

THINK GREEN

ECO ESS offers a range of energy storage products



THE BATTERY OF THE FUTURE



energy
storage product
CATALOGUE
2023-24



ECO ESS offers highly efficient Energy Storage Solution (ESS) in the UK, EU, African markets and in surroundings which would contribute substantial value to the economy and society. Our Multi-Megawatt containerised solutions are 15/25-year systems and priced to beat all.

The ideal solution for ALL renewable energy projects of a storage nature. WE ALSO TAILOR SOLUTIONS TO SUIT YOUR SCHEME.

ECO ESS has identified the potential for fast-moving products which should lead to saving energy, reduce electricity bills/cost, and CO₂ emission and pull towards mass job creations and growth into the national and international markets.

ECO ESS would supply and provide a complete support package to their potential partners and keep a presence on-line and off-line through various distribution models for a B2B business, with the aim of achieving quicker growth.

We support our customers on their individual journeys toward decarbonization with customized needs of their ESS. We push the transition to a more sustainable energy world. Our products, solutions, and services cover nearly the entire energy value chain. We have Know-how, innovative technologies. We turn ideas into reality.

From R&D to designing, from manufacturing to deliveries, from installation to warranty are ECO ESS prime tasks – you feel free and relax by assigning us your job which would be in technical and innovative hands i.e., ECO ESS Ltd UK

VISION

We are committed to utilize and sustain green energy sources to play our role for the global cause of CO₂ emission-free world.

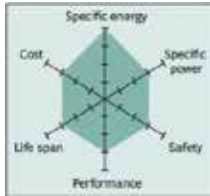
MISSION

Lead the world in employing innovative energy and engineering solutions to sustainably manage the Earth's resources and to meet society's needs.

Why Lithium Titanate (Li_2TiO_3)-LTO



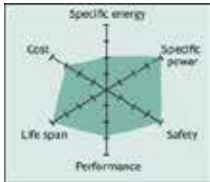
Lithium Nickel Manganese Cobalt Oxide (LiNiMnCoO_2) — NMC



Lithium Nickel Manganese Cobalt Oxide: LiNiMnCoO_2 , cathode, graphite anode
Short form: NMC (NCM, CMN, CNM, MNC, MCN similar with different metal combinations) Since 2008
Voltages 3.60V, 3.70V nominal; typical operating range 3.0–4.2V/cell, or higher
Specific energy (capacity) 150–220Wh/kg
Charge (C-rate) 0.7–1C, charges to 4.20V, some go to 4.30V; 3h charge typical. Charge current above 1C shortens battery life.
Discharge (C-rate) 1C; 2C possible on some cells; 2.50V cut-off
Cycle life 1000–2000 (related to depth of discharge, temperature)
Thermal runaway 210°C (410°F) typical. High charge promotes thermal runaway
Cost ~\$420 per kWh (Source: RWTH, Aachen)
Applications E-bikes, medical devices, EVs, industrial
Comments Provides high capacity and high power. Serves as Hybrid Cell. Favorite chemistry for many uses; market share is increasing. Leading system; dominant cathode chemistry.

2019 update

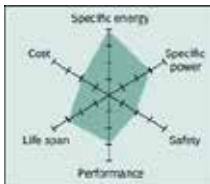
Lithium Iron Phosphate(LiFePO_4) — LFP



Lithium Iron Phosphate: LiFePO_4 , cathode, graphite anode
Short form: LFP or Li-phosphate - Since 1996
Voltages 3.20, 3.30V nominal; typical operating range 2.5–3.65V/cell
Specific energy (capacity) 90–120Wh/kg
Charge (C-rate) 1C typical, charges to 3.65V; 3h charge time typical
Discharge (C-rate) 1C, 25C on some cells; 40A pulse (2s); 2.50V cut-off (lower than 2V causes damage)
Cycle life 2000 and higher (related to depth of discharge, temperature)
Thermal runaway 270°C (518°F) Very safe battery even if fully charged
Cost ~\$580 per kWh (Source: RWTH, Aachen)
Applications Portable and stationary needing high load currents and endurance
Comments Very flat voltage discharge curve but low capacity. One of safest Li-ions. Used for special markets. Elevated self-discharge. Used primarily for energy storage, moderate growth.

2019 update

Lithium Nickel Cobalt Aluminum Oxide (LiNiCoAlO_2) — NCA



Lithium Nickel Cobalt Aluminum Oxide: LiNiCoAlO_2 , cathode (~9% Co), graphite anode
Short form: NCA or Li-aluminum - Since 1999
Voltages 3.60V nominal; typical operating range 3.0–4.2V/cell
Specific energy (capacity) 200–260Wh/kg; 300Wh/kg predictable
Charge (C-rate) 0.7C, charges to 4.20V (most cells), 3h charge typical, fast charge possible with some cells
Discharge (C-rate) 1C typical; 3.00V cut-off; high discharge rate shortens battery life
Cycle life 500 (related to depth of discharge, temperature)
Thermal runaway 150°C (302°F) typical, High charge promotes thermal runaway
Cost ~\$350 per kWh (Source: RWTH, Aachen)
Applications Medical devices, industrial, electric powertrain (Tesla)
Comments Shares similarities with Li-cobalt. Serves as Energy Cell. Mainly used by Panasonic and Tesla; growth potential.

2019 update

Lithium Titanate (Li_2TiO_3) — LTO



Lithium Titanate: Cathode can be lithium manganese oxide or NMC; Li_2TiO_3 (titanate) anode
Short form: LTO or Li-titanate Commercially available - since about 2008.
Voltages 2.40V nominal; typical operating range 1.8–2.85V/cell
Specific energy (capacity) 50–80Wh/kg
Charge (C-rate) 1C typical; 5C maximum, charges to 2.85V
Discharge (C-rate) 10C possible, 30C 5s pulse; 1.80V cut-off on LCO/LTO
Cycle life 3,000–7,000
Thermal runaway One of safest Li-ion batteries
Cost ~\$1,005 per kWh (Source: RWTH, Aachen)
Applications UPS, electric powertrain (Mitsubishi i-MiEV, Honda Fit EV), solar-powered street lighting
Comments Long life, fast charge, wide temperature range but low specific energy and expensive. Among safest Li-ion batteries
2019 update Ability to ultra-fast charge; high cost limits to special application.

eNERGY STORAGE SOLUTION



Lithium ion battery



High safety



Long life



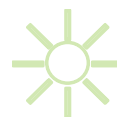
Large power



High C-rate



Wide temperature range



Battery module



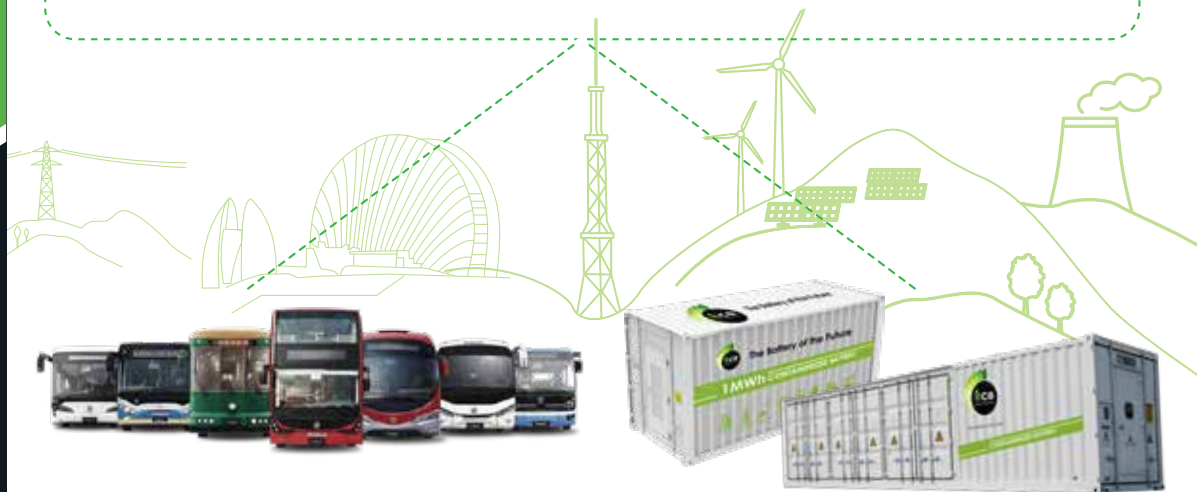
Standardization



Modularization



Lightweight



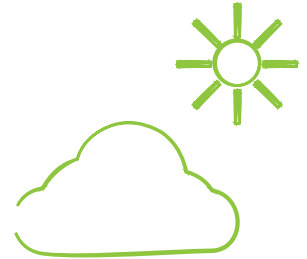
Power battery

Energy storage system



THE BATTERY OF THE FUTURE

eENERGY STORAGE CONTAINERIZED SYSTEM





CONTAINERIZED ENERGY STORAGE SYSTEM

It has rich functions and is suitable for all stages of Power system

It adopts standardized general-purpose energy storage battery module with building block design and flexible power capacity configuration, which can meet different functional requirements such as peak regulation and frequency modulation, wind and solar energy absorption, power capacity expansion, peak shaving and valley filling, emergency power backup, etc., and is suitable for all stages of power system including power generation, transmission, distribution and utilization.



Active Equilibrium

The active equalization technology of megawatt level system is adopted to improve the long-term operation consistency of the cell and greatly increase the system life and capacity utilization.



Even heat Dissipation

The matrix cooling technology is adopted to realize the precise thermal management of each single cell core and greatly improve the cycle life of the cell.



Communication Linkage

The energy system and information system can communicate with each other to realize the functions of real-time data monitoring, AI data analysis and cloud storage.



Security Upgrade

The system has air conditioning system, fire protection system, insulation detection and other safety protection systems, and the system security is upgraded in an all-round way.



CONTAINERIZED ENERGY STORAGE SYSTEM

Model	ECO-IES/LFP/500kW/1.666MWh
System parameters	
Types of batteries	LFP
Nominal energy (kW.h)	1666
Rated power (kW)	500
AC rated output current (A)	721
AC rated output current (V)	400
Grid frequency range (Hz)	50/60
Adjustable power factor	>0.99 (at rated output power)/ 1 (leading)-1 (lagging)
THDi	<3% (at rated output power)
Overloading capacity	110% Times long-term operation
Maximum efficiency	0.99
Basic parameters	
Container dimensions (L×W×H) mm	6058×2438×2896 (20 Feet)
IP grade	IP54
Operating temperature range	-30~50
Operating temperature range	0~95% (no condensation)
Highest working altitude (m)	4000(> 3000m derating operation)
Fire protection system	Temperature sensor, smoke sensor, heptafluoropropane
Communication interface	RJ45/CAN/RS485



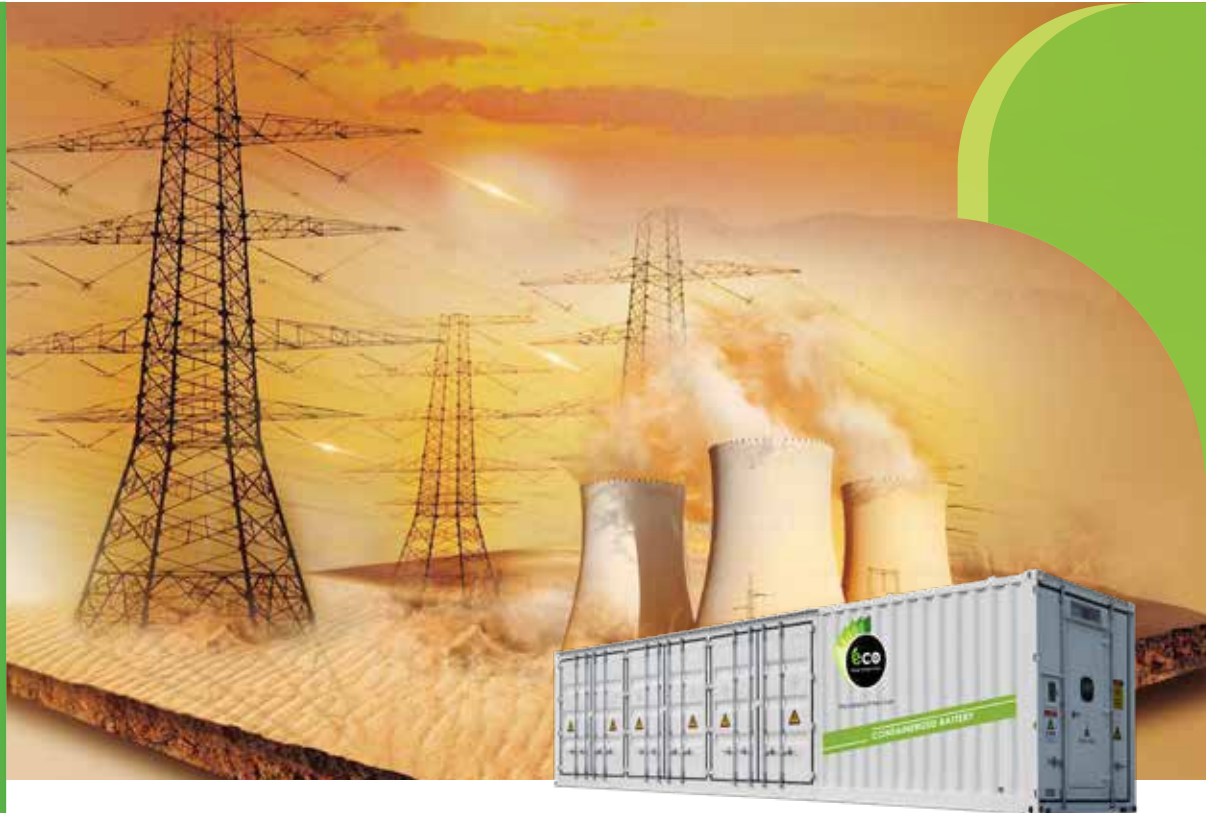
CONTAINERIZED BATTERY SYSTEM

Model	ECO-IES/LFP/1000kW/1MWh/E
System parameters	
Types of batteries	LFP
Nominal energy (kW.h)	1000
Maximum charge / discharge power (kW)	1000
DC rated voltage (V)	772.8 (Adjustable)
DC voltage range (V)	500~900
Basic parameters	
Container dimensions (L×W×H) mm	6058×2438×2896 (20 feet) (Not including PCS)
IP grade	IP54
Operating temperature range (°C)	-30~50
Relative humidity	0~95% (no condensation)
Fire protection system	Temperature sensor, smoke sensor, heptafluoropropane
Controlling temperature type ¹⁹	Air conditioner
Communication interface	RJ45/CAN/RS485



CONTAINERIZED ENERGY STORAGE SYSTEM

Model	ECO-IES/LFP/1000kW/3.332MWh
System parameters	
Types of batteries	LFP
Nominal energy (kW.h)	3332
Rated power (kW)	1000
AC rated output current (A)	721 x 2
AC rated output current (V)	400
Grid frequency range (Hz)	50/60
Adjustable power factor	>0.99(at rated output power)/ 1(Leading)~1(lagging)
THDi	<3% (at rated output power)
Overloading capacity	110% Times long-term operation
Maximum efficiency	0.99
Basic parameters	
Container dimensions (L×W×H) mm	12192×2438×2896 (40 Feet)
IP grade	IP54
Operating temperature range (°C)	-30~50
Relative humidity	0~95% (no condensation)
Highest working altitude (m)	4000(> 3000m derating operation)
Fire protection system	Temperature sensor, smoke sensor, heptafluoropropane
Communication interface	RJ45/CAN/RS485



CONTAINERIZED BATTERY SYSTEM

Model	ECO-IES/LTO/2000kW/0.8MWh/E	ECO-IES/LTO/4000kW/1MWh/E
System parameters		
Types of batteries	LTO	LTO
Nominal energy (kW.h)	800	1000
Maximum charge / discharge power (kW)	2000	4000
DC rated voltage (V)	704	1067
DC voltage range (V)	600~850	907~1260
Basic parameters		
Container dimensions (L×W×H) mm	12192×2438×2896 (40 feet) (Not including PCS)	13716×2438×2896 (40 feet) (Not including PCS)
IP grade	IP54	IP54
Operating temperature range (°C)	-30~55	-30~55
Relative humidity	0~95% (no condensation)	0~95% (no condensation)
Fire protection system	Temperature sensor, smoke sensor, heptafluoropropane	Temperature sensor, smoke sensor, heptafluoropropane
Controlling temperature type	Air conditioner	Air conditioner
Communication interface	RJ45/CAN/RS485	RJ45/CAN/RS485



ENERGY STORAGE SYSTEM OF COMMUNICATION BASE STATION

Long life, stable standby power supply, convenient maintenance and repair

The system uses embedded modular design, which has the advantages of high application flexibility, high system power, strong disaster resistance, long service life, and has two application forms of rack type and cabinet type, which can fully meet the power reserve demand of the communication base station under various environments.



Flexible Application

The modular design is convenient for installation, debugging and transportation, and has strong application flexibility.



Remote Monitoring

The system can be remotely monitored by computer to reduce the daily maintenance cost and ensure the long-term stable operation of the system.



Safe & reliable

It has the protection functions of battery over-voltage protection, over-current protection, over temperature protection, short-circuit protection, electric leakage protection, etc., with high safety and reliability.



Strong Applicability

Equipped with wide temperature resistant lithium-ion batteries, it can effectively meet the application requirements in complex environment.

RACK-MOUNTED COMMUNICATION BASE STATION

energy storage system



Model	ECO-CES/LTO/300Ah/50.6V/7.59kW	ECO-CES/LTO/400Ah/50.6V/10.12kW
Standard parameters		
Cell capacity (Ah)	30	40
Grouping	10P22S	10P22S
Nominal voltage (V)	50.6	50.6
Rated capacity (Ah)	300	400
Rated power (kW . h)	15.18	24.24
Performance parameters		
Charge & discharge C-rate	<0.5C	<0.5C
Continuous charge & discharge current (A)	150	200
Operating temperature range (°C)	-30~55	-30~55
Voltage range (V)	43.2~57.6	43.2~57.6
Communication interface	RS485	RS485
Physical parameters		
Length×Width×Height (mm)	1240×600×1035	1240×600×1035
Weight (Kg)	550	550

Model	ECO-CES/LTO/480Ah/50.6V/10.12kW
Standard parameters	
Cell capacity (Ah)	40
Grouping	12P22S
Nominal voltage (V)	50.6
Rated capacity (Ah)	480
Rated power (kW . h)	24.29
Performance parameters	
Charge & discharge C-rate	<0.5C
Continuous charge & discharge current (A)	240
Operating temperature range (°C)	-30~55
Voltage range (V)	43.2~57.6
Communication interface	RS485
Physical parameters	
Length×Width×Height (mm)	1240×600×1035
Weight (Kg)	550
Qty as per 1x20 ft FCL +/-	24

CABINET TYPE COMMUNICATION BASE STATION

energy storage system



Model	ECO-CES/LTO/210Ah/50.6V/5.06kW	ECO-CES/LTO/300Ah/50.6V/7.59kW
Standard parameters		
Cell capacity (Ah)	35	30
Grouping	6P22S	10P22S
Nominal voltage (V)	50.6	50.6
Rated capacity (Ah)	210	300
Rated power (kW . h)	10.68	15.18
Performance parameters		
Charge & discharge C-rate	<0.5C	<0.5C
Continuous charge & discharge current (A)	100	150
Operating temperature range (°C)	-30~55	-30~55
Voltage range (V)	43.2~57.6	43.2~57.6
Communication interface	RS485	RS485
Physical parameters		
Length×Width×Height (mm)	800×800×1800	800×800×1800
Weight (Kg)	450	600

Model	ECO-CES/LTO/400Ah/50.6V/10.12kW	ECO-CES/LTO/480Ah/50.6V/7.59kW
Standard parameters		
Cell capacity (Ah)	40	40
Grouping	10P22S	12P22S
Nominal voltage (V)	50.6	50.6
Rated capacity (Ah)	400	480
Rated power (kW . h)	20.24	24.29
Performance parameters		
Charge & discharge C-rate	<0.5C	<0.5C
Continuous charge & discharge current (A)	200	240
Operating temperature range (°C)	-30~55	-30~55
Voltage range (V)	43.2~57.6	43.2~57.6
Communication interface	RS485	RS485
Physical parameters		
Length×Width×Height (mm)	800×800×1800	800×800×1800
Weight (Kg)	600	600
Qty as per 1x20 ft FCL +/-	27	27



COMMUNICATION LITHIUM-ION

energy storage system

Standby power / starting power supply		
Rated capacity (Ah)	50	100
Rated power (kW.h)	2.56	5.12
Rated voltage (V)	51.2	51.2
Rated charge current (A)	25	50
Rated discharge current(A)	50	100
Cycle life (times)	2000	2000
Length×Width×Height	446×520×133	446×520×133
Qty as per 1x20 ft FCL +/-	429	429

Standby power / starting power supply		
Rated capacity (Ah)	150	200
Rated power (kW.h)	7.68	10.24
Rated voltage (V)	51.2	51.2
Rated charge current (A)	50	50
Rated discharge current(A)	100	100
Cycle life (times)	2000	2000
Length×Width×Height	446×520×266	446×520×266
Qty as per 1x20 ft FCL +/-	231	231



PORTABLE ENERGY STORAGE SYSTEM (Independent Power)



Model	ECO-R2000
System parameters	
Main capacity	921 Wh
AC output/Inverter	2048 Wh
DC output	12V/15A max (car cigarette lighter socket) 12V/15A max (Anderson powerpole)
USB output	(5V/2.4A)x2; Qc3.0; PD
AC charger	750W
Solar charger/MPPT	600W
Main weight	15kg
Additional battery weight	15kg
Basic parameters	
Lifetime cycles	>3500
Storage temperature range C	-20C~55C
Charging temperature range C	0C~45C
Operating temperature range C	-20C~55C



BATTERY MODULE PRODUCTS



LTO POUCH CELL MODULE



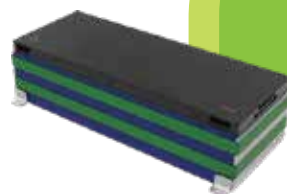
Model	24V 70Ah
Standard parameters	
Rated capacity - Ah	≥65
Voltage range - V	17~27.5
Performance parameters	
Max Continuous charge & discharge current (A)	500
Max pulse charge & discharge current (A)	900
Operating Temperature range (C)	-50~65
Room temperature cycle life @25 C (times)	25000(Discharge capacity ≥ 80% of initial capacity)
high temperature life @55C (times)	6000(Discharge capacity ≥ 80% of initial capacity)
Physical parameters	
Length x Width x Height (Including module electrode tab (mm)	279.1×158.6×333.2
Weight KG.	28
Qty as per 1x20 ft FCL +/-	1232

LTO PRISMATIC BATTERY MODULE



Model	ECO-MLTO/132/18.4/4P8S	ECO-MLTO/165/13.8/5P6S
Standard parameters		
Cell capacity (Ah)	33	33
Grouping	4P8S	5P6S
Nominal voltage (V)	18.4	13.8
Rated capacity (Ah)	132	165
Rated power (kW . h)	2.43	2.28
Performance parameters		
Charge & discharge C-rate	≥3C	≥3C
Continuous charge & discharge current (A)	396	495
Physical parameters		
Length×Width×Height (mm)	659×160×244	619×160×244
Weight (Kg)	45	43

LFP PRISMATIC BATTERY MODULE



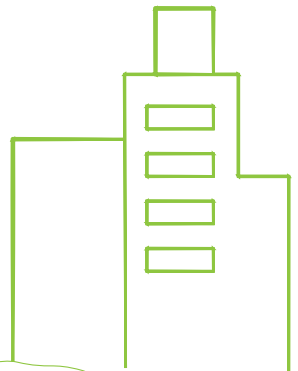
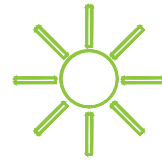
Model	ECO-MLFP/50/51.2/1P16S	ECO-MLFP/100/25.6/2P8S	ECO-MLFP/200/12.8/4P4S
Standard parameters			
Cell capacity (Ah)	50	50	50
Grouping	1P16S	2P8S	4P4S
Nominal voltage (V)	51.2	25.6	12.8
Rated capacity (Ah)	50	100	200
Rated power (kW . h)	2.56	2.56	2.56
Performance parameters			
Charge & discharge C-rate	<1C	<1C	<1C
Continuous charge & discharge current (A)	50	100	200
Physical parameters			
Length×Width×Height (mm)	1005×495×350	1005×495×350	1005×495×350
Weight (Kg)	18	18	18

LFP PRISMATIC BATTERY MODULE



Model	ECO-MLFP/140/25.6/2P8S	ECO-MLFP/140/22.4/2P7S
Standard parameters		
Cell capacity (Ah)	70	70
Grouping	2P8S	2P7S
Nominal voltage (V)	25.6	22.4
Rated capacity (Ah)	140	140
Rated power (kW . h)	3.58	3.13
Performance parameters		
Charge & discharge C-rate	0.5C	0.5C
Continuous charge & discharge current (A)	70	70
Physical parameters		
Length×Width×Height (mm)	689×177×123	648.5×177×123
Weight (Kg)	25	23.6
Qty as per 1x20 ft FCL +/-	1120	1120

POWER BATTERY PRODUCTS



POWER BATTERY PRODUCTS



Model	ECO-PLTO/120/27.6/4P12SA01A	ECO-PLTO/160/25.3/4P11SA01N
Standard parameters		
Cell capacity (Ah)	30	40
Grouping	4P12S	4P11S
Nominal voltage (V)	27.6	25.3
Rated capacity (Ah)	120	160
Rated power (kW . h)	3.312	4.048
Performance parameters		
Continuous charge & discharge current (A)	150	240/80
Maximum charge & discharge current(A)	250	300/200
Operating temperature range (°C)	-30~55	-30~55
Physical parameters		
Length×Width×Height (mm)	640×570×200	620×210×800
Weight (Kg)	150	150
Cooling Mode	Forced air cooling	Natural cooling
Qty as per 1x20 ft FCL +/-	240	165



Model	ECO-PLTO/165/25.3/5P11SA01A	ECO-PLTO/396/46/12P20SA01N
Standard parameters		
Cell capacity (Ah)	33	33
Grouping	5P11S	12P20S
Nominal voltage (V)	25.3	46
Rated capacity (Ah)	165	396
Rated power (kW . h)	4.175	18.216
Performance parameters		
Continuous charge & discharge current (A)	150	300
Maximum charge & discharge current(A)	220	400
Operating temperature range (°C)	-30~55	-30~55
Physical parameters		
Length×Width×Height (mm)	790×627×212	835×630×770
Weight (Kg)	270	800
Cooling Mode	Forced air cooling	Natural cooling
Qty as per 1x20 ft FCL +/-	165	53



POWER BATTERY OF INTELLIGENT MACHINE

All-round Guarantee System Safety, Power Lasting Stability

Designed under working condition of high frequency vibration, the system has the advantages such as excellent seismic performance and high safety & reliability, the pack body adopts the standardized design, fast and easy for installation, which is suitable for the intelligent machines such as sweeping robots and AGVs.



Independent Interface

The charging port and discharging port are designed independently to effectively avoid the occurrence of mis-operation of the intelligent machine during charging.



Dynamic Stability

The system has excellent C-rate performance. When the load of the intelligent machine suddenly increases, the power supply can be stabilized within a safe range to ensure the stability and reliability of power.



Sustained Endurance

Equipped with high quality lithium ion battery with high energy density, compared with the traditional intelligent machine power battery, the battery life can be greatly improved.



Safe and reliable

With short circuit protection function, in case of short circuit fault, it can quickly disconnect the circuit to ensure the safety and reliability of system application.



POWER BATTERY OF INTELLIGENT MACHINE



Model	ECO-IES/LFP/70Ah/51.2V/2kW
Standard parameters	
Cell capacity (Ah)	70
Nominal voltage (V)	51.2
Rated capacity (Ah)	70
Rated power (kW . h)	3.584
Operating voltage range(V)	44.8~58.4
System battery configuration	1P16S
System parameters	
Length×Width×Height (mm)	430×243×240
Weight (kg)	32
Protection level	IP54
Operating temperature range(C)	-20~50
Operating humidity range	≤95%
Maximum working altitude	≤3000m
System communication interface	RS485
System communication protocol	MODBUS
Qty as per 1x20 ft FCL +/-	588



THE BATTERY OF THE FUTURE

BATTERY PACK



Lithium Iron Phosphate ECO ESS Battery

Longer Cycle Life

Offers up to 20 times longer cycle life and five times longer float/calendar life than lead-acid battery, helping to minimize replacement cost and reduce total cost of ownership

Lighter weight

About 40% of the weight of a comparable lead-acid battery. A 'Drop in' replacement for lead-acid batteries.

Higher Power

Delivers twice the power of lead-acid battery, even higher discharge, while maintaining high energy capacity.

Wider Temperature Range -20C° ~ 60C°

Superior safety

Lithium Iron Phosphate chemistry eliminates the risk of explosion or combustion due to high impact, overcharging or short circuit situations.

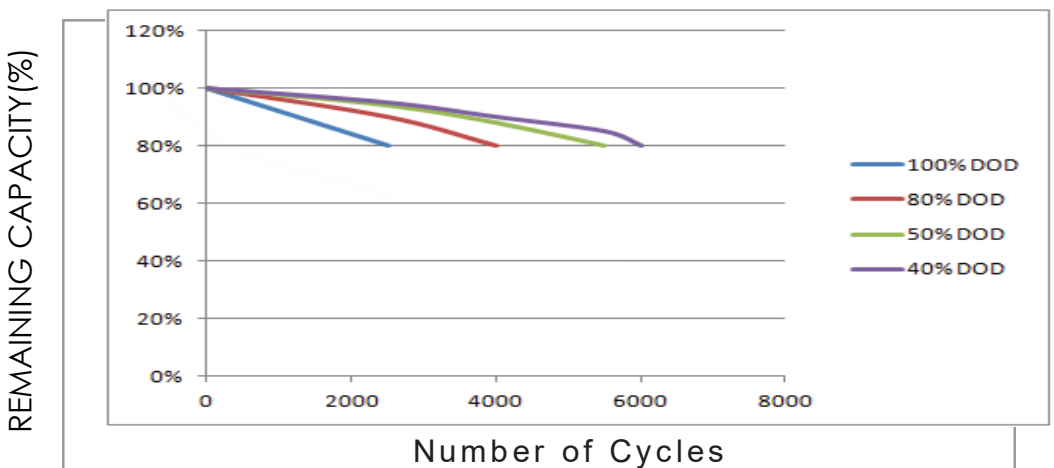
Increased Flexibility

Modular design enables deployment of up to four batteries in series and up to ten batteries in parallel.

Application

- Electric vehicles, electric mobility
- Solar/wind energy storage system
- UPS, backup power
- Telecommunication
- Medical equipment
- Lighting

Cycle Life Curve



ECO-LFP12.8-250 (12.8V250AH)



Model

LFP12.8-250(12.8V250Ah)

Electrical Characteristics	Nominal Values
Nominal Voltage	12.8V
Nominal Capacity	250Ah (C5,25°C)
Energy	3200Wh
Internal Resistance	≤200mΩ
Cycle Life	>5000 cycles @1C 80%DOD
Months Self Discharge	<3%
Efficiency of Charge	100% @0.2C
Efficiency of Discharge	96~99% @1C
Standard Charge	
Charge voltage	14.6±0.2V
Charge Mode	0.2C to 14.6V, then 14.6, charge current 0.02C(CC/CV)
Charger Current	50A
Max Charge current	125A
Charge Cut-off Voltage	14.8V±0.2V
Standard Discharge	
Continuous Current	150A
Max. Pulse Current	500A(<3s)
Discharge cut-off Voltage	10V
Environmental	
Charge Temperature	0 °C to 45 °C (32F to 113F) @60?25% Relative Humidity
Discharge Temperature	-20 °C to 60 °C (-4F to 140F) @60?25% Relative Humidity
Storage Temperature	0 °C to 40 °C (32F to 104F) @60?25% Relative Humidity
Water Dust Resistance	
Mechanical	
Cell & Method	3.2V50AH-4S5P
Plastic Case	ABS
Dimensions (in./mm.)	522*268*218 mm
Weight (lbs./kg.)	24Kg (Approx.)
Terminal	M8
Protocol (optional)	NO
BMS	4S150A

ECO-LFP12.8-300 (12.8V300AH)



Model

LFP12.8-300(12.8V300Ah)

Electrical Characteristics	Nominal Values
Nominal Voltage	12.8V
Nominal Capacity	300Ah (C5,25°C)
Energy	3840Wh
Internal Resistance	≤200mΩ
Cycle Life	>5000 cycles @1C 80%DOD
Months Self Discharge	<3%
Efficiency of Charge	100% @0.2C
Efficiency of Discharge	96~99% @1C
Standard Charge	
Charge voltage	14.6±0.2V
Charge Mode	0.2C to 14.6V, then 14.6, charge current 0.02C(CC/CV)
Charger Current	60A
Max Charge current	150A
Charge Cut-off Voltage	14.8V±0.2V
Standard Discharge	
Continuous Current	150A
Max. Pulse Current	500A (<3s)
Discharge cut-off Voltage	10V
Environmental	
Charge Temperature	0 °C to 45 °C (32F to 113F) @60%25% Relative Humidity
Discharge Temperature	-20 °C to 60 °C (-4F to 140F) @60%25% Relative Humidity
Storage Temperature	0 °C to 40 °C (32F to 104F) @60%25% Relative Humidity
Water Dust Resistance	0 °C to 45 °C (32F to 113F) @60%25% Relative Humidity
Mechanical	
Cell & Method	3.2V50AH-4S6P
Plastic Case	ABS
Dimensions (in./mm.)	522*268*218 mm
Weight (lbs./kg.)	28 Kg (Approx.)
Terminal	M8
Protocol (optional)	NO
BMS	4S150A

ECO-LFP12.8-400 (12.8V400AH)



Model

LFP12.8-400(12.8V400Ah)

Electrical Characteristics	Nominal Values
Nominal Voltage	12.8V
Nominal Capacity	400Ah (C5,25°C)
Energy	5120Wh
Internal Resistance	≤200mΩ
Cycle Life	>5000 cycles @1C 80%DOD
Months Self Discharge	<3%
Efficiency of Charge	100% @0.2C
Efficiency of Discharge	96~99% @1C
Standard Charge	
Charge voltage	14.6±0.2V
Charge Mode	0.2C to 14.6V, then 14.6, charge current 0.02C(CC/CV)
Charger Current	80A
Max Charge current	150A
Charge Cut-off Voltage	14.8V±0.2V
Standard Discharge	
Continuous Current	150A
Max. Pulse Current	500A (<3s)
Discharge cut-off Voltage	10V
Environmental	
Charge Temperature	0 °C to 45 °C (32F to 113F) @60%25% Relative Humidity
Discharge Temperature	-20 °C to 60 °C (-4F to 140F) @60%25% Relative Humidity
Storage Temperature	0 °C to 40 °C (32F to 104F) @60%25% Relative Humidity
Water Dust Resistance	
Mechanical	
Cell & Method	3.2V50AH-4S8P
Plastic Case	ABS
Dimensions (in./mm.)	522*268*218 mm
Weight (lbs./kg.)	36 Kg (Approx.)
Terminal	M8
Protocol (optional)	NO
BMS	4S150A

ECO-LFP25.6-100 (25.6V100AH)



Model

LFP25.6-100(25.6V100Ah)

Electrical Characteristics	Nominal Values
Nominal Voltage	25.6V
Nominal Capacity	100Ah (C5,25°C)
Energy	2560Wh
Internal Resistance	≤200mΩ
Cycle Life	>5000 cycles @1C 80%DOD
Months Self Discharge	<3%
Efficiency of Charge	100% @0.2C
Efficiency of Discharge	96~99% @1C
Standard Charge	
Charge voltage	29.2±0.2V
Charge Mode	0.2C to 29.2V, then 29.2,charge current 0.02C(CC/CV)
Charger Current	20A
Max Charge current	50A
Charge Cut-off Voltage	29.6V±0.2V
Standard Discharge	
Continuous Current	100A
Max. Pulse Current	300A (<3s)
Discharge cut-off Voltage	20V
Environmental	
Charge Temperature	0 °C to 45 °C (32F to 113F) @60?25% Relative Humidity
Discharge Temperature	-20 °C to 60 °C (-4F to 140F) @60?25% Relative Humidity
Storage Temperature	0 °C to 40 °C (32F to 104F) @60?25% Relative Humidity
Water Dust Resistance	
Mechanical	
Cell & Method	3.2V50AH-8S2P
Plastic Case	ABS
Dimensions (in./mm.)	522*238*225 mm
Weight (lbs./kg.)	19Kg (Approx.)
Terminal	M8
Protocol (optional)	NO
BMS	8S100A

ECO-LFP25.6-150 (25.6V150AH)



Model

LFP25.6-150(25.6V150Ah)

Electrical Characteristics	Nominal Values
Nominal Voltage	25.6V
Nominal Capacity	150Ah (C5,25°C)
Energy	3840Wh
Internal Resistance	≤200mΩ
Cycle Life	>5000 cycles @1C 80%DOD
Months Self Discharge	<3%
Efficiency of Charge	100% @0.2C
Efficiency of Discharge	96~99% @1C
Standard Charge	
Charge voltage	29.2±0.2V
Charge Mode	0.2C to 29.2V, then 29.2, charge current 0.02C(CC/CV)
Charger Current	30A
Max Charge current	75A
Charge Cut-off Voltage	29.6V±0.2V
Standard Discharge	
Continuous Current	100A
Max. Pulse Current	300A (<3s)
Discharge cut-off Voltage	20V
Environmental	
Charge Temperature	0 °C to 45 °C (32F to 113F) @60%25% Relative Humidity
Discharge Temperature	-20 °C to 60 °C (-4F to 140F) @60%25% Relative Humidity
Storage Temperature	0 °C to 40 °C (32F to 104F) @60%25% Relative Humidity
Water Dust Resistance	
Mechanical	
Cell & Method	3.2V50AH-8S2P
Plastic Case	ABS
Dimensions (in./mm.)	522*268*218 mm
Weight (lbs./kg.)	28 Kg (Approx.)
Terminal	M8
Protocol (optional)	NO
BMS	8S100A

ECO-LFP25.6-200 (25.6V200AH)



Model

LFP25.6-100(25.6V200Ah)

Electrical Characteristics

Nominal Values

<i>Nominal Voltage</i>	25.6V
<i>Nominal Capacity</i>	200Ah (C5,25°C)
<i>Energy</i>	5120Wh
<i>Internal Resistance</i>	≤200mΩ
<i>Cycle Life</i>	>5000 cycles @1C 80%DOD
<i>Months Self Discharge</i>	<3%
<i>Efficiency of Charge</i>	100% @0.2C
<i>Efficiency of Discharge</i>	96~99% @1C
Standard Charge	
<i>Charge voltage</i>	29.2±0.2V
<i>Charge Mode</i>	0.2C to 29.2V, then 29.2, charge current 0.02C(CC/CV)
<i>Charger Current</i>	40A
<i>Max Charge current</i>	100A
<i>Charge Cut-off Voltage</i>	29.6V±0.2V
Standard Discharge	
<i>Continuous Current</i>	150A
<i>Max. Pulse Current</i>	500A(<3s)
<i>Discharge cut-off Voltage</i>	20V
Environmental	
<i>Charge Temperature</i>	0 °C to 45 °C (32F to 113F) @60?25% Relative Humidity
<i>Discharge Temperature</i>	-20 °C to 60 °C (-4F to 140F) @60?25% Relative Humidity
<i>Storage Temperature</i>	0 °C to 40 °C (32F to 104F) @60?25% Relative Humidity
<i>Water Dust Resistance</i>	
Mechanical	
<i>Cell & Method</i>	3.2V50AH-8S4P
<i>Plastic Case</i>	ABS
<i>Dimensions (in./mm.)</i>	522*268*218 mm
<i>Weight (lbs./kg.)</i>	36Kg
<i>Terminal</i>	M8
<i>Protocol (optional)</i>	NO
<i>BMS</i>	8S150A

ECO-LFP48-100 (48V100AH)



Model

LFP48-100(48V100AH)

Electrical Characteristics	Nominal Values
Nominal Voltage	48V
Nominal Capacity	100Ah (C5,25°C)
Energy	4800Wh
Internal Resistance	≤200mΩ
Cycle Life	>5000 cycles @0.2C 80%DOD
Months Self Discharge	<3%
Efficiency of Charge	100% @0.2C
Efficiency of Discharge	96~99% @1C
Standard Charge	
Charge voltage	54.8±0.2V
Charge Mode	0.2C to 54.8V, then 54.8, charge current 0.02C(CC/CV)
Charger Current	20A
Max Charge current	50A
Charge Cut-off Voltage	55.5V±0.2V
Standard Discharge	
Continuous Current	50A
Max. Pulse Current	300A (<3s)
Discharge cut-off Voltage	37.5V
Environmental	
Charge Temperature	0 °C to 45 °C (32F to 113F) @60?25% Relative Humidity
Discharge Temperature	-20 °C to 60 °C (-4F to 140F) @60?25% Relative Humidity
Storage Temperature	0 °C to 40 °C (32F to 104F) @60?25% Relative Humidity
Water Dust Resistance	
Mechanical	
Cell & Method	10213245-3.2V50AH-15S2P
Plastic Case	3U standard case
Dimensions (in./mm.)	482*396*132 mm
Weight (lbs./kg.)	37.5Kg (Approx.)
Terminal	50A through terminal
Protocol (optional)	RS485
BMS	15S100A

ECO-LFP48-250 (48V250AH)



Model

LFP48-250(48V250AH)

Electrical Characteristics	Nominal Values
Nominal Voltage	48V
Nominal Capacity	250Ah (C5,25°C)
Energy	12000Wh
Internal Resistance	≤500mΩ
Cycle Life	>5000 cycles @0.2C 800%DOD
Months Self Discharge	<3%
Efficiency of Charge	100% @0.2C
Efficiency of Discharge	96~99% @1C
Standard Charge	
Charge voltage	54.8±0.2V
Charge Mode	0.2C to 54.8V, then 54.8,charge current 0.02C(CC/CV)
Charger Current	50A
Max Charge current	125A
Charge Cut-off Voltage	55.5V±0.2V
Standard Discharge	
Continuous Current	100A
Max. Pulse Current	500A(<3s)
Discharge cut-off Voltage	37.5V
Environmental	
Charge Temperature	0 °C to 45 °C (32F to 113F) @60%25% Relative Humidity
Discharge Temperature	-20 °C to 60 °C (-4F to 140F) @60%25% Relative Humidity
Storage Temperature	0 °C to 40 °C (32F to 104F) @60%25% Relative Humidity
Water Dust Resistance	
Mechanical	
Cell & Method	10213245-3.2V50AH-15S5P
Plastic Case	6U standard case
Dimensions (in./mm.)	482*570*270 mm
Weight (lbs./kg.)	92Kg (Approx.)
Terminal	100A through terminal
Protocol (optional)	RS485/CAN
BMS	15S100A

ECO-LFP48-300 (48V300AH)



Model

LFP48-300(48V300AH)

Electrical Characteristics	Nominal Values
Nominal Voltage	48V
Nominal Capacity	300Ah (C5,25°C)
Energy	14400Wh
Internal Resistance	≤500mΩ
Cycle Life	>5000 cycles @0.2C 80%DOD
Months Self Discharge	<3%
Efficiency of Charge	100% @0.2C
Efficiency of Discharge	96~99% @1C
Standard Charge	
Charge voltage	54.8±0.2V
Charge Mode	0.2C to 54.8V, then 54.8, charge current 0.02C(CC/CV)
Charger Current	60A
Max Charge current	150A
Charge Cut-off Voltage	55.5V±0.2V
Standard Discharge	
Continuous Current	100A
Max. Pulse Current	500A (<3s)
Discharge cut-off Voltage	37.5V
Environmental	
Charge Temperature	0 °C to 45 °C (32F to 113F) @60%25% Relative Humidity
Discharge Temperature	-20 °C to 60 °C (-4F to 140F) @60%25% Relative Humidity
Storage Temperature	0 °C to 40 °C (32F to 104F) @60%25% Relative Humidity
Water Dust Resistance	
Mechanical	
Cell & Method	10213245-3.2V50AH-15S6P
Plastic Case	6U standard case
Dimensions (in./mm.)	482*570*270 mm
Weight (lbs./kg.)	107Kg (Approx.)
Terminal	100A through terminal
Protocol (optional)	RS485/CAN
BMS	15S100A

ECO-LFP51.2-200 (51.2V200AH)



Model

LFP51.2-200(51.2V200AH)

Electrical Characteristics	Nominal Values
Nominal Voltage	51.2V
Nominal Capacity	200Ah (C5,25°C)
Energy	10240Wh
Internal Resistance	≤500mΩ
Cycle Life	>5000 cycles @0.2C 80%DOD
Months Self Discharge	<3%
Efficiency of Charge	100% @0.2C
Efficiency of Discharge	96~99% @1C
Standard Charge	
Charge voltage	58.4±0.2V
Charge Mode	0.2C to 58.4V, then 58.4, charge current 0.02C(CC/CV)
Charger Current	40A
Max Charge current	100A
Charge Cut-off Voltage	59.2V±0.2V
Standard Discharge	
Continuous Current	100A
Max. Pulse Current	500A (<3s)
Discharge cut-off Voltage	37.5V
Environmental	
Charge Temperature	0 °C to 45 °C (32F to 113F) @60?25% Relative Humidity
Discharge Temperature	-20 °C to 60 °C (-4F to 140F) @60?25% Relative Humidity
Storage Temperature	0 °C to 40 °C (32F to 104F) @60?25% Relative Humidity
Water Dust Resistance	
Mechanical	
Cell & Method	13161227-3.2V50AH-16S4P
Plastic Case	6U standard case
Dimensions (in./mm.)	482*500*270 mm
Weight (lbs./kg.)	80Kg (Approx.)
Terminal	100A through terminal
Protocol (optional)	RS485/CAN
BMS	16S100A

ECO-LFP51.2-250 (51.2V250AH)



Model

LFP51.2-250(51.2V250AH)

Electrical Characteristics	Nominal Values
Nominal Voltage	51.2V
Nominal Capacity	250Ah (C5,25°C)
Energy	7680Wh
Internal Resistance	≤500mΩ
Cycle Life	>5000 cycles @0.2C 80%DOD
Months Self Discharge	<3%
Efficiency of Charge	100% @0.2C
Efficiency of Discharge	96~99% @1C
Standard Charge	
Charge voltage	58.4±0.2V
Charge Mode	0.2C to 58.4V, then 58.4, charge current 0.02C(CC/CV)
Charger Current	50A
Max Charge current	125A
Charge Cut-off Voltage	59.2V±0.2V
Standard Discharge	
Continuous Current	100A
Max. Pulse Current	500A (<3s)
Discharge cut-off Voltage	37.5V
Environmental	
Charge Temperature	0 °C to 45 °C (32F to 113F) @60?25% Relative Humidity
Discharge Temperature	-20 °C to 60 °C (-4F to 140F) @60?25% Relative Humidity
Storage Temperature	0 °C to 40 °C (32F to 104F) @60?25% Relative Humidity
Water Dust Resistance	
Mechanical	
Cell & Method	13161227-3.2V50AH-16S5P
Plastic Case	6U standard case
Dimensions (in./mm.)	482*570*270 mm
Weight (lbs./kg.)	97Kg (Approx.)
Terminal	100A through terminal
Protocol (optional)	RS485/CAN
BMS	16S100A

ECO-LFP51.2-300 (51.2V300AH)



Model

LFP51.2-300(51.2V300AH)

Electrical Characteristics	Nominal Values
Nominal Voltage	51.2V
Nominal Capacity	300Ah (C5,25°C)
Energy	15360Wh
Internal Resistance	≤500mΩ
Cycle Life	>5000 cycles @0.2C 80%DOD
Months Self Discharge	<3%
Efficiency of Charge	100% @0.2C
Efficiency of Discharge	96~99% @1C
Standard Charge	
Charge voltage	58.4±0.2V
Charge Mode	0.2C to 58.4V, then 58.4, charge current 0.02C(CC/CV)
Charger Current	60A
Max Charge current	150A
Charge Cut-off Voltage	59.2V±0.2V
Standard Discharge	
Continuous Current	100A
Max. Pulse Current	500A (<3s)
Discharge cut-off Voltage	37.5V
Environmental	
Charge Temperature	0 °C to 45 °C (32F to 113F) @60%25% Relative Humidity
Discharge Temperature	-20 °C to 60 °C (-4F to 140F) @60%25% Relative Humidity
Storage Temperature	0 °C to 40 °C (32F to 104F) @60%25% Relative Humidity
Water Dust Resistance	
Mechanical	
Cell & Method	13161227-3.2V50AH-16S6P
Plastic Case	6U standard case
Dimensions (in./mm.)	482*570*270 mm
Weight (lbs./kg.)	112Kg (Approx.)
Terminal	100A through terminal
Protocol (optional)	RS485/CAN
BMS	16S100A

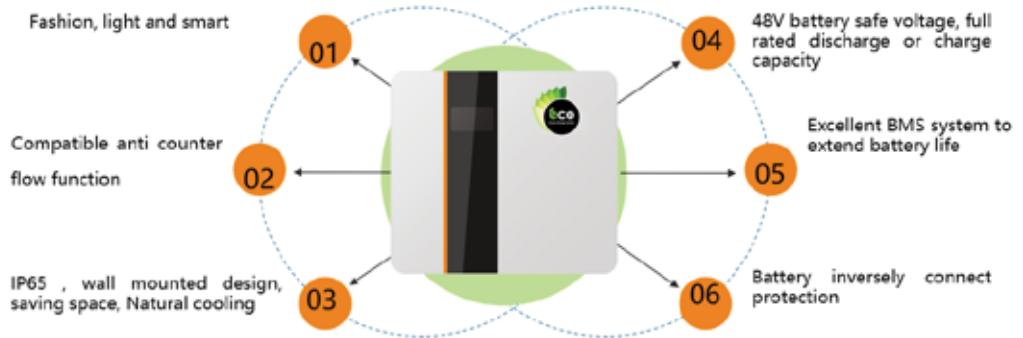


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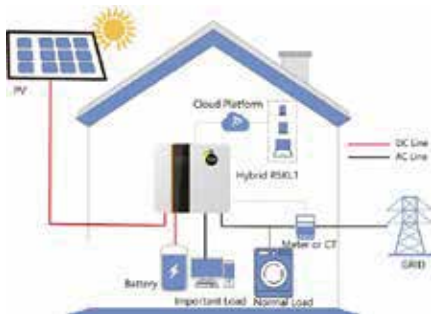
eco HYBRID INVERTERS



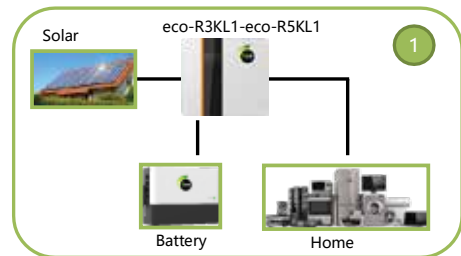
Hybrid Inverter



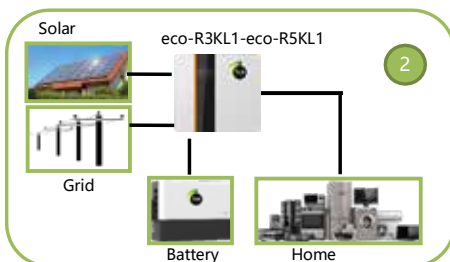
APPLICATION



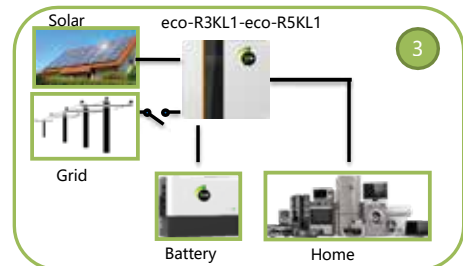
Off Grid



On Grid



Backup



Hybrid Inverter

Energy Storage

Hybrid Inverter (Low Battery Voltage)



Flexible

- Wide input voltage range.
- Compatible with lead-acid or lithium-ion batteries or other battery.

Grace

- Fashion appearance, light weight, smart operation.
- Natural cooling, low noise.
- IP65 , wall mounted design, saving space.
- Touch screen LCD.

Reliable

- Compatible anti counter flow function.
- Battery reverse connect protection.

Advanced

- Intelligent energy management system for home.
- Power dispatching and demand side response management.
- Distributed virtual power station management.

Application Scenario



Villa



Communication base station



Nomadic area



Farm

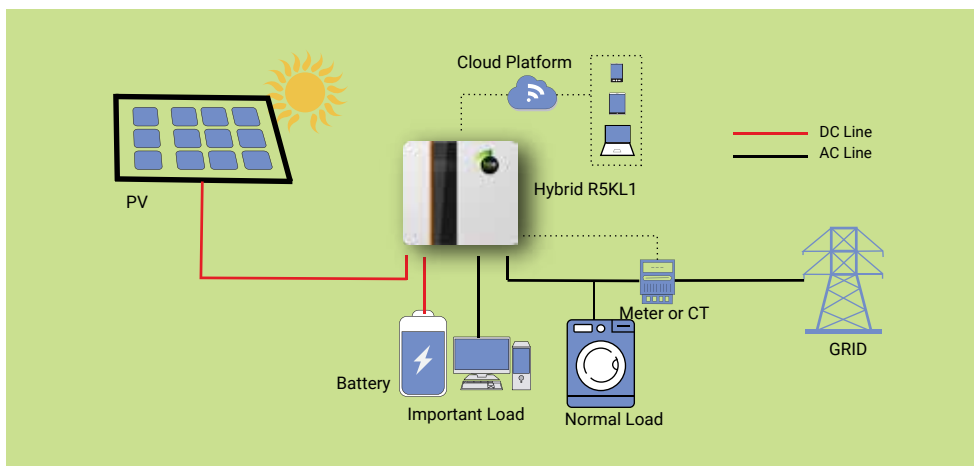


Household



Field power supply

Product Topology



Energy Storage Hybrid Inverter (low battery Voltage)

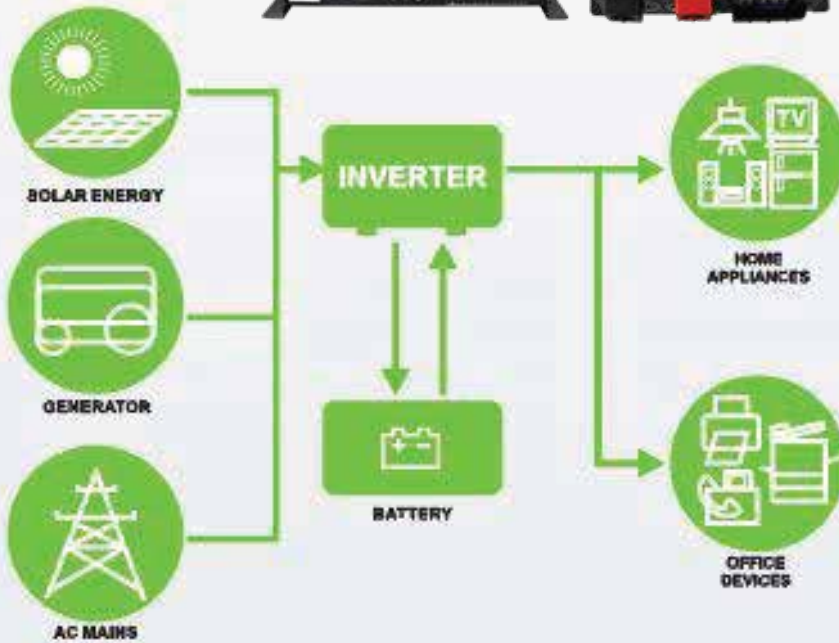


Model	ECO-R3KL1	ECO-R3K6L1	ECO-R4KL1	ECO-R4K6L1	ECO-R5KL1	ECO-R6KL1
DC input						
Max. Input Power	4600W		6000W		7000W	
Start-up voltage	125V					
Max. PV voltage	550V					
MPPT range/nominal	125V-550V /360V					
Max. input current	14A/14A					
MPPT tracker/strings	2/1					
AC output						
Rated power w/va	3000VA/3000W	3600VA/3600W	4000VA/4000W	4600VA/4600W	5000VA/5000W	6000VA/6000W
Max. output current	13A	16A	17.4A	20A	21.7A	26A
Nominal voltage/range	230V /180Vac~280Vac					
Frequency	50 /60Hz					
PF	1 (0.8lagging-0.8leading)					
THDI	<3%					
AC output topology	L+N+PE					
Battery						
Battery voltage range	42~59V					
Max. charging voltage	58V					
Charge/discharge current	95A/62.5A	95A/76.6A	95A/83.3A	95A/95.8A	95A/110A	95A/110A
Battery type	lithium /Lead-acid					
Communication interface	CAN/RS485					
EPS output						
Rated power w/va	3000VA/3000W	3600VA/3600W	4000VA/4000W	4600VA/4600W	5000VA/5000W	6000VA/6000W
Rated voltage	230Vac					
Rated current	13A	16A	17.4A	20A	21.7A	26A
Rated frequency	50 /60Hz					
Automatic switchover time	<20ms					
THDU	<2%					
General data						
Battery charge/discharge DC max. efficiency	95.5%/95%					
Euro efficiency	97%					
MPPT efficiency	99.9%					
Protection class	IP65					

Pure Sine Wave Charger Inverter



APPLICATION



Home



Office



Farm



Industrial



sinewave
output



Solar/AC
charger



96%
Efficiency
(ECO Mode)



Generator
Restart
MPPT
Controller Inside

Specification

Pure Sine Wave Charger Inverter



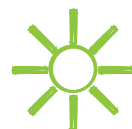
Model	EC0801000	EC0802000	EC0803000	EC0804000	EC0805000	EC0806000	EC0808000	EC0810000	EC0812000
Power Rating	1000W	2000W	3000W	4000W	5000W	6000W	8000W	10KW	12KW
AC Input	Input Voltage Waveform pure sine wave (utility or generator) Nominal Input Voltage 120/230VAC Low Line Disconnect 85Vacs±4%(Normal) or 80Vacs±4%(Wide) for 120Vac 184Vacs±4%(Normal) or 135Vacs±4%(Wide) for 230Vac Low Line Re-connect 95Vacs±4%(Normal) or 85Vacs±4%(Wide) for 120Vac 194Vacs±4%(Normal) or 145Vacs±4%(Wide) for 230Vac High Line Disconnect 138Vacs±4%(Normal) or 145Vacs±4%(Wide) for 120Vac 263Vacs±4%(Normal) or 263Vacs±4%(Wide) for 230Vac Max AC Input Voltage 120Vac for Max150Vac, 230Vac for Max270Vac Frequency 50Hz:41-54Hz, 60Hz:51-64Hz								
AC Charger	Nominal Charge Current 20A/35A/50A/70A/90A(5 stages adjustable charging current) Over Charge Protection Bat.V≥15.5VDC for 12V battery ; Bat.V≥31.0VDC for 24V battery, Bat.V≥62.0VDC for 48V battery ; beeps 0.5s every 1s & fault after 60s								
Solar Charger	Rated Charge Current 40A 80A 80A 80A 80A 80A 80A 80A 80A 80A PV Input Voltage range 15VDC-40VDC for 12VDC, 25VDC-75VDC for 24VDC, 55-145VDC for 48V Max.PV open circuit array voltage 12V for 40VDC, 24V for 75VDC, 48V for 145VDC Charger mode MPPT PV Low Voltage Re-connect PV≥Bat.V+3V PV Low Voltage Disconnect PV ≤ Bat.V Efficiency ≥97%								
Charger	Nominal Charger Current 20A/35A/50A/70A/90A(According to the inverter model), 5 stages adjustable charging current Over charge Protection Bat.V≥15.5VDC/31VDC/62VDC,beeps 0.5s every 1s & fault after 60s								
Efficiency	Efficiency (Battery Mode) >87% Efficiency (Line Mode) >98%								
Battery Voltage	Nominal DC Input Voltage 12/24/48VDC 24/48VDC 48VDC Low Battery Alarm 10.5VDC±0.3VDC for 12VDC, 21VDC±0.6VDC for 24VDC, 42VDC±1.2VDC for 48VDC Low DC input shut-down 10VDC±0.3VDC for 12VDC, 20VDC±0.6VDC for 24VDC, 40VDC±1.2VDC for 48VDC High DC input Alarm & Fault 16VDC±0.3VDC for 12VDC, 32VDC±0.6VDC for 24VDC, 64VDC±1.2VDC for 48VDC								
Transfer Time	AC to DC 20ms(max) DC to AC 15ms(max)								
System Parameter	Over-Load Protection 110%<load<150%, beeps 0.5s every 1s, and Fault after 60s off the output, load>150%, beeps 0.5s every 1s, and Fault after 20s Output Short Circuit Protection Current limit(Fault after 10s) Surge Rating(10s) 1.3(VA) Power Saver Loads≤25W(Enabled on *P/S auto*Setting of Remote control) Protections Low battery,over charging,over load,over temp Indicators LED+LCD Display								
General Specifications	Operating Temperature Range 0°C to 40°C Storage Temperature -15°C~60°C Operation humidity 5% to 95%(non-condensing) Audible Noise 60dB max cooling Forced air,variable speed fan Dimension(L*W*H) 480*338*190mm 530*400*190mm 627*418*204mm Net Weight(kg) 19.5kg 23.5kg 28.0kg 30.0kg 35.5kg 39.0kg 52.5kg 58.5kg 66.5kg								

◆ Product specifications are subject to change without further notice.



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eco NANO Cylinder Cells



40 amp Hour Cell

Nano Lithium Titanate Battery Cell



Model

ECO-LTO14AHC23

Performance Characteristics	Nominal Values
Nominal Voltage	2.3 V
Capacity (Min / Typical @40 amp [1C rate] at 25°C CCCV Charge)	40 / 42 Ah
Typical high-rate capacity (240 amp at 25°C CCCV Charge)	37 Ah
Typical energy (40 amp [1C rate] at 25°C CCCV discharge)	88 Wh
Pulse power (400 amp [10C rate], 10s pulse, 50% SOC at 25°C) (Discharge, charge)	TBD
Pulse power (FreedomCAR, 10s pulse, 50% SOC at 25°C) (Discharge, charge)	1550 W, 3755 W
Energy density	161 Wh/L
Power density (Discharge, charge) ¹	2834 W/L, 6865 W/L
Specific energy	72 Wh/kg
Specific Power (Discharge, charge) ¹	1260 W/kg, 3053 W/kg
Internal charge impedance (10sec DC pulse, 50% SOC, 25°C)	0.52 mΩ
Internal discharge impedance (10sec DC pulse, 50% SOC, 25°C)	0.71 mΩ
Max continuous charge	240 A
Max continuous discharge	240 A
Max 10 Sec Pulse discharge or charge current	800 A
Internal impedance (1 Hz AC, 10% SOC, 25°C)	0.29 mΩ
Life Characteristics	
Cycle life at 2C charge and 2C discharge, 100% DOD, 25°C	>25,000 to 80% initial capacity
Cycle life at 2C charge and 2C discharge, 100% DOD, 55°C	>3000 to 90% initial capacity
Calendar life at 25°C	25 years
Temperature Limits²	
Operating and storage temperature range	-50°C to +65°C cell temperature
Voltage Limits³	
Discharge cut off voltage at -40°C to 55°C	1.5 V
Charge cut off voltage at -40°C to 55°C	2.9 V
Cell dimensions⁴	
Diameter (Φ) x Height(H)	66 mm (Φ) x 160 mm(H)
Weight	1.23 kg
Transportation	
Transportation Specifications	Tested to UN 38.3

30 amp Hour Cell

Nano Lithium Titanate

Battery Cell



Model

ECO-LTO14AHC23

Performance Characteristics	Nominal Values
Nominal Voltage	2.3 V
Capacity (Min / Typical @30 amp [1C rate] at 25°C CCCV Charge)	30 / 31.5 Ah
Typical high-rate capacity (240 amp at 25°C CCCV Charge)	75 Ah
Pulse power (FreedomCAR, 10s pulse, 50% SOC at 25°C) (Discharge, charge)	900 W, 1700 W
Energy density	140 Wh/L
Specific energy	75 Wh/kg
Internal charge impedance (10sec DC pulse, 50% SOC, 25°C)	0.42 mΩ
Internal discharge impedance (10sec DC pulse, 50% SOC, 25°C)	0.43 mΩ
Max continuous charge	300 A
Max continuous discharge	300 A
Max 10 Sec Pulse discharge or charge current	600 A
Life Characteristics	
Cycle life at 2C charge and 2C discharge, 100% DOD, 25°C	>1000 to 85% initial capacity
Cycle life at 2C charge and 2C discharge, 100% DOD, 55°C	>1000 to 90% initial capacity
Calendar life at 25°C	25 years
Temperature Limits²	
Operating and storage temperature range	-50°C to +65°C cell temperature
Voltage Limits³	
Discharge cut off voltage at -40°C to 55°C	1.5 V
Charge cut off voltage at -40°C to 55°C	2.9 V
Cell dimensions⁴	
Width x Height x Thickness (T, compressed)	173 x 97 x 27.8 mm
Weight	1.01 kg
Transportation	
Transportation Specifications	Tested to UN 38.3

1. Power at 25°C for 10 sec is calculated using freedomCAR discharge formulas
2. Optimal storage temperature is 25°C
3. In battery systems, the battery management system must enforce the voltage limits at the individual cell level.
4. Cell terminal height are not included in the stated cell dimensions.



THE BATTERY OF THE FUTURE

eCO Solar & Wind



Introduction

Street lights powered by solar and wind energy are an emerging trend. Hybrid lighting is an off-grid lighting solution, which does not have any running costs post-fitting. The significant advantage of wind-solar hybrid street lighting systems is that when solar and wind power productions are used together, the system's reliability is enhanced.

Wind solar hybrid street lighting is an intelligent and complete stand-alone LED street lighting system. Composed of Mono-crystalline solar module, VAWT (Vertical Axis Wind Turbine), Lithium Iron Battery, Smart Hybrid Charger Controller and high brightness LED Street Lamp.

This hybrid system harvests energy from wind and solar and stores it in batteries to power street lights during the night. Using a combination of wind & solar resources, the system will provide a stable and constant flow of power to power the street lighting.

The constantly moving turbine with solar panels will last up to twenty years (Not including the batteries). Likewise, the LED lights and other parts within will endure for as long as the turbine and Solar panel along with hybrid street lights are guaranteed.

A stable supply of electricity is generated even when it is cloudy! The lighting starts automatically when the environment becomes dark through the use of an intelligent sensor system. The LED lights will turn on and off by an automatic controller, which will deliver an average lighting time of 8-12 hours per day.

Main Features



Vertical Axis Wind Turbine

With the 360° wind pick-up design and robust construction, helix wind turbines function even under air turbulence and frequent changes of wind direction.



Practically Silent

Our Helix Wind Turbine WIND OF CHANGE is a very quiet working unit. even at more than 10 m / s wind speed no meaningful value could be determined, since the ambient sounds of the surroundings were louder than the helix wind turbine.



High Efficient Solar Panel

With high transfer efficiency solar panel. Mono-crystalline silicone solar panel, 25 years life span, it works efficiently even in low light and cloudy weather.



High Brightness LED Street Lamp

High-efficiency LED chip (Philips SMD3030) luminous efficiency is up to 160lm/W (@25 C). Superior outdoor LED · Aluminum lamp base excellent heat dissipation



Li-ion

LiFePO4 Lithium-ion Battery

Over 2000 times cycle charge-discharge and our patented technology battery management program, enabling the life span of battery to last for more than six years, significantly improving the ROI and at the same time helping to sustain the earth's resources.



Solar & Wind Power Charger Controller

The hybrid controller integrates the needs of both the solar panel and the wind turbine and allows you to maximize the usefulness of both energy sources.

Application

Path, lawn, park lighting

Nowadays, roads, lawns, and parks are becoming increasingly popular within communities. Smooth and bright lighting will become necessary to make a safer and more functional living place.

Parking lot lighting

Each sports facility, station, park, shopping center, or countless other public spaces always have an attached parking lot. All of these spaces must be adequately for visibility and safety. The hybrid street lighting solution is safe because it is low voltage, an off-grid system, meanings can make an independent installation.

Road and highway lighting

The risk of accidents can be minimized because the hybrid power LED street lights are easy to install without access to external power. They can be easily installed on remote roads or highways where there is no electricity. LED Technology provides greater visibility of vehicles and pedestrians and reduces road safety risks.

Outdoor lighting (rural area)




The hybrid power LED street lights converting solar & wind energy into electricity. Therefore, these lights are a practical option for outdoor or remote areas as they can operate at night as no electricity is required. Equipped Photocell sensor, the lights will automatically work dust to dawn.

Installation Projects







Specification

ECO ESS Vertical Wind Turbine

Model	Parameter		
ECO-V-100		Product Name	ECO-V-100
		Start-up wind speed	1.3 m/s
		Cut-in wind speed	2.5 m/s
		Rated Wind speed	13 m/s
		Rated voltage	12/24V
		Rated power	100W
		Max power	150W
		Rotor Diameter of Blades	0.4m
		Blades Height	0.9m
		Blades quantity	2pcs
		Blade material	glass/basalt
		Generator: 3 phase AC meglev generator	
		ECO-V-200	
Started wind speed	1.3 m/s		
Cut-in wind speed	2.5 m/s		
Rated Wind speed	13 m/s		
Rated voltage	12/24V		
Rated power	200W		
Max power	250W		
Rotor Diameter of Blades	0.4m		
Blades Height	0.9m		
Blades quantity	2pcs		
Blade material	glass/basalt		
Generator: 3 phase AC meglev generator			
ECO-V-300			
		Started wind speed	1.3 m/s
		Cut-in wind speed	d
		Rated Wind speed	13 m/s
		Rated voltage	12/24V
		Rated power	300W
		Max power	350W
		Rotor Diameter of Blades	0.52m
		Blades Height	1.05m
		Blades quantity	2pcs
		Blade material	glass/basalt
		Generator: 3 phase AC meglev generator	

Specification

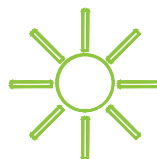
ECO ESS Vertical Wind Turbine

Model		Parameter		
ECO-V-400		<table border="1"> <tr> <td>Product Name</td> <td>ECO-V-400</td> </tr> </table>	Product Name	ECO-V-400
		Product Name	ECO-V-400	
		<table border="1"> <tr> <td>Start-up wind speed</td> <td>1.3 m/s</td> </tr> </table>	Start-up wind speed	1.3 m/s
		Start-up wind speed	1.3 m/s	
		<table border="1"> <tr> <td>Cut-in wind speed</td> <td>2.5 m/s</td> </tr> </table>	Cut-in wind speed	2.5 m/s
		Cut-in wind speed	2.5 m/s	
		<table border="1"> <tr> <td>Rated Wind speed</td> <td>13 m/s</td> </tr> </table>	Rated Wind speed	13 m/s
		Rated Wind speed	13 m/s	
		<table border="1"> <tr> <td>Rated voltage</td> <td>12/24V</td> </tr> </table>	Rated voltage	12/24V
		Rated voltage	12/24V	
		<table border="1"> <tr> <td>Rated power</td> <td>400W</td> </tr> </table>	Rated power	400W
		Rated power	400W	
		<table border="1"> <tr> <td>Max power</td> <td>450W</td> </tr> </table>	Max power	450W
Max power	450W			
<table border="1"> <tr> <td>Rotor Diameter of Blades</td> <td>0.52</td> </tr> </table>	Rotor Diameter of Blades	0.52		
Rotor Diameter of Blades	0.52			
<table border="1"> <tr> <td>Blades Height</td> <td>1.05</td> </tr> </table>	Blades Height	1.05		
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<table border="1"> <tr> <td>Blades quantity</td> <td>2pcs</td> </tr> </table>	Blades quantity	2pcs		
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<table border="1"> <tr> <td>Blade material</td> <td>glass/basalt</td> </tr> </table>	Blade material	glass/basalt		
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<table border="1"> <tr> <td>Generator: 3 phase AC meglev generator</td> </tr> </table>		Generator: 3 phase AC meglev generator		
Generator: 3 phase AC meglev generator				
ECO-V-500		<table border="1"> <tr> <td>item</td> <td>FS-V-500</td> </tr> </table>	item	FS-V-500
	item	FS-V-500		
	<table border="1"> <tr> <td>Started wind speed</td> <td>1.3 m/s</td> </tr> </table>	Started wind speed	1.3 m/s	
	Started wind speed	1.3 m/s		
	<table border="1"> <tr> <td>Cut-in wind speed</td> <td>2.5 m/s</td> </tr> </table>	Cut-in wind speed	2.5 m/s	
	Cut-in wind speed	2.5 m/s		
	<table border="1"> <tr> <td>Rated Wind speed</td> <td>13 m/s</td> </tr> </table>	Rated Wind speed	13 m/s	
	Rated Wind speed	13 m/s		
	<table border="1"> <tr> <td>Rated voltage</td> <td>12/24V</td> </tr> </table>	Rated voltage	12/24V	
	Rated voltage	12/24V		
	<table border="1"> <tr> <td>Rated power</td> <td>500W</td> </tr> </table>	Rated power	500W	
	Rated power	500W		
	<table border="1"> <tr> <td>Max power</td> <td>550W</td> </tr> </table>	Max power	550W	
Max power	550W			
<table border="1"> <tr> <td>Rotor Diameter of Blades</td> <td>0.52m</td> </tr> </table>	Rotor Diameter of Blades	0.52m		
Rotor Diameter of Blades	0.52m			
<table border="1"> <tr> <td>Blades Height</td> <td>1.3m</td> </tr> </table>	Blades Height	1.3m		
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<table border="1"> <tr> <td>Blades quantity</td> <td>2pcs</td> </tr> </table>	Blades quantity	2pcs		
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<table border="1"> <tr> <td>Blade material</td> <td>glass/basalt</td> </tr> </table>	Blade material	glass/basalt		
Blade material	glass/basalt			
<table border="1"> <tr> <td>Generator: 3 phase AC meglev generator</td> </tr> </table>		Generator: 3 phase AC meglev generator		
Generator: 3 phase AC meglev generator				
ECO-V-600		<table border="1"> <tr> <td>item</td> <td>FS-V-600</td> </tr> </table>	item	FS-V-600
	item	FS-V-600		
	<table border="1"> <tr> <td>Started wind speed</td> <td>1.3 m/s</td> </tr> </table>	Started wind speed	1.3 m/s	
	Started wind speed	1.3 m/s		
	<table border="1"> <tr> <td>Cut-in wind speed</td> <td>2.5 m/s</td> </tr> </table>	Cut-in wind speed	2.5 m/s	
	Cut-in wind speed	2.5 m/s		
	<table border="1"> <tr> <td>Rated Wind speed</td> <td>13 m/s</td> </tr> </table>	Rated Wind speed	13 m/s	
	Rated Wind speed	13 m/s		
	<table border="1"> <tr> <td>Rated voltage</td> <td>12/24V</td> </tr> </table>	Rated voltage	12/24V	
	Rated voltage	12/24V		
	<table border="1"> <tr> <td>Rated power</td> <td>600W</td> </tr> </table>	Rated power	600W	
	Rated power	600W		
	<table border="1"> <tr> <td>Max power</td> <td>650W</td> </tr> </table>	Max power	650W	
Max power	650W			
<table border="1"> <tr> <td>Rotor Diameter of Blades</td> <td>0.52m</td> </tr> </table>	Rotor Diameter of Blades	0.52m		
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<table border="1"> <tr> <td>Blades Height</td> <td>1.3m</td> </tr> </table>	Blades Height	1.3m		
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<table border="1"> <tr> <td>Generator: 3 phase AC meglev generator</td> </tr> </table>		Generator: 3 phase AC meglev generator		
Generator: 3 phase AC meglev generator				



THE BATTERY OF THE FUTURE

ALONG WITH GREEN





ECO ESS e-BUS



Global 500 New Energy Enterprise



Top 500 Manufacturing Enterprise in China



Quality Leading Enterprise

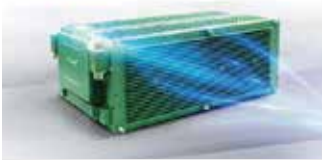


CE Certificate Product

Excellent horsepower

Speedy arrival

The vehicle is equipped with quality LFP power batteries, which features zero-pollution, zero-emission, high safety and high efficiency. It could readily meet the daily operational requirement for electric buses, promoting efficient operation of urban public transportation.



Power batteries with excellent performance

Zero pollution, zero emission, high safety and high efficiency.



Intelligent motor controller

Easy to start and easy to operate.



Innovative energy-saving permanent magnet synchronous motor

Small size, low energy loss and high power factor.

Steering ahead

Exploring the fun of driving

The control panel in the driver's cabin adopts integral enclosing design, and was equipped with anti-glare LCD instrument and multifunctional operating system, allowing for easy maneuvering.



All-enclosed driver's cabin

The driver's cabin is fully enclosed to protect drivers from outside disturbances, which at the same time allows passengers to monitor the driver's condition at all times.



Anti-glare LCD instrument

Anti-glare LCD instrument can display information much more clearly, which can reduce visual fatigue resulting from long hour driving.



CCTV system

A CCTV system is installed on the bus with a 10 inch monitoring screen to display interior and exterior image of the bus, leaving no blind spots unchecked.

TECHNICAL PARAMETER (E-BUS)

Vehicle	Total length(mm)	12000
	Total width(mm)	2550
	Total height (kg)	3260
	Curb weight (kg)	12900
	G.V.W(kg)	19000
	Rated passenger Capacity(person)	27 seats/80 passengers
	One step height of passenger door(mm)	≤340
	Net height of low floor area inside the vehicle	2420
Power	Motor power(kW)	245
	Motor Torque (N.m)	3329
	Battery type	LFP
	Total power capacity	350.1kWh
	Electric A/C	Electric air conditioning, 20kW cooling capacity, heating (heat pump 18kW, PTC10kW). Driver has separate heating and venting. Driver has separate AC air vents above and in front.
Chassis	Front axle	ZF
	Rear axle	ZF
	Suspension	Air spring with ECAS
	Steering system	Electric power steering, THP90
	Braking system	Front and rear disc. EBS braking
	Tyre	6pcs, 275/70R22.5, rim: 8.25*22.5, aluminum alloy.
	Suspension	Air suspension, with two front air bags and four rear air bags.
Vehicle body	Bus layout	Seat:27 +1
	Side hatch door	Aluminum alloy side hatch door
	Vehicle door	Passenger door: front pneumatic double internal swing door, rear sliding door; net width of passenger door is 1200mm.
	Passenger seat	27 ergonomic molding plastic seats, 4 priority seats. Passengers seats meet EU standard. Seats for disabled people are equipped with raising armrest.
	Air duct	Aluminum alloy air duct, Panoramic advertisement light box, LED bar light.
Electrical Equipment	24V low voltage battery	Maintenance-free battery (100Ah*2)
	Front defrost device	High voltage electric defrost
	Windscreen wiper	Two-speed wipers



ECO ESS **e-COACH**



Global 500 New
Energy Enterprise



Top 500 Manufacturing
Enterprise in China



Quality Leading
Enterprise



CE Certificate
Product

Providing Comfort All The Way

The vehicle is equipped with USB sockets, high-back soft-covering seats, touch switch reading lamp, first aid kit, etc., which greatly improve comfort and convenience for passengers.



USB socket

Passengers can charge their mobile phone or tablet computer at any time, which is convenient to use and meets any urgent needs.



Touch switch reading lamp

Touch switch reading lamp offers comfortable and convenient ride experience.



High-back soft-covering seat

Adjustable seat back to relief fatigue from long-hour ride.



First aid kit

Onboard first aid kit for crew members or passengers in the case of emergency.



Structural safety

The vehicle body adopts full bearing enclosed structure and the main weight-bearing unit structures are optimized to guarantee driving safety and reduce energy consumption at the same time.



Battery safety

The vehicle is installed with intelligent BMS, which can self-diagnose and send out alarm to prevent overcharge or over discharge of battery.



Fire Prevention

Flame resistant materials and smoke detecting alarm system are employed, which can cope with different fire emergencies and helps to identify and put out the source of flame before a fire is developed. It features fast response, safety and reliability.



Driving safety

By installing visual fusion and radar sensors, the vehicle can use lane departure and collision warning system to effectively reduce the risk of accidents.

TECHNICAL PARAMETER (E-COACH)

Vehicle	Length(mm)	12000
	Total width(mm)	2550
	Total height(mm)	3490
	Curb weight (kg)	13000
	G.V.W(kg)	18000
	Rated passenger Capacity(person)	51+1 (guide seat) +1
Power	Battery type	LFP
	Total power capacity	350.1kWh
	Monitoring module	Remote monitoring module
	Electric power steering pump	Electric power steering pump
	Electric air pump	Oil-free air pump
	Electric A/C	Electric air conditioner with both cooling and heating functions, 20kW cooling capacity
Chassis	Front axle	Dongfeng Dana front axle, load-bearing capacity 6.5T, KNORR 22.5" disc brake
	Rear axle	Dongfeng Dana rear axle, load-bearing capacity 13T, KNORR 22.5" disc brake, speed ratio 6.143, double side high precision gear, gear surface reinforced on both sides, improved surface smoothness, no abnormal sound during operation
	Suspension	Front 2, rear 4 air suspension, with front and rear horizontal stabilizer bar
	Steering system	Electric power steering system, Hubei Tri-ring power steering gear(model:3401ZB3). Transparent power steering oil tank for easy observation of oil level
	Braking system	Front and rear disc braking. Energy storage spring parking brake (steel air cylinder), EBS.
	Tyre	295/80R22.5 inner tube free radial tyre (meet European standard), Aluminium rim, full size spare tyre
Bus Body	Structure type	Monocoque type, steel frame, closed ring structure
	Base frame	Torque tube truss
	Bus layout	51+1 (guide seat)+1(driver seat), 2+2 layout, seat pitch is more than 680mm which required by EU standard
	Side hatch door	Whole aluminum manual flip up side hatch door
	Vehicle door	Aluminum alloy front and middle single pneumatic internal swing door
	Curtain	Folding-type fabric curtain
	Floor/flooring covering	12mm bamboo plywood(slot floor), non-slip wear-resistant floor leather
Electrical equipment	24V low voltage battery	80AH*2, maintenance-free battery
	Monitoring device	Middle door, reverse + instrument display, Car video monitoring system and four-way probe
	Front defrost device	High voltage electric defroster
	Windscreen wiper	Two speed wiper
	Others	Outside vehicle low speed alarm, and speed limit alarm of visual and acoustic signal device



ECO ESS e-BUS



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Quality Leading Enterprise



CE Certificate Product

Caring design Throughout the ride

The vehicle adopts one-step boarding for easy access. It's also installed with special foldable seats for the disabled and USB sockets, offering humanized and convenient service for passengers.



Environmentally friendly interior

The interior is made of superior sound-proof and heat insulating materials, which can effectively reduce structural noise and makes a quiet and comfortable trip.



Large view window

The vehicle adopts large view window to provide a better view for passengers to enjoy the beauty of the city.



Onboard USB sockets

The vehicle provides onboard USB sockets for charging mobile phones, tablet computers and other portable digital devices, which is convenient and solves any battery crisis en-route.



One-step low floor for easy boarding

Instead of multiple steps, the entrance adopts one step boarding design, which is easy to get on and off.



Flip ramp for wheelchair access

A manually controlled flip ramp is installed for passage of wheelchairs, which greatly increases accessibility for inconvenient passengers.



Foldable seats

Foldable seats are installed on the vehicle with labels indicating special use, which can provide space for wheelchairs and baby strollers when folded. Convenience comes from reasonable space allocation.

Excellent horsepower Speedy arrival

The bus is powered by Yinlong self-developed LTO power batteries, which features high safety, fast charge and discharge, wide working temperature, and long service life, and can fully meet the operational requirement of electric buses.

TECHNICAL PARAMETER (E-BUS)

Vehicle	Total length(mm)	12000
	Total width(mm)	2550
	Total height(mm)	3330
	Curb weight (kg)	12935/13200
	G.V.W(kg)	19000
	Rated passenger Capacity(person)	78 (total passengers)/34 passenger seats
	One step height of passenger door(mm)	≤340
	Net height of low floor area inside the vehicle	2400
Power	Motor power(kW)	145/245
	Motor Torque (N.m)	1100/3329
	Battery type	LTO
	Total power capacity	114kWh
	Electric power steering pump	Electric power steering pump(ED.KAM-OP, 3kW, 16-22L/min)
	Electric air pump	Air pump (ED.KAM-AP, 3-4kW, 310-340L/min)
	Electric A/C	Electric air conditioning, 20kW cooling capacity, heating (heat pump 18kW, PTC10kW). Driver has separate AC ports above him and in front of him.
Chassis	Front axle	ZF
	Rear axle	ZF
	Suspension	Air spring with ECAS
	Steering system	Electric power steering, THP90
	Braking system	Front and rear disc. EBS braking
	Tyre	6pcs, 275/70R22.5, rim: 8.25*22.5, aluminum alloy.
Vehicle body	Passenger seat	34 ergonomic molding plastic seats, 4 priority seats. Seats for disabled people are equipped with raising armrest. Armrest color-Yellow
	Instrument panel and instrument	Intelligent integrated instrument panel
	Air duct	Aluminum alloy air duct, panoramic advertisement light box, LED bar light.
Electrical equipment	Fire extinguisher	Motor control hatch and battery hatch are equipped with automatic fire extinguishing system.
	24V low voltage battery	Maintenance-free battery (100Ah*2).
	Monitoring device	Reversing monitor and middle door monitor + 10-inch display screen, reserve location for on-board CCTV system installation and 6-way probe line position.



THE BATTERY OF THE FUTURE

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