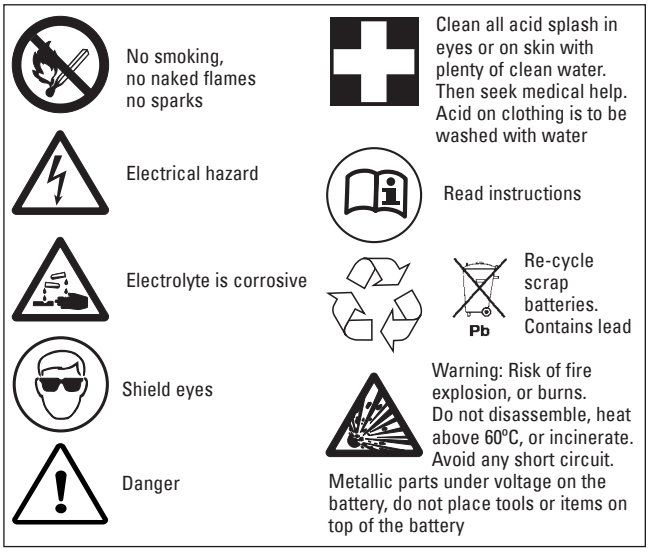



**California Proposition 65 Warning – Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.**

**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

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

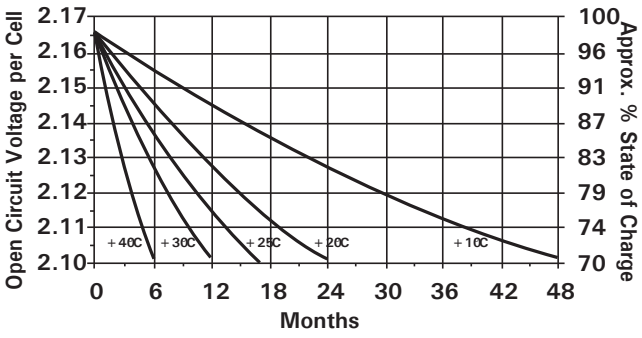
### 2.1 Storage Conditions and Time

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

During storage monoblocs and 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 Refresh Charge

Monoblocs and 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 0.1$C_{10}$ A for 24 hours. Recommended OCV audit intervals are given in the table below.

PowerSafe® SBS EON Technology®

# Instruction Sheet

| Temperature (°C/ °F) | Storage Time (Months) | OCV Audit Interval (Months) |
|---|---|---|
| +10 / +50 | 48 | 6 |
| +15 / +59 | 34 | 6 |
| +20 / +68 | 24 | 4 |
| +25 / +77 | 17 | 4 |
| +30 / +86 | 12 | 3 |
| +35 / +95 | 8.5 | 2 |
| +40 / +104 | 6 | 2 |

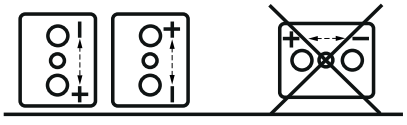
### 2.3 Commissioning Charge

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 20°C) 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 blocs and cells can be mounted in any orientation except inverted. However, in cyclic/hybrid applications, EnerSys recommend to install DIN-sized SBS EON Technology 2V cells in horizontal orientation. In such conf guration 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.

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

On each monobloc/cell the positive terminal is identif ed by a "+" symbol. 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. Tighten the fastener set bolt(s) / nut(s) to the fastening torque level indicated on the product label. Place the insulating covers in position immediately after tightening the fasteners.

## 4. Operation

PowerSafe® SBS® EON Technology® monoblocs and cells retain the long f oat life and storage characteristics of traditional PowerSafe SBS monoblocs and cells with the added benef t of improved cyclic ability in both f oat 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 20°C/68°F or 2.27Vpc at 25°C/77°F.

Operation at temperatures higher than 20°C will reduce life expectancy. Life is reduced by typically 50% for every 10°C rise in temperature. To offset the impact of higher temperatures compensation to the f oat voltage should be applied.

The recommended f oat voltage temperature compensation is:

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

Due to the very low internal resistance, PowerSafe SBS EON monoblocs and cells will accept unlimited current during recharge but for cost and practical purposes in f oat applications where recharge time to repeat duty is not critical, the rectif er current can be limited to the load plus 0.1$C_{10}$ 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 20°C/68°F, with the rectif er current limit set to a minimum of 0.1$C_{10}$ 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 monoblocs and 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:

Recharge time (hrs) = 2* ((0.8 x discharged Ah) / current limit) +1

The recommended compensation for charge voltage in cyclic applications is:

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

## 5. Maintenance

In practice, the user usually specif es 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 f oat voltage to the correct value.

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

Measure individual bloc/cell voltages. The blocs/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 certif ed lead acid battery recycler.

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