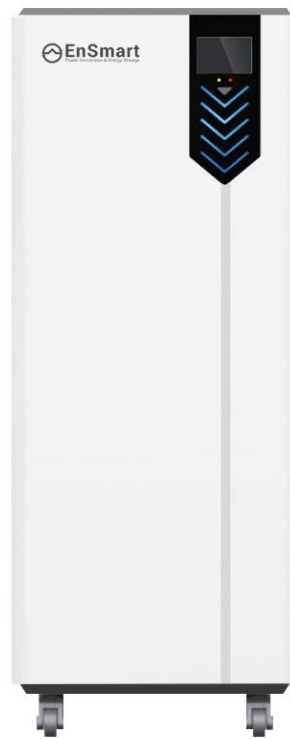




# ELV-F Series Floor Mounted Lithium Battery

Models 15kWh-20kWh



## User Manual

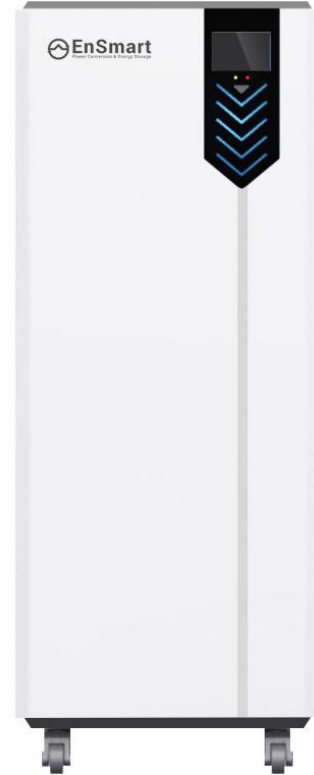
## About This Product

ENSMART ELV-F Series Battery utilizes most environmentally LiFEPO<sub>4</sub> cells, which eliminates operating temperature constraints, and the risk of thermal runaway and fire. The built-in smart Battery Management System (BMS) integrates multilevel safety concepts: Overcharge and Over-discharge Protection; Temperature Observation; Overload Monitor, and Cell balancing.

ENSMART ELV-F Series Battery are manufactured according to UL1973&UL9540A&IEC62619. Its materials meet the flame-retardant requirements. And the BMS is designed with redundant protection.

It comes with a smart USB Logging function (with optional USB flash disk) and supports WIFI platform Monitor. It supports up to 20 units in parallel, so that composes a large commercial Energy Storage System with 300~400kWh energy.

This installation manual contains information concerning important procedures and features of Lithium batteries. Read all the instructions in this manual before installation, operation, transportation, storage and maintenance.



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## 1. SAFETY ATTENTION

- ❖ All types of breakdown of the product may lead to a leakage of electrolyte or flammable gas.
- ❖ During installation of the battery, the utility grid, solar input must be disconnected from the Battery Pack wiring. Wiring must be carried out by qualified personnel. Battery Pack is not user serviceable. High voltage or current is present in the device. The electronics inside the Battery Pack are vulnerable to electrostatic discharge. Observe the following precautions:
- ❖ Risks of explosion
  - Do not subject the battery pack to strong impacts.
  - Do not crush or puncture the battery pack.
  - Do not dispose of the battery pack in a fire.
- ❖ Risks of fire
  - Do not expose the battery pack to temperatures in excess of 122 °F ( 50°C ) .
  - Do not place the battery pack near a heat source such as a fireplace.
  - Do not expose the battery pack to direct sunlight.
  - Do not allow the battery connectors to touch conductive objects such as wires.
- ❖ Risks of electric shock
  - Do not disassemble the battery pack
  - Do not touch the battery pack with wet hands
  - Do not expose the battery pack to moisture or liquids
  - Keep the battery pack away from children and animals.
- ❖ Risks of damage to the battery pack
  - Do not allow the battery pack to come into contact with liquids.
  - Do not subject the battery pack to high pressures.
  - Do not place any objects on top of the battery pack.



**The Lithium Batteries must always be installed with a charge controller and the appropriate settings to protect the batteries from open PV voltage and other highvoltage charging sources. The Battery Management System (BMS) alone will not protect the batteries from these extreme electrical phenomena. Failure to adhere to user manual will void the Warranty.**

Most batteries pose some risk of shock or sparking during the installation and initial wiring and connection process. Wearing insulated gloves, clothing and footwear and using electrically insulated tools are required when working with Lithium Batteries. Cover, restrain or remove jewelry or conductive objects (metal bracelets, rings, belt buckles, metal snaps, zippers, etc.) when working with any electrical or mechanical device. Cover or restrain long hair and loose clothing when working with any electrical or mechanical device.

**CAUTION!**

- **Verify polarity at all connections before energizing the system. Reverse polarity at the battery terminals will void the Warranty and destroy the batteries. Do not short circuit the batteries.**
- **Do not combine this type of Lithium Batteries with others.**
- **Do not disassemble or modify the battery. If the battery housing is damaged, do not touch exposed contents.**

## 2. TRANSPORTATION, HANDLING AND STORAGE

### 2.1 Transportation and Handling

- Do not knock, drop, puncture, or crush the battery;
- Do not expose battery to flames, incinerate or direct sunlight;
- Do not open battery enclosure or disassemble the battery;
- Do not lift battery by the terminal cables;
- Do not vibrate battery;
- Do not expose battery to water or other fluids;
- Do not expose battery to open flame;
- Do not place the product nearby highly flammable materials, it may lead to fire or explosion in case of accident;
- Move batteries in the required direction. Do not place a battery upside down or tilt it;
- A ventilated area is strongly recommended for handling the product.

### 2.2 Storage

- Do not expose battery to high temperatures and direct sunlight under;
- Store at cool and dry place. Storage Temperature (Min. /Max.): 41°F/5°C — 95°F/35°C. Relative Humidity (Min./Max.): 5%~75% RH;
- Do not store in greenhouses and storage areas for hay, straw, chaff, animal feed, fertilizers, vegetables or fruit products;
- Do not store in a high temperature and humidity environment;
- Store the product on a flat surface;
- Store the product out of reach of children and animals;
- Store the product where it should be minimal dust and dirt in the area;
- Systems should be put into storage at 60% SOC and checked monthly to ensure the system SOC does not fall below 20%. At 20% SOC the battery will self-discharge in approximately 2 months. Also check the voltage every 3 months and recycle every 6 months if the battery is not use for long time.

### 2.3 Response to emergency situations

The battery pack comprises multiple batteries that are designed to prevent hazards resulting from failures. However, ENSMART cannot guarantee their absolute safety.

## ❖ 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.

## ❖ Fire

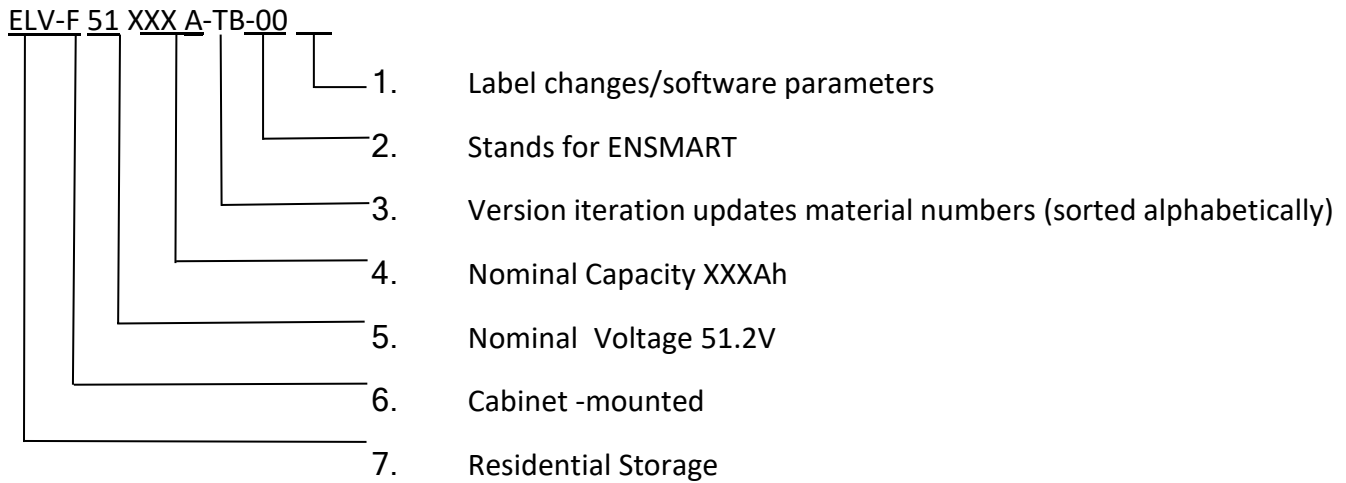
In case of fires, make sure that the extinguisher is available near the battery pack. If possible, move the battery pack to a safe area before it catches fire.

### **Note: Fire extinguisher**

- Water, carbon dioxide, dry chemical powder and foam are the most effective means to extinguish a Lithium Ferrous Phosphate (LFP) battery fire.
- Use ABC Fire extinguisher, if the fire is not from battery and not spread to it yet.

### 3. PRODUCT INTRODUCTION

#### 3.1 Product Name



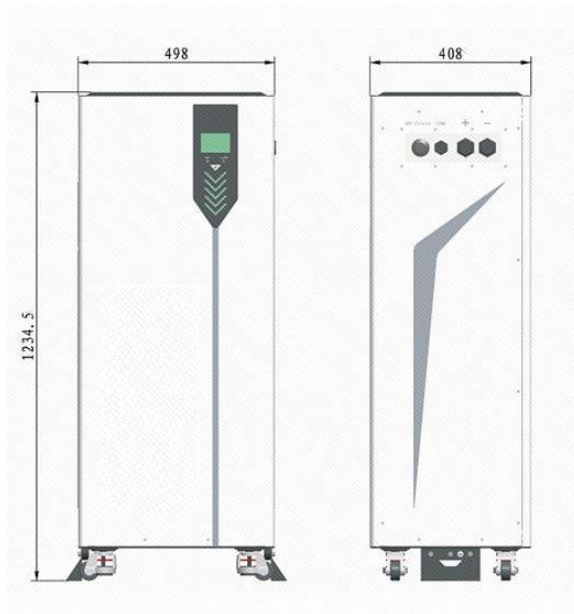
#### 3.2 Technical data

Items	ELV-F51300	ELV-F51400
Total Energy	15.36kWh	20.0 kWh
Usable Energy	14.7 kWh	19.2 kWh
Recommend Charge Current	90A	120A
Max. Charge Current (Continuous)	150A	180A
Max. Discharge Current Continuous)	180A	180A
Nominal Capacity	300 Ah	400Ah
Nominal Voltage	51.2 V	
Charging Temperature	0°C~45°C(32~113F)	
Discharging Temperature	-20°C~60°C(-4~140F)	
Dimension [W*D*H]	498*408*1234.5mm	
Weight	~200kg	~240kg
Enclosure Protection Rating	IP55 (indoor unit)	
Scalability	Up to 20units	
High Current Circuit Breaker	250 A	
Battery Efficiency	>98%	
Self-discharge rate (Sleep mode)	Capacity:≤3%/month;≤20%/years	



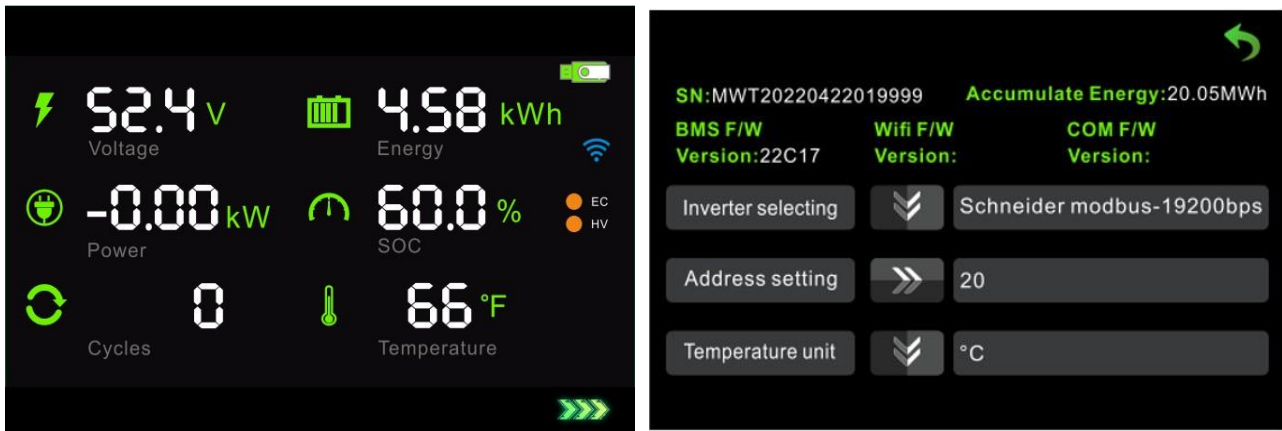
### 3.3 Product pictures

➤ Product dimension (Unit:mm) :



➤ LCD:

LCD can display Voltage, Residual Energy, Power, SOC, Cycles, Temperature. User also can browse battery factory information, and select inverter protocol, battery parallel Address and Temperature unit.



**Note:** User can click "Temperature unit" on the LCD screen to switch the temperature unit.

## 4. INSTALLATION

Safe and reliable installation requires trained and certified technicians. The following discussion of Battery configurations is a basic primer. Due to the variety of systems and components in the field, all possible scenarios are not covered. This is not the purpose of this section of the manual. Refer to professional installers regarding your system and its components and specifications. We encourage you or your installer to contact us with any specific questions for technical support. We are committed to working with you and your installation team to achieve a safe, reliable storage system that will provide years of maintenance free service.



**Lithium Batteries are designed for parallel operation only. Do not design for series connection for increased voltage. Series connection of this product can result in damage to Lithium Batteries and will void warranty!**

### 4.1 Installation Preparation

#### 1) Environment Requirement

Application scenarios	Residential & commercial energy storage systems
Operating Environment	Indoor and place away from strong electromagnetic radiation
Recommended salt spray	An area 2km from the coast
Ambient Temperature	-10~40°C (14~104°F)
IP grade	IP55
Storage Temperature	Short time(≤1month): -20~45°C (-4~110°F) Long time (≥1month): 5~35°C (41~95°F)
Operating Humidity	0 ~ 85%
Install Altitude	≤4000m
Case Ground requirement	Use at least 6mm <sup>2</sup> copper wire with the resistor ≤1Ω.

#### 2) Tools & Materials

The following insulated tools and materials are required:





- Positive and negative battery cables. We recommend copper cables AWG 3/0. The battery power cables are not included. Please refer to the published Battery Cable Sizing Chart for the proper size, based on your system specification.
- Positive and Negative Terminal luge recommendation: M10\*1.5 (diameter: 10mm or 3/8in).
- Screwdriver.

- RJ45 cable.
- Wall Mount hangers.
- OSHA(Occupational Health and Safety Administration) approved personal protective equipment

		
Insulated gloves	Safety Glasses	Safety Shoes

### 3) Check the packing list

- Check the battery package, type, quantity, appearance and other components.

Parts	QTY	Photo
Battery parallel communication cable_RJ45_RJ45	1pcs	
Expanding screw M8*60, fix rack on the floor	4pcs	
Inverter communication cable_RJ45_Gray*	Optionnal	
L-shaped support foot	2pcs	

**\* Note: Usually user equip inverters of different brands, which need prepare different kinds of communication cable. The dealer can inform us the inverter brand which this battery support, such as Schneider, Deye, Sol-ark, Megarevo, SMA, Victron, Growatt. Before installation, connect the matching inverter with thedealer to avoid the mismatch of the inverter in the installation process.**

- Check if there is any damage on the battery box.
- Check the battery terminals and connections to make sure they are clean, free of dirt, fluids and corrosion.
- All battery cables and their connections should be tight, intact, and NOT broken or frayed.
- Check torque on terminal bolts.
- Replace any damaged batteries and cables.



**IMPORTANT NOTE: Please inform us of any problems within 7 days of receipt of goods. Otherwise, we deem that clients have no objection to the goods.**

## 4) Installation Location

The battery pack must be installed indoors. Make sure that the installation location meets the following conditions:

- The area is completely waterproof.
- The floor is flat and level (Inclination < 15°).
- There are no flammable or explosive materials.
- The optimal ambient temperature is within the range from 59 °F (15°C) to 95 °F (35°C) .
- The temperature and humidity are maintained at a constant level.
- There is minimal dust and dirt in the area.

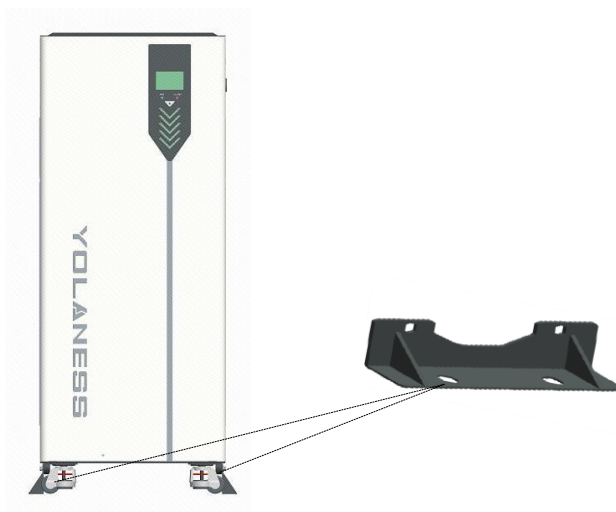


**IMPORTANT NOTE: The ambient temperature exceeds the operating range, the battery pack may stop operating to protect itself. Frequent exposure to harsh temperatures may deteriorate the performance and life of the battery pack.**

## 4.2 Installation Steps

### 4.2.1 Mounting and securing the battery

The ELV-F Series Battery is designed to stand on the floor with 4 wheels on the bottom. If desired to strengthen Anti earthquake ability, the rack should be fixed on floor with expanding screw and L- shaped holder prepared in wooden case. We recommend putting the batteries on platform to avoid flooding. Please refer to the Lithium Battery Data Sheet for weight and dimension. Lock the wheels on the battery pack.

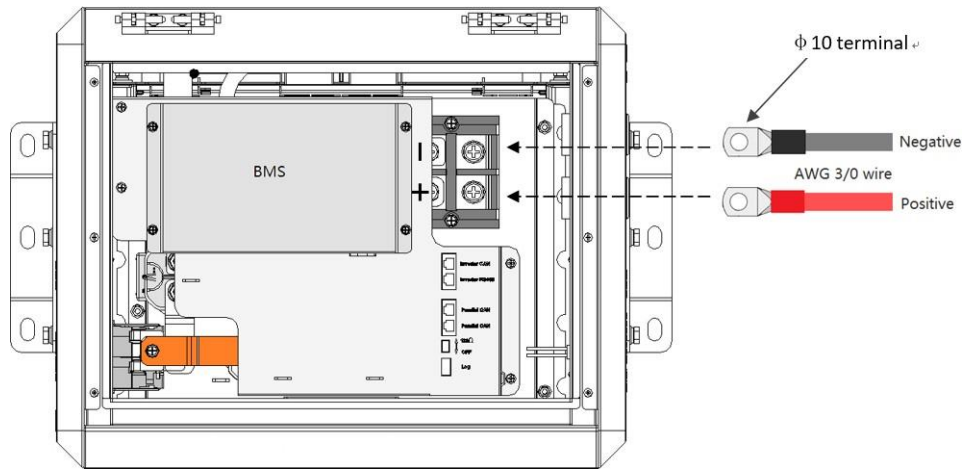


### 4.2.2 Connecting the battery to the Charge Controller and/or Hybrid Inverter

The battery terminals are positioned under the top cover. Please make sure the breaker on the left side of rack is in the OFF position. Please install the positive cable first and the negative

cable second. Please do not cross the positive and negative terminals; also, ensure the terminals are not connected to any metal mounting, fixture, or body part. Recommended terminal torque range is 10.0 – 19.1 N·m (7.4 – 14.1 ft.lb)

The Lithium Batteries are equipped with two M10 threaded terminals with a lock washer and nut. 10mm ring terminals along with proper size wiring cables are required to connect battery to inverter/charger. Positive use red wire and connect to “+” electrode; negative use black wire and connect to “-” electrode. **Do not reverse polarity to void warranty.**



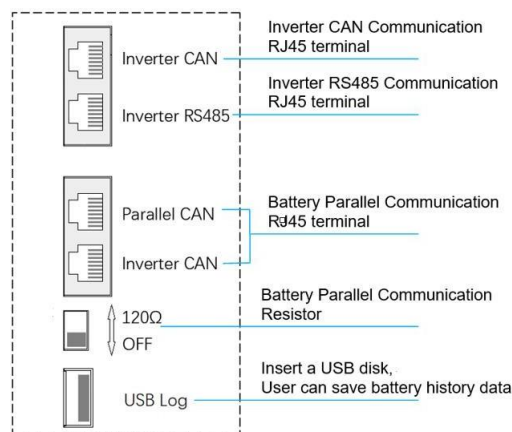
Top View



**NOTE!** Without exception, products experiencing terminal burn out will not be covered under the warranty.

### 4.2.3 Using Communication Port

ELV-F Series Battery has a self-managed Battery Management System (BMS). The Communication board has five ports which are designed to support Inverter RS 485 and CAN communication, battery parallel communication (see section 4.5.6.) and USB Logging. And User can set the battery Parallel CAN port terminator by Small toggle switch



#### 4.2.4 Grounding

Grounding the battery, if necessary. ENSMART ELV-F series has 1 grounding holes on the bottom of battery case.



#### 4.2.5 System Commission

If you only install single ELV-F Series Battery, please follow the below steps to start up.

- 1) Check system connection cables for correct polarity.
- 2) Put the battery's breaker on the "ON" position.
- 3) Put inverter breaker in the "ON" position.
- 4) Push the power button on the front of the unit for 3 seconds to turn on the battery LCD display.



**If you install multiple inverters with one or more ELV-F Series Battery, please turn the first Inverter on by following the above mentioned steps, then power up the remaining inverters.**

#### 4.2.6 Parallel Connection

Lithium Batteries with the same capacity may be connected in parallel up to 20 units with high stability, efficiency and overall quality. A qualified installer should understand this and must adhere to the industry standard and published electrical guidelines.

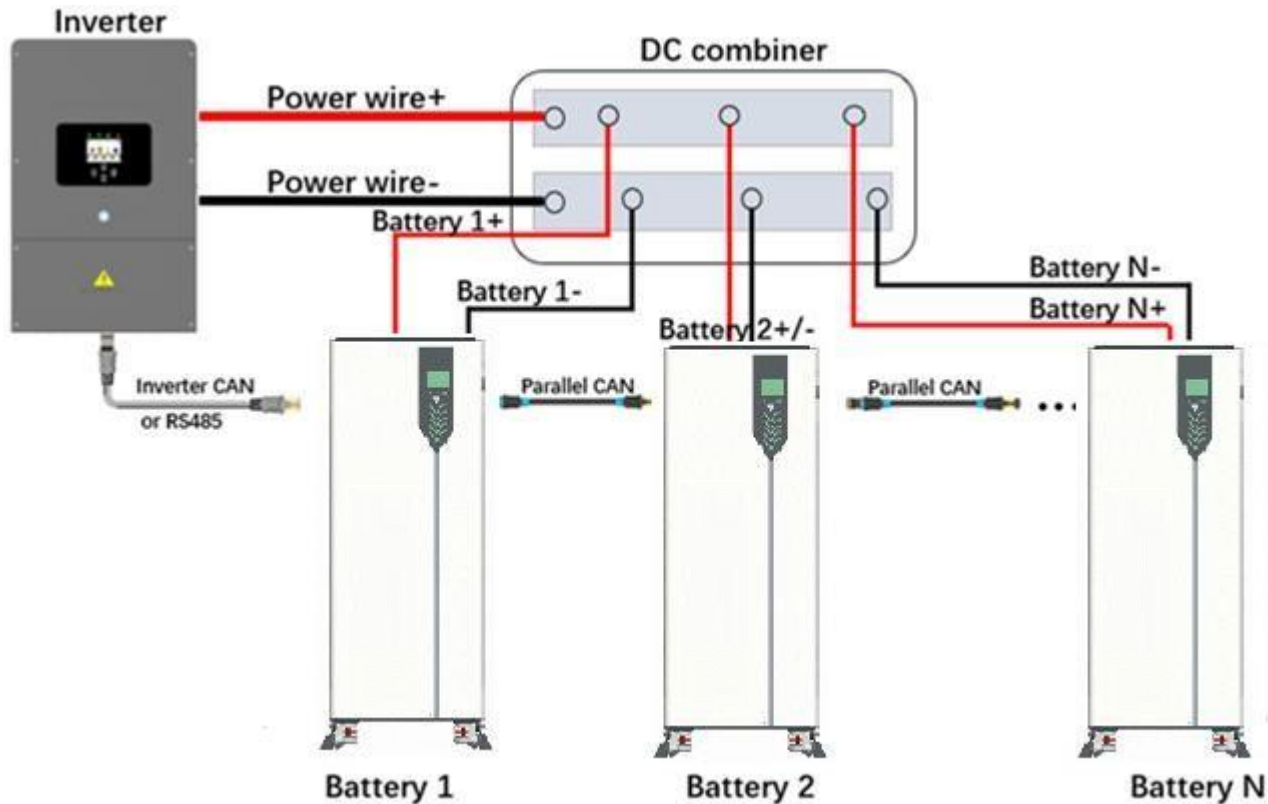


**CAUTION! Lithium Batteries are designed for parallel operation only. Do not connect in series for increased voltage. Series connection can result in damage to Lithium Batteries and will void warranty!**

The Storage Capacity and total available Amperage are increased by the parallel connection. The following illustration shows how to connect multiple batteries in parallel. Please note the overall Voltage is not changed. The available Amperage from the system has been accumulated.



**CAUTION!** For parallel connecting: Maintain identical wire length and wire construction from each Battery terminal to the common bus. If you parallel more than 4 units, a batterycombiner is highly recommended.



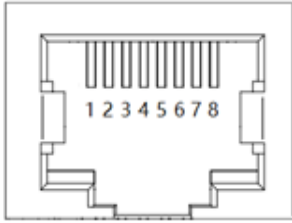
System wire block diagram

**Note:** Battery address Numbers are set by LCD.

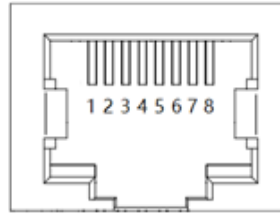
**Please follow the procedure to parallel ELV-F Series batteries**

- 1) Prepare communication cable.** Each unit comes with 2pcs RJ45 cable (One for inter- battery Parallel CAN port, the other for communication with inverter). If the cable is missing, please make sure the cable you purchase on the market meets the following standards. Please note that a standard RS485 cable is used.

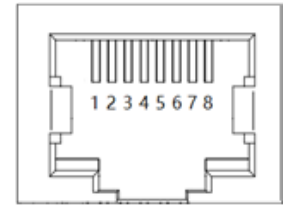
Note: Inverter CAN and RS485 are optional, and just be used one of them depending on inverter communication port.



BATTERY & INVERTER  
CAN Port



BATTERY & INVERTER  
RS485 Port



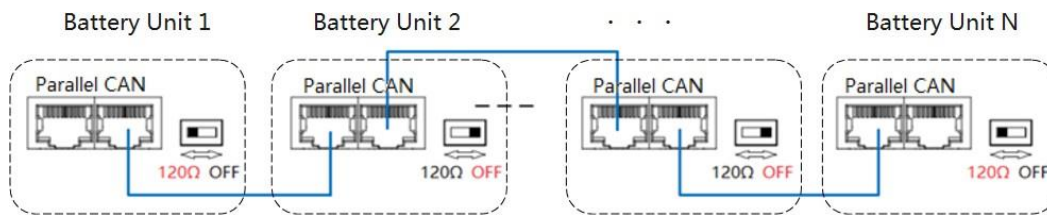
INTER-BATTERY  
Parallel CAN port

Pin No.	Definition
1	INVERTER_CANH
2	INVERTER_CANL
3	CANGND
4	NC
5	NC
6	NC
7	NC
8	NC

Pin No.	Definition
1	NC
2	NC
3	INVERTER_RS485A
4	NC
5	INVERTER_RS485B
6	RS485GND
7	NC
8	NC

Pin No.	Definition
1	BMS debug_CANH
2	BMS debug_CANL
3	CANGND
4	NC
5	NC
6	CANGND
7	Parallel_CANL
8	Parallel_CANH

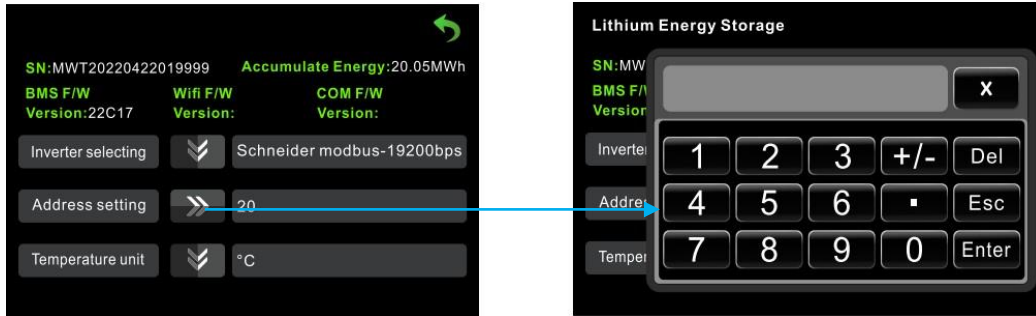
- 2) Confirm the Battery DC breaker is in the “OFF” position.
- 3) Wire each battery’s Power bus to Inverter. And wire inverter’s cable to PV, Grid and Load.
- 4) Use the RJ45 cables to connect the batteries’ Parallel CAN port, as illustrated in the chart below. Ensure communication matching resistor of two terminal (Unit 1 & Unit N) is set as 120Ω(Dial left) , others is set as OFF.



- 5) Press the button on the front of each battery for 3+seconds one by one, until all batteries wake up.
- 6) Touch the batteries’ LCD to set Battery “Address setup” from 1 to N (Parallel number) as the picture below.

Note: If used for single battery without parallel, must set “Address setup” as 0.





7) Touch the LCD to set Inverter “Inverter Setup” as the following form.

Inverter Setup	Support Inverter Protocol
1	Deye CANbus,500kbps
2	SMA CANbus, 500kbps
3	Reserved
4	Victron CAN, 250kbps
5	Schneider Modbus, 19200bps
6	Solark/Megarevo CANBus, 500kbps
7	Voltronic Modbus, 9600bps
8	Growwat Modbus, 9600bps
9	Reserved
10	Reserved

- 8) Use RJ45 cable to connect the inverter CAN or RS485 port of master battery (which Battery ID set as 1) to inverter communication port.
- 9) Turn ON inverter’s breaker, then turn ON all batteries’ DC breaker, and then press the button of master battery (Battery ID 1) for 6+ seconds to turn off, at last press master battery’s button for 3+ seconds to start automatically PARALLEL PROCESS as below:
  - a) Master battery requests the lowest voltage battery of the whole bank to pre-charge and turn on relay, and request charge current from inverter.
  - b) As the battery voltage increase by inverter, other battery join in to parallel one by one.
  - c) After all normal batteries complete parallel, the PARALLEL PROCESS end up, and recover normal request from inverter.

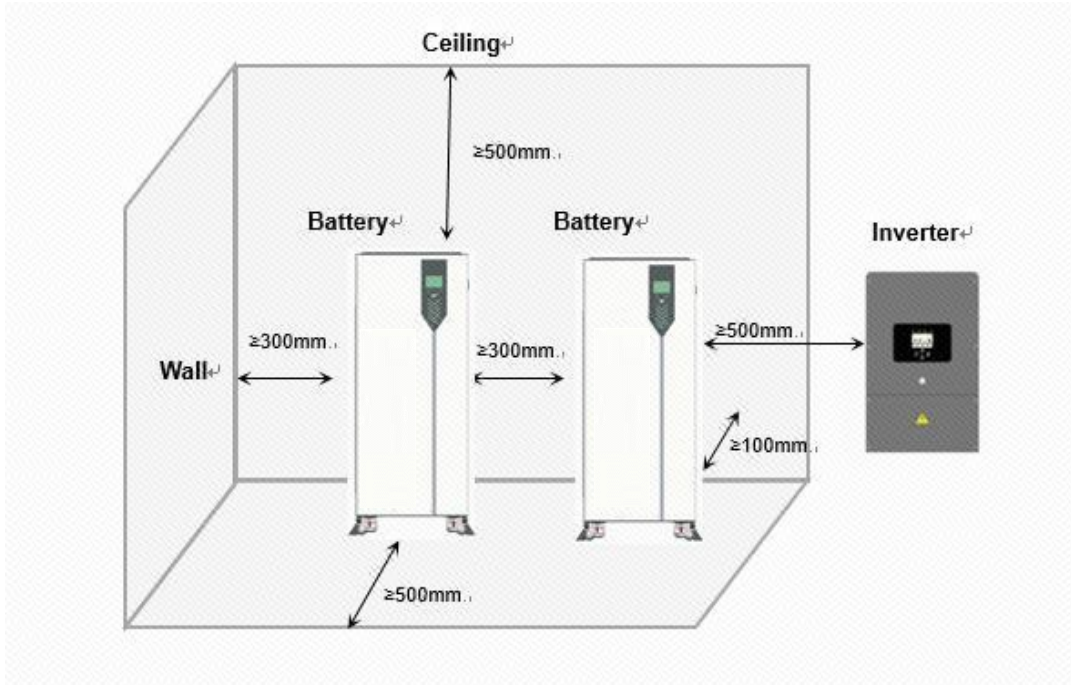
### 4.3 Wire the battery cables



**CAUTION!** For parallel connecting: Maintain identical wire lengths and wire gauge from each Battery terminal to the common bus.



**CAUTION!** For connecting multiple units: Maintain the recommended distance among battery units' side or wall- **at least 12 inches (300mm)**. Keep battery unit' front at least 20 inches (500mm) away from wall, battery unit' rear at least 4 inches (100mm) away from wall. And keep battery unit' side at least 20 inches (500mm) away from Inverter or ceiling.



1. Connect the positive and negative common bus to the inverter.
2. Please put battery breaker into "ON" Position
3. Please put inverter breaker into "ON" Position



**CAUTION!** If Paralleling the ELV-F Series Battery without connecting them via RJ45 cable(s), please make sure the voltage difference between the highest voltage and lowest voltage does not exceed 1.0 volts. A large current flow from the higher voltage battery to the lower voltage battery could potentially damage one or both batteries.

Resulting damage to the battery will void the warranty.



**CAUTION!** Verify polarity at all connections with a standard voltmeter before energizing the system. Reverse polarity at the battery terminals will void the Warranty and destroy the batteries. Do not short circuit the batteries.

**KEY POINTS SUMMARY:**

1. Each Lithium Battery contains circuitry that protects the Lithium Ferro Phosphate cells from overcharging, over-discharging, and excessive load amperage. If the values specified are exceeded, the battery will enter a protective shut down state. In some cases, this may result in the need to re-initialize an inverter charger or other equipment in the installation. In other cases, the inverter's system settings may be saved within the inverter memory storage and will not need to be reset. This is not an absolute standard but is common among most inverter chargers. Check your inverter manufacturer specifications.
2. If the battery enters a self-protective mode, negligible voltage readings will be present until the unit is reset. In some instances, after unused for long time, a charge might need to be manually applied to the energy storage bank. Should this occur, please contact ENSMART for technical support. Lithium Batteries are designed to remain robust and safe under most circumstances.
3. Although each Lithium Battery contains circuitry that protects the Lithium Ferro Phosphate cells from overcharging, over-discharging and excessive load amperage, Lithium Batteries must always be installed with a charge controller and the appropriate settings to protect the batteries from open PV and other high voltage sources. Lithium Batteries alone will not protect from extreme electrical phenomena.
4. GRID TIED SYSTEMS: Once the Lithium Battery has been installed, turn on the entire system to test. Once testing has been completed, please disconnect the batteries from the load center until your local Utility Inspector is ready to turn on the entire system. The charge controllers and inverter monitoring systems can drain the Lithium Batteries over an extended period when the entire system is not fully operational due to the electrical draw of the system components.
5. OFF GRID SYSTEMS: Do not connect the Lithium Batteries until the entire system is ready to turn on and is fully operational.

**4.4 Final Connection of the Installation**

Final installation and operation guidelines will be dictated by your Electrician and Installer based on the overall properties of and procedures for the equipment in your installation and any code requirements that apply to your region. ENSMART technicians and sales staff are available to provide any additional information on the Lithium Batteries as needed. Please be aware of the potential electrical hazards before interacting with any and all electrical or mechanical devices. Please take all necessary safety precautions in your projects and installations.

**4.5 Turn off the Unit**

If you need to turn off the unit, please push the button for about 6 seconds.

**4.6 Cut off the Unit**

Battery has a breaker accessory, which is connected to battery output terminal, and can cut off both two electrodes of battery.

## 5. OPERATING

### ➤ **Operating Environment**

See “3.1 Technical Data” Table on page 5

### ➤ **Charging**

Never attempt to charge a battery without first reviewing and understanding the instructions for the charger being used. Only use a ENSMART Approved Lithium Ferro Phosphate (LFP) charger if ancillary charging is required before installation, testing or troubleshooting. Failure to use a ENSMART approved LFP charger will damage the battery and void the warranty



#### **CAUTION!**

**Please follow the following steps to use the charger to charge the battery:**

- Connect the charger leads to the battery;
- Make sure that the charger lead, both at the charger and the battery side, connections are tight;
- Turn on the breaker of battery;
- Startup the battery by holding the power button of battery for about 3 seconds;
- Turn the charger on.



**CAUTION! Recommended charging current is 120A, Max. 200A (Please follow the specification on Lithium Battery Datasheet.)**

### ➤ **Discharging**

- Do not discharge battery below operating voltage.
- Do not discharge battery at rates greater than maximum continuous current.
- Do not operate in conditions that will exceed the internal operating temperatures of the battery.

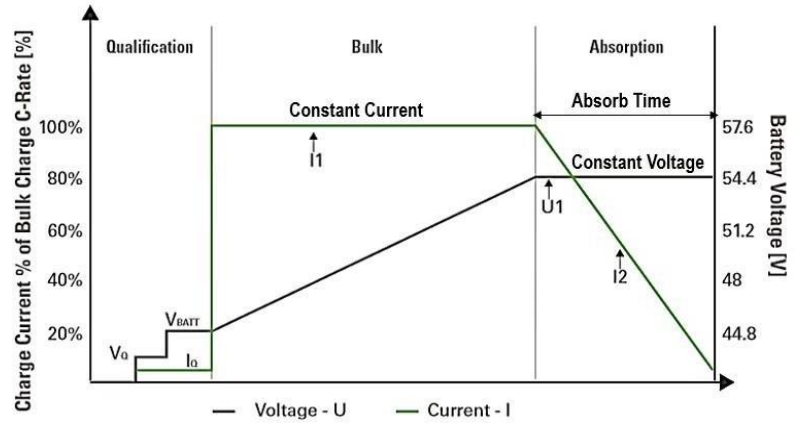
### ➤ **Parameter set up guide in Charger/Inverter**

Before commissioning the energy storage system, the appropriate controller and inverter settings must be programmed per the manufacturer's recommendations. Consult the manufacturer's manuals and/or access technical support (Schneider, Sol-Ark, Victron, SMA, Growatt, Deye).

Although Lithium batteries can perform at very high rates and depths of discharge within a very wide temperature range, in order to achieve extended life cycles and to comply with the Warranty, the following guidelines should be followed:

➤ **Understand Charge Stage**

1. Bulk Charge: Charge at Constant Current (CC) to Bulk/Absorb Voltage;
2. Absorption Charge: Maintain Constant Bulk/Absorb Voltage (CV);
3. Terminate when charge current drops below 0.05C;
4. Unlike Lead Acid batteries, Lithium Ferro Phosphate batteries do not require Float Charge.



➤ **Charger/Inverter configuration recommendation for best Performance:**

Recommended operating parameters of charger/Inverters For 3,000 Cycles:

- Operating temperature range: 32 F to 120 F (0 °C to 49°C) Recommended

operating parameters of charger/Inverters For 6,000 Cycles:

- Operating temperature range: 50 F to 110 F (10°C to 43°C)



**CAUTION! Do Not Operate Lithium Batteries at an average temperature exceeding 30 °C / 86 °F over the life of the battery.**

## 6. DIAGNOSTIC GUIDE

The smart ELV-F Series BMS provides multiple level protection function:

- Over Charge Voltage Protection;
- Over Discharge Protection;
- Over Current Protection for Discharge Via Thermal Control;
- Short Circuit Protection;
- ON/OFF Switch;
- In the event of a fault the battery protection circuit will open its internal relays disconnecting the negative battery terminals from the internal cells. The battery uses relays and precautions should be taken to reduce voltage spikes and large inductance in the application.

Over Voltage Fault	58.4±0.4V
Over Voltage Recovery	54.0±0.4V
Low Voltage Fault	43.2±0.4V
Low Voltage Recovery	50.4±0.4V

When an Incident occurs or an alarm light is on, please follow this guide as the initial step in the troubleshooting process.

1. Please isolate the battery:
  - a. Turn OFF main Breaker on side of the battery;
  - b. Remove all external power sources to/from battery.
2. Make sure Battery Voltage is consistent with LCD Display:
  - a. Turn ON main Breaker on side of the battery;
  - b. Use an available Multimeter to measure the voltage at top of the terminals;
  - c. If not disaccord, Follow “Troubleshooting Guide”.

## 7. TROUBLESHOOTING Guide

Status	● RUN	● ALM	● LCD Display	Solution
Normal	●	-	-	-
Wait For Parallel	● Flash (1Hz)	-	● WFP	No processing required. This battery are waiting for parallel, It will join in parallel within 1 cycle automatically.
Remote Discharge Switch	● Flash (1Hz)	-	● RDS	Battery is remotely switched OFF by WIFI APP, user can resume the discharge ON through APP.
Rapid Shut Down	● Flash (1Hz)	-	● RSD	Check the whether the user has triggered the Rapid Shut Down switch; Check the RSD switch must be set NC(Normal)
External COM Error	●	-	● ECE	Check communication cable between battery & inverter; Check inverter selecting on battery's LCD; Check the inverter's BMS protocol settings;
Internal COM Error	-	● Flash (1Hz)	● ICE	Check the communication cable between battery; Check the CAN communication resistor following <b>4.5.6 Parallel Connection, section 4)</b> ;
Battery Address Repeat	-	● Flash (1Hz)	● ASR	Battery address setting cannot repeat with other battery, please reset address on LCD following <b>4.5.6 Parallel Connection, section 6)</b> ; then restart it.
BMS hardware failure	-	● Flash (2Hz)	● AFE, or ● ADS	Need replace the BMS.
Sampling Line Break	-	● Flash (2Hz)	● SLB	Open the top door of the battery rack, then check the battery cable of CON4~CON7.
High Voltage protection	-	●	● HV	Stop charge
Charge Over Current protection	-	●	● COC	Lower the charge current
Charge High Temperature protection	-	●	● CHT	Stop charge
Charge Low Temperature protection	-	●	● CLT	Stop charge
Charge Low Voltage protection	-	●	● LV	Stop discharge, charge the battery as soon as possible.
Discharge Over current protection	-	●	● DOC	Lower the discharge current
Discharge High Temperature protection	-	●	● DHT	Stop Discharge
Discharge Low Temperature protection	-	●	● DLT	Stop Discharge







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