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|-------------|---------------------------|
| GB | Operation manual |
| CZ | Návod k použití |
| SK | Návod na použitie |
| PL | Instrukcja użytkowania |
| HU | Üzemeltetési kézikönyv |
| SI | Navodila za uporabo |
| RS HR BA ME | Uputa za uporabu |
| DE | Bedienungsanleitung |
| RO | Instrucțiuni de utilizare |
| LV | Lietošanas instrukcija |

Maintenance free standby (stationary) accumulator type AGM (VRLA design, lead battery with soaked in electrolyte – valve controlled, suitable for ALARMS, UPS standby supply, emergency lighting, telecommunications etc.)

This manual describes commissioning of individual battery-accumulator types, their maintenance, safe handling, storage and disposal.

Important warning:

- Each battery (cell, accumulator) is a chemical source of electric power; it contains solid or liquid chemicals (caustics) which may cause harm to human health, damage to property or the environment. Therefore it is necessary to handle the battery with special care.
- Accumulator, as a power source, is, in ready state, able to supply electric power at any moment, not excluding unintended circumstances! Caution, even partially charged batteries, when both their contacts (terminals) become interconnected by a conductive material (e.g. during negligent handling, transport, storage etc.), uncontrolled release of large volume of electric power occurs, it is called SHORT CIRCUIT. In the better case only the battery is damaged. In worse case, providing the contact is lasting longer (a few seconds is enough), it can cause fire, and yet explosion, damage to property or environment, last but not least, though, harm to human health or even death! Therefore it is recommended to always handle batteries so as to prevent the short circuit!
- Used batteries and the old unused ones, functional and non functional batteries and cells become hazardous waste upon exploitation, and as such can, if disposed improperly, present a serious risk to environment! Absolute majority of batteries contain dangerous chemical elements and compounds. Lead, cadmium, mercury, electrolyte (H₂SO₄), and other, poisonous agents harmful to human health. These may be released as a result of improper disposal and cause nature contamination. That is why we beg you not to dispose used batteries and cells as municipal waste! We will recollect any exploited batteries and cells from you FOR FREE, and we will ensure their proper and safe liquidation and recycling. According to Act on Waste each municipality is obligated to provide, so called, collection spots, where citizens can deposit hazardous part of municipal waste. Used batteries and cells are also always collected at the point of their sale.
- Individual accumulators vary greatly from one another. When replacing a new battery for a used one, it is always necessary to observe instructions of the device manufacturer (standby source – UPS etc.), which stipulates which accumulator is designed for particular devices. Installation of unfit battery type may cause irreversible damage of the device. In such case warranty claim cannot be accepted from the side of battery supplier nor from the device manufacturer.

a) Description

Gases are released from standby battery VRLA (Valve Regulated Lead Acid) through a valve. Practically it means that nearly no aerosols leak out from electrolyte H₂SO₄. The valve blocks gas leaks and it can handle overpressure of up to 0.43 kPa. The battery is designed on the basis of lead and electrolyte bound to fiberglass microfibers (so called, AGM – absorbed glass mat) or, exceptionally, to gel (contain electrolyte thickened by tixotropic gel – SiO₂). AGM type standby batteries are common for devices of UPS type (standby supplies), EPS (electronic fire signalization), EZS (electronic security systems), emergency lighting, telecommunication applications, but also as source for actuation for electrical motors (scooters, toys, and a number of other appliances).

b) Maintenance, storage and handling

Stationary AGM type batteries are maintenance free. However, basic rules have to be observed during their use, in order to prevent shortening of their service life. Operation conditions are very important,

especially ambient temperature. Optimum operation temperature suggested by manufacturer is 20°C to 25°C. In case of permanent or temporary excess of these thresholds, service life of the batteries dramatically drops. In case of extremely high operation temperatures, irreversible damage can occur. Prolong exposure of the battery to operation temperatures exceeding 40°C, at which all chemical processes are faster, high gas production occurs, resulting in building of internal overpressure within the cell. Under such circumstances the valves are no longer able to regulate the overpressure and the accumulated gasses cannot escape, which results in volume increase (it literally inflates). Service life of AGM batteries claimed by manufacturers, on condition the optimum operation conditions are met, is between 4 to 12 years, depending on a particular model. The AMG technology very efficiently suppresses the self discharge effect. While classic flooded batteries loose to self discharge approximately 1% of capacity a day, with AGM type the loss is dramatically lower. The loss is about 1-3% per month (i.e. max. 0.1% a day)! That naturally extends the storage time. Operation and handling of standby batteries requires only observance of basic rules. The batteries can be operated in any position. The bottom up position is the least suitable and it is not recommended, though. Battery must not be stored or operated near open fire. Fall from height or heavy impacts may cause irreversible mechanical damage. During storage, handling and operation the contacts must not be connected to each other, it would represent a short circuit hazard. That can result in battery damage, fire, health or life hazard, or to battery explosion. In case of mechanical damage of the battery housing the electrolyte may escape (caustic), and/or skin contact may occur. In case of skin contact immediately rinse the affected area with clean water and neutralize the electrolyte with soap or soda. In case of more extensive contact or in case of cauterization seek medical help as soon as possible.

c) Charging

Prior to charging process make sure what nominal voltage is your battery. Then check if your charger is suitable for charging of given type of accumulator (AGM, GEL) and if it can supply suitable nominal voltage. Last but not least, check if the charger is powerful enough for charging of your accumulator or if it is not too powerful, as that would make it also unsuitable, for it would charge the battery with too strong current.

Charging is nothing complicated, let us tell you how to do it. If you are not sure you fully understand our instructions, seek advice of an expert, or have an expert do the charging. You may also resort to manual provided with the charger.

Some sections of chapter c) describe situations that are unnecessary information for users of automatic chargers. These sections are marked with asterisk (*).

- **Accumulator type** – Charging of maintenance free accumulator type AGM or GEL will be described.
- **Correct voltage** – Make sure that your charger is set to correct nominal voltage for 12V or 6V batteries, some chargers have no switch, so it is enough to just check if data on both the components match (e.g. 12V charger and also 12V battery).
- **Correct polarity** – Prior to activating the charger check the order of poles on the battery and terminal clamps on the charger cables, then connect correctly plus to plus and minus to minus, if not observed – short circuit hazard occurs.
- **Ventilation** – Check that venting (valve gaps) is not dirty or blinded and that the gases may freely escape the battery as necessary, venting = valve gaps in the battery cover (on top or on its side), in case these are obstructed, gasses accumulate inside which can result in irreversible damage. Some batteries do not have gaps or these are covered.
- **Setting of automatic charger** – In case the charger can be set for more options, follow the instructions in the charger manual. Charging voltage and current are usually set. The following paragraph gives instructions for charging current values. If the charger does not have any setting elements, start it by inserting the plug of the power cord to the wall socket 220V (230V), the

cables with clamp terminals should be connected to the poles of battery by now.

- **Charging current*** – General rule says, charge by current of one tenth value (1/10) of the battery capacity. Formulated in numbers, if you have a 60Ah accumulator, charge it at 6A (60: 10 = 6A). There is a more precise charging formula, it says: the charging current should equal 0.12 multiple of the accumulator capacity. In other words: $I = 0.12 \times C$. Technically you are to charge a 60Ah battery as follows: $60 \times 0.12 = \text{charging current is } 7.2\text{A}$.

Majority of users today use automatic chargers, in such case just choose suitable charger with sufficient current, with respect to the fact that the charging time is directly proportioned to the value of charging current, and charging time may be too long (for 60Ah current of 1A is too low). And on the other hand do not choose a too strong charger in order to prevent too fast charging which is also, in long term prospective, damaging the accumulator (e.g. for 60Ah current of 14A is too strong).

Note: If you are charging by adjustable charging current, charge according to formula: $I = 0.12 \times C$ up to voltage of 14.2V, then lower the current by half and continue until the battery is fully charged (voltage reaches 14.4V).

- **Signs of fully charged battery*** – In general, the battery is charged until signs of full charge have been reached. For maintenance free batteries without plugs, or for AGM with soaked in electrolyte the thickness cannot be measured any more, do not, under any circumstances, try to penetrate the battery! For the 12V maintenance free lead batteries types AGM or GEL charged in standard manner by manual charger the charging status may be judged by measuring the voltage between the poles during charging. The values may be interpreted as follows: 14.3V = 90 to 95% charged, 14.4 to 14.5V = 100% charged.

CAUTION – Observe the correctly set values on the meter – voltage [V].

- **Rapid charging*** – In case of need for rapid charge it is possible to use charging current of $I = 1 \times C$ (in our case, for 60Ah batteries the charging current will be 60A). However, charge with this current for no longer than 30 minutes! Keep in mind, that the more often you use higher current for charging your battery, the shorter service life may be expected for the given accumulator in the future.
- **Accumulator capacity** – Current capacity (charge status) may be roughly defined by metering instruments. Either instruments for approximate measuring may be used without loading the accumulator, or also more precise instruments measuring internal resistance can be used. However, the remaining service life of an accumulator can only be precisely defined through complex diagnostic process, using an expensive testing instrument that operates on the principles of charging and discharging. Such diagnostics may take several hours for small batteries and up to several days for larger batteries. Any battery capacity testing is always recommended for fully charged accumulators with a delay of at least 4 hours after charging. Rough capacity test may be done by a simple electrical gauge – voltmeter. Measure without load, i.e. voltage without use of current only. Compare the measured values with the following table (note: for old, longer used or damaged batteries the test results may be distorted or completely useless, such batteries may only be judged and tested by the more complex methods):

| Charge status | Voltage measured |
|---------------|------------------|
| 100% | 12.90+ V |
| 75% | 12.60 V |
| 50% | 12.40 V |
| 25% | 12.10 V |
| 0% | 11.90 V |

- **Deep discharge** – If an accumulator is fully discharged and left for a few days, so called, deep discharge state occurs, measured

voltage without load drops below 11V level, and a process called sulfation is triggered inside the cells. The sulfur, originally contained in the electrolyte, "soaks" to active masses of the lead plates due to discharge. Charging than causes repeated "pushing" and mixing the sulfur back to watery electrolyte, i.e. increasing of the acid saturation. In the other case, though, it reacts with lead, further oxidizing occurs, active lead surfaces change their chemical composition to lead sulphate, briefly sulphate. This process is, in advanced stage, irreversible and the accumulator is irreversibly damaged. If the accumulator gets to the deep discharge state, it often cannot be charged by a regular automatic charger. These chargers tend A) not to be able to detect voltage of deeply discharged battery and the charging process does not start, or B) to start charging, but are not capable of overcoming the internal resistance of the sulfated accumulator and they tend to overheat.

To bring the accumulator back to life, try to give the battery to specialized service. Deep discharged batteries and batteries with such damage are not covered by warranty.

- **Maintenance of maintenance free accumulator** – The basic rule in maintenance of lead batteries says: keep the battery, if possible, constantly in charged state. If it needs to be discharged – used (logically), charge it immediately after discharging it.

d) Introducing the battery to operation

For battery introduction to operation always adhere to device manufacturer's instructions. Observe the safety instructions. In case of doubt seek expert advice.

CZ | Návod k použití

Bezúdržbový záložní (staniční) akumulátor typ AGM (konstrukce VRLA, olověná baterie se zásáknutým elektrolytem – řízená ventilem, vhodná pro ALARMY, UPS záložní zdroje, nouzové osvětlení, telekomunikace, atd.)

Tento návod popisuje uvedení jednotlivých druhů baterií – akumulátorů do provozu, jejich údržbu, bezpečnou manipulaci, skladování a likvidaci.

Důležitá upozornění:

- Každá baterie (článek, akumulátor) je chemický zdroj elektrické energie, obsahuje tuhé či tekuté chemické sloučeniny (žiraviny), které mohou způsobit újmu na zdraví, majetku či životním prostředí. S bateriemi proto manipulujte se zvýšenou opatrností.
- Akumulátor, jakožto zdroj elektrické energie, je v připraveném stavu schopný kdykoliv dodávat elektrický proud, a to i za nežádoucích okolností! Pozor i u částečně nabitě baterie, při vzájemném propojení obou kontaktů (terminálů) vodivým materiálem (např. při neopatrné manipulaci, při přepravě, skladování, apod.) dojde k nekontrolovanému uvolnění velkého množství elektrické energie, k takzvanému ZKRATU. V lepším případě dojde pouze k poškození baterie. V horším případě, je-li jev dlouhodobý (stačí však i několik vteřin), může způsobit požár, dokonce výbuch, újmu na majetku či životním prostředí, ale v neposlední řadě také újmu na zdraví či životě člověka! S bateriemi proto vždy zacházejte tak, aby ke zkratu nedošlo!
- Použité baterie i staré nepoužité, funkční i nefunkční baterie a články se po spotřebování automaticky stávají nebezpečným odpadem, který může při neodborné likvidaci vážně ohrozit životní prostředí! V naprosté většině obsahují baterie nebezpečné chemické prvky nebo jejich sloučeniny. Olovo, kadmium, rtuť, elektrolyt (H2SO4), ale i další, lidskému organismu škodlivé, jedovaté látky. Ty se mohou vlivem špatného uložení uvolňovat do přírody a zamořit ji. Proto Váš prosíme, neodkládejte spotřebované baterie a články mezi komunální odpad! ZDARMA od Vás jakékoliv použité akumulátory i články odebereme, a zajistíme jejich řádnou a bezpečnou recyklaci či likvidaci. Podle zákona o odpadech, má každá obec povinnost zajistit tzv. sběrná místa, kam mohou její obyvatelé odkládat nebezpečné složky komunálního

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!