

**PowerSafe<sup>®</sup>**  
**SBSXC+**

Installation, Operation  
and Maintenance Manual



Visit us at [www.enersys.com](http://www.enersys.com)

## Important

Please read this manual immediately on receipt of the battery before unpacking and installing. Failure to comply with these instructions will render any warranties null and void.

## Care for your safety



No smoking, no naked flames, no sparks



Shield eyes



Read instructions



Electrical hazard



Electrolyte is corrosive



Danger



Clean all acid splash in eyes or on skin with plenty of clean water. Then seek medical help. Acid on clothing is to be washed with water



Warning: Risk of fire, explosion, or burns. Do not disassemble, heat above 60°C (140°F), or incinerate. Metallic parts under voltage are present on the battery, avoid short circuit. Do not place tools or items on top of the battery.



Recycle scrap batteries. Contains lead

## Handling

PowerSafe® SBS XC+ batteries are supplied in a charged condition and are capable of extremely high short circuit currents. Take care to avoid short-circuiting terminals of opposite polarity.

## Keep flames away

In case of accidental overcharge a flammable gas can leak off the safety vent. Discharge any possible static electricity from clothes by touching an earth connected part.

## Tools

Use tools with insulated handles. Do not place or drop metal objects on the battery. Remove rings, wristwatch and articles of clothing with metal parts that may come into contact with the battery terminals.

**California Proposition 65 Warning** - Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

## 1. Receiving

Upon the receipt of the shipment, check the contents against the packing slip and for damage. Immediately inform EnerSys® of any missing or damaged items. EnerSys is not responsible for shipment damage or shortages that the receiver does not report to the carrier.

## 2. Storage

### 2.1. Storage Conditions and Time

If a battery cannot be installed immediately it should be stored in a clean, cool and dry area. During storage products lose capacity through self-discharge. High temperatures increase the rate of self-discharge and reduce the storage life.

2.1.1. The maximum storage time before a refresh charge is required and the recommended OCV audit intervals are:

Temperature (°C / °F)	Storage Time (Months)	OCV Audit Interval (Months)
+10 / +50	36	6
+15 / +59	25	6
+20 / +68	18	4
+25 / +77	12	4
+30 / +96	9	3
+35 / +95	6	2
+40 / +104	4	2

2.1.2. Products must be given a refresh charge when the OCV approaches the equivalent of 2.10 Volts per cell or when the maximum storage time is reached, whichever occurs first.

### 2.2. Refresh Charge

Charge at a constant voltage equivalent to 2.29 - 2.40Vpc with a minimum 0.1C<sub>10</sub> Amps available for a period of 24 hours.

### 2.3. Commissioning Charge

Prior to commencement of operation, the battery must be given a commissioning charge. This shall consist of a 24 hour charge at a voltage equivalent to 2.40Vpc at 20°C with no load connected.

## 3. Battery Location

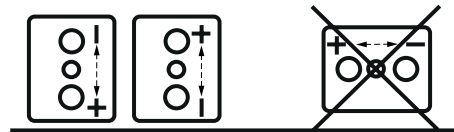
The battery compartment/room must have adequate ventilation to limit hydrogen accumulation. Batteries must be installed in accordance with the IEC 62485-2 standard and any other local/national laws and regulations.

## 4. Installation

PowerSafe SBS XC+ batteries can be mounted in any orientation except inverted.

However, in cyclic/hybrid applications, EnerSys recommend to install 2 Volt DIN-size cells in horizontal orientation. In such configuration the instructions below must be complied with.

- Do not use terminal posts to lift or handle cells.
- Do not install the cells in such a way that the box-lid seal is resting on a runner.
- Always ensure that the arrow on the lid of each unit is pointing in vertical orientation.



Each monobloc / cell is supplied with terminal/connector fasteners.

The positive terminal is identified by a "+" symbol on each monobloc / cell. Install the batteries in accordance with the instructions and/or layout drawing, taking care to ensure correct terminal location and polarity.

Connect the blocs / cells with the connectors and fasteners provided. The fastener torque value is indicated on the product label.

Place the insulating covers in position immediately after tightening the fasteners.

## 5. Operation

PowerSafe SBS XC+ products are specifically designed for controlled hybrid partial state of charge operation (PSoC).

The battery will give the best performance and service life when working at a temperature of 20°C. The maximum operating temperature range is -40°C to +50°C.

### 5.1. Fast Charge Operation

The inherently high charge acceptance of the TPPL technology used in the PowerSafe SBS XC+ is suited for applications which require a fast time to repeat duty.

The rectifier output voltage should be set at 2.40Vpc at 20°C. Temperature compensation for charge voltage should be applied as follows:

- +3mV per cell per °C below 20°C
- -3mV per cell per °C above 20°C

Where rectifier voltage cannot be adjusted to values >2.40Vpc to compensate for temperatures below 20°C, the time for recharge will be increased.

## 5.2. Charging Current

Due to their very low internal resistance PowerSafe SBS XC+ batteries will accept unlimited current during recharge. The rectifier current can be limited to the load plus  $0.2C_{10}$  Amps (minimum).

## 5.3. Discharging

Batteries must not be left in a discharged condition after supplying the load but must immediately return to recharge mode.

Failure to observe these conditions may result in greatly reduced service life.

## 5.4. Accidental Deep Discharge

In order to protect the battery it is advisable to have system monitoring and low voltage cut-out. A low voltage disconnect of 1.93Vpc (80% DoD) should be applied to protect the battery from abusive over discharge.

Abusive deep discharge can result in premature deterioration of the battery and a noticeable reduction in the life expectancy.

## 5.5. Operation in Hybrid Controlled Partial State of Charge

For advice about this topic, please refer to the PowerSafe® SBS XC+ operation guide for hybrid applications.

## 6. Data Recording

It is recommended that as a minimum, the following information be recorded by means of regular data logging. The user must make this available to EnerSys in order to validate any warranty claim.

- 1) Records of the commission charge.
- 2) The number of cycles performed and the depth of discharge of each cycle.
- 3) The duration of each discharge and charge cycle, and the Ah in and out (Wh in and out).
- 4) Full details of the recharge voltage/current profile for the last 50 cycles.
- 5) A full history of the ambient and battery surface temperatures, recorded at regular intervals throughout battery operation and life.
- 6) The time and date of each "event" (an "event" is defined as the start/stop of the battery discharge, the start/stop of the battery recharge, the start stop of any generator input power or other input power source, etc).

Contact EnerSys if you have any questions regarding maintenance.

## 7. Disposal

PowerSafe SBS XC+ batteries are recyclable. Scrap batteries must be packaged and transported in accordance with prevailing transportation rules and regulations.

Scrap batteries must be disposed of in compliance with local and national laws by a licensed or certified lead acid battery recycler.



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