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.opalenergy.com.sg

Warning: Read 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.

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 OPAL 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, send an email to info@opalenergy.com.sg

ELECTRONIC DEVICE: DO NOT THROW AWAY

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

MADE IN CHINA

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE IMPORTANT SAFETY INSTRUCTIONS

This manual contains important instructions for the power Lite 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 OPAL ENERGY Certified Installers. OPAL 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 guide or on the equipment:

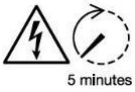
 **WARNING:** indicates a hazardous situation which, if not avoided, could result in injury or death.

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

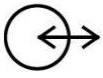
NOTE: indicate an important step or tip that leads to best results, but is not safety or damage related.

 **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 TERMINIAL:** 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 OPAL 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 power Lite 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. Batterycells in power Lite are replaceable. Contact the OPAL 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 power Lite 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 parts or OPAL ENERGY accessories, or parts or accessories not purchased directly from OPAL ENERGY or a OPAL 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 OPAL 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 photo voltaic (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 ℃ or below -20 ℃.

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
2022-04-30	V1.1	Update template, Same parameters update.	TangXX
2022-06-30	V1.2	Update parallel diagram； Update Unpacking inspection Defined ΔV requirement when battery in Parallel	TangXX
2022-04-30	V1.3	Parameters update.	TangXX

CONTENT

1. Introduction

Thank you for choosing OPAL Energy storage system.
The energy storage module is comprised of lithium ion rechargeable batteries with 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 if charged and discharged once in a day at room temperature (25 °C).

- **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 nicely designed in 3U, in favour of standard industrial applications.

- **High Capability**

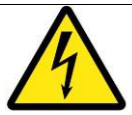
Multiple energy storage modules can be connected in parallel, and the capacity can be customized according to the intended use.

1.2. Safety Precautions

OPAL Energy products are designed with full consideration of safety. However, all electrical appliances can be dangerous if used inappropriately; it 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 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 designated cable. A non-designated cable use can cause electric shock. Be sure to use the cable 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 alter 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 closed area. If the module/controller is installed in a closed area with no air-conditioning, heat may build up inside the set and cause a fire.

Prohibited

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

Prohibited

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

Prohibited

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 “Input Positive” and “Input Negative” 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 products.

Prohibited

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

1. Do not put the device in a poorly ventilated and narrow space.
2. Remove any dust buildup in the vent.
3. Do not place the device 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 set 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 the installations lack of stability and can cause injury.

■ **Instruction**

Fix a rack to the floor. If a rack falls by the weight of the set, it may cause serious injury or death.

■ **keep Dry**

Do not touch with wet hands If you touch the set 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**

Set up cables properly. If you trip over a cable, the set 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 and remove the power connector from the power connector terminal/ the power cable from their wall plugs.

■ **Prohibited**

Do not put anything, stand or sit on the device. If you put anything on the device, 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 through 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 the liquid comes in contact with skin or clothing, wash thoroughly with plenty of water.
- If the 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 OPAL 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 function inside, or cause abnormal charge/ discharge, heat generation, gas eruption, or fire.).
- Touch the output terminal except for installation.
- Throw the product into fire or heat, or otherwise expose the set to heat or naked flame.
- Submerge the product in liquid or allow it to become wet.
- Apply strong shock, pressure, or drop.
- Use for medical purposes.
- Place any foreign objects inside.
- Connect any devices that exceed the operating voltage and current range.
- Do not 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

L051100-A1 Energy Storage System is consisted of 2 sets of 1P8S battery modules manufactured by OPAL Energy. In each battery module , there are 8 pcs of 100 Ah LFP cell originated from CATL. The overall system also provides standard communication port, i.e. CAN and RS485, to monitor the working status and communicate with computer as well as the Power Conversion System (PCS). The system schematic drawing is presented in Figure 1.

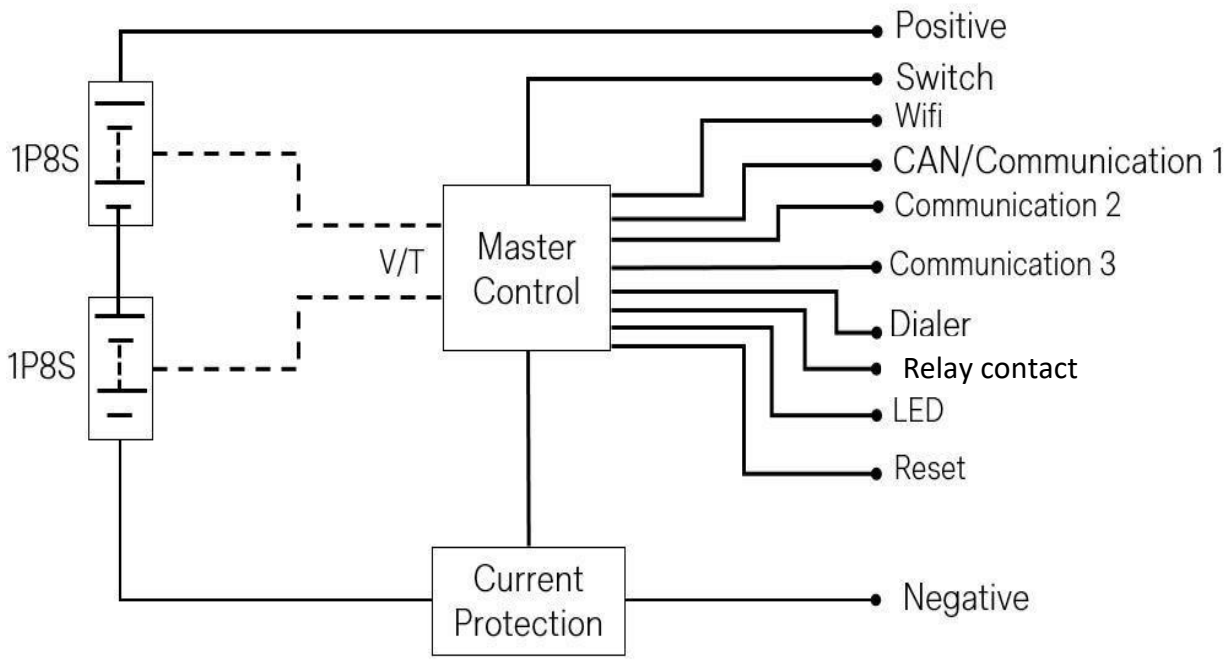


Figure 1 - System Schematics

2.2. Dimensions

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

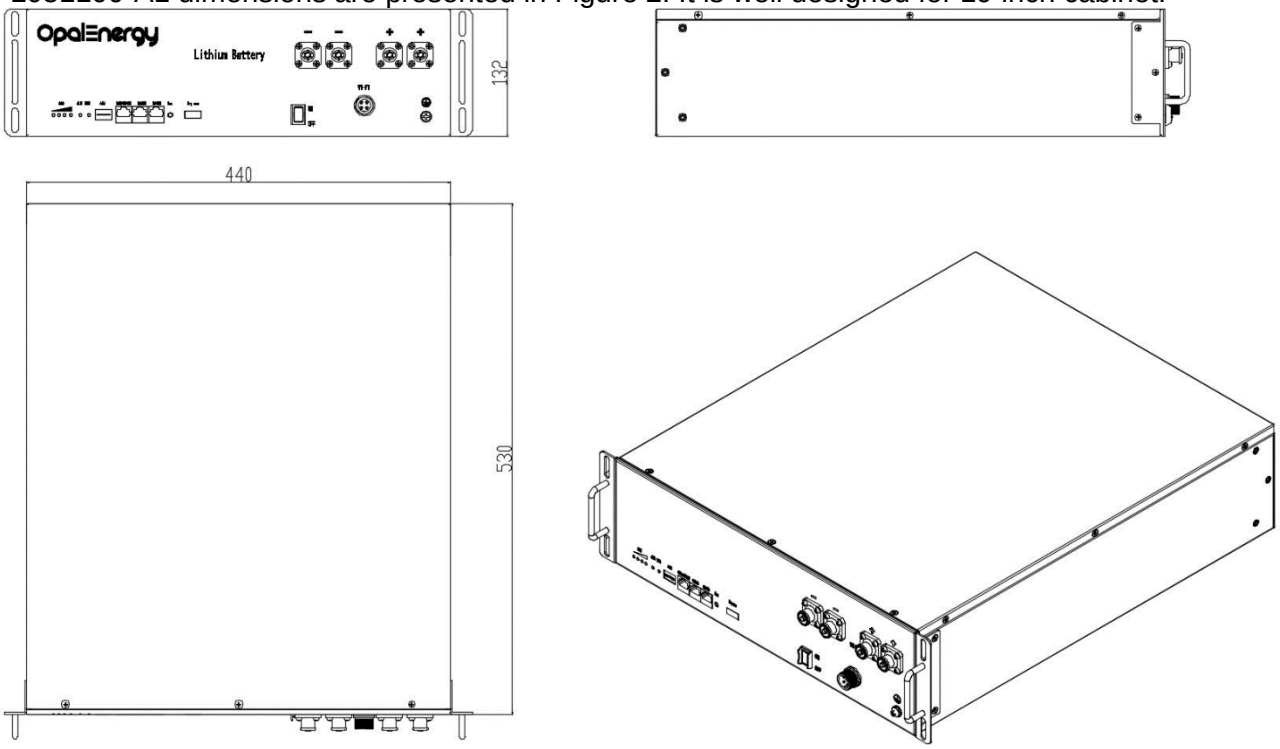


Figure 2 - L051100-A1 Dimension

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
Battery Depth of Discharge	100%
Battery Max 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)	Only boost version Supports 100 (>60% SOC). (For details, please consult our engineers) Normal version only supports 0.5C (50A)

Peak Current	100A
Rated DC Power(kw)	2.56
Short circuit current (A)	210
Standard Charging Method	0.5C CC to 57.6V; CV at 57.6V till current is 0.05C
Working Temp. (°C)	Charging: 0 ～50; Discharging: -20～55
Working humidity ROH	20%～80%
Storage Temp. (°C)	-20~50
Self-discharging rate	≤5% (25 °C, 50% SoC) Per Month
SOC after assembly line	50%
Insulation Resistance (MΩ)	>100
Voltage Difference in each module (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)	440*530*132/ 17.3”x20.9”x5.2” (not including connector, handle and other parts)
*Note: 1. Battery ΔV should be less than 3V at first Parallel installation,or BMS has a potential failure risk if ΔV＞3V , please Dis/Charge the batteries to meet ΔV≤3V, or consult our engineers;	

2.4. Installing Instructions

Instructions for installing the battery must be followed. (Refer to your distributor OPAL Energy support in case of doubt)

2.4.1. Definition of internal Sampling Connector -CON1

PIN	Wire No.	Signal	Wire size (mm^2)	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

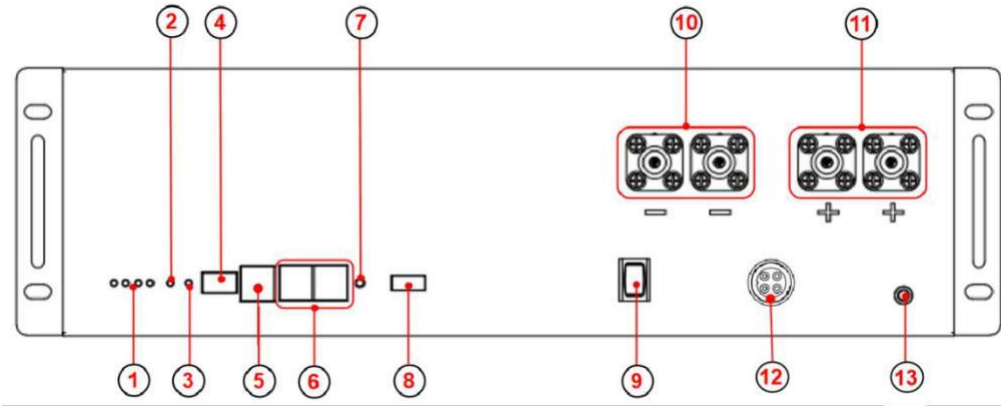


Figure 3 - Front View of L051100-A1

Item	Name	Model	Remarks
1	SOC LED x4		
2	Alarm LED		
3	operation LED		
4	Dialer switch		
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	relay 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 Socket		
13	GND	M6	Yellow-Green, 10 AWG

2.4.6 Port CAN/RS485 and RS485

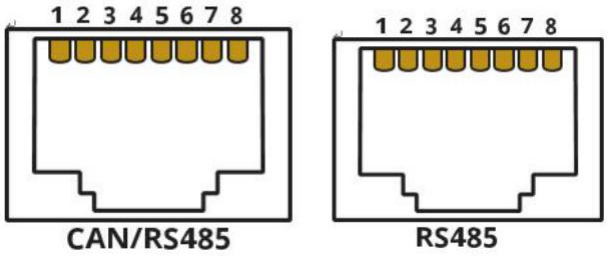


Figure 4 - CAN/RS485 and RS485 connections

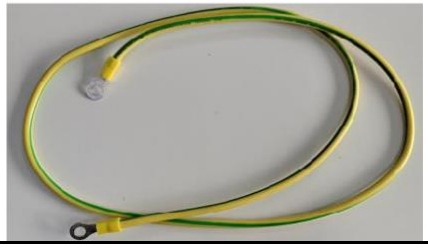
	Description
CAN/RS485	Pin 1: CAN-H Pin 2, 7:RS485-A Pin 3, 6: RS485-B Pin 4: NC Pin 5: CAN-L Pin 8: GND
RS485	Pin 1, 4, 5: NC Pin 2, 7: RS485-A Pin 3, 6: RS485-B Pin 8: GND

3. Installation

3.1. Unpacking inspection

- When the equipment arrives at the installation site, loading and unloading should be carried out according to the rules and regulations, to prevent from being exposed to sun and rain.
- Before unpacking, the total number of packages shall be indicated according to the shipping list attached to each package, and the case shall be checked for good condition.
- In the process of unpacking, handle with care and protect the surface coating of the object.
- After opening the package, the installation personnel should read the technical documents, verify the list, according to the configuration table and packing list, ensure objects are complete and intact, if the internal packing is damaged, should be examined and recorded in detail.

Packing list is as follows:

Item	Specification	Quantity	Figure	Note
Battery	L051100-A1 440x530x132mm	1		Standard
Output Cable (CA04)	Power Cable Positive: Red plug,25mm2 /L1.5m Negative: Black plug, 25mm2 /L1.5m	2		Option
	Communication cable to Inverter Black/L1.5m/Double RJ45 Plug	1		
	Ground Cable Yellow,Green/L1m/Double OT M6	1		

Parallel Cable (CA05）	Parallel Power Cable Positive: Red plug,25mm2 /L0.6m Negative: Black plug, 25mm2 /L0.6m	2		Option （For C100 /C300 Fittings ）
	Communication Parallel Cable Black/L0.8m/Double RJ45 Plug	1		

3.2.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.

3.3. DC Cable

Danger

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

3.3.1 Material List

Plug

Isolation Cap

Tail-hood

3.3.2 Steps

1. Put wire through isolation cap and Tail-Hood.

3. remove outer isolation layer of DC cable according to the picture on the right

3. The red is used for the positive, and the black is for negative cable, the end of the cable is bunched at the terminal using a wire clamp.

4. Tighten the isolation cap and cover.

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

6. Use isolated cap for unused DC plug.

3.4. DC Cable Connection

3.4.1 Single Unit

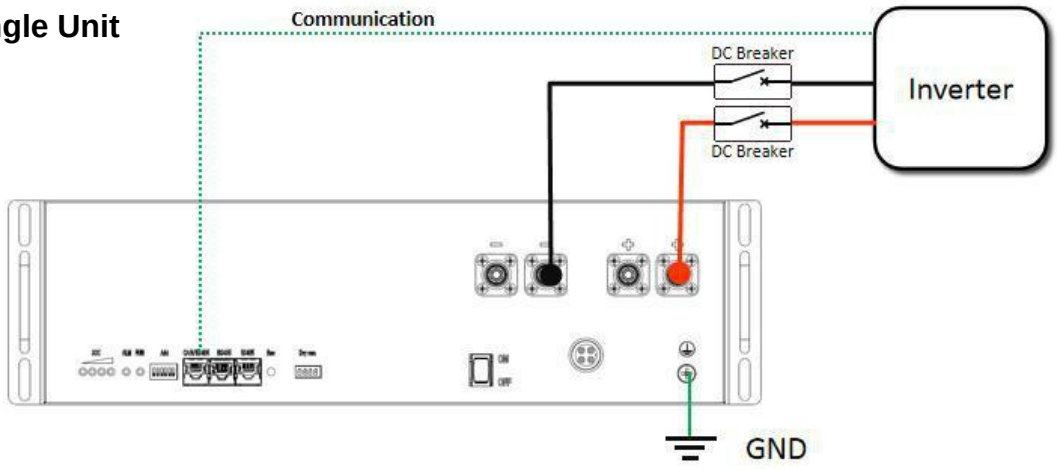


Figure 5 - Single Unit Connection
（DC breaker, follow the Technical Parameters: 125A/2P/DC125V ）

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

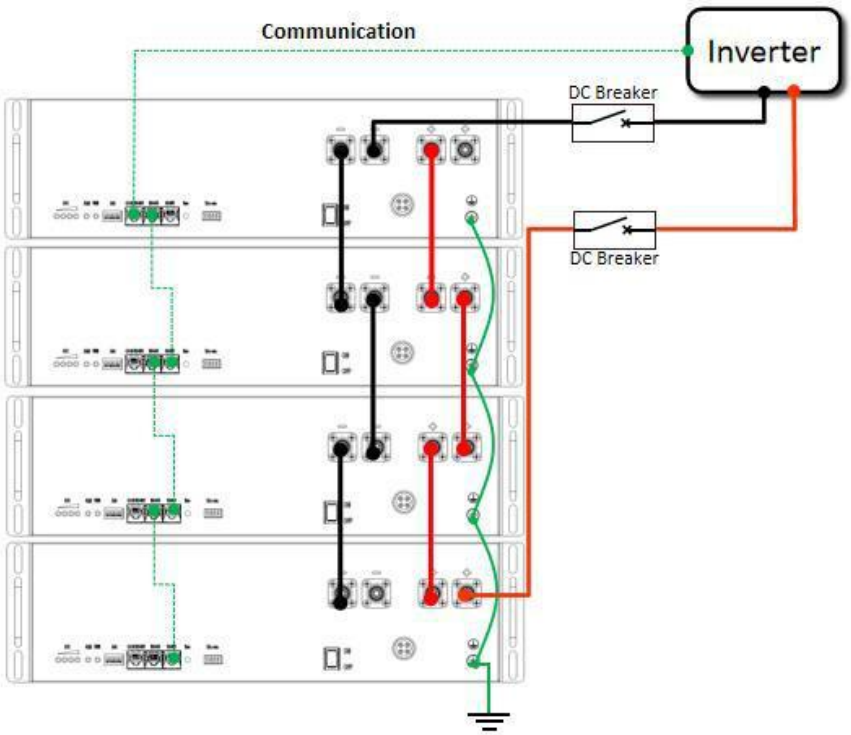


Figure 6 - Multi-Units Connection-1
(Battery ΔV should be less than 3V at first Parallel installation)

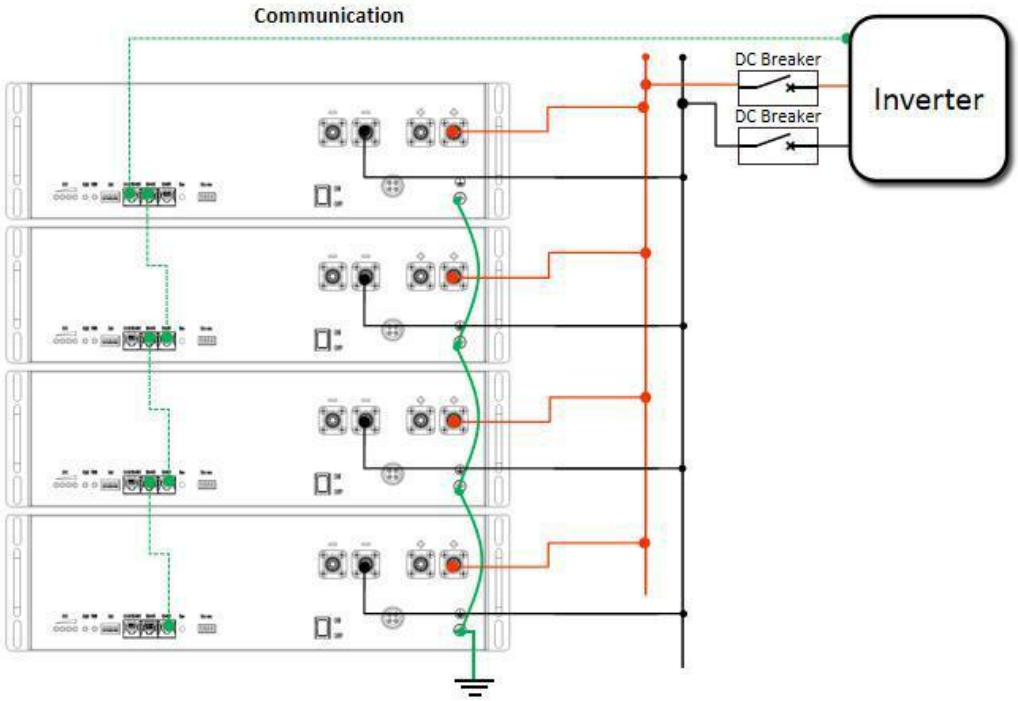


Figure 7 - Multi-Units Connection-2
(Battery ΔV should be less than 3V at first Parallel installation)

Master Pack and Slave Pack L051100-A1 can be used as single unit as well as multi-units (in parallel) mode. The customer must inform supplier if multi-units mode is required. The Master Pack can be used individually, but Slave Pack cannot be used individually.

3.4.3. Set up Master Pack and Slave Pack

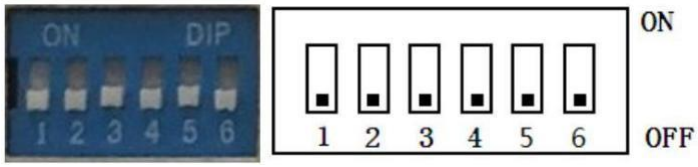
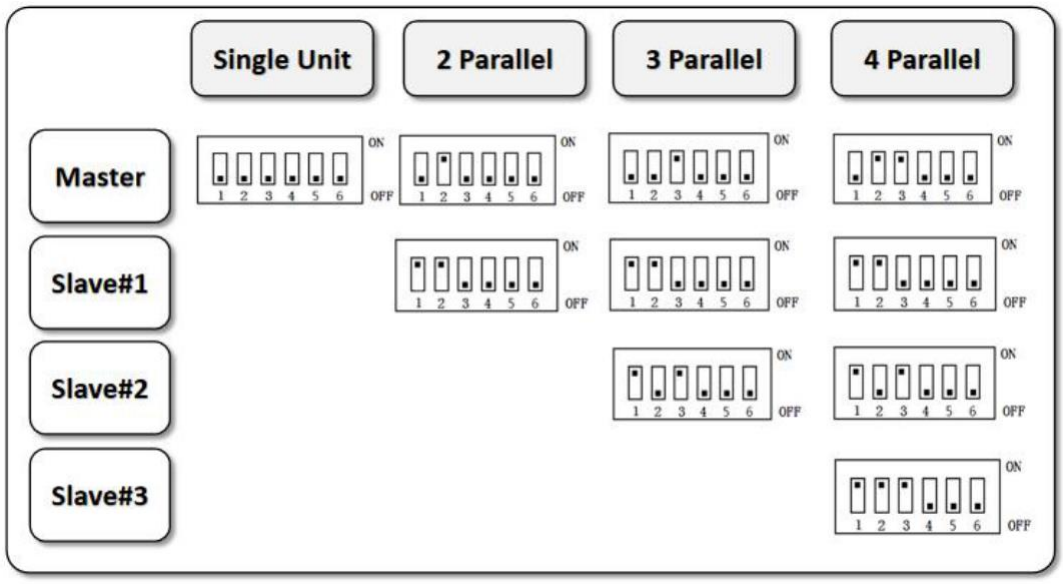
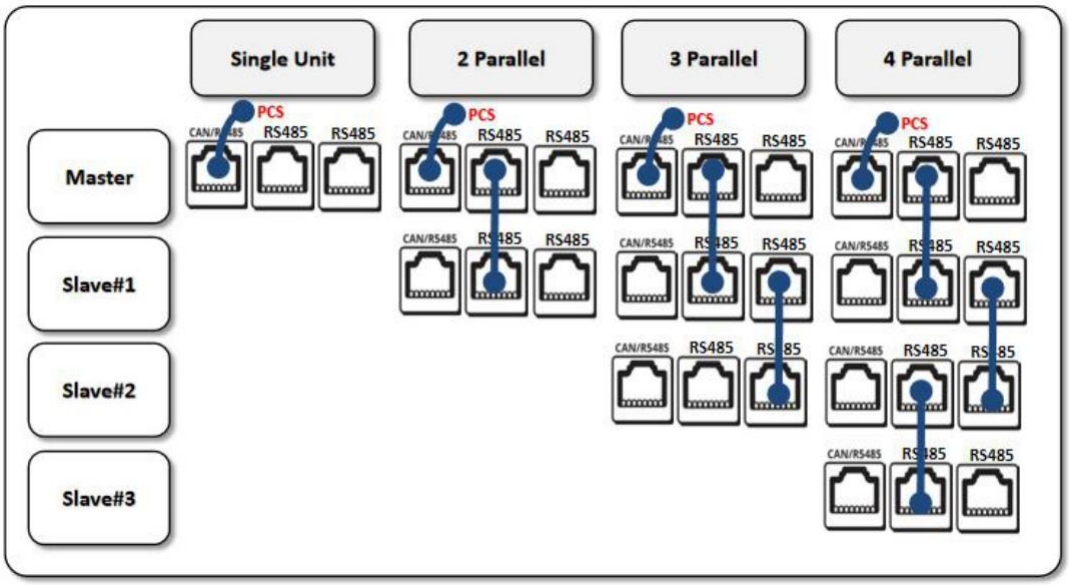


Figure 8 - Dial Diagram

Master/Slave dial code diagram:





4. Power ON and OFF

4.1. Instruction

Please double check the Precautions for use in section 1.3.

4.1.1 System Power ON

- Installation (including DC cable, communication wire connection and dialer switch) is properly installed and set up.
- Press Power Switch button, green LED should be flashing and the battery should turn into 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 into OFF (0) position.
Green LED should be flashing and the battery should turn into stop mode

4.1.3. Sleep and Wake-up Function

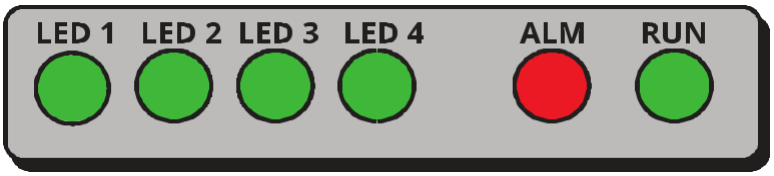
Number	Sleep Condition	Wake-up Condition	Mark
1	Forced sleep by external computer	Reset button	
2	Forced sleep by ON/OFF switch	ON/OFF switch	Only those equipped with ON/OFF switch can Wake up
3	Total Voltage is lower than 48V or voltage/cell is lower than 2.8V, and continuous No charge and/or discharge current for 4 hours, no communication	Reset button; Software-Communication; Charging	If battery is charged it wakes up automatically. Switching the ON/OFF button to off-position and back into on-position also wakes up device.

4.1.4. Alarm Signal Function

- 0.25s per 1s in case of error
- 0.25s per 2s in case of protection

4.1.5. System Status Instruction

There are 6 LED indicators, 4 green LED gives status of SoC (charging state), 1 red Alarm LED and 1 green Running Status LED (ALM: indicating charging/ discharging mode etc.)



Status	Normal/Warning/Protection	RUN	ALM	SoC				Remarks
		●	●	●	●	●	●	
Power Off	Hibernate	off	off	off	off	off	off	
Standby	Normal	flash 1	off	Real SoC				
	Warning	flash 1	off					Temp. Warning ALM flash 3
Charging	Normal	flash 2	off	Real SoC				
	Warning	flash 2	off					Temp. Warning ALM flash 3
	Overcharging	flash 1	off					
	Overheating, Low Temp., Over-Current, short-circuit	flash 1	flash 2					
Discharging	Normal	Continuous	off	Real SoC				
	Warning	Continuous	flash 3					Overcharging, ALM off
	Over-discharging	flash 1	off					
	Overheat, Low Temp., Over-current, Short-circuit	flash 1	flash 2					
Malfunction	Warning	off	Continuous	off	off	off	off	BMS Damage, MOS Damage, Temp. Reading malfunction

4.1.6. LED Twinkle Status

Status	On	Off
flash 1	0.25s	3.75s
flash 2	0.5s	0.5s
flash 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 of serious vibration and shock during transportation.

5.2. Storage

If the system is not in use, the system must be properly stored. Otherwise, if any issues, OPAL Energy shall not be liable.

Storage Conditions:

- It should be stored in 60% ± 5% SoC status (alternatively 52.4Vdc).
- ROH 20~80%
- Temperature at 20°C ± 10°C
- It should be stored avoiding direct sunlight.
- 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 (SoC is less than 0% over extended periods) occurs. Charge the Battery to 60% or 52.4V if Battery charge is beneath those statistics. At over-discharge status, the battery would behave as:

1. The battery could not start-up when turning the power switch to the ON position;
2. The battery output voltage could be less than 40V when turned on;
3. Indicators are off and battery can not communicate to any external computer via RS485/USB converter.

Please contact the technical person you purchased the battery from immediately once the above abnormal issues occur. Additional actions before on-site installation have to be taken in order to charge the battery to an SoC over 50%

6. Disclaimer

It should be noted that OPAL Energy shall not be liable if any materials are added to this user's manual without further inform of customers.

OPAL Energy Pte Ltd

Add：18, Boon Lay Way, #06-107, Trade Hub 21, Singapore 609966

Tel: +65-6515-4780

E-mail: info@opalenergy.com

http://www.opalenergy.com.sg