



IO-Power USSP-12V1224-OA Series

Outdoor high/low temperature resistance & high current long-term supply type Outdoors on-line intelligent DC UPS not interrupted operation power system



IO-Power technology USSP-12V1224-OA series, based on $-40^{\circ}\text{C} \sim +80^{\circ}\text{C}$ design need of industrial level environment tolerance grade, for hardware circuit and electronic component of planning and import. Match can bear $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$ of resistance high & low temperature C-LiFePO₄ lithium batteries, using metal shell of IP66 above of institutions design and the used 1300W super high anti-lightning bursting wave impact of protection, to build out outdoor waterproof online intelligent type DC UPS not interrupted operation power system. It can affordable outdoor $-35^{\circ}\text{C} \sim +75^{\circ}\text{C}$ operating environment require of high & low temperature resistant products. To help face a variety of systems integrators in the construction after the power supply problems, you can choose the following achieved the best power solution:

1. The street lamps, Garden lamps ... etc., not all 24-hour power supply for power charging source:

At day use "outdoors on-line intelligent DC UPS not interrupted operation power system (Outdoor DC UPS)" within built charge & discharge controller, to combine of customized C-LiFePO₄ lithium batteries and power supply for operation system about 8A max loading as around 100W/H power supply to the devices.

At night can through street lamps or garden lamps of general mains AC power, using transform adapter to exchange AC power turned into DC power in 15~32VDC. And then entered to "outdoor on-line intelligent DC UPS not interrupted operation power system" within built charge and discharge controller, turned out 12VDC voltage power for discharge loading system in 11.7V~14.2V DC power voltage. At the same time, using within built charging and discharging controller by turned out of 14.2V DC power to charging internal built of 12.8V C-LiFePO₄ lithium batteries by fast charge mode.

2. The solar power, wind power and other energy power ... etc., with a patented design 『DAPS- DC Auto Power Selector by parallel connection mode of power supply』 for power charging source:

The DAPS will be collection of DC power from different power sources; through special ideas design independent parallel connection to



integrate all power together. Working by similar input power voltage and higher voltage is preferred modes and use loading distribution of current input mode ... etc., to direct charge "outdoors on-line intelligent DC UPS not interrupted operation power system (Outdoor DC UPS)". And then through within built charging and discharging controller by directly DC to DC way for down grade voltage and rectifier current to discharge loading system in 11.7V~14.2V DC power. When any entered power source interrupted, other entered power source will undertake power of needs power, it can be avoided in the operation of equipment because there is no power source leads to cease operation of the system.

3. Car 12VDC or 24VDC generator ... etc., with a unique design "DBBVC- DC Buck Boost Voltage Convertor" for power charging source:

Using vehicles of generator (engine power circuit) or Cigar light device of plug hole output contact, through unique design of car DC Buck Boost Voltage Convertor, will entered 12~28VDC/6A (8A maximum design, can avoid on car generator in the vehicles power caused damage risk), lifting pressure turned out 20VDC/4A (5A maximum). To direct charge " outdoors on-line intelligent DC UPS not interrupted operation power system (Outdoor DC UPS)", and then through within built charging and discharging controller by directly DC to DC way for reduced voltage and rectifier current to discharge loading system in 11.7V~14.2V DC power.

In addition, the DC Buck Boost Voltage Convertor out of 20VDC/4A (5A maximum) power, can charging the Notebook Laptop use vehicle cigar light pole DC power too.

4. General power of indoor or outdoor ... etc., all 24hour power supply for power charging source:

Entered 100-260V AC power source, exchange AC to DC by transform adapter conversion for 15~32V DC voltage and 4.5~8A DC current. Through " outdoors on-line intelligent DC UPS not interrupted operation power system (Outdoor DC UPS)" within built charging and discharging controller by directly DC to DC way for reduced voltage and rectifier current to discharge for loading system in 11.7V~14.2V DC power. It is not needs exchange DC power of battery to AC power and then AC power exchange to DC power again and will save exchange power of 50% conversion losses.

Specifications additional to general uninterrupted power systems (UPS) power supply capacity of the indoor mark mode, that has shown corresponds to the VA value and discharging time and full charging time. It will help the system integrators or operators to plan projects design



and let designer can easily adopt the corresponding data and do projects appraisal of the outdoor DC UPS power supply system in advanced.

5. Using general power supply or streetlights power + solar power and other green energy generator + temporary power... etc., for variety of hybrid power sources, with a patented design “DAPS - DC Auto Power Select by parallel connection mode of power supply” for power charging source:

The DAPS will be collection of DC power from different power sources; through special ideas design independent parallel connection to integrate all power together. Working by similar input power voltage and higher voltage is preferred modes and use loading distribution of current input mode ... etc., to direct charge “outdoors on-line intelligent DC UPS not interrupted operation power system (Outdoor DC UPS)”. And then through within built charging and discharging controller by directly DC to DC way for down grade voltage and rectifier current to discharge loading system in 11.7V~14.2V DC power. Because has more stable of general power or street lamps power or solar power... and other power sources, so built-in customized C-LiFePO4 lithium batteries is almost at full charging power status or stability can be achieved full operational status, it can completely solve the outdoor exigencies of the uninterruptible power supply issues.

6. Mobile backup power system (built-in battery) or independent separate battery ... etc., with a unique design “DBBVC-DC Buck Boost Voltage Converter” for power charging source:

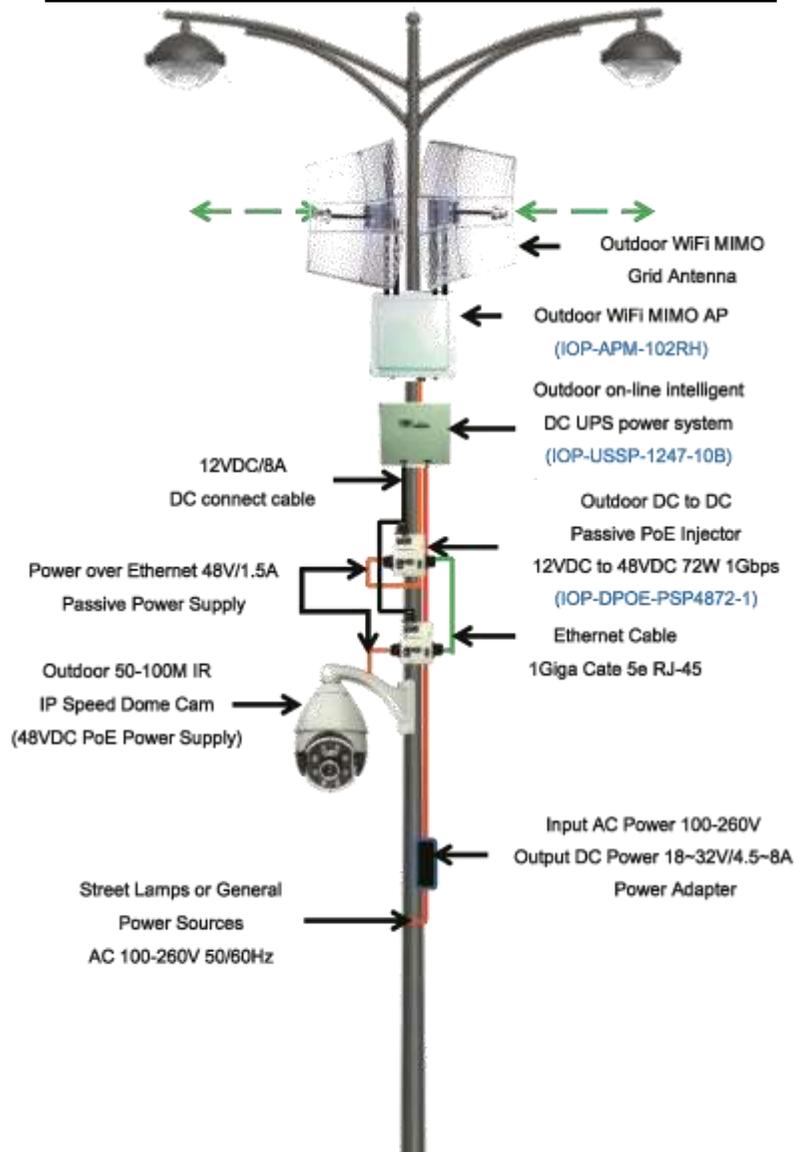
If want to use battery charging the battery, will meet between battery voltage have differential pressure is not too much, so shall be could not charging each other or balance of power voltage or averaging power capacity. It needs to match the boost voltage to achieve certain level of 2V voltage over the differential pressure between the batteries, finally can achieve do the battery to charge battery upgrade voltage effectiveness.

Through the unique design of the “DBBVC-DC Buck Boost Voltage Converter” entered the battery 12~28VDC / 6A the power sources, buck out or boost out of 20VDC/4A (5A max) charging power supply. That can direct charge low voltage for mobile power supply battery or charge controller to charge low voltage battery or built-in charge controller in the functioning of the battery ...etc. Even It can also fine-tune the automatic lifting power switch out of 14.4~15VDC / 5A (6A max) as charge power or discharge power, applied to independent 12V battery charging or similar emergency power system to start car batteries.

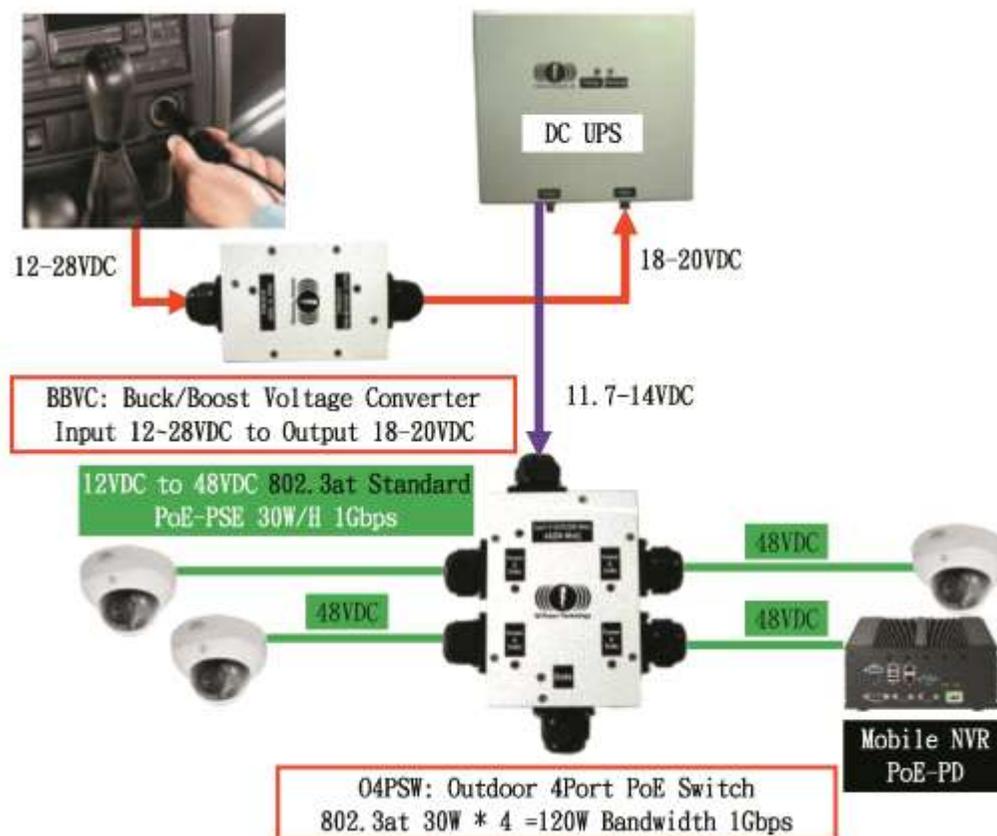


Outdoors on-line intelligent DC UPS not interrupted operation power system, solutions for various systems & applications:

Street Lamps Type DC UPS Power System



Car / Vehicle Type DC UPS Power System





IO-Power Technology USSP-12V1224-OA series, 『outdoors on-line intelligent DC UPS not interrupted operation power system』 operating system including:

1. Enter the AC Power to DC power output port:

Input 100-260VAC Power source and through AC to DC transformers convert 15 ~ 32V / 4.5 ~ 8A DC voltage and current to enter "outdoors on-line intelligent DC UPS not interrupted operation power system". Within a built-in MCU of intelligent charging and discharge controller output 13.8V ~ 14.2V voltage power to charge customized C-LiFePO4 lithium batteries, charging up to approximately 4.5A around 60W/H by fast charging CV/CC mode.

2. MCU microprocessor modules: includes microprocessor for operation of the power system:

System boot started detection management and protection, entered / output power detection management and protection, battery charging / discharge management and protection, over voltage / over current / polarity reversed / short-circuit protection / battery abnormalities...etc.

Their independent interface of independent protection, open housing photographic records management, temperature detect protection management, battery cycle life of detection records and cycle life using times of control management...etc.

3. The charge and discharge control circuit:

Through a built-in MCU of intelligent charging and discharge controller, with a unique automatic charge control technology of CV/CC, design software control by 4.0A/4.5A/5.0A for battery charging current, simultaneously have full charge of the battery charging voltage, over current, full charge enable float charge ... etc., doing detect for the purpose of management. Similarly, via a built-in MCU intelligent charging and discharge controllers, do protection like battery low voltage discharge, low current discharge, discharge in low voltage protection and low voltage protection system to restore power after starting operation ... etc., provide the best protection and the efficient functioning of the mechanism. It is worth mentioning that, specially-designed hardware to play the final input / output voltage and current protection and take separate independent protection design for interface to avoid charging and discharging the temporary exception of affecting the operation of the system.

4. Output DC power terminal:



Through built-in MCU intelligent charging and discharging controller, for DC power discharge detection control and discharge total capacity control protection, for load equipment of power requirements, take relative should appropriate current of power supply. By minimum 0.5A to maximum 8A of DC current supply control, while design hardware circuit match MCU processor, let battery has added support power operation mode, to meet big power system equipment of big power requirements. While in order to avoid battery full charge, charge and discharge load operation performed cause over charging, leading to the cycle life of the battery is reduce, so special design when full charge of the battery will enable adapter power supply direct to power supply for loading system to improve stability power supply and increase battery life.

5. The special enhanced protection measures:

For outdoor environment of high / low temperature changes, on battery of life and using efficiency, may produce serious damage, even produced using safety problem, so design within built MCU intelligent charging and discharging controller, support - 35°C low temperature and + 75°C high temperature of security protection mechanism, and used industrial level closed aluminum metal thermal protection shell and waterproof dust reached IP66 of institutions design and the industrial level resistance high & low temperature M12 connector, to avoid outdoor environment using safety problem occurred. In response to outdoor lightning surge storm or power surge and voltage instability or excessive power noise ...etc. to lead upgrade risk. So special to use high-specification 1300W lightning surge impulse and filter regulator design. Considering the input and output terminals and battery terminals, often because the human factor, cause short circuits, polarity reversed, or leakage to import ... such as, so special hardware and software design of dual protection, try to completely eliminate abnormal short circuits generated by using risk factors.

6. Resistance to high temperature and long acting customized C-LiFePO4 lithium batteries:

Consider outdoor environment changing and more demanding of high & low temperature impact test, except for a few such as C-LiFePO4 lithium batteries, the traditional Lead-acid or Lead-acid deep cycle colloidal battery or Lithium batteries or Ni-MH battery... etc. They should operate in high temperature environment by outdoor UPS power system application and will face all the feasibility of the use of challenge.



Following the IO-Power company's outdoor DC UPS power systems V.S. general UPS power system, analysis of the main characteristics:

■ Resistant to high temperature and ultra-low temperature:

The C-LiFePO₄ lithium batteries can bear - 20°C ~ + 60°C of high / low temperature environment using, match unique of institutions design, it can upgrade bear - 35°C ~ + 75°C of temperature using; General indoor UPS system most using Lead-acid battery or Lead-acid deep cycle colloidal battery, only can work in - 5°C ~ + 45°C of temperature, below - 5°C temperature using, battery will release not out power; above + 45°C temperature using, battery cycle life will rapid reduced left 1/8 around, even occurred high temperature high pressure of explosion risk. (The C-LiFePO₄ lithium batteries design has a unique pressure relief valve when more than +130°C high temperature, the pressure relief valve will open and cool, not exploding risk.)

■ Battery charge / discharge cycle life:

The C-LiFePO₄ lithium batteries can work in temperature + 25 °C environment, for charging and discharging cycle using life reached 2000 times above (about 7 years), even work in high temperature environment of charging and discharging at + 55°C, the battery cycle life also still reached 2000 times above (about 7 years); General indoor UPS power system most using Lead-acid battery or Lead-acid deep cycle colloidal battery, in temperature + 25°C environment using for charging and discharging, the cycle life reached 300~800 times around (about 1~ 2 years), at a temperature of + 45°C environment to work, the cycle life can only use about 40-90 times (about 3 months).

■ Depth of discharge of power capacity:

The C-LiFePO₄ lithium batteries can discharge deep up reached 98%, relative of general Lead-acid battery only discharge depth reached 50~55%, even Lead-acid deep cycle colloidal battery also only discharge depth reached 70~85%. Lead-acid battery or lead acid deep cycle colloidal battery discharge for devices, if discharge depth over limit value, although still can discharge, but charging and discharging cycle life will fast reduced a lot, even caused directly damaged. In addition, because the depth of discharge is only about 50%~70%, so the system backup power capacity design, you need to add the battery capacity of over 40%~60%.

■ Use loss compensation of battery power capacity:



The C-LiFePO₄ lithium batteries in 25°C of temperature environment to charging and discharging cycle life about using 2000 times, and the battery power capacity will reduced around 20%, left about 80% of power capacity can for load system power using; Lead-acid battery or Lead-acid deep cycle colloidal battery in 25°C of temperature environment to charging and discharging cycle life about using 300-800 times, and the battery power capacity will reduced 30~50% around, left about 50~70% of power capacity can for load system power using, so system prepared aid backup power capacity design, will need to specifically increase the battery capacity of over 30%~50% to cope with the day-to-day operation of the system power consumption capacity.

■ Volume and weight differences:

The C-LiFePO₄ lithium batteries compared to Lead-acid batteries or Lead-acid deep cycle colloidal battery with a volume of about narrowing the ratio 1/2 ~ 1/3; percentage of weight reduced by about 1/2 ~ 1/3, for system operators to set up space and convenient mobile power supply system or erection of temporary power source, are more superior characteristics.

■ Sealed IP66 weatherproof metal:

For outdoor or car sunshine high temperature environment using and car or mobile power of jumped hit risk and the exception short-circuit or using exception status occurred. It has led to "outdoors on-line intelligent DC UPS not interrupted operation power system" of within built charging and discharging controller fault or The C-LiFePO₄ lithium batteries exception charging and discharging damaged or load end equipment indirect damaged. So special design closed type IP66 grade of dust waterproof design institutions and the metal roast paint anti-introduction lightning impact design; Compared to the Lead-acid battery or Lead-acid deep cycle colloidal battery of UPS power system, those design will have more rugged and withstand environmental attributes.

■ Enhanced safety protection design of input port and output port:

Outdoor temperature or streetlights or onboard generator power or temporary power supplies or solar power complex features such as power or special environmental requirements, we need to design more intensive professional security with electronic component tolerance and long-term and more charge-discharge capacity, in response to the needs of different users.

The company "outdoors on-line intelligent DC UPS not interrupted operation power system" of within built charging and discharging controller, has special design of entered & output ends both of prevent short-circuit hurt design, and improve anti-bursting wave lightning of



tolerance degree reached 1300W. used industrial level electronic component match resistance high & low temperature C-LiFePO4 lithium batteries, real do - 35°C ~ + 75°C of environment tolerance, through unique of hardware and software in the MCU operation design, strengthened battery of charging and discharging effectiveness and more security of battery operation protection.

Last add special sensors and detection and management mechanisms, the limitation of the operation of the product and damage protection and integrated remote management, feasibility of providing expanded integration.

■ Design DC to DC power supply mode to reduce AC to DC mode conversion loss:

General UPS mostly use 12VDC battery, from DC voltage power convert to AC voltage power output, and then use AC to DC transformers switch out DC voltage power again, and power supply to the load equipment used, such a direct DC to AC and AC to DC conversion, simply wasting battery power capacity of about 30%~50%.



IOP-USSP-12V1224-OA Series Specification

Model	USSP-1212-06B	USSP-1216-07B	USSP-1218-08B	USSP-1224-09B	USSP-1228-10B
Outdoor Model M12 Connector Aluminium Radiating Airtight Housing IP 66					
Built In C-LiFePO4 Lithium Batteries Power Capacity	148 WH (11.6Ah@12.8V)	206 WH (16.1Ah@12.8V)	235 WH (18.4Ah@12.8V)	297 WH (23.2Ah@12.8V)	355 WH (27.6Ah@12.8V)
General UPS Label Size (DC Power Factor is Equal to 1)	888VA (0.9KVA)	1236VA (1.2KVA)	1410VA (1.4KVA)	1782VA (1.8KVA)	2130VA (2.1KVA)
Max Output Wattage (Battery Life Protection Design)	85W/H	85W/H	85W/H	85W/H	85W/H
UPS Discharge Power Supply Time	More than 1.5hr @85W/H Discharge	More than 2hr @85W/H Discharge	More than 2.5hr @85W/H Discharge	More than 3hr @85W/H Discharge	More than 4hr @85W/H Discharge
Quickly Full Charge DC UPS Battery Time	About 3hr @4A Charging	About 4hr @4A Charging	About 4.5hr @4A Charging	About 6hr @4A Charging	About 7hr @4A Charging
AC to DC Adapter Input AC Voltage & Output DC Voltage	AC 100~260V/1.5A~2.5A 50/60Hz transformer adapter DC 15V~32V/4.5~8.0A above Shipments match AC 100~240V / 1.5A~2.5A to DC 19 ~ 20V/4.7A ~ 6.0A transformer adapter				



External load voltage	DC 11.7V~14.2V +-3%
External load current	4A (7A around 85W/H Max)
Battery charging voltage	13.8V~14.2V +-3% Max
Battery standard charging current	4A
Transform Efficiency	95%
Strengthen the protection measures With Special operations functions	<ul style="list-style-type: none">● Power outages without disrupting the operation of the on-line operation system (monitor system not black screen)● MCU microprocessor starts, automatic charging and discharging systems functioning State protection● Automatically detect abnormal voltage the battery status and abnormal aging or faulty battery or battery charging protection● Shell opening record of vandal detection and RS-485 signal alarm mechanism (optional function)● With temperature detection records with read function mechanism● Mechanism of low temperature (@ -35°C) & high temperature (@ +75°C) protection (Please see note 3 & note 4)● Specially designed battery cycle life defining and recording and control mechanisms (optional function)● RS-485 input / output interface, can enhance remote management and control in real time (optional function)● System operation State record function● Support industrial MODBUS communication protocol (allowing the PLC programmable logic control)● Input overvoltage protection● Input power supply over-current protection● Input of positive and negative polarity reverse protection● Input short-circuit protection● Input lightning or power surge protection up to 1300W● Battery full charge, input power supply power directly to the load, maximum output power is reached, at the same time avoiding battery overcharge protection



	<ul style="list-style-type: none">● Battery intelligent charging system protection and the float charge function● Output power limit voltage protection● Output power limit current protection● Output of positive and negative polarity reverse protection● Output short circuit protection● Output lightning or power surge protection up to 1300W● Battery voltage is less than 12.8V, MCU microprocessor automatically starts into the battery low discharge warning state● Battery discharge below the 11.7V,MCU microprocessor automatically stop discharging into the battery low voltage protection status● Battery voltage is lower than 11.2V, MCU microprocessor goes into sleep protection status● Battery low voltage static ultra-low power protection● When the input power, MCU microprocessor automatically starts recovery operation mechanism● After discharge low voltage battery protection to restart the battery, special designed discharge voltage protection function● Discharging under load, batteries have added support mode power supply operation
Support Battery Type	C-LiFePO4 Lithium Batteries Lead-acid batteries or lithium batteries or other battery, can be customized to modify (optional function)
Built-in battery capacity range	11.6Ah @ 12.8V (148 WH) ~ 30.0Ah @ 12.8V (384 WH)
Battery Charge Mode	CC/CV MCU Automatic charging mode control
Battery Charge Voltage	14.2V +- 3%
Battery Charge Float Voltage	13.8V +- 3%
Battery Cut-off Discharge	11.7V +- 3%



Voltage	
Battery recovery discharge voltage	12.8V +- 3%
Max. Charge Current	4.5A
Max. Discharge Current	7A (Using load-discharge C-LiFePO4 Lithium Batteries, the maximum discharge current is 7A around 85W/H)
Charging and Discharging at same time, the Max. discharge current	4A
Charging and Discharging at same time, the Max. discharge watts	55W/H, recommends assessing the normal functioning of the system total power consumption, lower wattage requirements is appropriate.
Life cycle the battery 0.2C charge & 0.5C discharge (Battery capacity remaining after using 80%, the defined service life will terminate)	@ 25°C 2000 Times (@ 25°C discharging 800 times: after more than 93% capacity, @ 25°C discharging 1100 times: after more than 90% capacity) @ 45°C 1600 Times @ 50°C 1200 Times @ 60°C 550 Times @ 60°C 720 Times 70%
Industrial Housing & Connector	Iron Airtight Housing IP 68 Gland Connector
Connector Type	Input AC/DC power adapter: 100~240V/50-60Hz AC Plug to 19~20V M12 Female DC output: 12V M12 Female to DC Jack Female Input / output IO interface: RS-485 (optional function)
Operating Temperature	-35°C ~ +75°C (Including the chassis of the machine working temperature tolerance)



(Discharge Temperature)	-20°C ~ +60°C (Excluding institutions, the battery operating temperature tolerance) +20°C ~ +40°C Battery Capacity:100% -10°C Battery Capacity : 60% -20°C Battery Capacity : 48%				
Charging Temperature	-35°C ~ +75°C (Including the casing machine operation)				
Storage Temperature	-35°C ~ +75°C , Recommendations at +20°C ~ +30°C environmental temperature for storage.				
Rel. Humidity	10~95%RH				
Storage Time	Do not wake the system can store 12 months (after you wake the system, each 3 months charging 1 times; Please fully charging battery in first times to use)				
Dimension	209(L) x 200(W) x 210mm(H)				
Weight	2.5Kg (Box 3.6Kg) (2Pcs/Carton)	3Kg (Box 4.1Kg) (2Pcs/Carton)	3.2Kg (Box 4.3Kg) (2Pcs/Carton)	3.8Kg (Box 4.9Kg) (2Pcs/Carton)	4.5Kg (Box 5.5Kg) (2Pcs/Carton)
LED Indicator	<ol style="list-style-type: none"> 1. AC input (Converted to DC power supplies): red light constant light, show on battery in full charge status. 2. AC input (Converted to DC power supplies): red light flashing display, represents the battery is charging status. 3. When the battery is not charging, insert the 12VDC device load discharge, discharge the green light constant light show, shine on behalf of low voltage in discharge, please do the charging operation 4. Simultaneous charging of the battery, insert the 12VDC device load discharge, discharge the green light constant light show 5. AC input (Converted to DC power supplies): quick shine a red light shows that represents an input power supply or the input port or the battery charge State, please remove the input power terminal as soon as possible. 6. Insert the load discharge 12VDC devices: fast shiny green display on behalf of power output or output port or abnormal battery discharge condition is request to remove output power connector as soon as possible. <p>Note: when the system alarm status, please remove the cause as soon as possible the reason for the exception. When after eliminating abnormal, just re-switch input power supply or plug power to supply again, the red LED flashing light signal will resume once per second in charging status, those processing will remove most of the alarm status, allow the system to</p>				



	resume normal operation.
Housing	IP66
Approvals	CE & FCC
Installation	1.Street lamp pole mount 2.Upright pole mount 3.Wall mount installation 4.DIN Rail (Optional)
Warranty	Intelligent charge & discharge main board & IP66 housing & parts support two years limited warranty. Customize C-LiFePO4 lithium batteries support one year limited warranty.
Carton Size	490 * 400 * 155mm

Note 1: Battery Capacity is +/- 5%.

Note 2: Product specifications change, without notice, consultation with agent or dealer before buying the latest specifications.

Note 3: detect the temperature reached -30°C, start the red LED have low temperature warning, reach low temperature -35 °C, a start-stop system function will enable, when temperatures returned to above -30°C, normal operation will resume.

Note 4: detect the temperature reached +70°C, start red LED have high temperature warning, reach high temperature +75°C, a start-stop system function will enable, when temperatures back below +70°C temperature, normal operation will resume.