



AGM

ULTRA HIGH PERFORMANCE

User Manual of Deep Cycle Battery



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GIANTZ sealed lead acid battery is shipped with charge, handle the battery according to the following instructions before use:

1. Battery storage

- If the battery has high temperature or poor ventilation during storage and delivery, the self-discharge will be increased. So, keep good ventilation and keep away from fire, flame, heat supply etc.
- When keep the battery, take it off from the charger and load and keep it in the dry and cool place.
- After storing for a long time, please charge the batteries before use.

2. Use circumstances

- Temperature range: $-20\sim+45^{\circ}\text{C}$
- No fire, flame and heat supply near the battery
- Avoid the heat supply and direct sunshine place;
- Avoid the humid and soggy place
- Avoid the obturating place.

3. Use conditions

- Parallel connection: commend within 4 groups;
- Multilayer assembly: Temperature among layers should be controlled within 3°C ;
- Heat dispersing: ep around 10mm inter cell;
- Ventilation: ensure the volume concentration of released hydrogen smaller than 0.8%;
- Recommended ambient temperature range: charging at $0\sim+40^{\circ}\text{C}$, discharging at $-15\sim+45^{\circ}\text{C}$, storage at $-15\sim+40^{\circ}\text{C}$;
- Float use : limited current $\leq 0.30\text{C}_{10}$, voltage $2.23 \sim 2.27\text{V/cell}$ (2.25V/cell is recommended)
- Equalizing Charge condition (25°C) : limited current $\leq 0.30\text{C}_{10}$ voltage $2.30 \sim 2.40\text{V/cell}$;
- Mix use of batteries: disallow the mix use of new and old batteries, batteries from different manufacturers, if ask to mix use, please

contact us.

4. Assembly of batteries

4.1 Open box and check

Handling:

- Forbid the force on the terminal, avoid the affect to the sealed part;
- Avoid the upside down, throw or impact of battery
- Absolutely avoid metal wire such as steel rope etc. to prevent the short circuit.
- Inspection: packaging, appearance of battery——no damage;
- Count check: battery quantity, spare parts——full;
- Reference: catalogue, assembly drawing, notice.

4.2 Notice before assembly

- If no abnormality after check, assemble the batteries in the designated place such as battery chamber;
- If assemble the batteries in the battery chamber, try to place them in the rock bottom of battery chamber;
- Avoid assembling the batteries near the heat supply such as transformer place;
- As battery may cause flammable gas during storage, avoid closing with the unit which produce flame such as fuse when assembly.
- Before connecting, clear the terminals to make it present metal brightness.
- Be care that conductive material and battery positive and negative terminal form short circuit.
- When multi batteries are used together, connect the batteries correctly firstly, then connect the battery with charger or load. In this circumstance, battery positive should be connected with the positive terminal of charger or load and negative connect with negative terminal. If the battery isn't connected with charger correctly, the

charger will be damaged, so make sure that the connection is made correctly.

- Don't give extreme force on the terminals when connecting, every connecting nut and screw should be tighten, please refer to the torque as table 1.

Table 1 Suggested torque table

N	Applicability	Torque
1	M5	2.0~3.0N*m(20~30kgf*cm)
2	M6	3.9~5.4N*m(40~55kgf*cm)
3	M8	11~14.7N*m(111~150kgf*cm)

4.3 Assembly and connection

- Pack the metal assembly tool such as spanner with insulation tape;
- Connect the batteries first, then connect the battery group with charger or load;
- When multi-group batteries are parallel connected, connect in series first and then parallel connect;
- To ensure good ventilation, the batteries per row should keep around 10~20mm inter-distance;
- Before connection, clear the battery terminals to make it present metal brightness;
- Before and after connection, paste certain antirust such as Vaseline on the surface of battery post;
- After assemble batteries, test the whole voltage of the battery group and if ok, then with load.
- Always keep the battery upward during use.

4. 4 Use of battery

4. 4. 1 Supplement charge

- During the delivery and storage, the battery will lose part of the capacity due to self discharge, so please supplement charge before use;
- If stop using temporarily during use, please supplement charge termly;
- Supplementary charge according to the table below before use;

Table 2 The time interval of supplementary charge and storage temperature

Storage temperature	Time interval of supplementing charge	Supplementing charge way (3 options for choice)
20℃ or less	Every 9 months	a) Charging at constant voltage of 2.23-2.27V/cell and an initial current less than 0.3C (A) for 2-3 days
20℃~30℃	Every 6 months	b) Charging at a constant current of 0.3C(A) and a constant voltage of 2.35-2.45V/cell for 10-16 hours
30℃~40℃	Every 3 months	c) Charging at a constant of 0.1C(A) for 8-10 hours

Note: Current value C is rated capacity of battery.

For example : rated capacity of 12V100AH battery is 100AH , 0.1C (A) =0.1X100=10A;

For example: charge voltage: 12V battery is 2.25X6=13.50V,

6V battery is 2.25X3=6.75V

4.4.2 Discharge

4.4.2.1 Judgment of discharging end point

- Discharging test: discharge the 30~40% of the rated capacity
- Capacity test: release the 60~80% of the rated capacity.
- Judging the final discharging voltage: usually, it will be settled according to the below table 3. While we can also make certain the final discharge voltage under different discharge current according to the discharge curve of the battery.

Discharging rate	Discharging current (A)	End point voltage of each cell (V)	Standard of capacity testing
10h	1.0I ₁₀	1.80	≥1.00C ₁₀
5h	1.6I ₁₀	1.80	≥0.80C ₁₀
3h	2.5I ₁₀	1.75	≥0.75C ₁₀
1h	5.5I ₁₀	1.75	≥0.55C ₁₀

Conditions which meet any one of the above requirement are to be regarded as end point discharge.

Notes:

- 1) Keep the terminal voltage above the above stipulation
- 2) Please supplement charge the battery immediately after discharging, don't make storage.
- 3) The maximal allowed discharging current must be controlled under the below range:

Discharging current $I \leq 1C_{10}$ (A) , keep discharging

Discharging current $I = 3C_{10}$ (A) , discharging time $T \leq 2min$

Discharging current $I = 6C_{10}$ (A) , discharging time $T \leq 10s$.

4.4.2.2 Judgment on laggard battery

Terminal voltage of the laggard battery is lower, so it should be tested under the discharging condition. If the terminal voltages are lower on the

average during the three continuing discharging cycle test, it can be judged as the laggard battery of the group. Equalizing charge should be proceeded when laggard battery is available.

4.4.2.3 Battery Charging

To maximize the life of your battery, it is important that it is properly charged. Over and under-charging a battery will result in shortened service life. The best protection from improper charging is the use of a quality charger and routinely checking that the charger current and voltage settings are maintained. Please review the following Battery Charging Instructions.

	Battery 12V	
	Bulk Charge	Float Charge
Charge voltage(v)	14.4-15.0 v	13.5-13.8v
Charge Current(A)	Refer to the battery label	No Limitation

For Equalization charge : The charge time refers to the period when charging the battery with constant current at the rate of below 0.20C 10 (A) to make sure that the voltage of battery terminals should reach the value of charging voltage shown as the below table during the charging.

Ambient temperature(℃)	Charge voltage	Charge time (h)
5	13.86v	12
	14.76v	7
20	13.5v	12
	14.4v	7
35	13.26v	12
	14.04v	7

Please stop charging the battery if the charging is overtime shown in above table, otherwise, it will shorten the battery life. If the charging time is not enough, battery cannot reach its rated capacity because of insufficient charging.

4.4.3Notes during charging

- Charging current at the end of charging is over 0.05CA, which may result in permanent damage on battery appearance and battery life, please pay more attention to charging voltage.
- The used charger should have degressive automatic constant voltage device, please contact us if use other kind of charger.
- If the ambient temperature is not 25 ℃ , temperature supplementary should be applied on the voltage, formula is $U = U_{25} \text{℃} - K \times (T - 25) \times (T - \text{ambient temperature, } K - \text{temperature supplementary modulus})$:
- Judgment on charge end point. Usually, if the battery charge can meet any one of the below listed condition, it can be regarded as the charge end point.

- 1) Charged value is not less than 1.2 times of the released value.
- 2)The current is less than $0.005C \pm 0.0A$ ($C \pm 0.0 = \text{rated capacity of the battery}$) during the final period of charging.
- 3)The current is steady for 5 hours during the final period of charging.

5 Battery maintenance

- Keep the battery surface and its working circumstance clean and dry.
- Keep battery clean and avoid static condition.
- Clean battery with wet cloth, no organic solvent such as gasoline, alcohol etc. or clothes with such substance is used to clean battery.

- To avoid over discharge, disconnect the equipment from battery if the equipment are not going to use in 1 week.

6 Exchange of Batteries:

6.1 Exchange judgments:

Before the batteries are discharged 80% (refer the corresponding discharge rates, such as C10,C3 etc.) of rated capacity, the voltage is below 1.8V/cell(the discharge rate for 1 hour is 1.75V/cell). It should be exchanged.

6.2 Exchange time

The VRLA battery has the certain service life , Please replace the old battery with the new one before the end of service life so that the application can run safely and normally .

7 Cautions:

- Keep batteries in the place, which the children could not touch.
- Do not attempt to disassemble, revised, damaged, impacted, disposed batteries, otherwise the battery would be leaked, heated, explored.
- Do not dispose of the batteries in water, fire, and do not heating the batteries.
- If the voltage of battery back is above 45V, please be sure wear the insulated glove in working, otherwise, it may be get an electronic shock
- Do not face to the top of batteries in a short distance, please keep a certain distance when you measuring and repairing.
- There are sulfuric acid in the battery, do not contact with sulfuric acid in skin, cloths, especially in eyes. If eyes contact with sulfuric acid, please wash with a lot of clean water , and consult a

physician immediately.

- The permitted using temperature is -20~+45℃, but longer service life will be attained when the battery is operated within an ambient temperature range of +5~+35℃.

Thanks to choose GIANTZ battery!

