51.2V 150Ah

INTEGRATED RACK

LITHIUM BATTERY PACK

TECHNICAL SPECIFICATION

"Join the green revolution and harness the unlimited power of the sun with solar energy solutions from eTUIT".

DIRECTORY

FOREWORD

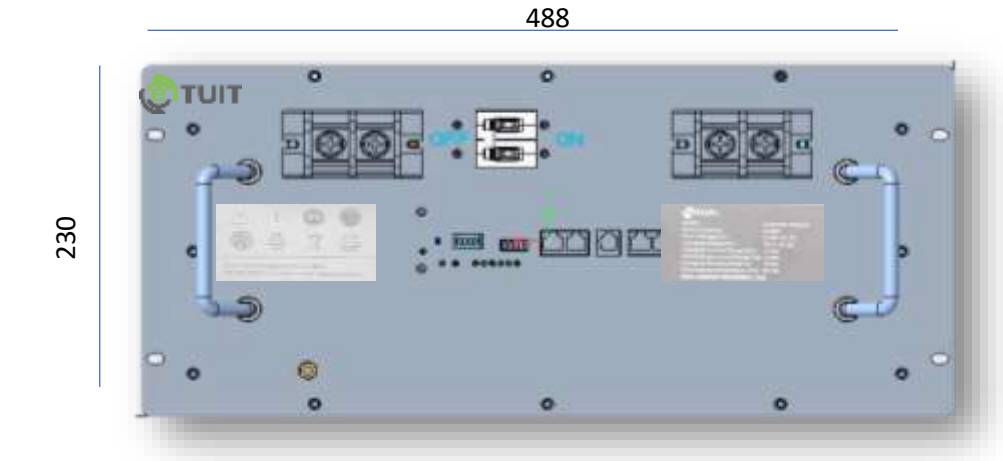
SCOPE

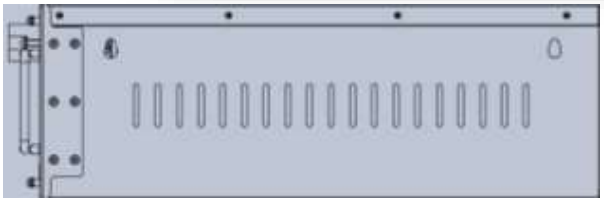
This specification describes the external dimensions, characteristics, technical requirements, and matters needing attention of the Energy Storage battery. This specification is applicable to eTUIT 51.2V 150Ah lithium phosphate battery produced by eTUIT Battery Co., LTD.

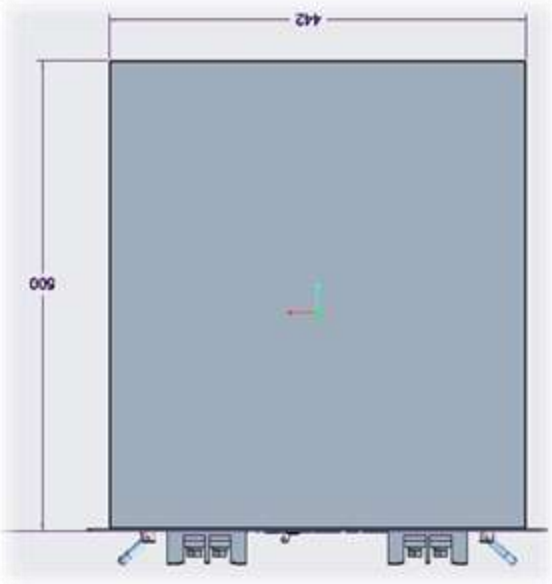
MECHANICAL DESIGN

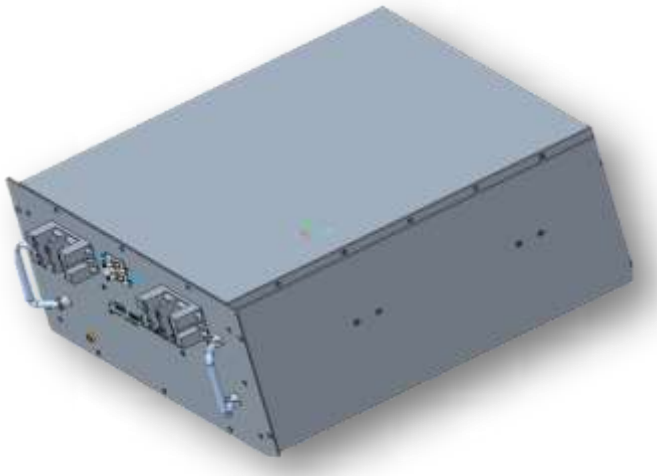
Battery Specification:	51.2V, 150Ah
Battery Dimension:	500*488*230mm
Combination Method:	16S

2.1 51.2V 150AH DIAGRAMS









BATTERY PACK BASIC PREFORMANCE 3

BASIC PERFORMANCE

No.	Item	Parameter	Remark
1	Rated Capacity	150Ah	23°C±5°C, 0.2C Constant current discharging ,37.5V cut off
2	Rated Voltage	51.2V	Battery module-rated voltage
3	Standard Charge Current	75Ah（0.5C）	0°C~45°C, 0.2C CC charge to 58.4V, then CV charge Cut off when charging current≤0.05C.
4	Max. Charge Current	150Ah	0°C~45°C, less than 100Ah
5	Charge Cut-Off Voltage	55V	
6	Max Continuous Discharge Current	150Ah	25°C±3°C, continuous 100Ah discharge
7	Discharge Cut Off Voltage	37.5V	
8	Maximum Pulse Discharge Current	200Ah	25°C±3°C ; ≤0.3 sec
9	Working Temperature (charge)	0°C~55°C	During charge, battery and ambient temperature should not exceed 55°C
10	Working Temperature (discharge)	-20°C~60°C	The battery can work at a specified temperature range with capacity loss intolerance
11	Weight	67kg	
12	Impendence	≤25mΩ	AC 1kHz impendence with half electricity

MAIN PREFORMANCE 4

4.1 BATTERY PACK MAIN PERFORMANCE PARANCTER

NO	Item		Standard	Test Method
1	Discharge Rate Character	0.2°C	100%	**Test Temperature** : 25°C±3°C ; Charge : 0.5C CC charge to 58.4V , transfer to constant voltage, Cut off when current ≤0.05C **Discharge:** 0.2C/0.5C constant current discharge cut off@37.5V.
2		0.5°C	>98%	
		1°C	97%	
3	Capacity & Temperature	55°C	95%	**Charge** : 0.5C CC charge to 58.4V, transfer to CV, cut off when current ≤0.05C. **Discharge:** 0.5C CC discharge cut off at 32V,2 hr. interval for the temperature
4		45°C	>95%	
5		25°C	100%	
6		0°C	>65%	
7		-10°C	>50%	
8	Life Cycle Character		>3000	After finishing the standard charging, lay aside for 30 min, in 25°C±5,0.5C CC discharge to 80% DOD, then go for the next cycle.
9	Storage Character	25°C 6 months	≥95%	Charge battery with 60%~75% capacity for storage
10		45°C 3months	≥90%	
11		60°C 1 month	≥90%	

4.2 MAIN PREFORMANCE AMBIENT

No.	Item	Standard	Test Method
1	Steady damp heat test	No fire, No explosion, No leakage. Discharge capacity cannot be lower than 60% of the initial capacity	After the standard charge, test as below: Temp:40°C±5°C, Relative Humidity:90%~95%. Standing time:48h; take out and place for 2hr at room temperature, then discharge with 1C till cut off voltage
2	Vibration	No fire, No explosion, No leakage.	After the standard charge, fix to the vibration machine and vibrate 30 minutes each at XYZ direction. Frequency Sweeping Rate: 1oct/min. Vibration Frequency: 10Hz~30Hz; Displacement amplitude (Single): 0.28mm; Vibration Frequency:30Hz~55Hz; Displacement amplitude (Single): 0.19mm
3	Low Pressure	No fire, No explosion, No leakage.	Under 25±3°Cambient temperature, put call into vacuum cabinet and reduce internal pressure gradually to not higher than 11.6kPa (Simulated altitude 15240m), keep 6 hr.
4	Drop Test	No fire, No explosion, No leakage.	Under the condition of shipment, the battery is free fall from a height of 1m to a concrete floor of 5cm thick repeat 3 times. from X, Y, Z axis direction.

4.3 MAIN PERFORMANCE SAFE PERFORMANCE

No.	Item	Standard	Test Method
1	Over Charge Test	No fire, No explosion, No leakage	After the standard charge, Under 25°C ± 3°C ambient temperatures for 1hr. Then under the same temperature, 0.5C constant current charge to 5V (the simple cell)
2	Over Discharge Test	No fire, No explosion, No leakage	After the standard charge, Under 25°C ± 3°C ambient temperatures for 1hr. Then under the same temperature, 0.2C constant current discharge to 0V (the simple cell)
3	Heat shock	No fire, No explosion, No leakage	Put the battery in the hot cabinet, the temperature is up to 5°C
4	High-Temperature Test	No fire, No explosion, No leakage	After the standard charge, place the battery at 85°C for 4hrs.
5	Short Circuit	No fire, No explosion, No leakage	After the standard charge, ambient temperature for 1hr. Then put the battery by the external short circuit for 10 minutes, the outside line resistance should be less than 100mΩ.

BMS (BATTERY MANGMENT SYSTEM) 5

5.1 PROTECTION PARAMETER

NO	Item		Description	Value	Unit
1	Over Charge Parameter		Unit Overcharge Warning Voltage	3600	mV
			Unit Overcharge Protection	3700	mV
			Battery Pack Over Charge Warning Voltage	57.6	V
			Battery Pack Over Charge Protection Voltage	59.2	V
2	Over Discharge Parameter		Unit Over Discharge Warning Voltage	2800	mV
			Unit Over Discharge Protection Voltage	2700	mV
			Battery Pack Over Discharge Warning Voltage	44.9	V
			Battery Pack Over Discharge Protection Voltage	43.2	V
3	Charge Over Current Parameter		Charge Over Current Warning	155	A
			Charge 1st Over Current	160	A
			Short Circuit at Charging Port	YES	
4	Discharge Over Current Parameter		Discharge Over Current Warning	155	A
			Discharge 1st Over Current	160	A
			Discharge 2nd Over Current	200	A
			Short Circuit at Discharging Port	YES	
5	Temperature Protection	Charge	High-Temperature Warning	60.0	°C
			Low-Temperature Warning	-0	°C
			High Temperature Protection	65.0	°C
			Low-Temperature Protection	-5.0	°C
		Discharge	High-Temperature Warning	65.0	°C
			Low-Temperature Warning	-15.0	°C
			High Temperature Protection	70	°C
			Low-Temperature Protection	-20.0	°C

5.2 ELECTRICAL PARAMETER

NO	Item	Min	Typical	Max	Unit
1	Manage Cell Qty	-	16	-	个
2	Normal Working Voltage	-	51.2	57.6	V
3	Working Temperature Range	-20	25	60	°C
4	Continuous Charge Current	-	150	155	A
5	Continuous Discharge Current	-	150	160	A
6	Total Operate Power Consumption	-		45	mA
7	Total Dormant Power Consumption	-		200	uA

5.3 ELECTRICAL PARAMETER

NO	Function	Description
1	Setup Address Devices	By dial switch
2	System Rest	Using reset button
3	Communicate Interface	RS485 connector allows several devices to connect in parallel to enlarge battery capacity. RS232 interface communicates with the computer.
4	SOC Evaluate and Display	Can dynamically evaluate SOC for each battery pack and display the remaining power by 6 green LEDs.
5	Operation Status Display	It can display system operation status with 1 green LED.
6	Failure Warning Display	Can display system failure by 1 red LED
7	Data Storage	Can record battery array's voltage, temperature, each charge, and discharge power
8	Low Consumption	Very slight static consumption deviation, and low operation & standby consumption
9	Soh Evaluation	Per sampling information, can do an SOH evaluation for the whole battery
10	Balance Management	The balanced opening voltage is 3500mv and the opening voltage difference is 30mV to improve the battery consistency
11	Unit Voltage Inspection	The test cell unit's voltage, 16S Max can be inspected
12	Temperature Inspection	Battery temperature protection function, battery high& low-temperature protection and component high-temperature protection.
13	Charge & Discharge Control	Disconnect failed modules when at an abnormal charge, over-discharge, over-hot, over current, or short circuit, separate each defective module timely and reduce defective scope.
14	Short Circuit Protection	When the battery has a short circuit, the system will be automatically protected within 300Us, disconnect the load, and recover.
15	Communication	Through the connection between the upper computer and BMS, remote signaling can. Remote control, remote adjust,
16	Battery In Parallel Connection Management	Support multiple-unit battery connection in parallel and set up address. The charge limiting current is 20Ah (0.2C).

STORAGE & TRANSPORT REQUIREMENT 6

Item		Requirement
Storage Temperature	Less than 1month	-20°C~55°C
	Less than 6 months	-10°C~+35°C
Humidity		＜70%RH
Storage SOC		60%~75%SOC

ACCESSORIES LIST 7

NO.	Product	Description	Quantity	Unit
1	Power Cable	Length：500mm, wire diameter: 25m, 1 positive and 1 negative pole.	1	PCS/module
2	RS485 Communication Line	Length:500mm, RJ45 port *2	1	PCS/modules
3	Rs485-Usb Converter Cable	Length:1500mm,	1/8	PCS/8modules
4	Rs232-Usb Converter Cable	Length:1500mm,	1/8	PCS/8 modules

NOTE FOR BATTERY USAGE 8

8.1 PROHIBITATION

TO AVOID BATTERY LEAKAGE, HEAT RADIATING, AND EXPLOSION, THE BELOW PREVENT TIPS BE TAKEN CARE OF:

A) Prohibition of disassembly or reassembly.
B） Prohibition of short-circuited battery.
C） Prohibition to use near hot source.
D） Prohibition of dumping of batteries into water, ocean or getting battery wet.
E） Prohibition of charging near fire or under sunlight.
F） Charge with specified charge according to charging requirement.
G） Prohibition of inserting nails into the battery, hammering or stepping on foot.
H） Prohibition of throwing.
I） Prohibition to use with a damaged or deformed battery.

8.2 ATTENTION

A) Prohibit of using batteries in sunlight, otherwise will cause heating, fire, function failure, and life reduction.
B) Prohibit use near static places which are over 64V.
C) Prohibit charge at a temperature below 0°C or above 60°C.
D) When used for the first time, if it has corrosion, or bad smell, or any other abnormal, **DO NOT USE**.

9 ENVIRONMENTAL PROTECTION

Items for Test	Testing Methods	Requirements
0.1C Discharge performance	Standard battery charge, 1hour within 1hr with 0.1C discharge current to 40.5V, Record the discharge time	Discharge time ≥ 600min
0.5C Discharge performance	Standard battery pack, 1hr within 0.5C discharge current to 40.5V, record the discharge time	Discharge time ≥ 115 min
High-temperature performance	After the battery pack is charged in the standard (60 ± 2 °C) high-temperature box for 4 hours and then discharged to 40.5V at 0.1C, the discharge time	Discharge time ≥ 600min
Low-temperature performance (-10°C)	After charging, the battery pack is put in the low-temperature box of (-10 ± 2) °C for 6 hours, then discharged to 40.5V at 0.2C at this temperature, record the discharging time.	Discharge time ≥ 180 min
Low-temperature performance (-20°C)	After charging, the battery pack is allowed to stand for up to 6 hours at (-20 ± 2°C), then discharged to 40.5V at 0.2C at this temperature, record the discharging time.	Discharge time ≥ 120 min

9.1 THE ENVIRONMENTAL LABEL

This mark indicates that the product described in this manual does not contain toxic and hazardous substances or elements. It is a green product, and can be recycled after being discarded, and should not be discarded incorrectly.

9.2 RECYCLE

This mark indicates that the product cannot be disposed of with other waste.

After the battery life is terminated, the battery can continue to be used after it is recycled by a professional recycling organization. Do not discard incorrectly.

Recycling must be performed according to national and local regulations for end-of-life treatment of Electrical and Electronic equipment. Printed circuit board assemblies (PCBA) must be handled separately from other waste and kept away from open fire. All work must be done according to good operating practices and strict safety standards, following all relevant health and safety aspects.

9.3 ABBREVIATIONS

H Height
BMS Battery Management System
RS232 Recommended Standard 232
LCD Liquid Crystal Display
DOD Depth of Discharge
EOD end of discharge
USB Universal Serial Bus
RS485 Recommended Standard 485
SOC State of Charge
PCB Printed Circuit Board
D Depth
LFP LiFePO4
OCV Open Circuit Voltage
ESM energy storage module
EPO Emergency Power Off
W Width
RTU Remote Terminal Unit
NTC Negative Temperature Coefficient
PC Personal Computer
PCS Power Conversion System
BMS Battery Management System
ESN equipment serial number
UPS uninterruptible power system
CAN control area network.

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CHANGE HISTORY 12

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