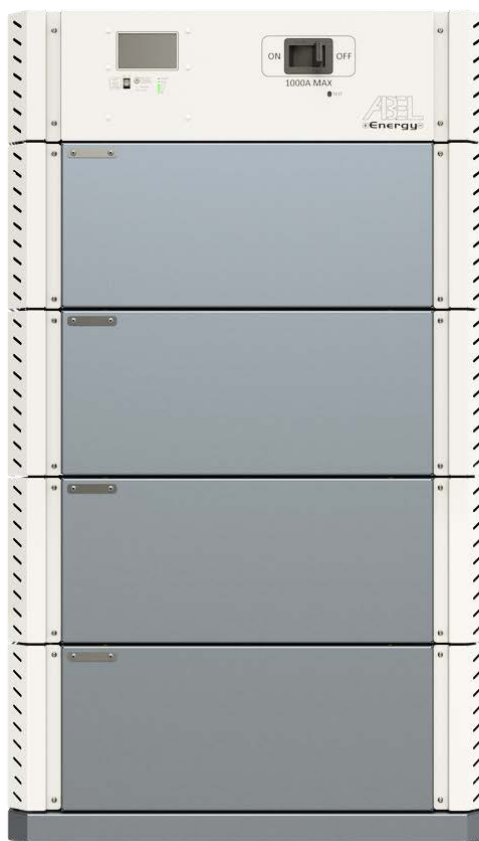


# STORAGEDOCK

48 VOLT /LV COMMERCIAL RANGE



## LV/COM STACKABLE LiFePO<sub>4</sub> BATTERY

### TECHNICAL DATA SHEET WITH INSTALLATION INSTRUCTIONS

| STORAGEDOCK LV COMMERCIAL / 48 VOLT |                                                                                       |
|-------------------------------------|---------------------------------------------------------------------------------------|
| Product Codes                       | LV-Com15/300, LV-Com30/600, LV-Com45/900, LV-Com60/1000, LV-Com75/1000, LV-Com90/1000 |
| Packaged Weight                     | BMU & foot piece: 83kg / 15kWh module: 137kg                                          |
| Dimensions                          | 780mm (w) x 440mm (d) x height is stack dependent                                     |



Manufactured by SPECIALIZED SOLAR SYSTEMS  
43 Ossie Urban Street, Tamsui Industria, George, South Africa  
+27 (0)44 878 1126 | [www.specializedsolarsystems.co.za](http://www.specializedsolarsystems.co.za) | [info@specializedsolarsystems.co.za](mailto:info@specializedsolarsystems.co.za)



To be completed by Distributor:

| <b><u>IMPORTANT INFORMATION</u></b> |                      |
|-------------------------------------|----------------------|
| • PROJECT No.                       | <input type="text"/> |
| • CLIENT NAME                       | <input type="text"/> |
| • CLIENT CONTACT DETAILS            | <input type="text"/> |
| • DATE PURCHASED/INSTALLED          | <input type="text"/> |
| • SERIAL NUMBER of UNIT             | <input type="text"/> |
| • SSS REPRESENTATIVE                | <input type="text"/> |

*Please retain this booklet as proof of your warranty.*

*If this section has not been completed by a registered SSS Distributor, please submit a copy of the above to the following email address to ensure that your warranty will be valid:*

*[info@specializedsolarsystems.co.za](mailto:info@specializedsolarsystems.co.za)*



# STORAGEDOCK

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## TABLE OF CONTENTS

|     |                                           |         |
|-----|-------------------------------------------|---------|
| 1.  | Introduction                              | page 3  |
| 2.  | Commercial Battery Pack Configurations    | page 5  |
| 3.  | Technical Specifications                  | page 7  |
| 4.  | Modular Battery Units                     | page 10 |
| 5.  | LV Commercial BMU Settings and Conditions | page 10 |
| 6.  | BMS Settings and Conditions               | page 11 |
| 7.  | Pack Charge Voltage Settings              | page 11 |
| 8.  | BMS Screen Interpretations                | page 12 |
| 9.  | Communication to the Stackable Battery    | page 14 |
| 10. | Battery Assembly                          | page 16 |
| 11. | Safety Instructions                       | page 20 |
| 12. | Battery Monitoring App                    | page 22 |
| 13. | LV-Com Battery Warranty                   | page 23 |
|     | Quality Control and Sign-Off              | page 26 |



# STORAGEDOCK LV COMMERCIAL BATTERY

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## INTRODUCTION

Each Storedock battery is composed of prime A grade lithium iron phosphate ( $\text{LiFePO}_4$ ) cells. The  $\text{LiFePO}_4$  battery is one of the most stable forms of lithium-iron technologies available for this specific purpose. This battery uses a lithium-iron-derived chemistry and shares many advantages with other lithium-ion battery chemistries. However, there are significant differences. Lithium iron phosphate chemistry offers a longer cycle life than other lithium-ion approaches. Another important advantage over other lithium-ion chemistries is thermal and chemical stability, which improves battery safety, making these batteries ideal for home and business use.

The commercial Storedock batteries are also modular in design which allows one to increase the capacity of your energy system over time, if so required. Additionally, up to four stacked units can be connected in parallel to create larger capacities, up to 360 kWh.

With a Specialized Solar Systems' (SSS) custom designed and intelligent BMS (battery monitoring system) with CAN- bus, the health of the battery is automatically maintained from the charging cycle, right through to the discharging floor level State of Charge (SOC) within the various parameters from the battery cell supplier in order to ensure the optimal lifespan, safety and warranty.



The BMS CAN-bus communication protocol integrates seamlessly with the Victron CCGX, Venus GX or Cerbo GX graphical user interfaces for a fully optimised ESS (Energy Storage System). The batteries can be remotely monitored and managed, allowing optimal performance and extended battery life.

The stackable architecture of this battery design allows for effective transportation and ease of installation.

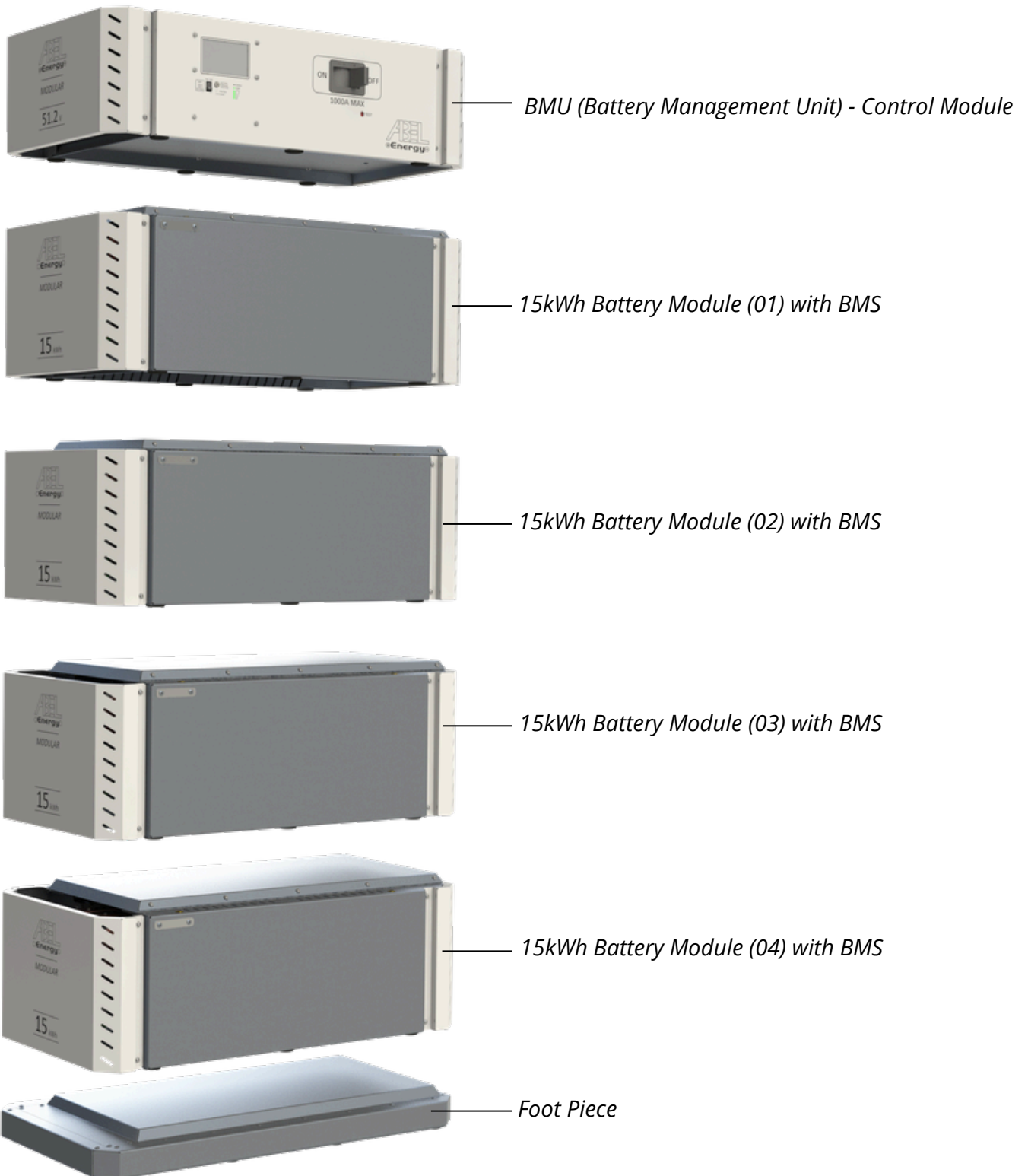
### Important Terminology:

- A **module** is an individual 15 kWh battery unit.
- A **stack** is a number of modules connected in parallel (up to 6 units) and positioned on top of each other, with a foot piece and a BMU at the very top, forming a battery stack.



# STORAGEDOCK

## COMPONENTS



**Above: Illustration of one 60 kWh battery stack**

*Note: The serial numbers of the battery modules are located on the front of each module.*



## 2. COMMERCIAL BATTERY PACK CONFIGURATIONS

*The LV Commercial battery is available in six different configurations:*

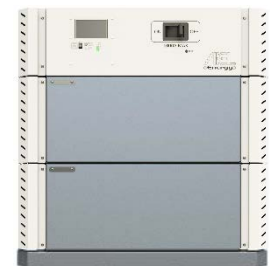
### 1. **15 kWh / 300 A UNIT** (Product code: LV-Com15/300)

- Includes:
  - Control module
  - 1 x battery module
  - Foot piece
- Capacity: 15 kWh / 12 kWh usable at 80% depth of discharge
- Height: 530mm
- Width: 780mm
- Depth: 440mm
- Weight: 220kg (packaged weight)



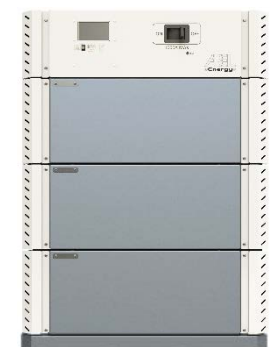
### 2. **30 kWh / 600 A UNIT** (Product code: LV-Com30/600)

- Includes:
  - Control module
  - 2 x battery modules
  - Foot piece
- Capacity: 30 kWh / 24 kWh usable at 80% depth of discharge
- Height: 800mm
- Width: 780mm
- Depth: 440mm
- Weight: 357kg (packaged weight)



### 3. **45 kWh / 900 A UNIT** (Product code: LV-Com45/900)

- Includes:
  - Control module
  - 3 x battery modules
  - Foot piece
- Capacity: 45 kWh / 36 kWh usable at 80% depth of discharge
- Height: 1070mm
- Width: 780mm
- Depth: 440mm
- Weight: 494kg (packaged weight)



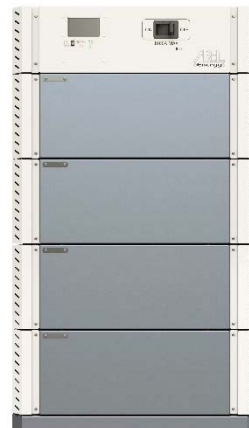
|                 |                 |       |
|-----------------|-----------------|-------|
| PRODUCT WEIGHT: | BMU + FOOTPIECE | 48kg  |
|                 | BATTERY MODULE  | 120kg |

|                  |                 |       |
|------------------|-----------------|-------|
| PACKAGED WEIGHT: | BMU + FOOTPIECE | 83kg  |
|                  | BATTERY MODULE  | 137kg |

*The battery BMU, foot piece and accessories are packaged together in a timber box for shipping. The battery modules are individually packaged in separate timber boxes for shipping. "Packaged weights" above include the weight of the box.*

#### 4. **60 kWh / 1000 A UNIT** (Product code: LV-Com60/1000)

- Includes:
  - Control module
  - 4 x battery modules
  - Foot piece
- Capacity: 60 kWh / 48 kWh usable at 80% depth of discharge
- Height: 1340mm
- Width: 780mm
- Depth: 440mm
- Weight: 631kg (packaged weight)



#### 5. **75 kWh / 1000 A UNIT** (Product code: LV-Com75/1000)

- Includes:
  - Control module
  - 5 x battery modules
  - Foot piece
- Capacity: 75 kWh / 60 kWh usable at 80% depth of discharge
- Height: 1610mm
- Width: 780mm
- Depth: 440mm
- Weight: 768kg (packaged weight)



#### 6. **90 kWh / 1000 A UNIT** (Product code: LV-Com90/1000)

- Includes:
  - Control module
  - 6 x battery modules
  - Foot piece
- Capacity: 90 kWh / 72 kWh usable at 80% depth of discharge
- Height: 1880mm
- Width: 780mm
- Depth: 440mm
- Weight: 905kg (packaged weight)



|                 |                 |       |
|-----------------|-----------------|-------|
| PRODUCT WEIGHT: | BMU + FOOTPIECE | 48kg  |
|                 | BATTERY MODULE  | 120kg |

|                  |                 |       |
|------------------|-----------------|-------|
| PACKAGED WEIGHT: | BMU + FOOTPIECE | 83kg  |
|                  | BATTERY MODULE  | 137kg |

*The battery BMU, foot piece and accessories are packaged together in a timber box for shipping. The battery modules are individually packaged in separate timber boxes for shipping. "Packaged weights" above include the weight of the box.*

### 3. TECHNICAL SPECIFICATIONS

| LV-Com 15/300 TECHNICAL SPECIFICATIONS |                                            |
|----------------------------------------|--------------------------------------------|
| Battery type                           | Grade A LiFePO4 Prismatic cells            |
| Nominal voltage                        | 51.2 VDC - 48V - 56 VDC                    |
| Nominal capacity                       | 295 Ah                                     |
| Total energy capacity                  | 15 kWh                                     |
| Energy capacity at 80% DoD             | 12 kWh                                     |
| Maximum & constant current             | 300 A                                      |
| Maximum charge current                 | 305 A for 5 seconds                        |
| Maximum discharge current              | 355 A for 5 seconds / 305 A for 30 seconds |
| Max recommended inverter size          | 15 kVA                                     |
| Cycle life                             | 6000 cycles @0.5C 80% depth of discharge   |

| LV-Com 30/600 TECHNICAL SPECIFICATIONS |                                            |
|----------------------------------------|--------------------------------------------|
| Battery type                           | Grade A LiFePO4 Prismatic cells            |
| Nominal voltage                        | 51.2 VDC - 48V - 56 VDC                    |
| Nominal capacity                       | 590 Ah                                     |
| Total energy capacity                  | 30 kWh                                     |
| Energy capacity at 80% DoD             | 24 kWh                                     |
| Maximum & constant current             | 600 A                                      |
| Maximum charge current                 | 610 A for 5 seconds                        |
| Maximum discharge current              | 710 A for 5 seconds / 610 A for 30 seconds |
| Max recommended inverter size          | 30 kVA                                     |
| Cycle life                             | 6000 cycles @0.5C 80% depth of discharge   |

| LV-Com 45/900 TECHNICAL SPECIFICATIONS |                                             |
|----------------------------------------|---------------------------------------------|
| Battery type                           | Grade A LiFePO4 Prismatic cells             |
| Nominal voltage                        | 51.2 VDC - 48V - 56 VDC                     |
| Nominal capacity                       | 885 Ah                                      |
| Total energy capacity                  | 45 kWh                                      |
| Energy capacity at 80% DoD             | 36 kWh                                      |
| Maximum & constant current             | 900 A                                       |
| Maximum charge current                 | 915 A for 5 seconds                         |
| Maximum discharge current              | 1065 A for 5 seconds / 915 A for 30 seconds |
| Max recommended inverter size          | 45 kVA                                      |
| Cycle life                             | 6000 cycles @0.5C 80% depth of discharge    |



| <b>LV-Com 60/1000 TECHNICAL SPECIFICATIONS</b> |                                              |
|------------------------------------------------|----------------------------------------------|
| Battery type                                   | Grade A LiFePO4 Prismatic cells              |
| Nominal voltage                                | 51.2 VDC - 48V - 56 VDC                      |
| Nominal capacity                               | 1180 Ah                                      |
| Total energy capacity                          | 60 kWh                                       |
| Energy capacity at 80% DoD                     | 48 kWh                                       |
| Maximum & constant current                     | 1060 A                                       |
| Maximum charge current                         | 1100 A for 5 seconds                         |
| Maximum discharge current                      | 1300 A for 5 seconds / 1100 A for 30 seconds |
| Max recommended inverter size                  | 60 kVA                                       |
| Cycle life                                     | 6000 cycles @0.5C 80% depth of discharge     |

| <b>LV-Com 75/1000 TECHNICAL SPECIFICATIONS</b> |                                              |
|------------------------------------------------|----------------------------------------------|
| Battery type                                   | Grade A LiFePO4 Prismatic cells              |
| Nominal voltage                                | 51.2 VDC - 48V - 56 VDC                      |
| Nominal capacity                               | 1475 Ah                                      |
| Total energy capacity                          | 75 kWh                                       |
| Energy capacity at 80% DoD                     | 60 kWh                                       |
| Maximum & constant current                     | 1060 A                                       |
| Maximum charge current                         | 1100 A for 5 seconds                         |
| Maximum discharge current                      | 1300 A for 5 seconds / 1100 A for 30 seconds |
| Max recommended inverter size                  | 60 kVA                                       |
| Cycle life                                     | 6000 cycles @0.5C 80% depth of discharge     |

| <b>LV-Com 90/1000 TECHNICAL SPECIFICATIONS</b> |                                              |
|------------------------------------------------|----------------------------------------------|
| Battery type                                   | Grade A LiFePO4 Prismatic cells              |
| Nominal voltage                                | 51.2 VDC - 48V - 56 VDC                      |
| Nominal capacity                               | 1770 Ah                                      |
| Total energy capacity                          | 90 kWh                                       |
| Energy capacity at 80% DoD                     | 72 kWh                                       |
| Maximum & constant current                     | 1060 A                                       |
| Maximum charge current                         | 1100 A for 5 seconds                         |
| Maximum discharge current                      | 1300 A for 5 seconds / 1100 A for 30 seconds |
| Max recommended inverter size                  | 60 kVA                                       |
| Cycle life                                     | 6000 cycles @0.5C 80% depth of discharge     |



To increase the maximum inverter size, one can increase the amount of stacks connected in parallel, to a maximum of 4. This also doubles the storage capacity of the combined battery. For example:

| <b>2 x LV-Com 45/900 TECHNICAL SPECIFICATIONS</b> |                                              |
|---------------------------------------------------|----------------------------------------------|
| Battery type                                      | Grade A LiFePO4 Prismatic cells              |
| Nominal voltage                                   | 51.2 VDC - 48V - 56 VDC                      |
| Nominal capacity                                  | 1770 Ah                                      |
| Total energy capacity                             | 90 kWh                                       |
| Energy capacity at 80% DoD                        | 72 kWh                                       |
| Maximum & constant current                        | 1800 A                                       |
| Maximum charge current                            | 1830A for 5 seconds                          |
| Maximum discharge current                         | 2000 A for 5 seconds / 1830 A for 30 seconds |
| Max recommended inverter size                     | 90 kVA                                       |
| Cycle life                                        | 6000 cycles @0.5C 80% depth of discharge     |

| <b>2 x LV-Com 60/1000 TECHNICAL SPECIFICATIONS</b> |                                              |
|----------------------------------------------------|----------------------------------------------|
| Battery type                                       | Grade A LiFePO4 Prismatic cells              |
| Nominal voltage                                    | 51.2 VDC - 48V - 56 VDC                      |
| Nominal capacity                                   | 2360 Ah                                      |
| Total energy capacity                              | 120 kWh                                      |
| Energy capacity at 80% DoD                         | 96 kWh                                       |
| Maximum & constant current                         | 2120 A                                       |
| Maximum charge current                             | 2200 A for 5 seconds                         |
| Maximum discharge current                          | 2600 A for 5 seconds / 2200 A for 30 seconds |
| Max recommended inverter size                      | 135 kVA                                      |
| Cycle life                                         | 6000 cycles @0.5C 80% depth of discharge     |

| <b>2 x LV-Com 75/1000 TECHNICAL SPECIFICATIONS</b> |                                              |
|----------------------------------------------------|----------------------------------------------|
| Battery type                                       | Grade A LiFePO4 Prismatic cells              |
| Nominal voltage                                    | 51.2 VDC - 48V - 56 VDC                      |
| Nominal capacity                                   | 2950 Ah                                      |
| Total energy capacity                              | 150 kWh                                      |
| Energy capacity at 80% DoD                         | 120 kWh                                      |
| Maximum & constant current                         | 2120 A                                       |
| Maximum charge current                             | 2200 A for 5 seconds                         |
| Maximum discharge current                          | 2600 A for 5 seconds / 2200 A for 30 seconds |
| Max recommended inverter size                      | 135 kVA                                      |
| Cycle life                                         | 6000 cycles @0.5C 80% depth of discharge     |



| <b>2 x LV-Com 90/1000 TECHNICAL SPECIFICATIONS</b> |                                              |
|----------------------------------------------------|----------------------------------------------|
| Battery type                                       | Grade A LiFePO4 Prismatic cells              |
| Nominal voltage                                    | 51.2 VDC - 48V - 56 VDC                      |
| Nominal capacity                                   | 3540 Ah                                      |
| Total energy capacity                              | 180 kWh                                      |
| Energy capacity at 80% DoD                         | 144 kWh                                      |
| Maximum & constant current                         | 2120 A                                       |
| Maximum charge current                             | 2200 A for 5 seconds                         |
| Maximum discharge current                          | 2600 A for 5 seconds / 2200 A for 30 seconds |
| Max recommended inverter size                      | 135 kVA                                      |
| Cycle life                                         | 6000 cycles @0.5C 80% depth of discharge     |

#### 4. MODULAR BATTERY UNITS

Each 51.2 Volt LV battery is modular and consists of a control module, the Battery Management Unit (BMU), the required number of 15 kWh battery modules (up to a maximum of six modules connected in parallel ie: 90 kWh) and a foot piece.

The battery modules are connected in parallel and have a simple automatic connection process, making them easy to assemble on remote sites. Each module has its own BMS, which has been custom designed for this specific unit, together with the custom designed LCD screen.

The complete unit has three levels of protection, ensuring the highest safety standards. The main 1000 Amp circuit breaker is housed in the control module along with the main contactors. Each battery module also has its own contactor installed. The current threshold has been pre-programmed to a maximum of 1100 Amps when four or more modules are connected. When two or more battery stacks are connected in parallel, this can increase to 2200 Amps.

#### 5. LV COMMERCIAL BMU SETTINGS AND CONDITIONS

The control of the LV-Commercial battery is managed individually by each module's BMS, feeding information to the BMU. The BMU received all the required information from each modules' BMS unit and processes this information based on pre-programmed algorithms for protection and efficiency of the total stack of batteries.

The BMU has internal charge/discharge and resistor relays built into the unit. The BMU will trip the main circuit breaker at 1300 Amps on over-current discharge (total current of head) within 5 seconds of condition.



The BMU will control the temperature of different sensors at different temperatures:

- Component temperature
- Resistor temperature
- Fan control
- Cell temperature
- Module temperature

The temperature cut-off will react on high temperatures and will automatically reconnect when normal operating temperatures are reached.

## 6. BMS SETTINGS AND CONDITIONS

Each individual stack BMS also has pre-programmed control, managing the individual 15 kWh battery modules. The parameters are as follows:

|      |                                |                       |
|------|--------------------------------|-----------------------|
| CUV  | (Cell Under Voltage)           | 2.5 V per cell        |
| CUVR | (Cell Under Voltage Reconnect) | 2.7 V per cell        |
| COV  | (Cell Over Voltage)            | 3.75 V per cell       |
| COVR | (Cell Over Voltage Reconnect)  | 3.6 V per cell        |
| SOC  | (State of Charge reset 100%)   | 3.47 V per cell       |
| OCD1 | (Over Current Discharge)       | - 355 A for 5 seconds |
| OCC  | Over Current Charge)           | + 305 A for 5 seconds |
| OT   | (Over Temperature)             | + 60 C for 2 seconds  |
| OTR  | (Over Temperature Reset)       | + 55C for 5 minutes   |

## 7. PACK CHARGE VOLTAGE SETTINGS

|                         |          |
|-------------------------|----------|
| Absorb Charge Voltage   | 56.4 VDC |
| Float Charge Voltage    | 56.2 VDC |
| Battery Cut-off Voltage | 47.2 VDC |

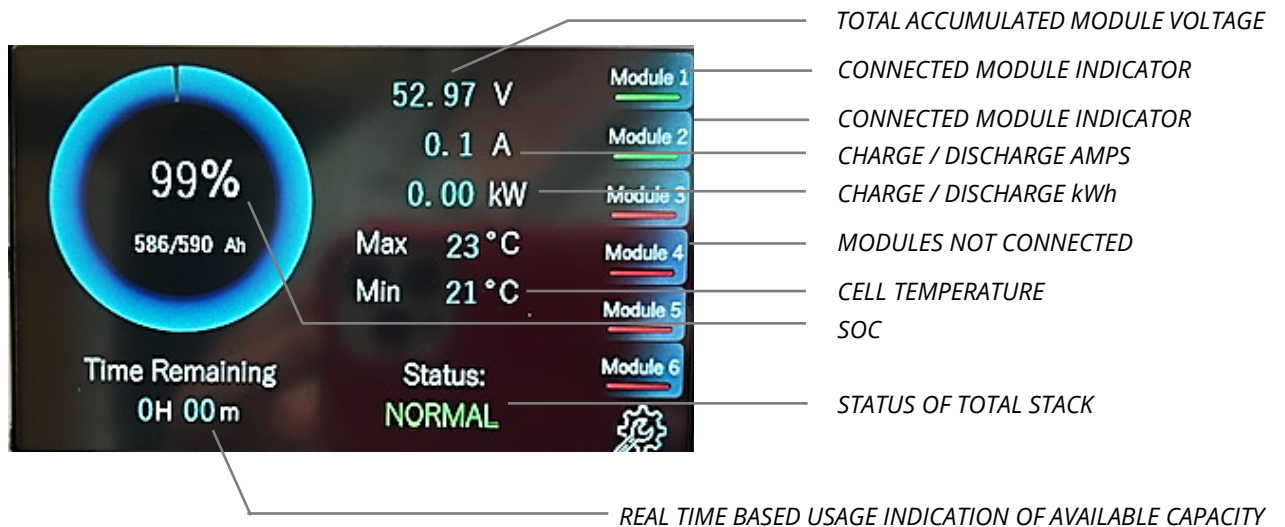


## 8. BMS SCREEN INTERPRETATIONS

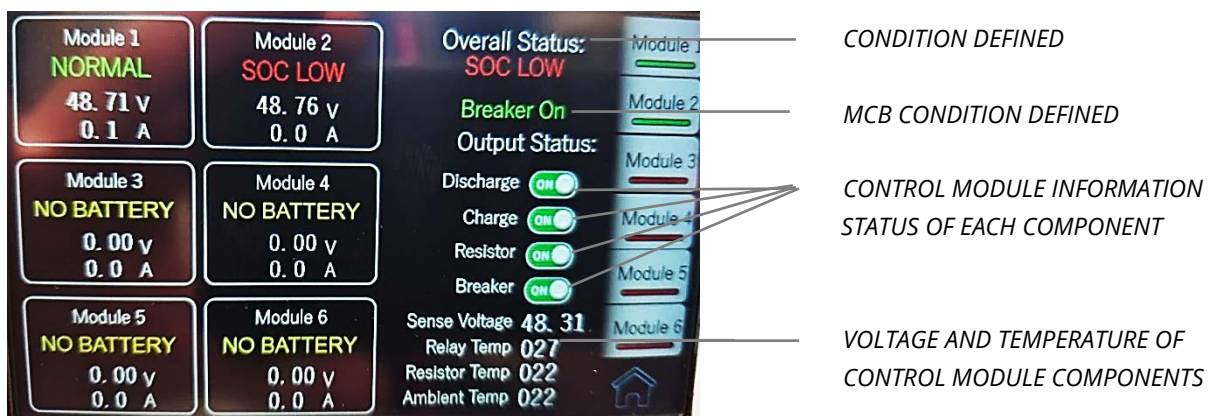
The LV-Commercial battery has various additional safety features and control mechanisms built into the unit's BMU as well as each module. This battery will be controlled via four main platforms of contactors:

1. Discharge Management control contactor
2. Charge Management control contactor
3. Resistor Circuit control
4. Motorized Circuit Breaker control

### 8.1 Main Screen Information

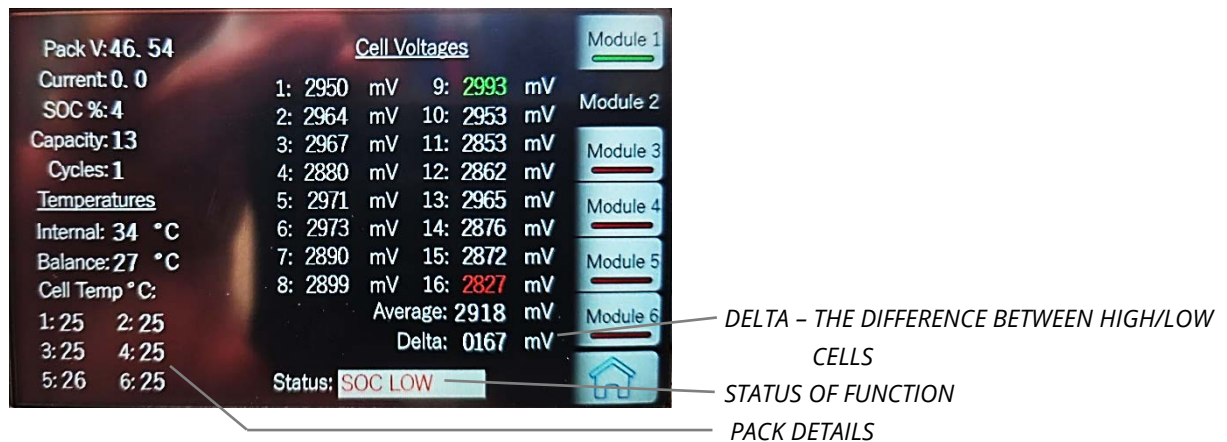


Please see the conditions illustrated on the BMU control panel SETTINGS:



## 8.2 Status of Individual Modules

By selecting the module on the touch screen, all internal details of the selected module will be displayed on the screen



## 8.3 Resistive Current Control

Functions:

1. To accommodate the internal microfarad capacitors of a transformer inverter.
2. To ensure charge / discharge criteria under extreme temperature conditions.
3. To ensure maximum efficiency during charging.

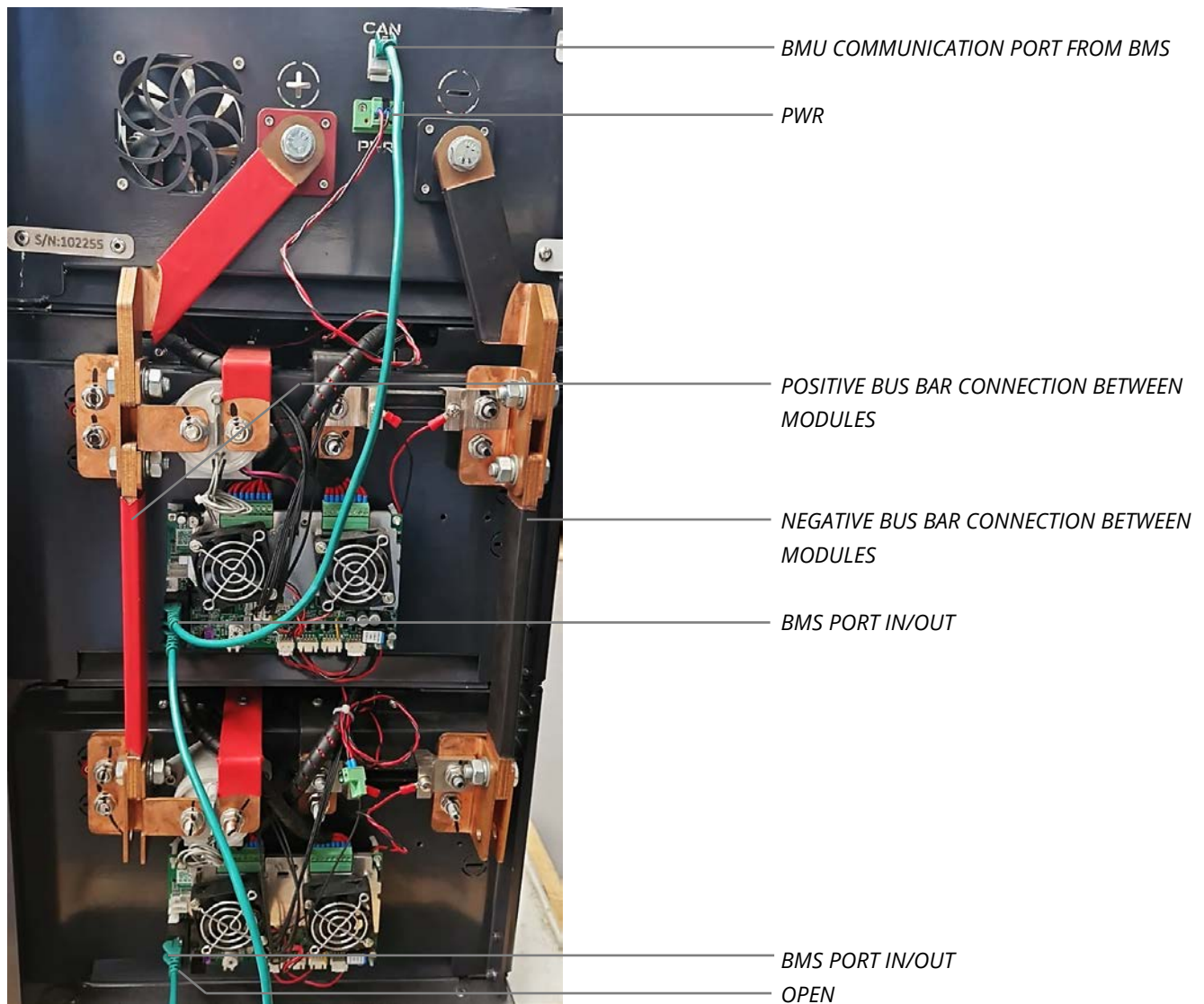
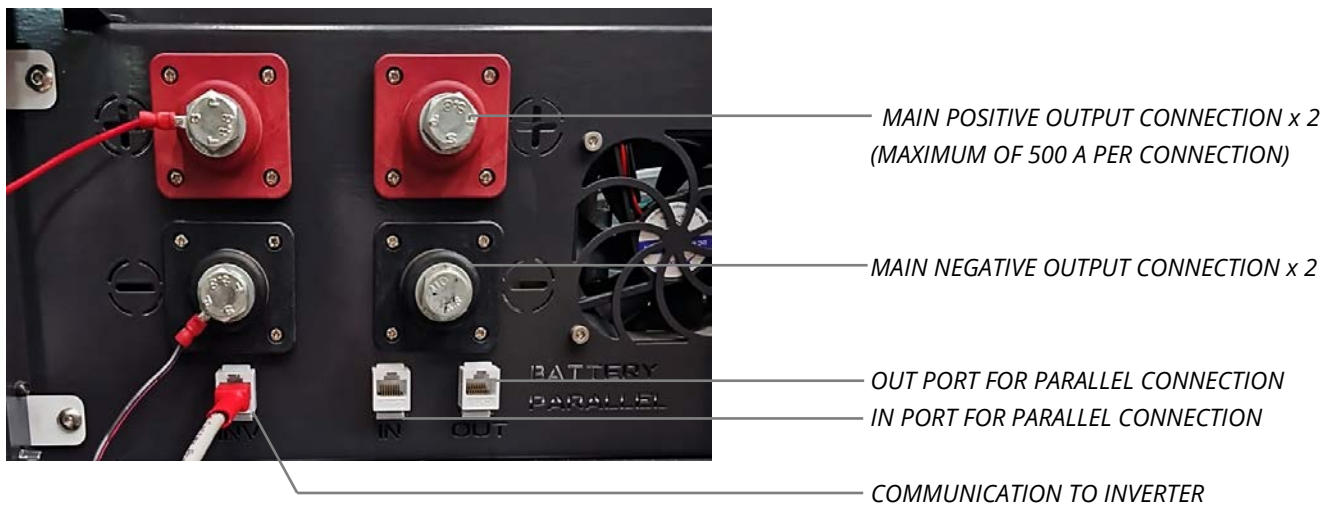
Example of function:

When charging the stack battery at a reasonably high Ampere (say, for example, 700 A), the BMU will calculate the condition of the battery based on the voltage and SOC condition of every cell. When the battery reaches a high SOC or highest cell voltage of 3.55 V per cell, the BMU will disconnect the high amperage charge (700 A) and disconnect the charge circuit, but connect the resistive circuit. As the battery cells are nearly fully charged, this resistive circuit will introduce a lower average ampere (10 A for example). It will continue to charge at 10 A until the cells are stabilized and then the BMU will reconnect the charge circuit and again charge at 700 A. this process will continue until the battery cells have all reached the full condition. Reducing the charge at the top-end will ensure maximum energy storage and longer life of the cells.



## 9. COMMUNICATION TO THE STACKABLE BATTERY

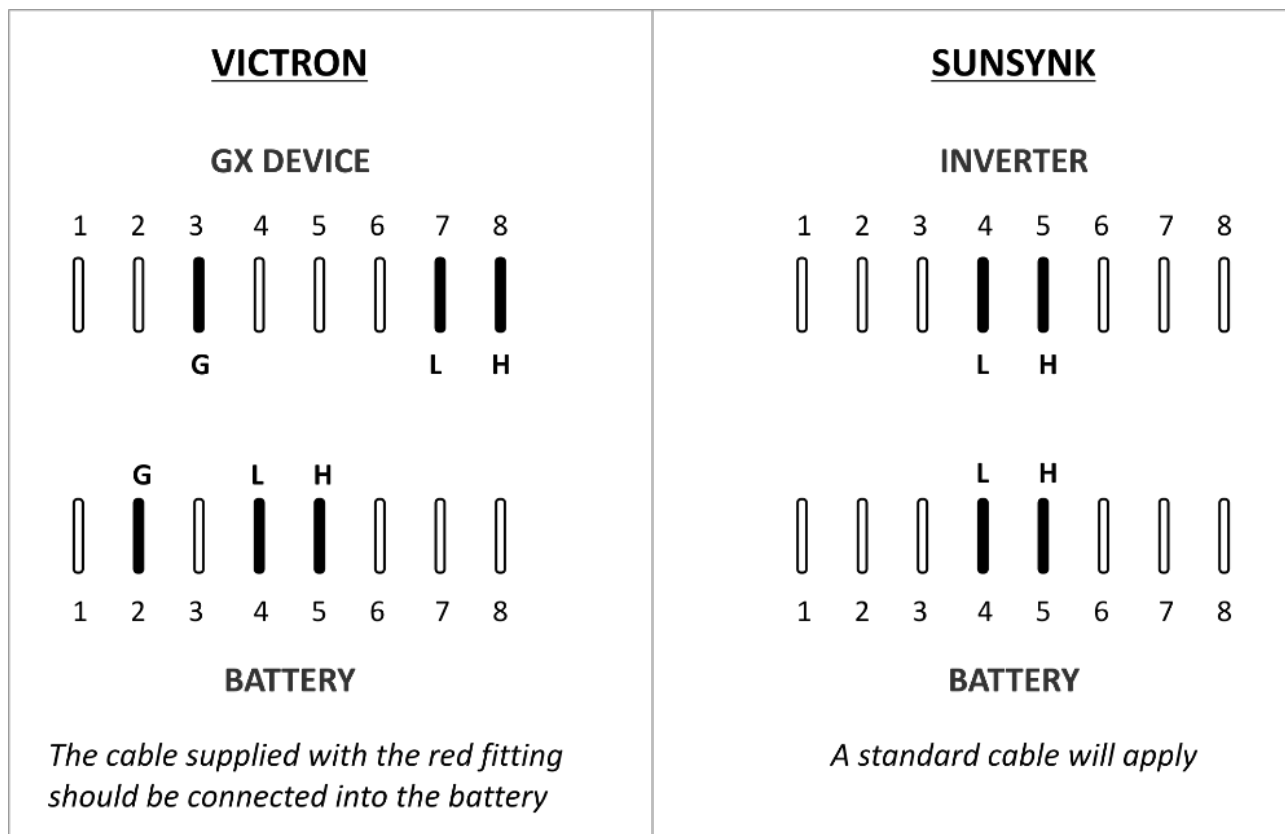
## 9.1 External Connections



## 9.2 Protocol

- Standard frame format 29-bit identifier. CAN 2.0.
- Bit rate is 500 Mbps.
- BMU is terminated.
- CAN ports for Victron GX device would be CAN-H and CAN-L. for Victron unit, the cable will always be supplied to be connected with the "RED" side into the battery. Please enquire for additional PIN layouts if required.

### CAN-BUS PIN LAYOUT



Additional communication interphase can be requested.



## 10. BATTERY ASSEMBLY – FROM PACKAGING TO COMMISSIONING

There are two packaging segments:

1. BMU and foot piece (Box Number 1)
2. Battery module (Box Number 2) – based on the amount of modules

### 10.1 BMU Box 1



This box contains the BMU and the battery foot piece, as well as the required assembly equipment packaged in a tray in the top section of the box. The top tray in this box will contain the following equipment:

- 2 x carry handles
- Module interconnecting bus-bars
- Module top connecting bus-bars
- Victron communication cable
- Module interconnecting cable
- 4 x screw-in carry bolt (lifting bolts)
- 4 x shackles



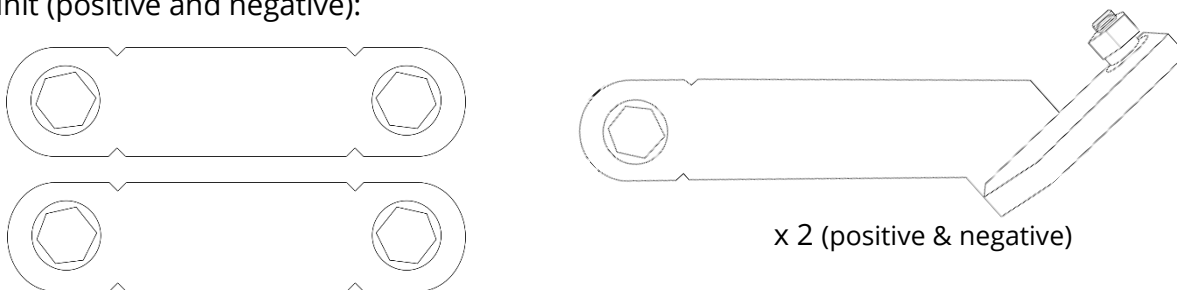
Unpack the box and put the foot piece in position.

Now the assembly of the battery will start:



## 10.2 Battery Assembly

1. In the tray with all the loose equipment packaged in the BMU box you will have copper bus-bars; two flat units (per battery module) for module interconnection and two terminal bus-bar unit (positive and negative):



2. Remove the 15 kWh battery module from Box 2 by unscrewing the screws of the box and removing the sides. Take the lifting bolts from the tray in Box 1 and secure these into position on the top of the module (Photo 1). Take the lifting bars from the tray and secure these to the bolts using the shackles supplied (Photo 2).



3. Lift the module out of the box and carefully place it on the foot piece (Photos 3 and 4). If there is more than one battery module, remove the lifting bolts and bars from the first module and repeat this process for the other modules, carefully placing them on top on each other.





Photo 3

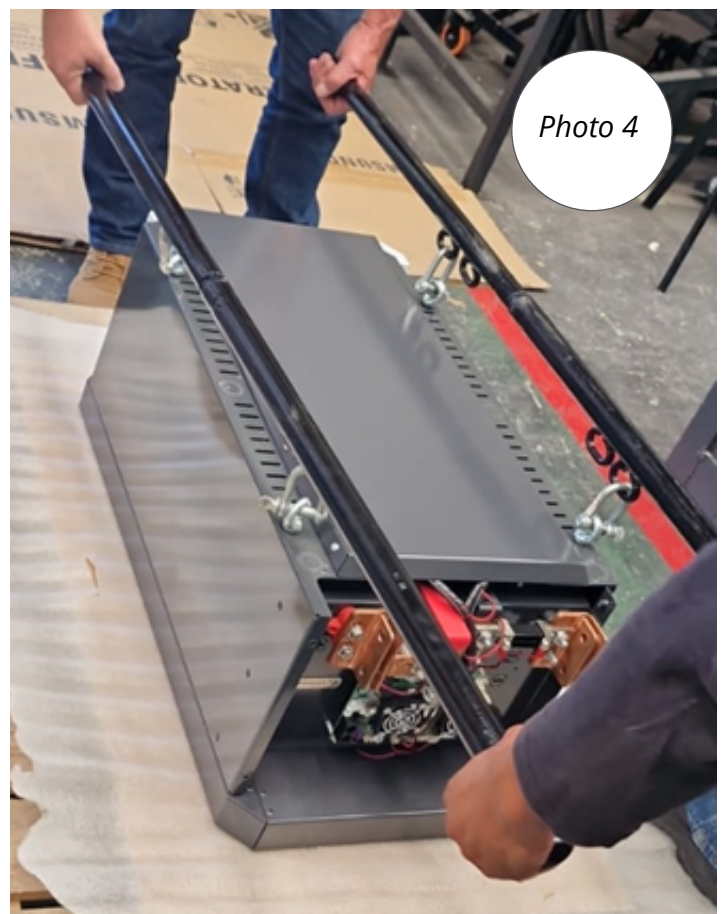


Photo 4

4. Remove the side cover of the module(s) exposing the connection of the bus-bars. Do the same with the side cover of the BMU unit.
5. Place the BMU unit on top of the module(s) also using the lifting bolts, shackles and lifting bars.
6. Remove the bolts, shackles and lifting bars once the unit is assembled.
7. Connect the bus-bars using the bolts, nuts, washers and spring washers supplied. Put the bus-bars into position, place the bolts in position and tighten.
8. Take the green communication cable (supplied in tray of Box 1) and plug it into the CAN port of the BMU. Insert the other end of the cable into the BMS OUT port (top port) of module 1. If more than one module is connected, insert the next comms cable into the BMS IN port (bottom port) of module one and the other end into the BMS OUT port of module 2, and so on until all the battery modules are connected via a communication cable.



9. Each battery module has a power cable. Insert the power cable of battery module 1 into the PWR connection of the BMU, ensuring that polarity is correct. If the battery consists of more than one module, please note that it is only the power cable of module 1 that is connected to the BMU. The remaining modules' cables are not connected.
10. Next, ensure that the Battery Parallel Selector dial for each battery has been correctly set. The module below the BMU must be set to "1", the next module set to "2" and so forth. If the selector dial on each module is not set correctly, the BMU will not pick up this module.

*Please note: If more than one stack is to be connected in parallel, then the Battery Parallel Selector dial on the front of the BMU should be set to 1 for the master battery, the next stack should be set to 2 on the dial, and so forth up to a maximum of 4.*

11. Once all the cables are connected and the parallel selector dials have been set, it is important to complete a quick check before replacing the side panels:
  - Check that all the bolts are torqued correctly (at a minimum of 17 Newton meters).
  - Check that all washers are in place.
  - Check that the communication cables are connected properly.
  - Check that the power cable is connected securely and that polarity is correct.

The side covers can now be replaced and secured in position.

12. You will note that the motorized circuit breaker is in the OFF position. Leave it OFF until the BMS has been initiated.
13. Now initiate the BMS by pressing the ON/OFF button on. This is the black switch below the BMS screen on the front of the BMU.
14. Once the BMS is ON, the unit will run through its test procedure.
15. Check that all the green lights are active once the test procedure is complete.
16. On the main screen of the BMS, check that all the installed modules are indicated in GREEN (the individual modules will either be NORMAL, CHARGING or DISCHARGING between each other).
17. The status indicator should show BREAKER OFF.
18. Select settings icon on the on the lower right hand side of the screen.
19. In SETTINGS, check that all the modules are indicated as NORMAL. If there is no module connected, NO BATTERY will be indicated. You will note that the output status is OFF for charge, discharge, resistor and breaker.
20. Now switch the main circuit breaker ON. Once the breaker is ON, the output status should now be indicated in GREEN.



21. You can now return to the BMS main screen and select Module 1. The screen should indicate the module's serial number and all its details. Do the same for all the remaining modules.
22. If there are no faults or warnings indicated, then the battery is ready for operation.
23. To turn the battery off, hold in the black ON/OFF switch below the BMS screen for 3 seconds. The battery will then switch off.
24. Switch off the circuit breaker manually.

***Ensure that the battery is installed in a well ventilated area and not in direct sunlight, and that there is appropriate ventilation space around the battery (minimum of 200mm).***

## **11. SAFETY INSTRUCTIONS**

### **11.1 General safety instructions**

Please read all documentation supplied with this product first so that you are familiar with the safety indicators and instructions before using this product. This equipment should be used for the designated application only.

#### **WARNING: Danger and electrical shock**

- This product is used in combination with a permanent energy source (battery). Even if the equipment is switched off, a dangerous electrical voltage can occur at the input or output terminals. Always switch the AC power OFF and disconnect the battery before any maintenance is carried out.
- Never use the product at sites where a gas or a dust explosion could occur. The product is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or with a lack of experience or knowledge.
- An approved service agent must take responsibility of the installation of this product.

### **11.2 Transport and storage safety instructions**

- When transporting or storing the product, ensure that the main supply and the battery leads are disconnected.
- Transport the product in the original packaging only.
- Store all products in a dry environment and preferably at a temperature of 25°C.

**WARNING: Do not lift heavy objects without assistance.**



### 11.3 Installation Safety Instructions

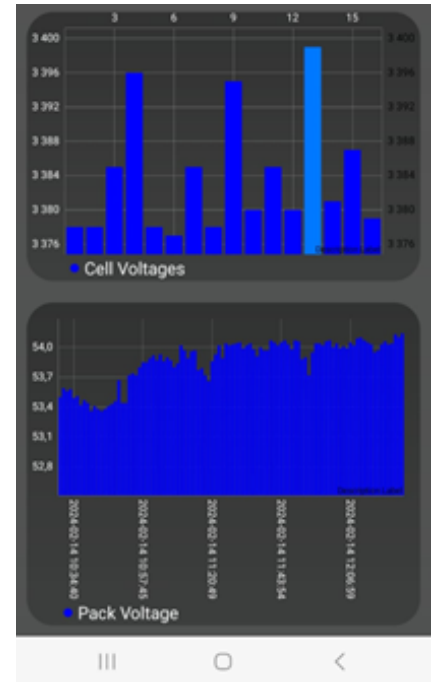
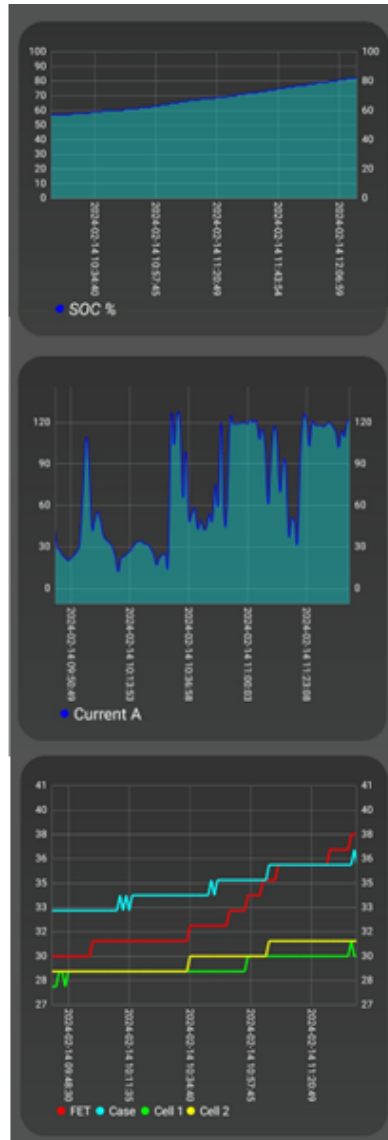
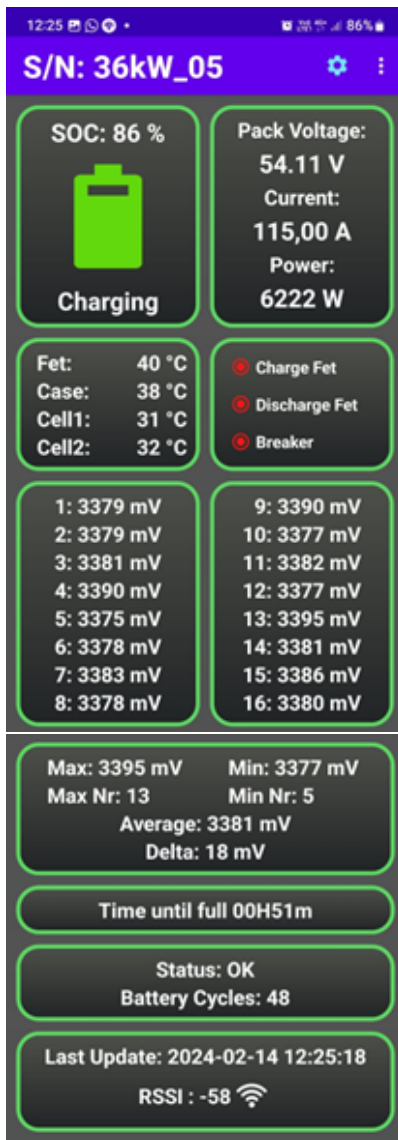
- For electrical work, always follow the National Wiring Standards and Regulations of South Africa.
- Never replace a protective device with a component of a different kind.
- Before switching the energy system on, first check that the input voltage is correct.
- Ensure that the equipment is used in the correct operating conditions.
- Never operate in wet or dusty conditions
- Ensure that there is sufficient free space for ventilation around the installed equipment.
- Install the product in a heat proof environment.
- Ensure that there are no chemicals, plastic pots or curtains in the immediate vicinity of the installation.
- Always ensure that you follow the correct installation video/manual procedures when attempting to install this unit.

**NB: Battery to be installed by qualified Specialized Solar Systems approved installers only.**



## 12 BATTERY MONITORING APP

There is an app specifically for the BMS that allows the user to monitor the status of the battery as well as the battery's performance. Please ask your service provider to supply you with details. Below is an example of a battery being monitored by the app:



### 12.1 How to Connect to the App.

- Download the "ABEL Energy" App from your App Store.
- Open the battery cover where the breaker is.
- On top of the breaker is a white sticker with a code on it (IP address).
- Link your phone wifi to the setup of the battery.
- Choose the wifi network and allow the battery to connect with your password.
- Go to the ABEL Energy App and use the serial number of the battery to add this unit to the app.
- Check that the battery has been added.
- You now have remote viewing rights to the battery.



# STORAGEDOCK

## LV-COM BATTERY RANGE WARRANTY

**AUGUST 2024**

*This warranty update was issued in August 2024 and is applicable to all Storedock LV-Com batteries purchased from Specialized Solar Systems from 1<sup>st</sup> May 2024 onwards.*

Specialized Solar Systems guarantees the performance of the Storedock LV-Com battery with regards to the “condition sets” as defined in this document, and this warranty covers LV-Com stackable battery units of up to six modules connected in parallel and positioned on top of each other with a foot piece at the bottom and a Battery Management Unit (BMU) at the very top, and not more than four stacked units connected in parallel.

Specialized Solar Systems guarantees that the service life of the Storedock LV-Com battery will achieve at least a **10 year** service life or deliver an equivalent in kWh of at least **4 000 charge/discharge cycles** at 80% Depth of Discharge (DoD), whichever event should first occur.

*Note: The life expectancy of the battery cell cycles would be 6000 cycles at 80% DoD.*

The battery is defined as satisfactorily achieving this service duration or duty if it is still able to produce 70% or more of the modules’ stated new capacity in kWh from a complete discharge. The discharge test shall be done at a current equal to or less than 20% of the Ah rating.

The integrated BMU calculates and records the pro rata number of cycles that have been completed by each battery module, where one complete cycle in terms of this warranty is a discharge from 100% State of Charge (SoC) to 20% SoC (which is equivalent to 80% DoD), followed by a charge again to 100% SoC. Discharge deeper than 80% DoD and less than 80% DoD is also counted into to the total number of cycles on a pro rata basis.

It is the responsibility of the installer or designer to ensure that the battery and solar capacities are adequate to achieve an average daily DoD of 80% or less, or to ensure that the inverter reverts to grid consumption at or above 80% DoD (for grid connected systems). This parameter is recorded by the BMU.

### Temperature Conditions

The LV-Com battery should not be kept and/or operated in a location that regularly experiences extended periods of ambient temperatures above 35 degrees Celsius or below zero degrees Celsius. The extreme ambient operating range is -20 to +60 degrees Celsius. In terms of the



warranty, the battery may not be charged below 0°C, although discharge is allowed down to -20°C. The following temperature related operation will void the warranty:

- If the battery records internal temperatures below -20°C.
- If the battery records internal temperatures above 60°C.
- If the BMS records more than an **average** of five hours per day in the 10 year warranty period in the temperature region 45-50°C.
- If the BMS records more than an **average** of one hour per day in the 10 year warranty period in the temperature region 50-60°C.

The LV-Com battery should also be installed indoors away from direct sunlight, precipitation, extreme moisture, and sea spray.

If the battery is installed in a small room with inverters and charge controllers, it may be necessary to install an extraction fan to extract the heat from the inverters and charge controllers. Similarly, if the system is installed in a container, the container must be out of direct sunlight and fitted with insulation cladding and ventilation fans or air conditioners. In hot environments (with ambient temperatures regularly exceeding 30°C) the battery room **must** be fitted with air conditioning to maintain a room temperature in the range **20-25°C**.

*Note: Above temperature restrictions relate to battery longevity and do not pertain to safety concerns. The battery is designed to operate safely up to 60°C.*

Should a LV-Com battery be found unable to produce 70% of its 'as new capacity' in kWh prior to the 10 year service life, or 4 000 cycles being achieved, Specialized Solar Systems undertakes to service the battery to ensure that it thereafter again meets this performance objective. This service may involve changing settings in the BMU profile and or replacement of any number of cells. The capacity of the battery will be confirmed using kWh readings taken from the BMU, which may be corroborated by any suitable inverter. The discharge test shall be conducted at 0,2C from 100% SoC.

## DC Breaker

The LV-Com battery is fitted with a high-performance motorized DC breaker. This breaker may only be closed a maximum of 150 times in the warranty period (this is recorded by the BMU). If this number is exceeded the warranty will exclude any failures in the battery relating to the breaker. The breaker should not be re-closed after a trip without first contacting Specialized Solar Systems or an accredited representative for troubleshooting assistance.

## Validity of Warranty

In the event a battery cannot be repaired on site, this warranty is only valid on return of the product to the manufacture in George.



The warranty shall only be valid if:

- The battery enclosure has not been tampered with.
- The battery was installed by an authorized installer only or approved and commissioned by Specialized Solar Systems.
- The original invoice is presented.

This warranty only covers the battery and the components of the battery.

Damage relating to a lightning strike or other external cause is not covered by the warranty.

No enclosure scratches and/or dents will be covered by this warranty.

The guarantee period begins at the date of the final invoice, which shall include reference to the serial numbers of the battery as depicted on the battery serial plate.

The *"Technical Data Sheet with Installation Instructions"* supplied with each battery will have a registration document on page 1 of the booklet. To ensure registration has been completed, please follow the instructions of this document.

Warranty claims should be addressed to:                      Head of Technical Support

Email:                      [sss@headtek.co.za](mailto:sss@headtek.co.za)

Physical address:        43 Ossie Urban Street  
Tamsui Industria  
George  
Western Cape

Website:                      [www.specializedsolarsystems.co.za](http://www.specializedsolarsystems.co.za)

Warranty thus confirmed:

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DIRECTOR

SPECIALIZED SOLAR SYSTEMS



## SPECIALIZED **SOLAR** SYSTEMS QUALITY CONTROL & SIGN-OFF

|                |                           |                          |  |
|----------------|---------------------------|--------------------------|--|
| PRODUCT NAME:  | <b>STORAGEDOCK LV-COM</b> | ASSEMBLER NAME:          |  |
| SERIAL NUMBER: |                           | QUALITY CONTROLLER NAME: |  |

| CHECKLIST |                                                                                                               |                               |          |
|-----------|---------------------------------------------------------------------------------------------------------------|-------------------------------|----------|
| PASS      | FIT & FINISH                                                                                                  | QUALITY CONTROLLER INSPECTION | COMMENTS |
|           | MAIN ASSEMBLY (Paint Finish, Structure, Rivets)                                                               |                               |          |
|           | BATTERY COMPARTMENT LID                                                                                       |                               |          |
|           | CIRCUIT BREAKER DIN RAIL & SSS COVER                                                                          |                               |          |
|           | LiFePO <sub>4</sub> BATTERY MOUNT SECURE                                                                      |                               |          |
|           | ALIGNMENTS                                                                                                    |                               |          |
| SIGN OFF: |                                                                                                               | DATE:                         |          |
| PASS      | FIT & FINISH                                                                                                  | QUALITY CONTROLLER INSPECTION | COMMENTS |
|           | LiFePO <sub>4</sub> BREAKER, SIZE, TEST                                                                       |                               |          |
|           | LiFePO <sub>4</sub> VOLTAGE SENSING CABLES                                                                    |                               |          |
|           | BMS MAIN ON/OFF                                                                                               |                               |          |
|           | BATTERY MAINS ON/OFF                                                                                          |                               |          |
|           | TORQUE VALUE: <div style="border: 1px solid black; width: 100px; height: 20px; display: inline-block;"></div> |                               |          |
|           | RJ45 CABLE (CAN-bus Colour Coded)                                                                             |                               |          |
|           | FUSE HOLDER - ALIGNMENT LEVEL                                                                                 |                               |          |
| SIGN OFF: |                                                                                                               | DATE:                         |          |
| PASS      | PROGRAMMING & COMMISSIONING<br>Memory Setup & Connectivity                                                    | QUALITY CONTROLLER INSPECTION | COMMENTS |
|           | BREAKER ON/OFF, OC AMP TRIP                                                                                   |                               |          |
|           | BMS ON/OFF                                                                                                    |                               |          |
|           | BMS CONFIG UPLOAD                                                                                             |                               |          |
|           | BMS UPDATE WITH PRODUCT SERIAL NUMBER                                                                         |                               |          |
|           | CELL MONITOR- CELL VOLTAGES: HIGH:.....                                                                       |                               |          |
|           | LOW:.....                                                                                                     |                               |          |
|           | PACK:.....                                                                                                    |                               |          |
|           | CELL TEMPERATURE: A: ..... B: .....                                                                           |                               |          |
| SIGN OFF: |                                                                                                               | DATE:                         |          |



| PASS                        | PERFORMANCE - DISCHARGE & CHARGE           | QUALITY<br>CONTROLLER<br>INSPECTION | COMMENTS |
|-----------------------------|--------------------------------------------|-------------------------------------|----------|
|                             | UPS MORE - AC DISCONNECT (NON ESS/VS)      |                                     |          |
|                             | RESISTIVE LOAD 1700W DISCHARGE TO LVD      |                                     |          |
|                             | DISCHARGE SOC 80%                          |                                     |          |
|                             | RE-CHARGE TO 100% (AC Source 35A)          |                                     |          |
| SIGN OFF:                   |                                            | DATE:                               |          |
| PASS                        | SAFETY & LEGAL                             | QUALITY<br>CONTROLLER<br>INSPECTION | COMMENTS |
|                             | BREAKER TEST                               |                                     |          |
|                             | LABELS - AC, PV DC (if applicable & align) |                                     |          |
|                             | QR CODE                                    |                                     |          |
| SIGN OFF:                   |                                            | DATE:                               |          |
| PASS                        | PACKAGING                                  | QUALITY<br>CONTROLLER<br>INSPECTION | COMMENTS |
|                             | PACKAGING MATERIAL AND MOUNT               |                                     |          |
|                             | SHIPPING LIST                              |                                     |          |
|                             | PRODUCT SPECIFICATION BROCHURE             |                                     |          |
|                             | HANGER BRACKET KIT                         |                                     |          |
|                             | QC LABEL                                   |                                     |          |
|                             | SERIAL NUMBER TAG                          |                                     |          |
| SIGN OFF:                   |                                            | DATE:                               |          |
| FINAL SIGN-OFF AND APPROVAL |                                            |                                     |          |
| NAME OF COMMISSIONER:       |                                            |                                     |          |
| DATE:                       |                                            |                                     |          |
| SIGN OFF:                   |                                            |                                     |          |

**NOTE: PLEASE RETAIN THIS BOOKLET AS PROOF OF YOUR WARRANTY**

