PowerHub

BRILLIANCE BM9000
BATTERY MONITORING SYSTEM

Get 24/7 remote access to the battery performance information you need to proactively maintain your stationary power systems and avoid costly downtime

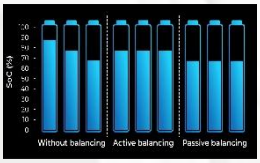
The BMS Solution For UPS using VRLA Batteries

The Brilliance BM9000 Battery Monitoring System (BMS) provides an accurate and reliable indication of battery state-of-health through constant monitoring and analysis of battery voltage, temperature, and impedance. It provides immediate warnings of battery deterioration and imminent failures. It identifies any individual battery that exhibits problems, thus providing a proactive approach to ensuring system reliability. The concepts behind Brilliance BM9000 system are flexibility and scalability, with ease of installation, usage and operation. It is specifically designed to monitor backup batteries at large scale data centers, sub stations and power stations.

FEATURES OF BRILLIANCE BM2000 BMS

Real-time Monitoring

24/7 real-time monitoring of individual Battery Voltage, Charge and Discharge Current, Internal Impedance and Internal Temperature, State Of Charge (SOC) and State Of Heath (SOH).



Auto Battery Cell Balancing

Identify uneven battery voltages and automatically equalize the voltages across all batteries.

Alarm Notifications

Send out alarm notifications in the event when a failing battery is detected.

Battery State Of Health

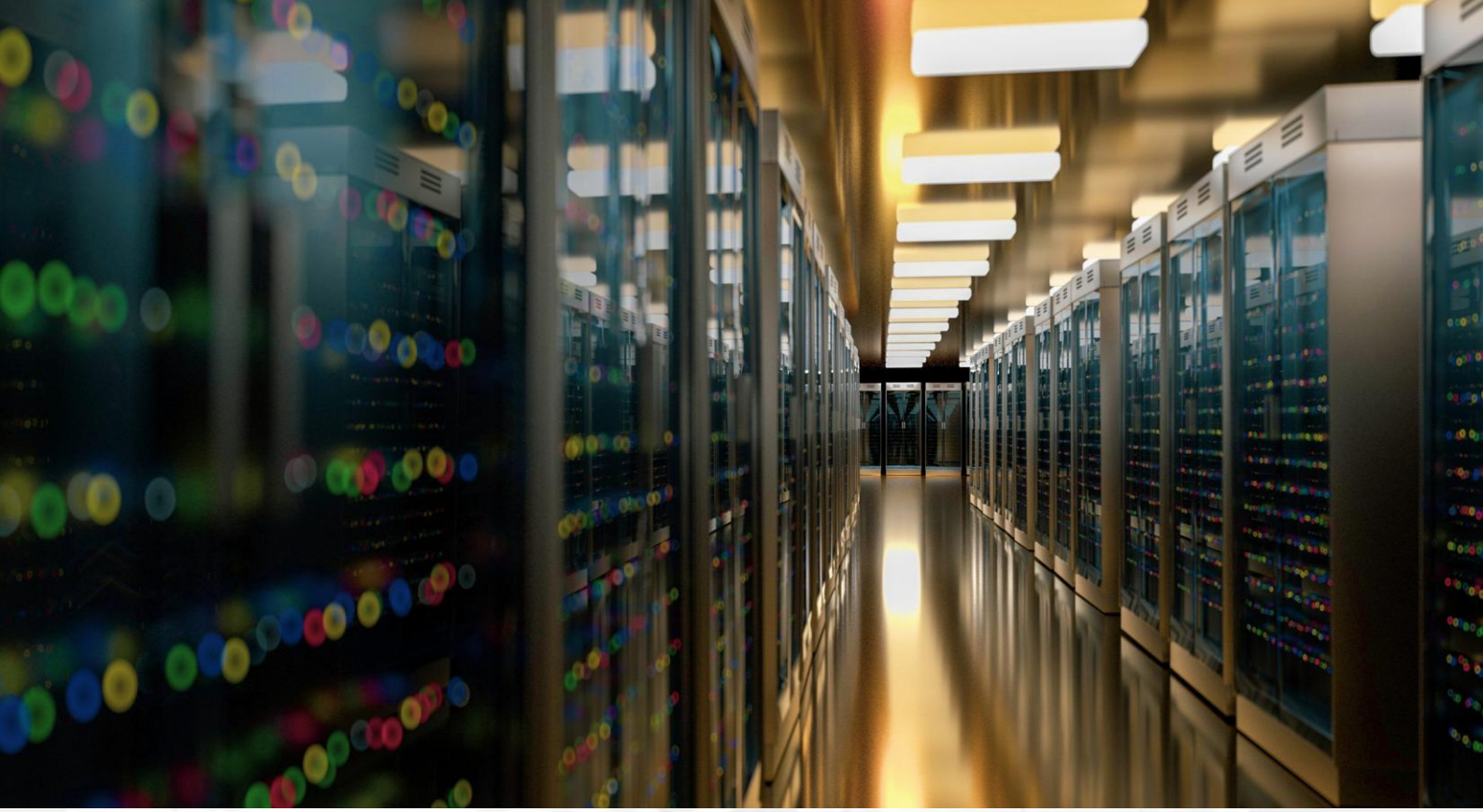
Track the health status of each battery and the entire battery string to enable predictive maintenance. Prevent unexpected outages caused by battery failures.

Real-time LED Battery Health Indicator

A real-time LED battery health indicator displays the battery status using two different colors. A green LED light indicates a healthy battery, while a red LED light signals a failing battery.

Allows Dual Power Sources

Utilize dual power sources to prevent power shutdowns. This setup significantly reduces the risk of power outages and enhances the reliability of the BRILLIANCE BM9000 BMS.



In a mission critical system, relying on the protection of a UPS and battery bank, battery monitoring is essential to keep operations running smoothly. In recent years, battery monitoring has become an integral part of system continuity strategy for all organizations with medium to large UPS systems. Having a battery monitoring system that constantly monitors that the batteries (State Of Health) brings a lot of advantages.

BENEFITS OF BRILLIANCE BM9000 BMS

Prevents Unplanned Outages – by monitoring every battery every day, failing batteries are identified to be removed from the battery string thus preventing healthy units from further deterioration and preventing outages due to a battery failure.

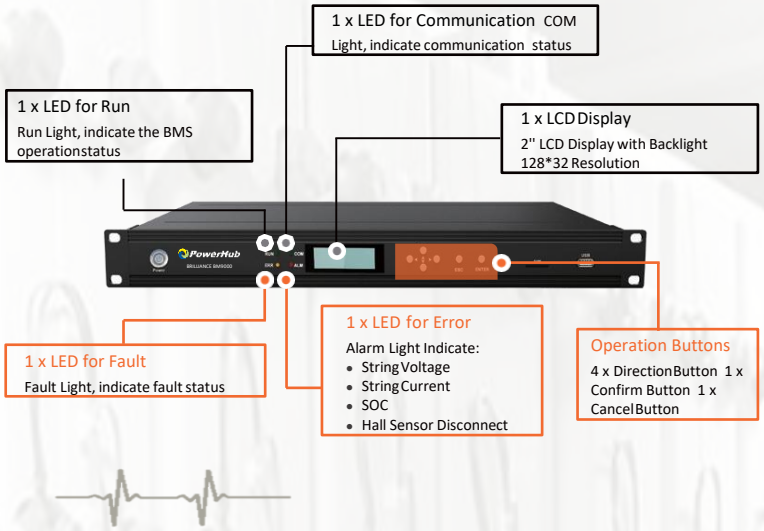
Saves money – by extending useful battery life through constant monitoring and balancing between each battery, predict battery's health, deferring premature replacements, and reducing manual corrective maintenance costs.

Complies with regulatory requirements – Brilliance BM9000 BMS complies with IEEE 1188-2005.

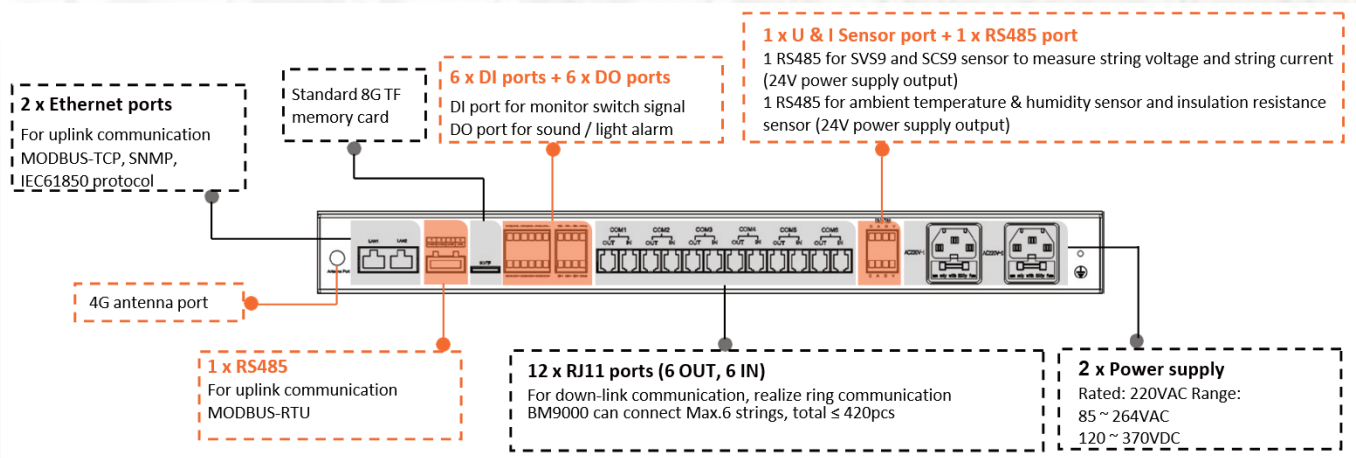
SYSTEM COMPONENTS

1. BRILLIANCE BM9000 Battery Monitoring Gateway

- Standard 1 U design for distribution cabinet
- Dual-source to avoid power shutdown
- Built-in web server with visual display
- Monitor Max. 6 strings battery, in a total of 420 batteries
- Measure battery string current & voltage, ripple voltage & current, charge & discharge current, internal temperature, impedance, insulation resistance, ambient temperature & humidity, SOC and SOH
- Alarm message by SMS or Email
- Support Modbus-TCP, Modbus-RTU, SNMP and IEC61850 protocols
- Support MQTT for JSON format to data upload
- 1 RS485 port, 2 Ethernet ports and 1 4G Antenna port to data upload
- 6 DI ports (digital Input connecting)
- 6 DO ports (sound and light alarm)



➢ Dimension and Installation



Technical Specification

CPU	ARM Cortex A7 528MHz	**Up-link Communication**	2 Ethernet Ports (10/100M), MODBUS-TCP, SNMP, IEC61850 1 RS485 port, MODBUS-RTU, Baudrate: 9600bps, 19200bps, 38400bps (optional)	
Flash	512MB flash, 4G EMMC + 8G TF memory card			
Display	2" inch LCD with backlight	**Down-link Communication**	6 Channels RJ11 Ports, each Port Max. Connect≦70pcs Batteries, total Max. 420pcs	
MTBF	≧ 100,000 hours			
Power Supply	Rated: AC 220V Range: AC 85~264V or DC120~370V	**Additional Port**	6 x DI Dry Contact 6 x DO Relay Output, 250VAC/5A or 30VDC/5A	
Power Consumption	<15W (only main controller)	**Measurement Range**	Voltage	1~6 strings, Range: DC 8~1000V(±0.5%), Resolution：0.01V
			Ripple Voltage	1 ~ 6 strings, Range: 2 ~ 100V (peak), resolution: 0.01V
			Current	1~6 strings, Range: DC -2000~+2000V(±2.0%, under 15℃~35℃), Resolution：0.01A
Dimension	Standard 19'' inch 1 U Device 483mm × 206mm × 44.5mm Open hole: 440mm×46mm (L*H)		Ripple Current	1 ~ 6 strings, according to the rated current of the hall sensor, Range: DC 0 ~ 0.4*I (peak), resolution ： 0.01A
Extension Sensor (Optional)	• RS485 for measuring 1~6 strings string voltage & current • RS485 for measuring Max. 6 strings ambient temperature & humidity • RS485 for measuring 1~6 strings DC insulation resistance	**Operation Environment**	Working Temperature: -15°C ~ +55°C Storage Temperature: -40°C ~ +70°C Humidity: 5% ~ 95% Non-condensing	

2. BRILLIANCE BM9000 Battery Cell Sensor

Functions:

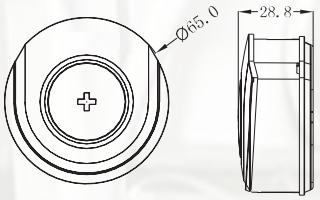
- BRILLIANCE 602 for 2V Battery, BRILLIANCE 612 for 12V Battery
- Monitor Individual Battery Voltage, Internal Temperature (Negative pole), Internal Impedance(Ohmic Value)
- Calculate Individual Battery State Of Charge (SOC), State of Health (SOH)
- Powered by Communication Bus, no consumption of battery power
- Auto-balancing function

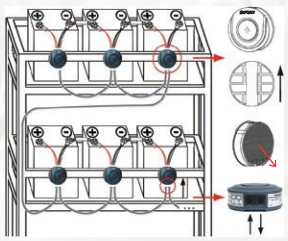
Normal Status

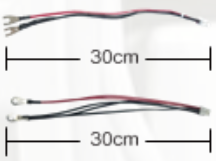
Abnormal Status

Item	Power Supply	Measuring Range		
		Voltage	Internal Temperature	Impedance
BRILLIANCE 602	DC24V Power Consumption: Running: <70mW Sleeping: <8mW	DC 1.6 ~ 2.6V (±0.2%V)	-20℃~ 85℃ (±0.5℃)	Range: 0.1mΩ~50mΩ Repeatability error: 1.0%±25μΩ Conformity error: 1.5%±25μΩ
BRILLIANCE 612		DC 7.5 ~ 15.6V (±0.2%)		

➢ Dimension and Installation





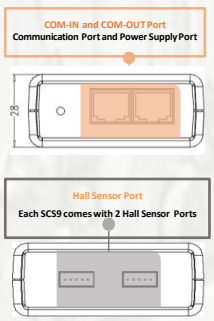


	Item	Description
Battery Sensing Cable	Length	30cm
	Terminal& Size	U type, hole diameter: 8mm
		O type, hole diameter: 8mm

3. BRILLIANCE SCS9 String Current Measuring Sensor & Hall Sensor

Functions:

- One string of battery will need 1 x BRILLIANCE SCS9.
- Measure battery string charge and discharge current as well as ripple current.
- Measure multi-pole battery's string charge and discharge current and ripple current with flexible module and hall sensor.
- Accessories:
  - Hall Sensor and Cable: Range from 0～±1000A with 2m cable
  - Communication Cable : 5m with RJ45 port



Item	Power Supply	Measuring Range		Environment
		String Current	Ripple Current	
BRILLIANCE SCS9	DC24V (Range: DC9~ 32V) Power Consumption: ＜0.5W	1 Hall Sensor:- 1000A ~ +1000A 2 Hall Sensors: -2000A ~ +2000A (±2.0%, 15℃~35℃)	20% of Hall Sensor Rated Current (Peak value) Frequency: 50Hz~1KHz	Working Temperature: 0℃ ～ +45℃ Limit Temperature: -15℃ ~ +55℃ Storage Temperature: -40℃～+70℃ Humidity: 5% ～95%RH, Non-condensing

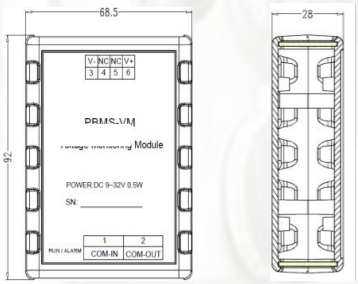
4. BRILLIANCE SVS9 String Voltage Measuring Sensor (Optional Module)

Functions:

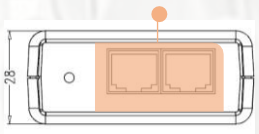
- Measure Battery String Voltage
- Measure Battery String Ripple Voltage

Item	Power Supply	Measuring Range		Environment
		String Voltage	Ripple Voltage	
BRILLIANCE SVS9	DC24V (Range: DC 9 ~ 32V) Power Consumption: ＜1W	DC 20 ~ 1000V (±0.5%)	2 ~ 100V (Peak value)	Working Temperature: 0℃ ~ +45℃ Limit Temperature: -15℃ ~ +55℃ Humidity: 5% ~ 95%RH, Non-condensing Storage Temperature: -40℃ ~ +70℃

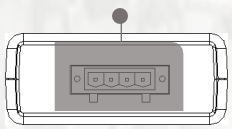
➢ Dimension and Installation



COM-IN and COM-OUT Port
Communication Port and Power Supply Port



Voltage +/- Port
For Measuring String Voltage



5. BRILLIANCE HMI-BM9000 (Optional)

Functions:

- 10.1'' inch Touch-Screen HMI for Display and Operation
- Real-time Data Inquiry:
  - Individual Battery Voltage, Impedance, Inner Temperature, SOC, SOH
  - String Voltage, Charge and Discharge Current, SOC, Balance Degree
- Alarm Data Inquiry:
  - Real-time Alarm Status and Related Alarm Information
    (Faulty Battery ID, Date / Time, Alarm Reason, Communication Status etc.)
  - 3000 Alarm Records for Each String Battery

BRILLIANCE HMI-BM9000

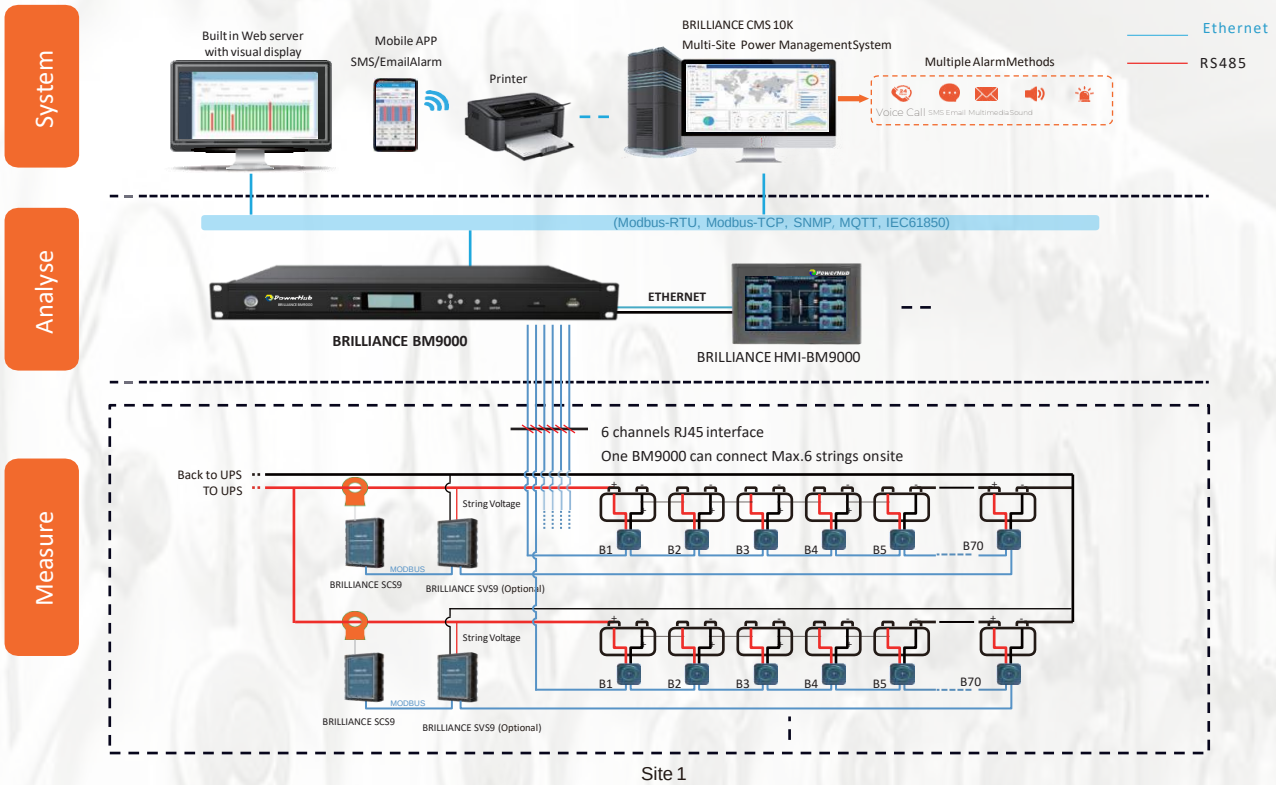
Real-time Data Query

Alarm Settings

Liquid Level Display

Display	10.1'' inch TFT display	**CPU**	ARM cortex-A8，400MHz
	LED backlight	**Flash**	128M NAND
	Resolution: 800 X 480	**RAM**	64M DDR2
Communication	1 Ethernet port, (connect with PBAT-Gate)	**Dimension**	226.5mm X 163mm X 36mm
	1 RS485 port, (connect with PBMS Series)		Mounting Hole: 215mm±0.5 X 152mm±0.5
Power Supply	24VDC, 20% / 300mA max.	**Power Consumption**	< 5W

SOLUTION OVERVIEW:



Site 1

SYSTEM INFORMATION

System Structure		Model	Description	Remark
Management Layer		BRILLIANCE BM9000	Battery Monitoring Main Controller	One per UPS One BRILLIANCE BM9000 can Monitor Max. 6 Strings, Max. 420pcs Batteries
		BRILLIANCE BM9000 - L	Battery Monitoring Main Controller with 4G Antenna port (Standard)	
String Measuring Sensor		BRILLIANCE SCS9	String Current Measuring Sensor	One per string, with each string featuring 2 Hall Sensor Ports, capable of connecting up to 2 Hall Sensors. For multi-pole batteries, the BRILLIANCE SCS9 can be configured based on the number of poles. Hall Sensor and Cable: Range from 0 ~ ±1000A with 2m cable Communication Cable : 5m with RJ45 port
		BRILLIANCE SVS9	String Voltage Measuring Sensor	One Per String (Optional)
Battery Cell Sensor		BRILLIANCE 602	Monitor 2V Battery Cell Sensor	One Per Battery Cell
		BRILLIANCE 606	Monitor 6V Battery Cell Sensor	One Per Battery Cell
		BRILLIANCE 612	Monitor 12V Battery Cell Sensor	One Per Battery Cell
Accessory	Hall Sensor for BRILLIANCE BM9000	BRILLIANCE CS100	Rated Input: 50A	Measure Range: 0～±100A, Φ20mm
		BRILLIANCE CS200	Rated Input: 100A	Measure Range: 0～±200A, Φ40mm
		BRILLIANCE CS400	Rated Input: 200A	Measure Range: 0～±400A, Φ40mm
		BRILLIANCE CS800	Rated Input: 400A	Measure Range: 0～±800A, Φ40mm
		BRILLIANCE CS1K	Rated Input: 500A	Measure Range: 0～±1000A, Φ40mm
	Power Supply	BRILLIANCE PS12	12VDC Power Source, 220AC to 12VDC, for BRILLIANCE HMI-BM9000	
Optional Module	Local Display & Operation Layer	BRILLIANCE HMI-BM9000	10'' Touch-Screen HMI For Local Display	One Per BRILLIANCE BM9000 Communication with BM9000 via Ethernet
	Ambient Temperature & Humidity	BRILLIANCE 9000 ENV	Temperature: -20°C ~ 60°C (±0.4°C) Humidity: 0 ~ 100%RH (±3%RH)	One BRILLIANCE BM9000 can connect Max. 6pcs
	DC Insulation Resistance Sensor	BRILLIANCE DC-RES SENSOR	Measuring Range: 1KΩ ~ 30MΩ	One per string, One BRILLIANCE BM9000 can connect Max. 6pcs
	Hydrogen (H2) Sensor	BRILLIANCE HYDROSENSE	Measuring Range: 0 ~ 1000ppm	One per BRILLIANCE BM9000

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