User Manual

Maintenance-free lead batteries in nonwoven technology, valve controlled (VRLA/AGM)
Type OGiV: SSB SBH

Nominal data

• Nominal voltage U_N:	cells 2V blocks 6V blocks 12V
• Nominal capacity C10:	10-hour discharge
• Nominal temperature T_N:	20 °C
• Reduction factors:	according to EN IEC 62485-2
• Nominal discharge current: $I_N = I_{10}$	C_N/10h

Battery manufacturer: SSB Battery Model: SBH	
Installation by:	on:
Commissioning by:	on:
Safety labels applied by:	on:

	• Observe user manual and place visibly near the battery! • Only work on the battery after instruction by technical specialists!
	• Smoking prohibited! Do not bring an open flame, embers or sparks near the battery, as there is a risk of explosion and fire!
	• Wear safety glasses and protective clothing when working on batteries! • Observe the accident prevention regulations as well as EN IEC 62485-2!
	• Flush out or rinse off acid splashes in the eyes or on the skin with ample clean water. Afterwards, see a doctor immediately. Wash acid-contaminated clothing with water!
	• Risk of explosion and fire, prevent short circuits! Caution! Metal parts of the batteries are always live, therefore do not place any foreign objects or tools on the battery!
	• Electrolyte is highly corrosive! In normal operation contact with the electrolytes is practically excluded. If you have come into contact with the electrolyte, please rinse thoroughly with water and see a doctor!
	• Block batteries/cells have a high tare weight! Make sure of secure placement! Only use suitable transport equipment.
	• Recyclable commodity; does not belong in domestic waste! • Non-compliance with the user manual, the non-use of original spare parts for repairs or unauthorised interventions void the warranty claims.
	• **Return to the manufacturer** Used batteries with this symbol are recyclable commodities and must be sent to the recycling process. Used batteries, which are not sent to the recycling process, must be disposed of as hazardous waste, in compliance with all regulations.

Closed lead batteries consist of cells, which do not allow refilling with water over the entire service life. Relief valves are used as sealing plugs, which can only be opened by destruction.

1. Commissioning
Before the commissioning, all blocks must be checked for mechanical damage, correct polarity, and tight seat of the connectors. The batteries must not be installed at more than 2,000m. The valve cover, which covers the relief valve, must not be taken off or taped over. The following torques apply to screw connections:

M5	M6	M8
6.2Nm	8.5Nm	12.4Nm

If necessary, the pole covers are to be placed on. Connect the battery to the DC supply with correct polarity when the charging device is switched off and consumers are disconnected (positive pole on positive connecting clamp), switch on the charging device and charge according to Point 2.2.

2. Operation
EN IEC 62485-2 applies to the design and operation of these batteries. The battery must be installed so that between the individual blocks an environmental temperature difference of >2K cannot occur.

2.1 Discharging
The end-point voltage of the battery must not fall below the discharge current assigned to it. As long as there are no special instructions from the manufacturer, no more than the nominal capacity must be taken. After discharge, also partial discharge, it must be immediately charged.

2.2 Charging
All charging methods can be used with their limit values according to EN IEC 62485-2 (IU characteristic curve). Depending on the charging device design and charging device characteristic curve, alternating currents flow through the battery during the charging process, which are superimposed onto the direct current (< 0.1C(A) effective ripple). These superimposed alternating currents and the reactions of the consumers lead to an additional warming of the battery and strain on the electrodes with possible resulting damage (see Point 2.5). Depending on the system, charging can take place with the following operating modes (according to VDE 0510-485-2). (Batteries must not be charged upside down!)

a) Standby parallel and buffer operation
Here the consumers, the DC source and the battery are continually switched on in parallel. Thereby, the charging voltage is the operating voltage of the battery and at the same time the system voltage. For standby parallel operation the DC source is capable at all times of supplying the maximum consumer current and battery charging current. The battery only supplies current when the AC source fails. The charging voltage to be set is 2.295 V/cell (20 °C) x the number of cells in series connection, measured on the end poles of the battery. In buffer operation, the DC source is not able to always supply the maximum consumer current at all times. The consumer current intermittently exceeds the nominal current of the DC source. During this time the battery supplies current. It is not always charged at all times, however, the maintenance charge voltage of 2.295 V/cell at 20 °C x number of cells in series connection is sufficient to ensure a recharge. A consumer-and-cell-number-dependent tuning should be done in individual cases with the battery manufacturer.

b) Switching mode
The battery is disconnected from consumers during charging. To shorten the recharging time, in the first charging step the battery is charged with a voltage of 2.35–2.40V/cell at 20 °C up to a point in time when the charging current drops to 0.07C(A)(t_1). The charging time of the first phase is measured to reach this value. During the second phase of the recharging, a voltage of 2.35–2.40V/cell is used, whereby the recharging time of the second phase should be 50% of the first phase ($t_2 = 0.5t_1$). When exceeding $t > t_1 + 0.5t_1$ the voltage is reduced to the maintenance voltage of 2.295 V/cell at 20 °C.

c) Battery mode (charge/discharge mode)
The consumer is only fed from the battery. The charging method is user-dependent and to be agreed upon with the battery manufacturer.

2.3 Maintaining the full charge condition (maintenance charging)
Devices with the specifications according to EN IEC 62485-2 must be used. They must be set so that the cell voltage has an average of 2,295 V/cell.

2.4 Supplementary and equalising charge
Before the first commissioning, a supplementary charge of the batteries must be carried out and logged. Equalising charges are required after deep discharge and insufficient charging. The battery surface temperature must not exceed 45 °C during this; if necessary, the charging must be interrupted or switched to charge maintenance. The end of the supplementary/equalising charge is reached when the charge voltage and charge current no longer show any change within two hours. Batteries, which are installed retroactively in a battery network as a replacement, must be fully charged before installation.

2.5 Superimposed alternating current (AC)
During the recharging according to the operating modes Point 2.2, the effective value of the AC must not exceed 2A/100Ah of the nominal capacity.

2.6 Charging currents
In standby parallel operation or buffer operation without recharge step, the charging currents are not restricted. The charging current should be 10A to 20A per 100Ah nominal capacity (reference value). In cycle operation, the charging current should not exceed 0.2C(A) (20A/100Ah).

2.7 Temperature
The recommended operating temperature range for lead batteries is 18 °C to 22 °C. The ideal operating temperature range is 20 °C ± 2K (according to EUROBAT). Higher temperatures shorten the service life. The technical data applies to the nominal temperature of 20 °C. Lower temperatures lessen the available

capacity. Exceeding the limit temperature of 45 °C is not allowed. Continuous operating temperatures over 40 °C must be avoided.

2.8 Temperature-dependent float charge voltage and quick charge

The maintenance charge voltage of 2.295 V/cell refers to a battery temperature of 20 °C. A temperature-guided voltage compensation of the maintenance voltage is necessary to compensate for an overcharge with higher temperatures and an undercharge with low temperatures. The recommended compensation factor is -3mV/cell/V °C for the float charge voltage state. To avoid a "thermal runaway", the float charge voltage with temperatures of 30 °C and up must in all cases be compensated for guided by temperature. The strong charging process can be used, if a quick charge is required. Thereby the charging current of 0.25C(A) should not be exceeded and reduced constantly to below 0.01C(A). When 0.01C(A) is reached, it should be switched over to float charge voltage.

Temperature (°C)	Charging voltage quick charge (V/cell)	Maintenance charge voltage (V/cell)
20	2.40	2.295
25	2.37	2.275

2.9 Electrolyte

The electrolyte is diluted sulphuric acid and bound in fleece.

3. Battery care and control

The battery must always be kept clean and dry, to prevent leakage currents.

The cleaning of the battery should be carried out according to the ZVEI datasheet "Cleaning of batteries". Plastic parts of the battery must only be cleaned with water without additives; the use of organic cleaning agents is not advised. At least every 6 months the following should be measured and recorded:

- Battery voltage
- Voltage of some cells/block batteries
- Surface temperature of some cells
- Battery room temperature

If the cell voltage deviates from the average maintenance voltage by ± 0.1V/cell, or if the surface temperature of various cells/blocks deviates by more than 2K, customer service must be requested. To be measured and recorded annually:

- Voltage of all cells/block batteries
- Surface temperature of all cells
- Battery room temperature
- Insulation resistance according to EN 60896-21

Annual visual inspection of:

- the screw connections, unsecured screw connections must be checked for a tight fit
- the battery placement and/or housing
- the aeration and ventilation according to EN IEC 62485-2

4. Tests

Tests should proceed according to EN 60896-21, special test instructions, e.g. according to EN 50172 and VDE 0100-710, must also be observed. Also refer to the mentioned EN standards. To ensure a reliable current supply, the entire battery should be replaced after the expected service life, taking into account the conditions of use and temperatures.

5. Faults

If malfunctions of the battery or the charging device are detected, customer service must be contacted immediately. Measurement data according to Point 3 simplify troubleshooting and fault elimination. A maintenance and service contract facilitates the timely detection of faults.

6. Storage and decommissioning

If cells/batteries are stored or taken out of service for a longer period, they must be stored fully charged in a dry, frost-free area. To prevent damage, maintenance charges should be carried out according to Point 2.4.

7. Transport

AGM batteries are not hazardous materials as long as they are protected from short circuits, slipping, falling and damage (Gefahrgutverordnung GGVS – Hazardous Material Ordinance, Vol. no. 2801a). This applies to roads, trains, sea freight and air transport, as well as according to the regulations of IATA (Regulation A67), ADR (Regulation 598), IMDG (Regulation 238.2) and UN 2800 Special Provisions. There should be no hazardous traces of acids on the outside of the shipping packages. For all closed batteries and cells, whose containers are leaking or damaged, the corresponding exemption regulations apply.

Subject to technical changes.

As at 11/2024

Battery-Kutter

Battery-Kutter GmbH & Co. KG
Robert-Koch-Straße 19a · D-22851 Norderstedt
Phone: +49 40 611 631-0 · Fax: +49 40 611 631-79
Email: info@battery-kutter.de

www.battery-kutter.de