Lithium-Ion Phosphate Energy Storage Battery

EVIA100LFP-48R User Manual

Version：1.0

Note: Please read and understand all the contents of this Manual carefully before installation and use of the product, and please keep this Manual properly for look-up at anytime.

Content

1. Safety Instruction

1.1. Precaution

1).Before formally installing and operating this product, please read this manual carefully and strictly implement its contents.

2).During installation and use of this product, in order to prevent the personal injury and property loss and ensure the long-term usage of this product, the installation personnel and user shall abide by the articles and regulations of the relevant local laws and comply with all safety provisions and usage specifications of this Manual.

3).EVI will not be responsible for any damage to the product or personal injury caused due to any operation and usage that violates the above-mentioned relevant contents.

1.2. Safety requirements before installation

1).After unpacking, please check product and packing list first, if product is damaged or lack of parts, please contact with EVI or the local distributor.

2).The installation and commissioning personnel of the product shall obtain the local electrician qualification

shall receive the corresponding training and obtain the qualification for installation and commissioning of the product.

3).Before installation, be sure to cut off inverter and make sure the battery is in the turned-off mode.

4).Wiring must be correct, do not mistake the positive and negative cables, and ensure no short circuit with the external device.

5).It is prohibited to connect the battery and AC power directly.

6).Battery system must be well grounded and the resistance must be less than 100mΩ.

7).Please ensured the electrical parameters of battery system are compatible to related equipment.

8).Keep the battery away from water and fire.

1.3. Safety requirements in using

1).The product shall be repaired, replaced and maintained by the authorized personnel with electrician qualification.

2).If the battery system needs to be moved or repaired, the power must be cut off and the battery is completely shut down.

3).It is prohibited to connect the battery with different type of battery.

4).It is prohibited to put the batteries working with faulty or incompatible inverter.

5).It is prohibited to disassemble the battery (QC tab removed or damaged).
6).In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited.
7).Please do not open, repair or disassemble the battery except staffs from EVI or authorized by EVI. We do not undertake any consequences or related responsibility which because of violation of safety operation or violating of design, production and equipment safety standards.

1.4. Warnings

1).Do not install and use this product near any heatsource、combustible materials、corrosive gas or liquids.
2).Do not install and use this product in the areas where the persons frequently move.
3).Do not expose this product to the direct sunlight for a long time.
4).Do not discarding the battery into fire or heater.
5).Do not disassemble the battery and its part.
6).Put the battery in the right place and recycle it in compliance with local environmental regulations.
7).If the battery is stored for long time , it is required to charge them every six months, and the SOC should be no less than 80%.Battery needs to be recharged within 12 hours, after fully discharged.
8).Please contact the supplier within 48 hours if there is something abnormal.
9).In areas with poor environmental conditions, effective protective measures must be taken for battery module,

such as good grounding, sun shading board, rain cabinet and dust screen, to avoid lightning, rain, snow, high temperature, dust damage battery module and impact battery life.

10).For being used in high temperature areas, the battery must be used in cabinets with corresponding heat dissipation equipment (fans or air conditioners). In low temperature areas, the battery must be used in cabinets with corresponding heating equipment (heating plates or air conditioners). In coastal areas, the battery must be used in a cabinet with the corresponding salt spray protection capability.

11).Unless otherwise specified, the charging and discharging current for the battery is recommended to be set less than 0.5C.

2. Product Introduction

2.1. Main features

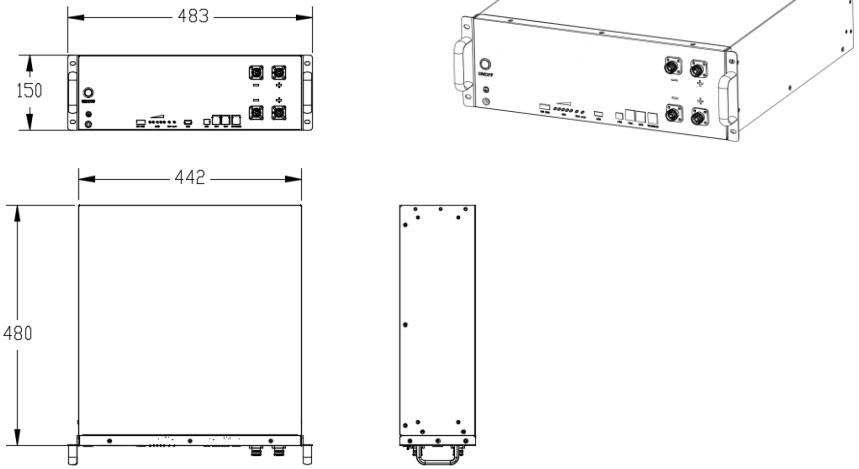
The Battery is a new generation of the household energy storage system which can meet the diversified needs of the users around the world. The high- performance lithium iron phosphate battery is adopted, and the functional integration and modular structural design are carried out, so as to achieve the convenient capacity expansion and quick product installation, and realize the functions, such as load matching, remote control, emergency power supply and so on.

Model	EVIA100LFP-48R
Battery Chemistry	Lithium Iron Phosphate (LiFePO4)
Cell string	15S
Nominal Voltage	48V
Battery capacity	105Ah
Nominal Energy	5.04KWh
Usable Energy	4.54KWh

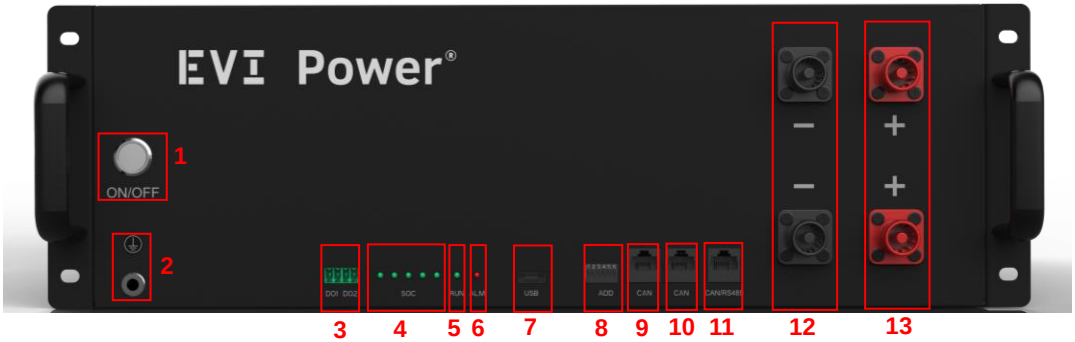
Operating Voltage Range	42V-54V
Recommended Charge/Discharge Current	50A
Max. Charge/Discharge Current (Peak)	100A
Dimension (W*D*H)	442*480*150 mm(exclude handle)
Weight(Kg)	46Kg
Expansion	Up to 8 units in parallel
Communication	RS485
Operating Temperature Range	Charge: 0°C ~ +55°C
	Discharge: –20°C ~ +60°C
Storage Temperature	–20 ~ +35°C
Humidity	5%~95%
Altitude (m)	＜2000

2.2. Specifications

2.2.1. Mechanic size



2.3. Interface introduction

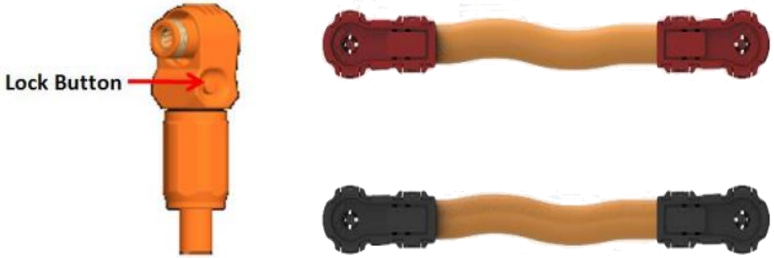


No.	Name	Description
1	ON/OFF button	To turn on/off Battery
2	Ground hole	For battery grounding
3	Dry Contact	2 way dry contact signal

4	Capacity indicator	Battery capacity indicator: 5 green lamps, each light represent 20% capacity.
5	RUN light	To show the battery’s running status
6	Alarm light	To show the battery’s Alarm and Protection status
7	USB port	For connecting WIFI device(Only work when BMS support extended WIFI function)
8	ADD	4 bit dial switches to manually distribute the communication address of the each battery when parallel.
9	COM1	CAN/RS485 Communication port for Parallel
10	COM 2	CAN/RS485 Communication port for parallel
11	COM 3	RS485 Communication port for Inverter
12	Power Terminal -	Battery output Negative terminal Connect to Inverter.
13	Power Terminal +	Battery output Positive terminal Connect to Inverter.

2.3.1. Power terminal +/-

There are two pair of terminals with same function, one connect to equipment, the other one paralleling to other battery module for capacity expanding. For each single module, each terminal can achieve charging and discharging function. For power cables uses water-proofed AMPHENOL connectors. It must keep pressing this Lock Button during pulling out the power plug.



2.3.2. LED indicators instructions

status indicator

Battery Status	Operation status	Capacity SOC					RUN	ALM	Remark
		●	●	●	●	●	●	●	
ShutDown	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All off
Sleep	Normal	OFF	OFF	OFF	OFF	OFF	Flash2	OFF	Indicates Sleep Mode, to save the power.
Active	Normal	Indicate based on capacity					Light	OFF	Indicates active mode.
Protecting	Protect	Indicate based on capacity					Flash2	OFF	Normal protection
Alarm	Protect	Indicate based on capacity					OFF	Light	Stop discharging, ALM lighting
Abnormal	Protect	Indicate based on capacity					OFF	Flash2	Error status return to manufacture

Note: The flashing instructions

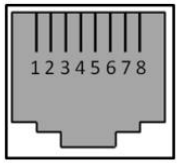
flash 1 - light 1s / off 1 seconds;

flash 2 - 0.25s light / 0.25s off;

SOC indicator

SOC (%)	LED1	LED2	LED3	LED4	LED5
0~5	Flashing	OFF	OFF	OFF	OFF
6~19	ON(Flashing when charging)	OFF	OFF	OFF	OFF
20~39	ON	ON(Flashing when charging)	OFF	OFF	OFF
40~59	ON	ON	ON(Flashing when charging)	OFF	OFF
60~79	ON	ON	ON	ON(Flashing when charging)	OFF
80~94	ON	ON	ON	ON	ON(Flashing when charging)
95~100	ON	ON	ON	ON	ON

2.3.3. Definition of RJ45 port pin



RJ45 Port

RJ45 Plug

Pin No.	COM1	COM2	COM3
1	CAN_H	CAN_H	---
2	CAN_L	CAN_L	---
3	RS485B	RS485B	RS485B
4	---	---	---
5	RS485A	RS485A	RS485A
6	---	---	---
7	---	---	---
8	---	---	---

2.3.4. Address configure table for parallel connection

4 bit dial switches to manually distribute the communication address of the battery system. Nether position is OFF, means “0”. Upper position is ON, means “1”.

Address	Switch position(ON/OFF)			
	1	2	3	4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF

5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

3. Installation Instruction

3.1. Tools list

During installation of Battery, the following tools may be used:

	Leveling instrument		Slotted screwdriver
	Wire clamp		Flexible rule
	Trox screwdriver		Torque wrench
	Wrench		Hammer
	Churn drill		Phillips screwdriver

3.2. Personal protective equipment

1).The personal protective equipment must be worn during installation, use and maintenance of the product.

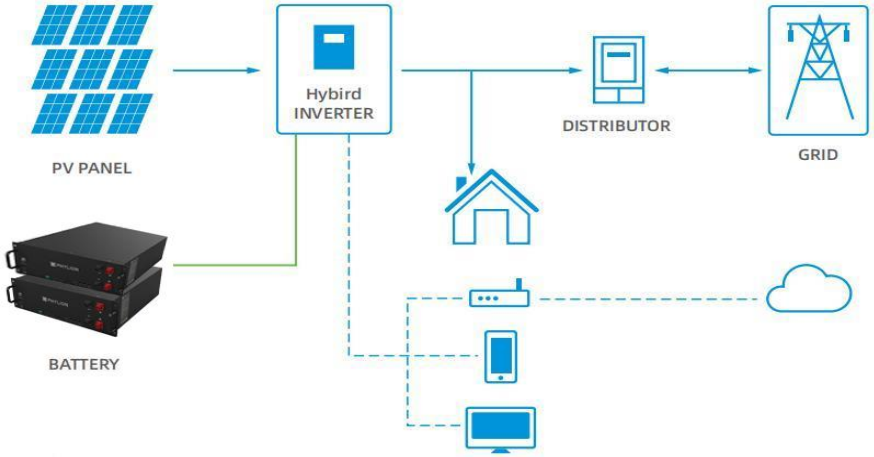
2).It's recommended to wear the following personal protective equipment: --Insulated gloves: ensure the life safety of installers.

--Safety shoes: ensure the safety in case of accidental falling of modules during installation.

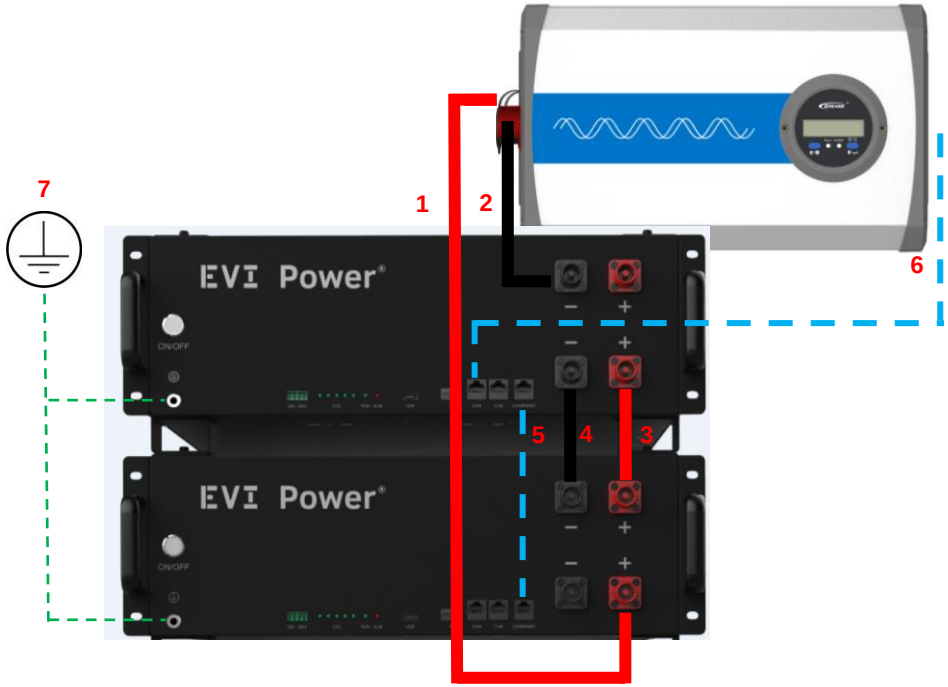
Insulated gloves

Safety shoes

3.3. Typical topology diagram



3.4. Connection schematic diagram(with hybrid inverter)



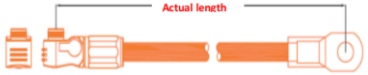
Note:

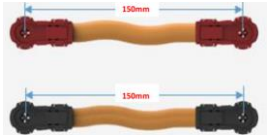
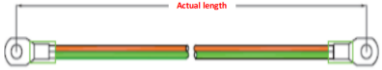
1).The installation location should be completely water proof.

2). The ambient temperature should be within the range from -5°C to 45°C. The temperature and humidity should be maintained at a constant level.

3). The distance from air outlet of inverter is more than 0.5 meters. Do not cover or wrap the battery case or cabinet.

4).Inverter setting procedure please refer to the manual of Inverter.

No.	Item	Description
1		Positive power cable, for connecting to Inverter.(*Need to be purchased separately, or specify separately when placing an order)

2		Negative power cable, for connecting to Inverter.(*Need to be purchased separately, or specify separately when placing an order)
3/4		Power cable, for parallel connection
5		Communication cable, Battery to Battery RS485 port
6		Communication cable, Inverter connect to Battery CAN port
7		Grounding cable

4. Battery Maintenance

4.1. Regular maintenance items

1).Battery maintenance must be carried out by professionals or under their guide.
2).When the battery is not used for a long time, discharge the battery to between 45% and 60% of the battery capacity, and disconnect the battery output to avoid the battery power being emptied.
3).When the battery is not used for a long time, it is recommended to charge the battery once every six months to ensure that the battery can work normally.
4).Ensure reliable grounding.
5).When replacing the battery, use the same type and number of batteries or battery packs.

4.2. Maintenance method

4.2.1. Inspection

1). Fully clean the lithium battery on site, clean the heat dissipation channel to ensure no dust;
2).On-site check whether the BMS is working properly;
3).Check the alarm performance on site. Whether the wiring, switch, connecting point and contact device are in reliable contact;
4).Check whether the Charge voltage and Inverter supply parameters are normal;
5).Turn off AC and PV charging switches on site. Check whether the battery can discharge properly. Read the discharge status data and load current .
.Recover the float voltage on site. Check whether the battery can charge properly. Read the charge status data and charge current. Tighten the terminals.
7).For problems that cannot be judged on-site, please contact the manufacturer for after-sales solution immediately。

4.2.2. Software monitor

The Battery information and history can be monitored and read by upper computer through RS485 communication. Using the software to check the operation status of the lithium battery on site, check the basic information of the lithium battery brand, model, capacity, quantity, online time, etc., if the input information of the SW is found to be inconsistent with the actual information on site, record and timely feedback to the regional distributor for deep analysis.

4.3. Common troubleshooting

4.3.1. Fault diagnose based on

1).Whether the battery can be turned on or not;
2).If battery is turned on, check the red light is off, flashing or lighting;
3).If the red light is off, check whether the battery can be charged/discharged or not.

4.3.2. Preliminary diagnose steps

1).Battery cannot be turned on, switch on the lights are all no lighting or flashing.If the battery RESET switch is turned on, the RUN light is flashing, and the external power supply voltage is 48V or more, the battery still unable to turn on, please contact EVI or its distributor.
2).The battery can be turned on, but red light is lighting, and cannot charge or discharge. If the red light is lighting, that means system is abnormal, please check values as following:
a).Temperature: Above 45°C or under -5°C, the battery could not work.
Solution: To move battery to the normal operating temperature range between -5°C and 45°C.

b).Current: If current is greater than 50A, battery protection will turn on.
Solution: Check whether current is too large or not, if it is, to change the settings on power supply side.
c).High Voltage: If charging voltage above 54V, battery protection will turn on.
Solution: Check whether voltage is too high or not, if it is, to change the settings on power supply side.
d).Low Voltage: When the battery discharges to 40.0V or less, battery protection will turn on.
Solution: Charge the battery for some time, the red light turn off.Excluding the four points above, if the faulty is still cannot be located, turn off power switch
of the battery and repair.

4.3.3. The battery cannot be charged or discharged

1).Cannot be charged:

Disconnect the power cables, measure voltage on power side, if the voltage is 48.0~51.0V, restart the battery, connect the power cable and try again, if still not work, turn off battery and contact EVI or its distributor .

2).Unable to discharge:

Disconnect the power cables and measure voltage on battery side, if it is <40.0V, please charge the battery; if

voltage is above 48V and still cannot discharge, turn off battery and contact EVI or its distributor.

4.4. Fault code

When the product fault cannot be judged by direct observation, the hardware is detected to be free of faults,and the fault cannot be cleared after re-power-on and restart (i.e., shut down by pressing the button and start up by pressing the button), the fault information of the relevant equipment may be viewed through the fault code or monitoring website.The upper computer is connected by use of the 485 interface to obtain the fault code.

The fault light will be on when the system fault as listed in the following table. Generally, the fault will be automatically cleared within 30s~180s. If the fault cannot be automatically cleared for a long time, the system needs to be cut off and restarted. If the fault still exists, please contact the dealer.

***Emergency**:

In case of emergency, promptly cutoff the power supply and disconnect the circuit breaker.

5. Storage Requirements

The storage temperature range of the battery is -10°C ~ +45°C. As for the battery with long-term storage, the routine maintenance is required. Please charge the battery to 40%SOC at a current of 0.2C according to the requirements in the table below.

Ambient temperature for storage	Relative humidity for storage environment	Storage Time	SOC
<-10°C	/	Prohibited	/
-10~25°C	5%~70%	≤12 months	30%≤SOC≤60%
25~35°C		≤6 months	
35~45°C		≤3 months	
>45°C	/	Prohibited	/

6. Emergency Situations

6.1. Leaking batteries

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below. Inhalation: Evacuate the contaminated area, and seek medical attention.
Contact with eyes: Rinse eyes with flowing water for 15 minutes, and seek medical attention.
Contact with skin: Wash the affected area thoroughly with soap and water, and seek medical attention.
Ingestion: Induce vomiting, and seek medical attention.

6.2. On fire

NO WATER! Only dry powder fire extinguisher can be used; if possible, move the battery pack to a safe area before it catches fire.

6.3. Wet batteries

If the battery pack is wet or submerged in water, do not let people access it, and then contact EVI or an

authorized dealer for technical support.

6.4. Damaged batteries

Damaged batteries are dangerous and must be handled with the utmost care. They are not fit for use and may pose a danger to people or property. If the battery pack seems to be damaged, pack it in its original carton, and then return it to EVI or an authorized dealer.

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