

POWERSTACK™

Maintenance Manual



Solar Reimagined.

Maintenance Manual

PLEASE READ

The general maintenance checks laid out in this manual are the minimum requirement at a quarterly or annual interval (as noted) to ensure your PowerStack system is working as intended.

Failure to perform these checks, as per the maintenance schedule at the end of this document, and send a completed, signed email copy to maintenance@powerstack.energy will void the terms of your warranty on the PowerStack Systems you have purchased.

Recommended Tools & Equipment

Recommended equipment is indicative only. The Power Gin winch system and Grip sleeve attachment (or machinery equivalent) are recommended for PowerStack system poles 3m and above, where we advise that the pole is winched down for maintenance.

Ring spanner sets



Allen key sets



3/8th socket for battery drill



Wrench/Shifters 12" and 6"



Multimeter/Clamp Meter*



Battery drill & impact driver



General tools inc. Phillips and flat head screwdrivers



Power Gin winch system and Grip sleeve



Basic checks

Note: Before commencing checks, troubleshooting or scheduled maintenance please check weather patterns in the vicinity of the PowerStack System. PowerStack does not recommend performing maintenance or troubleshooting during inclement weather.

Inspection of upper panels, payload(s), controllers and batteries requires larger poles to be winched down. Please reverse steps detailed in the installation manual to winch pole down. PowerStack recommends resting pole on a workhorse or similar while down for maintenance.

Visual checks

Recommended interval: Biannual



If your PowerStack system is not performing to required level, check the system for physical damage or other obstruction such as:

- Graffiti - this can be cleaned off with acetone
- Change in land profile or foliage in surrounding area creating sun blockage
- Heavy dirt/ice buildup on panels
- Other damage to photovoltaic panels

Software update

Recommended interval: Quarterly



Log into the the installed controller(s) to confirm that software is current and system analytics are running as designed. Logging in typically launches an automatic software update, if any is required. Consult your system user guide to confirm hardware, associated software, operating settings, and data management program.

Inspect battery & components

Recommended interval: Every 5 years



Consult the PowerStack technical specification for your system and the warranty for projected battery life information (typically 10 years). To maintain the warranty, PowerStack requires a minimum mid-warranty inspection of the battery.



Troubleshooting



Quick checklist

- Check battery indicator on Controller
- Check Charge indicator on Controller
- Check all cables are secure
- Ensure all circuit breakers are active (red colour is visible)

Measure voltage from batteries

- This should be above 11.5 volts on 12 volt systems
- This should be above 23 volts on 24 volt systems

Measure voltage from solar panels

- This should be 16 volts and above for a 12 volt system in full sunshine
- This should be 30 volts and above for a 24 volt system in full sunshine

Measure the amps from the PV

- This should be in line with the amperage on the specification sheet of the manufacturer

System reboot

- Power down the system by turning off the circuit breaker for the Battery, then the circuit breaker for the PV
- Power up the system by turning on the circuit breaker for the Batteries, then the circuit breaker for the PV

NOTE: Sometimes a system re-boot is all that is needed to kick the system back into normal operation. If this is required too often, contact PowerStack for further assistance.





- Download Victron connect app from app store
- Push down Orange Switches to Activate system
- Turn Bluetooth on your phone & open APP
- Hit on the controller which shows up on the app
- Update firmware if needed
- Use code 778225 when prompted or (000000 as Default)
- Once logged in you will see electrical data
- Test Load by hitting cog top right-hand corner
- Turn street light function to off to bring load always on

NOTES-

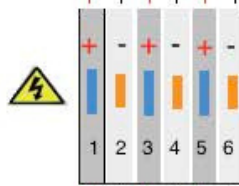
- All Electronics are accessed via the top (Winch Required)
- Bluetooth code is PSTACK (778225) Or 000000
- WARNING - DC Low voltage Circuit in use
- Push down Orange Lever arm firmly
- Battery voltage range (10.6 to 14.6 VDC)
- Solar voltage range (16.0 to 26.5 VDC)
- R/BR = Red / Brown (Positive wiring)
- BL/K = Blue / Black (Negative wiring)



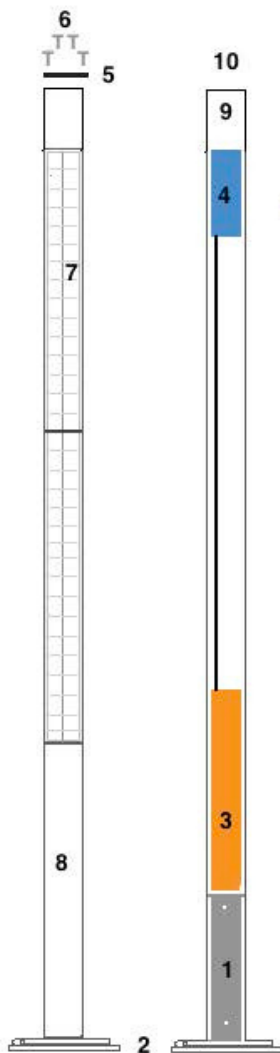
DANGER
WARNING
DUAL POWER SOURCES
PHOTOVOLTAIC SYSTEM

VDC on solar panels
always present in sunlight

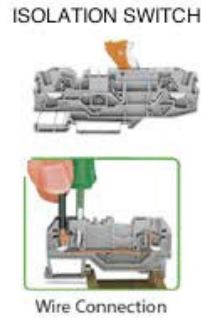
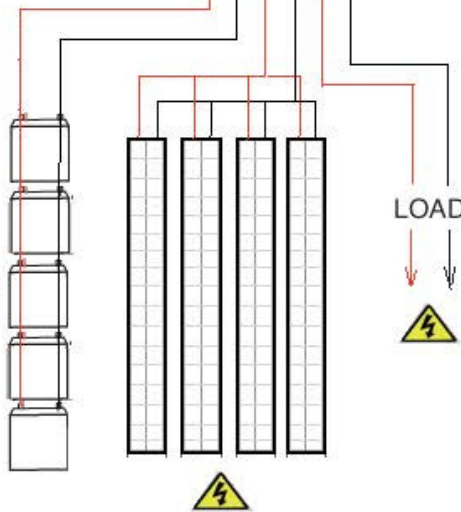
10-50 VDC present



Isolate all power supplies
before working on this system



1. Internal stainless sleeve
2. Stainless hinge system
3. Battery Pack
4. Control board
5. Top cap
6. Top cap Screws
7. Glassless solar panels
8. Infill composite panel
9. Solar module termination
10. Access to electronics



- 15 amp Mini Blade Fuse
- Isolation Switch
- Push down Orange lever arm firmly

INSTALLATION - OPERATION - MAINTENANCE



POWERSTACK- QUICK START COMMISSIONING GUIDE

DWG NUMBER - APS-M30- 222



Understanding system components

Solar Panels

Typically, Solar Panels do not need any maintenance, however, you should ensure that they are free of debris, snow, bird droppings and grime as much as possible. The cleaner the panel face, the more efficient the generating ability of the Solar Panel.

Batteries

The batteries are extreme temperature LIFEPO4 batteries rated for normal operation between -30C/-35F to +70C/+170F. The battery terminals should be free of any oxidation/reduction build up. If you notice any such build-up on the terminals, please contact PowerStack. If you notice any bulging of the batteries, decommission the system immediately and contact PowerStack.

LED Driver

The LED Driver is a state-of-the-art electronic DC-DC booster that keeps the current sent to any LEDs in lighting payloads at a constant rate.

There is nothing to maintain here other than to note if any wires have come loose at any point in time. DO NOT try and reinsert loose wires while system is trying to discharge (If in discharge: the lights will be on or it will be night time). Power down the system in the specified order using the circuit breakers and then reactivate the system in the specified order when you are finished. If it is determined that there is a fault with the driver, de-commission the system and contact PowerStack.

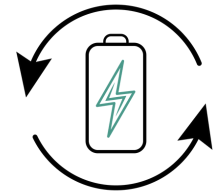
Other payloads

For the payload maintenance requirements and recommended intervals, please refer to manufacturers maintenance and warranty documentation. If it is determined that there is an issue with the load, please decommission the system and contact PowerStack.

Solar controller states

System charge

When the sun comes up in the morning, the solar panel starts generating electricity. The controller monitors this and when a particular voltage threshold is reached (controller dependent), the controller will stop drawing voltage from the batteries to feed to the driver and instead direct the charge coming from the panels to the batteries. The system is now charging for the day.



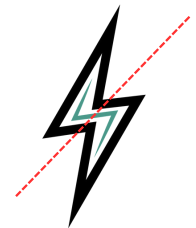
System discharge

As the sun sets, the panel will start producing less electricity and the voltage from the panel will start to drop. When a particular threshold is reached, the controller will stop charging the batteries and start to instead draw from the batteries to feed power to the payload(s). The system is now discharging for the night.



Low voltage disconnect

When the system experiences several days on end with little to no charge, particularly in the winter months, you may note that the systems do not stay on all night. The controller has a low voltage disconnect built into it in order to preserve the batteries. When the battery level drops below a certain level, the controller will stop drawing from the batteries in order to preserve them and wait for the next charging cycle.



NOTE: This low voltage level is factory pre-set. Changes are not possible as this could affect the life of the batteries.

Low voltage disconnect

The controller also regulates when the batteries have received enough charge and stops charging the system when the batteries are full as overcharging batteries will damage them.

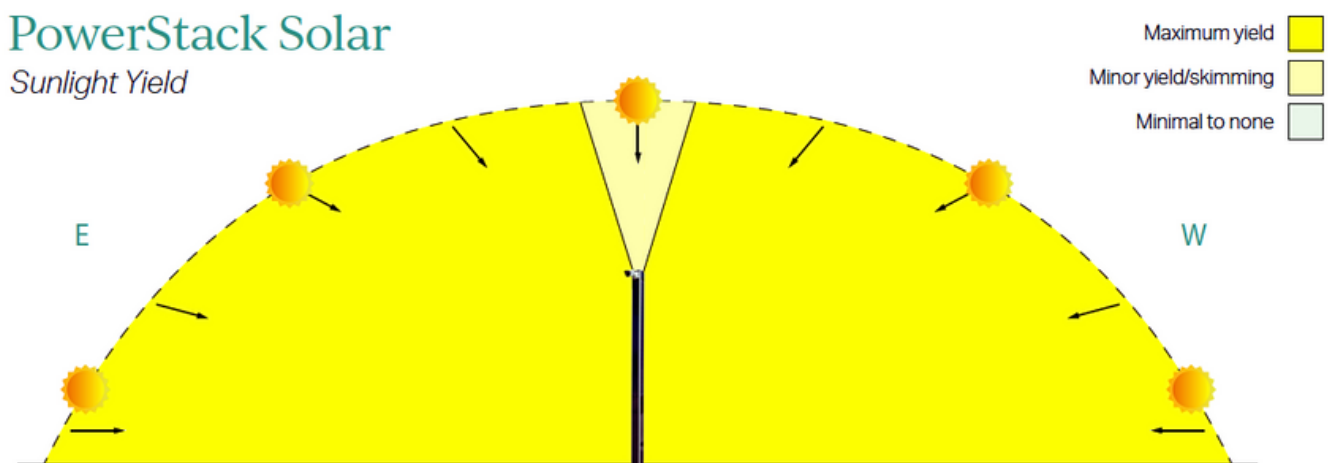
NOTE: This overcharge voltage level is factory pre-set. Changes are not possible as this could affect the life of the batteries.



Solar concepts

System Autonomy

This refers to the length of time the system is designed to operate once the batteries are fully charged. PowerStack designs all systems with a 5 day battery backup (or autonomy) as standard. This means that once the system is fully charged, the lights will last for 5 full nights before becoming inactive. This translates roughly into 5 – 7 days (depending on the region and temperature) of real time autonomy. This is because even on a cloudy day, the system is still charging, harvesting sunlight throughout the day due to it's unique, vertical design.



Indicative example of system autonomy:

- Day 1 – last sunny day
- Night 1 – system discharges from 100% to 75%
- Day 2 – first overcast day / rainy day. System is re-charged to 90%
- Night 2 – system discharges from 90% to 65%
- Day 3 – second overcast day / rainy day. System is re-charged to 80%
- Night 3 – system discharges from 80% to 55%
- Day 4 – third overcast day / rainy day. System is re-charged to 70%
- Night 4 – system discharges from 70% to 45% etc.

NOTE: Snow collecting on solar panels can lead to the system discharging for 15 hours straight and then not being activated again until the next charge cycle. If you notice snow on the panels for any period of time, it would be a good idea to try and remove it. The angle of the panel is vertical eliminating falling snow from collecting on the solar panels.

Maintenance Schedule

The systems should be checked and maintained once a year to ensure continuous warranty and operation of the PowerStack system. Please record the values noted during the yearly maintenance within the above tables.

	Year 1	Year 2	Year 3	Year 4
Panel is clean and free of debris				
Panel voltage				
Panel amperage				
Battery terminals checked				
Battery voltage				
Battery amperage				
Controller charge				
Indicator is on				
Lights turn on when tested				

	Year 5	Year 6	Year 7	Year 8
Panel is clean and free of debris				
Panel voltage				
Panel amperage				
Battery terminals checked				
Battery voltage				
Battery amperage				
Controller charge				
Indicator is on				
Lights turn on when tested				

	Year 9	Year 10	Year 11	Year 12
Panel is clean and free of debris				
Panel voltage				
Panel amperage				
Battery terminals checked				
Battery voltage				
Battery amperage				
Controller charge				
Indicator is on				
Lights turn on when tested				

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