



PowerSafe[®]
SBS 2 Volt



Telecommunications

NEBS™ Certified*

Instruction Sheet

Applies to SBS 320 to 900



EnerSys[®]

Power/Full Solutions

RESERVE
POWER

*Pending
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Read these instructions immediately upon receipt. PowerSafe[®] SBS[®] EON[®] Technology batteries are safe when operated and handled properly. It is vitally important that you observe the precautions recommended in this instruction sheet. YOU SHOULD BE **TRAINED** IN HANDLING, INSTALLING, OPERATING AND MAINTAINING BATTERIES BEFORE YOU WORK ON **ANY** BATTERY SYSTEM.

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.



When working on batteries wear safety glasses with side shields, rubber gloves and protective clothing. All metallic personal objects, such as rings, watches, bracelets, etc, should be removed before starting work on the battery! Only use insulated tools!



Electrolyte is corrosive.



In case of **SKIN CONTACT** with electrolyte, **IMMEDIATELY**

1. **REMOVE** contaminated **CLOTHING**
2. **FLUSH** the area **THOROUGHLY** with **WATER**
3. Get **MEDICAL ATTENTION**



In case of **EYE CONTACT** with electrolyte, **IMMEDIATELY**

1. **FLUSH THOROUGHLY** for at least 15 minutes with large amounts of **WATER**.
2. Get **MEDICAL ATTENTION**.



In case of electrolyte **CONTACT WITH CLOTHING OR MATERIAL, IMMEDIATELY**

1. **REMOVE CONTAMINATED CLOTHING**
2. Apply large amounts of water to affected area.
3. Wash clothing as soon as possible.



Batteries can generate gases which, when released, can explode, causing blindness and other serious personal injury.



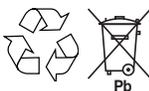
Warning: batteries remain live even though they are disconnected. No rings or metal bracelets should be worn during the assembly of the battery. Do not place electrically conductive objects such as tools etc. on top of the battery! Warning: cells are heavy, use proper lifting technique.



Do not allow flames, embers or sparks near the battery due to the risk of explosion or fire!

The Instruction Sheet must be strictly observed. Non-compliance with the Instruction Sheet, use of non OEM spares or use of additives to the electrolyte or unauthorized tampering will void the warranty.

Spent batteries with this symbol are reusable products and have to be put into a recycling system. Used batteries must be disposed of as special waste in accordance with all standards.



WARNING!

PowerSafe[®] SBS[®] EON Technology[®] 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.

1. Receiving the battery

Upon receipt of a shipment, check that the items delivered are undamaged and match the carrier's Bill of Lading. Report any damage or shortages to the carrier. 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

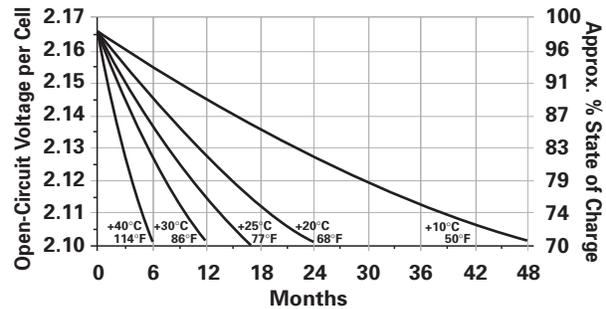
If a battery cannot be immediately installed it should be stored in a clean, cool, dry area.

During storage cells lose capacity through self-discharge.

High temperature increases the rate of self-discharge and reduces the storage life.

The chart below shows the relationship between open-circuit voltage (OCV) and storage time at various temperatures.

2.2 Freshening Charge



Cells must be given a freshening charge when the OCV approaches the equivalent of 2.10 Volts per cell or when the maximum storage time has been reached. Freshening charge should be by means of constant voltage charge set between 2.29 and 2.40Vpc with current limit 0.1C₁₀ A for 24 hours. Recommended OCV audit intervals are given in the table below.

Temperature °F / °C	Storage Time Months*	OCV Audit Interval Months**
50 / 10	48.0	6
59 / 15	34.0	6
68 / 20	24.0	4
77 / 25	17.0	4
86 / 30	12.0	3
95 / 35	8.5	2
104 / 40	6.0	2

2.3 Commissioning Charge

Before conducting a capacity discharge or commencing cycling, the battery must be given a commissioning charge. In float applications the commissioning charge shall consist of 7 continuous days of float charge at the recommended float voltage (2.29Vpc at 68°F) with no load connected to the battery. In hybrid applications the commissioning charge shall consist of 24 hours charge at a voltage equivalent to 2.40 Volts/cell with no load connected.

3. Installation

Whatever your application, PowerSafe SBS EON Technology cells can be mounted in any orientation except inverted. However, in cyclic/hybrid applications, EnerSys recommends to install DIN-sized SBS EON Technology 2V 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 bond is resting on a runner.
- Always ensure that the arrow on the lid of each unit is pointing in vertical orientation.



The battery compartment/room must have adequate ventilation to limit hydrogen accumulation to a maximum of 1% by volume of free air.

On each cell the positive terminal is identified by a "+" symbol. Install the batteries in accordance with the instructions, taking care to ensure correct terminal location and polarity.

Tighten the fastener set bolt(s) / nut(s) to the fastening torque level indicated in the table below.

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

Cell	Terminal	Torque
SBS 320	M10 F	24 ± 1 Nm - 212 ± 9 lbf in
SBS 400	M10 F	24 ± 1 Nm - 212 ± 9 lbf in
SBS 480	M10 F	24 ± 1 Nm - 212 ± 9 lbf in
SBS 580	M10 F	24 ± 1 Nm - 212 ± 9 lbf in
SBS 680	M10 F	24 ± 1 Nm - 212 ± 9 lbf in
SBS 780	M10 F	24 ± 1 Nm - 212 ± 9 lbf in
SBS 900	M10 F	24 ± 1 Nm - 212 ± 9 lbf in

4. Operation

PowerSafe® SBS® EON Technology® cells retain the long float life and storage characteristics of traditional PowerSafe SBS cells with the added benefit of improved cyclic ability in both float voltage and fast charge modes.

4.1 Stand by / Float Operation

Constant voltage chargers are recommended. The charging voltage should be set at the equivalent of 2.29Vpc at 68°F/20°C or 2.27Vpc at 77°F/25°C.

Operation at temperatures higher than 20°C will reduce life expectancy. Life is reduced by typically 50% for every 50°F rise in temperature. To offset the impact of higher temperatures compensation to the float voltage should be applied.

The recommended float voltage temperature compensation is:

	Temperature °F / °C						
	50/10	59/15	68/20	77/25	86/30	95/35	104/40
Recommended	2.33	2.31	2.29	2.27	2.25	2.23	2.21 Vpc
Minimum	2.31	2.29	2.27	2.25	2.23	2.21	2.21 Vpc

Due to the very low internal resistance, PowerSafe SBS EON cells will accept unlimited current during recharge but for cost and practical purposes in float applications where recharge time to repeat duty is not critical, the rectifier current can be limited to the load plus 0.1C-10 Amps.

4.2 Cyclic Operation

In addition to the long life characteristics inherent in traditional PowerSafe SBS TPPL designs, EON Technology has been developed to provide high performance in applications where the battery is subjected to repeated cyclic duty or where power reliability is tested by high temperatures and harsh conditions combined with remote locations.

In cyclic applications the charging voltage should be set at the equivalent of 2.40Vpc cell at 68°F/20°C, with the rectifier current limit set to a minimum of 0.1C-10 A (EON Technology is designed to accept unlimited in rush currents without causing damage to the internal electro chemistry).

The optimal cyclic performance is achieved by returning the battery to full state of charge between discharge cycles. It is possible to operate SBS EON Technology cells in partial state of charge condition, however, in such situations it is very important to ensure that the battery is periodically returned to full state charge to maintain battery state of health.

It is recommended to contact your EnerSys® representative to obtain additional information and guidance for such psoc applications. In systems where control of charge factor is not possible, it may be possible to estimate time to full state of charge by using the calculation:

$$\text{Recharge time (hrs)} = 2^* ((0.8 \times \text{discharged Ah}) / \text{current limit}) + 1$$

The recommended compensation for charge voltage in cyclic applications is:

	Temperature °F / °C						
	50/10	59/15	68/20	77/25	86/30	95/35	104/40
Vpc	2.44	2.42	2.40	2.38	2.36	2.34	2.32

5. Maintenance

In practice, the user usually specifies the maintenance schedule based on site criticality, location and manpower.

However, the following may be used as a suggested maintenance schedule.

- **Monthly (record all readings)**
Measure the battery string voltage. If necessary, adjust the float voltage to the correct value.
- **Every six months (record all readings)**
Measure the battery string voltage. If necessary, adjust the float voltage to the correct value.

Measure individual cell voltages. The cells should be within 5% of the average.

Inspect for contamination by dust, loose or corroded connections. If necessary isolate the string/bloc/cell and clean with a damp soft cloth. Warning - Do NOT use any type of oil, solvent, detergent, petroleum-based solvent or ammonia solution to clean the battery containers or lids. These materials will cause permanent damage to the battery container and lid and will invalidate the warranty.

Contact EnerSys if you have any questions regarding maintenance.

6. Disposal

PowerSafe SBS EON Technology 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.



www.enersys.com

EnerSys World Headquarters 2366 Bernville Road, Reading, PA 19605, USA Tel: +1-610-208-1991 / +1-800-538-3627

EnerSys EMEA EH Europe GmbH, Löwenstrasse 32, 8001 Zurich, Switzerland Tel: +41 44 215 7410

EnerSys Asia 152 Beach Road, Gateway East Building #11-03, Singapore 189721 Tel: +65 6508 1780

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