Battery Simulator 1200
Installation Manual

Bloomy Controls, Inc.

Part Number 8700-00001 V1.2

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Bloomy Controls, Inc., (Bloomy) provides products and services for battery test and simulation, delivering enterprise solutions for EVs, grid storage, and battery manufacturers; including OEMs, contract manufacturers, researchers, and test labs. Bloomy allows companies and organizations to increase productivity, improve quality, and reduce costs with automation.

FCC STATEMENT:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTE:

Do not open the enclosure. This product contains no user-serviceable parts. Opening the enclosure will void the warranty.

Important Information

 This symbol identifies messages in this document related to safety.

 **DANGER**

DANGER indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.

Failure to follow the instructions given will result in death or serious injury.

 **WARNING**

WARNING indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

Failure to follow the instructions given can result in death or serious injury

 **CAUTION**

CAUTION indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury.

Failure to follow these instructions can result in personal injury.

NOTICE

NOTICE alerts you to practices unrelated to personal injury, such as those that can cause property damage.

Failure to follow these instructions can result in property damage.

IMPORTANT

IMPORTANT indicates additional information about making effective use of this product.

Table of Contents

1. Introducing the Battery Simulator 1200

The Battery Simulator 1200 provides a safe and efficient method for battery, grid storage, and automotive companies to accurately simulate a broad range of battery pack and cell conditions. The Battery Simulator 1200 provides 12 individually controlled simulated cells and several auxiliary analog and digital I/O channels. Integrated computing allows the unit to be configured for custom battery profiles and simulated events. Multiple units can be combined in series to simulate higher channel count battery packs.

1.1 Features

- Simulate 12 independent cells per unit
- Sink and source 5 VDC and 500 mA per channel
- 1000 VDC channel-to-channel and channel-to-ground isolation
- Auxiliary analog and digital I/O
- Ethernet (LAN) and high-speed CAN control communications
- High speed CAN interface compliant with ISO 11898
- NI LabVIEW drivers

Figure 1: Front View of Battery Simulator 1200 solid running blinking = error state

Power indication:

Power-on Indicator LED	**Condition**
Constant green	Operating
Blinking green	Error state
Off	System off

Figure 2: Rear View of Battery Simulator 1200

The outputs of the Battery Simulator 1200 may be connected in series to simulate a pack. This must be done with extreme caution as hazardous voltages can be generated due to the additive nature of the cell outputs. For example, 12 cells in series with each cell at 4 volts will generate 48V total.

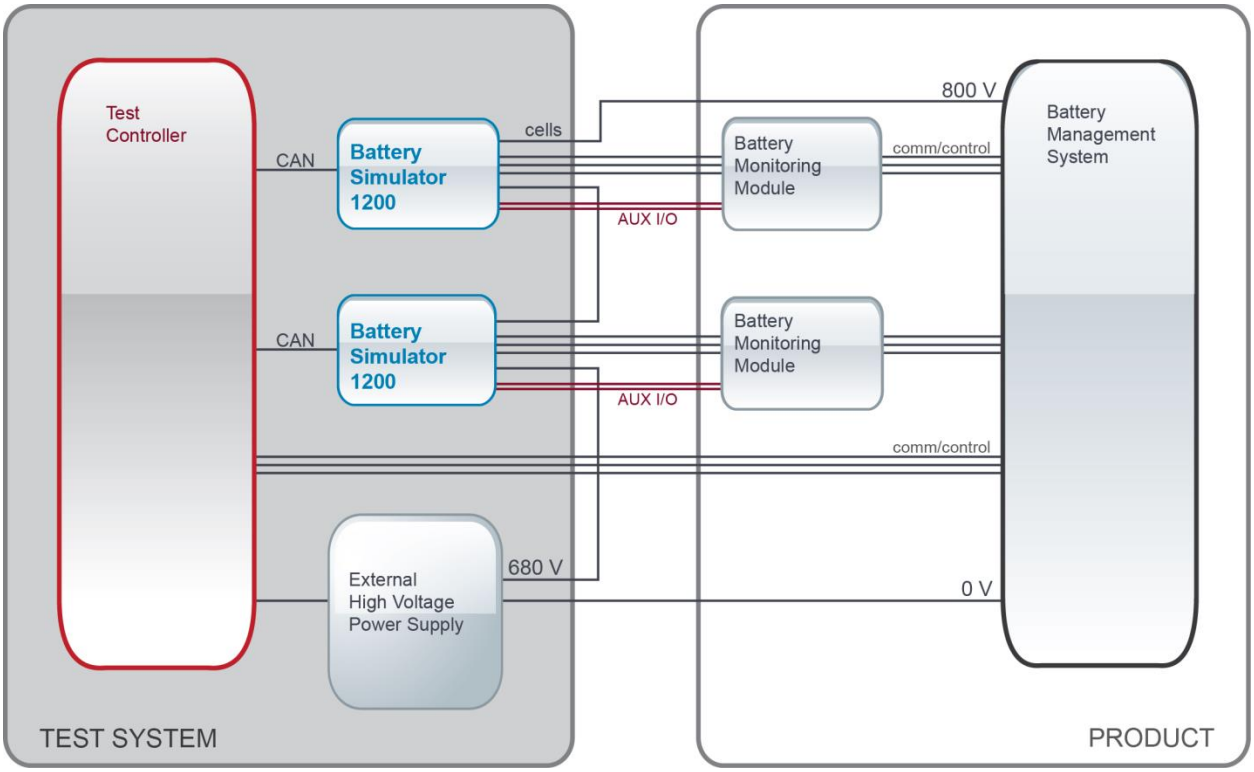
WARNING

Hazardous voltages can result from connecting outputs in series. Use extreme caution when connecting outputs in series.

Failure to follow the instructions given can result in death or serious injury

1.2 Application Example

Highly isolated cells provide the flexibility to integrate the Battery Simulator 1200 into many custom system architectures. In the example shown below, two units are stacked above a 680V external power supply to provide an overall pack voltage of 800V.



Typical applications include

- Battery management system testing, verification, and validation
- Battery pack simulation, up to 200 cells
- Hardware-in-the-Loop (HIL) system integration

2. Installation

To install your Battery Simulator 1200, follow the instructions below.

1. Mount the Battery Simulator 1200 in a 19-in. rack. It uses 1U of space. The cooling air flows from left to right when viewed from the front of the unit. You can mount additional units above and below; no space is required between units.
2. Make wiring connections as needed (see Table 1: Connections for Cells 1 –12 and Table 2: Aux I/O Connections). See also Figure 3: Wiring Remote Sense
3. Connect the AC power cord to the back panel of the unit and to a properly grounded power receptacle controlled by an input power disconnect device near the equipment and within easy reach of the operator.

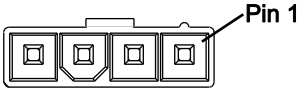
CAUTION

DO NOT open the equipment enclosure. This product contains no user-serviceable components.

Failure to follow these instructions can result in personal injury.

Ethernet **Auxiliary I/O** ← **Cell Connections (1 – 12)** → **AC Power**

Table 1: Connections for Cells 1 –12



Pin number	Signal
Pin 1	Sense+
Pin 2	Vout+
Pin 3	Vout–
Pin 4	Sense–

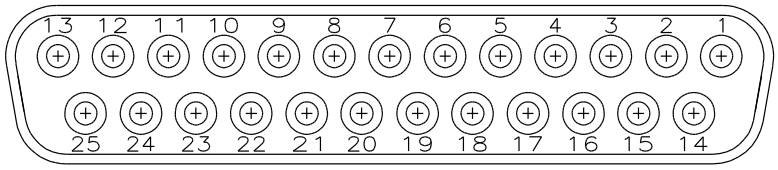
Cell Connection	Function
Vout +/–	Cell simulator output capable of both sourcing and sinking current
Sense +/–	Remote sensing of the Vout +/–signals

NOTE: When connected, the system compensates for voltage drop when current flows through the Vout +/– cables. The Battery Simulator 1200 contains resistors that connect Vout +/– to Sense +/– to allow proper sensing at the output connector if the Sense lines are not connected. The system is designed to compensate for up to 200 mV of total round-trip cable loss.

Connector: Molex 39-01-4041

Contact: Molex 39-00-0429 (18-24AWG, many other options available)

Table 2: Aux I/O Connections



Analog I/O Connection	Description
Analog Inputs 1 – 8	Single-ended inputs Capable of measuring 0 to 5 VDC
Analog Output 1 – 2	Can be configured to output voltages of 0 to 5 VDC
CAN+, CAN–	Controller area network connections
Digital I/O 1-8	3.3V digital I/Os that can be configured as inputs or outputs capable of sourcing and sinking up to 3 mA
GND	Ground

Pin Number	Connection
Pin 1	Analog In #1
Pin 2	Analog In #3
Pin 3	Analog In #5
Pin 4	Analog In #7
Pin 5	GND
Pin 6	Analog Out #1
Pin 7	GND
Pin 8	Digital I/O #2
Pin 9	Digital I/O #4
Pin 10	Digital I/O #6
Pin 11	Digital I/O #8
Pin 12	GND
Pin 13	CAN+

Pin Number	Connection
Pin 14	Analog In #2
Pin 15	Analog In #4
Pin 16	Analog In #6
Pin 17	Analog In #8
Pin 18	GND
Pin 19	Analog Out #2
Pin 20	Digital I/O #1
Pin 21	Digital I/O #3
Pin 22	Digital I/O #5
Pin 23	Digital I/O #7
Pin 24	GND
Pin 25	CAN–

IMPORTANT

- Battery Simulator 1200 does not contain a CAN bus termination resistor.
- If needed, add CAN bus termination between the CAN signals at the AUX I/O connector.
- Provide a dedicated CAN network for your Battery Simulator 1200s to avoid addressing conflicts.

Connector: Tyco 1658613-2 (many other options available)

2.1 Wiring Remote Sense

Use remote sensing to regulate the output voltage at the device under test. This feature lets you compensate for the voltage drop in the leads between the Battery Simulator 1200 and the device under test.

To set up the remote sensing mode, refer to Figure 3: Wiring Remote Sense and follow these steps:

1. Connect a pair of sense leads from Sense + and Sense – to the device under test.

IMPORTANT
For system stability, use jacketed twisted-pair cables between the remote sense terminals of the unit and the load.

2. Connect a pair of drive leads from drive Vout + and drive Vout – to the device under test.

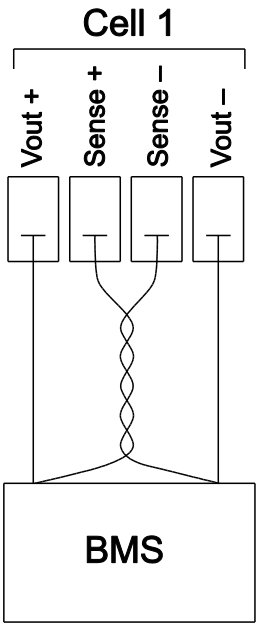


Figure 3: Wiring Remote Sense

3. Specifications

Note: All specifications subject to change.

3.1 Cell Simulation

Sink and Source	
Number of Channels	12
Voltage Range	0.0 to 5.0 V
Voltage Resolution	0.1 mV
Voltage Accuracy	±3 mV
Current Range	± 500.0 mA; output derates linearly under 2 V
Current Resolution	0.1 mA
Isolation	1000 VDC CH-TO-CH, CH-TO-GND
Control	
Communication	LAN (Ethernet) CAN (optional)
Drivers	NI LabVIEW™
Readback	
Voltage Resolution	.1 mV
Voltage Accuracy	±3 mV
Current Resolution	.1 mA
Current Accuracy	±4 mA

3.2 Auxiliary I/O Specifications

Analog Input	
Number of Channels	8 (single -ended)
Resolution	.1 mV
Max Voltage	5.0 V
Analog Output	
Number of Channels	2
Resolution	.1 mV
Max Voltage	5.0 V
Digital I/O	
Channels	8 (bidirectional)
Logic Level	3.3 V

3.3 Physical Specifications

Dimensions	19” W x 1.75” H x 15” D (1U) (482.6 mm W x 44.5 mm H x 381.0mm D)
Weight	7.5 lb (3.4 kg)
Operating Temperature	0 to 35° C
Input Power	Single phase, 100 - 240 VAC/3A, 50/60 Hz
Altitude	9842 ft (3000 m), maximum
Pollution Degree	PDX1

4. Maintenance

4.1 Cleaning Instructions

To clean your Battery Simulator 1200, follow these steps:

1. Power down the unit.
2. Clean with a damp cloth.

4.2 Calibration

The recommended calibration interval is 1 year. Please contact Bloomy for information regarding calibration.

5. Revisions

Rev	Date	Description	Originator	Approver
1.2	7/8/2019		Paul Tortora	Grant Gothing