Power Lite
L051100-A1 Lithium Battery System User Manual

Ver 1.3

For the latest Power Lite installation documents in all supported languages, visit: www.uzenergy.com.

Warning: Read this entire document before installing or using Power Lite batteries. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or can damage the Power Lite batteries or attached power conversion systems, potentially rendering them inoperable.

PRODUCT SPECIFICATIONS

All specifications and descriptions contained in this document are verified to be accurate at the time of printing. However, because continuous improvement is a goal at UZ ENERGY, we reserve the right to make product modifications at any time.

The images provided in this document are for demonstration purposes only. Depending on product version and market region, details may appear slightly different.

ERRORS OR OMISSIONS

To communicate any inaccuracies or omissions in this manual, please send an email to: wangyx@uzenergy.com

ELECTRONIC DEVICE: DO NOT THROW AWAY

Proper disposal of batteries is required. Refer to your local regulations for disposal requirements.

MADE IN CHINA

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE IMPORTANT SAFETY INSTRUCTIONS

This manual contains important instructions for the Power Lite batteries that must be followed during installation and maintenance of the system.

Power Lite installation and service require knowledge of high voltage electricity and should only be performed by UZ ENERGY Certified Installers. UZ ENERGY assumes no liability for injury or property damage due to repairs attempted by unqualified individuals or a failure to properly follow these instructions. These warning and cautions must be followed when using Power Lite.

Symbols Used

These symbols indicate important safety information in this manual or on the equipment:

 WARNING: Indicates a hazardous situation which, if not avoided, could result in injury or death.

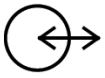
 CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor injury or damage to the equipment.

NOTE: indicates an important step or tip that leads to best results but is not safety-related or damaging.

 REFER TO OPERATING INSTRUCTIONS: Indicates that user should refer to operating or installation instructions before proceeding.

 RISK OF ELECTRIC SHOCK: Indicates components that present risk of electrical shock.

CAUTION, RISK OF ELECTRIC SHOCK, ENERGY STORAGE TIMED DISCHARGE: Discharge time is 5 minutes from de-energization.

 BIDIRECTIONAL TERMINAL: Indicates location of combined input/output connector on the equipment.

 PROTECTIVE CONDUCTOR TERMINAL: Indicates location of grounding connection on the equipment.

General Information

WARNING: Reading this entire document before installing or using Power Lite. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death or can damage Power Lite, potentially rendering it inoperable.

WARNING: A battery can present a risk of electrical shock, fire, or explosion from vented gases. Observe proper precautions.

WARNING: Power Lite installation must be carried out only by UZ ENERGY Certified Installers who have been trained properly.

WARNING: Power Lite is heavy. Use of Lift equipment is recommended.

WARNING: Use Power Lite only as directed.

WARNING: Do not use Power Lite if it is defective, appears cracked, broken, or otherwise damaged, or fails to operate.

WARNING: Before beginning the wiring portion of the installation, ensure that the Power Lite battery is switched off, and open any associated circuit breakers and disconnect switches (if applicable for the installation).

WARNING: Do not attempt to open, disassemble, repair, tamper with, or modify Power Lite. Power Lite and its components are not user serviceable. Battery cells in Power Lite are replaceable. Contact the UZ ENERGY Certified Installer who installed the system for any repairs.

WARNING: To protect Power Lite and its components from damage when transporting, handle with care. Do not impact, pull, drag, or step on Power Lite. Do not subject Power Lite to any strong force. To help Prevent damage, leave the Power Lite battery in its shipping packaging until it is ready to be installed.

WARNING: Do not insert foreign objects into any part of Power Lite.

WARNING: Do not expose Power Lite or its components to direct flame.

WARNING: Do not install Power Lite near heating equipment.

WARNING: Do not immerse Power Lite or its components in water or other fluids.

CAUTION: Do not use solvents to clean Power Lite or expose Power Lite to flammable or harsh chemicals or vapors.

CAUTION: Do not use fluids, parts or accessories other than those specified in this manual including use of non-genuine UZ ENERGY parts or accessories, or parts or accessories not purchased directly from UZ ENERGY or a UZ ENERGY-certified party.

CAUTION: Do not place Power Lite in a storage condition for more than one (1) month, without placing Power Lite into a storage condition in accordance with UZ ENERGY's storage specifications.

⚠ CAUTION: Do not paint any part of Power Lite, including any internal or external components such as the exterior shell or casing.

⚠ CAUTION: Do not connect Power Lite directly to photovoltaic (PV) solar wiring.

⚠ CAUTION: When installing Power Lite in a garage or near vehicles, keep it out of the driving path. If possible, install Power Lite on a side wall and/or above the height of vehicle bumpers.

Environmental Conditions

⚠ WARNING: Install Power Lite in a location that prevents damage from flooding.

⚠ WARNING: Operating or storing Power Lite in temperatures outside its specified range might cause damage to Power Lite.

⚠ WARNING: Do not expose Power Lite to ambient temperature above 40 °C or below -20 °C.

⚠ CAUTION: Ensure that no water sources are above or near Power Lite, including downspouts, sprinklers, or faucets.

⚠ CAUTION: Ensure that snow does not accumulate around Power Lite.

Revision History:

Date	Revision	Description	Owner
2021-12-10	V1.0	Initial Release	TangXX
2022-02-16	V1.1	Update storage note.	TangXX
2022-11-16	V1.3	Minor changes	AlarioA

CONTENT

1. Introduction

Thank you for choosing a UZ Energy energy storage system.
The energy storage module is comprised of lithium-ion rechargeable battery cells with a total of 5.12 kWh capacity, and the controller enables a control of multiple modules.
This manual provides information regarding safety precautions to prevent possible accidents and how to use the product.
Please read this manual carefully before use for safety and keep this manual handy for reference.

1.1. Main Features

Some main features of this product are:

- Long Life Span

The battery can be expected to remain serviceable for more than 10 years, considering that it is charged and discharged once in a day at room temperature (25 ℃).

- Long Life Span

Olivine-type lithium iron phosphate batteries with excellent thermal stability and storage characteristics are used in this product. The module also incorporates a self-monitoring function for the detection of any abnormalities in energy storage.

- Compact Design

The height is designed in 3U for 19-inch rack systems, in favor of standard industrial applications.

- High Capability

Multiple energy storage modules can be connected in parallel, and the capacity can be customized according to the intended use.

1.2. Safety Precautions

UZ Energy products are designed with full consideration of safety. However, all electrical appliances can be dangerous if used inappropriately. This can cause a fire or electric shock that leads to severe injury or death. For your protection, please read these safety precautions thoroughly.

Definitions of Symbols:

Below are symbols used in this manual and on the unit.
Please read through the following definitions before installing.

	Warning	If you ignore these instructions, it can lead to a fire or electric shock causing serious injury or death.

	Caution	If you ignore these instructions, it can lead to electric shock or other accidents causing injury or harm to nearby products.

Warning

If you do not follow the instructions below, it can lead to a fire or electric shock causing serious injury or death.

Instruction

Use only designated cables. A non-designated cable use can cause electric shock. Be sure to use the cables designated in this manual.

Prohibited

Do not damage cables. If you damage a cable, it can cause a fire or electric shock.

1. Do not modify or damage a cable.
2. Do not place heavy objects on a cable or pull the cable.
3. Do not place a heater near the cable, which may result in the cable overheating.
4. Do not tuck down a cable when installing in a rack.
5. When you unplug a communication cable, be sure to hold the plug and pull it.

Instruction

Connect a power cable and communication cable properly.

1. If you connect a power cable improperly, contact resistance will increase and it may damage the parts or cause a fire.
2. Insert the connector of the communication cable all the way in. If it is connected improperly, the system may be deactivated.

Prohibited

Do not install in a tight closed area. If the module is installed in a closed area with no air-conditioning, heat may build up inside the module and cause a fire.

Prohibited

Do not place in direct sunlight or near a heater. Doing so can cause deformation, a breakdown, or a fire. Pay extra attention when you place the unit near windows.

Prohibited

Do not install the unit where the air is contaminated with excessive oil smoke, steam, moisture, or dust. If the unit is installed in such a place, it may cause a fire or electric shock.

Instruction

Wear insulating gloves and protection glasses during installation and connection of the set to prevent electric shock or other injuries.

Keep Dry

1. Do not allow water and/or foreign objects inside the module
2. Water or foreign objects inside the module can cause a fire or electric shock.
3. Should this occur, however, turn off the “POWER ON/OFF” switch on the controller to shut down, and remove the power connector from the POWER CONNECTOR terminal of the module.

Do not disassemble

Do not open the set unnecessarily. Opening and modifying the unit can cause a fire or electric shock.

Caution

If you ignore any of the following instructions, it can cause injury or damage to nearby items.

Prohibited

Do not cover the vent. If the vent is covered, heat may build up inside the module and cause a fire.

1. Do not put the unit in a poorly ventilated and narrow space.
2. Remove any dust buildup in the vent.
3. Do not place the set upside down or sideways.
4. Do not place on a shag carpet or bed.
5. Do not cover the vent with a cloth, etc.

Instruction

Install in a stable place.

1. If you install the unit in an unstable place, such as an unstable rack, it may fall and cause injury.
2. Do not install upside down or sideways. The set may drop and cause injury.

Instruction

Use the designated packaging materials for transportation. If you do not use the designated packaging materials, the packaging material may be damaged by vibration during transportation, and it may cause injury.

Instruction

Install based on the designated way of installation. If you do not follow the designated way of installation, the set may drop due to an insufficiently stable mounting method and can cause injury.

Instruction

If using a rack, fix it to the floor. If a rack falls by the weight of the batteries, it may cause serious injury or death.

Keep Dry

Do not touch with wet hands If you touch the unit with wet hands, it may cause electric shock.

Instruction

Install other equipment or accessories properly. If you inadequately install other equipment or accessories sold separately, they may fall and cause injury. When you install any of the following accessories, install it properly based on this manual.

Instruction

Route cables properly. If your foot is caught by a cable, the unit may fall and cause injury. Connect and install cables carefully.

Instruction

Power off at a malfunction. If any malfunction happens, please turn off the power switch to shut down the battery and remove the power connectors from their terminals.

Prohibited

Do not put anything on, stand or sit on the unit. If you put anything on the unit, it may fall and cause injury. Also, if it is used as a stool, for example, it may topple or crush and cause injury.

Instruction

Follow related laws or ordinances for disposal. When you dispose of this product, do not dispose as general or household waste.

Instruction

Disposal with specified method. Contact technical vendor when you discard. Do not disassemble, destroy, or dispose of in fire.

Danger

If liquid is leaking from the module, observe the following measures.

Do not allow the liquid to come in contact with skin or clothing.

- If liquid comes in contact with skin or clothing, wash thoroughly with plenty of water.
- If liquid gets into the eyes or mouth, flush immediately with clean water, and immediately seek medical treatment.
- Contact customer service.

1.3. Precautions for Use

In the case of a failure, or any of the abnormalities shown below, turn off the Unit and contact UZ Energy customer services.

1. Abnormal sound, smell or smoke.
2. Water or particles inside the product.
3. The product is dropped, or the cabinet is damaged.

- Charge and discharge the product according to the control signals of the controller.
- Replace the module with a new one if discharge time at room temperature is noticeably short, even from fully charged.

DO NOT:

- Disassemble.
- Modify the product (modification may destroy the protection functions inside, or cause abnormal charge / discharge, heat generation, gas eruption, or fire).
- Touch the power output terminals except for installation.
- Throw the product into fire or heat, or otherwise expose the unit to heat or open flames.
- Submerge the product in liquid or allow it to become wet.
- Apply strong shock, crush, or drop.
- Use for medical purposes.
- Place any foreign objects inside.
- Connect any devices that exceed the operating voltage or current range.
- Unplug the power connector from terminal while power is on.
- Do not hammer a nail or punch a hole in the product.

2. Specification and Functions

2.1. System Introduction

The Power Lite L051100-A1 Energy Storage System is consists of 2 sets of 1P8S battery modules manufactured by UZ Energy. In each battery module there are 8 pcs. of 100 Ah LFP (lithium iron phosphate) cells originating from CATL. The system also provides standard communication ports, i.e. CAN and RS485, to monitor the working status and communicate with the upper machine as well as the connected Power Conversion System (PCS). The system schematic drawing is presented in Figure 1.

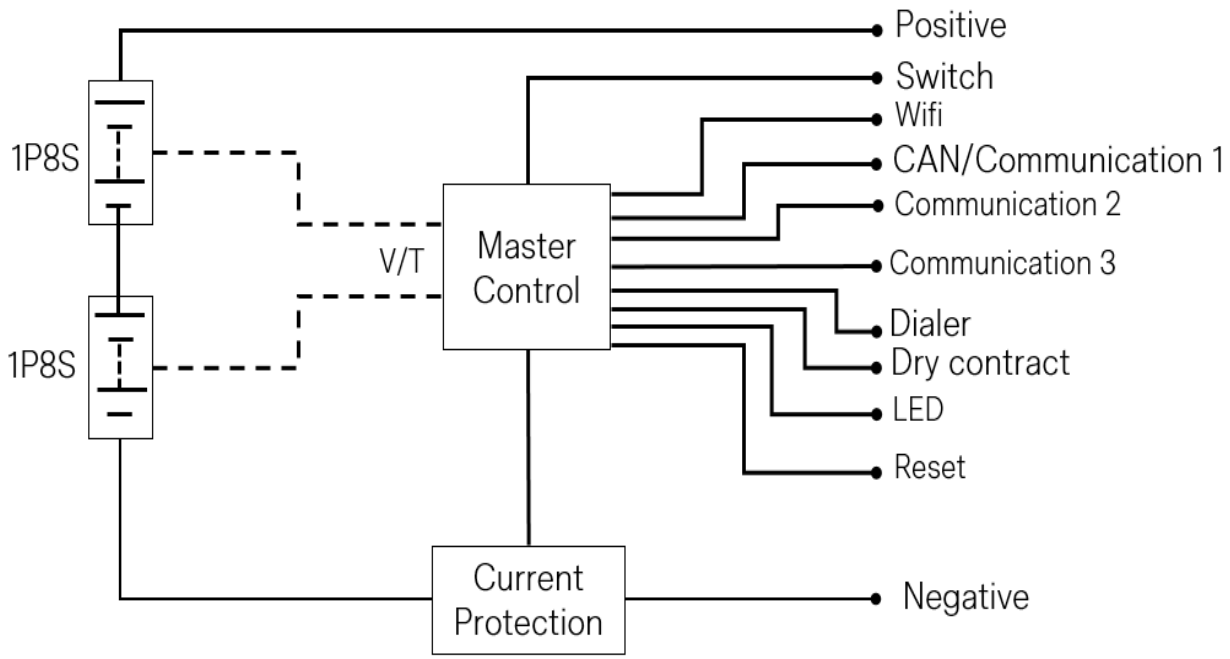


Figure 1 - System Schematics

2.2. Dimensions

L051100-A1 dimensions are presented in Figure 2. It is designed for 19-inch cabinets.

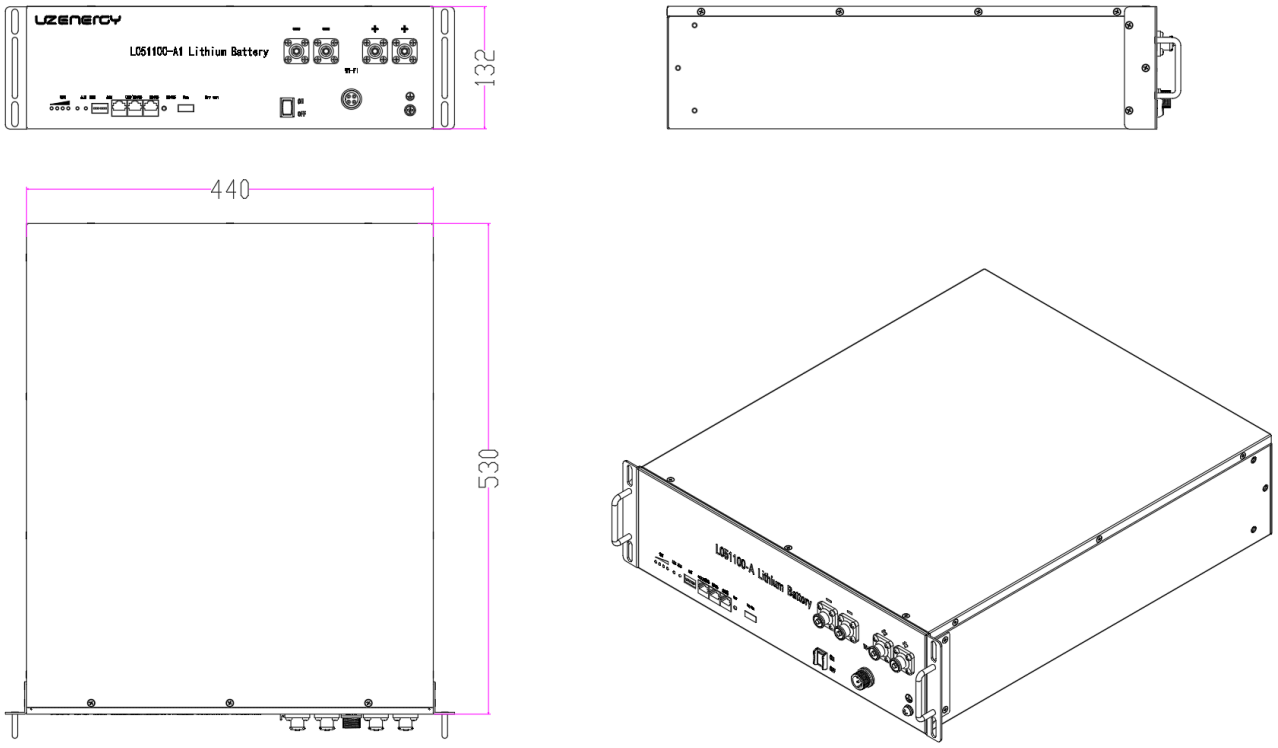


Figure 2 - L051100-A1 Dimensions (mm)

2.3. Specifications

Specifications of L051100-A1	
Cell Type	LiFePO4 (LFP)
Rated Voltage (V)	51.2
Rated Capacity (Ah)	100
Rated Energy (kWh)	5.12
Usable Battery Capacity (Ah)	100
Usable Battery Energy (kWh)	5.12
Max. Battery Depth of Discharge	100%
Battery Max. Charge/Discharge Power (kW)	2.56/5.12
Cell Configuration	1P16S
Working Voltage Range (V)	44.8~57.6
Standard Charge Current (A)	50
Max. Continuous Charge Current (A)	50
Standard Discharge Current (A)	50
Max Continuous Discharge Current (A)	100 for boost version at >60% SoC 50 (0.5C) for normal version

Peak Current (A)	100
Rated DC Power (kW)	2.56
Short-circuit current (A)	210
Standard Charging Method	0.5C CC to 57.6V; CV at 57.6V until current is 0.05C
Working Temperature (°C)	Charging: 0~50; Discharging: -20~55
Working Relative Humidity	20%~80%
Storage Temperature (°C)	-20~50
Self-Discharge Rate	≤5% (25 °C, 50% SoC) per Month
SoC at end of product line	50%
Insulation Resistance (MΩ)	>100
Voltage Difference between Cells (mV)	≤20
Inner Resistance of single Cell (mΩ)	0.34±0.05 (new cell, 30~40% SoC)
IP-Rating	IP20
Recommended Usage	Indoor
Net Weight (kg)	Approx. 45
Dimension (mm/inch)	440x530x132 / 17.3”x20.9”x5.2” (not including connector, handles and other parts)

2.4. Installing Instructions

Instructions for installing the battery must be followed (if in doubt refer to your retailer or UZ Energy support).

2.4.1. Definition of Internal Sampling Connector CON1

Pin	Wire No.	Signal	Wire size (mm²)	Remarks
CON1-1	T1+	Signal	0.3	Temp. #1+
CON1-2	T1-	Signal	0.3	Temp. #1-
CON1-3	B0	Signal	0.3	Cell #1-
CON1-4	B1+	Signal	0.3	Cell #1+
CON1-5	B2+	Signal	0.3	Cell #2+
CON1-6	B3+	Signal	0.3	Cell #3+
CON1-7	B4+	Signal	0.3	Cell #4+

2.4.2. Definition of Internal Sampling Connector CON2

PIN	Wire No.	Signal	Wire size (mm²)	Remarks
CON2-1	T2+	Signal	0.3	Temp. #2+
CON2-2	T2-	Signal	0.3	Temp. #2-
CON2-3	B5+	Signal	0.3	Cell #5+
CON2-4	B6+	Signal	0.3	Cell #6+
CON2-5	B7+	Signal	0.3	Cell #7+
CON2-6	B8+	Signal	0.3	Cell #8+

2.4.3. Definition of Internal Sampling Connector CON3

PIN	Wire No.	Signal	Wire size (mm²)	Remarks
CON3-1	T3-	Signal	0.3	Temp. #3-
CON3-2	T3+	Signal	0.3	Temp. #3+
CON3-3	NC	NC	NC	NC
CON3-4	B9+	Signal	0.3	Cell #9+
CON3-5	B10+	Signal	0.3	Cell #10+
CON3-6	B11+	Signal	0.3	Cell #11+
CON3-7	B12+	Signal	0.3	Cell #12+

2.4.4. Definition of Internal Sampling Connector CON4

PIN	Wire No.	Signal	Wire size (mm²)	Remarks
CON4-1	T4-	Signal	0.3	Temp. #4-
CON4-2	T4+	Signal	0.3	Temp. #4+
CON4-3	B13+	Signal	0.3	Cell #13+
CON4-4	B14+	Signal	0.3	Cell #14+
CON4-5	B15+	Signal	0.3	Cell #15+
CON4-6	B16+	Signal	0.3	Cell #16+

2.4.5. Front View

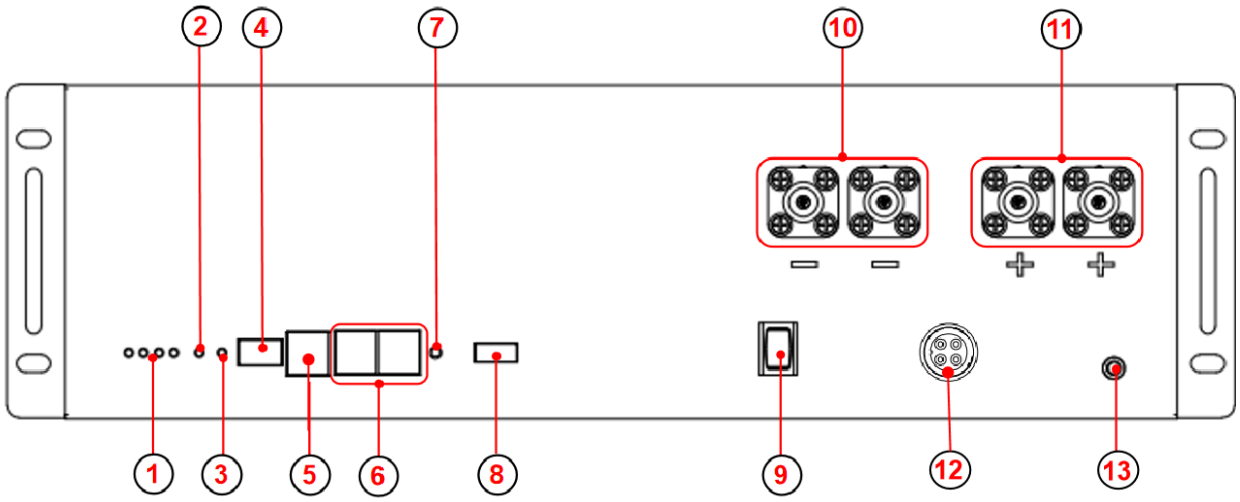


Figure 3 - Front View of L051100-A1

Item	Name	Model	Remarks
1	SOC LED x4		
2	Alarm LED		
3	RUN LED		
4	Dialer		
5	Communication port	RJ45	CAN to PCS, RS485 Internal Connection
6	Communication port *2	RJ45	RS485 Internal Connection
7	Reset		Wake up the system from malfunction status
8	Dry Contact		
9	Power On/Off Switch		
10	Port Negative x2	PSR6XAB	Black 5.7, 25 mm^2
11	Port Positive x2	PSR6XBB	Orange 5.7, 25mm^2
12	WIFI		
13	GND	M6	Yellow-Green, 10 AWG

2.4.6 Port CAN/RS485 and RS485

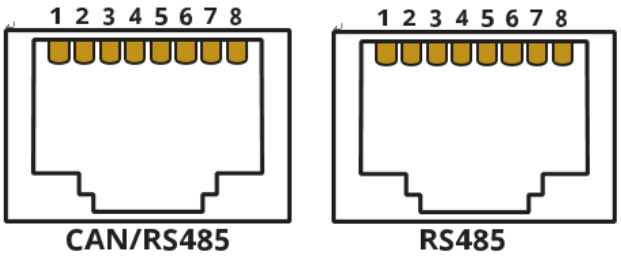


Figure 4 - CAN/RS485 and RS485 connections

	Description
CAN/RS485	Pin 1: CAN-H Pin 2, 7: RS485-A Pin 3, 6: RS485-B Pin 4: NC Pin 5: CAN-L Pin 8: GND
RS485	Pin 1, 4, 5: NC Pin 2, 7: RS485-A Pin 3, 6: RS485-B Pin 8: GND

3. Installation

3.1. DC Cable Requirements

Size	Outer Diameter	Max. Voltage	Max. Current
21-33 mm²	10-12 mm	1000 V	120 A

Caution

DC cable must be a multicore wire.

3.2. DC Cable

Danger

- Turn off system before doing electrical connection
- Ensure all the cables are in electrical safe condition

3.2.1 Material List

Plug

Isolation Cap

Tail-hood

3.2.2 Steps

1. Put wire through isolation cap and tail-hood.

2. Remove outer isolation layer of DC cable as shown.

3. The red is used for the positive, and the black is for negative. The end of the cable is crimped to the terminal using a suitable crimping clamp.

4. Tighten the isolation cap and plug contact.

5. Put the positive and negative plug on to the system.

6. Use isolation cover for unused DC sockets.

3.3. DC Cable Connection

3.3.1 Single Unit

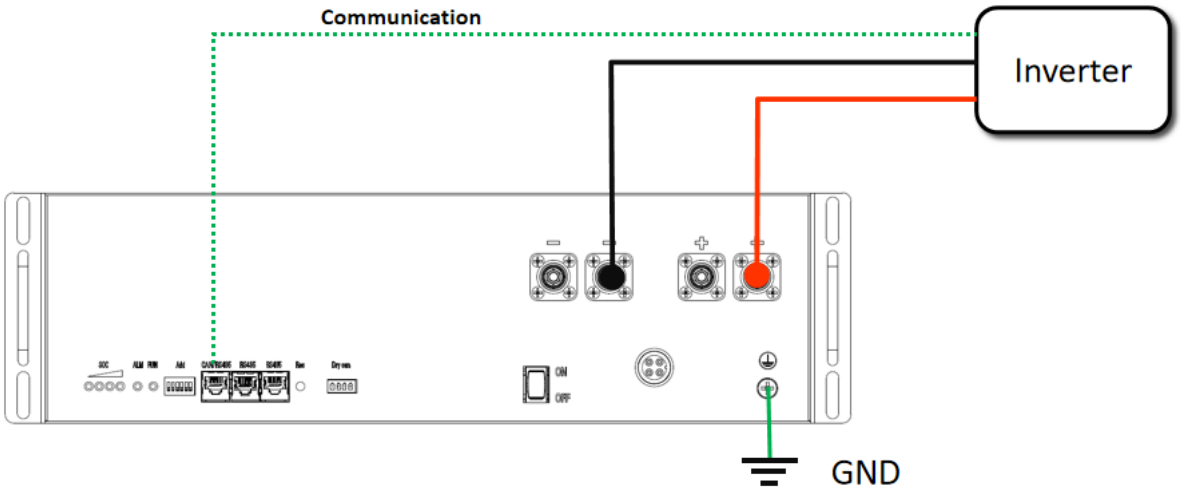


Figure 5 - Single Unit Connection

(If connected with a DC breaker (recommended), follow the Technical Parameters: 125A/2P/DC125V)

3.3.2 Multi-Units in Parallel (4 units as an example)

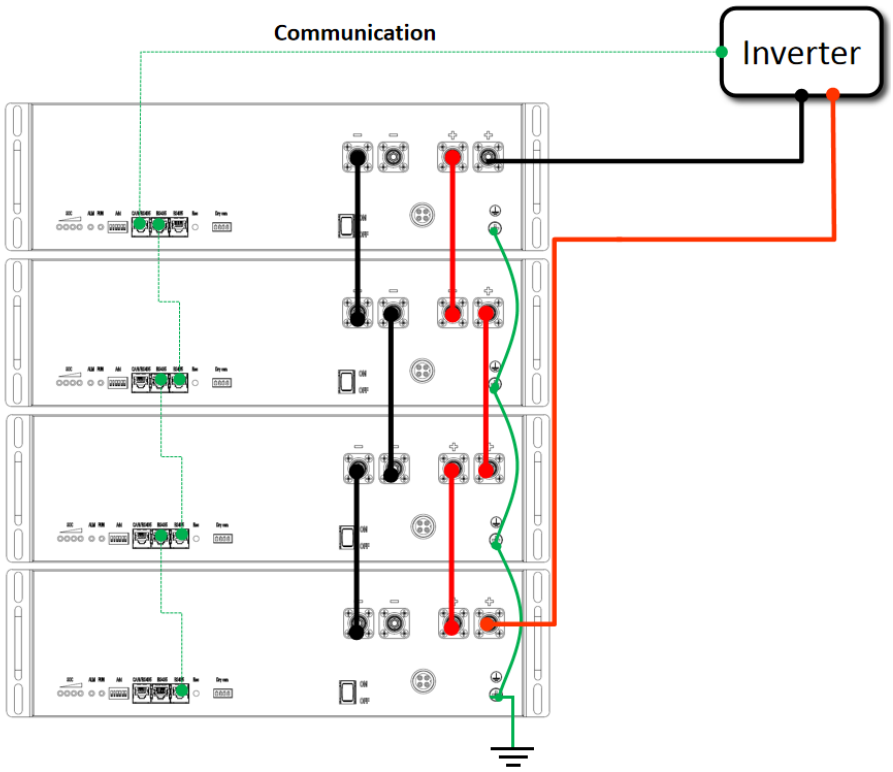


Figure 6 - Multi-Units Connection-1 (Inverter with max. 100A)

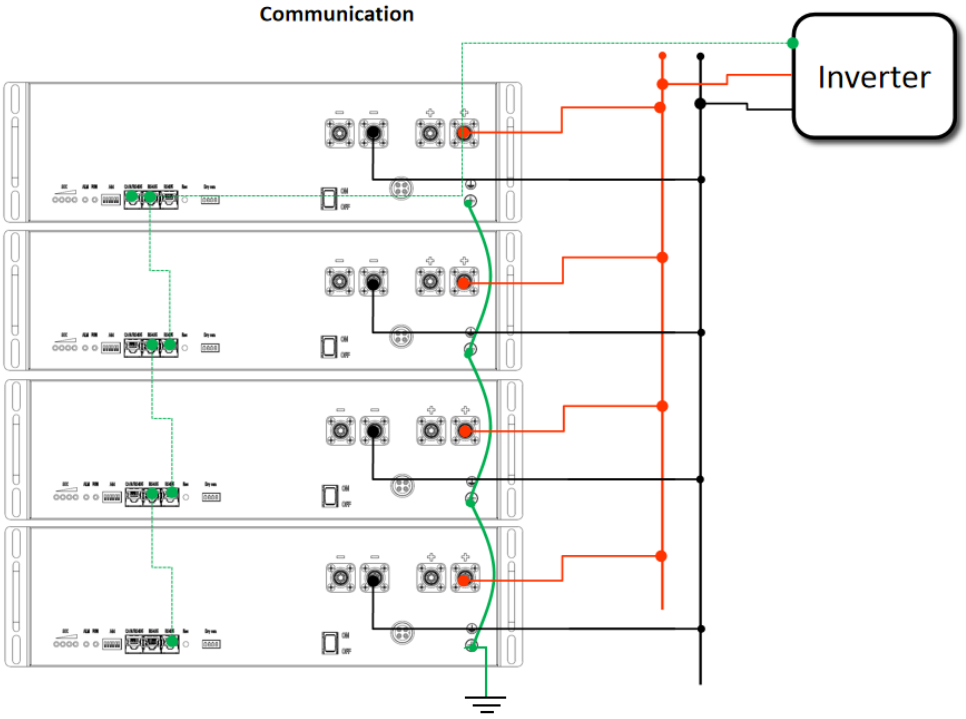


Figure 7 - Multi-Units Connection-2 (Inverter >100A)

The L051100-A1 can be used as a single unit as well as multi-units (in parallel). The DIP switches must be set as below for single- or multi-unit operation.

3.3.3. Setup Master Pack and Slave Pack

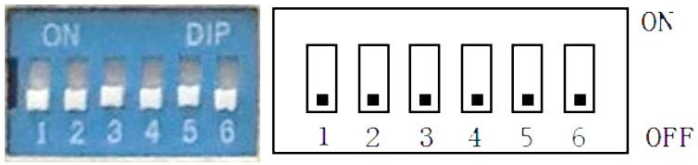
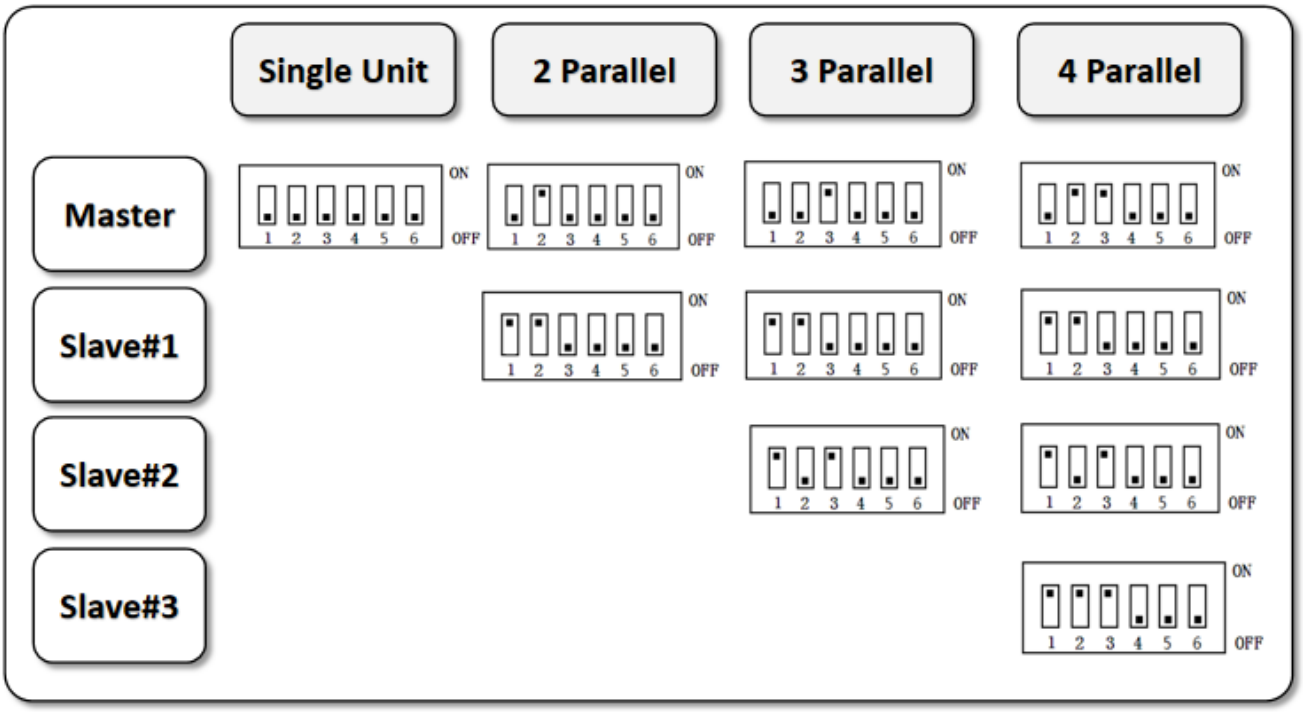
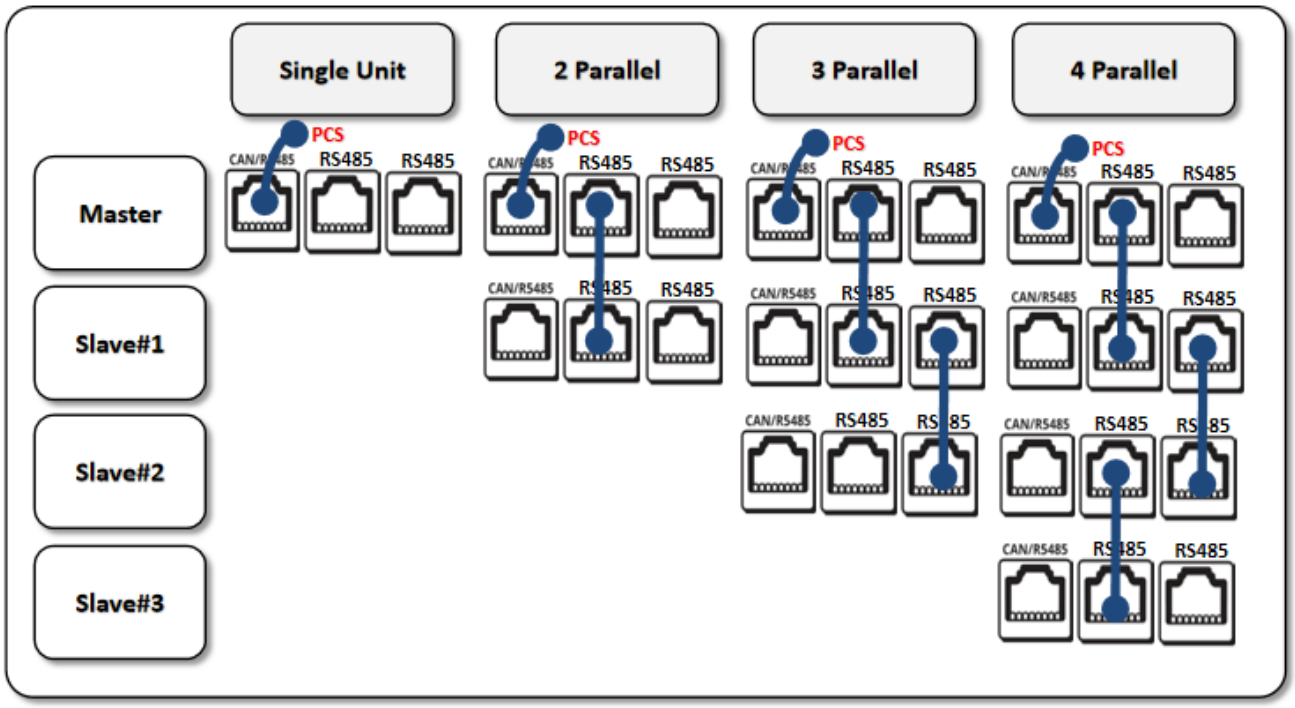


Figure 8 – DIP Switch for Addressing (Dialer)

Master/Slave address DIP switch configuration:




Single Unit
2 Parallel
3 Parallel
4 Parallel
Master
Slave#1
Slave#2
Slave#3
PCS
CAN/RS485
RS485

4. Power ON and OFF

4.1. Instruction

Please double check the Precautions for use in section 1.3. Precautions for Use.

4.1.1 System Power ON

- Installation (including DC cable, communication wire connection and dialer switch) is properly installed and set.
- Press Power Switch to the ON (1) position, the green LED should then be flashing and then switch to normal function mode (system status can be read from LED signal, as shown below).

4.1.2. System Power OFF

Attention: It must be confirmed that the system is off before taking off DC cables.
Press Power Switch button to the OFF (0) position.
The green LED should be flashing and then the battery will go into stop mode.

4.1.3. Sleep and Wake-up Function

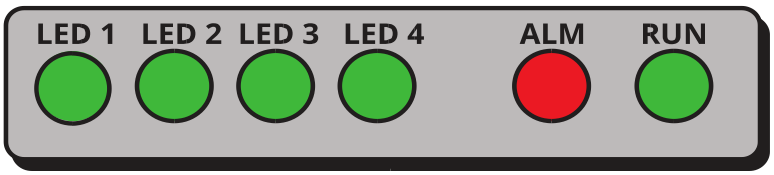
Number	Sleep Condition	Wake-up Condition	Remarks
1	Forced sleep by upper computer	Reset button	
2	Forced sleep by Power On/Off Switch	Power On/Off Switch	Only the power On/Off switch can wake up the battery.
3	Total Voltage is lower than 48V or cell voltage is lower than 2.8V, and continuous no charge and/or discharge current for 4 hours and no communication	Reset button, power On/Off switch, charging	When the battery is charged, it automatically wakes up. Toggling the power On/Off switch can wake up the battery.

4.1.4. Buzzer Function

- 0.25s sound per 1s in case of fault
- 0.25s sound per 2s during protection

4.1.5. System Status LEDs

There are 6 LED indicators, 4 green LEDs give the status of SoC (state-of-charge), 1 red Alarm LED and 1 green Running Status LED (indicating charging, discharging etc.).



Status	Normal/Warning/ Protection	RUN	ALM	SoC				Remarks
		●	●	●	●	●	●	
Power Off	Sleep / Hibernate	Off	Off	Off	Off	Off	Off	
Stand-by	Normal	Flashing 1	Off	Actual SoC				
	Warning	Flashing 1	Off					Temp. Warning ALM Flashing 3
Charging	Normal	Flashing 2	Off	Actual SoC				
	Warning	Flashing 2	Off					Temp. Warning ALM Flashing 3
	Overcharging	Flashing 1	Off					
	Overheat, Low Temp., Over-current	Flashing 1	Flashing 2					
Discharging	Normal	Continuous	Off	Actual SoC				
	Warning	Continuous	Flashing 3					Overcharging, ALM off
	Over-discharging	Flashing 1	Off					
	Overheat, Low Temp., Over-current, Short-circuit	Flashing 1	Flashing 2					
Malfunction	Warning	Off	Continuous	Off	Off	Off	Off	BMS damage, MOS damage, temp. sampling malfunction

4.1.6. LED Flashing Status

Status	On	Off
Flashing 1	0.25s	3.75s
Flashing 2	0.5s	0.5s
Flashing 3	0.5s	1.5s

4.1.7. SoC Indicator

SoC	LED			
	LED1	LED2	LED3	LED4
0~25%	On	Off	Off	Off
25%~50%	On	On	Off	Off
50%~75%	On	On	On	Off
75%~100%	On	On	On	On

5. Transportation and Storage

5.1. Transportation

It is forbidden to expose the battery to serious vibration and shock during transportation.

5.2. Storage

If the system is not used, the system must be correctly stored. Otherwise, if there are any issues, UZ Energy shall not be liable. Storage conditions are as follows:

- Temperature at 20 °C ± 10 °C
- Relative air humidity 20 ~ 80%
- Protected from direct sunlight
- State of charge (SoC) around 60% ± 5% (alternatively 52.4 Vdc)
- It should be stored in place where it can be monitored by professionals

NOTE:

A proper inspection shall be conducted every 4 months, to ensure no over-discharge of the battery (if the SoC is less than 0% for a long time) occurs. Recharge the battery to 60% or 52.4V if it is below these values. If over-discharged, the battery will behave as follows:

1. The battery may not start-up when turning the power switch to the ON position
2. The battery output voltage may be less than 40V when turned on
3. All LED indicators are off and the battery cannot communicate to the upper computer via RS485/USB converter.

Please contact the technical contact where you purchased the battery immediately once the above abnormal issues occur. Additional actions are required before the field installation in terms of re-charging the battery to a SoC over 50%.

6. Disclaimer

It should be noted that UZ Energy shall not be liable if any further points are added to this user's manual without informing customers.

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