General manual

Rechargeable lead-acid batteries FENIKS

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General Features

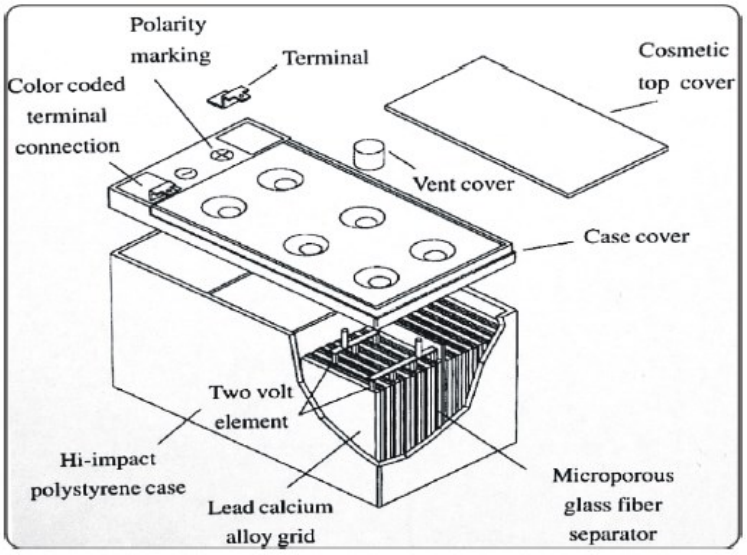
The rechargeable batteries are lead-lead dioxide systems. The dilute sulfuric acid electrolyte is absorbed by separators and plates and thus immobilized. Should the battery be accidentally overcharged producing hydrogen and oxygen, special one-way valves allow the gases to escape thus avoiding excessive pressure build-up. Otherwise, the battery is completely sealed and is, therefore, maintenance-free, leak proof and usable in any position.

Application

- UPS Equipment
- Burglar and Fire Alarm Systems
- Telecommunication
- Emergency Lighting
- Automation system
- Mobile and Portable devices
- Medical Equipment
- Electric Wheelcharis
- Audio & Video Equipment

Battery Construction

Component	Positive plate	Negative plate	Container	Cover	Safety valve	Terminal	Separator	Electrolyte
Raw material	Lead dioxide	Lead	ABS	ABS	Rubber	Copper/ Pug	Fiberglass	Sulfuric acid



Battery Specification

Discharging

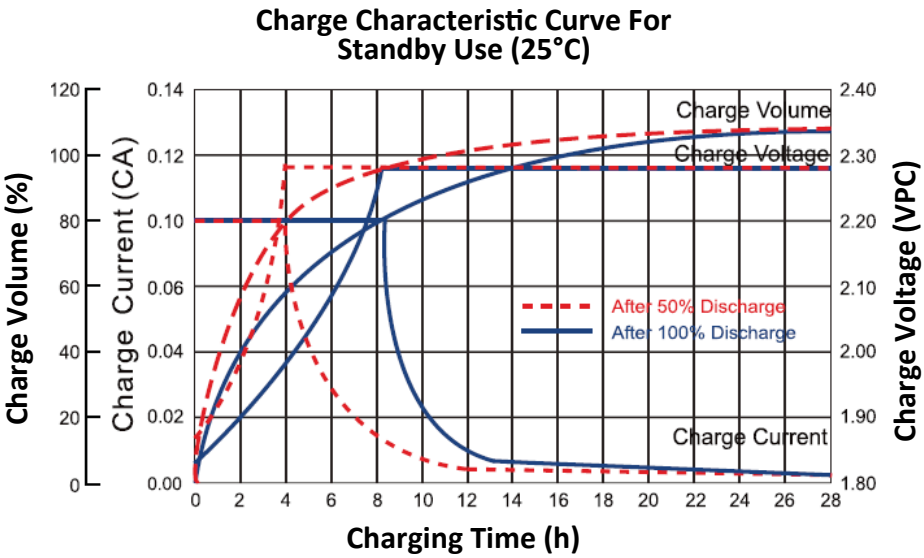
Lead-acid batteries are susceptible to deep discharge. The battery life depends on the depth of its discharge. Deeper discharge shortens the battery life. One of the most common causes of over-discharge is leaving the battery uncharged for a long period of time without charging. Too deeply discharged batteries become sulphated, which manifests itself in a partial, irreversible loss of available capacity. The minimum permissible discharge voltage of the battery depends on the discharge current and is specified on the battery discharge characteristics (see the installation manual for the selected battery model).

Charging

The recommended method of charging rechargeable batteries is the constant voltage method with limitation of the initial charging current (see charging characteristics). The initial charging current should not exceed 0.3 C [A] (C—battery capacity). For example, initial charging current for ZS-24 battery should not exceed 7,2 [A]. The recommended initial charging current is 0,1 of battery capacity value, so for the ZS-24 battery it is 2,4 [A].

The optimal battery charging voltage depends on the ambient temperature. At a temperature of 25°C, the recommended value of the charging voltage in standby use is 2,23—2,30 [V / cell] (for a 12V battery the voltage range is 13,38—13,8V) and in cycle use it is 2,40—2,45 [V / cell] (for a 12V battery the voltage range is 14,4—14,7V). The recommended value of the initial charging current—0,1 C [A] (C—battery capacity).

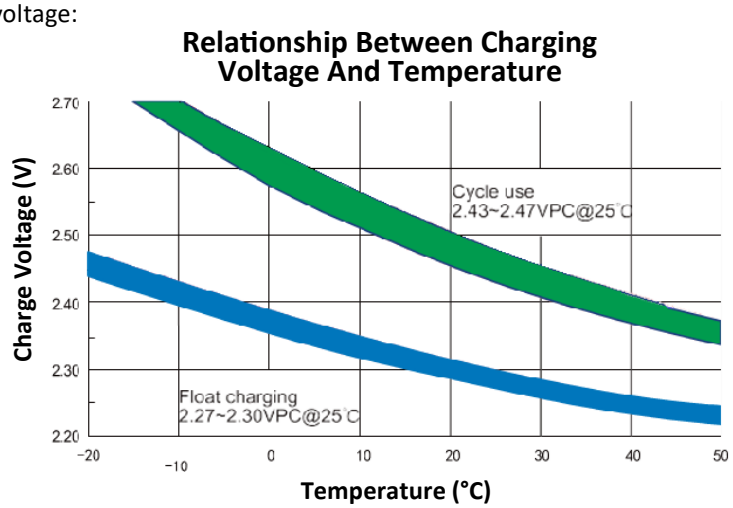
The battery sealing system (VRLA) is made with AGM technology and includes a one-way pressure (safety) valve. The valve opens when the internal pressure increases too much (it may occur, for example, when overcharging the battery) and safely discharges the resulting gas to the outside, preventing the casing from bursting. For this reason, the sealed rechargeable, maintenance-free batteries should not be overcharged, and the room in which the battery is located should be equipped with efficient ventilation.



Note! Make sure that the voltage level is set correctly. Too high level of charging voltage can increase sulfation of the positive plates, which will reduce the capacity and at the same time it will shorten the battery life.

Correction of the charging voltage depending on the ambient temperature

As the temperature rises, the electrochemical activity of the battery increases. When the temperature drops, the electrochemical activity of the battery also drops. In case of an increase of temperature, the charging voltage should be reduced to prevent overcharging of the battery. If the temperature drops, the charging voltage must be increased. In order to maintain the optimal battery life in the event of large fluctuations in operating temperature, a power supply with a charging voltage temperature compensation system should be used, which reduces the charging voltage with increasing temperature. The temperature compensation coefficient for FENIKS batteries is -20 [mV / °C / cell] in buffer operation and 30 [mV / °C / cell] in cyclic operation at 25°C. The characteristics presented below show the relationship between temperature and charging voltage:



Operating temperature

The location of battery is very important to the life and capacity of the battery. The nominal operating temperature of maintenance-free batteries is 20°C. Operation at temperatures above 20°C shortens the battery life. Any increase in temperature 8 to 10°C above the nominal value reduces the battery life by half. For example, the service life of a battery operated at 30°C will be reduced by half.

General storage conditions

The battery should be stored in a dry, cool and clean place with low humidity. The room temperature should be between 15 and 40°C.

After long-term storage, the battery capacity may be less than recommended. In order to obtain the capacity recommended by the manufacturer, the battery should be subjected to several charge / discharge cycles (usually two cycles).

In order to ensure proper operation after storage, it is recommended to periodically charge the batteries at the following intervals:

Ambient temperature	Recommended interval
below 20°C	12 months
from 20 to 30°C	6 months
from 30 to 40°C	3 months

Installation

Install the battery in a clean and dry room. Under normal operating conditions, the battery does not emit any gases, so it can work indoors with other electrical devices.

Note!

All data may be changed without notice, AAT SYSTEMY BEZPIECZEŃSTWA sp. z o.o. reserves the right to explain and updated the information

Safety

Activities related to the servicing of batteries should be performed only by qualified and appropriately authorized personnel. When installing and maintaining lead-acid batteries, be careful and strictly observe the following precautions:

- Wear protective clothes and google during maintenance or installation.
- The current health and safety regulations in force in the country where the battery is used must be observed.
- Disconnect the power supply before preforming assembly / disassembly or maintenance.
- It is forbidden to smoke in the room where the battery is installed and if the battery will be installed near sparking electrical devices. This action may cause the battery to explode.
- In case of any contact of battery acid with the skin, wash the burned area with plenty of clean water. If necessary, consult a doctor. Clothing contaminated with acid should be washed in water.
- Avoid short circuits, do not use non-insulated tools, do not put tools or other objects on the battery. The metal parts of the batteries are always energized and short-circuited may result in an explosion or fire
- There is a risk of electric shock. Batteries have high short-circuit currents. The metal parts of the battery are always energized. Before starting work, remove metal elements of clothing and other items such as: watches, rings, chains, etc.
- The electrolyte has a strong caustic effect. Under normal operating conditions of the battery, there is no risk of contact with the acid. Electrolyte may leak from the safety valves in the event of overcharging the battery or mechanical damage to the battery casing. If it comes into contact with acid, immediately wash with plenty of clean water.
- Batteries are heavy. Ensure that they are installed safely. Only suitable equipment should be used for transport.

Maintenance

FENIKS batteries are sealed lead-acid batteries and do not need to be refilled. However, maintenance activities and keeping a maintenance book is essential in order to obtain maximum service life, reliability and validity of the battery warranty.

Proper battery maintenance includes keeping it and the surrounding area clean and dry. It is recommended to keep a maintenance logbook in which will be register measured values, power interruptions and discharge tests.

Maintenance activities should only be performed by authorized personnel. The condition for accepting the complaint is the provision of the service book containing the measurement results from each required periodic inspection.

At least every 12 months (recommended quarterly) from the date of battery installation, the following data must be checked and documented:

- Battery charging voltage - which should be in the range of 2.25 to 2.30 [V / cell]
- Charging voltage on individual batteries - which should be in the range of 13.5 to 13.8V
- Internal resistance - which should not exceed the value of the internal resistance of the new battery (specified on the catalog card), increased by 30%.
- Battery charging current - which after a few days of charging should decrease to 4mA per 1Ah of battery capacity or less, but should be higher than 0 [A].
- Operating temperature - which should not exceed the range of 15 to 25°C.

You should also pay attention if the battery has no mechanical damage.

Utilization/ Recycling

Used FENIKS batteries must be disposed of in an environmentally safe manner. Do not throw used batteries into domestic waste, into fire or into water. Used FENIKS batteries should be removed / processed in accordance with the requirements of national regulations or returned for recycling to AAT SYSTEMY BEZPIECZEŃSTWA sp. z o.o. In every sales point of the company (in every branch of the company) there is a marked place for storing used FENIKS batteries. The user is equally responsible as the manufacturer for ensuring environmentally friendly recycling of used batteries.

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