

**Van or small Motorhome drawing with: Smart BMS CL12/100 MultiPlus 3kVA DMC 400Ah Li VE.Bus Smart Dongle & Shunt SBP 100A MPPT 100-50.pdf****What is this drawing about ?**

This drawing typically has been setup for Camper Vans or Motorhomes for the US market 120V/60Hz AC but can easily be used for boats as well.

**This Victron system works as follows:**

This system has been built around the 3kVA MultiPlus and the Li battery capacity has been adjusted to give you enough spare capacity. Protection of the Li batteries from a charge and discharge point of view is being dealt with by the Smart BMS CL 12/100.

To make sure you will not run out of power that easily, there are multiple charge possibilities available for this setup:

1. AC Campsite Power that will enable the 3kVA MultiPlus Inverter/Charger to charge with 120 Amps towards the Li batteries.
2. DC Solar Power that will enable the Smart Solar MPPT 100|50 to charge towards the Li batteries. The total Charge capacity depends on the installed Solar array.
3. DC Engine charging power allowed by the Smart BMS CL 12/100 to charge with a limited current of about 60 Amps towards the Li batteries when the Engine runs.

Charge combinations of the above mentioned devices also are possible.

DC loads or power consumers such as lights, pumps and so on, can be connected behind a Smart Battery Protect 100 with use of a DC switch panel and a negative busbar.

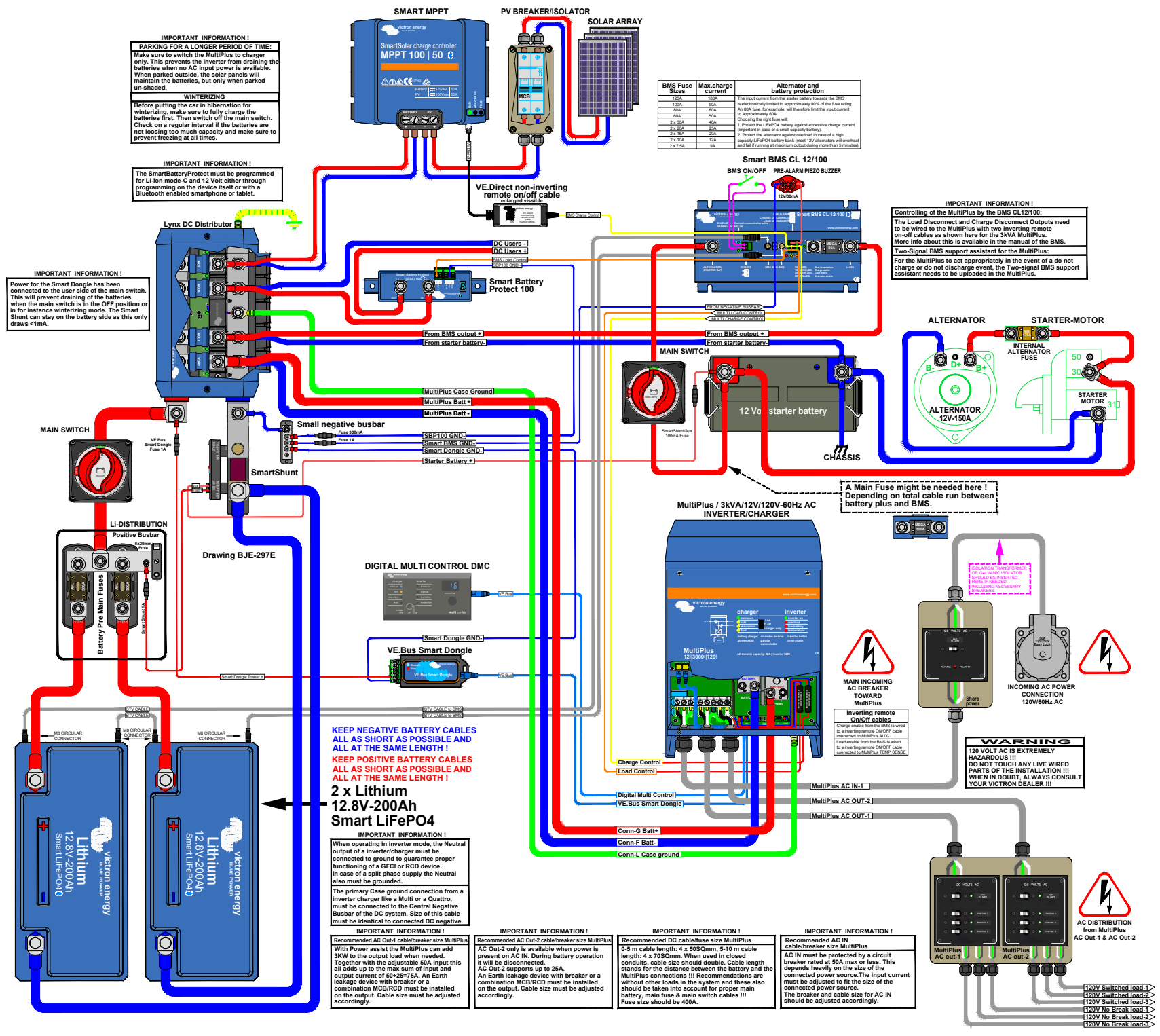
AC Power will be available from the 3kVA MultiPlus Inverter/Charger the moment it has been switched on. This means that without any AC power on its input, the MultiPlus will give you 3kVA of inverter power on AC OUT-1. The moment AC Power is available on input AC IN-1 of the MultiPlus, AC Power will be used to charge the batteries and also is available for loads connected to AC OUT-1. The second AC output AC OUT-2 is live only when AC power is available on the input of the MultiPlus. With the easily settable Digital Multi Control one can adjust the available AC campsite power to the maximum AC current the MultiPlus will use and this is where the Power Assist function comes into play. Power Assist supplements AC inverter power to (for instance) a limited Shore power connection when needed.

Information about all AC and DC power to and from the MultiPlus is clearly visible through the connected VE.Bus Smart Dongle when using the VictronConnect App. The MultiPlus can also easily be set and controlled with use of the Smart Dongle and the VictronConnect App. All battery parameters like for instance the state of charge (SoC) can easily be checked when using the VictronConnect App with your SmartShunt. You can exactly see what is happening with your batteries like how much power is coming into the batteries when the engine runs or from the installed solar system or from a charging MultiPlus. Or how much power runs away when using the MultiPlus as an inverter. If you wish to see all available information on one device at the same time, you can also think about installing a GX device like the Cerbo GX with a touch screen.

**This is how the system has been setup:****Around the Victron Lithium Batteries 12.8V Smart.**

There are two Victron Lithium Batteries 12.8V Smart of 200Ah in this drawing.

Following the drawing from the bottom-left, both positive battery terminals are connected to an individual ANL fuse-holder with a 300A fuse. The top side of the ANL fuse holders are connected together with a piece of Tinned copper bar. On the same copper bar is a fuse holder connected for the Smart Shunt with a fuse of 1A keeping it on 24-7. Between the two ANL fuse holders is a Center Tab connection that runs to the Victron Main Switch and from the Main Switch a connection has been made to the Lynx Distributor positive Battery connection and that connection includes a fuse holder for the VE.Bus Smart Dongle with a fuse of 1A.

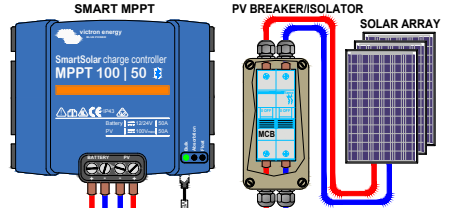


**IMPORTANT INFORMATION !**  
**PARKING FOR A LONGER PERIOD OF TIME:**  
 Make sure to switch the MultiPlus to charge only. This prevents the inverter from draining the batteries when no AC input power is available. When parked outside, the solar panels will maintain the batteries, but only when parked un-shaded.

**WINTERIZING**  
 Before putting the car in hibernation for winterizing, make sure to fully charge the batteries first. Then switch off the main switch. Check on a regular interval if the batteries are not loosing too much capacity and make sure to prevent freezing at all times.

**IMPORTANT INFORMATION !**  
 The SmartBatteryProtect must be programmed for Li-Ion mode-C and 12 Volt either through programming on the device itself or with a Bluetooth enabled smartphone or tablet.

**IMPORTANT INFORMATION !**  
 Power for the Smart Dongle has been connected to the user side of the main switch. This will prevent draining of the batteries when the main switch is in the OFF position or in for instance winterizing mode. The Smart Shunt can stay on the battery side as this only draws <1mA.



BMS Fuse Sizes	Max. charge current	Alternator and battery protection
125A	100A	The input current from the starter battery towards the BMS is electronically limited to approximately 95% of the fuse rating. An 80A fuse is advised, well below the limit the input current is approximately 80A. Choosing the right fuse will: 1. Protect the LiFePO4 battery against excessive charge current (prevents the risk of a small capacity battery). 2. Protect the alternator against overload in case of a high capacity LiFePO4 battery bank (over 100Ah maximum with 100Ah and half of running at maximum output during more than 5 minutes).
150A	125A	
200A	150A	
250A	200A	
300A	250A	
400A	300A	

**IMPORTANT INFORMATION !**  
**Controlling of the MultiPlus by the BMS CL12/100:**  
 The Load Disconnect and Charge Disconnect Outputs need to be wired to the MultiPlus with two inverting remote on-off cables as shown here for the 3kVA MultiPlus. More info about this is available in the manual of the BMS.

**Two-Signal BMS support assistant for the MultiPlus:**  
 For the MultiPlus to act appropriately in the event of a do not charge or do not discharge event, the Two-signal BMS support assistant needs to be uploaded in the MultiPlus.

**KEEP NEGATIVE BATTERY CABLES ALL AS SHORT AS POSSIBLE AND ALL AT THE SAME LENGTH !**  
**KEEP POSITIVE BATTERY CABLES ALL AS SHORT AS POSSIBLE AND ALL AT THE SAME LENGTH !**  
**2 x Lithium 12.8V-200Ah Smart LiFePO4**

**IMPORTANT INFORMATION !**  
 When operating in inverter mode, the Neutral output of a inverter charger must be connected to ground to guarantee proper functioning of a GFCI or RCD device. In case of a split phase supply the Neutral also must be grounded.

The primary Case ground connection from a inverter charger like a Multi or a Quattro, must be connected to the Central Negative Busbar of the DC system. Size of this cable must be identical to connected DC negative.

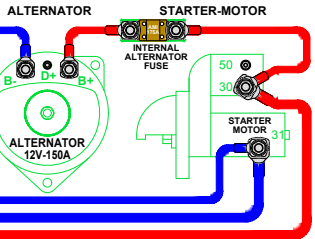
**IMPORTANT INFORMATION !**  
**Recommended AC Out-1 cable/breaker size MultiPlus**  
 With Power assist the MultiPlus can add 3KW to the output load when needed. Together with the adjustable 50A input this all adds up to the max sum of input and output current of 50+25=75A. An Earth leakage device with breaker or a combination MCB/RCD must be installed on the output. Cable size must be adjusted accordingly.

**IMPORTANT INFORMATION !**  
**Recommended AC Out-2 cable/breaker size MultiPlus**  
 AC Out-2 only is available when power is present on AC IN. During battery operation it will be disconnected. AC Out-2 supports up to 25A. An Earth leakage device with breaker or a combination MCB/RCD must be installed on the output. Cable size must be adjusted accordingly.

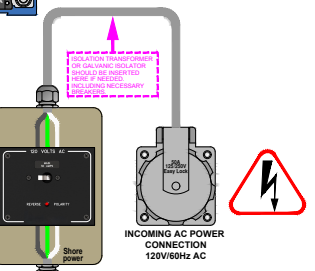
**IMPORTANT INFORMATION !**  
**Recommended DC cable/fuse size MultiPlus**  
 D+S m cable length: 4 x 50S0mm, 5-10 m cable length: 4 x 70S0mm. When used in closed conduits, cable size should double. Cable length stands for the distance between the battery and the MultiPlus connections !!! Recommendations are without other loads in the system and they also should be taken into account for proper main battery, main fuse & main switch cables !!! Fuse size should be 40A.

**IMPORTANT INFORMATION !**  
**Recommended AC IN cable/breaker size MultiPlus**  
 AC IN must be protected by a circuit breaker rated at 50A max or less. This depends heavily on the size of the connected power source. The input current must be adjusted to fit the size of the connected power source. The breaker and cable size for AC IN should be adjusted accordingly.

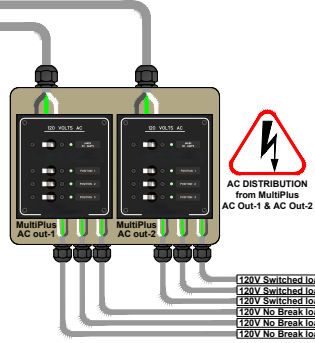
**WARNING**  
 120 VOLT AC IS EXTREMELY HAZARDOUS !!! DO NOT TOUCH ANY LIVE WIRED PARTS OF THE INSTALLATION !!! WHEN IN DOUBT, ALWAYS CONSULT YOUR VICTRON DEALER !!!



**A Main Fuse might be needed here !**  
 Depending on total cable run between battery plus and BMS.



**MAIN INCOMING AC BREAKER TOWARD MultiPlus**  
 Inverting remote On/Off cables  
 Charge enable from the BMS is wired to a inverting remote ON/OFF cable connected to MultiPlus AUX-1  
 Load enable from the BMS is wired to a inverting remote ON/OFF cable connected to MultiPlus AUX-2



**AC DISTRIBUTION from MultiPlus**  
 AC Out-1 & AC Out-2  
 120V Switched load-1  
 120V Switched load-2  
 120V Switched load-3  
 120V No Break load-1  
 120V No Break load-2  
 120V No Break load-3

Both negative battery terminals are directly connected to the Smart Shunt Battery Connection. The Smart Shunt System Minus connection is connected to the Lynx Distributor negative Battery connection with a piece of Tinned copper bar. Also connected here is a small negative Busbar that will be needed for the following negative connections:

- 1 - Smart Battery Protect 100 GND (with a 300mA fuse)
- 2 - Smart BMS GND (with a 1A fuse)
- 3 - Smart Dongle GND

### **Smart Shunt 500A:**

The Smart Shunt 500A used in this drawing has two positive connection terminals, one for its own Power and measurements named Vbatt+ and one called Aux. The Aux connection can be used to measure the Battery Voltage of the Starter battery as shown in this drawing. Place an In-Line fuse for this of 1A close to the positive starter battery terminal and connect to the Aux connection of the Smart Shunt. The negatives of the starter battery and the service batteries have to be connected together to make this work. The Smart Shunt VE.Direct connection is not used here but when you decide to use a Cerbo GX, you can connect the Smart Shunt directly to the Cerbo and by doing this all battery information will be available on a GX Touch screen.

### **Lynx Distributor:**

The Lynx Distributor is the centre DC distribution point of this installation. It holds 4 Mega fuses and all of them are in use here. It is important to always start with connecting the negative cable first before connecting the positive for each distribution position. Read the manual for additional information.

1. The first fuse position at the bottom of the Distributor holds a 400A fuse together with its lower positioned negative connection for the biggest device in this installation, a 3kVA MultiPlus inverter/charger. Keep the distance between the Lynx Distributor and the MultiPlus as short as possible. If that can not be achieved, you have to double up the positive and negative DC power cables to power up the MultiPlus efficiently. Read the MultiPlus manual carefully to proceed further.
2. The second fuse position holds a 100-125A fuse for the Li Connection of the Smart BMS CL 12/100 together with its lower positioned negative connection coming from the Starter Battery negative connection.
3. The third fuse position holds a 100A fuse together with its lower positioned negative connection for a Smart Battery Protect 100. This one can be used for a DC switch panel.
4. The fourth fuse position holds a 60A fuse together with its lower positioned negative connection for the output of a Smart Solar charge controller MPPT 100|50.
5. The PE/Earth connection will be dealt with later together with the MultiPlus.

### **Smart Battery Protect 100:**

The smart battery protect 100A model can be used for a DC switch panel and is needed to protect the Li batteries from discharging beyond a low Voltage setpoint. It comes highly recommended to install a fuse of 300mA in the negative connection of the SBP.

### **Smart BMS CL 12/100:**

Above the starter battery you will find the Smart BMS CL 12/100 and this device can be seen as a charge current limiter that protects a standard alternator against overheating when charging through the Smart BMS towards the Li batteries.

The installed MEGA fuse mounted on the BMS acts as shunt measuring the current flow through the BSM. In the Fuse table above the BMS you can clearly see what a certain fuse value will do to limit the charge current from a standard alternator towards the Li batteries.

The BMS allows current to flow from the starter battery towards the Li batteries in a restricted way and is fully adjustable to the circumstances it is used for. The BMS also protects the LiFePO<sub>4</sub> batteries against over Voltage, under Voltage and high temperature. The Victron Lithium Batteries 12.8V Smart have an integrated Balancing, Temperature and Voltage control (acronym: BTVC) and connect to the BMS with two M8 circular connector cable sets. The BTVC's of several batteries can be daisy-chained as in this drawing. The BMS supports up to 5 batteries in parallel. When cables are not long enough, extensions cables are available in several lengths from your Victron dealer which will suit your purpose.

The starter battery plus connection for the BMS first runs through a main switch before connecting to the BMS ALTERNATOR/ STARTER BAT connection. The positive BMS output connection Li-ION, runs to the second Lynx Distributor fuse position holding a 100-125A fuse. The BMS negative connection GND comes from the small negative busbar with a 1A In-Line fuse.

An extra Main fuse might be needed depending on the total cable run between the starter battery Plus and the BMS.

There is a small BMS ON/OFF switch connected to the Remote-H en Remote-L connections.

The switch settings can be programmed with the Victron Connect App to:

Only alternator off, or everything off. You can decide whether or not to use this switch.

If you decide to use the BMS ON/OFF switch, make sure to mount it away/out of sight from little kid's hands otherwise you might be in the dark quite suddenly !

The Load disconnect output of the BMS will stop connected devices from discharging when the Battery Voltage has decreased below a preset value.

The following Victron devices will be stopped when this happens:

- Smart Battery Protect 100 controlling a full Load disconnect of what is connected to the SBP100 OUT Connection.
- 3kVA MultiPlus will stop discharging the batteries through its inverter with use of an Inverting Remote On/Off cable connected to the MultiPlus Temp sense connections.

The Charge disconnect output of the BMS will stop connected devices from charging to prevent Cell over-Voltage or a Cell temperature that runs too high.

The following Victron devices will be stopped when this happens:

- The Smart Solar charge controller MPPT 100|50 will stop charging the batteries with use of a VE.Direct Non Inverting Remote On/Off cable.
- 3kVA MultiPlus will stop charging the batteries with use of an Inverting Remote On/Off cable connected to the MultiPlus Aux-1 connections.

The Pre-Alarm output of the BMS will generate a Pre-Alarm signal to warn of an imminent Cell under-Voltage. The buzzer will sound and this will give you ample time to start a charge or to switch off devices preventing a load disconnect.

The BMS LED indicators can help you identify what is going on with the BMS & Li batteries:

Green next to L-H: Smart BMS CL 12/100 is active.

Blue next to L-H: Blinking-Bluetooth broadcasting. ON-Connection established.

Red: Over-Temperature protection of the built in BMS current limiter.

Yellow: Charge disconnect output of the BMS is enable.

Orange: Load disconnect output of the BMS is enable.

Green next to Fuse: Alternator is charging.

For more LED indicator info, read the BMS manual.

### **Smart Solar charge Controller MPPT 100|50:**

In the top centre of the drawing you will find a Smart Solar charge Controller MPPT 100|50.

Also visible here is a PV breaker/Isolator. The Solar array as shown in the drawing is just to visualize some solar panels and how things need to be connected.

It might be a good idea that you use the free MPPT sizing calculator available from the Victron website. This is a great and accurate tool to size what you need on Solar panel power and charge controllers for your Van or Motorhome. On the Victron Website just search for MPPT calculator. DC power from the solar array first passes through the PV breaker/Isolator and then connects to the MPPT PV input connections. The positive DC Output connection of the MPPT connects to the fourth fuse position of the Lynx Distributor. The fourth fuse position holds a 60A fuse together with its lower positioned negative connection for the MPPT output.

The Smart BMS CL 12/100 Charge Disconnect connection, connected to a VE.Direct Non Inverting Remote On/Off cable, controls the MPPT through its VE.Direct port from overcharging the Li batteries.

### **Engine System:**

The starter circuit of the engine with Starter Battery and Chassis ground connections, Alternator with main fuse and Starter Motor visible in this drawing should be seen as an example to show you how to connect your Victron products.

### **MultiPlus Inverter/Charger 3kVA/12V 120V/60Hz AC:**

Below the starter battery and starter circuit you will find the MultiPlus Inverter/Charger. The MultiPlus should be mounted in such a way that it can cool itself down properly and the space where it is in should be dry and well ventilated. Free space around the device should be at least 10cm or 4". Don't box the device in as this will certainly have a bad effect on its functioning and service life.

Most connections to and from the Multiplus already have been discussed, but it might be a good idea to have them all together here again:

The DC power to and from the MultiPlus connects to the first fuse position at the bottom of the Lynx Distributor holding a 400A fuse together with its lower positioned negative connection.

Incoming AC power into the Van or Motorhome comes through a Camp site or Shore Power connection of 50A. From there it passes through an incoming AC breaker panel towards the MultiPlus AC IN-1 connections.

AC OUT-1 of the MultiPlus is connected to an AC breaker panel.

These are NO Break AC outputs and as the name suggests are constantly powered through the MultiPlus Inverter.

AC OUT-2 of the MultiPlus is also connected to an AC breaker panel.

These are switched AC outputs and as the name here suggest are switched off when there is no incoming AC power available. AC OUT-2 is live only when AC power is available on the input of the MultiPlus with a 2 minute connect delay.

The Smart BMS CL 12/100 will control de MultiPlus to protect the Li batteries the following way: The Load disconnect output of the BMS will stop the MultiPlus from discharging the batteries when the Battery Voltage has decreased below a preset value.

- The MultiPlus will stop discharging the batteries with use of an Inverting Remote On/Off cable connected to the MultiPlus Temp sense connections and the BMS Load disconnect output. The Charge disconnect output of the BMS will stop the MultiPlus from charging the batteries to prevent Cell over-Voltage or a Cell temperature that runs too high.

- The MultiPlus will stop charging the batteries with use of an Inverting Remote On/Off cable connected to the MultiPlus Aux-1 connections and the BMS Charge disconnect output.

For the MultiPlus to act appropriately in the event of a do not charge or do not discharge event, the Two-signal BMS support assistant needs to be uploaded into the MultiPlus.

The MultiPlus has two VE.Bus connections:

One is used for the VE.Bus Smart Dongle and one for the Digital Multi Control or DMC device.

The MultiPlus has a Case Ground connection-L that should be connected to the Lynx Distributor negative Busbar as shown in this drawing. The PE/Ground connection also is connected to the Lynx Distributor negative Busbar as shown at the top of the Lynx Distributor. The Case Ground cable should be one size smaller compared to its total connected negative.

All shown connections in this drawing, are made according to US ABYC regulations.

This is a NON Isolated DC System setup. When in doubt about how to continue with these connections, consult your Victron dealer.

Read the MultiPlus manual carefully to proceed further.

### **VE.Bus Smart Dongle:**

The VE.Bus Smart dongle is a Bluetooth enable VE.Bus interface for the MultiPlus

The dongle can remotely monitor and control the 3kVA MultiPlus inverter/charger via Bluetooth with use of the VictronConnect app. The inverter/charger can be switched to On, Off or charger-only, the AC input current limit can be adjusted and the AC and DC parameters, device status, warnings or alarms can be monitored. The positive power for the Dongle comes from a 1A fuse connected to the Lynx Distributor positive Battery connection.

The negative power comes from the small negative busbar.

### **Digital Multi Control:**

The Digital Multi Control or DMC is used to remotely view and adjust the AC input current of your MultiPlus in a direct and easy way by the turn of a knob, and you can switch your MultiPlus remotely ON or OFF, or to Charger Only.

### **Software settings for all shown Victron devices in this drawing:**

- When setting up a new system, it will be good practice to update all Victron devices to the latest available Software/Firmware.
- The Victron LiFePO4 12,8V 200Ah Smart batteries can be set, monitored and updated with use of the VictronConnect App.
- The Victron Smart Shunt 500A can be set, monitored and updated with use of the VictronConnect App. Don't forget to set the Battery capacity.
- The Victron Smart Battery Protect 100 can be set, monitored and updated with use of the VictronConnect App. Must be programmed for Li-Ion mode-C and 12V.
- The Victron Smart Solar charge controller MPPT 100|50 can be set, monitored and updated with use of the VictronConnect App. Must be programmed for Li-Ion mode and 12V.
- The Smart BMS CL 12/100 can be set, monitored and updated with use of the VictronConnect App.
- The Victron MultiPlus can be set, monitored and updated with use of the MK3-USB interface and VEConfigure software (Windows only) or use the VictronConnect App (Multi Platform). Limitations of Victron Connect are that one can not add assistants, use Virtual Switch and/or change the Grid Code.

### **The recommended way to commission a MultiPlus system like in this drawing is to:**

- Update the firmware first.
- Install the Two-signal BMS support assistant.
- Install and connect the Inverting remote on/off cables
- Install and connect the Smart BMS CL 12/100.
- When the MultiPlus and the Smart BMS CL 12/100 are up and running with AC power available unplug the Charge disconnect cable and wait for the MultiPlus to stop charging or switch to passthrough/switch off.
- When the MultiPlus and the Smart BMS CL 12/100 are up and running without AC power available and the Multiplus is in Inverter mode unplug the Load disconnect cable and wait for the MultiPlus to stop Inverting or switch off.
- These steps ensures that the MultiPlus has been properly connected and setup with the Smart BMS CL 12/100.
- Finish the commissioning, or connect with VictronConnect and make the rest of the configuration that you wish to make.

### **Wiring Calculations:**

There are no wire sizes visible in this drawing and there is a good reason why this is not available in any drawing on the Victron website. We at Victron do not know what the physical size of your project is and it therefore will be impossible to give you specific wire sizes that will fit your setup. But there is a very handy tool available from Victron called Victron Toolkit for Android and iPhone users. In this app you will find Cable Calc that will help you size any cable for AC and DC. This will help you find all the right cable sizes for your project.

### **Wiring Unlimited:**

This is a book freely available for downloading from the Victron Website. This book is all about electrical wiring for systems containing batteries, inverters, charger, inverter/chargers and so on. With this book Victron aims to explain wiring basics of electrical systems. This book helps to explain the importance of 'getting it right' and the issues that might happen when a system has inferior wiring. It also assists electrical installers or users to troubleshoot issues that have arisen from bad wiring. This book will certainly help to get it right and to make sure proper conclusions can be drawn for the electrical systems its readers are involved with.

**Using the Victron-Remote-Monitoring / VRM app or website when a Cerbo is installed:**

Monitoring of your installation can be done either with a Cerbo in front of you or from anywhere in the world using an internet connection with VRM World that connects to the Victron VRM portal either using the Victron connect app or website. Just login to your VRM account or setup a new one and tap on your account to view your installation. You can for instance set alarm status information for the state of charge or SoC and this will automatically warn you when a certain level has been reached. This is extremely useful for long time parking or winterizing mode and..... it is free of charge ! For more info read the latest available VRM manual. The VRM app is available for Android and iPhone users.

**Parking for a longer period of time:**

Make sure to switch the MultiPlus to charger only. This prevents the inverter from draining the batteries when no AC input power is available. When parked outside, the solar panels will maintain the batteries, but only when parked away from shade.

**Winterizing:**

Before putting the Camper Van or motorhome in hibernation for winterizing, make sure to fully charge the batteries first. Then switch off the MultiPlus and the main switches. The Smart Shunt is on 24-7. Check at regular intervals if the batteries are not losing too much capacity and make sure to prevent freezing at all times. A regular interval is 4-6 weeks. Installing a small Victron maintenance charger for wintertime is a very good investment. With for instance a Victron Blue Smart IP65 Charger 120V/12V/10A, you can switch off the MultiPlus and only use the maintenance charger to keep your batteries in good condition throughout the winter.

**In this drawing you will find the following Victron equipment with some additional material:**

Victron Part description	Part No.	Amount	Remark
Battery switch on/off 275A	VBS127010010	2	
Blue Sea ANL Pre-Main fuse holders for the Li batteries	5005	2	
Blue Sea ANL 300A Main fuse	5133	2	
Blue Sea Mini BusBar - 5 Gang with Cover	2314	1	
Cables with M8 circular connector (for Li-ion batteries) Male to Female 3 pole 2 m (bag of 2)	ASS030560200	1	Bag of 2
Digital Multi Control 200/200A GX	DMC000200010R	1	
Fuse holder 2AG or 5x20mm by Little Fuse including fuses	150 series	5	Order on line or from your Victron dealer
Inverting remote ON/OFF cable	ASS030550120	2	
LiFePO4 Battery 12,8V/200Ah - Smart	BAT512120610	2	
Lynx Distributor	LYN060102000	1	Order fuses from your Victron dealer
Modular fuse holder for Mega-fuse	CIP100200100	1	Possibly needed
MultiPlus 12/3000/120-50 120V	PMP123021102	1	
Paneltronics 120 Volt AC main Input panel	.....	1	
Paneltronics 120 Volt AC Output panel	.....	2	

<b>Victron Part description</b>	<b>Part No.</b>	<b>Amount</b>	<b>Remark</b>
Piezo buzzer, on/off switch	.....	1	Order from your Victron dealer
PV Breaker/Isolator	.....	1	Order from your Victron dealer
Smart BatteryProtect 12/24V-100A	BPR110022000	1	
Smart BMS CL 12/100	BMS110022000	1	
Smartshunt 500A/50mV	SHU050150050	1	
SmartSolar MPPT 100/50	SCC110050210	1	
VE.Bus cables: from Multiplus to DMC, from Multiplus to VE.Bus Smart Dongle	.....	2	Cable lengths not known
VE.Bus Smart Dongle	ASS030537010	1	
VE.Direct Non Inverting remote ON/OFF cable	ASS030550320	1	

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