



## Product Specification

Product Name : Power Lite

Product Model : L051100-A


Date : 30/12/2019

PBA		Client	
Drafted	Approved	Confirmed	Approved

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SASU PERMA BATTERIES

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	Product Name	Product Number	L051100-A
	Power Lite	Effective Date	2019-12-30
		Version	V1.0

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## 1. Scope

This document is a specification, as an input file for the design and development of the pack, and as a standard for acceptance of battery system products.


## 2. Terminology and Basis for Writing

### 2.1 Definition of Terms

Battery Cell	The smallest energy storage unit, a basic electrochemical energy storage device, consisting of a positive electrode, a negative electrode, an electrolyte, a separator, and a casing, also called a cell.
Battery Module	Intermediate energy storage unit, a combination of several single-unit and circuit devices (monitoring and protection circuits, electrical and communication interfaces), also called modules, placed in a mechanical electrical unit.
Battery System	A power supply system consisting of a number of battery modules, circuit equipment (protection circuits, cell management systems, electrical and communication interfaces), and thermal management devices for powering electrical devices.
Nominal Voltage	Indicates or identifies an appropriate voltage approximation for the cell.
Capacity	The amount of electricity that can be supplied by a fully charged battery under specified conditions. Usually expressed in Ah.
Energy Capacity	The energy that can be supplied by a fully charged cell under specified conditions. Usually expressed in Wh or kWh.
Nominal Capacity	At the beginning of life (BOL), the minimum capacity that can be provided by a fully charged cell at a rate of 1 C (C-rate).
Unit	"V" (Volt) Volt (V), voltage unit "A" (Ampere) Ampere (A), current unit "Ah" (Ampere-Hour) Ampere-hour (Ah), charge unit "Wh" (Watt-Hour) Watt-hour (Wh), unit of electrical energy "Ω" (Ohm) ohm (Ω), resistance unit °C (degree Celsius) Celsius (°C), temperature unit "mm" (millimeter) mm (mm), length unit "s" (second) seconds (s), time unit "kg" (kilogram) kilograms (kg), weight unit "Hz" (Hertz) Hertz (Hz), frequency unit

### 2.2 Abbreviations

PB	PERMA BATTERIES
BMS	Battery Management System
BMU	Battery Management Unit
BOL	Begin of Life


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Bus-bar	Battery pole connecting rod
CAN	Controller Area Network
C-CAN	BMU and CMC communication CAN
CMC	Cell Manager Circuit
EOL	End of Life
HV	High Voltage
LV	Low Voltage
OCV	Open Circuit Voltage
SOC	State of Charge

### 3. Battery System Technical Parameters

The key parameters of the L051100-A battery system are as follows:

Serial Number	Key Item	Specification	Remarks
3.1	Battery Model	L051100-A Battery	Lithium iron phosphate
3.2	Module Model	M026100-A 1P8S Module	2 modules in series
3.3	Nominal Capacity	100Ah	
3.4	Nominal Voltage	51.2V	Single cell voltage 3.2v
3.5	Operating Voltage Range	44.8V~57.6V	
3.6	Rated Energy	5.12kWh	
3.7	Available SOC Range	0% ~ 100%	
3.8	SOC Transportation Range	40%	
3.9	Operating Temperature	Charging Temperature: 0 ° C ~ 55 ° C; Discharge Temperature: -20 ° C ~ 55 ° C	Detailed use conditions need to refer to the charge and discharge window
3.10	Storage Temperature	-20°C ~ 50 °C	Longer than three months 25 ° C storage
3.11	Working Humidity	20~80%RH	
3.12	Standard Charging Current	0.5C (50A)	
3.13	Maximum Charging Continuous Current	0.5C (50A)	
3.14	Standard Discharge	0.5C (50A)	

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	Current		
3.15	Maximum Discharge Continuous Current	1C (100A)	1C 25°C ± 2°C
3.16	Maximum Discharge Pulse Current	2C (200A)	Duration 30S, 25°C±2°C , SOC ≥ 40%
3.17	Cell Voltage Difference	≤20mV	60 min after standing and stopped after charging and discharging
3.18	Weight	About 43Kg	Actual weight requires weighing confirmation
3.19	Dimensions	Length: 440 (±5) Width: 530 (±5) Height: 132 (±5)	Air switch, MSD and other exteriors not included


#### 4. Battery System Structure

##### 4.1 Dimensions and External Surface Requirements

The appearance of the Power Lite battery system is shown below. The battery system consists of 16pcs of 100Ah cells connected in serial.



Figure 1. Schematic Diagram of the Power Lite Battery System

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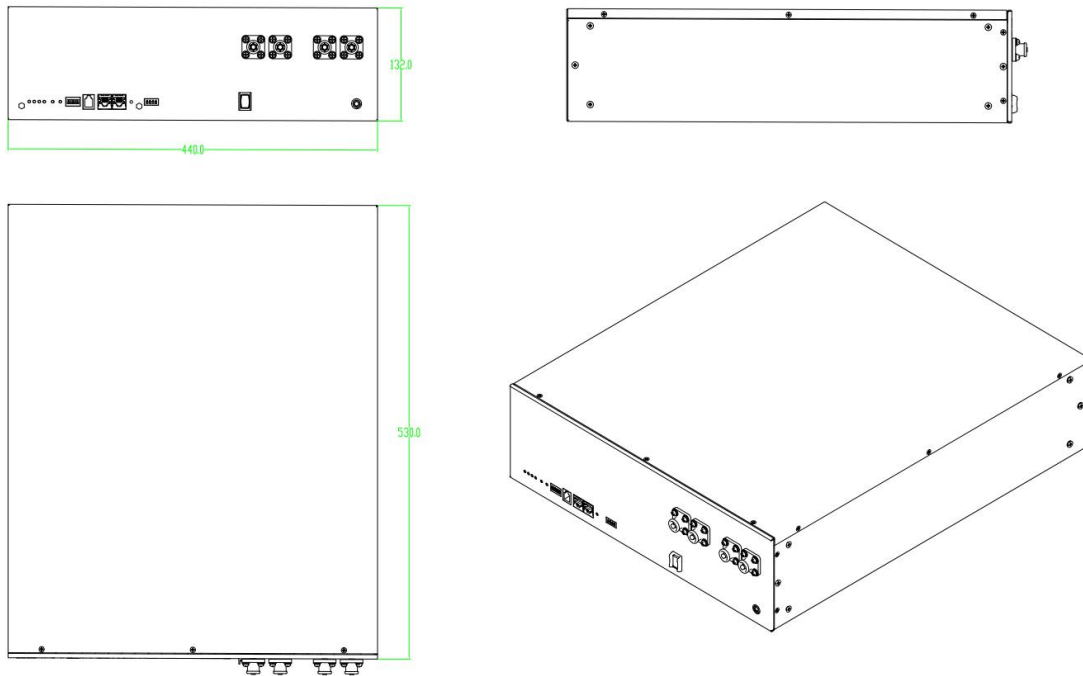


Figure 2, Power Lite Battery System Size Chart

Appearance requirements: The appearance of the assembly has no obvious processing or bumping flaws, no crack on the surface, and no burrs on the weld.

#### 4.2 Electrical Schematic

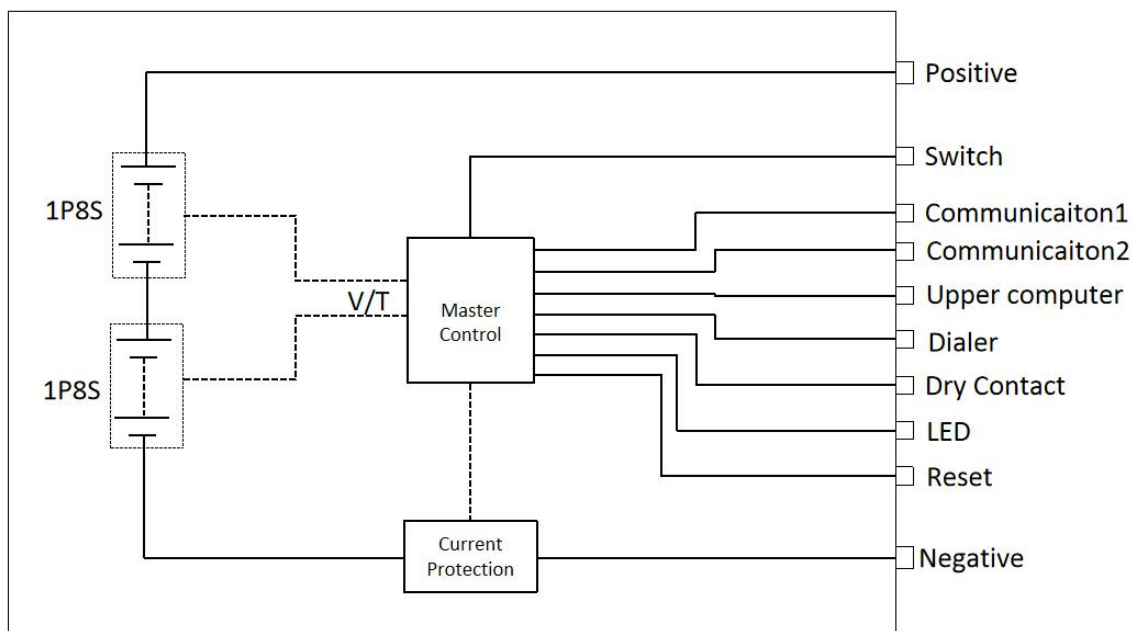

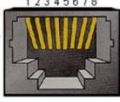
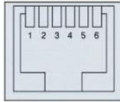


Figure 3, Electrical Schematic

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#### 4.3 Battery System Panel Connector

Interface	Connector Socket Model	Connector Plug Type	Definition	Remarks														
Positive 1	PSR6XBB	PSRP6XB25	Orange 5.7	25mm <sup>2</sup> , IP67, Busbar														
Positive 2	PSR6XBB	PSRP6XB25	Orange 5.7	25mm <sup>2</sup> , IP67, Busbar														
Negative 1	PSR6XAB	PSRP6XA25	Black 5.7	25mm <sup>2</sup> , IP67, Busbar														
Negative 2	PSR6XAB	PSRP6XA25	Black 5.7	25mm <sup>2</sup> , IP67, Busbar														
Communication Port x2	RJ45 	Pin 1: CAN-H Pin 2: RS485-A Pin 3: RS485-B Pin 4: NC Pin 5: CAN-L Pin 6: RS485-B Pin 7: RS485-A Pin 8: GND	CAN/RS485	<table border="0"> <tr> <td><b>CAN</b></td> <td><b>RS485</b></td> </tr> <tr> <td>Pin 1: CAN-H</td> <td>Pin 2: RS485-A</td> </tr> <tr> <td>Pin 5: CAN-L</td> <td>Pin 3: RS485-B</td> </tr> <tr> <td>Pin 2,3,4,6,7:NC</td> <td>Pin 1,4,5: NC</td> </tr> <tr> <td>Pin 8: GND</td> <td>Pin 6: RS485-B</td> </tr> <tr> <td></td> <td>Pin 7: RS485-A</td> </tr> <tr> <td></td> <td>Pin 8: GND</td> </tr> </table>	<b>CAN</b>	<b>RS485</b>	Pin 1: CAN-H	Pin 2: RS485-A	Pin 5: CAN-L	Pin 3: RS485-B	Pin 2,3,4,6,7:NC	Pin 1,4,5: NC	Pin 8: GND	Pin 6: RS485-B		Pin 7: RS485-A		Pin 8: GND
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	Pin 7: RS485-A																	
	Pin 8: GND																	
Upper Machine Communication	RJ11  RS232	Pin 1,2,6: NC Pin 3: BMS Transmit; Computer Receiver Pin 4: BMS receiver; Computer transmit Pin 6: GND	RS232															

#### 5. Standard Test Environment

Unless otherwise stated, all tests in this specification are performed under the following environmental conditions:

Temperature: 25±3°C

Humidity: 65±20% RH

#### 6. Transportation and Storage


##### 6.1 Transportation

During transportation, it should be protected from severe vibration, shock, sun and rain, and should not be inverted to ensure that short circuits will not occur. During the loading and unloading process, it should be handled gently to prevent falling, rolling, heavy pressure and inverted.

##### 6.2 Storage

Product storage requirements are as follows:

- When the battery system is stored, it should be stored in a state of charge of 60%;
- Battery system products should be stored in a dry and ventilated environment, the temperature is not higher than 50 ° C, the relative humidity is less than 80%, while away from flammable and explosive materials, avoid dust and metal powder, and avoid acid or other corrosion. Sexual gas contact;

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- The storage location of the battery system products should be protected from rain, moisture and sun.

## 7. Main Issues and Statements

### 7.1 Precautions

This product must comply with the operating instructions, and any installation, maintenance and use of this product must strictly comply with the relevant safety regulations.

- Do not store or use at high temperatures, and must be kept away from heat. These environments above the safe temperature range can cause significant degradation in the performance and life of the product, and even cause serious consequences such as burning and explosion;

- Storage and use in environments with high static or high electromagnetic radiation is prohibited.

Otherwise, the electronic components in this product may be damaged, which may cause safety hazards;

- Do not get wet or even soak in water. Otherwise, it may cause internal short circuit, loss of function or abnormal chemical reaction of the product, and cause fire, smoke, explosion and other accidents;

- If you find any abnormalities in smoking, fever, discoloration or deformation, or in use, storage, transportation and service, you should contact the professional department immediately to further observe and control the risks;

- Do not discard discarded products in fire or in hot furnaces. Waste batteries should be recycled and recycled by professional agencies or organizations;

- The installation and maintenance of the battery system must be performed by professional technicians.

The use must strictly comply with the relevant safety regulations. Non-professionals are strictly prohibited from installing, repairing, and over-discriminating battery systems.

### 7.2 Declaration

The right to interpret this specification belongs to PERMA BATTERIES SAS