Exponential POWER

Testing and Monitoring Equipment

for Motive Power

Motive Power Batteries Testing & Monitoring Catalog

Batteries are the heart of your equipment. When batteries are undercharged, used with low water or with elevated temperatures, not just battery life is shortened but it can cause malfunction of the equipment and affect its performance.

In opportunity and fast-charging environments battery management becomes even more critical. Surface voltage can "confuse" battery discharge indicators or controllers. As a result, a fault condition may exist but will not be recognized which can result in component damage and downtime of equipment.

As equipment control systems get more sophisticated, a poor battery can cause fault conditions and some fault codes that are difficult to diagnose. If batteries are discharged/charged to optimum level and watered properly, you can increase productivity and extend battery life.

Battery monitoring can detect problems in early stages and eliminates guessing when planning new applications.

Enables you to monitor these 24 hours a day:

- Utilization
- Temperatures
- Cycle counts
- Performance

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SBS-H2 Hydrogen Gas Detector

Complete Hydrogen Monitoring System for Your Battery Room

The SBS-H2 Hydrogen Detector is a complete hydrogen monitoring system with visual and audible alarms.

The system comes complete with the main display, a highly accurate hydrogen gas sensor and a 25 ft. cable. This unit can be powered with either AC 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.

Includes

- Main body/display
- Hydrogen sensor
- 25 ft. cable

Benefits

- The True Hydrogen Gas Detector - single gas detection to eliminate false positives from other gases such as butane, ethanol, and hydrocarbons in the air
- SBS exclusive
- Modular design detector does not require complete replacement for repairs
- Dual AC or DC power supply connections
- UL / CE Certified Hydrogen Sensor for installations and hazardous locations
- Ideal for remote locations
- Provides coverage redundancy in large monitoring spaces
- Protects life, property and company profits

Applications

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

Features

- Universal power inputs: 110/220 Vac and/or 12 - 48 Vdc input
- Push button diagnostic test
- Audible alarm
- Sensor has a temperature rating of -4° F to 176° F
- Can operate in a wide range of temperatures and humidity
- Hydrogen sensor is UL Class 1 Division 2 (E349728), ATEX, and CE certified for hazardous locations

Installation

- Wall or 2-gang junction box mountable
- Mechanical relays are easily accessible:
  - Max Switching voltage 28 Vdc, 277 Vac
  - Rated Current 10A @ 277 Vac, 15A @ 125 Vac
- Redundant power supply capability (DC power supply will operate as backup power source)
- SBS-H2 display allows for a second sensor input to increase coverage area
- Display can be calibrated in the field with P/N H2-CALKIT option

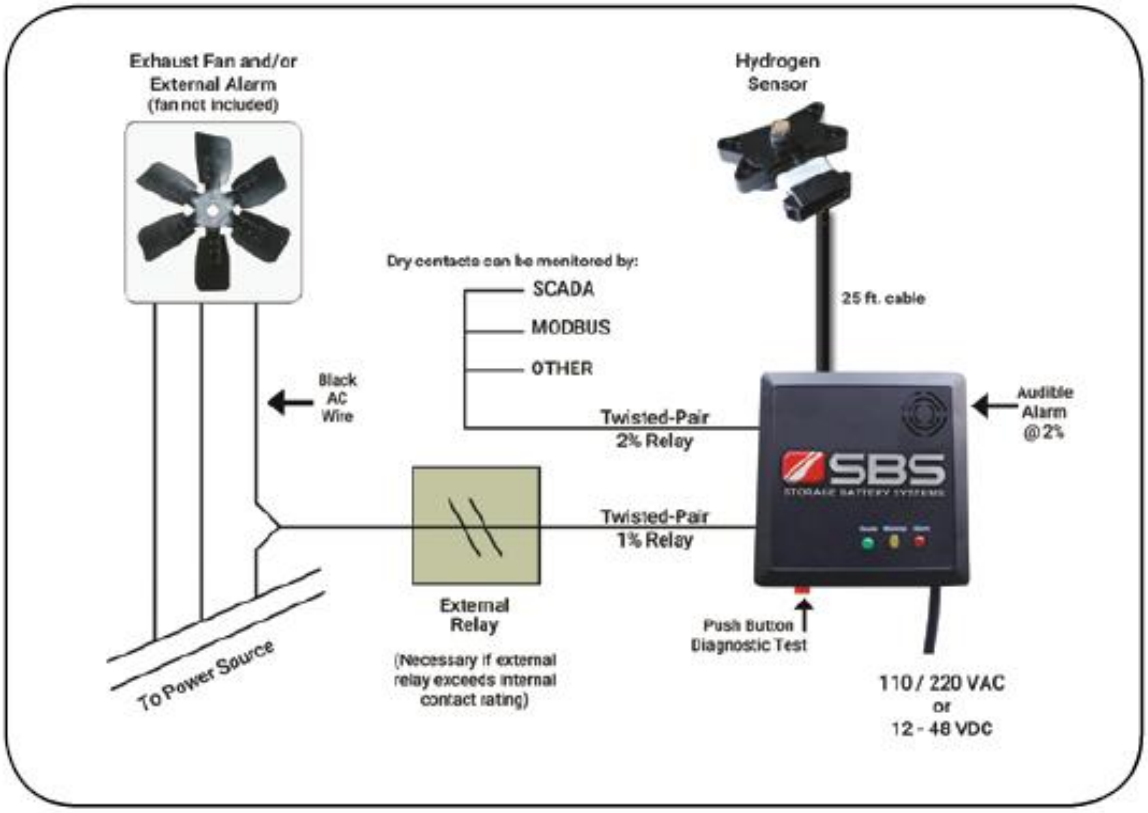
Available Accessories

Test kit

Additional hydrogen sensor/25 ft. cable and optional 50 ft. and 100 ft. cables

Standard, 2-gang junction box (Hardwired AC or DC)

HYDROGEN GAS DETECTOR



Warning Settings: When 1% hydrogen is present in the air the yellow warning light will come on and the warning relay contact will close allowing power to peripherals, such as a vent fan or other devices.

Alarm Settings: When at least 2% hydrogen is present in the air the red warning light will come on and an audible alarm activates. In addition, a second alarm relay contact will close which can be used to shut down the system, or notify a building alarm system or other devices.

Ordering Information

Part No.	Description
SBS-H2	Hydrogen Detector Package

Accessory Ordering Information

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

Specifications

1% Hydrogen	Energizes a relay which can activate exhaust fan or SCADA system/alarm
2% Hydrogen	Sounds audible alarm and energizes relay which can be used on SCADA system
Power source	110 / 220 Vac, 50/60 Hz ***OR*** 12-48 Vdc (9-60 Vdc operating voltage)
Size	4.75" L x 5.25" W x 1.4" D (main body/display)

Main Body/Display:
Mounting and Power Options

Wall-mountable

Standard, 2-gang junction box
(Hardwired AC or DC)

18 AWG AC cord
recommended (not included)

PowerTrac SP Data Logger

Monitors and Logs Critical Battery Performance Data

The PowerTrac SP Series is a battery monitoring system developed specifically to meet the needs of industrial and motive battery systems. The battery monitor tracks and logs various battery performance data including battery voltage, battery temperature, and battery current.

Features

- Instantaneous battery voltage, battery current, and temperature
- Charge and discharge Amp-Hours since installation and per event
- Minimum and maximum voltages and temperature with time stamps

Ordering Information

Part No.	Description
PTSP+ 12 – 84V	PowerTrac SP+
PTSP+ 12 – 84V-S/ PTSP+ 12 – 84V-ITH	External / internal thermistor
PTSP+ 12 – 84V-EL/ PTSP+ 12 – 84V-ITEL	Electrolyte level sensor (Ext./Int. Thermistor)
PTSP+ 12 – 84V-485	RS-485 communication (PowerCharge interface)

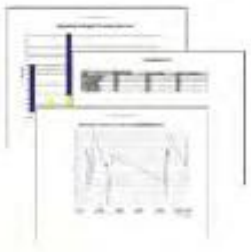
TOBi Data Logger, Mounted

Communicates with Charger for Maximum Battery Lifetime

NEW TOBi Stores 4000
Previous Battery Events

New Features

1. Sleek, compact size: 3.5" long x 1.56" wide x .875" high. Easily fits at or below most battery intra-cell straps
2. Composite molded enclosure
3. Waterproof
4. Battery acid resistant
5. Combination thermistor and electrolyte indicator
6. Electrolyte level sensor maintains a record of electrolyte levels for proper battery maintenance and diagnosis
7. LEDs for temperature and water level status
8. Easy installation. No welding of shunts; no straps to remove; 15-minute installation by non-technical personnel
9. All new TOBi Report Suite



Monitor and Record

- Battery temperature
- Electrolyte level
- Amp hour throughput
- Battery voltage
- Charge/discharge cycles
- Battery idle time
- Lifetime data record

TOBi Power Logger, Portable

Total On-Board Battery Information - Automatically Downloads Data Wirelessly

Power Study Data

The Power Logger Wi-z provides battery and charge data in real time to assist in proper selection of battery and charger solution.

Portable

Lightweight with small profile, the Power Logger Wi-z is the perfect choice for measuring battery throughput on a short-term basis.

East to Install - No Tools

Installs between battery and truck via standard connector. The Power Logger Wi-z ships with a SB350 connector.

Wireless

A laptop with TOBi WI-z coordinator is the only "tool" necessary.

Specifications

Dimensions:

Box size: 4.4" W x 3.3" D x 1.8" H

Input Voltage:

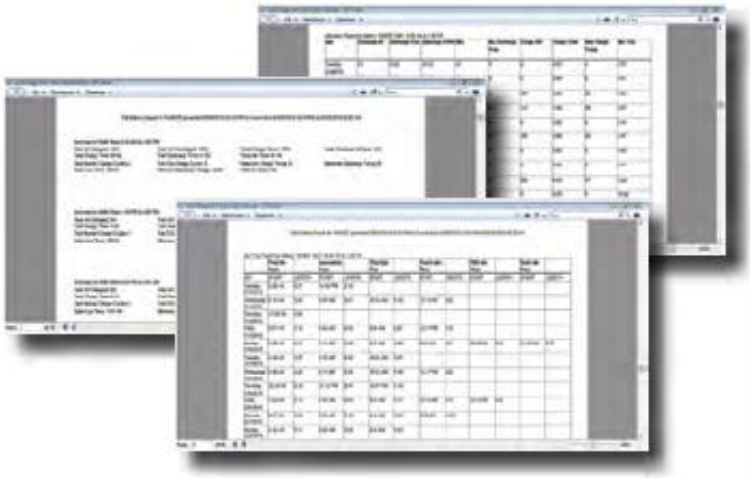
24 – 80 VDC nominal

Connectors:

SB350

Cable Size:

3/0



Installs in minutes

- Compatible with 24 – 80 V lead-acid batteries
- Wireless data upload with TOBi reports
- Compact design – fits inside most battery compartments

TOBi Ordering Information

Part No.	Description
038-483	TOBI PI Wi-z Data Logger, Mounted
038-489	Power Logger Wi-z, Portable
038-465	TOBI PI Wi-z USB Wireless Communicator - Includes Software CD & Installation Manual

Data Collection Software

Upload Data with TOBi Wi-z Coordinator

- Select and print your own reports
- Qualify opportunity charge candidates
- Identify battery usage

Features of TOBi Wi-z Coordinator

- Events captured are Charge, Discharge and Idle time date stamped for time of day and day of week.
- Easily customize reports for shifts and/or 24-hour periods.
- Amp hour throughput is recorded in real time for each charge and discharge event.
- Idle time report shows time available for use in opportunity charging.
- Equivalent Batteries Used (EBU) is calculated to assist in proper selection of batteries and charger.
- Reports based on TOBi Wi-z platform. Easy to run and read results.
- No need to send data to others for interpretation.

Requires TOBi PI Coordinator and Software Suite. Pt. #038-465

CellTrac Data Loggers

Diagnostic Power Analysis Kit and Monitors

PowerKit

The health of your batteries plays a huge role in your equipment performance and, in turn, your overall productivity.

PowerKit is a simple, yet powerful device for diagnosing battery-related issues. Installed between the equipment and the battery, it monitors critical parameters to aid technicians in isolating battery problems.

Benefits

- Installs in about 5 minutes and it requires no set up on the equipment
- Identify under-performing batteries and isolate battery issues from the equipment
- Specify appropriate battery based on equipment type and application
- Identify plug-ins required for opportunity and fast charging
- Identifies opportunities to convert from gas to electric

Features

- Performs a power study and analysis
- Monitors battery and equipment performance
- Identifies alarm conditions with date/time stamps
- Analyzes daily usage
- Reviews plug-ins (fast/opportunity charging)

CellTrac

CellTrac is an innovative battery management system which can help enhance battery performance, extend battery life, improve productivity and reduce maintenance costs. CellTrac measures current non-invasively, transfers data wirelessly and installs in about 10 minutes.

Benefits & Features

- Identification of poor performing batteries to prevent potential equipment malfunction
- Extension of battery life by prevention of over/undercharging and over-discharging of batteries
- Monitoring of electrolyte level
- Data collected: Battery ID, voltage, current, Amp Hours, battery temperature, cable temperature, electrolyte level, depth of discharge and alarms
- Ability to download recorded data wirelessly to a PC-based application which provides reports on battery fleet performance and exceptions

Part Number	Description
CT0220	Standard Unit with Temp. Sensor
CT0220-CT	Standard Unit with Cable Temp. sensor
CT0220-WL	Standard Unit with Water Level sensor
CT0220-PK	CellTrac PowerKit
CT0220-USB	USB Communicator (one required per computer)

Specifications	
Operating Voltage	12 - 84 Vdc
Parameters Measured	Amp Hours, Current, Voltage, Temperature, Electrolyte Level, Total AH delivered and returned
Data Storage	Up to 1500 events
Data Transfer	PC via wireless radio link
User Interface	Visual indicators for status and alarms

Computer Requirements	
Processor	1 GHz Pentium III or compatible processor or higher
Memory	Minimum: 1 GB
Operating System	Windows XP Pro Service Pack 2 or higher
USB Interface	At least 2
Video	1024 x 768 or higher

Manual Battery Hydrometer and Thermometer

Z-1G Manual Specific Gravity Tester

Hydrometers (density meters) measure the specific gravity of liquids. Specific gravity is the ratio of the density of the liquid being tested to the density of water. In the case of battery testing, the hydrometer is measuring the specific gravity of the battery's electrolyte. The higher the acid concentration in the electrolyte, the higher the specific gravity.

Based on the specific gravity, the user can determine the state of charge of the battery.

Retaining hydrometer readings and data over time is recommended by IEEE as part of any Battery Maintenance Program.

Features

- Industrial grade hydrometer
- Virtually unbreakable
- Built with polycarbonate barrel and special heavy-duty glass float that can withstand drops from 10 ft.
- Scale: 1.100 – 1.350 with .005 subdivisions

A scale inside the stem makes it easy to read specific gravity.

- Scale 1.100 – 1.350
- Note: .005 Subdivisions

Applications

- Lead-acid battery testing (SBS also offers digital battery hydrometers)
- Alcohol testing
- Food and beverage
- Petrochemical

Ordering Information		
Part No.	**Scale**	**Description**
Z-1G	1.100 – 1.350	Industrial grade hydrometer with heavy duty glass float
1353	-20° – 130° F	Thermometer, includes S.G. correction factor table

Thermometer with specific gravity correction factor table

MANUAL HYDROMETER

SBS-2003 Digital Hydrometer / Density Meter

Digital Specific Gravity Tester with Downloading Capabilities for Lead-Acid Batteries

Next Generation
Bluetooth Hydrometer
(replaces the SBS-2002)

Specific gravity testing has never been this easy. Simply insert the nozzle into the battery and depress the finger pump which draws a few drops of sulfuric acid (H_2SO_4) through the tube. Within three seconds the measured refractive index is converted into a temperature-compensated specific gravity reading and then the specific gravity, temperature and cell count are displayed. Then, you have the ability to transfer the data to your PC or laptop via Bluetooth and download results into Excel.

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 in all industrial environments.

Benefits

- Via Bluetooth, wirelessly transfers testing data to supplied Excel template
- Time savings – 5 times faster than conventional methods
- Measures specific gravity, ambient temperature and count
- Automatically temperature compensates to 77° °F (or 25° C)
- Stores up to 1000 readings – can export raw data to Excel from template

Features

- ***Exclusive to Storage Battery Systems***
- Able to record temp in Fahrenheit or Celsius
- ±0.002 accuracy
- LED display
- IP64 water resistant
- Field calibrate with distilled water
- For lead-acid batteries only

Data Archive/ Export into Excel

Applications

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

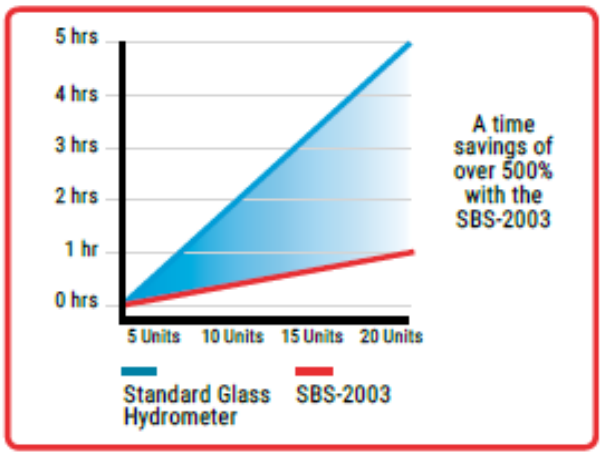
Cost Savings Example

Field studies show time savings of at least 5 times (500%) using a digital hydrometer over a standard glass hydrometer and thermometer.

If you spend 60 minutes testing specific gravities every month in 20 sites, this total, 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.



DIGITAL HYDROMETER

Hydrometer/Resistance Tester Package

3 Steps for Easy Data Management & Storage

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

1. Press the 'SG Upload' button on the SBS-6500 resistance tester.
2. Follow prompts for the 3-step data transfer from the SBS-2003 hydrometer. The hydrometer will then upload all of its specific gravity readings into the SBS-6500.
3. Select the readings string to view and it inserts the SG information into the string. The combined SG and SBS-6500 readings will be integrated into a single report for battery analysis.

SBS-6500 Battery Analyzer

SBS-2003 Hydrometer

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

Now all data for each battery is in one, easy-to-read spreadsheet. The generated report will include the downloaded specific gravity readings.

SBS-2003 Includes

- Main unit
- Three (3) silicone tubes
- 9V battery
- Adjustable hand strap
- Instruction manual
- Bluetooth to USB adapter w/software template
- Soft case (optional)

Specifications

Measured Items	Specific gravity of sulfuric acid, temperature compensated to 77° F (25° C) Temperature of sulfuric acid as electrolyte in lead-acid batteries
Display	LCD; specific gravity, temperature, and count
Measuring Time	Within 3 seconds after pushing "START" button
Measurement Range	Specific gravity: 1.000 to 1.400 Temperature: 41 to 104° F (5 to 40° C)
Measurement Accuracy	Specific gravity: ±0.002 @ 50 to 86° F (10 to 30° C) Temperature: ±1.8° F @ 50 to 86° F (±1° C @ 10 to 30° C)
Method of Detection	Light refraction system
Size & Weight	2.75" x 1.75" x 8.25"; 0.66 lbs.
Suction Nozzle	9.5"L x 1/8" dia. flexible silicone tube

Ordering Information

Part No.	Description
SBS-2003	Digital 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" sample tubes
2002/3-TUBE	9" sampler tube for SBS-2003
2002/3-HOL	Holster w/ belt for SBS-2003
SBS-TE CASE	Soft case for hydrometer

SBS-6500 Battery Analyzer

Complete Battery Resistance Tester and Data Logger / Meets All IEEE/NERC Standards

The SBS-6500 analyzer is a multipurpose resistance and voltage testing kit. It has a storage capacity of 7.5 million data records for capturing and analyzing the entire history and details of up to 300 battery systems. Through your PC, or while on-site, 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 on-site comparisons and historical trending. The SBS-6500 will also connect to a PC via USB to create custom graphical reports in PDF, Excel or Word formats.

The SBS-6500 will also directly import specific gravity readings from an optional SBS-2003 digital hydrometer storing voltage, resistance, temperature and gravity readings inside the SBS-6500 tester for future reference/reporting.

Benefits

- Quickly records and stores impedance, voltage and temperature of batteries and strings
- User-friendly software and easy-to-navigate menu
- Retests cells and recalls readings on-site
- Includes software package for storing and analyzing results
- Individually name and set parameters for each battery string (up to 300 strings)
- Large 3.8" LCD backlit display
- Download specific gravity readings wirelessly into the SBS-6500 with the SBS-2003 digital hydrometer – no separate data logger required
- 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

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

Functions

- Communicates to PC through USB port
- Storage battery resistance testing: automatically switches within the test range 1 mΩ to 400 mΩ and resistance measurement resolution reaches 1 mΩ
- Resistance tests each connection in under 5 seconds
- Test results are compared to preset, user-defined alarm and set point values
- Generates and displays the battery string's single cell test report and comparison data
- On-screen pass / warning / fail indication during testing based on set parameters
- Can view all historical data on handheld unit

Features

- For flooded lead-acid, VRLA, Ni-Cad, Li-ion & NiMH batteries and strings
- Voltage testing range is 0–100 Vdc
- IEC 6101-1 CAT II 300V Safety Standard
- Built-in rechargeable NiMH battery
- Automatically measures and stores data
- Software package

Specifications	
Size and Weight	4.2"W x 2.2"D x 8.3"H; 2.6 lbs.
Storage	7,500,000 records
Ah Measurement Range	5 – 6000Ah, 0 to 100 Vdc per reading
Voltage Measurement	Resolution: 0.001V Accuracy: ±0.1%
Resistance Measurement	Range: .001 mΩ to 400Ω Resolution: 0.001 mΩ Accuracy: ±1.0% of reading
Display	3.8" LCD, 320 x 240 backlit screen
User Programmable	Alarms, Setpoints, Site names, Battery models
Communication Interface	USB, Bluetooth w/ SBS-2003
Software	SBS-6500 Battery Management Software
Software Format	MS Windows
Built-in Battery	Rechargeable NiMH battery pack
Operation Time	8 hours
Operation Temperature	14° F to 122° F

Hydrometer/Resistance Tester Package

Easy Data Management & Storage

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. When a report is created with SBS-6500 battery management software, all voltage, resistance, and specific gravity data will be in a single report.

For more information on the hydrometer, see the SBS-2003 data sheet.

SBS-6500 Battery Analyzer

SBS-2003 Hydrometer

Battery Management Software (Included)

- Analyzes battery function and efficiency
- Interface for loading string and alarm data to and from tester
- Direct export into Excel format for easy incorporation into custom reports
- Separate data archives for cell, battery, intercell connector resistance records and specific gravity
- Self interpretation of data for clear, concise comparisons
- Graphs cell trends; creates battery analysis and reports

Track changes in battery resistance and battery deterioration trend

SBS-6500 Includes

- Main unit
- Pin probes
- NiMH battery & charger
- USB cable
- Quick start guide
- Software
- Carrying case

Pin Probes (included)
P/N 6500-PIN-PROBE

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

Ordering Information

Part No.	Description
SBS-6500	Battery resistance testing kit
SBS-6500/2003PKG	Complete battery maintenance testing combo (Includes SBS-6500 & SBS-2003)

Accessory Ordering Information

Part No.	Description
SBS-2003	Digital lead-acid battery hydrometer
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-200CT Battery Discharge Cycle Tester

Battery Charge and Discharge Cycle Testing with Downloading

The SBS-200CT is a discharge cycler for batteries' discharge and charge cycle. The voltage range of 2V – 96V covers all types of traction batteries (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 for your material handling needs.

Features

- Wide voltage range battery discharge from 2V to 96V
- Automatically run multiple discharge/charge cycles
- 5.7 inch LCD touch screen for easy operation and showing various parameters real time
- Adjustable stop points and multiple alarm designs to control the discharge and charge process intelligently
- **Parameters can be adjusted during discharge**
- 30 parameter presets for quick setup
- Supports RS232 real time monitoring by PC or USB download data after discharge
- PC software for capacity evaluation and report generation
- Can be used to test overall system voltage and individual cell voltages
- Wireless modules included (up to 40 cells) with other module package options available

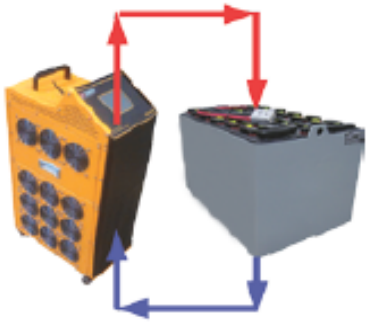
Benefits

- Save money with unmanned warranty evaluations
- Increase run time in sulfated batteries
- Quickly identifies bad cells for replacement
- Extends battery service life
- Increases overall battery throughput – repair and service batteries quicker with per cell documentation
- Works with all chargers
- No need for multiple voltage dischargers
- Will verify charge and discharge battery performance

PC Analysis Software

- Data downloading and analyzing through real-time communication or USB memory devices
- The software interface includes: battery voltages curve and bar chart, battery resistances bar chart, group voltage curve, current curve, capacities histogram, data form, etc.
- Powerful capacity estimating function; the software can predict the capacity of each battery in the tested group
- Automatically create Excel data report

Standalone Discharge



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

Cycle

The SBS-200CT discharger will cycle through the charge and discharge cycles of the batteries multiple times while recording cell data unattended.

BATTERY DISCHARGE CYCLER

Test Range

Can support 2V to 96V battery groups:

Battery Nominal Voltage	Max Discharge Current
2 V	60A
4 V	120A
6/24 V	180A
12/36/48 V	200A
72/80/96 V	200A

Portable packing case included

SBS-200CT Includes

- Main unit
- Wireless modules (qty. 10 +1 spare)
- PC analysis software
- DC test (power) cables
- Instruction manual
- Carrying case

Wireless Modules

- Wireless modules are included for collection of individual cell/battery voltage data during discharge
- For 1.2V and 2V batteries
- Each module is capable of monitoring up to 4 cells/ batteries at a time
- Wireless technology eliminates having hundreds of feet of signal cables lying underfoot while performing testing
- Clips are detachable for easy replacement

Discharge Ranges

Voltage Range	Current Range
1.6 - 2.5 V	0-60A
3-6V	0-180A
6-120V	0-200A

Ordering Information

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

Accessory Ordering Information

Part No.	Description
8400-600A	600 DC Current Clamp
BCT110/220 - 1000	1000 Watt Voltage Transformer 110/220 Vac 50/60 Hz
8400-SLAVE-CABLE	For operating in parallel with load banks of same voltage range

Specifications

Current Measurement:	
Internal Current Range Accuracy & Resolution	0-200A </= ±0.5%, 0.1A
External Current Range Accuracy & Resolution	0-600A (optional current clamp) </= ±0.5%, 0.1A
Voltage Measurement:	
Group Voltage Range Accuracy & Resolution	1.6 - 120V </= ±0.5%, 0.1V
Cell Voltage Range Accuracy & Resolution	0-15V </= ±0.5%, 0.1A
Power Supply:	
Power Supply Voltage	110 Vac 220 Vac (optional)
Frequency	50/60 Hz
Power Consumption	500W (max.)
Communication & Storage:	
Communication ports	USB/RS232
Internal Memory	8MB Flash
Environment:	
Operation Temperature	-23° to 122° F
Storage Temperature	-40° to 158° F
Humidity	5% - 95% RH
Altitude	below 13,100 ft.
Working Noise	<60 dB
Dimensions & Weight:	
Main Tester	11.6 x 19.8 x 40 in.
Carrying Case	12.4 x 20.6 x 40.4 in.
Weight	121 lbs. (main tester only) 220 lbs. (tester, accessories, case)

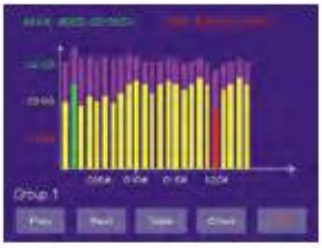
For additional specifications and model details, please contact a Storage Battery Systems representative.

SBS-4815CT Battery Discharge / Capacity Tester

For 24/48 Vdc Battery Systems

The SBS-4815CT is a fully programmable, constant current discharge 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).



Applications

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

Features

- **Weighs only 21 lbs.; designed for portability**
- Provides 0–150A adjustable current for different load testing requirements and performs constant current discharges while testing
- 5.7" LCD touch screen for easy operation and display of various parameters in real time
- 4 programmable stop points and multiple alarm settings to control the discharge automatically
- Supports RS232 real time monitoring with a PC or stores data internally for later transfer via a USB device
- PC software included for detailed analysis of test results and generation of reports
- Can be powered from DC or AC power supply
- **Wireless modules included for individual cell data collection during testing**

Internal Memory

- Saves each test result automatically and protects data from unexpected termination of test
- Menu interface provides data management operations like test results review, deleting or downloading of results by RS232 or USB device to the PC software

Analytical Software

- Powerful analytical software calculates test results and reports battery cell conditions and capacity
- Software interface displays detailed graphs and charts for all battery test data
- Features the ability to export raw data into Excel for the creation of customized reports

Preset Feature

- Can be programmed with up to 8 sets of test parameters, speeding up test setup and performance

Adjustable test stop points to prevent excessive discharge

Discharge Ranges	
Voltage Range	**Current Range**
20 - 40V	0-75A
40 - 60V	0-150A

Stop Point	Setting Range
Low System Voltage	0 - 60.0 V
Discharge Time	0 - 99 Hour 99 Min.
Cell Low Voltage	0 - 15.00 V

Wireless Modules

- Wireless modules are included for collection of individual cell/battery voltage data during discharge
- For 2V, 6V or 12V batteries (Optional 1.2V Ni-Cad modules available)
- Each module is capable of monitoring up to 4 cells/ batteries at a time
- Wireless technology eliminates having hundreds of feet of signal cables lying underfoot while performing testing

SBS-4815CT Includes

- Main unit
- Wireless SBS-2/6/12 modules (qty. 6 +1 spare) (24 cells)
- PC analysis software
- 6 ft. DC cable set (pos. & neg.)
- Instruction manual
- Carrying case with wheels

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

Parallel Operation

Incorporation of the Current Clamp accessory allows the SBS-4815CT to be operated in parallel with other load banks of the same voltage range. This allows for increasing the total discharge current capacity that can be monitored by the unit for larger Ah rated batteries.

Specifications	
Current Measurement:	
Internal Current Range Accuracy & Resolution	0 - 150A </= ±0.5%, 0.1A
External Current Range Accuracy & Resolution	0 - 600A (optional current clamp) </= ±1%, 0.1A
Voltage Measurement:	
Group Voltage Range Accuracy & Resolution	20 - 60V </= ±0.5%, 0.1V
Cell Voltage Range Accuracy & Resolution	0 - 15V </= ±0.5%, 0.1A
Power Supply:	
DC Power Supply Voltage	20 - 60V
Power Consumption	150W (max.)
AC Power Supply Voltage	120 Vac (-20% to +30%)
Frequency	50/60 Hz
Power Consumption	150W (max.)
Communication & Storage:	
Communication port	USB/RS232
Internal Memory	8MB Flash
Environment:	
Operation Temperature	-23° to 122°F
Storage Temperature	-40° to 158°F
Humidity	5% - 95% RH
Altitude	Below 13,100 ft.
Working Noise	<60 dB
Dimensions & Weight:	
Main Tester	15.7 x 8.7 x 7.9 in.
Carrying Case	20.5 x 19.7 x 15 in.
Weight	21 lbs. (main tester only) 62 lbs. (tester, accessories, case)

Ordering Information	
Part No.	**Description**
SBS-4815CT	Battery discharge & capacity tester

Accessory Ordering Information	
Part No.	**Description**
8400-600A	600 DC Current Clamp
8400-SLAVE-CABLE	For operating in parallel with load banks of same voltage range
BCT110/220-750	750 Watt Voltage Transformer 110/220 Vac 50/60 Hz

Battery Chargers

Ametek Prestolite UltraCharge® Charger

The UltraCharge is an interactive SCR (Silicon Controlled Rectifier) industrial battery charger.

Features

- Multi-voltage and AH adjustability
- Selectable charge curves
- For Flooded, AGM, and Gel batteries
- Adjustable constant current finish rate makes this model an ideal battery shop charger
- I-E-I charge profile for accurate and efficient charging
- Automatically compensates for battery operating temperatures
- Archive function allows for easy review of the last 99 cycles
- Two line display shows output volts, amps, and amp hours returned during the charge cycle

La Marche A39 Universal SCR Charger

The A39 is a microprocessor-controlled SCR charger with adjustable output voltage, current limit and charge timer. This charger may be used as a constant current charger where the open circuit voltage can be adjusted or as a constant voltage charger with 1% regulation.

Features

- Microprocessor control
- Auto start/stop circuitry
- Constant current mode charging
- Wide current, voltage & timer ranges
- AC breaker
- DC breaker (single phase units)
- Automatic surge protection
- Digital display
- Fault mode diagnostics

Optional

- DC circuit breaker (three phase units)
- Safety door switch
- Mobile caster kit
- Zero volt battery start

Electrical

AC Input Voltages (60 Hz)

120/208/240 VAC single phase
240/208 VAC single or three phase
480 VAC three phase

DC Output Current

20 to 200 amps

DC Output Voltage Range

2-30 VDC
6-60 VDC
8-90 VDC
12-150 VDC

Operating Temperature

0° to 50° C

Regulation

1%

Battery Charge Monitoring Systems

iBOS® - Intelligent Battery Organizing System

Site tests have shown that if battery selection is left to an operator, 30% of the batteries will be underutilized and 20% will be overused. The result: uneven battery usage, premature battery failure and lost productivity.

The iBOS® (Intelligent Battery Organizing System) with Real-Time Monitor enables the most cost-effective utilization of your pool of batteries. It ensures proper battery rotation, which is critical to long battery life and maximum run time.

iBOS monitors all batteries in a pool and eliminates operator judgment in battery selection by determining which battery has had the longest cooling time since charging. Once charged, each battery is placed in queue. The simple-to-use iBOS "read and react" Display then tells the operator which battery to take.

An audible alarm called the Shouter alerts the operator when the wrong battery is taken. And the Real-Time Monitor provides all the information needed to efficiently manage the battery pool.

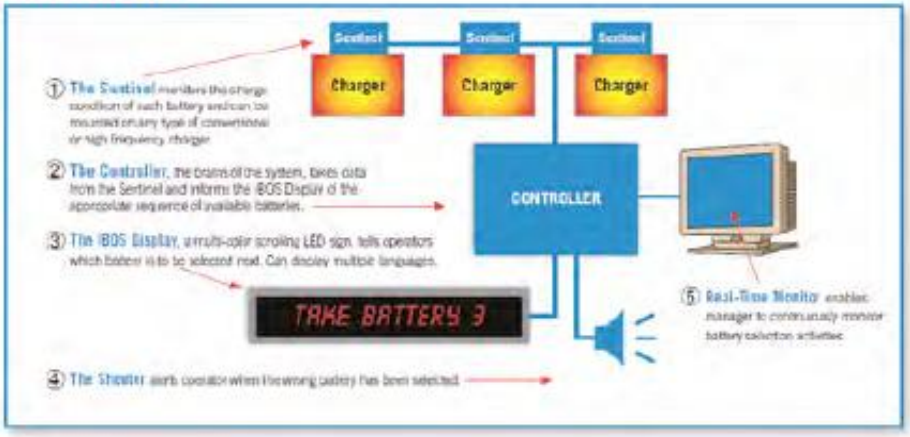
Benefits

- Promotes longer battery run time and life through uniform usage
- Improves operator productivity
- Identifies faulty equipment
- Helps managers decide if there are too many or too few batteries in the pool

Features

- Easy-to-use "read and react" system
- Large scrolling display tells forklift operators the "correct" battery to pick next; displays are available in multiple languages
- Shouter sounds an alarm when operator takes a battery that is not fully charged, reducing mispicks
- Real-time monitor provides all the information needed to efficiently manage the battery pool
- Works with virtually any charger

How iBOS Works



SBS-600 Graphical Digital Multimeter with USB PC Interface

High Accuracy True RMS Digital Multimeter and Data Logger with Trend Analysis

The SBS-600 is an industrial graphical digital multimeter and data logger with trend analysis. It will quickly capture data with real-time logging and graphing capabilities and can store up to 10,000 readings with recall ability.

This unit has a large, 50,000 count, 3.5" high resolution display with the ability to zoom on trends to view and analyze captured data. This means you don't need to download the readings to a laptop or PC to detect a trend or recall past readings. PC integration software is included so you can download readings into the provided software or export to Excel.

Benefits

- 600V CAT III DMM / 1000V CAT IV Safety Rating
- Next generation, high performance, graphical digital multimeter
- Large 50,000 count, 3.5" high resolution LCD displays DC Voltage, True RMS AC V
- Efficiency measurement and ripple noise measurement
- Includes real-time PC connection/logging
- Multiple logging sessions possible without download

Power Efficiency Measurement

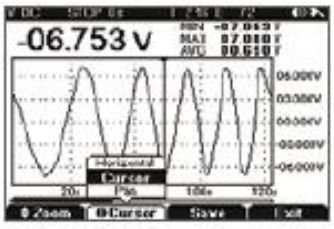
- Automatically displays efficiency without having to manually calculate
- Measures all power circuit efficiencies, including DC to DC converter and total instrument efficiency readouts
- Range for DC Voltage: 50mV ~ 1000V, DC Current: 500µA ~ 10A

Dual Mode Measurement (Ripple Noise Measurement)

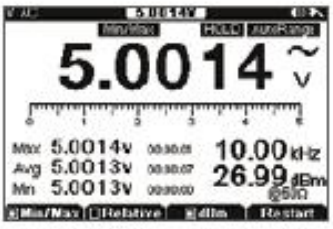
- Measures ripple noise under 100 kHz
- DC voltage and AC voltage measurements displays separately from AC+DC measurement function
- Measures DC voltage and AC voltage in order
- DC voltage measurement range: 5V ~500mV
- Ripple noise frequency displays simultaneously

Data Logger with Trend Analysis

- Plots up to 10,000 recorded readings
- Man-Free Monitoring as well as Trend Capture and Analysis
- The data logger plots at real time stamping
- Internal storage memory can store up to 10,000 records and instantly recall
- Trend Capture and Trend Analysis are available from Complete Mode (Run/Stop, sampling time, accumulated sample qty, measured value scale (max))



Multimeter data logging screen shot



Voltage data logging screen shot

Resistance logging screen shot

Technical Data

DC/AC Voltage Range Accuracy	50.000mV 500.00mV 5.0000V 50.000V 500.00V 1000.0V 50mV (±0.05%+50) 500mV-50V (±0.025%+10) 500V-1000V (±0.030%+10)
DC/AC Current Range Accuracy	500.00µA 5.0000mA 50.000mA 500.00mA 10.000A 500mA-5.0000mA (±0.05%+10) 50mA-500mA (±0.15%+10) 10A (±0.30%+10)
Temperature (excluding probe) Accuracy	(-20.0° ~ 500.0° C, -20.0° ~ 1370.0° C) or (-4.0° ~ 500.0° F, -4.0° ~ 2498.0° F) Dependent on optional temperature probe
Resistance Accuracy	50.000Ω 500.00Ω 5.0000kΩ 50.000kΩ 500.00kΩ 5.0000MΩ 50.000MΩ 50Ω-500kΩ (±0.05% +10) 5MΩ (±0.15% +10) 50MΩ (±1.00% +10)
Capacitance Accuracy	5.0000nF 50.00nF 500.0nF 5.000uF 50.00uF 500.0uF 5.000mF (±1% +10) > 50.00uF (±2% +10)
Frequency Accuracy	10.00Hz 100.0Hz 1kHz 10kHz 100kHz 1000kHz 0.005%

	SBS-600	Fluke® 287*	Fluke® 289*
Multiple On-Screen Displays	Yes	Yes	Yes
dBV/dBm	Yes	Yes	Yes
DC mV Resolution	1 uV	1 uV	1 uV
Megaohm Range	Up to 500 MΩ	Up to 500 MΩ	Up to 500 MΩ
Continuity Beep	Yes	Yes	Yes
Battery/Fuse Access	Battery/Fuse	Battery/Fuse	Battery/Fuse
Elapses Time Clock	Real Time PC connection/ logging	Yes	Yes
Time of Day Clock	Real Time PC connection/ logging	Yes	Yes
Min-Max-Avg	Yes	Yes	Yes
Duty Cycle	0.05 to 95.00%	0.01 to 99.99%	0.01 to 99.99%
Hold	Yes	Yes	Yes
Decibels	Yes	No	Yes
Isolated Optical Input	USB to PC	Yes	Yes
Auto Touch/Hold	Yes	Yes	Yes
Reading Memory	Yes	Yes	Yes
Log to PC	Yes	Yes	Yes
Interval/Event Logging	Yes	Yes	Yes
Logging Memory	10,000 readings	10,000 readings	15,000 readings

SBS-600 Package Includes

- Main body/display
- Pinpoint probes
- Software/USB cable
- Batteries
- Quick start guide

Optional test lead accessory kit

Specifications

Maximum Voltage Terminal to Earth Ground	1000 Vac
Battery Type	6 AA alkaline batteries
Battery Life	80 hours continuous without backlight
Operating Temperature	32° F to 122° F
Storage Temperature	32° F to 158° F
Humidity	80% RH or less (non condensing)
Dimensions	3.9" W x 8.6" H x 2.1" D
Weight	20 oz. / 1.2 lbs. (meter only)
Display	3.5" 240 x 160 pixel graphic mono LCD

Ordering Information

Part No.	Description
SBS-600	Digital multimeter with data logging and software

Accessory Ordering Information

Part No.	Description
600/700-TEST-LEAD-KT	Test lead accessory kit
600/700-CASE	Case for multimeter

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SBS-700 Multi-Function Oscilloscope/Multimeter

Oscilloscope and Digital Multimeter Including Data-Logging PC Software

The SBS-700 scope/meter helps you gain insight into your environment faster by providing reliable, accurate data or waveform capture and the complete view of Logic Tools. This comprehensive unit offers highly accurate multimeter measurement functions and additional functions of Sig-Out (Generator) and Digital Debug (Logic, Serial Bus Protocol with Digital Pattern Generator). Includes a case and USB PC Integration software so that you can download your readings into your PC. You can also recall readings and graphs directly from the unit.

Oscilloscope

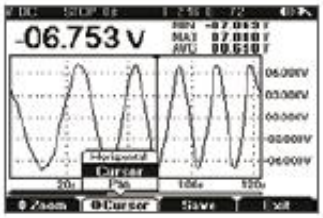
- 10 MHz bandwidth with max. 50 MS/s real sampling rate
- AC/DC coupling
- Wide direct input voltage – up to 100V/div in 1,2,5 steps
- Multiple advanced programmable trigger modes
- Advanced auto-set functions automatically catch and display waveform

Benefits

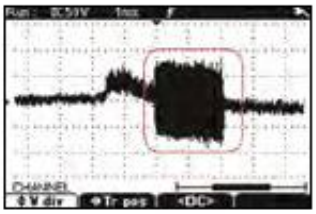
- 600 V CAT III & 1000 V CAT IV DMM / 300 V CAT III O-Scope
- Large 50,000 count, 3.5" high resolution LCD, displays DC Voltage, True RMS AC V
- Efficiency measurement and ripple noise measurement
- Includes real-time PC connection/logging
- Multiple logging sessions possible without download

Graphical Digital Multimeter

- 50,000 count True RMS 3.5" high resolution display DC V, True RMS AC V, AC+ DC V, DC A (automatically displays frequency when measuring AC voltage), True RMS AC A
- Voltage, current, frequency, resistance, capacitance, continuity, frequency - duty cycle - pulse width, diode tester, relay isolation, signal out generation, dBm
- Temp., humidity, hi-current, pressure measurement through AUX (external adapters not included)
- Min/max, autorange, (manual) hold, auto hold, peak hold, bar graph display, REL, warning mode, simultaneous multiple display: present measurement, min/max/avg/dBm in real-time sampling



Multimeter Data Logging

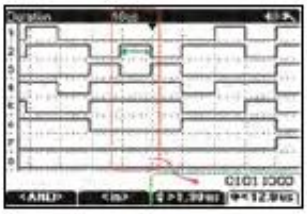


Oscilloscope - Peak Detection Mode

Logic Analyzer

Achieve the fastest logic analyzer control and analysis to maximize your analyzer's usage. Sets up measurements quickly and easily.

- 8 input channels supported
- Sample rate: maximum 50 MHz per channel
- Peak detection and time measurements supported
- Trigger mode: pattern and duration supported



Logic Analyzer - Duration Trigger

Logic Analyzer - Pattern Trigger

Protocol Analyzer

- Sample Rate: maximum 50 MHz per channel
- Peak detection and time measurements supported
- Trigger Mode: CAN, LIN, I2C, UART, USB (low/full speed), I2S, SMBus, SPI, DMX512, 1-Wire supported
- Supports trigger condition setup and speed selection if needed

Digital Pattern Generator

An essential feature for digital system development. Digital pattern is automatically displayed on protocol analyzer screen without connecting with the oscilloscope.

- 2 channels (TX, RX) supported
- Baud rate: up to 1 Mbps
- Pattern format: UART, CAN, and user defined
- Supports making and storage of up to 8 patterns including information like interval, repetition and idle condition
- Monitoring mode supported for watching pattern waveform or data transaction

Technical Details

Display	9.5 cm 50,000 count 240 x 160 pixel FSTN
Bandwidth	10 MHz
Number of Inputs	1
True-RMS Multimeter	5000 counts DDM
Dual Input Trend Plot	Single Input Trend Plot
Safety Certified EN6101-1	600 V CAT III DMM 300V CAT III O-Scope
Battery (Installed)	8 hours (7.2 V NiMH)
PC and Printer Interface	USB
Input True RMS Meter	VDC, VAC, VAC+VDC, OHMS, Amps AC, Amps DC, Hz, Continuity, Diode, Capacitance, F/C, dBV, dBM, 8 Channel Logic, 8 Channel Protocol, Pattern
Trend Plot Recording	Automatic; Displays Pk-Pk, Mean, +Width and Hz
Real Time Sample	50 MS/s
Time Base Range	100 ns - 50 sec/Division
Input Sensitivity	20 mV to 100 V/Division
Trigger Types	Auto/Normal / Single, Edge / Pulse, Rising / Falling / Alternate
Scope Measurements	Automatic

Real-time PC monitoring

SBS-700 Package Includes

- Main body/display
- Removable rubber armor case
- Carrying case
- Pinpoint probes
- Software/USB cable
- Quick start guide
- AC adaptor

Optional test lead accessory kit

Specifications

Maximum Voltage Terminal to Earth Ground	1000 Vac
Battery Type	Rechargeable batteries
Battery Life	80 hours continuous without backlight
Operating Temperature	32° F to 122° F
Storage Temperature	32° F to 158° F
Humidity	80% RH or less (non condensing)
Dimensions	3.9" W x 8.6" H x 2.1" D
Weight	20 oz. / 1.2 lbs. (meter only)

Ordering Information

Part No.	Description
SBS-700	Multi-function oscilloscope meter

Accessory Ordering Information

Part No.	Description
600/700-TEST-LEAD-KT	Test lead accessory kit

Technical Data

DC/AC Voltage Ranges Accuracy	50.000mV 500.00mV 5.0000V 50.000V 500.00V 1000.0V 50mV (±0.05% +50) 500mV-50V (±0.025% +10) 500V-1000V (±0.030% +10)
DC/AC Current Range Accuracy	500.00µA 5.0000mA 50.000mA 500.00mA 10.000A 500µA-5.0000mA (±0.05% +10) 50mA-500mA (±0.15% +10) 10A (±0.30% +10)
Temperature Accuracy	(-20.0° ~ 500.0° C, -20.0° ~ 1370.0° C) or (-4.0° ~ 500.0° F, -4.0° ~ 2498.0° F) Dependent on optional temperature probe
Resistance Accuracy	50.000Ω 500.00Ω 5.0000kΩ 50.000kΩ 500.00kΩ 5.0000MΩ 50.000MΩ 50Ω-500kΩ (±0.05% +10) 5MΩ (±0.15% +10) 50MΩ (±1.00% +10)
Capacitance Accuracy	5.0000nF 50.00nF 500.0nF 5.000uF 50.00uF 500.0uF 5.000mF (±1% +10) > 50.00uF (±2% +10)
Frequency Accuracy	10.00Hz 100.0Hz 1kHz 10kHz 100kHz 1000kHz 0.005%

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

Exponential Power
N56 W1665 Ridgewood Dr.
Menomonee Falls, WI 53051
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