GB	Instruction Manual
CZ	Návod k použití
SK	Návod na použitie
PL	Instrukcja użytkowania
HU	Használati útmutató
SI	Navodila za uporabo
RS|HR|BA|ME	Priručnik za uporabu
DE	Gebrauchsanweisung
UA	Інструкція по застосуванню
RO|MD	Manual de utilizare
LT	Naudojimo instrukcija
LV	Lietošanas rokasgrāmata
EE	Kasutusjuhend
BG	Ръководство за експлоатация

CE

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GB | Instruction Manual

Maintenance-free back-up (stationary) accumulator, type: AGM (VRLA design: valve-regulated lead-acid battery with absorbed electrolyte – suitable for alarms, UPS, auxiliary power units, emergency lighting, telecommunication, etc.)
This manual describes how to put the individual types of batteries (accumulators) into operation and also describes their maintenance, safe handling, storage and disposal.

Important warnings:

- Every battery (cell, accumulator) is a chemical power source containing solid or liquid chemical compounds (corrosive substances) that may damage health, property or the environment. Handle batteries with caution.
- When ready for use, the accumulator is capable of supplying electrical current at any time, even under undesirable circumstances! Even if the battery is only partially charged, interconnecting both contacts (terminals) with a conductive material (e.g. by careless handling, transport, storage etc.) will result in an uncontrolled release of a large amount of electrical energy, i.e. a SHORT CIRCUIT. At best, this will only damage the battery. It worst, if the short circuit is long-term (but even a few seconds are enough), it may cause fire or even an explosion, resulting in property or environmental damage, injury and potentially loss of life! Always handle batteries in a way that prevents short circuits!
- Used batteries or old unused batteries, functional and non-functional batteries and cells automatically become hazardous waste once depleted. Improper disposal may seriously endanger the environment! In the vast majority of cases, batteries contain hazardous chemical elements or compounds: lead, cadmium, mercury, electrolyte (H2S04) and other poisonous substances harmful to human health. Improper storage may release these substances into the environment and cause contamination. Please do not dispose of depleted batteries and cells as communal waste! We will take back any used accumulators or cells FREE OF CHARGE from you and ensure their proper recycling or disposal. In accordance with the Waste Act, every municipality is obligated to arrange the establishment of collection points where citizens can bring hazardous components of communal waste. You can also bring in used batteries and cells to shops that sell new ones.
- Individual accumulator types greatly differ from one another. When changing an old battery for a new one, it is necessary to follow the instructions of the manufacturer of the device (auxiliary power unit – UPS etc.) which state which type of accumulator is suitable for the appliance in question. Installing an unsuitable type of battery can cause irreversible damage to the device. Such cases are not covered by the warranty on the part of the supplier of the replacement battery, nor on the part of the manufacturer of the appliance.

a) Description

As the name suggests, VRLA batteries (valve-regulated lead-acid batteries) regulate the release of gas by a valve. In practice, this means that there is almost no leakage of aerosols from the H2S04 electrolyte. The valve prevents gas leakage and can handle overpressure of up to 0.43 kPa. The battery is based on lead and electrolyte bound in glass microfibres (so-called AGM – absorbent glass mat) or, more rarely, in gel (containing electrolyte thickened by thixotropic gel – SiO2). AGM back-up batteries are commonly used in devices such as UPS, electrical fire alarm systems, electrical security systems, emergency lighting, telecommunication, but also as a power source for electric motors (scooters, children's toys and many other appliances).

b) Maintenance, Storage and Handling

AGM-type stationary batteries are fully maintenance-free. However, basic rules have to be followed during their use to prevent shortening of their service life. Operating conditions are very important, particularly ambient temperature. Optimal operating temperature provided by the manufacturer is 20 to 25 °C. Exceeding these values long-term or frequently will dramatically shorten the service life of the battery. Extremely high operating temperatures may even result in irreversible damage. If the battery is subjected to long-term exposure to operating temperatures above 40 °C, all chemical processes are accelerated, resulting in increased release of gas and thus increased pressure inside the cell. In such circumstances, the valves can no longer regulate the pressure and the accumulating gas is not released at a sufficient pace. The accumulator heats up and the plastic casing deforms and increases in volume (literally inflates). The service life of AGM batteries as stated by manufacturers, provided optimal operating conditions are observed, is between 4 to 12 years depending on model. AGM technology is very effective in reducing self-discharge. While classic flooded batteries self-discharge at a rate of approximately 1 % of their capacity a day, AGM batteries discharge approximately 1–3 % a month (i.e. a maximum of 0.1 % a day)! This naturally increases their shelf life. Handling and operation of back-up batteries only requires following basic principles of battery use. The battery can be operated in any position. However, operating the battery in upside down position is the least suitable and is not recommended. The battery must not be stored or operated in the vicinity of open flame. Fall from height or heavy blows can cause irreversible mechanical damage. The terminals of the battery must not be interconnected with one another during operation, handling or storage to prevent short circuits. A short circuit may damage the battery, cause a fire or an explosion, resulting in injury or even death. If the casing of the battery sustains mechanical damage, electrolyte (corrosive substance) may leak out of the battery and come into contact with the skin. Immediately wash any affected skin areas with water and neutralise with soap or soda. In the event of more extensive contact or acid burns, seek medical attention as soon as possible.

c) Charging

Before beginning the charging process, check the rated voltage of your battery. The battery must be charged by a suitable power source or charger with charging voltage of 14.4 V for 12 V accumulators and 7.2 V for 6 V accumulators. If the charger or power source does not meet these parameters, the battery will not be charged fully, which will result in its quick depletion and, in extreme cases, destruction. Complaints regarding these negative effects will not be accepted. Also check that your charger is suitable for charging the given type of accumulator (AGM, GEL) and has the correct rated voltage. Last but not least, check that the charger is sufficiently powerful to charge your accumulator or that it is not too powerful and thus also unsuitable, since its charging current is too high.
Charging accumulators is not difficult. Here are simple guidelines to follow. If you are still unsure after these instructions, it is always best to consult a professional ahead of time or have them charge the accumulator for you. You can also use the manual that came with the charger.

Some sections of article c) describe situations that are irrelevant to users of automatic chargers. These chapters are marked with an asterisk *.

- **Accumulator type** – we will be describing the charging of AGM or GEL maintenance-free accumulators.
- **Correct voltage** – make sure your charger is set to the correct rated charging voltage. Charging voltage must be 14.4 V for 12 V batteries and 7.2 V for 6 V batteries. Some chargers do not have a switch. In that case, simply check whether the data on both components matches (e.g. 12 V charger and 12 V batteries).
- **Correct polarity** – before starting the charger, check that the poles on the battery and the terminals on the charger cables match, i.e. connect the negative terminal to the negative pole and positive terminal to the positive pole. Otherwise you risk a short circuit.
- **Ventilation** – check that the ventilation (valve vents on the battery lid on top or on the side) is clean and unobstructed and that gases can freely release from the battery if needed. If the vents are clogged or covered, there is a risk of accumulation of gases inside the battery, causing potential irreversible damage. Some batteries do not feature vents or the vents are hidden.
- **Setting an automatic charger** – if the charger features multiple setting options, follow the instructions provided by the manufacturer of the charger. Usually the charger allows setting charging voltage and current. You will find instructions on the required charging current in the next paragraph. If the charger has no settings, start it up by plugging the power cable into a 220 V (230 V) mains socket; the cables with terminals should already be connected to the battery poles at this point.
- **Charging current*** – general rule of thumb: charge with current equal to one tenth (1/10) of battery capacity. Expressed numerically, if you have a 60 Ah accumulator, charge it at 6 A (60 : 10 = 6 A). There is a more accurate charging formula that states that the charging current should equal 0.12 times the accumulator capacity. I.e. I = 0.12 × C. In practice, if you have a 60 Ah accumulator, then 60 × 0.12 = 7.2 A charging current.
  These days, most users have automatic chargers. In that case, simply choose a suitable charger with sufficient current. Take into account, however, that charge time is directly proportional to charging current. Charging should not take unnecessarily long (1 A charging current is too little for a 60 Ah battery, for instance). Vice versa, do not choose a charger that is too powerful, so that charging isn't unnecessarily fast. Such charging is harmful to the accumulator in the long term (e.g. charging current over 14 A is too high for a 60 Ah battery).
  Note: if your charger allows adjusting the charging current, charge according to formula I = 0.12 × C up until you reach voltage of 14.2 V; then, reduce the current to half and continue until charging is complete (voltage will reach 14.4 V).
- **Signs of full charging*** – in general, a battery should be recharged to full charge. Maintenance-free batteries without caps or AGM batteries with absorbed electrolyte no longer allow measuring energy density; do not under any circumstances attempt to break into the battery! The state of charge of a 12 V maintenance-free AGM or GEL type lead-acid battery, charged in a standard way with a manual charger, can be estimated by measuring voltage on the poles during charging. The values can be interpreted as follows: 14.3 V = 90 to 95 % charge, 14.4 to 14.5 V = 100 % charge.
  WARNING – make sure to correctly set the measured quantity on the measuring device to voltage [V].
- Quick charging* – In exceptional cases where quick charging is necessary, it is possible to use a charging current of I = 1 × C (in our example of a 60 Ah battery, charging current would be 60 A). However, only charge this way for a maximum of 30 minutes! Keep in mind that the more frequently you use higher charging currents to recharge your battery, the shorter you can expect the service life of the battery to be.
- Accumulator capacity – the current capacity (state of charge) of the accumulator can be determined using simple measuring devices. You can use both devices for approximate measurement without putting a load on the accumulator and more precise devices that measure internal resistance. However, precisely determining the service life of the accumulator requires a complex diagnostic process using an expensive testing device that discharges and recharges the accumulator. Such diagnostic can take several hours for smaller batteries and several days for larger batteries. It is recommended to do any testing to determine battery capacity only with a fully charged accumulator and with at least 4 hour gap since last charging. Approximate measurement of capacity can be done using a simple measuring device called a voltmeter. Measure without load, i.e. only measure voltage without current drain. Compare the measured values with the following table (note: the results of measurement may be misrepresentative or completely incorrect for damaged batteries or older batteries that have been used for a long time; such batteries can be identified and tested only using more complex methods):

State of charge	Measured voltage
100 %	12.90+ V
75 %	12.60 V
50 %	12.40 V
25 %	12.10 V
0 %	11.90 V

- **Deep discharge** – if you discharge the accumulator completely and leave it in this state for several days, you will reach a state of so-called deep discharge; measured voltage at zero load will drop under 11 V and a process called sulphation will begin inside the cells. The sulphur originally contained in the electrolyte will „seep" into the active material of the lead plates due to discharging. Recharging would once again „dislodge" and mix the sulphur with the diluted, watery electrolyte, increasing the concentration of the acid. But when not recharged, the sulphur reacts with the lead, resulting in further oxidation and the active lead material turns into lead sulphide, also known as sulphate. In advanced stages, the process is irreversible and the accumulator is permanently damaged. If the accumulator reaches a state of deep discharge, it is often no longer rechargeable using a standard automatic charger. These chargers are usually either unable to detect the voltage in the discharged battery and will not start charging at all, or they start charging but are unable to overcome the internal resistance of the sulphated accumulator and overheat.
  To try to restore the accumulator, bring it to a professional service centre. Deeply discharged accumulators that have become damaged in this way are not covered by the warranty.

Obsah je uzamčen

Dokončete, prosím, proces objednávky.

Následně budete mít přístup k celému dokumentu.

Proč je dokument uzamčen? Nahněvat Vás rozhodně nechceme. Jsou k tomu dva hlavní důvody:

1) Vytvořit a udržovat obsáhlou databázi návodů stojí nejen spoustu úsilí a času, ale i finanční prostředky. Dělali byste to Vy zadarmo? Ne*. Zakoupením této služby obdržíte úplný návod a podpoříte provoz a rozvoj našich stránek. Třeba se Vám to bude ještě někdy hodit.

   **) Možná zpočátku ano. Ale vězte, že dotovat to dlouhodobě nelze. A rozhodně na tom nezbohatneme.*

2) Pak jsou tady „roboti“, kteří se přiživují na naší práci a „vysávají“ výsledky našeho úsilí pro svůj prospěch. Tímto krokem se jim to snažíme překazit.

A pokud nemáte zájem, respektujeme to. Urgujte svého prodejce. A když neuspějete, rádi Vás uvidíme!