



**Thunder Sky Winston**  
www.winston-battery.com

# 使用說明書

## Operator's Manual

LYP / LTHP / LP 雷天溫斯頓稀土鋰動力電池  
LYP/LTHP/LP Thunder Sky Winston Rare-earth Lithium Power Battery

雷天溫斯頓電池有限公司  
THUNDER SKY WINSTON BATTERY LIMITED



非常感謝您選用具有國際自主知識產權的雷天溫斯頓動力牌電池，雷天牌及溫斯頓牌LYP.LTHP.LP稀土鋰動力電池是本集團發明并注冊的國際專利產品。

**注意：在使用之前，請仔細閱讀本說明書，確保正確使用電池，并請妥善保存此手冊，以備隨時查閱。**

Thank you for choosing Thunder Sky Winston Power Battery. LYP、LTHP and LP series of rare earth lithium power battery which under the brand name of Thunder Sky and Winston are invented by our group and owned the international patent.

**NOTE: Before first application, please read this manual carefully to ensure the proper operation of battery. Always keep this manual properly for in case of any need under some circumstances.**

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若本公司因生產技術提升導致本手冊的內容和圖解說明變更，恕不另行通知。

If the contents and illustrations in this manual are changed for the technology improvements of the company, it won't be noticed.

## 拆封開箱以後

After opening the box

確認物品是您所訂購的產品

Make sure the goods are what you ordered

## 請認准銘牌

Please recognize the accurate trademark



# Thunder Sky Winston

## 注意 Notice

檢查產品在運輸途中是否有損壞。

Check whether the product is damaged during shipment.

如產品型號、規格、數量不符合，或已經損壞，請與我公司聯系。

Please contact us if the type, specification and quantity is inconsistent with what you ordered, or being damaged.

**TSWB** - **LTH** / **LY** - **P** - **XXXAH** - **A**

● **"A"** 表示電池正負極在同一方向  
"A" means cathode and anode terminal of the battery are in the same direction

● **"B"** 表示電池正負極在相反方向  
"B" means cathode and anode terminal of the battery are in the opposite direction

● **"XXXAH"** 表示電池標稱容量  
"XXXAH" means battery nominal capacity

● **"P"** 表示方形  
"P" means quadrate

● **"LY"** 表示稀土氧化鋰鈮活性材料正極  
"LY" means positive electrode of rare earth lithium yttrium oxide active material.

● **"LTH"** 表示稀土氧化鋯及鋰鈮活性材料正極  
"LTH" means positive electrode of rare earth zirconium and lithium yttrium oxide active material.

● **"TSWB"** 表示“雷天溫斯頓”品牌的縮寫  
"TSWB" means the abbreviation of brand "Thunder Sky Winston".

**TSWB**

**LP**

**XXV**

**XXAH**

● **“XXAH”** 表示電池額定標稱容量;  
“XXAH” means battery's nominal capacity

● **“XXV”** 表示電池的工作電壓;  
“XXV” means battery's operating voltage

● **“LP”** 表示復合稀土氧化活性材料的高電壓電池;  
“LP” means high voltage battery of compound rare earth oxide active material

● **“TSWB”** 表示“雷天溫斯頓”品牌的縮寫。  
“TSWB” means the abbreviation of brand “Thunder Sky Winston”



**電池短路**  
Battery short circuit



**新出廠的電池切勿直接進行放電**  
Do not discharge the new battery directly for the first use



- 任何情況下不得將電池短路。  
Do not make the battery short-circuit in any situation.
- 新出廠的電池，切勿進行放電！必須先充滿電。  
Do not discharge the new battery! It must be fully charged at first.



**不得掀開電池安全閥！**  
Do not open the battery safety valve!



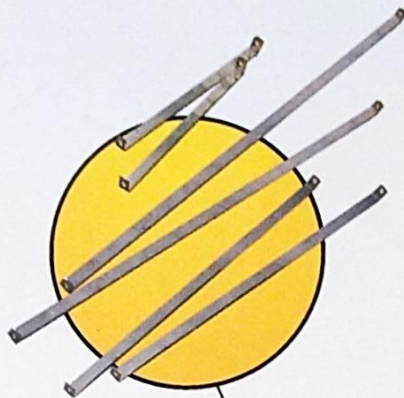
**切忌猛力扭動電池極柱上端的螺絲**  
Do not violently wrest the screw on the terminal!



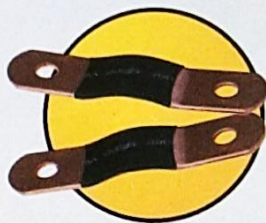
- 任何情況下不得掀開電池安全閥！  
Do not open the battery safety valve in any situation!
- 安裝導電條時，切忌猛力以免損壞電池極柱上端的螺紋！  
Do not install the terminal connector with violent force, to avoid the damage of terminal screw!



均要使用夾板固定電池  
Must use jigs and straps to fix the battery



電池系統組合拉條  
Battery pack straps



銅質導電條  
Copper terminal connectors



電池系統組合夾板  
Battery pack jigs



極柱的不銹鋼螺栓  
The stainless steel bolt of the terminal post  
平光墊圈和彈簧墊  
Mat gloss washer and spring washer

- 正式使用前應該檢查電池配件（各型號有少許偏差，配件以實物為準）  
Please check the accessories before using the battery (The pictures are for reference only. The accessories are subject to their actual features).
- 正常使用，不管單體或系統組合，均要使用夾板將電池固定，以防止鼓脹！  
Please use jigs and straps to fix the single cell or battery pack to avoid swelling for normal use!



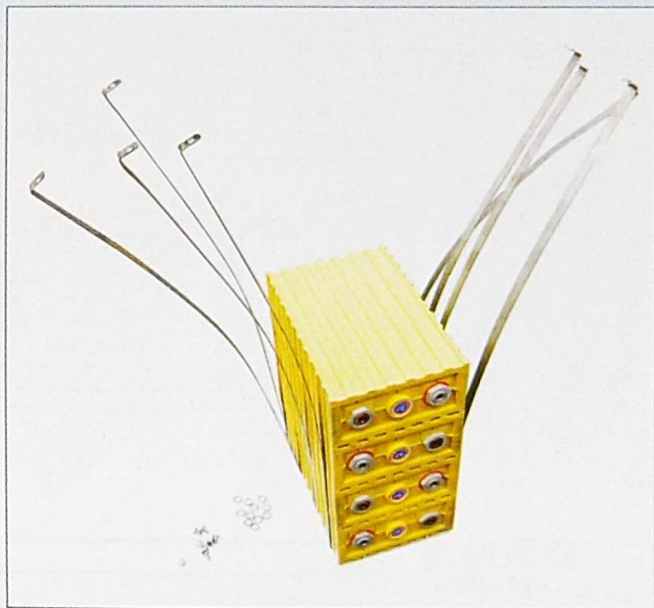


### 七個串聯為一組

Assemble 7 cells in series as one battery pack

要將多個單體電池系統組合，必須採用串聯或并聯的方式完成。一般理想的系統組合，應該祇有串聯，串聯系統組合對必須匹配安裝電池管理系統(BMS)較為妥善。

Put the cell into series or parallel connection to assemble the battery into pack. The ideal pack should only in series connection and with BMS.



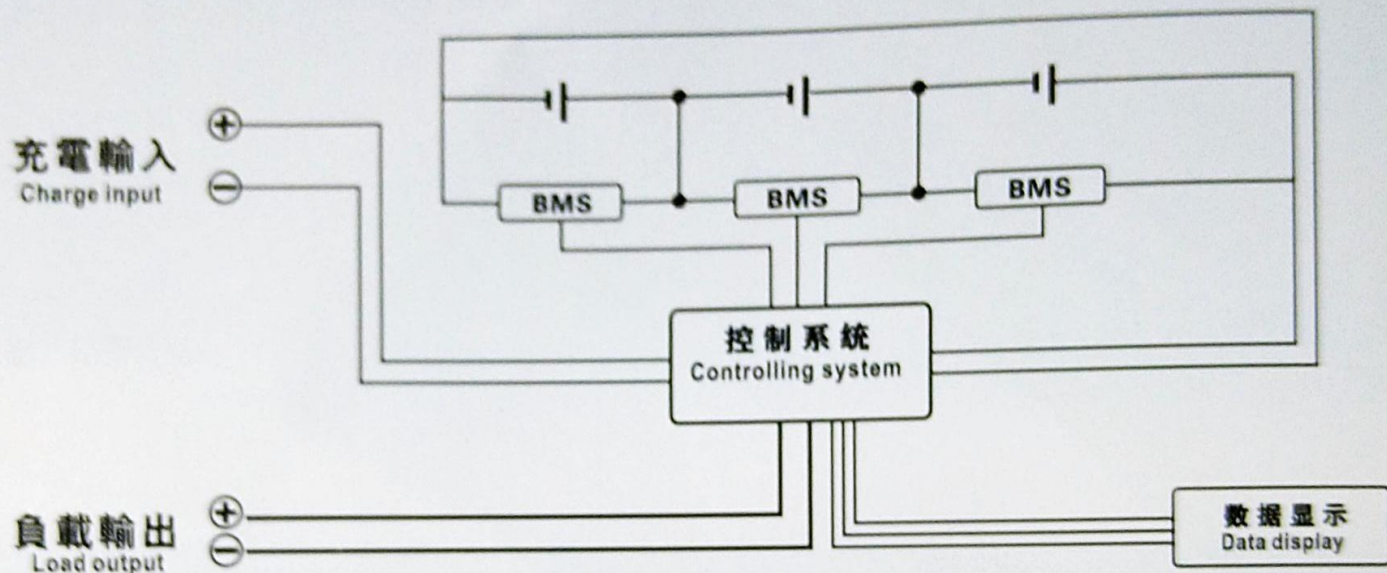
### 配置一些拉條，螺絲等輔件

Collocate accessories including straps, bolts and screws etc.

如果要將多個電池串聯系統組合時，還要配置一些拉條，緊固件，螺栓和螺母等輔件才能完成。不管系統組合成多大功率的電池堆，祇要配置好這些主要輔件便可進行。

Accessories such as straps, bolts and screws will be needed to assemble several series connection together. Make sure the accessories are fixed however large of the battery is.

● 電池管理系統(BMS)  
Battery Management System



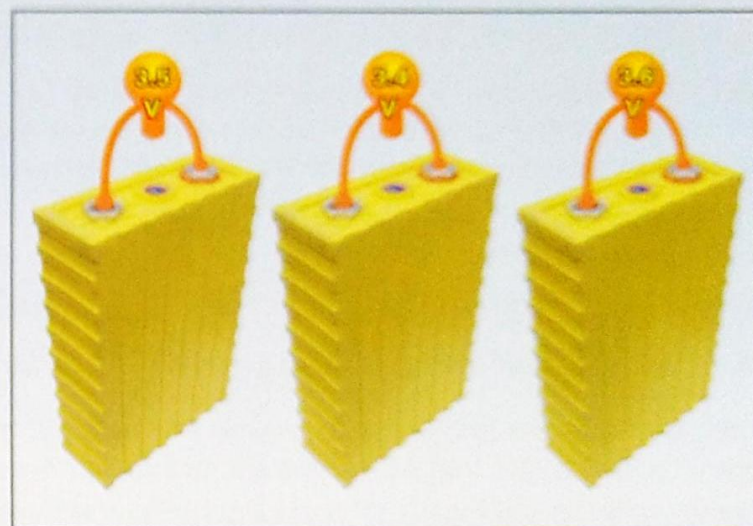
任何蓄電池通過串聯或并聯充放電使用，都要安裝一些電子綫路或監測綫路，對每個單體電池充電電壓和放電電壓進行有效的監測與保護，以免有部分電池出現過充電或過放電的不良現象而損傷電池。  
Any storage cell be used by parallel or series connection must install electronic circuit or monitor circuit to monitor the charging and discharging voltage and prevent the cells from damage caused by overcharged or over discharged.



不正常  
Abnormal

- 同一批電池中, 有個別電池電壓明顯相差1V以上屬不正常電池

In the same batch, it is abnormal that battery's voltage is differing above 1V.



正常  
Normal

- 一般同一批次出廠的同型號電池電壓相差0.1V屬正常

In the same batch, it is normal that the voltage of the same model is differing at 0.1V

雷天溫斯頓稀土鋰動力電池是一種大容量，高功率，長壽命和安全性極佳的動力和儲能裝置，在日常使用時必須遵循正確的使用方法，按規定操作與存放，祇有這樣，使用任何一種類型的電池才能得心應手。

ThunderSky Winston Rare Earth Lithium Power Battery is a kind of power and storage device with large capacity, high power density, long life and safety performance. During actual application, it is necessary to follow the instructions that operate and store it as prescribed which is the best way to use any type of our batteries.

## 操作 Operation

不得拆卸分解、擠壓、刺穿電池，不得將電池正負極短接，不得加熱電池，不得將電池擲入火中，不得將不同品牌（如我司電池與其他公司電池）、不同類型（如LYP與LP/LTHP）、不同容量以及新舊電池混用。

Do not disassemble, squeeze or pierce the battery, make the cathode and anode short circuit, heat the battery, throw it into fire. Do not use different brand (such as our company's battery and other company's battery), or different type (for example LYP and LP/LTHP), or different capacity, or different conditions batteries together.

## 存放 Storage

電池需要存放在涼爽通風的地方（最佳溫度為 $25 \pm 3^{\circ}\text{C}$ ），電池放置需與牆壁保持適當距離，遠離潮濕、熱源。將電池保持在初始包裝中直至使用。

需要長期存放的電池，不能倒置儲存，首先將電池充電至荷電的40-60%。以後需每月檢查電池的開路電壓，確定存放的同批電池的電壓一致，或相差不大，如發現電壓低於3.0V應盡快補充充電。一般正常情況下電池每月自放電率在1%左右，每半年補充充電一次即可。

The battery must be stored in cool and ventilated place (optimum temperature at  $25 \pm 3$  °C). Battery must maintain an appropriate distance from the wall and keep away from moist and heat. Keep the battery in the original package until be used.

Do not leave those battery which need to be stored in a long time upside-down, and those should be charged to 40%–60% before the storage. Check battery's open circuit voltage every month to make sure the voltage in the same batch is consistent or in slightly difference It should charge as soon as possible if the voltage is lower than 3.0V. The regular self-discharge rate is about 1% every month. Please recharge once every half year.

## 存放管理信息 Storage Management Information

### 1. 溫度範圍

Temperature range

儲存 Storage	$+25^{\circ}\text{C} \pm 5^{\circ}\text{C}$
放電 Discharge	$-45^{\circ}\text{C}/+85^{\circ}\text{C}$
充電 Charge	$-45^{\circ}\text{C}/+85^{\circ}\text{C}$

### 2. 比能：（備注：WH=標準電壓\*額定安時）KG=平均電池重量

Specific Energy: (Note: Wh = Normal voltage x Rated Ah) kg = Average battery weight

### 3. 比脈衝功率：600W–1200W/KG, 視電池尺寸不同。

Specific Pulse Power: 600w–1200w/kg, Varies depending on battery size

### 4. 機械阻力：如IEC標準相關規定

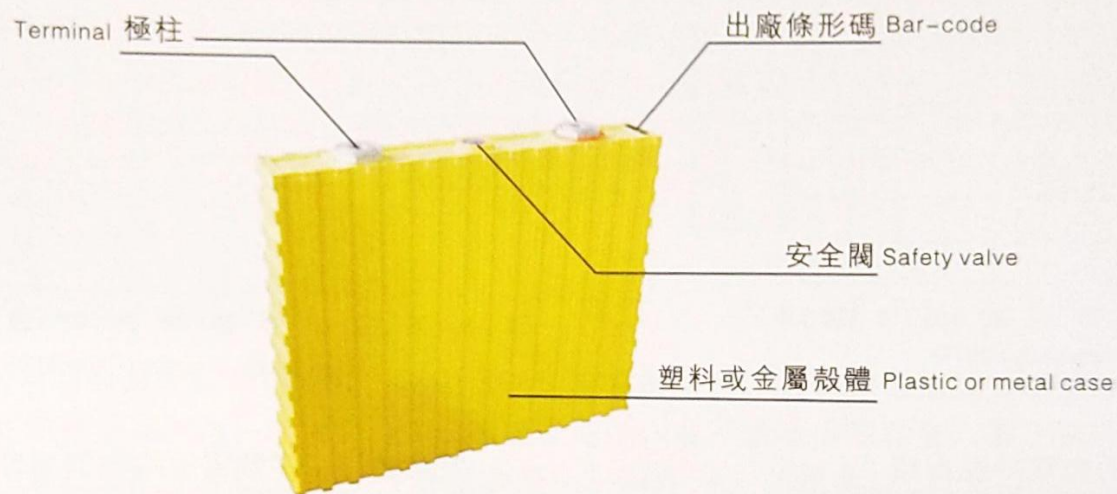
Mechanical Resistance : As defined in IEC relevant standard

# WB-LYP

太陽能、風能、峰谷、不間斷電源 (UPS) 儲能類電池  
Solar Energy、Wind Energy、Peak Valley、UPS Storage Type Battery



## 單體電池的結構 Structure of cell



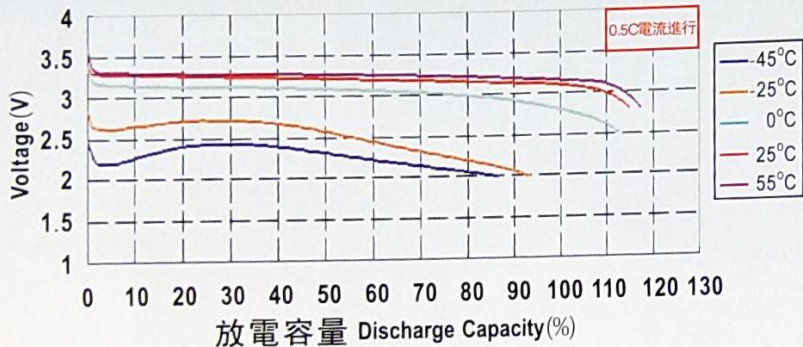
- LYP類電池是用作移動式動力源和儲能裝置最理想的電池  
LYP type battery is ideally used as a mobile power source and energy storage device.
- 該類電池具有極佳的安全性能，極佳的循環壽命  
This type of battery has excellent safety performance and cycle life.
- 充電時電池外殼溫度若低於85度，該類電池允許採用3CA以下電流進行快速充放電  
When the battery case temperature below 85 degrees, this type of batteries can accept a fast charge and discharge under 3CA current.

# LYP類電池的放電特性圖

## Charge and discharge characteristics chart of LYP type battery

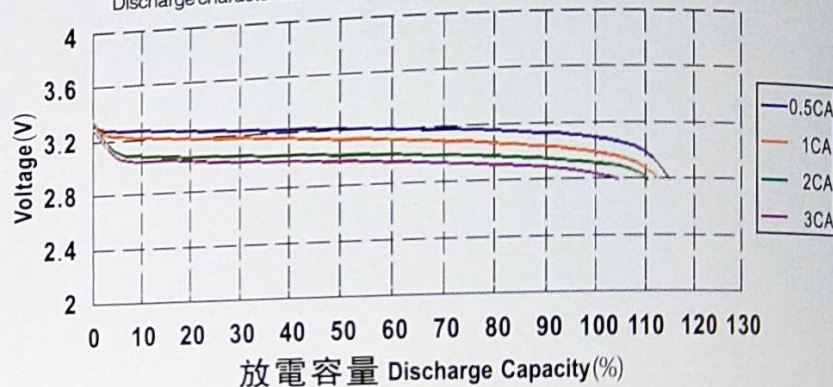
### 不同環境溫度下LYP類電池的放電特性曲綫

Discharge characteristic curve of LYP type battery under different ambient temperature



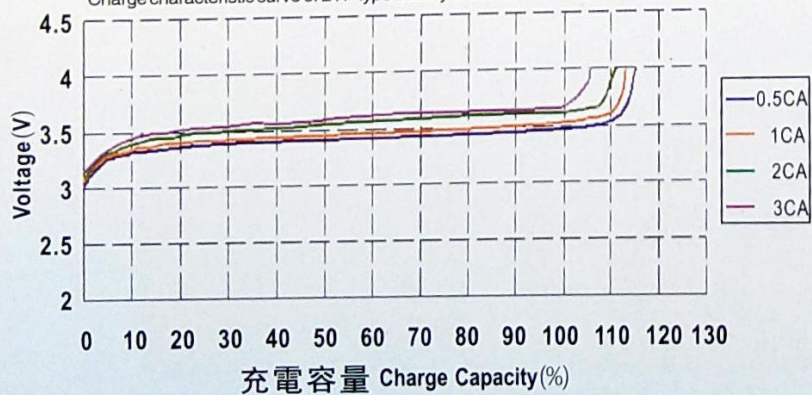
### 常溫下LYP類電池的放電特性曲綫

Discharge characteristic curve of LYP type battery under normal temperature



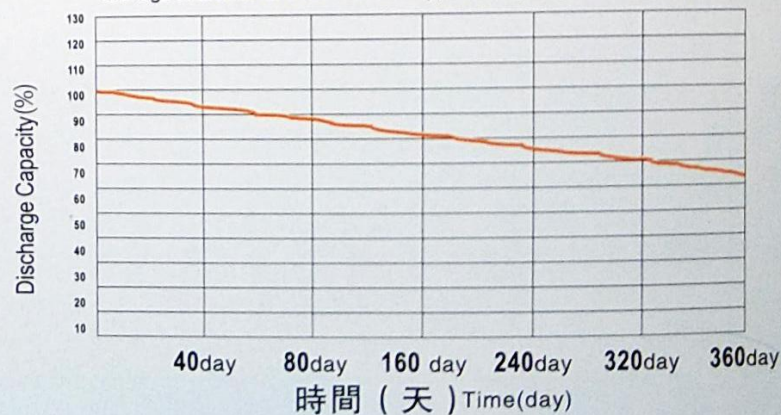
### 常溫下LYP類電池的充電特性曲綫

Charge characteristic curve of LYP type battery under normal temperature



### 在常溫下LYP類電池的存儲特性曲綫

Storage characteristic curve of LYP type battery under normal temperature





由于LYP類電池正極活性物質采用氟化合物與稀土混合燒制而成，而負極活性物質則采用納米碳素纖維與人造石墨，所以在接受大電流充電中，始終能保持其固有分子結構不變，晶格牢固，耐衝擊，壽命長等特點。

The LYP battery's cathode active material is made by fluorine compound and rare earth, and the anode active material is made by nanometer carbon fiber and artificial graphite. Therefore in the large current charge, it can maintain its original molecular structure. Make the crystal lattice solid, have resistance to impact and sustain a long life.

- LYP類電池一般在常規環境中保持充電電壓 $\leq 4V$ ；放電電壓 $\geq 2.7V$ ；該類電池的循環壽命可大于3000次以上。
- 該類電池最大充電電流為3CA，該類電池在反復充放電中，會不斷地提高容量，屬正常現象。
- 該類電池的工作電壓為2.8–4V。標準的充電電流是0.3–0.5CA，并適應在 $-45^{\circ}C$ 至 $85^{\circ}C$ 環境溫度下使用。
- 該類電池放電電壓低至2.0–2.5V，不會損壞電池，但建議放電截止電壓 $\geq 2.7V$ 。
- In normal environment, the charging voltage of LYP battery should be kept at  $\leq 4V$ ; discharging voltage  $\geq 2.7V$ ; cycle life can be more than 3000 times.
- The maximum charge current of LYP battery is 3CA. It is normal that battery capacity increased when charge and discharge repeatedly.
- LYP battery working voltage is 2.8~4V, nominal charging current is 0.3~0.5CA, can be operated under temperature between  $-45^{\circ}C$ ~ $85^{\circ}C$ .
- LYP battery will not be damaged when discharge voltage is below to 2.0~2.5V, but suggest the discharge end-off voltage is  $\geq 2.7V$ .

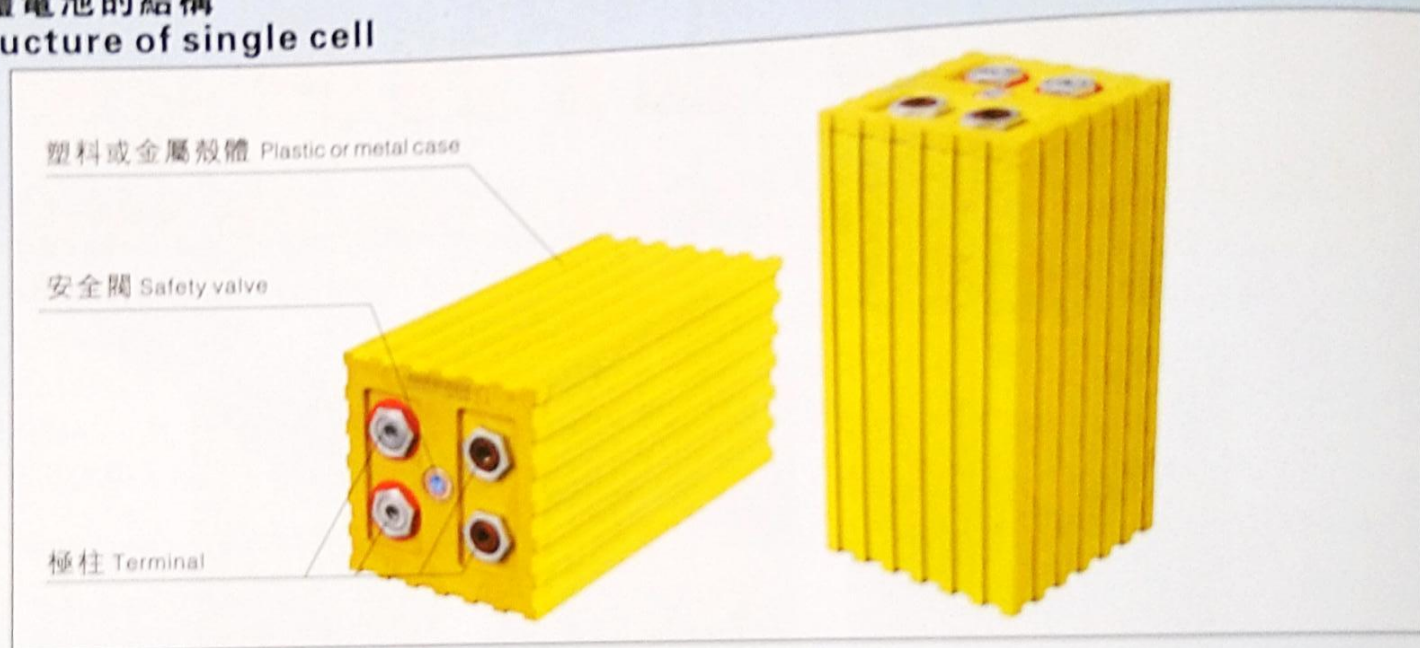
- 該類電池每月自放電率 $\leq 1\%$ ，常溫放置狀態下每半年補充充電一次即可。
- LYP類電池對於破壞性試驗，短路，槍擊，過充電過放電，擠壓，針刺，都不會因為內部短路而發生起火燃燒和爆炸等危險。
- 該類電池在組合使用時，如果沒有使用有效的BMS（電池管理系統），並進行長期使用時，個別單體電池仍可能會出現過充電或過放電的現象，電池雖然不會出現起火燃燒等危險，但仍會造成電池性能下降或失效。
- 匹配的BMS（電池管理系統）是在電池系統組合中最能保護每個單體防止過充電和過放電的有效的裝置，也能延長電池的使用壽命。
- Discharging rate of the battery is  $\leq 1\%$ . Under normal condition, recharge the battery once every six months.
- Under the destructive test, such as short circuit, gunshot, overcharge and overdischarge, extruding and nail penetration, battery will not on fire or explosion caused by internal short circuit.
- When using the battery pack without the effective BMS(Battery Management System) for a long time, some of the single cells will appear overcharge and overdischarge. Under this circumstances, battery performance will degradation or even invalid, but there is no danger such as on fire.
- Matched BMS(Battery Management System) is the best device to protect single cell from overcharge and overdischarge in the battery pack and ensure a long life endurance of the battery.

# WB-LTHP

陸地或海上電動交通工具作牽引力移動類動力電池  
Battery that be used on land or sea as tractive mobile power



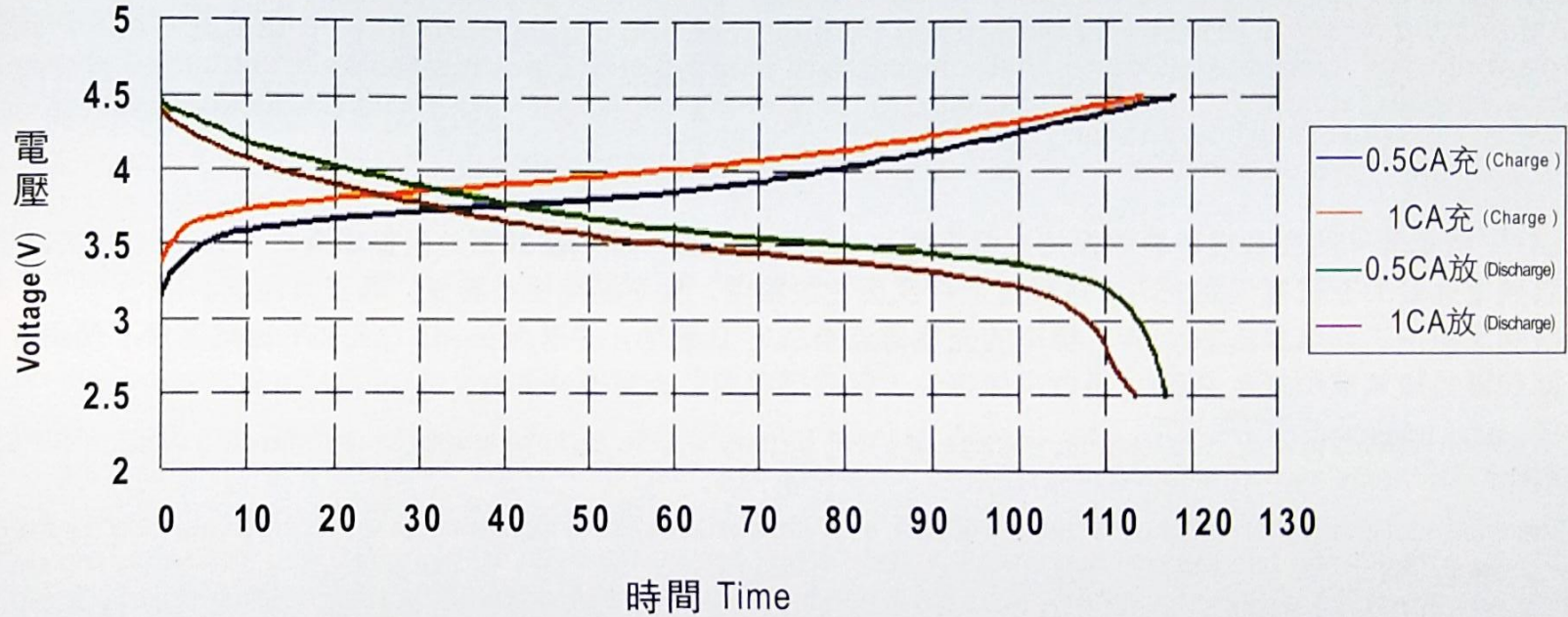
## 單體電池的結構 Structure of single cell



- 本LTHP類電池不用夾板，可側放串并聯使用。  
The LTHP battery do not need splint and can be used in parallel and series connection
- LTHP類電池是用作移動能源類交通工具領域最理想的電池  
LTHP battery is the best choice be used in mobile energy type of transportation
- 該類電池具有極佳的安全性能，極佳的循環壽命  
This type of batteries has excellent safety performance and cycle life.
- 充電時電池外殼溫度若低於85度，該類電池允許採用1CA以下電流進行快速充電  
When the case temperature below 85 degrees, this type of batteries can accept a fast charge under 1CA or less current.

# 常溫下LTHP類電池的充放電特性曲綫

Charge and discharge characteristic curve of LTHP battery under normal temperature



由于LTHP類電池正極活性物質采用稀土氧化鋯與氧化鋰鈮混合燒制而成，而負極活性物質則采用納米碳素纖維與人造石墨，所以在接受大電流充電中始終能保持其固有分子結構不變，晶格牢固，耐衝擊，壽命長等特點。

The LTHP battery's cathode active material is made by fluorine compound and oxide lithium yttrium and the anode active material is made by nanometer carbon fiber and artificial graphite. Therefore in the large current charge, it can maintain the characteristics of invariable inherent molecular structure, solid crystal lattice, impact resistance, and long life. Its original molecular structure. Make the crystal lattice solid, have resistance to impact and sustain a long life.

- LTHP類電池一般在常規環境中保持充電電壓 $\leq 4.5$ ；放電電壓 $\leq 2.5V$ ；該類電池的循環壽命可大于3000次以上。
- 該類電池最大充電電流為3CA，該類電池在反復充放電中，會不斷地提高容量，屬正常現象。
- 該類電池的工作電壓為3–4.5V。標準的充電電流是0.3–0.5CA，并適應在 $-45^{\circ}C$ 至 $85^{\circ}C$ 環境溫度下使用。
- 該類電池放電電壓低至2.5V，不會損壞電池，但建議放電截止電壓 $\geq 3V$ 。
- In normal environment, the charging voltage of LTHP battery should be kept at $\leq 4.5V$ ; discharging voltage  $\geq 2.5V$ ; cycle life can be more than 3000 times.
- The maximum charge current of LTHP battery is 3CA. It is normal that battery capacity increased when charge and discharge repeatedly.
- LYP battery working voltage is 3~4.5V, nominal charging current is 0.3~0.5CA, can be operated under temperature between  $-45^{\circ}C$ ~ $85^{\circ}C$ .
- LYP battery will not be damaged when discharge voltage is 2.5V, but suggest the discharge end-off voltage is  $\geq 3V$ .

- 該類電池每月自放電率低于3%左右,常溫放置狀態下每半年補充充電一次即可。
- LTHP 類電池對於破壞性試驗，短路，槍擊，過充電過放電，擠壓，針刺，都不會因為內部短路而發生起火燃燒和爆炸等危險。
- 該類電池在組合使用時，如果沒有使用有效的BMS（電池管理系統），并進行長期使用時，個別單體電池仍可能會出現過充電或過放電的現象，電池雖然不會出現起火燃燒等危險，但仍會造成電池性能下降或失效。
- 匹配的BMS（電池管理系統）是在電池系統組合中最能保護每個單體防止過充電和過放電的有效的裝置，也能延長電池的使用壽命。
- Discharging rate of the battery is  $\leq 3\%$ . Under normal condition, recharge the battery once every six months.
- Under the destructive test, such as short circuit, gunshot, overcharge and overdischarge, extruding and nail penetration, battery will not on fire or explosion because of the internal short circuit.
- When using the battery pack without the effective BMS(Battery Management System) for a long time, some of the single cells will appear overcharge and overdischarge. Under this circumstances, battery performance will degradation or even invalid, but there is no danger, such as on fire.
- Matched BMS(Battery Management System) is the best device to protect single cell from overcharge and overdischarge in the battery pack and ensure a long life endurance of the battery.

# WB-LP

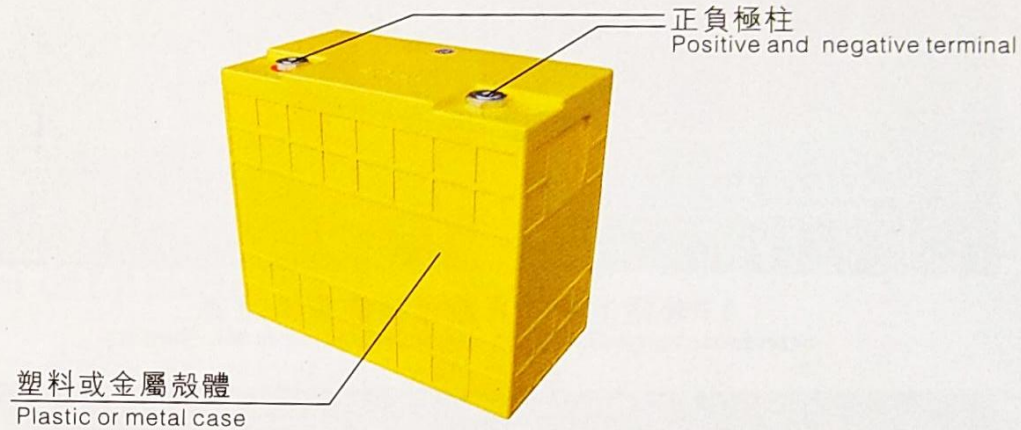
替代鉛酸類蓄電池，專門用于各類燃油汽車  
Replace Lead-acid Storage Battery, Specialized on various fuel automobiles

12V/24V/48V 啟動電池  
12V/24V/48V starter battery





## 單體電池的結構 Structure of single cell

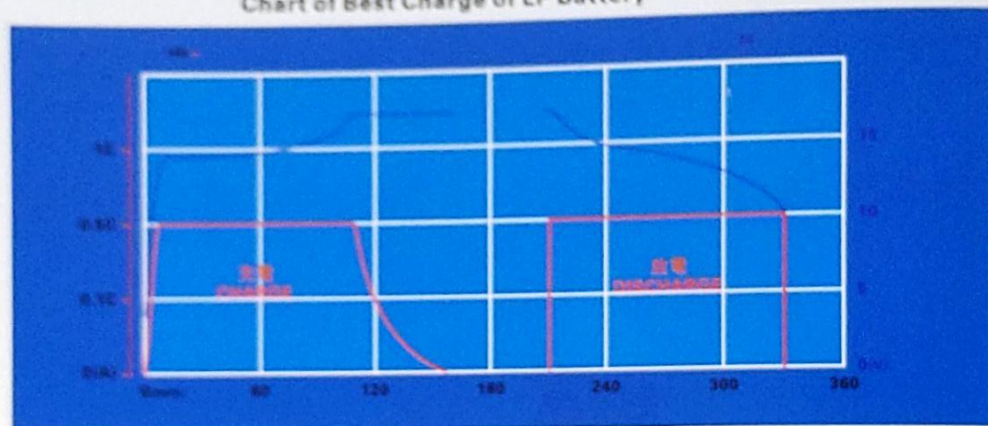


**WB-LP12V90AH**

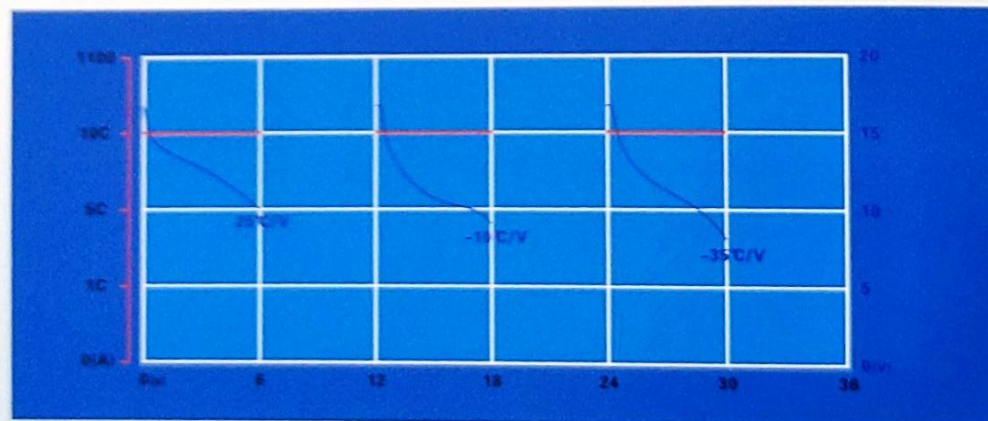
- LP類高電壓稀土鋰動力電池是替代燃油汽車啓動鉛酸電池的最有效產品，該類電池生產、使用、回收對環境友好無污染。

The LP high voltage rare earth lithium power battery is the most effective product to replace the lead-acid battery as the starter battery. And the battery production, usage and recycling are environmentally friendly.

LP類電池最佳充放電圖  
Chart of Best Charge of LP Battery



LP類電池標準充放電特性曲綫圖 ▲  
Standard charge discharge characteristic curve of LP battery



LP類電池不同環境溫度下瞬間放電特性曲綫圖 ▲  
Transient discharge characteristic curves of LP battery under different environment temperature

## LP類電池最大充電電流

### Maximum Charging current of LP battery

LP類電池祇允許採用 $\leq 3CA$ 以下電流充電，充放電最佳電壓範圍為11V~16V，

LP battery only can be charged under ( $\leq$ )3CA current. The best charging and discharging voltage range is 11V~ 16V;

最佳的充電電流是在0.5CA以下進行充電。

The best charging current is below 0.5CA.

- 該類電池的工作電壓為11V-16V，可直接替代鉛酸電池用作燃油車的起動電池，長期使用壽命大於10年。  
LP battery's working voltage is 11V-16V. It can substitute the lead-acid battery directly in the fuel car as the start-up battery. The life is more than 10 years.
- 一般在常規環境中保持充電電壓 $\leq 16V$ ；放電電壓 $\geq 11V$ 時，該類電池的循環壽命應大於3000次以上或10年。  
Generally, LP battery's cycle life should be longer than 3000 times or 10 years when the charging voltage is  $\leq 16V$  and discharging voltage  $\geq 11V$  at normal environment.
- 該類電池適應 $-45^{\circ}C$ 至 $85^{\circ}C$ 環境溫度下使用。  
It can be used at temperature between  $-45^{\circ}C$  to  $85^{\circ}C$ .
- 該類電池不會因過充或過放電而發生意外，但仍會造成電池性能下降或失效。除非將電池作破壞性實驗，否則該類電池不會因內部短路而起火燃燒。  
LP battery would not cause accident when it is over charged or over discharged, but the performance would degradation or get invalid. It won't cause fire when short circuit unless the user destroys it on purpose.

# 標準充放電

## Standard Charge and Discharge

### 首次充放電 Charge/discharge setup for the first use.

新出廠的電池處於半荷電狀態，切勿直接使用！首次使用時必須將每個單體電池依照各類電池的特性設定充電標準，對電池充電，必須選擇匹配的專用充電器進行充電。

The new battery is in half electric charge condition, which can not be used directly! Before using the new battery for each new battery must charge according to each kind of battery's charge standard that is set by their characteristics. The battery must use the matched battery charger to charge.

	LYP類電池 LYP battery	LTHP類電池 LTHP battery	LP類電池 LP battery
■ 充電最高電壓 The highest charge voltage:	4.00V	4.50V	16V
■ 充電最佳電流 The best charge current:	0.5CA	0.5CA	0.5CA
■ 放電最低電壓 The lowest discharge voltage:	2.70V	2.50V	11.0V
■ 放電最佳電流 The best discharge current:	0.5CA	0.5CA	0.5CA

當電池經過首次充放電后，可依照各類別電池特性設定充放電電壓。

After initial charge and discharge, the user could set up the charge and discharge voltage according to each kind of battery's characteristics.

- 常溫環境下單體電池的充放電電流電壓標準 (表一)  
Single cell's charge and discharge current and voltage standard at normal temperature (Chart 1)

溫度 Temperature	標準 類別 Standard Category	標準充放電電流 standard charge/discharge current	最大充電電流 The highest charge current	最高充電電壓 The highest charge voltage	最大放電電流 The highest discharge current	最低放電電壓 The highest discharge voltage
25°C	LYP	0.5CA	≤3CA	4V	恒流 Constant Current 3 CA	2.7V
					脈衝 Pulse 10CA	
	LTHP	0.5CA	≤1CA	4.5V	恒流 Constant Current 3 CA	2.5V
					脈衝 Pulse 10CA	
	LP	0.5CA	≤3CA	16V	恒流 Constant Current 3 CA	11V
					脈衝 Pulse 10CA	

- 低溫環境下單體電池的特殊充放電電流電壓 (表二)  
Single cell's special charge and discharge current and voltage at low temperature (Chart 2)

溫度 Temperature	標準 類別 Standard Category	標準充放電電流 standard charge/discharge current	最大充電電流 The highest charge current	最高充電電壓 The highest charge voltage	最大放電電流 The highest discharge current	最低放電電壓 The highest discharge voltage
-25°C	LYP	0.5CA	≤1CA	4.25V	恒流 Constant Current 3 CA	2.0V
					脈衝 Pulse 10CA	
	LTHP	0.5CA	≤1CA	4.5V	恒流 Constant Current 3 CA	2.5V
					脈衝 Pulse 10CA	
	LP	0.5CA	≤1CA	17V	恒流 Constant Current 3 CA	10V
					脈衝 Pulse 10CA	

**特別注意：** 當環境溫度或電池溫度升高時，所有指標應回復到 (表一) 常溫充電標準！  
**Special Notice:** When the ambient temperature or battery's temperature increases, all the index should go back to (Chart 1) the charge standard at normal temperature!