can be used to power essential devices (heat pumps, refrigerators, freezers, internet connection, etc.) during a power outage. However, the problem is that grid-connected renewable energy sources will fail as soon as the grid fails. This product and batteries can solve this problem: **the product can replace the network during a power outage**. If renewable energy sources produce more energy than needed, the product will use the excess to charge the batteries; in the event of a power shortage, the product will supply additional energy from the battery.

##### 3.1.5. Two AC outputs

In addition to the usual uninterruptible output (AC-out-1), there is an auxiliary output (AC-out-2) that disconnects its load when operating on battery power only. Example: an electric water heater that is only allowed to operate when AC input is available. There are several applications for the AC-out-2 output.

##### 3.1.6. Three-phase capability

The unit can be interconnected with others and configured for three-phase output. Up to 6 sets can be connected in parallel on three phases, for a total of 18 units.

##### 3.1.7. PowerControl – maximum use of limited AC power

This product can deliver a huge charging current. This means a large load on the AC input. Therefore, the maximum current can be set. The product will then take into account other appliances and only use the "excess" current for charging.

##### 3.1.8. PowerAssist – extended use of generator or shore power

This feature takes the PowerControl principle to the next level, allowing the device to supplement the capacity of an alternative source. Where peak power is often only required for a limited period of time, the device ensures that insufficient AC input current is immediately compensated by energy from the battery. As soon as the load decreases, the free energy is used to recharge the battery.

##### 3.1.9. Programmable

All settings can be changed using a computer and free software that you can download from our website [www.victronenergy.com](http://www.victronenergy.com). For more information, please refer to this manual – [https://www.victronenergy.com/media/pg/VEConfigure\\_Manual/en/index-en.html](https://www.victronenergy.com/media/pg/VEConfigure_Manual/en/index-en.html)

##### 3.1.10. Programmable relay

The product is equipped with a programmable relay. The relay can be programmed for various applications, for example as a trigger relay.

### 3.1.11. External current transformer (optional)

Possibility to connect an external current transformer to implement PowerControl and PowerAssist functions with external current sensing

### 3.1.12. Programmable analog/digital input/output ports (Aux in 1 and Aux in 2, see appendix)

The product is equipped with 2 analog/digital input/output ports.

These ports can be used for several purposes. One application is to communicate with BMS controls to enable charging and discharging of a lithium-ion battery.

## 3.2. Specific features for grid-connected and off-grid systems combined with photovoltaics

### 3.2.1. External current transformer (optional)

When used in a grid-parallel topology, the internal current transformer cannot measure the current to or from the grid. In this case, an external current transformer must be used. See Appendix A. For more information on this type of installation, contact your Victron distributor.

### 3.2.2. Frequency shift

When solar inverters are connected to the AC output of the product, the excess solar energy is used to charge the batteries. Once the absorption voltage is reached, the charging current is reduced and the excess energy is fed back to the grid. When the grid is not available, the product will slightly increase the AC frequency to reduce the power of the solar inverter.

### 3.2.3. Integrated battery monitor

Ideal solution if the product is part of a hybrid system (AC input, inverters/chargers, battery and alternative energy sources). The built-in battery monitor can be set to open and close the relay:

- start at preset discharge level in %
- start (with preset delay) at preset battery voltage
- start (with preset delay) at preset load level
- stop at preset battery voltage
- stop (with preset delay) after completion of the fast charging phase
- stop (with a preset delay) at a preset load level

### 3.2.4. Autonomous operation during a power outage

Homes or buildings equipped with solar panels, micro-combined heat and power plants or other sustainable energy sources have the potential to provide autonomous energy supply that can be used to power essential devices (heat pumps, refrigerators, freezers, internet connections, etc.) during a power outage. However, the problem is that grid-connected renewable energy sources stop working as soon as the grid goes out. This product and batteries can solve this problem: **the product can replace the network during a power outage**. If renewable energy sources produce more energy than needed, the product will use the excess to charge the batteries; in the event of a power shortage, the product will supply additional energy from the battery.

## 3.3. Battery charger

### 3.3.1. Lead-acid batteries

#### Adaptive four-stage charging algorithm: bulk – absorption – trickle – storage

The microprocessor-controlled adaptive battery management system can be set for different battery types. The adaptive function automatically adjusts the charging process according to battery usage.

#### The right amount of charge: variable absorption time

In the event of a slight discharge of the battery, the absorption phase is shortened to prevent overcharging and excessive gas formation. After a deep discharge, the absorption time is automatically extended to fully charge the battery.

#### Preventing damage from over-gassing: BatterySafe mode

If a high charging current in combination with a high absorption voltage has been selected for fast charging of the battery, damage due to excessive gassing is prevented by automatically limiting the voltage rise rate once the gassing voltage is reached.

Less maintenance and aging when the battery is not in use: storage mode

Storage mode is activated whenever the battery has not been discharged for 24 hours. In storage mode, the float voltage is reduced to 2.2 V/cell (13.2 V for a 12V battery) to minimize evaporation and corrosion of the positive plates. Once a week, the voltage is increased again to the absorption voltage level to “equalize” the battery. This feature prevents electrolyte stratification and sulfation, which are the main causes of premature battery failure.

Battery voltage sensing: correct charging voltage

Voltage drop caused by cable resistance can be compensated for using the voltage measurement function, which measures the voltage directly at the DC bus or battery terminals.

Battery voltage and temperature compensation

The temperature sensor is used to reduce the charging voltage when the battery temperature increases. This is especially important for maintenance-free batteries, which could otherwise dry out due to overcharging.



The temperature sensor is not included in the delivery for 48 V models.

It can be ordered separately. Order number: ASS000001000

### 3.3.2. Lithium-ion batteries

#### Victron LiFePO4 Smart Battery

Use the VE.Bus battery management system (BMS)

### 3.3.3. Other lithium-ion batteries

See [https://www.victronenergy.com/live/battery\\_compatibility:start](https://www.victronenergy.com/live/battery_compatibility:start)

### 3.3.4. More information about batteries and charging them

Our book “Energy Unlimited” offers further information on batteries and their charging and is available for free on our website: <https://www.victronenergy.com/support-and-downloads/technical-information>.

You can also find more information about adaptive charging in the General Technical Information section of our website.

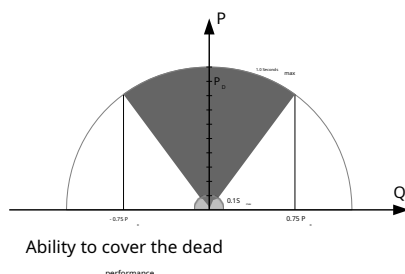
## 3.4. ESS – energy storage systems: feeding energy back into the grid

If the product is used in a configuration where it will return energy to the grid, it is necessary to ensure compliance with grid regulations by selecting the appropriate country setting for grid regulations using the VEConfigure tool.

Once set up, a password will be required to disable grid compliance or change grid compliance related parameters. If you need this password, please contact your Victron distributor.

Depending on the grid regulations, there are several reactive power control modes:

- Fixed value  $\cos \varphi$
- $\cos \varphi$  as a function of P
- Fixed Q
- Q as a function of input voltage



If the product does not support local network regulations, an external certified interface must be used to connect the product to the network.

The product can also be used as a bidirectional inverter operating in parallel with the grid, integrated into a customer-designed system (PLC or other) that provides the grid control loop and metering,

#### Special note regarding NRS-097 (South Africa)

1. The maximum allowed network impedance is  $0.28 \Omega + j0.18 \Omega$
2. The inverter meets the unbalance requirement for multiple single-phase units only if it is part of a GX installation.

**Special notes regarding AS 4777.2 (Australia/New Zealand)**

1. In an installation where the continuity of the neutral conductor to the load must not be interrupted, the installer must place a conductor between AC-in N and AC-out N. Furthermore, the network code "Australia X: AS/NZS 4777.2:2020 standalone application M (with N-bypass)" must be selected. In this case, the ground relay (earthing relay) remains open and the internal neutral relay will not be triggered in through-mode.

## 4. Operation

### 4.1. On/Off/Charge Only Switch

The switch is located on the bottom right corner of the product.

The switch has three positions. The middle position 0 means off. Position I means on and position II means charging only.

After switching to the "I / On" position (by switching towards the front of the device), the product is put into operation and the inverter is fully functional.

If AC voltage is applied to the "AC in" terminal, it will be switched to the "AC out" terminal if it is within specifications. The inverter will shut down and the charger will start charging. Depending on the charger mode, "Bulk", "Absorption" or "Float" will be displayed.

If the voltage at the "AC-in" terminal is rejected, the inverter will turn on.

If the switch is set to the "II / Charger Only" position, only the Multi's battery charger will operate (if mains voltage is available). In this mode, the input voltage is also switched to the "AC out" terminal.

**NOTE:** If you only need the charger function, make sure the switch is set to the "II/Charger Only" position. This will prevent the inverter from turning on in the event of a utility power outage, thus preventing your batteries from being drained.

## 5. GX LCD interface

The display shows useful information about your system.

### 5.1. On/off behavior

If the product is turned off using the physical switch on the device or the remote on/off terminals, the GX card is also turned off. If you turn the product off remotely using the Digital Multi Control, the GX card will remain powered. The GX card will also remain powered when the inverter/charger is turned off from the GX menu.

Finally, if the inverter/charger shuts itself down due to an alarm, such as low battery or overheating, the GX card will also remain on and operational.

### 5.2. Button function

When the GX card is on, pressing the button next to the display will increase the backlight brightness. The backlight will dim again after 5 minutes.

Once the backlight is activated, pressing the button again will cycle through the available display options. Some options will appear automatically, while others require you to press the button to display them.

### 5.3. Displayed information

- Solar power, voltage and state of charge (if connected)
- ESS/DVCC reason codes (if active)
- Daily yield from solar panels
- Inverter/charger charge status
- Battery charge status, power and voltage
- Network IP address and connection type (if connected).
- AC input and output power

In a system with more than one phase, additional information will be available about the AC input and output, e.g.

- Input AC voltage and power of phase 1.
- Output AC voltage and power phase 1
- AC input voltage and power in phase 2.
- Output AC voltage and power in phase 2.
- Input AC voltage and power in phase 3.
- Output AC voltage and power in phase 3.

### 5.4. Displaying error codes

If an error occurs in the system, an error code will be displayed on the display. The display will show the VE.Bus error code numbers and MPPT error codes (if connected).

For basic information about VE.Bus error codes, see the "Error Indications" section. More

Details about error codes can be found here:

[VE.Bus error codes](#)

[MPPT error codes](#)

The error will be displayed until it is resolved.

## 6. Photovoltaic array design

### 6.1. Array sizing

We recommend using [MPPT sizing calculator](#) which is available on our website

- The solar charge controller will only operate if the PV system voltage exceeds the battery voltage (Vbat).
- For the controller to start, the PV voltage must exceed  $V_{bat} + 5\text{ V}$ . Then the minimum PV voltage is equal to  $V_{bat} + 1\text{ V}$ .
- The maximum open circuit voltage of the photovoltaic array is 250 V.
- The maximum short-circuit current of the photovoltaic array is

35 A. For example:

- Minimum number of cells in series: 144 (4 panels of 12 V or 2 panels of 24 V in series).
- Maximum number: 360 cells (10 12V panels or 5 24V panels connected in series).

*Note: At low temperatures, the open circuit voltage of a 360-cell array may exceed 250 V, depending on local conditions and cell specifications. In this case, it is necessary to reduce the number of cells connected in series.*

The EasySolar-II GX MPPT component is pre-programmed to match the battery voltage rating requirements of the supplied inverter/charger. In addition to the inverter/charger voltage parameters, specific battery voltage charging parameters may also need to be programmed.

## 7. Access to connection points

All electrical connections are accessible after removing the bottom plate. Below are photos of the EasySolar-II GX with the bottom plate removed.



## 8. Installation

This product contains potentially dangerous voltages. It should only be installed under the supervision of a qualified installer with appropriate training and in accordance with local regulations. Please contact Victron Energy for further information or any necessary training.

### 8.1. Location

The product must be installed in a dry and well-ventilated area, as close as possible to the batteries. There should be a free space of at least 10 cm around the product for cooling.



Excessively high ambient temperature will result in:

- Shortening of service life.
- Reducing the charging current.
- Peak capacity reduction or inverter shutdown. Never place the device directly above the batteries.

This product is suitable for wall mounting. A solid surface must be available that can support the weight and dimensions of the product (e.g. concrete or masonry). A hook and two holes are provided on the back of the housing for mounting purposes (see Appendix G). The device can be mounted either horizontally or vertically. Vertical mounting is recommended for optimal cooling.



The interior of the product must remain accessible after installation.

Try to keep the distance between the product and the battery to a minimum to minimize voltage losses in the cables.

For safety reasons, this product should be installed in a heat-resistant environment. You should avoid the presence of chemicals, synthetic materials, curtains or other textiles, etc. in the immediate vicinity.

### 8.2. Connecting the battery cables

To fully utilize the product's capacity, batteries with sufficient capacity and battery cables with sufficient cross-section must be used. See table.

|                                                                              | 48/4k5/55          | 48/6k5/100         |
|------------------------------------------------------------------------------|--------------------|--------------------|
| Recommended battery capacity (Ah)                                            | 200–800            | 250–1200           |
| Recommended DC fuse                                                          | 180 A              | 250 A              |
| Recommended cross-section (mm <sup>2</sup> ) per connection terminal + and – |                    |                    |
| 0 – 5m                                                                       | 50 mm <sup>2</sup> | 70 mm <sup>2</sup> |
| 5 – 10 m                                                                     | 70 mm <sup>2</sup> | 95 mm <sup>2</sup> |

Note: When working with low capacity batteries, internal resistance is an important factor. Please contact your supplier or refer to the relevant chapters in our publication "Energy Unlimited", which can be downloaded from our website.

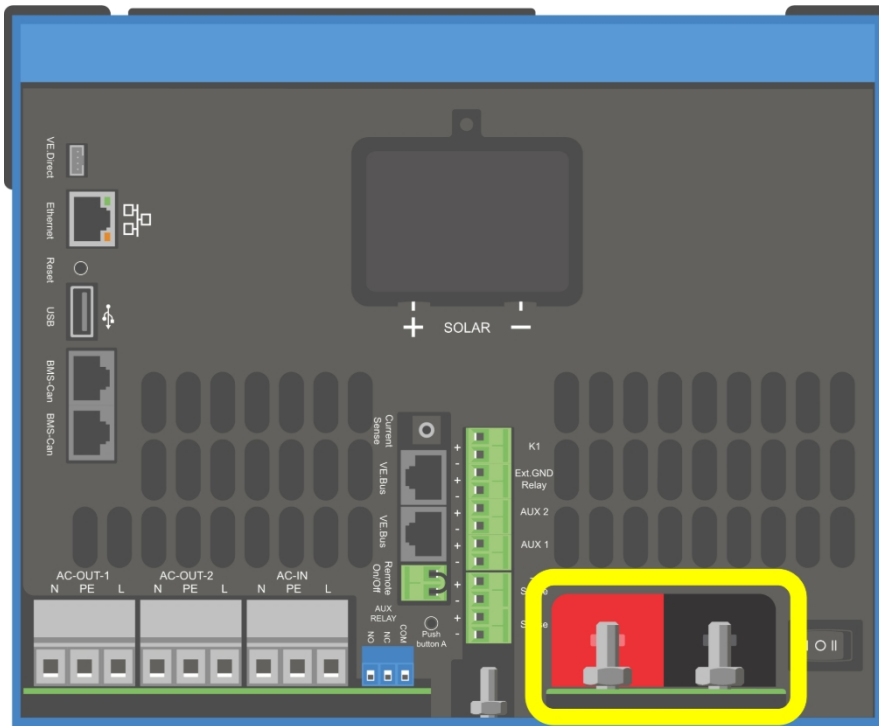
### 8.3. Battery connection procedure

When connecting the battery cables, proceed as follows:



Use a torque wrench with an insulated wrench to prevent shorting the battery. Avoid shorting the battery cables.

Special care and caution must be taken when connecting the battery. Before connecting, it is necessary to verify the correct polarity with a multimeter. Connecting the battery with incorrect polarity will cause destruction of the device and is not covered by the warranty.

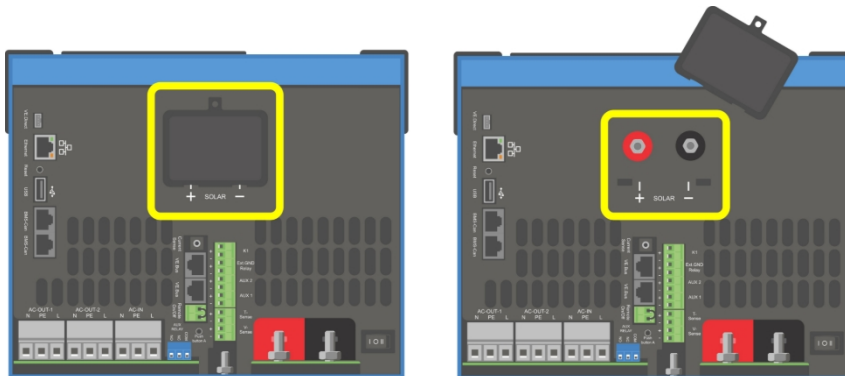


- Connect the battery cables. First the “-” cable, then the “+” cable. Be aware that sparking may occur when connecting the battery.
- Tighten the nuts to the prescribed torque to keep contact resistance as low as possible.

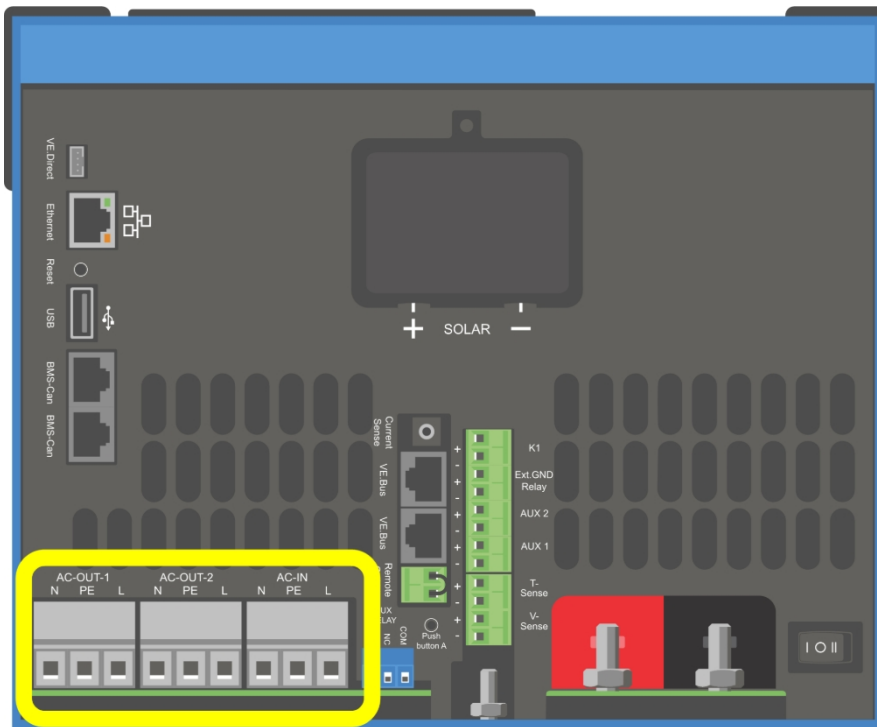
#### 8.4. Connecting the photovoltaic array

1. Check the correct polarity of the photovoltaic system
2. Remove the solar connection cover
3. Attach the solar panel to the M6 solar screws.

NOTE: If the polarity is reversed, the voltage of the photovoltaic system will drop, the controller will heat up, but will not charge the battery.



## 8.5. Connecting the AC cable line



This product is a safety class I device, designed for the TN system (for safety reasons it is equipped with an earthing terminal). **For safety reasons, its AC input and/or output terminals must be equipped with an uninterruptible ground.**

In case of high leakage current, it is necessary to use an additional grounding point with a conductor about the cross section at least 10 mm<sup>2</sup>. See Appendix A.

This product is equipped with a grounding relay (relay H, see Appendix B) which **automatically connects the neutral output to the enclosure if no external AC power is available**. If an external AC power supply is available, the grounding relay H opens before the input safety relay closes. This ensures the correct operation of the residual current device connected to the output. Since the unit is isolated from DC and therefore no DC leakage is possible, any residual current device can be used.

In a mobile installation (e.g. with a shore power connection), if the connection to the shore is interrupted, the earthing is also disconnected. In this case, the cover must be connected to the chassis (vehicle) or to the hull or earthing plate (ship). In the case of a ship, a direct connection to the shore earthing is not recommended due to possible galvanic corrosion. The solution is to use an isolation transformer.

The pins are located on the printed circuit board, see Appendix A.

**When connecting alternating current, do not confuse the neutral wire and the phase.**

- **AC input (AC-in)** The AC input cable can be connected to the “AC-in” terminal block. From left to right: “N” (neutral), “PE” (earth) and “L” (phase). **The AC input must be protected by a fuse or magnetic circuit breaker with a rated current of 32 A or less and the cable cross-section must be sized accordingly.** If the input AC power rating is lower, the fuse or magnetic circuit breaker rating must be reduced accordingly.

The cross-section of the grounding conductor should be at least the same as the cross-section of the AC conductors.

- **AC-out-1** The AC output cable can be connected directly to the “AC-out” terminal block. From left to right: “N” (neutral), “PE” (earth) and “L” (phase). Thanks to the PowerAssist function, the Multi can increase the output current during peak power demand by up to its rated power (e.g. 3000 / 230 = 13 A). Together with the maximum input current of 32 A, this means that the output can deliver up to 32 + 13 = 45 A. A residual current device and a fuse or circuit breaker sized for the expected load must be connected in series with the output, and the cable cross-section must be selected accordingly.
- **AC-out-2** There is a second output that disconnects its load when operating on battery. Devices that can only operate when AC voltage is available at AC-in-1, such as an electric water heater or air conditioner, are connected to these terminals. The load at AC-out-2 is disconnected immediately as soon as the inverter/charger switches to battery operation. As soon as AC power is available at AC-in-1, the load at AC-out-2 will be reconnected with a delay of approximately 2 minutes. This allows the generator to stabilize.

## 8.6. Optional connections

A number of optional connections can be made:

### 8.6.1. Remote control

The product can be remotely controlled in two ways.

- Using an external switch (connection terminal M, see appendix A). It only works if the switch on the device is set to the “on” position.
- Using the Digital Multi Control panel (connected to one of the two RJ45 L sockets, see Appendix A). It only works if the switch on the device is set to “on”.

The Digital Multi Control panel is equipped with a rotary knob that can be used to set the maximum AC input current: see PowerControl and PowerAssist.

### 8.6.2. Programmable relay

The relay can be programmed for a variety of other applications, such as a starting relay for a generator.

### 8.6.3. Programmable analog/digital input/output ports

The product is equipped with 2 analog/digital input/output ports.

These ports can be used for several purposes. One application is to communicate with BMS controls to enable charging and discharging of a lithium-ion battery.

### 8.6.4. Voltage sensing (connection terminal J, see appendix A)

To compensate for any losses in the cables during charging, two measuring leads can be connected, which can be used to measure the voltage directly on the battery or at the positive and negative distribution points. Use a lead with a cross-section of 0.75 mm<sup>2</sup>.

During battery charging, the inverter/charger will compensate for the voltage drop on the DC cables up to a maximum of 1 volt (i.e. 1 V on the positive connection and 1 V on the negative connection). If the voltage drop is likely to exceed 1 V, the charging current is limited to keep the voltage drop to 1 V.

### 8.6.5. Temperature sensor (connection terminal J, see appendix A)

A temperature sensor can be connected for temperature compensated charging. The sensor is insulated and must be connected to the negative terminal of the battery.



The temperature sensor is not included in the delivery of 48 V models.

It can be ordered separately. Order number: ASS000001000

### 8.6.6. Parallel connection

For three-phase and parallel systems, identical units must be used. In this case, since only one GX device is allowed per system, if you want to connect this product in parallel and/or in a three-phase system, you must find the same MultiPlus-II model to pair.

To make it easier to find identical units, consider using the MultiPlus-II for parallel and three-phase systems and the external GX device instead.

Up to six units can be connected in parallel. When connecting this product to a MultiPlus-II in a parallel system, the following requirements must be met:



It is essential that the negative terminal of the battery between units is always connected. A fuse or circuit breaker is not permitted on the negative terminal.

- All units must be connected to the same battery.
- Maximum six units connected in parallel.
- The devices must be identical (except for the GX component) and must have the same firmware.
- The DC connection cables to the devices must have the same length and cross-section.
- If a positive and negative DC distribution point is used, the cross-section of the connection between the batteries and the DC distribution point must be at least equal to the sum of the required cross-sections of the connection between the distribution point and the units.

- Always connect the negative battery cables first and only then place the UTP cables.
- Place the units close together, but leave at least 10 cm of free space below, above and next to the units for ventilation.
- UTP cables must be connected directly from one unit to another (and to the remote panel). Junction boxes or junction boxes are not permitted.
- **TOsystem** Only one remote control (panel or switch) can be connected. This means only one GX device. If multiple GX models are to be connected in parallel or in a three-phase circuit, the internal connection between the GX card and the other components must be disconnected. For this reason, it is recommended to use MultiPlus models without built-in GX for these systems.

#### 8.6.7. Three-phase operation

The product can also be used in a three-phase star (Y) configuration. For this purpose, the devices are connected using standard RJ45 UTP cables (the same as for parallel operation). **System** will require subsequent configuration.

Prerequisites: see section Voltage Sensing

1. Note: The product is not suitable for three-phase delta ( $\Delta$ ) connection configuration.
2. If the AS4777.2 network code was selected in the VEConfigure program, only 2 units connected in parallel per phase are allowed in a three-phase system.

For detailed information on parallel and three-phase connections, always consult your Victron distributor first and refer to this specific guide:

[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)

#### 8.6.8. Connecting to the VRM portal

Connecting your product to the VRM portal requires an internet connection. This can be done via Wi-Fi or, more conveniently, using a wired Ethernet connection to a router connected to the internet.

The VRM page ID is located on a label inside the device's cable connection area. Other

For information on VRM settings, see the manual. [VRM Getting Started Manual](#).

## 9. Configuration

This section is intended primarily for standalone applications

For information on grid-connected energy storage systems (ESS), visit <https://www.victronenergy.com/live/ess:start>

- The settings should only be changed by a qualified installer with appropriate training and in accordance with local requirements. Please contact Victron for further information or necessary training.
- Please read the instructions carefully before making any changes.
- The AC input must be disconnected during charger setup.

### 9.1. Standard settings: ready to use

The product is set to factory default values when shipped. Generally, these settings are suitable for single device operation.



It is possible that the standard battery charging voltage is not suitable for your batteries! Read the manufacturer's documentation or contact your battery supplier!

#### Standard factory settings

| Settings                                                 | 48V                                                                                                                           |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Inverter frequency                                       | 50Hz                                                                                                                          |
| Input frequency range                                    | 45 – 65 Hz                                                                                                                    |
| Input voltage range                                      | 187-265VAC                                                                                                                    |
| Inverter voltage                                         | 230VAC                                                                                                                        |
| Stand-alone operation / parallel operation / three-phase | separate                                                                                                                      |
| AES (Automatic Energy Saving Switch)                     | off                                                                                                                           |
| Ground relay                                             | on                                                                                                                            |
| Charger on/off                                           | on                                                                                                                            |
| Battery charging curve                                   | four-stage adaptive charging with BatterySafe mode                                                                            |
| Charging current                                         | 100% of maximum charging current                                                                                              |
| Battery type                                             | Victron Gel Deep Discharge (also suitable for Victron AGM Deep Discharge)                                                     |
| Automatic equalization charging                          | off                                                                                                                           |
| Absorption voltage                                       | 57.6V                                                                                                                         |
| Absorption charging time                                 | up to 8 hours (depending on full charge time)                                                                                 |
| Holding voltage                                          | 55.2V                                                                                                                         |
| Storage voltage                                          | 55.2 V (cannot be set)                                                                                                        |
| Reabsorption time                                        | 1 hour                                                                                                                        |
| Absorption repetition interval                           | 7 days                                                                                                                        |
| Mass protection                                          | on                                                                                                                            |
| AC input current limitation                              | 32 A for the 3 kVA model and 50 A for the 5 kVA model (= adjustable current limit for functions PowerControl and PowerAssist) |
| UPS functions                                            | on                                                                                                                            |
| Dynamic current limiter                                  | off                                                                                                                           |
| WeakAC                                                   | off                                                                                                                           |
| Amplification factor                                     | 2                                                                                                                             |
| Programmable relay                                       | alarm function                                                                                                                |
| PowerAssist                                              | on                                                                                                                            |

## 9.2. Explanation of settings

Settings that are not obvious at first glance are briefly described below. For more information, see the help files in the software configuration programs.

### Inverter frequency

Output frequency if no signal is present at the input

AC voltage. Adjustable values: 50 Hz; 60 Hz

### Input frequency range

Acceptable input frequency range. Within this range, the device synchronizes to the frequency of the AC input voltage. The output frequency is then equal to the input frequency.

Adjustable ranges: 45 – 65 Hz; 45 – 55 Hz; 55 – 65 Hz

### Input voltage range

Acceptable voltage range. Within this range, the device synchronizes with the input AC voltage. The output voltage is then equal to the input voltage.

Adjustability:

Lower limit: 180 – 230 V

Upper limit: 230 – 270 V

**Note:** The default low limit setting of 180V is intended for connection to a weak power source or to a generator with unstable AC output. This setting may cause the system to trip when connected to a “brushless, self-excited, externally voltage regulated, synchronous AC generator” (synchronous generator with AVR). Most generators rated at 10 kVA or more are synchronous generators with AVR. The trip is initiated when the generator stops and the speed drops while the AVR “tries” to maintain the generator output voltage at 230V.

The solution is to increase the lower limit setting to 210V AC (the output of generators with AVR is generally very stable) or to disconnect the device from the generator as soon as the signal to stop the generator is given (using an AC contactor connected in series with the generator).

### Inverter voltage

Output voltage when operating on battery.

Adjustable range: 210 – 245 V

### Stand-alone operation / parallel operation / 2-3 phase setting

When using multiple devices, it is possible to:

- increase the total inverter power (several devices connected in parallel)
- create a split-phase system using a separate autotransformer: see the data sheet and instructions for use of the VE autotransformer
- create a three-phase system.

The standard product settings are intended for one device in standalone operation.

### AES (Automatic Economy Switch)

When this setting is enabled, the power consumption in no-load and light-load operation is reduced by approximately 20% due to a slight “narrowing” of the sine wave voltage. Applies to standalone configuration only.

### Search mode

Instead of AES mode, you can also select **search mode**. When the search mode is on, the power consumption in no-load operation is reduced by approximately 70%. In this mode, the device switches off when operating in inverter mode at no load or very low load and switches on for a short time every two seconds. If the output current exceeds the set level, the inverter will continue to operate. Otherwise, the inverter switches off again.

The load values for “turn off” and “stay on” in search mode can be set using

VEConfigure. The default settings are:

| Action   | Threshold value     |
|----------|---------------------|
| Shutdown | 40 W (linear load)  |
| Turn on  | 100 W (linear load) |

### Grounding relay (see Appendix B)

This relay is used to ground the neutral conductor of the AC output to the chassis when the backfeed safety relays are open. This ensures the correct operation of the output residual current devices. If necessary, an external grounding relay can be connected (for a split-phase system with a separate autotransformer). See Appendix A.

#### Battery charging algorithm

The default setting is "Four-stage adaptive with BatterySafe mode".

This is the recommended charging algorithm for lead-acid batteries. For more features, see the help in the software configuration programs.

#### Battery type

The standard setting is best suited for Victron Gel Deep Discharge, Exide A200 Gel and stationary tubular plate batteries (OPzS). This setting can also be used for many other batteries: e.g. Victron AGM Deep Discharge and other AGM batteries, as well as many types of flooded flat plate batteries.

Using the VEConfigure program, the charging algorithm can be customized to charge any type of battery (nickel-cadmium batteries, lithium-ion batteries).

#### Absorption time

In the case of the standard setting "Four-stage adaptive charging with BatterySafe mode", the absorption time depends on the filling time (adaptive charging curve) to optimally charge the battery.

### 9.2.1. Equalization charging

Traction batteries require regular additional charging. In equalization charging mode, the product is charged for one hour at an increased voltage (4 V for a 48 V battery). The charging current is then limited to 1/4 of the set value.



The equalization mode provides a higher charging voltage than most DC-consuming devices can handle. These devices must be disconnected before additional charging can begin.

#### Automatic equalization charging

This setting is intended for traction batteries with tubular plates with liquid electrolyte or OPzS type batteries. During the absorption phase, the limit voltage increases to 2.83 V/cell (68 V for a 48V battery) as soon as the charging current drops to less than 10% of the set maximum current.

See "Charging curve of tubular plate traction batteries" in the VEConfigure program.

#### Storage voltage, reabsorption time, reabsorption interval

See Appendix E.

#### Overcharge protection

When this setting is enabled, the bulk charging time is limited to 10 hours. A longer charging time may indicate a system error (e.g., a short circuit in a battery cell).

#### AC input current limitation

This is a current limit setting, when exceeded, the PowerControl and

PowerAssist. AC input current limit range when PowerAssist is enabled:

Model 4k5 from a minimum of 3.6 A to a maximum of 32 A; model

6k5 from a minimum of 7 A to a maximum of 50 A. Default

setting: maximum value.

#### UPS functions

If this setting is enabled and there is an AC input power outage, the device will switch to inverter mode with virtually no interruption.

The output voltage of some small generator sets is too unstable and distorted to use this setting - the device would constantly switch to inverter mode. For this reason, the setting can be turned off. The device will then respond less quickly to . The time to switch to inverter mode is therefore slightly longer, but this does not have a negative impact on most devices (most computers, clocks or household appliances).

**Recommendation:** Disable this UPS feature if the device fails to synchronize or constantly switches back to inverter mode.

mode. This setting is also often used with "classic" generators that react slowly to sudden changes in load.

#### Dynamic current limiter

Designed for generators where the alternating voltage is generated by a static converter (so-called "inverter" generators). In these generators, the engine speed is reduced at low load: this reduces noise, fuel consumption and pollution. The disadvantage is that in the event of a sudden increase in load, the output voltage drops significantly or even drops out completely. A larger load can only be supplied after the engine has reached full speed.

When this setting is enabled, the device will start to provide additional power at low generator output and gradually allow the generator to deliver more until the set current limit is reached. This allows the generator motor to reach the desired speed.

This setting is also often used with "classic" generators that react slowly to sudden load changes.

#### **Weak AC voltage**

Severe input voltage distortion can cause the charger to operate poorly or not at all. If WeakAC is set, the charger will accept severe input voltage distortion, but at the cost of greater input current distortion.

**Recommendation:** Turn on the "WeakAC" function if the charger is charging barely or not at all (which is quite rare!). At the same time, also turn on the dynamic current limiter and reduce the maximum charging current if necessary to prevent overloading the generator.

**Note:** When the "WeakAC" function is turned on, the maximum charging current is reduced by approximately 20%.

**BoostFactor** This value adjusts the behavior of the PowerAssist function. If you are experiencing problems with the PowerAssist function (e.g. overloading), please consult a Victron Energy trained professional before attempting any adjustments.

#### **Programmable relay**

The relay can be programmed for a variety of other applications, such as a starting relay for a generator.

#### **Auxiliary AC output (AC-out-2)**

Designed for non-critical loads. The default setting enables AC-out-2 output after a 30-second delay after AC input is detected. The current sensing circuit activates the PowerAssist feature. This relay can be reprogrammed for greater control.

### **9.3. Inverter/charger**

For more information on configuring the inverter/charger component of the EasySolar-II GX, see [manual](#) to the device [MultiPlus-II](#)

Full functionality of inverter/charger programming requires the use of a laptop with [with the VEConfigure program](#) Limited configuration is possible using the VictronConnect app.

### **9.4. SmartSolar MPPT 250/70 charge controller**

The solar charger is configured using the VictronConnect app. The easiest way to connect to the solar charger is via Bluetooth. This works for Android, iOS and macOS. Bluetooth is not currently supported for Windows.

If you must use Windows, disconnect the VE.Direct cable from the solar charger and use [VE.Direct cable with USB interface](#) to connect to a Windows laptop. Once complete, reconnect the VE.Direct cable that connects the GX internal device to the solar charger.

Complete documentation for the MPPT controller included in the EasySolar-II GX device can be found in these documents:

[Documentation](#) to the regulator [SmartSolar MPPT 250/70](#)

[VictronConnect User Manual](#)

## 10. Maintenance

The product does not require any special maintenance. Just check all connections once a year. Protect your device from moisture, oil, soot and fumes and keep it clean.

## 11. Troubleshooting

Most faults can be quickly identified using the procedures below. If the fault cannot be rectified, please contact your Victron Energy supplier.

### 11.1. General error indications

| Problem                                                                                       | Cause                                                                                                                                                                                                                           | Solution                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| At the AC-out-2 output there is no output voltage, even after the waiting period has expired. | in inverter mode                                                                                                                                                                                                                | AC input is not connected. Follow the instructions in <a href="#">Frequently Asked Questions about the MultiPlus Generator</a> .                                                                                                  |
| The device will not switch to generator operation or from the network.                        | The circuit breaker or fuse on the AC-in input is tripped due to overload.                                                                                                                                                      | Remove the overload or short circuit on the ACout-1 or AC-out-2 output and reset the fuse/circuit breaker.                                                                                                                        |
| The inverter does not start operating when switched on.                                       | Battery voltage is too high or too low. There is no voltage at the DC connection.                                                                                                                                               | Ensure that the battery voltage is within the correct range.                                                                                                                                                                      |
| "Low battery"                                                                                 | The battery voltage is low.                                                                                                                                                                                                     | Charge the battery or check its connection.                                                                                                                                                                                       |
| "Low status" battery" (shutdown)                                                              | The inverter shuts down because the battery voltage is too low.                                                                                                                                                                 | Charge the battery or check its connection.                                                                                                                                                                                       |
| Overload                                                                                      | The inverter load is higher than the rated load.                                                                                                                                                                                | Reduce the load.                                                                                                                                                                                                                  |
| "Overload" (shutdown)                                                                         | The inverter has shut down due to excessive load.                                                                                                                                                                               | Reduce the load.                                                                                                                                                                                                                  |
| "Overheating"                                                                                 | The ambient temperature is high or the load is too high.                                                                                                                                                                        | Install the inverter in a cool and well-ventilated environment or reduce the load.                                                                                                                                                |
| "Low battery voltage" and overload" (shutdown)                                                | Low battery voltage and excessively high load.                                                                                                                                                                                  | Charge the batteries, disconnect or reduce the load, or install higher capacity batteries. Use shorter and/or thicker battery cables.                                                                                             |
| "High ripple" direct current"                                                                 | The voltage ripple on the DC connection exceeds 1.5 Vrms.                                                                                                                                                                       | Check the battery cables and battery connections. Check that the battery capacity is high enough and increase it if necessary.                                                                                                    |
| "Shutdown due to ripple" direct current"                                                      | The inverter has shut down due to too high input voltage ripple.                                                                                                                                                                | Install larger capacity batteries. Use shorter and/or thicker battery cables and reset the inverter (turn it off and on again).                                                                                                   |
| The charger is not working.                                                                   | The input AC voltage or frequency is not within the set range.                                                                                                                                                                  | Ensure that the AC input voltage is between 185 VAC and 265 VAC and that the frequency is within the set range (default setting 45-65 Hz).                                                                                        |
|                                                                                               | The circuit breaker or fuse on the AC-in input is tripped due to overload.                                                                                                                                                      | Remove the overload or short circuit on the ACout-1 or AC-out-2 output and reset the fuse/circuit breaker.                                                                                                                        |
|                                                                                               | The battery fuse has blown.                                                                                                                                                                                                     | Replace the battery fuse.                                                                                                                                                                                                         |
|                                                                                               | Distortion or input AC voltage is too high (usually when powered by a generator).                                                                                                                                               | Turn on the "WeakAC" setting and the dynamic current limiter.                                                                                                                                                                     |
| Charger doesn't work. Displays "Bulk Protection" with "Bulk" Protection".                     | The charger is in "Bulk Protection" mode, which means that the maximum charging time in "Bulk" mode (10 hours) has been exceeded. Such a long charging time may indicate a system error (e.g. short circuit in a battery cell). | Check the batteries. NOTE: You can reset the error mode by turning the device off and then on again. The factory default setting for Bulk Protection is on. Bulk Protection can only be turned off using the VEConfigure program. |
| The battery is not fully charged. charged.                                                    | The charging current is too high, causing a premature transition to the absorption phase.                                                                                                                                       | Set the charging current to between 0.1 and 0.2 times the battery capacity.                                                                                                                                                       |
|                                                                                               | Bad battery connection.                                                                                                                                                                                                         | Check the battery connection.                                                                                                                                                                                                     |

|                                                                    |                                                                                                                                                                                                                  |                                                                                                                                                         |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                    | The absorption voltage was set to the wrong level (too low).                                                                                                                                                     | Set the absorption voltage to the correct level.                                                                                                        |
|                                                                    | The float voltage was set to the wrong level (too low).                                                                                                                                                          | Set the float voltage to the correct level.                                                                                                             |
|                                                                    | The available charging time is too short to fully charge the battery.                                                                                                                                            | Choose a longer charging time or a higher charging current.                                                                                             |
|                                                                    | The absorption phase time is too short. With adaptive charging, this may be caused by an extremely high charging current relative to the battery capacity, so that the main charging phase time is insufficient. | Reduce the charging current or select "fixed" charging characteristics.                                                                                 |
| The battery is overcharged.                                        | The absorption voltage is set to the wrong level (too high).                                                                                                                                                     | Set the absorption voltage to the correct level.                                                                                                        |
|                                                                    | The float voltage is set to the wrong level (too high).                                                                                                                                                          | Set the float voltage to the correct level.                                                                                                             |
|                                                                    | Bad battery condition.                                                                                                                                                                                           | Replace the battery.                                                                                                                                    |
|                                                                    | Battery temperature is too high (due to insufficient ventilation, too high ambient temperature or too high charging current).                                                                                    | Improve ventilation, place batteries in a cooler environment, reduce charging current <b>and connect the temperature sensor</b> .                       |
| Once the absorption phase begins, the charging current drops to 0. | Defective battery temperature sensor                                                                                                                                                                             | Disconnect the temperature sensor connector in . If charging starts properly after approximately 1 minute, the temperature sensor needs to be replaced. |
|                                                                    | The battery is overheated (+50 °C)                                                                                                                                                                               | Place the battery in a cooler environment                                                                                                               |
|                                                                    |                                                                                                                                                                                                                  | Reduce charging current                                                                                                                                 |
|                                                                    |                                                                                                                                                                                                                  | Check if any of the battery cells have an internal short circuit.                                                                                       |

## 11.2. VE.Bus error codes

The VE.Bus system can display various error codes. These codes are shown on the front display of the GX. For correct

To interpret the VE.Bus error code, you should consult the VE.Bus error code documentation. [at the address](https://www.victronenergy.com/live/ve.bus:ve_bus_error_codes)

[https://www.victronenergy.com/live/ve.bus:ve\\_bus\\_error\\_codes](https://www.victronenergy.com/live/ve.bus:ve_bus_error_codes).

| Code | Importance:                                                                           | Cause/Solution:                                                                                                                                                                            |
|------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | The device is off because one of the other phases in the system has been turned off.  | Check the faulty phase.                                                                                                                                                                    |
| 3    | Not all expected devices were found in the system, or more than expected were found.  | The system is not configured correctly. Reconfigure the system. If the error persists, the communication cable may be faulty. Check the cables and turn all devices off and then on again. |
| 4    | No other devices were detected.                                                       | Check the faulty unit. Check the communication cables.                                                                                                                                     |
| 5    | Overvoltage at the AC output.                                                         | Check the AC cables.                                                                                                                                                                       |
| 10   | There was a problem with system time synchronization.                                 | This should not happen with a properly installed device. Check the communication cables.                                                                                                   |
| 14   | The device cannot transmit data.                                                      | Check the communication cables (there may be a short circuit).                                                                                                                             |
| 17   | One of the devices took over the role of "master" because the original master failed. | Check the faulty unit. Check the communication cables.                                                                                                                                     |
| 18   | There was a power surge.                                                              | Check the power cables.                                                                                                                                                                    |
| 22   | This device cannot function as a "slave".                                             | This device is an outdated and unsuitable model. It should be replaced.                                                                                                                    |

| Code | Importance:                                                                                                               | Cause/Solution:                                                                                                                                                                                                                                                               |
|------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 24   | The switching system protection has been triggered.                                                                       | This should not happen with a properly installed device. Turn off all devices and then turn them back on. If the problem persists, check the installation. <b>Possible solution: increase the lower limit of the AC input voltage to 210 VAC (factory setting is 180 VAC)</b> |
| 25   | Firmware incompatibility. The firmware of one of the connected devices is not up to date enough to work with this device. | 1) Turn off all devices. 2) Turn on the device that is showing this error message. 3) Turn on all other devices one by one until the error message reappears. 4) Update the firmware on the last device that was turned on.                                                   |
| 26   | Internal error.                                                                                                           | It should not occur. Turn all devices off and then on again. If the problem persists, contact Victron Energy.                                                                                                                                                                 |

### 11.3. GX Device – Factory Reset

Restoring the GX card to factory settings is done by inserting a USB flash drive containing a specific recovery file into the USB port. The recovery requires Venus firmware version 2.12 or higher and does not require the use of buttons or screens.

#### Reasons for factory reset:

- If the GX card is locked due to a forgotten remote console password.
- If residual memory from the previous environment needs to be removed (e.g. detected AC PV inverters).
- To restore incorrectly configured settings causing unusual behavior.
- If the data partition is full due to modifications to the GX card operating system.
- If an error occurs in the beta version of the firmware.
- If there are no problems, but it is desirable to perform a clean start.

#### To restore factory settings:

1. Download the file [venus-data-90-reset-all.tgz](#).
2. Copy the file to a blank, freshly formatted USB memory stick in FAT32 format. Do not unzip, compress, or rename the file.

If the GX card is using firmware version 2.12 to 3.10, only one file is supported to run. In this case, either update the firmware on the GX card or rename the downloaded file to “venus-data.tgz” before copying it to the USB flash drive.

3. Turn off the device.
4. Insert the USB flash drive and turn the device back on.
5. Wait for the GX card to fully boot.
6. Remove the USB flash drive.
7. Turn the device off and on again or use the Reboot function in the Settings → General menu.

If factory reset does not work, you will need to reinstall Venus OS. To do this, .

### 11.4. GX Device – Reinstalling Venus OS



- Use this procedure only as a last resort, after performing the following procedure “GX Device – Factory Reset [24]” and exhausting all other problem-solving options!
- This procedure is intended to repair a device that has stopped working and is not suitable for devices that start but exhibit unusual behavior.



- This procedure involves opening the unit cover and connecting the battery while the cover is open. This exposes you to dangerous voltages.
- This procedure should only be carried out by Victron Energy dealers and distributors, electrical engineers or professional users.
- If you are unsure how to perform this procedure, please contact your Victron dealer or distributor.

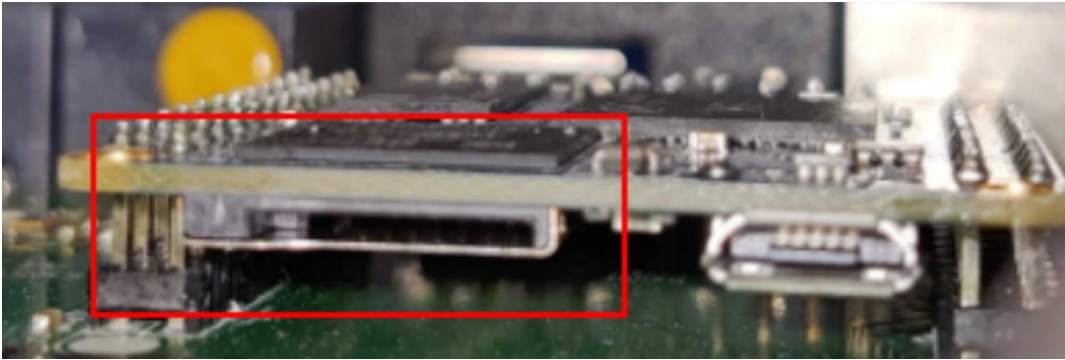


- Connecting the battery while the device is open will expose you to dangerous AC or DC voltage that cannot be isolated.
- Always use insulated tools.
- Avoid short circuits between the battery terminals, AC terminals, and internal circuit boards.



- This procedure will erase all partition data, including all settings.
- After this procedure, you may need to reset the VRM authorization token.

### Venus OS reinstallation procedure

|   |                                                                                                                                                                                                                                       |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Download the installation image (venus-install-sdcard-nanopi-*.img.zip) here: <a href="https://updates.victronenergy.com/feeds/venus/release/images/nanopi/">https://updates.victronenergy.com/feeds/venus/release/images/nanopi/</a> |
| 2 | Use the Balena Etcher program to burn the image to a microSD card. Download the Etcher program here: <a href="https://etcher.balena.io/">https://etcher.balena.io/</a> The application will automatically extract the archive.        |
| 3 | Turn off the device.                                                                                                                                                                                                                  |
| 4 | Disconnect all electrical connections from the bottom of the device.                                                                                                                                                                  |
| 5 | Unscrew the front cover screws; there are three screws on each side and two on the bottom.                                                                                                                                            |
| 6 | Remove the front cover.<br>Pay attention to the ribbon cable connected to the display on the cover.                                                                                                                                   |
| 7 | Find the GX card, which is circled in red in the image below.<br>                                                                                  |
| 8 | Insert the microSD card into the SD card slot with the contacts facing up.<br>                                                                    |

| Venus OS reinstallation procedure |                                                                                                      |
|-----------------------------------|------------------------------------------------------------------------------------------------------|
| 9                                 | Connect the battery and turn on the device. Wait 2 minutes for the installation process to complete. |
| 10                                | Remove the microSD card.                                                                             |
| 11                                | Reassemble the device.                                                                               |
| 12                                | Turn the device off and then on again. Turn the device off and then on again.                        |

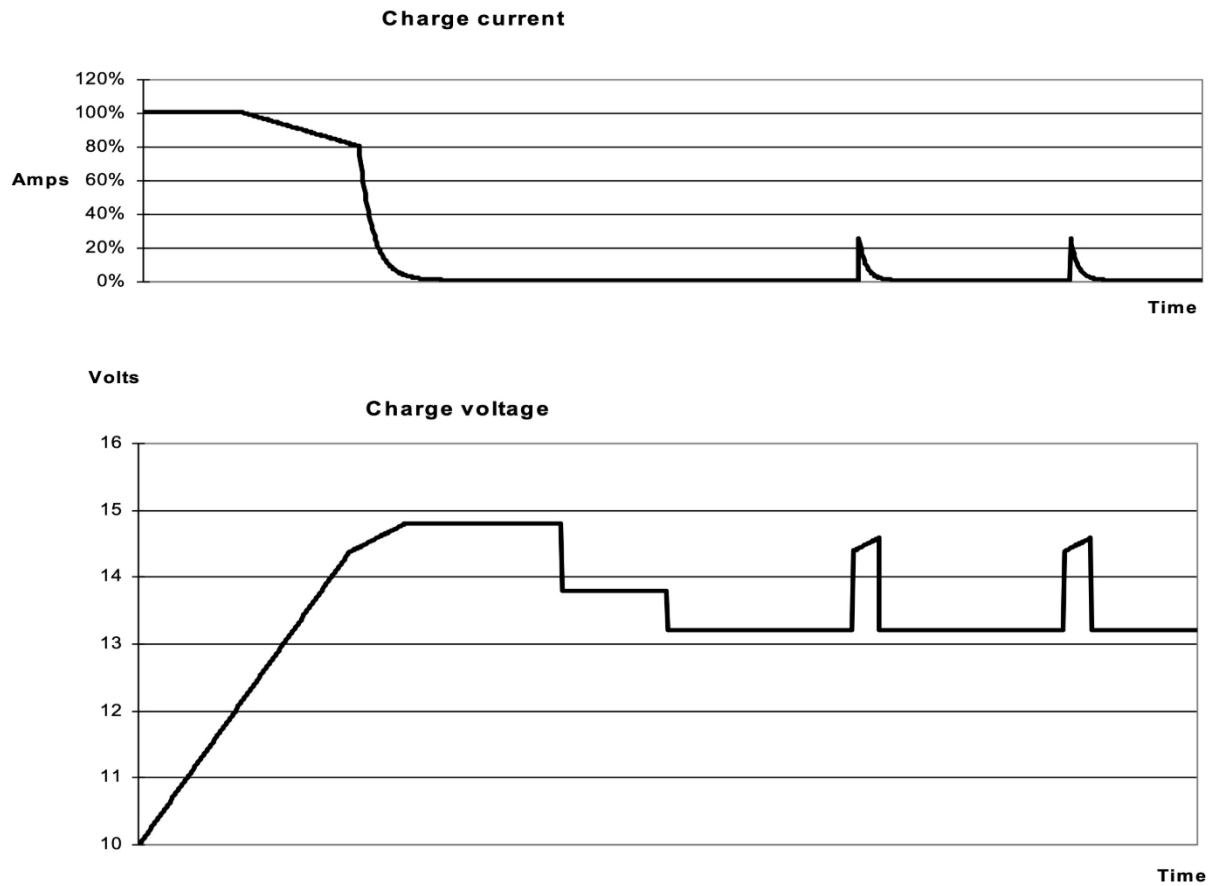
## 12. Technical specifications

| EasySolar-II GX 230 V                       | 48/4k5/55-32 MPPT 250/70                                                         | 48/6k5/100-50 MPPT 250/100 GX |
|---------------------------------------------|----------------------------------------------------------------------------------|-------------------------------|
| PowerControl and PowerAssist                | Yes                                                                              |                               |
| Toggle switch                               | 32 A                                                                             | 50 A                          |
| Maximum AC input current                    | 32 A                                                                             | 50 A                          |
| INVERTER/CHARGER                            |                                                                                  |                               |
| Input voltage range                         | 38 – 60V                                                                         |                               |
| Output in inverter mode(1)                  | Output voltage: 230 VAC ± 2% Frequency: 50 Hz ± 0.1%                             |                               |
| Continuous output power at 25 °C            | 4kW                                                                              | 6 kW                          |
| Continuous output power at 40 °C            | 3.7kW                                                                            | 5.7kW                         |
| Continuous output power at 65 °C            | 3kW                                                                              | 4.6 kW                        |
| Time-limited power 1 (cold start)           | 4.5 kW/2 hours                                                                   | 6.5 kW/4 hours                |
| Time-limited power 2 (cold start)           | 6 kW/25 min                                                                      | 8 kW/1 hour                   |
| Maximum power when powered by mains         | 4kW                                                                              | 6 kW                          |
| Peak performance                            | 7 kW/1 min                                                                       | 11 kW/1 min                   |
| Maximum efficiency                          | 95%                                                                              | 96%                           |
| Power consumption at zero load              | 20W                                                                              | 28W                           |
| Power consumption at no load in AES mode    | 13W                                                                              | 18W                           |
| Power consumption at no load in search mode | 8W                                                                               | 8W                            |
| Input AC voltage                            | Input voltage range: 187-265 VAC Input frequency: 45-65 Hz                       |                               |
| "Absorption" of charging voltage            | 57.6V                                                                            |                               |
| Charging voltage "float"                    | 55.2V                                                                            |                               |
| Maintenance mode                            | 52.8V                                                                            |                               |
| Maximum battery charging current at 25 °C   | 55 A                                                                             | 100A                          |
| Maximum battery charging current at 40 °C   | 50 A                                                                             | 95 A                          |
| Battery temperature sensor                  | Optional. Order number: ASS000001000                                             |                               |
| Compatible battery types                    | Lithium, lead, zinc-bromine and others(3)                                        |                               |
| IN GENERAL                                  |                                                                                  |                               |
| Auxiliary output                            | Yes (32A)                                                                        |                               |
| External AC sensor (optional)               | 100A                                                                             |                               |
| Programmable relay(4)                       | Yes                                                                              |                               |
| Protection(2)                               | a–g                                                                              |                               |
| VE.Bus communication port                   | For parallel and three-phase operation, remote monitoring and system integration |                               |
| Universal communication port                | Yes, 2 times                                                                     |                               |
| Remote power on/off                         | Yes                                                                              |                               |
| GX device interface                         | VE.Can, USB, Ethernet, VE.Direct, Wi-Fi                                          |                               |
| Operating temperature range                 | - 40 to +65 °C (fan cooling).                                                    |                               |
| Humidity (non-condensing)                   | Maximum 95%                                                                      |                               |
| Maximum altitude                            | 2000m                                                                            |                               |
| SMART SOLAR CHARGER                         |                                                                                  |                               |
| Model                                       | MPPT 250/70-Tr                                                                   | MPPT 250/100-Tr               |
| Maximum output current                      | 70 A                                                                             | 100A                          |

| EasySolar-II GX 230 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 48/4k5/55-32 MPPT 250/70                                                                                  | 48/6k5/100-50 MPPT 250/100 GX |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------|
| Maximum PV power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4000W                                                                                                     | 5800W                         |
| Maximum open circuit voltage of the photovoltaic circuit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 250V                                                                                                      |                               |
| Maximum efficiency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 99%                                                                                                       |                               |
| Own consumption                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 20 mA                                                                                                     |                               |
| Charging voltage "absorption", default value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 57.6V                                                                                                     |                               |
| Charging voltage "float", default value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 55.2V                                                                                                     |                               |
| CABINET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                           |                               |
| Material and color                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Steel, blue RAL 5012                                                                                      |                               |
| Degree of protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | IP21                                                                                                      |                               |
| Battery connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | M8 screws                                                                                                 |                               |
| 230 V AC connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Screw terminals 13 mm <sup>2</sup> (6 AWG)                                                                |                               |
| Weight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 28.8 kg                                                                                                   | 39.6 kg                       |
| Dimensions h x w x d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 591 × 275 × 254mm                                                                                         | 670 × 320 × 270 mm            |
| STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                           |                               |
| Safety                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EN-IEC 62019-1, EN-IEC 6201-2, EN-IEC 60335-1, EN-IEC 60335-2-29                                          |                               |
| Emissions / Resistance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-IEC 61000-3-3<br>IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3 |                               |
| Backup power source                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | IEC 62040-1                                                                                               |                               |
| <div><div><div>1) Can be set to 60 Hz</div><div>2) Protection key:<div>a) short circuit at the output</div><div>b) overload alarm</div><div>c) battery voltage too high</div><div>d) battery voltage too low</div><div>e) temperature too high</div><div>f) 230 V AC at the inverter output</div><div>g) too high input voltage ripple</div></div></div><div><div>3) Other chemistries are possible, provided the charger is configured to specification<br/>battery manufacturer.</div><div>4) Programmable relay that can be set to general , DC undervoltage or generator start/stop function.<br/>Rated AC current: 230 V / 4 A, nominal<br/>DC current: 4 A up to 35 V DC and 1 A up to 60 V DC</div></div></div> |                                                                                                           |                               |

## 13. Appendix

### 13.1. E: Charging algorithm



#### 4-stage charging:

##### In bulk

It is triggered when the charger is switched on. A constant current is applied until the battery's rated voltage is reached, depending on temperature and input voltage, then a constant power is applied until the point where excessive gassing begins (respectively 14.4V, 28.8V or 57.6V with temperature compensation).

##### Battery Safe Mode

The voltage applied to the battery is gradually increased until the set absorption voltage is reached. Battery Safe mode is part of the calculated absorption time.

##### Absorption

The absorption time depends on the charging time in "Bulk" mode. The maximum absorption time is set as "Maximum Absorption Time".

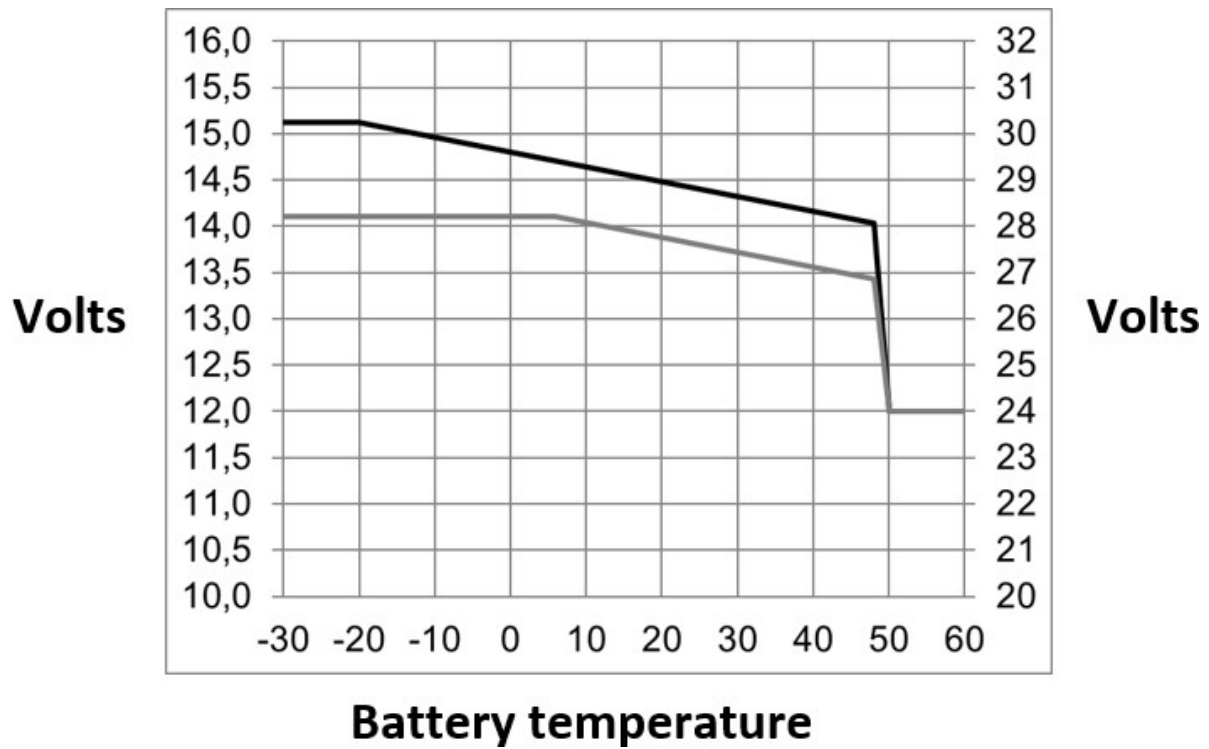
##### Maintenance mode

Float voltage is applied to keep the battery fully charged.

##### Storage

After one day of trickle charging, the output voltage is reduced to the storage level. This is 13.2 V for 12V, 26.4 V for 24V and 52.8 V for 48V batteries. This reduces water loss to a minimum when the battery is stored during the winter period. After an adjustable period (default = 7 days) the charger will switch to re-absorption mode for an adjustable period (default = one hour) to "refresh" the battery.

### 13.2. F: Temperature compensation table



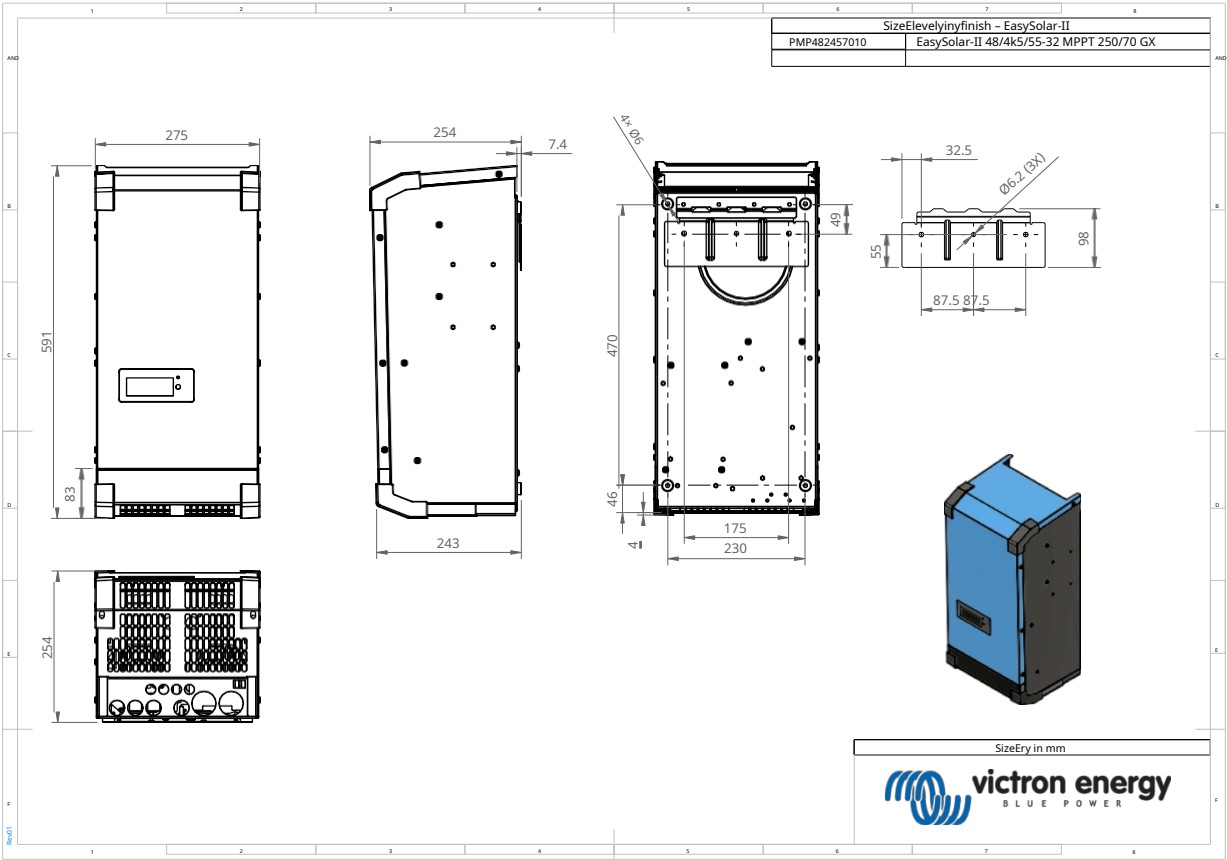
The table above shows the default output voltage for trickle charge and absorption charge modes at 25°C for 12V and 24V battery banks. For a 48V battery bank, multiply the 24V voltage by 2.

The reduced voltage in Float mode is controlled by the voltage in Float mode and the increased voltage in Absorption mode is controlled by the voltage in

Absorption mode. Temperature compensation is not applied in setting mode.

13.3. G: Cabinet dimensions

4500W



6500W

