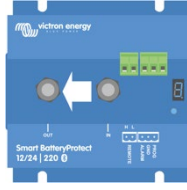


BatteryProtect 12/24V
 ENGLISH

Installation

- The BatteryProtect (BP) must be installed in a well-ventilated area and preferably close (max 50 cm) to the battery (but, due to possible corrosive gasses not above the battery!). **Voltage drop over a long or undersized cable between the battery plus and the BP may result in a short circuit alarm when starting-up the load, or unexpected shutdown.**
- A properly sized fuse must be inserted according to local regulations in the cable between the battery and the BP.
- The BP is designed to allow current to flow from IN (battery) to OUT (load) terminals only. Reverse currents from OUT to IN terminals are strictly forbidden, and will damage the device. If you wish to use the BP as a disconnection for a charge source, you must orient the unit in the system so that the current is flowing in the intended direction, IN to OUT.
- The short circuit protection of the BP will be activated if you try to directly connect loads with capacitors on their input (eg inverters). For that use case, please use the BP to control the remote on/off switch on the inverter, instead of disconnecting the higher power DC line.
- Use a 1,5mm² wire (included) for the minus connection, which should be connected directly to the battery minus. No other equipment should be connected to this wire.
- The BP automatically detects the system voltage **one time only** after connection of plus and minus to the battery. The selected voltage (12 or 24V) is stored, and further automatic detection is disabled. See **d** in the programming table for how to reset it when re-using the BP in a different installation.
- Do not connect the load output until the BP has been fully programmed.
- A remote on-off switch can be connected to the two pole connector (see figure 1) or between pin 2-1 of the two pole connector and the battery plus.
- A buzzer, LED or relay can be connected between the alarm output and the battery plus (see figure 1). Maximum load on the alarm output: 50 mA (short circuit proof).


Load disconnect events and alarm output options

Buzzer or LED mode (buzzer or LED connected to the alarm output):

- In case of under voltage, a continuous alarm will start after 12 seconds. The BP will disconnect the load after 90 seconds and the alarm will stop. Reconnect delay: 30 seconds.
- In case of over voltage, the load will be disconnected immediately and an intermittent alarm will remain on until the overvoltage problem has been corrected. There is no reconnect delay.

Relay mode (relay connected to the alarm output):

- In case of under voltage, the relay will engage after 12 seconds. The BP will disconnect the load after 90 seconds and the relay will disengage.
- In case of over voltage, the load will be disconnected immediately and the alarm output will remain inactive. Overvoltage trip levels: 16V respectively 32V

Li-ion mode:

- Connect the load disconnect output of the VE.Bus BMS to pin 2-1. The load is disconnected immediately when the load disconnect output of the VE.Bus BMS switches from 'high' to 'free floating' (due to battery cell under voltage, over voltage or over temperature). The under-voltage thresholds and alarm output of the BP are inactive in this mode.

Operation

There are 4 possible error modes, indicated by the 7-segment display:

- E 1 Short circuit detected
- E 2 Over load or over temperature
- E 3 Under voltage
- E 4 Over voltage

After 5 minutes the error is no longer displayed to reduce current consumption.

The decimal point of the 7-segment display is used for status indication:

- On solid: the BP attempts to activate the output
- Flash every 5s: output is active
- Flashing every 2s in Li-ion mode: output 'connecting'

Remote control and short circuit

- The BP will connect the load 1 second after closing the remote contact.
- The BP will disconnect the load immediately when the remote contact is opened.
- When in Li-ion mode the BP will connect the load 30 seconds after the remote input of the BP has been pulled high by the VE.Bus BMS. This delay increases to 3 minutes in case of frequent switching.
- In case of a short circuit, the BP will attempt to connect the load every 5 seconds. After two attempts the display will show E 1 (short circuit detected).

Programming

When switched off (remote open), the BP can be programmed for the desired voltages and modes by connecting the PROG pin to ground. Please see the programming table.

The display will first step through the shutdown and restart voltages. Disconnect the PROG pin when the desired voltage is displayed.

The display will confirm the chosen voltage and default mode (R) twice.

Reconnect the PROG pin to ground if another mode is (b, C or d) is required. Disconnect when the required mode is displayed.

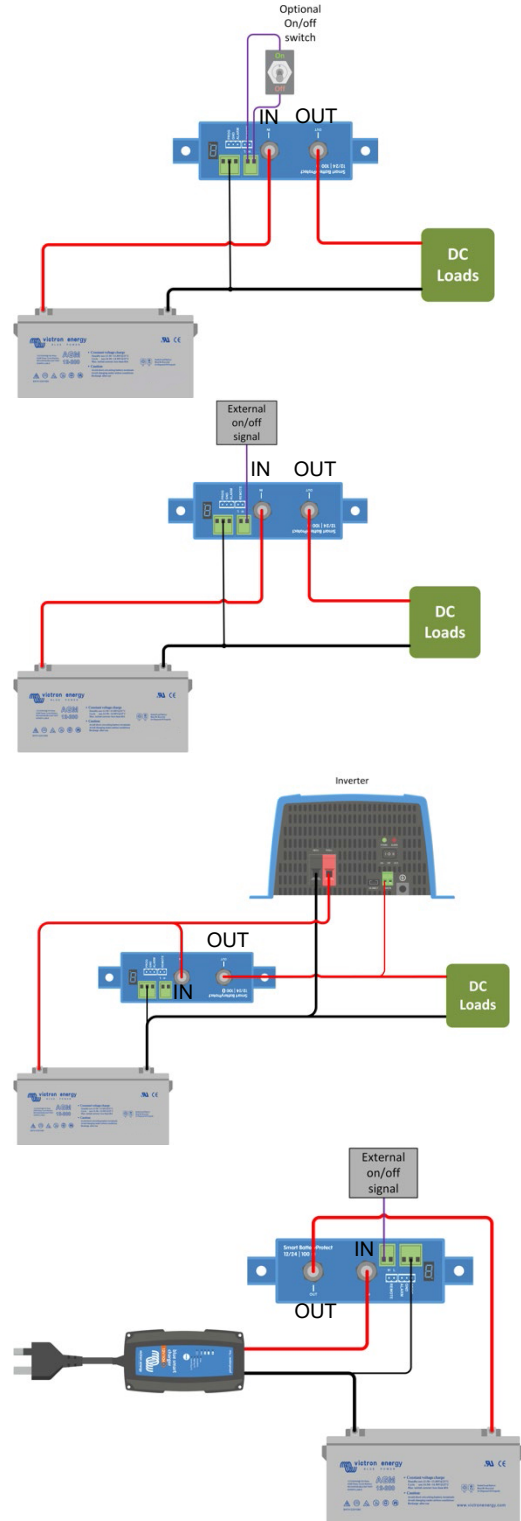
The display will confirm the chosen voltage and mode twice.

Programming table

7 segment display	Under voltage shut down 12V / 24V system	Under voltage restart 12V / 24V system
0	10,5V / 21V	12V / 24V
1	10V / 20V	11,5V / 23V
2	9,5V / 19V	11,5V / 23V
3	11,25V / 22,5V	13,25V / 26,5V
4	11,5V / 23V	13,8V / 27,6V
5	10,5V / 21V	12,8V / 25,6V
6	11,5V / 23V	12,8V / 25,6V
7	11,8V / 23,6V	12,8V / 25,6V
B	12V / 24V	13V / 26V
9	10V / 20V	13,2V / 26,4V
R	Buzzer or LED mode	
b	Relay mode	
C	Li-ion mode	
d	Detect system voltage	

Specifications

BatteryProtect	BP-65	BP-100	BP-220
Maximum cont. load current	65A	100A	220A
Peak current	250A	600A	600A
Operating voltage range	6-35V		
Current consumption	When on: 1,5 mA When off or low voltage shutdown: 0,6 mA		
Alarm output delay	12 seconds		
Max. load on alarm output	50mA (short circuit proof)		
Load disconnect delay	90 seconds (immediate if triggered by the VE.Bus BMS)		
Load reconnect delay	30 seconds		
Default thresholds	Disengage: 10,5V or 21V Engage: 12V or 24V		
Operating temperature range	Full load: -40°C to +40°C (up to 60% of nominal load at 50°C)		
Connection	M6	M8	M8
Weight	0,2kg 0,5 lbs	0,5kg 0,6 lbs	0,8kg 1,8 lbs
Dimensions (hxxwxd)	40 x 48 x 106 mm 1.6 x 1.9 x 4.2 inch	59 x 42 x 115 mm 2.4 x 1.7 x 4.6 inch	62 x 123 x 120 mm 2.5 x 4.9 x 4.8 inch

Example Wiring Diagrams


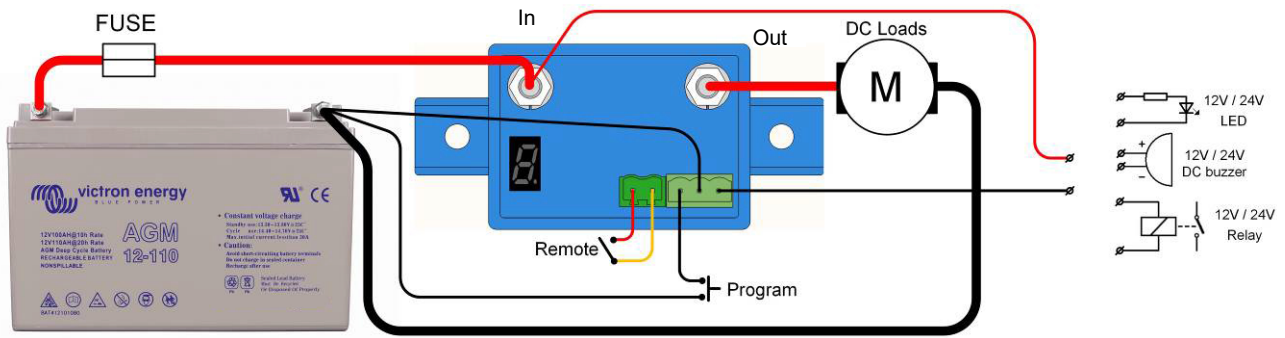


Figure 1: Connection diagram of the BP-65

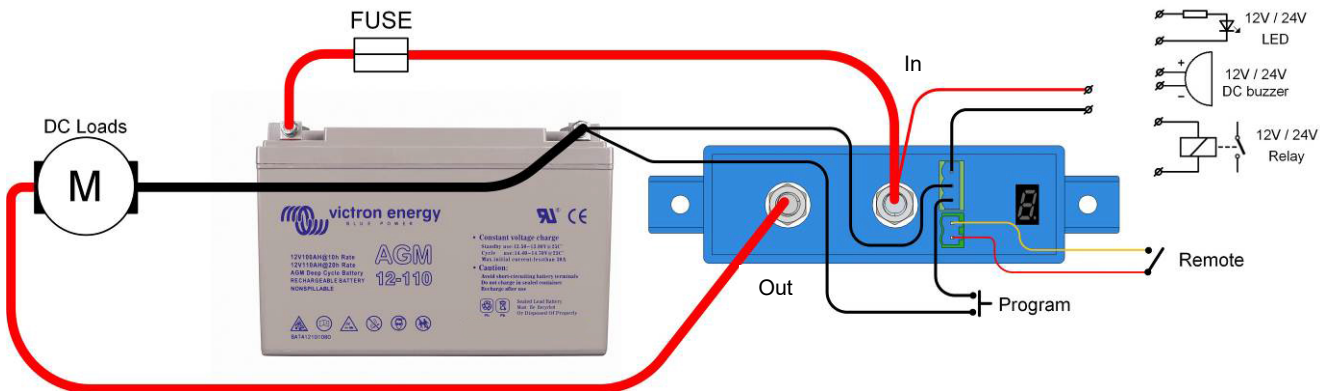


Figure 2: Connection diagram of the BP-100 and BP-220

- 1.1 ALARM
- 1.2 GND
- 1.3 PROG
- 2.1 REMOTE (remote switch can also be connected between pin 2.1 and battery plus)
- 2.2 REMOTE + (protected against short circuit with internal 10kΩ series resistor)

Figure 3: Connectors and pin numbering

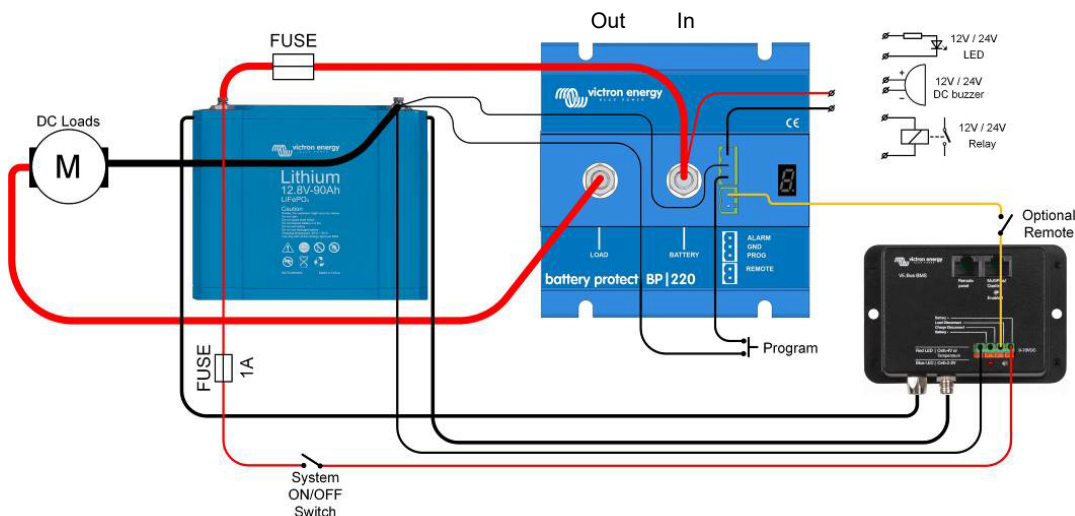


Figure 4: System with Li-ion battery

Note: The BP will disengage when its control input becomes free floating. If the battery voltage recovers after disconnecting (which will happen when no other loads are connected to the battery), the output of the Ve.Bus BMS will become high and the BP will re-engage after 30 seconds. After 3 attempts to re-engage, the BP will remain disengaged until battery voltage has increased to more than 13V (resp. 26V) during at least 30 seconds (which is a sign that the battery is being recharged). The under voltage thresholds and alarm output of the BP are inactive in this mode.

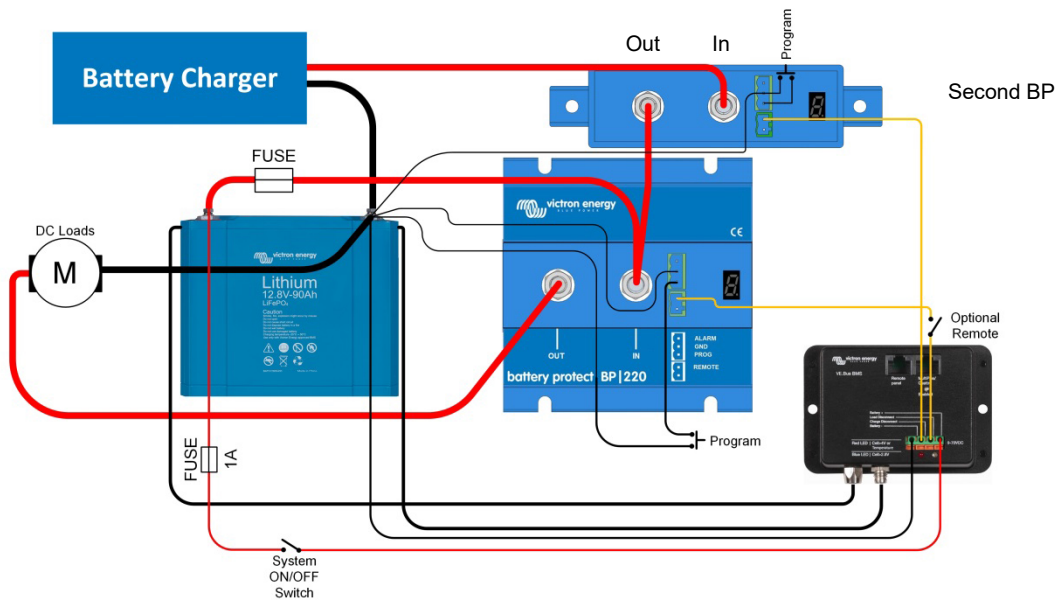

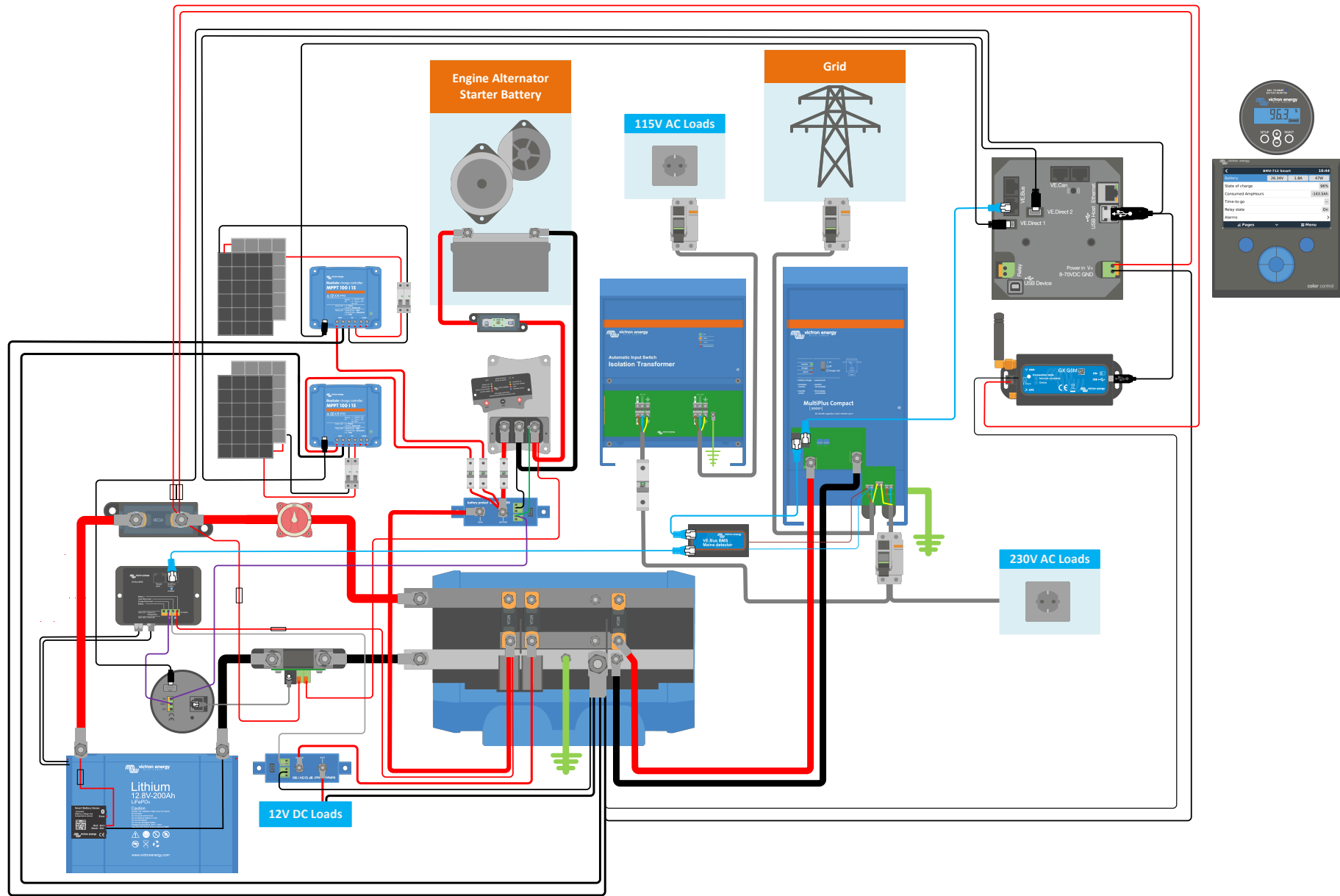
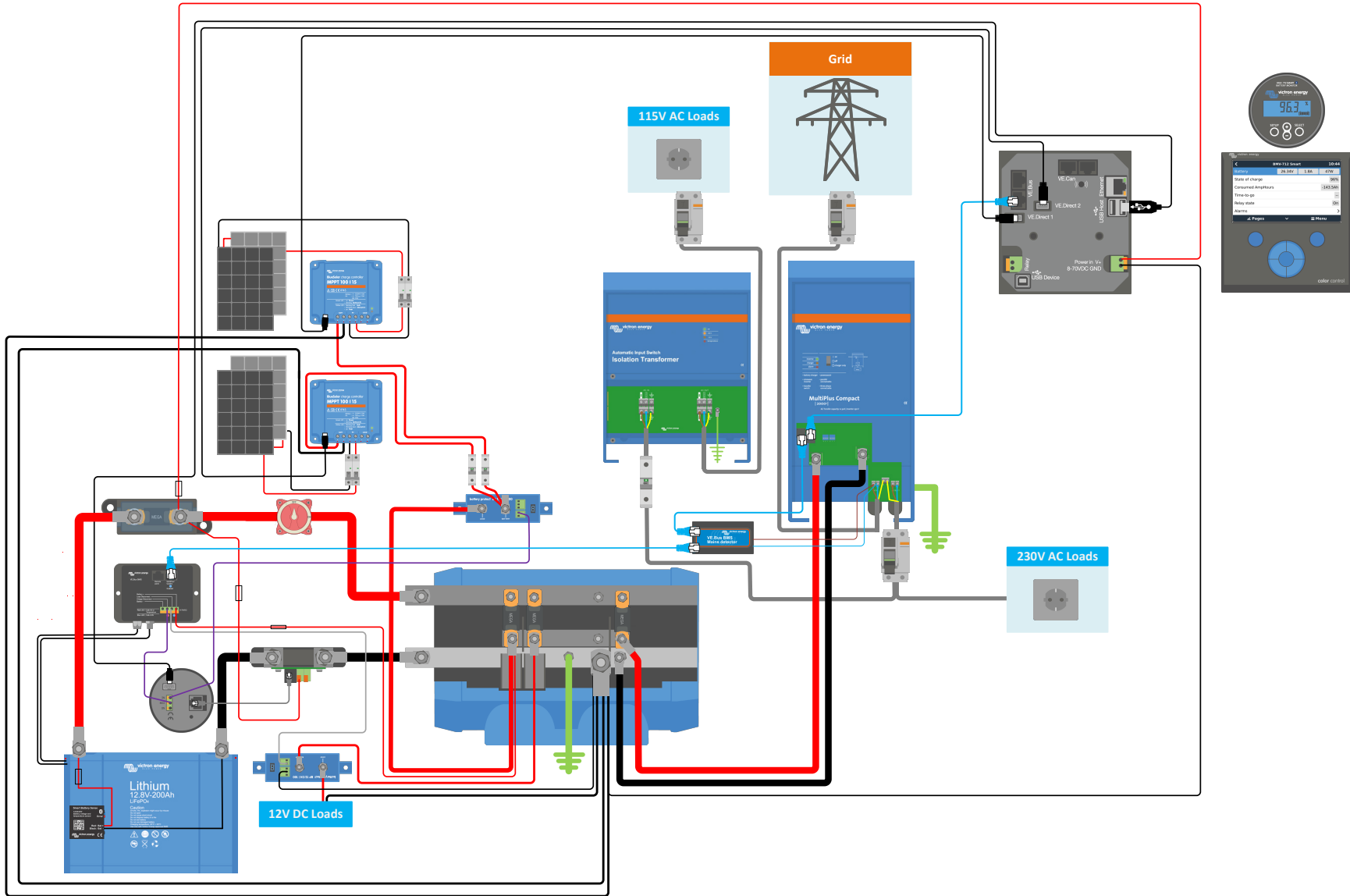


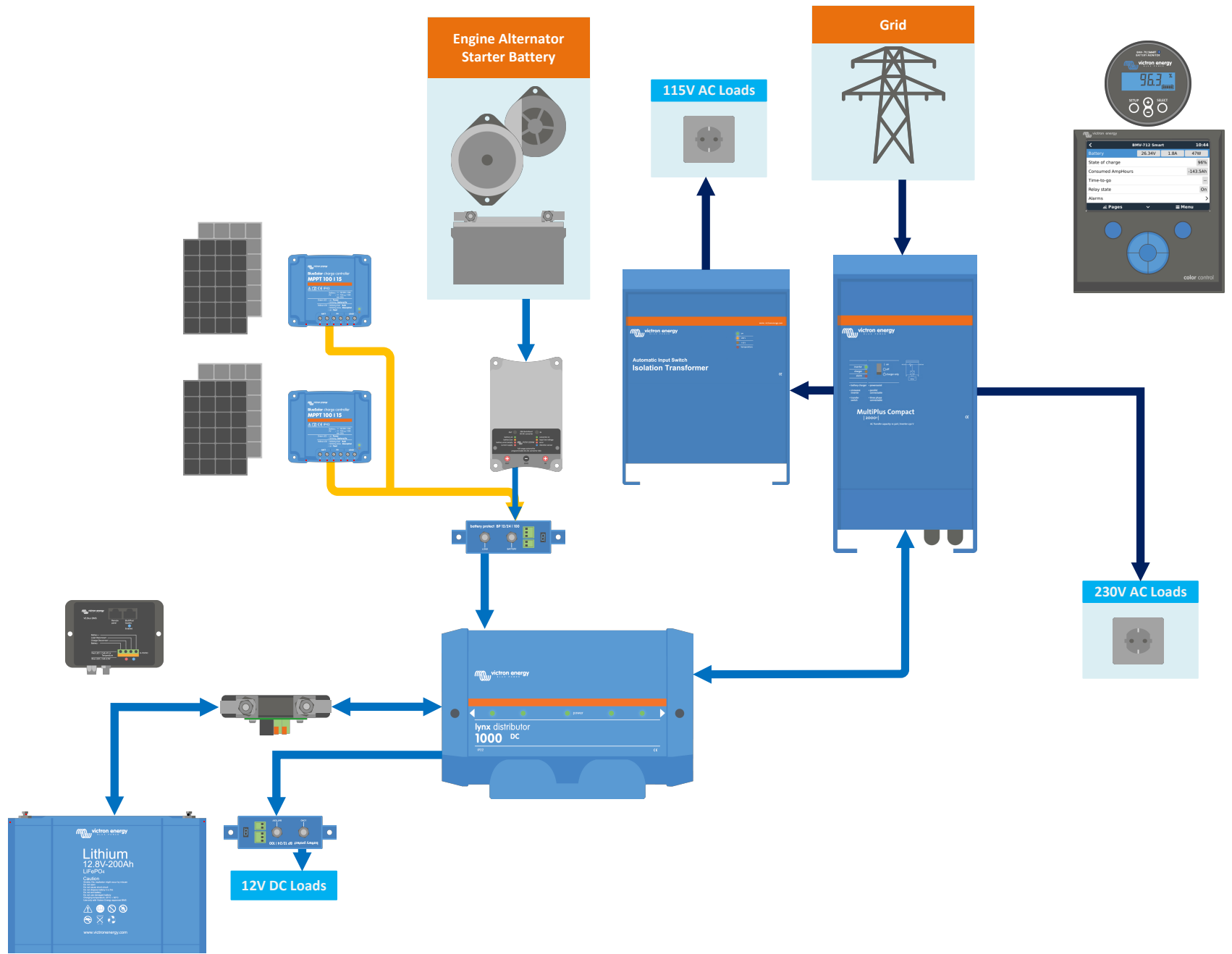
Figure 5: Second Battery Protect in between a battery charger or MPPT solar charge controller and a Li-ion battery

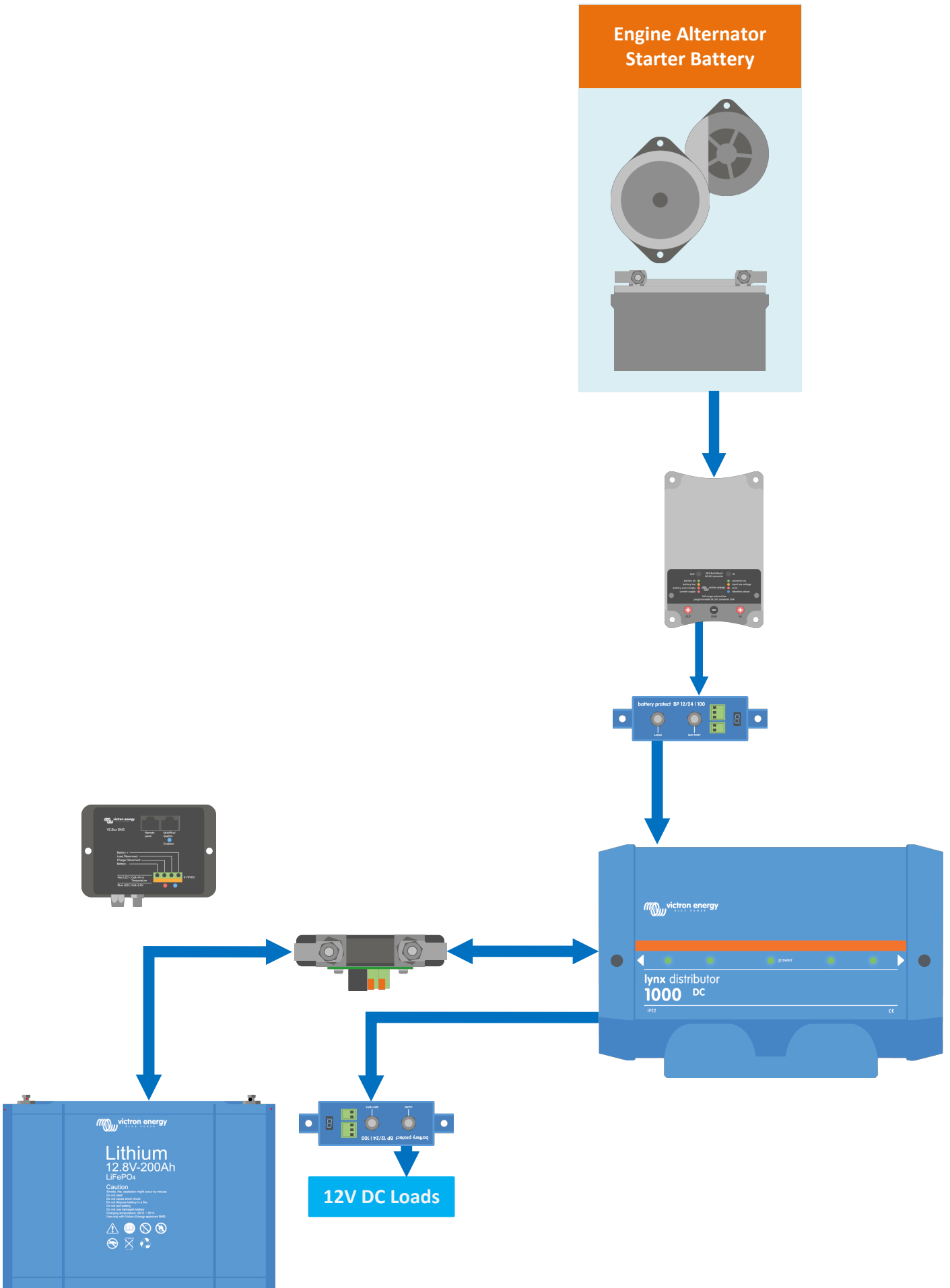
The second BP replaces a Cyrix-Li-charge relay (advantages: lower power consumption, alarm relay).
 (not applicable if the charger has remote on-off contacts and can be controlled with an interface cable between the BMS and the charger)
 Choose program  for this application.

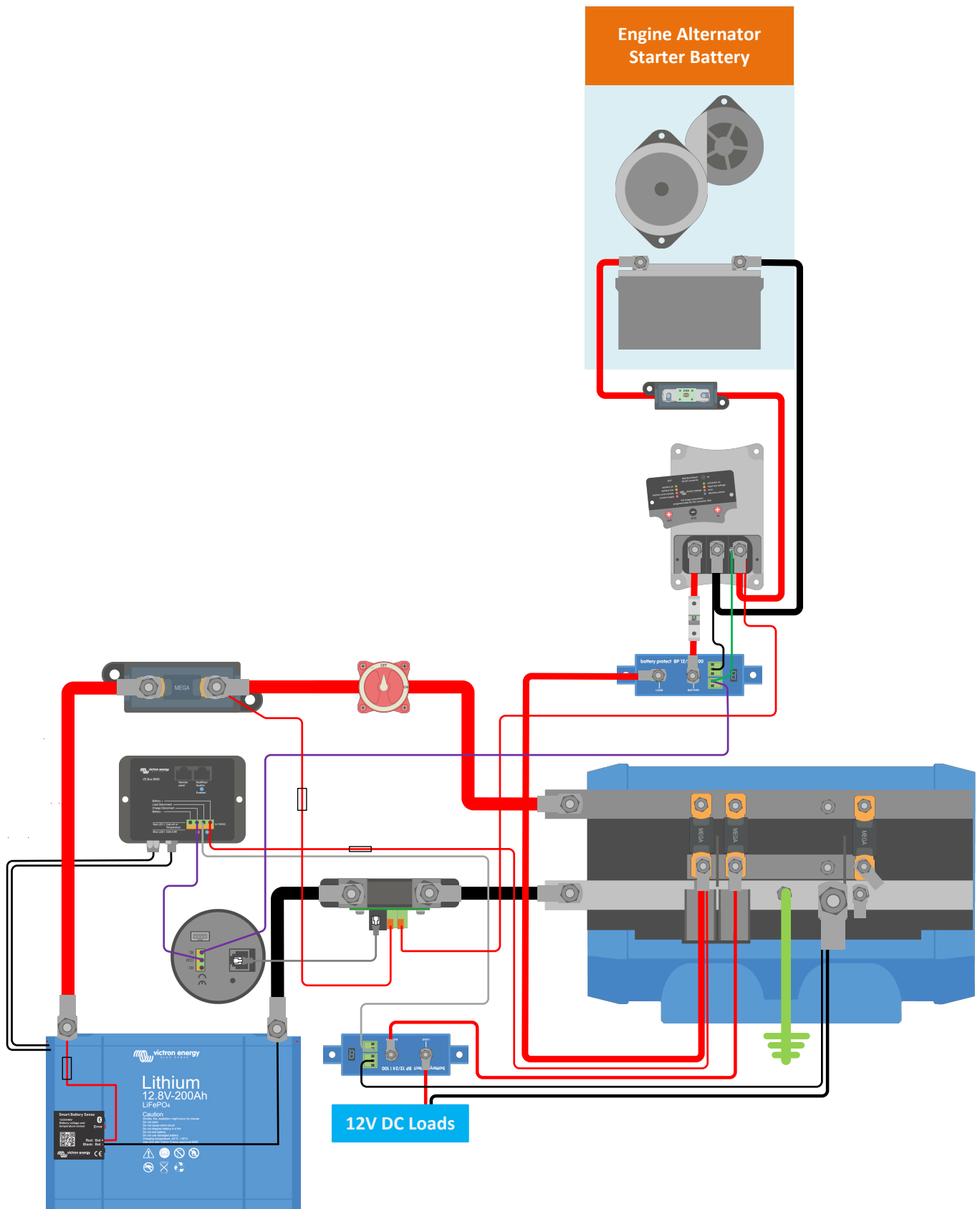
Caution: uncontrolled reverse current will flow through a Battery Protect if $V_{out} > V_{in}$. Therefore never use a Battery Protect for battery to battery charging.

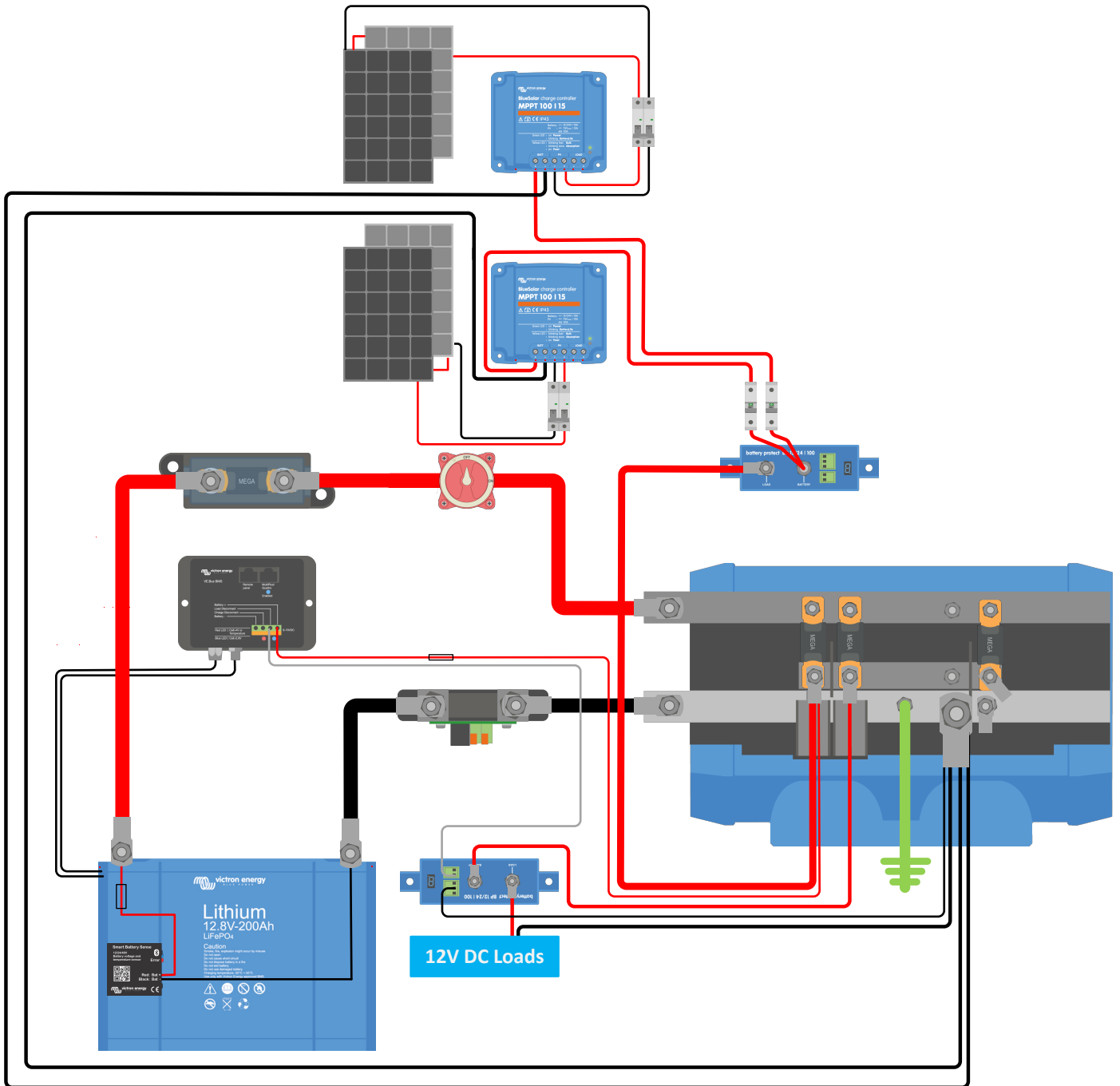


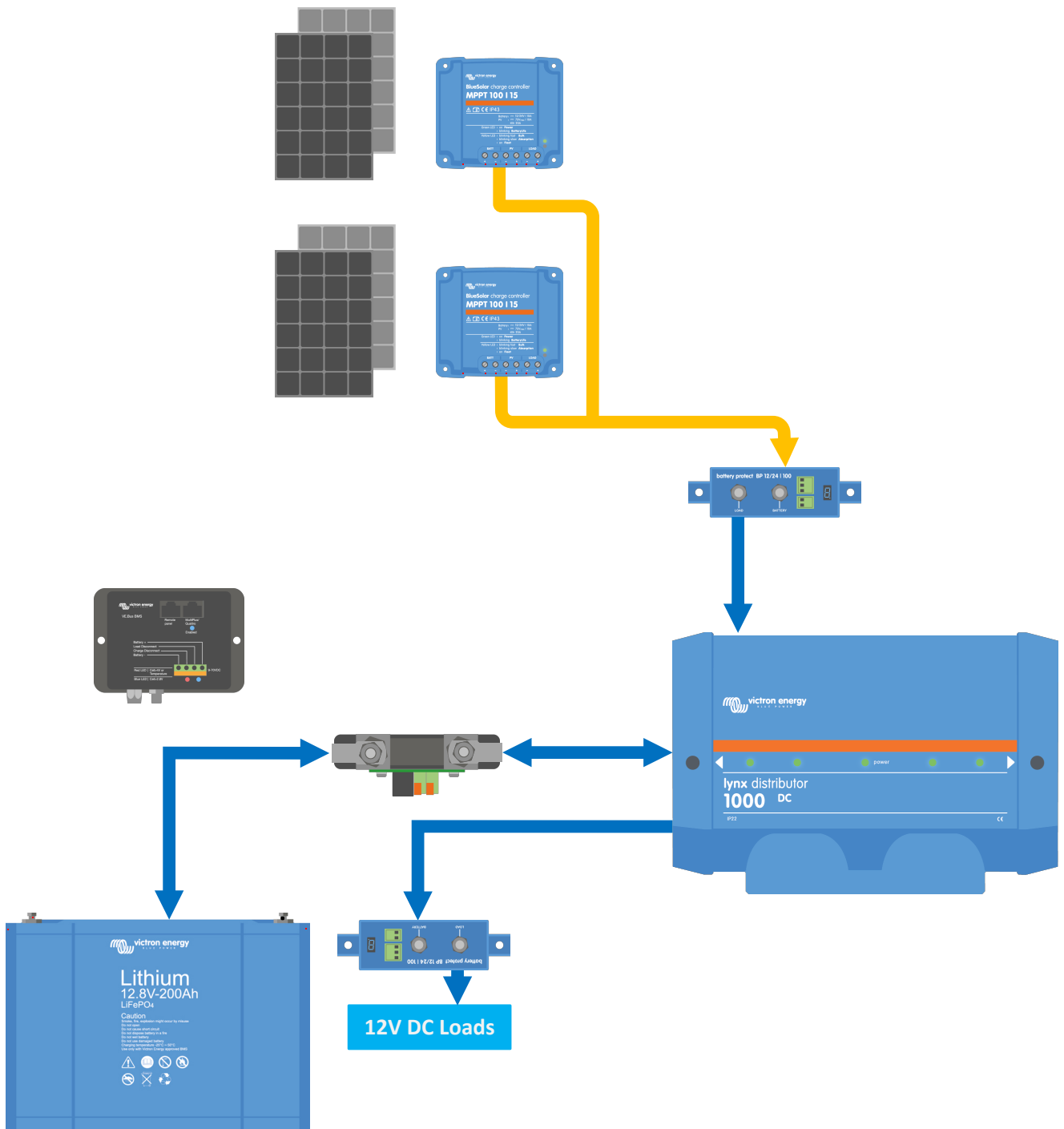












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