

# MARXON<sup>®</sup>









## MAINTENANCE & OPERATION INSTRUCTIONS

Leoch Deep Cycle LDC Series Maintenance-free Battery





## SAFETY AND WARNING LABEL

	<ul style="list-style-type: none"><li>● Please follow the instructions and put them near the battery for reference. Only professional personnel can operate the battery and pay attention to the precautions in the manual.</li></ul>
	<ul style="list-style-type: none"><li>● No smoking.</li><li>● Stay away from any fire or heat source.</li></ul>
	<ul style="list-style-type: none"><li>● Please wear protective clothes and glasses when handle the battery.</li><li>● Please be careful to follow the accident prevention protocol.</li></ul>
	<ul style="list-style-type: none"><li>● Please wash with plenty of water and go to hospital if acid splash into skin or eyes.</li><li>● Please wash with water if acid splash on clothes</li></ul>
	<ul style="list-style-type: none"><li>● Warning! The metal part of the battery is electrically charged, do not place objects on the battery.</li><li>● Avoid heat, fire or explosion caused by short circuit.</li></ul>
	<ul style="list-style-type: none"><li>● Electrolyte is corrosive, and cannot be contacted under normal working conditions, but if the battery is damaged, do not touch the spilled electrolyte.</li></ul>
	<ul style="list-style-type: none"><li>● The batteries are very heavy, please use suitable tools for transportation.</li><li>● Shockproof!! Handle with care.</li></ul>
<p>Please do not violate the operation instruction, AGM valve regulated sealed lead - acid battery do not need add water, the safety valve has sealed function, do not open it.</p>	
	<p>Battery disposal</p> <p>Batteries marked with recycling marks shall be recycled by formal recycling agencies, or can be returned to manufacturer for recycling.</p> <p>Batteries should not be placed with industrial waste.</p>



## SAFETY PRECAUTIONS

“**Danger**” indicates high danger and vigilance; “**Warning**” indicates moderate danger to on alert; “**Caution**” indicates mild risk needs attention.

**Danger**—Please do not use the battery outside the designated purpose. If it is used outside the designated purpose, it may cause liquid leakage, heating, fire and explosion.

**Danger**—It is forbidden to disassemble, transform, damage, strongly impact or throw the battery, as it may leads to liquid leakage, heating, fire or explosion.

**Danger**—It is forbidden to put the battery into the fire or heat it, as it may leads to fire or explosion.

**Danger**—It is forbidden to connect the battery in short circuit, otherwise the battery will be heated and ignited.

**Warning**—If total voltage of battery pack exceeds 45V, safety measures such as insulated gloves shall be used before work. If safety measures are not taken during work, there is risk of electric shock.

**Warning**—Keep and use the batteries out of the reach of children.

**Warning**—Sulfuric acid solution is adsorbed on the plates and separators inside the battery. If the battery is mechanically damaged, prevent the sulfuric acid from contact the skin and clothes, and splash into the eyes. If this happens wash it immediately with plenty of water and go to hospital for serious cases.

**Warning**—when installing wiring, wrap the handle of metal installation tool with insulating tape.

**Notice**—It is forbidden to discard batteries at will, as batteries and leakage can pollute the environment.

**Notice**—It is forbidden to wipe the battery with organic solvents such as petrol or alcohol.

**Notice**—It is forbidden to store or use the batteries upside down.

**Notice**—When measuring for maintenance, the face should not be directly on top of the battery and should be kept at an angle or distance.

**Notice** — The limit temperature range allowed for batteries: Charging 32 to 104° F, discharging -4 to 131°F, storage 5 to 122°F, but use at 68 to 86°F is more conducive to battery life.

**Notice**—If the battery is used in a way that is not described in this manual, or if there is any inconsistency with other product information, please seek help from your supplier.

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## 1. Battery Storage

High temperatures or poor ventilation during storage and transport can lead to higher self-discharge rate, so keep the battery well ventilated and keep it away from open flames, sparks, heat sources, organic solvents, etc.

When storing batteries, they should be removed from the charger or load and stored in a dry, cool environment.

As battery storage requires charge maintenance, it is recommended that batteries should not be stored for longer than the following.

6 months below 77°F

3 months 77°F to 95°F

6 weeks above 95°F

If storage exceeds the above time, it should be charged and maintained.

If you are using a charger, the charger setting parameters should follow the charging curves 4.1 and 4.2 until the charger turns green and then continue float charging for 2-4hrs.

If you are using other charging devices, below three charging methods are available.

1) Constant voltage 2.40-2.45V/cell charge 8-12hrs;

2) Constant voltage 2.45-2.48V/cell charge 6-8hrs;

3) Constant current 0.1C(A) Charge for 4-6hrs.

You can also measure open-circuit voltage of the storage battery to determine whether it needs to be charged for maintenance. If open-circuit voltage drops below 2.12V/cell, it is recommended to charge for maintenance.

First in first out management is required during battery storage to avoid battery performance degradation due to a long storage period.

Failure to comply with these storage conditions may result in serious degradation of battery capacity and service life.

## 2. Use Condition

Environment temperature range: charge 32 ~ 104°F, discharge -4 ~ 131°F, storage -5 ~ 122°F.

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The battery can operate in above temperature range, but the standard data is measured at 25°C. The ideal temperature range for charge and discharge is 20 ~ 30°C for best battery performance and life. Use at lower temperatures will shorten discharge times, while use at higher temperature will shorten life and increase potential for thermal runaway.

Batteries should be kept away from open flames, sparks and heat sources.

Avoid heat and direct sun explosion.

Keep away from wet places that may be soaked in water.

The battery will release a small amount of gas in normal use, should avoided completely closed place.

Different specifications, different years, different brands, different performance of the battery cannot be mixed, if you need to mix, please contact us for technical guidance.

**Notice:**

If there is an accidental overcharging, the gas inside the battery will be discharged from the safety valve. Contact the ground before operation to release the static electricity that may exist on the body or clothing.

### **3. Battery Installation**

#### **3.1 Open Box and Check**

It is recommended to unpack all single batteries and accessories for inspection and check whether the appearance of batteries is damaged before installation, rather than opening and installing them one by one to avoid omission.

Count the number of batteries and whether the accessories are complete according to the attached proposal or goods list.

Batteries are heavy and should be handled or installed with special care. Avoid battery case damage from collision, drop or impact. In absence of battery handle, the battery should be lifted from bottom of the battery.

The insulating terminal cover on battery terminal is intended for protect the terminals during transportation. It can take off during installation.

#### **3.2 Notes before Installation**

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Before connection, check the battery and confirm that the terminal polarity is correct. Check the configuration number, install by group, cannot be confused. Polish the battery terminals so that they have a metallic shine.

Check all connection cables to make sure they are clean and free from damage.

Insulate metal installation tools (such as wrenches), for example, wrap them with insulating tape. Wear insulated gloves, take off watch, bracelets, rings and other conductors containing metal, to prevent electric shock and cause positive and negative short circuit.

When connecting terminals, ensure that they are securely connected. Tighten each bolt or nut, but do not use too much force to avoid damage.

For the damaged terminal seal structure, see Table 1 for the recommended tightening torque.

Table 1: Tightening torque recommendation table

Bolt Specification	M5	M6	M8
Tightening Torque	2.0~3.0N·m	3.9~5.4N·m	11~14.7N·m

**Notice:**

Loose terminal connections may lead to unstable battery performance or even damage to the battery or cause personal safety.

Avoid mounting the battery close to heat sources (e.g. transformers) and also avoid other equipment cooling fan ports facing the battery.

The battery should be installed avoid proximity to spark generating devices (e.g. fuses).

**3.3 Install the Wiring**

Install the battery upright, not upside down.

To ensure good heat dissipation, keep space between batteries at least 20mm, heat dissipation holes should be installed around the battery box.

Installation should be anti-vibration, anti-pressure treatment, installation should be firm, in order to prevent battery moving, bumping and mutual friction during use.

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The battery box should not be completely sealed. The air hole should not be smaller than 10mm and should not be blocked.

When multiple batteries are used together, connect the batteries first, and then connect the battery pack with the charger or load. Note that the positive terminal of the battery pack should be connected with the positive terminal of the charger or load, and the negative terminal should be connected with the negative terminal.

Note: If the battery is not properly connected to the charger or load motor, the charger or load motor may be burned out.

The power test can be performed only after the battery is installed and the total voltage of the battery string is correctly measured.

## **4. Battery use**

### **4.1 Three Stage Charging**

Three-stage charging, the three stages of charging will be automatically switched by the charger.

The first stage (S1), constant current charging, charge at constant current of 0.15-0.18C. The charger will automatically switch to the second stage when single cell voltage reaches 2.40-2.45V.

The second stage (S2), constant voltage charging, with a single cell voltage of 2.40-2.45V constant voltage charging, when the charging current drops to 0.012-0.02C, the charger will automatically turn to the third stage, at this time the charger should turn the light (usually turn green, means fully charged).

The third stage (S3), float charging, float charging with single cell voltage 2.28-2.32V, float charging 2-4hrs can end the charging, at this time the charger should be turned off.

#### **◆ Charging Time Recommendation:**

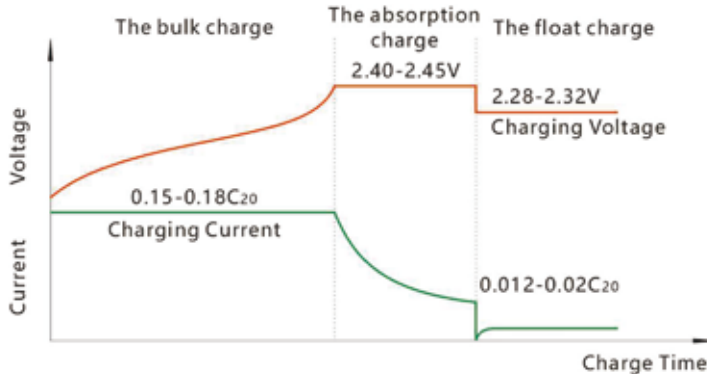
1) Charge above 77°F for about 12hrs. If surface temperature of the battery reach 113°F, stop charging until the temperature drop below 86°F and charging can be continued, otherwise, the battery will be damaged.

2) Charging below 77°F, the battery is stored indoors for 1hr and then charged for about 16hrs.



The charger should have charging temperature compensation function, with 77°F as the base point, for every 33.8°F increase in ambient temperature, the charging voltage will be adjusted down by 4mV/cell. For 33.8°F decrease in ambient temperature, the charging voltage will be adjusted up by 4mV/cell.

Fig. 1: Three-stage charging curve



**Notice:**

In different voltage systems, the current does not change, but voltage should change. For example, when charging at constant voltage, in 48V system, the voltage is 57.6-58.8V at constant voltage charging, and in 24V system, the voltage is 28.8-29.4V. In 48V system, when floating charge, the voltage is 54.7-55.6V, in 24V system, the voltage is 27.4-27.8V.

**4.2 Five Stage Charging**

The first stage (S1), charging at constant current of  $0.18-0.2C$ , automatically switches to the second stage when single cell voltage reach 2.40V.

The second stage (S2), charging at constant current of  $0.10-0.12C$ , automatically switches to the third stage when single cell voltage reach 2.47V.

The third stage (S3), charging at constant voltage of 2.47V with current limit of  $0.05C$ , and automatically switch to the fourth stage when charging current drop to  $0.01C$ .

The fourth stage (S4), charging at  $0.01C$  constant current, when the voltage of single cell reach 2.50V, it automatically switches to the fifth stage, at which point

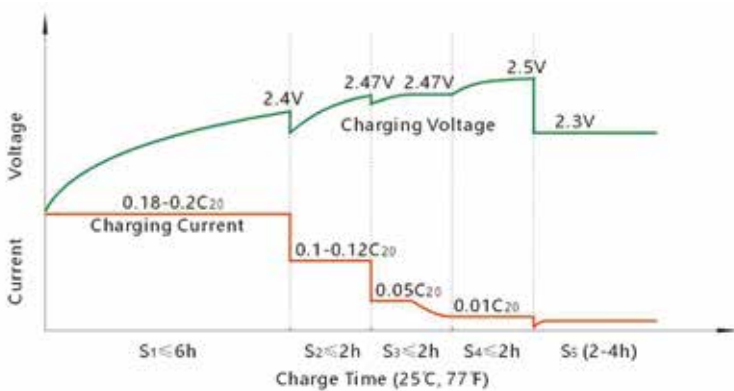
the charger should turn the light (usually turns green, which means it is fully charged).

The fifth stage (S5), single cell voltage 2.3V floating charge, floating charge 2-4hrs can end the charge, at this time the charger should be turn off.

◆ Charging Time Recommendation:

The charging time under the five stage charging curve is for reference, but the charging time of the five stage charging method shall not be less than 12hrs.

Fig. 2: Five-stage charging curve



**Notice:**

In different voltage systems, the current is constant, but voltage should vary. For example, in 48V system, the current should be constant, but voltage should vary as follow: the first stage voltage should be 57.6V, the second and third stage voltage should be 59.3V, the fourth stage voltage should be 60V, and the fifth stage floating charge voltage should be 55.2V.

**4.3 Discharge**

When the load is operating, the battery is in the discharge stage and over-discharge is strictly prohibited.

To avoid battery over discharge, single-cell protection voltage is 1.75V, 6V battery is 5.25V, 8V battery is 7V, and 12V battery is 10.5V.

See Table 2 for the protection voltage under different voltage systems.

Table 2: Battery power-off protection voltage

Voltage System	2V/Cell	24V System	48VSystem
Power-off protection voltage (V)	1.75V	21V	42V

**Notice:**

If the battery is used in the vehicle, do not frequently start the high current, because high current discharge will lead to the the positive plate active substances in the battery late in participate in chemical reaction, and accelerate the contraction and expansion, and eventually lead to softening and fall off of the active substances,.

If large current is discharge frequently, it will aggravate softening and falling off of active material of the positive plate inside the battery, and eventually lead to reduction of battery capacity and termination of its life.

Therefore, in daily use of the process, avoid discharge of large current. When starting the vehicle, the accelerator pedal shall be slowly pressed until the vehicle runs at a constant speed.

It is suggested that the starting current should be less than 1.5C. Uniform running current should be less than 0.5C.

The connection wire should be selected according to continuous climbing current or maximum working current of the vehicle load. If the wire diameter is too small, in use will overload heat, or even damage the battery or cause fire accidents.

## **5. Battery use Prevention**

### **5.1 Charging Prevention**

The quality of battery charging performance plays an important role in battery life and service performance, which must be pay attention to.

The electrical process is the reverse process of the electrochemical reaction of discharge. If the electrochemical reaction process is carried out in an ideal state during charging, the process should be reciprocal reversible reaction, that is, the charged electric quantity is basically equal to the released electric quantity.

1) If charging parameters do not match or the charger type is not accurate, the charging voltage is too high, the current is large or the charging time is long, the

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water loss rate of the battery will increase. For the AGM battery, the serious gas evolution will damage the battery and cause early failure of the battery.

① The scouring effect of a large amount of gas on the active material of the electrode plate makes the active material easy to fall off.

② Under higher polarization voltage, the grid of positive plate will be seriously corroded, and make grid deformation, brittle crack, lose the skeleton and conductive function, so that the life of the battery is shortened.

2) If charging is insufficient for a long time, unreacted active substance will produce irreversible coarse lead sulfate grains, that is irreversible sulfate salivation (or sulfurization for short), which will reduce battery capacity, increase internal resistance, increase charging difficulty, and cause early stage of the battery invalid.

Therefore, the battery should be fully charged to prevent irreversible sulfation.

## **5.2 Discharge Prevention**

The protection voltage set for the battery unit is 1.75V/unit, when the power meter remind of low voltage or there is power failure during usage of the vehicle, do not use battery's rebound voltage continue driving the vehicle. The battery voltage at this time is a false voltage, continued use will lead to over-discharge of the battery pack, excessive deep discharge will lead to shedding and softening of active material of the battery positive plate, and also intensify the corrosion, eventually lead to reduction in battery capacity and battery life.

Therefore, battery should be charged before low voltage alarm of the vehicle meter, or battery should be repalced at the recharging station. The replaced battery should be charged in time, if idle for a long time, it will also lead to reduction of battery capacity.

## **5.3 High and Low Temperature Prevention**

When batteries are operated in high temperature season, there is risk of overcharging.

When battery temperature increases, the activity of various active substances increases, the positive electrode oxygen evolution potential decreases, the negative electrode hydrogen evolution potential also falls down. Therefore, the ability to accept charging increases, charging reaction speed up, and charging current is big, which requires low voltage for charging the battery full. To prevent

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high charging voltage, battery temperature should lower down to ensure good heat dissipation.

Keep away from heat sources, do not charge under the sun, and avoid charging immediately after sun exposure.

In low temperature environment, various active substances of battery are less active, the positive electrode charging acceptance capacity is reduced, and the negative electrode charging is affected by the swelling agent, and the low temperature charging acceptance capacity is even lower.

Therefore, charging at low temperature have the problem of poor charging acceptability and insufficient charging, which requires increase charging voltage and prolong charging time. In particular, charging should be placed in a warm environment, as described in 4.1, and stored indoor for 1hr before charging. It is beneficial to ensure sufficient charge, prevent irreversible sulfation and extend the life of battery.

#### **5.4 Prevent Short Circuit**

Under battery short circuit state, its short circuit current can reach thousands of amperes. Therefore, the connection part will produce a lot of heat when short-circuiting, which will fuse the connection, damage surrounding sealant or shell, and cause hidden dangers like leakage.

Therefore, the battery must not short circuit, it should be more careful during installation or usage. All tools used need take insulation measures, the connection wire should be connected to the appliances outside the battery first, after checking no short circuit, finally connect to the battery.

Battery terminal screws should be covered with matching insulation sleeves or take other insulation measures·

Wiring specifications, should be well insulated to prevent overlapping compression and rupture.

#### **5.5 Prevent Loose Connections**

If the terminal is not firmly connected to the connection strip, and the degree is light, there will be poor conductivity, causing the contact part heating, large wire loss, low output voltage, and affect the motor power, so that the mileage is reduced or cannot run normally.

If the terminal parts are not in contact (most of the faults are in the terminal and the connecting part), the terminal cause large amount of heat, affect the

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combination of terminal and sealant. If the situation kept for a long time, it will cause terminal leakage phenomenon. If in the driving or charging process, the loose connection may produce spark, or even safety accidents.

Electric vehicles have to bear strong vibrations during operation. Therefore, all connections should be reliable. Ensure that no accidents occur during the driving process.

## **5.6 Prevent Exposure to the sun**

Exposure to the sun will increase temperature of the battery, increase internal pressure of the battery, and force the safety valve open, increase water loss, and reduce the gas evolution potential of the battery. Therefore, shorten the battery life. It should also be prevented from charging in the sun.

## **5.7 Charger Prevention**

The charger control must be accurate to have a stable voltage and current, otherwise it will damage the battery. The following are examples of battery damage caused by chargers.

- 1) If output voltage or output maximum current is too low, it will shorten the life of the battery. If used for a long period of time, it can lead to sulfation of the pole plates and reduction in battery capacity.
- 2) If output voltage of charger is too high, it will cause battery overcharge and lose water, which will lead to reduction in capacity, shortened battery life and, even bulge deformation.
- 3) The rectifier effect of charger is poor, ripple coefficient is large, more than 2%, will lead to battery self-discharge, charging heat and even bulging.
- 4) Short circuit problems within the charger, such as short circuit at the output end, damaged or uninstalled diodes prevent backflow, can cause the charger not to charge. The battery will be severely over-discharged until the end of its life.
- 5) If the charger is unstable, which will lead to battery damage.
- 6) After discharge, the battery should be charged in time, otherwise the battery will be sulfated and its capacity will decrease.
- 7) The charging voltage of the special charger for flooded battery is high. Charging the AGM battery will cause the AGM battery overcharge and swell.

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## 6. Battery Maintenance

### 6.1 Basic Maintenance Knowledge

The service life of battery is not only related to the quality of battery products and the system configuration of electric vehicles, but also has a great relationship with the use and maintenance of consumers. Therefore, it is necessary to master some basic knowledge of battery maintenance.

1) The battery shall not be stored under power loss. If it is used up and idle for a few days before charging, the plate is prone to sulfuric acid salinization and the capacity will decrease. Battery deficit storage will seriously affect the service life, the longer the idle time, the more serious the damage.

2) Regular inspection. If the initial exercise mileage of the new electric car is 60km, there is serious reduction in capacity within three months, such as 30km below, at this time multimeter can be used to check single voltage of the battery. Generally, fully charged single cell voltage can reach 6.55V(6V battery), 8.73V(8V battery) and 13.1V(12V battery). If one of the battery voltage is significantly lower than the other batteries, the backward battery may have internal single block short circuit, and needs replacement, so as not to damage rest of the batteries. On the other hand, charging parameters of the charger should also be checked.

3) Check battery connection cable once a week. The driving vibration of vehicle may cause the bolt or nut of the connection cable get loose. It needs to be checked regularly. If loosend bolt or nut is found, fasten it immediately

4) When starting the electric vehicle, the accelerator pedal shall be slowly pressed to start the vehicle with a small current until the vehicle runs at a constant speed. If it is started, press the accelerator pedal to the bottom. At this time, the motor current will increase rapidly, so that the battery will discharge fast and the voltage will drop quickly. The smaller the discharge depth, the longer the battery life. So reduce the discharge of high current can extend the battery life, and increase the mileage.

5) In winter, it is normal for the battery capacity decrease with the decrease of temperature. Take 77°F as the standard, the capacity is about 85% at 32°F.

6) The charger should be chosen to match the battery model. When charging, it should avoid high temperature and humidity. Do not let water flow into the charger to avoid short-circuit accident. The charger should have temperature compensation function. At 77°F base point, for every 33.8°F increase in ambient

temperature, the charging voltage will be reduced by 4mv/cell. When the ambient temperature decreases by 33.8° F, the charging voltage increases 4mv/cell.

7) Keep the battery surface clean for a long time, and the vehicle should be parked in a cool, ventilated and dry place.

8) When the vehicle needs to be placed for long time, the battery must be fully charged first, and the battery should be fully charged once a month. Or, under the guidance of professional personnel, remove one of the connection cables from the battery pack, so that the battery is in the open state and can be stored for longer time, and refer to "1. Battery Storage" for charge the battery.

## 6.2 Routine Maintenance Items

Item	Period	Content	Standard	Maintenance
Battery single cell voltage	One month	When the battery group is fully charged, use multimeter measure voltage of a single cell	Single voltage difference, 6V battery should be less than 0.2V, 8V battery should be less than 0.3V, 12V battery should be less than 0.4V	Remove the backward single cell and charge it separately for maintenance. If the voltage still deviates from the standard, replace the cell with low voltage
Battery appearance	One month	Visually check battery case and cover for acid leakage, deformation, cracks or damage	Appearance is normal	If the appearance is abnormal, first confirm the cause. If it affects normal use, replace the battery.
		Visually check the battery surface for dust and stains	Appearance is clean	Clean the dust and stains on battery surface with a dry cloth
		Visually check whether there is rust or corrosion in the connector or terminal	No rust, no corrosion	Slight rust or corrosion, use a steel brush to remove rust, and apply rust inhibitor. For severe rust or corrosion, replace with a new connector or battery



Connector	One week	Use wrench to check whether the bolts and nuts are loose	Strong connection	Tighten immediately if it gets loose
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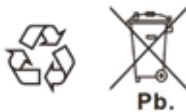
**Notice:**

Removal or replacement of the battery involved in the above battery maintenance, and removal of rust on the connector or terminal requires professional operation. Consumer operation can cause danger, please contact the supplier for maintenance.

**6.3 Battery replacement and recycling**

Batteries are consumables and have certain life cycle. After a period of charging and discharging cycles, the capacity will gradually decrease, and the mileage of the electric vehicle will be shortened. However, if capacity of the battery falls below 50% of nominal value within the warranty, the battery is deemed to have failed, please seek help from the supplier. If the capacity of the out-of-warranty battery drops below 50%, please consider replacing it with a new battery.

The battery is marked with recycling symbol, and the scrapped battery should be recycled by a formal recycling organization, or it can be returned to the supplier for unified recycling. Do not throw it into the trash can or discard it at will, it will cause environmental pollution.



**7. Common Battery Failures**

**1) Battery Leakage**

- a. Check whether the seal between the cover and the bottom slot is cracked due to poor sealing or collision, resulting in battery leakage.
- b. Check whether the safety valve leaks acid.
- c. Check whether there is acid leakage outside the terminal.
- d. Check whether the battery case cracked, damaged or leaked.

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The leaking battery can not be used and should be replaced with a qualified battery. If you cannot determine, please seek supplier for help.

## **2) Charging Heat**

- a. The battery heats up during the charging process. Check the charging voltage and current of the charger. If the voltage is too high or the current is too high, the temperature of the battery will rise during charging process, and even swollen.
- b. Check whether the battery connector is firmly connected with the terminal. Poor connection may also cause battery heating and burn out the terminal or connector during the charging process.

If the cause of the heating is found and the temperature of the battery does not exceed 122°F, wait until the temperature of the battery is lower than 30 °C, and there is no potential for heating problem, you can continue use the battery.

If the cause of heating is not found, seek help from the supplier.

If temperature of the battery exceeds 122°F or the battery swollen and deformed, it cannot be used anymore and should be replaced with a qualified battery.

## **3) Battery Short Circuit**

If single cell short circuit appears inside the battery, the open circuit voltage is about 2V lower than normal battery. It will react strongly to battery charging, or the heat is obvious when a single cell is charged.

If the short-circuited battery cannot be used any longer, it should be replaced by a qualified battery.

## **4) Battery Open Circuit**

a. The battery have voltage, but the whole battery group cannot be charged or discharged. The internal resistance meter can be used to check the single battery with open circuit, because the internal resistance of the open circuit battery is very large.

b. Open circuit state: If the battery has no voltage, it is open circuit.

The open circuit battery cannot be used any longer, it should be replaced with a qualified battery.

## **5) Irreversible sulfation**

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- a. When the plate is severely sulfated, the voltage rises quickly, the gas precipitates prematurely, and the temperature rises quickly.
  - b. The battery discharge rapidly until reach the final voltage, and the battery capacity decreases.
  - c. Through dissection, the positive and negative plate are found hard and brittle, and the separator is adhered, there are white crystals on the surface.

Check whether the battery is undercharged for long time or stored in a deficit.

Slightly sulphated batteries will repair in the process of use, but seriously sulphated batteries, the capacity has decreased significantly, can not continue to be used, and should be replaced with qualified batteries.

### **6) Single Battery Capacity is low**

In the same group, when the voltage a single battery drops faster than the other batteries, and drop faster to the protective voltage(1.75V/cell). The battery is determined to be backward.

If the battery capacity backward, see 6.2 for maintenance.

#### **Notice:**

If the faults found are not included in the above, please seek help from the supplier.



## LDC12-100T

### FEATURES&BENEFITS

- True deep cycle AGM-GEL technology-GREEN SOLUTION
- Over 99.99% virgin lead for grid plate
- Carbon active material
- Electrolyte + Gel for longer cycle life
- Heavy duty grid/paste design for deep cycle application
- Maintenance free, non-spillable, valve-regulated
- Double separator configuration :long cycle life &High energy density and super anti-vibration design
- Low self-discharge for longer shelf life



### ELECTRICAL SPECIFICATIONS

Voltage (V)	Capacity(Ah)					Reserve Capacity(min)		
	100HR	20HR	10HR	5HR	3HR	25A	56A	75A
12	115	108	104	96	90	220	80	55

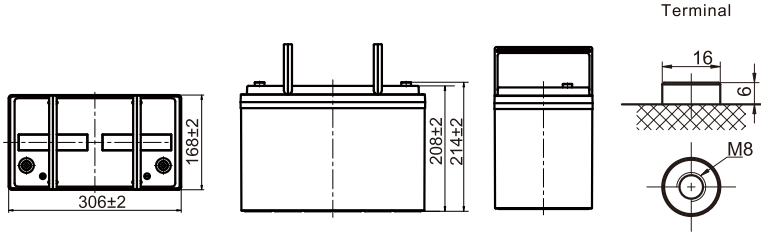
### PHYSICAL SPECIFICATIONS

Dimensions(mm/inches)				Weight (kg/lbs)	Terminal Type (Standard)	Case Material
Length	Width	Height	Total Height			
306/12.05	168/6.61	208/8.19	214/8.43	27.3/60.2	T6-A(M8)	ABS

Operating Temperature Range		
Discharge	Charge	Storage
-20°C~55°C(-4°F~131°F)	0C~40°C(32F~104°F)	-15°C~40°C(5°F~104°F)

# LDC12-100T

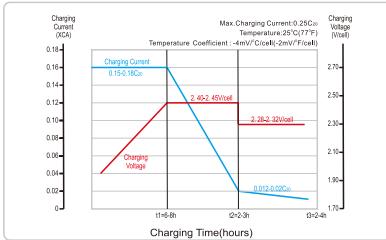
## DIMENSIONS



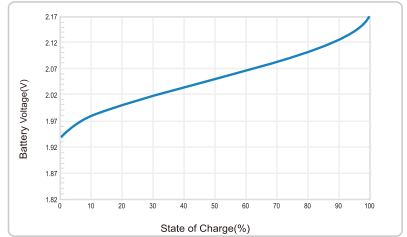
Note: Terminal Torque Values in-lb(Nm):97.28-130.0(11-14.7)

## PERFORMANCE CHARACTERISTICS

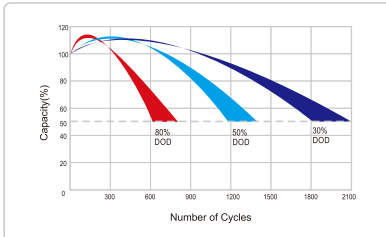
Charging Profile



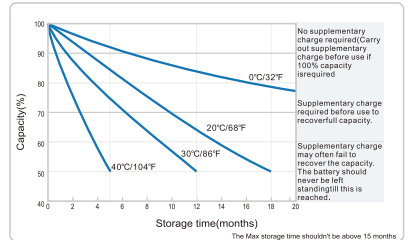
Relationship of OCV and State Of Charge(25°C, 77°F)



Cycle Life in Relation to Depth Of Discharge



Self-discharge Characteristic



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