TROPHY BATTERY, LLC

51.2V300E-3UL Rack Mountable LiFePO4 Battery

Model 51.2V300E-3UL

Important Information – Read this First

1. Thank you for purchasing our Trophy Battery 51.2V300E-3UL battery.

2. Trophy Battery offers personalized assistance and guidance for you in designing and setting up your system. If you have any questions or concerns please call us.

   Please call us at 803-380-6211 if you need assistance.
   Our email is **dan@trophybattery.com**

   If you need to text us or send us photos, use 803-341-2117, as the 803-380-6211 phone line does not accept texts or photos.

   For non-emergency situations, you may call between 8 am and 10 pm Eastern Time (New York Time).

   For emergency situations, you may call us 24/7.

3. This is a 48 Volt class battery which may be used with 48V class Inverters, Chargers, and Solar Charge Controller.

   The nominal voltage of this battery is 51.2 Volts.

   The Recommend Charge Voltage is 56.8 Volts, with a Float of 54.0 Volts, and a Battery Cutoff Voltage of 48 Volts or higher.

   Certain inverters such as some EG4, MPP Solar, Sun Gold Power, Rich Solar, and others will require a Battery Float Voltage of 56.0 Volts.

   If your inverter or Solar Charge Controllers seems to stop charging the battery at 54 Volts, set the Float Voltage to 56.0 Volts.

   Only 48 Volt Inverters, 48 Volt Solar Charge Controllers, or 48V LiFePO4 chargers may be used to charge this battery.

   Do not reverse the polarity when connecting to the battery terminals, positive (+) must be connected to positive and negative (-) to negative.

**Never connect AC, of any voltage, such as from a wall outlet to the battery terminals.
An appropriate 48V inverter, charger, or solar charge controller must be used.**

Do not expose the battery to water, excessive humidity, excessive temperatures in excess of 105F, to oils or acids, or to direct sunlight.

Do not drill into the battery case, or weld to the battery case.

4. **The battery may be oriented vertically, horizontally, or on its side.
   We do not recommend setting the battery upside down.**

   **The battery comes with a nice 4-wheel dolly with locking wheels.
   Please consider using this dolly. If desired, remove the sides of the wooden battery case, ensure that the dolly wheels are locked in place, leave the dolly on the bottom of the battery, then, with help, then lift one end of the battery so that the battery rests on the dolly.**

5. **The two short DC Power Cables included with the battery should only be used if you will be drawing no more than 50 amps from the battery.**

   If will be using a 3,000 watt or higher inverter, these cables must not be used.

   **Use 2/0 AWG Pure Copper battery cables, with very high strand count.
   You may also use 4/0 AWG Pure Copper battery cables.**

   To make this easy, we recommend using www.batterycablesusa.com

   **Use the Marine Grade, UL Listed battery cables, with 5/16" copper lugs for the battery ends.
   If you are using a Victron Lynx Power End or Distributor busbars, also use 5/16" copper lugs.**

   [00 Gauge (2/0 AWG) Marine Grade Tinned Copper Battery Cable UL 1426 Flexible with ends (batterycablesusa.com)](batterycablesusa.com)

   [0000 Gauge (4/0 AWG) Marine Grade Tinned Copper Battery Cable UL 1426 Flexible with ends (batterycablesusa.com)](batterycablesusa.com)

   We highly recommend using the above cables to prevent problems, either immediately, or in the future. You may call us for advice.

   The recommended DC Power Cables for most installations are 2/0 AWG (Pronounced Two-Aught), using 5/16" Copper Cable Lugs.

   Cable Lugs are Cable Terminators (ends) that allow the battery cable to be bolted to the battery terminal.

There are two positive battery terminals, and two negative battery terminals.

For the connection to the battery terminals, 5/16" cable lugs are best, but 3/8" may be used.

6. **Never connect our batteries in series.**

Never connect + to – as this is a series connection.

If connecting multiple batteries, the batteries must be connected in parallel.
Parallel connections are + to + and – to –. (Positive to Positive, Negative to Negative)

7. **The best way to connect multiple batteries, if you are using more than one battery, is to use professional copper busbars.**

When using busbars, you use equal length battery cables from each battery to the busbar.

Then you connect your inverter(s) to the busbars. If you have multiple inverters, then each of the cables to the busbars must be the same length.

Victron makes high quality 1000 amp busbars, called Lynx Power In and Lynx Distributor.

The Lynx devices are expandable, as each unit can bolt to the next.

One Power In has connections to enable four batteries to be connected.
One Distributor also has four connections.

Trophy Battery sells Victron gear, so you may purchase the Lynx busbars from us or other sources. The Lynx busbars are two busbars in one, one for positive and one for negative.

The Lynx Distributor is a fused busbar, thus you can economically add Mega-Fuses to protect your inverters or solar charge controllers.

Please feel free to call us for guidance.

The Lynx busbars use M8 – 5/16" terminals.

Blue Sea Systems also makes quality busbars.

Avoid at all costs, a cheap, undersized busbars or a busbar that contains brass instead of copper. These will not work and are a waste of money.

8. When using Multiple Inverters, it is necessary to combine all batteries together, using busbars, to make one large battery bank, and then connect all inverters to the busbars.

9. Certain Inverters, such as Sol Ark 12K and Sol Ark 15K use 3/8" terminals, so your busbar to inverter cables must have 3/8" terminals for the inverter ends.

    The Sol Ark 15K has dual DC input terminals, two + and two – and you should use two battery cables to power each Sol Ark 15K inverter.

    You may call us for guidance.

10. When you have multiple batteries, you need to have a communication cable from each battery to the next. You should connect one each of the cable to either of the 485-1 or 485-2 ports of one battery to either 485-1 or 485-2 port of the next battery.

    We provide these communication cables with the batteries. But, if you need a longer cable, please use a straight-thru cable, not a cross-over cable. Use an Ethernet cable, with RJ45 connectors, preferably CAT5e.

    When connecting multiple batteries together, it is best to use the same brand and model of batteries together.

    There are cases where it is ok to connect a different brand or model of batteries together. Please call us so we can advise you in advance.

    If you have more than 16 batteries, you can set up one bank of 16 and then have another bank of up to 16 batteries. Other arrangements are possible, such as 20 batteries in two banks of 10 each.

    If you have a different brand of battery, or a different model of battery, you will need to break the battery to battery communication cabling. Please call us for advice.

    Different types of batteries generally cannot communicate with each other, thus omit the communications cable between them.

11. The battery has a push-button On-Off Switch to turn the battery on or off.
    This turns on the battery's electronics, the battery's Battery Management System.

    The large circuit breaker is labeled Breaker, and this is to connect or disconnect this one battery from the load or from charging.

12. If the battery is in storage, or not being used, it is necessary to charge it a little, 5 to 10% every three months. This is necessary to keep the electrolyte in the battery liquid. Do not go by battery voltage or state-of-charge to determine if the battery needs to be recharged after 3 months.

13. This battery is compatible with Victron 48V Inverter/Chargers and 48V Solar Charge Controllers.

    If you have a Cerbo GX as part of your Victron System, please order a Victron Type A cable to go from the CAN/485 Port on the battery to the BMS CAN port on the Cerbo GX.

    If you have a Cerbo S GX, it is possible to use it instead of a Cerbo GX under certain conditions. Please call us for advice. If you have any VE.CAN devices that you need to connect and you need to also connect to the battery, then you must have the Cerbo GX and not the Cerbo S GX.

    The Type A cable is labeled "BMS- Battery" on one end, plug this end into the CAN/485 port on the battery.

    Plug the end labeled VE.CAN to either BMS-CAN Port on the Cerbo GX, and not a VE.CAN Port! Plug a Victron Blue Terminator into the other BMS-CAN port.

    If you need assistance, please call us. Trophy Battery is an authorized Victron Dealer and can provide most any Victron device.

14. This battery has Bluetooth communications so you can easily see the status of your battery.

    The iOS/Android app is named yBMS and can be downloaded to you iPhone/iPad or Android device.

15. This battery is designed to communicate with Sol Ark Inverters. Connect Straight-Thru Ethernet Cable from the battery's CAN/RS-485 port to the CAN port on your inverter.

    If you have any questions, please call use.

    For Sol Ark, please set the option to use Battery Cutoff by Voltage and not State-of-Charge.

TROPHY BATTERY, LLC

51.2V300E-3UL Rack Mountable LiFePO4 Battery

Model 51.2V300E-3UL

MODEL: 51.2V300E-3UL

Nominal Voltage：   51.2 (Works with 48V Devices)

Nominal Capacity: 300Ah

Content

1. MODIFIED LIST

Product Modified Record List

Revision	Date	Mark	Modified content	Approved by
A1	2023-01-14			
A2	2023-01-14			
A3	2023-01-14			
A4	2023-09-27			

2 . Scope

This specification describes the basic performance, technical requirement, testing method, warnings and cautions for the Trophy Battery 51.2V300E-3UL Lithium Ferrous Phosphate rechargeable battery .

3. Products assembly drawing and size refers to picture 1
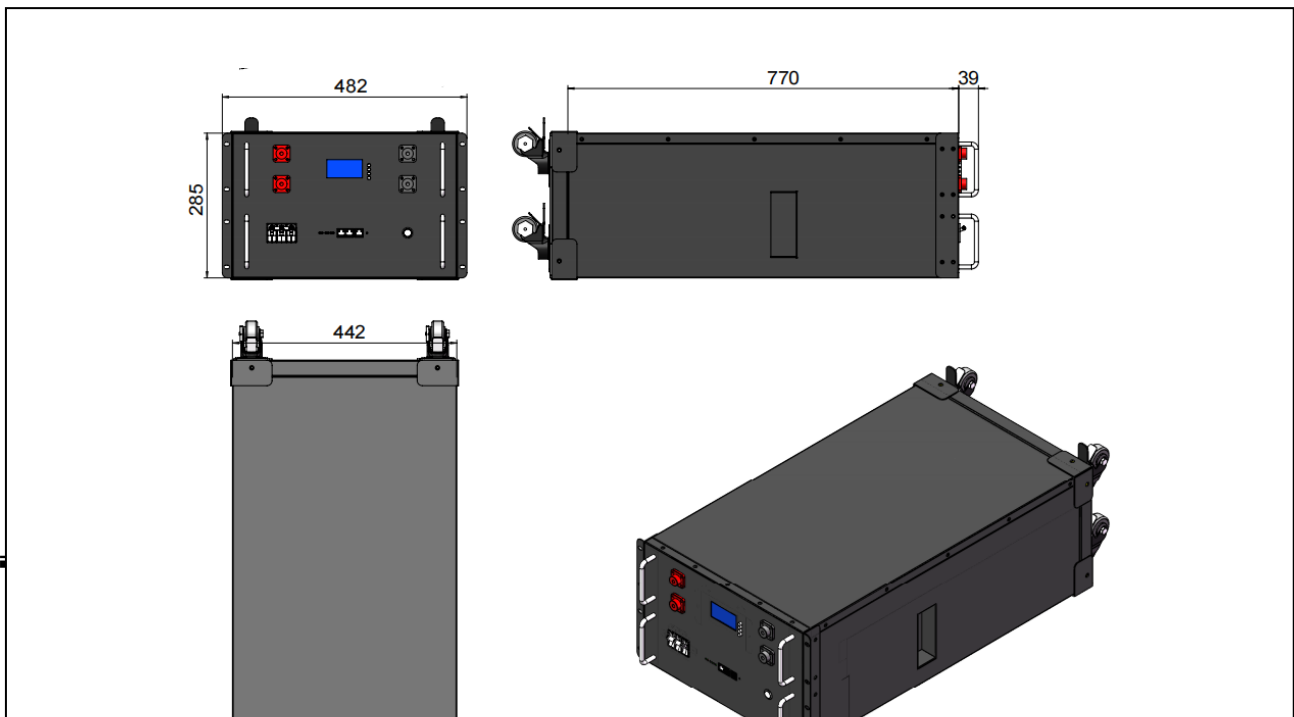
4. Specification

NO.	Item	Specifications
4.1	Cell Type	LiFePO4
4.2	Typical Capacity	300Ah @ 1C Discharge (1C)
	Minimum capacity	298Ah @ 1C Discharge (1C)
4.3	Nominal voltage	51.2V
4.4	End-of-charge Voltage	57V±1.0V, 0.2C5A
4.5	End-of-discharge Voltage	42V±2.0V, 0.2C5A
4.6	Max Charge Current	150A
4.7	Max Continuous Discharge Current	200A
4.8	Instantaneous Max Discharge Current	220A±5A /1 Second
4.9	Over Current Protection	250A±15A /100milliseconds
4.10	Protection function	OCVP/ODVP/OCP/SCP/OTP etc.
4.11	Communication interface	RS485/CAN/Bluetooth

4.12	On/Off Switch	Yes
4.13	Operating temperature	Charging： 0℃~45℃ Discharging：-10℃~60℃
4.14	Storage temperature	-5℃~35℃
4.15	Storage Humidity	≤75% RH
4.16	Standard environmental condition	Temperature： 25±2℃ Humidity ： 45-75%RH Atmospheric Pressure： 86-106 KPA
4.17	Positive terminals	Two Waterproof terminals Black
4.18	Negative terminal	Two Waterproof terminals RED
4.19	Communication connector	RJ45
4.20	Switch connector	Switch
4.21	Shell Material	Metal
4.22	Shell Color	Black
4.23	Size	442mm*770mm*285mm 17.4"x30.31"x11.22"
4.24	Weight	Approximate：140kg 308.65lbs

5. BMS

NO.	Item	Specifications
5.1	Single cell overcharge protection	3.65V±20mV, 1 Second
5.2	Whole battery overcharge protection	57V±0.5V, 1 Second
5.3	Single cell over discharge protection	2.60V±50mV, 1 Second
5.4	Whole battery over-discharge protection	43V±2V, 1 Second
5.5	Charging over current protection	150A±10A, 1 Second
5.6	Discharge over current protection	220A±10A, 1 Second
5.7	Discharge over current protection 2	250A±15A, 100milliseconds

5.7	Charging high temperature protection	55℃±2℃
5.8	Charging low temperature protection	0℃±2℃
5.9	Discharge high temperature protection	65℃±2℃
5.10	Discharge low temperature protection	-10℃±2℃
5.11	Short circuit protection	Yes

6 . General Performance

No.	Item	Test Methods and Condition	Criteria
6.1	0.2C Capacity 0.2C	After standard charging, rest battery for 10min, then discharging at 0.2C to voltage 40V, recording the discharging time.	≥300Ah
6.2	Capability of keeping electricity	20±5℃, After standard charging, rest the battery 28days, discharging at 0.2C to voltage 40.0V, recording the discharging time.	≥200min

7. Environment Performance

No.	Item	Test Methods and Condition	Criteria
7.1	Discharge at high temperature	After standard charging, rest the cells 4h at 60±2℃, then discharging at 1C to voltage 40.0V, recording the discharging time.	≥45min
7.2	Discharge at low temperature	After standard charging, rest the cells for 16h at -20±2℃, then discharging at 0.2C to voltage 40.0V, recording the discharging time.	≥180min
7.4	Thermal shock	Put the cells in the oven. The temperature of the oven is to be raised at 5±2℃ per minute to a temperature of 100±2℃ and remains 30 minutes.	No fire, no smoke

8 . Safety Characteristics

No.	Item	Test Methods and Condition	Criteria

8.1	Over charge testing	At 23±5℃, charging cells with constant current 1C to voltage 60V, Stop test till cells temperature 10℃ lower than max temperature.	No smoke or fire
8.2	Over discharge testing	At 23±5℃, According to the requirements of standard charge, the cells will be discharge to cut-off voltage, then connect with external load of 30 ohm for 24 hours.	No fire, no smoke, no leakage.
8.3	Short-circuit testing	At 23±5℃, After standard charging, connect cells anode and cathode by wire which impedance less than 200±20mΩ, keep 6h.	No smoke or fire

※ Above testing of safe characteristic must be performed with protective equipment.

9. 1 CAUTIONS IN USE

To ensure proper use of the battery please read the manual carefully before using it.

Proper Handling

- Do not expose to, dispose of the battery in fire.
- Do not put the battery in a charger or equipment with wrong terminals connected.
- Avoid shorting the battery
- Avoid excessive physical shock or vibration.
- Do not disassemble or deform the battery.
- Do not immerse in water.
- Do not connect the battery to other different make, type, or model batteries.
- Keep out of the reach of children.

Charge and Discharge
- Battery must be charged using an appropriate LiFePO4 charger or inverter only.
- Never use a modified or damaged charger.
- Do not leave battery in charger over 24 hours.

Storage
- Store the battery in a cool, dry and well-ventilated area.

Disposal
- Regulations vary for different countries.
  Dispose of in accordance with local regulations.

10. Battery operation instruction

10.1 Charging

Charging current：Do not exceeded the maximum charging current specified in this document.

Charging voltage：Do not exceeded the maximum charging voltage specified in this document.

Temperatures: Do not exceed the maximum and minimum temperatures specified in this document.

This battery uses the constant current/constant voltage method of charging.

Do not use reverse voltage to charge the battery.

Do not short circuit the positive and negative terminals of the battery.

Use chargers designed for 51.2 Volt (48V Class) LiFePO4 chargers and/or inverters.

10.2 Discharging Current

The discharging current should not exceed the specifications in this document. Exceeding the specifications can cause reduced battery capacity and excessive heat

10.3 Discharge Temperature

The battery discharge must be within the ambient temperatures listed in this document.

10.4 Over-Discharges

Avoid over discharging the battery. Multiple over discharges can affect the battery.

10.5 Storing the Batteries

If the battery is stored, ensure that the ambient temperature and humidity conditions in this document are met.

Storage over 3 months requires the battery to be charged, ideally to 50% to 70% State of Charge.

11. Other

The Chemical Reaction

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the

battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to replace the battery.

12. Notes: