



*Green life all the way*



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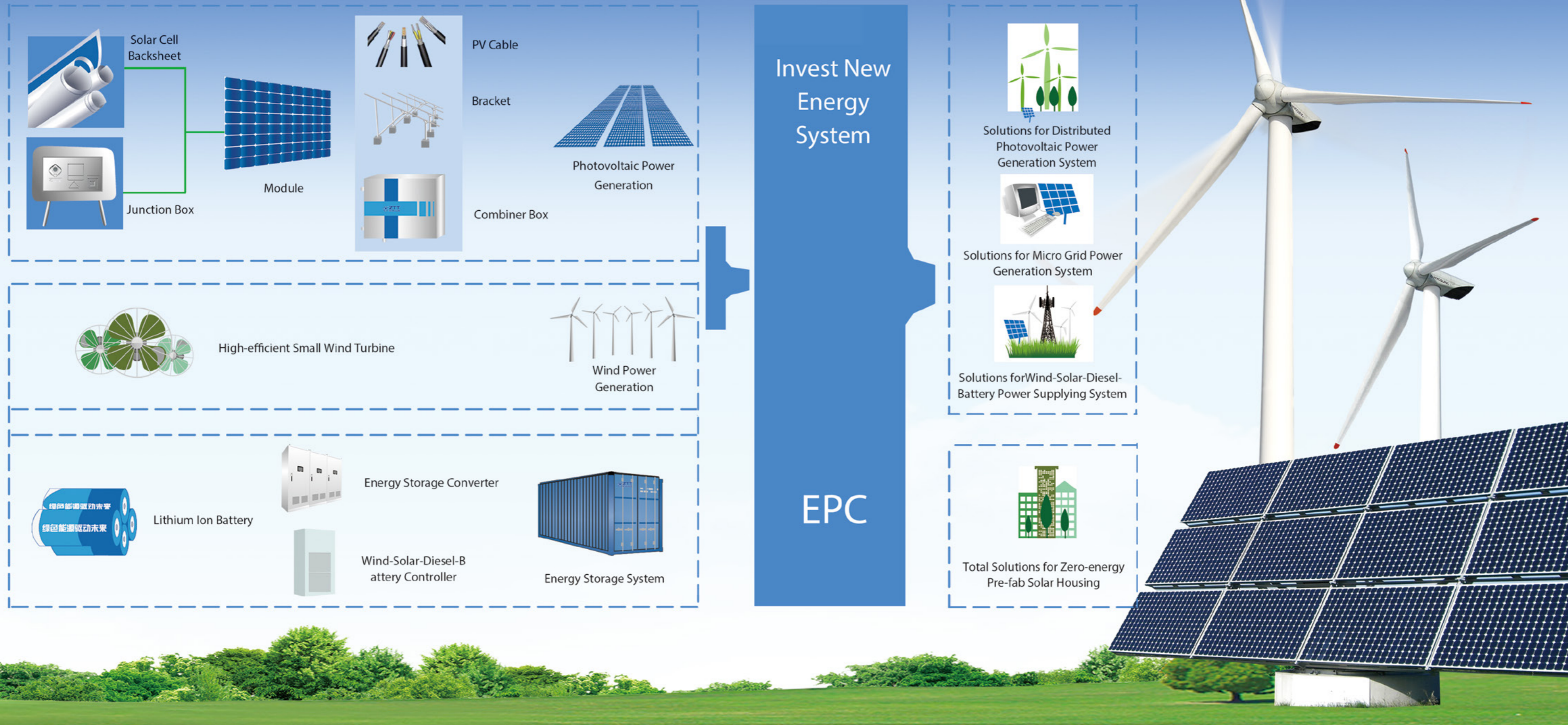
# Deployment of ZTT New Energy Industry



The stern realities such as air pollution, resource exhaustion and environment deterioration have become major concerns of the contemporary world. Challenging all socially responsible enterprises.

It is under this context that ZTT Group has firmly stepped into the segment of new energy. The enterprise determined to make every effort to energy saving, emission reduction and environment. And add dynamic force to the enterprise to achieve a new leap from "two-wheel driving" of communication and power grid to "three pillars", For the enterprise to achieve expansion and upgrade and a sustainable development.

ZTT form a Complete Industrial Chain to Enter the New Energy



# To Be The World Class Manufacturer of Energy Storage System

## About the Company

Zhongtian Energy Storage Technology Co., Ltd. is a subsidiary of Jiangsu Zhongtian Technology Co., Ltd.(Shanghai Stock: 600522). It's a hi-tech enterprise professional in new type of lithium-ion production and research in energy storage system. Various lithium battery products of ZTT attach importance to professionalism, matching and applicability Which have now been extensively applied in the fields such as communication, electric power and dynamic force and etc. Customized complete system integrated solutions can meet different demands of the clients.

The company devotes to be the world class manufacturer of energy storage. And operates by innovation system, QS and talent development inheriting ZTT group's culture. The company develops to international first class products, pursues continuous improvement on our product quality and maximizes customers' satisfaction.

### Application of telecommunication energy storage:

Telecommunication power supply, UPS,switched-mode power supply and etc.

### Application of power battery:

Electric vehicle, electric power tool, electric bicycle and etc.

### Electric power energy storage:

Wind energy storage, Solar energy storage, Household energy storage, Industrial energy storage and etc.



## Qualification & Certification

- Over 100 patents have been accepted and authorized until June, 2014.
- ISO9001, ISO14000, OHSAS18001 and SA8000.
- The products got TLC certificate, radio network card, national defense network card and etc.
- The company is certified by certification authority in Europe and America, with UL, CE, MSDS, UN38.3, cargo transportation test report and etc.
- The products have passed nine seismic strength test of information industry anti-seismic performances by quality supervision test center.
- By the test of North automobile quality supervision inspection center, the batteries meet every 32 inspection standards of QC/T743 2006 "Lithium-ion batteries for Electric Vehicles".
- "Low cost, longtime cycle life" lithium-ion products have passed the provincial level identification. And have been unanimously acknowledged by Academician Yang Yusheng from Chinese People's Liberation Army Chemical Defense Research Institute, Director Wang Zidong from 201 Research Institute and other well-know experts in the industry.
- Project topic of National High-tech Research and Development Projects (863):

Project name: Key technology research of Island Intelligent Micro-grid and demonstration projects.

Research topic name: Apply to research of high efficiency and long-life time energy storage system intelligent Micro-grid.



海运 By Sea



空运 By Air



# R&D

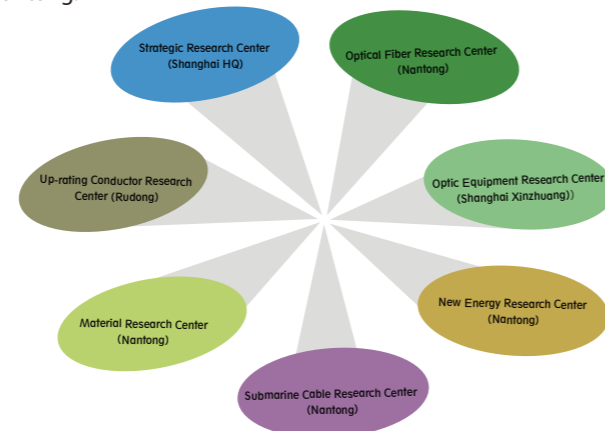


# Technical Advantages



- **National Enterprise Technology Center, Provincial Zhongtian Technology Research Institute**

ZTT is the first National Enterprise Technology Center in Nantong.



- **ZTT new energy research center, energy storage R&D center**

The company has first-class R&D center in China. Fully equipped with high-end analyzer, and most advanced squeezing-mode battery test facilities and modified diaphragm test facilities.

The R&D teams are led by veteran experts, doctors and masters. We have more than 100 of patented technology. Establish close partnerships with Chinese Academy of Sciences, Shanghai Jiaotong University, Fudan University.



### High Safety

Using high safety lithium iron phosphate material to ensure the safety of positive part. With the unique patented technology of safety valve, it improves the electrical safety of short circuit, over charge and over discharge. Using the ceramic coating technology, it ensures the safety and avoids the physical damage such as prick, crush and enhance the tolerance under thermal stability test.



### Long cycle-life

Using self-developed ultrasonic plastic patent "transverse drainage technology with no tabs", it ensures the electric current on the electrode surface be evenly distributed. Using conductive foil coating current collector, it effectively improves the utilization of the active material in the battery and adhesion strength of electrodes. Combined with the good battery design, it ensures that the battery cell can 100% DOD. The cycle life is over 3000 times during 1C/1C charge-discharge cycles.



### Good consistency of the battery

Strict parameter control of plant's temperature, humidity, cleanliness and other environmental conditions. High standards of material selection, preparation process, and requirements of equipment. First full automation assembly production line of high capacity lithium-ion battery. Reduce the human influence at the maximum degree. On the basis of high consistency of static parameters, it also ensures the consistency of dynamic parameters of cell.



# Precision Manufacturing



# Certificates



## ● Highly automation production line

Fully automated feeding system. All-in-one machine of rolling and slitting. Battery forming and capacity grading system and store system improve the automation level of production. It ensures the battery production more efficient.



Self-developed ultrasonic plastic patent "transverse drainage technology with no tabs" fills the void of lithium-ion battery tab's production. And established a fully automatic battery assembly line. It reduces the burrs during slitting the pole piece, and low scrappage rate during coating, slitting and winding. The improving of automation technology reduces labor costs. It well controlled the battery costs. Lower cost

if compared with similar products.

## ● Strict regulatory of quality

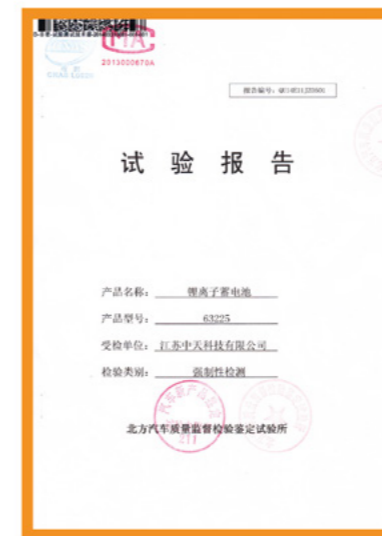
Import surface density tester and high-speed video camera tightly control the quality and impurity defects during the production.



Strict regulatory of quality ensures there is no non-qualified products to customers.



Raw material inspection   Product process inspection   Finished products inspection   Storage inspection   Product package   Warehouse-out sampling inspection



# Single Cell

# BMS

## Cells & Battery Pack

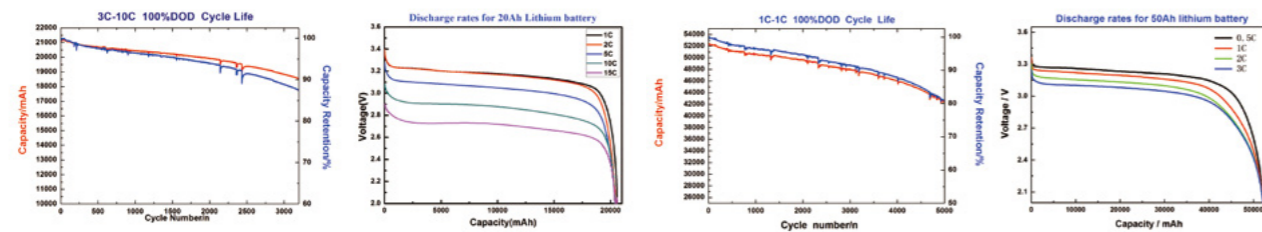


20Ah 3C-10C 100DOD Cycle Life

Discharge rates for 20Ah Lithium battery

50Ah 1C-1C 100DOD Cycle Life

Discharge rates for 50Ah lithium battery



## Technical Parameter:

Cell Model	63225	43184	38120
Nominal Capacity	50AH	20Ah	10Ah
Size	63mm*225mm	43mm*184mm	38mm*120mm
Weight	1500g	540g	330g
Nominal Voltage	3.2V	3.2V	3.2V
Max. Charge Voltage	3.65V	3.65V	3.65V
Discharge Terminal Voltage	2.75V	2.0V	2.0V
AC Impedance	<1 mΩ	<1.8 mΩ	<2.5mΩ
Standard Charge Current	0.5C	1C	1C
Max. Charge Current	1C	3C	5C
Standard Discharge Current	1C	5C	10C
Max. Discharge Current	4C	10C	30C
Design Life	15year	15year	15year
Cycle Life (Under standard charge and discharge current, 100% DOD)	5000times	5000times	5000times
Operation Temperature	-20~60℃	-20~60℃	-20~60℃



ZTT provides LiFePO4 battery energy storage solution based on standard LA Battery size.

## Brief Description:

ZTT energy storage and management system is combined by 12V and 18V battery module and accessories. Compared with same size LA battery, ZTT LiFePO4 battery is twice operation time and half weight only. The material is lithium iron phosphate with low cost and it has better safety performance and long cycle life. Till now, more than thousand system put into application.



## Characteristics:

- Monitor, temperature, voltage, current and charge status
- Battery module
- Digital and analog I/O
- Preliminary charge control for drive
- System grounding insulation
- New super high voltage unit
- Single BMS can manage parallel
- CANbus communication control and manage
- Balance control between battery
- Max. 4 contactors controlled
- Press close key to make battery in sleep model

## Technical Paramete:

Model	Max. cell series/voltage range
BMS-LV	1-10 cells/10V-150V
BMS-LV	10-30cells/100V-450V
BMS-SHV	27-48cells/350V-700V
Size (L*W*H)	188X157X42mm
Weight	0.55kg
External Communication	CAN2.0b, 125, 250,500Kbit/s standard frame
Battery module communication	RS-485 W/valence protocol
External Control	Signal control line, preliminary charge and charger contactor
Monitoring Parameter	Charge status, error code, system equalization
Insulation	Chassis battery insulation test
Operation Humidity	5%-95%, no condensing
Accessories	IP56, UL, 94v-0 install hole (4X)5mm
Certificate	FCC Class B, CE

## ● ZTT UPS 48VDC 500VA~3000VA



### Characteristics:

- Higher inverter efficiency, less heat.
- For battery charge and discharge, prolong battery life-span.

### Parameter:

S.No.	Item	Technical Value	Remark
1	Main electricity input voltage	98-275V	
2	Battery voltage	48V	
3	Charge current	2-10A	
4	heat-dissipating	Inner Fan	
5	Main electricity input current	≤10	
6	Output effective power	≥nominal power X 0.8	Battery invert
7	Output voltage	220±5%	Battery invert
8	Dynamic voltage transient range	<10%	Battery invert
9	Coefficient of output peak current	≥3	Battery invert
10	Output efficiency	≥88%	Soft start inverter output
11	Frequency	49-51	Battery invert
12	Output wave form	Pure sine	Battery invert
13	Main electricity/invert switch	≤3mS	With loads (power factor ≥ 0.8)
14	Noise	<50dB	

## ● ZTT Lithium Battery integrated UPS power supply



### Characteristics:

- Higher efficiency, less weight, less volume
- More stable output, better wave form
- Longer time back up
- Outdoor application, IP67

### Parameter:

	Item	Technical Value	Remark
Rectify Module	Input voltage range	88V~280v	More width range
	Output voltage range	48V: 40~58vdc ( adjustable ) 24V: 20~29vdc ( adjustable )	
	Output current	48V: 15a/20a/25a/30a/50a 24V: 30a/40a/50a	Module design, easy change
	Dynamic response	100Usmax	20%-100% Loads
	Output peak noise	≤200Mv	0-20Mhz
	Whole efficiency	>91%	Synchronous rectification
	Weight	5.5Kg	
Inverter Module	Main electricity input voltage	Ac 175-275v	
	Battery voltage	Dc 48v	
	Input power factor	≥0.98	
	Output wave form	Pure sine	
	Nominal output power	500Va/1000va/2000va/ 3000va	Invert output
	Output efficiency	≥88%	Soft start,inverter output
	Output effective power	≥Nominal power x0.8	Invert output
	Main electricity/invert switch	≤1Ms	
	Noise	<50Db	

## ● ZTT 96V/192V Lithium Battery UPS power supply



### Characteristics:

- 192V input voltage can have higher convert efficiency, up to 95% or more.
- It can install network management module, through TCP/IP protocol, real time monitor and display UPS and lithium battery parameter.
- Less weight, no need consider bearing limitation for floors, longer back up time and longer life span.

## ● 10AH-100AH Battery Pack



### Application:

- Outdoor exposed on sunlight, no AC, small space, need wall/pole mount, no manpower.
- Outdoor integrated cabinet, broadband, , chamber, WLAN, Outdoor integrated base station, ONU, MBO, CBO (E), 4G integrated cabinet etc., outdoor, roof (floor), garage area.

### Option:

Model	Voltage/Capacity ( V/AH )		Appearance ( U )	Weight ( Kg )	Equalization Charge ( V )	Floating Charge ( V )	Equipment Power ( W )	Back up Time ( h )
ZTT4810	48	10	1	10	55~58	54.4~56	30~100	5~16
ZTT4820	48	20	2	20	55~58	54.4~56	100~200	5~10
ZTT4830	48	30	3	25/30	55~58	54.4~56	200~500	4~10
ZTT4840		40						
ZTT4850	48	50	3	35	55~58	54.4~56	500~1000	4~10
ZTT48100	48	100	6	70	55~58	54.4~56	500~2000	4~10

## ● 48V Lithium Battery Pack for Macro Base Telecommunication Station



### Application:

- Limited area, no enough ground bearing, need energy conservation and emission reduction.
- Mainly for indoor and outdoor macro base telecommunication station. In Tianjin China Mobile station alongside high speed rail, ZTT 48V 300Ah lithium battery used.

### Characteristics:

- Better high and lower temperature performance, suitable for outdoor high temperature station use; For indoor usage, it required less AC function and by this way to reach purpose of energy conservation and emission reduction.
- Less volume, less weight, save space room and floor bearings.
- Free maintenance, longer life.

### Option:

Voltage/Capacity ( V/AH )	Appearance ( U )	Weight ( Kg )	Equalization Charge ( V )	Floating Charge ( V )	Charge Current ( A )	Back up Time ( h )
48 200	14U	<130	55~58	54.4~56	20~100	>10
48 300	20U	<200	55~58	54.4~56	30~150	>10
48 500	32U	<320	55~58	54.4~56	50~200	>12

## ● LA Battery and Lithium Battery Composite System Solution



### Application:

- Increase capacity, LA battery still work.
- Macro base and integrated cabinet. This solution can not only provide high quality electricity, but also reduce one time investment, and a economic solution for replacement LA.

## ● HV DC Lithium Battery Solution



### Application:

- HV DC replace UPS.
- Mainly used in data room, ZTT has different solution such as HV DC 240VPC, 336VPC etc.
- The floating charge voltage for battery is 268-270V, equalization charge voltage is 282V.
- The back up time can be 4-8h.
- BMS real time monitor, equalization and floating charge has current limit.
- Temperature compensation.

## ● Wind, Solar, Lithium Battery and DG integrated Power Supply Solution



### Application:

- Rural area lack of power, often power cut and energy saving.
- Mainly for solar, wind power generation on/off grid combined with DG system, for telecommunication station power supply.
- ZTT Solar has cooperated with China Southern Power Grid for national 863 programme. We designed wind, solar, lithium battery and DG integrated power system.

## ● Special Power Supply Product



### Application:

- Portable and movable, AC DC coexist, DC switch cabinet.



## Battery Module:

Design standard LiFePO4 battery pack based on LA battery size, and in this battery pack we use advanced LiFePO4 energy system technology.

## Description:

ZTT advanced energy system and management system is an integration of 12V, 18V and 36V battery module. compared with same size LA battery, it has twice work time and half weight.

Excellent floating charge, cycle life and free maintenance save cost and provide safety for end user.

Module, monitor and diagnostic box keep pace with, it can record data and detailed status of performance.

## Technical advantages:

- Under normal condition, more than 3000times cycle life, 100% DOD
- Applicable voltage from 12V-700V
- Balance for inner cell and module
- BMS monitor internal data communication
- IP56
- LED battery status indicator
- Under special condition, the voltage keeps stable
- Free maintenance
- Can be suitable to most of standard charger for LA batter(AGM/GEL)
- Strong mechanical design
- Flame retardant plastic

## Technical Parameter:

Nominal module voltage	12.8V	12.8V	12.8V	19.2V	38.4V	
Nominal voltage	40Ah	110Ah	138Ah	69Ah	45Ah	
Weight (Approximately)	6.5 kg	15.8 kg	19.5 kg	14.9 kg	19.6kg	
Size include terminals (LXWXH)mm	197x131x182	260x172x225	306x172x225	269x148x245	306x172x225	
Screws	M6 x 1.0	M8 x 1.25	M8 x 1.25	M8 x 1.25	M8 x 1.25	
Energy ratio	79 Wh/kg	89 Wh/kg	91 Wh/kg	89 Wh/kg	91 Wh/kg	
Energy density	110 Wh/l	139 Wh/l	148 Wh/l	124 Wh/l	148 Wh/l	
Standard discharge 25°C	Max. continuous load current	80 A	150 A	150 A	120 A	90 A
	Peak load current	120 A	300 A	300 A	200 A	135 A
	Terminal voltage	10 V	10 V	10 V	15 V	30 V
Standard charge	Max. charge voltage	14.6 V	14.6 V	14.6 V	21.9 V	43.8 V
	Floating charge voltage	13.8 V	13.8 V	13.8 V	20.7 V	41.4 V
	Recommend current C/2	20A	55A	70A	35A	23A
	Charge time C/2	2.5 hrs	2.5 hrs	2.5 hrs	2.5 hrs	2.5 hrs
DC resistance (Max.)	15 mΩ	6 mΩ	5 mΩ	10 mΩ	25 mΩ	
Equivalent lithium content for each module	48.6	127.98	160.38	121.5	160.38	

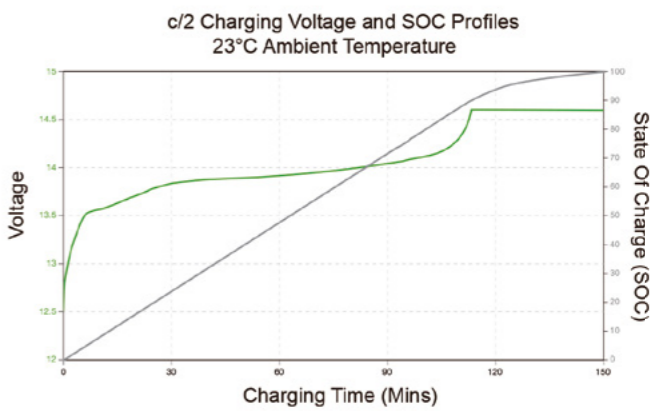
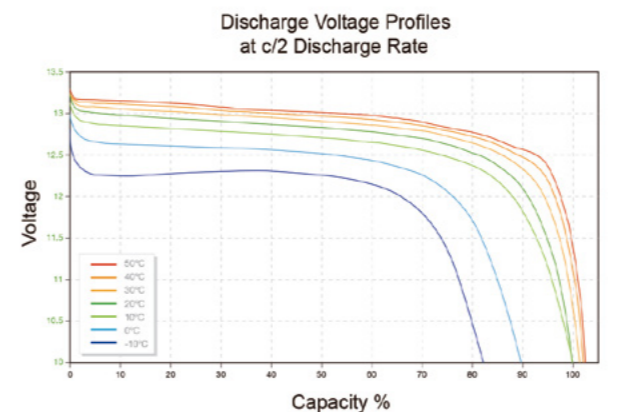
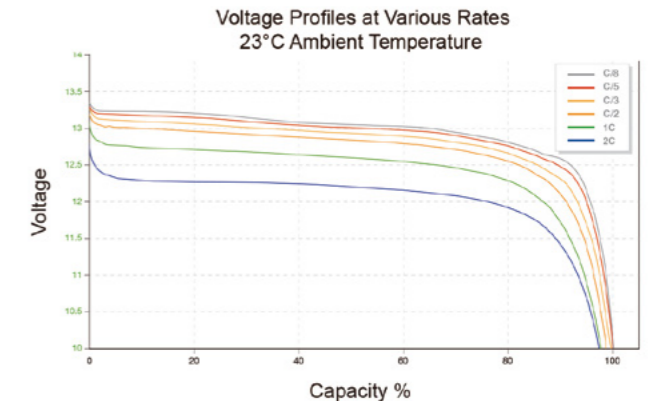
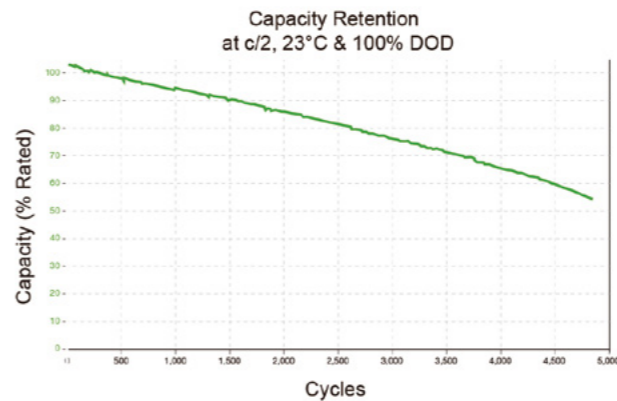
## Typical spec:

Discharge temperature	-10°C to 50°C	IP grade	IP56
Charge temperature	0°C to 45°C	Impact and vibration	IEC62133, DIN VG96 924
Storage temperature	-40°C to 50°C	Certificate	FCC Class B, CE, UL1642 (cells only)
Operation humidity	5% to 95% non-condensing		Transportation catalogue

## Accessories:

BMS is for cells equalization control, it can directly control 4 contactors and through CAN-bus port to monitor and control data system.

- BMS-HV : operation voltage 100V-450V
- BMS-LV: operation voltage 10V-100V
- BMS-SHV: operation voltage 350V-700V



# System Integrated

# Power Plant Energy Storage System

# System Integrated

# Household Energy Storage System



Technical Parameters	Energy	Power
Nominal discharge power	250kW 500kW 1MW	500KWh 1MWh 2MWh
Energy storage capacity	500KWh 1MWh 2MWh	250KWh 500KWh 1MWh
Rated grid voltage	380V / 220V (480V / 220V)	
Permissible grid voltage	85%~110% Rated voltage	
Nominal grid frequency	50Hz / (60Hz)	
Frequency range	48.5~50.5Hz / (59~60.5Hz)	
Connection method	3 phase 4 line	
Voltage total harmonic distortion	<3%	
Current harmonic wave distortion	<4.5%	
System efficiency	≥ 90% Total system efficiency	
Cooling-down method	Forced-air cooling	
Operation temperature	-20°C~60°C	
Optimum storage temperature	-10°C~45°C	
Permissible relative humidity	< 90% No condensation	
Installation	Outdoor installation(20~40 ft Container)	
Cycle life	≥3000 Cycles (< 70% capacity)	

Technical parameters		ZTT - 1000	ZTT - 2500	ZTT - 5000
Battery pack	Voltage	48V	48V	48V
	Capacity	50Ah~200Ah		
	Energy	2.5KWh	5KWh	10KWh
	Max. output current	50A	50A	100A
	Charge current	10A	20A	40A
	Operation temperature	- 10°C~45°C		
	Input frequency range	50Hz/60 Hz		
	System output	Output voltage	220Vac/ 110Vac ( ±5% )	
Output frequency		50Hz/60Hz ( ±1% )		
Output power		1KW	2.5KW	5KW
Waveform distortion		Linear load≤ 3%		
PV-AC conversion time		≤5mS		
Conversion efficiency		≥85%		