BLOOMY®

The Leader in Automated Test, Data Acquisition and Control Systems

BMS Manufacturing Test System

Ensures functionality before final assembly

The Battery Management System (BMS) Manufacturing Test System performs functional testing of product during end-of-line manufacturing. The system hardware includes all instrumentation to test a BMS, including multiple cell simulators, a mass interconnect for quick product transition, and bed-of-nails fixtures to ensure less downtime, higher throughput, and easy maintenance. The system application easily integrates into manufacturing processes, provides a method to test multiple product types, and optimizes tests to ensure only good product is released from manufacturing.

APPLICATIONS

- End-of-line manufacturing test of BMS master and modules
- Autoloading of BMS software
- Calibration of cell monitors
- RMA testing
- Factory recalibration

FEATURES

- Cell simulation via Battery Simulator 1200
  - 12 cells per module
  - 0 to 5V programmable range
  - Sink and source 500 mA of current
  - 1,000 VDC isolation
- Thermistor and RTD temperature simulation
- CANbus, RS-232, and RS-485 communications
- Mass interconnect for quick product transition
- Fault insertion and auxiliary system measurements
- Operator-friendly test management software based on NI TestStand and LabVIEW
- Barcode scanner, safety integration
- Optional high-voltage pack simulation power supply

Trying to validate a BMS?

Inquire about Bloomy's BMS Validation System.

MANUFACTURING INTEGRATION

The BMS Manufacturing Test System is a modular design that includes all necessary instrumentation and manufacturing necessities such as the Battery Simulator 1200, the UTS Software Suite, a barcode scanner, and safety integration. A robust Virginia Panel mass interconnect provides a method for interchangeable fixtures to connect to the instrumentation to test a wide range of BMS models. Custom bed-of-nails or cabled fixtures can be developed for your BMS.

The UTS Software Suite is Bloomy's own test management software enabling easy creation of test sequences and interfaces, based on National Instruments TestStand and LabVIEW. Optimized for manufacturing, the UTS Software Suite configures system tests, controls instruments, communicates to the BMS, and executes test profiles. Typical BMS tests include connector opens and shorts, cell voltage and current sensing, temperature sensing, pack current sensing, cell balancing, over voltage, under voltage, over current, and over temp alarms and interlocks; output relays, CAN or serial communications.

- Auto fixture and product identification
- Barcode scanning
- Firmware loading
- Test optimization
- Highly automated BMS test sequences
- Operator-friendly interface
- Calibration of cell monitors and temperature sensors
- Customized reports and travelers
- Database integration

HARDWARE SPECIFICATIONS

The following specifications are standard. Systems can be customized to accommodate specific requirements.

CELL CHANNEL SIMULATION	
Number of Channels	12 / module
Max number of Modules	20 (240 channels @ 4.2V)
Channel Type	Sink and Source
Voltage Range per cell	0.0 to 5.0V
Voltage Resolution	0.1 mV
Voltage Accuracy	±3 mV
Current Range	±500.0 mA
Current Resolution	0.1 mA
Current Accuracy	±4 mA
Current Limiting Accuracy	±10 mA
Common Mode Isolation	1000 VDC CH-TO-CH, CH-TO-GND

CELL CHANNEL READBACK	
Voltage Resolution	0.1 mV
Voltage Accuracy	±3 mV
Current Resolution	0.1 mA
Current Accuracy	±4 mA

Higher accuracies can be achieved with a custom relay matrix and an integrated 7.5 digit DMM.

COMMUNICATION PROTOCOLS	
Standard Protocol	High-speed CAN
Number of Ports	2
Baud Rate	40 kbits/s to 1Mbit/s
Additional Protocols	LIN, SPI, RS232, Modbus

CURRENT SENSOR SIMULATION	
Typical Signal Type	Analog voltage
Number of Channels	2 channel
Range	±10V
Resolution	16 bit
Accuracy	±0.5%
Additional Signal Types	CAN communications

TEMPERATURE SENSOR SIMULATION	
Typical Signal Type	Resistance
Number of Channels	up to 24
Range	10Ω to 500 kΩ
Resolution	1Ω
Accuracy	1%
Additional Signal Types	Analog voltage (±10V) Analog current (0 – 40 mA)

BMS CONTROL I/O	
Number of Channels	24 input / 24 output
Voltage Range	0 to 60V
Current Drive	150 mA
Common Mode Isolation	60V channel-to-channel

FAULT INSERTION	
Number of Channels	24
Type	Relays
Voltage Range	0 to 500V

AUXILIARY MEASUREMENTS	
Number of Channels	32
Type	7.5 Digit DMM (voltage, current, resistance)
Voltage	±10 nV to 1000 VDC
Current	8 DC current ranges with sensitivity down to 1 pA
Resistance	10 μΩ to 5 GΩ
Common Mode Isolation	±500 VDC/Vrms

OPTIONAL

PACK VOLTAGE SIMULATION	
Number of Channels	1 channel
Voltage Range	up to 1000 VDC
Current Range	1.5 ADC
Programming Accuracy	±0.25% of full scale

BMS BUS VOLTAGE SIMULATION	
Number of Channels	2 channel
Voltage Range	0 to 60V
Current Range	0 to 20A
Power Range	850W