



SACRED SUN

DZM SERIES

TECHNICAL MANUAL



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Security Instruction

In order to properly, safely and effectively use the product, read this manual carefully. This manual provides important information on installation and using of the product, to ensure optimum performance and extended service life.

- ▲ For your safety, do not open the battery. Maintenance should be done by professional personnel.
- ▲ As battery can be potentially harmful to health and environment, only manufacturer's service centre should replace the battery. For replacement or maintenance, please call company's service centre or after-sales service hotline.
- ▲ Battery is recyclable waste, if not disposed properly it may be harmful to health and environment. Appropriate laws and regulations should be complied for the disposal of battery. It is suggested to send back the battery to manufacturer for proper disposal.
- ▲ Battery is a hazardous product, replacing should be done only by experienced professionals with precautions. Same model and type of lead-acid battery should be replaced as different manufacturers have different specifications. Old and new batteries should not be mixed.

Notices

Warning	Electricity shock	Protecting eyes	With adults custody	No short circuit
No flame and spark	Recycled	Proper disposal	Read instructions	UL certificate

Chapter One Product Introduction

Product Features

- ⊗ Cadmium free multi-alloy, Clean environment
- ⊗ Safe, reliable and maintenance free (Sealed)
- ⊗ Excellent performance in low temperatures
- ⊗ Low self-discharge rate
- ⊗ Small size, large capacity delivering high specific energy
- ⊗ Excellent long life and cycling performance
- ⊗ Excellent large discharge current and high starting current performance
- ⊗ Wide operational temperature range: -20°C to 50°C.

Main Applications

- ⊗ E-Bicycle
- ⊗ E-Motorcycle
- ⊗ E-Car for old aged people
- ⊗ EV (Electric Vehicle)
- ⊗ E-Tricycle
- ⊗ E-Scooter
- ⊗ Electric toys/tools
- ⊗ Others

Chapter Two Specifications and Models

Product Overview

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Battery Models	Rated Voltage	Rated Capacity (Ah)			Dimensions(±1.5%)				Weight	Terminal Type
		C ₂	C ₃	C ₅	L	W	H	TH	Kg	
6-DZM-12	12	12	13	13.5	151	100	98	103	4.45	M5×Φ8
6-DZM-12F	12	12	13	13.5	151	100	98	103	4.45	(L×W×T)8.3×6.6×1
6-DZM-20	12	20	22	23	181	77	170	170	7.00	M5×Φ10
6-DZM-25	12	25	28	30	223	81	175	175	8.8	M5×Φ10
6-DZM-28	12	28	30	32	166	175	125	125	9.6	M5×Φ10
6-DZM-30	12	30	32	35	223	93	175	175	10.3	M5×Φ10
6-DZM-35	12	35	36	38	223	106	175	175	12.0	M5×Φ10
6-DZM-40	12	40	42	45	223	123	175	175	13.6	M6×Φ12

Chapter Three Product Characteristics

Performance Curve

Figure 3-1 Discharge capacity curve in different discharge rate

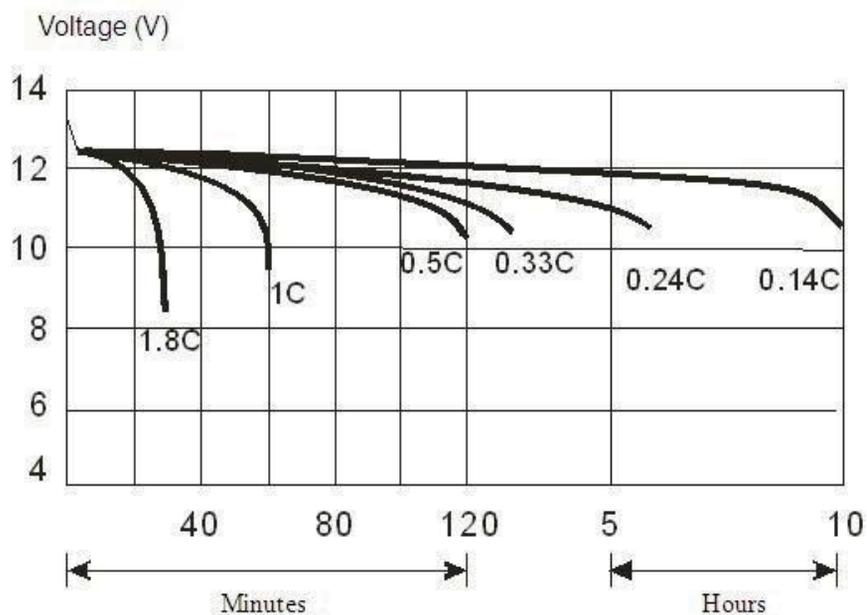
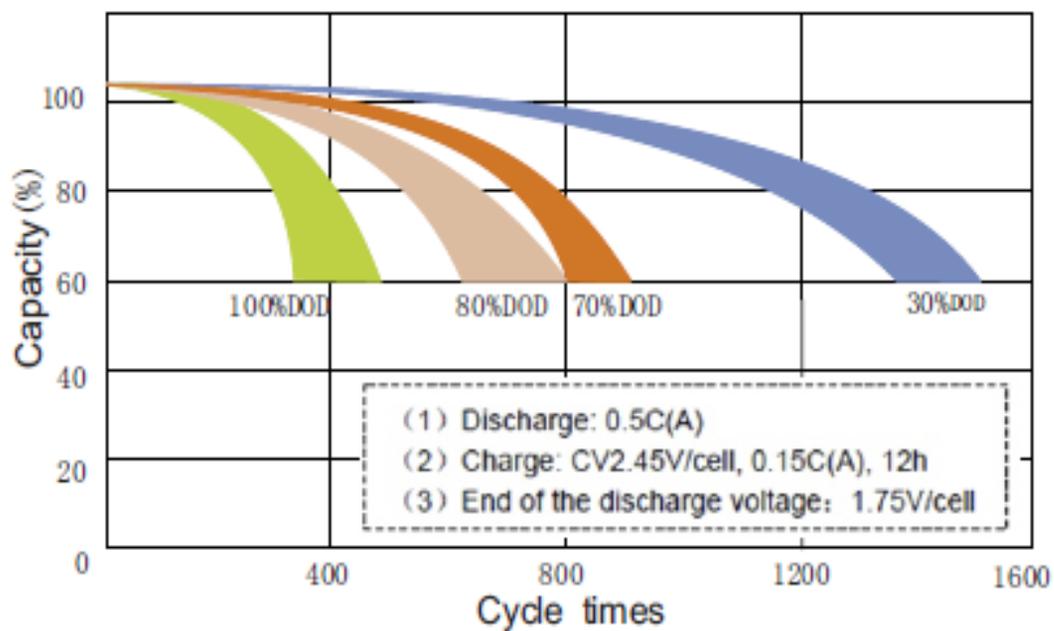
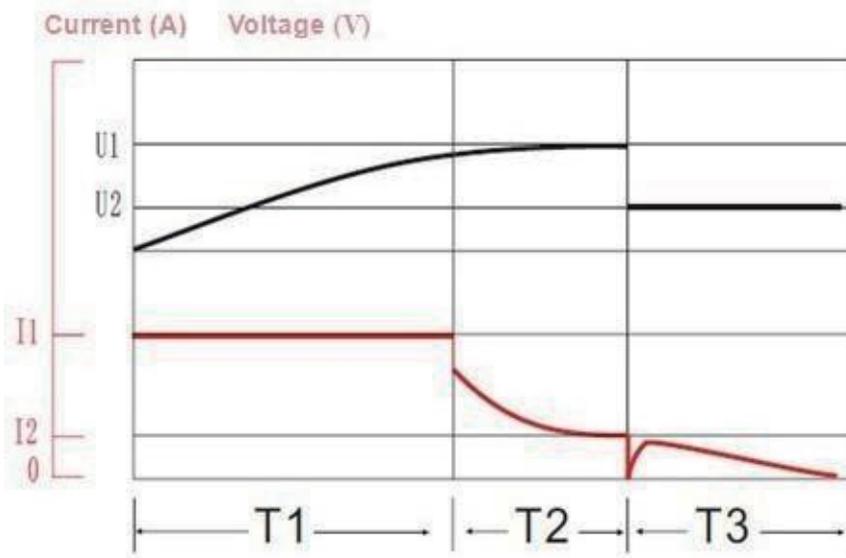


Figure 3-2 Cycle Life Curve



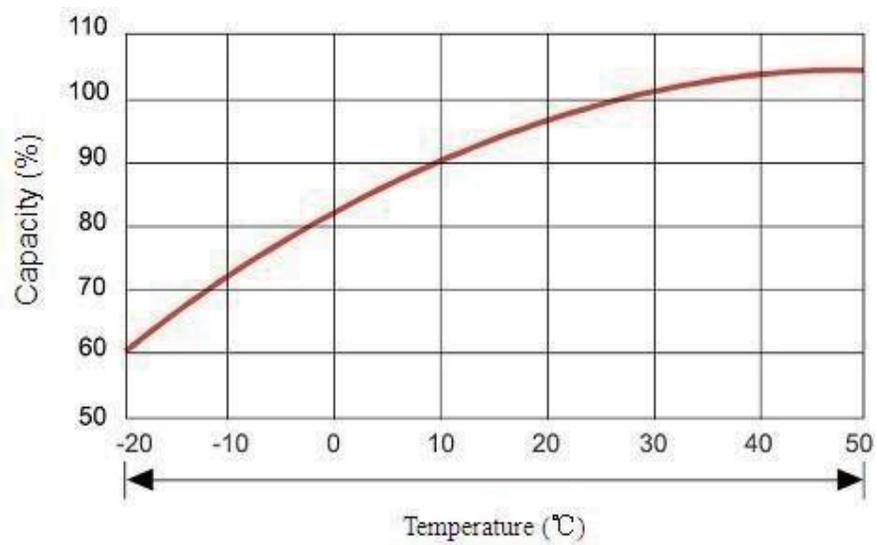


■ Figure 3-3 Charging curve (3 stage universal charging curve)



For specific parameters, refer Chapter Four

■ Capacity curve in different temperatures



Chapter Four Operation

Discharge

The operation process of electric vehicles is the discharge process of battery. The battery does not allow over-discharge; therefore, when electric car under-voltage (low voltage) lights indicating light, batteries should be charged as soon as possible, otherwise it will seriously affect battery life. In order to get the best use life, we proposal that the depth of discharge do not exceed 80% of rated capacity. Discharge more than 80% of rated capacity is deep discharge resulting in shortening battery life. Especially at low temperatures over discharge is not allowed.

DOD	10%~20%/Day	20%~40%/Day	40%~60%/Day	More than 60%/Day
Charging Frequency	3~4 Day/Time	2~3 Day/Time	1~2 Day/Time	1 Day/Time

Temperature

Battery operating temperature range is -20°C ~ 50°C . Technical parameter of the battery is measured in rated temperature 25°C . Ideal operation temperature range is 20°C ~ 30°C . Battery discharge is a chemical change process. Higher the temperature, faster reaction, larger capacity and contrarily smaller capacity, hence in summer, electric car mileage is significantly higher than in winter.

Charging

Electric bicycle run up to 70%~80% of the maximum riding mileage and then charge, can achieve best performance. If riding mileage is too short or long it will affect the battery life. If riding too long, it will have a serious impact on battery life. Riding for short time will reduce charging time accordingly. In summer when charger light turns green, continue floating charge for 1~2 hours then stop charging. It is recommended not to charge for long time.



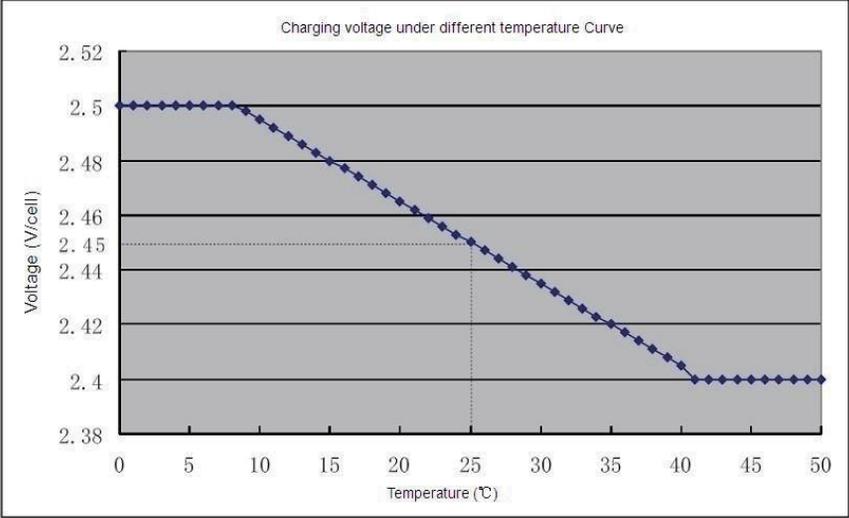
Recommended charging process is as follow:

Stage	Current(A)	Voltage(V)	Time(h)	Conversion condition	Temperature Compensation
T1 Constant Current Charging	Constant current I1=0.15C(A)	Charge to U1=2.45V/cell	8	When charge voltage reach to U1 or charging time reach to 8h	3.5A and below, charger not required, 3.5A and above charger should have function of temperature compensation.
T2 charging with Constant voltage, Limited Current	Limited Current I1=0.15C(A)	Constant voltage U1=2.45/cell	2	Constant Voltage and limited current charging, current gradually decreased to I2(A); or till time reaches 2h	
T3 Floating charge	Limited Current I2(A), Lowest Current to 0A	Constant voltage U2=2.3 to 2.35/cell	3	Charging time is 3h	
T4	Shut down the system				

Charging process U1, I1 tolerance, I2 change to floating charge current and tolerance requirement:

Apply model	Charging Voltage U1	Charging Current I1	Change to float Charging Current I2	
	± tolerance(V)	± tolerance(A)	Mid-Limited current(A)	± tolerance(A)
36V12Ah	0.15	0.1	0.4	0.05
48V12Ah	0.2	0.1	0.4	0.05
48V20Ah	0.2	0.1	0.7	0.05
48V25Ah	0.2	0.2	0.95	0.05
48V28Ah				
48V30Ah				
48V35Ah	0.2	0.2	1.0	0.05
48V40Ah				

Charging Temperature Compensation:



Battery Storage

Battery should be stored away from heat and source of fire, in summer avoid electric vehicle to rest under sunlight. During storage, charging once a month is recommended in order to avoid fading of the battery capacity.

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Wrong Operation

- ⊗ Total road mileage charging is not accurate, as each time user is riding to 100% discharge capacity, without charging on time. This will critically reduce battery life. Battery should be charged on time after long range riding.
- ⊗ Excessive use of battery even after low voltage light turns on, can cause unnecessary discharging of the battery which will shorten battery life. When low voltage light turns on, please stop using the vehicle and charge the battery in time.
- ⊗ When riding uphill, against the wind, electric vehicle completely rely on the power, do not use pedals. This case will cause the motor overload which might result in burning of the motor, damaging battery due to large discharge current and reducing battery life. Vehicle starting power should be slow until it reaches normal speed.
- ⊗ Riding in rain or passing through still water may affect motor causing short circuiting. This will result in battery over discharge causing termination of the battery.
- ⊗ When electric car is left unused for long time and battery is not charged, this also will result in termination of the battery due to loss of electricity. Longer the idle time, more serious the damage of the battery. The correct approach is to charge the battery once a month .

Chapter Five Installation and Maintenance

Installation

- ⚠ Before installing the battery, check for deformation, damage or leakage. If any of the above defects are detected, replace the batteries immediately.
- ⚠ Battery has to be installed vertical, not inverted or on the side. At least 2mm distance should be kept between adjacent cells for solid and reliable installation.
- ⚠ Battery should be used in groups. It is strictly prohibited using different groups. Positive and negative connections should be connected correctly, and bolts should be screwed tightly to prevent loosening.
- ⚠ Battery is in charged state after arriving from factory, it can be used directly. If battery storage time is more than 15 days, charge the battery for 1~2 hours until charging light turns green.

Maintenance

Battery life is not only related to its quality or the system configuration of the vehicle. It also depends on user's usage and maintenance method. So before buying electric vehicle batteries, first choose the brand for quality and service; second, should be aware of basic concepts of battery usage, maintenance; these concepts include:

- ⚠ Keep the battery fully charged for longer time. Avoid the loss of current (long time storage). The more storage battery time, the more damage is done to the power of battery.
- ⚠ After 2 months of using, it is recommended to charge the battery after low voltage state (after low voltage light turns on). This is helpful for the life of battery and its capacity.
- ⚠ If you buy a new car, fully charge the batteries and strictly check battery voltage after 50 km in first three months. If voltage is shortened, vehicle should be taken to service centre for checking.

Fully charged battery group voltage:

- 3 Pcs/group ----- 39~42 V/group
- 4 Pcs/group ----- 52~56 V/group

If battery voltage is low, or open the battery compartment. Find the specific battery with low voltage than others. Take it to service station or replace it with new one to avoid damage to other normal cells. If battery turns to normal condition, check vehicle's electrical components and wiring to avoid collateral damage to the battery.

- ⚠ Electric vehicles cannot carry load more than its designed load (refer vehicle user manual). Avoid carrying heavy objects on the vehicle. Please note the use of power when starting and riding on uphill. This can protect battery's service life. Also can create good habit of charging on time.
- ⚠ In winter, battery capacity decreases as temperature drops, this is a normal phenomenon. As standard temperature is 25℃, generally at -10℃, capacity is 70% to 80% of the nominal capacity.
- ⚠ Keep the battery surface clean; car should be parked in dry, cool and ventilated place. This helps to extend battery service life.

Chapter Six Service

- ⚙ According to user needs, our company can provide users with free selection of services.
Within the warranty period, if have any objection on the quality of the product, company will be responsible for the service.
- ⚙ As on customer request, our company can organize technical training courses for installation, use and maintenance of the product.
- ⚙ We have a professionally developed team which satisfies the requirements of different users, which will continue to provide customers, satisfactory products and services.
- ⚙ Extensive collection of customer information on the usage of products in demand helps in constantly improving and refining of the existing products and services.
- ⚙ Our company has a fast and efficient service team to solve various difficulties and problems encountered by the user using the product in a timely manner. After receiving customer's request, company will give clear answer within 24 hours and will take effective measures in appropriate time to provide services.



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