



## User Manual

### ➤ Battery Applications

Navaio battery is Valve Regulated Sealed Lead-Acid Battery, commonly known as VRLA battery which is designed for standby use. It is widely applied in UPS/EPS, medical equipment, emergency light and security back up system...etc.

### ➤ Safety

1. Constructors must have Electrical Construction Qualification recognized by the government.
2. Please place the battery in the place out of the reach of children and irrelevant persons.
3. For those equipment (such as hospital operating table power supply equipment, etc.) resulting in significant impacts on society or property losses and human life related accidents due to battery error, please be sure that the battery capacity and other performance parameters have enough margin and take other safety countermeasures such as dual power supply.
4. Please use the battery and keep it in well-ventilated places away from fire or heat source. The battery may overflow explosive gas containing hydrogen during overcharge, so it should be placed at ventilating place without smoke or sparks, otherwise it may cause explosion and other accidents.
5. Avoid the positive and negative short circuit of battery or battery pack; otherwise, it will cause electric shock, fire or accidents.
6. Please do not overhaul, dismantle or remold the battery, otherwise toxic substances inside the battery will harm human and environment.
7. Please use the appropriate conductor to connect and extract battery pack, otherwise it will cause fire damage or fire disaster.
8. Please firmly connect terminal bolt; otherwise, it will cause heat and fire, etc.

9. Please keep the battery away from oil water or other chemicals.
10. Please be sure to cut off the main power supply during construction; and in the operation of batteries being connected in series, to avoid contacting the terminal parts of battery head and tail at the same time.
11. Please avoid connecting to the power supply that is not the rated power supply.
12. Please avoid directly connecting the battery to the alternating current (AC) power supply.
13. Please avoid using inappropriate charging voltage for battery charging.
14. Please immediately stop using the battery when the battery shell temperature is heating and more than 60°C in the using process.

➤ **Handling**

1. Please handle it gently, do not throw it or press it, otherwise the shell and terminal will be damaged or broken, which would cause battery failure, pollution and accidental injury.
2. Please place the battery face up according to the labels on the outer box, to avoid stress against the easily worn face.
3. Please avoid a high- temperature, high-humidity and high-vibration, dusty handling environment for transportation.

➤ **Unboxing**

1. Check whether there is fracture, deformation, damage or liquid leakage on the shell.
2. Terminal voltage test: open circuit terminal voltage normally should be greater than or equal to 2.1 V/monomer (the 2V battery terminal voltage should be greater than or equal to 2.1V; the 6V battery terminal voltage should be greater than or equal to 6.2V; the 12V battery terminal voltage should be greater than or equal to 12.4 V).

➤ **Installation**

1. During installation, the positive and negative cannot be inversely placed, and there shall be no short circuit.

2. During installing terminal connecting lines, ensure to keep the metal exposed portion of terminal and connecting lines at least 2cm distance away from the case or other terminals or end terminals.
3. During installing the battery, please use insulated tools for installing and remove all personal metal objects (watches, etc.). Do not connect or disconnect the electriferous closed circuit, and the electriferous part of battery cannot contact the rack; metal tools and hard objects cannot be placed above the battery. The battery with broken shell cannot be put into the rack; if the electriferous operation during running is a must, please cover the battery exposed portion with insulation materials first.
4. During installing the batteries, do not install them in a sealed container, and leave 5 to 10 mm intervals between batteries for heat dissipation. If the batteries are installed in the battery box, keep a proper distance between the box and walls or other equipment.
5. The batteries (or battery pack) can be connected in series when they are of same actual capacity. Connected use in series cannot be allowed in the circumstances as follows: different rated capacities; old batteries mixed with new batteries; batteries made by different manufacturers; same type of batteries but different residual capacities.
6. It is recommended that the battery should work under the environment temperature between 21°C and 27°C. Battery capacity decreases when the environment temperature decreases, while the battery life decreases and failure rate increases when the environment temperature increases. When the environment temperature is higher than 25°C, the battery life decreases around 50% per increase of 10°C in environment temperature.
7. To avoid failure, acid leakage and electric leakage, please do not use it in the places as follows.
  - A. Places below -10°C or above +45°C.
  - B. Places such as outdoor directly exposed in the rain or sunlight.
  - C. Places with condensed fog water or ice.

- D. Places with corrosive gas.
- E. Places with heavy moisture or dust.
- F. Places with vibration or impact.

➤ **Storage**

1. The environment temperature for storing position should be maintained in -20°C to +40°C, keep ventilated and dry.
2. The height for storing should be no more than 5 layers; otherwise, it will cause shell and terminal damage or shell sealing failure.
3. The battery should be stored after fully charged and compensative charging is required once every three months in case of nonuse for a long time. It is recommended that compensative charging should be processed with a constant-voltage charging within 3 to 16 hours.

➤ **Maintenance**

1. Timely compensative charging is required in 7 days once the discharge is completed. Always keep the battery in a fully charged state.
2. The maintenance and protection of the battery require supervision and implementation of professionals who are familiar with the knowledge of plumbic acid battery, electrician and personal safety requirements and equipment safety. The non-professionals are not allowed to deal with maintenance and protection.
3. The battery safety valve must not be removed, or water must not be added, which will cause battery failure.
4. The surface of each battery should keep clean and dry, otherwise the dirt, dust and moisture accumulating on the shell will cause self-discharge, short circuit failure or earth fault in conductive path.
5. Keep the battery in open circuit state when cleaning the battery. Avoid clean the battery by using the chemical cleaner's corrosive to ABS or polypropylene.