

# Test and Monitoring Equipment



# Test & Monitoring Equipment Table of Contents

## Monitoring Systems

4-5 • SBS-H2 Hydrogen Gas Monitoring

6-7 • Equalink Battery Management System



## Digital Hydrometers

8-9 • SBS-2003

10 • SBS-2500

11 • SBS-3500



## Resistance Tester

12-13 • SBS-6500 Internal Resistance Tester



## Constant Current DC Load Banks

14-17 • SBS-8400 & Wireless Modules

18-19 • SBS-4830S/1110S/1230S/2206S/2415S

20-21 • SBS-4815CT

22-23 • SBS-200CT



# SBS Recommended Testing Schedule Based on IEEE & NERC PRC-005

■ - Meets the minimum requirements of NERC PRC-005-2\*  
● or ■ - Meets IEEE Recommendations\*

Vented / Flooded Lead Acid Batteries (VLA)	Test Equipment	IEEE 450-2010			
		Monthly	Quarterly	Yearly	5 Years
Visually inspect batteries, rack, charger, room.		●	●	■	
Record battery system float voltage and current at battery terminals.	SBS-600	●	●	■	
Record charger output voltage and current. Correct if needed.	SBS-600	●	■	■	
Check electrolyte levels. Fill with distilled water to 'max' line if necessary.		●	■	■	
Record pilot cell(s) or block(s) voltage, electrolyte temperature and specific gravity†.	SBS-2003	●			
Record voltage of ALL cells/blocks.	SBS-600, SBS-6500		●		
Record specific gravity of 10% of the cells†.	SBS-2003, SBS-2500, SBS-3500		●		
Record temperature of 10% of the cells.	SBS-2003		●		
Record specific gravity of ALL cells†.	SBS-2003, SBS-2500, SBS-3500			●	
Record the internal resistance value of ALL cells/blocks.	SBS-6500		■	■	
Record temperature of ALL cells/blocks.	SBS-6500			●	
Record internal resistance value of ALL cell-to-cell and terminal connections.	SBS-6500			■	
Conduct load test two years after installation and then every five years. When the system's capacity falls below 90% load test annually.	SBS-8400, SBS-1230, SBS-1110				■

†Specific gravity should be temperature-corrected to 77°F.

Nickel Cadmium Batteries	Test Equipment	IEEE 1106-2005			
		Quarterly	Semi-Yearly	Yearly	5 Years
Visually inspect batteries, rack, charger, room.		●	●	■	
Record battery system float voltage and current at battery terminals.	SBS-600	●	■	■	
Record charger output voltage and current. Correct if needed.	SBS-600	■	■	■	
Check electrolyte levels. Fill with distilled water to 'max' line if necessary.		■	■	■	
Record voltage of ALL cells/blocks.	SBS-600, SBS-6500		●	●	
Record temperature of 10% of the cells.	SBS-6500	●	●	●	
Record the internal resistance value and temperature of ALL cells/blocks.	SBS-6500			●	
Record internal resistance value of ALL cell-to-cell and terminal connections.	SBS-6500			■	
Conduct load test two years after installation and then every five years. When excessive capacity loss is noticed load test annually.	SBS-8400				■

Valve Regulated Lead Acid Batteries (VRLA)	Test Equipment	IEEE 1188-2005			
		Monthly	Quarterly	Yearly	2 Years
Visually inspect batteries, rack, charger, room.		●	●	■	
Record battery system float voltage and current at battery terminals.	SBS-600	●	●	■	
Record charger output voltage and current. Correct if needed.	SBS-600	●	■	■	
Record voltage and temperature of ALL cells/blocks at the negative terminal.	SBS-6500		●	●	
Record the internal resistance value of ALL cells/blocks.	SBS-6500		■	■	
Record internal resistance value of ALL cell-to-cell and terminal connections.	SBS-6500			■	
Conduct load test after initial installation and then every two years or 25% of expected battery life.	SBS-8400				■

\*The above testing schedules are based on SBS's interpretations of both IEEE and NERC PRC-005-2. This information should be used for guidance purposes only and SBS can't be held responsible if the information is incorrect or if other parties interpret the information differently.

# SBS-H2 Hydrogen Gas Detector

Complete Hydrogen Detection System

New! Certified: UL 61010-1



### Includes

- Main control
- Hydrogen sensor
- 25 ft. cable

### Applications

- Substations
- Battery rooms
- Uninterruptible power supply (UPS)
- Battery cabinet systems
- Battery charging areas
- Hydrogen fueled back-up power systems

The SBS-H2 Hydrogen Detector is a hydrogen detection system with visual and audible alarms and 1% and 2% hydrogen relays.

The system comes complete with the main control, a highly accurate hydrogen gas sensor and a 25 ft. cable. This unit can be powered with AC and/or DC power and can be mounted directly to a wall or to an electrical box, making it extremely versatile and very user-friendly.

The SBS-H2 includes relays for remote connection to alarm/monitoring systems and for control of external relays or an exhaust fan.

### Benefits

- Protects life, property and company profits
- Ideal for remote locations
- Fail safe mode in event of loss of power
- Up to three (3) sensors can be installed to main control to meet space coverage requirements

### Features

- Universal power inputs: 110/220 Vac and/or 12-48 Vdc input
- Strobe light for visual alerts
- Sensor status indicator LEDs on the main control
- Modular design for optimal placement of sensor(s)
- NRTL/C Certified: UL Std. No. 61010-1
- CAN/CSA-C22.2 No. 61010-1-12



### Installation

- Wall or 2-gang junction box mountable
- Mechanical relays are easily accessible:
  - Warning 1% relay, 15 A @ 120 Vac; 10 A @ 277 Vac; 10 A @ 28 Vdc
  - Alarm 2% relay, 1 A resistive @ 30 Vdc, 0.5 A @ 125 Vac
- Redundant power supply capability; dual AC and/or DC power supply connections (DC power supply will operate as backup power source)
- Indicator LEDs can be tested by pushing the red "TEST" button
- Sensors can be tested in the field with the P/N H2-TESTKIT

### Main Control Mounting and Power Options



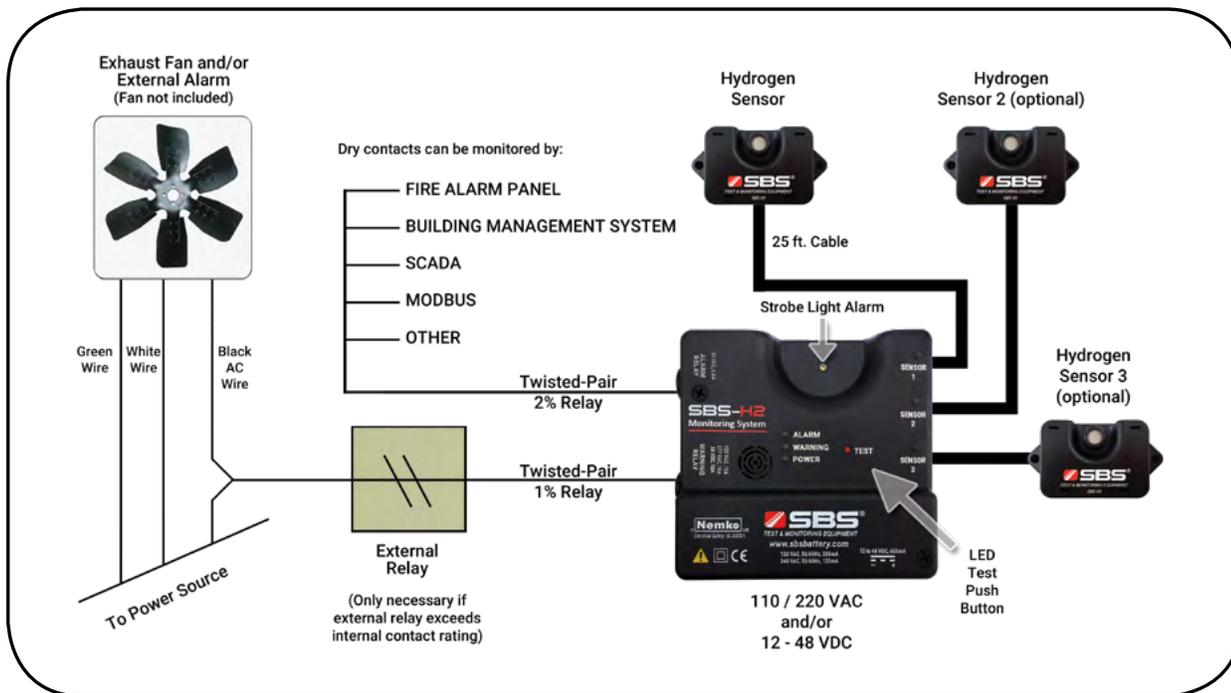
Wall-mountable



2-Gang Junction Box  
Hardwired AC and/or DC  
(optional)



18 AWG AC Cord (optional)



**Warning Settings:** Should the concentration of hydrogen gas in the air surrounding the sensor reach 1% by volume, the "1% Warning" yellow LED will light up on the main control of the unit. In addition, the 1% internal relay will energize and can be used to activate an external exhaust fan or a building management/alarm system (via SCADA Modbus).

**Alarm Settings:** Should the hydrogen gas concentration reach 2% by volume, the "2% Alarm" red LED will light up, the strobe will flash and an audible alarm will sound. In addition, the 2% internal relay will energize and can be used to activate a building management/alarm system (via SCADA/Modbus).

Ordering Information	
Part No.	Description
SBS-H2	Hydrogen detector with (1) sensor and 25 ft. cable

Accessory Ordering Information	
Part No.	Description
H2-SENSOR-25FT	Additional hydrogen sensor with 25 ft. cable
H2-SENSOR-50FT	Additional hydrogen sensor with 50 ft. cable
H2-SENSOR-100FT	Additional hydrogen sensor with 100 ft. cable
H2-TESTKIT	Test kit (includes 1% and 2% hydrogen, regulator, tubing and case) <b>Note: cannot ship via air freight</b>
H2-JB	4 11/16" x 4 11/16" 2-gang junction box
E190399	AC Cord 110 V, 10 A, 10 ft. with plug

Specifications	
1% Hydrogen	Dry contacts rated 10A/25 Vac
2% Hydrogen	Dry contacts rated .5A/28 Vdc
Power source	110/220 Vac, 50/60 Hz and/or 12-48 Vdc (9-58 Vdc operating voltage)
Temperature	Sensor rating of -4° F to 176° F (-20° C to 80° C)
Size	4.7" L x 4.7" W x 1.2" D (main control)

**Available Accessories**



Test Kit



Additional Hydrogen Sensor with 25 ft., 50 ft. or 100 ft. Cable



2-Gang Junction Box (Hardwired AC and/or DC)

# Equalink Battery Management & Monitoring System

Active Battery Management System with Voltage Balancing

Equalink is an Ethernet-based battery management system that monitors the voltage, internal resistance and temperature of each battery in a stationary battery system. Through a patented balancing process, Equalink actively regulates the float charging current of each battery, ensuring all batteries charge at the optimal voltage.

**Equalink Battery Management System actively manages batteries to increase reliability and extend life, whereas other battery monitoring systems simply monitor batteries while they deteriorate.**

Equalink can monitor current, ambient/room temperature, humidity, hydrogen gas and electrolyte levels. Through available Form C contacts/relays, Equalink can also monitor electrical equipment such as UPSs, inverters, transfer switches, generators and air conditioning systems.

### Benefits

- Prevents unexpected battery failure
- Increased battery capacity
- Extends battery life
- Easy access to battery data via web browser
- Automate data collection for NERC requirements

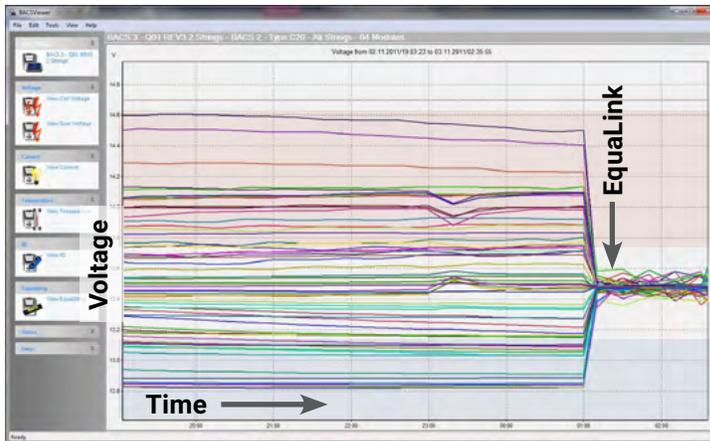


### Features

- Patented voltage balancing process
- Pinpoints poorly performing cells
- Regulates charging (prevents overcharging and undercharging)
- Advance warning system
- Remote log in
- Email and SMS text alerts
- Downloadable battery history
- SNMP and Modbus communication
- Compatible with batteries 2V to 16V
- Thermal runaway prevention
- Listed to UL 60950 standards

Status log of individual battery data

String Equalink Demo String #1 48 VDC					
No.	Volt [V]	Temp. [°C]	RI [mΩ]	Equalize	Status
1	2.26	14.5	1.59	█	●
2	2.26	14.8	1.67	█	●
3	2.26	14.8	1.55	█	●
4	2.26	14.7	1.54	█	●
5	2.26	14.5	1.55	█	●
6	2.26	14.1	1.55	█	●
7	2.26	14.5	1.53	█	●



The included Equalink software (above) shows Equalink-balanced voltages on a 5-year-old battery system with voltage spread.

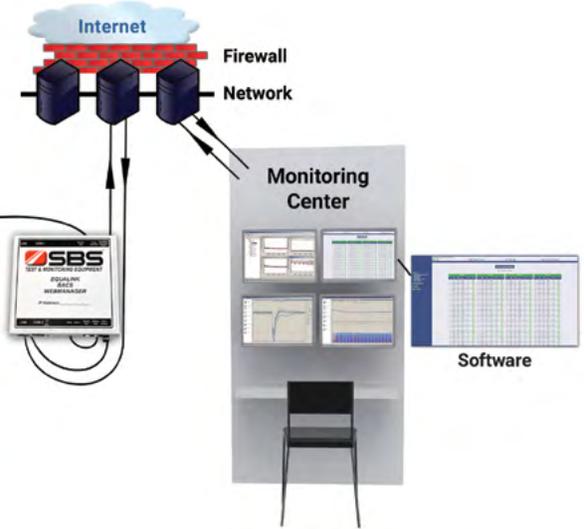
### How Balancing Works

Equalink reads individual battery voltages and compares them to the battery system's overall voltage. Each Equalink module controls the amount of float current passing through the battery to regulate the voltage to the optimum value. This constant monitoring and balancing of the individual charging voltages helps guarantee the availability of the battery system at all times.

With its proprietary balancing process, Equalink is able to monitor and actively regulate battery voltage within 0.001 volts of the system's average float charging voltage.



Remote Battery Location



### Data Collection & Alarms

EqualLink continuously collects data and provides warnings and alarms. Detailed data and reports can be accessed and collected through a local or remote secured browser connection.

## NERC PRC-005-2 Battery Maintenance Requirements

■ - Meets the minimum requirements of NERC PRC-005-2\*  
● or ■ - Meets IEEE Recommendations\*

Vented / Flooded Lead Acid Batteries (VLA)	IEEE450-2010			
	Monthly	Quarterly	Yearly	5 Years
Visually inspect batteries, rack, charger, room	●	●	■	
Record battery system float voltage and current at battery terminals	●	●	■	
Record charger output voltage and current; correct if needed	●	■	■	
Check electrolyte levels. Fill with distilled water to 'max' line if necessary.	●	■	■	
Record ambient/room temperature	●	●	●	
Make sure ventilation system is operational	●	●	●	
Inspect system for unintentional battery grounds	●	■	■	
Record pilot cell(s) or block(s) voltage and electrolyte temperature	●			
Record pilot cell(s) specific gravity (temp. corrected to 77° F)	●			
Record voltage of ALL cells/blocks		●		
Record specific gravity of 10% of the cells (temp. corrected to 77° F)		●		
Record temperature of 10% of the cells		●		
Record specific gravity of ALL cells (temp. corrected to 77° F)			●	
Record the internal resistance value of ALL cells/blocks		■	■	
Record temperature of ALL cells/blocks			●	
Record internal resistance value of ALL cell-to-cell and terminal connections			■	
Conduct load test two years after installation and then every five years. When the system's capacity falls below 90%, load test annually.				■

✓ EqualLink can assist in NERC and FERC reporting by verifying and recording the relevant information (see checkmarks on left).

\*The above testing schedules are based on SBS's interpretations of both IEEE and NERC PRC-005-2. This information should be used for guidance purposes only and SBS can't be held responsible if the information is incorrect or if other parties interpret the information differently.

### For Battery Types

- Lead Acid (flooded/wet and VRLA)
- Nickel Cadmium
- NiMH
- Most types of Li-Ion

### Available Environmental Monitoring

- Temperature
- Humidity
- Electrolyte level
- Hydrogen gas detection

### Maintenance Cost/Time Savings

EqualLink reduces maintenance costs, especially for remote locations, through:

- Decreased travel to remote locations for data collection
- Decreased time preparing and submitting reports
- Decreased manual monitoring with custom alarm parameters

### EqualLink Order Code

	BM	A	B	C	D
Example*	BM	125-	60	x	2V .01
Your Code	BM			x	

	Code	Feature
A	Nominal DC System Voltage	12- 12 Vdc
		24- 24 Vdc
		48- 48 Vdc
		125- 125 Vdc
		250- 250 Vdc
	XXX-	Other XXX Vdc
B	XXX	Enter number of batteries (blocks or cells)
C	Battery Voltage	2V 2 V Cells
		4V 4 V Blocks
		6V 6 V Blocks
		12V 12 V Blocks
D	Input Power	.01 120 Vac/12 Vdc
		.02 18-72 Vdc
		.03 120-370 Vdc

\*Example part number BM125-60x2V.01 represents: 125V system of sixty (60) 2 Volt cells with a 120 VAC powered WebManager.

# SBS-2003 Digital Hydrometer / Density Meter

Digital Specific Gravity Tester with Bluetooth Downloading Capabilities



Specific gravity testing is easy and efficient with the SBS-2003. Simply insert the nozzle into the battery and depress the finger pump, which draws a few drops of sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) through the tube. Within three seconds the measured refractive index is converted into a temperature-compensated specific gravity reading and the specific gravity, temperature and cell count are displayed. After testing is completed, you can transfer the data to your computer via Bluetooth and download results into an Excel report.

Combining a light weight and durable design with easy maintenance, field-replaceable spare parts and a large data storage memory, the SBS-2003 is suitable for use with lead acid batteries.

### Benefits

- Measures specific gravity, ambient temperature and count
- Automatic temperature compensation to 77° F (or 25° C)
- Time savings: 5 times faster than conventional methods
- Stores up to 1000 readings
- Wirelessly transfers testing data to provided software to create an Excel report

### Features

- Able to record temperature in Fahrenheit or Celsius
- ±0.002 accuracy
- LCD display
- IP64 water resistant

### Applications

- Utility
- UPS
- Data Centers
- Telecom
- Material Handling

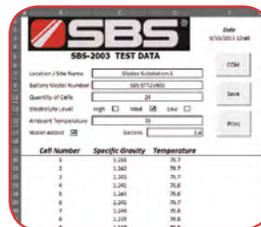
### Cost Savings Example

SBS field studies show that using the SBS-2003 is five times faster than using a standard glass hydrometer and thermometer.

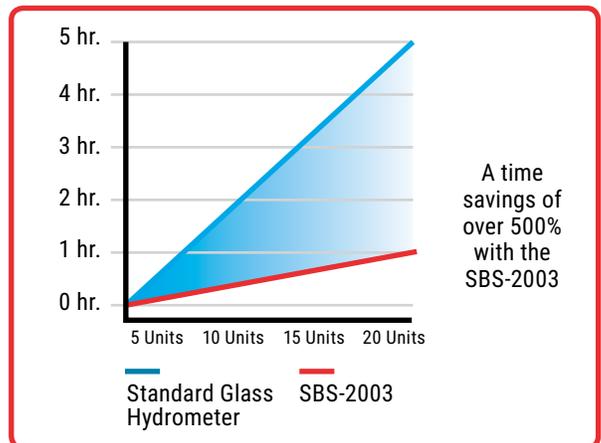
If you spend 60 minutes testing specific gravities every month in 20 sites, this totals 60 minutes x 20 sites x 12 months per year = 14,400 minutes divided by 60 minutes = 240 labor hours per year.

Since we can reduce this time by 500%, 240 hours divided by 5 = 48 hours total time with the SBS-2003.

That's a savings of 192 hours per year. Multiplied by \$45.00 per hour labor cost with benefits: 192 x \$45.00 = \$8,640.00 of savings per year.



Data Archive/  
Export into Excel

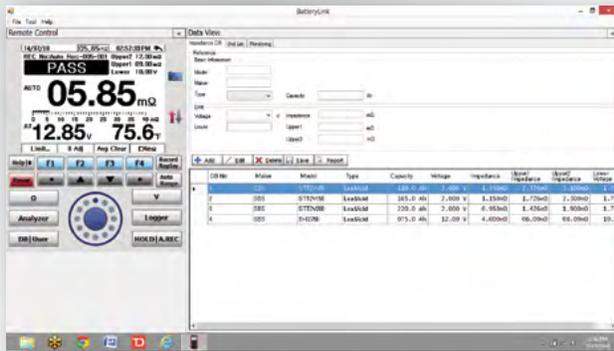


Video available at [www.sbsbattery.com/videos](http://www.sbsbattery.com/videos)

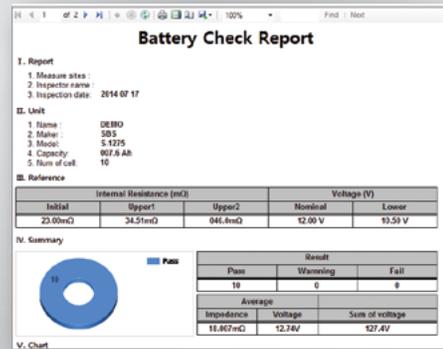
## Hydrometer & Resistance Tester Data Merge



When combined with our SBS-6500 resistance tester, the SBS-2003 provides an all-in-one solution for your battery testing needs



Specific gravity readings will be integrated into the SBS-6500 data/readings



Now all data for each battery can be exported into one, easy-to-read report which will include the downloaded specific gravity readings



### SBS-2003 Includes

- Main unit
- Instruction manual
- Excel template software
- Three (3) filling tubes
- 9V battery
- Adjustable hand strap
- Hard case

### Specifications

Method of Detection	Specific gravity; light refraction method
Temperature	Measuring: 5 to 40° C (41 to 104° F)
Range	1.000–1.400
Measuring Time	Within 3 seconds
Power Supply	(1) DC9V alkaline battery
Calibration	Distilled or de-ionized water
Accuracy	Specific gravity: ±0.002 @ 10 to 30° C (50 to 86° F) Temperature: ±1° C @ 10 to 30° C (1.8° F @ 50 to 86° F)
Size	2.75" D x 1.75" W x 8.25" H; 10.75 oz.
Filling Tube	9.5" L x 1/8" diameter

### Ordering Information

Part No.	Description
SBS-2003	Specific gravity tester (°F and °C)

### Accessory Ordering Information

Part No.	Description
2002/3-SPR-PRT-KIT	Spare parts kit includes: O-ring, sample chamber w/ rubber pump, (3) 9" filling tubes
2002/3-TUBE	9" filling tube for SBS-2003
2002/3-HOL	Holster w/ belt for SBS-2003
SBS-TE CASE	Soft case for hydrometer

# SBS-2500 Digital Hydrometer / Density Meter

Digital Specific Gravity Tester with Downloading Capabilities for NiCd or Lead Acid Batteries



### SBS-2500 Includes

- Main unit
- Instruction manual
- CD-ROM software package
- IR computer link
- 12" filling tube
- Protective rubber boot
- Carrying case

The SBS-2500 offers the ability to test the specific gravity and temperature of lead acid or nickel cadmium batteries within seconds. The unit is able to take readings between the range of 0.0000 to 2.0000.

The hydrometer's internal memory will store up to 1100 individual specific gravity and temperature readings. Readings can be uploaded into an easy-to-read report using the included software.

### Features

- Measures specific gravity, ambient temperature and count
- Tests both lead acid and nickel cadmium batteries
- Time savings: 5 times faster than conventional methods
- $\pm 0.001$  accuracy
- Automatic temperature compensation
- Stores up to 1100 measurements including time stamps
- Software package for downloading
- LCD display
- CE compliant



### Ordering Information

Part No.	Description
SBS-2500	Specific gravity tester (°F and °C)

### Accessory Ordering Information

Part No.	Description
SBS-2500-SPR-PRT-KIT	Spare parts kit includes: O-ring, sample pump, filling tube and washer
SBS-2500TUBE/WASH	Filling tube and washer for SBS-2500

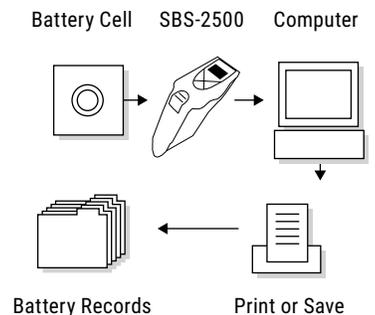
### Specifications

Method of Detection	Specific gravity; oscillating tube method
Temperature	Working: 5 to 35° C (41 to 95° F) Storage: -20 to 70° C (-4 to 158° F)
S.G. Range	0.0000-2.0000
Measuring time	Within 3 seconds
Power supply	(2) AAA batteries
Calibration	With dry air or pure water
Accuracy	$\pm 0.001$ ; temperature: 0.2° C (0.4° F)
Size	9" L x 4.5" W x 2.5" H; 12.7 oz.
Filling tube	11.8" L x 1/8" diameter

### Applications

- Utility
- UPS
- Data Centers
- Telecom
- Material Handling
- Battery Manufacturing

DIGITAL HYDROMETER



# SBS-3500 Digital Hydrometer / Density Meter

Digital Specific Gravity Tester with Downloading Capabilities for NiCd or Lead Acid Batteries

The SBS-3500 uses oscillating U-tube technology to measure specific gravity and temperature of lead acid or nickel cadmium batteries within seconds. The unit is able to take readings between the range of 0.0000 to 3.0000. With the ability to communicate wirelessly to a printer or computer via the integrated IrDA interface, testing results can be uploaded into an easy-to-read report.

## Features

- Measures specific gravity, ambient temperature and count
- Tests both lead acid and nickel cadmium batteries
- Time savings: 5 times faster than conventional methods
- $\pm 0.001$  accuracy
- Automatic temperature compensation
- Compact, lightweight design enabling one-hand measurement
- Stores up to 100 sample IDs for easy sample identification
- Stores up to 1024 measurements including time stamps and sample IDs
- Infrared data interface for data exchange
- LCD display



## SBS-3500 Includes

- Main unit
- Instruction manual
- IR computer link and driver
- 7" filling tube
- Carrying case

## Ordering Information

Part No.	Description
SBS-3500	Specific gravity tester (°F and °C)

## Accessory Ordering Information

Part No.	Description
SBS-3500-TUBE	7" filling tube for SBS-3500
SBS-3500-PUMP	Replacement hand pump for SBS-3500

## Specifications

Method of Detection	Specific gravity; oscillating tube method
Temperature	Measuring: 0 to 100° C (32 to 212° F) Ambient: -10 to 50° C (14 to 122° F) Storage: -20 to 70° C (-4 to 158° F)
S.G. Range	0.0000–3.0000
Measuring Time	Within 3 seconds
Power Supply	(2) AA batteries
Calibration	With dry air or pure water
Accuracy	$\pm 0.001$ ; temperature: 0.2° C (0.4° F)
Size	5.5" L x 5.4" W x 1" H, 12.2 oz.
Filling Tube	7" L



## Applications

- Utility
- UPS
- Data Centers
- Telecom
- Material Handling
- Battery Manufacturing

# SBS-6500 Battery Resistance Tester

Assists with IEEE/NERC Compliance

The SBS-6500 is a multipurpose resistance and voltage tester. Readings of cells and intercell connectors are taken within seconds using the included pin probes (or optional clamp probes). The SBS-6500 can be programmed with site names, battery details and pass/warning/fail alarm set points for resistance measurements (pass/fail for voltage). All data is retained in the meter's internal memory for easy on-site access. With a computer and the included software, the SBS-6500 generates custom graphical reports for historical trending and comparisons.

The SBS-6500 pairs with our SBS-2003 digital hydrometer to import specific gravity readings from the SBS-2003 into the SBS-6500. With this data merge, the SBS-6500 will store and generate reports with voltage, resistance, temperature and gravity readings.

Contains  
Data logger,  
SG Bluetooth  
Upload and  
USB PC  
Integration  
Software



### Benefits

- Quickly records and stores resistance, voltage and temperature of strings, cells and intercell connectors
- Instantly retests and recalls readings on-site
- Pin probe or clamp probe compatible
- User-friendly software and easy-to-navigate menu
- Convenient battery string and parameter set up via unit or software
- Organizes data by name and parameters for each battery string (up to 300 strings)
- Optional ability to download specific gravity readings wirelessly from SBS-2003 hydrometer
- Meets IEEE and NERC maintenance recommendations for stationary battery systems

### Data Storage:

*300 battery strings  
x 250 cells per string x  
4 tests per year over a  
period of 25 years =  
7.5 million records*

### Applications

- Telecom
- Utility
- Oil and Gas
- Solar/Photovoltaic
- UPS
- Emergency Lighting
- Railways

### Functions

- Tests and records resistance, voltage and temperature readings of cells and intercell connectors
- On-screen pass/warning/fail indication during testing based on set parameters
- Stores and displays all historical data on handheld unit
- Communicates with computer and software via USB port
- Generates and displays battery string's test report and comparison data



### Features

- Versatile: tests flooded lead acid, VRLA, NiCd, Li-ion and NiMH batteries and strings
- Automatically measures and stores data within seconds
- Voltage testing range of 0-100 Vdc
- IEC 6101-1 CAT II 300V Safety Standard
- Built-in NiMH battery with unit charging cord
- Large 3.8" LCD backlit display

### Specifications

Size and Weight	4.2" W x 2.2" D x 8.3" H; 2.6 lb.
Storage	7,500,000 records
Ah Measurement Range	5-6000 Ah, 0-100 Vdc
Voltage Measurement	Resolution: 0.001V Accuracy: ±0.1%
Resistance Measurement	Range: 1 mΩ to 400Ω Resolution: 0.001 mΩ Accuracy: ±1.0%
Display	3.8" LCD, 320 x 240 backlit screen
Communication Interface	USB, Bluetooth w/ SBS-2003
Software	SBS-6500 Battery Management Software
Software Format	MS Windows
Power Supply	Rechargeable NiMH battery pack
Operation Time	8 hours
Operation Temperature	14° to 122° F



Video available at [www.sbsbattery.com/videos](http://www.sbsbattery.com/videos)

BATTERY RESISTANCE TESTER

## Hydrometer & Resistance Tester Data Merge

When combined with our SBS-2003 hydrometer, the SBS-6500 provides an all-in-one solution for your battery testing needs. The hydrometer downloads specific gravity data directly into the SBS-6500 for viewing or reporting. When a report is created with the SBS-6500 software, correlating voltage, temperature, resistance and specific gravity data readings will be together in a single report.



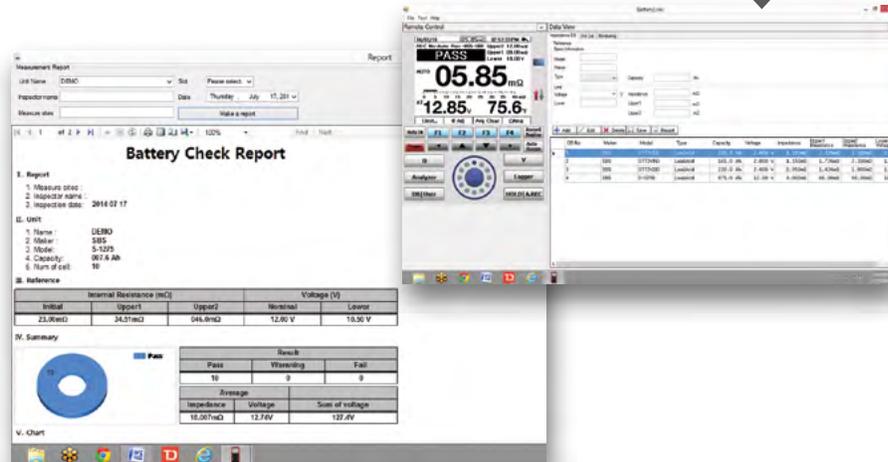
SBS-2003  
Hydrometer



SBS-6500  
Resistance Tester

## Battery Management Software (Included)

- Interface for loading string and alarm data to and from tester
- Exports into Excel and PDF formats for easy incorporation into custom reports
- Creates graphs and reports for battery analysis and trending



## SBS-6500 Includes

- Main unit
- Pin probes
- Instruction manual
- Quick start guide
- Software
- USB cable
- Unit charging cable
- NiMH battery
- Calibration bar
- Adjustable carrying strap
- Carrying case



Clamp Probes (optional)  
P/N 6500-CLAMP-PROBE



### Ordering Information

Part No.	Description
SBS-6500	Battery resistance tester

### Accessory Ordering Information

Part No.	Description
SBS-2003	Specific gravity tester
6500-CLAMP-PROBE	Clamp probe leads
6500-PIN-PROBE	Replacement pin probe leads
6500-PIN	Replacement pin set for 6500-PIN-PROBES
6500-BATT	Spare NiMH battery for SBS-6500

# SBS-8400 Battery Capacity Tester with Monitoring

10–300 Vdc, 0–120 Amp Constant Current Load Bank with Individual Cell Monitoring Capabilities



The SBS-8400 is a versatile and fully programmable constant current discharge load bank with detailed data acquisition and display capabilities. The unit features a user-friendly touch screen menu and a complete built-in data monitoring/acquisition system when paired with wireless modules and software.

Unlike basic load banks, the SBS-8400 is a high-tech solution for easy, efficient collection of data and generation of records for archiving.

## Benefits

- Automatically discharges batteries unmanned without danger of over-discharging
- Individual cell monitoring capabilities via wireless modules
- Can be used on a variety of systems with lead acid and/or nickel cadmium batteries
- Test parameters are adjustable during test without stopping test
- Automatically protects and saves data from an unexpected test stop/end
- Easy to navigate unit menu and computer software
- Download data after discharge to USB drive
- Generates custom reports for trending, records and reporting with included software
- Can be slaved with other load banks to increase amp draw up to 720 Amps



Touch Screen Menu

## Features

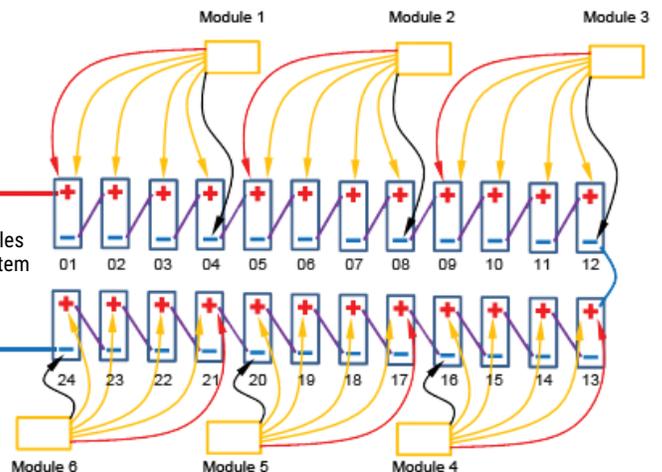
- Wide voltage and current range: 10–300 Vdc / 0–120 Amps
- Wireless module connection that measures and records individual cell voltages
- 5.7 in. LCD touch screen
- 30 parameter presets that can be adjusted during testing
- Selectable discharge mode: constant current (amps) / power (kW)
- 4 adjustable stop points and multiple alarm designs to control the process intelligently
  - Low system voltage: 0–250 Vdc
  - Discharge time: 0–99 Hour 99 Min.
  - Discharge capacity: 0–9999 Ah
  - Low cell voltage: 0–15.00 V
- View test data in real time on screen or with computer via RS232

## Applications

- Telecommunications
- Utility
- UPS
- Battery manufacturing
- Industrial maintenance
- Critical power
- Data center



Example of how the wireless modules would be installed on a 48 Vdc system consisting of qty. (24) 2 volt cells



Video available at [www.sbsbattery.com/videos](http://www.sbsbattery.com/videos)

Specifications	
DC Volt Range	10–300 Vdc
DC Current Range	10–15 / 150–300 Vdc: 0–60 Amps 15–150 Vdc: 0–120 Amps
Accuracy and Resolution	±1.0%, 0.1 Amp
Display	5.7" LCD Color Touch Screen
Power Supply	110 Vac, 60 Hz
Communications Port	USB / RS232
Internal Memory	8MB Flash
Size (main unit)	9.0" x 14.5" x 27.0"; 53 lb.
Size (with case/acc.)	12.5" x 23.0" x 31.0"; 93 lb.

**Includes**

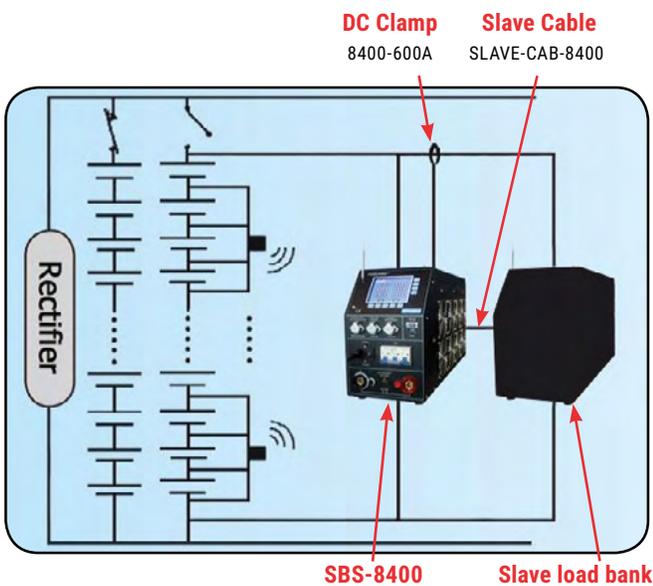
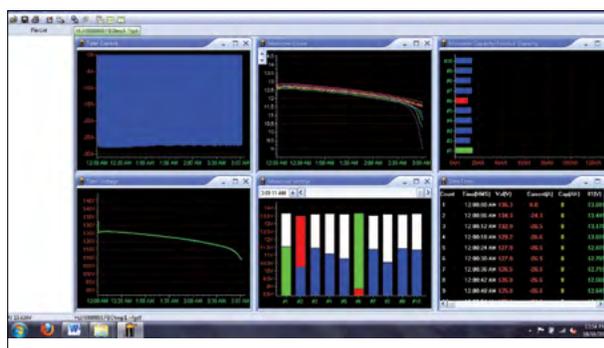
- Main unit
- Instruction manual
- Computer analysis software
- 6 ft. DC cable set (pos. & neg.)
- 3 ft. AC cable
- RS232 wire
- Case with wheels



Portable case included

**Computer Analysis Software**

- User-friendly and easy to navigate
- Data downloading and analyzing through real-time communication or USB memory devices
- Software interface includes: battery voltages curve and bar chart, battery resistances bar chart, group voltage curve, current curve, capacities histogram data form, etc.
- Generate custom and detailed Excel reports with USB and software



**Paralleling Load Banks**

The SBS-8400 has a 0–120 Amp current range; however, it is possible to parallel additional compatible load banks with the SBS-8400 to increase the current.

With the optional P/N 8400-600A DC clamp the user can discharge up to 720 Amps and the SBS-8400 will monitor the total DC current being drawn by up to two (2) additional load banks in parallel.

Accessory Ordering Information	
Part No.	Description
MODULE-1.2/2-25	1.2/2V Wireless module kit w/ case Qty. 25 (+2 spare)*
MODULE-1.2/2-30	1.2/2V Wireless module kit w/ case Qty. 30 (+2 spare)*
MODULE-2/6/12-15	2/6/12V Wireless module kit w/ case Qty. 15 (+2 spare)*
MODULE-2/6/12-30	2/6/12V Wireless module kit w/ case Qty. 30 (+2 spare)*
8400-600A	600 DC Current Clamp
SLAVE-CAB-8400>8400	Paralleling Cable, SBS-8400 to SBS-8400/SBS-4815
SLAVE-CAB-8400>S	Paralleling Cable, SBS-8400 to S-Series
SLAVE-CAB-8400>(2)S	Paralleling Cable, SBS-8400 to (2)S-Series
BCT110/220-1000	750 Watt Voltage Transformer 110/220 Vac 50/60 Hz
Pelican case upgrade available	

Ordering Information	
Part No.	Description
SBS-8400	0–300 Vdc, 0–120 Amp load bank

# SBS Wireless Modules

Individual Cell Monitors (Accessory for Compatible Battery Capacity Testers)



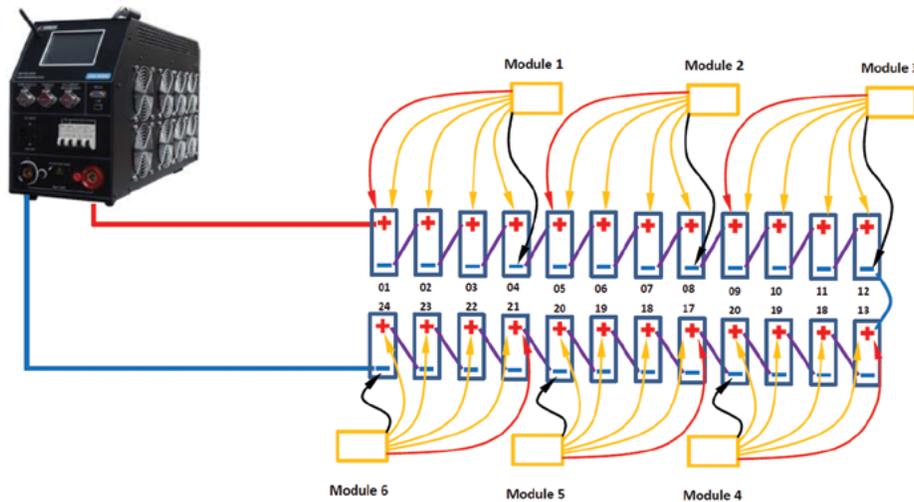
During capacity testing, the wireless modules measure each cell's voltage and wirelessly send the data back to the paired load bank. All voltage values are displayed on the load bank's LCD screen and listed in the test report, which is created with the computer software. Wireless modules make it easy to locate failed or problematic cells in the battery bank.

## Features

- Real-time cell voltage measurement during discharge test
- Advanced technology that wirelessly communicates readings between modules and load bank
- Wide range for 1.2/2V or 2/6/12V battery applications
- One module supports voltage measurements for up to 4 cells
- Supports monitoring up to 120 cells/batteries in a single test
- Protective storage included



Voltage bar chart on load bank screen



## Specifications

Type	SBS-2/6/12	SBS-1.2/2
Support Cell Voltage	2/6/12V	1.2/2V
Wires	Six (1 Red, 1 Black, 4 Yellow)	Five (4 Red, 1 Black)
Power Supply Wire	Red & Black Operating Voltage: 5-24 V Max. Voltage: <400V	Red No. 1 & Black Operating Voltage: 3.5-20 V Max. Voltage: <60V
Measure Voltage Range	0-16 V for each channel	0-5 V for each channel
Accuracy and Resolution	±0.5%, 0.01 V	±0.5%, 0.01 V
Dimensions / Weight	3.9 x 2.6 x 1.3 in. (100 x 65 x 32 mm) / 0.66 lb. (0.3 kg)	
Operation Temp. / Storage Temp. / Humidity	23° to 122° F (-5° to 50° C) / -40° to 158° F (-40° to 70° C) / 5% - 95% RH	

## Connection Drawings

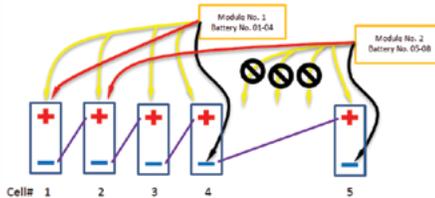
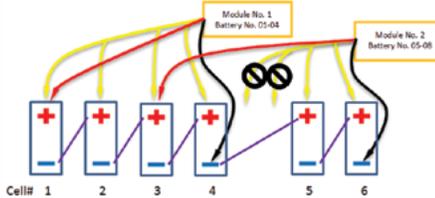
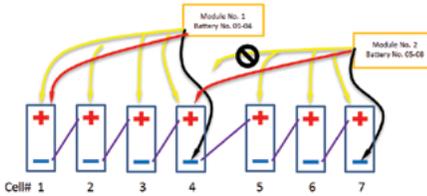
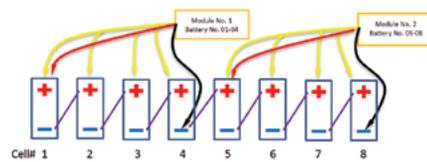
**SBS-2/6/12**  
For Lead Acid Battery Monitoring



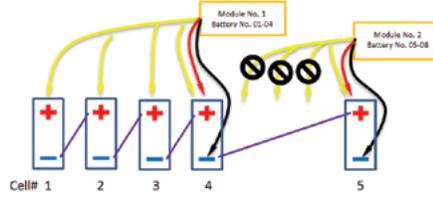
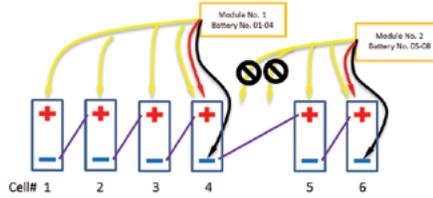
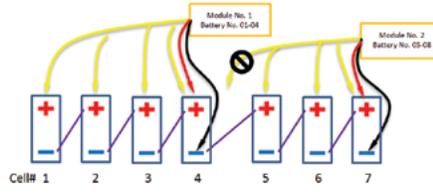
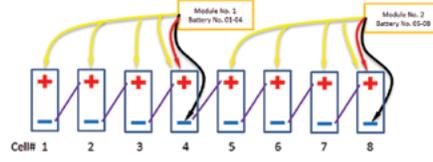
**SBS-1.2/2**  
For Single-Cell Monitoring



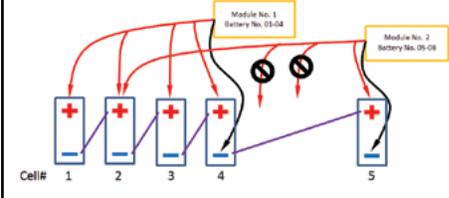
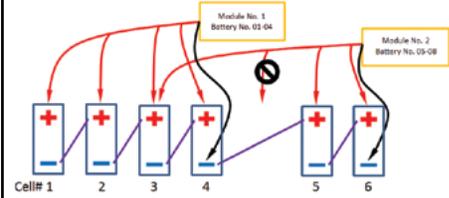
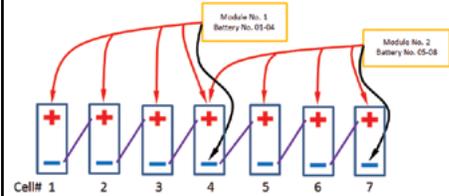
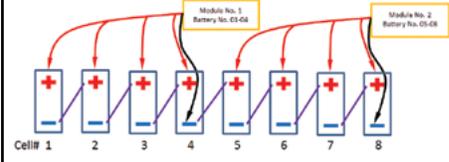
**Monitoring 2Volt Cells with 2/6/12V Module**



**Monitoring 6 or 12V Blocks with 2/6/12V Module**



**Monitoring 1.2 or 2V Cells with 1.2/2V Module**



### Wireless Load Bank Module Kits Ordering Information

Battery Type	DC Voltages of Systems to be Tested	Module Package(s) Required (Part No.)	Qty. of Modules (+2 spares)
Lead Acid Only (2/6/12V)	12-125 Vdc	MODULE-2/6/12-15	15
	12-250 Vdc	MODULE-2/6/12-30	30
NiCd/Single Cell LA Only (1.2/2V)	12-125 Vdc	MODULE-1.2/2-25	25
	12-250 Vdc	MODULE-1.2/2-30	30

# Battery Capacity Testers

24–250 Vdc, 0–300 Amp Series of Constant Current Load Banks

The only way to know if your stationary batteries will perform to specification is to test them regularly.

NERC standard PRC-005-2 requires that vented lead acid and nickel cadmium (NiCd) systems be discharge tested every six (6) years and valve regulated lead acid (VRLA) batteries every three (3) years. IEEE recommends load testing stationary flooded/vented lead acid and NiCd stationary batteries every five (5) years and VRLA batteries every 12–18 months.

The SBS constant current load banks are an affordable way to perform easy and accurate IEEE450 (vented lead acid), IEEE1106 (NiCd) and IEEE1188 (VRLA) load tests.

These units are quick and easy to set up. They display the voltage, current and Ah removed from the string during the test. Since this is a constant current load bank, the user also does not have to adjust the current during the test.

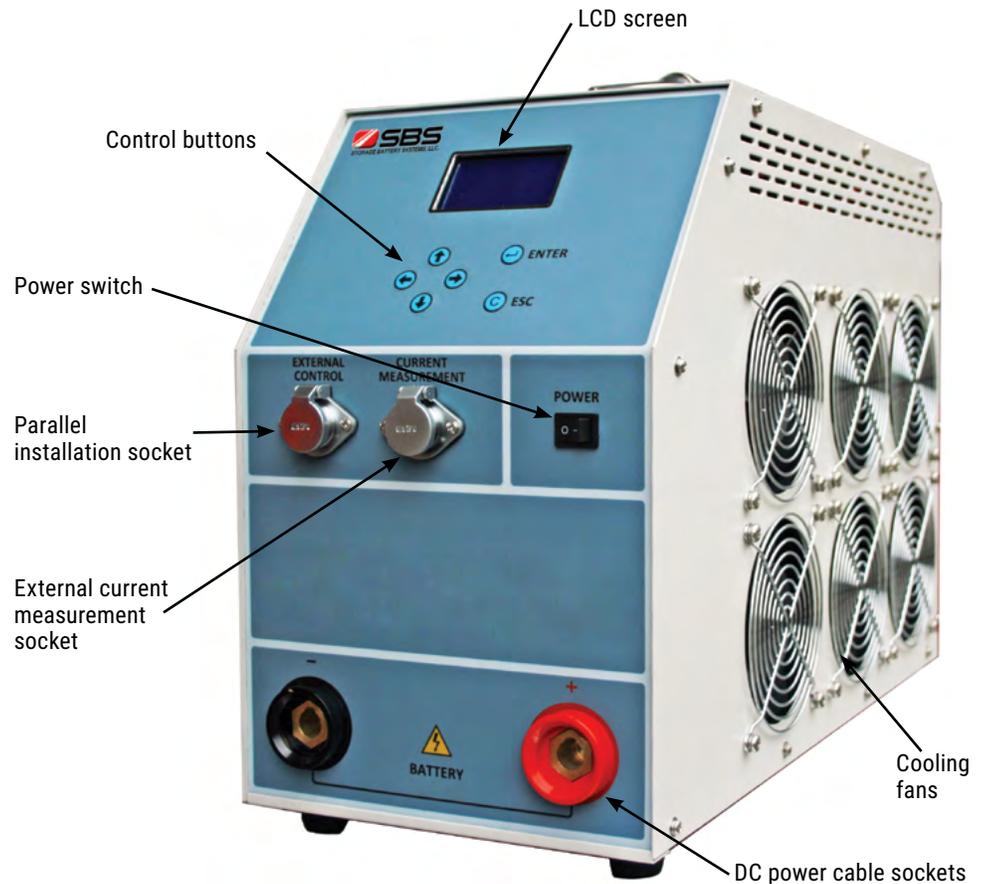
These load banks come standard with multiple adjustable stop points and built-in protection to ensure that the batteries are never damaged due to over-discharge.

## Features

- Many unit options with wide voltage and current range
- Automatically discharges batteries unmanned without danger of over-discharging
- Continuously holds the current set throughout the test
- LCD screen displays real time voltage, discharge current and capacity/Ah removed
- Test parameters are adjustable during test without stopping test
- 3 adjustable stop points for built-in protection
  - End system voltage
  - Discharge time
  - Discharge capacity (Ah)
- Units can be slaved with the SBS-8400 and/or other load banks to increase amp draw

## Built-in Protection

- Audible alarm
- Warning on LCD screen
- High temperature shutdown
- High voltage shutdown
- Overload protection



SBS-4830S



Video available at [www.sbsbattery.com/videos](http://www.sbsbattery.com/videos)

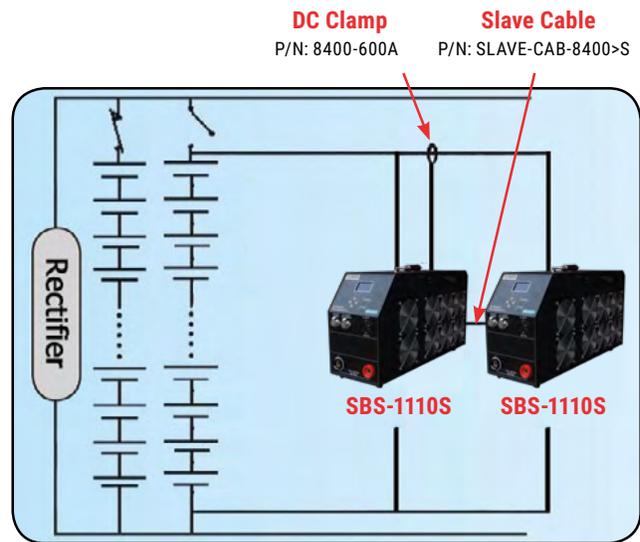


SBS-1110S



**Includes**

- Main unit
- Instruction manual
- 9 ft. DC cables
- Carrying case with wheels



With the optional P/N 8400-600A DC clamp the user can parallel additional load banks of the same voltage range to increase discharge current.

**Ordering Information**

Part No.	Description
SBS-4830S	24 Vdc 0-150 Amp / 48 Vdc 0-300 Amp Constant Current Load Bank
SBS-1110S	125 Vdc 0-100 Amp Constant Current Load Bank
SBS-1230S	125 Vdc 0-300 Amp Constant Current Load Bank
SBS-2206S	250 Vdc 0-60 Amp Constant Current Load Bank
SBS-2415S	250 Vdc 0-150 Amp Constant Current Load Bank

**Accessory Ordering Information**

Part No.	Description
8400-600A	600 DC Current Clamp
SLAVE-CAB-8400>S	Paralleling Cable, S-Series to S-Series/SBS-8400/SBS-4815
SLAVE-CAB-8400>(2)S	Paralleling Cable, S-Series to (2) S-Series/SBS-8400/SBS-4815
BCT110/220-1000	750 Watt Voltage Transformer 110/220 Vac 50/60 Hz
Pelican case upgrade available for select models	

**Technical Data**

Display	LCD (128 x 64 pixels)
Input	During discharge: real time voltage / current / test time / capacity discharged (Ah) User can set: end system voltage / test time / capacity discharged (Ah)
Test Type	Unit holds the set current throughout the test
Protection	Overheat / Overload / Over voltage protection with audible alarm and screen warning
Power Supply	SBS-4830S uses DC power supply (from tested battery) 125 and 250 Vdc units use AC power supply (110 Vac 60 Hz)
DC Cables	Included, 9 ft. long

**Specifications**

Part No.	DC Voltage Range	DC Current Range (Amps)	Dimensions L x W x H (in.)	Weight (lb.)
SBS-4830S	20-40 Vdc 40-60 Vdc	0-150 A 0-300 A	26 x 9 x 16	40
SBS-1110S	90-150 Vdc	0-100 A	25 x 9 x 15	44
SBS-1230S	90-150 Vdc	0-300 A	36 x 9 x 25	110
SBS-2206S	190-265 Vdc	0-60 A	26 x 9 x 16	40
SBS-2415S	196-300 Vdc	0-150 A	36 x 9 x 25	110

# SBS-4815CT Battery Capacity Tester with Monitoring

24/48 Vdc, 0–150 Amp Constant Current Load Bank with Individual Cell Monitoring



## Applications

- Telecom
- Forklifts, Golf Carts & AGVs
- Power Plants
- Oil Companies

The SBS-4815CT is a fully programmable and portable constant current load bank with detailed data acquisition and display capabilities.

Built-in memory continuously records discharge data including: overall system voltage, current and individual cell voltages (when modules are installed).

## Benefits

- Can be powered from DC or AC power supply
- Weighs only 21 lb.; designed for portability
- Can be slaved with other load banks of the same voltage to increase discharge current



## Features

- Voltage and current range: 20–60 Vdc / 0–150 Amps
- 5.7" LCD touch screen
- 4 adjustable stop points and multiple alarm designs to control the process intelligently
- Wireless modules that measure and record individual cell voltages during testing
- View test data in real time on screen or with computer via RS232
- Download data after discharge to USB drive
- Computer software for capacity evaluation and report generation

Data		Memory: 78%	
DataFile	01/08	Type	Discharge
		Capacity	0500AH
2008-11-18 11:25:10		TestCurr	125.0A
2008-11-18 11:26:45		TestCap	400AH
2008-11-18 11:26:28		TestTime	03H10M
2008-11-18 11:26:32		BattLow	01.80V
2008-11-18 11:27:48		GroupLow	043.5V
2008-11-18 11:34:02		BattSum	024#
2008-11-18 11:50:41		GroupSum	002G
		StopType	BattLow

## Internal Memory

- Automatically protects and saves data from an unexpected test stop/end
- Menu interface provides data management operations for parameter settings, test results review, and download by RS232 or USB device to the computer software



## Analytical Software

- Powerful analytical software calculates test results and reports cell/battery conditions and capacity
- Software interface displays detailed graphs and charts
- Ability to export raw data into customized Excel reports



### Wireless Modules

- Included for collection of cell voltage data during testing
- Advanced technology that wirelessly communicates readings between modules and load bank
- For 2/6/12V batteries
- One module supports voltage measurements for up to 4 cells
- Easily locate failed cells in battery and estimate actual capacity of each cell



### Includes

- Main unit
- Instruction manual
- Wireless 2/6/12 Volt modules (qty. 6 +1 spare)
- Computer analysis software
- DC test (power) cables
- 3 ft. AC power cable
- RS232 wire
- Carrying case with wheels

### Discharge Protection

Stop Point	Setting Range
Low System Voltage	0–60.0V
Discharge Time	0–99 Hour 99 Min.
Discharge Capacity	0–9999 Ah
Cell Low Voltage	0–15.00V

### Alerts

Malfunction	LCD Prompt	Warning Beep
Input Over Voltage	✓	✓
Reverse Polarity	✓	✓
Overload	✓	✓
Overheat	✓	✓

### Parallel Operation

The SBS-4815CT has a 0–150 Amp current range; however it is possible to parallel additional load banks of the same voltage range with the SBS-4815CT to increase current draw.

With the optional P/N 8400-600A DC clamp the user can discharge up to 750 Amps and the SBS-4815CT will monitor the total DC current being drawn by up to three load banks in parallel.

### Ordering Information

Part No.	Description
SBS-4815CT	Battery discharge and capacity tester

### Accessory Ordering Information

Part No.	Description
8400-600A	600 DC Current Clamp
SLAVE-CAB-8400>8400	Paralleling Cable, SBS-4815 to SBS-4815/8400
SLAVE-CAB-8400>S	Paralleling Cable, SBS-4815 to S-Series
SLAVE-CAB-8400>(2)S	Paralleling Cable, SBS-4815 to (2)S-Series
BCT110/220-1000	750 Watt Voltage Transformer 110/220 Vac 50/60 Hz
Pelican case upgrade available	

### Specifications

DC Volt Range	20–60 Vdc
DC Current Range	20–40 Vdc: 0–75 Amps 40–60 Vdc: 0–150 Amps
Accuracy & Resolution	±0.5%, 0.1 Amp
Display	5.7" LCD Color Touch Screen
DC Power Supply	20–60V
AC Power Supply	120 Vac, 50/60 Hz
Communications Port	USB / RS232
Internal Memory	8MB Flash
Main Tester Size	16.25 x 9.0 x 9.0 in.
Carrying Case Size	20.5 x 19.7 x 15 in.
Weight	21 lb. (main tester only) 62 lb. (tester, accessories, case)

# SBS-200CT Battery Discharge Cycle Tester

Battery Discharge and Charge Cycle Testing with Individual Cell Monitoring Capabilities



The SBS-200CT is a discharge cycler for battery testing and battery rejuvenation. The voltage range of 24–96 Vdc covers many types of traction batteries including: stationary, forklifts, automobile, golf cart, train, wheel chair, etc. When equipped with an industrial charger (sold separately), the SBS-200CT can provide an unmanned discharge/cycling solution to help increase battery capacity. The unit includes wireless modules for individual cell readings and software to generate detailed reports.

## Features

- Wide voltage and current range from 24–96 Vdc / 0–200 Amps
- 5.7 in. LCD touch screen
- 30 parameter presets with stop/alarm points that can be adjusted during testing
- 4 adjustable stop points and multiple alarm designs to control the discharge process intelligently
- Wireless modules that measure and record individual cell voltages during testing
- View test data in real time on screen or with computer via RS232
- Download data after discharge to USB drive
- Computer software for capacity evaluation and report generation

## Benefits

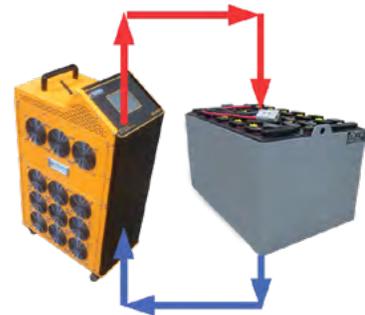
- Automatically run multiple discharge/charge cycles unmanned
- Increase run time in sulfated batteries
- Bring capacity back into warranty or scrap batteries
- Extend battery service life
- Quickly identify problematic cells with wireless modules
- Generate custom reports for trending, records and reporting
- Automatically protects and saves data from an unexpected test stop/end



## Computer Analysis Software

- User friendly and easy to navigate
- Data downloading and analyzing through real-time communication or USB memory devices
- Software interface includes: battery voltages curve and bar chart, battery resistances bar chart, group voltage curve, current curve, capacities histogram, data form, etc.
- Generate custom and detailed Excel reports with USB and software

### Standalone Discharge



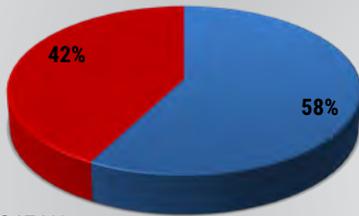
Or, use with any charger to automatically cycle the battery:

### Cycle



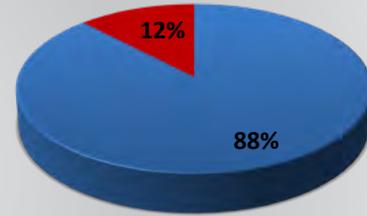
Automatically cycle through multiple charges and discharges of the batteries while recording individual cell data.

### Initial Capacity Before Cycling



■ Actual 347AH  
■ Lost Capacity 253AH

### Capacity after 4 Cycles



■ Actual 527AH  
■ Lost Capacity 73AH

**50%  
Capacity  
Increase\***  
\*Example from actual data.  
Results may vary.

Nominal Capacity	Actual Capacity	Capacity Percentage
600 Ah	347 Ah	57.83%

Nominal Capacity	Actual Capacity	Capacity Percentage
600 Ah	527 Ah	87.83%



Portable case included

### Wireless Modules

- Wireless modules included for collection of individual cell voltage data during testing
- Advanced technology that wirelessly communicates readings between modules and load bank
- Includes 1.2/2V wireless modules; 2/6/12V wireless modules available separately
- One module supports voltage measurement for 4 cells
- Easily locate failed cells in battery and estimate actual capacity of each cell

### Includes

- Main unit
- Instruction manual
- Wireless 1.2/2V modules (qty. 10 +1 spare)
- Computer analysis software
- DC test (power) cables
- 3 ft. AC power cable
- RS232 wire
- Carrying case with wheels

### Test Range

Battery Nominal Voltage	Max. Discharge Current
24 V	180A
36/48 V	200A
72/80/96 V	200A

### Ordering Information

Part No.	Description
SBS-200CT	Battery discharge and capacity tester

### Accessory Ordering Information

Part No.	Description
BCT110/220 - 1000	1000 Watt Voltage Transformer 110/220 Vac 50/60 Hz
MODULE-2/6/12-15	2/6/12 Wireless module kit w/ case Qty. 15 (+2 spare)*

### Specifications

DC Volt Range	24-96 Vdc
DC Current Range	24 Vdc: 0-180 Amps 36-96 Vdc: 0-200 Amps
Accuracy and Resolution	±0.5%, 0.1 Amp
Display	5.7" LCD Color Touch Screen
AC Power Supply	120 Vac, 50/60 Hz
Communications Port	USB / RS232
Internal Memory	8MB Flash
Main Tester Size	11.6 x 19.8 x 40 in.
Carrying Case Size	12.4 x 20.6 x 40.4 in.
Weight	121 lb. (main tester only) 220 lb. (tester, accessories, case)

For additional specifications and model details, please contact a Storage Battery Systems representative.



TEST & MONITORING EQUIPMENT

N56 W16665 Ridgewood Dr.  
Menomonee Falls, WI 53051



- Testing Equipment
- Battery Monitoring
- Hydrometers
- Load Banks
- Data Loggers
- Hydrogen Detectors



1-800-554-2243  
www.sbsbattery.com  
test@sbsbattery.com

03-18-TSTCAT