
# SBM-650

## Battery Monitor

CAT II Electrical Measurement Equipment

## Installation and Service Manual

(Updated on Dec-2023)

think before you print

Only print the page(s) you need

**Caution, possibility of electric shock**
**High Voltage Hazard exists on Battery Terminals, Sampling Leads, Connectors and Inside Circuits!**

**Please read through this manual before installation**
Information in this document is subject to change without notice.

BatteryDAQ LLC, USA

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## Trademarks

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**BatteryDAQ™**, **MyBattery Platform™** and **Sentry Battery Monitor™** are the registered trademarks of **BatteryDAQ**.

## Copyright



## Liability

Neither **BatteryDAQ** nor any of its employees shall be liable for any direct, indirect, incidental or consequential damages arising from the failure of the battery monitoring system due to the failure of a proprietary part of the battery monitoring system, even if **BatteryDAQ** had been advised in advance except for as provided by law.

## Specification

**BatteryDAQ** makes every effort to ensure that the specifications and details in this manual are accurate and complete. **BatteryDAQ** reserves the right to alter or improve the specification, design or manufacturing process at any time, without notice.

## Warranty

**BatteryDAQ** warrants this system free from defects in material and workmanship in operation for one year from the date of commissioning or sale by **BatteryDAQ** or its authorized dealer.

## Limitation of Warranty

This warranty does not apply to defects arising from system modification performed without **BatteryDAQ**'s written approval, or misuse of the system or any part of the system. The warranty excludes defects or malfunctions resulting from failure by the customer, or his designated personnel, to maintain and upkeep the batteries to which the system is fitted.

## Repair and Return

This product can only be repaired by authorized personnel.

If you determine that a repair is needed, please contact our Customer and Product Service (CaPS) department to have an RMA number issued. CaPS should also be contacted to obtain information regarding equipment currently in house or possible fees associated with repair.

For warranty service or repair, this product must be returned to the BatteryDAQ factory. Buyer shall pay shipping charges to send the product to BatteryDAQ, and BatteryDAQ shall pay shipping charges to return the product to the Buyer in United States. However, Buyer shall pay all shipping charges, duties and taxes for products returned to BatteryDAQ from another country.

**Telephone: 1-800-455-8970** **Email: tech@batterydaq.com**

## Safety Instructions

| | |
|---|---|
|  | Caution, follow the instruction |
|  | Caution, possibility of electric shock |
|  | Protective Earth (ground) Terminal |

**This warning label must be permanently presented on battery rack/cabinet!**

**Unplug MAIN Terminal from Sentry Unit before Service/Replace Batteries.**

The following safety precautions should be observed before any work is performed on the system containing the **BatteryDAQ** product.

1. **This system is intended for installation by personnel who are trained and qualified to recognize the hazards associated with working with such systems and are familiar with the safety precautions required to avoid possible injury.**
2. **Never work on any system that threatens life or injury through hazardous voltages except when applying absolute safety precautions.**
3. **Never work alone. Always ensure that you work with a properly trained colleague.**
4. **BatteryDAQ recommends that when performing any work concerning batteries, the safety procedures and safe working practices as described in the appropriate battery manufacturers documentation should be followed at all times.**
5. **Never make unauthorized changes or modifications to equipment. This may create unsafe, or even hazardous, situations.**
6. **Where the battery documentation recommends that links are removed for safe working, it is important to totally remove any unit which is connected across any link to be broken prior to separation and subsequent removal of the link. Failure to do so will result in the string not being totally isolated.**
7. **After replacing/servicing of the battery, any removed links must be fitted and reconnected before the modules are reconnected.**

## Tools and Equipment

1. Ensure all equipment and tools are proper, safe and in good working order.
2. Ensure electrical tools have been tested for proper insulation and grounding where appropriate.
3. Observe all **CAUTION**, **WARNINGS** and **DANGER** notices on equipment, tools, and building, whether internally or externally displayed.

# Contents



* Drawings/pictures in this manual may be for reference only.

# 1 Overview - Battery Monitoring for NERC Compliance

BatteryDAQ provides advanced technologies and products for **NERC PRC-005** compliance. Our technologies are outstanding in many aspects:

- Measurement Precision
- System Reliability
- Communication and Networking
- Plug and Play Operator Interface
- Battery Data Management Software and Alarm Delivery

We provide two battery monitoring models for 120/240VDC in power plants and substations:

| BMS Model | Sentry-6002NEMA | SBM-650 |
|---|---|---|
| **Monitoring Level** | **Cell Level** | **String Level** |
| **String Voltage, current, temperature** | Yes | Yes |
| **Battery Bank ohmic values** | Each cell | Full string, or each section |
| **Battery continuity** | Yes | Yes |
| **Battery cell-to-cell resistance** | Each cell-to-cell | Full string, or each section |

Sentry Battery Monitor SBM-650 utilizes BatteryDAQ field proven technologies to reliably detect battery faults for NERC PRC-005-2 compliance. This string level monitoring unit is designed for utility clients choosing not to monitor at the cell level. Connections to the battery system are simplified & optimized for easy installation.

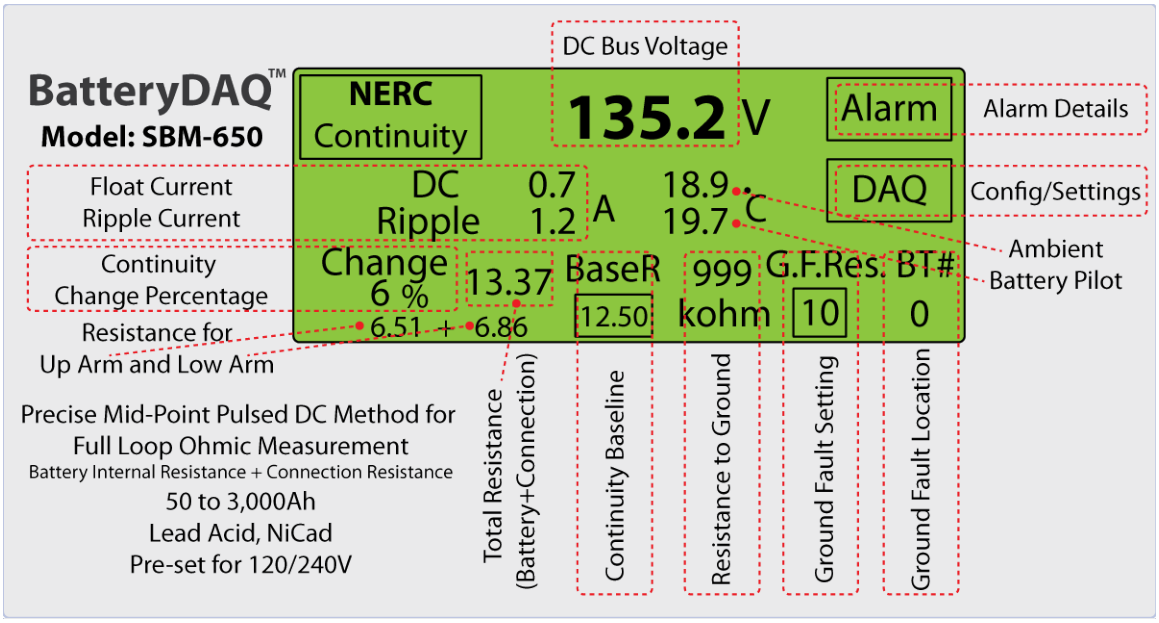
## NERC PRC-005-2 Protection System Maintenance

***Every 18 calendar months***, verify/inspect the following:

- Battery bank ohmic values to station battery baseline (if performance tests are not opted)
- Battery charger float voltage
- Battery rack integrity
- Cell condition of all individual battery cells (where visible)
- Battery continuity
- Battery terminal connection resistance
- Battery cell-to-cell resistance (where available to measure)

PRC-005-2 Supplementary Reference and FAQ – October 2012
Adopted by the NERC BOT November 2012

# 2 Features




1) Continuously monitors battery string voltage, float current, ripple current, and temperature to ensure batteries are in the correct charging condition. An alarm will be generated if thresholds are breached.
2) Actively measures battery to DC bus continuity. An alarm will be generated if there is an open circuit, an open/dead battery, one or more deteriorated batteries, or a high connection resistance in any battery terminal or bus/switch connection.
3) Provides a precise value for total battery bank “Internal Resistance + Connection Resistance”. Reliably detects battery deterioration and continuity problems. Values can be trended for battery service and replacement timing.
4) Detects ground fault and displays real-time grounding resistance. Locates which cell should be inspected, in case of leaks within battery cells.
5) An intelligent embedded algorithm detects thermal runaway risk at its earliest stage. “Battery Working Status” is analyzed to avoid false alarms.
6) Touch screen to view data, alarm, and make changes to settings.
7) Compatible with VLA, VRLA, NiCad batteries. Minimum settings.
8) NEMA 4 grade sealed enclosure allows for safe and protected battery room installations.
9) Dry contact alarms can be linked to the charger, for counter adjustment to prevent thermal runaway.
10) RS485 Modbus-RTU and Ethernet Modbus-TCP for SCADA integration.

## 2.1 Environmental Conditions

Sentry Battery Monitor SBM-650 models are designed for normal environmental conditions as UL61010-1 standard:

a) Indoor use;

b) Altitude up to 2 000 m;

c) Temperature 5 °C to 40 °C (41°F to 104°F);

d) Maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;

e) MAINS supply voltage fluctuations up to ±10 % of the nominal voltage;

f) TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY II;

NOTE 1: These levels of transient overvoltage are typical for equipment supplied from the building wiring.

g) TEMPORARY OVERVOLTAGES occurring on the MAINS supply.

h) Pollution Degree 2

SBM-650 utilizes an impact-resistant polycarbonate sealed enclosure, to allow it to be installed in battery room.

## *2.2 Specifications*

| | |
|---|---|
| **Working Voltage** | **SBM-650-120, 120V Version (90 to 150V)**<br>**SBM-650-240, 240V Version (180 to 300VDC)** |
| **Battery String Float Voltage LOW** | Charging voltage low threshold<br>Discharging termination voltage threshold<br>Automatic switch threshold for float charging and discharging |
| **Battery String Float Voltage HIGH** | charging voltage high threshold |
| **Battery String Continuity** | Threshold for Total Resistance<br>*Deteriorated batteries will alarm as a continuity problem.* |
| **Voltage Measurement** | Accuracy 0.1% Resolution 0.1A |
| **Current Measurement** | Float current and charging/discharing current<br>Range +/-450A, resolution 0.1A<br>Ripple current, resolution 0.1A |
| **Temperature** | Measurement accuracy +/- 1.0°C, resolution 0.1°C<br>Working range -20 to 65°C |
| **Ground Fault** | Enable/Disable<br>Adjustable Threshold (Grounding Resistance) for Ground Fault |
| **Alarm Beeping** | Audio beep |
| **Alarm Dry Contact** | Urgent Alarm (Normal Close, Voltage-free, 60V 0.1A capacity)<br>Service Alarm (Normal Close, Voltage-free, 60V 0.1A capacity) |
| **Serial Port Modbus-RTU** | Isolated RS485, Bus-Pin ESD Protection up to 15kV. 9650-8-1-None |
| **Ethernet** | Onboard Ethernet 10/100Mbps<br>Web page for realtime data<br>Modbus-TCP for SCADA or Master-800 centralized monitoring |
| **Modbus-RTU and Modbus-TCP Data** | Bank/DC voltage<br>BUS+ to ground Voltage, BUS- to ground Voltage<br>Ambient Temeprature, Pilot Temperature<br>Current and Ripple current<br>Ground Fault (resistance to ground)<br>Total Resistance (Battery Internal Resistance and Connection Resistance)<br>Thermal Risk ( value 0 to 100) |
| **Enclosure and Dimensions** | Impact-resistant polycarbonate sealed enclosure<br>UL Listed NEMA Type 4X, 6, 6P, 12&13<br>IP66 rated<br>230mm x 180mm x 150mm (9” x 7” x 6”) |

*Specifications subject to change without notice

# 3 How it works

The monitor is connected to the DC bus and the middle point of the battery string. A pulsed DC current is applied to measure battery string total resistance (battery internal resistance and connection resistance).

Voltage, temperature, and current are continuously monitored.

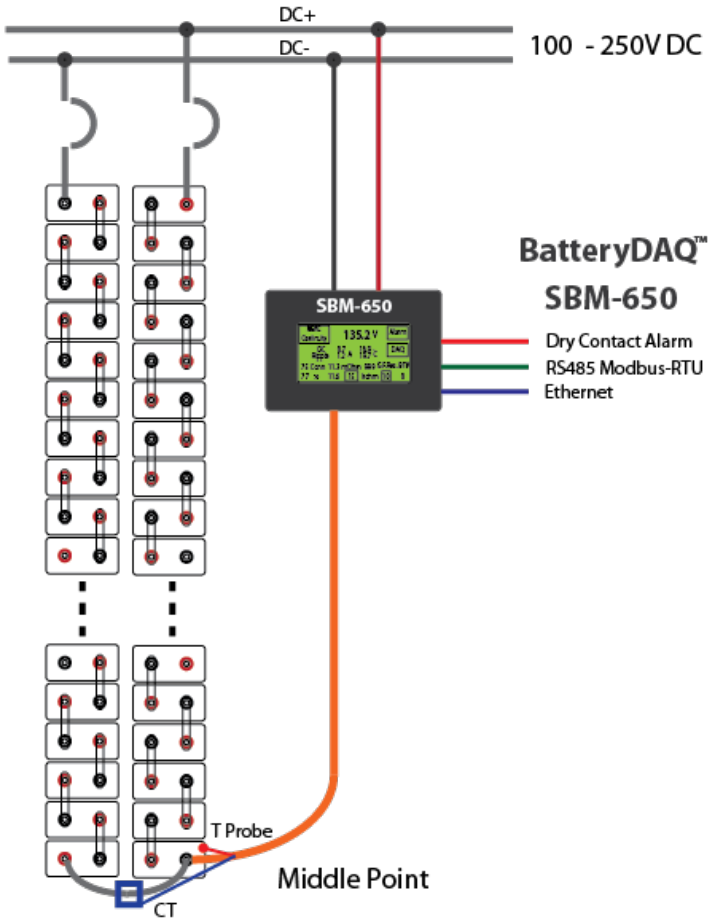
The following conditions are periodically checked (default 1 hour) and an alarm is generated, if a fault is found. Data/alarm is available via Modbus-RTU.

1) Circuit break is off, or having a problem.
2) High connection resistance caused by corrosion.
3) Any loose connection(s)
4) Open/bad battery cells, and deteriorated cells.

Utilizing a CT (Current Transducer), the charging and discharging status are monitored and analyzed to evaluate battery SOC (State-of-Charge), which provides a reliable thermal risk detection/alarm. The ripple current is utilized to detect charger offline. [Ripple threshold can be adjusted according to actual value. This detection can also be disabled with HMI.]

Alarm can be linked to charger for counter adjustment to avoid thermal runaway.

Ground faults are also detected when this function is enabled. (Disable it if utilizing the charger's GF function.)



# 4 Package Information

| Part Number | Photo | Description |
|---|---|---|
| **SBM-650-KIT** |  | Monitoring unit, HMI touch screen on panel<br>Wall/Rack mount.<br>Includes harness, pre-wired to terminals on unit. Default length 20ft (other length can be ordered.)<br><br>High precision, low drift split core CT<br>+/-450A range<br><br>Please choose:<br>**SBM650-120** (120V default)<br>**SBM650-240** (240V version)<br>Connection leads are protected by in-line fuse.<br>6mm/8mm/10mm tab washers are included. |

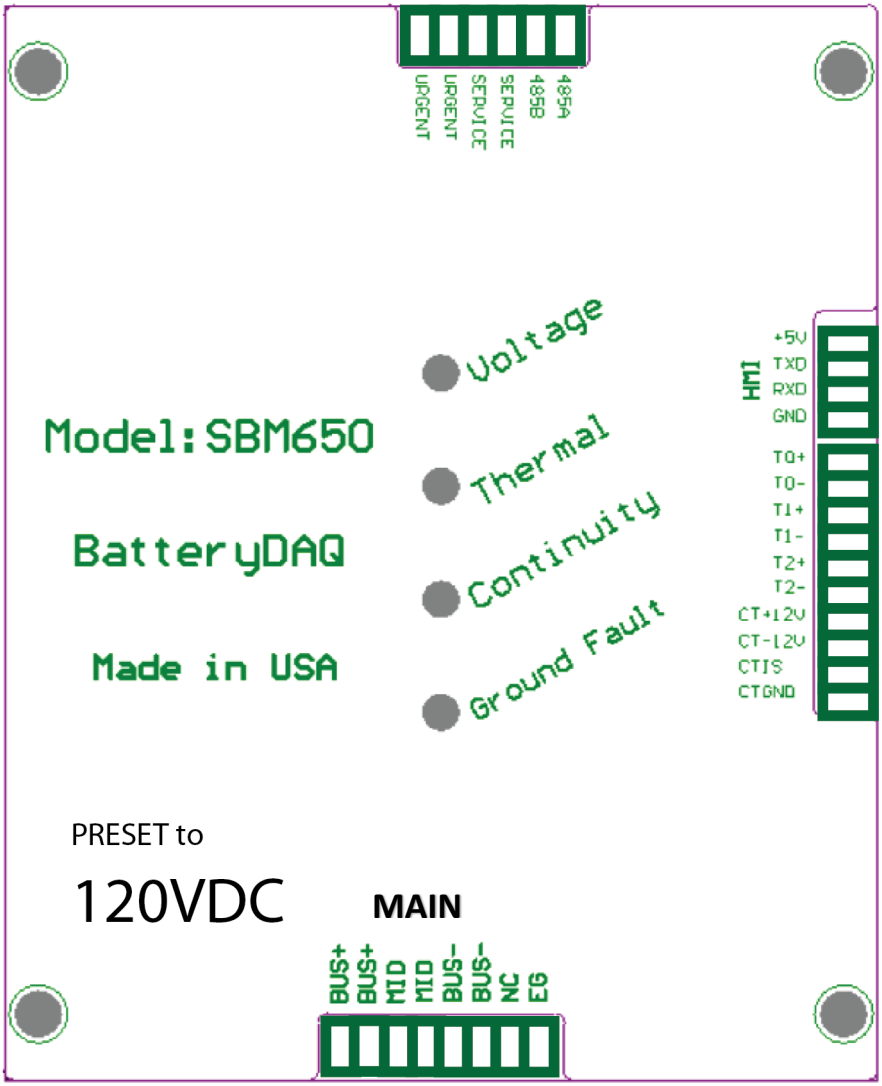
**SBM-650 unit will be configured in factory for different voltage range.**

**When using a 240V version for 120V battery bank, the unit will work but the resistance accuracy will be lower.**

**120V version cannot be connected to 240V battery bank!!! Only authorized technician can re-config it on-site to change from 120V to 240V working range.**

| **Model** | **SBM650-120** | **SBM650-240** |
|---|---|---|
| **Nominal Battery Bank Voltage** | 110/120V | 220/240V |
| **Working range** | 90 to 150VDC | 180V to 300VDC |

# 5 SBM-650 Terminals and Wiring




**Caution, possibility of electric shock** – monitor is designed for 120V or 240VDC systems. A 120V system cannot be used for 240V directly. Modification between 120V and 240V versions can only be done in factory or by certified technician.

## 5.1 Terminal Connections

**Connector 1**: **MAIN** terminal

| Pin | Signal Name | Description |
|---|---|---|
| **1** | BUS+ | Battery string or DC BUS Positive |
| **2** | BUS+ | Battery string or DC BUS Positive (Sensing) |
| **3** | MID | Middle Point |
| **4** | MID | Middle Point (Sensing) |
| **5** | BUS- | Battery string or DC BUS Negative |
| **6** | BUS- | Battery string or DC BUS Negative (Sensing) |
| **7** | NC | Not connected |
| **8** | EG | Earth Ground |

**Connector 2**: Current Sensor and Temperature Sensors

| Pin No | Signal Name | Description |
|---|---|---|
| 1 | T0+ | Ambient temperature sensor (No Direction)<br>Leave the sensor inside the flexible tubing |
| 2 | T0- | |
| 3 | T1+ | Pilot temperature sensor-1 (No direction)<br>Pilot sensor is pre-wired to MID cable.<br>Attach the pilot sensor to battery surface with included tape. |
| 4 | T1- | |
| 5 | T2+ | Pilot temperature sensor-2 (No direction)<br>Not required. Install it if needed. When it is open, it is measured, no alarm. |
| 6 | T2- | |
| 7 | CT+12V | Current sensor +12V, pin-1 (RED) |
| 8 | -CT12V | Current sensor -12V, pin-2 (WHITE) |
| 9 | CTIS | Current sensor output, pin-3 (GREEN) |
| 10 | CTGND | Current sensor 0V, pin-4 (BLACK) |

**Connector 3**: Alarm and RS485

| Pin No | Signal Name | Description |
|---|---|---|
| **1** | Urgent | Urgent Alarm output, solid state relay, “dry” contact (60V, 0.1A, No direction) |
| **2** | Urgent | |
| **3** | Service | Service Alarm output, solid state relay, “dry” contact (60V, 0.1A, No direction) |
| **4** | Service | |
| **5** | RS485B | RS485B |
| **6** | RS485A | RS485A |

**Connector 4**: RS-232 or HMI

| Pin No | Signal Name | Description |
|---|---|---|
| 1 | +5V | +5V power to HMI |
| 2 | TXD | RS-232 TXD |
| 3 | RXD | RS232 RXD |
| 4 | GND | GND |

# 6 Installation Guide

- Batteries can present a risk of electrical shock or burn from high short-circuit current. Observe proper precautions.
- Installation should be performed by qualified service personnel knowledgeable of batteries and required precautions.
- Keep unauthorized personnel away from batteries.
- This handbook must be read thoroughly before installation.
- Device location must be ensured before installation.

## *6.1 Installation Cautions*

**CAUTION**

1) **Ensure all equipment and tools are properly safe and in good working order.**
2) **Ensure electrical tools have been tested for proper insulation and grounding.**
3) **Observe all CAUTION, WARNINGS and DANGER notices on any equipment.**
4) **Never work alone.**

**CAUTION: High Voltage**

**Please follow the detailed instructions for each step.**

**Only a qualified electrician with battery knowledge can perform the installation.**

**Never work alone with high voltage.**

## 6.2 Installation Steps

Depending on the battery post/connection, it may be necessary to switch off battery string, to place the sampling leads/terminals to the battery post/connection. The SBM-650 monitor itself does not require an off-line installation.
To achieve high precision, the test current lead and sensing lead are separated as “2-wire” for Four-Terminal measurement. Use correct tab washers and hardware for installation.

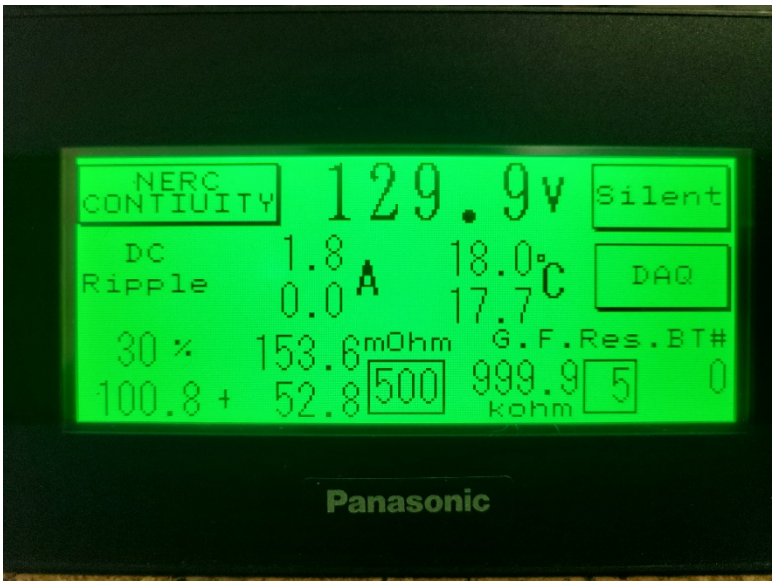
| # | Description |
|---|---|
| **1** | Mount unit on the wall/rack/strut/beam, with proximity to the battery bank.<br>The unit is rated as IP66 and can be installed inside most battery rooms.<br>U**nit is NOT rated as explosion proof.** |
| **2** | Unscrew 2 screws on the inner panel to flip & open panel to access the terminals on PCB.<br>Unplug **8P MAIN** terminal (DC+, MID, EG, DC-) from board. |
| **3** | **MID Cable** 8-conduct cable assembly, 2-wire for Middle Point, 2-wire for pilot T sensor, 4-wire for CT.<br>Install 2 tab-washers to battery middle point. For 58x2V, the middle point is the Negative Post of cell#29.<br>For an odd number of cells, for example 57x2V, the positive section has one more cell, still at cell#29-.<br>Attach the temperature probe to battery surface.<br>Install CT to battery cable, arrow points to the charging current direction. |
| **4** | **BUS Cable** 4-conduct cable assembly, 2-wire for DC+, 2-wire for DC-<br>Install 2 tab-washers to DC+ plate. Connect fused leads ***[BUS+, DC+]***<br>Install 2 tab-washers to DC- plate. Connect fused leads ***[BUS-, DC-]*** |
| **5** | **EG wire** Protective/Earth Ground (YELLOW/GREEN)<br>Do not connect EG wire if ground fault function is not needed. |
| **6** | Check voltage at the **8P MAIN** terminal plug.<br>Shall have full string voltage between DC+ and DC-.<br>Shall have half voltage from MID to DC+ or DC-.<br>Plug terminal to PCB assembly to power on the unit.<br>Plug **8P MAIN** terminal to board, now the unit is powered on. |
| **7** | Check data and alarm:<br>- BUS Voltage, Float Current<br>- Temperature<br>- Total Resistance [Comparing to baseline. Contact BatteryDAQ for baseline calculation.] |
| **8** | Make sure Ground Fault detection for charger/rectifier is disabled.<br>Connect a test resistor one end to ground, another end to touch battery post to trigger an alarm. |
| **9** | Connect alarm and/or RS485.<br>Test communication, if connected to SCADA or other alarm management system |
| **10** | Connect to Ethernet if available. Set IP address. Check battery data on web page. |
| **11** | Secure all cables, seal glands if not utilized. Label the unit properly. Fill up the installation report. |

# 7 HMI Panel Operation

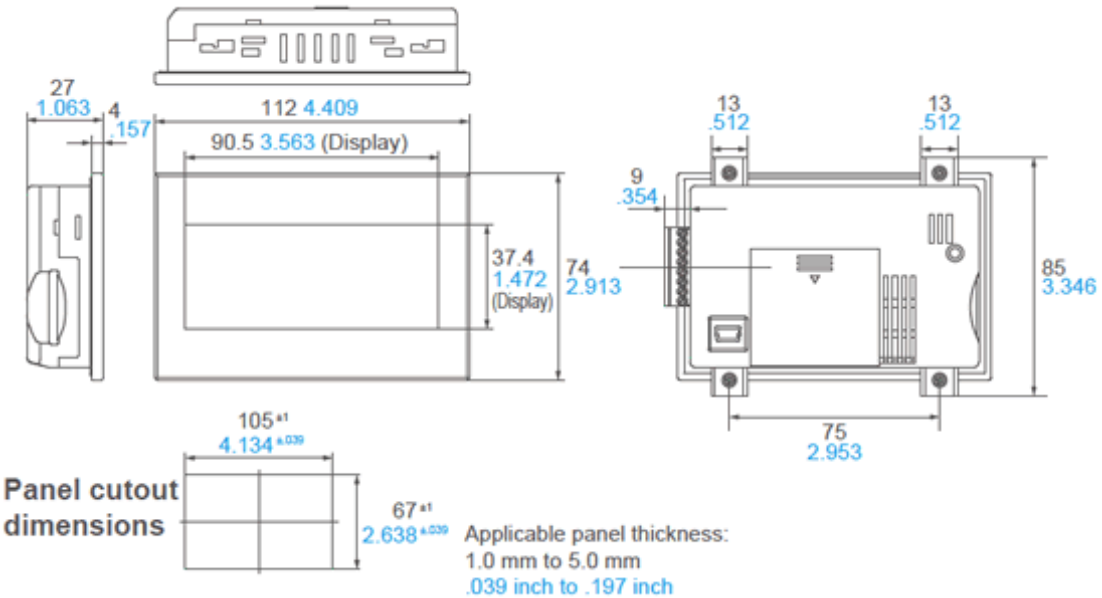
HMI (Human Machine Interface) is a touch screen panel. It has been programmed for comprehensive battery monitoring tasks.

- Displays the battery string data. (Voltage, current and temperature)
- Displays (Flash) the alarm sign for abnormal battery condition. (Alarm Sound if selected)
- Sets alarm parameters for monitor
- Calibrates monitor.

*(HMI content may vary based on your order.)*

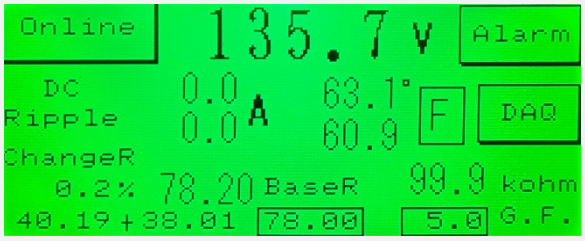
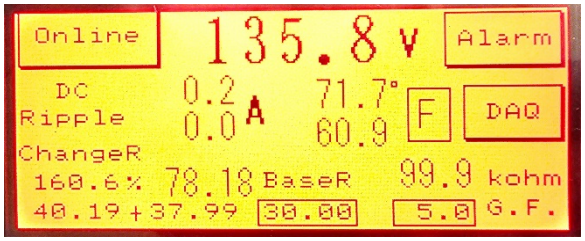
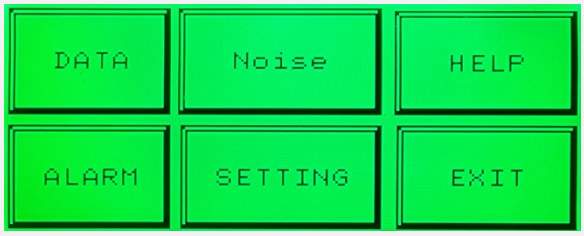
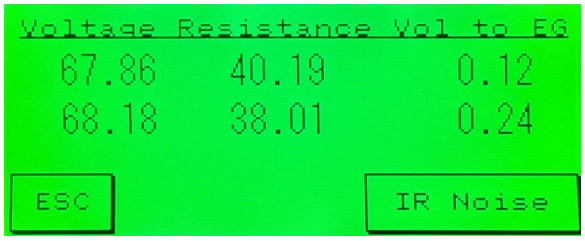
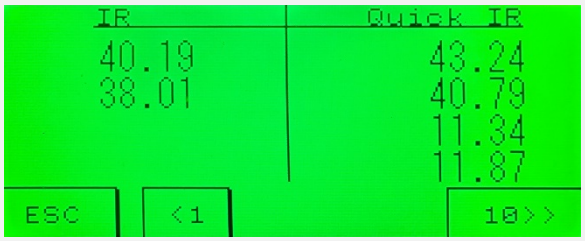


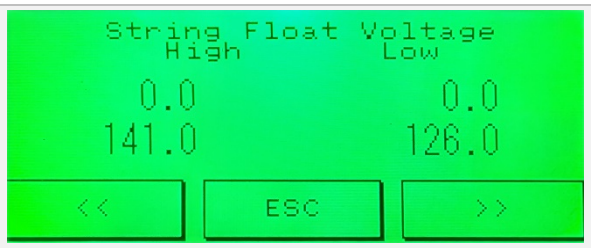
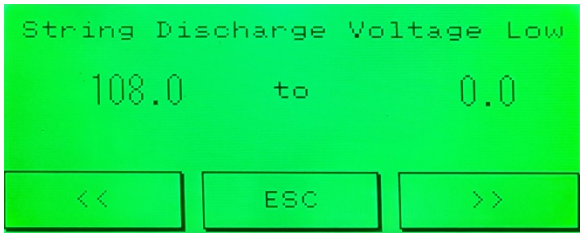

*HMI Cut off Dimensions*

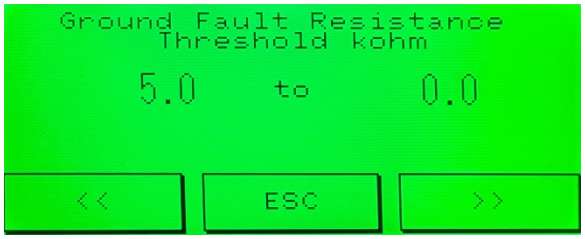
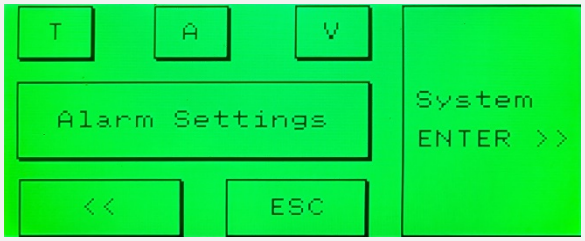
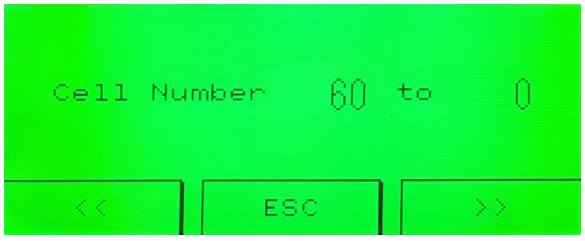
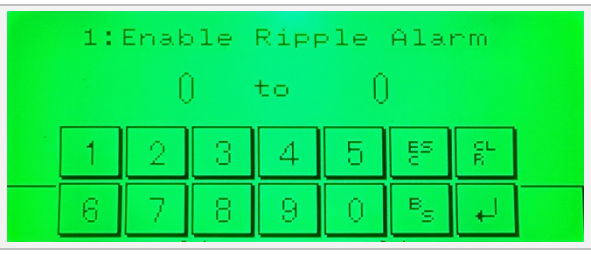
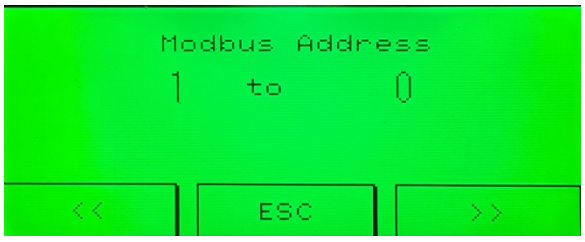


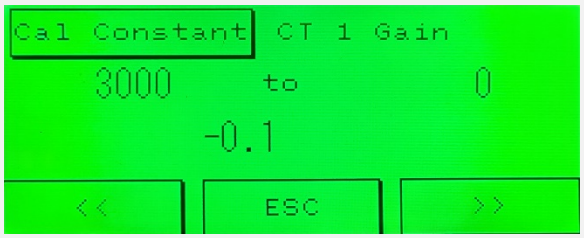
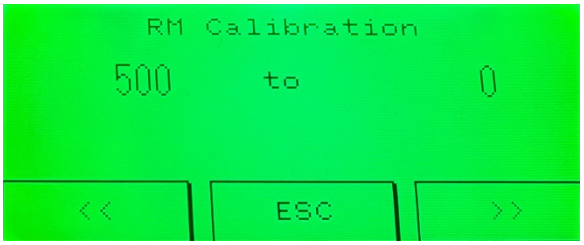
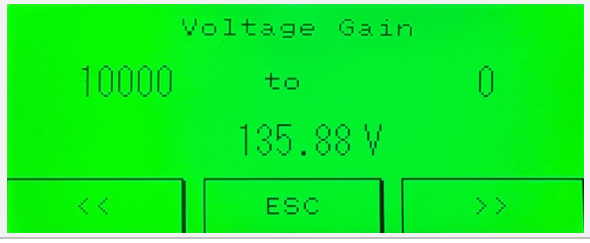
## *7.1 HMI Screen Contents*

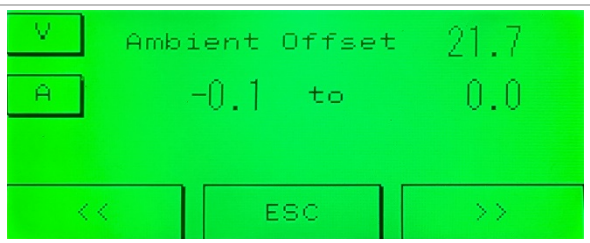
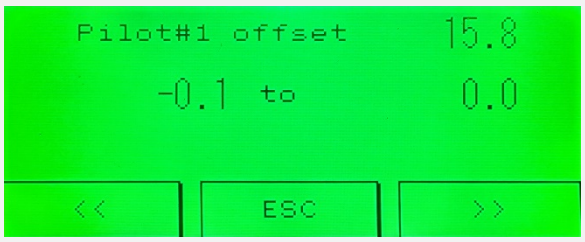
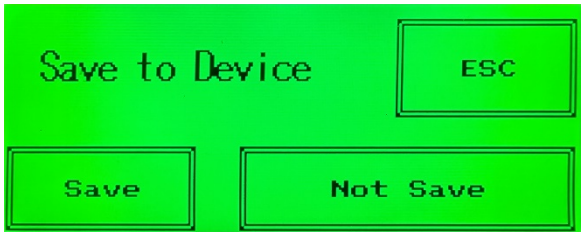
[HMI screen contents might be different depending on the configuration]

| Screen | Display | Description |
|---|---|---|
| #1 |  | **Home Screen**<br>▪ String Voltage<br>▪ Charging/Discharging Current<br>▪ Ripple Current<br>▪ Ambient/Pilot temperature [Fahrenheit/Celsius]<br>▪ Total resistance change [Percentage]<br>▪ Total resistance value [Up and Low half]<br>▪ Resistance Baseline<br>▪ Grounding resistance, threshold |
| #2 |  | **Alarm Status**<br>Service Alarm – Orange<br>Urgent Alarm - Red |
| #3 |  | **DAQ Menu**<br>Click on each button for different function |
| #4 |  | **Data**<br>Up half and Low half |
| #5 |  | **Quick IR**<br>When the ripple function is disabled for string continuity detection, SBM650 unit will generate a “ripple” to detect continuity. |
| #7 |  | **Alarm Status**<br>It will show an alarm for each type. Normal is OK.<br>Clicking on each alarm button will take you to the threshold setting. You may make changes to settings. |

| | | |
|---|---|---|
| **#8** |  | **Voltage Alarm**<br>Floating charge voltage High/Low |
| **#9** |  | **Discharge Voltage Low**<br>Discharge termination voltage.<br>It will generate alarm during discharge when reach the Low voltage point. |
| **#10** |  | **Temperature High**<br>Ambient or pilot temperature High |
| **#11** |  | **Resistance**<br>Baseline<br>Percentage threshold<br>Click on 0.00 or 0 to input new parameter |
| **#12** |  | **Change baseline**<br>Input new value, hit enter ↵. |
| **#13** |  | **Change Percentage** |
| **#14** |  | **Ground Fault**<br>Detect if the middle point is off the center (earth ground). |

| | | |
|---|---|---|
| **#15** |  | **Ground Fault Threshold**<br>Resistance to earth ground. Kohm. |
| **#16** |  | **Ripple Low**<br>When use ripple to detect continuity, set a threshold.<br>Recommend 1/3 of actual ripple current. |
| **#17** |  | **Audio Beep**<br>The audio beep can be disabled. |
| **#18** |  | **System Settings**<br>System settings and calibration.<br>Click on T, A, V for quick access to calibration parameters for temperature, current and voltage. |
| **#19** |  | **Cell Number (not utilized yet)** |
| **#20** |  | **Ripple Detection**<br>If the ripple is very low, such as < 1.0A, ripple alarm can be disabled. |
| **#21** |  | **Modbus Address**<br>When change the Modbus address, the DTU settings also need to match.<br>DTU/Ethernet can be disabled if only need Modbus-RTU via serial RS485. |

| | | |
|---|---|---|
| **#22** |  | **Resistance Interval**<br>Default is 24 hours (recommended), minimum 1 hour.<br>The quick IR measurement will be executed every 5 minutes to detect open circuit. |
| **#23** |  | **Current Offset**<br>If needed, move out the CT from current loop, calibrate to zero. Put back. |
| **#24** |  | **Current Gain**<br>**[Do not change]** |
| **#25** |  | **Ripple Offset**<br>**[No need to change]** |
| **#26** |  | **Ripple Gain**<br>**[No need to change]** |
| **#27** |  | **Resistance Calibration**<br>**[No need to change]** |
| **#28** |  | **Voltage Gain**<br>**[Do Not Change]** |

| | | |
|---|---|---|
| #29 |  | Ambient Temperature Calibration |
| #30 |  | Pilot temperature Calibration |
| #31 |  | Save the changes |

## *7.2 Calibrate Sentry Unit*

### 7.2.1 Temperature Calibration

TS1 offset = previous offset + actual temperature – readout

You can read the calibrated temperature on the same page. So, fine tune it until it displays the accurate value.

### 7.2.2 Current Calibration

Current offset and gain can be calibrated and adjusted with HMI.

**Calibrate Offset**

**It is often needed to calibrate offset so the readout reflects actual floating current.**

Calibrate zero at battery string open circuit or when the sensor is out of current loop.

HMI → DAQ → Settings → System Settings
Page down to Calibration → Current-1 offset. Adjust offset to reflect actual current or bring it to zero.
Example-1, existing offset 12.0, read out is -0.3A, set new offset as 12.0 – 0.3 = 11.7.
Example-2, existing offset 12.0, read out is 0.5A, set new offset as 12.0+0.5 = 12.5.

**Calibrate Gain**

Calibrate gain when you select different CT, otherwise the gain does not need to be calibrated.

For 300A CT, set gain to 3000.
For 100A CT, set gain to 1000.

If more accurate reading is desired, with 0.1% accuracy current generator, unit gain can be re-calibrated.
New gain input = previous x (actual current/readout).
For example, readout is 98.0A for actual 100A input, new gain = previous gain x (100/98.0)

Ripple current takes the same gain as main current.

### 7.2.3 Voltage Calibration

**Battery/Cell Voltage Gain**

Measure the string voltage with a reliable/calibrated meter. Set Gain = previous gain x Standard/Readout.

**Zero offset**

Offset is automatically obtained. No need to calibrate.

### 7.2.4 Internal Resistance Calibration

Obtain standard/reference internal resistance from battery manufacturer datasheet or use a high performance internal resistance meter to conduct a manual measurement.

New value = previous value * (actual value / readout)
For example, actual value is 3.050mohm, readout is 2.751mohm, new calibration = previous calibration x (3.050/2.751)

### 7.2.5 Save to Onboard Flash

If not saved, it will be lost after a power off/on cycle.

# 8 Network and DTU Settings

Ethernet port has been programed as **DTU mode** with embedded web page

In some circumstances, customer may want to re-program DTU mode to S2E (Serial-to-Ethernet) mode.

Contact BatteryDAQ to downgrade the DTU firmware to S2E.

## *8.1 IP Address Settings*

The product will come with a pre-configured DTU ID number and monitor configuration.

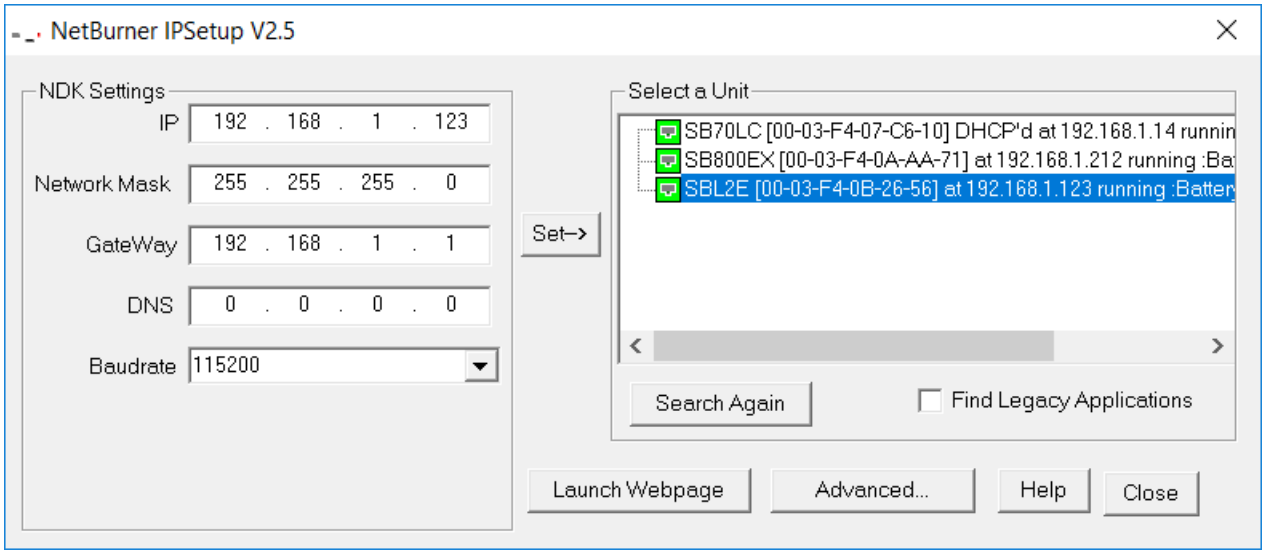
For example,

DTU-ID: 12501
Host: www.thisbattery.com
Monitor configuration: 3,1,40,120, 10 [***no space in between***]
(Modbus address 3, 1-wire mode, 40 batteries, 12V, 10 for BatteryDAQ Sentry product).

In any case, if you need to change any configuration, you may find IPSetup.exe in the software disk. Or, download from this link:
https://batterydaq.com/tech/IPSetup.exe

By default, DTU has been set for static IP as 192.168.1.1xx (xx is the same as the last two digits of Serial Number. For example, unit with SN ST410010375 will have IP pre-set to 192.168.1.175.)

Use “IPSetup.exe” to seach for a device in the local network. The IP may sometimes be set to static. If dynamic is needed, set all numbers to “0” as below, DTU will reset back to DHCP.

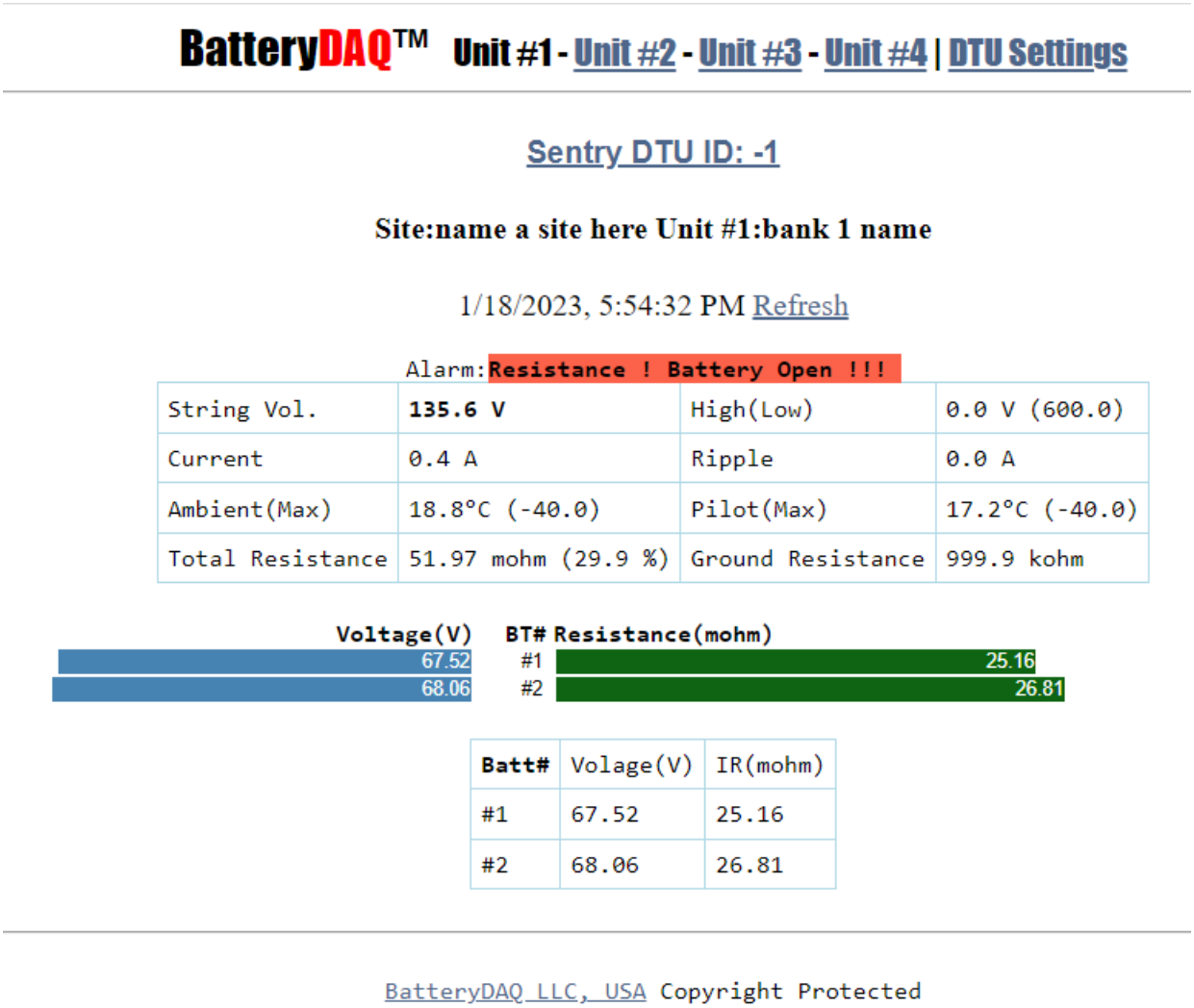



Leave DNS to “0, 0, 0, 0”.

Launch Webpage for battery data and configuration

## 8.2 Access Battery Data from Web Page

[Web page contents might be different depending on monitor configurations]



BatteryDAQ™ Unit #1 - Unit #2 - Unit #3 - Unit #4 | DTU Settings

Sentry DTU ID: -1

**Site:name a site here Unit #1:bank 1 name**

1/18/2023, 5:54:32 PM Refresh

Alarm:**Resistance ! Battery Open !!!**

| | | | |
|---|---|---|---|
| String Vol. | **135.6 V** | High(Low) | 0.0 V (600.0) |
| Current | 0.4 A | Ripple | 0.0 A |
| Ambient(Max) | 18.8°C (-40.0) | Pilot(Max) | 17.2°C (-40.0) |
| Total Resistance | 51.97 mohm (29.9 %) | Ground Resistance | 999.9 kohm |



| Batt# | Volage(V) | IR(mohm) |
|---|---|---|
| #1 | 67.52 | 25.16 |
| #2 | 68.06 | 26.81 |

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## 8.3 DTU Settings

Authorized user can obtain password from BatteryDAQ to update DTU configuration
***When set Monitor to none (all 0,0,0,0, no space in between), the RS485 port is available as slave.***

**BatteryDAQ™** Unit #1 - Unit #2 - Unit #3 - Unit #4 | **DTU Settings**

Sentry DTU ID: 12856

| - | Description | Value | New Value |
|---|---|---|---|
| 1 | DTU ID | 12856 | 12856 |
| 2 | Site Name | name a site here | name a site here |
| 3 | Host Name | www.thisbattery.com | www.thisbattery.com |
| 4 | Host IP | 50.62.40.65 | 50.62.40.65 |
| 5 | Host UDP Port | 5566 | 5566 |
| 6 | Report Interval(mins) | 60 | 60 |
| 7 | Specific Gravity(x0.001) | 1230 | 1230 |
| 8 | 0:Celsius/1:Fahrenheit | 0 | 0 |
| 9 | 0:Resistance/1:Conductance | 0 | 0 |
| 11 | Monitor 1 Code | 3,1,40,120,10 | 3,1,40,120,10 |
| - | Battery Bank 1 | bank 1 name | bank 1 name |
| 12 | Monitor 2 Code | 0,0,0,0,0 | 0,0,0,0,0 |
| - | Battery Bank 2 | bank 2 name | bank 2 name |
| 13 | Monitor 3 Code | 0,0,0,0,0 | 0,0,0,0,0 |
| - | Battery Bank 3 | bank 3 name | bank 3 name |
| 14 | Monitor 4 Code | 0,0,0,0,0 | 0,0,0,0,0 |
| - | Battery Bank 4 | bank 4 name | bank 4 name |

Monitor Code Example: (3,1,40,120,10)
re-mode,battery number,nominal voltage(x0.1V),monitor type:10 standalone;11,12...mul
Enter Password: Update DTU Configuration

Only authorized person can make changes.Click "Update" to send a data packet.

# 9 SBM650 Installation Acceptance Report

| | | | |
|---|---|---|---|
| Client Name | | Client Representative | |
| Installation Company | | Installer | |
| Site Name | | Site Address | |
| Battery Type/Model | | Capacity | Ah |
| Nominal BUS Voltage | | Cell Number | |
| DTU ID | | BMS Model | SBM650- |
| IP Address | | Sentry Serial No: | |

**Readout and Alarm Threshold Settings**

| Alarm Parameters | Low Value | High Value | Current Value |
|---|---|---|---|
| String Voltage Abnormal | | | |
| Ambient/Pilot Temperature | | | |
| Total Resistance Threshold | | | |
| Ground Fault Resistance | N/A | | |

**Measurements Verification**

| | Voltage | Current-1 (out of circuit) | Current-2 (In circuit) | Ambient Temperature | Pilot Temperature |
|---|---|---|---|---|---|
| Meter Measured Value | | 0 | | | |
| BMS Readout | | | | | |
| Pass √ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | |
|---|---|
| Installer Signature | Date |
| Client Signature | Date |

If there is any concern of accuracy, please send this report to customerservice@batterydaq.com

Notes: