BLOOMY®

Automated test solutions for the entire product lifecycle

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 *FLEX 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 EFT Module for TestStand, 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 EFT Module for TestStand 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 EFT Module for TestStand 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
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	Voltage	Resistance
Number of Channels	4 to 64	
Range	±10V	2.5Ω – 1.5MΩ
Resolution	<1 mV	2Ω
Accuracy (typical)	0.03%	0.2%
BMS CONTROL I/O		
Number of Channels	Up to 32 input / 32 output	
Voltage Range	0 to 30V	
Current Drive	Up to 150 mA	
Common Mode Isolation	30V bank-to-bank	
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 to 10		
Voltage Range	Up to 1000 VDC		
Output Power	5W	30W	1500W
Resolution	0.1V	0.1V	0.003V
Accuracy (typical)	1-2%	1-2%	0.075%
BMS BUS VOLTAGE SIMULATION			
Number of Channels	2 channel		
Voltage Range	0 to 60V		
Current Range	0 to 20A		
Power Range	850W		