Self-consumption & energy storage
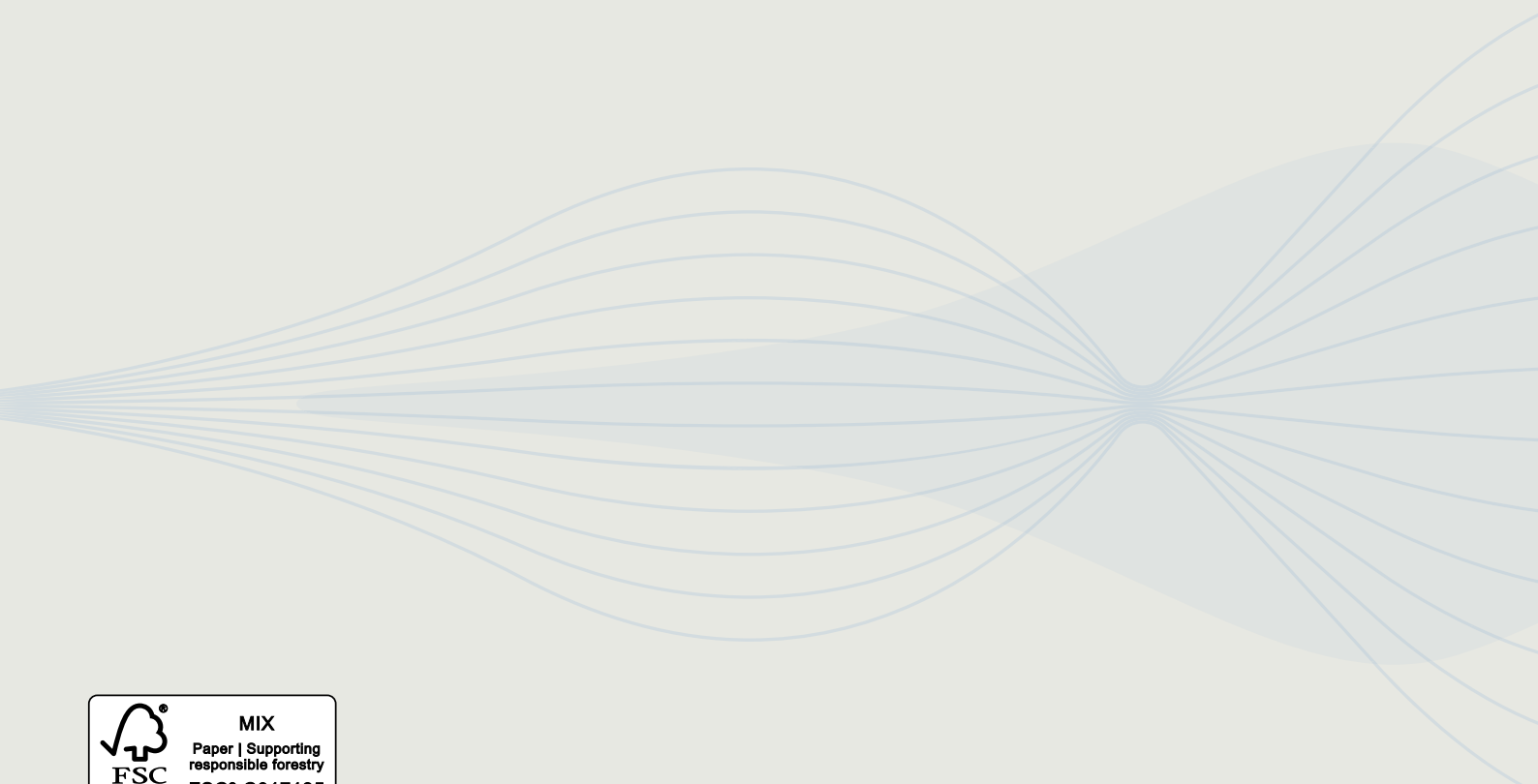
System examples & products

victron energy
BLUE POWER

How do you minimise energy usage from the grid and optimise self-consumption?

The solution is powered by know-how. With over 50 years of experience, we've learned what it takes to build reliable energy storage and self-consumption systems that minimize reliance on the grid. Our customers value the reassurance that our power solutions deliver knowing they have our worldwide network of authorized dealers by their side. They know our family run business is built on a foundation of trust they can always depend on.

Energy. Anytime. Anywhere.

5
Year
Warranty

Index

Free charging. Powered by know-how.

When you want to charge your electric vehicle with excess solar power, it's good to know the power of know-how is by your side.

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Introduction to self-consumption and energy storage

Self-consumption or grid independence

The primary goal of a self-consumption system is to optimise the use of solar and/or wind power. The major obstacle in such a system is that power generation times do not match with the actual times of power use. This results in a system being forced to import energy from the grid and export it when there is a surplus. In an optimised self-consumption system, surplus energy is stored locally for local on-demand use. Such energy storage is becoming an increasingly attractive proposition, especially with feed-in tariffs decreasing and grid supplies becoming less stable and more expensive.

Self-consumption versus off-grid systems

There are some major considerations which should be taken into account when comparing an off-grid system with a self-consumption system.

An off-grid system is a system that is not (or mostly not) connected to grid power and is used to supply the total energy needs of the complete energy system. Therefore it is sized to cope in a worst case scenario. This worst case scenario can occur when there is simultaneous usage of high loads which then requires a high power inverter for occasional use.

The other worst case scenario is the lack of ability to generate energy in periods of overcast weather and/or no wind. This results in substantial battery storage provision, which, like the large inverter power situation mentioned above, is only used on occasion. In general it can therefore be stated that an off-grid system is oversized in both inverter power and storage capacity in order to deal with such situations.

For a self-consumption system this is different, as there is always a grid present. With Grid assist functionality the grid can be used seamlessly, whenever there is a high peak load, meaning the inverter can be sized according to the base load. The base load is the part of the total energy-need which generally comes from low-powered equipment and these loads continue to draw energy almost constantly over a 24 hour period.
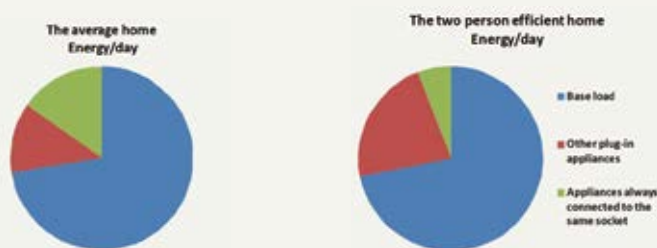
Examples of this are heating pumps, chargers and the standby power of household equipment. In order to optimise PV usage and limit the use of imported energy, targeting the base load offers the greatest rewards. It's possible to avoid importing any energy at all, but this would require investment in a larger inverter capable of meeting the greatest loads. Most high loads, however, are of short duration and the actual energy consumed is relatively low - so the investment in a larger inverter is often not justified.

When considering battery capacity, a self-consumption system is able to work with a smaller battery capacity. By day, PV energy is consumed by live loads and any surplus energy is stored in the battery. In this case the solar array is sized according to the base load, and stored energy used overnight.

How do you prepare for power outages whilst minimising energy usage from the grid?

The solution is powered by know-how. Solar energy is stored until you need it and sent to the grid when you don't. Simply select your battery's minimum state of charge to weather any black-out and let our algorithms do the rest. It's good to know the power of know-how is by your side.

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My solar home with Energy Storage   5 min ago

Mode

Optimized with Battery life   ○

Optimized without Battery life   ●

Keep batteries charged   ○

External Control   ○

Minimum State of Charge

60%   [− | +]
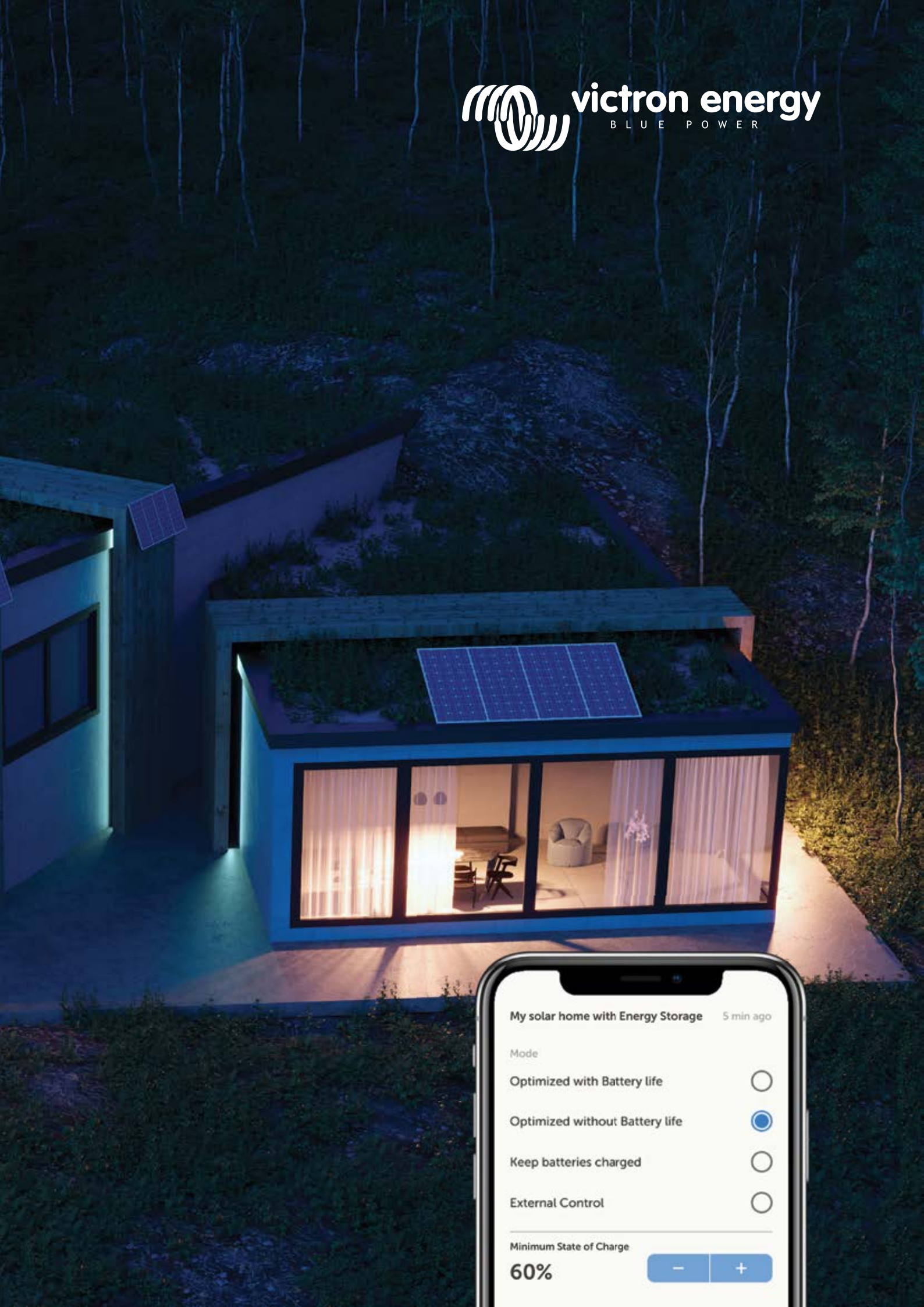
Victron Training in a cabinet ESS / Off Grid / 3Phase

Victron Ambassador Markus Pauritsch has packed a 3-Phase ESS Off-Grid energy system into a stylish cabinet which he uses for training. The fully operational cabinet demonstrates the features of a full-scale static installation. It includes Lithium battery storage with a battery management system; three-phase power from MultiPlus II units - plus integration with a third party 'Fronius' three phase inverter; energy metering - low-voltage battery protection ...and monitoring from anywhere in the world.

So what is happening on the inside?

Packed into the case there's a 9000VA 3-phase ESS system including 10kW/h battery storage:

- 3 x MultiPlus-II 48/3000/35-32
- SmartSolar MPPT 150/45-Tr
- Cerbo GX
- GX Touch 50
- Fronius Symo 3.0-3- M
- Energy meter EM24 – 3 phase – max. 64A/phase

- 2 x LiFePO4 Batteries 25,6V/200Ah smart.
- VE.Bus BMS
- Orion-Tr 48/12-9A (110W)
- Smart BatteryProtect 48V-100A
- Battery Monitor BMV-712 Smart, together with all necessary Fuses, cables and Busbars.
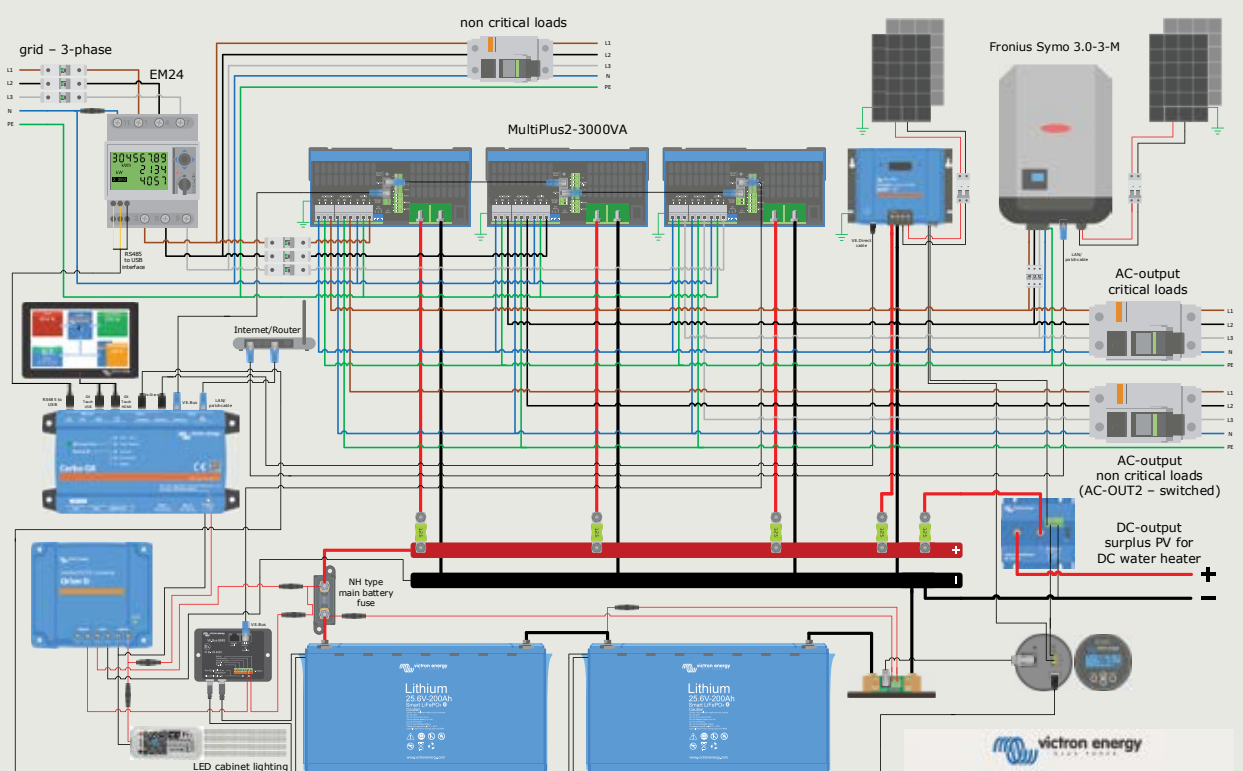
The fully functioning cabinet is designed to work like this: 5.1kWp solar modules feed both the Fronius Inverter and the SmartSolar MPPT. Four AC powered fans mounted in the cabinet-roof provide ventilation and control internal temperature. Excess PV power can be used for water heating using 48V DC immersion heaters. The 48V-100A Smart BatteryProtect will turn the water heating elements on/off, so there's no risk of melting relay contacts.

The cabinet is fitted with RGB LED downlighting. A Wi-Fi enabled controller operates the LED strips – and a neat enhancement is that it is possible to change lighting colours according to system conditions (State of Charge; warnings and alarms, etc.) via Node-RED. The default setup of the 3-Phase AC and DC coupled cabinet is as an ESS, but it can easily reconfigured to an Off-Grid system. Markus uses the cabinet for training sessions on Power Calculation; System configuration; Tips and tricks regarding cable calculations; and Troubleshooting - and when not in use he employs the cabinet installation in his own house!

Markus Pauritsch shows us the GX Touch 50 which provides at-a-glance system information and access to settings of his3-phase training cabinet.

Freedom. Powered by know-how.

When you need power on a grid when you're off the grid,
it's good to know the power of know-how is by your side.

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Which system to choose

There is a solution for every situation, from simple to more complex.
We have different options available: PV in parallel, AC-Coupled PV, DC-Coupled
PV or a combination of all these options.
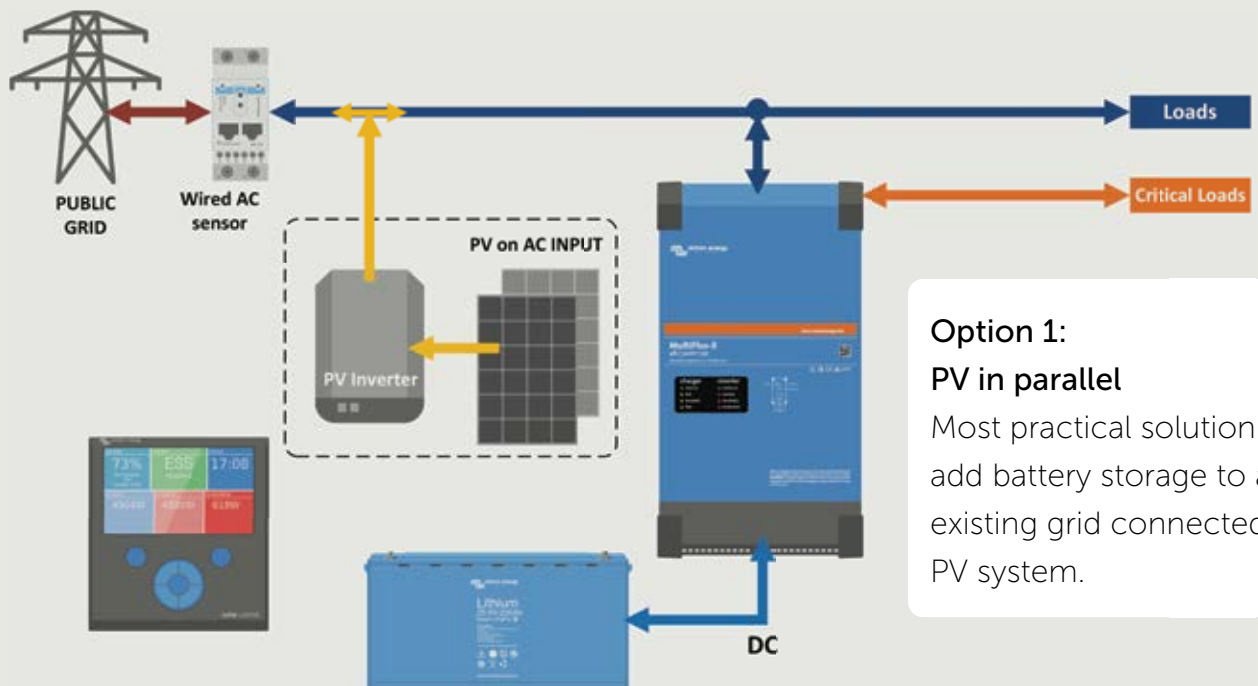
Option 1:
PV in parallel
Most practical solution to add battery storage to an existing grid connected PV system.
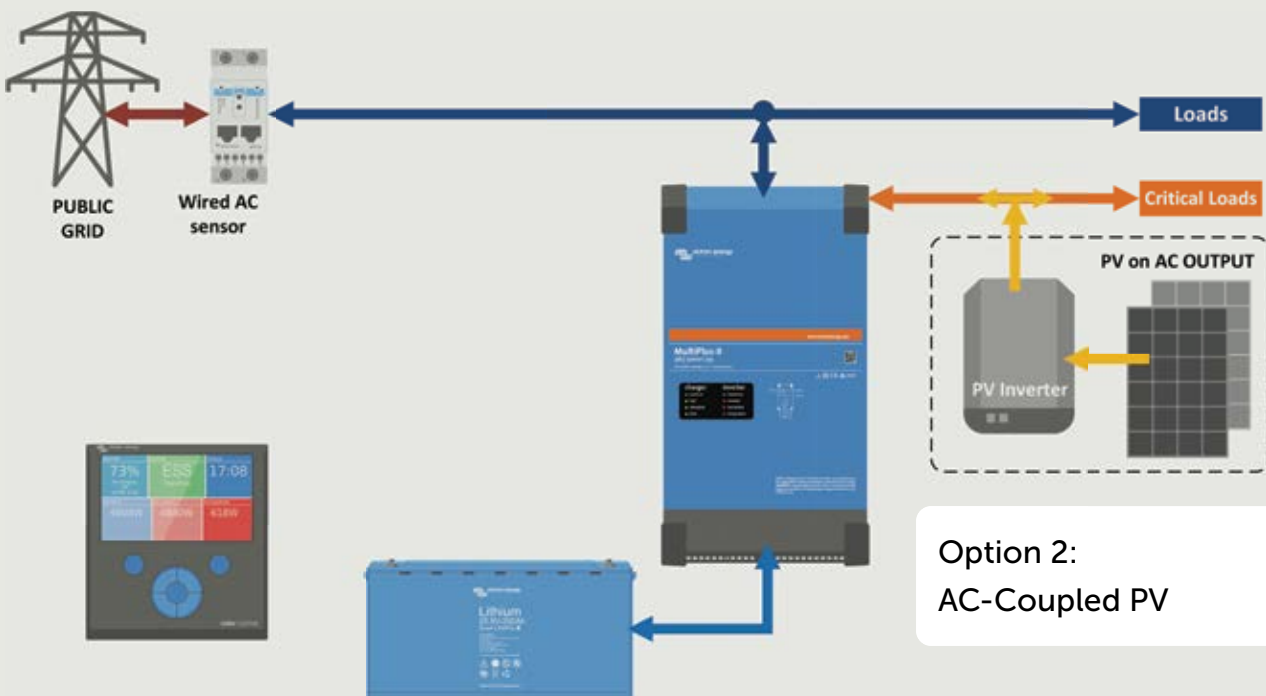
Option 2:
AC-Coupled PV

Option 3:
DC-Coupled PV

The size of the PV array and the PV inverter is not limited by the maximum nominal power of the inverter/charger.
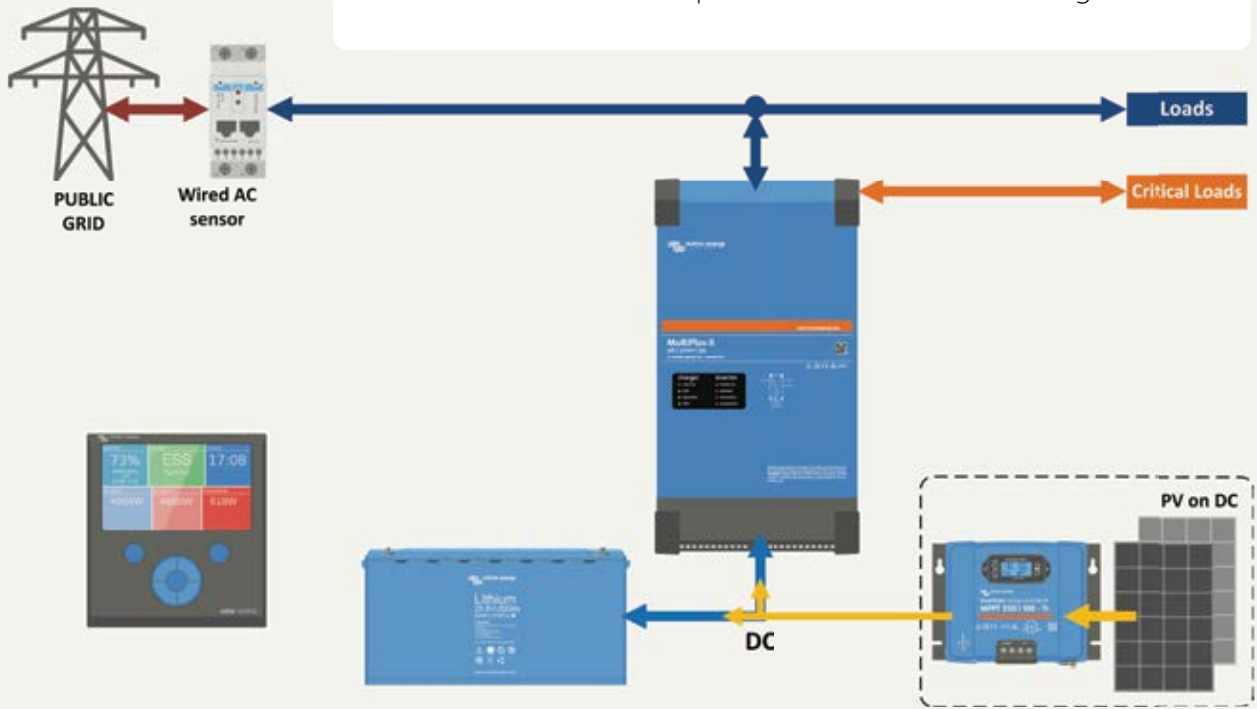
All options combined
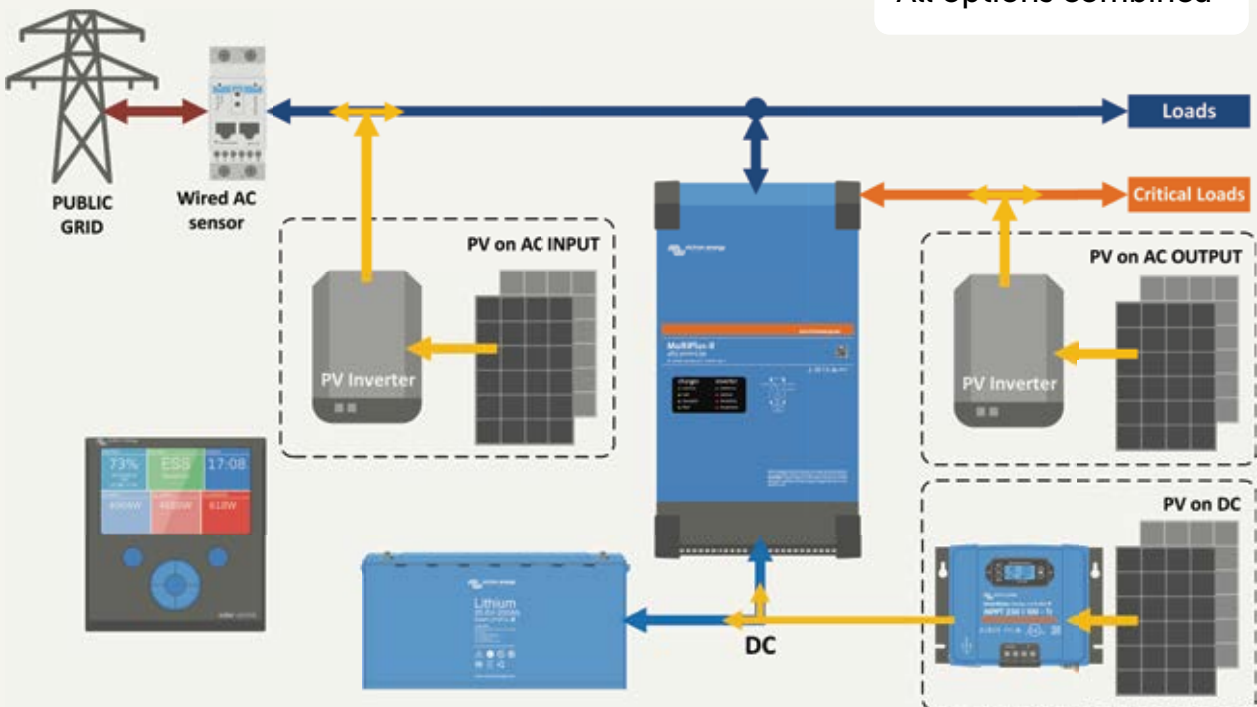
Open architecture means choice.

We believe that offering choice to our customers is crucial. Great efforts are made to ensure a deep and problem free integration with a long list of third party managed battery brands, AC-PV manufacturers and more. We are proud to closely work together with many of the leading brands. The global recognition for our efforts only pushes us further, giving 'seamless' even more meaning.

Supported battery technologies

Easy integration
Managed batteries can be integrated through our GX devices in minutes. Search for our ever growing battery compatibility list on victronenergy.com

Supported AC-PV manufacturers

We are compatible with many brands of PV Inverters; with a strong collaboration with Fronius PV Inverters.

AC-PV inverters are supported directly after installing a software assistant on our inverters.
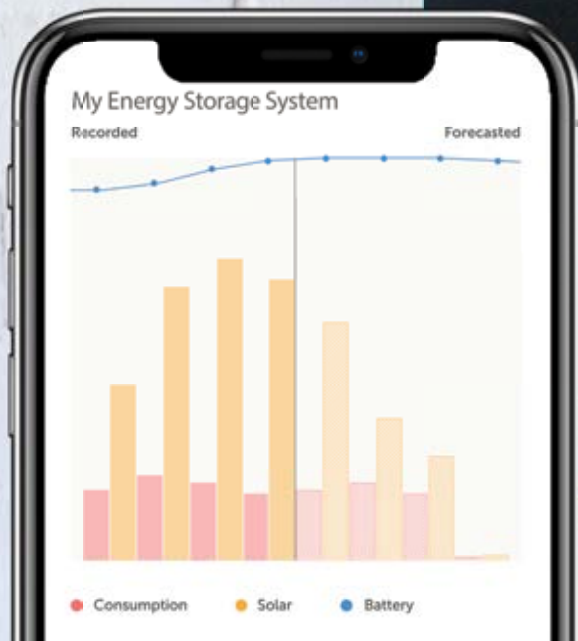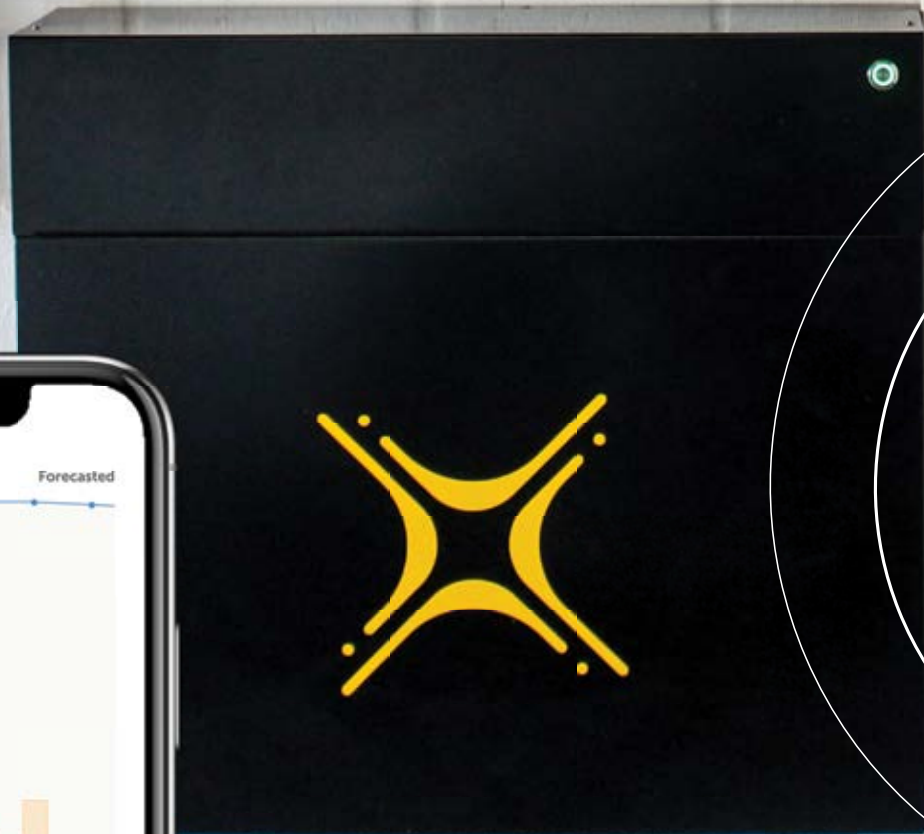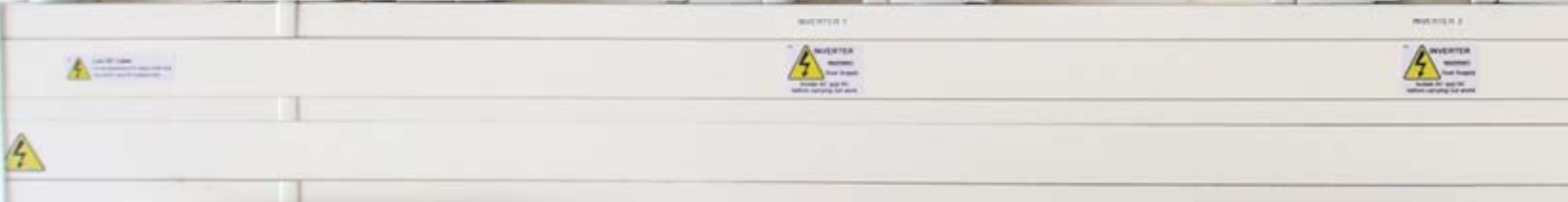
How to optimise your energy usage behaviour to achieve higher levels of self-consumption?

The solution is powered by know-how. With our VRM - remote monitoring portal and widgets, detailed insights into your energy usage will help increase efficiency and lower utility bills. Simply check the new solar forecast in VRM and learn when it's best to run heavy loads. It's good to know the power of know-how is by your side.

Energy. Anytime. Anywhere.

Experience the power of Victron Energy monitoring

Works with

VictronConnect app

VRM - Remote Management portal

MFD & NMEA 2000 integration

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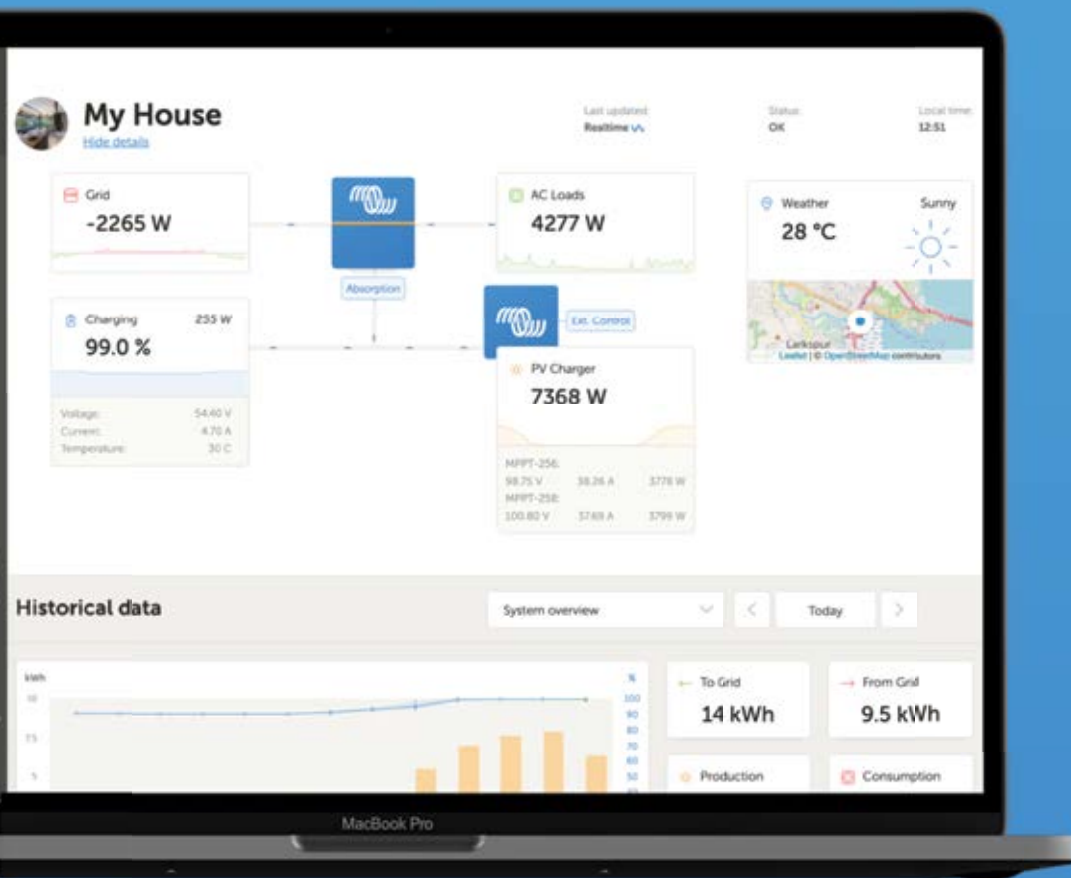
Bring the best of Victron systems together in a powerful experience that will redefine life off-grid. Thanks to the know-how that powers our connected products, you can monitor and control your systems, prevent issues and resolve challenges straight from our VictronConnect App and VRM portal. With the most up-to-date monitoring solution on the planet you can manage it all from anywhere in the world.

See our monitoring solutions in action at **victronenergy.com/monitoring**

System monitoring components

Monitoring is crucial to fine-tune and optimize energy harvest and use based on ever-changing circumstances. With Victron you have complete insight in your installation, from the system's performance to its tank levels, temperatures and more. To enable remote monitoring via VRM, add a communication-centre, such as the Cerbo GX. If local monitoring is sufficient, choose a Smart product.

Learn more at victronenergy.com/monitoring

Cerbo GX
This communication-centre allows you to always have perfect control over your system from wherever you are and maximises its performance. Simply connect through our Victron Remote Management (VRM) portal, or access directly, using the separate GX Touch, a MFD or our VictronConnect app thanks to its added Bluetooth capability. Offers the highest level of control thanks to an impressive range of features and integrations.

GX Touch 50 and GX Touch 70
The GX Touch 50 and GX Touch 70 are display accessories for our Cerbo GX. The five inch and seven inch touch screen displays give an instant overview of your system and allow to adjust settings in the blink of an eye. Simply connected to the Cerbo GX with one cable. Their super slim waterproof design, top-mountable setup and simple installation bring a lot of flexibility when creating a crisp and clean dashboard.

Ekrano - All-in-one GX device
Combines a full featured GX device and GX Touch in one.
This practical combination of a Cerbo GX and GX Touch gives you easy access to the ports from the back of the device.

GlobalLink 520
The GlobalLink 520 allows you to connect Victron VE.Direct equipment, such as: battery monitors, MPPT solar chargers, the IP43 Charger or Phoenix Inverters, to our free remote monitoring website: the VRM Portal. The GlobalLink uses the LTE-M cellular network and the first five years of cellular connectivity is included in the purchase price. The unit will come pre-configured and ready for use out of the box. No need to change any settings.

Battery Monitor

Key tasks of the Victron Battery Monitor are measuring charge and discharge currents as well as calculating the state-of-charge and time-to-go of a battery. An alarm is sent when certain limits are exceeded (such as an excessive discharge).

SmartSolar Control Display

The SmartSolar Control Display is a pluggable LCD display for the SmartSolar Charge Controllers. Simply remove the rubber seal that protects the plug on the front of the controller and plug-in the display.

Smart Battery Sense

Smart Battery Sense is a wireless battery voltage and temperature sensor for Victron MPPT Solar Chargers.

With voltage and temperature sense in place, batteries will be better charged; improving charging-efficiency and prolonging battery life.

How do you charge your electric vehicle with excess solar power while running your house on solar too?

The solution is powered by know-how. Solar energy is stored for self-consumption while your electric vehicle is charged with excess solar power. Simply select the auto mode and let our algorithms do the rest. It's good to know the power of know-how is by your side.

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EVCS2
Charging   5 min ago

Charged energy   Power
23.38kWh   6762W

Charging time
6h 12m

Mode   Auto

Charge current   6A

Charge   On

Helpful system design resources

Victron Energy offers one of the largest product ranges in the market to cover almost every power challenge.
Admittedly, choosing the right system concept and products can be overwhelming. This brochure intends to assist with basics in systems design, covering a number of different system concepts. Check our helpful resources or feel free to discuss your ideas with a local Victron specialist.

Check our **Off-grid, Backup and Storage** market web-page to explore our deepdive with example calculations.

Product & design information

Our **product pages** on the website provide all necessary product information, such as product data sheets, product manuals, more system examples, enclosure drawings and certificates.

MPPT Calculator Excel sheet

With the MPPT Calculator Excel sheet you can match solar modules to MPPT charge controllers. Download the Excel sheet from our software page. **MPPT Calculator - Victron Energy**

System examples booklet

Download our systems **examples booklet** for Off-grid, backup and storage applications with many different system design examples.

Energy Unlimited & Wiring Unlimited white papers

Understand the principles behind off-grid power systems and get your wiring right with Wiring Unlimited. Find these white papers and a large variety of technical papers and example system schematics in the **download section**.
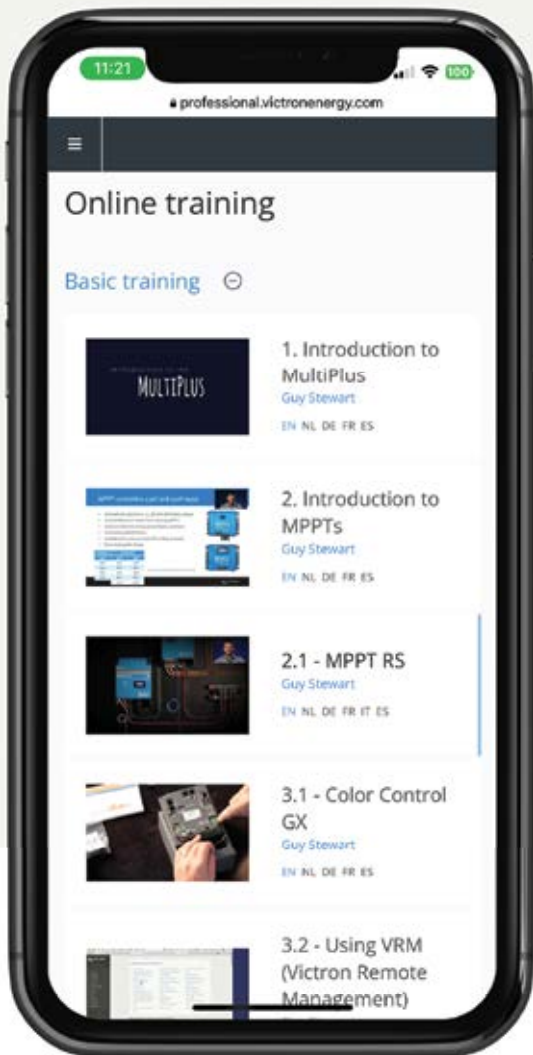
Victron Professional

Get updated with the latest developments and access our large range of training courses. Succesful completion is rewarded with a certificate.

professional.victronenergy.com
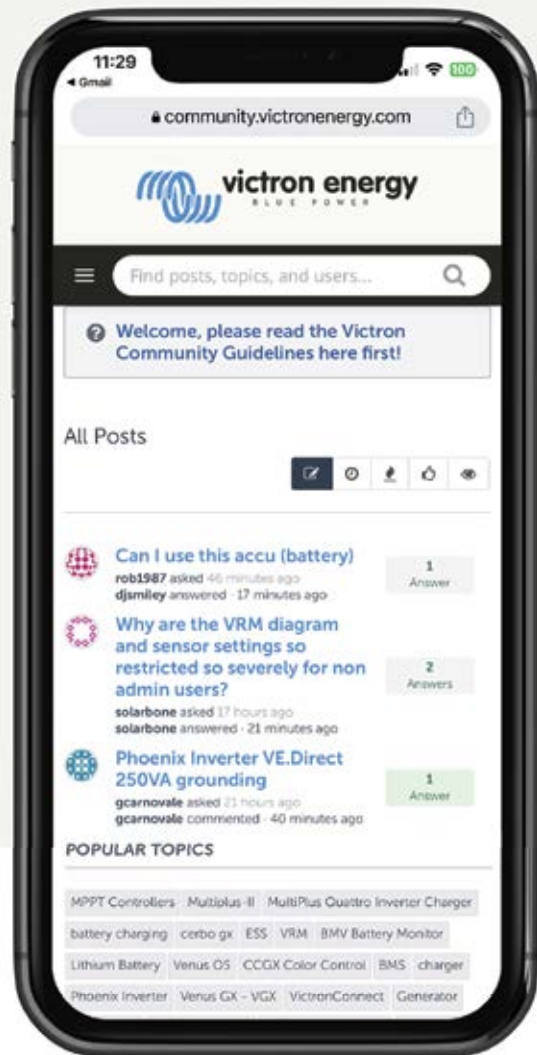
Victron Community

Search in the knowledge base for questions and answers or ask our large and active community of experienced Victron users.

community.victronenergy.com
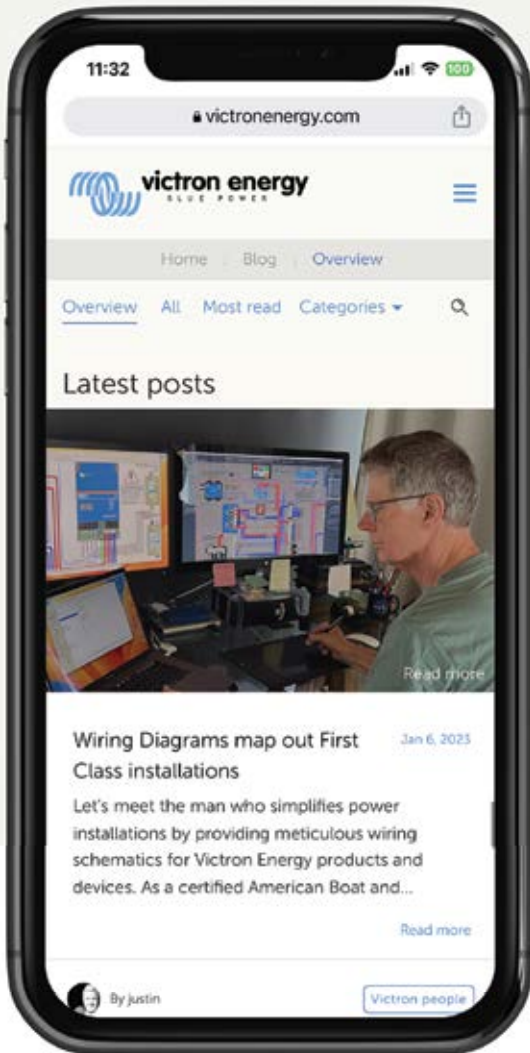
Victron Energy Blog

Follow interesting cases in great detail, learn about new products and new system design resources.

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victronenergy.com/blog
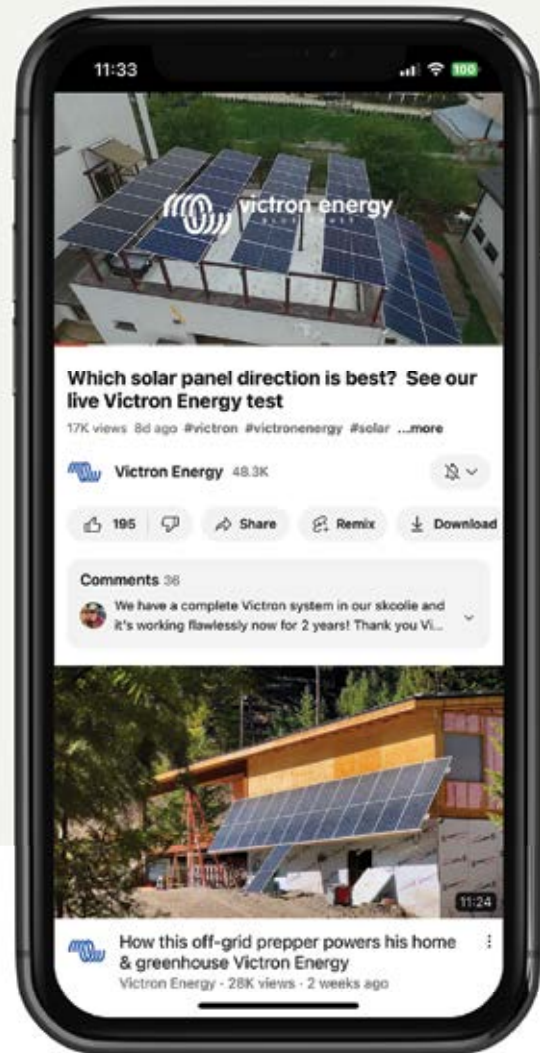
YouTube

Follow our youtube channel to see interesting case videos and field tests. Learn from instructional video's, Q&A sessions and new product introductions.

youtube.com/victronenergy

Components for Energy Storage Systems

Our systems are comprised of various components. Some of which are especially designed for specific markets. Other Victron components are applicable to a wide range of applications. You can find the specifications and other detailed information about these components in the 'Technical Information' section.

victronenergy.com

Current Transformer for MultiPlus-II
Current Transformer 100A:50mA for MultiPlus-II / MultiGrid-II to implement PowerControl and PowerAssist and to optimize self-consumption with external current sensing.

Energy Meter
The ET112 (for single phase max. 100A) and the ET340 (for three phase max. 65A) Energy Meters are typically used in an Energy Storage System to measure the power and energy of the whole application at the distribution box, or to measure the output of a PV Inverter. Data can be displayed with a GX device on the GX touch and the VRM portal.

AC Current sensor - single phase - max 40A
The AC Current sensor is a simple external current sensor used to measure AC Current, Power (VA) and calculate energy of a PV Inverter connected to the AC input or output of a Multi or Quattro. These values can then be displayed and sent to the VRM-website by the Color Control. The two measurement wires can be connected to the AUX and/or temperature sense input of a Multi or Quattro.

Zigbee to USB converter & Zigbee to RS485
This pair of Zigbee converters is used to connect an Energy Meter to a GX Device, wirelessly.

Zigbee to USB converter, DRF2658C, DTK
Zigbee to RS485 converter, DRF2659C, DTK

Ziehl Voltage and frequency relay UFR1001E

The UFR1001E monitors voltage and frequency in plants for own generation of electricity. It fulfills the requirements of VDE-AR-N 4105 bdew-directive, G59/3, G83/2 and ÖVE/ÖNORM E 8001-4-712:2009 for generators connected to the public grid.

For more information, we refer you to the datasheet and certificates below which are available to download. Or visit www.ziehl.de and look for the UFR1001E under the Mains monitoring group.

Ziehl Voltage and Frequency Relay SPI1021

Voltage- and Frequency-Relay with integrated Vector-Shift-Relay Grid- and Plant Protection.

For more information, we refer you to the datasheet and certificates below which are available to download. Or visit www.ziehl.de and look for the SPI1021 under the Mains monitoring group.

Anti-Islanding Box 63A single- and three-phase

The Anti-Islanding Box 63A single- and three-phase is a combination of an anti-islanding device, the Ziehl UFR1001E, two in-line contactors and main circuit breaker. It is suitable for both single- and three-phase systems. It is rated up to 63A per phase and all parts are conveniently housed in an IP65 rated enclosure.

The Anti-Islanding Box can be added to a grid-feeding inverter/charger system (ESS) to meet local anti-islanding regulations.

Note - for our latest datasheets please refer to our website:
www.victronenergy.com

Technical information

All-in-one solar power solution

The EasySolar combines a MPPT solar charge controller, an inverter/charger and AC distribution in one enclosure.

The product is easy to install, with a minimum of wiring.

The solar charge controller: Blue Solar MPPT 100/50

Up to three strings of PV panels can be connected to three sets of MC4 (PV-ST01) PV connectors.

The inverter/charger: MultiPlus Compact 12/1600/70 or 24/1600/40

The MPPT charge controller and the MultiPlus Compact inverter/charger share the DC battery cables (included). The batteries can be charged with solar power (SmartSolar MPPT) and/or with AC power (inverter/charger) from the utility grid or a genset.

AC distribution

The AC distribution consists of a RCD (30 mA/16 A) and four AC outputs protected by two 10A and two 16A circuit breakers.

One 16A output is controlled by the AC input: it will switch on only when AC is available.

PowerAssist

Unique PowerAssist technology protects the utility or generator supply from being overloaded by adding extra inverter power when needed.

Unique solar application software

Several software programs (Assistants) are available to configure the system for various grid interactive or stand-alone applications. Please see
http://www.victronenergy.nl/support-and-downloads/software/
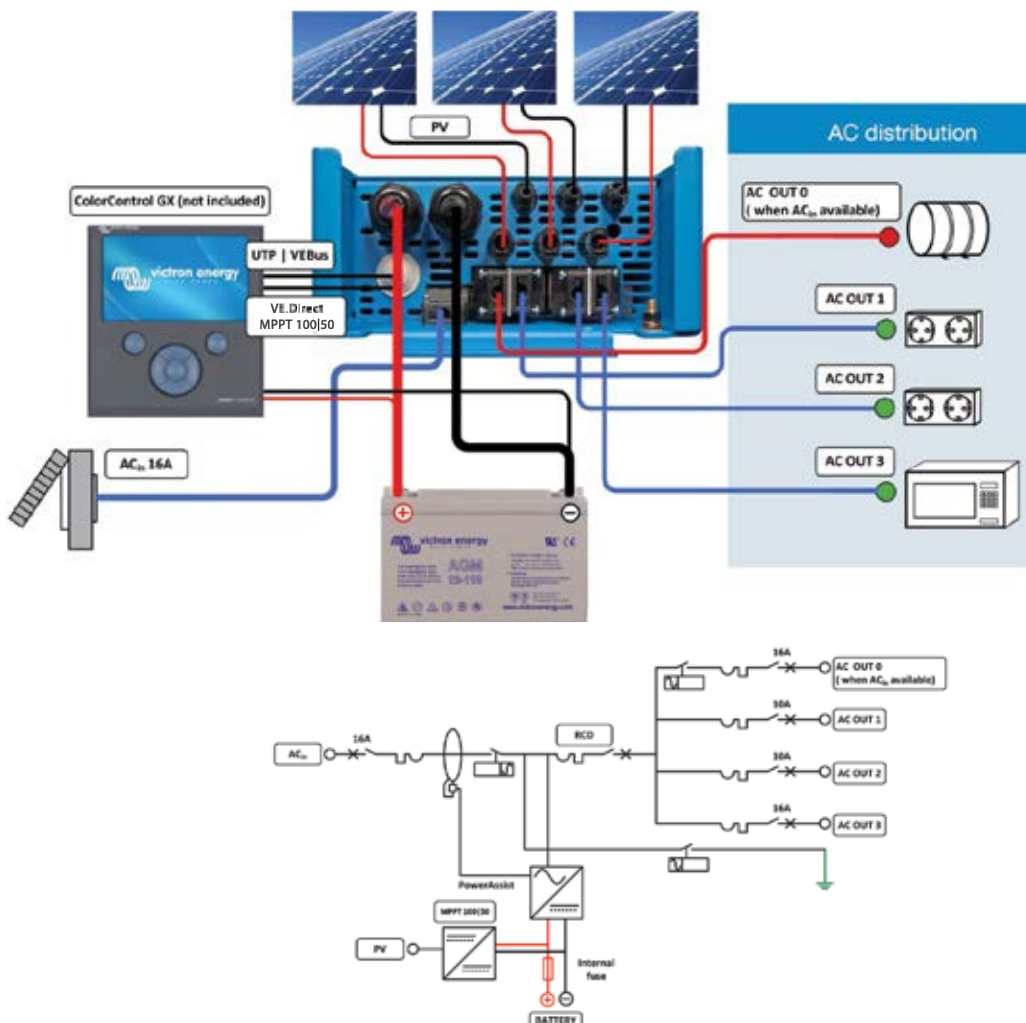
EasySolar	EasySolar 12/1600/70	EasySolar 24/1600/40
Inverter/charger		
Transfer switch	16A	
INVERTER		
Input voltage range	9,5 – 17V	19 – 33V
'Heavy duty' output AC 0	16A	
Output AC1, 2, 3	Output voltage: 230 VAC ± 2% Frequency: 50 Hz ± 0,1% (1)	
Cont. output power at 25℃ (3)	1600VA / 1300W	
Cont. output power at 40℃	1200W	
Peak power	3000W	
Maximum efficiency	92%	94%
Zero load power	8W	10W
Zero load power in search mode	2W	3W
CHARGER		
AC Input	Input voltage range: 187-265VAC Input frequency: 45 – 65Hz Power factor: 1	
Charge voltage 'absorption'	14,4V	28,8V
Charge voltage 'float'	13,8V	27,6V
Storage mode	13,2V	26,4V
Charge current house battery (4)	70A	40A
Charge current starter battery (A)	4	
Battery temperature sensor	Yes	
Programmable relay (5)	Yes	
Protection (2)	a – g	
Solar Charge Controller		
Model	MPPT 100/50	
Maximum output current	50A	
Maximum PV power, 6a,b)	700W	1400W
Maximum PV open circuit voltage	100V	100V
Maximum efficiency	98%	
Self-consumption	10 mA	
Charge voltage 'absorption', default setting	14,4V	28,8V
Charge voltage 'float', default setting	13,8V	27,6V
Charge algorithm	multi-stage adaptive	
Temperature compensation	-16mV/℃	-32mV/℃
Protection	a - g	
COMMON CHARACTERISTICS		
Operating temp. range	-20 to +50℃ (fan assisted cooling)	
Humidity (non-condensing):	max 95%	
ENCLOSURE		
Material & Colour	aluminium (blue RAL 5012)	
Protection category	IP 21	
Battery-connection	Battery cables of 1.5 meter	
PV connection	Three sets of MC4 (PV-ST01) PV connectors.	
230 V AC-connection	G-ST18i connector	
Weight	15kg	
Dimensions (hxwxd)	745 x 214 x 110mm	
STANDARDS		
Safety	EN 60335-1, EN 60335-2-29, EN 62109	
Emission / Immunity	EN 55014-1, EN 55014-2, EN 61000-3-3	
Automotive Directive	2004/104/EC	

1) Can be adjusted to 60Hz and to 240V
2) Protection
a. Output short circuit
b. Overload
c. Battery voltage too high
d. Battery voltage too low
e. Temperature too high
f. 230 VAC on inverter output
g. Input voltage ripple too high

3)   Non-linear load, crest factor 3:1
4)   At 25℃ ambient
5)   Programmable relay which can be set for general alarm, DC under
      voltage or genset start signal function
6a) If more PV power is connected, the controller will limit input power to
      700W resp. 1400W
6b) PV voltage must exceed Vbat + 5V for the controller to start.
Thereafter minimum PV voltage is Vbat + 1V

EasySolar-II GX 3 kVA

The all-in-one solar power solution
The Victron EasySolar-II GX integrates the following elements:
- A MultiPlus-II inverter/charger
- A SmartSolar MPPT -Tr solar charge controller
- A GX device with a 2 x 16-character display.

These elements come prewired together inside a single unit. This greatly simplifies most installations, saving time and money.

Display and Wi-Fi
The display reads battery, inverter and solar charge controller parameters.
The same parameters can be accessed with a smartphone or other Wi-Fi enabled device.
In addition, Wi-Fi can be used to set up the system and to change settings.

Solar charge controller
The DC output of the SmartSolar MPPT is parallel wired with the DC connection of the MultiPlus-II inverter/charger.
The on/off mechanism of the MultiPlus-II also controls the SmartSolar MPPT.

GX device
The integrated GX device includes:
- A BMS-Can interface. This can be used to connect to a compatible CAN-bus managed battery. Note that this not a VE.Can compatible port.
- A USB port
- An Ethernet port
- A VE.Direct port

The GX device controls the MultiPlus-II and the SmartSolar MPPT with respectively a VE.Bus and a VE.Direct connection.

VRM app for Wi-Fi
Monitor and manage your Victron Energy system from your smart phone and tablet. Available for both iOS and Android.

VRM Portal
Our free remote monitoring website (VRM) will display all your system data in a comprehensive graphical format. System settings can be changed remotely via the portal. Alarms can be received by e-mail.
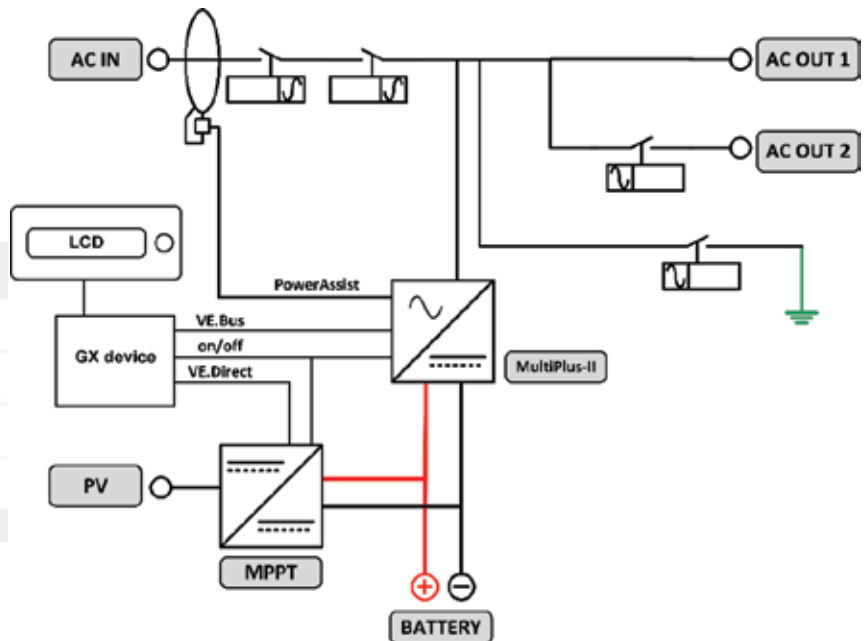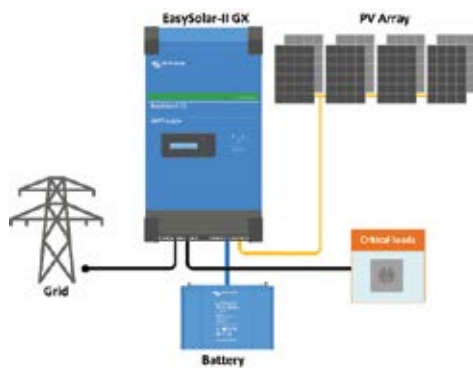
Grid in-line topology

The EasySolar-II GX will use excess PV power to charge the batteries or to feed power back into the grid and will discharge the battery or use power from the grid to supplement a shortage of PV power. In case of a power outage, the EasySolar-II GX will disconnect the grid and continue to supply the loads.

Loads that should shut down when AC input power is not available can be connected to a second output (not shown). These loads will be taken into account by the PowerControl and PowerAssist function in order to limit AC input current to a safe value.
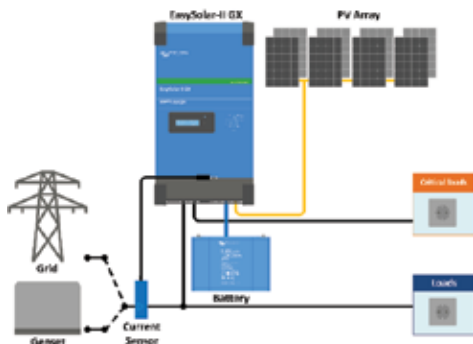
Grid parallel topology

The EasySolar-II GX will use data from the external AC current sensor (must be ordered separately) or power meter to optimise self-consumption and, if required, to prevent grid feed. In case of a power outage, the EasySolar-II GX will continue to supply the critical loads

Current sensor 100A:50mA

To implement PowerControl and PowerAssist and to optimise self-consumption with external current sensing.
Maximum current: 50 A resp. 100 A.
Length of connection cable: 1 m.

Connection area

EasySolar-II	24/3000/70-32 MPPT 250/70 GX	48/3000/35-32 MPPT 250/70 GX	48/5000/70-50 MPPT 250/100 GX
INVERTER/CHARGER			
PowerControl & PowerAssist	Yes		
Transfer switch	32 A		50 A
Maximum AC input current	32 A		50 A
Auxiliary output	32 A		50 A
INVERTER			
Input voltage range	19 – 33 V	38 – 66 V	38 – 66 V
Output	Output voltage: 230 VAC ± 2 % Frequency: 50 Hz ± 0,1 % (1)		
Cont. output power at 25 °C (3)	3000 VA / 2400 W	3000 VA / 2400 W	5000 VA / 4000 W
Cont. output power at 40 °C / 55 °C	2200 W / 1700 W	2200 W / 1700 W	3700 W / 3000 W
Maximum apparent feed-in power	2470W / 3000 VA	2470W / 3000 VA	4400 W / 5000 VA
Peak power	5500 W	5500 W	9000 W
Maximum efficiency	94 %	95 %	96%
Zero load power	13 W	11 W	18 W
Zero load power in AES mode	9 W	7 W	12 W
Zero load power in Search mode	3 W	2 W	2 W
CHARGER			
AC Input	Input voltage range: 187-265 VAC Input frequency: 45 – 65 Hz		
Charge voltage 'absorption'	28.8 V	57,6 V	
Charge voltage 'float'	27.6 V	55,2 V	
Storage mode	26.4 V	52,8 V	
Maximum battery charge current	70 A	35 A	70 A
Battery temperature sensor	Yes		
Programmable relay (5)	Yes		
Protection (2)	a - g		
VE.Bus communication port	For parallel and three phase operation, remote monitoring and system integration		
General purpose com. port	Yes, 2x		
SMARTSOLAR CHARGE CONTROLLER			
Model	MPPT 250/70-Tr		MPPT 250/100-Tr
Maximum output current	70 A		100 A
Maximum PV power	2000 W	4000 W	5800 W
Maximum PV open circuit voltage	250 V		
Maximum efficiency	99%		
Self-consumption	20 mA		
Charge voltage 'absorption', default	57,6 V		
Charge voltage 'float', default	55,2 V		
Protection (2)	a – e		
GENERAL			
Interfaces	BMS-Can, USB, Ethernet, VE.Direct, Wi-Fi		
Remote on-off	Yes		
Operating temp. range	-20 to +45 °C (fan assisted cooling) Max. altitude 2000 m		
Humidity (non-condensing):	max 95 %		
ENCLOSURE			
Material & Colour	aluminium (blue RAL 5012)		
Protection category	IP21		
Battery-connection	M8 bolts		
PV connection	M6 bolts		
230 VAC-connection	Screw terminals 16 mm² (6 AWG)		
Weight	26 kg	26 kg	38.6 kg
Dimensions (h x w x d) mm	499 x 268 x 237		604 x 323 x 253
STANDARDS			
Safety	EN-IEC 60335-1, EN-IEC 60335-2-29, EN-IEC 62109-1, EN-IEC 62109-2		
Emission / Immunity	EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-IEC 61000-3-3 IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3		
Anti-islanding	See our website		

1) Can be adjusted to 60 Hz
2) Protection key:
   a) output short circuit
   b) overload
   c) battery voltage too high
   d) battery voltage too low
   e) temperature too high
   f) 230 VAC on inverter output
   g) input voltage ripple too high

3) Non-linear load, crest factor 3:1
4) At 25 °C ambient
5) Programmable relay which can be set for general alarm, DC under voltage or genset start/stop function.
   AC rating: 230 V / 4 A, DC rating: 4 A up to 35 VDC and 1 A up to 60 VDC

MultiPlus
500 / 800 / 1200 / 1600 VA

MultiPlus 2000 VA
(bottom cover removed)

Multifunctional, with intelligent power management

The MultiPlus is a powerful true sine wave inverter, a sophisticated battery charger that features adaptive charge technology, and a high-speed AC transfer switch in a single compact enclosure. Next to these primary functions, the MultiPlus has several advanced features, as outlined below.

Parallel operation and three phase capability

Up to six Multis can operate in parallel to achieve higher power output.
In addition to parallel connection, three units can be configured for three-phase output.

PowerControl - Dealing with limited generator, shore side or grid power

With the Multi Control Panel a maximum generator or shore current can be set. The MultiPlus will then take account of other AC loads and use whatever is extra for charging, thus preventing the generator or shore supply from being overloaded.

PowerAssist - Boosting the capacity of shore or generator power

This feature takes the principle of PowerControl to a further dimension. It allows the MultiPlus to supplement the capacity of the alternative source. Where peak power is so often required only for a limited period, the MultiPlus will make sure that insufficient shore or generator power is immediately compensated for by power from the battery. When the load reduces, the spare power is used to recharge the battery.

Four stage adaptive charger and dual bank battery charging

The main output provides a powerful charge to the battery system by means of advanced 'adaptive charge' software. The software fine-tunes the three-stage automatic process to suit the condition of the battery, and adds a fourth stage for long periods of float charging. The adaptive charge process is described in more detail on the Charger datasheet and on our website, under Technical Information. In addition to this, the MultiPlus will charge a second battery using an independent trickle charge output intended for a main engine or generator starter battery.

High start-up power

Needed to start high inrush loads such as power converters for LED lamps, halogen lamps or electric tools.

Search Mode

When Search Mode is 'on', the power consumption of the inverter in no-load operation is decreased by approx. 70 %. In this mode the Multi, when operating in inverter mode, is switched off in case of no load or very low load, and switches on every two seconds for a short period. If the output current exceeds a set level, the inverter will continue to operate. If not, the inverter will shut down again.

Programmable relay

By default, the programmable relay is set as an alarm relay, i.e. the relay will de-energise in the event of an alarm or a pre-alarm (inverter almost too hot, ripple on the input almost too high, battery voltage almost too low).

Remote on / off / charger on

Three pole connector.

On-site system configuring, monitoring and control

After installation, the MultiPlus is ready to go.
Some settings can be changed with DIP switches.
500/800/1200 VA models: remote switch / battery charge voltage / inverter frequency / search mode.
1600/2000 VA models: battery charge voltage / search mode.
For more settings use VE-Config or the VE.Bus Smart dongle.

Remote configuring and monitoring

Install a Cerbo GX or other GX product to connect to the internet.
Operational data can be stored and displayed on our VRM (Victron Remote Management) website, free of charge.
When connected to the internet, systems can be accessed remotely, and settings can be changed.

Ekrano GX or Cerbo GX
Provides intuitive system control and monitoring and enables access to our free remote monitoring website: the VRM Online Portal.

VRM Portal
Our free remote monitoring website (VRM) will display all your system data in a comprehensive graphical format. System settings can be changed remotely via the portal. Alarms can be received by e-mail or push notification.

VRM app
Monitor and manage your Victron Energy system from your smart phone and tablet. Available for both iOS and Android.

12 Volt 24 Volt 48 Volt	MultiPlus 12/500/20 MultiPlus 24/500/10 MultiPlus 48/500/6	MultiPlus 12/800/35 MultiPlus 24/800/16 MultiPlus 48/800/9	MultiPlus 12/1200/50 MultiPlus 24/1200/25 MultiPlus 48/1200/13	MultiPlus 12/1600/70 MultiPlus 24/1600/40 MultiPlus 48/1600/20	MultiPlus 12/2000/80 MultiPlus 24/2000/50 MultiPlus 48/2000/25
PowerControl / PowerAssist	No	Yes	Yes	Yes	Yes
Three Phase and parallel operation	Yes	Yes	Yes	Yes	Yes
Transfer switch	16 A	16 A	16 A	16 A	35 A
INVERTER					
Input voltage range			9,5 – 17 V 19 – 33 V 38– 66 V		
Output			Output voltage: 230 VAC ± 2 % Frequency: 50 Hz ± 0,1 % [1]		
Cont. output power at 25 °C [3]	500 VA	800 VA	1200 VA	1600 VA	2000 VA
Cont. output power at 25 °C	430 W	700 W	1000 W	1300 W	1600 W
Cont. output power at 40 °C	400 W	650 W	900 W	1100 W	1400 W
Cont. output power at 65 °C	300 W	400 W	600 W	800 W	1000 W
Peak power	900 W	1600 W	2400 W	2800 W	3500 W
Maximum efficiency	90 / 91 / 92 %	92 / 93 / 94 %	93 / 94 / 95 %	93 / 94 / 95 %	93 / 94 / 95 %
Zero-load power	6 / 6 / 7 W	7 / 7 / 8 W	10 / 9 / 10 W	10 / 9 / 10 W	10 / 9 / 10 W
Zero-load power in search mode	2 / 2 / 3 W	2 / 2 / 3 W	3 / 3 / 3 W	3 / 3 / 3 W	3 / 3 / 3 W
CHARGER					
AC Input			Input voltage range: 187-265 VAC Input frequency: 45 – 65 Hz		
Charge voltage 'absorption'			14,4 / 28,8 / 57,6 V		
Charge voltage 'float'			13,8 / 27,6 / 55,2 V		
Storage mode			13,2 / 26,4 /52,8 V		
Charge current house battery [4]	20 / 10 / 6 A	35 / 16 / 9 A	50 / 25 / 13 A	70 / 40 / 20 A	80 / 50/ 25 A
Charge current starter battery			1 A (12 V and 24 V models only)		
Battery temperature sensor			Yes		
GENERAL					
Programmable relay [5]			Yes		
Protection [2]			a – g		
VE.Bus communication port			For parallel and three phase operation, remote monitoring and system integration (RJ45-spliter ASS030065510 needed for 500 / 800 / 1200 VA models)		
Remote on-off		On/off/charger only			On/off
DIP switches	Yes [6]	Yes [6]	Yes [6]	Yes [7]	Yes [7]
Internal DC fuse	125 / 60 /30 A	150 / 80 / 40 A	200 / 100 / 50 A	200 / 125 / 60 A	no
Common Characteristics		Operating temp. range: -40 to +65 °C (fan assisted cooling) Humidity (non-condensing): max 95 %			
ENCLOSURE					
Common Characteristics		Material & Colour: Steel/ABS (blue RAL 5012) Protection category: IP 21			Steel (RAL 5012), IP22
Battery-connection	16 / 10 / 10 mm²	25 / 16 / 10 mm²	35 / 25 / 10 mm²	50 / 35 / 16 mm²	M8 bolts
230 VAC-connection		G-ST18i connector			Screw
Weight	4,4 kg	6,4 kg	8,2 kg	10,2 kg	15,5 kg
Dimensions (h x w x d)	311 x 182 x 100 mm	360 x 240 x 100 mm	406 x 250 x 100 mm	470 x 265 x 120 mm	506 x 236 x 147 mm
STANDARDS					
Safety			EN-IEC 60335-1, EN-IEC 60335-2-29, EN 62109-1		
Emission Immunity			EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-IEC 61000-3-3, IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3		
Automotive Directive			ECE R10-5		

1) Can be adjusted to 60Hz and to 240V
2) Protection:
a. Output short circuit
b. Overload
c. Battery voltage too high
d. Battery voltage too low
e. Temperature too high
f. 230 VAC on inverter output
g. Input voltage ripple too high

3) Non-linear load, crest factor 3:1
4) Up to 25 °C ambient
5) Programmable relay which can be set for:
   general alarm, DC under voltage or generator start/stop signal function
   AC rating: 230 V/4 A
   DC rating: 4 A up to 35 VDC, 1 A up to 60 VDC
6) Remote / battery charge voltage / inverter frequency / search mode
7) Battery charge voltage / search mode

Digital Multi Control Panel
A convenient and low-cost solution for monitoring and control. With an on/off charger-only switch, full LED readout and a rotary knob to set PowerControl and PowerAssist levels.

VE.Bus Smart Dongle
For monitoring and control via Bluetooth together with the VictronConnect app. It also measures battery voltage and temperature.

Interface MK3–USB
Needed to configure the MultiPlus, Can be used with the VictronConnect app or VE.Configure software. The interface connects to the MultiPlus via an RJ45 UTP cable and plugs into a USB port.

VictronConnect app
Use to monitor or configure the MultiPlus using your phone tablet or PC.

Battery Monitor
To monitor battery state of charge via Bluetooth or the VRM portal.
The BMV 712 Smart has display, while the SmartShunt does not have a display. Both communicate via Bluetooth and have a VE.Direct communication port.

**MultiPlus Compact
12/2000/80**

**MultiPlus
24/3000/70**

Two AC Outputs
The main output has no break functionality. The MultiPlus takes over the supply to the connected loads in the event of a grid failure or when shore/generator power is disconnected. This happens so fast (less than 20 milliseconds) that computers and other electronic equipment will continue to operate without disruption.
The second output is live only when AC is available on the input of the MultiPlus. Loads that should not discharge the battery, like a water heater for example can be connected to this output (second output available on models rated at 3 kVA and more).

Virtually unlimited power thanks to parallel operation
Up to 6 Multis can operate in parallel to achieve higher power output. Six 24/5000/120 units, for example, will provide 25 kW / 30 kVA output power with 720 Amps charging capacity.

Three phase capability
In addition to parallel connection, three units of the same model can be configured for three phase output. But that's not all: up to 6 sets of three units can be parallel connected for a 75 kW / 90 kVA inverter and more than 2000 Amps charging capacity.

PowerControl - Dealing with limited generator, shore side or grid power
The MultiPlus is a very powerful battery charger. It will therefore draw a lot of current from the generator or shore side supply (nearly 10 A per 5 kVA Multi at 230 VAC). With the Multi Control Panel a maximum generator or shore current can be set. The MultiPlus will then take account of other AC loads and use whatever is extra for charging, thus preventing the generator or shore supply from being overloaded.

PowerAssist - Boosting the capacity of shore or generator power
This feature takes the principle of PowerControl to a further dimension. It allows the MultiPlus to supplement the capacity of the alternative source. Where peak power is so often required only for a limited period, the MultiPlus will make sure that insufficient shore or generator power is immediately compensated for by power from the battery. When the load reduces, the spare power is used to recharge the battery.

Solar energy: AC power available even during a grid failure
The MultiPlus can be used in off grid as well as grid connected PV and other alternative energy systems.
Loss of mains detection software is available.

System configuring
- In case of a stand-alone application, if settings have to be changed, this can be done in a matter of minutes with a DIP switch setting procedure.
- Parallel and three phase applications can be configured with VE.Bus Quick Configure and VE.Bus System Configurator software.
- Off grid, grid interactive and self-consumption applications, involving grid-tie inverters and/or MPPT Solar Chargers can be configured with Assistants (dedicated software for specific applications).

On-site Monitoring and control
Several options are available: Battery Monitor, Multi Control Panel, Color Control GX or other GX devices, smartphone or tablet (Bluetooth Smart), laptop or computer (USB or RS232).

Remote Monitoring and control
Color Control GX or other GX devices.
Data can be stored and displayed on our VRM (Victron Remote Management) website, free of charge.

Remote configuring
When connected to the Ethernet, systems with a Color Control GX or other GX device can be accessed and settings can be changed remotely.

Ekrano GX or Cerbo GX
Provides intuitive system control and monitoring and enables access to our free remote monitoring website: the VRM Online Portal.

VRM Portal
Our free remote monitoring website (VRM) will display all your system data in a comprehensive graphical format. System settings can be changed remotely via the portal. Alarms can be received by e-mail or push notification.

VRM app
Monitor and manage your Victron Energy system from your smart phone and tablet. Available for both iOS and Android.

Standard marine, mobile or off-grid application
Loads that should shut down when AC input power is not available can be connected to a second output (not shown). These loads will be considered by the PowerControl and PowerAssist function in order to limit AC input current to a safe value when AC power is available.

MultiPlus	12 Volt 24 Volt 48 Volt	C 12/800/35 C 24/ 800/16	C 12/1200/50 C 24/1200/25	C 12/1600/70 C 24/1600/40	C 12/2000/80 C 24/2000/50	12/3000/120 24/3000/70 48/3000/35	24/5000/120 48/5000/70
Nominal Battery voltage		12 V battery 24 V battery	12 V battery 24 V battery	12 V battery 24 V battery	12 V battery 24 V battery	12 V battery 24 V battery 48 V battery	24 V battery 48 V battery
PowerControl		Yes	Yes	Yes	Yes	Yes	Yes
PowerAssist		Yes	Yes	Yes	Yes	Yes	Yes
AC input		Input voltage range: 187-250 V Input frequency: 50/60 Hz Cos Φ >0.8					
Transfer switch (A)		16	16	16	30	16 or 50	100

INVERTER							
Input voltage range (VDC)				9,5 – 17 V 19 – 33 V 38 – 66 V			
Input current (A DC)		n. a.	n. a.	n. a.	n. a.	250 / 125 / 65	238 / 118
Output		Output voltage: 230 VAC ± 2 % Frequency: 50 Hz ± 0,1 % [1]					
Cont. output power at 25 °C (VA) [3]		800	1200	1600	2000	3000	5000
Cont. output power at 25 °C (W)		700	1000	1300	1600	2400	4000
Cont. output power at 40 °C (W)		650	900	1200	1400	2200	3700
Cont. output power at 65 °C (W)		400	600	800	1000	1700	3000
Peak power (W)		1600	2400	3000	4000	6000	10.000
Maximum continuous Output current (A~)		n. a.	n. a.	n. a.	n. a.	11	19
Power factor range		n. a.	n. a.	n. a.	n. a.	±0.8	±0.8
Maximum output fault current		n. a.	n. a.	n. a.	n. a.	32A peak 1 sec.	53A peak 1sec
Maximum efficiency (%)		92 / 94	93 / 94	93 / 94	93 / 94	93 / 94 / 95	94 / 95
Zero load power (W)		8 / 10	8 / 10	8 / 10	9 / 11	20 / 20 / 25	30 / 35
Zero load power in AES mode (W)		5 / 8	5 / 8	5 / 8	7 / 9	15 / 15 / 20	25 / 30
Zero load power in Search mode (W)		2 / 3	2 / 3	2 / 3	3 / 4	8 / 10 / 12	10 / 15

CHARGER							
AC Input		Input voltage range: 187-265 VAC Input frequency: 45 – 65 Hz Power factor: 1					
Charge voltage 'absorption' (VDC)		14,4 / 28,8 / 57,6					
Charge voltage 'float' (VDC)		13,8 / 27,6 / 55,2					
Storage mode (VDC)		13,2 / 26,4 / 52,8					
Charge current house battery (A) [4]		35 / 16	50 / 25	70 / 40	80 / 50	120 / 70 / 35	120 / 70
Charge current starter battery (A)		4 (12 V and 24 V models only)					
Battery temperature sensor		yes					

GENERAL							
Auxiliary output [5]		n. a.	n. a.	n. a.	n. a.	Yes (16A)	Yes (50A)
Programmable relay [6]		Yes					
Protection [2]		a - g					
VE.Bus communication port		For parallel and three phase operation, remote monitoring and system integration					
General purpose com. port		n. a.	n. a.	n. a.	n. a.	Yes	Yes
Remote on-off		Yes					
Common Characteristics		Operating temp. range: -40 to +65 °C (fan assisted cooling) Humidity (non-condensing): max 95 %					
Maximum altitude		2000 m.					

ENCLOSURE							
Common Characteristics		Material & Colour: aluminium (blue RAL 5012), Protection category: IP20, pollution degree 2, OVCIII Icw: 6kA 30mS					
Battery-connection		battery cables of 1.5 meter			M8 bolts	Four M8 bolts (2 plus and 2 minus connections)	
230 VAC-connection		G-ST18i connector			Spring-clamp	Screw terminals 13 mm² (6 AWG)	M6 bolts
Weight (kg)		10	10	10	12	18	30
Dimensions (hxwxd in mm)		375 x 214 x 110			520 x 255 x 125	362 x 258 x 218	444 x 328 x 240

STANDARDS							
Safety		EN-IEC 60335-1, EN-IEC 60335-2-29, IEC 62109-1					
Emission, Immunity		EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-IEC 61000-3-3, IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3					
Road vehicles		12 V and 24 V models: ECE R10-4					
Anti-islanding		See our website					

1) Can be adjusted to 60 HZ. 120 V models available on request
2) Protection key:
   a) output short circuit
   b) overload
   c) battery voltage too high
   d) battery voltage too low
   e) temperature too high
   f) 230 VAC on inverter output
   g) input voltage ripple too high

3) Non-linear load, crest factor 3:1
4) Up to 25 ˚C ambient
5) Switches off when no external AC source available
6) Programmable relay that can a.o. be set for general alarm,
   DC under voltage or genset start/stop function
   AC rating: 230 V/4 A
   DC rating: 4 A up to 35 VDC, 1 A up to 60 VDC
7) A.o. to communicate with a Lithium-Ion battery BMS

Digital Multi Control Panel
A convenient and low-cost solution for monitoring and control. With an on/off charger-only switch, full LED readout and a rotary knob to set PowerControl and PowerAssist levels.

VE.Bus Smart Dongle
For monitoring and control via Bluetooth together with the VictronConnect app. It also measures battery voltage and temperature.

Interface MK3-USB
Needed to configure the MultiPlus, Can be used with the VictronConnect app or VE.Configure software. The interface connects to the MultiPlus via an RJ45 UTP cable and plugs into a USB port.

VictronConnect app
Use to monitor or configure the MultiPlus using your phone tablet or PC.

Battery Monitor
To monitor battery state of charge via Bluetooth or the VRM portal.
The BMV 712 Smart has display, while the SmartShunt does not have a display. Both communicate via Bluetooth and have a VE.Direct communication port.

QUATTRO INVERTER/CHARGER 3KVA - 10KVA 230V

Quattro
48/5000/70-100/100

Quattro
48/15000/200-100/100

Ekrano GX or Cerbo GX
Provides intuitive system control and monitoring and enables access to our free remote monitoring website: the VRM Online Portal.

Two AC inputs with integrated transfer switch
The Quattro can be connected to two independent AC sources, for example the public grid and a generator, or two generators. The Quattro will automatically connect to the active source.

Two AC Outputs
The main output has no-break functionality. The Quattro takes over the supply to the connected loads in the event of a grid failure or when shore/generator power is disconnected. This happens so fast (less than 20 milliseconds) that computers and other electronic equipment will continue to operate without disruption.
The second output is live only when AC is available on one of the inputs of the Quattro. Loads that should not discharge the battery, like a water heater for example, can be connected to this output.

Split phase option
A split phase AC source can be obtained by connecting our autotransformer (see data sheet on www.victronenergy.com) to a 'European' inverter programmed to supply 240 V / 60 Hz.

Three phase capability
Three units can be configured for three phase output. But that's not all: up to 4 sets of three 15 kVA units can be parallel connected to provide 144 kW / 180 kVA inverter power and 2400 A charging capacity.

PowerControl – Dealing with limited generator, shore side or grid power
The Quattro is a very powerful battery charger. It will therefore draw a lot of current from the generator or shore side supply (16 A per 5 kVA Quattro at 230 VAC). A current limit can be set on each AC input. The Quattro will then take account of other AC loads and use whatever is spare for charging, thus preventing the generator or mains supply from being overloaded.

PowerAssist – Boosting shore or generator power
This feature takes the principle of PowerControl to a further dimension allowing the Quattro to supplement the capacity of the alternative source. Where peak power is so often required only for a limited period, the Quattro will make sure that insufficient mains or generator power is immediately compensated for by power from the battery. When the load reduces, the spare power is used to recharge the battery.

Solar energy: AC power available even during a grid failure
The Quattro can be used in off grid as well as grid connected PV and other alternative energy systems.
Loss of mains detection software is available.

System configuring
- In case of a stand-alone application, if settings have to be changed, this can be done in a matter of minutes with a DIP switch setting procedure.
- Parallel and three phase applications can be configured with VE.Bus Quick Configure and VE.Bus System Configurator software.
- Off grid, grid interactive and self-consumption applications, involving grid-tie inverters and/or MPPT Solar Chargers can be configured with Assistants (dedicated software for specific applications).

On-site Monitoring and control
Several options are available: Battery Monitor, Multi Control Panel, Color Control GX or other GX devices, smartphone or tablet (Bluetooth Smart), laptop or computer (USB or RS232).

Remote Monitoring and control
Color Control GX or other GX devices.
Data can be stored and displayed on our VRM (Victron Remote Management) website, free of charge.

Remote configuring
When connected to the Ethernet, systems with a Color Control GX or other GX device can be accessed and settings can be changed remotely.

VRM Portal
Our free remote monitoring website (VRM) will display all system data in a comprehensive graphical format. System settings can be changed remotely via the portal. Alarms can be received by e-mail or push notification.

VRM app
Monitor and manage your Victron Energy system from your smart phone and tablet. Available for both iOS and Android.

Quattro	12/3000/120-50/50 24/3000/70-50/50	12/5000/220-100/100 24/5000/120-100/100 48/5000/70-100/100	24/8000/200-100/100 48/8000/110-100/100	48/10000/140-100/100	48/15000/200-100/100
Nominal Battery Voltage	12/3000: 12 V battery 24/3000: 24 V battery	12/5000: 12 V battery 24/5000: 24 V battery 48/5000: 48 V Batttery	24/8000: 24 V battery 48/8000: 48 V battery	48 V battery	
PowerControl / PowerAssist			Yes		
Integrated Transfer switch			Yes		
AC inputs (2x)		Input voltage range: 187-250 VAC	Input frequency: 50/60 Hz	Cos Φ >0.8	
Maximum feed through current (A)	2x 50	2x100	2x100	2x100	2x100
ICw	6 kA 30 mS		10 kA 30 ms		
INVERTER					
Input voltage range (VDC)		9,5 – 17 V	19 – 33 V	38 – 66 V	
Output [1]		Output voltage: 230 VAC ± 2 %	Frequency: 50 Hz ± 0,1 %		
Cont. output power at 25 °C (VA) [3]	3000	5000	8000	10000	15000
Cont. output power at 25 °C (W)	2400	4000	6400	8000	12000
Cont. output power at 40 °C (W)	2200	3700	5500	6500	10000
Cont. output power at 65 °C (W)	1700	3000	3600	4500	7000
Peak power (W)	6000	10000	16000	20000	25000
Input current (A DC)	250 / 125	458/238/118	381/188	235	350
Maximum continuous Output current (A~)	11	19	30	37	53/50
Power factor range	±0.8	±0.8	±0.8	±0.8	±0.8
Maximum output fault current	32 A peak 1 sec.	53 A 1 sec.	100 A 1 sec	100 A 1 sec	150 A 1 sec
Maximum efficiency (%)	93 / 94	94 / 94 / 95	94 / 96	96	96
Zero load power (W)	20 / 20	30 / 30 / 35	60 / 60	60	110
Zero load power in AES mode (W)	15 / 15	20 / 25 / 30	40 / 40	40	75
Zero load power in Search mode (W)	8 / 10	10 / 10 / 15	15 / 15	15	20
CHARGER					
Charge voltage 'absorption' (VDC)	14,4 / 28,8	14,4 / 28,8 / 57,6	28,8 / 57,6	57,6	57,6
Charge voltage 'float' (VDC)	13,8 / 27,6	13,8 / 27,6 / 55,2	27,6 / 55,2	55,2	55,2
Storage mode (VDC)	13,2 / 26,4	13,2 / 26,4 / 52,8	26,4 / 52,8	52,8	52,8
Charge current house battery (A) [4]	120 / 70	220 / 120 / 70	200 / 110	140	200
Charge current starter battery (A)		4 (12 V and 24 V models only)			
Battery temperature sensor			Yes		
GENERAL					
Auxiliary output (A) [5]	25	50	50	50	50
Programmable relay [6]	3x	3x	3x	3x	3x
Protection [2]			a-g		
VE.Bus communication port		For parallel and three phase operation, remote monitoring and system integration			
General purpose com. port	2x	2x	2x	2x	2x
Remote on-off			Yes		
Common Characteristics		Operating temp.: -20 to +60 ˚C	Humidity (non-condensing): max. 95 %		
Maximum altitude			2000 m		
ENCLOSURE					
Common Characteristics		Material & Colour: aluminium (blue RAL 5012)	Protection category: IP20, pollution degree 2, OVC III		
Battery-connection		Four M8 bolts (2 plus and 2 minus connections)			
230 VAC-connection	Screw terminals 13 mm² (6 AWG)	Bolts M6	Bolts M6	Bolts M6	Bolts M6
Weight (kg)	19	34 / 30 / 30	45 / 41	51	72
Dimensions (hxwxd in mm)	362 x 258 x 218	470 x 350 x 280 444 x 328 x 240 444 x 328 x 240	470 x 350 x 280	470 x 350 x 280	572 x 488 x 344
STANDARDS					
Safety		EN-IEC 60335-1, EN-IEC 60335-2-29, EN-IEC 62109-1			
Emission, Immunity		EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-IEC 61000-3-3, IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3			
Road vehicles		12 V and 24 V models: ECE R10-4			
Anti-islanding		See our website			

1) Can be adjusted to 60 HZ. 120 V models available on request
2) Protection key:
  a) output short circuit
  b) overload
  c) battery voltage too high
  d) battery voltage too low
  e) temperature too high
  f) 230 VAC on inverter output
  g) input voltage ripple too high

3) Non-linear load, crest factor 3:1
4) Up to 25 ˚C ambient
5) Switches off when no external AC source available
6) Programmable relay that can a.o. be set for general alarm,
  DC under voltage or genset start/stop function
  AC rating: 230 V / 4 A
  DC rating: 4 A up to 35 VDC, 1 A up to 60 VDC

Digital Multi Control Panel
A convenient and low-cost solution for monitoring and control. With an on/off charger-only switch, full LED readout and a rotary knob to set PowerControl and PowerAssist levels.

VE.Bus Smart Dongle
For monitoring and control via Bluetooth together with the VictronConnect app. It also measures battery voltage and temperature.

Interface MK3-USB
Needed to configure the MultiPlus, Can be used with the VictronConnect app or VE.Configure software. The interface connects to the MultiPlus via an RJ45 UTP cable and plugs into a USB port.

VictronConnect app
Use to monitor or configure the MultiPlus using your phone tablet or PC.

Battery Monitor
To monitor battery state of charge via Bluetooth or the VRM portal. The BMV 712 Smart has display, while the SmartShunt does not have a display. Both communicate via Bluetooth and have a VE.Direct communication port.

**Connection Area
MultiPlus-II 3k**

A MultiPlus, plus ESS (Energy Storage System) functionality
The MultiPlus-II is a multifunctional inverter/charger with all the features of the MultiPlus, plus an external current sensor option which extends the PowerControl and PowerAssist function to 50 A resp. 100 A.
The MultiPlus-II is ideally suited for professional marine, yachting, vehicle and land based off-grid applications.
It also has built-in anti-islanding functionality, and an increasingly long list of country approvals for ESS application.
Several system configurations are possible. For more detailed information see the ESS Design and configuration manual.

PowerControl and PowerAssist - Boosting the capacity of the grid or a generator
A maximum grid or generator current can be set. The MultiPlus-II will then take account of other AC loads and use whatever is extra for battery charging, thus preventing the generator or grid from being overloaded (PowerControl function).
PowerAssist takes the principle of PowerControl to a further dimension. Where peak power is so often required only for a limited period, the MultiPlus-II will compensate insufficient generator, shore or grid power with power from the battery. When the load reduces, the spare power is used to recharge the battery.

Solar energy: AC power available even during a grid failure
The MultiPlus-II can be used in off grid as well as grid connected PV and other alternative energy systems. It is compatible with both solar charger controllers and grid-tie inverters.

Two AC Outputs
The main output has no break functionality. The MultiPlus-II takes over the supply to the connected loads in the event of a grid failure or when shore/generator power is disconnected. This happens so fast (less than 20 milliseconds) that computers and other electronic equipment will continue to operate without disruption.
The second output is live only when AC is available on the input of the MultiPlus-II. Loads that should not discharge the battery, like a water heater for example, can be connected to this output.

Virtually unlimited power thanks to parallel and three phase operation
Up to 6 Multis can operate in parallel to achieve higher power output. Six 48/5000/70 units, for example, will provide 25 kW / 30 kVA output power with 420 Amps charging capacity.
In addition to parallel connection, three units of the same model can be configured for three phase output. But that's not all: up to 6 sets of three units can be parallel connected for a 75 kW / 90 kVA inverter and more than 1200 Amps charging capacity.
The MultiPlus-II 8k, 10k, and 15k models can only be connected in parallel if an external AC transfer switch is used. For more information see the MultiPlus-II External Transfer Switch application manual.

On-site system configuring, monitoring and control
Settings can be changed in a matter of minutes with VEConfigure software (computer or laptop and MK3-USB interface needed).
Several monitoring and control options are available: Cerbo GX, Color Control GX, Venus GX, Octo GX, CANvu GX, laptop, computer, Bluetooth (with the optional VE.Bus Smart dongle), Battery Monitor, Digital Multi Control Panel.

Remote configuring and monitoring
Install a Cerbo GX or other GX product to connect to the internet.
Operational data can be stored and displayed on our VRM (Victron Remote Management) website, free of charge.
When connected to the internet, systems can be accessed remotely, and settings can be changed.

Standard marine, mobile or off-grid application
Loads that should shut down when AC input power is not available can be connected to a second output (not shown). These loads will be taken into account by the PowerControl and PowerAssist function in order to limit AC input current to a safe value when AC power is available.

Grid parallel topology with MPPT solar charge controller
The MultiPlus-II will use data from the external AC current sensor (must be ordered separately) or power meter to optimise self-consumption and, if required, to prevent grid feed. In case of a power outage, the MultiPlus-II will continue to supply the critical loads

Ekrano GX or Cerbo GX
Provides intuitive system control and monitoring and enables access to our free remote monitoring website: the VRM Online Portal.

VRM Portal
Our free remote monitoring website (VRM) will display all system data in a comprehensive graphical format. System settings can be changed remotely via the portal. Alarms can be received by e-mail or push notification.

VRM app
Monitor and manage your Victron Energy system from your smart phone and tablet. Available for both iOS and Android.

MultiPlus-II 230V	12/3000/120-32 24/3000/70-32 48/3000/35-32	12/5000/220-50 24/5000/120-50 48/5000/70-50	48/8000/ 110-100	48/10000/ 140-100	48/15000/ 200-100
PowerControl & PowerAssist	Yes				
Transfer switch	32 A	50 A	100 A	100 A	100 A
Maximum AC input current	32 A	50 A	100 A	100 A	100 A
INVERTER					
DC Input voltage range	12 V - 9,5–17 V	24 V - 19–33 V	48 V – 38-66 V		
Output	Output voltage: 230 VAC ± 2 %		Frequency: 50 Hz ± 0,1 % (1)		
Cont. output power at 25 °C (3)	3000 VA	5000 VA	8000 VA	10000 VA	15000 VA
Cont. output power at 25 °C	2400 W	4000 W	6400 W	8000 W	12000 W
Cont. output power at 40 °C	2200 W	3700 W	5500 W	7000 W	10000 W
Cont. output power at 65 °C	1700 W	3000 W	4000 W	6000 W	7000 W
Max apparent feed-in power	3000 VA	5000 VA	8000 VA	10000 VA	15000 VA
Peak power	5500 W	9000 W	15000 W	18000 W	27000 W
Maximum efficiency	93%/94%/95%	95%96%/96%	95%	96%	95%
Zero load power	13 / 13 / 11 W	15/18/18 W	29 W	38 W	55 W
Zero load power in AES mode	9 / 9 / 7 W	11/12/12 W	19 W	27 W	39 W
Zero load power in Search mode	3 / 3 / 2 W	3 / 3 / 2 W	3 W	4 W	6 W
CHARGER					
AC Input	Input voltage range: 187-265 VAC Input frequency: 45 – 65 Hz				
Charge voltage 'absorption'	14,4 / 28,8 / 57,6 V				
Charge voltage 'float'	13,8 / 27,6 / 55,2 V				
Storage mode	13,2 / 26,4 / 52,8 V				
Max. battery charge current (4)	120 /70 / 35 A	220/120/ 70 A	110 A	140 A	200 A
Battery temperature sensor	Yes				
GENERAL					
Auxiliary output	Yes (32 A)		Yes (50 A)		
External AC current sensor (optional)	50 A or 100 A				
Programmable relay (5)	Yes				
Protection (2)	a – g				
VE.Bus communication port	For parallel and three phase operation, remote monitoring and system integration				
General purpose com. port	Yes, 2x				
Remote on-off	Yes				
Operating temperature range	-40 to +65 °C (fan assisted cooling)				
Humidity (non-condensing)	max 95 %				
Maximum altitude	2000 m.				
ENCLOSURE					
Material & Colour	Steel, blue RAL 5012				
Protection category	IP22				
Battery-connection	M8 bolts		Four M8 bolts (2 plus and 2 minus connections)		
230 VAC-connection	Screw terminals 13 mm² (6 AWG)		Bolts M6	Bolts M6	Bolts M6
Weight kg	19 kg	33/ 30/ 30 kg	42 kg	49 kg	80 kg
Dimensions (hxwxd) mm	546 x 275 x 147 499 x 268 x 141 499 x 268 x 141	702 x 345 x 152 607 x 330 x 149 565 x 320 x 149	642 x 363 x 206	677 x 363 x 206	810 x 405 x 217
STANDARDS					
Safety	EN-IEC 60335-1, EN-IEC 60335-2-29, EN-IEC 62109-1, EN-IEC 62109-2				
Emission, Immunity	EN 55014-1, EN 55014-2 EN-IEC 61000-3-2, EN-IEC 61000-3-3 IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3				
Uninterruptible power supply	Please consult the certificates on our website.				
Anti-islanding	Please consult the certificates on our website.				

1) Can be adjusted to 60 Hz
2) Protection key:
   a) output short circuit
   b) overload
   c) battery voltage too high
   d) battery voltage too low
   e) temperature too high
   f) 230 VAC on inverter output
   g) input voltage ripple too high

3) Non-linear load, crest factor 3:1
4) Up to 25 °C ambient
5) Programmable relay which can be set for general alarm, DC under voltage or genset start/stop function. AC rating: 230V / 4 A, DC rating: 4 A up to 35VDC and 1 A up to 60 VDC

Digital Multi Control Panel
A convenient and low-cost solution for monitoring and control. With an on/off charger-only switch, full LED readout and a rotary knob to set PowerControl and PowerAssist levels.

VE.Bus Smart Dongle
For monitoring and control via Bluetooth together with the VictronConnect app. It also measures battery voltage and temperature.

Interface MK3-USB
Needed to configure the MultiPlus, Can be used with the VictronConnect app or VE.Configure software. The interface connects to the MultiPlus via an RJ45 UTP cable and plugs into a USB port.

VictronConnect app
Use to monitor or configu MultiPlus using your pho tablet or PC.

Current sensor 100A:50mA
To implement PowerControl and PowerAssist and to optimize self-consumption with external current sensing. Maximum current: 100 A

A MultiPlus-II with LCD and GX functionality

The MultiPlus-II GX integrates a MultiPlus-II inverter/charger and a GX device with a 2 x 16 character display.

Display and WiFi

The display reads battery, inverter and solar charge controller parameters.
The same parameters can be accessed with a smartphone or other WiFi enabled device.

GX device

The integrated GX device includes:
- A BMS-Can interface. This can be used to connect to a compatible CAN-bus managed battery. Note that this not a VE.Can compatible port.
- A USB port.
- A Ethernet port.
- A VE.Direct port.

Applications

The MultiPlus-II GX is intended for applications where additional interfacing with other products and/or remote monitoring is required, such as on-grid or off-grid energy storage systems and certain mobile applications.

Parallel and three phase operation

Only one GX unit is needed in case of Parallel and three phase operation.
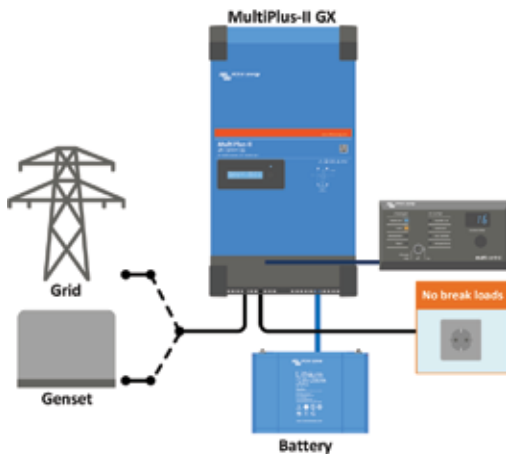
Standard marine, mobile or off-grid application
Loads that should shut down when AC input power is not available can be connected to a second output (not shown). These loads will be taken into account by the PowerControl and PowerAssist function in order to limit AC input current to a safe value when AC power is available.
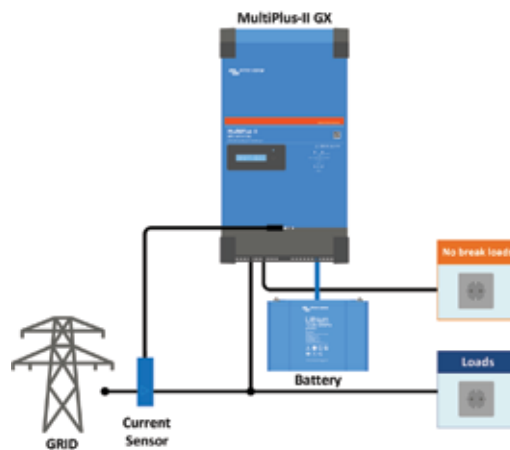
Standard mobile or off-grid application with external current sensor
Maximum current sensing range: 50 A resp 100 A
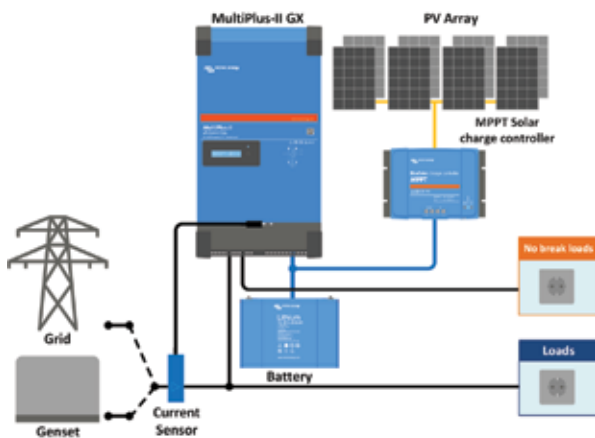
Grid parallel topology with MPPT solar charge controller
The MultiPlus-II will use data from the external AC current sensor (must be ordered separately) or power meter to optimise self-consumption and, if required, to prevent grid feed. In case of a power outage, the MultiPlus-II will continue to supply the critical loads
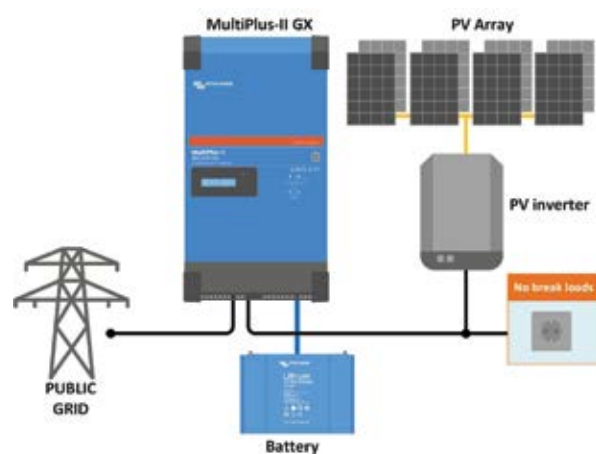
Grid in-line topology with PV inverter
PV power is directly converted to AC.
The MultiPlus-II will use excess PV power to charge the batteries or to feed power back into the grid, and will discharge the battery or use power from the grid to supplement a shortage of PV power. In case of a power outage, the MultiPlus-II will disconnect the grid and continue to supply the loads.

VRM Portal

Our free remote monitoring website (VRM) will display all system data in a comprehensive graphical format. System settings can be changed remotely via the portal. Alarms can be received by e-mail or push notification.

VRM app

Monitor and manage your Victron Energy system from your smart phone and tablet. Available for both iOS and Android.

GX GSM

A cellular modem; providing a mobile internet for the system and connection to Victron Remote Management (VRM). Optional: outdoor GSM antenna and GPS antenna. For more detail please enter *GX GSM* in the search box on our website

MultiPlus-II GX	24/3000/70-32	48/3000/35-32	48/5000/70-50
PowerControl & PowerAssist	Yes		
Transfer switch	32 A		50 A
Maximum AC input current	32 A		50 A
Auxiliary output	Yes (32 A)		
INVERTER			
DC Input voltage range	19 – 33 V	38 – 66 V	
Output	Output voltage: 230 VAC ± 2 % Frequency: 50 Hz ± 0,1 % (1)		
Cont. output power at 25 °C (3)	3000 VA		5000 VA
Cont. output power at 25 °C	2400 W		4000 W
Cont. output power at 40 °C	2200 W		3700 W
Cont. output power at 65 °C	1700 W		3000 W
Maximum apparent feed-in power	3000 VA		5000 VA
Peak power	5500 W		9000 W
Maximum efficiency	94 %	95 %	96 %
Zero load power	13 W	11 W	18 W
Zero load power in AES mode	9 W	7 W	12 W
Zero load power in Search mode	3 W	2 W	2 W
CHARGER			
AC Input	Input voltage range: 187-265 VAC Input frequency: 45 – 65 Hz		
Charge voltage 'absorption'	28,8 V	57,6 V	
Charge voltage 'float'	27,6 V	55,2 V	
Storage mode	26,4 V	52,8 V	
Maximum battery charge current (4)	70 A	35 A	70 A
Battery temperature sensor	Yes		
GENERAL			
Interfaces	BMS-Can, USB, Ethernet, VE.Direct, Wi-Fi		
External AC current sensor (optional)	50 A		100 A
Programmable relay (5)	Yes		
Protection (2)	a – g		
VE.Bus communication port	For parallel and three phase operation, remote monitoring and system integration		
General purpose com. port	Yes, 2x		
Remote on-off	Yes		
Operating temperature range	-40 to +65 °C (fan assisted cooling)		
Humidity (non-condensing)	max 95 %		
ENCLOSURE			
Material & Colour	Steel, blue RAL 5012		
Protection category	IP22		
Battery-connection	M8 bolts		
230 V AC-connection	Screw terminals 13 mm² (6 AWG)		
Weight	20 kg		31 kg
Dimensions (hxwxd) mm	506 x 275 x 147		565 x 323 x 148
STANDARDS			
Safety	EN-IEC 60335-1, EN-IEC 60335-2-29, EN-IEC 62109-1, EN-IEC 62109-2		
Emission, Immunity	EN 55014-1, EN 55014-2 EN-IEC 61000-3-2, EN-IEC 61000-3-3 IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3		
Uninterruptible power supply	IEC 62040-1		
Anti-islanding	Please consult the certificates on our website.		

1) Can be adjusted to 60 Hz
2) Protection key:
   a) output short circuit
   b) overload
   c) battery voltage too high
   d) battery voltage too low
   e) temperature too high
   f) 230 VAC on inverter output
   g) input voltage ripple too high

3) Non-linear load, crest factor 3:1
4) Up to 25 °C ambient
5) Programmable relay which can be set for general alarm, DC under voltage or genset start/stop function.
 AC rating: 230 V / 4 A, DC rating: 4 A up to 35 VDC and 1 A up to 60 VDC

Connection Area

Current sensor 100 A:50 mA
To implement PowerControl and PowerAssist and to optimize self-consumption with external current sensing.
Maximum current: 50 A resp. 100 A.
Length of connection cable: 1 m.
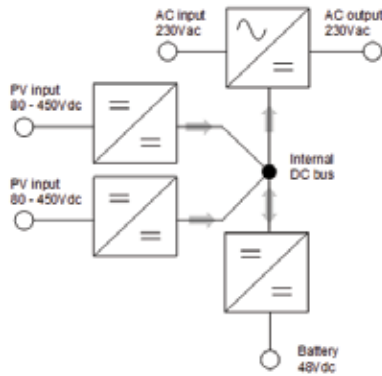
Digital Multi Control Panel
A convenient and low-cost solution for remote monitoring, with a rotary knob to set PowerControl and PowerAssist levels.

Multi RS Solar 48/6000 dual tracker

Inside the Multi RS Solar dual tracker

Operating modes

Hybrid mode – Stores excess solar energy in a battery, to be used during the night or periods of high demand. Supplies additional power from the battery when demand exceeds grid capacity.

Backup mode – Switches to backup mode during a grid outage.

Off-grid mode – Operates without grid connection.

Generator mode – Controls the generator to minimize run-hours. Supplies additional power from the battery when demand exceeds the capacity of the generator.

PowerControl and PowerAssist - Boosting the capacity of the grid or a generator

A maximum grid or generator current can be set. The Multi RS will then take account of other AC loads and use whatever is extra for battery charging, thus preventing the generator or grid from being overloaded (PowerControl function).

PowerAssist takes the principle of PowerControl to a further dimension. Where peak power is so often required only for a limited period, the Multi RS will compensate insufficient generator or grid power with power from the battery. When the load reduces, the spare power is used to recharge the battery.

Display, Bluetooth and VictronConnect app

The display reads battery, inverter and solar parameters. The same parameters can be accessed with a smartphone or other Bluetooth enabled device, using the VictronConnect app.

Extendable PV capacity, both AC-coupled and DC-coupled

The integrated 6 kWp PV capacity can be extended by adding solar chargers to the system.
Alternatively, the PV capacity can be extended by installing PV Inverters, of which the output power will be automatically controlled by the integrated frequency shift power control.

Communication ports

VE.Can connection to a GX device for system monitoring, data logging, and remote firmware updates.
VE.Direct connection to a GlobalLink 520 for remote data monitoring.
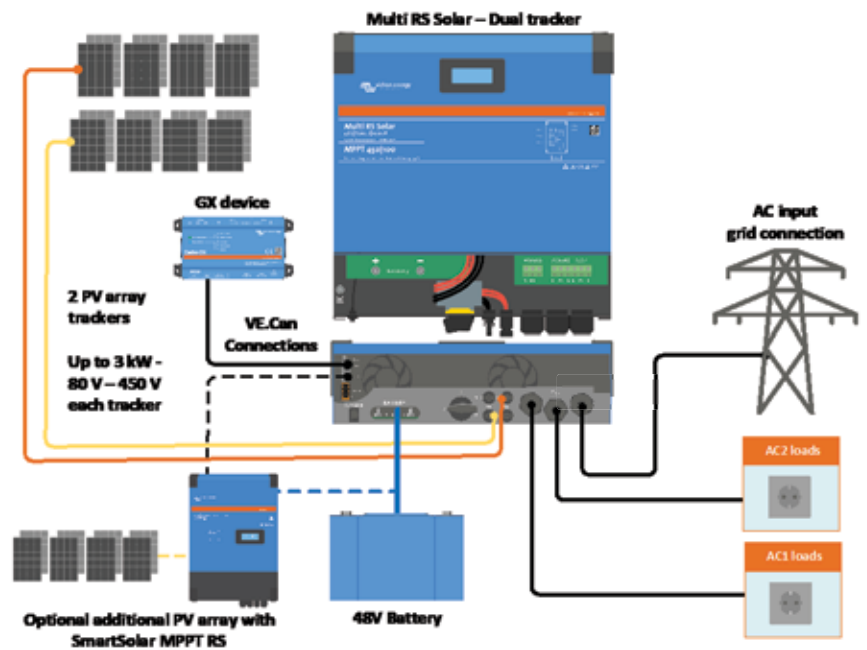
I/O Connections

Programmable relay, temperature sensor and voltage sensor connections.

Configure and monitor with VictronConnect
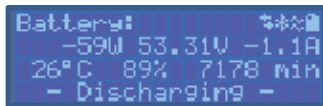A built in Bluetooth Smart connection allows for quick monitoring or settings adjustment of the Multi RS.

Multi RS Solar 48/6000 Dual Tracker

PowerControl & PowerAssist	Yes
Transfer switch	50 A
Maximum AC input and pass-through current	50 A
INVERTER	
DC Input voltage range [1]	38 – 62 V
AC Output [2]	Output voltage: 230 VAC ± 2 % Frequency: 50 Hz ± 0,1 % Maximum continuous inverter current: 25 Aac
Continuous output power at 25 °C	Increases linearly from 4800 W at 46 VDC to 5300 W at 52 VDC
Continuous output power at 40 °C	4500 W
Continuous output power at 65 °C	3000 W
Peak power [3]	9 kW for 3 seconds 7 kW for 4 minutes
Short-circuit output current	45 A
Max. AC output overcurrent protection	30 A
Efficiency	96,5 % at 1 kW load 94 % at 5 kW load
Zero load power consumption	20 W
Low Battery shutdown	37.2 V (adjustable)
Low battery restart	43.6 V (adjustable)
SOLAR	
Maximum open circuit PV array voltage [4]	450 V
Start-up voltage	120 V
MPPT operating voltage range	65 – 450 V
Maximum operational PV input current limit	13 A
Maximum PV conversion power	6 kW total – 3 kW per tracker
Maximum PV short circuit current	16 A
Earth leakage trip level	30 mA
Isolation fail level (detection before start-up)	100 kΩ
CHARGER	
AC Input	Nominal Voltage: 230 VAC, Input voltage range: 187-265 VAC Nominal frequency: 50 Hz, Input frequency: 45-65 Hz AC inrush current: NA
Programmable charge voltage range [5]	36 – 60 V
Charge voltage 'absorption'	Default setting: 57,6 V (adjustable)
Charge voltage 'float'	Default setting: 55,2 V (adjustable)
Maximum charge current from AC [6]	88 A @ 57,6 VDC
Total maximum charge current (AC + PV)	100 A DC
Battery temperature sensor	Included
Battery voltage sense	Yes
GENERAL	
Auxiliary output (AC-out-2) [7]	Yes
3-phase and parallel operation	3-phase support with one unit per phase. Parallel not supported.
Programmable relay [8]	Yes
Protections [9]	a - g
Data communications ports [10]	VE.Direct, VE.Can & Bluetooth
Bluetooth frequency & power	2402 - 2480 Mhz, 4 dBm
Programmable analog/digital input/output ports	Yes, 2x
Remote on-off	Yes
Operating temperature range	-40 to +65 °C (fan assisted cooling)
Maximum altitude	2000 m
Humidity (non-condensing)	max 95 %
ENCLOSURE	
Material & Colour	steel, blue RAL 5012
Protection category	IP21 Protective Class: I
Battery-connection	M8 bolts
PV Connection	2 strings, each with positive and negative MC4
230 VAC-connection	Screw terminals 10 mm² (6 AWG)
Weight	12,3 kg
Dimensions (hxwxd)	462 x 425 x 127 mm
STANDARDS	
Safety	EN-IEC 60335-1, EN-IEC 60335-2-29, EN-IEC 62109-1, EN-IEC 62109-2
Emission, Immunity	EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-IEC 61000-3-3, IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3, Pollution Degree 2
Overvoltage Category	Battery: OVC 1, PV port: OVC II, AC in / AC out: OVC III

1) Minimum start-up voltage is 41 VDC. Over-voltage disconnect: 65,5 V.
2) Can be adjusted to 240 VAC and 60 Hz
3) Peak power capacity and duration depends on start temperature of heatsink.
   Mentioned times are with cold unit.
4) The maximum PV voltage should not exceed 8x battery float voltage.
   If for example the float voltage of the battery is 50 V,
   the maximum PV voltage should not exceed 8 x 50 = 400 V.
5) The Charger set points (float & absorption) can be set to max 60 V.
   The output voltage at the charger terminals can be higher due to compensation
   for temperature & voltage drop over the battery cables.
   The maximum output current is reduced on a linear basis from full current at 60 V to
   5 A at 62 V. The equalization voltage can be set to max 62 V, the equalization current
   percentage can be set to max 6 %.
6) The maximum charge current from AC sources depends on input voltage and battery current. At 230V input and 57.6V battery voltage, and 25C ambient, the maximum charge
   current is 88 A. See manual, limitations section, for further details.
7) AC-out-2 is connected directly to the AC input and intended for non-critical loads. The AC-out-2 load is taken into account by PowerControl & PowerAssist.
8) Programmable relay which can be set for general alarm, DC under voltage or genset start/stop function. DC rating: 4 A up to 35 VDC and 1 A up to 70 VDC
9) Protection key: a) output short circuit   b) overload   c) battery voltage too high   d) battery voltage too low   e) temperature too high   f) 230 VAC on inverter output   g) solar
   earth leakage.
10) Not currently compatible with VE.Smart Networks. Connection to a GX device (i.e. Cerbo GX) must be made via the VE.Can interface. The VE.Direct interface is for connection to
   the GlobalLink 520.

INVERTER RS 48/6000 SMART

Inverter RS Smart 48/6000

Configure and monitor with VictronConnect
A built-in Smart Bluetooth connection allows for quick monitoring or settings adjustment of the Inverter RS.

Light weight, efficient and quiet
Thanks to high frequency technology and a new design this powerful inverter weighs only 11 kg. In addition to this it has an excellent efficiency, low standby power, and a very quiet operation.

Display and Bluetooth
The display reads battery and inverter parameters.
The same parameters can be accessed with a smartphone or other Bluetooth enabled device. In addition, Bluetooth can be used to set up the system and to change settings with VictronConnect.

VE.Can and VE.Direct port
VE.Can connection to a GX device for system monitoring, data logging, and remote firmware updates. VE.Direct connection to a GlobalLink 520 for remote data monitoring.

I/O Connections
Programmable Relay, temperature sensor and voltage sensor connections. The remote input can also be configured to accept the Victron smallBMS.

Inverter RS Smart	48/6000
INVERTER	
DC Input voltage range	38 – 62 V [4]
Output	Output voltage: 230 VAC ± 2 % Frequency: 50 Hz ± 0.1 % [1] Maximum continuous inverter current: 25 Aac
Continuous output power at 25 °C	Increases linearly from 4800 W at 46 VDC to 5300 W at 52 VDC
Continuous output power at 40 °C	4500 W
Continuous output power at 65 °C	3000 W
Peak power	9 kW for 3 seconds 7 kW for 4 minutes
Short-circuit output current	50 A
Maximum efficiency	96.5 % at 1 kW load 94 % at 5 kW load
Zero load power	20 W
CHARGER	
Programmable Charger voltage range (VDC)	36 – 60 V
Charge voltage 'absorption' (VDC)	Default setting: 57,6 V (adjustable)
Charge voltage 'float' (VDC)	Default setting: 55,2 V (adjustable)
Maximum AC coupled solar charging power	5000 W [5]
Maximum charge current	88 A @ 57.6V
Battery temperature sensor	Included
Battery voltage sense	Yes
GENERAL	
Parallel and 3-phase operation	12 parallel units supported, 3 phase supports 4 units per phase
Programmable relay [3]	Yes
Protection [2]	a - g
Data Communications	VE.Direct port, VE.Can port & Bluetooth
Bluetooth frequency & power	2402 – 2480 MHz, 4dBm
General purpose analogue/digital in port	Yes, 2x
Remote on-off	Yes
Operating temperature range	-40 to +65 °C (fan assisted cooling)
Maximum altitude	2000 m
Humidity (non-condensing)	max 95 %
ENCLOSURE	
Material & Colour	steel, blue RAL 5012
Protection category	IP21
Battery-connection	M8 bolts
230 VAC-connection	Screw terminals 10 mm² (6 AWG)
Weight	11 kg
Dimensions (hxwxd)	425 x 440 x 125 mm
STANDARDS	
Safety	EN-IEC 60335-1, EN-IEC 62109-1, EN-IEC 62109-2
Emission, Immunity	EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-IEC 61000-3-3 IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3

1) Can be adjusted to 60 Hz.
2) Protection key: a) output short circuit b) overload c) battery voltage too high d) battery voltage too low e) temperature too high f) 230 VAC on inverter output
   g) Solar earth leakage.
3) Programmable relay which can be set for general alarm, DC under voltage or genset start/stop function. DC rating: 4A up to 35 VDC and 1 A up to 70 VDC.
4) Minimum start-up voltage is 41 V. Inverter shutdown can be set as low as 32 VDC, but may shut down on low AC output voltage (due to load). Over-voltage disconnect is
   65.5 V.
5) AC coupled solar charging requires an external PV inverter to be connected on a circuit at the AC output of the Inverter RS.

MULTIPLUS INVERTER/CHARGER 2KVA & 3KVA 120V

MultiPlus
24/3000/70

MultiPlus Compact
12/2000/80

Ekrano GX or Cerbo GX
Provides intuitive system control and monitoring and enables access to our free remote monitoring website: the VRM Online Portal.

VRM Portal and app
Our free remote monitoring website (VRM) will display all your system data in a comprehensive graphical format. System settings can be changed remotely via the portal. Alarms can be received by e-mail or push notification.

Multifunctional, with intelligent power management

The MultiPlus is a powerful true sine wave inverter, a sophisticated battery charger that features adaptive charge technology, and a high-speed AC transfer switch in a single compact enclosure. Next to these primary functions, the MultiPlus has several advanced features, as outlined below.

Two AC Outputs

The main output has no-break functionality. The MultiPlus takes over the supply to the connected loads in the event of a grid failure or when shore-/generator power is disconnected. This happens so fast (less than 20 milliseconds) that computers and other electronic equipment will continue to operate without disruption.
The second output is live only when AC is available on the input of the MultiPlus. Loads that should not discharge the battery, like a water heater for example, can be connected to this output (second output available on models rated at 3 kVA and more).

Virtually unlimited power thanks to parallel operation

Up to six Multis can operate in parallel to achieve higher power output. Six 24/3000/70 units, for example, provide 15 kW / 18 kVA output power with 420 Amps of charging capacity.

Three phase capability

In addition to parallel connection, three units can be configured for three-phase output. But that's not all: with three strings of six parallel units a 45 kW / 54 kVA three phase inverter and 1260 A charger can be built.

Split phase options

Two units can be stacked to provide 120-0-120 V, and additional units can be paralleled up to a total of 6 units per phase, to supply up to 30 kW / 36 kVA of split phase power.
Alternatively, a split phase AC source can be obtained by connecting our autotransformer (see data sheet on www.victronenergy.com) to a 'European' inverter programmed to supply 240 V / 60 Hz.

PowerControl – Dealing with limited generator, shore side or grid power

The MultiPlus is a very powerful battery charger. It will therefore draw a lot of current from the generator or shore side supply (nearly 20 A per 3 kVA MultiPlus at 120 VAC). With the Multi Control Panel a maximum generator or shore current can be set. The MultiPlus will then take account of other AC loads and use whatever is extra for charging, thus preventing the generator or shore supply from being overloaded.

PowerAssist – Boosting the capacity of shore or generator power

This feature takes the principle of PowerControl to a further dimension. It allows the MultiPlus to supplement the capacity of the alternative source. Where peak power is so often required only for a limited period, the MultiPlus will make sure that insufficient shore or generator power is immediately compensated for by power from the battery. When the load reduces, the spare power is used to recharge the battery.

Four stage adaptive charger and dual bank battery charging

The main output provides a powerful charge to the battery system by means of advanced 'adaptive charge' software. The software fine-tunes the three-stage automatic process to suit the condition of the battery, and adds a fourth stage for long periods of float charging. The adaptive charge process is described in more detail on the Charger datasheet and on our website, under Technical Information. In addition to this, the MultiPlus will charge a second battery using an independent trickle charge output intended for a main engine or generator starter battery.

System configuring has never been easier

After installation, the MultiPlus is ready to go.
If settings have to be changed, this can be done in a matter of minutes with a DIP switch setting procedure. Even parallel and 3-phase operation can be programmed with DIP switches: no computer needed!
Alternatively, VE.Net can be used instead of the DIP switches.
And sophisticated software (VE.Bus Quick Configure and VE.Bus System Configurator) is available to configure several new, advanced, features.
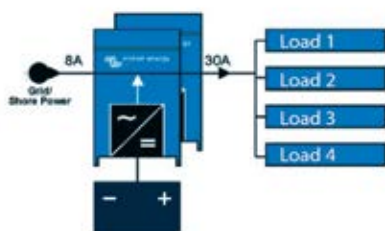
PowerAssist with 2x MultiPlus in parallel
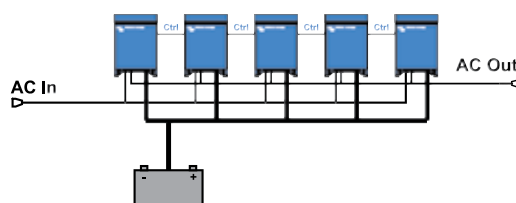
Five parallel units: output power 12,5 kW

MultiPlus	12 Volt 24 Volt	12/2000/80 24/2000/50	12/3000/120 24/3000/70
PowerControl		Yes	
PowerAssist		Yes	
Transfer switch (A)		50	
Parallel and 3-phase operation		Yes	
INVERTER			
Input voltage range (VDC)		9,5 – 17 V 19 – 33 V	
Output		Output voltage: 120 VAC ± 2 % Frequency: 60 Hz ± 0,1 % [1]	
Cont. output power at 25 ºC / 77 °F (VA) [3]		2000	3000
Cont. output power at 25 ºC / 77 °F (W)		1600	2400
Cont. output power at 40 ºC / 104 °F (W)		1450	2200
Cont. output power at 65 ºC / 150 °F (W)		1100	1700
Peak power (W)		4000	6000
Maximum efficiency (%)		92 / 94	93 / 94
Zero load power (W)		9 / 11	20 / 20
Zero load power in AES mode (W)		7 / 8	15 / 15
Zero load power in Search mode (W)		3 / 4	8 / 10
CHARGER			
AC Input		Input voltage range: 95-140 VAC Input frequency: 45 – 65 Hz Power factor: 1	
Charge voltage 'absorption' (VDC)		14,4 / 28,8	
Charge voltage 'float' (VDC)		13,8 / 27,6	
Storage mode (VDC)		13,2 / 26,4	
Charge current house battery (A) [4]		80 / 50	120 / 70
Charge current starter battery (A)		4	
Battery temperature sensor		yes	
GENERAL			
Auxiliary output [5]		n. a.	Yes (32 A)
Programmable relay [6]		Yes (1x)	Yes (3x)
Protection [2]		a - g	
VE.Bus communication port		For parallel and three phase operation, remote monitoring and system integration	
General purpose com. port [7]		n. a.	Yes (2x)
Remote on-off		Yes	
Common Characteristics		Operating temp. range: -40 - +65 °C / -40 to 150 °F (fan assisted cooling) Humidity (non-condensing): max 95%	
ENCLOSURE			
Common Characteristics		Material & Colour: aluminium (blue RAL 5012) Protection category: IP 21	
Battery-connection		M8 bolts	M8 bolts (2 plus and 2 minus connections)
120 V AC-connection		Screw-terminal 6 AWG (13 mm²)	Screw-terminal 6 AWG (13mm²)
Weight		13 kg 25 lbs.	19kg 40 lbs.
Dimensions (hxwxd in mm and inches)		520x255x125 mm 20.5x10.0x5.0 inch	362x258x218 mm 14.3x10.2x8.6 inch
STANDARDS			
Safety		UL 458, EN-IEC 60335-1, EN-IEC 60335-2-29	UL 1741, UL 458, EN-IEC 60335-1, EN-IEC 60335-2-29
Emission and Immunity		EN-IEC 61000-3-2/3-3/, EN-IEC 61000-6-1/6-2/6-3	EN-IEC 61000-3-2/3-3/, EN-IEC 61000-6-1/6-2/6-3

1) Can be adjusted to 50 HZ;
2) Protection key:
   a) output short circuit
   b) overload
   c) battery voltage too high
   d) battery voltage too low
   e) temperature too high
   f) 120 VAC on inverter output
   g) input voltage ripple too high

3) Non-linear load, crest factor 3:1
4) Up to 75 °F ambient
5) Switches off when no external AC source available
6) Programmable relay that can a.o. be set for general alarm,
   DC under voltage or genset start/stop function
   AC rating: 120 V/4 A
   DC rating: 4 A up to 35 VDC, 1 A up to 60 VDC
7) A.o. to communicate with a Lithium Ion battery BMS

Digital Multi Control Panel
A convenient and low-cost solution for monitoring and control. With an on/off charger-only switch, full LED readout and a rotary knob to set PowerControl and PowerAssist levels.

VE.Bus Smart Dongle
For monitoring and control via Bluetooth together with the VictronConnect app. It also measures battery voltage and temperature.

Interface MK3-USB
Needed to configure the MultiPlus, Can be used with the VictronConnect app or VE.Configure software. The interface connects to the MultiPlus via an RJ45 UTP cable and plugs into a USB port.

VictronConnect app
Use to monitor or configure the MultiPlus using your phone tablet or PC.

Battery Monitor
To monitor battery state of charge via Bluetooth or the VRM portal.
The BMV 712 Smart has display, while the SmartShunt does not have a display. Both communicate via Bluetooth and have a VE.Direct communication port.

MULTIPLUS-II INVERTER/CHARGER 3KVA 2 X 120V

120/240 V input and output, or 120 V input and output (always 120 V output when in inverter mode)

The AC input can be supplied from a split phase 120/240 V source, or single phase 120 V source.

When an AC source is available, the MultiPlus will feed through the AC to its output. The output will therefore mirror the AC input.

The inverter/charger connects to the neutral and the preferred input line (L1). Power needed to charge the batteries will therefore be drawn from L1.

The MultiPlus switches to inverter operation when no AC source is available. The inverter output is 120 V single phase. In invert mode, the MultiPlus connects both output lines (L1 and L2) together to provide 120 VAC to loads on either line. Any 240 V loads will therefore be supplied only when the MultiPlus is supplied by a split phase AC source. This prevents heavy loads such as water heaters or 240 V air conditioners from discharging the battery.

PowerControl and PowerAssist - Boosting the capacity of the grid or a generator

A maximum grid or generator current can be set. The MultiPlus will then take account of other AC loads and use whatever is extra for battery charging, thus preventing the generator or grid from being overloaded (PowerControl function). PowerAssist takes the principle of PowerControl to a further dimension. Where peak power is so often required only for a limited period, the MultiPlus-II will compensate insufficient generator, shore or grid power with power from the battery. When the load reduces, the spare power is used to recharge the battery (available on L1 input only).

Two AC Outputs

The main output has no break functionality. The MultiPlus takes over the supply to the connected 120 V loads in the event of a grid failure or when shore/generator power is disconnected. The transfer time of the L1 output is less than 18 milliseconds so that computers and other electronic equipment will continue to operate without disruption. The transfer time of the L2 output is longer: approximately 40 milliseconds.

The second (auxiliary) output is live only when AC is available on the input of the MultiPlus. Loads that should not discharge the battery can be connected to this output.

Virtually unlimited power thanks to parallel and three phase operation

Up to 6 Multis can operate in parallel to achieve higher power output.

In addition to parallel connection, three units of the same model can be configured for three phase output.

In multi-phase setups, L2 is disabled on all units.

On-site system configuring, monitoring and control

Settings can be changed in a matter of minutes with VEConfigure software (computer or laptop and MK3-USB interface needed).

Several monitoring and control options are available: Cerbo GX, Color Control GX, Venus GX, , CANvu GX, laptop, computer, Bluetooth (with the optional VE.Bus Smart dongle), Battery Monitor, Digital Multi Control Panel.

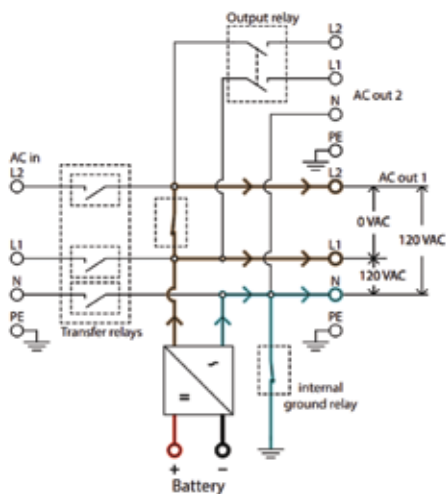## Remote configuring and monitoring

Install a Cerbo GX or other GX product to connect to the internet.

Operational data can be stored and displayed on our VRM (Victron Remote Management) website, free of charge.
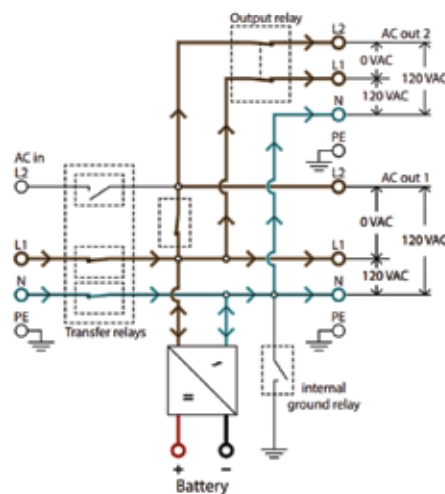
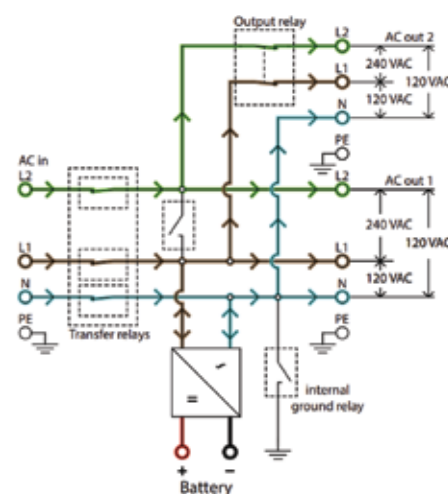When connected to the internet, systems can be accessed remotely, and settings can be changed.

Connection Area

Power flow: inverter mode

Power flow, 120VAC-input

Power flow, split phase input

Ekrano GX or Cerbo GX
Provides intuitive system control and monitoring and enables access to our free remote monitoring website: the VRM Online Portal.

VRM Portal
Our free remote monitoring website (VRM) will display all system data in a comprehensive graphical format. System settings can be changed remotely via the portal. Alarms can be received by e-mail or push notification.

VRM app
Monitor and manage your Victron Energy system from your smart phone and tablet. Available for both iOS and Android.

MultiPlus-II 2x120 V	12/3000/120-50	24/3000/70-50
PowerControl & PowerAssist	Yes (on L1 input)	
Transfer switch	50 A	
Maximum AC input current	50A (each leg)	
INVERTER		
DC Input voltage range	9,5 – 17 V	19-33 V
Output when in inverter mode	Output voltage: 120 VAC ± 2 % Frequency: 60 Hz ± 0,1 % (1)	
Cont. output power at 25 °C (3)	3000 VA	
Cont. output power at 25 °C	2400 W	
Cont. output power at 40 °C	2200 W	
Cont. output power at 65 °C	1700 W	
Maximum apparent feed-in power	2500 VA	
Peak power	5500 W	
Maximum efficiency	93 %	94 %
Zero load power	15W	11W
Zero load power in AES mode	10W	8W
Zero load power in Search mode	4W	4W
CHARGER		
AC Input	Split phase: 180-280 VAC 45 – 65 Hz Single phase: 90-140 VAC 45 – 65 Hz	
Charge voltage 'absorption'	14,4 V	28,8 V
Charge voltage 'float'	13,8 V	27,6 V
Storage mode	13,2 V	26,4 V
Maximum battery charge current (4)	120 A	70 A
Battery temperature sensor	Yes	
GENERAL		
Auxiliary output (5)	50 A (each leg) See note 8	
External AC current sensor (optional)	100 A	
Programmable relay (6)	Yes	
Protection (2)	a – g	
VE.Bus communication port	For parallel and three phase operation, remote monitoring and system integration	
General purpose com. Port (7)	Yes, 2x	
Remote on-off	Yes	
Operating temperature range	-40 to +65 °C (-40 -150°F) Fan assisted cooling	
Humidity (non-condensing)	max 95 %	
ENCLOSURE		
Material & Colour	Steel, blue RAL 5012	
Protection category	IP22	
Battery-connection	2x2 M8 bolts	2 M8 bolts
120/240 VAC-connection	Screw terminals 21 mm² (4 AWG)	
Weight	22 kg (48 lb)	
Dimensions (hxwxd)	578 x 275 x 148 mm (23 x 11 x 6 inch)	578 x 275 x 148 mm (23 x 11 x 6 inch)
STANDARDS		
Safety	EN-IEC 60335-1, EN-IEC 60335-2-29, UL 458	
Emission, Immunity	EN 55014-1, EN 55014-2 EN-IEC 61000-3-2, EN-IEC 61000-3-3 IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3	

1) Can be adjusted to 50 Hz
2) Protection key:
   a) output short circuit
   b) overload
   c) battery voltage too high
   d) battery voltage too low
   e) temperature too high
   f) 120 VAC on inverter output
   g) input voltage ripple too high

3) Non-linear load, crest factor 3:1
4) Up to 75 ˚F / 25 ˚C ambient
5) Switches off when no external AC source available
6) Programmable relay that can a.o. be set for general alarm, DC under voltage or genset start/stop function
   AC rating: 120 V/4 A
   DC rating: 4 A up to 35 VDC, 1 A up to 60 VDC
7) A. o. to communicate with a Lithium-Ion battery BMS
8) The auxiliary output of an early production batch of this product was rated at 35A instead of 50A. This batch has serial numbers starting with HQ2107. Later batches, with 50A aux. output have serial numbers starting with HQ2114 or higher.

Digital Multi Control Panel
A convenient and low-cost solution for monitoring and control. With an on/off charger-only switch, full LED readout and a rotary knob to set PowerControl and PowerAssist levels.

VE.Bus Smart Dongle
For monitoring and control via Bluetooth together with the VictronConnect app. It also measures battery voltage and temperature.

Interface MK3-USB
Needed to configure the MultiPlus, Can be used with the VictronConnect app or VE.Configure software. The interface connects to the MultiPlus via an RJ45 UTP cable and plugs into a USB port.

VictronConnect app
Use to monitor or configure the MultiPlus using your phone tablet or PC.

Current sensor 100A:50mA
To implement PowerControl and PowerAssist and to optimize self-consumption with external current sensing. Maximum current: 100A

**Quattro
48/5000/70-100/100**

Ekrano GX or Cerbo GX
Provides intuitive system control and monitoring and enables access to our free remote monitoring website: the VRM Online Portal.

VRM Portal
Our free remote monitoring website (VRM) will display all your system data in a comprehensive graphical format. System settings can be changed remotely via the portal. Alarms can be received by e-mail or push notification.

VRM app
Monitor and manage your Victron Energy system from your smart phone and tablet. Available for both iOS and Android.

Two AC inputs with integrated transfer switch
The Quattro can be connected to two independent AC sources, for example the public grid and a generator, or two generators. The Quattro will automatically connect to the active source.

Two AC Outputs
The main output has no-break functionality. The Quattro takes over the supply to the connected loads in the event of a grid failure or when shore/generator power is disconnected. This happens so fast (less than 20 milliseconds) that computers and other electronic equipment will continue to operate without disruption.
The second output is live only when AC is available on one of the inputs of the Quattro. Loads that should not discharge the battery, like a water heater for example, can be connected to this output.

Split phase and three phase capability
Two units can be configured for split phase, and three units can be configured for three phase output. But that's not all: up to 4 sets of three units can be parallel connected to provide 96W / 120kVA inverter power and more than 1600A charging capacity. For more detail please enter *parallel* in the search box on our website.

PowerControl – Dealing with limited generator, shore side or grid power
A current limit can be set on each AC input. The Quattro will then take account of other AC loads and use whatever is spare for charging, thus preventing the generator or mains supply from being overloaded.

PowerAssist – Boosting shore or generator power
This feature takes the principle of PowerControl to a further dimension allowing the Quattro to supplement the capacity of the alternative source. Where peak power is so often required only for a limited period, the Quattro will make sure that insufficient mains or generator power is immediately compensated for by power from the battery. When the load reduces, the spare power is used to recharge the battery.

Solar energy: AC power available even during a grid failure
The Quattro can be used in off grid as well as grid connected PV and other alternative energy systems.
Loss of mains detection software is available.

System configuring
- In case of a stand-alone application, if settings have to be changed, this can be done in a matter of minutes with a DIP switch setting procedure.
- Parallel and three phase applications can be configured with VE.Bus Quick Configure and VE.Bus System Configurator software.
- Off grid, grid interactive and self-consumption applications, involving grid-tie inverters and/or MPPT Solar Chargers can be configured with Assistants (dedicated software for specific applications).

On-site Monitoring and control
Several options are available: Battery Monitor, Multi Control Panel, Color Control GX or other GX devices, smartphone or tablet (Bluetooth Smart), laptop or computer (USB or RS232).

Remote Monitoring and control
Color Control GX or other GX devices.
Data can be stored and displayed on our VRM (Victron Remote Management) website, free of charge.

Remote configuring
When connected to the Ethernet, systems with a Color Control GX or other GX device can be accessed, and settings can be changed remotely.

Quattro	48/3000/35-50/50 120V	12/5000/220-100/100 120V 24/5000/120-100/100 120V 48/5000/70-100/100 120V	48/10000/140-100/100 120V
PowerControl / PowerAssist		Yes	
Integrated Transfer switch		Yes	
AC inputs (2x)		Input voltage range: 90-140 VAC Input frequency: 45 – 65 Hz Power factor: 1	
Maximum feed through current	2x 50 A	2x 100 A	2x 100 A
INVERTER			
Input voltage range		9,5 – 17 V 19 – 33V 38 – 66 V	
Output (1)		Output voltage: 120 VAC ± 2 % Frequency: 60 Hz ± 0,1 %	
Cont. output power at 25 ℃ (3)	3000 VA	5000 VA	10000 VA
Cont. output power at 25 ℃	2400 W	4000 W	8000 W
Cont. output power at 40 ℃	2200 W	3700 W	6500 W
Cont. output power at 65 ℃	1700 W	3000 W	4500 W
Peak power	6000 W	10000 W	20000 W
Maximum efficiency	94 %	94 / 94 / 95 %	96 %
Zero load power	25 W	30 / 30 / 35 W	60 W
Zero load power in AES mode	20 W	20 / 25 / 30 W	40 W
Zero load power in Search mode	12 W	10 / 10 / 15 W	15 W
CHARGER			
Charge voltage 'absorption' (V DC)	57,6 V	14,4 / 28,8 / 57,6 V	57,6 V
Charge voltage 'float' (V DC)	55,2 V	13,8 / 27,6 / 55,2 V	55,2 V
Storage mode (V DC)	52,8 V	13,2 / 26,4 / 52,8 V	52,8 V
Charge current house battery (A) (4)	35 A	200 / 120 / 70 A	140 A
Charge current starter battery (A)		4 A (12 V and 24 V models only)	
Battery temperature sensor		Yes	
GENERAL			
Auxiliary output (5)	32 A	50 A	50 A
Programmable relay (6)		3x	
Protection (2)		a-g	
VE.Bus communication port		For parallel, split phase and three phase operation, remote monitoring and system integration	
General purpose com. port		2x	
Remote on-off		Yes	
Common Characteristics		Operating temp.: -40 to +65 ℃ Humidity (non-condensing): max. 95 %	
ENCLOSURE			
Common Characteristics		Material & Colour: aluminium (blue RAL 5012) Protection category: IP 21	
Battery-connection		Four M8 bolts (2 plus and 2 minus connections)	
120 V AC-connection	Screw terminals 13 mm² (6 AWG)	Bolts M6	Bolts M6
Weight (kg)	42 lb 19 kg	75 / 66 / 66 lb 34 / 30 / 30 kg	128 lb 58 kg
Dimensions (hxwxd)	14.3 x 10.2 x 8.6 inch 362 x 258 x 218 mm	18,5 x 14,0 x 11,2 inch 470 x 350 x 280 mm 17,5 x 13,0 x 9,6 inch 444 x 328 x 240 mm 17,5 x 13,0 x 9,6 inch 444 x 328 x 240 mm	22.6 x 19,2 x 13,6 inch 572 x 488 x 344 mm
STANDARDS			
Safety		EN-IEC 60335-1, EN-IEC 60335-2-29, EN-IEC 62109-1, UL 1741 (only for 48V 5kVA and 10kVA)	
Emission, Immunity		EN 55014-1, EN 55014-2, EN-IEC 61000-3-2, EN-IEC 61000-3-3, IEC 61000-6-1, IEC 61000-6-2, IEC 61000-6-3	
Road vehicles		12 V and 24 V models: ECE R10-5	
Anti-islanding		See our website	

1) Can be adjusted to 60 HZ; 120 V 60 Hz on request
2) Protection key:
   a) output short circuit
   b) overload
   c) battery voltage too high
   d) battery voltage too low
   e) temperature too high
   f) 120 VAC on inverter output
   g) input voltage ripple too high

3) Non-linear load, crest factor 3:1
4) Up to 25 ˚C ambient
5) Switches off when no external AC source available
6) Programmable relay that can a.o. be set for general alarm, DC under voltage or genset start/stop function
   AC rating: 230 V / 4 A
   DC rating: 4 A up to 35 VDC, 1 A up to 60 VDC

Digital Multi Control Panel
A convenient and low-cost solution for monitoring and control. With an on/off charger-only switch, full LED readout and a rotary knob to set PowerControl and PowerAssist levels.

VE.Bus Smart Dongle
For monitoring and control via Bluetooth together with the VictronConnect app. It also measures battery voltage and temperature.

Interface MK3-USB
Needed to configure the MultiPlus, Can be used with the VictronConnect app or VEConfigure software. The interface connects to the MultiPlus via an RJ45 UTP cable and plugs into a USB port.

VictronConnect app
Use to monitor or configure the MultiPlus using your phone tablet or PC.

Battery Monitor
To monitor battery state of charge via Bluetooth or the VRM portal.
The BMV 712 Smart has display, while the SmartShunt does not have a display. Both communicate via Bluetooth and have a VE.Direct communication port.

Ekrano GX front and back

Accessories included with the Ekrano GX

Ekrano GX: communication-centre

The Ekrano GX represents the next generation in the GX product family. With its complete range of connections and interfaces as well as a built-in 7-inch touchscreen display, it is the most powerful GX device to date and allows you to always have perfect control over your system from wherever you are and to maximise its performance. Simply access your system via our Victron Remote Management (VRM) portal, or access it directly, using the built-in touchscreen, a Multi-Functional Display (MFD) or our VictronConnect app thanks to its built-in WiFi Access Point. The Ekrano GX is also the successor to the Color Control GX.

Built-in 7-inch touchscreen display

The seven-inch touchscreen display gives an instant overview of your system and allows you to adjust settings. The touch function can be disabled (or enabled) via a recessed button on the back to prevent unauthorised use. When mounted using the supplied steel bracket, the display is watertight from the outside.

Remote Console on VRM

Monitor, control and configure the Ekrano GX remotely, over the internet, just like if you were standing in front of the device, using the Remote Console. The same functionality is also available via local LAN network or via the built-in WiFi access point of the Ekrano GX.

Perfect monitoring & control

Instantly monitor the battery state of charge, power consumption, power harvest from PV, generator, and mains, or check tank levels and temperature measurements. Easily control the shore power input current limit, (auto) start/stop generator(s) or change any setting to optimise the system. Follow up on alerts, perform diagnostic checks and resolve complications remotely.

Simple mounting and configuration

The Ekrano GX installs easily via a cut-out for flush panel mounting and includes both a steel bracket and springs for blind hole mounting. All ports are easily accessible from the back. The power and relay terminal blocks can be screwed in place and the IO terminal block has a quick release clamp for easy access. The Bluetooth feature allows for quick connection and configuration via our VictronConnect app.
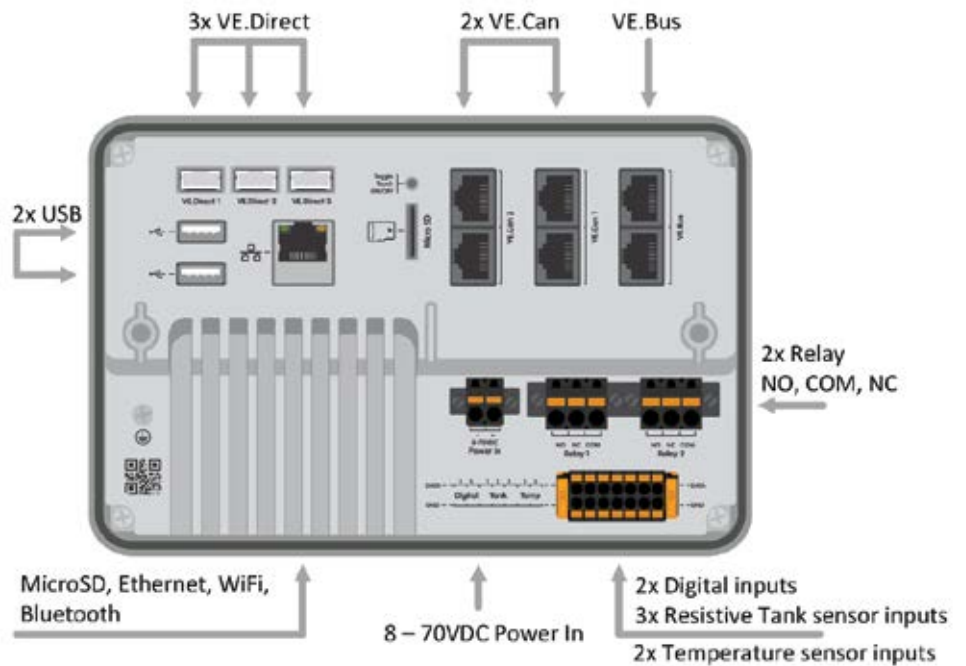
Temperature sensor for Quattro, MultiPlus and GX device (e.g. Ekrano GX) as an additional accessory.

Ekrano GX [1]	
Supply voltage	8 – 70 VDC
Power draw display on (100 % brightness)	6.2 W @ 12 V | 6.6 W @ 24 V | 7.4 W @ 48 V
Power draw display off	2.6 W 12 V | 3.0 W @ 24 V | 3.7 W @ 48 V
Relay	2 x NO/NC [2] DC up to 30 VDC: 3 A AC: 1 A, 125 VAC
Communication ports	
VE.Direct ports (always isolated)	3 (max. possible VE.Direct devices: 25) [7]
VE.Bus (always isolated)	1 bus with 2 paralleled RJ45 sockets
VE.Can 1	Yes - isolated
VE.Can 2	Yes – non-isolated
Ethernet	Yes
WiFi	Yes
Bluetooth Smart	Yes [3]
USB Host ports	Yes – 2 x USB-A (max. 1.5 A@5 V combined)
MicroSD Card Slot	Yes – SDHC cards up to max. 32 GB
IO	
Resistive tank level inputs	3 [4]
Temperature sense inputs	2 [5]
Digital Inputs	2 [6]
Display	
Display resolution	1024 x 600 pixels
Display max. backlight brightness	1000 cd/m^2
Backlight dimming	Yes – dynamic via built-in ambient light sensor or manually via Remote Console With timer for auto on/off
Touch toggle on/off button	Yes – recessed button on the back (prevents unauthorised use)
Dimensions	
Outer dimensions (h x w x d)	124 x 187 x 29.8 mm | 4.88 x 7.36 x 1.17 in (without connectors and mounting accessories)
Operating temperature range	-20 to +50 ℃
Other	
Mounting	Panel integrated flush mount or blind hole mount with included mounting accessories
Buzzer	Yes
Protection category	Front: IP54 (when installed with steel bracket) IP31 (when installed with springs) Back: IP21
Standards	
Safety	IEC 62368-1
EMC	EN 301489-1, EN 301489-17
Automotive	ECE R10-6

Notes
1. For more detailed information about the Ekrano GX, please visit the Victron GX product range page.
2. Currently, Relay 1 can be used for programming as an alarm relay, generator start/stop, tank pump, temperature controlled relay or manual operation. Relay 2 is available for programming as a temperature controlled relay or manual operation in the Relay menu of the GX (requires firmware 2.80 or higher).
3. Bluetooth functionality is intended to be used to assist with initial connection and networking configuration. You cannot use Bluetooth to connect to other Victron products (e.g. SmartSolar charge controllers).
4. The tank level inputs are resistive and should be connected to a resistive tank sender. Victron does not supply tank senders. The tank level ports can each be configured to work with either European (0 - 180 Ohm); or US tank senders (240 - 30 Ohm).
5. The Ekrano GX has 2 temperature inputs. They can be used to measure & monitor all kinds of temperatures. Temperature senders are not included. The required sensor is ASS000001000 - Temperature Sensor QUA/PMP/Venus GX. (Note that this is not the same as the BMV temperature accessory.). Temperature range is -20 ℃ to +70 ℃. Actually, it can measure up to 100 ℃, but the sensor is not made to withstand temperatures above 70 ℃ long term. Note that this is intended as a crude temperature sensor, and not calibrated. A deviation of +/- 2 ℃ is to be expected.
6. The digital inputs can be used for open/closed monitoring of alarms, for example doors, or fire- or bilge alarms and can also be used for pulse counting. See the product manual for electrical specifications of the digital inputs.
7. The listed maximum in above table is the total connected VE.Direct devices such as MPPT Solar Charge controllers. Total means all directly connected devices plus the devices connected over USB. The limit is mostly bound by CPU processing power. Note that there is also a limit to the other type of devices of which often multiple are connected: PV Inverters. Up to three or four three phase inverters can typically be monitored on a CCGX. Higher power CPU devices can monitor more.

Cerbo GX

**Accessories included
with the Cerbo GX**

**GX Touch (optional display for
Cerbo GX and Cerbo-S GX)**

**GX Touch 50 & 70 protective plastic
cover (not for the Flush model)**

Cerbo GX: communication-centre

This communication-centre allows you to always have perfect control over your system from wherever you are and to maximise its performance. Simply access your system via our Victron Remote Management (VRM) portal, or access it directly, using the optional GX Touch screen, a Multi-Functional Display (MFD) or our VictronConnect app thanks to its Bluetooth capability.

GX Touch: display accessory

The GX Touch 50 and GX Touch 70 series are display accessories for the Cerbo GX. The five inch and seven inch touch screen displays are available in two versions: top/wall (GX Touch 50 and 70) or flush mount (GX Touch 50 and 70 Flush). They give an instant overview of your system and allows you to adjust settings. Simply connect the display to the Cerbo GX with just one cable. The GX Touch displays have a waterproof design and are simple to install. The supplied (from serial number HQ2242 – not for GX Touch Flush) protection cover prevents damage from UV light during prolonged exposure to the sun.

Remote Console on VRM

Monitor, control and configure the Cerbo GX remotely, over the internet. Just like if you were standing in front of the device, using Remote Console. The same functionality is also available on the local network LAN, or using the WiFi Access Point of the Cerbo GX.

Perfect monitoring & control

Instantly monitor the battery state of charge, power consumption, power harvest from PV, generator, and mains, or check tank levels and temperature measurements. Easily control the shore power input current limit, (auto)start/stop generator(s) or change any setting to optimise the system. Follow up on alerts, perform diagnostic checks and resolve complications remotely.

Simple mounting and configuration

The Cerbo GX is easily mountable and can also be mounted on a DIN-Rail using the DIN35 adapter small, (not included). Its separate touchscreen can be bolted on a dashboard, eliminating the need to create perfect cut-outs (like with the Color Control GX). Connection is easy via just one cable, taking away the hassle of having to bring many wires to the dashboard. The Bluetooth feature enables a quick connection and configuration via our VictronConnect app.
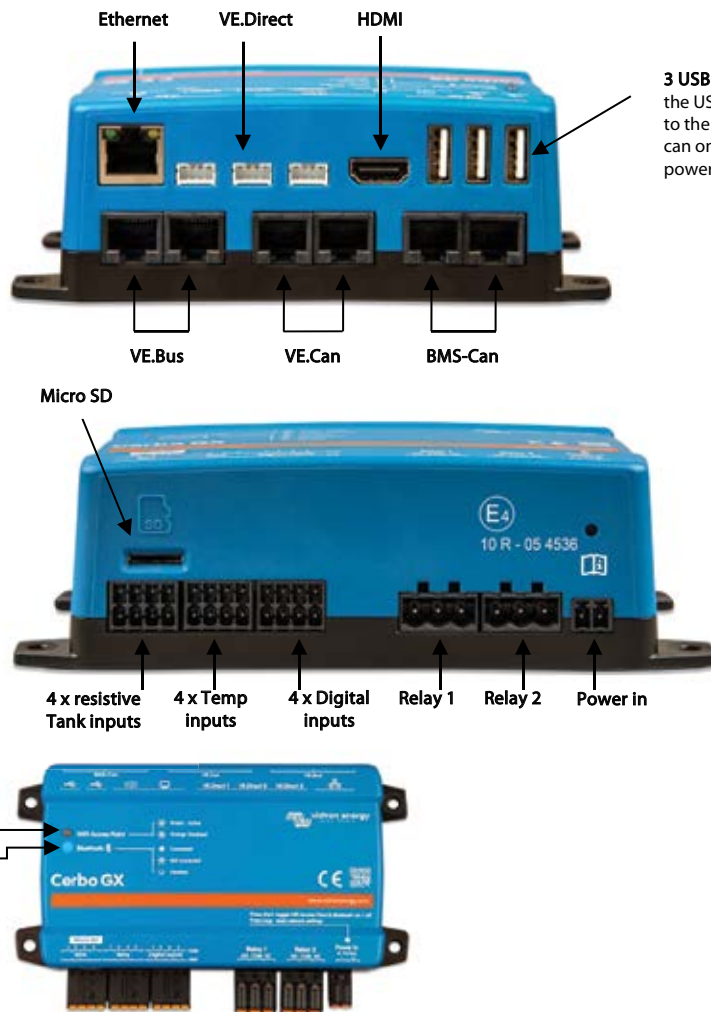
Ethernet **VE.Direct** **HDMI**

3 USB ports
the USB socket closest
to the HDMI connector
can only be used to
power a GX Touch

VE.Bus **VE.Can** **BMS-Can**

Micro SD

**4 x resistive
Tank inputs**   **4 x Temp
inputs**   **4 x Digital
inputs**   **Relay 1**   **Relay 2**   **Power in**

WiFi indicator LED
The Cerbo GX can connect to a
WiFi Network

Bluetooth indicator LED
The Cerbo GX can be accessed
directly via Bluetooth using the
VictronConnect app.
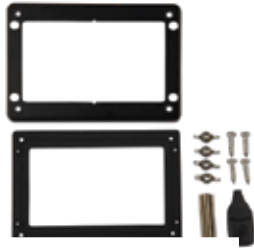
**Accessories included
with the GX Touch 50 / 70**

**Optional accessories for GX
Touch 50 / 70 only**

GX Touch adapter for CCGX cut-out
This adapter is designed to easily replace the
CCGX display with the newer GX Touch 50 or the
GX Touch 70. Contents of the packaging are the
metal bracket, the plastic bezel, and four
mounting screws.

**Accessories included
with the GX Touch 50 / 70 Flush**

**Temperature sensor for Quattro,
MultiPlus and GX Device (such as the
Cerbo GX)**

DIN35 adapter small
DIN-Rail adapter to easily mount a
device on a DIN-Rail. Suitable for the
Cerbo GX.

|	Cerbo GX (PN BPP900450100)	Cerbo GX BPP900450110 + BPP900451100	Cerbo-S GX
Supply voltage	8 – 70 VDC		
Power draw without GX Touch	2.8 W @ 12 V		
Power draw with GX Touch	Backlight off: 3.8 W @ 12 V | Backlight at max: 4.8 W @ 12 V		
Mounting	Wall or DIN rail (35 mm) [2]		
Communication ports			
VE.Direct ports (always isolated)	3 (max. possible VE.Direct devices: 15) [3]		
VE.Bus (always isolated)	2 paralleled RJ45 sockets		
VE.Can	Yes - non isolated	Yes VE.Can 1 isolated VE.Can 2 non-isolated	Yes – non-isolated
BMS-Can port	Yes – BMS-Can only	Yes – see VE.Can	No
Bluetooth	Yes [4]		
Ethernet	10/100 RJ45 socket - isolated except shield[7]		
WiFi	Built-in		
USB	2 USB Host ports & 1 power only port	3 USB Host ports	2 USB Host ports & 1 power only port
IO			
Resistive tank level inputs	4		0
Temperature sense inputs	4		0
Digital Inputs	4[6]		4[6]
Relays[5]	2 x NO/NC | DC up to 30 VDC: 6 A | DC up to 70 VDC: 1 A | AC: 6 A, 125 VAC		
Other			
Outer dimensions (h x w x d)	78 x 154 x 48 mm		
Operating temperature range	-20 to +50 ℃		
IP Rating	IP20		
Standards			
Safety	IEC 62368-1		
EMC	EN 301489-1, EN 301489-17		
Automotive	ECE R10-6		

	GX Touch 50 / GX Touch 70	GX Touch 50 Flush / GX Touch 70 Flush
Mounting	Top/wall mount with included mounting accessories	Flush mount or embossed (totally flush)
Protection cover	Included with every GX Touch from serial number HQ2242 Can also be purchased individually: Part # BPP900462050: GX Touch 50 protection cover Part # BPP900462070: GX Touch 70 protection cover	No
Display Resolution	GX Touch 50: 800 x 480GX | Touch 70: 1024 x 600	
IP Rating	IP54 (without connectors)	IP65 (when installed with the included rubber gasket)
Outer dimensions (h x w x d)	GX Touch 50: 87 x 128 x 12.4 mm | GX Touch 70: 113 x 176 x 13.5 mm GX Touch 50 Flush: 94 x 136 x 12 mm | GX Touch 70 Flush: 120 x 184 x 13 mm	
Cable length	2 meter	

Notes
1. For more detailed information about the Cerbo GX and the GX Touch, please visit the Victron GX product range page at Victron live:
www.victronenergy.com/live/venus-os:start
2. DIN rail mounting requires an additional accessory - DIN35 adapter small.
3. The listed maximum in above table is the total connected VE.Direct devices such as MPPT Solar Charge controllers. Total means all directly connected devices plus the devices connected over USB. The limit is mostly bound by CPU processing power. Note that there is also a limit to the other type of devices of which often multiple are connected: PV Inverters. Up to three or four three phase inverters can typically be monitored on a CCGX. Higher power CPU devices can monitor more.
4. Bluetooth functionality is intended to be used to assist with initial connection and networking configuration. You cannot use Bluetooth to connect to other Victron products (e.g. SmartSolar charge controllers).
5. In Cerbo GX hardware there are two relays. Currently, Relay 1 can be used for programming as an alarm relay, generator start/stop, tank pump, temperature-controlled relay or manual operation. Relay 2 is available for programming as a temperature-controlled relay or manual operation in the Relay menu of the GX (requires firmware 2.80 or higher).
6. The digital inputs on the Cerbo GX PN BPP900450100 and Cerbo-S GX are not able to do pulse counting.
7. On Cerbo GX PN BPP900450110 and BPP900451100, the RJ45 sockets are rotated 180 degrees to make it easier to remove the cable.

BMV-712 Smart

BMV bezel square

BMV shunt 500A/50mV
With quick connect pcb

Bluetooth inside
With Bluetooth built-in, the BMV Smart is ready for the Internet of Things (IoT) era. With Bluetooth being implemented in most other Victron Energy products, wireless communication between products will simplify system installation and enhance performance.

Download the Victron Bluetooth app
Use a smartphone or other Bluetooth enabled device to
- customize settings,
- monitor all important data on single screen,
- view historical data, and to
- update the software when new features become available.

Easy to install
All electrical connections are to the quick connect PCB on the current shunt. The shunt connects to the monitor with a standard RJ12 telephone cable. Included: RJ12 cable (10 m) and battery cable with fuse (2 m); no other components needed.

Also included are a separate front bezel for a square or round display appearance, a securing ring for rear mounting and screws for front mounting.

Midpoint voltage monitoring
One bad cell or one bad battery can destroy a large, expensive battery bank. When batteries are connected in series, a timely warning can be generated by measuring the midpoint voltage. Please see the BMV manual, section 5.2, for more information.
We recommend our Battery Balancer (BMS012201000) to maximize service life of series-connected lead-acid batteries.

Very low current draw from the battery
Current consumption: 0.7 Ah per month (1 mA) @12 V and 0.6 Ah per month (0.8 mA) @ 24 V
Especially Li-ion batteries have virtually no capacity left when discharged until low voltage shutdown. After shutdown due to low cell voltage, the capacity reserve of a Li-ion battery is approximately 1Ah per 100 Ah battery capacity. The battery will be damaged if the remaining capacity reserve is drawn from the battery. A residual current of 10 mA for example may damage a 200 Ah battery if the system is left in discharged state during more than 8 days.

Bi-stable alarm relay
Prevents increased current draw in case of an alarm.

Other features
- Battery voltage, current, power, ampere-hours consumed and state of charge
- Remaining time at the current rate of discharge
- Programmable visual and audible alarm
- Programmable relay, to turn off non critical loads or to run a generator when needed
- 500 Amp quick connect shunt and connection kit
- Shunt selection capability up to 10,000 Amps
- VE.Direct communication port
- Stores a wide range of historical events, which can be used to evaluate usage patterns and battery health
- Wide input voltage range: 6.5 – 70 V
- High current measurement resolution: 10 mA (0.01 A)
- Additional input to measure voltage (of a second battery), temperature or midpoint voltage, and corresponding alarm and relay settings

| Battery Monitor	BMV-712 Smart
Supply voltage range	6.5 - 70 VDC
Current draw, back light off	< 1 mA
Input voltage range, auxiliary battery	6.5 - 70 VDC
Battery capacity (Ah)	1 - 9999 Ah
Operating temperature range	-40 +50 ℃ (-40 – 120 °F)
Measures voltage of second battery, or temperature, or midpoint	Yes
Temperature measurement range	-20 +50 ℃
VE.Direct communication port	Yes
Bistable relay	60V / 1A normally open (function can be inverted)
RESOLUTION & ACCURACY (with a 500 A shunt)	
Current	± 0.01 A
Voltage	± 0.01 V
Amp hours	± 0.1 Ah
State of charge (0 – 100%)	± 0.1 %
Time to go	± 1 min
Temperature (0 - 50℃ or 30 - 120°F)	± 1 °C/°F
Accuracy of current measurement	± 0.4 %
Accuracy of voltage measurement	± 0.3 %
INSTALLATION & DIMENSIONS	
Installation	Flush mount
Front	63mm diameter
Front bezel	69 x 69mm (2.7 x 2.7 inch)
Shunt connections bolts	M10 (0.3937 inch)
Body diameter and depth	52 mm (2.0 inch) and 31 mm (1.2 inch)
Protection category	IP55 (not intended for outdoor use)
STANDARDS	
Safety	EN 60335-1
Emission / Immunity	EN 55014-1 / EN 55014-2
Automotive	ECE R10-4 / EN 50498
ACCESSORIES	
Shunt (included)	500 A / 50 mV
Cables (included)	10 meter 6 core UTP with RJ12 connectors, and cable with 1 Amp slow blow fuse for '+' connection
Temperature sensor	Optional (ASS000100000)
STORED TRENDS	
Data stored	Battery voltage, Current, State of Charge % as well as the Aux input (Battery temperature, or midpoint deviation, or starter battery voltage).
Number of days trends data is stored	46

1000A/50 mV, 2000 A/50 mV and 6000 A/50 mV shunt
The quick connect PCB on the standard 500 A/50 mV shunt can also be mounted on these shunts.

Interface cables
- VE.Direct cables to connect a BMV 712 to the Color Control (ASS030530xxx)
- VE.Direct to USB interface (ASS030530000) to connect several BMV 70x to a Color Control GX or to a computer.

Temperature sensor
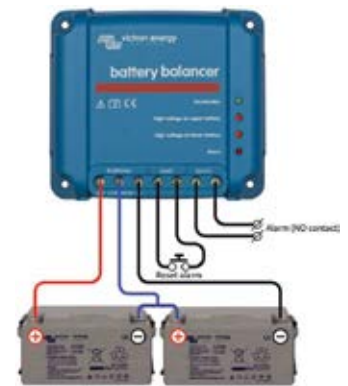
Battery Balancer (BMS012201000)
The Battery Balancer equalizes the state of charge of two series connected 12V batteries, or of several parallel strings of series connected batteries.
When the charge voltage of a 24 V battery system increases to more than 27 V, the Battery Balancer will turn on and compare the voltage over the two series connected batteries. The Battery Balancer will draw a current of up to 1A from the battery (or parallel connected batteries) with the highest voltage. The resulting charge current differential will ensure that all batteries will converge to the same state of charge.

If needed, several balancers can be paralleled.

A 48 V battery bank can be balanced with three Battery Balancers.

Color Control
The powerful Linux computer, hidden behind the colour display and buttons, collects data from all Victron equipment and shows it on the display. Besides communicating with Victron equipment, the Color Control communicates through CAN bus (NMEA 2000), Ethernet and USB.
Data can be stored and analysed on the VRM Portal.

A maximum of four BMVs can be connected directly to a Color Control GX. Even more BMVs can be connected to a USB Hub for central monitoring.

Venus GX
The Venus GX provides intuitive control and monitoring. It has the same functionality as the Color Control GX, with a few extras:
- lower cost, mainly because it has no display or buttons
- 3 tank sender inputs
- 2 temperature inputs

SMARTSHUNT 300A / 500A / 1000A / 2000A

SmartShunt 300 A

SmartShunt 500 A

SmartShunt 1000 A

SmartShunt 2000 A

The SmartShunt is an all-in-one battery monitor, only without a display. Your phone acts as the display.

The SmartShunt connects via Bluetooth to the VictronConnect app on your phone (or tablet) and you can conveniently read out all monitored battery parameters, like state of charge, time to go, historical information and much more.

Alternatively, the SmartShunt can be connected and be read by a GX device. Connection to the SmartShunt is made via a VE.Direct cable.

The SmartShunt is a good alternative for a BMV battery monitor, especially for systems where battery monitoring is needed but less wiring and clutter is wanted.

The SmartShunt is equipped with Bluetooth, a VE.Direct port and a connection that can be used to monitor a second battery, for midpoint monitoring, or to connect a temperature sensor.

Differences compared to BMV-712 Battery Monitor
- No programmable visual and audible alarm.
- No programmable relay.

Basic SmartShunt wiring

Connecting a SmartShunt to a GX device

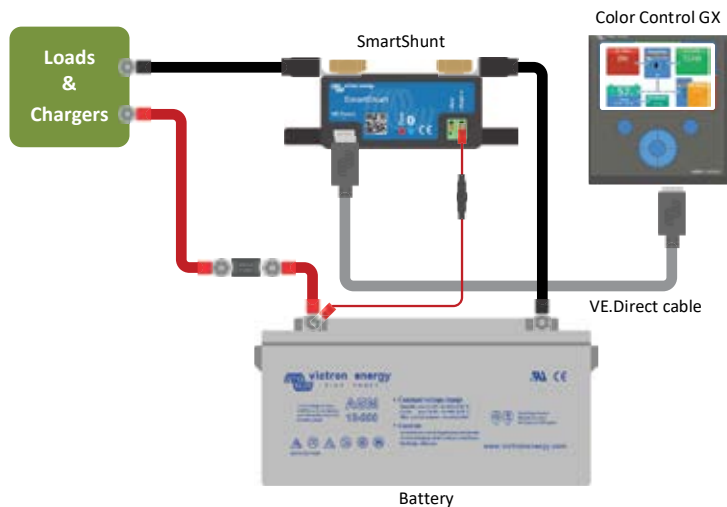| SmartShunt	300 A / 500 A / 1000 A / 2000 A
Supply voltage range	6.5 - 70 VDC
Current draw	< 1mA
Input voltage range, auxiliary battery	6.5 - 70 VDC
Battery capacity (Ah)	1 - 9999 Ah
Operating temperature range	-40 +50°C (-40 - 120°F)
Measures voltage of second battery, or temperature, or midpoint	Yes
Temperature measurement range	-20 +50°C
VE.Direct communication port	Yes
RESOLUTION & ACCURACY	
Current	± 0.01 A
Voltage	± 0.01 V
Amp hours	± 0.1 Ah
State of charge (0 – 100 %)	± 0.1 %
Time to go	± 1 min
Temperature (if optional temperature sensor connected)	± 1 °C/°F (0 – 50 °C or 30 – 120 °F)
Accuracy of current measurement	± 0.4 %
Offset	Less than 10 / 10 / 20 / 40 mA
Accuracy of voltage measurement	± 0.3 %
INSTALLATION & DIMENSIONS	
Dimensions (h x w x d)	300 A: 44 x 120 x 44 mm 500 A: 46 x 120 x 54 mm 1000 A: 68 x 168 x 75 mm 2000 A: 68 x 168 x 100 mm
Shunt connection bolts	300 A: M8 500 A, 1000 A, 2000 A: M10 (0.3937 inch)
Protection category	IP21
STANDARDS	
Safety	EN 60335-1
Emission / Immunity	EN-IEC 61000-6-1 EN-IEC 61000-6-2 EN-IEC 61000-6-3
Automotive	EN 50498
ACCESSORIES	
Cables (included)	Two cables with 1 A fuse, for '+' connection and starter battery or midpoint connection
Temperature sensor	Optional (ASS000100000)
A note regarding the range of the Bluetooth signal	The shunt and the electric cables do negatively influence the range of the Bluetooth signal. The resulting range of 10-15 meter is however satisfactory in most cases. The proximity of other electrically conducting elements, such as the metal chassis of a vehicle or seawater around the hull if a boat, may reduce the range of the Bluetooth signal to an unacceptable level. The solution in such a case is to add a VE.Direct Bluetooth Dongle (ASS030536011) to the system, and to switch off Bluetooth in the SmartShunt.
STORED TRENDS	
Data stored	Battery voltage, Current, State of Charge % as well as the Aux input (Battery temperature, or midpoint deviation, or starter battery voltage).
Number of days trends data is stored	46

Measuring voltage of the starter battery

Measuring battery temperature

Stored trends for SmartShunt

Measuring battery bank midpoint

SmartShunt IP65 300 A

SmartShunt IP65 500 A

SmartShunt IP65 1000 A

SmartShunt IP65 2000 A

The SmartShunt IP65 is an all-in-one battery monitor, only without a display. Your phone acts as the display.

The SmartShunt IP65 is water resistant and is available in a 300 A, 500 A, 1000 A or 2000 A version.

The SmartShunt IP65 connects via Bluetooth to the VictronConnect app on your phone (or tablet) and you can conveniently read out all monitored battery parameters, like state of charge, time to go, historical information and much more.

Alternatively, the SmartShunt IP65 can be connected and be read by a GX device. Connection to the SmartShunt is made via a VE.Direct cable.

The SmartShunt is a good alternative for a BMV battery monitor, especially for systems where battery monitoring is needed but less wiring and clutter is wanted.

The SmartShunt is equipped with Bluetooth, has a VE.Direct port and an auxiliary connection that can be used to monitor a second battery, for midpoint monitoring, or to connect a temperature sensor.

Differences compared to BMV-712 Battery Monitor
- No visual and audible alarm (alarms are only visible via the VictronConnect app or GX device).
- No programmable relay.
- Waterproof.
- The shunt is attached to the battery monitor unit.
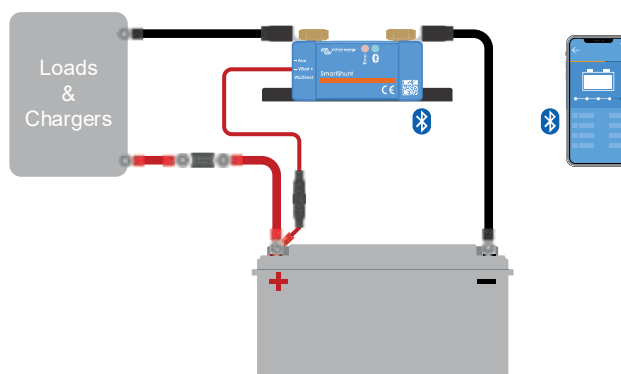
Basic SmartShunt wiring
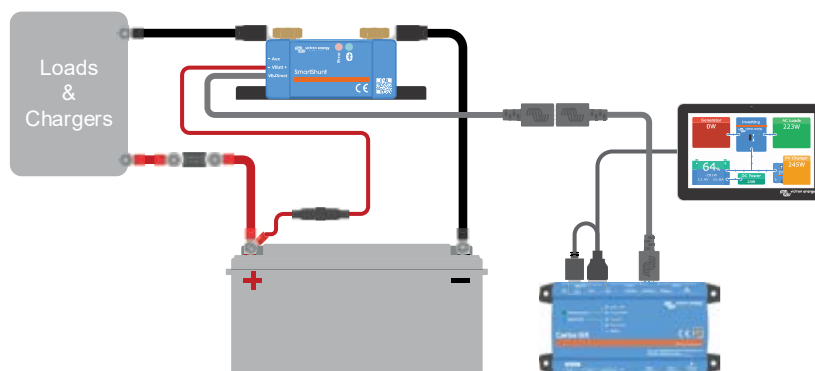
Connecting a SmartShunt to a GX device

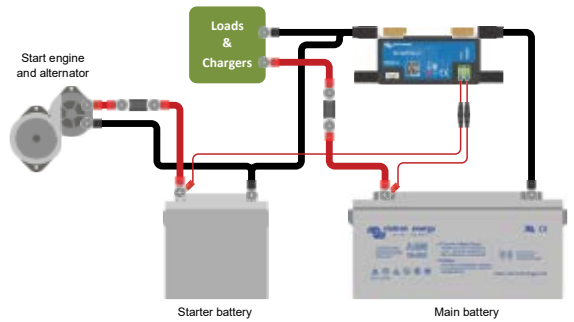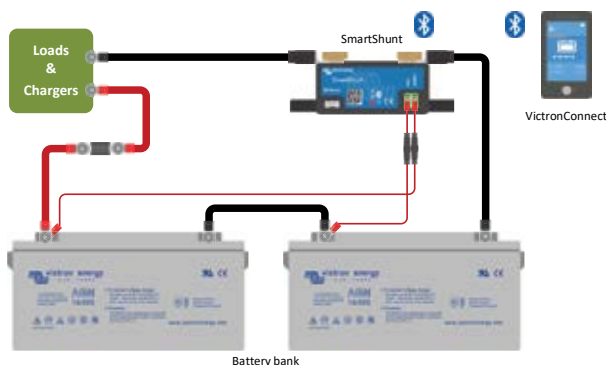| SmartShunt IP65	300 A / 500 A / 1000 A / 2000 A
Supply voltage range	6.5 - 70 VDC
Current draw	< 1 mA
Input voltage range, auxiliary battery	6.5 - 70 VDC
Battery capacity (Ah)	1 - 9999 Ah
Operating temperature range	-40 +50 °C (-40 – 120 °F)
Measures voltage of second battery, or temperature, or midpoint	Yes
Temperature measurement range	-20 +50 °C
VE.Direct communication port	Yes
RESOLUTION & ACCURACY	
Current	± 0.01 A
Voltage	± 0.01 V
Amp hours	± 0.1 Ah
State of charge (0 – 100 %)	± 0.1 %
Time to go	± 1 min
Temperature (if optional temperature sensor connected)	± 1 °C/°F (0 – 50 °C or 30 – 120 °F)
Accuracy of current measurement	± 0.4 %
Offset	Less than 10 / 10 / 20 / 40 mA
Accuracy of voltage measurement	± 0.3 %
INSTALLATION & DIMENSIONS	
Dimensions (h x w x d)	300A: 44 x 120 x 38 mm 500A: 46 x 120 x 54 mm 1000A: 68 x 168 x 75 mm 2000A: 68 x 168 x 100 mm
Shunt connection bolts	300 A: M8 500 A, 1000 A, 2000 A: M10 (0.3937 inch)
Protection category	IP65
STANDARDS	
Safety	EN 60335-1
Emission / Immunity	EN-IEC 61000-6-1 EN-IEC 61000-6-2 EN-IEC 61000-6-3
Automotive	EN 50498
Cables	Two 1.5 m cables with 1 A fuse, for '+' connection and starter battery or midpoint connection
VE.Direct cable	1.5 m cable with a VE.Direct socket. Note that a (not included) VE.Direct cable is needed to connect a GX device.
Temperature sensor	Optional (ASS000100000)
A note regarding the range of the Bluetooth signal	The shunt and the electric cables do negatively influence the range of the Bluetooth signal. The resulting range of 10-15 meter is however satisfactory in most cases. The proximity of other electrically conducting elements, such as the metal chassis of a vehicle or seawater around the hull if a boat, may reduce the range of the Bluetooth signal to an unacceptable level. The solution in such a case is to add a VE.Direct Bluetooth Dongle (ASS030536011) to the system, and to switch off Bluetooth in the SmartShunt.
STORED TRENDS	
Data stored	Battery voltage, Current, State of Charge % as well as the Aux input (Battery temperature, or midpoint deviation, or starter battery voltage).
Number of days trends data is stored	46

Measuring voltage of the starter battery

Measuring battery temperature

Stored trends for SmartShunt

Measuring battery bank midpoint

BLUESOLAR & SMARTSOLAR MPPT CHARGE CONTROLLERS - OVERVIEW

Maximum Power Point Tracking (MPPT)

Upper curve:
Output current (I) of a solar panel as function of output voltage (V).
The Maximum Power Point (MPP) is the point Pmax along the curve where the product I x V reaches its peak.

Lower curve:
Output power P = I x V as function of output voltage.
When using a PWM (not MPPT) controller the output voltage of the solar panel will be nearly equal to the voltage of the battery, and will be lower than Vmp.
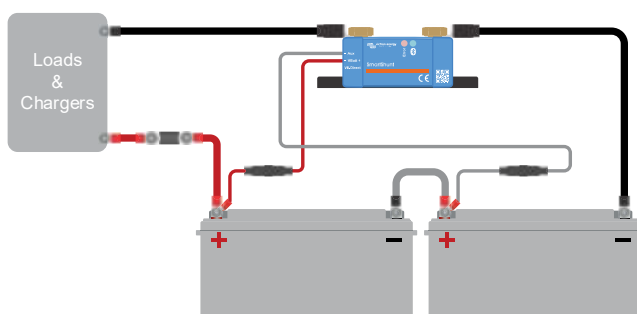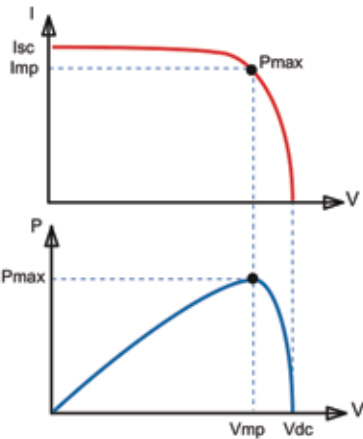

MPPT Control

SmartSolar Control

VictronConnect Application

Feature highlights common to all models
- Ultra-fast Maximum Power Point Tracking (MPPT).
- Advanced Maximum Power Point Detection in case of partial shading conditions.
- Outstanding conversion efficiency.
- Natural convection cooling.
- Automatic battery voltage recognition.
- Flexible charge algorithm.
- Over temperature protection and power derating when temperature is high.

Sizing options:
- Suitable for a variety of battery voltages. Most models connect to 12, 24, and 48V batteries, some only connect to 12 and 24V batteries, or only to 48V batteries.
- Charge currents rating from 10A all the way up to 100A.
- Maximum PV array Voc voltages ranging from 75V up to 250V.
- Multiple chargers can be used in parallel, for large systems we recommend to use the models with a VE.Can communication port.

PV terminal options:
- TR - one positive and one negative screw terminal.
- MC4 - 3 pairs of paralleled MC4 connectors.

Bluetooth options:
- SmartSolar models have Bluetooth.
- BlueSolar models do not have Bluetooth. They can be retrofitted to have Bluetooth by connecting the VE.Direct Bluetooth Smart dongle. Advantage: the product is not Bluetooth accessible when the dongle is not connected. Note that on the SmartSolar models, Bluetooth can be disabled.

Display options:
- VictronConnect Application. Connects via Bluetooth or via the VE.Direct - USB interface
- MPPT Control. Connects to all models via a VE.Direct cable
- SmartSolar Control Display. Plugs directly into the housing of the larger models
- GX device
- VRM website (GX monitoring device needed)

Communication ports:
- VE.Direct - all models
- VE.Direct and VE.Can - limited models. VE.Can is especially suitable for systems with multiple solar chargers. All units are simply "daisy chained" to each other with a single RJ45 cable between each unit and also between the last unit in the chain and the a GX monitoring device.

Temperature sensor options:
- Internally (all models).
- Externally via the Smart Battery Sense (only SmartSolar models).

Load output options:
- Physical output - On the 10, 15 and 20A models.
- Virtual output - via VE.Direct TX digital output cable and the BatteryProtect or a solid-state relay.

Remotely enabling and disabling the charger:
- All larger units feature the Victron standard remote on/off terminals. All models that don't feature an onboard Remote on/off terminal can be remotely controlled by using the VE.Direct non inverting remote on/off cable – ASS030550310. Note that this prohibits using the VE.Direct port for anything else.

Firmware update options:
- Local updates via the VictronConnect Application (via Bluetooth or USB-VE.Direct interface)
- Remote updates via VRM website and a GX device

Optional accessories:
- VictronConnect Application (free download)
- Wire boxes, to cover and protect the terminals. See table on page 2 for wire box types
- Control and display panels: MPPT control or SmartSolar control)
- GX monitoring device (CCGX, Venus GX, Octo GX or Cerbo GX)
- Data cables: VE.Direct cable, RJ45 Cable (VE.Can models only), USB-VE.Direct interface
- External control cables: TX cable, non-inverting cable
- Bluetooth dongle (for non-smart models)

More information:
- To access the above-mentioned documents or information: press the search button on our website and enter the appropriate search word.
- For connection to a Color Control GX or other GX device see: https://www.victronenergy.com/live/venus-os:start.

BlueSolar Charge Controller	Load output	Battery voltage	Optional display	Bluetooth	Com. port	Remote on-off	Programmable relay	Wire Box
75/10	15A	12/24V	MPPT control	Optional dongle	VE.Direct	No	No	S 75-10/15
75/15	15A	12/24V	MPPT control	Optional dongle	VE.Direct	No	No	S 75-10/15
100/15	15A	12/24V	MPPT control	Optional dongle	VE.Direct	No	No	S 100-15
100/20 (up to 48V)	20A/20A/1A	12/24/36/48V	MPPT control	Optional dongle	VE.Direct	No	No	S 100-20
100/30	No	12/24V	MPPT control	Optional dongle	VE.Direct	No	No	M
100/50	No	12/24V	MPPT control	Optional dongle	VE.Direct	No	No	M
150/35	No	12/24/36/48V	MPPT control	Optional dongle	VE.Direct	No	No	M
150/45	No	12/24/36/48V	MPPT control	Optional dongle	VE.Direct	No	No	M
150/60-Tr	No	12/24/36/48V	MPPT control	Optional dongle	VE.Direct	No	No	L
150/60-MC4	No	12/24/36/48V	MPPT control	Optional dongle	VE.Direct	No	No	L
150/70-Tr	No	12/24/36/48V	MPPT control	Optional dongle	VE.Direct	No	No	L
150/70-MC4	No	12/24/36/48V	MPPT control	Optional dongle	VE.Direct	No	No	L
150/100-Tr VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Optional dongle	VE.Direct & VE.Can	Yes	Yes	XL
250/70-Tr VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Optional dongle	VE.Direct & VE.Can	Yes	Yes	L
250/100-Tr VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Optional dongle	VE.Direct & VE.Can	Yes	Yes	XL

SmartSolar Charge Controller	Load output	Battery voltage	Optional display	Bluetooth	Com. port	Remote on-off	Programmable relay	Wire Box
75/10	15A	12/24V	MPPT control	Built-in	VE.Direct	No	No	S 75-10/15
75/15	15A	12/24V	MPPT control	Built-in	VE.Direct	No	No	S 75-10/15
100/15	15A	12/24V	MPPT control	Built-in	VE.Direct	No	No	S 100-15
100/20 (up to 48V)	20A/20A/1A	12/24/36/48V	MPPT control	Built-in	VE.Direct	No	No	S 100-20
100/30	No	12/24V	MPPT control	Built-in	VE.Direct	No	No	M
100/50	No	12/24V	MPPT control	Built-in	VE.Direct	No	No	M
150/35	No	12/24/36/48V	MPPT control	Built-in	VE.Direct	No	No	M
150/45	No	12/24/36/48V	MPPT control	Built-in	VE.Direct	No	No	M
150/60-Tr	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct	Yes	Yes	L
150/60-MC4	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct	Yes	Yes	L
150/70-Tr	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct	Yes	Yes	L
150/70-MC4	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct	Yes	Yes	L
150/70-Tr VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	L
150/70-MC4 VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	L
150/85-Tr VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	XL
150/85-MC4 VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	XL
150/100-Tr VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	XL
150/100-MC4 VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	XL
250/60-Tr	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct	Yes	Yes	L
250/60-MC4	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct	Yes	Yes	L
250/70-Tr	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct	Yes	Yes	L
250/70-MC4	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct	Yes	Yes	L
250/70-Tr VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	L
250/70-MC4 VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	L
250/85-Tr VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	XL
250/85-MC4 VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	XL
250/100-Tr VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	XL
250/100-MC4 VE.Can	No	12/24/36/48V	MPPT ctrl & SmartSolar ctrl	Built-in	VE.Direct & VE.Can	Yes	Yes	XL

Color Control GX   **Venus GX**   **Cerbo GX**   **Smart Battery Sense**   **VE.Direct Bluetooth Smart Dongle**   **VE.Direct to USB interface**

Bluetooth Smart built-in
The wireless solution to set-up, monitor, update and synchronise SmartSolar Charge Controllers.

VE.Direct - For a wired data connection to a Color Control GX, other GX products, PC or other devices

Ultra-fast Maximum Power Point Tracking (MPPT)
Especially in case of a clouded sky, when light intensity is changing continuously, an ultra-fast MPPT controller will improve energy harvest by up to 30 % compared to PWM charge controllers and by up to 10 % compared to slower MPPT controllers.

Load output
Over-discharge of the battery can be prevented by connecting all loads to the load output. The load output will disconnect the load when the battery has been discharged to a pre-set voltage (48 V model: interface with a relay).
Alternatively, an intelligent battery management algorithm can be chosen: see Battery Life.
The load output is short circuit proof.

Battery Life: intelligent battery management
When a solar charge controller is not able to recharge the battery to its full capacity within one day, the result is often that the battery will continually be cycled between a 'partially charged' state and the 'end of discharge' state. This mode of operation (no regular full recharge) will destroy a lead-acid battery within weeks or months.
The Battery Life algorithm will monitor the state of charge of the battery and, if needed, day by day slightly increase the load disconnect level (i.e. disconnect the load earlier) until the harvested solar energy is sufficient to recharge the battery to nearly the full 100 %. From that point onwards, the load disconnect level will be modulated so that a nearly 100 % recharge is achieved about once every week.

Programmable battery charge algorithm - See the software section on our website for details

Day/night timing and light dimming option - See the software section on our website for details

Internal temperature sensor - Compensates absorption and float charge voltage for temperature.

Optional external battery voltage and temperature sensing via Bluetooth
A Smart Battery Sense or a BMV-712 Smart Battery Monitor can be used to communicate battery voltage and temperature to one or more SmartSolar Charge Controllers.

Fully discharged battery recovery function
Will initiate charging even if the battery has been discharged to zero volts.
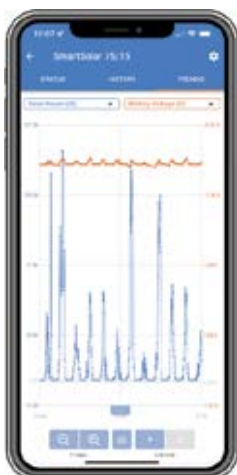Will reconnect to a fully discharged Li-ion battery with integrated disconnect function.

SmartSolar Charge Controller
MPPT 75/15

Bluetooth sensing
Smart Battery Sense

Bluetooth sensing
BMV-712 Smart Battery Monitor

Stored trends

SmartSolar Charge Controller	MPPT 75/10	MPPT 75/15	MPPT 100/15	MPPT 100/20-48V
Battery voltage (auto select)	12/24 V			12/24/48 V
Rated charge current	10 A	15 A	15 A	20 A
Nominal PV power, 12 V 1a,b)	145 W	220 W	220 W	290 W
Nominal PV power, 24 V 1a,b)	290 W	440 W	440 W	580 W
Nominal PV power, 48 V 1a,b)	n. a.	n. a.	n. a.	1160 W
Max. PV short circuit current 2)	13 A	15 A	15 A	20 A
Automatic load disconnect	Yes			
Max. PV open circuit voltage	75 V		100 V	
Peak efficiency	98 %			
Self-consumption – load on	12 V: 19 mA 24 V: 16 mA			26 / 20 / 19 mA
Self-consumption – load off	12 V: 10 mA 24 V: 8 mA			10 / 8 / 7 mA
Charge voltage 'absorption'	14,4 V / 28,8 V (adjustable)			14,4 V / 28,8 V / 57,6 V (adj.)
Charge voltage 'float'	13,8 V / 27,6 V (adjustable)			13,8 V / 27,6 V / 55,2 V (adj.)
Charge algorithm	multi-stage adaptive			
Temperature compensation	-16 mV / °C resp. -32 mV / °C			
Max. continuous load current	15 A			20 A / 20 A / 1 A
Low voltage load disconnect	11,1 V / 22,2 V / 44,4 V or 11,8 V / 23,6 V / 47,2 V or Battery Life algorithm			
Low voltage load reconnect	13,1 V / 26,2 V / 52,4 V or 14 V / 28 V / 56 V or Battery Life algorithm			
Protection	Output short circuit / Over temperature			
Operating temperature	-30 to +60 °C (full rated output up to 40 °C)			
Humidity	95 %, non-condensing			
Data communication port	VE.Direct (see the data communication white paper on our website)			
ENCLOSURE				
Colour	Blue (RAL 5012)			
Power terminals	6 mm² / AWG10			
Protection category	IP43 (electronic components), IP22 (connection area)			
Weight	0,5 kg		0,6 kg	0,65 kg
Dimensions (h x w x d)	100 x 113 x 40 mm		100 x 113 x 50 mm	100 x 131 x 60 mm
STANDARDS				
Safety	EN/IEC 62109-1, UL 1741, CSA C22.2			
STORED TRENDS				
Data stored	Battery voltage, current and temperature, as well as load output current, PV voltage and PV current.			
Number of days trends data is stored	46			

1a) If more PV power is connected, the controller will limit input power.
1b) The PV voltage must exceed Vbat + 5 V for the controller to start.
    Thereafter the minimum PV voltage is Vbat + 1 V
2) A PV array with a higher short circuit current may damage the controller.

**SmartSolar Charge Controller
MPPT 100/50**

**Bluetooth sensing
Smart Battery Sense**

**Bluetooth sensing
BMV-712 Smart Battery Monitor**

Bluetooth Smart built-in
The wireless solution to set-up, monitor, update and synchronise SmartSolar Charge Controllers.

VE.Direct
For a wired data connection to a Color Control GX, other GX products, PC or other devices

Ultrafast Maximum Power Point Tracking (MPPT)
Especially in case of a clouded sky, when light intensity is changing continuously, an ultra-fast MPPT controller will improve energy harvest by up to 30 % compared to PWM charge controllers and by up to 10 % compared to slower MPPT controllers.

Advanced Maximum Power Point Detection in case of partial shading conditions
If partial shading occurs, two or more maximum power points may be present on the power-voltage curve.
Conventional MPPTs tend to lock to a local MPP, which may not be the optimum MPP.
The innovative BlueSolar algorithm will always maximize energy harvest by locking to the optimum MPP.

Outstanding conversion efficiency
No cooling fan. Maximum efficiency exceeds 98 %.
The full output current up to 40 °C (104 °F).

Flexible charge algorithm
Fully programmable charge algorithm (see the software page on our website), and eight pre-programmed algorithms, selectable with a rotary switch (see manual for details).

Extensive electronic protection
Over-temperature protection and power derating when temperature is high.
PV short circuit and PV reverse polarity protection.
PV reverse current protection.

Internal temperature sensor
Compensates absorption and float charge voltage for temperature.

Optional external battery voltage and temperature sensing via Bluetooth
A Smart Battery Sense or a BMV-712 Smart Battery Monitor can be used to communicate battery voltage and temperature to one or more SmartSolar Charge Controllers.

Fully discharged battery recovery function
Will initiate charging even if the battery has been discharged to zero volts.
Will reconnect to a fully discharged Li-ion battery with integrated disconnect function.

SmartSolar Charge Controller	MPPT 100/30	MPPT 100/50
Battery voltage	12/24 V Auto Select	
Rated charge current	30 A	50 A
Nominal PV power, 12 V 1a,b)	440 W	700 W
Nominal PV power, 24 V 1a,b)	880 W	1400 W
Maximum PV open circuit voltage	100 V	100 V
Max. PV short circuit current 2)	35 A	60 A
Maximum efficiency	98 %	98 %
Self-consumption	12 V: 30 mA 24 V: 20 mA	
Charge voltage 'absorption'	Default setting: 14,4 V / 28,8 V (adjustable)	
Charge voltage 'float'	Default setting: 13,8 V / 27,6 V (adjustable)	
Charge algorithm	multi-stage adaptive	
Temperature compensation	-16 mV / °C resp. -32 mV / °C	
Protection	PV reverse polarity Output short circuit Over temperature	
Operating temperature	-30 to +60 °C (full rated output up to 40 °C)	
Humidity	95 %, non-condensing	
Data communication port	VE.Direct See the data communication white paper on our website	
ENCLOSURE		
Colour	Blue (RAL 5012)	
Power terminals	16 mm² / AWG6	
Protection category	IP43 (electronic components), IP22 (connection area)	
Weight	1,3 kg	
Dimensions (h x w x d)	130 x 186 x 70 mm	
STANDARDS		
Safety	EN/IEC 62109-1, UL 1741, CSA C22.2	
STORED TRENDS		
Data stored	Battery voltage,current and temperature, as well as load output current, PV voltage and PV current.	
Number of days trends data is stored	46	

1a) If more PV power is connected, the controller will limit input power.
1b) The PV voltage must exceed Vbat + 5 V for the controller to start.
    Thereafter the minimum PV voltage is Vbat + 1 V.
2) A PV array with a higher short circuit current may damage the controller.

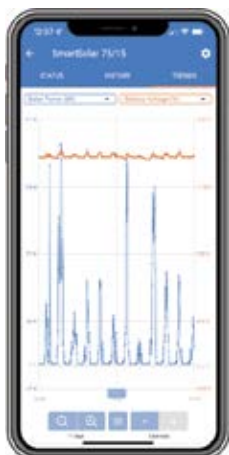# SMARTSOLAR CHARGE CONTROLLER
MPPT 150/35 & 150/45

Bluetooth Smart built-in
The wireless solution to set-up, monitor, update and synchronise SmartSolar Charge Controllers.

VE.Direct
For a wired data connection to a Color Control GX, other GX products, PC or other devices

Ultrafast Maximum Power Point Tracking (MPPT)
Especially in case of a clouded sky, when light intensity is changing continuously, an ultra-fast MPPT controller will improve energy harvest by up to 30 % compared to PWM charge controllers and by up to 10 % compared to slower MPPT controllers.

Advanced Maximum Power Point Detection in case of partial shading conditions
If partial shading occurs, two or more maximum power points may be present on the power-voltage curve.
Conventional MPPTs tend to lock to a local MPP, which may not be the optimum MPP.
The innovative BlueSolar algorithm will always maximize energy harvest by locking to the optimum MPP.

Outstanding conversion efficiency
No cooling fan. Maximum efficiency exceeds 98 %. Full output current up to 40 °C (104 °F).

Flexible charge algorithm
Fully programmable charge algorithm (see the software page on our website), and eight preprogrammed algorithms, selectable with a rotary switch (see manual for details).

Extensive electronic protection
- Over-temperature protection and power derating when temperature is high.
- PV short circuit and PV reverse polarity protection.
- PV reverse current protection.

Internal temperature sensor
Compensates absorption and float charge voltage for temperature.

Optional external battery voltage and temperature sensing via Bluetooth
A Smart Battery Sense or a BMV-712 Smart Battery Monitor can be used to communicate battery voltage and temperature to one or more SmartSolar Charge Controllers.

Fully discharged battery recovery function
Will initiate charging even if the battery has been discharged to zero volts.
Will reconnect to a fully discharged Li-ion battery with integrated disconnect function.

SmartSolar Charge Controller
MPPT 150/35

Bluetooth sensing
Smart Battery Sense

Bluetooth sensing
BMV-712 Smart Battery Monitor

SmartSolar Charge Controller	MPPT 150/35	MPPT 150/45
Battery voltage	12 / 24 / 48 V Auto Select (software tool needed to select 36 V)	
Rated charge current	35 A	45 A
Nominal PV power 1a, b)	35 A 12 V: 500 W / 24 V: 1000 W / 36 V: 1500 W / 48 V: 2000 W 45 A 12 V: 650 W / 24 V: 1300 W / 36 V: 1950 W / 48 V: 2600 W	
Max. PV short circuit current 2)	40 A	50 A
Maximum PV open circuit voltage	150 V absolute maximum coldest conditions 145 V start-up and operating maximum	
Maximum efficiency	98 %	
Self-consumption	12 V: 20 mA 24 V: 15 mA 48 V: 10 mA	
Charge voltage 'absorption'	Default setting: 14,4 / 28,8 / 43,2 / 57,6 V (adjustable)	
Charge voltage 'float'	Default setting: 13,8 / 27,6 / 41,4 / 55,2 V (adjustable)	
Charge algorithm	multi-stage adaptive (eight pre-programmed algorithms)	
Temperature compensation	-16 mV / -32 mV / -64 mV / °C	
Protection	PV reverse polarity / output short circuit / over-temperature	
Operating temperature	-30 to +60°C (full rated output up to 40°C)	
Humidity	95 %, non-condensing	
Data communication port	VE.Direct See the data communication white paper on our website	
ENCLOSURE		
Colour	Blue (RAL 5012)	
Power terminals	16 mm² / AWG6	
Protection category	IP43 (electronic components), IP22 (connection area)	
Weight	1,25 kg	
Dimensions (h x w x d)	130 x 186 x 70 mm	
STANDARDS		
Safety	EN/IEC 62109-1, UL 1741, CSA C22.2	
STORED TRENDS		
Data stored	Battery voltage,current and temperature, as well as load output current, PV voltage and PV current.	
Number of days trends data is stored	46	

1a) If more PV power is connected, the controller will limit input power.
1b) The PV voltage must exceed Vbat + 5 V for the controller to start.
    Thereafter the minimum PV voltage is Vbat + 1 V.
2) A PV array with a higher short circuit current may damage the controller.

SmartSolar Charge Controller
MPPT 150/70-Tr
without optional display

SmartSolar Charge Controller
MPPT 150/70-Tr
without optional display

Bluetooth sensing:
Smart Battery Sense

Bluetooth sensing:
BMV-712 Smart Battery Monitor

Bluetooth sensing: SmartShunt

Bluetooth Smart built-in
The wireless solution to set-up, monitor, update and synchronise SmartSolar Charge Controllers.

Ultra-fast Maximum Power Point Tracking (MPPT)
Especially in case of a clouded sky, when light intensity is changing continuously, an ultra-fast MPPT controller will improve energy harvest by up to 30 % compared to PWM charge controllers and by up to 10 % compared to slower MPPT controllers.

Advanced Maximum Power Point Detection in case of partial shading conditions
If partial shading occurs, two or more maximum power points (MPP) may be present on the power-voltage curve.
Conventional MPPTs tend to lock to a local MPP, which may not be the optimum MPP.
The innovative SmartSolar algorithm will always maximize energy harvest by locking to the optimum MPP.

Outstanding conversion efficiency
No cooling fan. Maximum efficiency exceeds 98 %.

Flexible charge algorithm
Fully programmable charge algorithm (see the software page on our website), and eight pre-programmed algorithms, selectable with a rotary switch (see manual for details).

Extensive electronic protection
Over-temperature protection and power derating when temperature is high.
PV short circuit and PV reverse polarity protection.
PV reverse current protection.

Internal temperature sensor
Compensates absorption and float charge voltage for temperature.

Optional external battery voltage, temperature and current sensing via Bluetooth
A Smart Battery Sense, a BMV-712 Smart Battery Monitor or a SmartShunt can be used to communicate battery voltage and temperature (and current, in case of a BMV-712 or a SmartShunt) to one or more SmartSolar Charge Controllers.

Synchronized parallel charging with Bluetooth
Up to 10 units can be synchronized with Bluetooth.

Fully discharged battery recovery function
Will initiate charging even if the battery has been discharged to zero volts.
Will reconnect to a fully discharged Li-ion battery with integrated disconnect function.

VE.Direct
For a wired data connection to a Color Control GX, other GX products, PC or other devices

Remote on-off
To connect for example to a VE.BUS BMS.

Programmable relay
Can be programmed to trip on an alarm, or other events.

Optional: SmartSolar pluggable LCD display
Simply remove the rubber seal that protects the plug on the front of the controller, and plug-in the display.

SmartSolar pluggable display

SmartSolar Charge Controller	150/60	150/70
Battery voltage	12 / 24 / 48 V Auto Select (software tool needed to select 36 V)	
Rated charge current	60 A	70 A
Nominal PV power, 12 V 1a,b)	860 W	1000 W
Nominal PV power, 24 V 1a,b)	1720 W	2000 W
Nominal PV power, 36 V 1a,b)	2580 W	3000 W
Nominal PV power, 48 V 1a,b)	3440 W	4000 W
Max. PV short circuit current 2)	50 A (max 30 A per MC4 conn.)	
Maximum PV open circuit voltage	150 V absolute maximum coldest conditions 145 V start-up and operating maximum	
Maximum efficiency	98 %	
Self-consumption	Less than 35mA @ 12 V / 20mA @ 48 V	
Charge voltage 'absorption'	Default setting: 14,4 / 28,8 / 43,2 / 57,6 V (adjustable with: rotary switch, display, VE.Direct or Bluetooth)	
Charge voltage 'float'	Default setting: 13,8 / 27,6 / 41,4 / 55,2 V (adjustable: rotary switch, display, VE.Direct or Bluetooth)	
Charge voltage 'equalization'	Default setting: 16,2 V / 32,4 V / 48,6 V / 64,8 V (adjustable)	
Charge algorithm	multi-stage adaptive (eight pre-programmed algorithms) or user defined algorithm	
Temperature compensation	-16 mV / -32 mV / -64 mV / °C	
Protection	PV reverse polarity / Output short circuit / Over temperature	
Operating temperature	-30 to +60 °C (full rated output up to 40 °C)	
Humidity	95 %, non-condensing	
Maximum altitude	5000m (full rated output up to 2000m)	
Environmental condition	Indoor, unconditioned	
Pollution degree	PD3	
Data communication port	VE.Direct or Bluetooth	
Remote on/off	Yes (2 pole connector)	
Programmable relay	DPST AC rating: 240 VAC / 4 A DC rating: 4 A up to 35 VDC, 1 A up to 60 VDC	
Parallel operation	Yes: up to 10 units can be synchronized with Bluetooth	
ENCLOSURE		
Colour	Blue (RAL 5012)	
PV terminals 3)	35 mm² / AWG2 (Tr models) Two pairs of MC4 connectors (MC4 models)	
Battery terminals	35 mm² / AWG2	
Protection category	IP43 (electronic components), IP22 (connection area)	
Weight	3 kg	
Dimensions (h x w x d)	Tr models: 185 x 250 x 95 mm MC4 models: 215 x 250 x 95 mm	
STANDARDS		
Safety	EN/IEC 62109-1, UL 1741, CSA C22.2	
STORED TRENDS		
Data stored	Battery voltage, current and temperature, as well as load output current, PV voltage and PV current.	
Number of days trends data is stored	46	

1a) If more PV power is connected, the controller will limit input power.
1b) The PV voltage must exceed Vbat + 5 V for the controller to start. Thereafter the minimum PV voltage is Vbat + 1 V.
2) A PV array with a higher short circuit current may damage the controller.
3) MC4 models: several splitter pairs may be needed to parallel the strings of solar panels
   Maximum current per MC4 connector: 30 A (the MC4 connectors are parallel connected to one MPPT tracker)

**SmartSolar Charge Controller
MPPT 150/100-Tr VE.Can
with optional pluggable display**

**SmartSolar Charge Controller
MPPT 150/100-Tr VE.Can
without display**

**Bluetooth sensing:
Smart Battery Sense**

**Bluetooth sensing:
BMV-712 Smart Battery Monitor**

Bluetooth sensing: SmartShunt

Ultra-fast Maximum Power Point Tracking (MPPT)
Especially in case of a clouded sky, when light intensity is changing continuously, an ultra-fast MPPT controller will improve energy harvest by up to 30 % compared to PWM charge controllers and by up to 10 % compared to slower MPPT controllers.

Advanced Maximum Power Point Detection in case of partial shading conditions
If partial shading occurs, two or more maximum power points (MPP) may be present on the power-voltage curve.
Conventional MPPTs tend to lock to a local MPP, which may not be the optimum MPP.
The innovative SmartSolar algorithm will always maximize energy harvest by locking to the optimum MPP.

Outstanding conversion efficiency
No cooling fan. Maximum efficiency exceeds 98 %.

Flexible charge algorithm
Fully programmable charge algorithm, and eight pre-programmed algorithms, selectable with a rotary switch (see manual for details).

Extensive electronic protection
Over-temperature protection and power derating when temperature is high.
PV short circuit and PV reverse polarity protection.
PV reverse current protection.

Bluetooth Smart built-in
The wireless solution to set-up, monitor, update and synchronise SmartSolar Charge Controllers.

Internal temperature sensor and optional external battery voltage, temperature and current sensing via Bluetooth
A Smart Battery Sense, a BMV-712 Smart Battery Monitor or a SmartShunt can be used to communicate battery voltage and temperature (and current, in case of a BMV-712 or a SmartShunt) to one or more SmartSolar Charge Controllers.

VE.Direct or VE.Can
For a wired data connection to a Color Control GX, other GX products, PC or other devices

Fully discharged battery recovery function
Will initiate charging even if the battery has been discharged to zero volts.
Will reconnect to a fully discharged Li-ion battery with integrated disconnect function.

VE.Can: the multiple controller solution
Up to 25 units can be synchronised with VE.Can, and up to 10 units with Bluetooth

Remote on-off
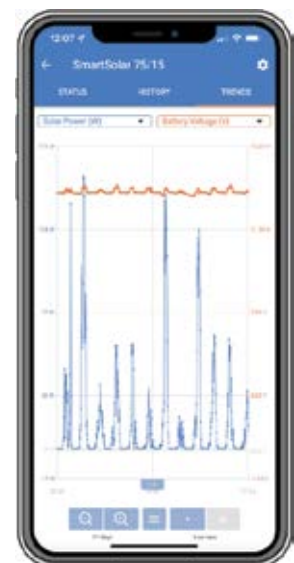To connect for example to a VE.BUS BMS.

Programmable relay
Can be programmed to trip on an alarm,
or other events.

Optional: SmartSolar pluggable LCD display
Simply remove the rubber seal that protects
the plug on the front of the controller,
and plug-in the display.

SmartSolar pluggable display

SmartSolar Charge Controller with VE.Can interface	150/70 VE.Can	150/85 VE.Can	150/100 VE.Can (also available without Bluetooth)
Battery voltage	12/24/48 V Auto Select (36 V: manual)		
Rated charge current	70 A	85 A	100 A
Nominal PV power, 12 V 1a,b)	1000 W	1200 W	1450 W
Nominal PV power, 24 V 1a,b)	2000 W	2400 W	2900 W
Nominal PV power, 36 V 1a,b)	3000 W	3600 W	4350 W
Nominal PV power, 48 V 1a,b)	4000 W	4900 W	5800 W
Max. PV short circuit current 2)	50 A (max 30 A per MC4 conn.)	70 A (max 30 A per MC4 conn.)	
Maximum PV open circuit voltage	150 V absolute maximum coldest conditions 145 V start-up and operating maximum		
Maximum efficiency	98 %		
Self-consumption	Less than 35 mA @ 12 V / 20 mA @ 48 V		
Charge voltage 'absorption'	Default setting: 14,4 / 28,8 / 43,2 / 57,6 V (adjustable with: rotary switch, display, VE.Direct or Bluetooth)		
Charge voltage 'float'	Default setting: 13,8 / 27,6 / 41,4 / 55,2 V (adjustable: rotary switch, display, VE.Direct or Bluetooth)		
Charge voltage 'equalization'	Default setting: 16,2 V / 32,4 V / 48,6 V / 64,8 V (adjustable)		
Charge algorithm	multi-stage adaptive (eight preprogrammed algorithms) or user defined algorithm		
Temperature compensation	-16 mV / -32 mV / -64 mV / °C		
Protection	PV reverse polarity / Output short circuit / Over temperature		
Operating temperature	-30 to +60 °C (full rated output up to 40 °C)		
Humidity	95 %, non-condensing		
Maximum altitude	5000m (full rated output up to 2000m)		
Environmental condition	Indoor, unconditioned		
Pollution degree	PD3		
Data communication	VE.Can, VE.Direct and Bluetooth		
Remote on/off	Yes (2 pole connector)		
Programmable relay	DPST AC rating: 240 VAC / 4 A DC rating: 4 A up to 35 VDC, 1 A up to 60 VDC		
Parallel operation	Yes, parallel synchronised operation with VE.Can (max. 25 units) or Bluetooth (max. 10 units)		
ENCLOSURE			
Colour	Blue (RAL 5012)		
PV terminals 3)	35 mm² / AWG2 (Tr models) Two pairs of MC4 connectors (MC4 models)	35 mm² / AWG2 (Tr models) Three pairs of MC4 connectors (MC4 models)	
Battery terminals	35mm² / AWG2		
Protection category	IP43 (electronic components), IP22 (connection area)		
Weight	3 kg	4,5kg	
Dimensions (h x w x d) in mm	Tr models: 185 x 250 x 95 mm MC4 models: 215x 250 x 95 mm	Tr models: 216 x 295 x 103 MC4 models: 246 x 295 x 103	
STANDARDS			
Safety	EN/IEC 62109-1, UL 1741, CSA C22.2		
STORED TRENDS			
Data stored	Battery voltage,current and temperature, as well as load output current, PV voltage and PV current.		
Number of days trends data is stored	46		

1a) If more PV power is connected, the controller will limit input power.
1b) The PV voltage must exceed Vbat + 5 V for the controller to start. Thereafter the minimum PV voltage is Vbat + 1 V.
2) A PV array with a higher short circuit current may damage the controller.
3) MC4 models: several splitter pairs may be needed to parallel the strings of solar panels
    Maximum current per MC4 connector: 30 A (the MC4 connectors are parallel connected to one MPPT tracker)

With VE.Can or Bluetooth up to 25 respectively up to 10 Charge Controllers can be daisy-chained for synchronous charging and connected to a Color Control GX or other GX device.
Each Controller can be monitored individually, for example on a Color Control GX and on the VRM website (VE.Can) or on a smartphone or iPad (Bluetooth)

**SmartSolar Charge Controller
MPPT 250/70-Tr
with optional pluggable display**

**SmartSolar Charge Controller
MPPT 250/70-MC4
without display**

**Bluetooth sensing:
Smart Battery Sense**

**Bluetooth sensing:
BMV-712 Smart Battery Monitor**

Bluetooth sensing: SmartShunt

Bluetooth Smart built-in
The wireless solution to set-up, monitor, update and synchronise SmartSolar Charge Controllers.

Ultra-fast Maximum Power Point Tracking (MPPT)
Especially in case of a clouded sky, when light intensity is changing continuously, an ultra-fast MPPT controller will improve energy harvest by up to 30 % compared to PWM charge controllers and by up to 10 % compared to slower MPPT controllers.

Advanced Maximum Power Point Detection in case of partial shading conditions
If partial shading occurs, two or more maximum power points (MPP) may be present on the power-voltage curve.
Conventional MPPTs tend to lock to a local MPP, which may not be the optimum MPP.
The innovative SmartSolar algorithm will always maximize energy harvest by locking to the optimum MPP.

Outstanding conversion efficiency
No cooling fan. Maximum efficiency exceeds 99 %.

Flexible charge algorithm
Fully programmable charge algorithm (see the software page on our website), and eight pre-programmed algorithms, selectable with a rotary switch (see manual for details).

Extensive electronic protection
Over-temperature protection and power derating when temperature is high.
PV short circuit and PV reverse polarity protection.
PV reverse current protection.

Internal temperature sensor and optional external battery voltage and temperature sensing via Bluetooth
A Smart Battery Sense, a BMV-712 Smart Battery Monitor or a SmartShunt can be used to communicate battery voltage and temperature (and current, in case of a BMV-712 or a SmartShunt) to one or more SmartSolar Charge Controllers

Synchronized parallel charging with Bluetooth
Up to 10 units can be synchronized with Bluetooth.

Fully discharged battery recovery function
Will initiate charging even if the battery has been discharged to zero volts.
Will reconnect to a fully discharged Li-ion battery with integrated disconnect function.

VE.Direct
For a wired data connection to a Color Control GX, other GX products, PC or other devices

Remote on-off
To connect for example to a VE.BUS BMS.

Programmable relay
Can be programmed (a.o. with a smartphone)
to trip on an alarm, or other events.
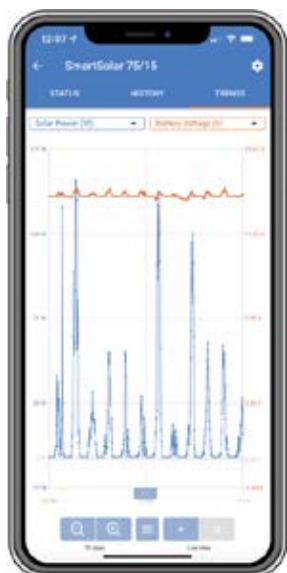
Optional: SmartSolar pluggable LCD display
Simply remove the rubber seal that protects
the plug on the front of the controller,
and plug-in the display.

SmartSolar pluggable display

SmartSolar Charge Controller	250/60	250/70
Battery voltage	12 / 24 / 48 V Auto Select (software tool needed to select 36 V)	
Rated charge current	60 A	70 A
Nominal PV power, 12 V 1a,b)	860 W	1000 W
Nominal PV power, 24 V 1a,b)	1720 W	2000 W
Nominal PV power, 36 V 1a,b)	2580 W	3000 W
Nominal PV power, 48 V 1a,b)	3440 W	4000 W
Max. PV short circuit current 2)	35 A (max 30 A per MC4 conn.)	
Maximum PV open circuit voltage	250 V absolute maximum coldest conditions 245 V start-up and operating maximum	
Maximum efficiency	99 %	
Self-consumption	Less than 35 mA @ 12 V / 20 mA @ 48 V	
Charge voltage 'absorption'	Default setting: 14,4 / 28,8 / 43,2 / 57,6 V (adjustable with: rotary switch, display, VE.Direct or Bluetooth)	
Charge voltage 'float'	Default setting: 13,8 / 27,6 / 41,4 / 55,2 V (adjustable: rotary switch, display, VE.Direct or Bluetooth)	
Charge voltage 'equalization'	Default setting: 16,2 V / 32,4 V / 48,6 V / 64,8 V (adjustable)	
Charge algorithm	multi-stage adaptive (eight pre-programmed algorithms) or user defined algorithm	
Temperature compensation	-16 mV / -32 mV / -64 mV / °C	
Protection	PV reverse polarity / Output short circuit / Over temperature	
Operating temperature	-30 to +60 °C (full rated output up to 40 °C)	
Humidity	95 %, non-condensing	
Maximum altitude	5000m (full rated output up to 2000m)	
Environmental condition	Indoor, unconditioned	
Pollution degree	PD3	
Data communication port	VE.Direct or Bluetooth	
Remote on/off	Yes (2 pole connector)	
Programmable relay	DPST AC rating: 240 VAC / 4 A DC rating: 4 A up to 35 VDC, 1 A up to 60 VDC	
Parallel operation	Yes: up to 10 units can be synchronized with Bluetooth	
ENCLOSURE		
Colour	Blue (RAL 5012)	
PV terminals 3)	35 mm² / AWG2 (Tr models) Two pairs of MC4 connectors (MC4 models)	
Battery terminals	35 mm² / AWG2	
Protection category	IP43 (electronic components), IP22 (connection area)	
Weight	3 kg	
Dimensions (h x w x d)	Tr models: 185 x 250 x 95 mm MC4 models: 215 x 250 x 95 mm	
STANDARDS		
Safety	EN/IEC 62109-1, UL 1741, CSA C22.2	
STORED TRENDS		
Data stored	Battery voltage,current and temperature, as well as load output current, PV voltage and PV current.	
Number of days trends data is stored	46	

1a) If more PV power is connected, the controller will limit input power.
1b) The PV voltage must exceed Vbat + 5 V for the controller to start. Thereafter the minimum PV voltage is Vbat + 1 V.
2) A PV array with a higher short circuit current may damage the controller.
3) MC4 models: several splitter pairs may be needed to parallel the strings of solar panels
   Maximum current per MC4 connector: 30 A (the MC4 connectors are parallel connected to one MPPT tracker)

83

SmartSolar Charge Controller MPPT 250/100-Tr VE.Can with optional pluggable display

SmartSolar Charge Controller MPPT 250/100-Tr VE.Can without display

Bluetooth sensing: Smart Battery Sense

Bluetooth sensing: BMV-712 Smart Battery Monitor

Bluetooth sensing: SmartShunt

SmartSolar pluggable display

Ultra-fast Maximum Power Point Tracking (MPPT)
Especially in case of a clouded sky, when light intensity is changing continuously, an ultra-fast MPPT controller will improve energy harvest by up to 30 % compared to PWM charge controllers and by up to 10 % compared to slower MPPT controllers.

Advanced Maximum Power Point Detection in case of partial shading conditions
If partial shading occurs, two or more maximum power (MPP) points may be present on the power-voltage curve.
Conventional MPPTs tend to lock to a local MPP, which may not be the optimum MPP.
The innovative SmartSolar algorithm will always maximize energy harvest by locking to the optimum MPP.

Outstanding conversion efficiency
No cooling fan. Maximum efficiency exceeds 99 %.

Flexible charge algorithm
Fully programmable charge algorithm, and eight pre-programmed algorithms, selectable with a rotary switch (see manual for details).

Extensive electronic protection
Over-temperature protection and power derating when temperature is high.
PV short circuit and PV reverse polarity protection.
PV reverse current protection.

Bluetooth Smart built-in
The wireless solution to set-up, monitor, update and synchronise SmartSolar Charge Controllers.

Internal temperature sensor and optional external battery voltage, temperature and current sensing via Bluetooth
A Smart Battery Sense, a BMV-712 Smart Battery Monitor or a SmartShunt can be used to communicate battery voltage and temperature (and current, in case of a BMV 712 or a SmartShunt) to one or more SmartSolar Charge Controllers.

VE.Direct or VE.Can
For a wired data connection to a Color Control GX, other GX products, PC or other devices.

Synchronized parallel charging with VE.Can or Bluetooth
Up to 25 units can be synchronized with VE.Can, and up to 10 units with Bluetooth.

Fully discharged battery recovery function
Will initiate charging even if the battery has been discharged to zero volts.
Will reconnect to a fully discharged Li-ion battery with integrated disconnect function.

VE.Can: the multiple controller solution
Up to 25 units can be synchronised with VE.Can.

Remote on-off
To connect for example to a VE.BUS BMS.
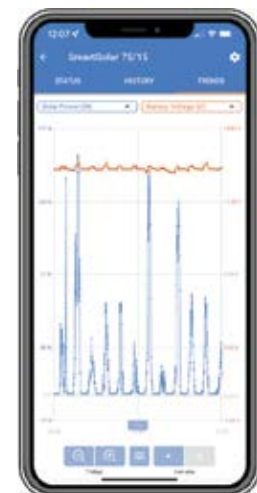
Programmable relay
Can be programmed to trip on an alarm, or other events.

Optional: SmartSolar pluggable LCD display
Simply remove the rubber seal that protects the plug on the front of the controller, and plug-in the display.

SmartSolar Charge Controller with VE.Can interface	250/70	250/85	250/100
Battery voltage	12/24/48 V Auto Select (36 V: manual)		
Rated charge current	70 A	85 A	100 A
Nominal PV power, 12 V 1a,b)	1000 W	1200 W	1450 W
Nominal PV power, 24 V 1a,b)	2000 W	2400 W	2900 W
Nominal PV power, 36 V 1a,b)	3000 W	3600 W	4350 W
Nominal PV power, 48 V 1a,b)	4000 W	4900 W	5800 W
Max. PV short circuit current 2)	35 A (max 30 A per MC4 conn.)	70 A (max 30 A per MC4 conn.)	
Maximum PV open circuit voltage	250 V absolute maximum coldest conditions 245 V start-up and operating maximum		
Maximum efficiency	99 %		
Self-consumption	Less than 35 mA @ 12 V / 20 mA @ 48 V		
Charge voltage 'absorption'	Default setting: 14,4 / 28,8 / 43,2 / 57,6 V (adjustable with: rotary switch, display, VE.Direct or Bluetooth)		
Charge voltage 'float'	Default setting: 13,8 / 27,6 / 41,4 / 55,2 V (adjustable: rotary switch, display, VE.Direct or Bluetooth)		
Charge voltage 'equalization'	Default setting: 16,2 V / 32,4 V / 48,6 V / 64,8 V (adjustable)		
Charge algorithm	multi-stage adaptive (eight pre-programmed algorithms) or user defined algorithm		
Temperature compensation	-16 mV / -32 mV / -64 mV / °C		
Protection	PV reverse polarity / Output short circuit / Over temperature		
Operating temperature	-30 to +60 °C (full rated output up to 40 °C)		
Humidity	95 %, non-condensing		
Maximum altitude	5000 m (full rated output up to 2000 m)		
Environmental condition	Indoor, unconditioned		
Pollution degree	PD3		
Data communication	VE.Can, VE.Direct and Bluetooth		
Remote on/off	Yes (2 pole connector)		
Programmable relay	DPST AC rating: 240 VAC / 4 A DC rating: 4 A up to 35 VDC, 1 A up to 60 VDC		
Parallel operation	Yes, parallel synchronised operation with VE.Can (max. 25 units) or Bluetooth (max. 10 units)		
ENCLOSURE			
Colour	Blue (RAL 5012)		
PV terminals 3)	35 mm² / AWG2 (Tr models) Two pairs of MC4 connectors (MC4 models)	35 mm² / AWG2 (Tr models) Three pairs of MC4 connectors (MC4 models)	
Battery terminals	35mm² / AWG2		
Protection category	IP43 (electronic components), IP22 (connection area)		
Weight	3 kg	4,5 kg	
Dimensions (h x w x d) in mm	Tr models: 185 x 250 x 95 mm MC4 models: 215 x 250 x 95 mm	Tr models: 216 x 295 x 103 MC4 models: 246 x 295 x 103	
STANDARDS			
Safety	EN/IEC 62109-1, UL 1741, CSA C22.2		
STORED TRENDS			
Data stored	Battery voltage, current and temperature, as well as load output current, PV voltage and PV current.		
Number of days trends data is stored	46		

1a) If more PV power is connected, the controller will limit input power.
1b) The PV voltage must exceed Vbat + 5 V for the controller to start. Thereafter the minimum PV voltage is Vbat + 1 V.
2) A PV array with a higher short circuit current may damage the controller.
3) MC4 models: several splitter pairs may be needed to parallel the strings of solar panels
    Maximum current per MC4 connector: 30 A (the MC4 connectors are parallel connected to one MPPT tracker)

**With VE.Can up to 25 Charge Controllers can be daisy-chained and connected to a Color Control GX or other GX device
Each Controller can be monitored individually, for example on a Color Control GX and on the VRM website**

SmartSolar MPPT RS 450|100

Inside the SmartSolar MPPT RS 450|100

Ultra-fast Maximum Power Point Tracking (MPPT) Solar Charge Controller
The MPPT RS SmartSolar is a 48 V Solar charge controller with up to 450 VDC PV input and either 100 A, or 200 A output. It is used in on-grid and off-grid solar applications where maximum battery charging power is required.

Multiple independent MPPT tracking inputs
With multiple MPPT trackers, you can optimize your solar panel design for maximum performance for your specific location.

Isolated PV connections for additional safety
Full galvanic isolation between PV and battery connections provide additional overall system safety.

Wide MPPT voltage range
65 – 450 VDC PV operating range, with a 120 VDC PV startup voltage.

Light weight, efficient and quiet
Thanks to high frequency technology and a new design this powerful charger weighs only 7.9 kg for the 100 A model. In addition to this it has an excellent efficiency, low standby power, and a very quiet operation.

Display and Bluetooth
The display reads battery, and controller parameters. The parameters can be accessed with a smartphone or other Bluetooth enabled device. In addition, Bluetooth can be used to set up the system and to change settings with VictronConnect.
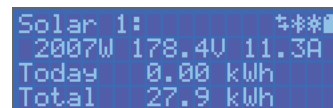
PV Isolation resistance monitoring for peace of mind at higher voltages
The MPPT RS continuously monitors the PV array and can detect if there are faults that reduce the isolation of the panels to unsafe levels.

VE.Can and VE.Direct port
For connection to a GX device for system monitoring, data logging, and remote firmware updates. VE.Can allows for up to 25 units to be connected together in parallel and synchronize their charging.

I/O Connections
Programmable Relay, temperature sensor, auxiliary, digital input and voltage sensor connections. The remote input can accept the Victron smallBMS, and other BMS with allow-to-charge signal.

Configure and monitor with VictronConnect →

The built-in Bluetooth Smart connection allows for quick monitoring and settings adjustment.

The built-in 30-day history shows individual performance of the separate MPPT trackers.

Try the VictronConnect demo to see the full range of configuration and display options with sample data.

MPPT RS

GX device

VE.Can or VE.Direct Connection

48V Battery

Independent Trackers 80 – 450V PV Arrays

System example diagram

The 100 A MPPT RS combined with a GX device, charging a 48 V battery with 2 separate solar PV strings.

VRM Portal

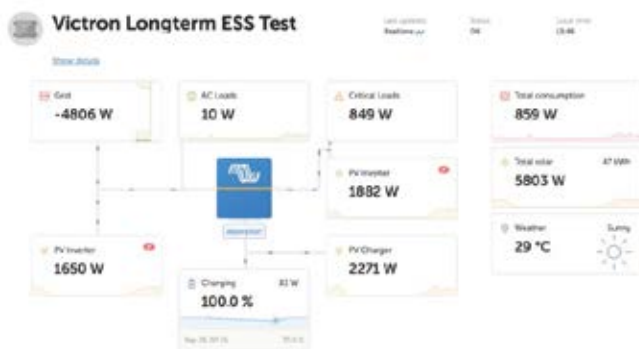When the MPPT RS is connected to a GX device with internet connection, or the GlobalLink 520 with built in 4G connectivity, you can access our free remote monitoring website (VRM). This will display all your system data in a comprehensive graphical format. Alarms can be received by e-mail.

Isolated SmartSolar MPPT RS	450|100	450|200
CHARGER		
Battery voltage	48 V	
Rated charge current	100 A	200 A
Maximum charge power	5.8 kW at 57.6 V	11.5 kW at 57.6 V
Charge voltage 'absorption'	Default setting: 57.6 V (adjustable)	
Charge voltage 'float'	Default setting: 55.2 V (adjustable)	
Programmable voltage range	Minimum: 36 V Maximum: 60 V [7]	
Charge algorithm	Multi-stage adaptive (adjustable)	
Battery temperature sensor	Included	
Maximum efficiency	96 %	
Self-consumption	15 mA	
SOLAR		
Maximum DC PV voltage	450 V	
Start-up voltage	120 V	
MPPT operating voltage range	65 – 450 V [1]	
Number of trackers	2	4
Max. PV operational input current	16 A per tracker	
Max. PV short circuit current [2]	20 A per tracker	
Max. DC output charging power	4000 W per tracker 5760 W total	4000 W per tracker 11520 W total
Maximum PV array size per tracker [3]	7200 Wp (450 V x 20 A) [3]	
PV Isolation fail level [4]	100 kΩ	
GENERAL		
Synchronised Parallel Operation	Yes, up to 25 units with VE.Can	
Programmable relay [5]	Yes	
Protection	PV reverse polarity Output short circuit Over temperature	
Data communication	VE.Direct port, VE.Can port & Bluetooth (6)	
Bluetooth frequency	2402 – 2480 MHz	
Bluetooth power	4dBm	
General purpose analogue/digital in port	Yes, 2x	
Remote on-off	Yes	
Operating temperature range	-40 to +60 °C (fan assisted cooling)	
Humidity (non-condensing)	max 95 %	
ENCLOSURE		
Material & Colour	steel, blue RAL 5012	
Protection category	IP21	
Battery-connection	2x M8 bolts, 1x positive and 1x negative	4x M8 bolts, 2x positive and 2x negative
Power terminals PV input	1 pair of male and female MC4 connectors per tracker	
Weight	7.9 kg	13.7 kg
Dimensions (h x w x d) in mm	440 x 313 x 126	487 x 434 x 146
STANDARDS		
Safety	EN-IEC 62109-1, EN-IEC 62109-2	
Country of Origin	Designed in The Netherlands made in India	

1) MPPT operating voltage range is constrained by battery voltage - PV VOC should not exceed 8 x battery float voltage. For example, a 52.8 V float voltage results in a maximum PV VOC of 422.4 V. See product manual for further information.

2) A higher short circuit current may damage the controller if PV array is connected in reverse polarity.

3) Max. 450 VOC result in appr. 360 Vmpp, therefor the maximum PV array is appr. 360 V x 20 A = 7200 Wp.

4) The SmartSolar MPPT RS will test for sufficient resistive isolation between PV+ and GND, as well as PV- and GND. If the resistance falls below the threshold, the unit will report an error and send an error signal to the GX device (if connected) for audible and email notifications. Despite the error, the product will continue charging the battery.

5) Programmable relay which can be set for general alarm, DC under voltage or genset start/stop function. DC rating: 4 A up to 35 VDC and 1 A up to 70 VDC

6) The MPPT RS is currently not compatible with VE.Smart Networks.

7) The Charger set-point (float and absorption) can be set to max 60 V. The output voltage at the charger terminals can be higher, due to temperature compensation as well as compensation for voltage drop over the battery cables. The maximum output current is reduced on a linear basis from full current at 60 V to 5A at 62 V. The equalization voltage can be set to max 62 V, the equalization current percentage can be set to max 6%.

EV CHARGER NS

EV Charging Station NS

EV Charging Station NS - Front

Black, blue (default) or white front

VictronConnect app

High power EV Charging Station
The EV Charging Station NS has three-phase and single-phase capabilities. It delivers a maximum of 22 kW AC in three-phase or 7.3 kW in single phase mode. It comes with a blue front. A black or white front can be purchased separately.

WiFi Communication
WiFi: 802.11 b/g/n for configuration, monitoring and control. The internal WiFi module can be configured in Access Point or Station mode for both, the initial setup and monitoring.

Easy operation and control via Bluetooth and the VictronConnect App
Get full control and overview of all operating parameters and session statistics at a glance.

Light Ring for fast viewing the device state
Fully programmable RGB Light Ring around the charging port to quickly determine the device state. It can be programmed from the integrated web interface to display different light effects based on the current state (disconnected, charging, charged etc.).

Three working modes available:
1. **Manual Mode to configure output current**
   Manual mode allows configurable output current between 6-32 A. The charging power can be regulated in different ways: by using the web interface, from a GX device and VRM and via VictronConnect. It allows to manually start or stop the charging process when a vehicle is connected to the charging station.

2. **Automatic Mode to ensure maximum PV system efficiency**
   Detects when excess power is available and uses only that power to charge the vehicle.

3. **Scheduled Mode to charge the EV at certain time intervals**
   A fully programmable scheduler allows charging at different time intervals, for example at certain times during the night when grid energy is cheaper.

Integration with GX devices and VRM
Control and monitor the EV Charging Station NS from a GX device touch display and the Remote Console and the VRM Portal. The VRM Portal also offers real time and custom reports for configurable time periods.

EV Charging Station NS	EVC200300200
Input voltage range (V AC)	170 – 265 VAC
Rated charge current	32 A / phase
Nominal power	22 kW
Current output range	6 – 32 A
WiFi standards	802.11 b/g/n (2.4 Ghz only)
Self-consumption	15 mA@230 V
Configurable Max. Current	10-32 A
Configurable Min. Current	6 A up to 1 A below max. value
Connector type	IEC 62196 Type 2
GENERAL	
Means to Disconnect	External circuit breaker (40 A recommended)
Configurable price/kWh calculator(Eur)	Default setting: 0.13 (adjustable)
Control type	Web page, GX Device over Modbus TCP, VictronConnect via Bluetooth
Light Ring	55 light configurable light effects available
Protection	External RCD is required
Operating temperature	-25 °C to +50 °C
Storage temperature	-40 °C to +80 °C
Humidity	95 %, non-condensing
Data communication	Modbus TCP over WiFi, Bluetooth
ENCLOSURE	
Enclosure colour	Light Blue (RAL 5012), Traffic Black (RAL 9017), Traffic White (RAL 9016)
Power terminals	6-10 mm^2 / AWG 10-8
Protection category	IP44
Ventilation	not required
Weight	3 kg
Dimensions (h x w x d)	372 x 292 x 122mm
STANDARDS	
Safety	IEC 61851-1, IEC 61851-22 Detection for Relay Contact welded Detection for missing protective conductor Detection for missing Ground Detection for shorted CP

GLOBALLINK 520

GlobalLink 520

Accessories included
with the GlobalLink 520

Optional Outdoor LTE-M
wall-mount antenna
(ANT100200100)

Outdoor LTE-M puck
antenna
(ANT100200200)

The GlobalLink 520 connects your remote Victron system or individual products to VRM, our online Victron Remote Management portal. Through that portal, you can monitor current and historical system operation – such as battery voltage and state of charge – from anywhere in the world. VRM is free to use.

Unique is the pre-installed and pre-paid SIM card: the GlobalLink comes with 5 years of 4G LTE-M connectivity. No need to purchase and maintain SIM-cards.

Features

- Smart device[1] and VE.Direct support: Connect up to 10 Victron smart products using BLE and two hard wired VE.Direct devices.
- VRM-monitoring: Monitor battery state of charge, power consumption, power harvest from PV, generator and grid or check temperature measurements. Follow up on alerts and perform diagnostics checks.
- RuuviTag support: These sensors connect via BLE and are easy to setup via VictronConnect. All the data, like temperature, humidity and atmospheric pressure will be directly available in VRM.
- Support for custom SIM cards.
- Simple mounting and configuration: The GlobalLink 520 is wall mountable. The Bluetooth feature enables a quick connection and easy configuration via our VictronConnect app.

[1] See the GlobalLink 520 manual for supported Victron products that can be connect over Bluetooth.

GlobalLink 520	ASS030543020		
Supply voltage	8 – 70 VDC		
Power draw with Bluetooth enabled (disabled)		Average with relay open	Average with relay closed
	12 V	50 mA (20 mA)	64 mA (40 mA)
	24 V	26 mA (10 mA)	34 mA (20 mA)
	48 V	14 mA (5 mA)	19 mA (10 mA)
Mounting	Wall		
Input connectivity			
VE.Direct ports (always isolated)	2		
RuuviTag support	Yes		
Instant Readout via Bluetooth	Yes (connect up to 10 additional Smart devices via BLE)		
Digital Inputs	2		
Relay	1 x NO/NC DC up to 30 VDC: 2 A AC: 0.5 A, 125 VAC		
Output connectivity			
Bluetooth	Yes		
WiFi	No		
Cellular	CAT M1 (LTE-M) 17 bands supported from 699Mhz to 2690Mhz (Total world-wide support) Bands supported are currently: 1, 2, 3, 4, 5, 8, 12, 13, 14, 17, 18, 19, 20, 25, 26, 28, 66		
Dimensions			
Outer dimensions (h x w x d)	123 x 67 x 23 mm		
Operating temperature range	-20 to +50 ℃		
Other			
Antenna	Internal and SMA connector for optional external antenna		
Factory included SIM	Prepaid 1nce data SIM with 5 years of connectivity		
Support for custom SIM	Yes		
Optional external LTE-M SMA-M antenna	Outdoor wall mount antenna	3 meter	ANT100200100
	Outdoor puck antenna	3 meter	ANT100200200

Notes
1. For more detailed information about the GlobalLink 520 see the product page, the manual and check out our community pages:
https://www.victronenergy.com/panel-systems-remote-monitoring/globallink-520
https://www.victronenergy.com/media/pg/GlobalLink_520/en/index-en.html
https://community.victronenergy.com/topics/65904/globallink.html

ENERGY METER VM-3P75CT

VM-3P75CT

Accessories included:

Current transformers (CT)

VE.Can RJ45 Terminators

Three-phase energy meter with Ethernet and VE.Can communication ports
The Victron VM-3P75CT energy meter is a standard device to measure the power and energy of single-, split- and three-phase applications, for example, at the distribution box or to measure the output of a PV Inverter, AC Genset or the output of an inverter and inverter/charger.

High refresh rate
Calculating the RMS power values for each phase, the energy meter transmits them at a high rate over VE.Can or Ethernet, leading to more accurate measurements for power usage, grid-import and grid feed-in, for example, in an ESS system.

The VM-3P75CT makes setup a breeze
Engineered for easy integration, the energy meter works out of the box (Plug & Play) as a grid meter for most systems. Configuration (via VictronConnect) is only required for changing the role (Grid Meter, PV Inverter, AC Genset or AC Load Meter) and manual IP configuration rather than the default, DHCP.

Remote monitoring from anywhere
Its data will be displayed in the VictronConnect App, a GX device such as the Cerbo GX or Ekrano GX and our VRM Portal.

Effortless Installation with snap-on type current transformers
The VM-3P75CT uses clamp-type current transformers to sense the current accurately, without having to modify the wiring of an existing installation.

Configurable energy registration method
The VM-3P75CT offers a configurable energy registration method, allowing selection between vector, arithmetic, or absolute registration. This flexibility makes it suitable for various regional requirements.

Comprehensive electrical parameter monitoring
Reporting of line-to-neutral, line-to-line and protective earth voltages as well as neutral and line currents.

LED pulse output
The status LED can be configured as an energy pulse signal to enable visual diagnostics at a glance.

VM-3P75CT	REL200300100
VOLTAGE INPUTS	
Voltage connection	Direct
Input voltage range L-N	85 to 265 VAC
Input voltage range L-L	150 to 460 VAC
Frequency	50/60 Hz
CURRENT INPUTS	
Current connection	Via current transformers (included - wire length 640 mm)
Rated current	75 A
COMMUNICATION	
VE.Can communication port	Two RJ45 connectors (VE.Can terminators included)
Ethernet communication port	One RJ45 connector, Modbus UDP
Refresh rate	100 ms
POWER SUPPLY	
Type	Self-power supply via L1-N
Consumption	1.45 W / 3.1 VA
Frequency	50/60 Hz
ENCLOSURE	
Material & Colour	Polycarbonate, blue (RAL 5012)
Voltage connection	Screw terminals 0.25 – 1.5 mm² (24 – 16 AWG)
Current transformer connection	Pluggable screw terminals (included)
Protection category	IP20
Weight	370 g (including packaging)
Dimensions (h x w x d)	90 x 71 x 59 mm (3.5 x 2.8 x 2.3 in)
ENVIRONMENTAL	
Indoor/outdoor usage	Indoor only
Operating temperature	From -10 to +55 °C
Storage temperature	From -20 to +70 °C
Relative humidity	< 90 % non-condensing
Altitude	2000 m (6562 ft)
Mains supply voltage fluctuations	±0.1 V_{in}
Overvoltage category	Cat. III
Pollution degree	2
STANDARDS	
Safety	EN-IEC 61010-1

12,8 V & 25,6 V LITHIUM SUPERPACK BATTERIES

Integrated BMS and safety switch
The SuperPack batteries are extremely easy to install, needing no additional components.
The internal switch will disconnect the battery in case of over discharge, over charge, low or high temperature.

Abuse proof
A lead-acid battery will fail prematurely due to sulfation:
- If it operates in deficit mode during long periods of time (i.e. if the battery is rarely, or never at all, fully charged).
- If it is left partially charged or worse, fully discharged.

A Lithium-Ion battery does not need to be fully charged. Service life even slightly improves in case of partial charge instead of a full charge. This is a major advantage of Li-ion compared to lead-acid.

The SuperPack batteries will cut-off the charge or discharge current when the maximum ratings are exceeded.

Efficient
In several applications (especially off-grid solar), energy efficiency can be of crucial importance.
The round-trip energy efficiency (discharge from 100 % to 0 % and back to 100 % charged) of the average lead-acid battery is 80 % .
The round-trip energy efficiency of a Li-ion battery is 92 % .
The charge process of lead-acid batteries becomes particularly inefficient when the 80 % state of charge has been reached, resulting in efficiencies of 50 % or even less in solar systems where several days of reserve energy are required (battery operating in 70 % to 100 % charged state).
In contrast, a Li-ion battery will still achieve 90 % efficiency even under shallow discharge conditions.

Can be connected in parallel
The batteries can be connected in parallel. Series connection is not allowed.
Use in upright position only.

12,8/20 (BAT512020705) [4]

12,8/200 (BAT512120705) [5]

Lithium SuperPack	12,8/20	12,8/60	12,8/100 High current	12,8/200	25,6/50
Chemistry	LiFePO4				
Nominal voltage	12,8 V				25,6 V
Nominal capacity @ 25 °C	20 Ah	60 Ah	100 Ah	200 Ah	50 Ah
Nominal capacity @ 0 °C	16 Ah	48 Ah	80 Ah	160 Ah	40 Ah
Nominal energy @ 25 °C	256 Wh	768 Wh	1280 Wh	2560 Wh	1280 Wh
Cycle life @ 80 % DoD and 25 °C	2500 cycles				
Capacity loss	(per 100 cycles, @ 25 °C, 100 % DoD): <1 %				
Energy loss	(per 100 cycles, @ 25 °C, 100 % DoD): <1 %				
Round trip efficiency	92 %				
CHARGE and DISCHARGE					
Max. cont. discharge current [1]	30 A	30 A	100 A	70 A	50 A
Peak discharge current (10 sec)	80 A	80 A	150 A	100 A	100 A
End of discharge voltage	10 V				20 V
Charge voltage, absorption [2]	14,2 V – 14,4 V				28,4 V – 28,8 V
Charge voltage, float	13,5 V				27 V
Max. cont. charge current	15 A	30 A	100 A	70 A	50 A
OPERATING CONDITIONS					
Parallel configuration	Yes, unlimited				
Series configuration	No				
Operating temperature	Discharge: -20 °C to +50 °C Charge: +0 °C to +45 °C [3]				
Storage temperature	-40 °C to +65 °C				
Max. storage time when fully charged	1 year ≤ 25 °C 3 months ≤ 40 °C				
Humidity (non-condensing)	Max. 95 %				
Protection class	IP 43				
MOUNTING					
Can be placed on its side	Yes [4, 5]	Yes [4]	Yes [4]	Yes [4, 6]	Yes [4]
OTHER					
Power connection (threaded inserts)	M5	M6	M8	M8	M8
Dimensions (h x w x d) mm	167 x 181 x 77	213 x 229 x 138	220 x 330 x 172	208 x 520 x 269	220 x 330 x 172
Weight	3,5 kg	9,5 kg	14 kg	21 kg	14 kg

1. The battery may disconnect when a load with a high input capacitance is connected, such as an inverter. The battery will however retry and connect after approximately 10 seconds.
2. The absorption period should preferably not exceed 4 hrs. A longer absorption period may slightly reduce service life.
3. Serial number HQ2040 and newer: charge is automatically blocked when the cell temperature decreases below 0±3 °C. It will accept charging again when increased above 3±3 °C. Discharge is automatically blocked when cell temperature decreases below -20±3 °C. This protection resets when temperature above -15±3 °C.
4. The battery can be mounted upright and on its side (with the exceptions of [5] and [6]), but not with the battery terminals facing down.
5. Do not lay the battery on the side with the negative terminal – see the image on the left.
6. Do not lay the battery on its long side where the positive terminal is at the bottom - see the image on the left.

Victron Energy Lithium Battery Smart batteries are Lithium Iron Phosphate (LiFePO4) batteries and are available in 12.8 V or 25.6 V in various capacities. They can be connected in series, parallel and series/parallel so that a battery bank can be built for system voltages of 12 V, 24 V or 48 V. The maximum number of batteries in one system is 20, which results in a maximum energy storage of 84 kWh in a 12 V system and up to 102 kWh in a 24 V[1] and 48 V[1] system.

A single LFP cell has a nominal voltage of 3.2 V. A 12.8 V battery consists of 4 cells connected in series and a 25.6 V battery consists of 8 cells connected in series.

Why lithium-iron-phosphate?

Rugged
A lead-acid battery will fail prematurely due to sulfation:
- If it operates in deficit mode during long periods of time (i.e. if the battery is rarely, or never at all, fully charged).
- If it is left partially charged or worse, fully discharged (yacht or mobile home during wintertime).

A LFP battery:
- Does not need to be fully charged. Service life even slightly improves in case of partial charge instead of a full charge. This is a major advantage of LFP compared to lead-acid.
- Other advantages are the wide operating temperature range, excellent cycling performance, low internal resistance and high efficiency (see below).

LFP is therefore the chemistry of choice for demanding applications.

Efficient
- In several applications (especially off-grid solar and/or wind), energy efficiency can be of crucial importance.
- The round-trip energy efficiency (discharge from 100 % to 0 % and back to 100 % charged) of the average lead-acid battery is 80 %.
- The round-trip energy efficiency of a LFP battery is 92 %.
- The charge process of lead-acid batteries becomes particularly inefficient when the 80 % state of charge has been reached, resulting in efficiencies of 50 % or even less in solar systems where several days of reserve energy is required (battery operating in 70 % to 100 % charged state).
- In contrast, a LFP battery will still achieve 90 % efficiency under shallow discharge conditions.

Size and weight
- Saves up to 70 % in space
- Saves up to 70 % in weight

Expensive?
- LFP batteries are expensive when compared to lead-acid. But in demanding applications, the high initial cost will be more than compensated by longer service life, superior reliability and excellent efficiency.

Bluetooth
- With Bluetooth cell voltages, temperature and alarm status can be monitored.
- Instant readout: The VictronConnect App can display the most important data on the Device list page without the need to connect to the product.
- Very useful to localize a (potential) problem, such as cell imbalance.

Six tailored BMS solutions
- There are 6 different BMS models tailored for various applications available for use with the Lithium Battery Smart. The system design and BMS selection guide in the battery manual provides an overview and explains the differences between them and their typical use.

[1] To reduce required balancing time, we recommend using a little different batteries in series as possible for the application. 24 V systems are best built using 24 V batteries. And 48 V systems are best built using two 24 V batteries in series. While the alternative, four 12 V batteries in series, will work, it will require more periodic balancing time.

12,8 V 330 Ah LiFePO4 Battery

VictronConnect App
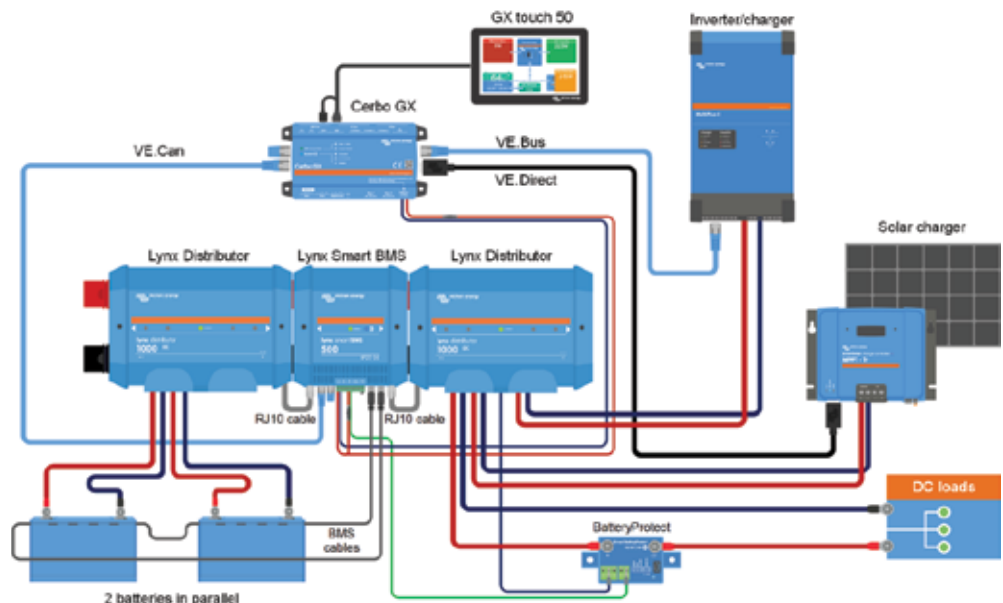
Our LFP batteries have integrated cell balancing and cell monitoring. The cell balancing/monitoring cables can be daisy-chained and must be connected to a Battery Management System (BMS).

Battery Management System (BMS)

The BMS will:
1. Generate a pre-alarm whenever the voltage of a battery cell decreases to less than 3.1 V (adjustable 2.85 V – 3.15 V).
2. Disconnect or shut down the load whenever the voltage of a battery cell decreases to less than 2.8 V (adjustable 2.6 V – 2.8 V).
3. Stop the charging process whenever the voltage of a battery cell increases to more than 3.75 V or when the temperature becomes too high or too low.

See the BMS datasheets for more features.

Battery specification								
VOLTAGE AND CAPACITY	LFP-Smart 12,8/50	LFP-Smart 12,8/100	LFP-Smart 12,8/160	LFP-Smart 12,8/180	LFP-Smart 12,8/200	LFP- Smart 12,8/330	LFP- Smart 25,6/100	LFP-Smart 25,6/200-a
Nominal voltage	12,8 V	12,8 V	12,8 V	12,8 V	12,8 V	12,8 V	25,6 V	25,6 V
Nominal capacity @ 25 ℃*	50 Ah	100 Ah	160 Ah	180 Ah	200 Ah	330 Ah	100 Ah	200 Ah
Nominal capacity @ 0 ℃*	40 Ah	80 Ah	130 Ah	150 Ah	160 Ah	260 Ah	80 Ah	160 Ah
Nominal capacity @ -20 ℃*	25 Ah	50 Ah	80 Ah	90 Ah	100 Ah	160 Ah	50 Ah	100 Ah
Nominal energy @ 25 ℃*	640 Wh	1280 Wh	2048 Wh	2304 Wh	2560 Wh	4220 Wh	2560 Wh	5120 Wh
Capacity loss	(per 100 cycles, @ 25 ℃, 100 % DoD): <1 %							
Energy loss	(per 100 cycles, @ 25 ℃, 100 % DoD): <1 %							
Round trip efficiency	92 %							
*Discharge current ≤1C								
CYCLE LIFE (capacity ≥ 80 % of nominal)								
80 % DoD	2500 cycles							
70 % DoD	3000 cycles							
50 % DoD	5000 cycles							
DISCHARGE								
Maximum continuous discharge current	100 A	200 A	320 A	360 A	400 A	400 A	200 A	400 A
Recommended continuous discharge current	≤50 A	≤100 A	≤160 A	≤180 A	≤200 A	≤300 A	≤100 A	≤200 A
End of discharge voltage	11.2 V	11.2 V	11.2 V	11.2 V	11.2 V	11.2 V	22.4 V	22.4 V
Internal resistance	2 mΩ	0.8 mΩ	0.9 mΩ	0.9 mΩ	0.8 mΩ	0.8 mΩ	1.6 mΩ	1.5 mΩ
OPERATING CONDITIONS								
Operating temperature	Discharge: -20 ℃ to +50 ℃ Charge: +5 ℃ to +50 ℃							
Storage temperature	-45 ℃ to +70 ℃							
Humidity (non-condensing)	Max. 95 %							
Protection class	IP 22							
CHARGE								
Charge voltage	Between 14 V/28 V and 14,4 V/28,8 V (14,2 V/28,4 V recommended)							
Float voltage	13,5 V/27 V							
Maximum charge current	100 A	200 A	320 A	360 A	400 A	400 A	200 A	400 A
Recommended charge current	≤30 A	≤50 A	≤80 A	≤90 A	≤100 A	≤150 A	≤50 A	≤100 A
MOUNTING								
Can be placed on their sides	Yes[2]	Yes[2]	Yes[2]	Yes[2]	Yes[2]	No[3]	Yes[2]	Yes[2]
OTHER								
Max storage time @ 25℃[1]	1 year							
BMS connection	Male + female cable with M8 circular connector, length 50 cm							
Max batteries per BMS	20 (102 kWh per BMS[4])							
Power connection (threaded inserts)	M8	M8	M8	M8	M8	M10	M8	M8
Dimensions (hxwxd) mm	199 x 188 x 147	197 x 321 x 152	237 x 321 x 152	237 x 321 x 152	237 x 321 x 152	265 x 359 x 206	197 x 650 x 163	237 x 650 x 163
Weight	7 kg	14 kg	18 kg	18 kg	20 kg	29 kg	28 kg	39 kg
STANDARDS								
Safety	Cells: UL1973 + IEC62619:2017 + UL9540A	Cells: IEC62133:2012		Cells: UL1973 + IEC62619:2017 + UL9540A Battery: IEC62619:2017 + IEC62620:2014		Cells: UL1642	Cells: UL1973 + UL9540A	Cells: UL1973 + IEC62619:2017 + UL9540A Battery: IEC62620:2014
	EN 60335-1:2012/AC:2014, EN-IEC 62368-1: 2020, IEC 61427-1:2013							
EMC	EN-IEC 61000-6-3:2007/A1:2011/AC:2012 - EN 55014-1:2017/A11:2020							
Automotive	ECE R10-6							

[1] When fully charged
[2] The lithium battery can be mounted upright and on its side, but not with the battery terminals facing down
[3] The 12,8V/330Ah lithium battery may only be mounted in an upright position
[4] Up to 5 BMS-es can be paralleled. For more info, please see the official release notes

Victron Energy Lithium NG batteries are Lithium Iron Phosphate (LiFePO$_4$ or LFP) batteries available in various capacities with nominal voltages of 12.8 V, 25.6 V and 51.2 V. They can be connected in series, parallel, or a combination of both to create battery banks for system voltages of 12V, 24V, or 48V. A maximum of 50 batteries can be used when configuring a bank with 12V or 24V batteries, while up to 25 batteries can be used with 48V batteries. This allows for a maximum energy storage capacity of 192 kWh with 12V batteries, up to 384 kWh with 24V batteries, and 128 kWh with 48V batteries.

Key features:

Integrated shunt
The battery data (battery voltage, current and temperature) are transmitted to the BMS and evaluated there, i.e. to calculate the state of charge, which can then be read out via VictronConnect or a GX communication centre, or to create and issue specific warnings and alarms.

Automatic setup, monitoring and control via VictronConnect App or a GX device and the VRM Portal
All battery parameters are managed by the BMS automatically. The BMS automatically detects the system voltage and the number of batteries in parallel, series and series/parallel connection. The BMS (from now on Lynx Smart BMS NG 500 A/1000 A, further models to follow) is mandatory and must be purchased separately.

Monitoring and control take place via VictronConnect (every BMS model has Bluetooth), a GX communication centre or the VRM Portal. You can view battery parameters such as cell status, cell voltages, battery current and temperatures in real-time. The battery firmware is automatically updated by the BMS.
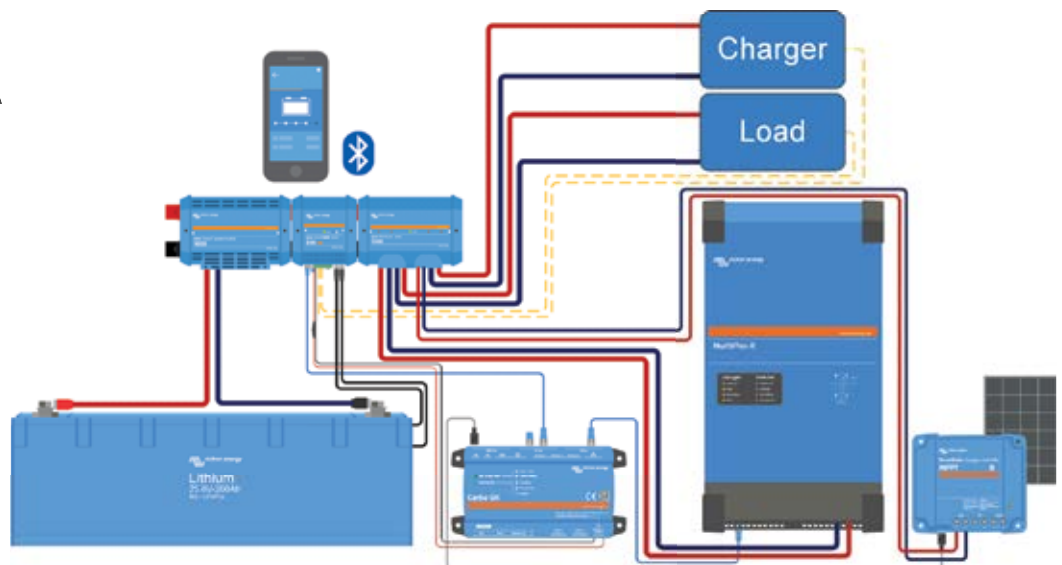
Easy bracket mounting
Mounting brackets make the installation easier and ensure that the battery is optimally secured against slipping and tipping over.

Increased ingress protection (IP-rating)
The Lithium NG batteries are effectively sealed against dust and can withstand low-pressure water jets, making them suitable for environments where exposure to dust and water is a concern.

Low self-discharge rate
The self-discharge rate has been significantly improved and is now a maximum of 2 % of the battery capacity per month. A low self-discharge rate contributes to the overall performance, longevity, and reliability of the NG batteries.

25,6 V 200 Ah Lithium NG battery

Secured with mounting brackets

Lynx Smart BMS NG 500 A & 1000 A

Complete overview of all battery data via VictronConnect (or a GX device and VRM)

Typical system example with Lithium NG battery and Lynx Smart BMS NG

Our Lithium NG batteries have integrated cell balancing and cell monitoring. The cell balancing/monitoring cables can be daisy-chained and must be connected to a Battery Management System (BMS).

Battery Management System (BMS)
The BMS will:
1. Generate a pre-alarm whenever the voltage of a battery cell decreases to less than 3.0 V.
2. Disconnect or shut down the load whenever the voltage of a battery cell decreases to less than 2.8 V.
3. Stop the charging process whenever the voltage of a battery cell increases to more than 3.6 V or when the temperature becomes too high or too low.

See the BMS datasheets for more features.

Battery specification								
VOLTAGE AND CAPACITY	LFP-12,8/100	LFP-12,8/150	LFP-12,8/200	LFP-12,8/300	LFP-25,6/100	LFP-25,6/200	LFP-25,6/300	LFP-51,2/100
Nominal voltage	12,8 V	12,8 V	12,8 V	12,8 V	25,6 V	25,6 V	25,6 V	51,2 V
Nominal capacity @ 25 ℃*	100 Ah	150 Ah	200 Ah	300 Ah	100 Ah	200 Ah	300 Ah	100 Ah
Nominal energy @ 25 ℃*	1280 Wh	1920 Wh	2560 Wh	3840 Wh	2560 Wh	5120 Wh	7680 Wh	5120 Wh
Capacity loss	(per 100 cycles, @ 25 °C, 100 % DoD): <1 %							
Energy loss	(per 100 cycles, @ 25 °C, 100 % DoD): <1 %							
Round trip efficiency	92 %							
*Discharge current ≤1C								
CYCLE LIFE (capacity ≥ 80 % of nominal)								
80 % DoD	2500 cycles							
70 % DoD	3000 cycles							
50 % DoD	5000 cycles							
DISCHARGE								
Max continuous discharge current (C-rate)	100 A (1C)	150 A (1C)	200 A (1C)	300 A (1C)	100 A (1C)	200 A (1C)	300 A (1C)	100 A (1C)
Max pulse discharge current 10s (C-rate)	200 A (2C)	300 A (2C)	400 A (2C)	600 A (2C)	200 A (2C)	400 A (2C)	600 A (2C)	200 A (2C)
End of discharge voltage	11,2 V				22,4 V			44,8 V
Internal resistance	2 mΩ		1 mΩ		4 mΩ	2 mΩ	1 mΩ	8 mΩ
CHARGE								
Charge voltage	Between 14 V / 28 V / 56 V and 14,4 V / 28,8 V / 56,8 V							
Float voltage	13,5 V / 27 V 54 V							
Max continuous charge current (C-rate)	100 A (1C)	150 A (1C)	200 A (1C)	300 A (1C)	100 A (1C)	200 A (1C)	300 A (1C)	100 A (1C)
Max pulse charge current 10s (C-rate)	200 A (2C)	225 A (1.5C)	400 A (2C)	450 A (1.5C)	200 A (2C)	400 A (2C)	450 A (1.5C)	200 A (2C)
GENERAL								
BMS-es	Lynx Smart BMS NG 500 A / 1000 A (M10 busbars), must be purchased separately							
Cell measurements	Cell voltages and temperatures, battery current							
Battery BMS interface	Male + female cable with M8 circular connector with high-speed digital communication, length 50 cm M8 extension cables are available separately for purchase in various lengths between 1 and 5 meters							
Alarm feature	Pre-alarm contact on BMS							
Bluetooth	In the BMS							
Max batteries per BMS	50 (up to 384 kWh per BMS [3])							25 (128 kWh per BMS [3])
Battery firmware updates	Battery firmware automatically updated by BMS							
Repairable	Yes (cover can be removed with screws)							
OPERATING CONDITIONS								
Operating temperature	Discharge: -20 °C to +50 °C | Charge: +5 °C to +50 °C							
Storage temperature	-45 °C to +70 °C							
Humidity (non-condensing)	Max. 95 %							
Protection class	IP65							
MOUNTING								
Mounting options	Strap or mounting brackets (brackets included)							
Can be placed on their sides	Yes [2]							
OTHER								
Self-discharge rate	≤ 3 % per month @ 25 °C							
Power connection	M8 (threaded inserts and bolts)							
Dimensions (h x w x d) mm	235 x 197 x 160	205 x 250 x 205	235 x 341 x 160	206 x 447 x 205	235 x 341 x 160	235 x 648 x 162	206 x 841 x 205	235 x 648 x 162
Weight (est.)	9 kg	14 kg	19 kg	29 kg	19 kg	37 kg	52 kg	37 kg
STANDARDS								
Safety	Cells: UL1973 UL9540A IEC62619	Cells: UL1973 UL9540A IEC62619 (all three pending)	Cells: UL1973 UL9540A IEC62619	Cells: UL1973 UL9540A IEC62619 (all three pending)	Cells: UL1973 UL9540A IEC62619	Cells: UL1973 UL9540A IEC62619	Cells: UL1973 UL9540A IEC62619(all three pending)	Cells: UL1973 UL9540A IEC62619 (all three pending)
	Battery: IEC 62619 (pending)							
EMC	EN 61000-6-3, EN 61000-6-2							
Automotive	ECE R10-6 (pending)							
Performance	IEC 62620 (pending)							

[1] When fully charged
[2] The lithium battery can be mounted upright and on its side, but not with the battery terminals facing down
[3] Up to 5 BMS-es can be paralleled. For more info, please see this announcement.
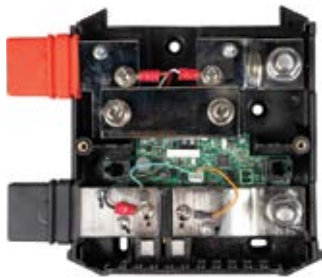
Lynx Shunt VE.Can (M8) model
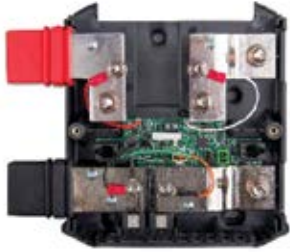
Lynx Shunt VE.Can (M8) without cover

Lynx Shunt VE.Can (M10) model

Lynx Shunt VE.Can (M10) with fuse dummy busbar installed

VE.Can RJ45 terminator

Busbar integrated battery monitoring

The Lynx Shunt VE.Can is an integral part of the Lynx Distribution system, featuring a positive and negative busbar, a battery monitor, and a fuse holder for the main system fuse. It is available in two versions: M8 and M10. The shunt can communicate with GX devices via VE.Can. Additionally, it is equipped with a power LED for status indication.

The M10 model includes an additional piece of busbar that can replace the fuse inside the shunt, providing the flexibility to place the main fuse outside the shunt in a different location. This is particularly useful in larger systems where higher-rated fuses are required.
The Lynx Shunt VE.Can ships with two RJ45 VE.Can terminators, which are used when connecting to a GX device.

The Lynx Shunt VE.Can M8 is specifically designed to accommodate a CNN fuse. The M10 model can handle CNN, ANL or Mega fuses. The fuse needs to be purchased separately. For more information, see the Fusing section in the Lynx Shunt VE.Can manual.

The Lynx Distribution System

The Lynx Distribution System is a modular busbar system that incorporates DC connections, distribution, fusing, battery monitoring and/or Lithium battery management. For more information also see the
DC Distribution Systems product page.

The Lynx Distribution System consist of the following parts:
- **Lynx Power In (M8, M10)** - A positive and negative busbar with 4 connections for batteries or DC equipment.
- **Lynx Class-T Power In (M10)** - A positive and negative busbar that connects and fuses up to two strings of lithium batteries using Class-T fuses (available in 225 A, 250 A, 350 A, and 400 A; must be purchased separately).
- **Lynx Distributor (M8, M10)** - A positive and negative busbar with 4 fused connections for batteries or DC equipment together with fuse monitoring.
- **Lynx Shunt VE.Can (M8, M10)** - A positive busbar with a space for a main system fuse and a negative busbar with a shunt for battery monitoring. It has VE.Can communication for monitoring and setup with a GX device.
- **Lynx Smart BMS 500 and 1000 (M8 – 1000A model only in M10)** - For use together with Victron Energy Smart Lithium batteries. It contains a positive busbar with a contactor that is driven by a battery management system (BMS) and a negative busbar with a shunt for battery monitoring. It has Bluetooth communication for monitoring and setup via the VictronConnect App and VE.Can communication for monitoring with a GX device and the VRM portal.
- **Lynx Smart BMS 500 and 1000 NG (M10)*** - For use together with Victron Energy Lithium NG batteries. It contains a positive busbar with a contactor that is driven by a battery management system (BMS) and a negative busbar with a shunt for battery monitoring. It has Bluetooth communication for monitoring and setup via the VictronConnect App and VE.Can communication for monitoring with a GX device and the VRM portal.

The Lynx modules: Lynx Power In, Lynx Class-T Power In, Lynx Distributor, Lynx Shunt VE.Can and Lynx Smart BMS
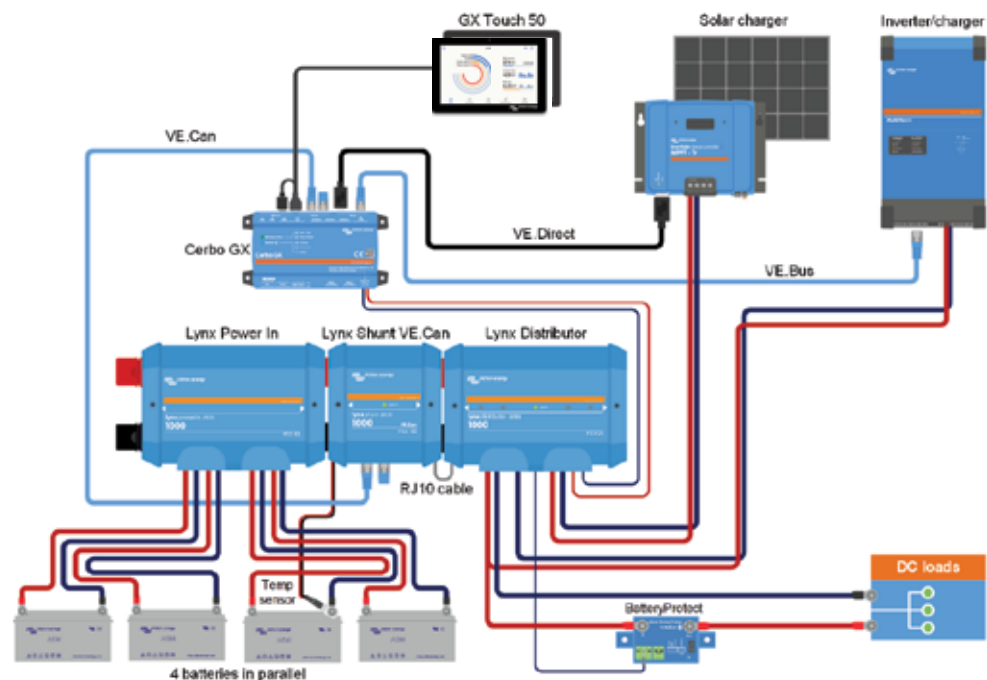
Lynx Shunt VE.Can	M8 model	M10 model
POWER		
Supply voltage range	9 - 70 Vdc	
Supported system voltages	12, 24 or 48 V	
Reverse polarity protection	No	
Current rating	1000 Adc continuous	
Power consumption	60 mA @ 1 2V 33 mA @ 24 V 20 mA @ 48 V	
Potential free alarm contact	3 A, 30 Vdc, 250 Vac	
CONNECTIONS		
Busbar	M8	M10
Fuse	M8	
Fuse Dummy Busbar	No	Yes, included
VE.Can	RJ45 (Two RJ45 terminators included)	
Power supply connection to Lynx Distributor	RJ10 (RJ10 cables ship with each Lynx Distributor)	
Temperature sensor	Screw terminal (Sensor included)	
Relay	Screw terminal	
PHYSICAL		
Enclosure material	ABS	
Enclosure dimensions (h x w x d)	190 x 180 x 80 mm	
Unit weight	1.4 kg	
Busbar material	Tinned copper	
Busbar dimensions (hxw)	8 x 30 mm	
ENVIRONMENTAL		
Operating temperature range	-40 °C to +60 °C	
Storage temperature range	-40 °C to +60 °C	
Humidity	Max. 95 % (non-condensing)	
Protection class	IP22	

System example – Lynx Shunt VE.Can, Lynx Power In, Lynx Distributor and lead acid batteries

This system contains the following components:
- Lynx Power In with 4 paralleled 12V lead acid batteries.
- Identical cable lengths for each battery.
- Lynx Shunt VE.Can with main system fuse and battery monitor.
- Lynx Distributor with fused connections for inverter/charger(s), loads and chargers. Note that additional modules can be added if more connections are needed.
- Cerbo GX (or other GX device) to read out the battery monitor data.

LYNX SMART BMS NG

The Lynx Smart BMS NG is a dedicated Battery Management System (BMS) designed specifically for the Victron Lithium NG batteries. These batteries utilise Lithium Iron Phosphate (LiFePO₄) technology and are available in 12.8 V, 25.6 V and 51.2 V variants with various capacities. They can be connected in series, parallel, or a combination of both to create battery banks for system voltages of 12V, 24V, or 48V. A maximum of 50 batteries can be used when configuring a bank with 12V or 24V batteries, while up to 25 batteries can be used with 48V batteries. This allows for a maximum energy storage capacity of 192 kWh with 12V batteries, up to 384 kWh with 24V batteries, and 128 kWh with 48V batteries. The maximum energy storage capacity can be multiplied by paralleling multiple Lynx Smart BMSs, which also ensures redundancy should one battery bank fail. For comprehensive details about these batteries, visit the Victron Lithium NG battery product page.

Out of the various BMSes available for the all new Lithium NG batteries, the Lynx Smart BMS NG is the most feature-rich and complete option and integrates seamlessly with other M10 products in the Lynx Distributor system. It is available in 500 A (M10) and 1000 A (M10) versions.

Built-in 500 A or 1000 A contactor
- Available in 500 A (M10) and 1000 A (M10) versions.
- Acts as a secondary safety system to protect the battery in case primary controls (ATC, ATD and/or DVCC) fail.
- Suitable as a remote controllable main system switch.

Pre-charge circuit
- Prevents high inrush currents when connecting capacitive loads like inverters.
- Eliminates the need for external pre-charging devices.

Monitoring and control
- Bluetooth connectivity for monitoring and control via the VictronConnect App or VE.Can connectivity in combination with GX devices such as the Cerbo GX or Ekrano GX and the VRM portal.
- Readout of cell voltages and temperatures also on GX devices and the VRM portal.
- Built-in battery monitor provides data such as state of charge, voltage, current, historical data, status info and more in real time.
- Diagnostic at a glance with Instant Readout.

DVCC closed loop control as well as ATC/ATD contacts
- Compatible Victron inverter/chargers, the Orion XS 12/12-50A DC-DC battery charger and solar charge controllers are automatically controlled via a connected GX device and DVCC.
- ATC/ATD contacts can be used to control other chargers and loads that have a remote on/off port.

Programmable relay
- Can be used either as an alarm relay (combined with the pre-alarm) or to control an alternator via its external regulator (ignition cable).
- Features Alternator ATC mode for safe alternator disconnection before battery disconnects.

AUX terminal
- Onboard auxiliary power supply (1.1 A @ system voltage) for powering specific loads (i.e. a GX device) post-BMS shutdown.
- Automatic shutdown of BMS and AUX connection if no charge voltage detected within 5 minutes after a low voltage event.
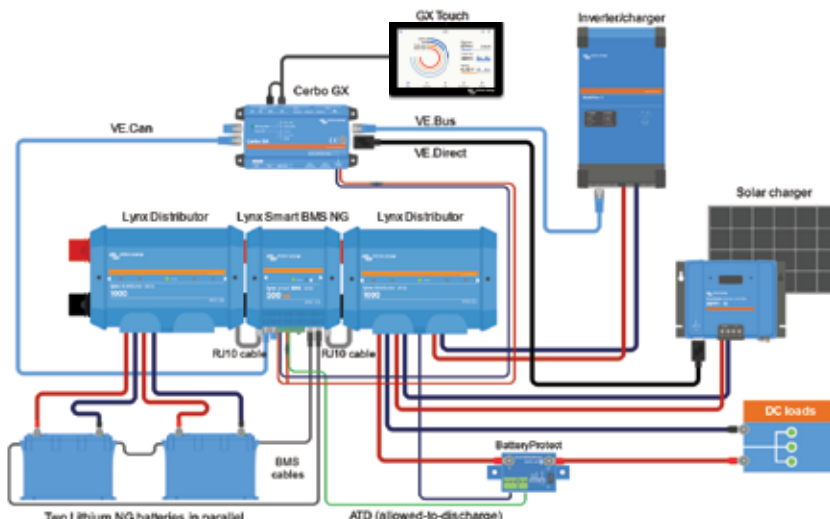
VE.Can and NMEA 2000 data communication
- Easy connection and communication with GX devices via VE.Can using a standard RJ45 network cable.
- Integration into marine networks via NMEA 2000 protocol (requires a VE.Can to NMEA 2000 micro-C male cable).

Lynx Distributor fuse monitoring
- Monitor fuse status of up to 4 connected Lynx Distributors via VictronConnect or GX devices.
- Receive alarms in case of blown fuses.

Parallel redundant Lynx Smart BMS
- The new parallel redundancy feature for the Lynx Smart BMS and Lynx Smart BMS NG series allows multiple Lynx BMSes in one installation. Each has its own battery bank, and together they form a single redundant battery system. Up to 5 BMS-es can be paralleled.

Lynx Smart BMS NG 500A

Lynx Smart BMS NG 1000A

VictronConnect

System example – Lynx Smart BMS NG, 2x Lynx Distributor M10 and Lithium NG batteries

This system contains the following components:
- Lynx Distributor M10 with 2 fused paralleled Lithium NG batteries.
- Lynx Smart BMS NG 500A with BMS, contactor and battery monitor.
- A second Lynx Distributor M10 provides fused connections for inverter/charger(s), loads and chargers. Additional modules can be added if more connections are needed.
- A Cerbo GX (or other GX device) to read out the Lynx Smart BMS and Lynx Distributor data.

Lynx Smart BMS NG	500 A (M10) (LYN034160310)	1000 A (M10) (LYN034170310)
POWER		
Battery voltage range	9 – 60 VDC	
Maximum input voltage	75 VDC	
Supported system voltages	12, 24 or 48 V	
Reverse polarity protection	No	
Main safety contactor continuous current rating	500 A continuous	1000 A continuous
Main safety contactor peak current rating	600 A for 5 minutes	1200 A for 5 minutes
Power consumption OFF mode	0.3 mA for all system voltages	
Power consumption in Standby mode	Approximately 0.6 W (50 mA at 12 V)	
Power consumption in ON mode	Approx. 2.6 W (217 mA at 12 V) depending on the state of the relays	Approximately 4.2 W (350 mA at 12 V) depending on the state of the relays
Minimum load resistance for pre-charging	10 Ω and above for 12 V systems 20 Ω and above for 24 V and 48 V systems	
AUX output maximum current rating	1.1 A continuous, protected by resettable fuse	
Allow-to-charge port Maximum current rating	0.5 A at 60 VDC, protected by resettable fuse	
Allow-to-discharge port Maximum current rating	0.5 A at 60VDC, protected by resettable fuse	
Alarm relay (SPDT) Maximum current rating	2 A at 60 VDC	
CONNECTIONS		
Busbar	M10 (Torque: 33 Nm) – can be combined with all M10 Lynx products	
VE.Can	RJ45	
I/O	Removable multi-connector with screw terminals	
Battery BTV cables	Male and female circular 3-pole connector with M8 screw ring Up to 50 batteries can be connected in one system	
Lynx Distributor fuse monitoring (up to 4 modules)	RJ10 (cable ships with each Lynx Distributor)	
PHYSICAL		
Enclosure material	ABS	
Enclosure dimensions (h x w x d)	190 x 180 x 80 mm	230 x 180 x 100 mm
Unit weight	1.9 kg	2.7 kg
Busbar material	Tinned copper	
Busbar dimensions (h x w)	8 x 30 mm	
ENVIRONMENTAL		
Operating temperature range	-40 °C to +60 °C	
Storage temperature range	-40 °C to +60 °C	
Humidity	Max. 95 % (non-condensing)	
Protection class	IP22	
STANDARDS		
Safety	EN-IEC 63000:2018	
EMC	EN-IEC 61000-6-3:2007/A1:2011/AC:2012	
QMS	NEN-EN-ISO 9001:2015	

Lynx Distribution products with M10 busbars

Flexible building blocks to solve any kind of power challenge

With Victron Energy you have one of the widest ranges of robust connected power products that keep performing, even in the harshest of climates. Our up-to-date solutions counter most off-grid issues and can be fine-tuned to the most demanding and specific needs.

Feel free to ask your local Victron dealer for advice.
www.victronenergy.com

Inverter/chargers — Inverter/charger/MPPT — Inverters

Solar chargers from small — ...to large

Battery chargers — EV charging station — DC distribution systems

Battery Monitoring — System monitoring

And more

Battery protection - DC-DC converters and chargers - Lithium batteries - AGM and GEL batteries - Battery Management Systems - Voltage sensitive relays - Fuses and fuse holders - Busbars - Battery switches

Self-consumption and energy storage systems at work

An up-to-date range of flexible and robust products is only half the story. Installing them correctly is equally important. It is the dedication and drive of authorised Victron Professionals that makes it all work. Together we turn Victron Energy systems into unbeatable systems powered by know-how. *Let's have a look at some recent installations.*

Why Victron?

At Victron Energy we're as dedicated and driven to making and improving power solutions today as we were when we started in 1975. Thanks to our customer feedback, data and knowledge sharing, we innovate 24/7. We are powered by know-how, it keeps us going and our users going, ensuring peace of mind in off-grid for years to come.

01

It's not one thing that makes it all work.

Our modular, robust and connected power systems have been proven to deliver unequalled reliability time and time again, even in the harshest of climates. But it's our unique combination of up-to-date hard- and software, intelligent monitoring apps, the network of highly trained authorized professionals and widespread repair centers that turns a Victron Energy system into an unbeatable system, that is powered by know-how.

02

Reliability powers long service life cycles.

When making power supply invest-ment decisions, calculations purely based on price can be deceptive. Their true performance and expected service life cycle are equally impor-tant. Good thing Victron Energy lives up to our specifications, both in terms of performance and expected life cycle (when used as designed). Our 5 or 10 year warranty and fair and fast repair policies mean your investments are protected and won't let you down.

Endless energy
since 1975
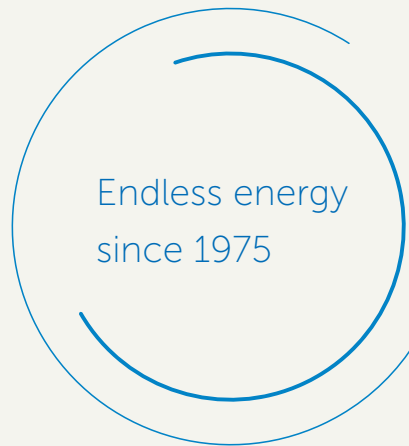
03

How efficiency translates into cost-effectiveness.

With battery-based systems, efficiency is always key to providing great levels of cost-effectiveness. From our incredibly efficient SmartSolar Charge Controllers to the way our inverter/chargers can intelligently control and minimise generator use, with a Blue Power system you can be sure that all the details are thought-through. This, combined with our reputation for extreme resilience and long life cycles, translates into cost-effective solutions, especially when compared to 'cheaper' options.

04

Intelligent monitoring means optimized systems.

Monitoring is crucial to fine-tune and optimize energy harvest and use based on ever-changing circumstances. With Victron you have the power of know-how at your fingertips. Through our industry leading and free VictronConnect app, you always have perfect control over your system from wherever you are. With our app and VRM portal you can monitor the complete system, change settings and catch potential issues early by programming alerts and alarms.

05

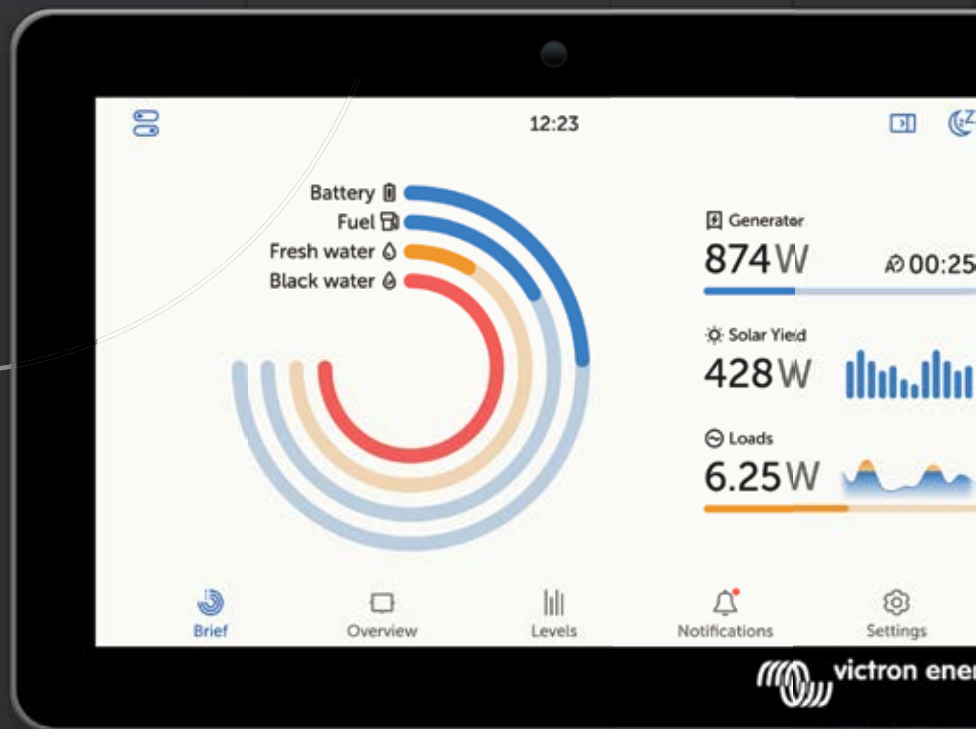## Our worldwide network of authorized dealers is by your side.

Our global network of ±1000 highly trained distributors, installers and service partners are always on hand to help. From stock advice, installation recommendations, after-care and technical support.

With the Victron Energy team, our partners and lively community you can always be sure the power of know-how is by your side.

Connect it all. Control it all.

Unlock the full power of Victron Remote Management
with the Cerbo GX

GX Touch

12:23

Battery
Fuel
Fresh water
Black water

Generator
874 W   00:25

Solar Yield
428 W

Loads
6.25 W

Brief   Overview   Levels   Notifications   Settings

victron ener

Tank

Works with

VictronConnect app

VRM - Remote Management portal
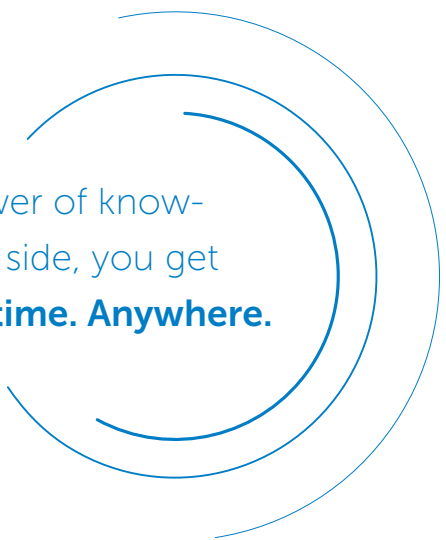
MFD & NMEA 2000 integration

Tank levels

victron energy
B L U E   P O W E R

Managed Batteries

Victron Connected
Products

VE.Con | VE.Bus
VE.Direct 1 | VE.Direct 2 | VE.Direct 3

victron energy
B L U E   P O W E R

Green: Active

Orange: Disabled

Connected

Not connected

Disabled

CE

www.victronenergy.com

Press short: toggle WiFi Access Point & Bluetooth on / off
Press long: reset network settings

Temp | Digital inputs | DATA GND | Relay 1 NO COM NC | Relay 2 NO COM NC | Power in 8-70VDC - +

MFD

Marine MFD's

Wireless temperature
sensors

Switch Relays

Solar irradiance &
wind meters

Auto start/stop
the generator

With the power of know-how by your side, you get **Energy. Anytime. Anywhere.**

Energy. Anytime. Anywhere.