

# Solar Power Supply User Guide



Cullen Community Allotment Association

## Solar Power Supply

### User Guide

#### **Contents**

Safety Notice

Schematic

Using the system

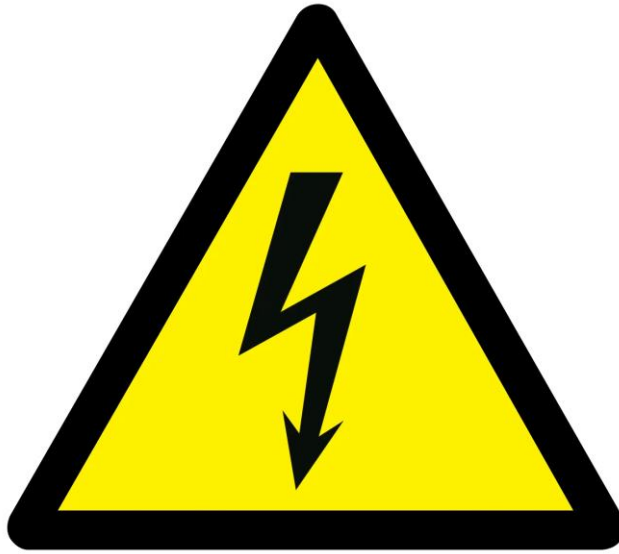
Bluetooth apps

Solar charge controller and inverter manuals

Notes

# Solar Power Supply User Guide

## Safety Notice

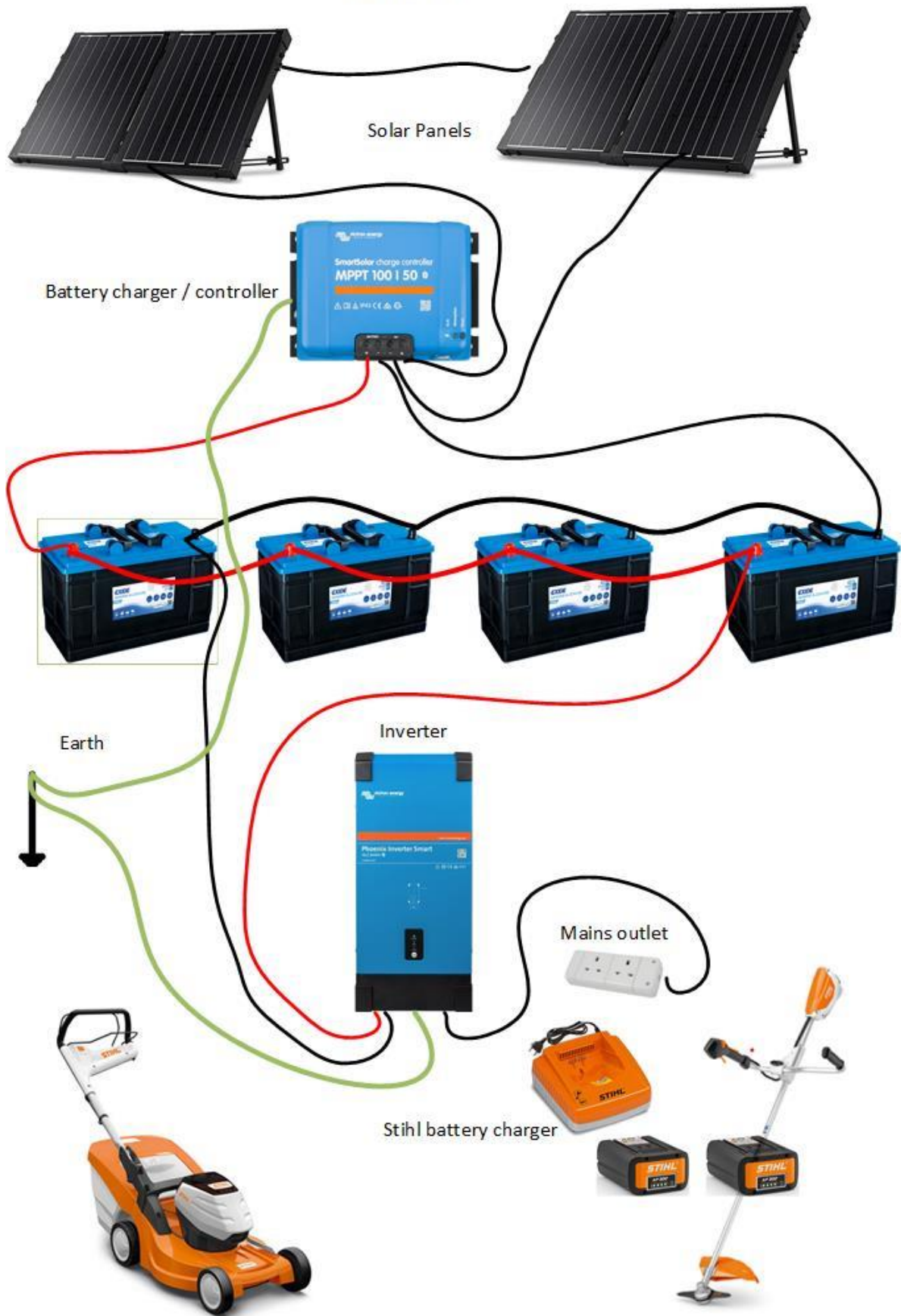


**Warning  
electricity**

Do not touch, or cause to be touched by any object, battery terminals or bare cables. Especially, do not short, or cause to short, the negative and positive battery terminals or cables. Although this is a 12volt system, the high amperage available can harm.

# Solar Power Supply User Guide

## Schematic



# Solar Power Supply User Guide

## Using the system

- Connect a battery charger or power tool to the mains outlet.
- Press the 'mode' button on the inverter.
- The green 'Inverter' LED will light up.



When the STIHL battery is fully charged, the Stihl battery charger switches itself off. When finished using the 240V inverter, press the 'mode' button twice and the inverter and LEDs will turn off.

# Solar Power Supply User Guide

## LED definitions

Green LED	Status	Trouble shooting
●●●●●●●● Solid on	Inverter on	<b>Red LED Off</b> status OK  <b>Red LED On or blinking:</b> The Inverter is still on, but will shut down when the condition gets worse. See red LED table for warning reason
●●----- Slow single pulse	ECO mode	If the inverter keeps switching on and off while there is a load connected, the load may be too small compared to the actual ECO mode settings. Increase the load or change ECO mode settings. (minimum ECO mode setting: 15W)
●●----- Fast double pulse	Off and waiting	Inverter did shut down because of a protection. The inverter will restart automatically as soon as all alarm conditions are cleared. See red LED state for the shutdown reason.
----- Off	Inverter off	<b>Red LED Off</b> Check Remote on/off connector. Check DC cable connections and fuses. Check operational mode by pushing push button one time.  <b>Red LED On or blinking</b> The inverter did shut down because of a protection. It will no longer automatically restart. The red LED indicates the reason for shutdown. Remove the cause and then restart the inverter by switching it Off, and then back On.
●●●●●●●● Fast blink	Off and firmware update in progress or failed	<b>Red LED Blinking (---●---●---●---●)</b> Firmware update in progress or firmware update failed. When failed; retry firmware update.

Yellow LED	Status	Trouble shooting
●●●●●●●● Solid on	ECO mode	<b>Red LED Off</b> status OK  <b>Red LED On or blinking:</b> The Inverter is still on, but will shut down when the condition gets worse. See red LED table for warning reason
----- Off	ECO mode off	<b>Red LED Off</b> Check operational mode by pushing push button one time. Check Remote on/off connector. Check DC cable connections and fuses.  <b>Red LED On or blinking</b> The inverter did shut down because of a protection. It will no longer automatically restart. The red LED indicates the reason for shutdown. Remove the cause and then restart the inverter by switching it Off, and then back On.

## Solar Power Supply User Guide

Red LED		Definition	Trouble shooting
●●●●●●●●	Solid on	Overload	Reduce load
●●●●----- blink	Slow	Low batt.	Recharge or replace battery Check DC cable connections Check cable cross section as it may be insufficient. See section 4.2 Protections and automatic restarts for manual and automatic restart behavior.
●-●-●-●- blink	Fast	High batt.	Reduce DC input voltage, check for faulty charger
●-●----- pulse	Double	High temp.	Reduce load and/or move inverter to better ventilated area
●-----●----- single pulse	Fast	High DC ripple	Check DC cable connections and cable cross section.

# Solar Power Supply User Guide

## Victron Connect Bluetooth apps

Monitoring and managing the solar charge controller or inverter is via Victron Connect software (apps) using a Bluetooth connection to a Windows laptop, an Android phone or tablet, or an Apple phone or tablet. The Bluetooth PIN to pair with either the solar charge controller or the inverter is the same as for the keysafe combination with two zeros added to the end.

The apps are available from the Google Play Store:

[https://play.google.com/store/apps/details?id=com.victronenergy.victronconnect&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.victronenergy.victronconnect&hl=en_US&gl=US)

The Apple Apps store

<https://apps.apple.com/gb/app/victronconnect/id1084677271?mt=12>

The Victron web site

<https://www.victronenergy.com/support-and-downloads/software>

The manuals for the apps are available on the Victron web site

<https://www.victronenergy.com/panel-systems-remote-monitoring/victronconnect#manuals>

The solar charger controller app provides details of current battery status and a 30-day history of activity (solar power yield).

The inverter app allows you to view dynamic data such as power-draw of connected loads; a power bar will show how hard the inverter is working, and there is information such as battery voltage, etc.

### **Paper Manuals**

The solar charge controller and inverter paper manuals have been scanned and converted to pdf files:

<http://edelsten.org.uk/CCAA/smart-solar-charge-controller.pdf>

<http://edelsten.org.uk/CCAA/Phoenix-Inverter.pdf>

# Solar Power Supply User Guide

## Notes

How much power is available?

When fully charged the batteries hold 800 amp hours at 12 volts (9,600 watts) or 9.6Kw. However, a) there will be inefficiencies in the system and b) the batteries should not be fully discharged so, to be conservative, make that 5Kw, 1Kw for 5 hours or 0.5Kw (500 watts) for ten hours.

The mains inverter is rated at 2Kw. Powers tools, such as hand-held circular saw, which uses 1.5Kw, but is never used continuously, will probably give several elapsed hours of usage. Other power tools, such as a 2Kw saw, may use too much power when first switched on, and will trip the inverter.

The Stihl battery chargers are rated as 2.3amp at 240volts, which is 552 watts, so could run for 10 hours, though they are quoted as taking 75 minutes to charge a battery ( $1.25 \times 552 = 690$  watts). With fully charged batteries, there should be plenty of power to recharge the Stihl batteries or recharge the batteries of other battery powered equipment such as electric screwdrivers.

How long will it take to recharge the main batteries?

This depends how depleted the batteries are and how much sun reaches the two solar panels which are rated at 200watts each. For various reasons, such as where we are, they are unlikely to achieve a combined 400watts of power. Again, being on the conservative side, 200watts over six hours per day = 1200 watts, which could take 4 days to recharge 50% depleted batteries. Maximum usage will occur during maximum sun availability but, because of their fixed angle (they cannot track the sun as the earth rotates), so, optimistically, 300 watts for eight hours = 2400 watts per day, which would then only take 2 days to recharge 50% depleted batteries. Reality will be somewhere in between. Either way there should be enough power to mow and strim once a week.