IO-Power Technology Co., Ltd 1F,No.100, Jinzhu Rd., North Dist., Hsinchu City 30053, Taiwan
勁電科技有限公司 台灣 新竹市北區金竹路 100 號 1 樓 Tel: +886-3-5429395 Fax: +886-3-5357297
http://www.io-power.com.tw www.io-power.com.cn e-mail: io-power@io-power.com.tw

IO-Power USMC-12V0206-IISeries

Automobile Large Consumption Model

Online Type Uninterruptible Operation

Automatic Boosted & Stabilized Power System

IOP-USMC-12V0206-IISeries

User Manual

IOP-USMC-1202-01A
IOP-USMC-1204-02A
IOP-USMC-1206-03A

V.17.05_0201

Directory

Trademark and Copyright Notice 4

About this manual 4

Product Warranty 5

Housing Warranty 5

Charge and discharge microprocessor control board warranty 5

DC Boost Voltage Convertor BBVC (Buck Boost Voltage Convertor BBVC) 5

C-LiFePO4 Lithium Batteries warranty 6

Attention of the Product storage 6


High and low temperature storage 6


Low-voltage storage 6


Regular maintenance of low voltage storage 7


Activate the system 7


Special attention of the Product used 7

Product Specification 10

Product Specification Selection Evaluation 16

Firstly to confirm the power consumption of the devices 16

Power consumption evaluation Description: 16

Load device power consumption Description: 16

Estimated DC UPS battery capacity calculation 17

C-LiFePO4 Lithium Batteries Capacity V.S. C Value of charging and discharging 17

Consideration for environmental characteristics (for C-LiFePO4 Lithium Batteries) 18

Product Installation Instruction 20

Mounting instructions 23

Product use instructions 24

External power input description 24

DC power output description 24

Recovery after low voltage discharge termination instruction 24

C-LiFePO4 Lithium Batteries Charging 24

LED display instructions and display notes 26

Product application 27

■ Trademark and Copyright Notice

IOP-USMC-12V0206-IIseries is Automobile Large Consumption Model online power voltage regulator power systems; IO-Power technology limited a registered trademark.

All parts of the product, including software and accessories, their copyrights are owned by IO-Power Technology Limited, without IO-Power Technology license, transcript may not be any imitation, copying or translation.

Product specifications and information referred to in this manual are for reference only, specification changes, without prior notice, please consult with agent or dealer before purchase latest product specification data.

■ About this manual

This manual discusses IO-Power Technology Automobile Large Consumption Model online power voltage regulator power systems, through the operation of the content of this article to address the problems of outdoor power-seizing.

This manual uses the following criteria to communicate instructions and information:

	C-LiFePO4 Lithium Batteries
	Readers' "**attention**". These attentions to include the special conditions referred to in this manual or use the recommendation and note references.
	Readers' "**beware**". In this case, readers can result in equipment damage or risks.
	**Hazard**. Means that there is a potential risk that can result in physical damage. Before using any equipment, please pay attention to the risks associated with the circuit, as well as familiar with standard practices required to prevent accidents from happening.

Bold: It means an important function and set of steps require your attention.

■ Product Warranty

Housing Warranty

IOP-USMC-12V0206-IIseries is Automobile Large Consumption Model online power voltage regulator and power systems, protection grade iron material metal casing, complemented by professional antirust paint, suitable for indoor and outdoor harsh environments.

Users in accordance with the operations manual to operation and use of this product in non-human is a misuse case will have 1 year warranty guarantee.

Charge and discharge microprocessor control board warranty

The IOP-USMC-12V0206-IIseries is designed with a wafer microprocessor designed as a control board for on-line charge and discharge micro processing controllers. The control board can operate normally from -40°C to + 80°C.

The control board has a charge / discharge overcurrent protection current of 10A and a low temperature / high temperature protection temperature of -40°C / + 75°C. When the product temperature is higher than + 70°C, the charge and discharge microprocessor controller will turn red LED flash warning, when the temperature is higher than +75°C, charge and discharge microprocessor controller will automatically stop all charge and discharge operation, the user must wait for cooling or eliminate the problem of high temperature, re-power wake-up operation.

In accordance with the user manual to operate and use this product in non-human misuse case, buyer will have 1 year warranty guarantee.

DC Boost Voltage Convertor BBVC (Buck Boost Voltage Convertor BBVC)

IOP-USMC-12V0206-IIseries, designed specifically for high-power vehicle load system equipment designed by the vehicle cigarette lighter for the supply of 12 ~ 28V DC power input, through the DC automatic boost voltage converter (DBBVC) output 19V ~ 20V DC direct current, to the car dedicated electric power system for charging, the output DC voltage of 19 ~ 20V / 4A (5A Max). (DC automatic boost voltage converter (DBBVC) with IP67 waterproof protection, but the installation, please installs the rear compartment or other vehicles placed in the appropriate location and waterproof and dustproof protection)

In accordance with the user manual to operate and use this product in non-human misuse case, buyer will have 1 year warranty guarantee for DC step-up and stabilizing converter.

C-LiFePO4 Lithium Batteries warranty

IOP-USMC-12V0206-IIseries adopts the latest technologies of high and low temperature resistance of C-LiFePO4 Lithium Batteries, supported by:

Automatic detection of abnormal voltage or battery status and fault exception of battery charging protection *

Battery low voltage protection with zero power consumption *

Balancing charge / discharge protection *

… Patent design and unique microprocessor system for charging and discharging control management, C-LiFePO4 Lithium Batteries characteristics into full play.

In accordance with the user manual to operate and use this product in non-human misuse case, buyer will have 1 year warranty guarantee or 500 times battery charge and discharge cycle.

(Extension of the warranty period and the number of cycle life 500 times, product warranty guarantee may be extended: 1year/500 times will cost another 10%)

■ Attention of the Product storage

High and low temperature storage

IOP-USMC-12V0206-IIseries adopts the latest technologies of high and low temperature resistance of C-LiFePO4 Lithium Batteries and ability to import static zero-power. But after the charge and discharge test before shipping, the system is on low-consumption detecting status. Storage temperature must be between 5℃ ~ 40℃ Temperature Storage, Humidity 50% + -20% to remain the normal operation of stockpile security and subsequent use of products.

Low-voltage storage

IOP-USMC-12V0206-IIseries uses static zero power function. But after the charge and discharge test before shipping, system stays in low voltage, low power reconnaissance operation status. When C-LiFePO4 Lithium Batteries discharge to 11.8V+-5%, the built-in charging and discharging micro-processing controller will automatically execute low-voltage-discharge-termination protection, so user should regularly detect for low voltage status, to keep stockpile sage and subsequent use of product. It is recommended to store low voltage higher than 13.1V or more.

The lowest discharging voltage of this product is 9V+-5%, and the highest voltage discharge protection for 14.4V+-5%.

Regular maintenance of low voltage storage

IOP-USMC-12V0206-IIseries adopts the storage under low-voltage and low-power consumption status, we strongly recommend that after obtaining the products, charge the battery for 8 hours for the first time, and then charge the battery once every 3 months.

(Fully-charged C-LiFePO4 Lithium Batteries stored @ 25°C storage for 1 year, its power capacity will remain 90%. After charging, its power capacity will lift to 95~97 %.)

Activate the system

IOP-USMC-12V0206-IIseries adopts low voltage detection operation for low power consumption storage, when the battery voltage is below 11.8V+-5%, microprocessor will execute the termination. After the outer power is put in, it will activate the system in 10 seconds. And then the PCBA will start to charge the C-LiFePO4 Lithium Batteries, and supply for the supported equipment at the same time.

After the first time to activate the system, before Automobile Large Consumption Model executes the low-voltage-discharge-termination, DC UPS power system can detect the discharging status. Once the supported equipment is plugged in, the system will automatically supply power for the equipment.

Special attention of the Product used

IOP-USMC-12V0206-IIseries adopts the latest technologies of high and low temperature resistance for C-LiFePO4 Lithium Batteries. The characteristics of C-LiFePO4 Lithium Batteries are very different from the lead-acid batteries and other types of batteries. C-LiFePO4 Lithium Batteries made by different manufacturers design different characteristics in product, including the operating voltage and operation current. This product uses C-LiFePO4 Lithium Batteries. Users shall pay more attention on list below:

1. Please use the product in accordance with the product specification data. Please do not remove or change this equipment without authorization of any of the main parts, so as to avoid the safe use of the extension of the problem.
2. Do not proceed heating over 80°C or put it close to fire or keep it less than -40°C to directly cooling down. It might cause damages for electronic components and the batteries.
3. When the product housing over 70°C, do not carry out charging and discharging operation to avoid danger.

4. Do not place this product in high humidity and put it into water or close to the highly volatile chemical solvents to avoid danger.
5. Installation and assembly connectors in accordance with product instructions, not adjacent to the wrong wire connection to avoid danger.
6. Do not use hammer or other items to strike this product, trample on the battery, cause strong impact, or throw, drop this product to avoid danger.
7. Before using this product, any action to charge and discharge the battery of this product, please be sure to read the manual in detail and with care.
8. When the C-LiFePO4 Lithium Batteries is discharging and being discharged, please keep it away from other conductive objects.
9. When recycling the batteries, please be sure that the battery (+) (-), short circuit is isolation to avoid danger.
10. The C-LiFePO4 Lithium Batteries has a life cycle, when the battery life-cycle ends, please contact your seller to replace the same battery.
11. Be aware of the abnormal heat, flame, shape, smell, color, and other abnormal conditions, please immediately discontinue your use of the product and contact the seller as soon as possible or contact IO-Power Technology company.
12. When erecting IOP-USMC-12V0206-IIseries, if there is more space in the distribution box or patch space license case, we recommend this product fixed inside the box, it will help to reduce this product at the risk of excessive high temperature operating temperature.
13. When erecting IOP-USMC-12V0206-IIseries, if possible, we recommends that this product fixed to the Lee side, or not to be in the rain, it will help to reduce the risk of this product working in environments that is too much/little humidity. Humidity too high/low and water environments is such an operational risks.
14. When erecting IOP-USMC-12V0206-IIseries, if possible, we recommend this product fixed on the back of sunshine, or not to be shined, it will help to reduce the heat caused by excessive heat and sunshine to protect the product body and wiring from speeding-up aging from the environmental risks.
15. When erecting IOP-USMC-12V0206-IIseries, even this product is rated IP66~IP67 of waterproof and dustproof grade, but for a sound safety for indoor and outdoor use, we suggest proceeding professional waterproof protection. Using general PVC tape for waterproof with 2 levels can reach the effect for waterproof and dustproof.

16. When erecting IOP-USSP-12V0712-II series, in response to different frequencies of vibration wave made by vehicles moving, electronic component vibration might be damaged. Please do shockproof to improve the service life and stability of the product.

Note1: The sunshine goes in the inside of the vehicles through the glasses. The temperature will rise especially when the windows are close. If the environment temperature is 36°C, temperature in the car will reach up to 60~65°C, and the positions that sunshine directly shines will reach up to 65~70°C. But temperature for other positions that are not shined directly is about 55~63 °C.

Note 2: USMC-12V0206-IIseries adopts high-temp-resistant coating wrapping on the metal housing. When the temperature reaches 36°C, and the temperature in the vehicles will reach 60~65°C. If it is directly shined, temperature of the housing surface is about 65°C while it is about 55~58°C inside the box and battery temperature is about 50~55°C. USMC-12V0206-IIwas tested under the sun during 10AM~4PM, and it worked normally to supply stable DC 11.5V~14.4V+-3% for the cameras both inside and outside the vehicle.

■ Product Specification

IOP-USMC-12V0206-II Series Specification

Model	USMC-1202-01A	USMC-1204-02A	USMC-1206-03A
Automobile High Temperature Model DC Jack Iron Airtight Housing IP 66~67 rate			
Built In C-LiFePO4 Lithium Batteries Power Capacity	29WH (2.3Ah@12.8V)	55W	
General UPS Label Size (DC Power Factor is Equal to 1)	174VA	330VA	445VA
Max Output Wattage (Battery Life Protection Design)	75W/H	75W/H	75W/H

UPS Discharge Power Supply Time	More than 0.3hr @75W/H Discharge	More than 0.7hr @75W/H Discharge	More than 0.9hr @75W/H Discharge
Quickly Full Charge DC UPS Battery Time	About 1hr @3.5A Charging	About 1.5hr @3.5A Charging	About 2hr @3.5A Charging
Vehicle DC Buck Boost Voltage Convertor **DC UPS system** **Output DC voltage / current**	Through the car cigarette lighter or vehicle power circuit, input DC 12~28V voltage/current 6A (8A Max), the automatic Buck Boost Voltage Convertor (BBVC) output 20VDC/4A (5A Max) to charge the DC UPS power supply system Output DC voltage / current: 12VDC/6A		
External load voltage	DC 11.7V~14.2V +-3%		
External load current**	3.5A (6A around 75W/H Max)		
Battery charging voltage	13.8V~14.2V +-3% Max		
Battery standard charging current	3A		
Transform Efficiency	95%		
Strengthen the protection measures With Special operations functions	● 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
- 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
- Match the automatic Buck Boost Voltage Convertor (BBVC), with car cigarette lighter power connection charging port and protection (including fuse)
- Match the automatic Buck Boost Voltage Convertor (BBVC), with buck boost voltage, fixed voltage, and stabilizing the voltage to upgrade effect of power supply protection.
- Match the automatic Buck Boost Voltage Convertor (BBVC), overvoltage and overcurrent and lightning / power surge protection (30V 1500W)

	● Match the automatic Buck Boost Voltage Convertor (BBVC), DC 18-20VDC power supply can be used as a vehicle and charge the notebook or device for temporary ● Specially designed "Automatically Detect the Healing Recovery Function", to solve user errors using an action or temporary power Input charge / output discharge for abnormal, causing alarm fault automatic removal mechanism of State
Support Battery Type	C-LiFePO4 Lithium Batteries Lead-acid batteries or lithium batteries or other battery, can be customized to modify (optional function)
Battery Safety Protection	Use pressure type explosion-proof battery design
Built-in battery capacity range	1.2Ah @ 12.8V (14WH) ~ 8.7Ah @ 12.8V (111WH)
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 Voltage	11.7V +- 3%
Battery recovery discharge voltage	12.8V +- 3%
Max. Charge Current	4A
Max. Discharge Current**	6A (Using load-discharge C-LiFePO4 Lithium Batteries, the maximum discharge current is 6A around 75W/H)
Charging and Discharging at same time, the discharge current**	3.5A
Charging and Discharging at same time, the discharge watts**	40W/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	Vehicle charging circuit or car cigarette lighter, enter 12~28V DC voltage / current 6A (8A Max) DC output: 12V DC Jack to DC Jack connector Input / Output I/O interface: RS-485 (optional function)		
Operating Temperature (Discharge Temperature)	-35°C ~ +75°C (Including the chassis of the machine working temperature tolerance) -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	DC UPS : 125mm(L)x110mm(W)x150mm(H) ; BBVC : 195mm(L)x92mm(W)x48mm(H)		
Weight	1.2Kg + 0.5Kg(BBVC)	1.4Kg + 0.5Kg(BBVC)	1.6Kg + 0.5Kg(BBVC)
LED Indicator	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. The battery is not charged, the load discharge 12VDC device is inserted, the discharge green constant light show; If you do not charge the job, wait until the battery discharge voltage up to 11.8V + -3%, the system will enter the state of the battery voltage protection, discharge the green light LED display will be extinguished. 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. **Note 1: 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 resume normal operation.** **Note 2: when a temporary abnormal use or abnormal operation occurs, causing the system to start the alarm status, specially designed automatic recovery mechanism 3 times the purpose and again after every 10 seconds to detect anomalies and try to exclude temporary malfunction alarm state.**
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.

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℃, start the red LED have low temperature warning, reach low temperature -35 ℃, a start-stop system function will enable, when temperatures returned to above -30℃, normal operation will resume.

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

** Note 5: The discharge wattage of the DC UPS system will vary depending on whether the battery has a high or low voltage (with or without full charge) and whether it is used at the same time as charging and discharging. The following are the differences between the products Status of the proposed discharge amperage wattage (with the maximum power consumption of equipment assessment reference):

5-1. Uncharged state, only battery direct discharge, the battery is fully charged state use: The maximum discharge Amp & Wattage is 6A / 75W.

5-2. Uncharged state, only battery direct discharge, the battery is not fully used state: The maximum discharge Amp & Wattage is 3.5A / 40W.

5-3. Uncharged state, only battery direct discharge, the battery is not fully charged and the low voltage state is used. The maximum discharge Amp & Wattage is 3A / 36W.

5-4. Charging and discharging operation at the same time, the battery is fully charged state use: The maximum discharge Amp & Wattage is 6A / 75W.

5-5. Charging and discharging operation at the same time, the battery is not fully charged used state: The maximum discharge Amp & Wattage is 4A / 50W.

5-6. Charging and discharging operation at the same time, the battery is not fully charged and the low voltage state is used: The maximum discharge Amp & Wattage is 3.5A / 40W.

■ Product Specification Selection Evaluation

Firstly to confirm the power consumption of the devices

Power consumption evaluation Description:

Usually, the current claimed on the device (EX: cameras) adapter is not the “actual power consumption” for normal working. We suggest asking the technical support from the Original-Design company for the actual power consumption for a precise evaluation.

The current claimed on the device (EX: cameras) adapter is usually for the transient current when starting the device. Therefore, it is usually much higher than its normal working power consumption. IOP-USMC-12V0206-IIseries can support 12V/7A above of the starting large current discharging, so please calculate and evaluate with the normal working power consumption.

Load device power consumption Description:

1. IOP-USMC-12V0206-IIseries product, the power consumption of the main control board: (estimated as in 1W/H)
2. General surveillance cameras, 2.5~5W/H (estimated as in 3.6W/H)
3. Professional surveillance cameras of road surveillance, 3.5~6W/H (estimated as in 4.5W/H)
4. Infrared surveillance cameras, IR on, 4~8W/H (estimated as in 6W/H)
5. Professional infrared shield, 4~10W/H (estimated as in 6W/H)
6. Professional long-distanced IR projector, 8~12W/H (estimated as in 10W/H)
7. Video Server (analog into digital processor), 6~10W/H (estimated as in 8W/H)
8. Speed Dome Cameras, 8~12W/H (estimated as in 10W/H estimates), with IR on, please add 6W/H (estimated as in 16W/H).
9. DVR with built-in 1 unit of 2TB Hard Disk drive: 8~14W/H (estimated as in 10W/H); plus 5W/H for 1 extra unit of hard drive
10. NVR with built-in 1 unit of 2TB Hard Disk drive: 8~14W/H(estimated as in 10W/H); plus 5W/H for 1 extra unit of hard drive
11. The network switches / hubs: 2~4W/H(estimated as in 3 W/H)
12. Outdoor wireless equipment, normal RF output power, 5~10W/H power consumption (estimated as in 8W/H); increased RF output power and MIMO-power consumption: 8~15W/H (estimated as in 12W/H); 1W high RF output power, 15~25W/H (estimated as in 22W/H)

Special reminder 1: some devices will have the fan heat sink design; calculate the power consumption of power plus the fan operation.

Special reminder 2: some devices will have heat heater design, computing power plus heat heater operation power consumption.

Estimated DC UPS battery capacity calculation

Automobile Model DC UPS: suggest designing for 10 hours

Long-term Automobile DC UPS: suggest designing for 24 hours

■ C-LiFePO4 Lithium Batteries Capacity V.S. C Value of charging and discharging

(C Value definition: hours of battery capacity and discharge current rate, such as: 1Ah battery capacity, amps to 1 A, =1C discharges 1 hour)

Suggest for charging current should be less than 0.5C, the discharge current should be less than 0.2C, to improve battery life and power stability.

EX: With 2 units of infrared surveillance cameras (6W/H) for 10 hours

Total power consumption: 6WH*2*10Hr*110%=132W=>132W/12.8V=10.3Ah

Recommended model: IOP-USMC-1212-07A -- 148 WH (11.6Ah @ 12.8V)

Discharging current and discharging C value:(6W*2)/12.8V =0.94A => 0.94A/11.6Ah =0.08C < 0.2C

Charging current and charging C value: (132W/4hr full charge)/12.8V =2.58A => 2.58A/11.6Ah =0.22C < 0.5C; 2.58A < Convertor 3.5A*80% =2.8A

EX: With 2 units of infrared surveillance camera (6W/H) and 1 unit of NVR(10W/H) for 24 hours

Total power consumption: (6WH*2+10W*1) *24Hr*110%=580.8W=>580.8W/12.8V=45.4Ah

Recommended model: IOP-USMC-1247-10B -- 594 WH (46.4Ah @ 12.8V)

Discharging current and discharging C value: 22W/12.8V =1.7A => 1.7A/46.4Ah =0.036C < 0.2C

Charging current and charging C value: (580.8W/16hr full charge)/12.8V =2.8A => 2.8A/46.4Ah =0.06C < 0.5C; 2.8A < Convertor 3.5A*80% =2.8A

Note 1: Using C-LiFePO4 Lithium Batteries for supplying enough electricity for 3 years use may drop the capacity to 90~95%. To operate 3 years; please plus the battery aging compensation coefficient of 10%.

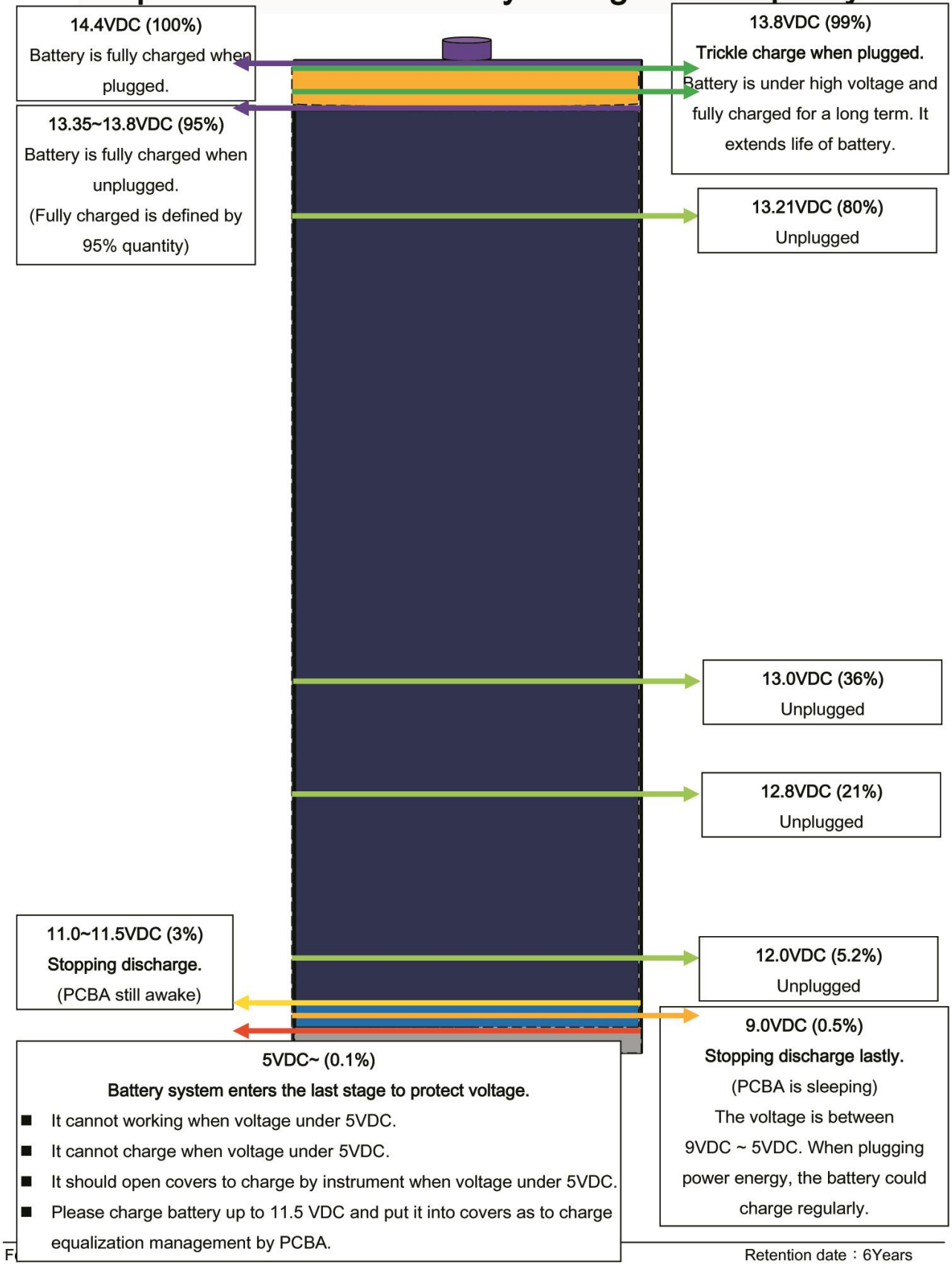
Note 2: The C-LiFePO4 Lithium Batteries voltage is 12.8V, different from lead-acid battery 12V. Therefore, C-LiFePO4 Lithium Batteries is 580.8W/12.8V=45.4Ah.

■ Consideration for environmental characteristics (for C-LiFePO4 Lithium Batteries)

Battery service life and service efficiency is influenced obviously by the factors below. Please take the factors in consideration:

1. Operating temperature: Lowest temperature shall be higher than -20°C, and highest temperature shall be lower than 60°C.
2. Discharge depth: Usually, the definition of full-charged battery state is at 95% capacity, @13.3V. When its voltage is @11.8V, the power capacity is about 5.0% left. Long-Term discharging deeply will speed up aging the batteries. Therefore, we suggest discharging 70%, and keeping 30% left, @ about 13V. It will obviously extend the battery service life.
3. The charging and discharging current: The recommended charging current should be less than 0.5C. And the recommended discharging current should be less than 0.2C. It will fully show the battery charging/discharging characteristics and performance. It can also extend the battery service life and slow down the battery aging.
4. Regularly re-charge the power: the self-discharging rate of C-LiFePO4 Lithium Batteries is much less than other batteries. Remaining in high voltage can extend battery service life and slow down battery aging.

Graph of C-LiFePO4 Battery Voltage and Capacity



Retention date：6Years

■ Product Installation Instruction

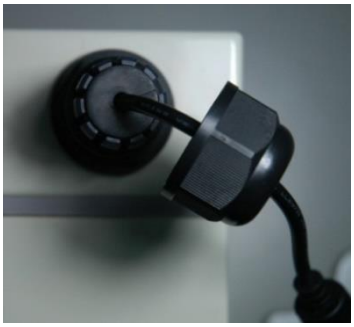
Automobile DC UPS power transferring:

Via the car cigarette lighter, the automobile power transformer transfers the power from 12~28VDC to 18~20VDC/4A, stably and efficient. And then it charges the C-LiFePO4 batteries and supply DC11.8V~14.4V to the devices via C-LiFePO4 batteries.

DC Jack Female (inserting DC Jack Male)

Waterproof and heat-resistant beam head (waterproof rubber harvest broken hole stuffing)

At the DC Jack on the PCBA Female holes, insert the DC Jack Male head-end and then stuff the waterproof rubber in



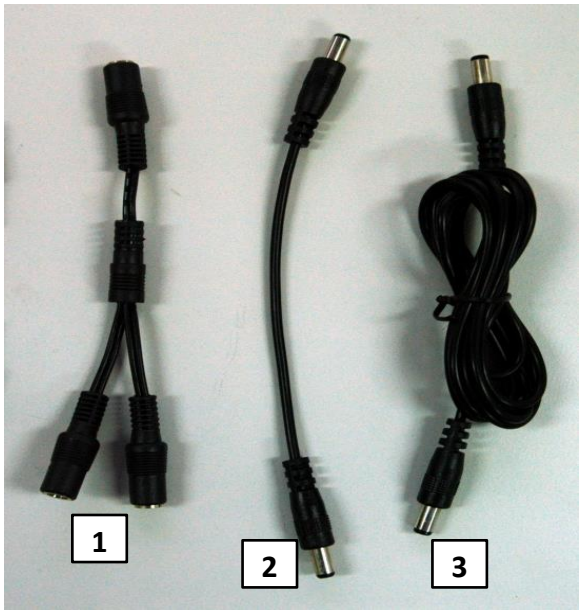
Lock the waterproof and heat-resistant beam head (please do an extra waterproof protection)

Output DC power Jack

At the DC Jack on the PCBA Female holes, insert the DC Jack Male head-end

Lock the waterproof and heat-resistant beam head (please do an extra waterproof protection)

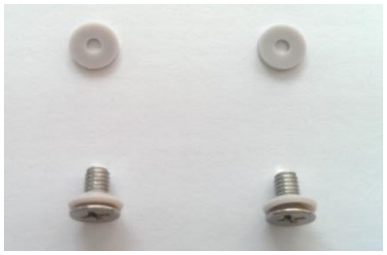
DC Extend Connector / DC Extend Cable



1. 1 DC Female to 2 DC Female 15cm (Female to Female, 1 to 2 extended distribution connector)
2. 1 DC Male to 1 DC Male 18.8cm (Male to Male, extended short cable)
3. 1 DC Male to 1 DC Male 150cm (Male to Male, extended long cable)

■ Mounting instructions

Firstly, put the waterproof rubber gaskets on the screws



Then set the screw, through another set of waterproof rubber gaskets, on the stainless steel bracket

Finally, screw the bracket tight into the screw holes in the bottom side of the housing

Pole fixation

Suggest using stainless steel cable belt to pass through the stainless steel fixing brackets on either side of the hole, and then fix the belt tightly to poles or garden lamp posts or street light lay … etc.

Wall fixation

Drill two holes on the wall, and put plastic plugs into the holes. And then screw the self-tapping stainless screws in. Finally, go through the stainless steel fixing brackets on either side of the holes, pressing down and keep the product fixed.

■ Product use instructions

External power input description

IOP-USMC-12V0206-IIseries, through the cigarette lighter on the output of 12 ~ 28VDC power supply, the boost stabilizer out of 18 ~ 20VDC / 4A DC power supply, and then input to the built-in charge and discharge microprocessor controller DC UPS products to charge and discharge lithium iron battery management, and also provide DC 11.8V ~ DC 14.4V power supply to the load device, such as surveillance cameras, DVR / NVR host, infrared projector ... and so on.

DC power output description

IOP-USMC-12V0206-IIseries uses built-in charging and discharging micro-controller with the online-power circuit design, online in real-time to discharge by C-LiFePO4 Lithium Batteries, providing DC power 11.8V~DC 14.4V to load devices, such as surveillance cameras, DVR/NVR host, infrared projector …etc.

When the battery discharges @ 11.8V+-5%, the built-in micro-controller will automatically stop discharging and executes low-voltage-discharge-termination, the final lowest voltage discharge termination is @ 9V+-5%, and the highest voltage discharge termination is @ 14.4V+-5%.

■ Recovery after low voltage discharge termination instruction

IOP-USMC-12V0206-IIseries uses built-in charging and discharging micro-controller. When battery discharging voltage is down to 11.8V+-5%, it will execute low-voltage-discharge-termination. It will not discharge for the load devices until the outer power source is back in service. The micro-controller will discharge again, when the battery voltage raise to 12.8V+-5% voltage. (Usually, it needs 1-10 minutes, depending on the charging current)

■ C-LiFePO4 Lithium Batteries Charging

IOP-USMC-12V0206-IIseries adopts the latest technologies of high and low temperature resistance of C-LiFePO4 Lithium Batteries. It is very different from the other types of battery, like lead-acid batteries, deep cycle lead-acid batteries, and lithium ion battery characteristics. Besides, the different C-LiFePO4 Lithium Batteries products characteristics made by different manufacturers are also different both in voltage and current.

IOP-USMC-12V0206-IIseries charging mode and charging voltage is as below:

Battery Charge Mode	CCP/CVP MCU Control
Battery Charge Voltage	14.4V +- 5%
Battery Charge Float Voltage	13.8V +- 5%
Battery Cut-off Discharge Voltage	11.8V +- 5%
Battery Final Cut-off Discharge Voltage	9V +- 5%

IOP-USMC-12V0206-IIseries uses C-LiFePO4 Lithium Batteries, different voltage values the remaining power capacity is as below (no load voltage): +-5%

Voltage(V)	Capacity (%)	Voltage(V)	Capacity (%)	Voltage(V)	Capacity (%)
14.10	100.00%	13.16	70%	12.60	13.72%
14.00	99.95%	13.13	65%	12.40	8.88%
13.80	99.85%	13.10	60%	12.20	7.14%
13.60	99.55%	13.08	55%	12.00	6.15%
13.40	98.80%	13.05	50%	11.80	5.38%
13.32	95%	13.03	45%	11.60	4.72%
13.28	90%	13.00	39.18%	11.40	4.14%
13.24	85%	12.98	35%	11.20	3.63%
13.20	78.55%	12.94	30%	11.00	3.15%
13.19	75%	12.80	21.40%	7.20	0.00%

■ LED display instructions and display notes

1. Input DC power supply (AC power through the transformer to DC power input): red light is bright, indicating that the battery is fully charged state.
2. Input DC power supply (AC power through the transformer to DC power input): red light flashing every second, on behalf of the battery charge state.
3. If the battery is not charging, the load of the 12VDC device will be inserted and the discharge will be on. If the battery is in low voltage discharge below 12.8V + -5%, please charge it. If the battery is not charging Operation, wait until the battery discharge voltage as low as 11.8V + -5%, the system MCU microprocessor will enter the battery low-voltage protection state, the discharge of green light will be off the lights show.
4. Battery charging at the same time, 12VDC equipment loads discharge, discharge green light bright display.
5. Input DC power supply (AC power through the transformer to DC power input): red light quickly flashing, on behalf of the input power or input port or battery charge abnormal state, please remove the input power supply as soon as possible, until the MCU microprocessor 10 after the automatic detection of recovery operations. Then you can re-enter the DC power supply, if the red light is a continuous flash 6 times same situation, please return the equipment to the manufacturer to detect maintenance.
6. 12VDC Device Load Discharge Insertion: The green light is flashing quickly, indicating that the output power or output port or battery discharge is abnormal. Please remove the output power connector as soon as possible.

Remark 1: When the system starts abnormal alarm state, please remove the cause of the abnormality as soon as possible. When the abnormal condition is excluded, simply re-switch the input power or plug the input power, the red LED will restore the flash once every second State, you can lift most of the abnormal warning state, so that the system re-normal operation.

Remark 2: When the temporary abnormal use or abnormal operation occurs, resulting in the system to start abnormal warning state, especially the design of automatic detection and recovery mechanism 6 times, every 10 seconds to re-detect the anomaly, to exclude the temporary disoperation abnormal warning state.

Note 3: When the load device is inserted, the green LED is not bright, because the minimum detection discharge current of the charge and discharge microprocessor is 250mA + -10% (the load power consumption is below 3.0W) Load device power consumption less than 250mA, more prone to LED green light does not shine, but this situation does not affect the charge and discharge function of the operation.

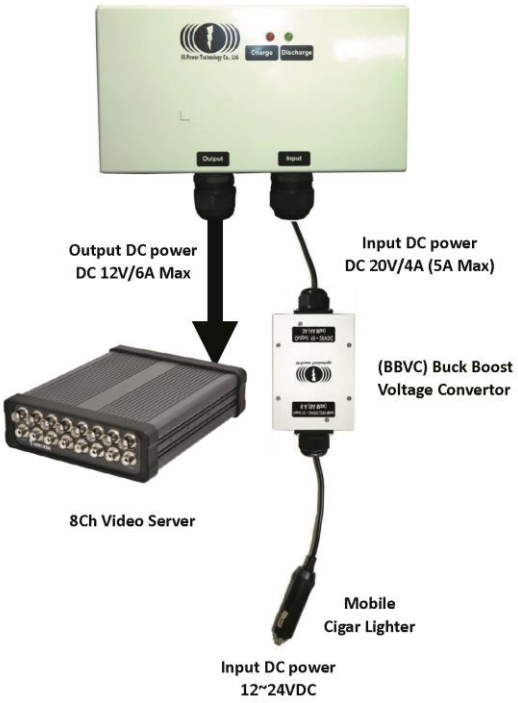
7. The vehicle-specific automatic Buck Boost Voltage Converter (BBVC) LED lights show: insert the car side of the DC power input, the red LED lights will be full, the output to the load side of the LED lights, the green LED lights bright.
8. The vehicle-specific automatic Buck Boost Voltage Converter (BBVC) LED lights show: when the

input or output terminals are in an abnormal state, the red LED or the green LED will flash. Please try to remove the input terminal as soon as possible. If the follow-up could not discharge the cause of the problem, please return the equipment to the manufacturer to detect maintenance.

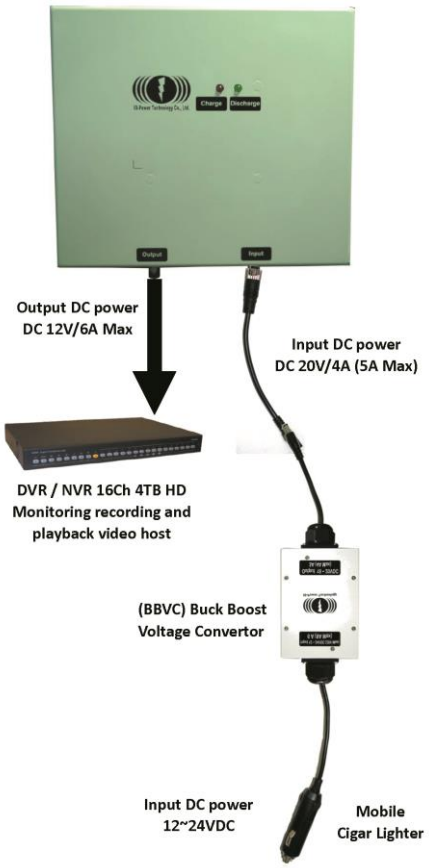
■ Product application

IOP-USMC-1206-03A

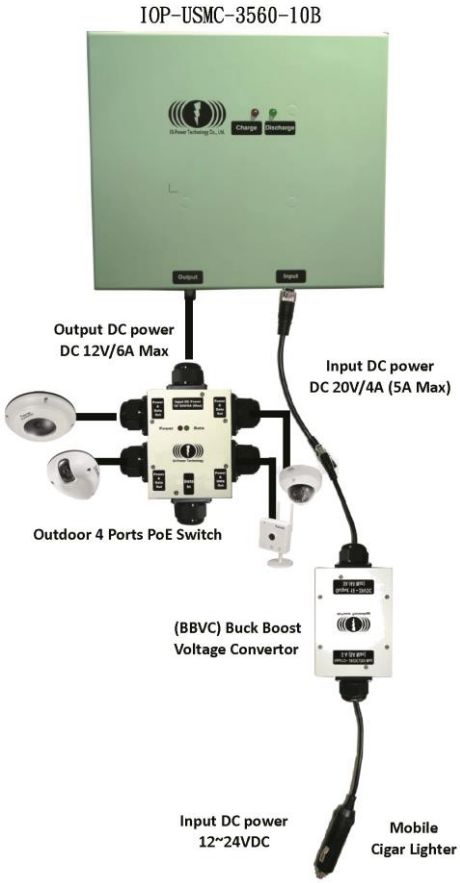
IOP-USMC-1212-07A



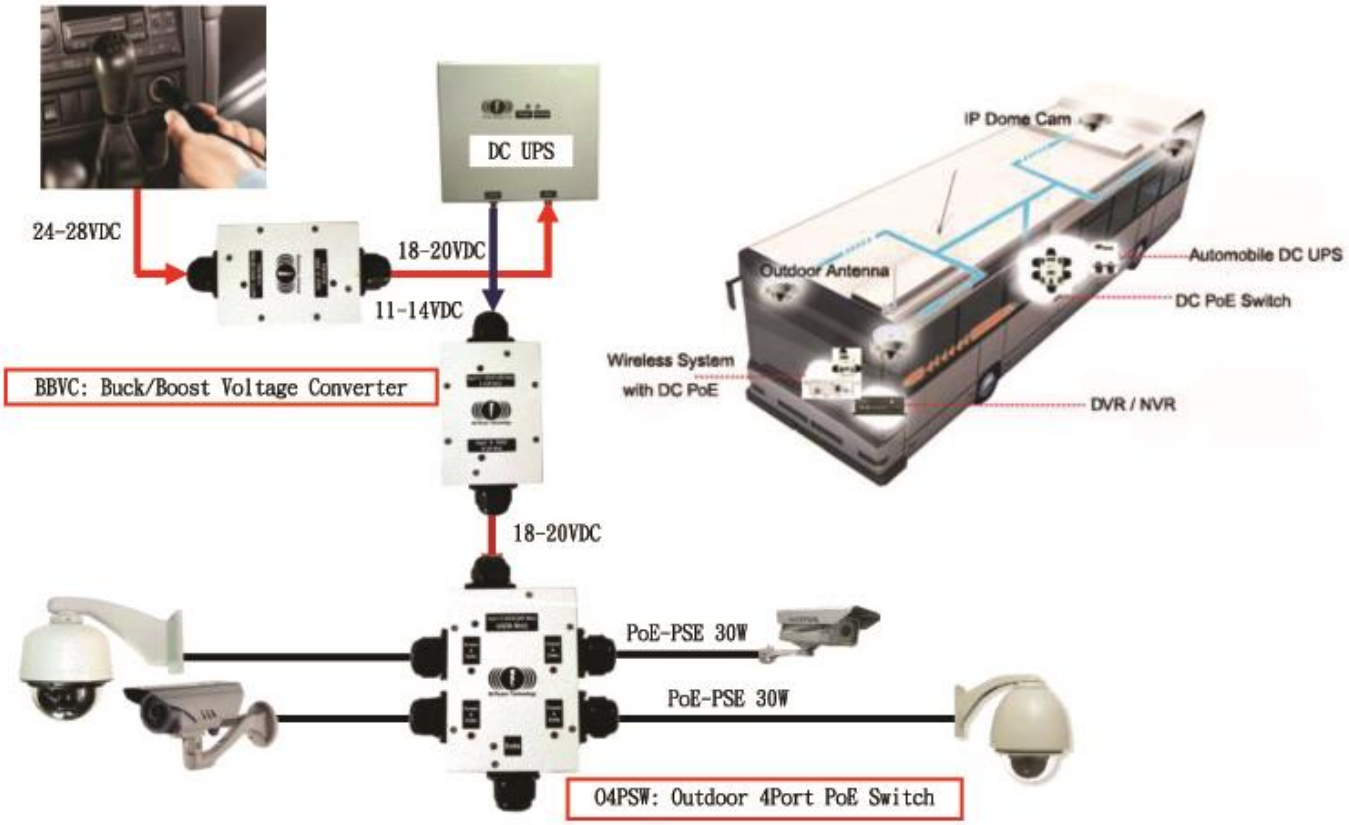
IOP-USMC-1224-09B



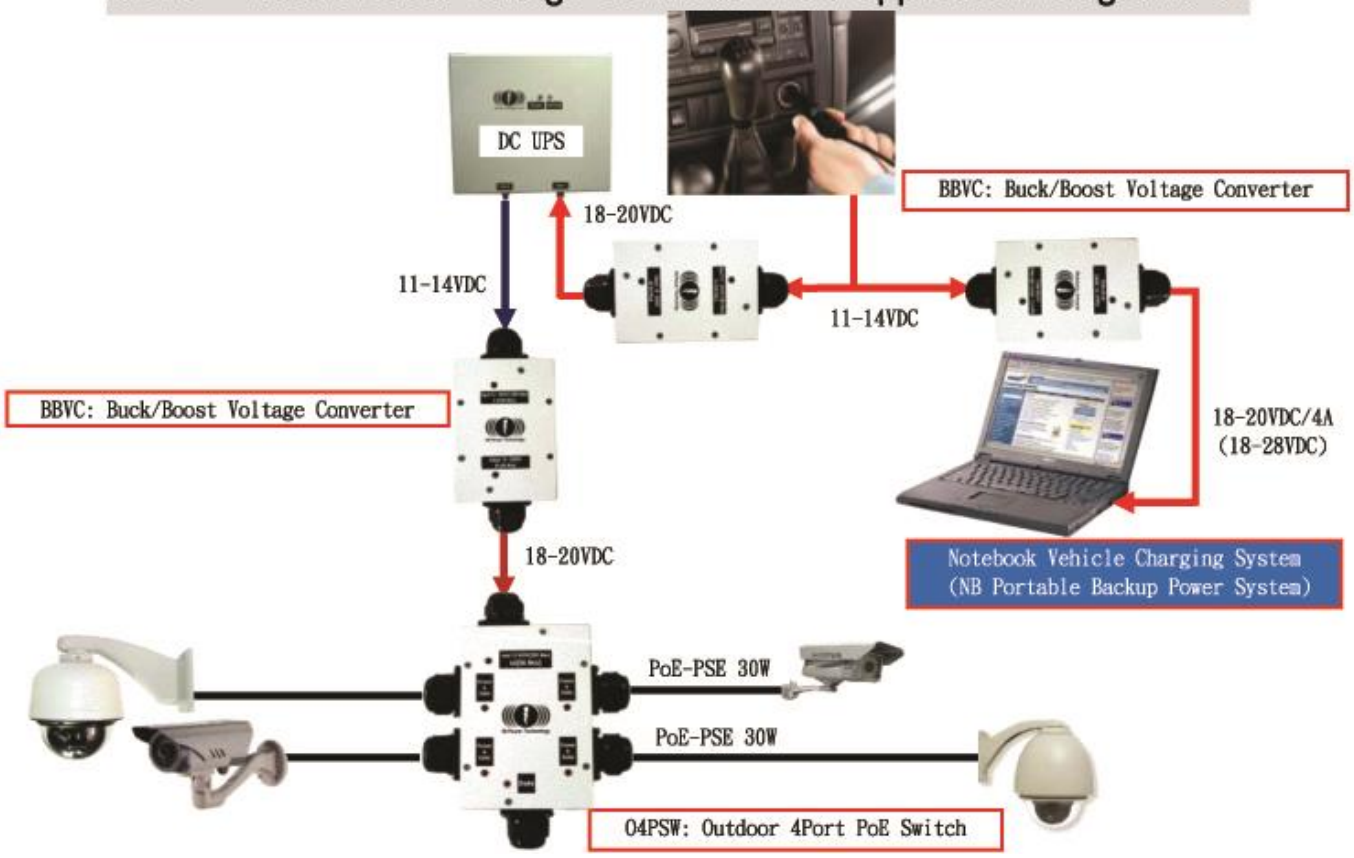
IOP-USMC-3560-10B

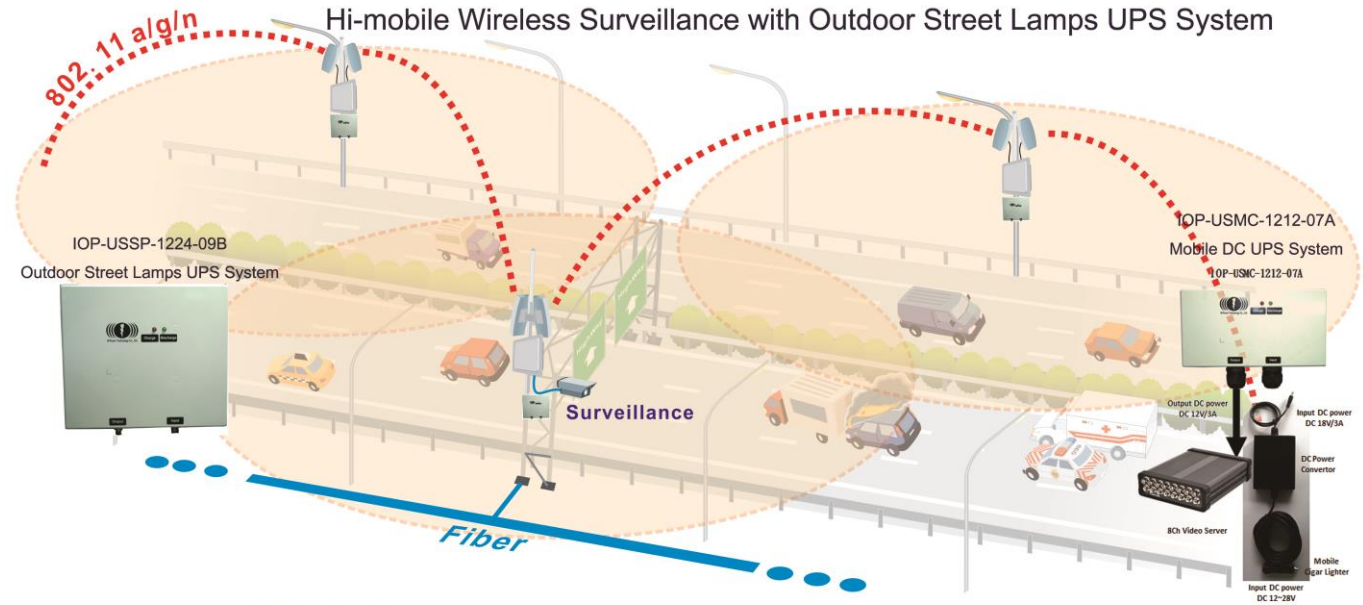


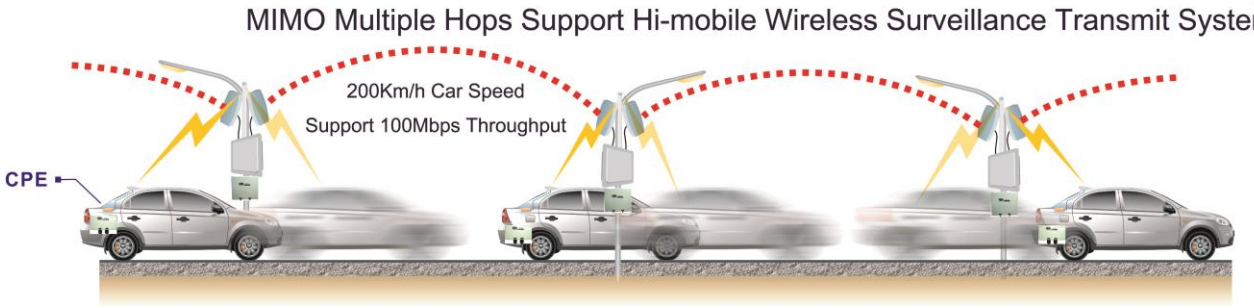
BBVC – Buck / Boost Voltage Converter Multi-application Diagrams 01



BBVC – Buck / Boost Voltage Converter Multi-application Diagrams 02




Hi-mobile Wireless Surveillance with Outdoor Street Lamps UPS System
802.11 a/g/n
IOP-USSP-1224-09B
Outdoor Street Lamps UPS System
IOP-USMC-1212-07A
Mobile DC UPS System
Surveillance
Fiber
Output DC power DC 12V/1A
Input DC power DC 18V/3A
DC Power Convertor
8Ch Video Server
Mobile Cigar Lighter
Input DC power DC 12~28V


MIMO Multiple Hops Support Hi-mobile Wireless Surveillance Transmit System
200Km/h Car Speed
Support 100Mbps Throughput
CPE