CAN22040S2C Information Guide

MAN0038.4

cangoo power

off-grid / on-grid / on- demand.

Contents

Safety Precautions

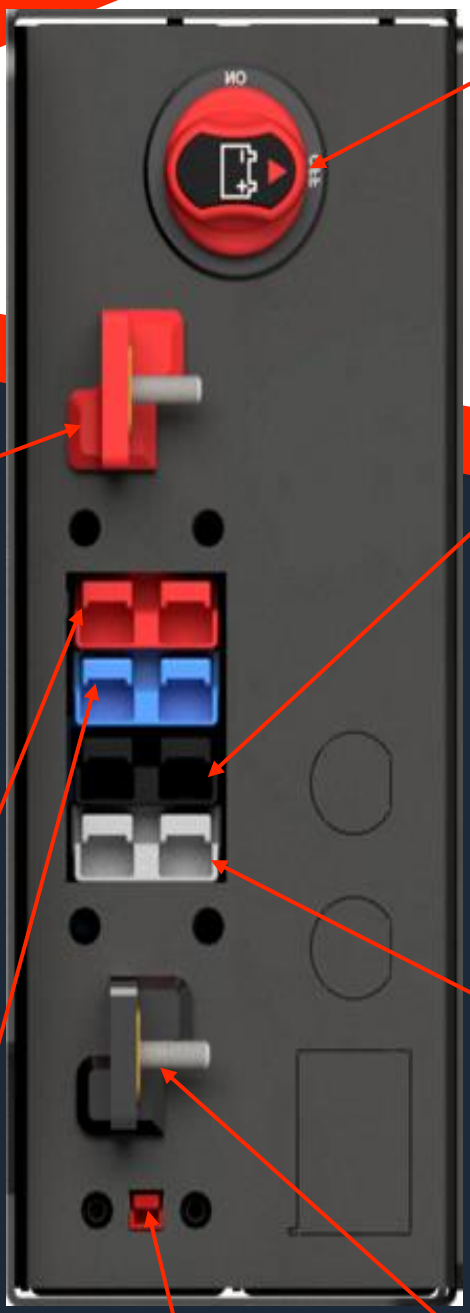
WARNING

- Avoid mechanical shock
- Do not expose the battery to fire
- Do not pierce the battery
- Do not disassemble
- Do not drill into the battery enclosure
- Do not short battery terminals
- Do not charge battery below 0°C
- Do not store below -20°C or above 60°C
- Risk of burns if misused
- Always follow safe working practices
- Installation of this device must only be carried out by appropriately qualified competent persons.
- All connections must be fused at recommended fuse ratings to avoid damage to components.
- All minimum cable gauges and maximum lengths must be followed.

Specifications

Cell Type	Lithium Iron Phosphate
Total Capacity	220Ah
Nominal Voltage	12.8V
Charge Voltage	13.8 – 14.6V
Float Voltage	13.6V
Charge Current	200A
Discharge Current	200A MAX. Continuous
	400A Surge
DC-DC Charger	40A
Operating Temp	0-45°C
Dimensions (LxWxD)	1060mm x 268mm x 112mm

CAN22040S2C Quick Guide



BATTERY ISOLATION SWITCH
This switch severs the positive feed to the main terminal. When changing connections always isolate the system with this switch. In the case that the internal circuit breaker trips, switching this isolator off and back on will reset it.

12V POSITIVE HIGH CURRENT LOADS – INPUT & OUTPUT
Continuous Discharge – 200A (@25˚C)
Peak Discharge – 400A (1 secs @25˚C)
Max charge rate – 200A
This is intended for inverter connection or for mains powered **lithium compatible** 240V to 12V charger input.

12V INPUT & OUTPUT
This connector can be used for 12V outputs or for mains powered **lithium compatible** 240V to 12V charger input.

SOLAR INPUT
Solar panel input. Max. 100V and 20A. Connects to Victron SmartSolar 100/20. It is essential to take protective measure prior to Anderson connection to the power hub.

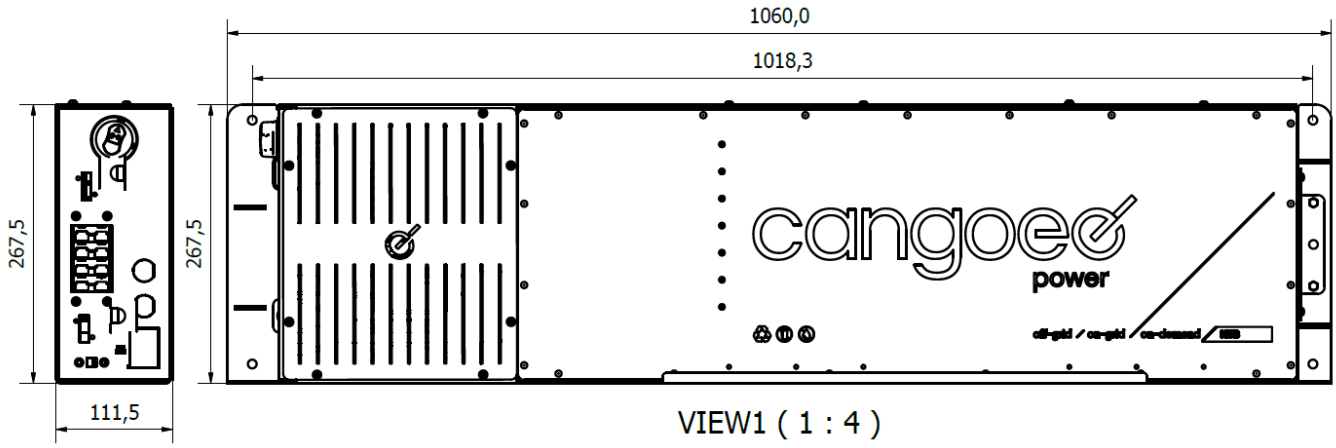
12V OUTPUT ONLY
Continuous – 100A
Surge Amps – 200A (5 secs)
Sum of AMPS from all loads must be under 200A continuous.

DC-DC CHARGE INPUT
DCDC Charge input from vehicle Alternator. Recommended 50A midi fuse from vehicle battery. DC-DC charger max delivery of 40A.

IGNITION SENSE
Ignition feed input for inbuilt DC-DC Charger on/off

GROUND
To earth or ground and negative loads
Be sure to size ground to chassis cable adequately dependent on load and length of run

Dimensions

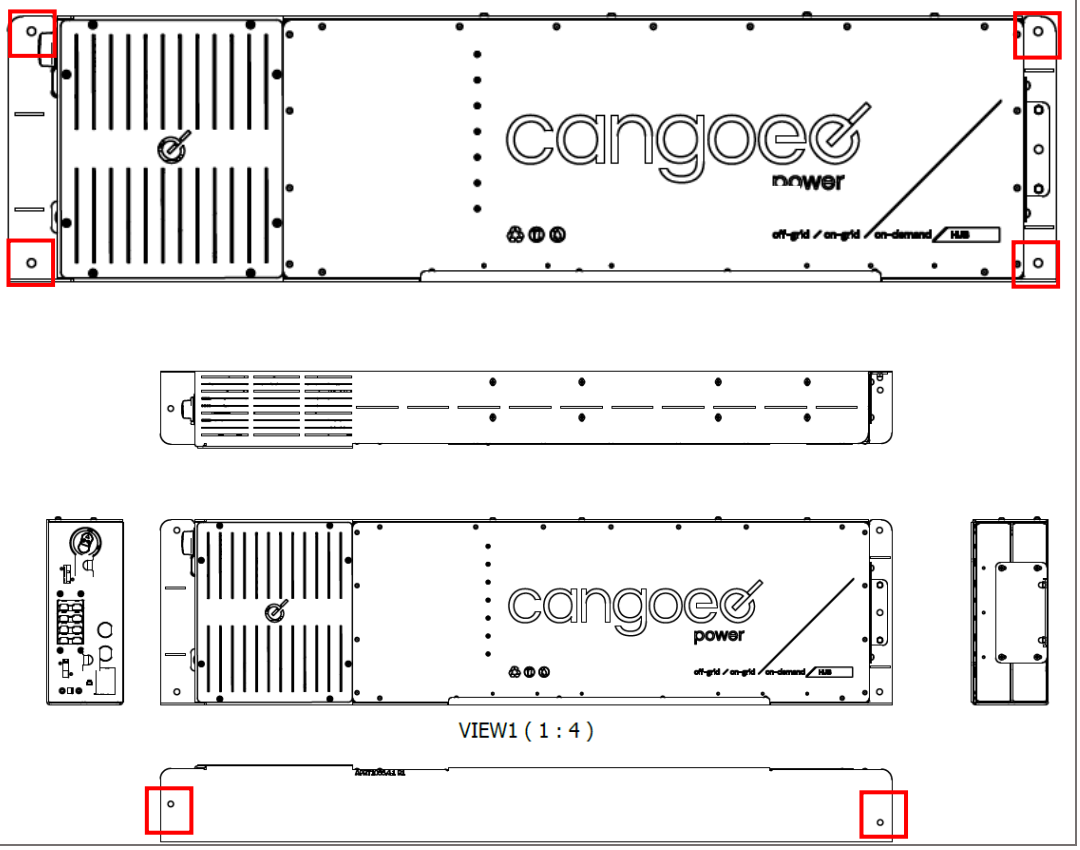


Mounting

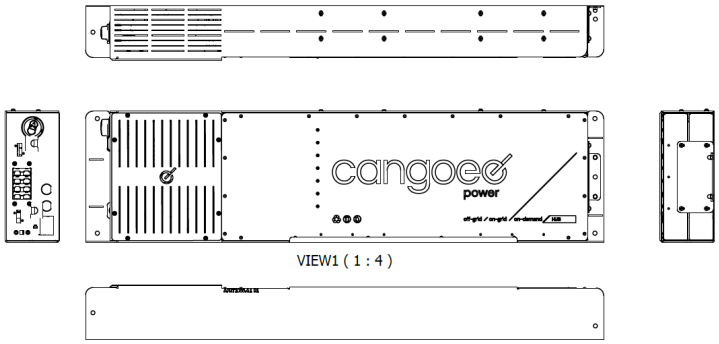
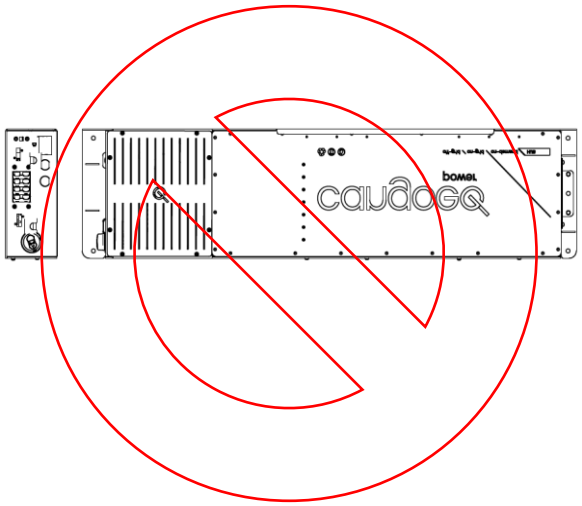
MOUNTING SCHEMATIC

MOUNTING HOLES THAT ARE SAFE TO MOUNT

MOUNTING BRACKETS MUST NEVER BE MOUNTED WITH THE CONFIGURATION DIALS FACING DOWN.



Mounting Orientation

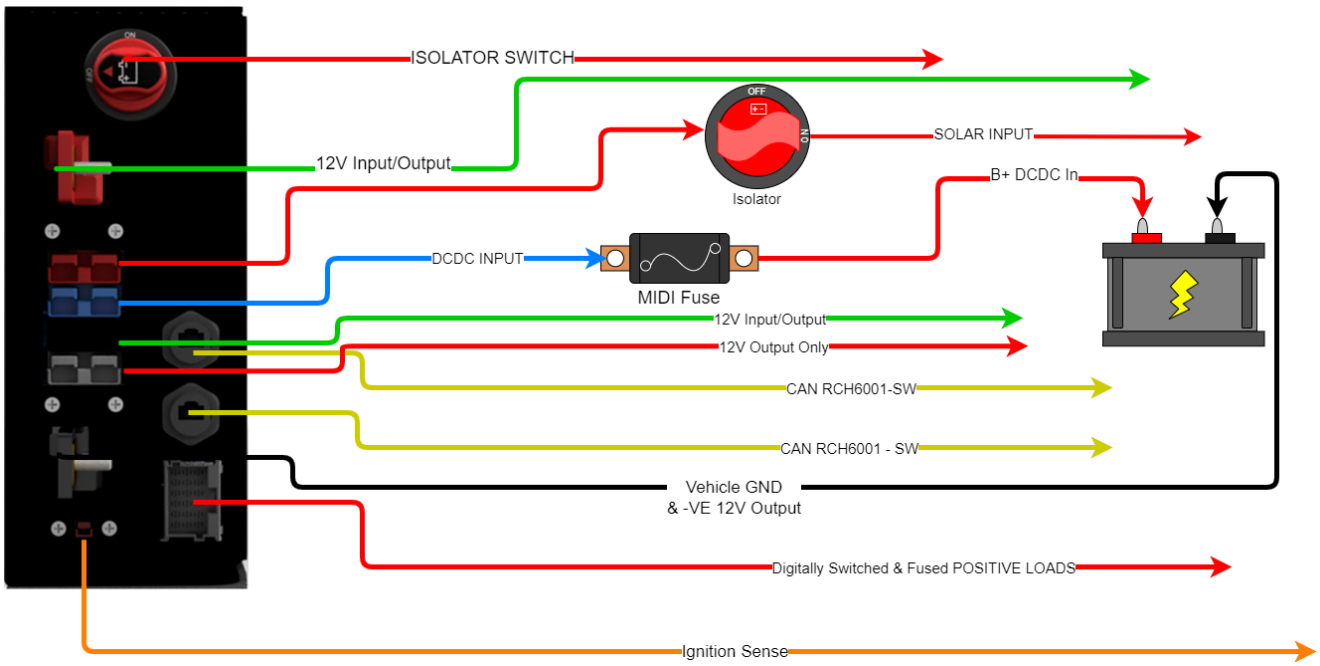
CORRECT MOUNTING ORIENTATION	INCORRECT MOUNTING ORIENTATION
	

The selector switches must always be facing upwards.
The Isolatopr switch mast always be facing upwards.

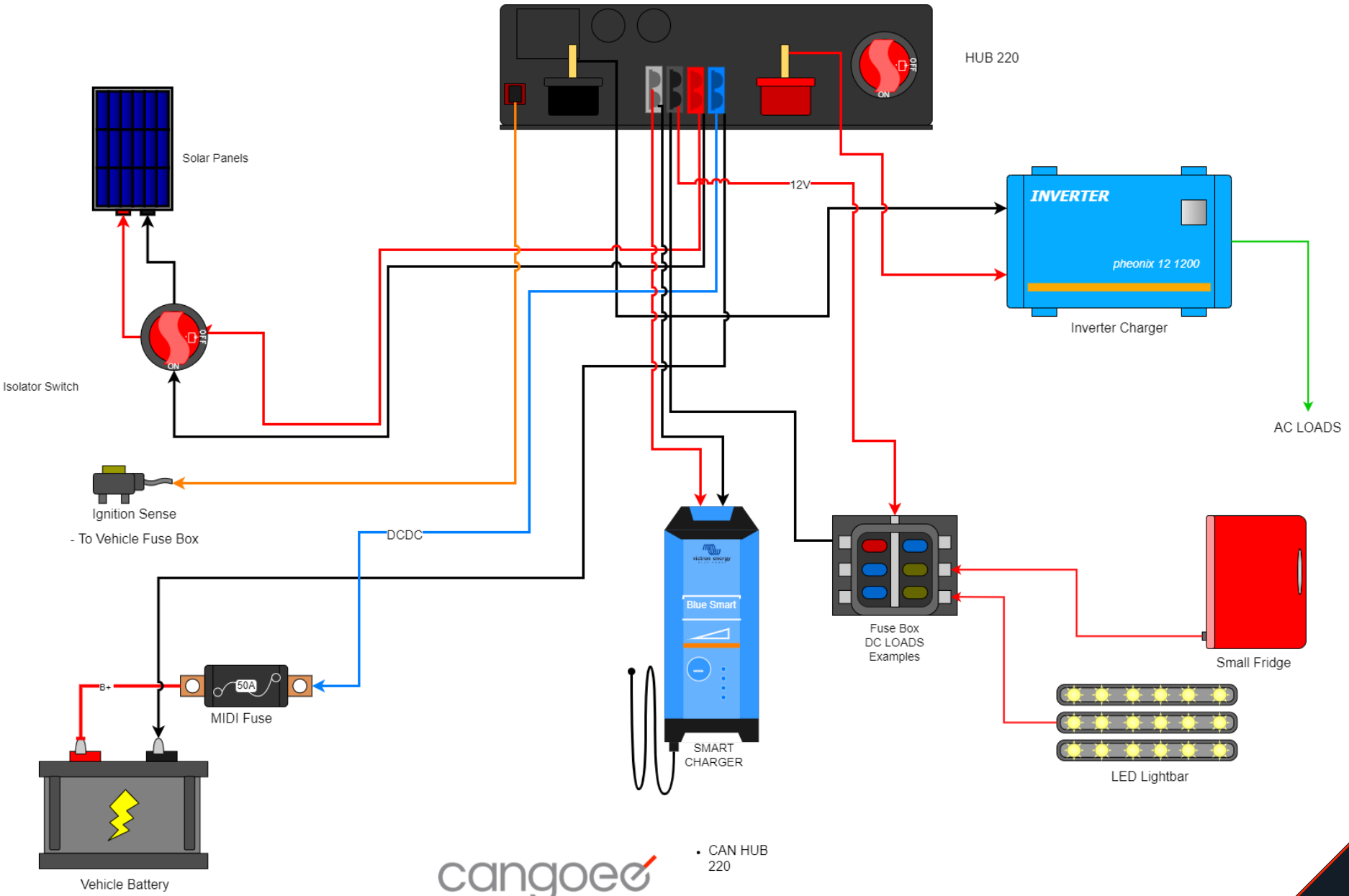
Wiring Schematic

To fully disconnect the system, the solar input ISOLATOR SWITCH must be turned off first. Once off the red anderson plug can be removed, disconnecting solar loads.

Please Note: No external shunt is required as a shunt is already pre built-in.



Example of System Setup



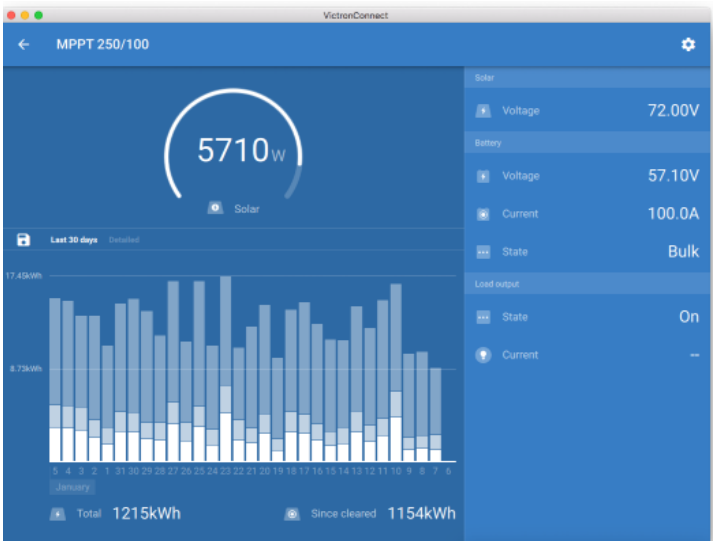
- CAN HUB 220
- Example Wiring Schematic

VICTRON CONNECT APP

Download the Victron Connect app onto your smart device to access and manage the Power Hub's Victron components.

Victron Connect info:

Download on the App Store | Get it on Google Play | Available on the Mac app | Download for Windows



VICTRON SMART SHUNT 500A

Pre-set and suggested programming settings:

110Ah SETTINGS

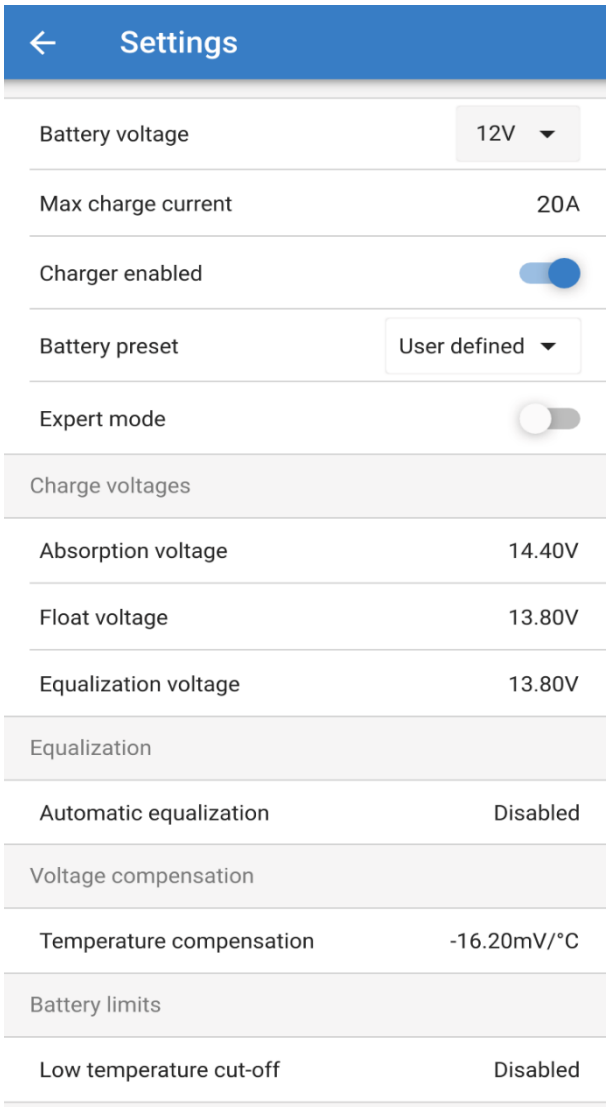
Battery settings	
Battery capacity	110Ah
Charged voltage	14.0V
Discharge floor	20%
Tail current	1.00%
Charged detection time	3m
Peukert exponent	1.05
Charge efficiency factor	99%
Current threshold	0.10A
Time-to-go averaging period	3m
Battery starts synchronized Battery SOC after a reset will be 100%	
State-of-Charge Manually set the current state-of-charge	85.0%
Synchronize SOC to 100%	SYNCHRONIZE
Zero current calibration	CALIBRATE

Victron Smart Solar MPPT 100/20

SOLAR PANEL ARRAY INPUT LIMITATIONS:

MAX. OPEN CIRCUIT VOLTAGE (V_{OC}): **100V**
MAX. SHORT CIRCUIT CURRENT (I_{SC}): **20A**

Pre-set and suggested programming settings:



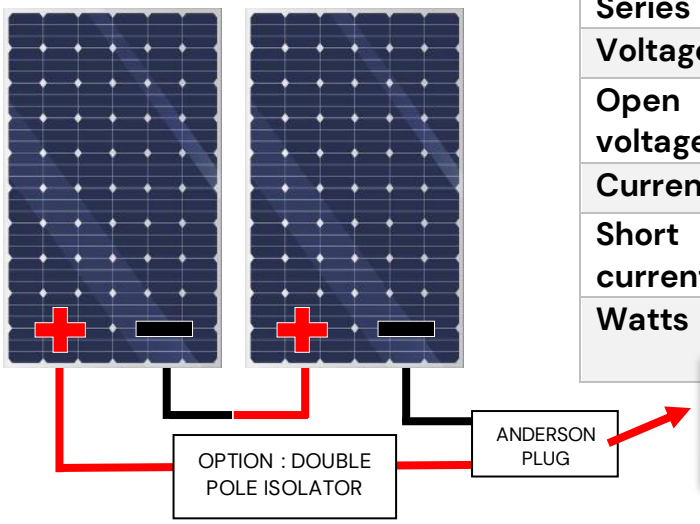
	Victron Smart Solar MPPT 100/20
Manual	
Datasheet	

Example Solar Panel Array

Example 325W Solar Panel		
Max power output	Pmax	325 W
Max power voltage	Vmmp	37.5 V
Max power current	Immp	8.75 A
Open circuit voltage	Voc	45 V
Short circuit current	Isc	70 A

Series Array

Solar panels in series results in the summing of voltages and the current stays the same. Here is an example below:

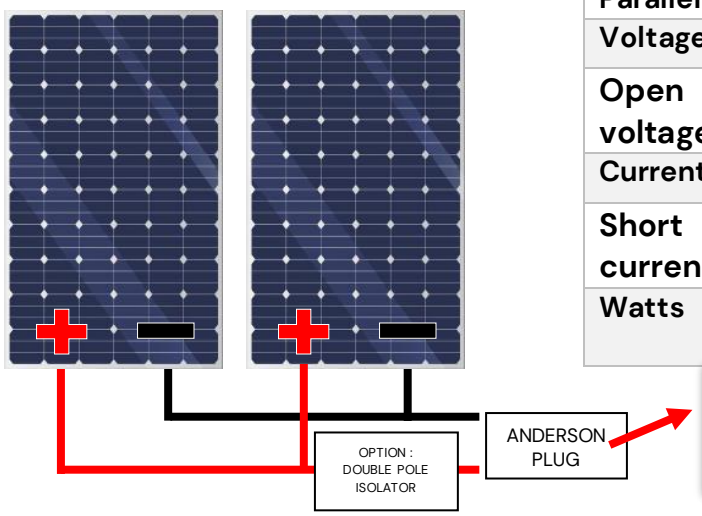


Output from Solar Panel Array in Series	
Voltage	37.5 + 37.5 = 75V
Open circuit voltage	45 + 45 = 90V
Current	8.75A
Short circuit current	10A
Watts	75V x 8.75A = 650W

Within max open circuit voltage limitation

Parallel Array

Solar panels in Parallel results in the summing of currents and the voltage stays the same. Here is an example below:



Output from Solar Panel Array in Parallel	
Voltage	37.5V
Open circuit voltage	45V
Current	8.75 + 8.75 = 17.5A
Short circuit current	10 + 10 = 20A
Watts	37.5 V x 17.5A = 650W

Within max short Circuit current limitation

DCDC CHARGER

The DC-DC charger in the CAN battery allows the battery to charge from a vehicle engine/alternator/start battery. However, to avoid draining the start battery, charging is only desired while the engine is running.

In some applications it can be difficult to determine when the engine is running. Therefore, the DC-DC charger reads several inputs to determine when to turn ON (charge) and turn OFF (stop charging) to achieve:

- Charging when the engine is running, to maximize charging of the Cangoee Battery
- Not charging when the engine is not running, to avoid discharging the vehicle start/cranking battery.

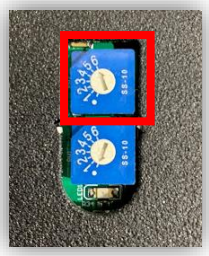
Logic to determine when to turn the DC-DC charger ON and OFF will be implemented using software running on a microcontroller to allow advanced control combining several inputs:

- Start battery voltage
- Ignition signal voltage
- Timing delays
- 2 x 7-position (0-6) rotary switches: user-accessible from outside the battery

The tables below denote the selector switch modes:
Please choose carefully as switches are not easily accessible after installation.

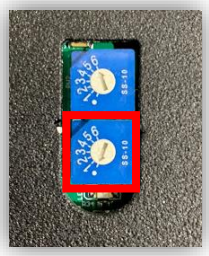
Delay Switch Position	Delay Off Time	Application
0	0 Sec	Trad Alt, or Ignition Relay
1	30 Sec	Smart Alternator
2	1 Min	Smart Alternator
3	1.5 Min	Smart Alternator
4	3 Min	Smart Alternator
5	3.5 Min	Smart Alternator
6	0 Sec	Ignition Signal Control

OFF DELAY



Switch Position	On Level (V)	Off Level (V)
0	11	10
1	12	11
2	13	12
3	13.3	12.3
4	13.5	12.5
5	13.7	12.7
6	14	13

MEASURED VOLTAGE



These tables demonstrate the selection modes. The first table denotes the off delay, and the second table is your voltage levels for the DC-DC charger. This works by turning off the DC-DC charger when the voltage decreases to not drain the vehicle battery or cause unexpected surges.
(E.g. if set to 6 and 0 the battery will cut out immediately once the voltage reduces due to the ignition sense, if set to 1 and 4, the battery will cut out after 30 seconds if the voltage goes below 12.5 volts.)

Recommended Wire Sizes and Gauges Chart

The below table represents the recommended wire sizes/ gauges, for battery installation into vehicles.

DCDC Capacity / Cable	Recommended Wire Size/ Gauge Figure 8 Cable	Recommended Wire Length
DC-DC 20A	8 B&S (7.71mm^2)	1m- Up to/ Maximum 5m
DC-DC 40A	6 B&S (13.5mm^2)	1m – Up to/ Maximum 5m
Ignition Sense Cable	2-4mm Auto Wire (Running a max of 1-2 Amps)	1m – Up to/ Maximum 6m
Main Positive +	6 B&S (13.5mm2) 80A – 120A	1m – Up to/ Maximum 4m
Main GND -	6 B&S (13.5mm2) 80A – 120A	1m – Up to/ Maximum 4m

Please Note: these wire gauges are suggested to mitigate the voltage drop along the cable It is recommended that you check the voltage at the Cangoee battery DC-DC input and alter charger selector switches accordingly (Please Note: these selector modes and conditions are shown on page 11)

Battery Management System

The battery system includes a Battery Management System (BMS) that is mounted internally. The BMS is an electronic solid-state circuit board that manages the cells and protects the battery, including overcharge and over-discharge protection. The BMS will also activate during low voltage at 10.5V, overcurrent at 100A, and short-circuit situations. Unlike lead-acid batteries, overcharging or over-discharging a lithium battery may lead to a hazardous scenario. Therefore, the BMS is essential to the lithium battery. Also, the BMS ensures that the battery cells are equalized throughout its operation.

Safety Tips

The battery contains lithium iron phosphate (LiFePO4) cells, considered to be the safest of all lithium-ion chemistries. The battery consists of a large amount of stored energy. Please follow these safety tips for use and operation:

- Ensure the battery is secured safely before travel.
- Do not drill into the enclosure. Doing so may inadvertently puncture one of the internal cells.
- Do not short-circuit the battery. Be careful not to drop a metallic object across the two exposed terminals. Always keep the terminal caps on the POS and NEG posts during operation.
- Do not mount the battery upside down. The battery can also be mounted on its side if mounting upright is not an option.
- Do not connect multiple batteries in series to raise the voltage. The BMS is not designed to accommodate higher voltages.
- If the battery is in contact with the skin, please immediately seek medical advice.

Longevity Tips

Factors that mainly affect the lifespan of the battery are depth of discharge and operating temperature. To ensure longevity and use of the battery:

- Do not fully discharge the battery to zero. Each time the battery is discharged to zero, either intentionally or unintentionally, reduces the lifespan of the battery.
- Do not discharge the battery below 80% depth of discharge (i.e., 20% full).
- Do not charge the battery outside the range $0^{o}C$ - $45^{o}C$ to maximize the life of the battery and avoid damage to the cells.
- Do not operate the battery in direct sunlight, mount the battery in a compartment or undercover.

The cells are designed to last 2,000 cycles at 80% DOD (Depth of Discharge) and 5,000 cycles at 50% DOD.

Tips for Use

- Batteries of the same voltage may be placed in parallel to increase storage capacity. However, each battery should be independently fused, and the battery must be from **CANGOEE**.
- If the battery is frozen it is essential to wait for the battery to be defrosted and wait for an appropriate room temperature before connecting power to the battery.
- The battery is splash-proof and water resistant but not waterproof, **DO NOT** directly submerge the battery in water.
- The battery is designed to be housed in a dry, enclosed compartment, not in direct sunlight or exposed to outside weather conditions for an extended period.

Maintenance Tips

If not using the battery for a prolonged period (months at a time), then store the battery as follows:

- Disconnect all loads from the battery as there is no external current draw.
- Store the battery close to full capacity (the battery does not need to be at 100%).
- There is no need to keep the battery on trickle charge. The battery will self-discharge over time slowly.
- Within every 2 months place the battery on a charge cycle to ensure longevity of the power cells.