

	No smoking, no naked flames, no sparks		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.
	Electrical hazard		Read instructions
	Electrolyte is corrosive		Re-cycle scrap batteries. Contains lead
	Shield eyes		Risk of explosion or fire. Avoid any short circuit. Metallic parts under voltage on the battery, do not place tools or items on top of the battery.
	Danger		

**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

### 1.1 In-Transit Damage or Short Shipments

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.

### 1.2 Shipment Damage or Shortages

Open the shipping containers and check the contents for damage and against the packing slip. Immediately inform EnerSys of any damaged or missing items.

EnerSys is not responsible for damaged or missing items after a shipment has been in storage.

## 2. Storage

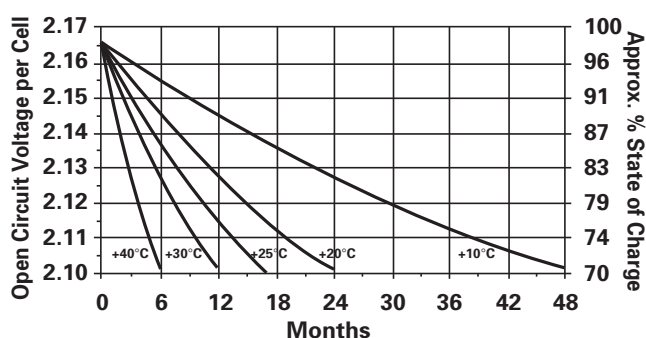
### 2.1 Storage Conditions and Time

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

During storage batteries 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.



**PowerSafe®**  
SBS



# Instruction Sheet

## 2.2 Commissioning Charge

Before conducting a capacity discharge or fully loaded duty cycle test, 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.

## 2.3 Refresh Charge

Monoblocs must be given a freshening charge when bloc voltages approach 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 10% C<sub>10</sub> current for 24 hours. Recommended OCV audit intervals are given in the table below.

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

## 3. Installation

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

Each monobloc is supplied with the terminal/connector fasteners.

On each monobloc the positive terminal is identified 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 with the connectors and fasteners provided. The fastener torque value is:

Battery Type	Fastener Size	Torque Nm / lbf in
SBS B14, C11, 100, 410	M8	5.0 / 44
SBS B14F, C11F, 100F	M6	5.0 / 44
SBS 170F & 190F	M6	9.0 / 80

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

## 4. Operation

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

#### 4.1 Interchangeability

PowerSafe® SBS EON Technology® battery types are fully interchangeable with standard PowerSafe SBS battery equivalents (where applicable). When used in conventional float applications the fit, form and function remain unchanged and their mixing will have no detrimental effect to either the performance or expected service life. However, where a PowerSafe SBS EON Technology monobloc is introduced as a replacement into an equivalent standard PowerSafe SBS battery, it must be understood that the improved cyclic capability afforded by EON Technology will not be achieved.

#### 4.2 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 float voltage should be applied.

The recommended float 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

In float applications where recharge time to repeat duty is not critical, the rectifier current can be limited to load + 10% C<sub>10</sub> Amps.

#### 4.3 Cyclic Operation

In addition to the long life characteristics inherent in traditional 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 rectifier current limit set to a minimum of 10% C<sub>10</sub> Amps (EON Technology is designed to accept in rush currents up to 6C<sub>10</sub> Amps without causing damage to the internal electrochemistry).

In cyclic applications, optimal life and performance is obtained by limiting recharge @ 2.40Vpc to the time taken to return 103% of discharged Ah before disconnecting the battery from the rectifier or switching to float voltage.

In systems where control of charge factor is not possible,

the battery will be returned to full state of charge (from 100% depth of discharge C<sub>10</sub>) in 6.5 hours at 2.40Vpc with 0.25C<sub>10</sub> Amps available. Higher charge currents will reduce charge time, lower currents will increase charge time.

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

**Warning:** Continuous charge at 2.40Vpc will significantly reduce battery life.

For additional information on the operation of PowerSafe SBS EON Technology batteries please refer to the application guide.

#### 5. Maintenance

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

The following is 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 bloc voltages. The blocs should be within 5% of the average.

Inspect for contamination by dust, loose or corroded connections. If necessary isolate the string/bloc 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

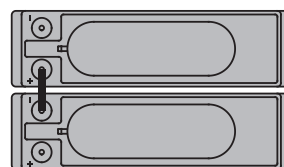
PowerSafe SBS EON Technology batteries are recyclable. Scrap batteries must be packaged and transported in accordance with prevailing transportation rules and regulations.

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

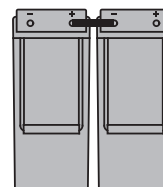
#### 7. Connectors

Battery Type	Connector Part No.
SBS B14, C11	2205-8919
SBS B14F, C11F	2205-8891
SBS 100	2205-8750
SBS 100F	2205-8749
SBS 170F & 190F	2205-8769
SBS 410	2205-9887 (A)
SBS 410	2205-8865 (B)

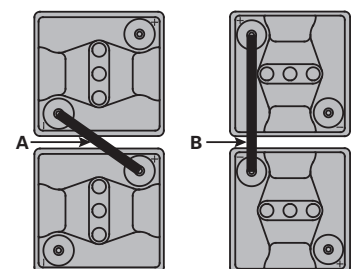
SBS B14, C11, 100



SBS B14F, C11F, 100F, 170F, 190F



SBS 410



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