JOHNRAY

VERSION 1.0
JRW48100 ESS

User Manual

www.johnrayenergy.com

About the manual

This manual describes some important information about the product and show how to install Johnray ESS battery pack. Read this manual carefully before you attempt to install or use the product, please follow the instructions throughout the installation process. If you are uncertain about any of the requirements, instruction, or safety procedures described in this manual, please contact Johnray service team immediately for advice. Notice that a warranty claim will be invalid if damage is caused by human error, inconsistent with the user manual.

NOTE:

This manual is only valid for the Johnray JRW48100 low voltage in parallel connection series battery pack (Hereinafter referred to as battery pack).

Abbreviated	Terms
SOC	State of charge

Contents

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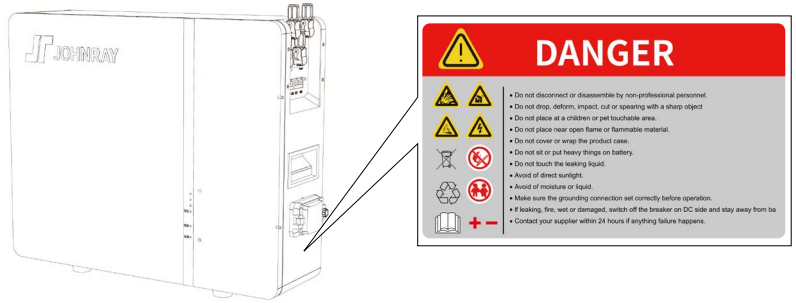
Safety

1.1 Symbols on battery pack label

There are some electrical symbols on battery related to electrical safety. Please make sure you have full understanding on them before installation.



- The voltage of this battery pack is strong enough to cause electric shock.
- Make sure that the battery polarity is connected correctly.
- Read the user manual before installing or operating the battery pack.
- Keep the battery pack away from children.
- Keep the battery pack away from ignition sources.
- The battery pack should not be disposed of with household waste at the end of its working life.
- The battery pack should be recycled.

1.2 Important safety instruction

For safety reasons, please carefully read the manual safety precautions, and observe all the safety instructions in this document before performing installation. Johnray company is not liable for any loss caused due to violation of the instructions in this manual.

In this document we use the following symbols to highlight important information: These warnings and cautions must be followed when using battery pack.

⚠ WARNNING

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

> A battery can present a risk of electrical shock, fire, or even explosion from exposed in vented air due to its active chemical properties, which can bring high dangers. When lithium metal is exposed to air, it will explode due to a violent oxidation reaction with oxygen. Observe proper precautions:

Do not crush, puncture the battery.

Do not dispose of the battery in a fire.

Do not expose the battery pack to direct sunlight.

Do not allow the battery pack connector to touch conductive objects such as wires.

Do not attempt to open, disassemble, tamper with, or modify the battery pack without prior written approval from the JOHNRAY company.

Keep the battery pack away from children.

> Battery pack is heavy! Lifting equipment is recommended.

> Do not touch the internal components when it's running. Ensure that the power switch and the breaker of the battery pack are always turned off prior to all installation, replacement, and maintenance processes.

> Read this entire document before installing or using battery. If operating the battery out of the specified conditions and requirements can result in high dangers of electrical shock, serious injury, or even death.

> Use battery pack only as directed

⚠ CAUTION

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

> Risk of electric shock. Do not remove the cover, there are no user serviceable parts inside. Refer to qualified personnel.

> When the PV array is exposed to light, it supplies a DC voltage to this equipment.

> Do not use cleaning solvents to clean battery pack, or expose battery to flammable or harsh chemicals or vapors。

> Do not place battery pack in storage condition for more than one month, or permit the electrical feed on the battery pack to be severed. Please reach out to your installer for more information if needed.

1.3 Personal Protective Equipment

Wear the following safety equipment properly to perform installations. Installers must meet the relevant requirements of standards, such as IEC60364，or local laws.

Safety goggles　Ear plugs　Insulated gloves　Safety gloves　Safety shoes

1.4 Contact information

Web: www.johnrayenergy.com
Email: info@johnrayenergy.com
Address: Room 209, Building 1, Lejiahui Business Plaza, New District, Suzhou, Jiangsu, China

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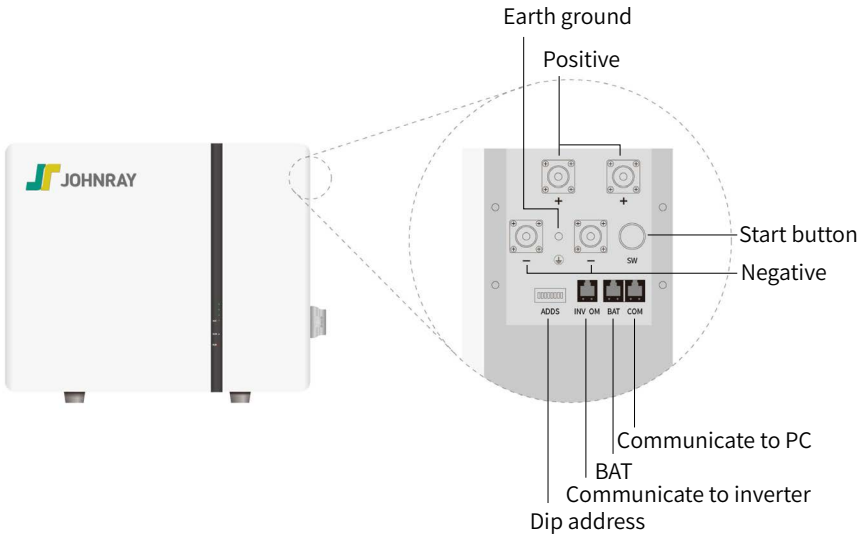
Product Introduction

2.1 Battery pack overview

The battery pack is a high voltage smart series lithium battery which consists of long span LiFePO4 battery cells and functional BMS. It can store and release electric energy based on the requirements of the inverter. It is mainly for home energy storage system or small commercial industries.

NOTE:

JRW48100 battery pack can extend to maximum 16 battery module boxes in parallel but minmal working with 1 battery module box.



Key Features

Compact size & Easy Installation

The lightweight and stackable design allows easier and faster installation indoor.

Safety

The battery pack use LFP cell to store energy, built-in BMS monitor its operation and prevents the battery from operating outside of design limitations.

Expandability

The battery pack capacity can be increased by adding battery modules.

High compatibility

The battery pack is compatible with a wide range of inverters.

Remote wake up

Johnray brand inverter can remotely wake up the sleep battery pack, this is a very important and useful function.

System design

The W48100 battery pack is designed for charging and discharging to maximize your home's energy independence, and potentially savings on your electricity bill.

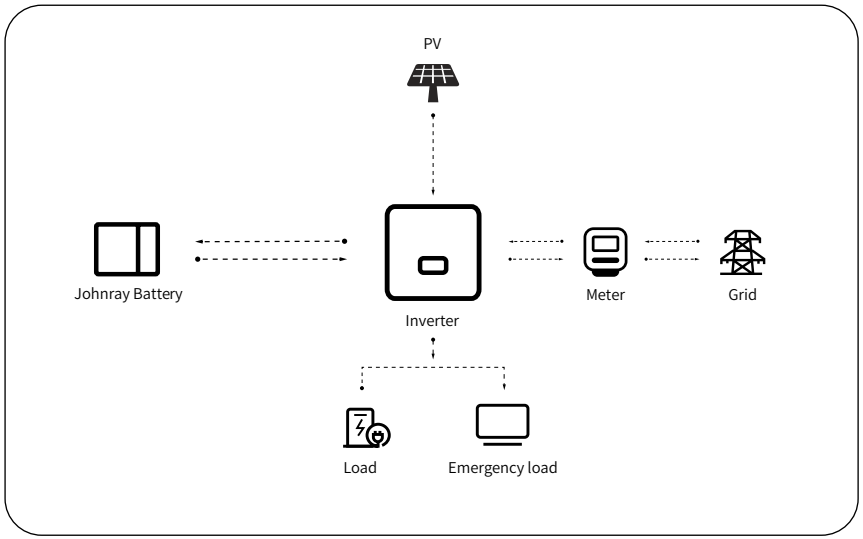
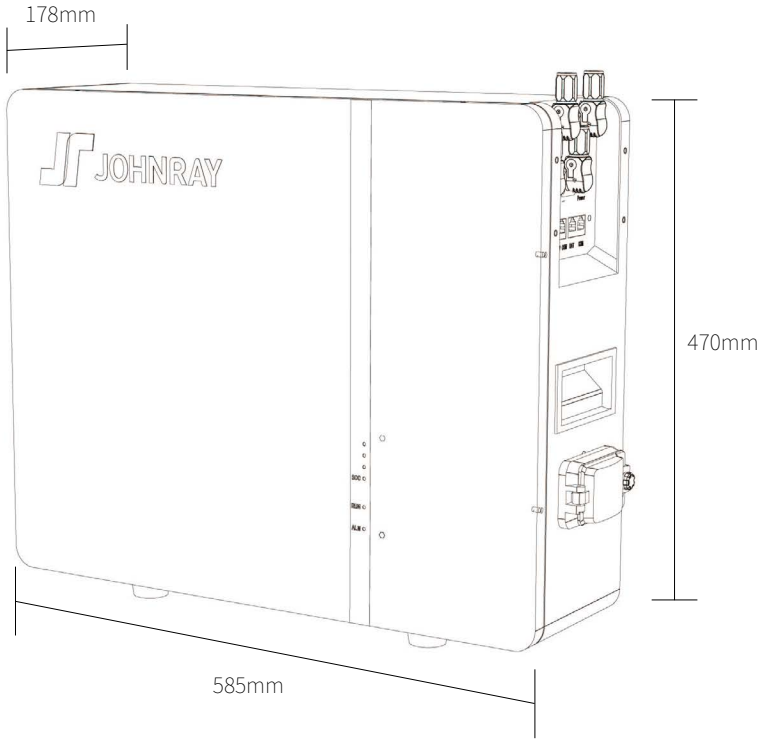


Figure1: The battery pack working with JOHNRAY low voltage single phase hybrid inverter.

2.2 Technical data

2.2.1 Dimensions and weight

	Length(mm)	Width(mm)	Height(mm)	Weight(kg)
Battery module	585	470	178	50±1kg



2.2.2 Performance

Electrical Specifications

Model	JRW48100
Nominal Energy:	51.2 kWh
Nominal Voltage:	51.2V
Nominal Capacity:	100Ah
Operating Voltage Range:	43.2-57.6V
Max.Charge/Discharge Current:	50A/70A
Charge/Discharge Temperature:	0~55°C /-10~55°C
Storage Temperature Range:	20 - 45°C
Cooling Method:	Natural Cooling
Recommended dod:	85%
Cycle Life:	>6000 Cycles (85% DOD/25C@0.5C)
Communication:	CAN/RS485
Certifications:	CE,CB,RoHS,IEC61000,IEC62619,UN38.3
Dimensions(LxDxH):	585x178x470mm
Weight:	50±1kg

2.2.3 Environment requirement

JRW48100	
Operating Temperature Range	0~55° C
Optimal Operating Temperature	5~50° C
Storage Temperature Range	-20~45° C
Humidity	5 to 95%
Altitude	Max 3000m
Cooling Strategy	Natural convection

2.2.4 Cable requirement

Power negative cable	$\phi 16mm^2$
Power positive cable	$\phi 16mm^2$
Communicate cable	$\phi 3mm^2$
Ground electrode	$\phi 2.5mm^2$

⚠ WARNNING

Above cables have been prepared in package, unqualified cable may cause something serious.

ENGLISH

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INSTALLATION

3.1 Preparation

3.1.1 Installation material and tool

Make sure all necessary tools and materials are available before starting the installation process to avoid any inconvenience on site. These tools are required to install battery pack.


Torque screwdriver

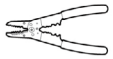
Phillips-screwdriver bit

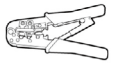
Hex-key bit


Phillips-head screwdriver


Flat-head screwdriver


Torque wrench


Wire stripper


Cable crimper


Voltmeter


Tape measure


Drill


Sealant gun

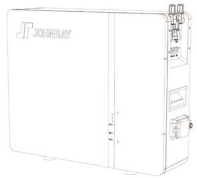
3.1.2 Location survey

Make sure that installation location meets the following condition:

> It is highly recommended that position at least more than 1000m away from sea to avoid salt water and humidity.
> The floor must be flat and level.
> There are no flammable or explosive materials nearby.
> The optimal ambient temperature is between 15°C and 30 °C .

3.1.3 Package Examine

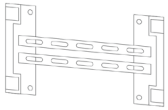
Verify and make sure that the following quantities are correct per placed order, and that no parts are broken or damaged during transportation. You may check off the unpacking inspection guide provided below.



Battery module

Ground cable

Red power cable



Bracket

Black power cable

RJ45 Communication cable

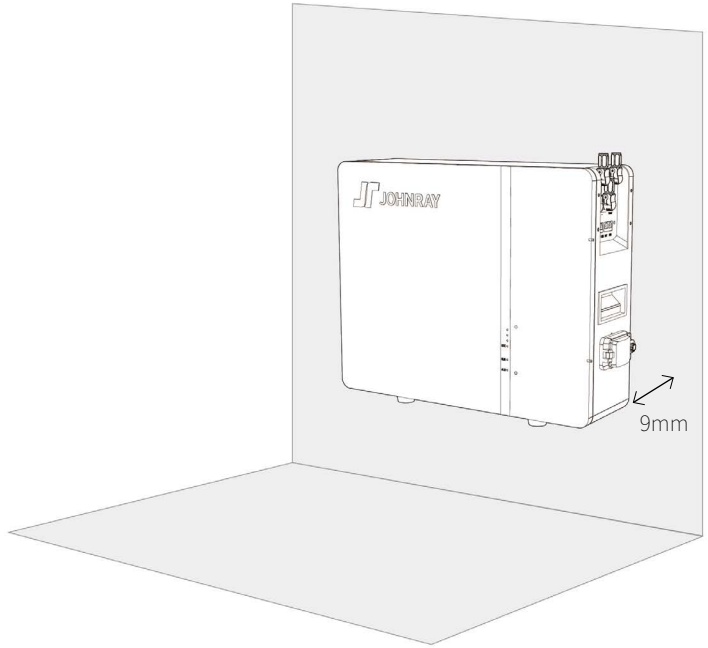
Parallel positive cable

Parallel negative cable

Parallel network cable

3.2 Start Installation

3.2.1 Installation Space



NOTE:

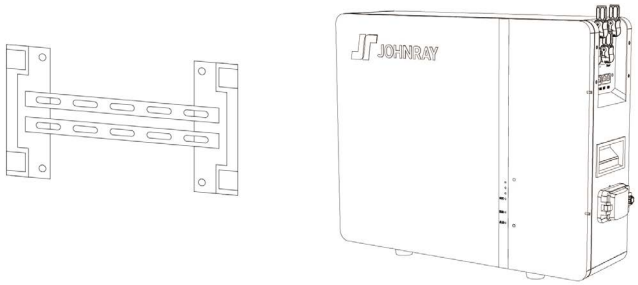
Make sure that the battery pack is always exposed to the ambient air. the battery pack is cooled by natural convection. If the battery pack is entirely or partially covered or shielded, it may cause the battery pack to stop operating.

3.2.2 Stack battery pack

Examine and ensure that the following quantities are correct per placed order, and that no parts were broken or damaged during transportation. You may check off the unpacking inspection guide provided below.

step 1

> Place the base on the floor



NOTE:

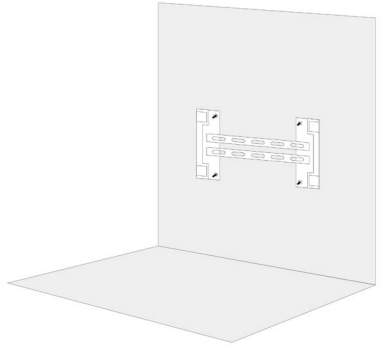
JRW48100 can be installed on the ground and walls.

⚠ WARNNING

Make sure floor is flat, level tool is needed, keep away from water accumulation.

step 2

> Place the battery pack on the bracket and hang the battery modules according to the required quantity.

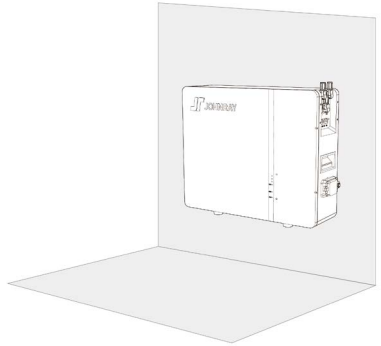


NOTE:

The installation of wall brackets must be firm.

step 3

> Connect the communication network cable to the inverter.



NOTE:

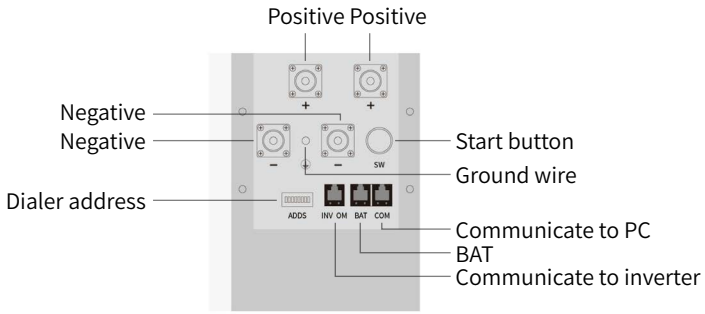
The positive and negative power lines are connected to the converter and cann't be reversed.

3.2.3 Cable connection

WARNNING

Make sure that the inverter is turned off before connecting the battery pack to the inverter.

> Remove the cable cover on the right side.
> Connec Red Power cable to “+” port and Black power cable to “–“port.
> Connecting RJ45 Communication cable to the “PCS” port.
> Connecting Ground electrode to “ ⏚ ” port.



NOTE:

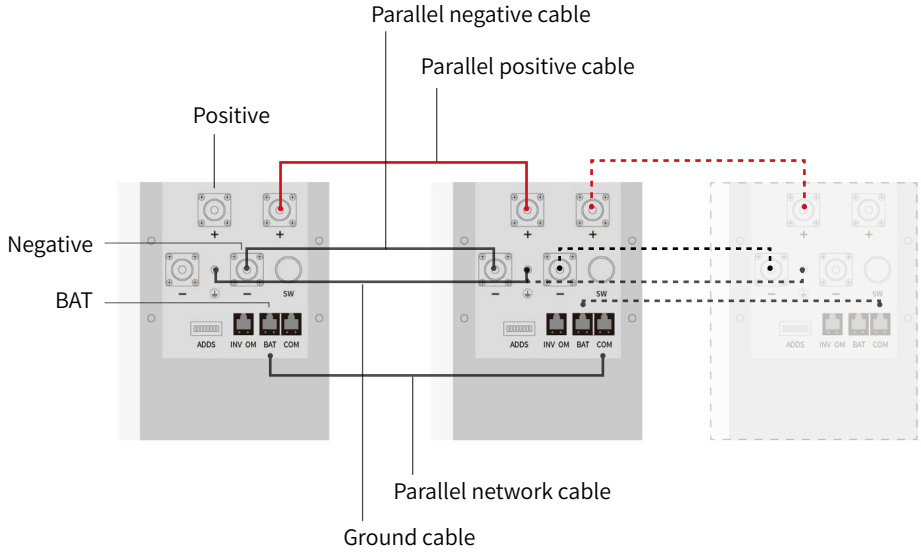
Pay attention not to reverse polarity. Connection with reversed polarity causes severe damage to the battery pack.

NOTE:

It is required for the battery back to communicate with the inverter for proper operation.

3.2.4 Parallel mode

> JRW48100 in parellel collection,prepare for power cable,comunication cable
> Red power cable for positive pole to the other positive pole. Black power cable for negative pole to the other negative pole
> IP switch trun on Automatically.For example,if 8 battery boxes are connected in parellel ,the sequences of 8 battery boxes would be set up automatically.



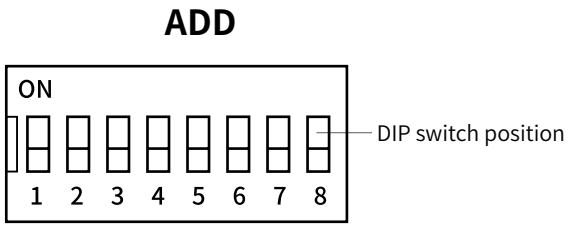
WARNNING

Make sure that the battery is turned off when connecting the battery pack to the battery pack.

WARNNING

Faults may be caused if sequences of power cables and communication cables are in disorder.

DIP switch in manual : From No1 to No 4 for battery box sequences(1-4 switch),No 5 to No 8 for number of battery boxes in parellel.



Model 1(One battery box)

DIP switch position							
#1	#2	#3	#4	#5	#6	#7	#8
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Model 2(Two battery boxes in parellel)

Battery boxes	DIP switch position							
	#1	#2	#3	#4	#5	#6	#7	#8
1(Any one of them)	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
2	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Model 3(From three battery boxes to sixteen battery boxes)

Battery boxes	DIP switch position							
	#1	#2	#3	#4	#5	#6	#7	#8
1(Any one of them)	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
2	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF

Slave mechine settings

ADD	DIP switch position								Description
	#1	#2	#3	#4	#5	#6	#7	#8	
1	OFF	OFF	OFF	OFF	ON	ON	ON	ON	Pack1
2	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Pack2
3	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	Pack3
4	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	Pack4
5	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	Pack5
6	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	Pack6
7	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	Pack7
8	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	Pack8
9	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	Pack9
10	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	Pack10
11	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	Pack11
12	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	Pack12
13	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	Pack13
14	ON	OFF	ON	ON	OFF	OFF	OFF	OFF	Pack14
15	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	Pack15
16	ON	ON	ON	ON	OFF	OFF	OFF	OFF	Pack16

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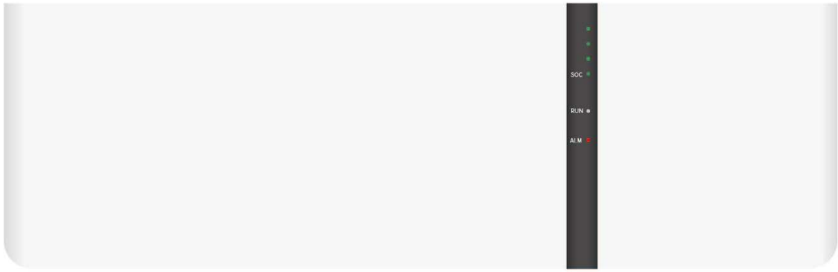
COMMISSIONING

4.1 Status Indicator



There are six LED indicators on the front of battery pack to show its operating status.

RUN: This indicator stays on while the battery pack running normally，including charge and discharge.

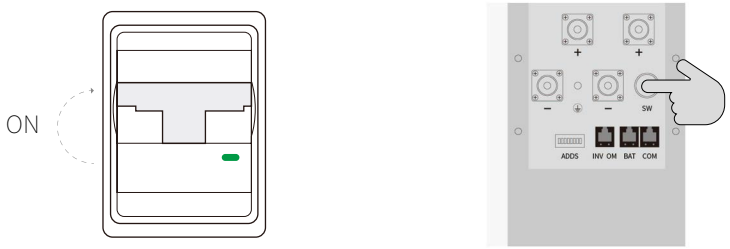
ALM: This indicator comes on when the battery pack is in an alarm state.

SOC: There are five indicators to indicate different levels of SOC.

4.2 Power on battery pack

> Move the DC breaker switch to ON position.

> Press the “SW” button to turn on the battery pack.



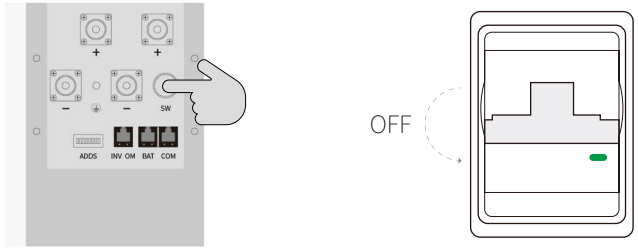
NOTE:

If communication with inverter is not established within 3 minutes after the battery pack is turned on, the output power from battery pack will close off. At the same time, RUN indicator will close off. while ALM indicator stay on.

4.3 Shutting down battery pack

> Press the “SW” button to turn off the battery pack.

> Move the DC breaker switch to OFF position.



NOTE:

Make sure all of indicators on the battery pack be off.

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Troubleshooting

Check the indicators on the front to determine the state of battery pack. A warning state is triggered when a condition, such as voltage, current or temperature, is beyond design limitations.
Use monitor software connected to battery pack to identify what has caused the warning, the possible warning message are as follows:

- Battery over voltage
- Battery under voltage
- Battery over temperature
- Battery under temperature
- Battery discharge over current
- Battery charge over current
- BMS internal communication error
- Battery cell voltage imbalance

NOTE:

System can recover minor risk hazardousless warnings automatically after a while. For critical warning or alarm, please contact JOHNRAY service team or local installers.

User Manual

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