

# USER MANUAL

## AIO-LVTS-512100 LFP Battery





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# 1 Product Overview

AIO-LVTS-512100 is a 51.2V 100Ah stackable LiFePO<sub>4</sub> battery that can be floor mounted.

AIO-LS-5000W is a 5KW off grid hybrid inverter that can be stacked on top of AIO-LVTS-512100 battery.

**Note: AIO-LVTS-512100 & AIO-LS-5000W is not suitable for life-sustaining medical devices.**

## 1.1 Appearance

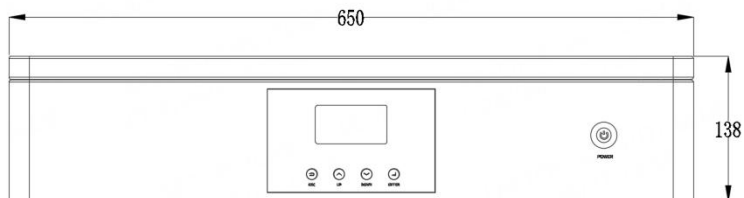
### 1.1.1 AIO-LS-5000W Inverter

Top View



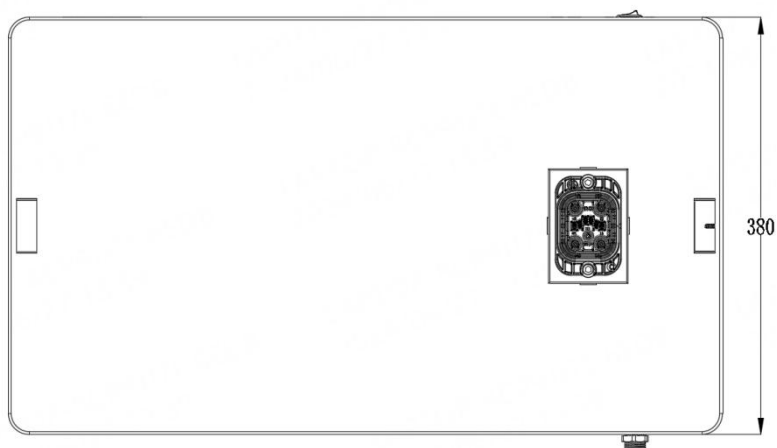


Front View

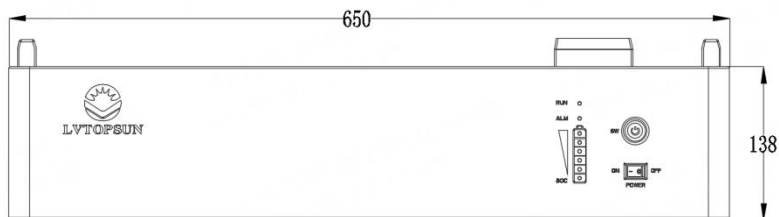


### 1.1.2 AIO-LVTS-512100 Battery

Top View



Front View





## 1.2 Button, LED & Communication Port

### 1.2.1 Switch ON/OFF

#### 1、Switch ON

For single AIO-LVTS-512100, switch ON POWER button, then long press (3 sec) SW button.

For multiple AIO-LVTS-512100 connected in parallel, switch ON POWER buttons of all batteries, then long press (3 sec) SW button of master battery.

#### 2、Switch OFF

Switch OFF all POWER button(s).

### 1.2.2 LED Indicator Definition

Note: Flash 1 - 0.25s ON / 3.75s OFF

Flash 2 - 0.5s ON / 0.5s OFF

Flash 3 - 0.5s ON / 1.5s OFF

#### SOC Status while charging

| STATUS     |        | CHARGE                                                                                 |                                                                                        |                                                                                        |                                                                                        |                                                                                        |                                                                                        |                                                                                        |                                                                                        |
|------------|--------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
|            |        | L8  | L7  | L6  | L5  | L4  | L3  | L2  | L1  |
| SOC<br>(%) | 0~17   | ON                                                                                     | OFF                                                                                    | OFF                                                                                    | OFF                                                                                    | OFF                                                                                    | OFF                                                                                    | OFF                                                                                    | Flash 2                                                                                |
|            | 18~33  |                                                                                        |                                                                                        | OFF                                                                                    | OFF                                                                                    | OFF                                                                                    | OFF                                                                                    | Flash 2                                                                                | ON                                                                                     |
|            | 34~50  |                                                                                        |                                                                                        | OFF                                                                                    | OFF                                                                                    | OFF                                                                                    | Flash 2                                                                                | ON                                                                                     | ON                                                                                     |
|            | 51~66  |                                                                                        |                                                                                        | OFF                                                                                    | OFF                                                                                    | Flash 2                                                                                | ON                                                                                     | ON                                                                                     | ON                                                                                     |
|            | 67~83  |                                                                                        |                                                                                        | OFF                                                                                    | Flash 2                                                                                | ON                                                                                     | ON                                                                                     | ON                                                                                     | ON                                                                                     |
|            | 84~100 |                                                                                        |                                                                                        | Flash 2                                                                                | ON                                                                                     | ON                                                                                     | ON                                                                                     | ON                                                                                     | ON                                                                                     |

**SOC Status while discharging**

| STATUS  |        | DISCHARGE                               |                                       |                                         |                                         |                                         |                                         |                                         |                                         |
|---------|--------|-----------------------------------------|---------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|
|         |        | L8 <span style="color: green;">●</span> | L7 <span style="color: red;">●</span> | L6 <span style="color: green;">●</span> | L5 <span style="color: green;">●</span> | L4 <span style="color: green;">●</span> | L3 <span style="color: green;">●</span> | L2 <span style="color: green;">●</span> | L1 <span style="color: green;">●</span> |
| SOC (%) | 0~17   | Flash 3                                 | OFF                                   | OFF                                     | OFF                                     | OFF                                     | OFF                                     | OFF                                     | ON                                      |
|         | 18~33  |                                         |                                       | OFF                                     | OFF                                     | OFF                                     | OFF                                     | ON                                      | ON                                      |
|         | 34~50  |                                         |                                       | OFF                                     | OFF                                     | OFF                                     | ON                                      | ON                                      | ON                                      |
|         | 51~66  |                                         |                                       | OFF                                     | OFF                                     | ON                                      | ON                                      | ON                                      | ON                                      |
|         | 67~83  |                                         |                                       | OFF                                     | ON                                      | ON                                      | ON                                      | ON                                      | ON                                      |
|         | 84~100 |                                         |                                       | ON                                      | ON                                      | ON                                      | ON                                      | ON                                      | ON                                      |

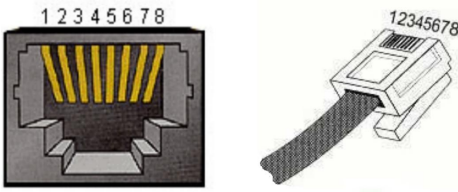
**Work Status**

| STATUS    |            | RUN                                     | ALM                                   | SOC                                     |                                         |                                         |                                         |                                         |                                         | DESCRIPTION                   |
|-----------|------------|-----------------------------------------|---------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-------------------------------|
|           |            | L8 <span style="color: green;">●</span> | L7 <span style="color: red;">●</span> | L6 <span style="color: green;">●</span> | L5 <span style="color: green;">●</span> | L4 <span style="color: green;">●</span> | L3 <span style="color: green;">●</span> | L2 <span style="color: green;">●</span> | L1 <span style="color: green;">●</span> |                               |
| Shutdown  |            | OFF                                     | OFF                                   | OFF                                     | OFF                                     | OFF                                     | OFF                                     | OFF                                     | OFF                                     |                               |
| Standby   |            | Flash 1                                 | OFF                                   | According to SOC                        |                                         |                                         |                                         |                                         |                                         |                               |
| Charge    | Normal     | ON                                      | OFF                                   | According to SOC                        |                                         |                                         |                                         |                                         |                                         |                               |
|           | Over volt  | ON                                      | OFF                                   | ON                                      | ON                                      | ON                                      | ON                                      | ON                                      | ON                                      | Switch to standby mode        |
|           | Protection | OFF                                     | ON                                    | OFF                                     | OFF                                     | OFF                                     | OFF                                     | OFF                                     | OFF                                     | Stop charging                 |
| Discharge | Normal     | Flash 3                                 | OFF                                   | According to SOC                        |                                         |                                         |                                         |                                         |                                         |                               |
|           | Under volt | OFF                                     | OFF                                   | OFF                                     | OFF                                     | OFF                                     | OFF                                     | OFF                                     | OFF                                     | Stop discharging              |
|           | Protection | OFF                                     | ON                                    | OFF                                     | OFF                                     | OFF                                     | OFF                                     | OFF                                     | OFF                                     | Stop discharging              |
| Faulty    |            | OFF                                     | ON                                    | OFF                                     | OFF                                     | OFF                                     | OFF                                     | OFF                                     | OFF                                     | Stop charging and discharging |

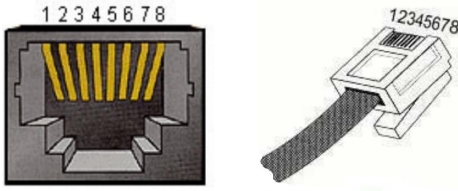


### 1.2.3 Communication Port Pin Definition

#### 1.2.3.1 CAN/RS485 to PCS

| Port definitions                                                                  | RJ45 Pin | Function |
|-----------------------------------------------------------------------------------|----------|----------|
|  | 1        | RS485-B  |
|                                                                                   | 2        | RS485-A  |
|                                                                                   | 3        | GND      |
|                                                                                   | 4        | CAN-H    |
|                                                                                   | 5        | CAN-L    |
|                                                                                   | 6        | NC       |
|                                                                                   | 7        | RS485-A  |
|                                                                                   | 8        | RS485-B  |

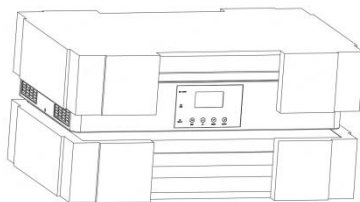
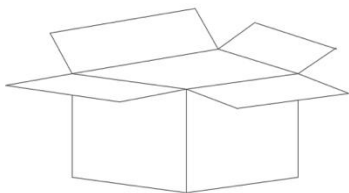
#### 1.2.3.2 RS232 to PC

| Port definitions                                                                    | RJ45 Pin | Function |
|-------------------------------------------------------------------------------------|----------|----------|
|  | 1        | RS232-TX |
|                                                                                     | 2        | GND      |
|                                                                                     | 3        | RS232-RX |
|                                                                                     | 4        | NC       |
|                                                                                     | 5        | NC       |
|                                                                                     | 6        | NC       |
|                                                                                     | 7        | NC       |
|                                                                                     | 8        | NC       |

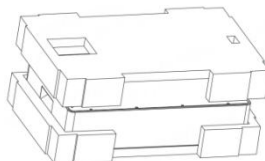
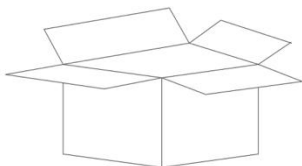


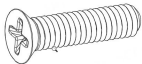
## 2 Installation Guide

### 2.1 Checking Deliverables

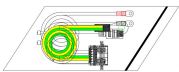


| NO. | Pictures | Quantity | Description              |
|-----|----------|----------|--------------------------|
| 1   |          | 1 pc     | AIO-LS-5000W<br>Inverter |
| 2   |          | 1 pc     | Base                     |
| 3   |          | 2 pcs    | bolt                     |
| 4   |          | 1 pc     | User Manual              |



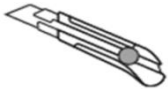
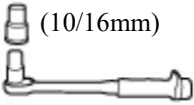
| NO. | Pictures                                                                          | Quantity | Description                |
|-----|-----------------------------------------------------------------------------------|----------|----------------------------|
| 1   |  | 1 pc     | AIO-LVTS-512100<br>Battery |
| 2   |  | 2 pcs    | bolt                       |

#### Optional Cable Kit

| NO. | Pictures                                                                            | Quantity | Description |
|-----|-------------------------------------------------------------------------------------|----------|-------------|
| 1   |  | 1 pair   | Power cable |
| 2   |  | 1 pc     | Cable Cover |



## 2.2 Tools

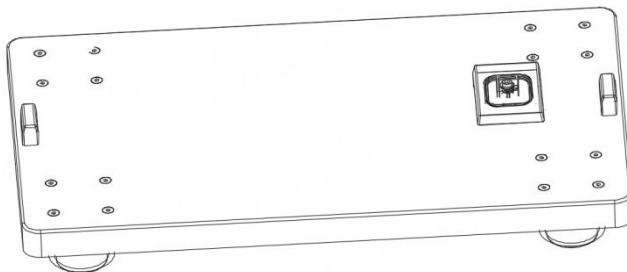
|                               |                                                                                                        |                                                                                                               |                                                                                                                         |
|-------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Installation<br/>Tools</b> | <b>Knife</b><br>      | <b>Measuring Tape</b><br>    | <b>Socket Wrench<br/>(10/16mm)</b><br> |
|                               | <b>Hammer</b><br>     | <b>Cross Screwdriver</b><br> | <b>Hammer Drill</b><br>                |
| <b>Protection<br/>Tools</b>   | <b>ESD Gloves</b><br> | <b>Safety Goggles</b><br>    | <b>Safety Shoes</b><br>                |

## 2.3 Installation Instruction

### 2.3.1 Installation Step

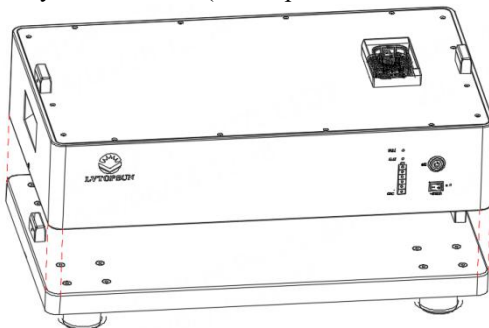
#### Step 1

Place the base on the ground

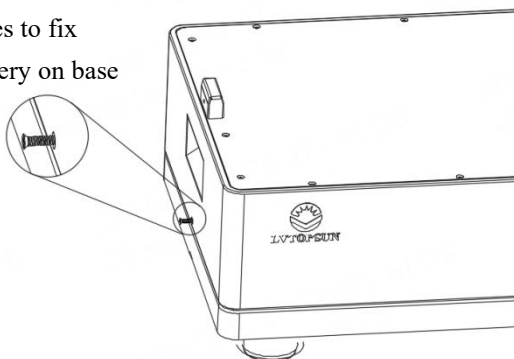


**Step 2**

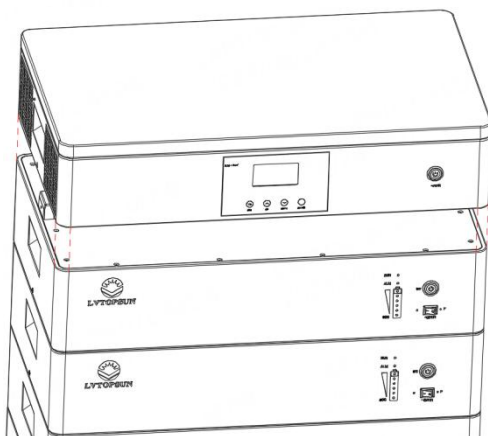
Fit AIO-LVTS-512100 battery on the base (max 5pcs AIO-LVTS-512100 Battery per stack)

**Step 3**

Install bolts on both sides to fix AIO-LVTS-512100 battery on base

**Step 4**

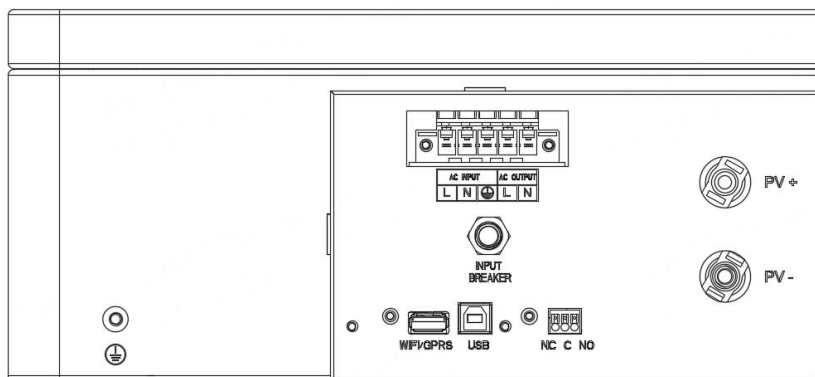
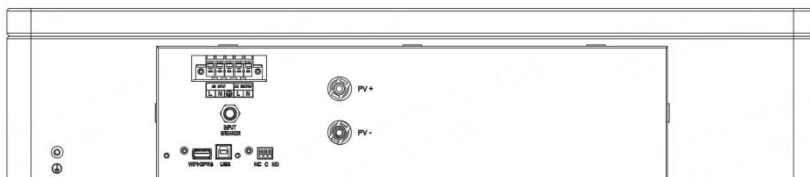
After installing all AIO-LVTS-512100 batteries, fit AIO-LS-5000W inverter on top of battery.





## Step 5

Connect PE, PV & AC cable.





### 3 Technical Specifications

| Basic Project           |                                | Parameter                                    |
|-------------------------|--------------------------------|----------------------------------------------|
| Nominal Voltage         |                                | 51.2V                                        |
| Nominal Capacity        |                                | 100Ah                                        |
| Nominal Energy          |                                | 5120Wh                                       |
| Charge Voltage          |                                | 56.16V                                       |
| Charge Current          |                                | 50A                                          |
| Discharge Voltage Range |                                | 45.6V~56.16V                                 |
| Discharge Current       |                                | 100A                                         |
| Communication Mode      |                                | CAN/RS485                                    |
| Working Temperature     | Charge                         | 0℃~55℃                                       |
|                         | Discharge                      | -20℃~55℃                                     |
| Storage Temperature     | Short Term<br>(within 1 month) | -10℃~45℃                                     |
|                         | Long Term<br>(within 1 year)   | 0℃~35℃                                       |
| Storage Humidity        |                                | <95% RH                                      |
| Cell Type               |                                | LiFePO <sub>4</sub> , Lithium Iron Phosphate |
| Size                    |                                | H380*W650*D138(mm)                           |
| Weight                  |                                | 44.8KG                                       |
| IP Level                |                                | IP20                                         |



## 4 Maintenance

### 4.1 Recharge Requirements During Storage

Batteries should be stored in temperature between  $-10^{\circ}\text{C} \sim +45^{\circ}\text{C}$ , and recharged regularly according to the following table with 0.2C (20A) current to 50% SOC after long time storage.

**Recharge requirement during storage**

| Storage Temperature          | Storage Relative Humidity | Storage Time     | SOC                            |
|------------------------------|---------------------------|------------------|--------------------------------|
| Below $-10^{\circ}\text{C}$  | /                         | Not Allowed      | /                              |
| $-10\sim 25^{\circ}\text{C}$ | 5%~70%                    | $\leq 12$ months | $30\%\leq \text{SOC}\leq 60\%$ |
| $25\sim 35^{\circ}\text{C}$  | 5%~70%                    | $\leq 6$ months  | $30\%\leq \text{SOC}\leq 60\%$ |
| $35\sim 45^{\circ}\text{C}$  | 5%~70%                    | $\leq 3$ months  | $30\%\leq \text{SOC}\leq 60\%$ |
| Above $45^{\circ}\text{C}$   | /                         | Not Allowed      | /                              |

### 4.2 Recharge Requirements When Over Discharged

Please recharge over discharged ( $>90\%$  DOD) batteries according to the following table, otherwise over discharged battery will be damaged.

**Recharge requirement when battery is over discharged**

| Storage Temperature          | Storage Time   | Note                          |
|------------------------------|----------------|-------------------------------|
| $-10\sim 25^{\circ}\text{C}$ | $\leq 15$ days | Battery disconnected from PCS |
| $25\sim 45^{\circ}\text{C}$  | $\leq 7$ days  |                               |
| $-10\sim 45^{\circ}\text{C}$ | $< 12$ hours   | Battery connected to PCS      |