DESIGNED AND DEVELOPED BY SkyEnergy

Hello!

INSTALLATION MANUAL

SkyBox

victron energy BLUE POWER | SkyEnergy Powered by | SkyBox

With great power comes great responsibility.

SkyBox

FIND THE RIGHT SECTION

Contents

IMPORTANT

Warnings

- After transporting SkyBox, Check all terminals are tight and have a good connection before use.
- Ensure SkyBox is earthed and installed according to your region's electrical standards.
- When choosing a location for your SkyBox, ensure it is at least 1.5M away from any gas connection or ignition source.
- You must install the SkyBox and SkyBox Mini to your region's electrical standards and battery code.
- Keep the SkyBox away from flooding/water
- String configuration (Voltages and earth guard)

IMPORTANT

Caution/Danger

The SkyBox is heavy. Use a minimum of two people or suitable lifting equipment to manoeuvre the battery units into position.
A licensed electrician must install the SkyBox.

WARNING

Lithium Battery hazard

Fire
In the case of fire, immediately evacuate the area and call emergency services (000 in Australia). Keep a dry agent fire extinguisher readily available, and DO NOT use water to extinguish a battery fire. Beware: battery fires may produce toxic gas.

Important Note
Sky Energy provide an SDS document with each SkyBox system. You can also find an electronic SDS document online at www.skyenergy.com.au.

Damaged battery
Do not use a damaged battery. Please dispose of lithium batteries at an appropriate recycling centre. Please contact Sky Energy should you require more information or guidance.

For further safety information, please refer to the SDS (Safety Data Sheet) document.

IMPORTANT

Safety

WARNING: Any works inside the SkyBox are strictly undertaken by a qualified electrician only. Installation of the SkyBox is recommended to be carried out by a licensed electrician.

All wiring diagrams and written instructions are provided as a guide only. Making sure installation is compliant and adheres to appropriate standards is the sole responsibility of the installer.

Please refer to the following relevant standard when installing any SkyBox product:

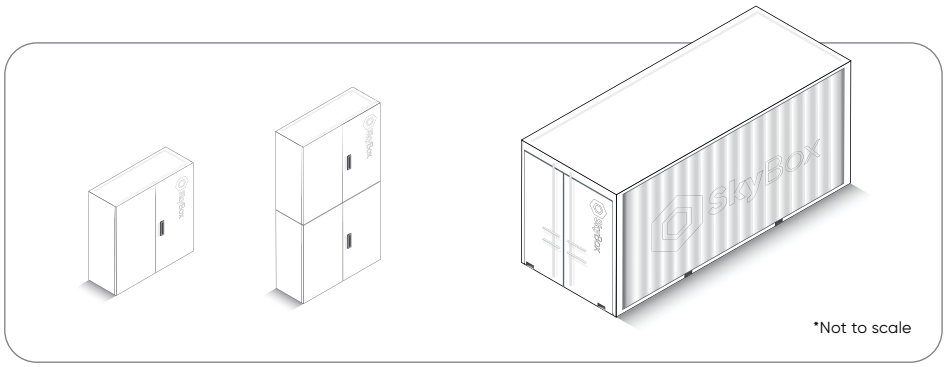
AS/NZS 3000:2018	Wiring rules
AS/NZS 5033:2014 (amdt 1&2)	Installation and safety requirements for solar, photovoltaic (PV) arrays
AS/NZS 4509.2:2012	Design of stand-alone power systems
AS/NZS 1170.2:2011	Structural design actions - Wind actions
AS/NZS1768:2007	Lightning protection
AS/NZS 3008.1.1:2017	Electrical installations – Selection of cables

A qualified electrician who has thoroughly read and understood the operation manual and all hazards and dangers involved should go ahead with the installation of the SkyBox.

WARNING: Do not attempt to charge the lithium batteries provided with this system with any charger device (other than the SkyBox). DO NOT connect any devices directly to the DC battery bus. Any attempts to do so will void the warranty.

This installation manual covers all the following model numbers:

- SkyBox Mini
- SkyBox
- Skytainer

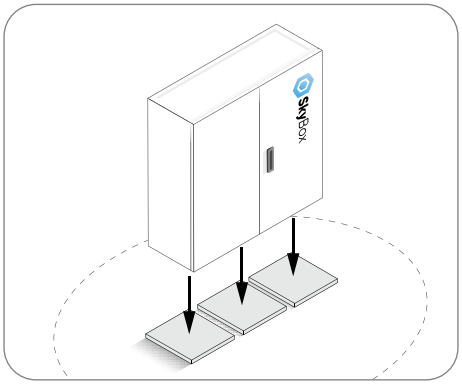


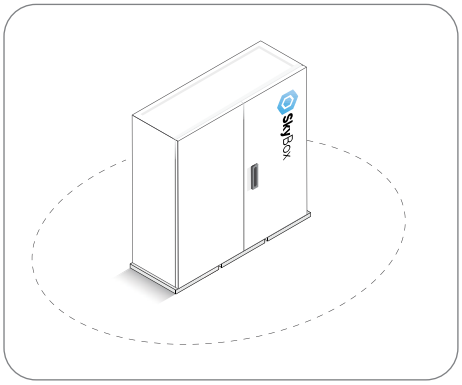
Sky Energy is always trying to better its products; as such, the installation manual and its content are subject to change at any time without notice. To ensure you have the most up-to-date manual, we advise you to visit **www.skyenergy.com.au** and download the relevant documentation.

GETTING UP AND RUNNING

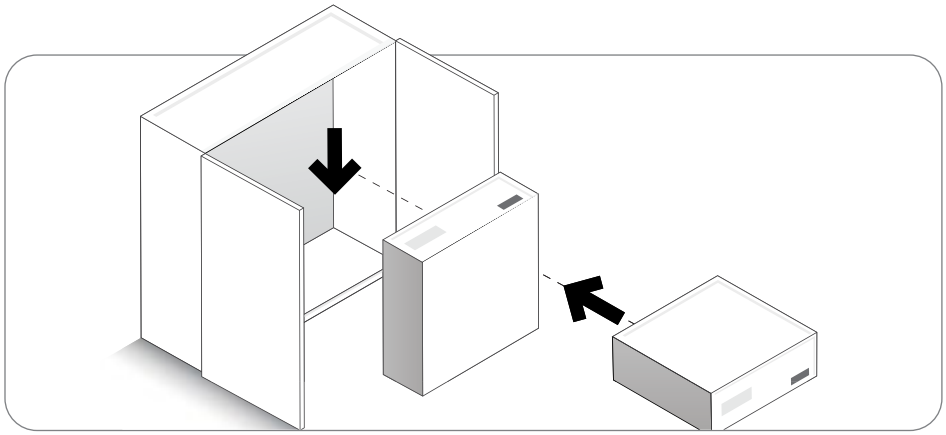
Quick start guide

1. Choose the desired space for the SkyBox and clear the surrounding area.
2. Place the SkyBox on a stable, even surface. Remember to use proper lifting equipment to move into place.





3. Place the batteries into the SkyBox cabinet, and secure them with the fastening bar.
4. Plug in the black and red cables onto the battery terminals.
5. Plug inverter cable into A/CAN.
6. Plug into powerpoint.



BITS AND PIECES

What is included with SkyBox

WHAT YOU GET IN THE DELIVERY

- SkyBox
- Solar Panels (If Solar option selected)
- Mounting Frames (If Solar option selected)
- Isolators and Circuit Breakers (If Solar option selected)
- Label Kit

WHAT YOU DON'T GET, BUT MIGHT NEED

- Electrical Cables - DC and AC
- Conduits and fittings
- Screws and fixings
- MC4 Connectors
- MC4 Branch Connectors
- Dektites
- Silicone and sealants
- Cat 5 or Figure 8 Cable (You will need this if you are connecting a generator autostart)
- Earth Stake

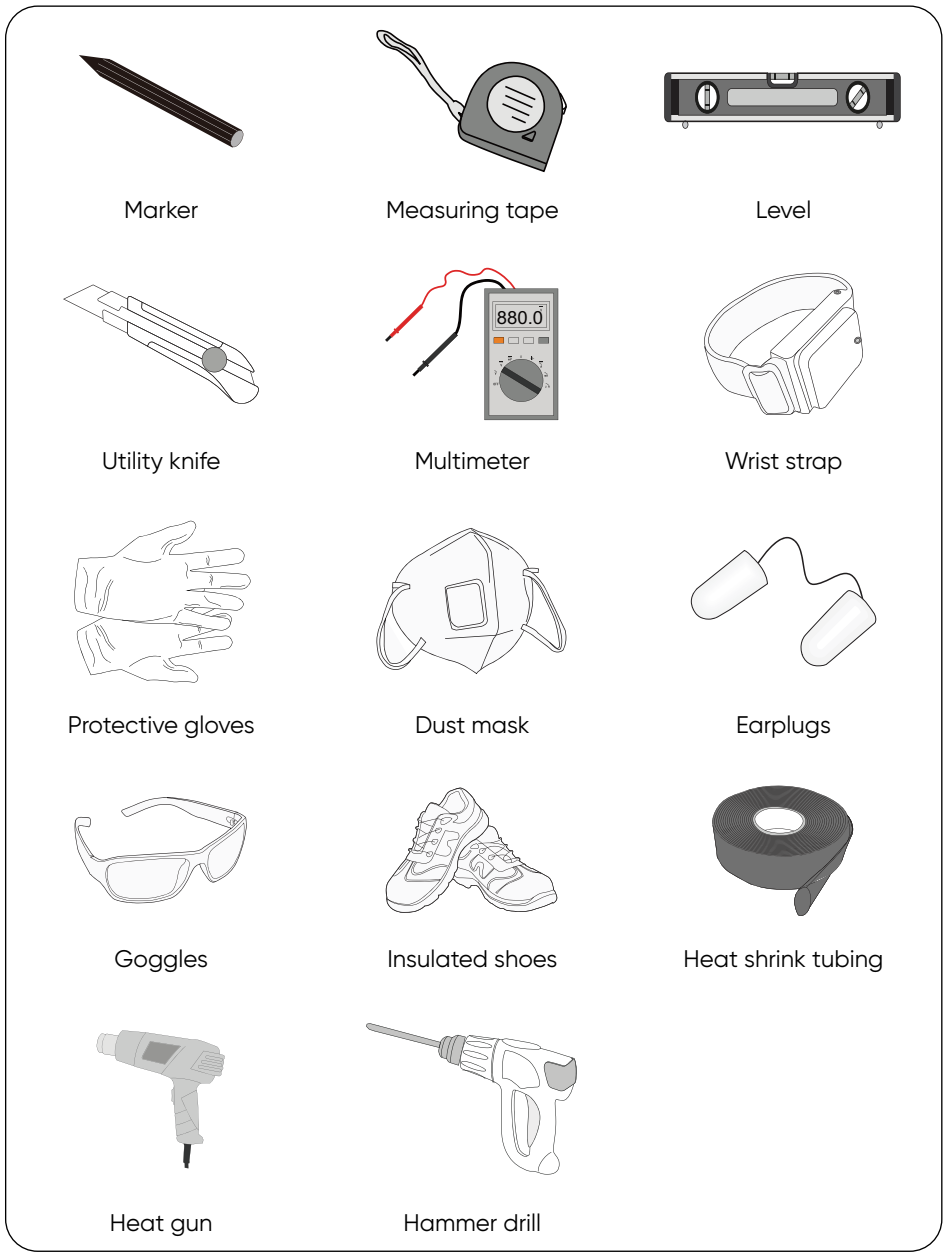
REQUIRED SKILLS

- Qualified Electrician
- Solar panel installation experience (If buying with solar panels)

INSTALLING THE RIGHT WAY

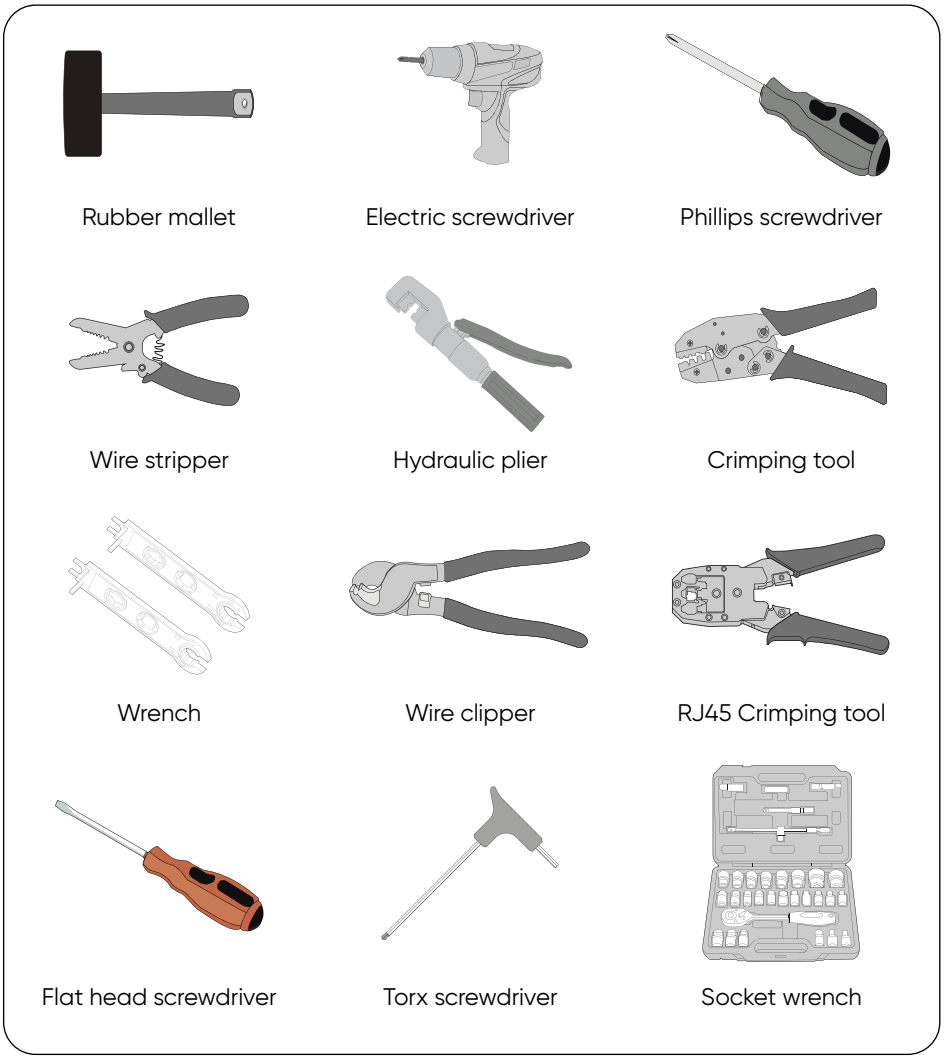
Tools required

To make installing the SkyBox as quick and straightforward as possible, please ensure you have the correct tools before starting.



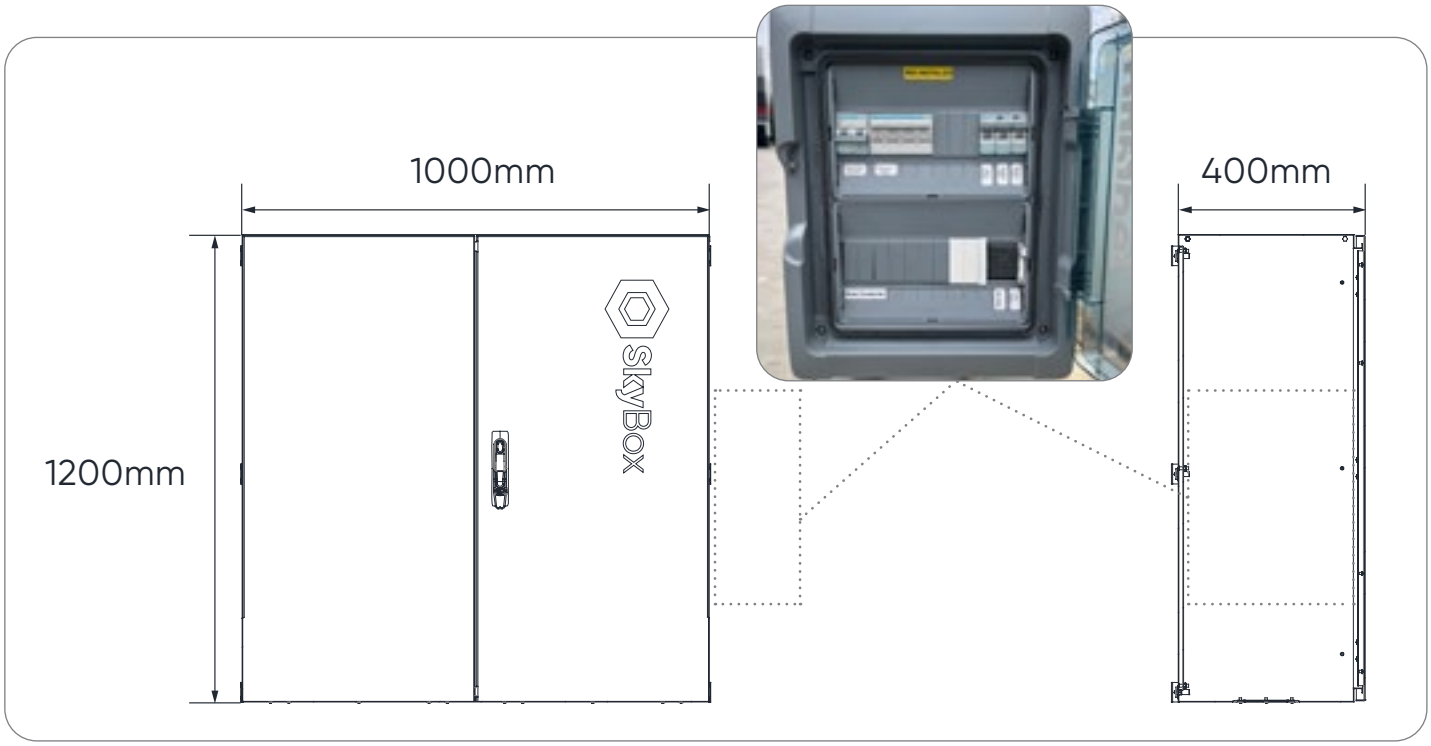
INSTALLING THE RIGHT WAY

Tools required

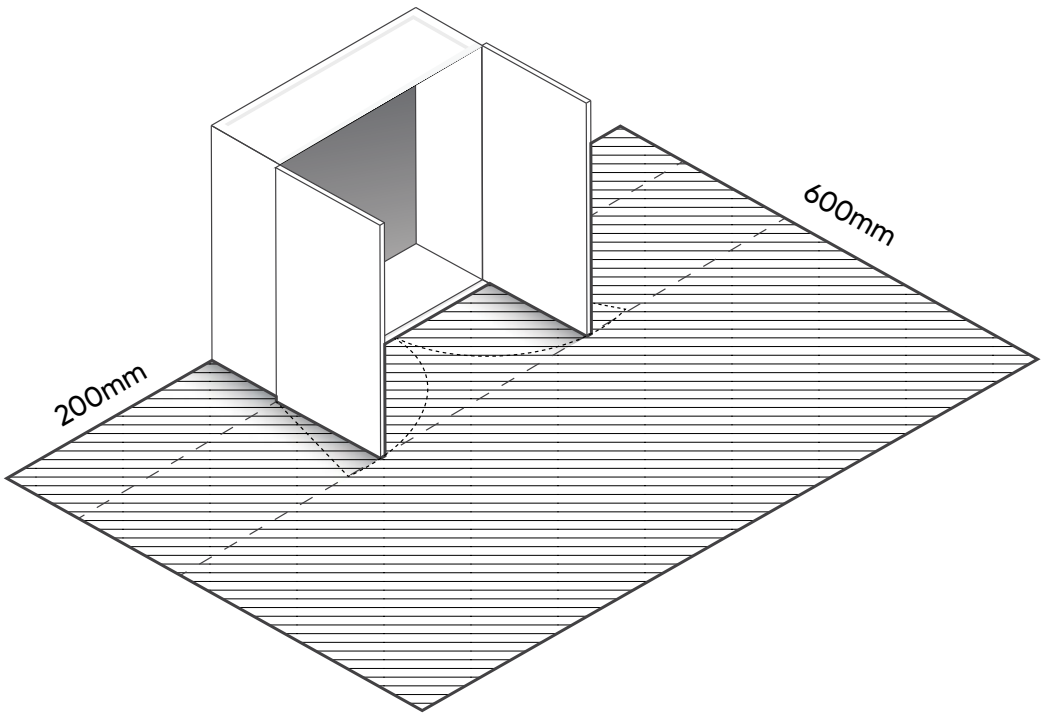


ITS NOT THE SIZE THAT MATTERS

Dimensions & Clearance



*Sizing may vary depending on stock availability and global supply. Orientation of inlets may vary.



CREATE YOUR OWN POWER GRID

Overview

SkyBox gives everyone freedom and independence from the power grid.

Acting as a central 'brain,' the SkyBox manages incoming power from your solar, wind, or hydro generators.

Balancing these power sources and storing excess energy in the internal batteries, SkyBox creates a reliable off-grid electricity supply.

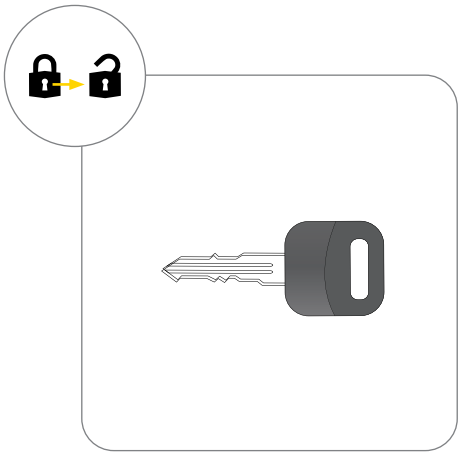
ACCESSING THE INTERNALS

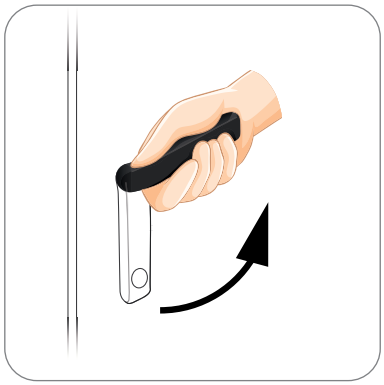
Components

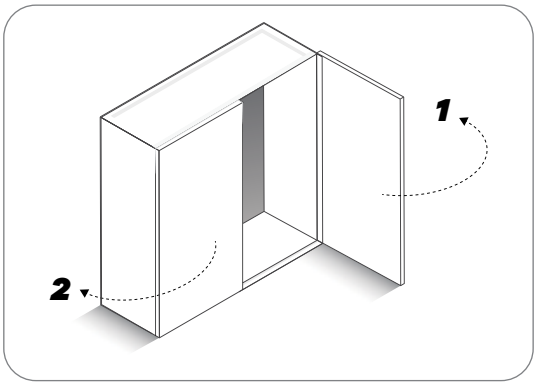
Opening the SkyBox

A key is required to access the internal section of the SkyBox. Now that the door has been unlocked lift the handle toward you, then keep raising it to the right until it pops out. Use the handle to pull open the door as required. The left door can now be opened with ease.

We strongly recommend keeping the SkyBox locked at all times.

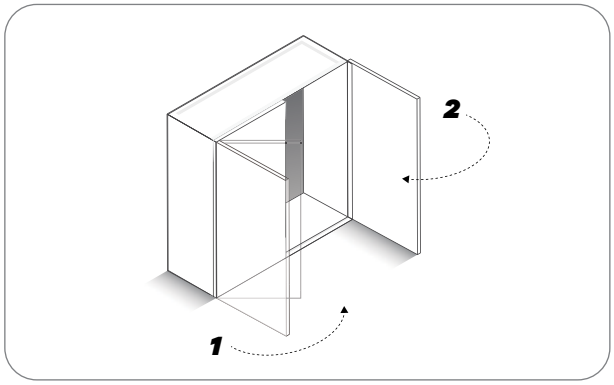


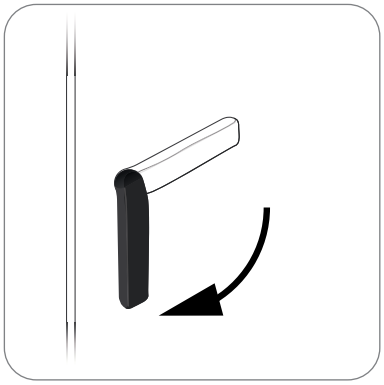


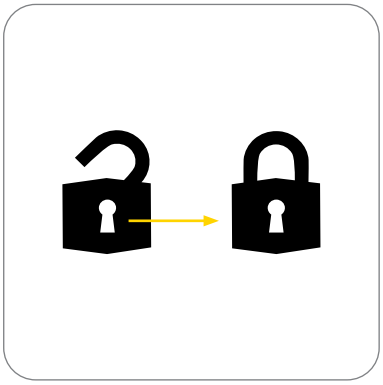


Closing the SkyBox

To close and lock the SkyBox, first, make sure the left door is shut. Close the right door and use the handle to push down clockwise until the handle pops into place. Use the key to lock the SkyBox.







If you have lost your set of keys and cannot access your SkyBox, please contact our team at **1300 787 488**. We will send you a replacement pair for a small fee.

INTRODUCING THE SKYBOX

Components (outside)

Key

01 Vents
02 Handle
03 Keyhole
04 Switchboard
05 Solar plug (Orientation may vary)

INTRODUCING THE SKYBOX

Components (inside)

Key

01 Inverter
02 Battery space
03 Breaker

*General layout pictured. Layout may vary.

TIME TO UP AND GO

Transporting

Weight 90kgs - 150kgs approx.

Your SkyBox comes preprogrammed and prewired, ready to go. It ships out securely strapped on a pallet in the off position to the destination discussed.

Weight ranges from 100kgs to 200kgs approximately—depending on parts used, batteries and other components available or other arrangements discussed with the SkyBox engineers in the pre-build stage.*

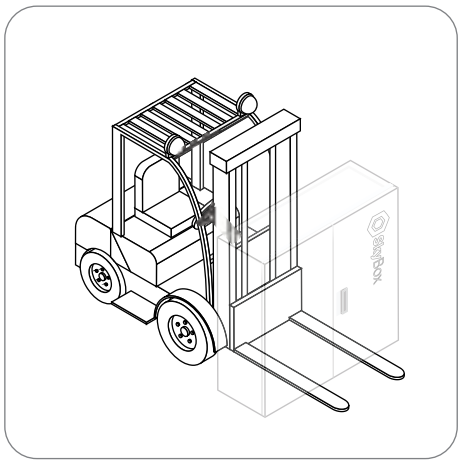
SkyBox should always be turned off properly before being moved and transported. Failing to power down may damage the SkyBox and components and cause property damage/fire.

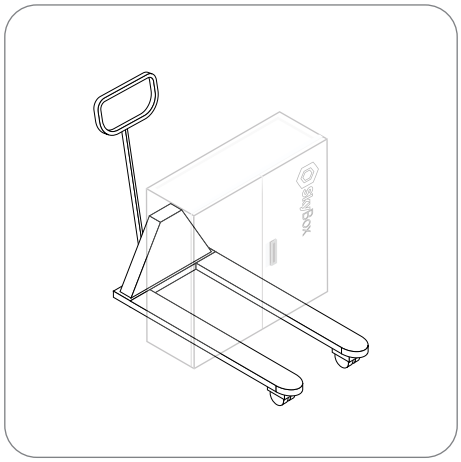
SkyBox is extremely heavy; we do not recommend moving or attempting to lift the SkyBox without suitable lifting machinery to prevent personal injury and damage to the SkyBox. Incorrectly transporting and moving the SkyBox may void the warranty.

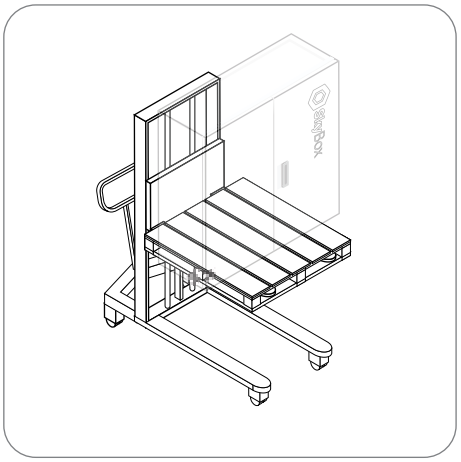
A qualified electrician may remove batteries as a last resort and must be cautiously handled. Removal of any components/parts without contacting Sky Energy first may cause severe injury and damage to the system and void the warranty.

We recommend using a forklift if applicable. However, these are also suitable:

- Forklift - Recommended.
- Hand trolley.
- Pallet jack.
- Other specialised lifting tools.





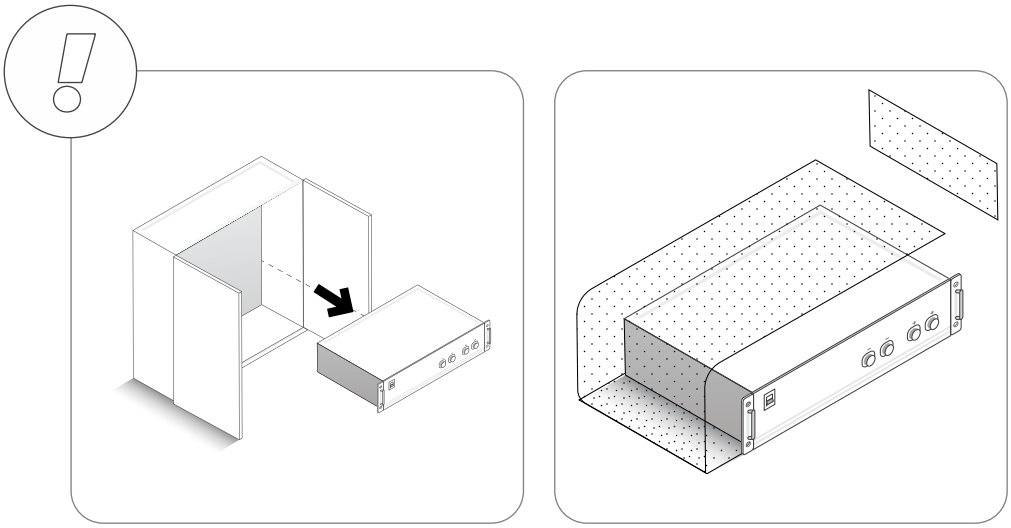


*Weight, parts and components may vary depending on stock availability and global supply.

BEFORE YOU GO

Getting ready to transport

Warning
Remove batteries before transporting them, and always ship in secure packaging to protect them from damage.



LOCATION, LOCATION, LOCATION

Positioning and Ventilation

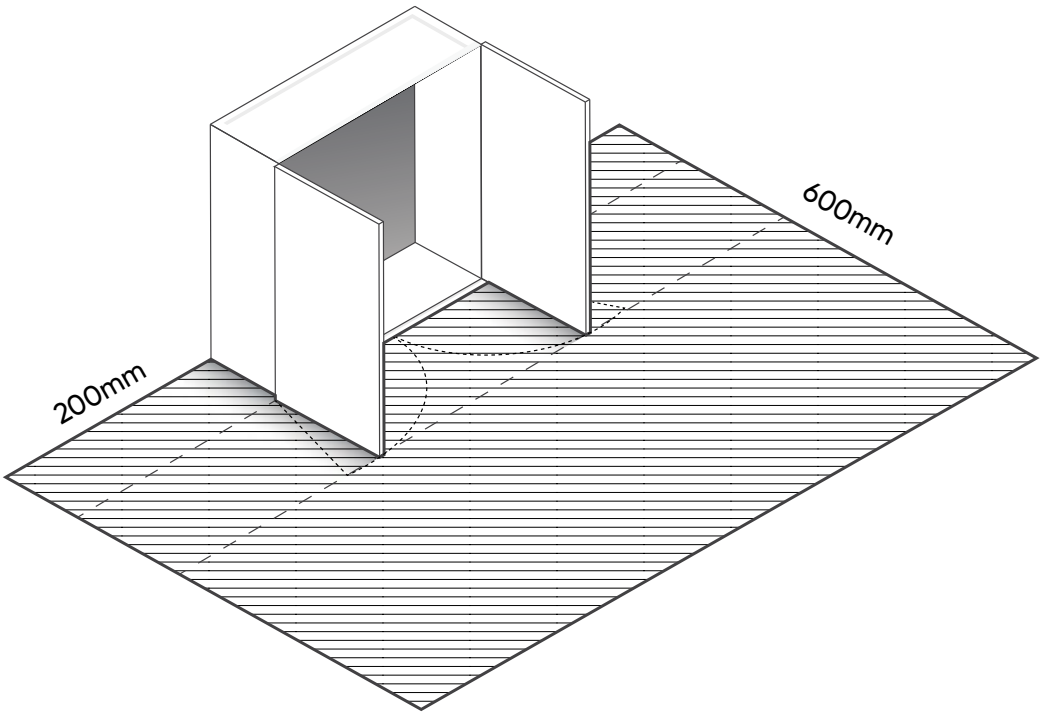
Designed, tested, and IP54 certified to withstand all weather conditions, SkyBox is a freestanding system that can be installed indoors or outdoors.

Prebuilt fans and vents are situated on the left and right-hand sides. These vents should be unconcealed and have the specified clearance when the SkyBox is sitting in its installation position.

It is crucial to leave enough clearance on each side of the SkyBox to allow optimal/maximise airflow to and from the vents. Any blocking will leave the system open to overheating, which could cause irreversible malfunctions/ damage. Following these instructions will keep the internal components of the SkyBox working optimally for longer.

The optimal and recommended placement for the SkyBox is in a shaded area away from direct sunlight.

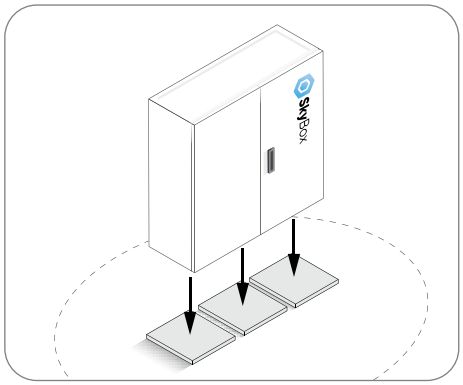
If combined with solar panels, we recommend placing the SkyBox as close to the array to minimise voltage drop/power loss.

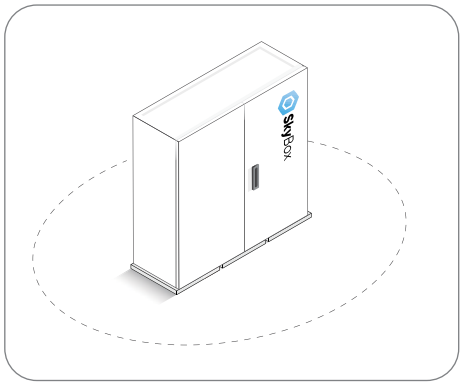


THE PERFECT PLACE

Installing the SkyBox cabinet

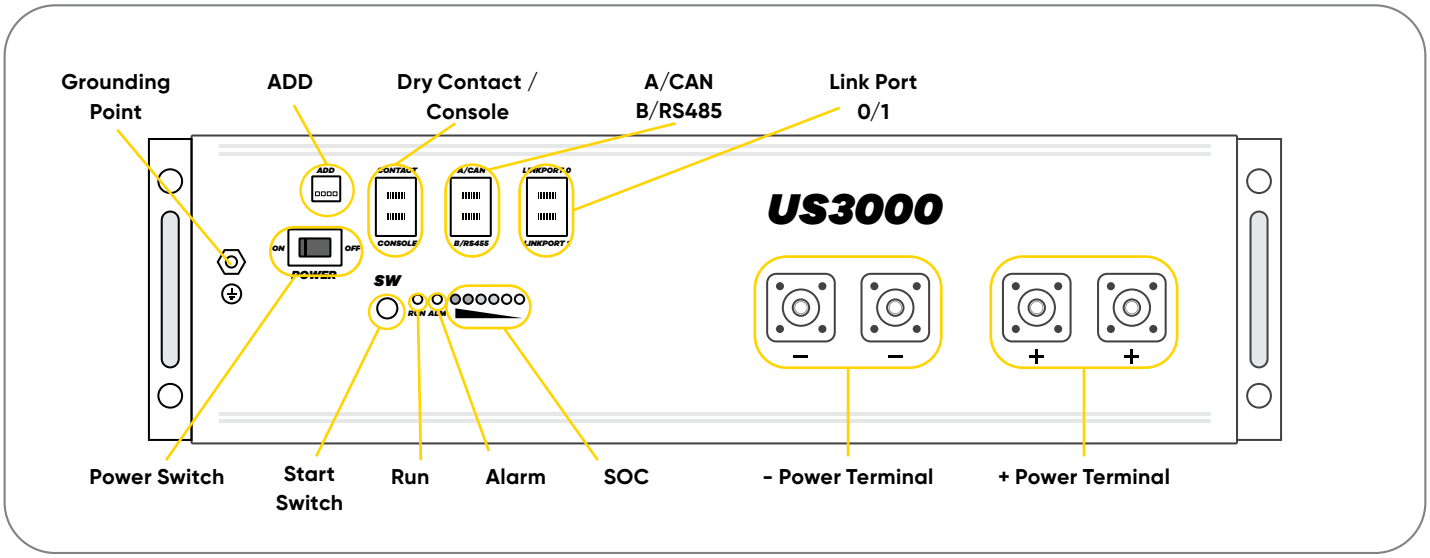
1. Choose the desired space for the SkyBox and clear the surrounding area.
2. Place the SkyBox on a stable, even surface. Remember to use proper lifting equipment to move into place.
3. ! Secure and fasten the SkyBox to the wall with fastening eyelets





GETTING TO KNOW YOUR BATTERY

Battery interface



Power Switch

ON: ready to turn on.

OFF: power off. For storage or shipping.

Start Switch

Turn on: press more than 0.5s to start the battery.

Turn off: press more than 0.5 to turn off the battery.

Run

Green LED lighting to show the battery running status.

Alarm

Red LED flashing shows the battery has an alarm; lighting shows the battery is under protection.

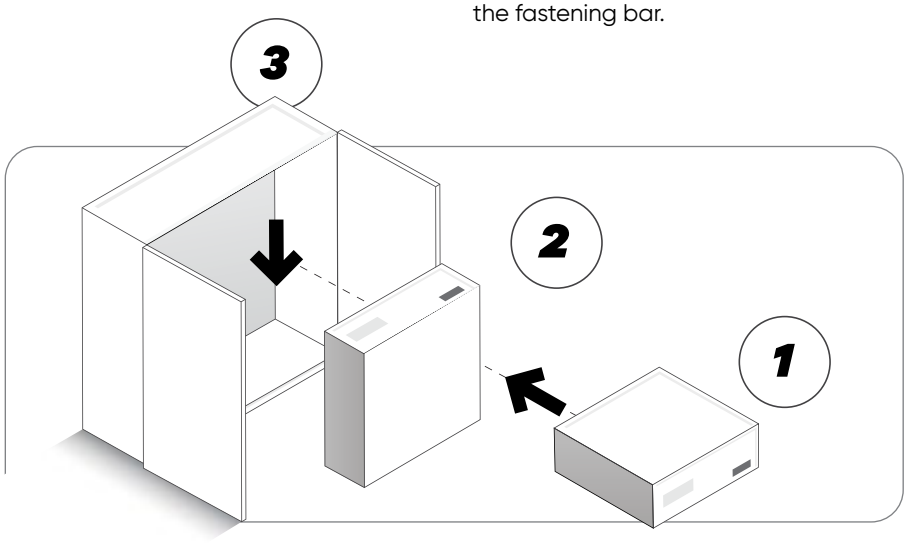
SOC

Six green LEDs show the battery's current capacity.

GET THE BATTERIES CONNECTED

Installing the batteries in the cabinet

1. Place the batteries into the SkyBox cabinet, and secure them with the fastening bar.



2. Plugin the black and red cables onto the battery terminals. Ensure connections are tight.

3. Plug inverter cable into A/CAN (Page 24).

GETTING THE BATTERIES TO WORK TOGETHER

Cable connections TOP view down

Connect the cables as shown below to suit the number of batteries you require.

SkyBox Mini - 1 pair of red and black cables return to the inverter.

SkyBox - 2 pairs of red and black cables return to inverter; each pair should be used for 4 batteries. Earth should be continuous to all batteries.

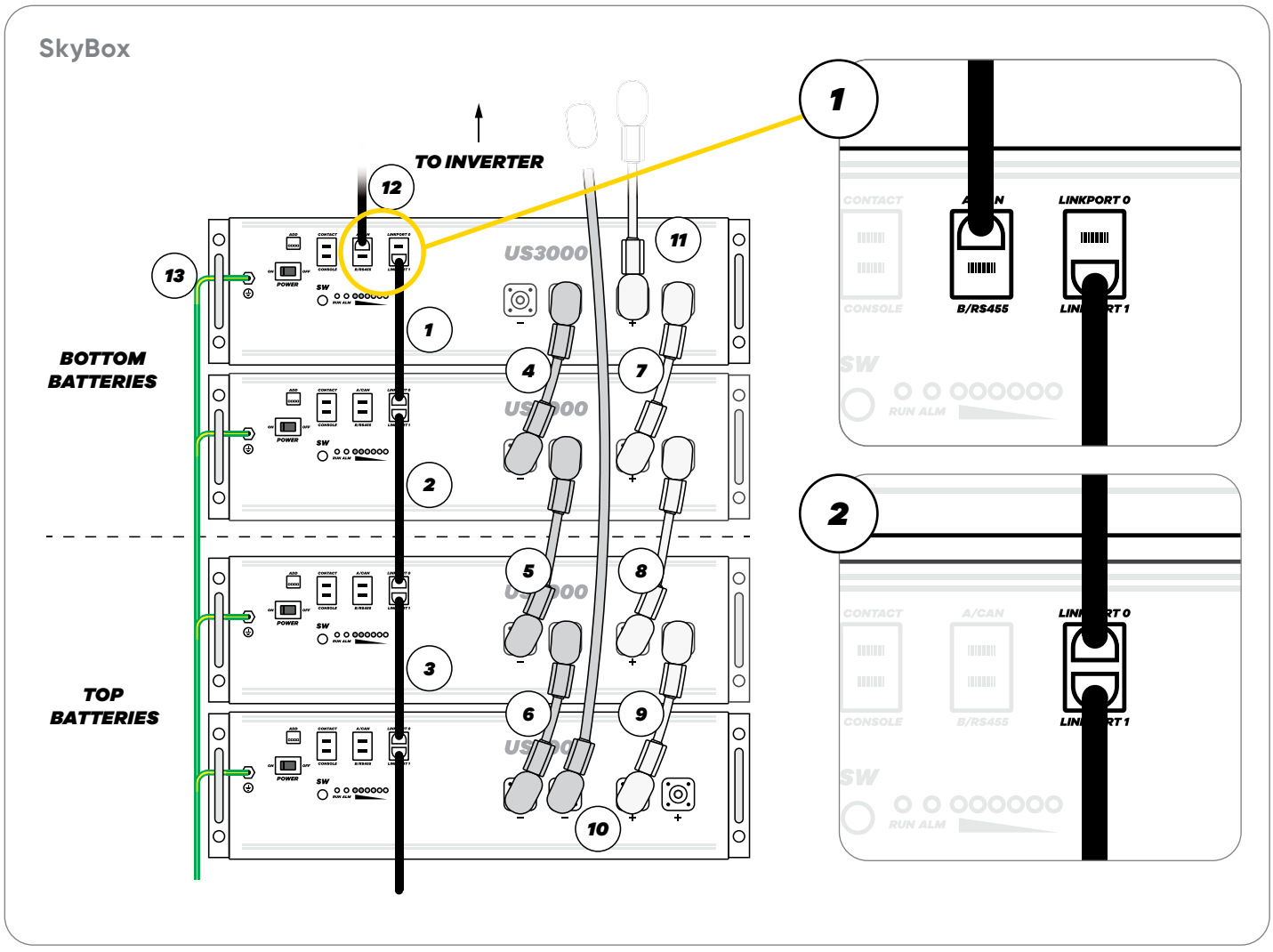
Connect the communication cable from battery **4** to battery **5** and continue up until battery **8**.

13 - Earth Cables.

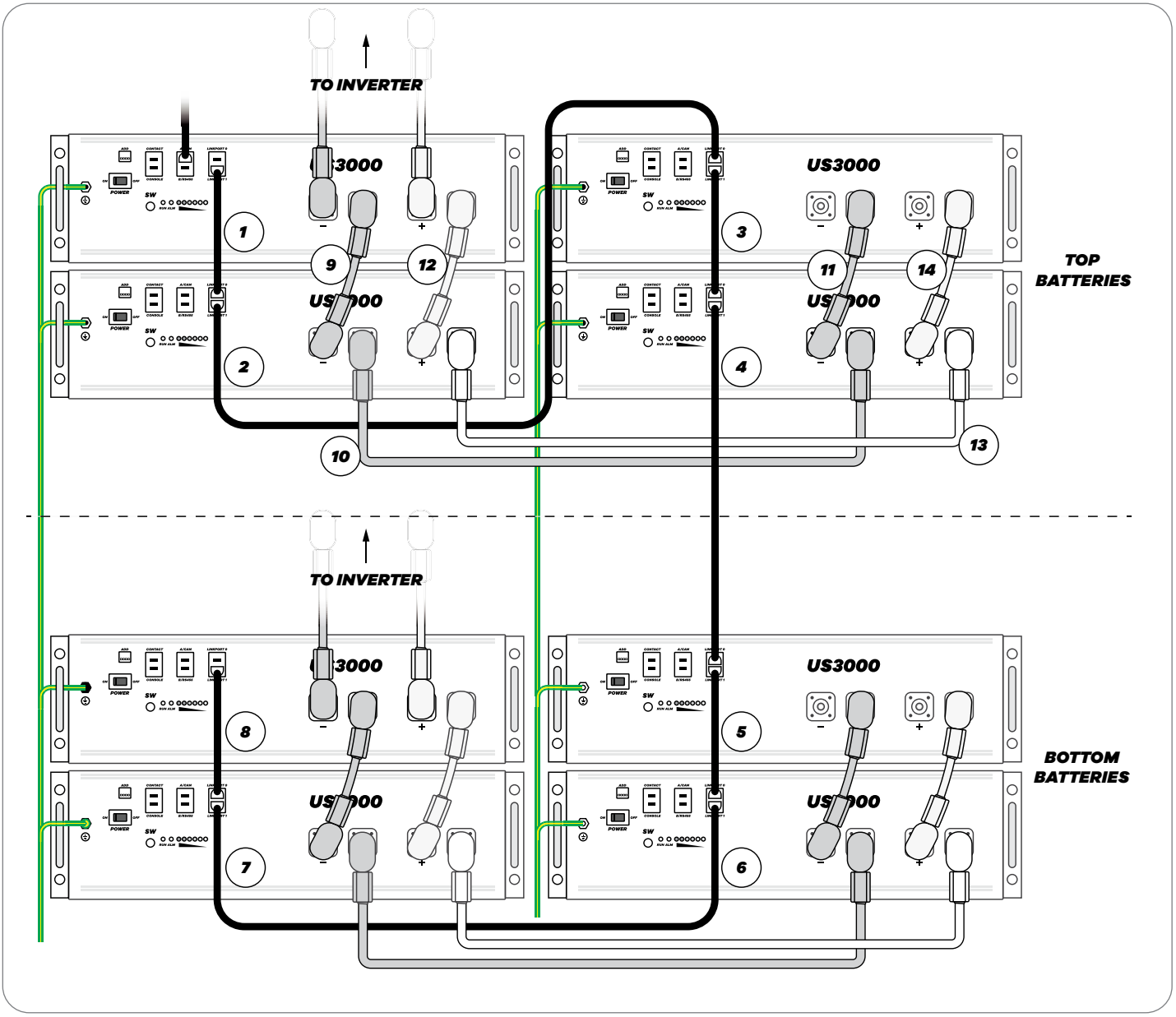
12 - From Inverter.

1, 2, 3 - Battery comms connections.

10, 11 - From Battery Breaker.



SkyBox additional battery setup



Inverter is into Can A

Link Port 1 to Link Port 0. Repeat. Must go to 1 then 0.

Earth is continuous.

Comms is continuous.

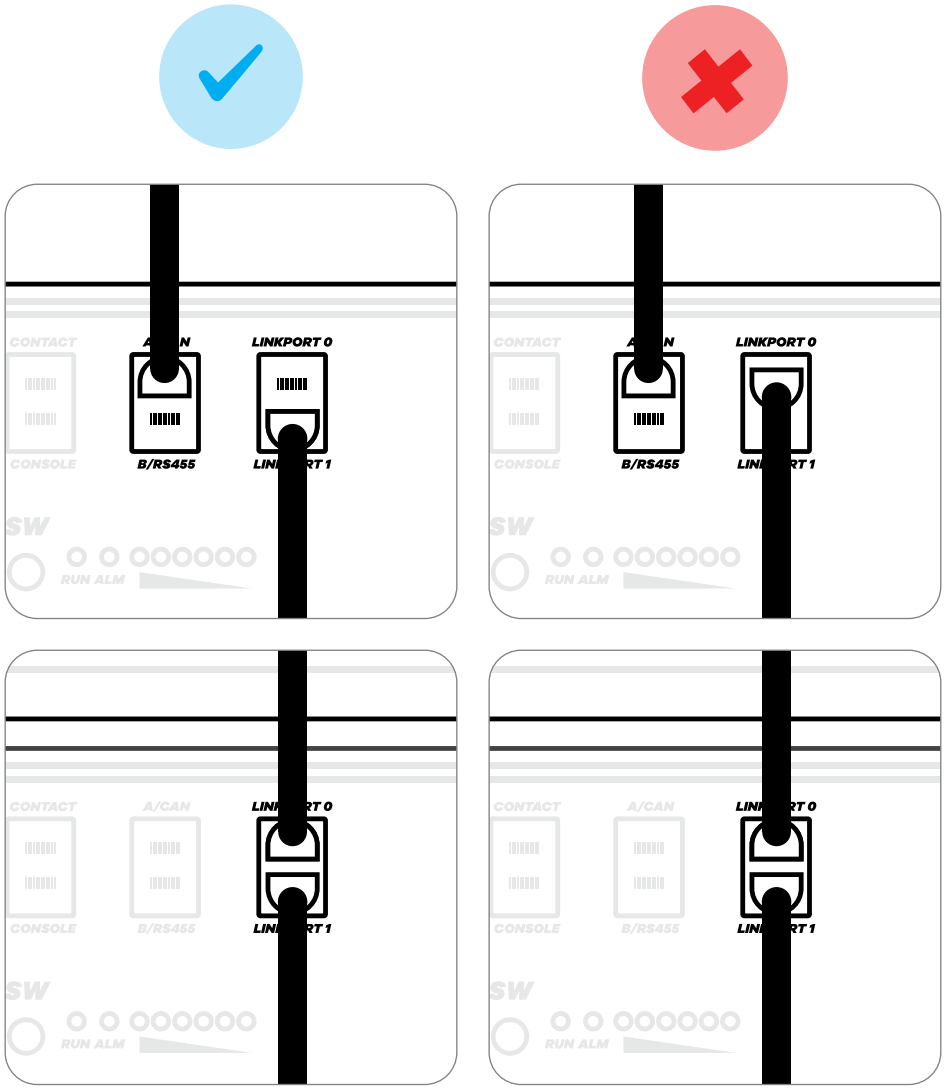
GETTING THE BATTERIES TO WORK TOGETHER

Cable connection troubleshooting

Troubleshooting

The most common mistake connecting the cables is starting from "**Link Port 0**", which is incorrect.

Please make sure the inverter cable is plugged into the "**A/CAN**" Port. Then connect batteries starting from "**Link Port 1"** to "**Link Port 0**" of the next battery unit and continue to alternate.



LET'S USE THAT SWEET ENERGY FROM THE SUN

Adding solar panels

Fast Forward

Not installing panels? You can fast forward to page 31.

Warning
Solar panels start producing electricity as soon as they are exposed to sunlight.

Warning
Check the inverter rating before installing a PV array. If the voltage or current values on the PV array are above the inverter, it will damage the SkyBox system and void the warranty.

1. Electrical Calculations

It is essential to ensure the solar voltages and current do not exceed the maximum inputs allowed on the skybox solar controller.

When calculating maximum voltages and current, we use the method found in the Australian Standards (your country code may differ).

Look for **VOC** and **ISC** on the specification sticker of your chosen panel.

Model	Max PV Open Circuit Voltage	Max PV Short Circuit Current
3kVA Mini SkyBox	250V	35A
5kVA Mini SkyBox	250V	70A
8kVA SkyBox	450V	20A per tracker
10kVA SkyBox	450V	20A per tracker

Panel PV Calculations

VOC = Qty of panels (series) X VOC X 1.12
ISC = No. of parallel strings X ISC X 1.25

See section 5 for examples of how to calculate strings.

The way to determine the maximum allowed inputs is to check the solar input specs printed on the inside of the door.

2. Strings

A string is a set of panels connected with a positive and negative on either end to create a circuit. Before wiring up panels, a basic understanding of series and parallel series is recommended.

Most charge controllers allow for a higher current input which will require running parallel strings. When running a parallel string, there are a few essential points.

1. A parallel string must be the same amount of panels in each series string eg. 2 strings of 4 panels will work, but a string of 3 and 4 in parallel will NOT work
2. Each string in a parallel set can be a different orientation or angle. Eg. 5 panels on the east and 5 on the west in parallel will work.

LET'S USE THAT SWEET ENERGY FROM THE SUN

Adding solar panels

3. Connecting the solar panels

Once the solar panels have been installed and wired up, you will end up with a positive and a negative cable return to the SkyBox. Simply connect these to the supplied DC isolator. Each DC isolator can take 1200V and 32A.

+
Male Positive Terminal

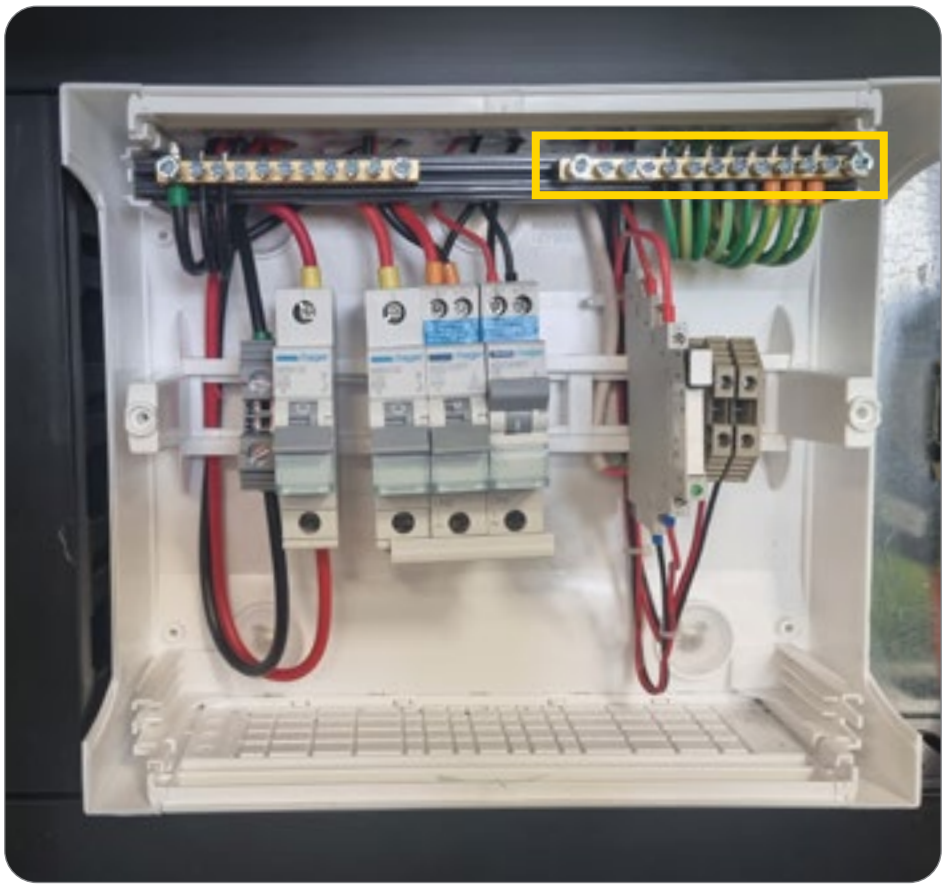
-
Female Negative Terminal

LET'S USE THAT SWEET ENERGY FROM THE SUN

Adding solar panels

4. Earth

It is essential to earth the solar panel array back to the main earthing point in the SkyBox. The earth can be connected using the supplied earth lugs and continuously lopped between all lugs and brought back to the SkyBox. Feed the earth cable into the SkyBox and connect it to the main earth bar inside the switchboard.



LET'S USE THAT SWEET ENERGY FROM THE SUN

Adding solar panels

Warning

Solar panels start producing electricity as soon as they are exposed to sunlight.

Pro Tip

Each set of 5 panels can be installed on a different orientation or different angle without the need for optimisers.

5. Examples

Let's have a look at some potential string configurations and how they might be wired.

SkyBox Mini

10 x 415w (4.15kw) Solar Panels (VOC: 41.8V / ISC:12.48)

Input Limit: 250V and 35A

VOC = Qty of panels (series) X VOC X 1.12 = 5 x 41.8 x 1.12 = 234V (max 5 panels per string)

No. of parallel strings X ISC X 1.25 = 2 x 12.48 x 1.25 = 31.2A

We can see here that we are under both the VOC and ISC input limits, so we are safe to install 2 strings of 5 in parallel.

SkyBox

20 x 415w (8.3kw) Solar Panels (VOC: 41.8V / ISC:12.48)

Input Limit: 250V and 70A

VOC = Qty of panels (series) X VOC X 1.12 = 5 x 41.8 x 1.12 = 234V (max 5 panels per string)

No. of parallel strings X ISC X 1.25 = 4 x 12.48 x 1.25 = 62.4AWe can see here that we are under both the VOC and ISC input limits, so we are safe to install 4 strings of 5 in parallel.

FORMALLY PART OF THE SYSTEM

Hardwiring the SkyBox (Connecting to an A.C. load) (optional)

Fast Forward

Not hardwiring? You can plug straight into the powerpoint.

Important
Please make sure that the SkyBox is turned OFF before opening the switchboard. Follow the Shutdown procedure if the SkyBox is turned on.

Important - Please make sure that the SkyBox is turned OFF before opening the switchboard. Follow the shutdown procedure below if the SkyBox is turned ON.

1. Run the A.C. supply cable from the SkyBox to the switchboard.
2. Connect the active cable to “Main Switch.”
3. Connect the Neutral cable to the neutral bar.
4. Connect the earth cable to the earth bar.
5. Close the switchboard.

Earthing.

1. Ensure earthing requirements meet the appropriate electrical standard for your region and country.

BACKUP WITH A GENERATOR

Adding a generator

Limitations
Electrician required.

Hardwire the generator into the 'Generator' circuit breaker.
If you require more power than what the inlet can provide, there is an option to hard-wire the generator directly into the switchboard—using the Gen Main Switch for active and the Neutral terminal next to it for the neutral cable. Earth goes into the main earth bar.

Auto start
You may configure the generator with a two-wire auto start. The auto-start terminals are located in the connection panel or within the switchboard (depending on your model). Wire the cable into the NO and COM terminal.

Changeover Switch

The SkyBox contains a changeover switch which has multiple positions:
Position I (Up) - Power is utilised from the SkyBox including the generator

Position II (Down) - Power is diverted directly from the generator. NOTE: This should only be used as a backup for emergencies when there is a fault causing the SkyBox to stop producing power.

Middle Position - OFF position

READY TO ROLL

Commissioning

Thorough commissioning and testing are done on all SkyBox models before they leave our headquarters. Your SkyBox will not leave our warehouse until it has been certified by our SkyBox engineers.

As with all systems, they are unique from the build to how their owners use them; this means slight changes to the parameter configuration are occasionally required. We strongly recommend a qualified technician to do this. If unsure, please contact our SkyBox engineers on **1300 787 488**.

AC Coupled Solar

Fronius

1. Make sure that the Fronius PV inverter is updated to the latest firmware.
2. After making the inverter operational according to the manual, select the language and after this the country specific setup.
3. Here choose MG50.
4. Ready to start up.

Fronius GEN24

1. In Fronius GEN24 devices with software version 1.14 or higher, the Solar API interface is not activated by default and must be activated for integration of the GX device. The setting for this can be found on the user interface of the Fronius inverter under “Communication” - “Solar API”.
2. Install as per Fronius guidelines. Connect locally:
3. Set to MicroGrid 50Hz
4. Enable Solar API under the “Communication” tab
5. Enable Sunspec Model type to int + SF under the “Modbus - SunSpec Model Type” tab.

SMA Sunny Boy

1. Change country code to MicroGrid 50Hz
2. Select the Sunny Boy in the left panel and click on Settings
3. Open the “External Communication” tab
4. Enable the TCP and UDP server; keep the default port (502)

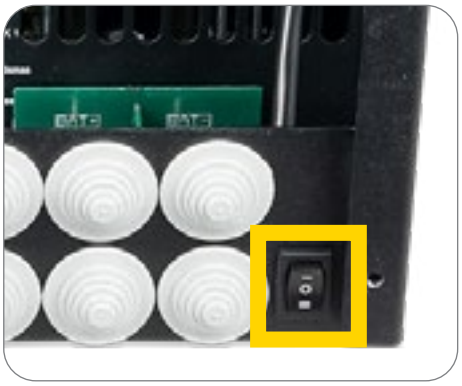
Once the steps above have been completed for your AC Coupled inverter, the GX device will automatically detect the PV Inverter.

For more information on AC Coupling please see relevant guide.

TIME TO GET IT GOING

Start-up procedure

1. Turn on the battery bank by following “Start Up” procedure in Battery Connections - **Next Page**
2. Turn on battery D.C. isolator
3. Switch the Victron inverter to Position I using the black 3-way toggle switch located below:



4. Turn on PV DC isolators located on the outside of the SkyBox
5. Turn on the main generator switch (If no genset is connected you can leave this turned off)
6. Turn on the main switch off-grid supply

TIME TO GET IT GOING

Start-up procedure

Step 1

Troubleshooting

If by any chance only 1 or 2 lights turn on but not the rest, please check all comms cabling and restart.

Any change you make, turn on/shut down and check cabling.

For any other issues, please refer to the in-depth troubleshooting guide at the end of this manual.

Power on

Double-check all the power cables and communication cables.

1. Switch on all the battery modules. The one with empty Link Port 0 is the Master Battery Module; others are slaves (1 master battery configured with a maximum of 15 slave batteries)

2. Press the red SW button of the master battery to power on;
   all the battery LED lights will turn on automatically one by one from the Master Battery.

3. Press the red SW button of master battery to power on, all the battery LED lights will be on one by one from the Master battery.

POWERING DOWN

Shut down procedure

Power off

1. Turn all external power switches off

2. Press the red SW button of the master battery; all batteries should turn off.

3. Switch Power switch off.

SEE WHAT YOUR SYSTEM IS DOING

Setting up system monitoring and viewing system performance

The 4 ways to view the performance of the SkyBox:

Local

Once the SkyBox has turned on (view start up), simply scan the QR code located on the inside of the door; this will connect your phone to the SkyBox internal access point.

Using a web browser, go to 172.24.24.1 and you will be able to see the data points.

WiFi/Bluetooth

Using the Victron Connect app.

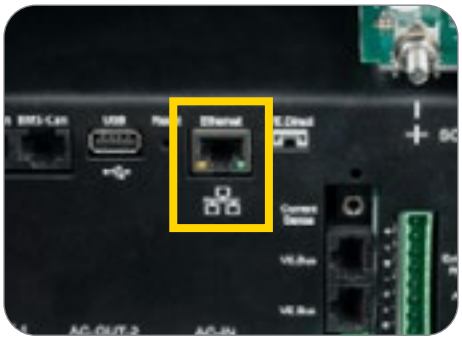
Scan the QR code, connect to the access point, and open Victron Connect.

4G (Optional)

Insert sim card.

Ethernet

Look for the Ethernet port and symbol underneath the Victron inverter. The location varies depending on model.



Once connected to the internet, head to https://vrm.victronenergy.com/

1. Create/login to your account
2. Add an installation
3. Enter the VRM ID located on the white QR Code sticker
4. Once added, a request will be sent which will be approved within 2 business days (usually much sooner)

ALL YOU NEED TO KNOW

FAQ's

What is a SkyBox?
SkyBox is a solution to make getting electrical power 'off-grid' easy. In the past, you'd have to pay up to tens of thousands to run cables to the property; SkyBox solves that and doesn't require an off-grid qualified electrician to install.

Who can install the SkyBox?
Any licensed electrician can install the SkyBox.

What power inputs will the SkyBox recognise?
The SkyBox can draw power from any wind turbine, water generator, solar or other power source. As long as that power source is installed via an A.C. Couple to the home, SkyBox will automatically detect the excess power and charge the batteries. Phase-shifting is required for solar systems that run off the grid with the SkyBox Mini.

What is SkyCare?
SkyCare is a support team based in Victoria that you can call with any technical questions about the SkyBox. This support ensures you have an award-winning team behind you if you get stuck.

Can a shed be connected to the SkyBox?
Yes, though the SkyBox has specific requirements around voltage and receiving 'clean' power from a generator, as long as your generator puts out 50Hz and close to 230V, then it can be plugged into the SkyBox. SkyBox is pre-programmed for this feature to make it easy.

Can it charge an electric car/tractor?
Yes, you can connect the batteries to an EV charger for vehicles. Check EV compatibility and requirements beforehand.

Can the SkyBox be relocated after installation?
Yes, as the SkyBox is easy to install and uninstall, it can be relocated as required by a licensed electrician.

Can the SkyBox be installed outside?
Yes, when the door is closed and the cables are installed according to the instructions, the SkyBox carries an IP55 Rating, meaning it is weather resistant.

Can SkyBox deliver 3 Phase power?
SkyBox offers three-phase capabilities. We program everything before it leaves our warehouse, giving you easily installed, three-phase off-grid or backup power.

What's the depth of discharge of the batteries?
The Lithium batteries in the SkyBox have a 95% depth of discharge. This means you can use 95% of the battery's stored power. This is compared to the 60% usable capacity you usually get when using products like lead-acid batteries off the grid. This gives you a lot more endurance and power capacity.

Can the SkyBox be expanded down the track?
Yes, with the impressive SkyBox capabilities, it can be expanded (almost) to infinity and beyond.

SPECIFICATIONS

SkyBox

SkyBox gives everyone freedom and independence from the power grid.

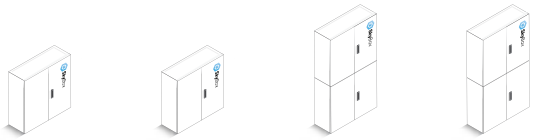
Acting as a central 'brain,' the SkyBox manages incoming power from your solar, wind, or hydro generators.

Balancing these power sources and storing excess energy in the internal batteries, SkyBox creates a reliable off-grid electricity supply.

10 YEAR WARRANTY

EXPANDABLE

OFF-GRID CERTIFIED
POWERED BY SkyEnergy

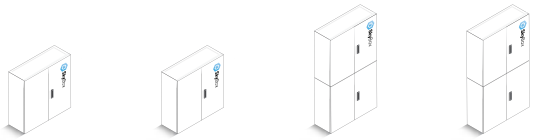


	3kVA	5kVA	8kVA	10kVA
Transfer Switch	32A	50A	100A	100A
Max AC Input (A)	32A	40A	63A	63A
INVERTER				
Output (V)	Output Voltage: 230VAC. Frequency 50Hz			
Cont Output at 25°C (VA)	3000VA	5000VA	8000VA	10000VA
Cont Output at 25°C (W)	2400W	4000W	6400W	8000W
Cont Output at 40°C (W)	2200W	3700W	5500W	7000W
Cont Output at 65°C (W)	1700W	3000W	4000W	6000W
Max Apparent feed-in power	3000VA	5000VA	8000VA	10000VA
Peak Power (W)	5500W	6000W	12000W	12000W
Maximum efficiency	94%	96%	95%	96%
SOLAR				
Max Output Current	70A	100A	100A	100A
Max PV Power*	4000W	5800W	5800W	5800W
Max Open Circuit Voltage	250V	250V	450V	450V
Max PV Short Circuit Current	35A	70A	20A	20A
Efficiency	99%	99%	96%	96%
MPPTs	1	1	2	2
BATTERIES	PYLONTECH		BSLBATT	
Nominal Voltage	48V			
Nominal Capacity (Wh)	4800 (Wh) multiplied by number of modules		5120 (Wh) multiplied by number of modules	
Usable Capacity (Wh)	4560 (Wh) multiplied by number of modules		4966 (Wh) multiplied by number of modules	
Max No. Modules (Single Unit)**	4	4	8	8
Max Capacity (Single Unit)	PYLONTECH 19.2kWh BSLBATT 20.48kWh	PYLONTECH 19.2kWh BSLBATT 20.48kWh	PYLONTECH 38.4kWh BSLBATT 40.96kWh	PYLONTECH 38.4kWh BSLBATT 40.96kWh
Capacity Per Extra Battery Stack	38.4kWh		40.96kWh	
Working Tempreature	0°C–50°C			
Design Life	15+ Years			
Cycle Life	>6000 Cycles			
Authentication Level	IEC62619/CE/UN38.3			
Warranty	10 Years to 60% retention			
MONITORING				
WiFi	Yes			
Ethernet	Yes			
4G LTE	Optional	Optional	Included[1]	Included[1]
ENCLOSURE				
Colour	White			
Protection Categroy	IP54			
Dimensions (h x w x d)	1200 x 1000 x 400	1200 x 1000 x 400	PYLONTECH 2400 x 1000 x 400 BSLBATT[4] 2400 x 1000 x 400	PYLONTECH 2400 x 1000 x 400 BSLBATT[4] 2400 x 1000 x 400

* Additional Solar power can be connected, the SkyBox will only utilise the specified amount
** Single Unit refers to one SkyBox, up to 12 additional battery stacks can be added to a SkyBox to increase battery capacity up to over 300kWh
1 Data plan not included
2 Size is an approximation only and may vary depending on parts available
3 Size of cabinets is an approximation only and may vary depending on stock available and size of system Off-Grid Certified meaning the SkyBox has capabilities for renewable energy and generator inputs. SkyBox creates a power supply where no grid input or referencing is required.
4 Subject to change.

SPECIFICATIONS

SkyBox



3kVA 5kVA 8kVA 10kVA

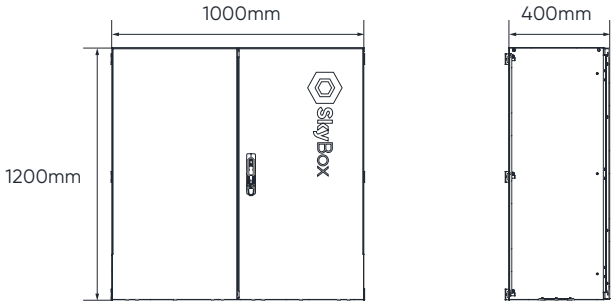
ENCLOSURE

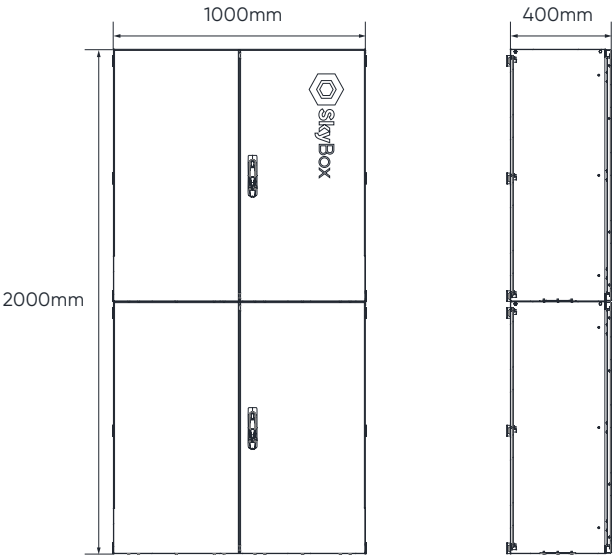
Colour	White			
Protection Categroy	IP54			
Dimensions (h x w x d)	1200 x 1000 x 400	1200 x 1000 x 400	2400 x 1000 x 400	2400 x 1000 x 400

* Additional Solar power can be connected, the SkyBox will only utilise the specified amount

** Single Unit refers to one SkyBox, up to 12 additional battery stacks can be added to a SkyBox to increase battery capacity up to over 300kWh

[1] Data plan not included





10 YEAR ★ ★ ★ ★ ★ WARRANTY

EXPANDABLE

OFF-GRID CERTIFIED

SkyBox

SKYENERGY.COM.AU/SKYBOX

SkyBox

DESIGNED AND DEVELOPED BY SkyEnergy

Sky Energy Group

4/4 Bridge Road, Keysborough,
Victoria, 3173, Australia

Tel: 1300 787 488

Email: team@skyenergysystems.com.au

Website: skyenergy.com.au

RECHARGEABLE LI-ION BATTERY US3000C

Safety Data Sheet

According to GHS (Eighth Revised Edition)

Section 1 Product and Company Identification

Product Identifier

Product Name:	Rechargeable Li-ion Battery US3000C
Synonyms:	-

Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

Relevant Identified Uses:	Please consult the manufacturer.
Uses Advised Against:	Please consult the manufacturer.

Details of the Supplier of the Safety Data Sheet

Applicant Name:	Pylon Technologies Co., Ltd.
Application Address:	No.73, Lane 887, Zu Chongzhi Road, Zhangjiang Hi-Tech Park Pudong, Shanghai 201203, China
Applicant Post Code:	200120
Applicant Telephone:	+86-21-51317697
Applicant Fax:	+86-21-51317698
Applicant E-mail:	xu.min@pylontech.com.cn
Supplier Name:	Pylon Technologies Co., Ltd.
Supplier Address:	Plant 8, No. 505 Kunkai Road, Jinxi Town, Kunshan City, Jiangsu Province, PEOPLE'S REPUBLIC OF CHINA
Supplier Post Code:	215300
Supplier Telephone:	+86-21-51317697
Supplier E-mail:	xu.min@pylontech.com.cn

Australian Importer Contact Details

Importer Names:	FortePowertech P/L
Importer Address:	2/16 Ellemsea Circuit Lonsdale SA, 5160, Australia
Importer Telephone:	1300 086 898
Importer E-mail:	info@fortepowertech.com.au

Section 2 Hazards Identification

Hazard class and label elements of the product according to GHS (the eighth revised edition):

GHS Hazard Class

This product meets the definition of an article. Under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS), Articles as defined in the Hazard Communication Standard (29 CFR 1910.1200) of the Occupational Safety and Health Administration of the United States of America, or by similar definition, are outside the scope of the system. [Rev.8 (2019) Part 1.3.2.1.1]

GHS Label Elements

Pictogram:	Not applicable.
Signal Word:	Not applicable.

Hazard Statements

Not applicable.

Precautionary Statements

Prevention:	Do not open or disassemble. Do not expose to high temperatures or open fire. Do not mix with batteries of varying sizes, chemistries or types. Avoid using external impact battery.
Response:	Not applicable
Storage:	Store under the roof in cool, dry, well-ventilated areas.
Disposal:	Dispose of contents/container in accordance with local/regional/national/international regulations.

Section 3 Composition/Information on Ingredients

Component	Concentration (weight percent, %)	CAS No.	EC no.
Lithium Iron Phosphate	Commercial secrets	15365-14-17	-
Graphite	Commercial secrets	7782-42-5	231-955-3
Copper	Commercial secrets	7440-50-8	231-159-6
Aluminium	Commercial secrets	7429-90-5	231-072-3
Poly (vinylidene difluoride)	Commercial secrets	24937-79-9	200-867-7
Carbon black	Commercial secrets	1333-86-4	215-609-9
Polyacrylic acid	Commercial secrets	9003-01-4	202-415-4
Lithium hexafluorophosphate	Commercial secrets	21324-40-3	244-334-7
Nickel	Commercial secrets	7440-02-0	231-111-4

Section 4 First Aid Measures

Description of First Aid Measures

General Advice

Immediate medical attention is required. Show this safety data sheet (SDS) to the doctor in attendance.

Eye Contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician if you feel uncomfortable.

Skin Contact

Take off contaminated clothing and shoes immediately. Wash off with plenty of water for at least 15 minutes and consult a physician if you feel uncomfortable.

Ingestion

Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a physician or Poison Control Center immediately.

Inhalation

Move the victim into the fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if the victim ingested or inhaled the substance. If not breathing, provide artificial respiration and consult a physician immediately.

Protecting First-aiders

Ensure that medical personnel are aware of the substance involved. Take precautions to protect themselves and prevent the spread of contamination.

Most Important Symptoms and Effects, both Acute and Delayed

1. Substance accumulation in the human body may cause concern following repeated or long-term occupational exposure.

Indication of Any Immediate Medical Attention and Special Treatment Needed

1. Treat symptomatically.
2. Delayed symptoms may occur.

Section 5 Fire Fighting Measures

Extinguishing Media

Suitable Extinguishing Media

Dry chemical, carbon dioxide or alcohol-resistant foam.

Unsuitable Extinguishing Media

Do not use a solid water stream as it may scatter or spread the fire.

Specific Hazards Arising from the substance or mixture

1. Containers may explode when heated.
2. Fire-exposed containers may vent contents through pressure relief valves.
3. May expand or decompose explosively when heated or involved in fire.

Advice for Firefighters

1. As in any fire, wear self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) and full protective gear.
2. Fight fire from a safe distance, with adequate cover.
3. Prevent fire extinguishing water from contaminating surface water or the groundwater system.

Section 6 Accidental Release Measure

Personal Precautions, Protective Equipment and Emergency Procedures

1. Ensure adequate ventilation. Remove all sources of ignition.
2. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.
3. Use personal protective equipment. Avoid breathing vapours, mist, gas or dust.

Environmental Precautions

1. Prevent further leakage or spillage if safe to do so.
2. Discharge into the environment must be avoided.

Methods and Materials for Containment and Cleaning Up

Absorb spilled material in dry sand or inert absorbent. In case of a large amount of spillage, contain a spill by bunding.

Adhered or collected materials should be promptly disposed of in accordance with appropriate laws and regulations.

Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

Section 7 Handling and Storage

Precautions for Handling

1. Handling is performed in a well-ventilated area.
2. Wear suitable protective equipment.
3. Avoid contact with skin and eyes.
4. Keep away from heat/sparks/open flames/hot surfaces.
5. Take precautionary measures against static discharges.

Precautions for Storage

1. Keep containers tightly closed.
2. Keep containers in a dry, cool and well-ventilated place.
3. Keep away from heat/sparks/open flames/hot surfaces.
4. Store away from incompatible materials and foodstuff containers.

Section 8 Exposure Controls/ Personal Protection

Control Parameters

Occupational Exposure Limit Values

Component	Country/Region	Limit Value - Eight Hours		Limit Value - Short term	
		ppm	mg/m³	ppm	mg/m³
Graphite 7782-42-5	USA - OSHA	-	15	-	-
	South Korea	-	2	-	-
	Ireland	-	10	-	-
	Germany (DFG)	-	4	-	-
	Denmark	-	2.5	-	5
	Australia	-	3 (4)	-	-
Copper 7440-50-8	The Netherlands	-	0.1	-	-
	Poland	-	0.2	-	-
	Latvia	-	0.5	-	1
	Germany (DFG)	-	0.01	-	0.02
Aluminium 7429-90-5	USA - OSHA	-	15	-	-
	South Korea	-	10	-	-
	Ireland	-	1	-	-
	Germany (DFG)	-	4	-	-
	Denmark	-	5	-	10
	Australia	-	10	-	-
Carbon black 1333-86-4	USA - OSHA	-	3.5	-	-
	South Korea	-	3.5	-	-
	Ireland	-	3.5	-	7
	France	-	3.5	-	-
	Denmark	-	3.5	-	7
	Australia	-	3	-	-
Nickel 7440-02-0	USA - OSHA	-	1	-	-
	South Korea	-	1	-	-
	Ireland	-	0.5	-	-
	Hungary	-	0.1	-	0.1
	Denmark	-	0.05	-	0.1
	Australia	-	1	-	-

Occupational Exposure Limit Values

Component	Source	Biological monitoring index	Biological limits value	Sampling time	remark
Lithium hexafluorophosphate	SCOEL(EU)	Fluorine/urine	8mg/L	end of shift	

Monitoring Methods

1. EN 14042 Workplace atmospheres. Guide for the application and use of procedures for assessing exposure to chemical and biological agents.
2. GBZ/T 160 Determination of toxic substances in workplace air (Series effective standard) and GBZ/T 300 Determination of toxic substances in workplace air (Series standard).

Engineering Controls

1. Ensure adequate ventilation, especially in confined spaces.
2. Ensure that eyewash stations and safety showers are close to the workstation location.
3. Use explosion-proof electrical/ventilating/lighting/equipment.
4. Set up an emergency exit and necessary risk-elimination area.

Personal Protection Equipment

Eye protection

Tightly fitting safety goggles approved by EN 166 (EU) or NIOSH (US).

Hand protection

Wear protective gloves (such as butyl rubber), passing the tests according to EN 374(EU), US F739 or AS/NZS 2161.1 standard.

Respiratory protection

If exposure limits are exceeded or if irritation or other symptoms are experienced, use a full-face respirator with a multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges.

Skin and body protection

Wear fire/flame resistant/retardant clothing and antistatic boots.

Section 9 Physical and Chemical Properties

Appearance:	Li-ion battery, individually packaged, 48V 74Ah 3552Wh
Odor threshold:	No information available
Melting Point/Freezing Point (°C):	No information available
Flash Point (°C)(Closed Cup):	Not applicable
Flammability:	No information available
Vapor Pressure (KPa):	Not applicable
Relative Density (Water=1):	No information available
n-Octanol/Water Partition Coefficient:	No information available
Particle characteristics:	No information available
Odor:	No information available
pH:	No information available
Initial Boiling Point & Boiling Range (°C):	No information available
Evaporation Rate:	Not applicable
Upper/Lower explosive limits [%(v/v)]:	Upper limit: No information available; Lower limit: No information available
Relative Vapour Density (Air = 1):	Not applicable
Solubility:	No information available
Auto-Ignition Temperature (°C):	No information available
Kinematic Viscosity (mm^2/s):	Not applicable

Section 10 Stability and Reactivity

Reactivity

Contact with incompatible substances can cause decomposition or other chemical reactions.

Chemical Stability

Stable under proper operation and storage conditions.

Possibility of Hazardous Reactions

Mixtures with metallic acetylene, when heated, cause a fire or incandescence. Reacts severely with halogens, interhalogens or other strong oxidants, or causes a fire. Ultrafine powder will self-ignite in the air at room temperature.

Conditions to Avoid

Incompatible materials, heat, flame and spark.

Incompatible Materials

Metal acetylide, halogen, interhalogen, halogen oxides, nitric acid, nitrous oxide, nitrates, nitrites, halogen oxyacid salts, chromates, permanganates, inorganic peroxides, metal oxides and peroxyformic acid. Halogen, interhalogen, strong oxidant, water and acids. Oxidants, halogen, interhalogen and mercury.

Hazardous Decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11 Toxicological Information

Acute Toxicity

Component	CAS No.	LD50 (Oral)	LD50 (Dermal)	LC50 (Inhalation, 4h)
Carbon Black	1333-86-4	>15400mg/kg (Rat)	>3000mg/kg (Rabbit)	No information available
Polyacrylic acid	9003-01-4	2500mg/kg (Rat)	No information available	No information available

Skin Corrosion/Irritation

No information available

Serious Eye Damage/Irritation

No information available

Skin Sensitization

No information available

Respiratory Sensitization

No information available

Germ Cell Mutagenicity

No information available

Carcinogenicity

ID	CAS No.	Component	IARC	NTP
1	15365-14-17	Lithium Iron Phosphate	Not Listed	Not Listed
2	7782-42-5	Graphite	Not Listed	Not Listed
3	7440-50-8	Copper	Not Listed	Not Listed
4	7429-90-5	Aluminium	Not Listed	Not Listed
5	24937-79-9	Poly(vinylidenedifluoride	Not Listed	Not Listed
6	1333-86-4	Carbon black	Category 2B	Not Listed
7	9003-01-4	Polyacrylic acid	Category 3	Not Listed
8	21324-40-3	Lithium hexafluorophosphate	Not Listed	Not Listed
9	7440-02-0	Nickel	Category 2B	Not Listed

Repoductive Toxicity

No information available

Reproductive Toxicity (Additional)

No information available

STOT-Single Exposure

No information available

Aspiration Hazard

No information available

Section 12 Ecological Information

Acute Aquatic Toxicity

Component	CAS No.	Fish	Crustaoceans	Algae
Nickel	7440-02-0	LC50:40mg/L (96h)(Fish)	EC50: 1mg/L (48h)	No information available
Aluminium	7429-90-5	LC50: 1.55mg/L (96h)(Fish)	No information available	No information available
Copper	7440-50-8	LC50: 0.665mg/L (96h)(Fish)	EC50: 0.02mg/L (48h)	ErC50: 7.9mg/L (96h)

Chronic Aquatic Toxicity

No information available.

Others

Persistence and Degradability

No information available

Bioaccumulative Potential

No information available.

Mobility in Soil

No information available

Lithium Iron Phosphate does not meet the criteria for PBT and vPvB according to Regulation (EC) No 1907/2006, annex XIII.

Graphite does not meet the criteria for PBT and vPvB according to Regulation (EC) No 1907/2006, annex XIII.

Copper does not meet the criteria for PBT and vPvB according to Regulation (EC) No 1907/2006, annex XIII.

Aluminium does not meet the criteria for PBT and vPvB according to Regulation (EC) No 1907/2006, annex XIII.

Results of PBT and vPvB Assessment

Poly(vinylidene difluoride does not meet the criteria for PBT and vPvB according to Regulation (EC) No 1907/2006, annex XIII.

Carbon black does not meet the criteria for PBT and vPvB according to Regulation (EC) No 1907/2006, annex XIII.

Polyacrylic acid does not meet the criteria for PBT and vPvB according to Regulation (EC) No 1907/2006, annex XIII.

Lithium hexafluorophosphate does not meet the criteria for PBT and vPvB according to Regul ation (EC) No 1907/2006, annex XIII.

Nickel does not meet the criteria for PBT and vPvB according to Regulation (EC) No 1907/2006, annex XIII.

Section 13 Disposal Considerations

Waste Chemicals

Before disposal should refer to the relevant national and local laws and regulations. Recommend the use of incineration disposal.

Contaminated Packaging Disposal Recommendations

Containers may still present a chemical hazard when empty. Keep away from hot and ignition source of fire. Return to supplier for recycling if possible. Refer to sections 13.1 and 13.2.

Section 14 Transport Information

Transporting Label

Marine pollutant	None
UN Number	3480
UN Proper Shipping Name	Lithium ion batteries (including lithium-ion polymer batteries)
Transport Hazard Class	9
Transport Subsidiary Hazard Class	None
Packaging Group	Packagings shall conform to packing group II performance level.

Section 15 Regulatory Information

International Chemical Inventory

Component	EINECS	TSCA	DSL	IECSC	NZIoC	PICCS	KECI	AICS	ENCS
Lithium Iron Phosphate	✗	✗	✗	✗	✗	✗	✗	✗	✗
Graphite	✓	✓	✓	✓	✓	✓	✓	✓	✗
Copper	✓	✓	✓	✓	✓	✓	✓	✓	✗
Aluminium	✓	✓	✓	✓	✓	✓	✓	✓	✗
Poly(vinylidene difluoride)	✗	✓	✓	✓	✓	✓	✓	✓	✓
Carbon black	✓	✓	✓	✓	✓	✓	✓	✓	✗
Polyacrylic acid	✗	✓	✓	✓	✓	✓	✗	✓	✓
Lithium hexafluorophosphate	✓	✓	✗	✓	✗	✓	✓	✓	✗
Nickel	✓	✓	✓	✓	✓	✓	✓	✓	✗

[EINECS] European Inventory of Existing Commercial Chemical Substances.

[TSCA] United States Toxic Substances Control Act Inventory.

[DSL] Canadian Domestic Substances List.

[IECSC] China Inventory of Existing Chemical Substances.

[NZIoC] New Zealand Inventory of Chemicals.

[PICCS] Philippines Inventory of Chemicals and Chemical Substances.

[KECI] Existing and Evaluated Chemical Substances.

[AICS] Australia Inventory of Chemical Substances.

[ENCS] Existing And New Chemical Substances.

Notes

✓ Indicates that the substance included in the regulations

✗ That no data or included in the regulations

Section 16 Additional Information

Creation Date	10/10/2020
Revision Date	10/10/2020
Reason for Revision	-

Disclaimer

This Safety Data Sheet (SDS) has been prepared according to UN GHS (the 8th revised edition). The data included was derived from an international authoritative database and provided by the enterprise.

Other information was based on the present state of our knowledge. We try to ensure the correctness of all information. Due to the diversity of information sources and the limitations of our knowledge, this document is only for user reference.

Users should make their independent judgement of the suitability of this information for their particular purposes. We do not assume responsibility for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.

RACK BATTERY PACK USER MANUAL

@2023

Rack Battery Pack

User Manual

Product Name: 48V55/100/104/134/156/172/200/280/300Ah Battery

Model No: B-LFP48-55/100/104/134/156/172/200/280/300E

Version No: V2.2

Content

1.Safety Precautions

It is very important and necessary to read the user manual carefully before installing or using the battery. Failure to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or may damage the battery and the whole system.

The battery needs to be recharged within 12 hours after fully discharging.

Do not expose cable outside.

All battery terminals must be disconnected before maintenance.

Do not use cleaning solvents to clean the battery.

Do not expose the battery to flammable or harsh chemicals or vapors.

Do not connect battery with PV solar wiring directly.

Any foreign object is prohibited to be inserted into any part of the battery.

Any warranty claims are excluded for direct or indirect damage due to items above.

If the battery is stored for a prolonged time, it is requirement that they are charged every three months, and the SOC should be no less than 30%.

Symbol	Description
	Caution, risk of electric shock
	Heavy enough may cause severe injure
	Keep the battery away from open flame or ignition sources
	Keep the battery away from children
	Do not dispose of the product with household waste
	Recycling
	Read this manual before installation and operation

1.1 Note Before Installation

When receiving, please check the battery and packing list first, if the battery is damaged or spare parts are missing, please contact the dealer;

Before installation, be sure to cut off the grid power and make sure the battery is in the turned-off mode;

Wiring must be correct, do not mix-connect the positive and negative cables, and ensure no short circuit with the external device;

It is prohibited to connect the battery with AC power directly;

The embedded BMS in the battery is designed for 51.2 VDC, please do not connect battery in series;

It is prohibited to connect the battery with different type of battery;
Please ensure the electrical parameters of battery system are compatible to inverter;
Keep the battery away from fire or water.

1.2 During Operation

If the battery system needs to be moved or repaired, the power must be cut off first and the battery is completely shutdown;
It is prohibited to connect the battery with different type of battery;
It is prohibited to put the batteries working with faulty or incompatible inverter;
In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited;
Please do not open, repair or disassemble the battery. We do not undertake any consequences or related responsibility due to violation of safety operation or violating of design, production and equipment safety standards.

2.System Application Introduction

This product is a household energy storage battery pack. The system is matched with a 2.8/5.1/5.3/6.9/8.0/8.8/10.2/14.3/15.3kwh lithium iron phosphate battery pack.This product can be used in conjunction with electricity, so that electricity consumption can be adjusted.This product supports a variety of application modes, such as PV self-use surplus power to grid, peak shaving and valley filling, standby power supply, etc. The specific operation logic is as follows.

2.1 PV Self-use Surplus Power to Grid

Under the condition of good illumination in the daytime, the DC power from PV panel is changed into AC through inverter to supply power for household load. If the household load cannot run out of photovoltaic power, the remaining power will be stored in the battery. If the battery is full, photovoltaic power will be supplied to the grid. In the night or rainy days, photovoltaic cannot generate electricity. The battery supplies power to the home load through an inverter. If the battery SOC is low, the household load will take power from the grid.

2.2 Peak Shaving and Valley Filling

In some countries and regions where peak valley time of use price is implemented, if the difference between peak price and low price is large, the application mode of peak shaving and valley filling can be adopted in energy storage system. In the low electricity price period, the energy storage system is charged; in the peak period of electricity price, the energy storage system supplies power to the household load. It can avoid users using too much power grid when the electricity price is high, and save

energy expenditure.

2.3 Standby Power Supply

In some extreme weather (such as tornadoes, typhoons, hail), or substation operation failure, power supply will be interrupted. If the energy storage system is installed, the user can still enjoy sufficient power guarantee under this situation.Figure 1

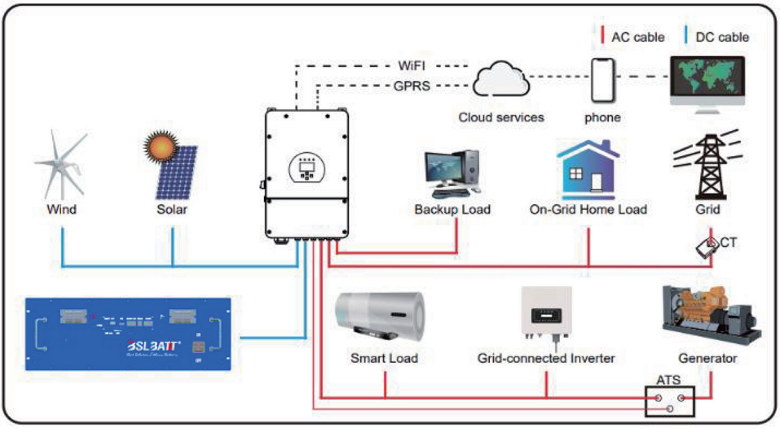
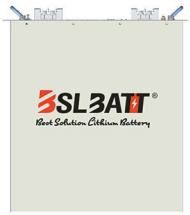
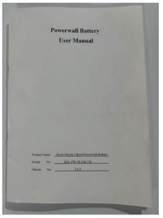


Figure 1. System Connection Diagram

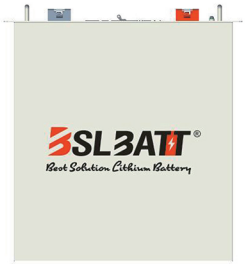
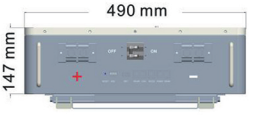
3.Product Specification

N	Item	General Parameter								
1	Nominal Voltage	51.2V								
2	Rated Capacity(Ah)	55	100	104	134	156	172	200	280	300
3	Cell Model(LFP-3.2V)	55Ah	100Ah	104Ah	67Ah	156Ah	86Ah	100Ah	280Ah	100Ah
4	Pack configuration	16S1P	16S1P	16S1P	16S2P	16S3P	16S2P	16S2P	16S1P	16S3P
5	Rate power(Wh)	2816	5120	5325	6861	7987	8806	10240	14336	15360
6	Charging Voltage	58.4V								
7	Float charge Voltage	55V								
8	Discharge Cut-off	40V								
9	Charging Current	40A	80A		120A			160A		
10	Max Discharging	50A	100A		150A			200A		
11	Charge over Current	60A	110A		160A			210A		
12	Discharge over Current	60A	120A		165A			215A		
13	Pack Weight (Kg)	30	53	55	62	71	78	95	110	130
14	Internal Impedance	≤100mΩ								
15	Communication protocol	CAN(500Kb/s)/RS485(9600b/S)								
16	Host software and	RS232								
17	Operation Temperature Range	Charge:0~55℃								
		Discharge: -10~55℃								
18	Storage Temperature	0℃~25℃								
Note: Parameters can be adjusted according to customer requirements										

3.1Packing List

Battery pack	Output cable	Parallel communication line	users manual
			

4.Battery Drawing

51.2V 55Ah	51.2V 104Ah	51.2V 130Ah
		
		
Product size :495*442*88mm	Product size :495*442*177	Product size :560*442*177mm
51.2V 172Ah	**51.2V 200Ah**	**51.2V 300Ah**
		
		
Product size :403*600*225mm	Product size :680*442*222mm	Product size :700*442*265mm

4.1.Interface Description

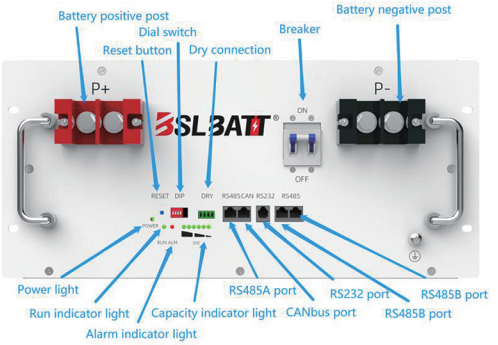


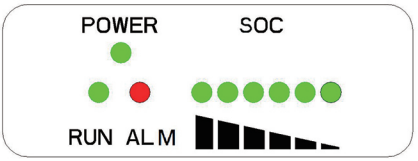
Figure 2

Table1.Battery Pack Frontpanel Port Definition

No.	Illustration	Silk-screen	Remark
1	Battery positive post	P+	positive output
2	Battery negative post	P-	negative output
3	Reset button	RESET	Reset battery
4	Dial switch	DIP	Address setting, range 2~15
5	Dry connection	DRY	pin3 to pin4 often open, closed with low power alarm Pin1 to pin2 often open, closed when failure or protection
6	RS485A Port	RS485	RS485 communication with monitoring equipment
7	CANbus port	CAN	CANbus and inverter connection ports
8	RS232 port	RS232	RS232 communication port
9	RS485B port	RS485	RS485 paralleling communication port
10	Power light	POWER	After startup, the LED is steady green

11	Running indicator light	RUN	After startup, the LED blinks green
12	Alarm indicator light	ALM	The fault is displayed in red
13	Capacity indicator light	SOC	Refer to Table 2
14	Breaker	ON/OFF	Battery string output is enabled

4.2 LED Display Definition



No.	Definition	Specification	Criteria
1	POWER Light	System no abnormal, always bright	
	RUN Light	See Table 2, Table 4	
	ALM Light	See Table 2, Table 4	
	SOC Light	See Table 3, Table 4	

Table 2 LED Working Status Indicators

Status	Normal/alarm /protection	RUN	ALM	Electricity indicator LED						Remark
		●	●	●	●	●	●	●	●	
Power off	Dormancy	off	off	off	off	off	off	off	off	All off
Stand by	Normal	Flash 1	off	According to the electricity indicator						Standby status
	Alarm	Flash 1	Flash 3							Module low voltage
Charge	Normal	Bright	off	According to the electricity indicator (power indicator maximum LED flash 2)						Maximum power LED flash (flash 2), overcharge alarm ALM no flash
	Alarm	Bright	Flash 3							
	Overcharge protection	Bright	off	Bright	Bright	Bright	Bright	Bright	Bright	If there is no electricity, the indicator is in standby status
	Temperature, overcurrent, failure protection	off	Bright	off	off	off	off	off	off	Stop charging

Discharge	Normal	Flash 3	off	According to the electricity indicator						
	Alarm	Flash 3	Flash 3							
	Undervoltage protection	off	off	off	off	off	off	off	off	Stop discharging
	Temperature, overcurrent, short circuit, reverse connection, failure protection	off	off	off	off	off	off	off	off	top discharging
Invalid	Normal	off	off	off	off	off	off	off	off	Stop charge/discharging

Table 3 Description of capacity indicators

Status		Charge						Discharge					
Capacity indicator		L6 ●	L5 ●	L4 ●	L3 ●	L2 ●	L1 ●	L6 ●	L5 ●	L4 ●	L3 ●	L2 ●	L1 ●
SOC (%)	0～16.6%	off	off	off	off	off	Flash 2	off	off	off	off	off	Bright
	16.6～33.2%	off	off	off	off	Flash 2	Bright	off	off	off	off	Bright	Bright
	33.2～49.8%	off	off	off	Flash 2	Bright	Bright	off	off	off	Bright	Bright	Bright
	49.8～66.4%	off	off	Flash 2	Bright	Bright	Bright	off	off	Bright	Bright	Bright	Bright
	66.4～83%	off	Flash 2	Bright	Bright	Bright	Bright	off	Bright	Bright	Bright	Bright	Bright
	83～100%	Flash 2	Bright	Bright	Bright	Bright	Bright	Bright	Bright	Bright	Bright	Bright	Bright
Operating indicator		Bright								Flash (flash 3)			

Table 4 LED Flash Notes

Flash mode	Bright	off
Flash 1	0.25S	3.75S
Flash 2	0.5S	0.5S
Flash 3	0.5S	1.5S

Remark：

LED indicator light alarm can be enabled or prohibited through the upper computer , factory default is enable.

4.3 Battery Connection and Communication Instructions

Positive and negative output interface: Connect the battery positive (+) and negative (-) through the DC isolator to the inverter positive and negative connection inlet.

RS485：With a dual RS485 interface to check PACK information, with a default baud rate of 9600bps. To communicate with the monitoring equipment through the RS485, the monitoring equipment as the host, according to the address polling data, address setting range of 2~15.

RS232：BMS can communicate with the upper computer through the RS232, RS485 interface, so as to monitor all kinds of information of the battery at the upper computer end, including battery voltage, current, temperature, state, SOC, SOH and battery production information, etc., the default baud rate is 9600bps.

CAN: With dual isolation CAN communication, default communication rate 500 K, active communication portal between battery and inverter.

Dial switch settings: when the PACK is used in parallel, different PACK can be distinguished by setting the address on the BMS dial switch, avoid to set the same address. The definition of the dial switch refers to the following table5.

Table 5 Set the address of pack

Address	Dial switch position						Remark
	#1	#2	#3	#4	#5	#6	
0	OFF	OFF	OFF	OFF	OFF	OFF	Stepless connection，Single use
1	ON	OFF	OFF	OFF	OFF	OFF	Set as main Pack1
2	OFF	ON	OFF	OFF	OFF	OFF	Set as subordinate Pack2
3	ON	ON	OFF	OFF	OFF	OFF	Set as subordinate Pack3
4	OFF	OFF	ON	OFF	OFF	OFF	Set as subordinate Pack4
5	ON	OFF	ON	OFF	OFF	OFF	Set as subordinate Pack5
6	OFF	ON	ON	OFF	OFF	OFF	Set as subordinate Pack6
7	ON	ON	ON	OFF	OFF	OFF	Set as subordinate Pack7
8	OFF	OFF	OFF	ON	OFF	OFF	Set as subordinate Pack8
9	ON	OFF	OFF	ON	OFF	OFF	Set as subordinate Pack9
10	OFF	ON	OFF	ON	OFF	OFF	Set as subordinate Pack10
11	ON	ON	OFF	ON	OFF	OFF	Set as subordinate Pack11
12	OFF	OFF	ON	ON	OFF	OFF	Set as subordinate Pack12
13	ON	OFF	ON	ON	OFF	OFF	Set as subordinate Pack13
14	OFF	ON	ON	ON	OFF	OFF	Set as subordinate Pack14
15	ON	ON	ON	ON	OFF	OFF	Set as subordinate Pack15
16	OFF	OFF	OFF	OFF	ON	OFF	Set as subordinate Pack16
17	ON	OFF	OFF	OFF	ON	OFF	Set as subordinate Pack17
18	OFF	ON	OFF	OFF	ON	OFF	Set as subordinate Pack18
19	ON	ON	OFF	OFF	ON	OFF	Set as subordinate Pack19
20	OFF	OFF	ON	OFF	ON	OFF	Set as subordinate Pack20
21	ON	OFF	ON	OFF	ON	OFF	Set as subordinate Pack21

22	OFF	ON	ON	OFF	ON	OFF	Set as subordinate Pack22
23	ON	ON	ON	OFF	ON	OFF	Set as subordinate Pack23
24	OFF	OFF	OFF	ON	ON	OFF	Set as subordinate Pack24
25	ON	OFF	OFF	ON	ON	OFF	Set as subordinate Pack25
26	OFF	ON	OFF	ON	ON	OFF	Set as subordinate Pack26
27	ON	ON	OFF	ON	ON	OFF	Set as subordinate Pack27
28	OFF	OFF	ON	ON	ON	OFF	Set as subordinate Pack28
29	ON	OFF	ON	ON	ON	OFF	Set as subordinate Pack29
30	OFF	ON	ON	ON	ON	OFF	Set as subordinate Pack30
31	ON	ON	ON	ON	ON	OFF	Set as subordinate Pack31
32	OFF	OFF	OFF	OFF	OFF	ON	Set as subordinate Pack32
33	ON	OFF	OFF	OFF	OFF	ON	Set as subordinate Pack33
34	OFF	ON	OFF	OFF	OFF	ON	Set as subordinate Pack34
35	ON	ON	OFF	OFF	OFF	ON	Set as subordinate Pack35
36	OFF	OFF	ON	OFF	OFF	ON	Set as subordinate Pack36
37	ON	OFF	ON	OFF	OFF	ON	Set as subordinate Pack37
38	OFF	ON	ON	OFF	OFF	ON	Set as subordinate Pack38
39	ON	ON	ON	OFF	OFF	ON	Set as subordinate Pack39
40	OFF	OFF	OFF	ON	OFF	ON	Set as subordinate Pack40
41	ON	OFF	OFF	ON	OFF	ON	Set as subordinate Pack41
42	OFF	ON	OFF	ON	OFF	ON	Set as subordinate Pack42
43	ON	ON	OFF	ON	OFF	ON	Set as subordinate Pack43
44	OFF	OFF	ON	ON	OFF	ON	Set as subordinate Pack44
45	ON	OFF	ON	ON	OFF	ON	Set as subordinate Pack45
46	OFF	ON	ON	ON	OFF	ON	Set as subordinate Pack46
47	ON	ON	ON	ON	OFF	ON	Set as subordinate Pack47
48	OFF	OFF	OFF	OFF	ON	ON	Set as subordinate Pack48
49	ON	OFF	OFF	OFF	ON	ON	Set as subordinate Pack49
50	OFF	ON	OFF	OFF	ON	ON	Set as subordinate Pack50
51	ON	ON	OFF	OFF	ON	ON	Set as subordinate Pack51
52	OFF	OFF	ON	OFF	ON	ON	Set as subordinate Pack52
53	ON	OFF	ON	OFF	ON	ON	Set as subordinate Pack53
54	OFF	ON	ON	OFF	ON	ON	Set as subordinate Pack54
55	ON	ON	ON	OFF	ON	ON	Set as subordinate Pack55
56	OFF	OFF	OFF	ON	ON	ON	Set as subordinate Pack56
57	ON	OFF	OFF	ON	ON	ON	Set as subordinate Pack57
58	OFF	ON	OFF	ON	ON	ON	Set as subordinate Pack58
59	ON	ON	OFF	ON	ON	ON	Set as subordinate Pack59
60	OFF	OFF	ON	ON	ON	ON	Set as subordinate Pack60
61	ON	OFF	ON	ON	ON	ON	Set as subordinate Pack61
62	OFF	ON	ON	ON	ON	ON	Set as subordinate Pack62
63	ON	ON	ON	ON	ON	ON	Set as subordinate Pack63

4.4 Interface Diagram

Dry Connection Port

The definition of dry connection port：Pin1 to pin 2 always open, close when broken and protection, Pin3 to Pin4 always open, close when low SOC alarm.

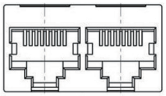
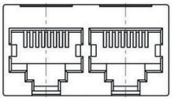
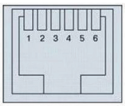
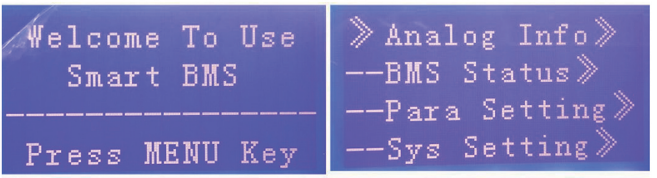
Parallel communication		RS485B-8P8C		RS485B-8P8C	
		RJ45		RJ45	
		1,8	RS485-B	9,16	RS485-B
		2,7	RS485-A	10,15	RS485-A
		3,6	GND	11,14	GND
		4,5	NC	12,13	NC
External communication		RS485A port		CAN port	
		RJ45		RJ45	
		1,8	RS485-B1	1,2,3,6,8	
		2,7	RS485-A1	5	CAN-L
		3,6	GND	4	CAN-H
		4,5	NC	7	GND
Communication with host computer		RS232 RJ11			
		RJ11		RJ11	
		1	NC	4	RX
		2	NC	5	GND
		3	TX	6	NC

Table 6 Communication interface table

4.5 Display rendering

Main menu page

After BMS is activated, will show the welcome screen, press the "MENU" button to enter the main menu page. As shown in the figure below：

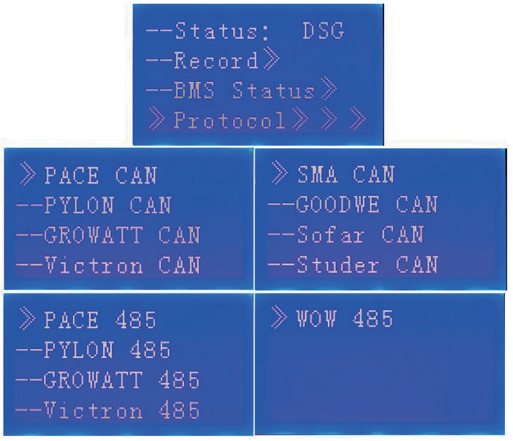


Battery parameters page

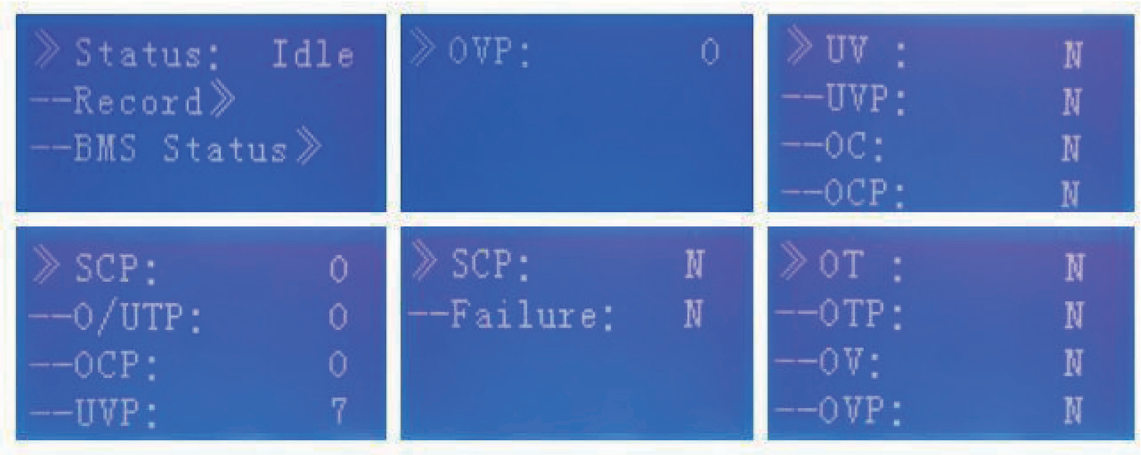
When the cursor" 》 "is point to "Battery Parameters Acquisition" ， press "ENTER" key will enter the page of"Battery Parameters Acquisition" ,As shown in the figure below：

Protocol selection function

（You can switch protocols through the display screen to quickly match inverters of different brands）

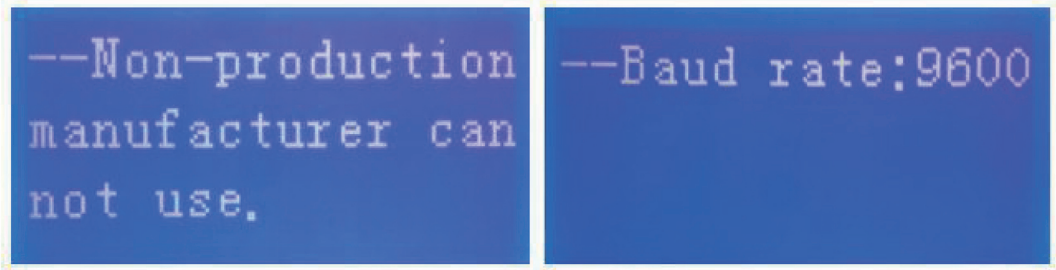


When the cursor “》”is point to”Battery Status”，press “ENTER” key will enter the page of “Battery Status”，As shown in the figure below：



Parameter Settings

Screen can not set parameters Baud Rate：9600 ,Can not be set.



Key description

SW1----MENU，SW2----ENTER，SW3----DOWN， SW4----ESC.

Each item is “》”or“--”as a beginning，among them“》”shows the current cursor position ,press “DOWN” key can move the cursor position ;with“》”end of the project，the content of the said project has not shown, press “ENTER” key can enter the corresponding page.

Press “ESC” key can be returned at the next higher level directory；In any position， press” MENU” key can return to the main menu page.

When BMS inter sleep mode, press any key, can activate the screen.

Inter standby mode , with no keystrokes 1 minutes later, LCD will enter Shutdown mode press any key,screen can be activated.

5.Battery Installation Instructions

5.1 Installation location

Make sure that the installation location meets the following conditions:
The building is designed to withstand earthquakes.
Far away from the sea to avoid salt water and humidity.
The floor is flat .
No flammable or explosive materials nearby.
Optimal ambient temperature is between 25°C and 55°C.
Temperature and humidity stays at a constant level.
Minimal dust and dirt in the area.
No corrosive gases present, including ammonia and acid vapor.

BSL batteries are IPX4 waterproof, so the battery could be installed indoor. If the ambient temperature is outside the operating range, battery will protect itself by shutting down. The battery optimal operate temperature is 25°C to 55°C. Frequent exposure to severe operating condition would exacerbate the performance and lifetime of the battery.

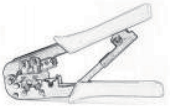
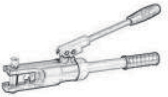
NOTICE

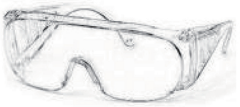
Make sure that the cross-sectional area of charging cables is 25 to 35 mm^2

A breaker between BSL battery and inverter was recommended to install and the breakers min. current should meet twice the rated current of the system or following with local regulations.

5.2 Installation Tools

To install the battery pack, those following tools are probably required:

			
Phillips screwdriver	Torque wrench	Cable crimper	Wire clamp
			
Voltmeter	Tape measure	Drill	Flat-head screwdriver

		
Insulated glove	Safety goggles	Safety shoes

5.3Installation steps

Step 1:

When receiving the product, first check whether all parts are complete, if not, please report to the Dealer .

Step 2:

Choose a suitable installation location and require the battery pack to be placed at a safe.The first load-bearing plate should be at least 15cm away from the ground. The distance between the load- bearing plates is about 205mm.
We recommend that the installation distance be 205mm.

Step 3:

Mark the position of the nut on the cabinet with the mounting bracket, and clamp the nut into the cabinet. See Figure3.

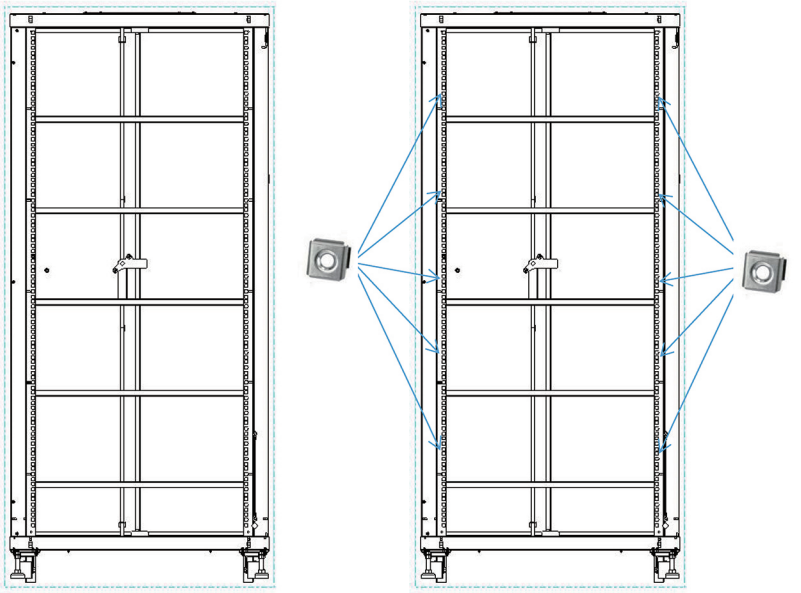


Figure 3

Step 4:

As shown in the below, install the battery pack. The pack is too heavy , Please use a special lifting device to lift the pack for operation and safety protection.Put the battery module into the cabinet and screw it, as shown in Figure 4.

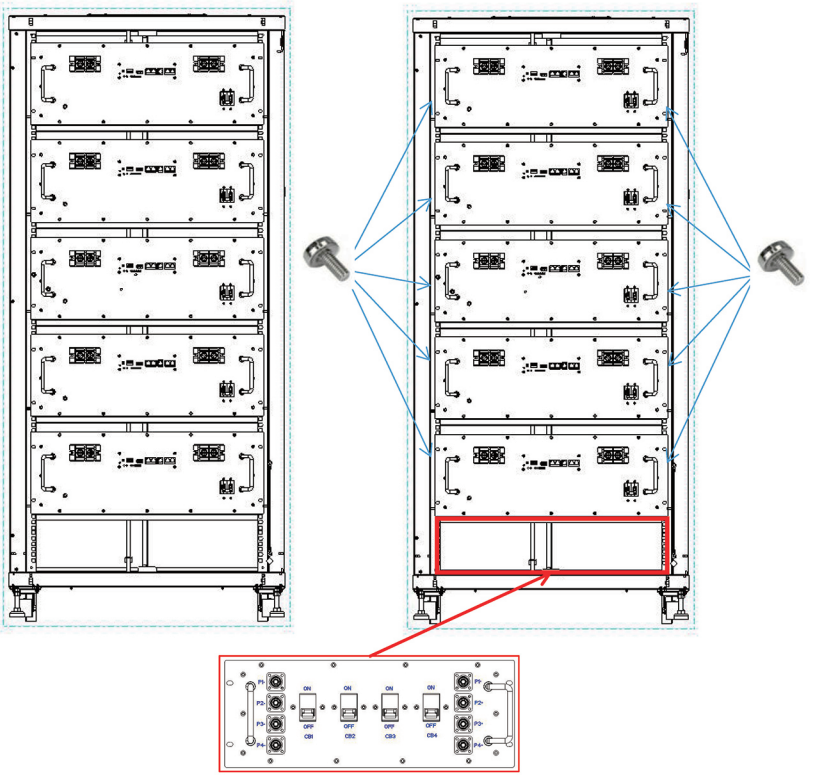


Figure 4

Step 5:

When more than 2PCS packs are connected in parallel ,then we recommend you install combiner box. 4 locations we recommend you install the combiner box.First select location is Top and Bottom.

Step 6:

Connect the wiring of the Pack as shown below.see figure 11.If inverter need CAN BUS port /RS485 port.please insert communication cable (RJ45) to CAN port or RS485A,RS485B only be used for battery packs parallel mode.

Step 7:

Set the address of pack.this a important step,you can see there is 4bit or 8bit coder in bottom of Pack.please set as bill 1 and 2.

bit CODER: this is Binary CODER,Calculated by 8 4 2 1 BCD code.PACK 1 set as Master(BCD 1 0 0 0),see Table5.It support 15 PCS pack(max) in parallel.Address “0” is only used for single mode.

Step 8:

Connect the parallel communication cable (yellow network line).Any Pack has 2 PCS RS485B port for parallel communication, 1 PCS RS485A and 1PCS CAN port for inverter or other device.RS232 port only used for host software and update the firmware.See Figure 5

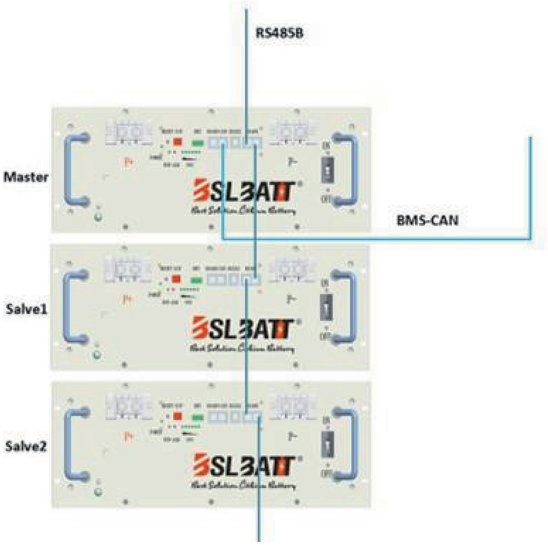


Figure 5

Step 9:

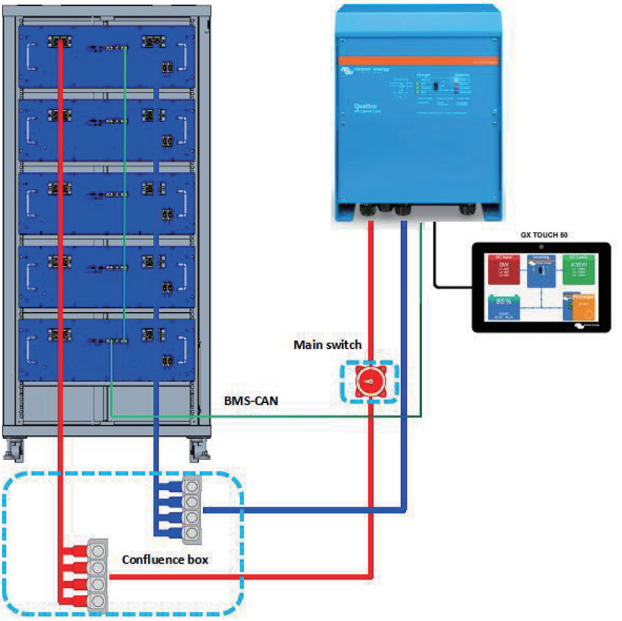
Start and stop battery pack.Confirm that the operation is correct, and the battery function can be turned on after the wiring is correct ,and You can press down power switch(ON/OFF) 3 second for start battery pack,then turn on switch in the Breaker , the battery start working and output ,it enter standby mode(if there is no power switch,please use a little pole and press down the RESET key 3-6second,like as follow picture,LED indicate all running status and check it's self). See Figure 6

Figure 5

Step 10:

Running the device, set the external charger or inverter parameters, please set according to the corresponding operation manual.Can not exceed the rated parameter

requirements .

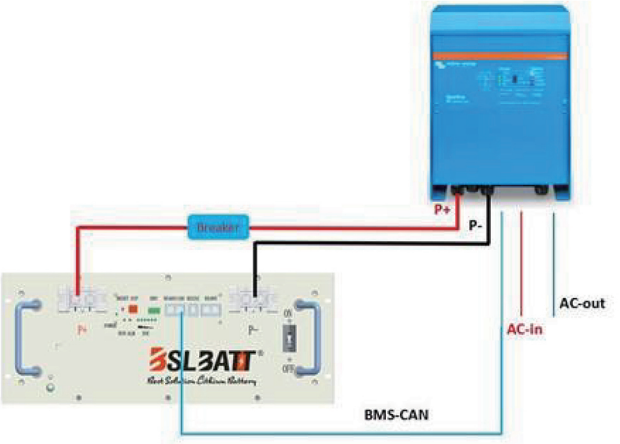


5.4 Installing battery strings in parallel

Taking two 51.2V100Ah batteries as an example, two parallel power lines（25 square） are used to combine the positive and negative outputs of two batteries.

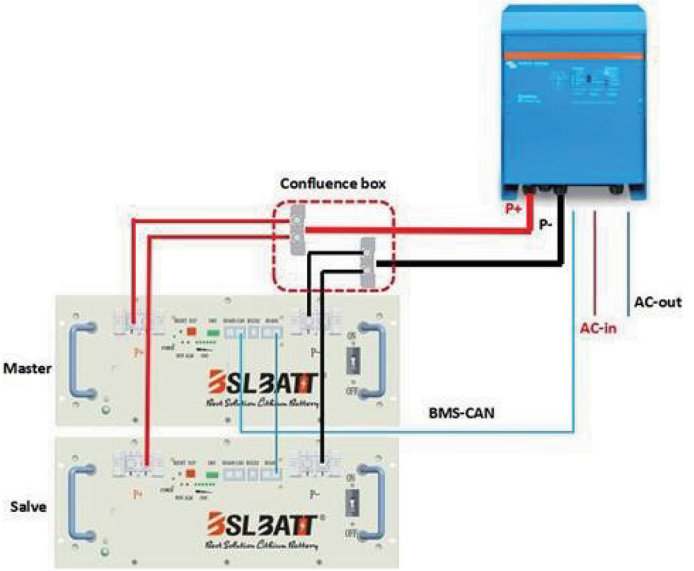
One battery pack's positive is connected with another battery pack's positive, negative is connected with negative. The communication between the battery packs adopts RJ45 network wire to connect through the RS485, the battery packs dial code address were set as table 5.

5.4.1 1pack---1 Inverter. Single mode .



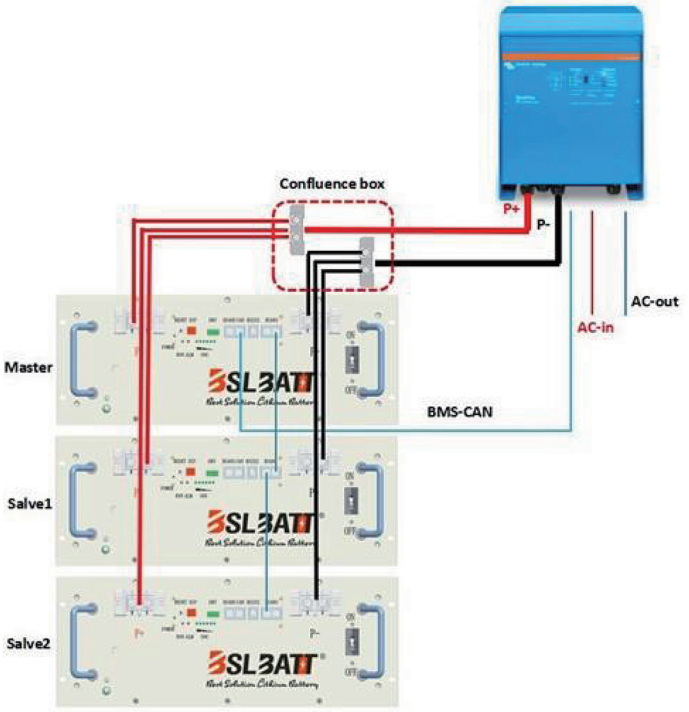
5.4.2 2pack---1 Inverter.

Pack 1 is slave ; pack 2 is master;Negative and Positive power cable has the same length.Figure11



5.4.3 3pack---1 Inverter.

Pack 1 ,2 is slave ; pack 3 is master.more pack are parallel,one pack is master,other are slave.Negative and Positive power cable has the same. Figure12.



Note: when a single unit is used, the inverter uses the battery as the main machine to communicate; when multiple batteries are used in parallel, the batteries inside are connected in parallel through the RS485B hardware interface, RS485A/CANBUS communicates with the inverter.

6.Appendix1

When the equipment manufacturer confirms that it is necessary, it can authorize to provide the customer with the host software and operating instructions.

Figure 7 RS232 Serial port communication device

Host soft operation:

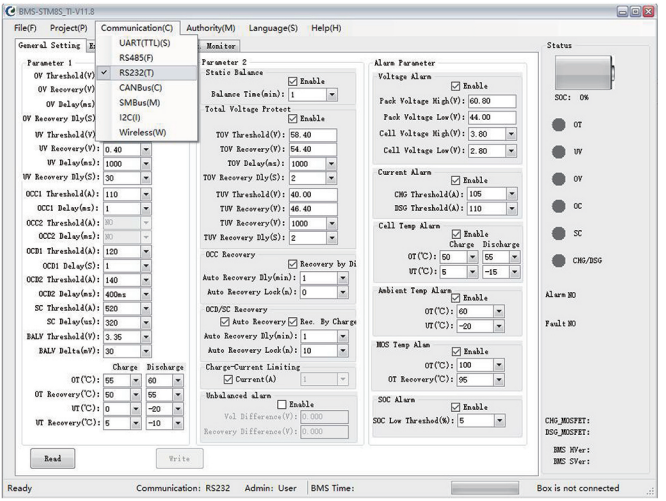


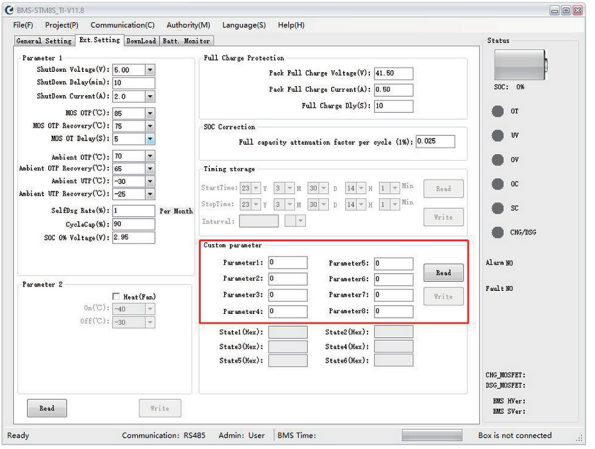
Figure 8

7.Appendix2

Multi Inverter protocol support.

Default setting: CANBUS - Victron, RS485-DEYE.

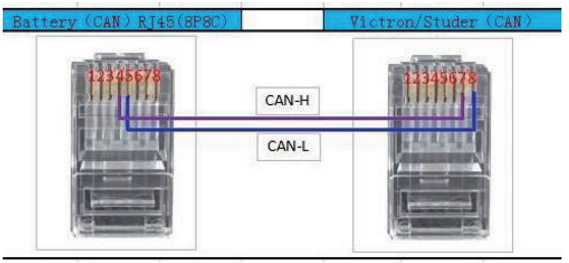
NO	Mode	Inverter	Baud rate	Parameter
1	CAN	Megarevo	500 Kbps	8=0
2		Pylon	500 Kbps	8=1
3		Goodwe	500 Kbps	8=1
4		Sol-Ark	500 Kbps	8=1
5		Deye	500 Kbps	8=1
6		Growatt	500 Kbps	8=2
7		Saijina	500 Kbps	8=2
8		Senergytec	500 Kbps	8=3
10		SOFAR	500 Kbps	8=4
11		Sorotec	500 Kbps	8=4
12		SMA	500 Kbps	8=4
13		Victrion	500 Kbps	8=4
14		MUST	500 Kbps	8=5
15		Luxpower	500 Kbps	8=6
16		SE	500 Kbps	8=7
17		Daneng	500 Kbps	8=8
18	RS485	Goodwe	9600 bps	Default
19		YWT	9600 bps	Default
20		Pylon	9600 bps	Default
21		Eastups	9600 bps	Default
22		Growatt	9600 bps	4=0
23		Saijina	9600 bps	4=0
24		WOW	9600 bps	4=1
25		Voltronic	9600 bps	4=2
26		Snat	9600 bps	4=3
27		Luxpower	9600 bps	4=4
28		Lantrun	9600 bps	4=5
29		Sol-Ark	9600 bps	4=6
30		SE	9600 bps	4=7

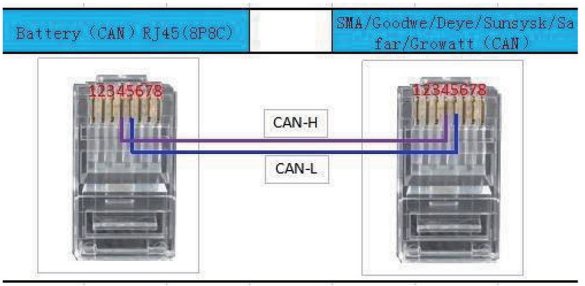


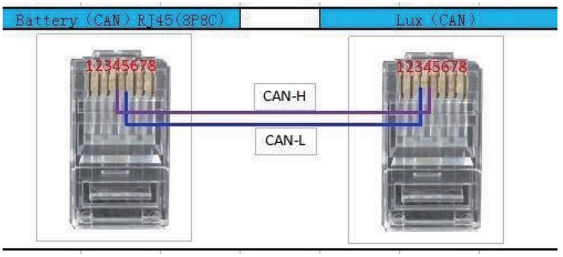
Remark：

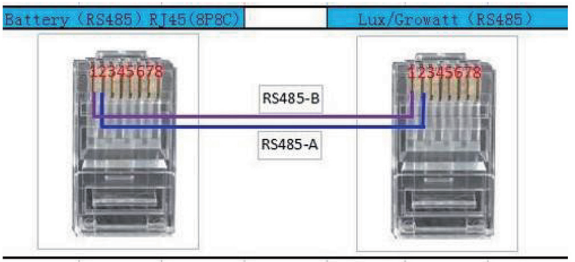
- Please ask your sales team to provide password for host computer software administration enter.
- Different inverters the pin assignment are not the same, please contact inverter supplier for detailed RJ45 cables of pin assignment.

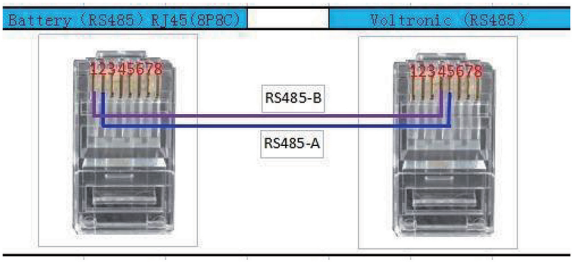
Connector pin configurations for the above-mentioned inverter manufacturers are listed below:

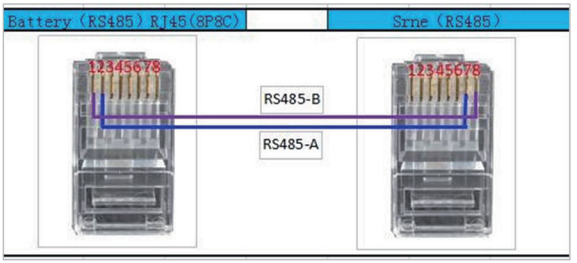





Battery (CAN) RJ45(8P8C)
Lux (CAN)
12345678
12345678
CAN-H
CAN-L


Battery (RS485) RJ45(8P8C)
Lux/Growatt (RS485)
12345678
12345678
RS485-B
RS485-A


Battery (RS485) RJ45(8P8C)
Voltronic (RS485)
12345678
12345678
RS485-B
RS485-A


Battery (RS485) RJ45(8P8C)
Srne (RS485)
12345678
12345678
RS485-B
RS485-A

8. Appendix3

Abnormal Situation Addressing

1. What if the battery pack does not work properly after power on?
A: The most direct way is to connect to the upper computer, through the upper computer to find the fault phenomenon, causes can be roughly analyzed from the upper computer interface prompt alarm, protection, fault and other information, it can also provide necessary reference for further testing.

2. Under what circumstances will RS232 communication fail?
A: The following steps can be taken to eliminate the problem:
1) Confirm that at least one of the indicator lights of the battery pack is on or flashing, that is, the battery pack is in normal working condition;

2) Confirm that the host computer software selects correct COM port (view device manager);

3) Confirm whether the RS232 communication line is fully inserted into the corresponding communication interface of the battery pack.

3. Under what circumstances will RS485 fail to paralleling batteries communication?
A: The possibility of failure of parallel batteries communication is as follows: first ensure whether the parallel RS485 communication port has been connected, and then make sure that the address dialing position of the battery pack is correct, and make sure that the RS485 terminal Plug-in in the right place.

4. What is the fault alarm mechanism?
A: battery pack has fault alarm function, can be checked through upper computer software.

Failure includes:
1) Sampling failure: analog front-end and main control chip communication failure. When the fault occurs, the charge and discharge function is turned off, and the fault alarm can be automatically cleared after the fault is cleared.

2) Temperature NTC failure: mainly detects whether the temperature NTC is short-circuited or disconnected. When the fault occurs, the charge and

discharge function is turned off, and the fault alarm can be automatically cleared after the fault is cleared.

3) Cell failure: the voltage difference of the cell exceeds 1V, or the difference between the total voltage detection voltage and the sum of single cell voltage is more than 5V, or the minimum voltage is less than 0.5V. The voltage sampling line disconnect also reports the same fault. When the fault is cleared, the fault alarm can be automatically cleared.

After the battery is connected to the system and shows over-current protection or short circuit protection. This is not a problem with the battery pack, but the capacity load of the electrical equipment is too large. Charging can remove the alarm, or extend the battery pack precharge circuit delay time.

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We will not be liable for the accidents resulting from operation breaking this specification and user manual.

We will not send separate notice, provided that the contents of this specification are changed due to improvement
of product quality or technological upgrading; provided that you want to understand the latest information of
this product, please contact us.

The shelf life of this product is within 60 months after it is delivered; we will maintain the product, which is in the warranty period for free of charge, provided that it has any product.
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so as to achieve the purpose of sustainable use without performance reduction; our after-sales service personnel
will propose the specific maintenance and troubleshooting methods.
In case of any questions, please contact us.

WARRANTY CARD			
Product Name		Model Number	
BATCH NO.		Shiping Date	
The Buyer		Phone	
Address			

If a device becomes defective during the agreed warranty period, please report the defective device situation to the original manufacturer with this warranty card. Supplier or end users required to send the warranty claim form to the original manufacturer or authorized service partner with all the necessary information. Customers must present this warranty card, battery purchasing invoice, extension warranty letter if applicable, and other related materials as well if required. It is the responsibility of the warranty holder to substantiate the warranty claim and show that the conditions are met. Please note the original manufacturer reserve the ultimate explanation right on this warranty card.

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