Telecom Battery Monitoring Units

Sentry-2402
Sentry-1202
Sentry-S2
Sentry-S6
Sentry-S15

CAT II Electrical Measurement Equipment

Installation and Service Guide

(Updated on June-12, 2018)

think before you print

Only print the page you need

High Battery Energy Exists on
Battery Terminals, Sampling Leads, Connectors and Inside Circuits!
Do NOT open the unit!

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

BatteryDAQ LLC, USA

11101 Gilroy Road, Hunt Valley, MD 21031
Email Support: tech@batterydaq.com
Telephone Support: 1-800-455-8970

Quick Guide

Ordering Correct Model and Accessories

- ☐ Choose the correct model(s) for your battery configuration(s). Confirm with BatteryDAQ before place order.
- ☐ Choose current sensor (CT) window size and measurement range.
- ☐ Harness is optional. If you order harness from BatteryDAQ, battery post/bolt size and cable length need to be specified.
- ☐ Choose software solution between Battery Analyzer and MyBattery Platform. (Integration to 3rd party doesn't need BatteryDAQ's software.)

Preparing for Installation

- ☐ Check the package. By default, it includes a Sentry unit, a set of plugs and temperature sensor (s).
- ☐ If ordered, confirm the window size of CT (Current Transducer) for your application.
- ☐ If not ordered, prepare the battery connection harness.
- ☐ Locate active Ethernet port(s) for the site, and run CAT 5 or CAT 6 cable to battery cabinet/shelf.
- ☐ If using RS232 or RS485, prepare serial cable from site management box to battery cabinet.

Network Settings

- ☐ Obtain static IP address from IT department. In cases where multiple units are chained with RS485, only the main unit requires an IP.
- ☐ Use IpSetup.exe to set IP, Mask and Gateway. Launch webpage to verify the IP settings.

Battery Analyzer Software

- ☐ Install Microsoft SQL express database. (All goes with default. Windows authentication. Add Current User)
- ☐ Install Battery Analyzer and DAS software. (setup.exe, right click, **run as administrator**)
  *DAS software is not required if in the same network.
- ☐ Run Battery Analyzer as administrator, add equipment. By default, a device is added with IP and Modbus ID set to a battery string in BatteryDAQ's lab.
- ☐ With "Equipment Management", add the Sentry unit(s) to Analyzer, set to correct IP address. Verify communication to Sentry unit(s).

- ☐ With new Sentry unit or demo unit, Record IR (Internal Resistance) baseline. Close/restart Analyzer to verify database installation. If the baseline is all zero, the database is not working and has to be re-installed.

MyBattery Platform

- ☐ If using BatteryDAQ hosted server, Sentry is configured as plug-and-play.
- ☐ If MyBattery Platform has to be hosted by user, refer to system requirements and instruction to setup the server. Professional IT personnel are required to work with BatteryDAQ technical support team.
- ☐ Change the host IP address for each Sentry unit to your server.
- ☐ Configure each Sentry unit to MyBattery Platform. Test and validate each unit.

Installation/Wiring

- ☐ Secure Sentry unit close to the batteries, such as on top of the battery cabinet.
- ☐ Sequentially label each battery with a number. (#1 is from the positive (+) bus)
- ☐ Disconnect the battery string from the power system.
- ☐ If ordered, install the CT to the bus cable.
- ☐ If required, install the O-ring leads, or tabs to the batteries.
- ☐ Wire from Sentry unit to the leads/posts. Organize the cabling professionally for long-term reliability and safety.
- ☐ Power on Sentry unit. Using the HMI, check the voltage and verify the wiring connections are correct.
- ☐ Using the HMI, set the **battery capacity** (Ah) and **designated runtime** (minutes).
- ☐ Using the HMI, check the current zero point, and adjust current offset (calibration setting) if necessary.
- ☐ Connect the battery string back to the power system.
- ☐ Use web browser, check the battery data.
- ☐ Check data from the Battery Analyzer or site management software.

Commission

- ☐ Verify the battery string voltage and ambient/pilot temperature.
- ☐ Verify the Internal Resistance values; ensure they are within the specified range for the battery type/model.
- ☐ Fill in the installation report.

Trademarks

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All rights reserved. NO part of this manual shall be stored in a retrieval system, or transmitted by any means without the written permission of **BatteryDAQ.**

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. However, Buyer shall pay all shipping charges, duties and taxes for products returned to BatteryDAQ from another country.

Telephone: 410-337-5233 email: caps@batterydaq.com

Safety Instructions

	Caution, follow the instruction
	Caution, possibility of electric shock
	Protective Earth (ground) TERMINAL

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 bank is disconnected by switching off, the wire/cable(s) to battery monitor or any other circuit may also need to be unplugged or disconnected in order to fully isolate battery bank.**
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**, **WARNING** and **DANGER** notices on equipment, tools, and building, whether internally or externally displayed.

Contents

Contents

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

1 Overview

1.1 Sentry Product Line for Telecom Applications

BatteryDAQ provides advanced technologies and products for a variety of battery applications. Our technology is advanced in many aspects:

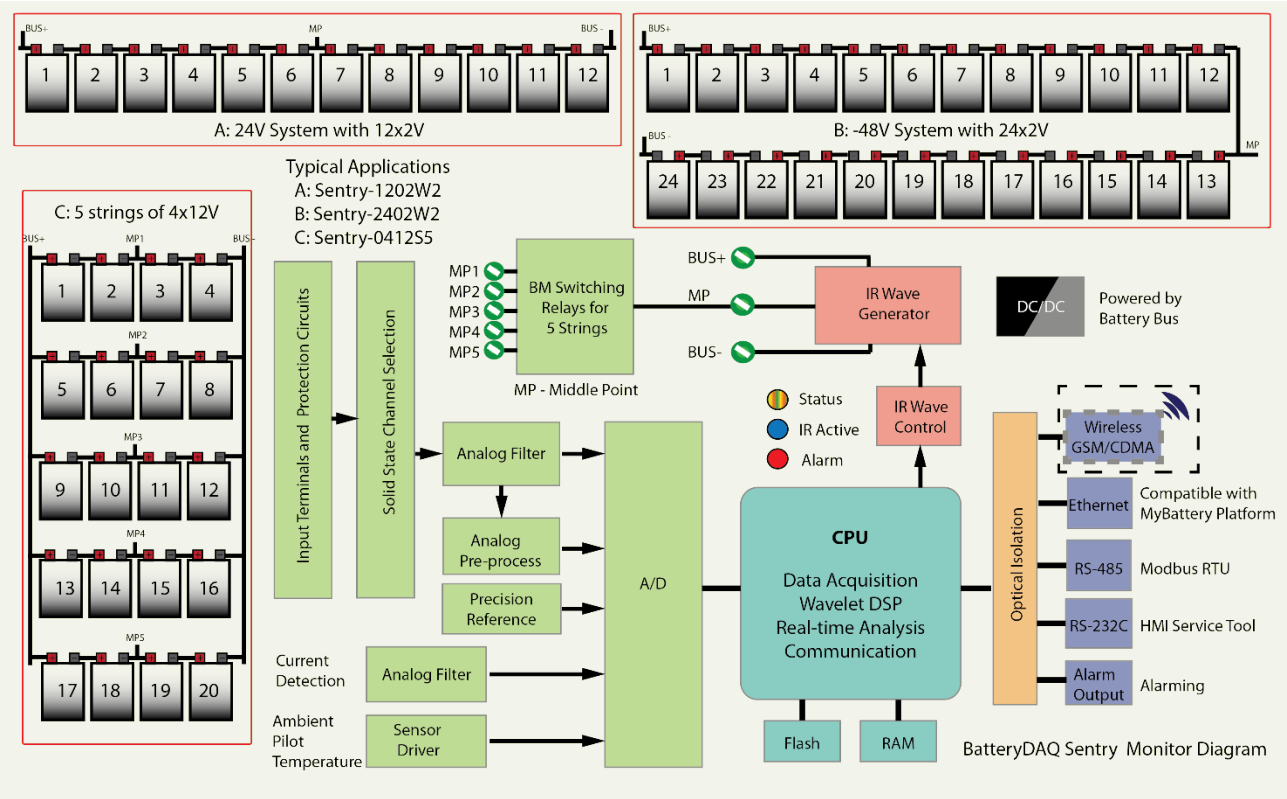
- Measurement Precision
- On Board Data Analysis
- Communication and Networking
- Operator Interface
- PC Software and Informatics Platform

Main Features

- Advanced precise IR (Internal Resistance) measurement technology
- Protection for over voltage input for each sampling channel
- 16-bit high resolution data acquisition
- No mechanical relays, resulting in high reliability for data center applications
- Superior resolution for high capacity cells with extremely low internal resistance
- Industry standard Modbus/RTU communication for high reliability and quick integration
- Compact design allows for easy installation on any telecom sites.
- Industrial grade reliable connections
- Plug and play HMI panel (optional)
- Flexible and scalable networking battery management system
- Compatible with MyBattery Platform™ for web based remote monitoring.

Main measurements

- Cell Voltage Monitoring
- Cell Internal Resistance (IR) Monitoring
- String Voltage Monitoring
- String Charge & Discharge Current Monitoring (optional)
- Ambient Temperature Monitoring
- Pilot Battery Temperature Monitoring


A: 24V System with 12x2V
B: -48V System with 24x2V
C: 5 strings of 4x12V
Typical Applications
A: Sentry-1202W2
B: Sentry-2402W2
C: Sentry-0412S5
Input Terminals and Protection Circuits
Solid State Channel Selection
BM Switching Relays for 5 Strings
MP - Middle Point
IR Wave Generator
DC/DC
Powered by Battery Bus
Status
IR Active
Alarm
IR Wave Control
Analog Filter
Analog Pre-process
Precision Reference
A/D
CPU
Data Acquisition
Wavelet DSP
Real-time Analysis
Communication
Optical Isolation
Wireless GSM/CDMA
Ethernet
Compatible with MyBattery Platform
RS-485
Modbus RTU
RS-232C
HMI Service Tool
Alarm Output
Alarming
Current Detection
Ambient Pilot Temperature
Sensor Driver
Flash
RAM
BatteryDAQ Sentry Monitor Diagram

BatteryDAQ provides a full line of products to cover every battery application in the telecom market.

- Central offices
- Cell sites/Base stations
- Outdoor cabinets
- Solar/wind powered sites

DC	Battery Configuration	BatteryDAQ Model	Main Features
24V	12 x 2V high capacity cells 	**Sentry-1202** 	:: High resolution IR for up to 3,000Ah cells :: Inter-cell connection resistance :: Thermal runaway detection :: Ethernet for static IP or DHCP :: Serial port RS232/485
24V	2 x 12V, up to 15 strings 	**Sentry-S15** 	:: Up to 15 strings per unit :: Individual battery voltage and IR :: Simple wiring :: Thermal runaway detection :: Ethernet for static IP or DHCP :: Serial port RS232/485
-48V	24 x 2V high capacity cells 	**Sentry-2402** 	:: High resolution IR for up to 4,500Ah cells :: Inter-cell connection resistance :: Thermal runaway detection :: Ethernet for static IP or DHCP :: Serial port RS232/485

Product Introduction

24V or -48V	4 x 12V, 4 x 6V or 2 x 12V per string, 3 to 6 strings 	**Sentry-S6** 	:: Individual battery voltage and IR :: Ambient and pilot temperature :: Thermal runaway detection :: Ethernet for static IP or DHCP :: Serial port RS232/485
24V or -48V	4 x 12V, 4 x 6V or 2 x 12V per string, 1 or 2 strings 	**Sentry-S2** 	:: Individual battery voltage and IR :: Ambient and pilot temperature :: Thermal runaway detection :: Serial port RS232/485 *[as a slave unit to a main unit with Ethernet]*

Please provide detailed battery configuration to BatteryDAQ in order to select the proper model(s).

Please consult with BatteryDAQ to determine the best way to integrate with existing site management and business operation.

1.2 Specifications of Sentry Telecom Models

1.2.1 Environmental Conditions

Sentry products are designed for normal environmental conditions as UL61010-1 standard:

a) Indoor and outdoor cabinet 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) Pollution Degree 2

1.2.2 Power Supply

All telecom models are powered from the battery bus.

Sentry-	2402	S2	S6	1202	S15
Nominal Voltage	48V	24 or 48V	24 or 48V	24V	24V
Voltage Range	36 to 60VDC	18 to 60VDC	18 to 60VDC	18 to 30VDC	18 to 30VDC
Maximum Power Consumption	< 10W	< 3W	< 10W	< 10W	< 10W
Isolation	500VDC@1min to battery string				

1.2.3 Measurement and Accuracy

Current/Temperature Measurement	
Current transducer (Optional)	Support LEM HAS current transducer with internal +/-12V power supply (Default range +/- 400A, window size 20mmx15mm. Contact us for larger window or split core sensor.)
Current Accuracy	0.1% + sensor accuracy
Temperature Sensors	1 ambient temperature sensor, 1 pilot temperature sensor (Sentry-0412S2 only has 1 temperature sensor.)
Temperature Range	Measurement range: -40ºC to 85ºC Operating range: Indoor use: 5ºC to 40ºC (41ºF to 104ºF) Extended temperature option for outdoor cabinet use: -40ºC to 65ºC (-40ºF to 149ºF)
Temperature Accuracy	1 ºC
Voltage Measurement	
Bus Voltage Range	48V models: 0 – 60V, 0.1% accuracy 24V models: 0 – 30V, 0.1% accuracy
Input Range for Each Channel	+/- 3V for 2V batteries +/- 16V for 12V batteries

Protected input	+/-60V at any voltage input terminal
Cell Voltage Accuracy	0.1%
Input Wiring	Refer to chapter-2 wring instruction for specific models
Internal Resistance	
Range and Resolution	2V models: 0 to 30mΩ, 0.001 mΩ resolution 12V models: 0 to 30mΩ, 0.01 mΩ resolution
2-wire mode (2V models)	Individual Internal Resistance and Connection Resistance
1-wire mode (12V models)	No contact resistance reading

1.2.4 Communication, Indication and Alarm

Communication	
Serial Port	Isolated RS-232C and RS-485 interface
Protocol	MODBUS RTU
Serial Setting	9600-8-1-None
Modbus address	1 to 28, configurable with HMI
Ethernet	Optional onboard Ethernet module for Sentry-2402W2, Sentry-1202W2, Sentry-0412S6 and Sentry-0212S15 (Sentry-0412S2 only has serial ports.)
Indication and Alarm	
LED indication	▪ Dual-color LEDs for status ▪ Orange LED for service alarm ▪ Red LED for urgent alarm
Alarm Outputs	Service Alarm (Normal Close, 60V 0.1A capacity) Urgent Alarm (Normal Close, 60V 0.1A capacity) *Alarm outputs are for signal connection (<60V) to other system. If a control for higher voltage or AC is needed, a relay has to be used for safety and capacity requirement.

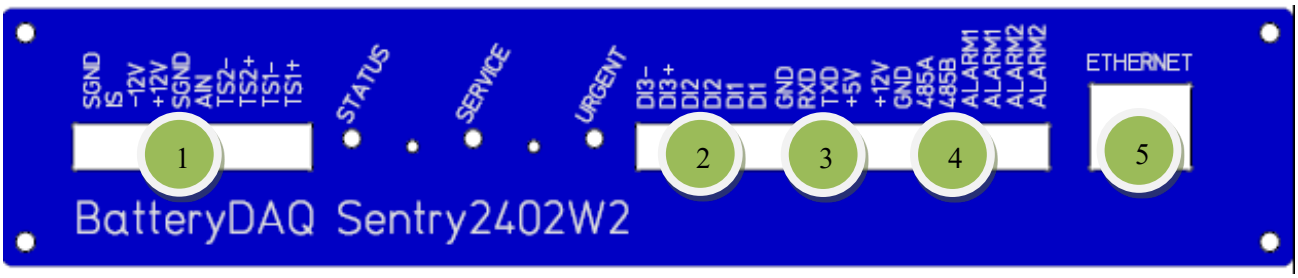
1.2.5 Dimensions and Mounting

Sentry Model	**-2402**	**-1202 / -S6 / -S15**
Unit Dimensions	216W x 42H x 182D (mm) 8.5”W x 1.65”H x 7.2”D (inch)	170W x 40H x 200D (mm) 6.7”W x 1.6”H x 7.9” (inch)
Mounting	Default: magnetic cup Optional DIN rail or customized bracket	Default: magnetic cup Optional DIN rail or customized bracket

(All specifications subject to change without notice.)

2 Communication and Sensor Connection

2.1 Sentry-2402 Communication and Sensor



Connector 1: Current and Temperature Sensors

Pin	Signal	Note
1	TS1+	Ambient temperature sensor + (RED)
2	TS1-	Ambient temperature sensor – (BLACK)
3	TS2+	Pilot temperature sensor + (RED)
4	TS2-	Pilot temperature sensor – (BLACK)
5	AIN	AUX, analog input (optional)
6	SGND	AUX analog signal ground (optional)
7	+12V	To current transducer power supply, pin-1
8	-12V	To current transducer power supply, pin-2
9	IS	Current transducer output, pin-3
10	SGND	Current transducer 0V, pin-4

Connector 2: Digital signal input (optional)

Pin	Signal	Note
1	DI1	Digital input 1, dry contact
2	DI1	Digital input 1, dry contact
3	DI2	Digital input 2, dry contact
4	DI2	Digital input 2, dry contact
5	DI3+	Digital input 3+ (0 to 10V)
6	DI3-	Digital input 3-

Connector 3: RS-232 or HMI

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

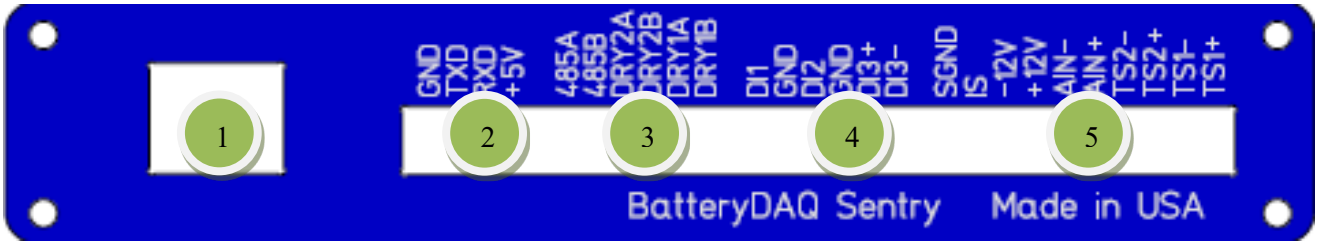
Connector 4: Power supply, RS485 and Alarm Output

Pin	Signal	Note
1	Alarm 2	Urgent Alarm output, solid state relay, “dry” contact
2	Alarm 2	Urgent Alarm output
3	Alarm 1	Service Alarm output, solid state relay, “dry” contact
4	Alarm 1	Service Alarm output
5	RS485B	RS485B
6	RS485A	RS485A
7	GND	Power supply GND
8	+12V	Optional power supply from AC/DC adapter, +12V 1A

Connector 5: Ethernet 10/100Mb, RJ45

Ethernet connection to router or switch.

2.2 Sentry-1202, S6 and S15 Communication and Sensor



Connector 1: Ethernet 10/100Mb RJ45

Connector 2: RS-232 or HMI

Pin	Signal	Note
1	+5V	+5V power to HMI
2	RXD	To PC/HMI RS-232 TXD
3	TXD	To PC/HMI RS232 RXD
4	GND	GND

Connector 3: RS485 and Alarm Output

Pin	Signal	Note
1	Alarm 2	Urgent Alarm output, solid state relay, “dry” contact
2	Alarm 2	Urgent Alarm output
3	Alarm 1	Service Alarm output, solid state relay, “dry” contact
4	Alarm 1	Service Alarm output
5	RS485B	RS485B
6	RS485A	RS485A

When Ethernet connection is active, RS485 acts as a master. If the slave mode is needed for integration, DTU can be disabled with monitor code “0,0,0,0”. (no space in between)

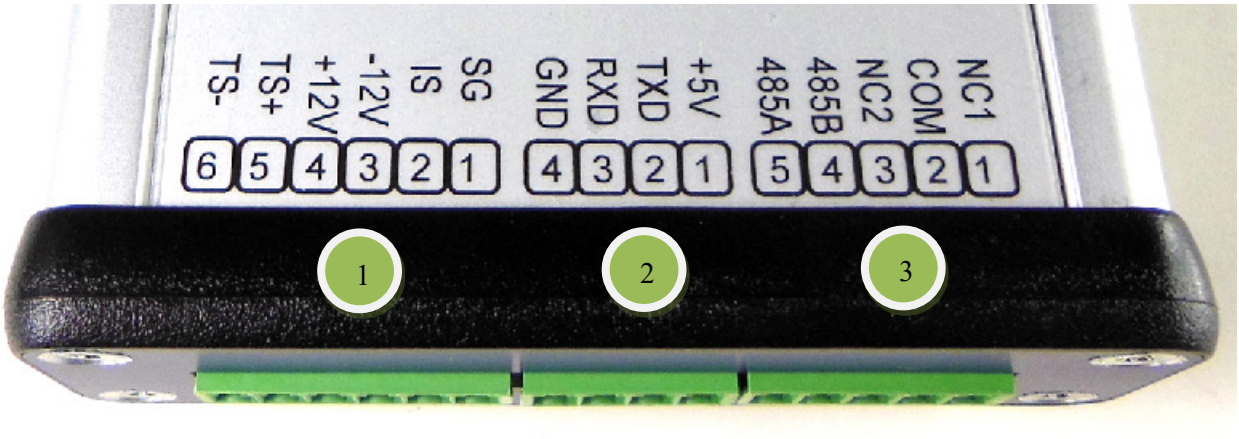
Connector 4: Digital signal input (optional)

Pin	Signal	Note
1	DI1	Digital input 1, dry contact
2	DI1	Digital input 1, dry contact
3	DI2	Digital input 2, dry contact
4	DI2	Digital input 2, dry contact
5	DI3+	Digital input 3+ (0 to 10V)
6	DI3-	Digital input 3-

Connector 5: Current transducer and Temperature Sensors

Pin	Signal	Note
1	TS1+	Ambient temperature sensor + (RED)
2	TS1-	Ambient temperature sensor – (BLACK)
3	TS2+	Pilot temperature sensor + (RED)
4	TS2-	Pilot temperature sensor – (BLACK)
5	AIN	AUX, analog input (optional)
6	SGND	AUX analog signal ground (optional)
7	+12V	To current transducer power supply, pin-1
8	-12V	To current transducer power supply, pin-2
9	IS	Current transducer output, pin-3
10	SGND	Current transducer 0V, pin-4

2.3 Sentry-S2 Communication and Sensor



Connector 1: Current transducer and Temperature Sensors

Pin	Signal	Note
1	SGND	Current transducer 0V, pin-4
2	IS	Current transducer output, pin-3
3	-12V	To current transducer power supply, pin-2
4	+12V	To current transducer power supply, pin-1
5	TS1+	Temperature sensor + (RED)
6	TS1-	Temperature sensor – (BLACK)

Connector 2: RS-232 or HMI

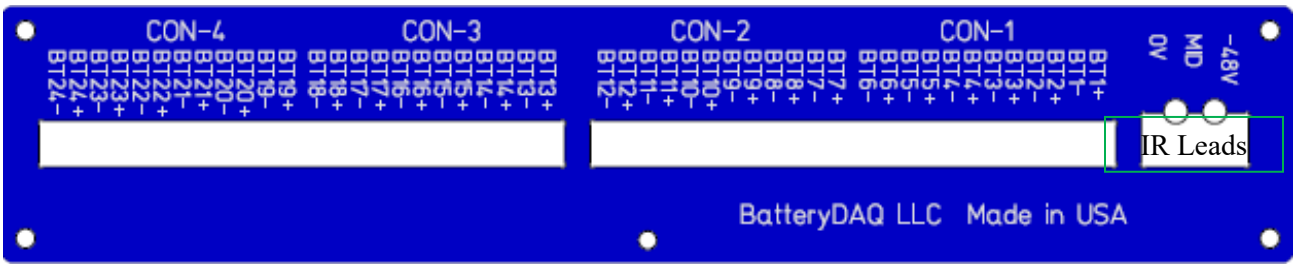
Pin	Signal	Note
1	+5V	+5V power to HMI
2	RXD	To PC/HMI RS-232 TXD
3	TXD	To PC/HMI RS232 RXD
4	GND	GND

Connector 3: RS485 and Alarm Output

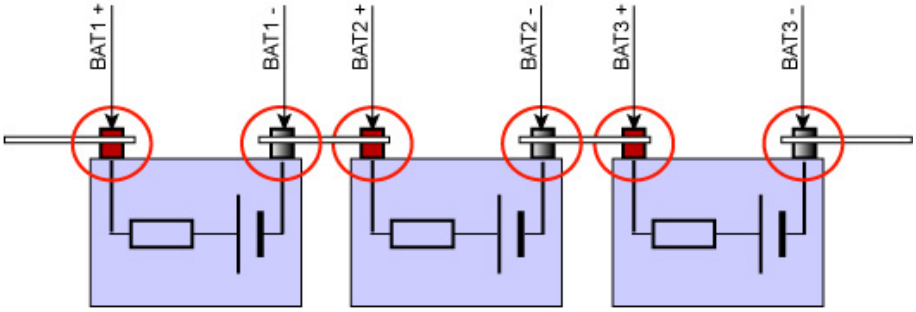
Pin	Signal	Note
1	Alarm 1	Service Alarm output, solid state relay, “dry” contact
2	COM	COM for both alarm outputs
3	Alarm 2	Urgent Alarm output
4	RS485B	RS485B
5	RS485A	RS485A

3 Battery Connection

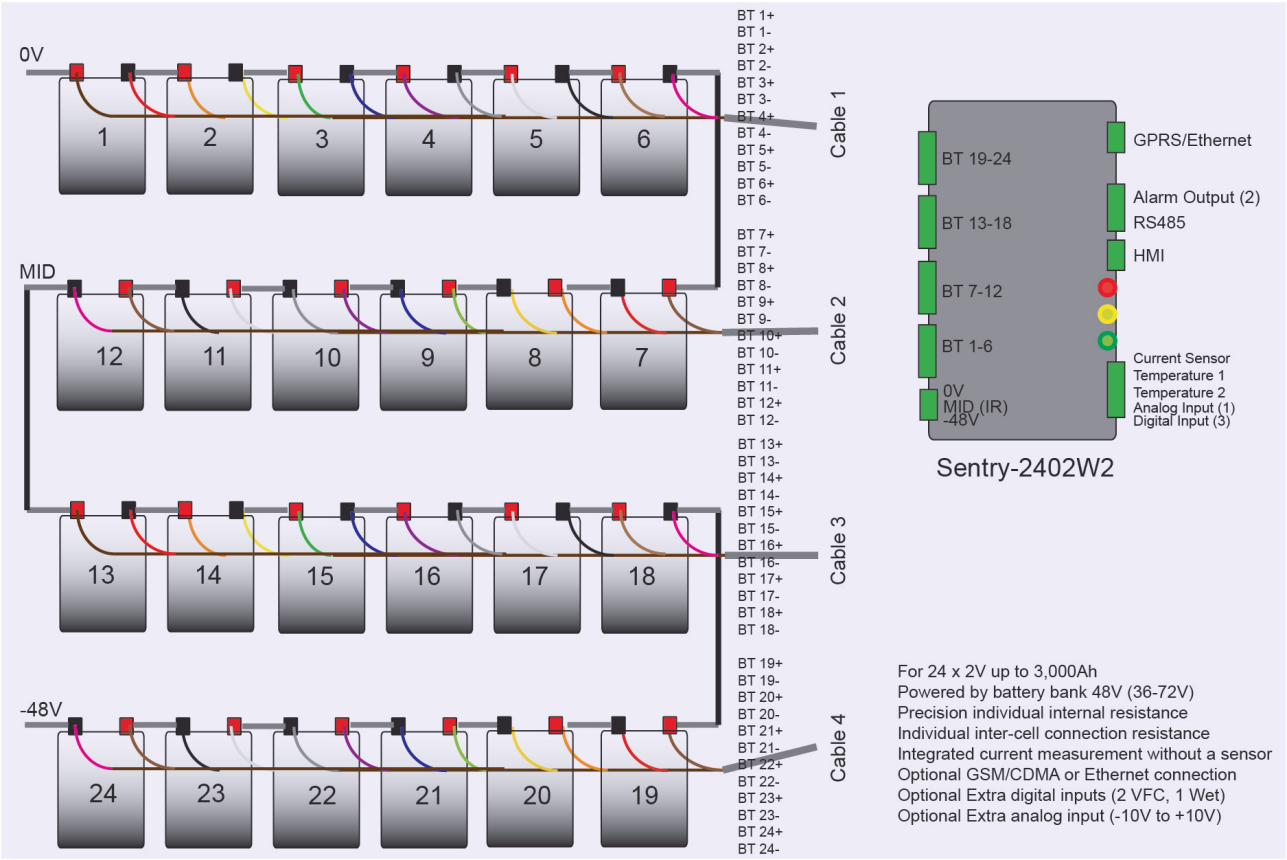
3.1 Sentry-2402 Battery Connection



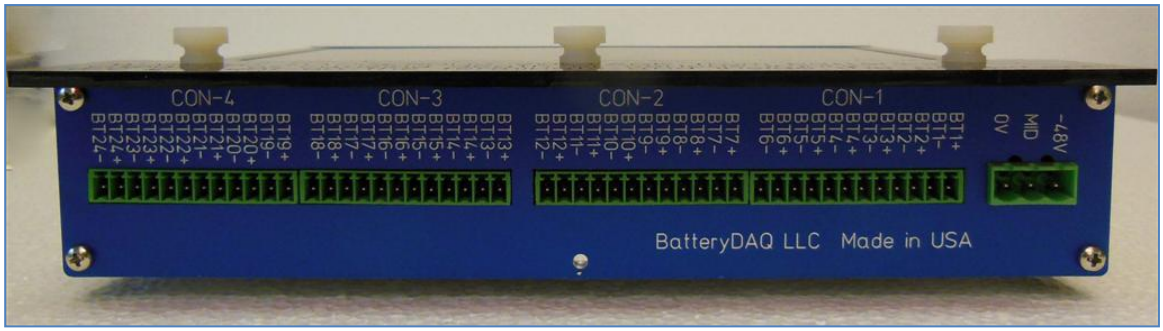
Pin No	Signal Name	Note
IR leads	-48V	Connect to -48V bus or battery 24 NEGATIVE post 10A fuses with 14 AWG wire Separate wire from sampling lead BT24-
	MID	Run separate wire to the middle point, **NEGATIVE post of battery #12** 10A fuses with 14 AWG wire
	0V	Connect to 0V bus or battery 1 POSITIVE post 10A fuses with 14 AWG wire Separate wire from sampling lead BT1+
CON-1 (1 to 12)	BT1+, BT1-, BT2+, BT2- BT3+, BT3- BT4+, BT4- BT5+, BT5- BT6+, BT6-	Battery #1 to #6 sampling leads Connect sampling leads to POSITIVE and NEGATIVE posts on battery ***Always count from positive*** ***All sampling leads are protected with 0.5A fuse to comply with UL approval.***
CON-2 (1-12)	BT7+, BT7- BT8+, BT8- BT9+, BT9- BT10+, BT10- BT11+, BT11- BT12+, BT12-	Battery #7 to #12 sampling leads
CON-3 (1 to 12)	BT13+, BT13- BT14+, BT14- BT15+, BT15- BT16+, BT16- BT17+, BT17- BT18+, BT18-	Battery #13 to #18 sampling leads
CON-4 (1 to 12)	BT19+, BT19- BT20+, BT20- BT21+, BT21- BT22+, BT22- BT23+, BT23- BT24+, BT24-	Battery #19 to #24 sampling leads



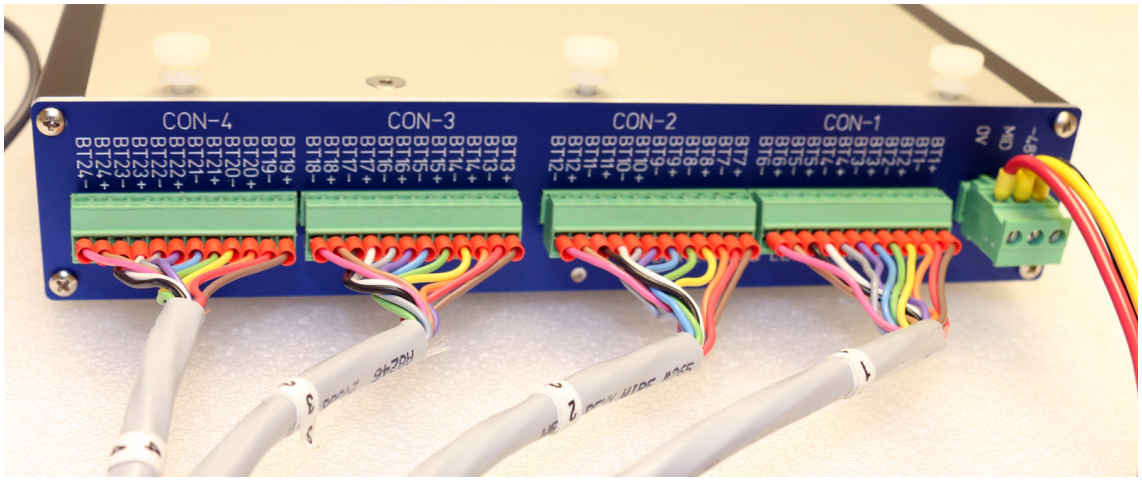
2-wire mode for precise internal resistance and inter-cell connection resistance



Battery Connection: Sentry-2402W2



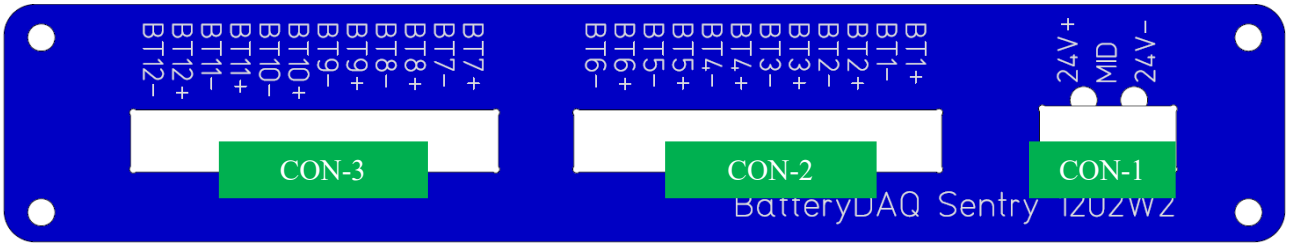
(Rear Panel for BUS and Battery Connections)



Voltage and High Energy Warning – Sentry-2402W2 battery monitor is designed for telecom -48V system with string voltage of up to 60**V**. Always wear gloves when you plug and/or unplug sensing lead connectors to/from the monitor. Follow the installation steps for wiring.

(*Do not connect any voltage sampling wires to communication/sensor panel. Those ports are for the communication or temperature/current transducers only!*)

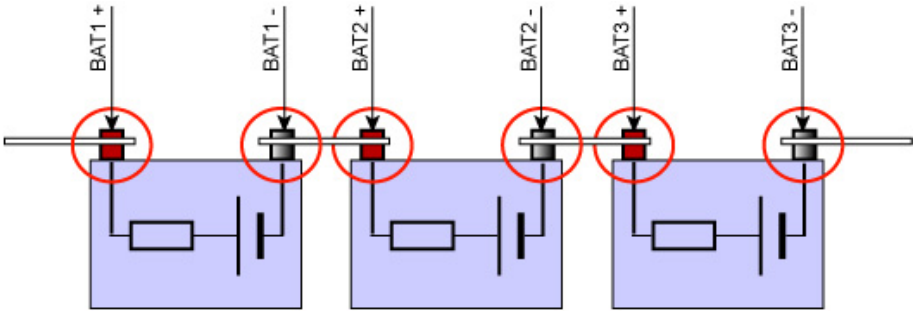
3.2 Sentry-1202 Battery Connection



Connector 1: Battery BUS and IR MID

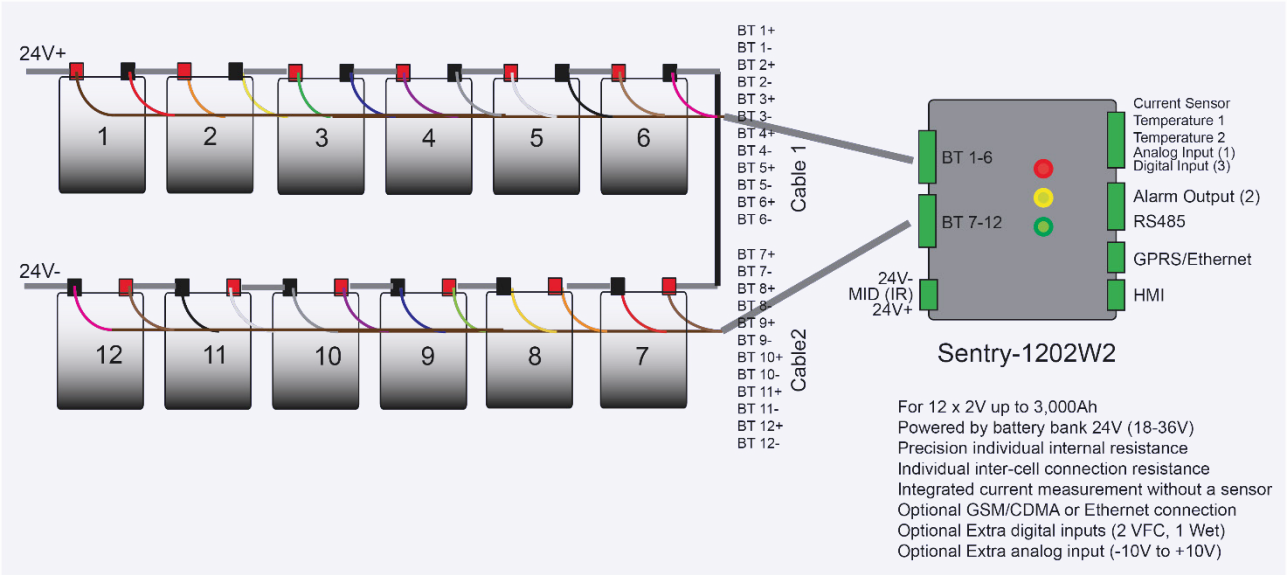
Pin No	Signal Name	Note
CON1-1	24V+	Battery string POSITIVE, 24V+, 10A fuse
CON1-2	MID	Internal Resistance Middle Point, 10A fuse Negative post of battery #6 or Positive post of battery #7
CON1-3	24V-	Battery string NEGATIVE, 24V-, 10A fuse

Pin No	Signal Name	Note
CON2 (1 - 12)	BT1+, BT1- BT2+, BT2- BT3+, BT3- BT4+, BT4- BT5+, BT5- BT6+, BT6-	Sampling wires for battery #1 to #6 ***Always count from positive*** BT1+ (Battery #1) is the POSITIVE of battery string/bank ***(24V)*** 2 wires are connected to each battery. All sampling leads shall be protected with a 0.5A fuse.
CON3 (1-12)	BT7+, BT7- BT8+, BT8- BT9+, BT9- BT10+, BT10- BT11+, BT11- BT12+, BT12-	Sampling wires for battery #7 to #12



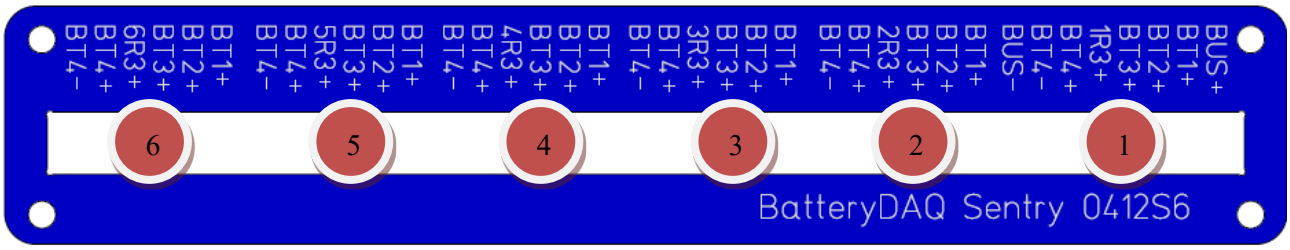
2-wire mode for precise internal resistance and inter-cell connection resistance

Battery Connection: Sentry-1202



High Energy Warning – Sentry-1202W2 monitor is designed for 24V system, with a maximum battery string voltage of up to **36V**. Do not use it for -48V. Any shortage to battery terminals or wires may result in a high current burn or fire.

3.3 Sentry-S6 Battery Connection



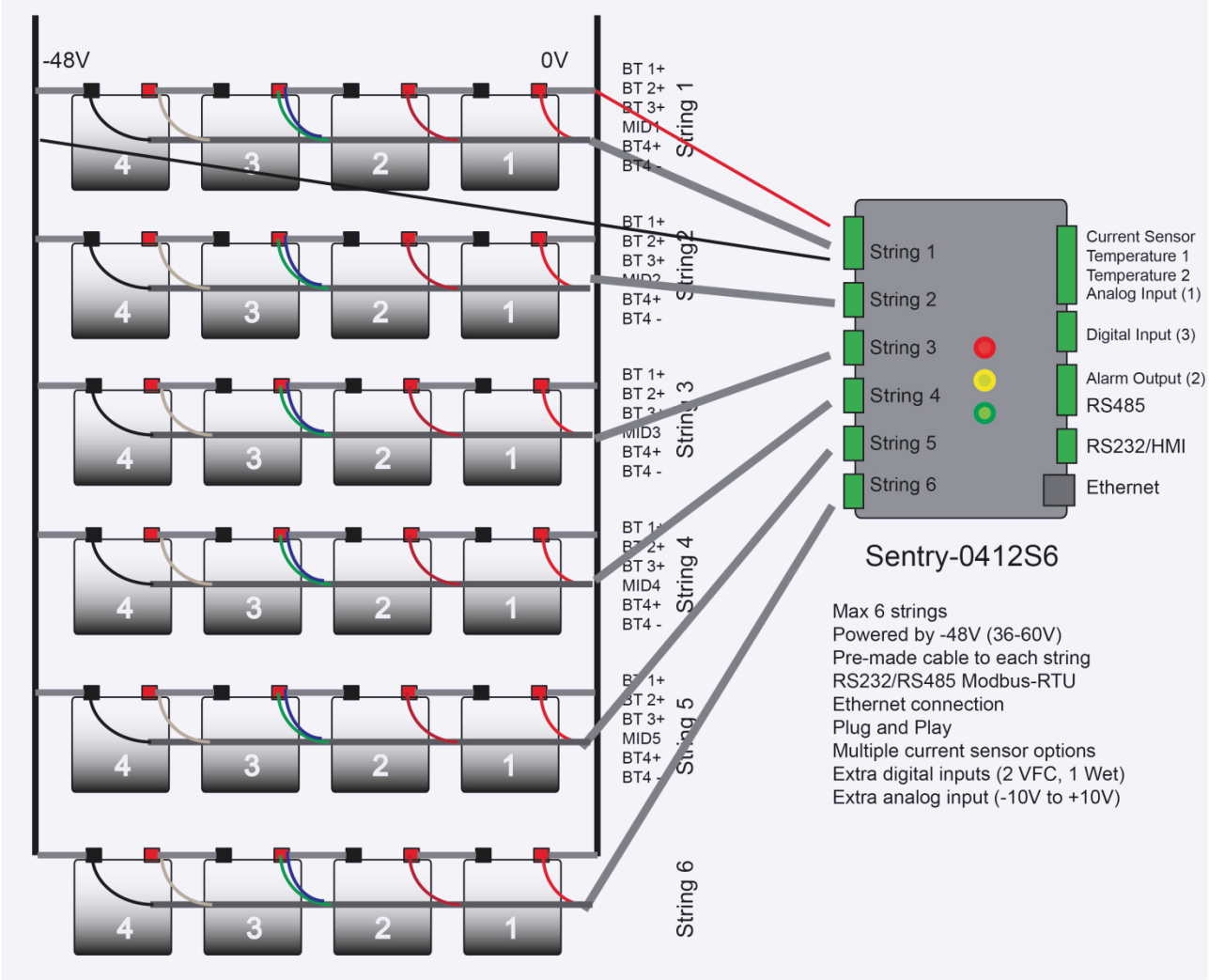
Connector 1-6: Battery Sampling Leads

Pin No	Signal Name	Note
String 1 CON-1 (1 - 6)	BUS+ BT1+ BT2+ BT3+ 1R3+ BT4+ BT4- BUS-	***Always count from positive*** BT1 (Battery one) is the POSITIVE of battery string/bank ***(0V)*** 2 wires are connected to BT1+ (sampling BT1+ and BUS+) 2 wires are connected to BT3+ (sampling BT3+ and 1R3+) 2 wires are connected to BT4- (sampling BT4- and BUS-) BT4- is the NEGATIVE of battery string/bank ***(-48V)***
String 2 CON-2 (1 - 6)	BT1+ BT2+ BT3+ 2R3+ BT4+ BT4-	Sampling leads for string 2 2 wires are connected to battery #3 post (+): sampling BT3+ and IR wire 2R3+
String 3 CON-3 (1 – 6)	BT1+ BT2+ BT3+ 3R3+ BT4+ BT4-	Sampling leads for string 3 2 wires are connected to battery #3 post (+): sampling BT3+ and IR wire 3R3+
String 4 CON-4 (1 – 6)	BT1+ BT2+ BT3+ 4R3+ BT4+ BT4-	Sampling leads for string 4 2 wires are connected to battery #3 post (+): sampling BT3+ and IR wire 4R3
String 5 CON-5 (1 – 6)	BT1+ BT2+ BT3+ 5R3+ BT4+ BT4-	Sampling leads for string 5 2 wires are connected to battery #3 post (+): sampling BT3+ and IR wire 5R3+
String 6 CON-6 (1 – 6)	BT1+ BT2+ BT3+ 6R3+ BT4+ BT4-	Sampling leads for string 6 2 wires are connected to battery #3 post (+): sampling BT3+ and IR wire 6R3+

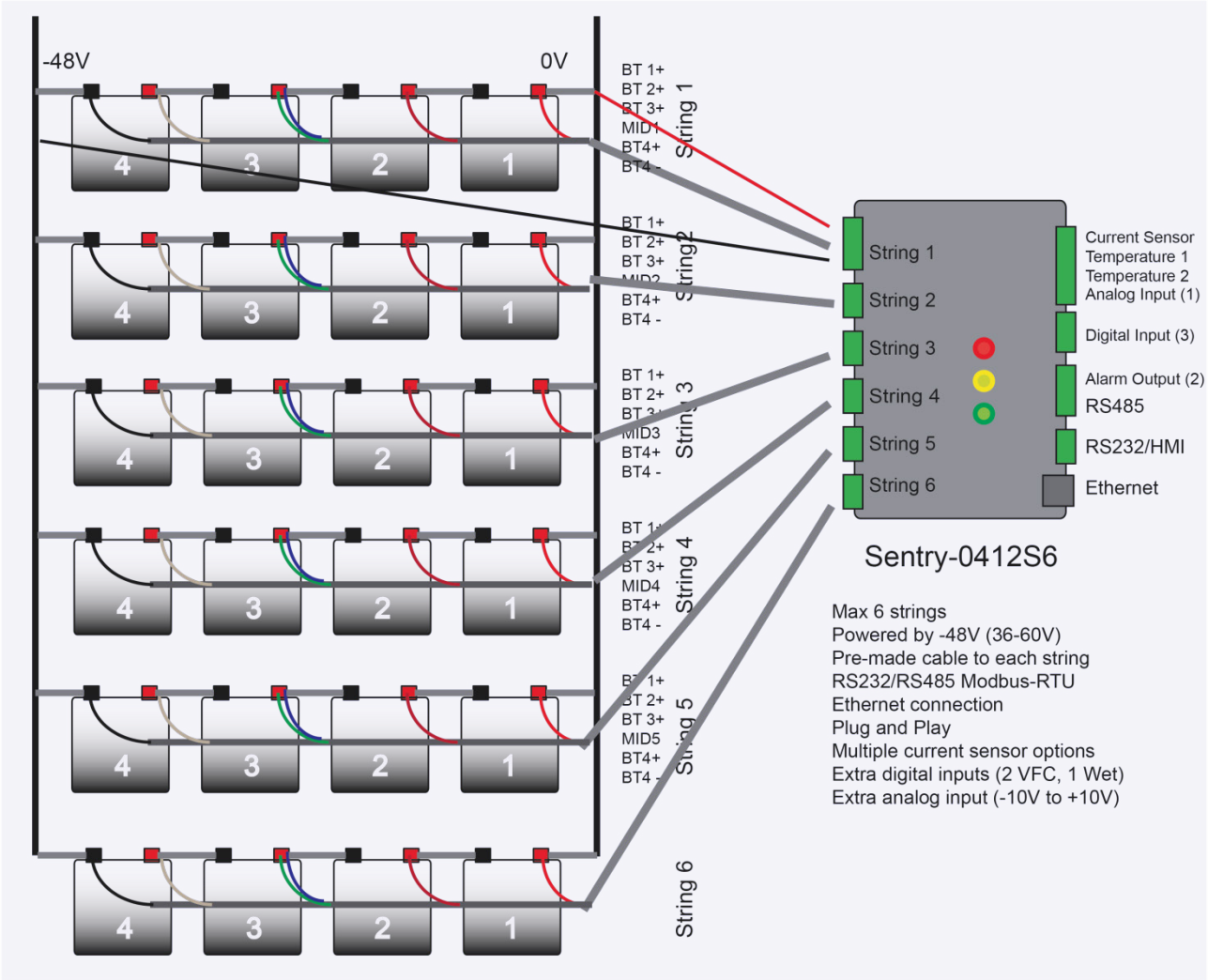
If use fused leads, 3A is required for all leads. *For applications that have less than 6 strings, connect to the least string number.*

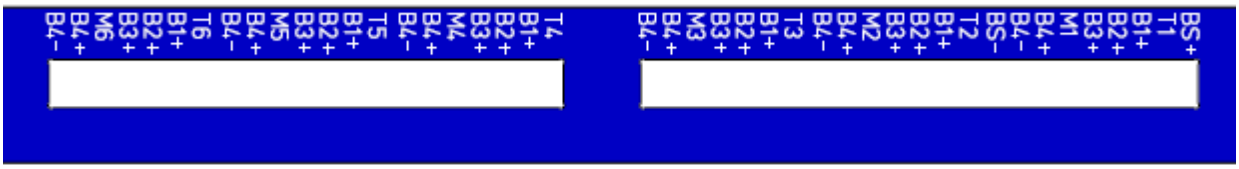
Battery Connection: Sentry-S6

For example, if there are 4 strings of 4x12V in a system, connect to string 1 through 4, leaving 5 and 6 un-connected. Set battery number to 20 with HMI.

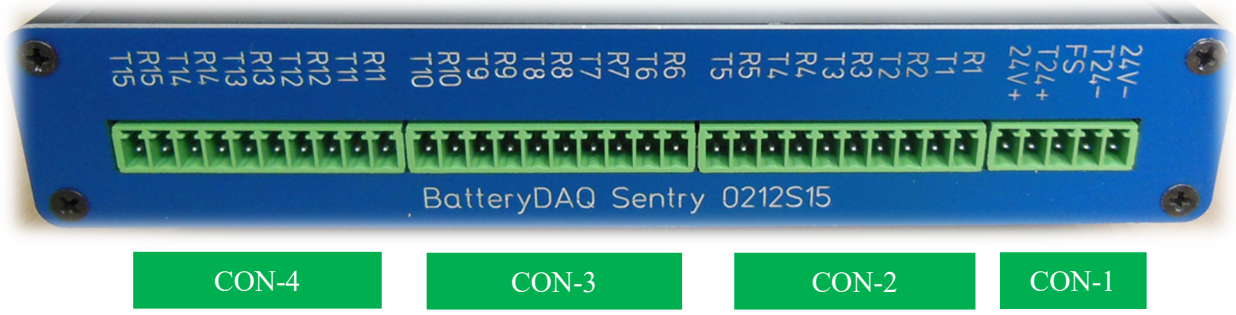


***If use fused leads, 3A is required for all leads**. For applications that have less than 6 strings, connect to the least string number.*
For example, if there are 4 strings of 4x12V in a system, connect to string 1 through 4, leaving 5 and 6 un-connected. Set battery number to 20 with HMI.


-48V
0V
BT 1+
BT 2+
BT 3+
MID1
BT4+
BT4 -
String 1
BT 1+
BT 2+
BT 3+
BT4+
BT4 -
String 2
BT 1+
BT 2+
MID3
BT4+
BT4 -
String 3
BT 2+
BT 3+
MID4
BT4+
BT4 -
String 4
BT 1+
BT 2+
BT 3+
MID5
BT4+
BT4 -
String 5
String 6
String 1
String 2
String 3
String 4
String 5
String 6
Current Sensor
Temperature 1
Temperature 2
Analog Input (1)
Digital Input (3)
Alarm Output (2)
RS485
RS232/HMI
Ethernet
Sentry-0412S6
Max 6 strings
Powered by -48V (36-60V)
Pre-made cable to each string
RS232/RS485 Modbus-RTU
Ethernet connection
Plug and Play
Multiple current sensor options
Extra digital inputs (2 VFC, 1 Wet)
Extra analog input (-10V to +10V)



3.4 Sentry-S15 Battery Connection



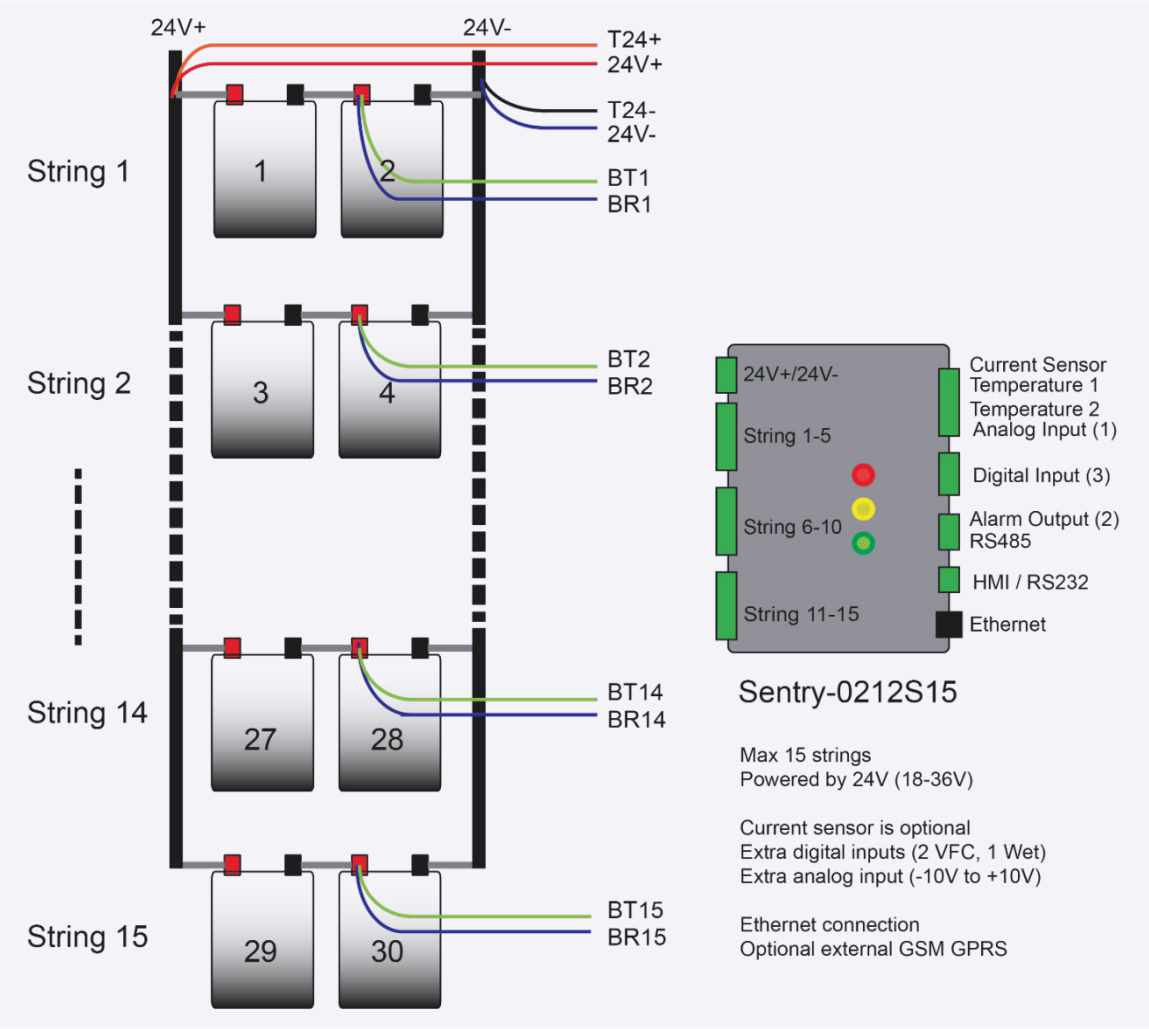
Connector 1: Battery BUS and IR MID

Pin No	Signal Name	Note
1	24V-	Bus NEGATIVE, 24V-, 3A fuse
2	T24-	String Voltage Test Lead, 3A fuse
3	FS	*Optional float current shunt, not connected*
4	T24+	String Voltage Test Lead, 3A fuse
5	24V+	Bus POSTIVE, 24V+, 3A fuse

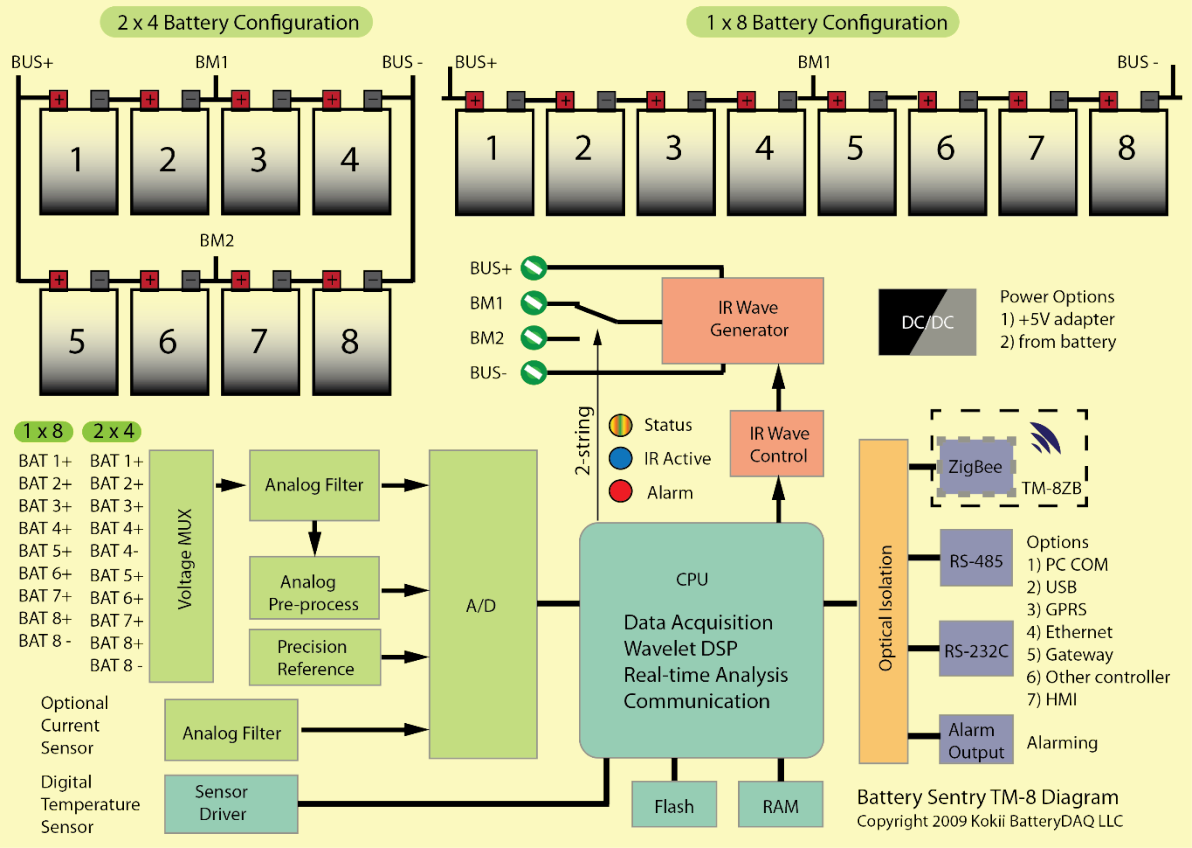
Connector 2 to 4: Battery Sampling Leads

Pin No	Signal Name	Note
CON-2 (1 - 10)	BR1, BT1 BR2, BT2 BR3, BT3 BR4, BT4 BR5, BT5	To string 1-5 **For the convenience, all leads use 3A fuse.** **BRx**: Battery Internal Resistance Measurement Current Injection Lead **BTx**: Voltage Measurement Lead
CON-3 (1-10)	BR6, BT6 BR7, BT7 BR8, BT8 BR9, BT9 BR10, BT10	To string 6 - 10
CON-4 (1-10)	BR11, BT11, BR12+, BT12 BR13+, BT13 BR14+, BT14 BR15+, BT15	To string 11 - 15

A terminal layout of 3 strings per connector is available. (Best for 5 tiers with 6 batteries per tier).

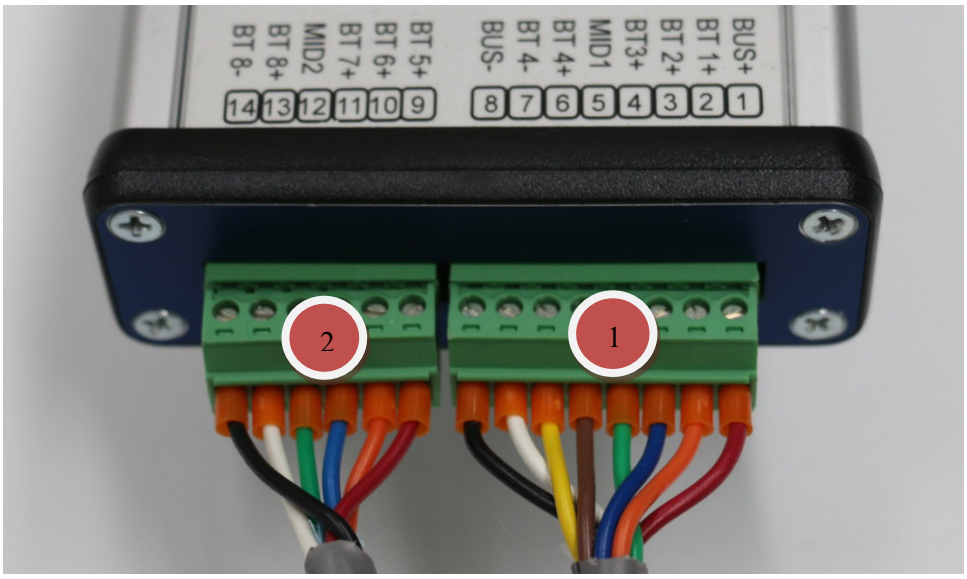

24V+
24V-
T24+
24V+
T24-
24V-
String 1
1
2
BT1
BR1
String 2
3
4
BT2
BR2
String 14
27
28
BT14
BR14
String 15
29
30
BT15
BR15
24V+/24V-
String 1-5
String 6-10
String 11-15
Current Sensor
Temperature 1
Temperature 2
Analog Input (1)
Digital Input (3)
Alarm Output (2)
RS485
HMI / RS232
Ethernet
Sentry-0212S15
Max 15 strings
Powered by 24V (18-36V)
Current sensor is optional
Extra digital inputs (2 VFC, 1 Wet)
Extra analog input (-10V to +10V)
Ethernet connection
Optional external GSM GPRS

3.5 Sentry-S2 Battery Connection



3.5.1 Battery Connection

Battery Configuration	Battery Connection	Notes
4x12V, 1 or 2 strings **8x6V, 1 string**	1 BUS+ 2 BT 1+ 3 BT 2+ 4 BT3+ 5 MID1 6 BT 4+ 7 BT 4- 8 BUS- 9 BT 5+ 10 BT 6+ 11 BT 7+ 12 MID2 13 BT 8+ 14 BT 8-	For 8x6V, connect middle point to terminal MID1.
2x12V, 1 or 2 strings	1 BUS+ 2 BT 1+ 3 BT 2+ 4 BT 2- 5 MID1 6 NC 7 NC 8 BUS- 9 BT 3+ 10 BT 4+ 11 BT 4- 12 MID2 13 NC 14 NC	



Connector 1: Battery String-1

Pin No	Signal Name	Note	-48V (4x12V)	24V (2x12V)
1	BUS+	***Always count #1 from positive*** Battery string POSITIVE bus	0V (BATT#1+)	24V+
2	BT1+	Battery #1 positive post	BATT#1+	BATT#1+
3	BT2+	Battery #2 positive post	BATT#2+	BATT#2+
4	BT3+	Battery #3 positive post	BATT#3+	BATT#2-
5	MID1	Sting-1 middle point	BATT#3+	-
6	BT4+	Battery #4 positive post	BATT#4+	-
7	BT4-	Battery #4 negative post	BATT#4-	-
8	BUS-	Battery string NEGATIVE bus	-48V (BATT#4-)	0V (BATT#2-)

Connector 2: Battery String-2

Pin No	Signal Name	Note	-48V (4x12V)	24V (2x12V)
1	BT5+	Battery #5 positive post, sensing lead	(BATT#5+	BATT#1+
2	BT6+	Battery #6 positive post	BATT#6+	BATT#2+
3	BT7+	Battery #7 positive post	BATT#7+	BATT#2-
4	MID2	String-2 middle point	BATT#7+	BATT#2+
5	BT8+	Battery #8 positive post	BATT#8+	-
6	BT8-	Battery #8 negative post, sensing lead	BATT#8-	-

3.5.2 Panel and Indicators

Urgent Alarm – Steady RED

1) String Voltage High or Low
2) Battery Voltage High or Low
3) Temperature High

Service Alarm – Flash Yellow

1) String Voltage High or Low
2) Battery Voltage High or Low
3) Temperature High
4) Internal Resistance High

Refer chapter 5.2 Calibration for alarm threshold settings.

IR Active – Flash Green

Flash when unit is doing internal resistance measurement

Status – Red and Green

Green indicates unit is powered on and no alarm.
Red flash indicates urgent or service alarm

4 Installation Guide

- Batteries can present a risk of electrical shock or burn from high short-circuits 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 determined before installation.
- Ensure all equipment and tools are properly safe and in good working order.
- Ensure electrical tools have been tested for proper insulation and grounding.
- Observe all CAUTION, WARNINGS and DANGER notices on any equipment.

4.1 Installation Requirement and Procedure

CAUTION: 60V Voltage, high energy battery bank

Please follow the detailed instructions for each step.

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

4.2 Preparation for Installation

Before going to the site, prepare all parts and tools.

Parameters in Sentry unit may need to be adjusted (with HMI) for a specific battery application such as battery number in a string.

Network functions shall be verified prior to site installation.

Step	Preparation	Description	Check
1	**Unpacking**	Unpack product and all accessories Check/verify with packing list	
2	**Software**	Install Battery Analyzer software to a laptop that can be brought to the site. Identify the server IP, port and Modbus address for a specific Sentry unit. It will be labeled like: **50.62.40.65 : 502 MID xxx** **(The MID xxx is the virtual Modbus ID and may differ from the actual Modbus ID for the Sentry unit.)**	
4	**Power on**	Use a 48V power supply, minimum 10W. (24V power supply for 24V models) Connect BUS+ and BUS- to the rectifier output. LEDs will blink/flash when the unit is powered on. (For Sentry-2402W2, an optional external 12V power adapter can be used to power on the unit.)	
5	**HMI**	1) Power on with external AC adapter 2) Plug in the HMI to the RS232 port 3) Check the unit with the HMI 4) Connect the temperature sensor/current transducer cable 5) Check the temperature reading with the HMI	
6	**Alarm Settings**	Using the HMI, check the alarm settings in Sentry unit. Confirm with end user if necessary. Cell Voltage High/Low String Voltage High/Low Temperature High Internal Resistance High (absolute value) Connection Resistance High	

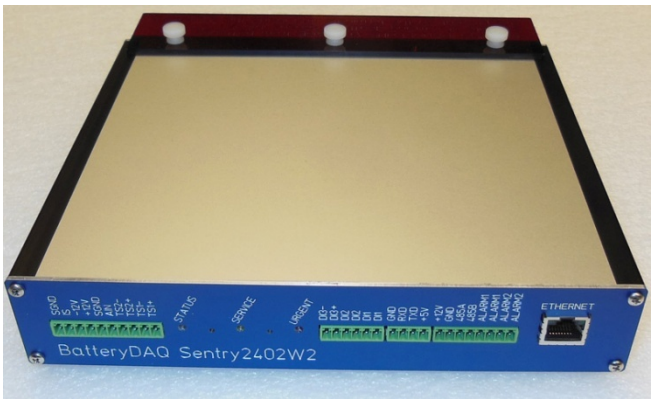
7	**Ethernet Connection**	Connect to the network with the CAT5 or CAT6 cable. Refer to the Ethernet chapter, run IPSetup.exe, check the IP address, set to static or dynamic IP if needed. (When the installation site is in a different network, this step may need to be performed on site.) Use web browser to check the DTU setting. Run Battery Analyzer software to check data. Hold the temperature sensor in your hand to warm it up, and confirm that the temperature data is changing.	
8	**Ethernet on Site**	Contact the end user for Ethernet availability. Prepare the proper length of Ethernet cable. Test the cable before site installation. Prepare the conduit for the Ethernet cable if needed.	
9	**Wireless Option**	1) Power off 2) Insert SIM card if a wireless DTU is utilized. (Refer to instruction if the DTU needs to be re-programmed for a different carrier other than AT&T.) 3) Power on 4) Wait for 1 minute. 5) Verify the wireless DTU is in service by checking the temperature data. In a unit that contains both Ethernet and wireless, there are two DTU ID numbers. Set Battery Analyzer to connect to the correct port for the wireless DTU. Unplug Ethernet to verify data is going through wireless, not Ethernet. By default, the wireless data interval is 6 hour unless there is a change of battery voltage, in which case, data will be immediately sent.	
10	**Mounting**	The unit can be mounted on the top, or side, of the battery bank/rack. Decide on the proper mounting method and prepare all necessary hardware Confirm the mounting method with the end user if necessary. Two magnetic cups are installed on the unit. If a different mounting method is preferred, take off the magnetic cups and use those two screws (4mm) for the DIN rail. (DIN rail is not included.)	
11	**Wire duct**	Prepare conduit and/or wire duct if needed.	

		Prepare materials to mount the wire duct	
12	**Current transducer**	Verify the battery bus cable size and sensor window size. Installer may need to customize a cable/strap to fit into the current transducer before crimping the compression lugs.	
13	**Temperature Sensor(s)**	Check the cable length for the ambient and pilot temperature sensor. Extend wires (18 or 20 AWG) if needed.	
14	**Voltage Sampling Leads & Cables**	For 2-wire mode, the total number of leads = battery number x 2. For 24 batteries, prepare at least 50 leads. Sampling lead comes with safety inline fuse (0.5A) Check the O-ring size. Make sure it matches with the battery terminal. **20 AWG (or 18AWG) is acceptable for sampling.** **Unshielded multi-conductor cable is recommended.** Calculate the cable length. If possible, cut the cable to the proper length. Connect one end to the terminal plugs, and label them. *(This will save significant installation time.)*	
15	**IR leads**	IR leads are protected with 10A (2V model) or 3A (12V models) fuse. For 10A fuse, use 16 or 18AWG wires. For 3A, use 18 or 20AWG wires. Check the O-ring size.	

4.3 Basic Steps for On Site Installation

Step	Description	Check
1	Locate/secure the Sentry unit	
2	Label the batteries with numbers	
3	Install O-ring fused leads	
4	Wire from unit to leads	
5	Verify connection	
6	Power on test	

4.3.1 Locate and secure the Sentry unit.

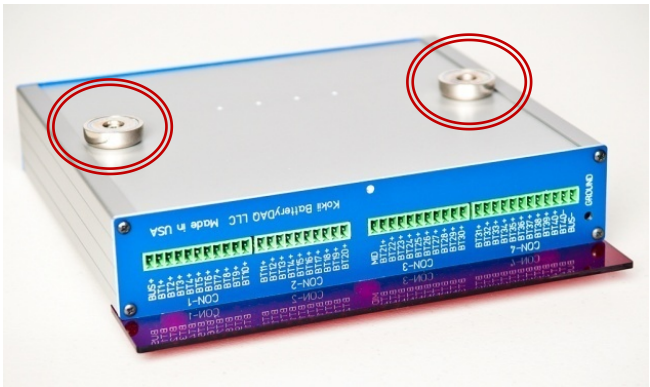


Unit shall be installed in a ventilated environment.

Space must be left between the Sentry unit and other objects for proper heat dissipation.

Two inches from the top to other object.
One inch from each side to other objects.

Leave enough space (>3 inches) for wiring to the front panel and the rear panel.



The two strong magnets on the bottom are utilized for placement on top of the battery cabinet.

For other installations such as wall mounting, unscrew the magnets and mount the unit to the DIN rail, or other bracket, by using the same screws and holes.
(Screws must be shorter than 8 mm. Longer screws may damage the circuit board or cause short circuit and electric shock.)

4.3.2 Label the batteries

Label all batteries in a string with numbers. The first battery to POSITIVE bus is “1”.

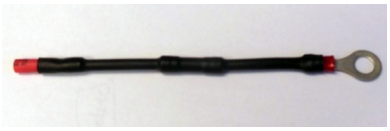
The principle of numbering the batteries is to define the battery that is connected to the positive bus of the string as NO.1 and to order sequentially.

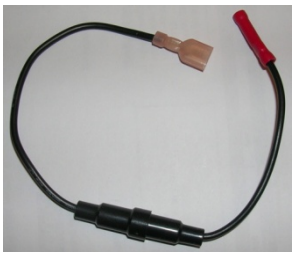
The battery serial number and the battery interface number on the monitoring module is a one-to-one correlation, and the system display is relative to the battery number which will be important for later battery alarm response and maintenance.

The battery number must be posted on an easily viewed area on the battery, and not block its original serial number.

4.3.3 Install O-ring fused leads

or





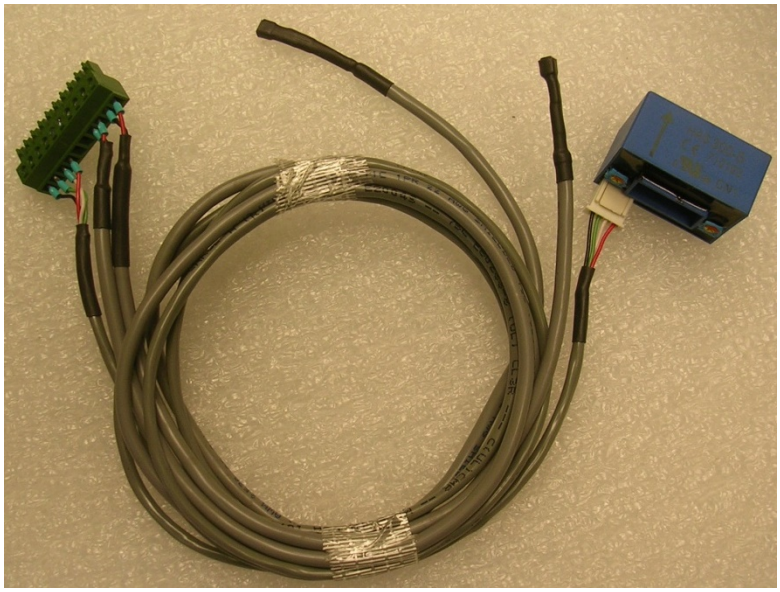
Installations over 20+ years have confirmed that O-ring fused leads provide the most reliable connection.

Install the O-ring fused leads to all batteries before wiring to the monitor terminals. 6mm, 8mm and 10mm O-rings are available for order.

For batteries using tabs for monitoring, please order WL-1T leads.

Please refer to battery connection instruction for each model.
There are more than 1 lead for some battery posts. For example, for Sentry-2402W2, install both sampling leads (BLACK 0.5A fuse) and IR leads (RED 10A fuse) to:
1) BUS+ (BAT1+),
2) MID (BAT13+),
3) BUS- (BAT24-).

4.3.4 Install sensors

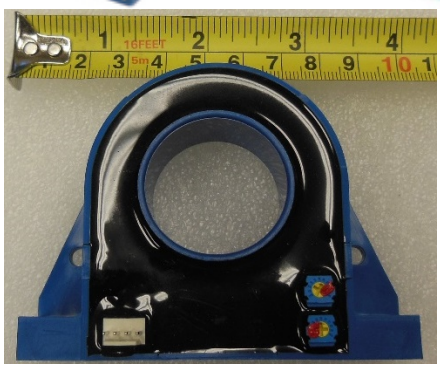


2 temperature sensors.

The shorter one is for ambient temperature. Leave it on top of the battery cabinet.

The longer one is for pilot temperature. It can be attached to a chosen pilot battery surface. **Do not place on any post.**

Installation



If a current transducer has been ordered, it can be installed in a convenient location in the string loop, such as positive bus to battery-1, or interconnection between battery 1 to 2, or other position close to Sentry unit.

The direction arrow is the charging current direction. (from charger toward to battery positive terminal)

By default, the sensor window is 15mmx20mm.

D32mm transducer is good for AWG4/0 cable.

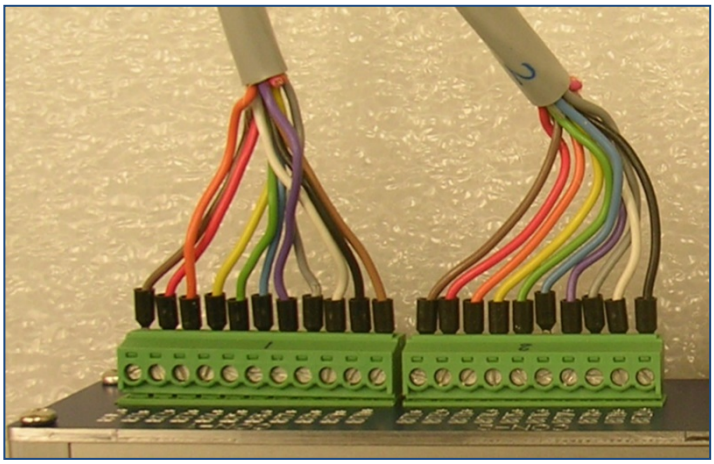
Cable may need to pass through the current transducer before crimping the compression lug.

A split core sensor is also available. They are easier to install but the accuracy is lower than closed loop model.

Contact BatteryDAQ for other window sizes.

4.3.5 Wire from monitor to battery

1. Use insulated ferrules.
2. Screw tightly to plugs
3. Separate the wires into small groups and tie them together
4. When using multi-conductor cable, 20AWG is recommended.

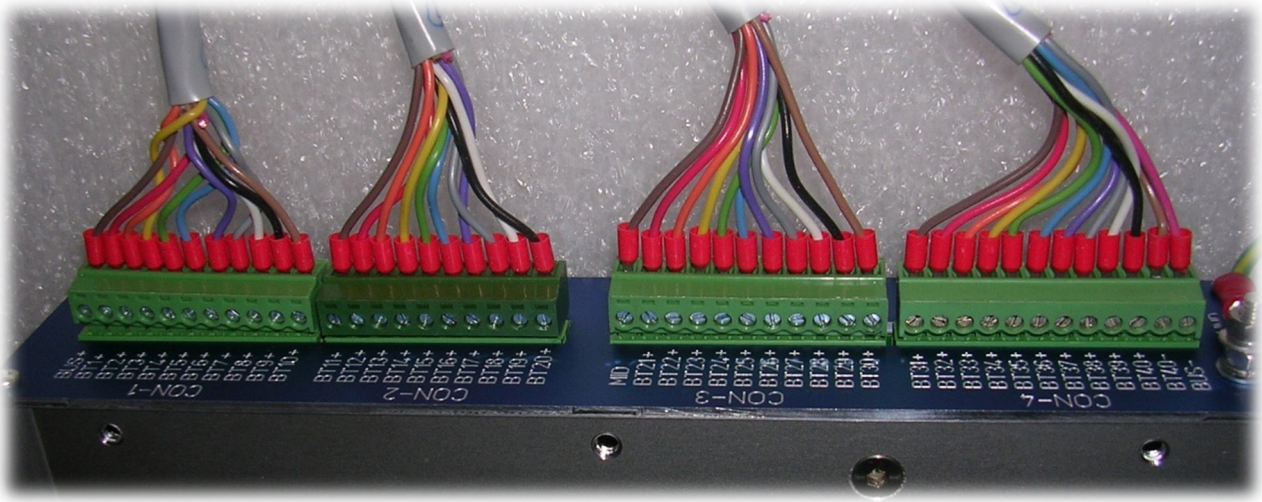


Use ferrules to protect wire for long term reliability.

Recommended clamping tool: Phoenix Contact CRIMPFOX 6 (PN: 1212034)

Use 2.5mm, insulated screw driver for terminals

After computing the length of the sampling line according to the position of battery layout and testing module, tailor the suitable length of the line and connect to the battery and wiring module.



4.3.6 Verify connection

1) Check all connections to confirm they are accurate and reliable.
2) Verify connection with a multimeter at terminals.
3) Measure the string voltage between BUS+ and BUS-.
4) Measure BUS+ to MID and MID to BUS-.
5) Go through the battery terminals to check the voltage.

Troubleshooting Hints:

1) If the voltage between BUS+ and BUS- is negative, the battery order may be incorrect.
ALWAYS LABEL BATTERY ONE FROM THE POSITIVE OF THE BATTERY POWER.

2) If the voltage between adjacent terminals is higher than 13.5V (12V battery) or 2.5V (2V battery), check the connection order.

3) If a channel registers no voltage, measure from the connector: if there is still no voltage reading, check the inline fuse; If there is voltage reading on connector, replace the Sentry unit and contact BatteryDAQ customer service.

DO NOT OPEN THE UNIT.

4.3.7 Power on test

1) Test voltage sampling.
   After powering on, verify there are no abnormal voltage readings.
2) Test internal resistance.
   The internal resistance measurement will be automatically started 30 seconds after powering on. Using the HMI to check the data. Wait for the first IR measurement to finish all channels. (Unfinished channels will show “-1”.)
3) Fill out the installation report.

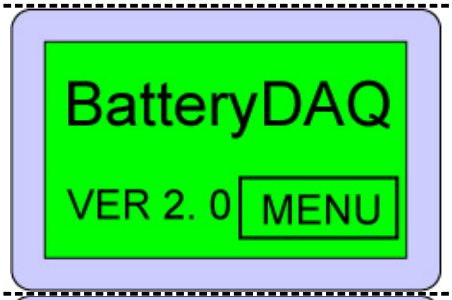
5 HMI Panel Operation

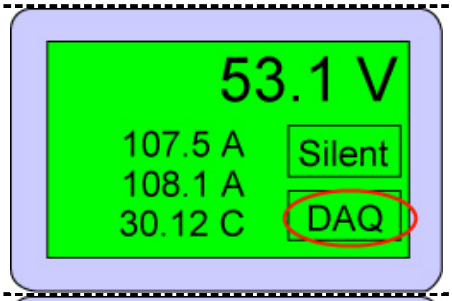
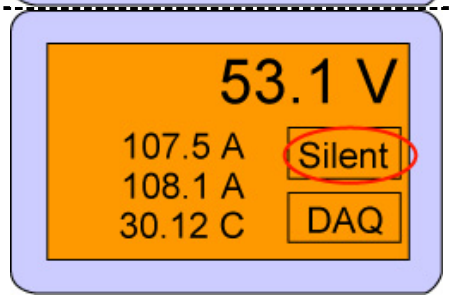
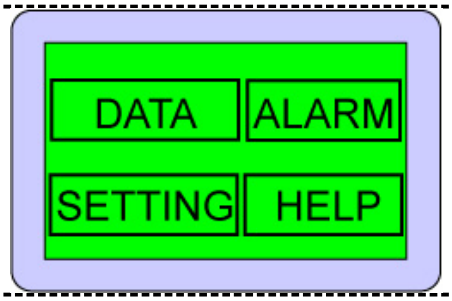
The HMI has a touch screen panel. It has been programmed for comprehensive battery monitoring tasks. It is simple but very useful for field installation and maintenance.

- Displays the battery string information. (Voltage, current and temperature)
- Displays each cell (Battery Unit) voltage, internal resistance, connection resistance using numeric data or a bar chart
- Displays (Flashes) the alarm sign for abnormal battery condition.
- Sets the alarm parameters for the monitors
- Calibrates the monitors.

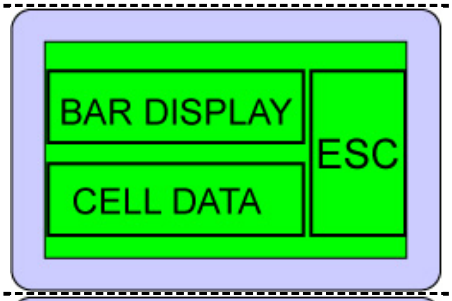
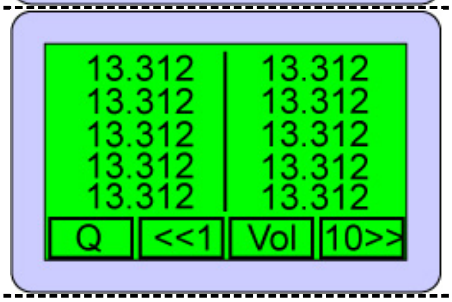
(HMI content may vary depending on the type on order.)

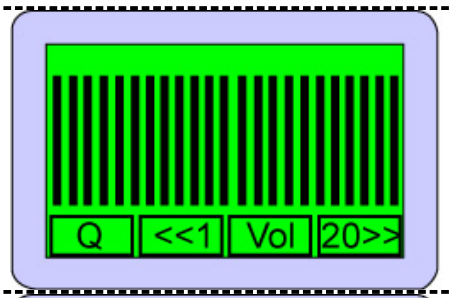
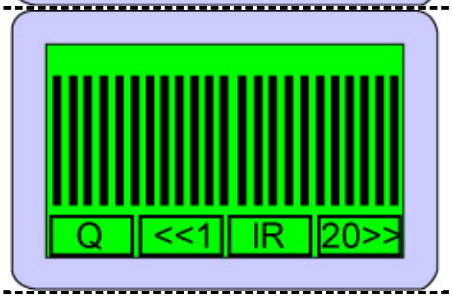
5.1 Power-on Check

	**Power-on Interface** Equipment models and company logos will be displayed after the system self-check. Enter the main menu by touching any place on the screen. The background light goes out when there is no operation for 1 minute.
	**ERFF Error** If the Sentry monitor is not powered on or the communication connection is not correct, the panel will display “ERFF”. Occasionally, when the battery monitor is busy with other tasks, an “ERFF” may show up.
	**ALARM TEST** Each time the unit is turned on, this ALARM TEST will show.

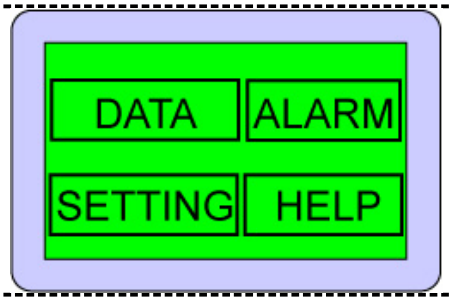
	**Default page** If not touched, or after 10 seconds of non-operation, the panel returns to the default page which displays the string voltage, current 1, and ambient temperature. Press DAQ to check the battery data.
	**ALARM Condition** In case of an alarm or incorrect configuration, the panel will blink with an orange color. If "Silent" is pressed, the blink will turn off for a short time. If the alarm condition still exists, the screen will blink again. "Silent" alarm also closes the Urgent alarm output for 30 seconds.
	**Main Menu** Press "DATA" data to check the battery online data. Battery string data includes the string total voltage, sample battery temperature and string current.

5.2 Battery Data Query

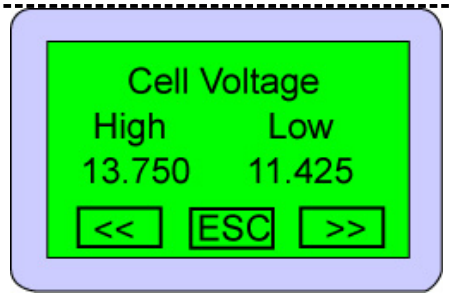
	**Display of Cell Data** Cell data includes the voltage and resistance data of every cell. The number in the middle represents the battery number that corresponds to the number labeled on the battery. Press right or left key to check the data in sequential order.
	**Display of real-time detection data** The system is in real-time detecting state when running. By real-time detecting, sampling data is received, processed and displayed.

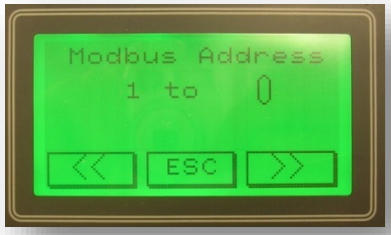
	**Display bar chart for Voltage** Each screen displays bar chart for 20 cells Press “<<” or “>>” to select other cells. Press “Q” to return to main menu.
	**Display bar chart for Internal Resistance** Each screen displays the bar chart for 20 cells Press “<<” or “>>” to select other cells. Press “Q” to return to the main menu.

5.3 Alarm Check

	**Real-time alarming event** The system processes the event over the alarming condition as a real-time alarming event. Alarming event inquiry Inquiry of the alarming event.

5.4 Setting Operation

	**Alarm setting** Adjust the alarming parameters according to the battery use requirement. System configuration includes: 1. float voltage upper limit 2. float voltage lower limit 3. discharge termination voltage 4. resistance threshold



System setting

Some basic system settings can be done with the HMI.

1) Battery number for this unit. Change to the actual battery number for this string if it is not 40.
2) Wire mode, do not change it.
3) Modbus address. Set from 1 to 30 if desired. The default is labeled on the unit. (Change DTU monitor code accordingly.)

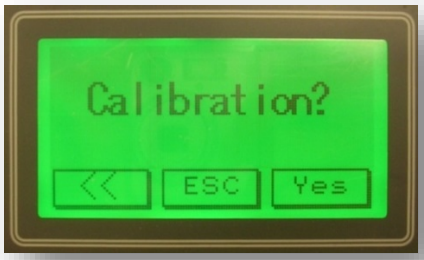
5.5 Calibrate Sentry Unit

Calibrations can be done with an HMI.

Calibration includes:

1. noise filter for 50Hz or 60Hz
2. current measurement gain and offset
3. Cell/battery voltage gain

Internal resistance



DAQ → Setting → System Setting

Scroll to calibration page

5.5.1 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.

5.5.2 Current calibration

Calibrate Offset

Go to Gain page, write down the Gain value. Change gain to “10000”.

Go back to offset page, set the offset to “0”

Read out current on the same page.

Input the readout x 10 as offset. (For example, readout is 233.6A, then input -2336 as offset. For bipolar power supply sensor, offset should be around -2400)

Go to Gain page, set back to previous gain. (For 300A sensor, set to 4000.)

Calibrate Gain

Usually, gain does not need to be recalibrated unless a different range sensor is used.

New gain input = previous x (new range / previous range)

For example, a previous sensor is 300A, a new sensor is 500A. The new gain = 4000 x 5000/3000 = 6667.

5.5.3 Voltage calibration

String Voltage Gain
There is no need to calibrate string voltage. String voltage is the sum of the battery voltage.

Battery/Cell Voltage Gain

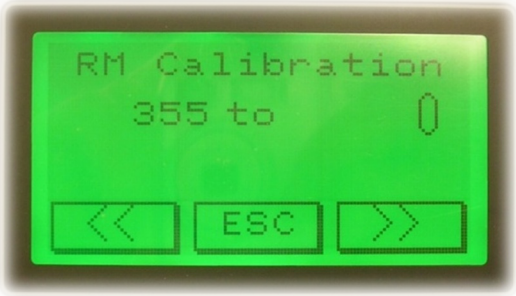
Measure the string voltage with a reliable/calibrated meter. Set Gain = previous gain x Standard/Readout.

Zero offset

All telecom models have automatic zero offset.

5.5.4 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.



RM Calibration

New value = previous value x (actual value / readout)
For example, actual value is 3.052mohm, readout is 2.751mohm, new value = previous value x (3.052/2.751)

5.5.5 Save to onboard flash

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

6 Communication and Network Setting

Sentry battery monitoring units provide variety of communication and network options for integration and data management.

Sentry-	2402W2	1202W2	0412S6	0212S15
RS232 **Modbus-RTU**	✓	✓	✓	✓
RS485 **Modbus-RTU**	✓	✓	✓	✓
Ethernet-to-Serial **Modbus-RTU**	✓	✓	✓	✓
DTU **http web page for battery data**	✓	✓	✓	✓
DTU **http XML data**	✓	✓	✓	✓
Optional External HTTPS DTU	✓	✓	✓	✓
Optional External Wireless DTU (GSM)	✓	✓	✓	✓
Optional External Wireless Router (AT&T, Verizon, Sprint certified)	✓	✓	✓	✓
Modbus-TCP through DAS software	✓	✓	✓	✓
SNMP (alarm traps and data polling) through Battery Analyzer software	✓	✓	✓	✓

Please contact BatteryDAQ for Modbus table.

6.1 Onboard Ethernet DTU Connection

The on-board Ethernet connection is set for MyBattery Platform™. (Special customized order may vary.)

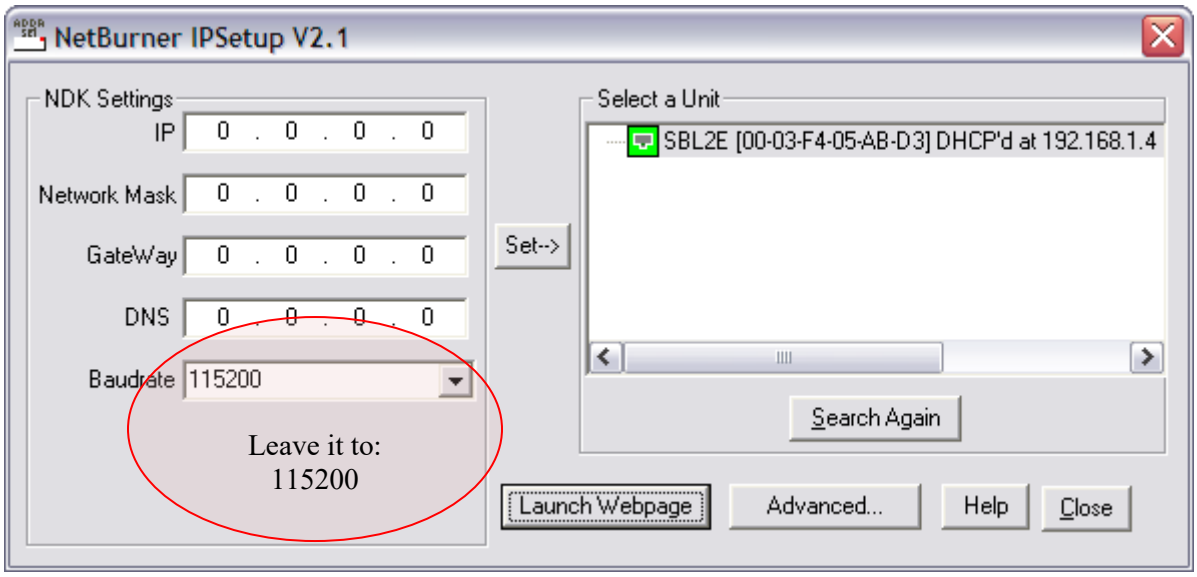
The product will come with a pre-configured DTU-ID and monitor configuration.

For example,
DTU-ID: 12501
Host: www.thisbattery.com
Monitor configuration: 2,2,24,10 (No space between comma and following digit.)
(Modbus address 2, 2-wire mode, 24 batteries, 10 for BatteryDAQ Sentry product).

In any case, if the configuration needs to be changed, you may find IPSetup.exe in the software disk. Or, download from this link:
http://batterydaq.com/tech/IPSetup.exe

By default, the DTU has been set for DHCP (Dynamic Host Configuration Protocol). It will work in most network environments and firewall situations.

Use "IPSetup.exe" to search 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. The DTU will reset back to DHCP.



Launch Webpage for configuration

Authorized users can obtain a password from BatteryDAQ to update the DTU configuration

When the Monitor Code is set to none (0,0,0,0), the RS485 port is available as a slave.

BatteryDAQ DTU - Mozilla Firefox

File Edit View History Bookmarks Tools Help

BatteryDAQ DTU

192.168.1.200/INDEX.HTM

BatteryDAQ™ Monitoring Solutions

MyBattery Platform DTU Configuration

System tick count: 144 seconds

Current configuration stored in User Parameter Flash:

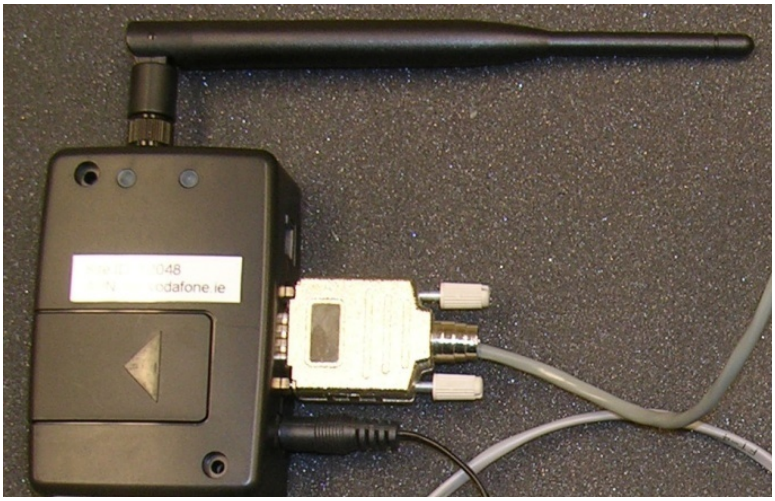
-	Description	Value	New Value
1	DTU ID	12057	12057
2	Host Name	www.thisbattery.com	www.thisbattery.com
3	Host IP	50.62.40.65	50.62.40.65
4	Host UDP Port	5566	5566
5	Report Interval(mins)	60	60
11	Monitor 1 Code	2,2,24,10	2,2,24,10
12	Monitor 2 Code	0,0,0,0	0,0,0,0
13	Monitor 3 Code	0,0,0,0	0,0,0,0
14	Monitor 4 Code	0,0,0,0	0,0,0,0
15	Monitor 5 Code	0,0,0,0	0,0,0,0
16	Monitor 6 Code	0,0,0,0	0,0,0,0
17	Monitor 7 Code	0,0,0,0	0,0,0,0
18	Monitor 8 Code	0,0,0,0	0,0,0,0

Monitor Code Example: (3,1,40,10)
(Modbus address, wire-mode, battery number, monitor type: 10 for Kc

Enter Password: Update DTU Configuration

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

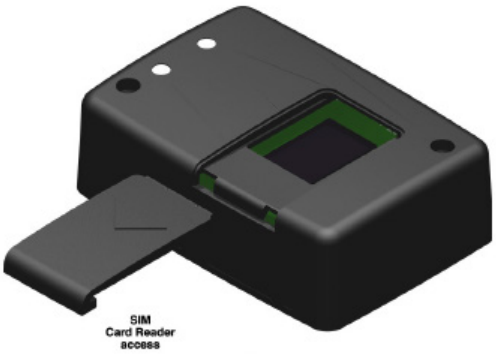
6.2 External Wireless DTU



A wireless DTU can be utilized for sites with no Ethernet connection.

Wireless DTU is based on the state-of-art M2M technology. It will only work for MyBattery Platform.

If you are using Battery Analyzer software, you can use a traditional wireless modem. Contact your modem provider for technical support.



A SIM card with data plan is required.

If you are using an iPad/iPhone card for a test, a card adapter is required for micro SIM card.

Wireless connects to Sentry through the RS232 port.

In the case one wireless DTU serves multiple Sentry units, a RS232 to RS485 converter can be utilized. Onboard DTU will be disabled if the RS485 port is used.

Connect other Sentry unit(s) with RS485.

Wireless DTU has been validated with the AT&T, T-Mobile, Jasper, Rogers and Vodafone networks. Please contact us with questions regarding other networks.

The wireless DTU is factory provisioned. The DTU ID is labeled on the unit.

Contact us for detailed instructions to re-configure a wireless DTU.

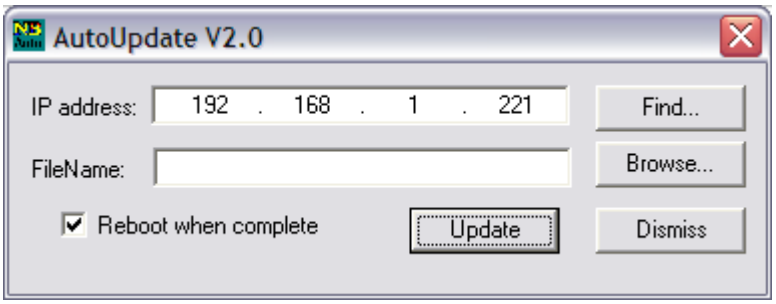
6.3 *Ethernet-Serial Connection*

In some circumstances, such as integration **without** utilizing Battery Analyzer software or MyBattery Platform, the onboard network can be re-programmed as a regular Ethernet to Serial server.

Once it has been programmed to S2E (serial to Ethernet), the DTU function will no longer be available. In this case, no data can be received by MyBattery Platform.

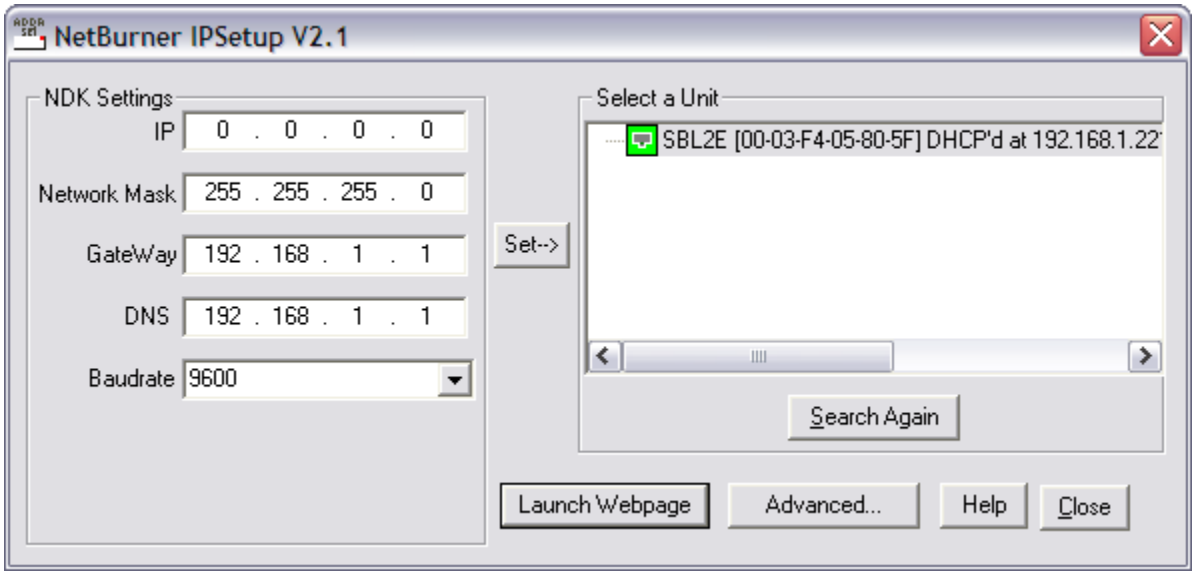
Procedures to re-program:

1) From the software CD, lunch the AutoUpdate.exe.



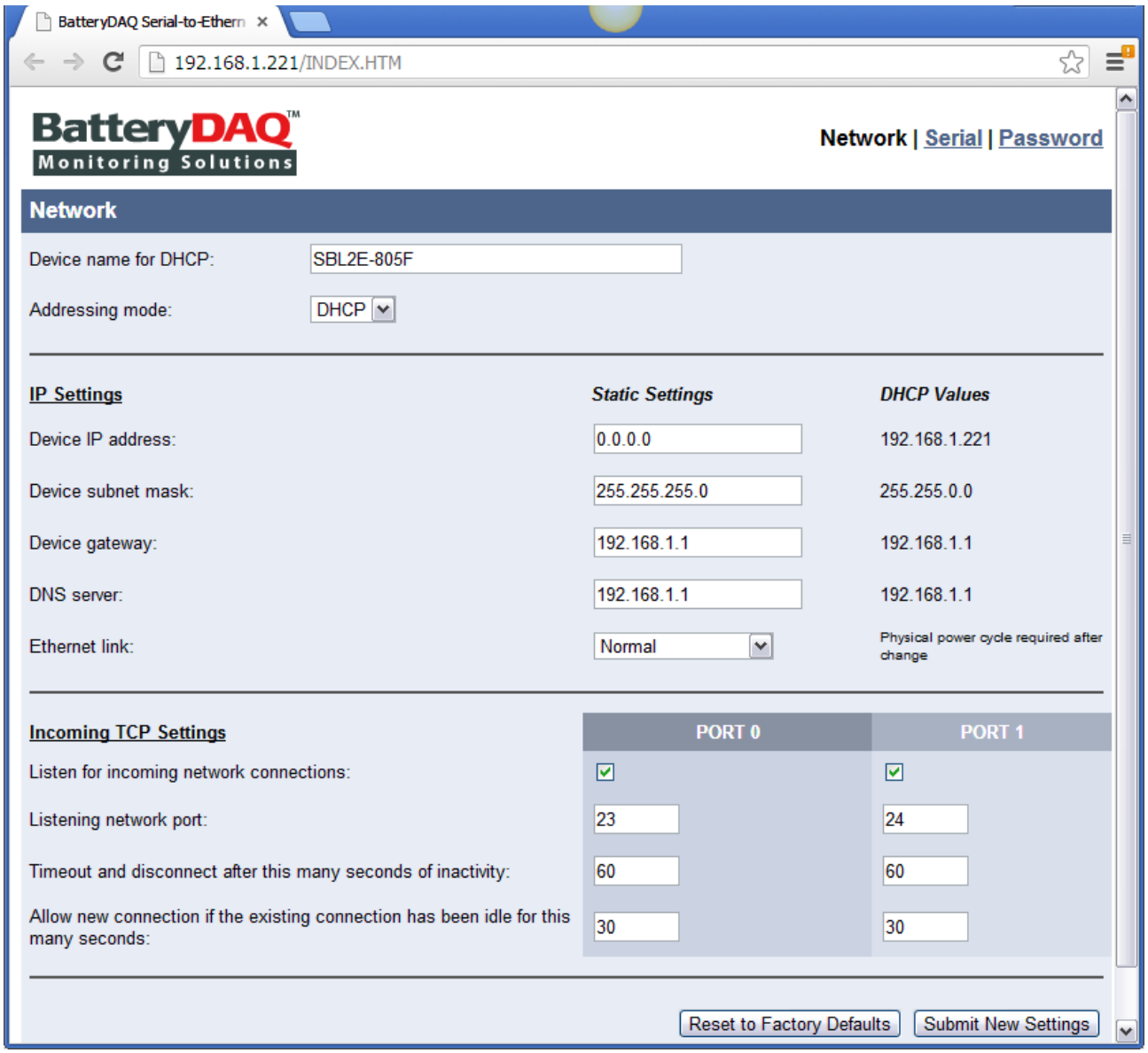
2) Find the Sentry network device. Browse CD to locate S2E_App.s19 file. Click Update.

3) After updating the firmware, use IPSetup.exe to configure the **static IP**. **(Must be static IP.)**



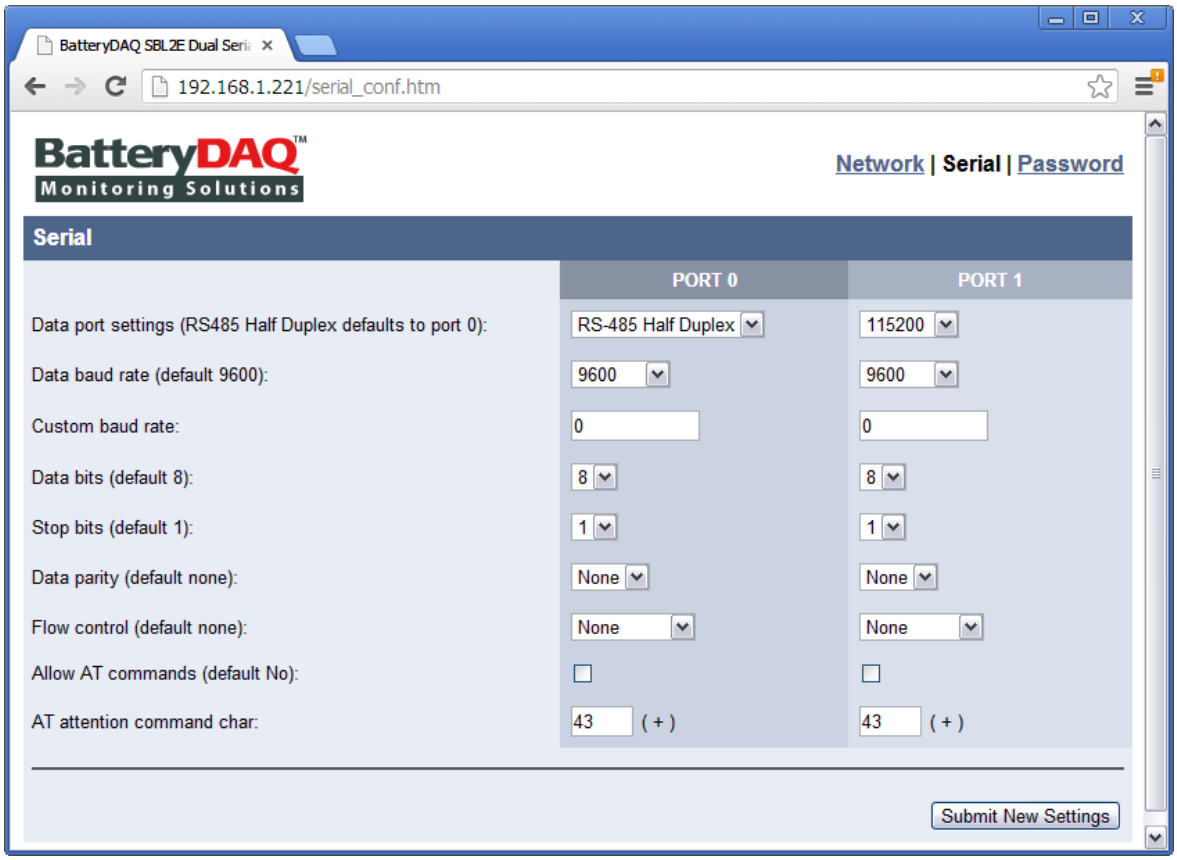
Or set the static IP from the web browser.

Communication and Network

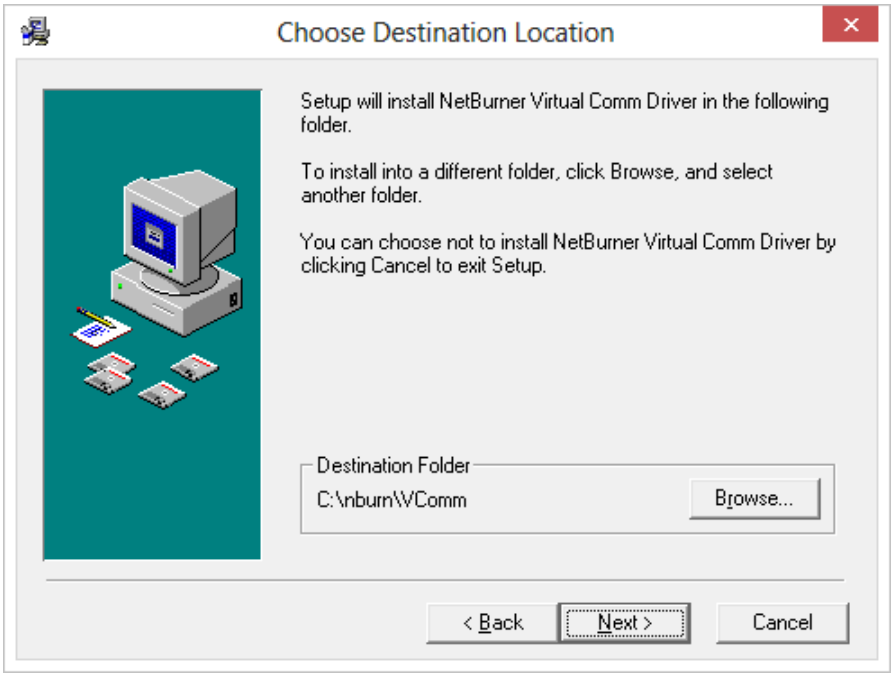


Please notice that only Port 0 is available for Sentry onboard Ethernet module.
The listening network port “23” will be used later to map a virtual serial port.

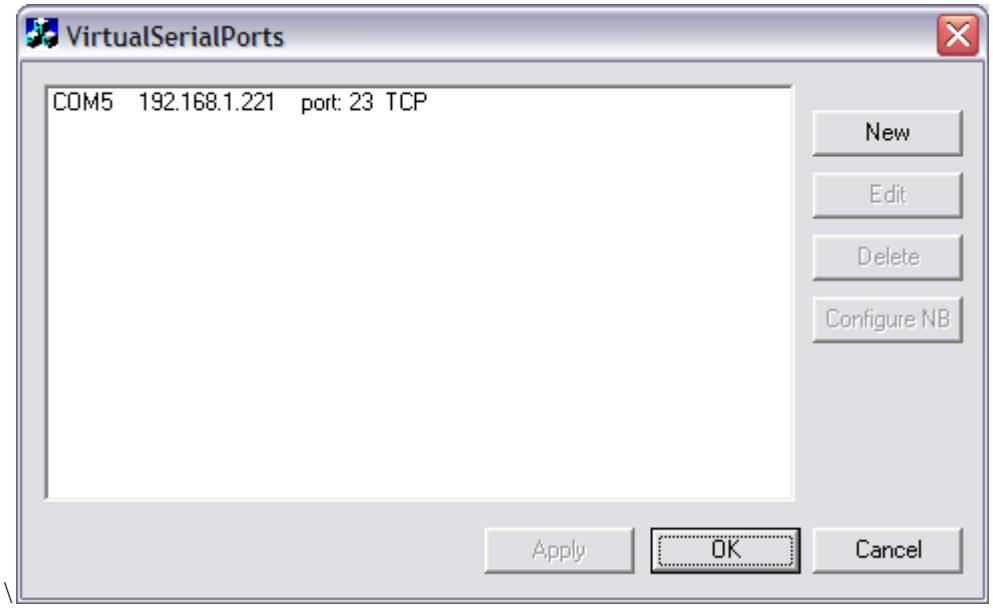
4) Check the serial setting. Leave it to the default setting.

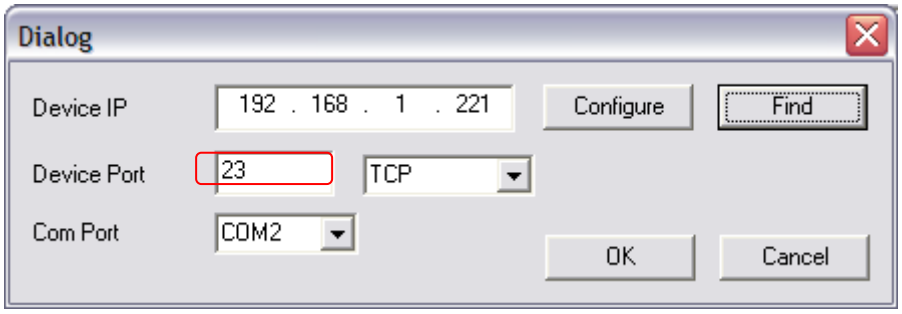


5) Run NNDKVComm.exe to install virtual serial port driver.



6) Run VirtualSerialPorts.exe to add virtual port to local PC





There is no need to change other fields. The device will work as a regular serial port.

If Modbus TCP is required, map remote Sentry units to a local computer, and run Battery DAS software with virtual ports. DAS software will provide fast Modbus TCP access to multiple clients. Battery Analyzer software and other integration software can be running simultaneously.

<u>After mapping a remote Ethernet port to a local virtual serial port, in some cases, the computer may need to be restarted.</u>

7 Battery Analyzer Software Setup

System Integration or MyBattery Platform™ users may skip this chapter.

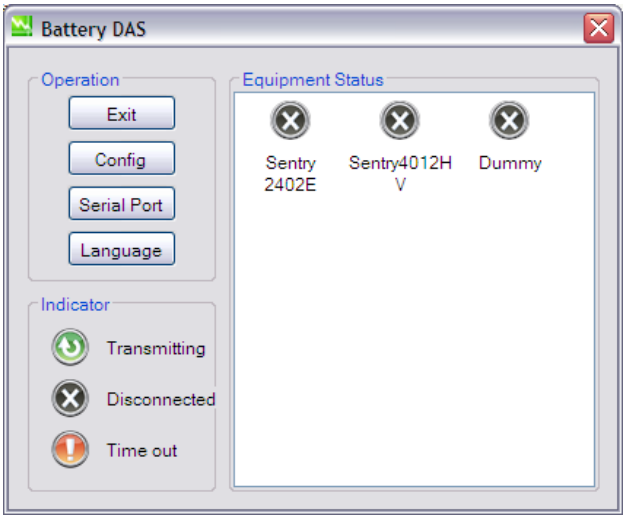
For software installation, please refer to software manual.
Please note that the Analyzer and DAS can be installed in separate computers within the same network. The monitor devices connect to the computer which runs the DAS. Both Analyzer and DAS will need .NET framework.

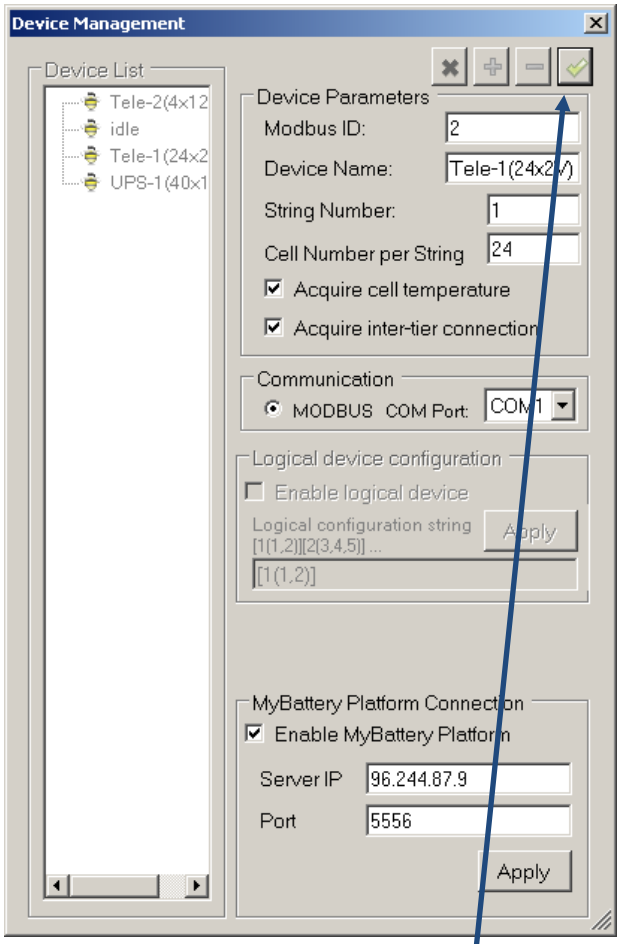
Battery Analyzer works on both Windows XP, Win 7 and Win 8.
Battery Analyzer 3.1 or later version requires Microsoft .NET Framework 3.5 and 4.0.

DAS software is only needed when you are setting your own cloud server or directly communicating to Sentry via serial port. Otherwise, skip the DAS Configuration.

7.1 DAS configuration

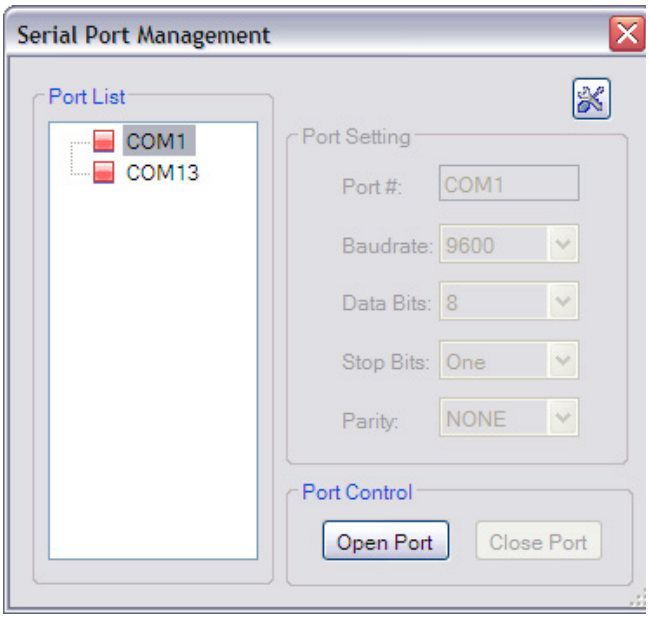
After installation, run Battery DAS. Click "Config" to add device.

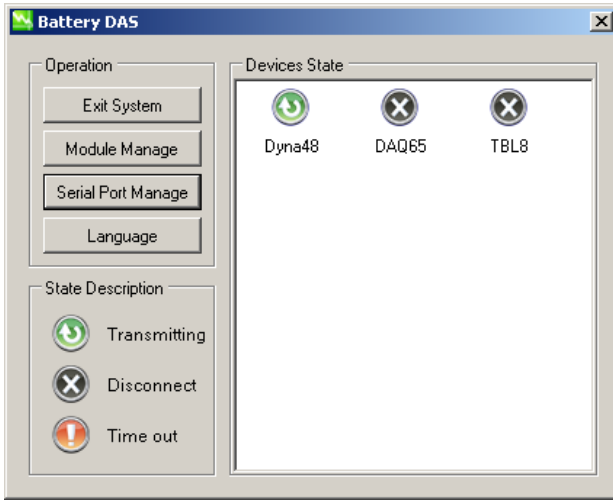




Click "+" to add new device or Click "Modify" to change selected device.
Give the unique Module Number, correct string number, cell number and COM port. Click the upper/right corner to save.

A logical device can be used when one string is monitored by multiple units so the software will treat it as one large monitor. For example, a 240x2V battery string is monitored by 10 units of 2402W2, Modbus from 1 to 8, set to [1(1,2,3,4,5,6,7,8,9,10)].

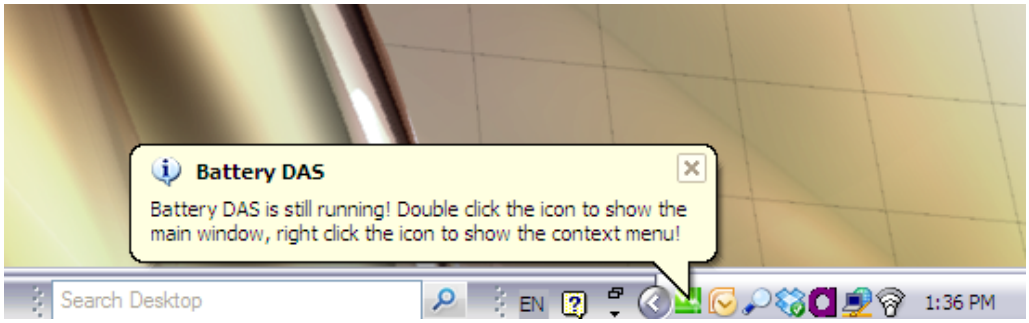




Click “Serial Port Manage” to set correct baud rate and others as above.
By Default, Sentry units are set to 9600, 8, 1, NONE. No change will be made here.

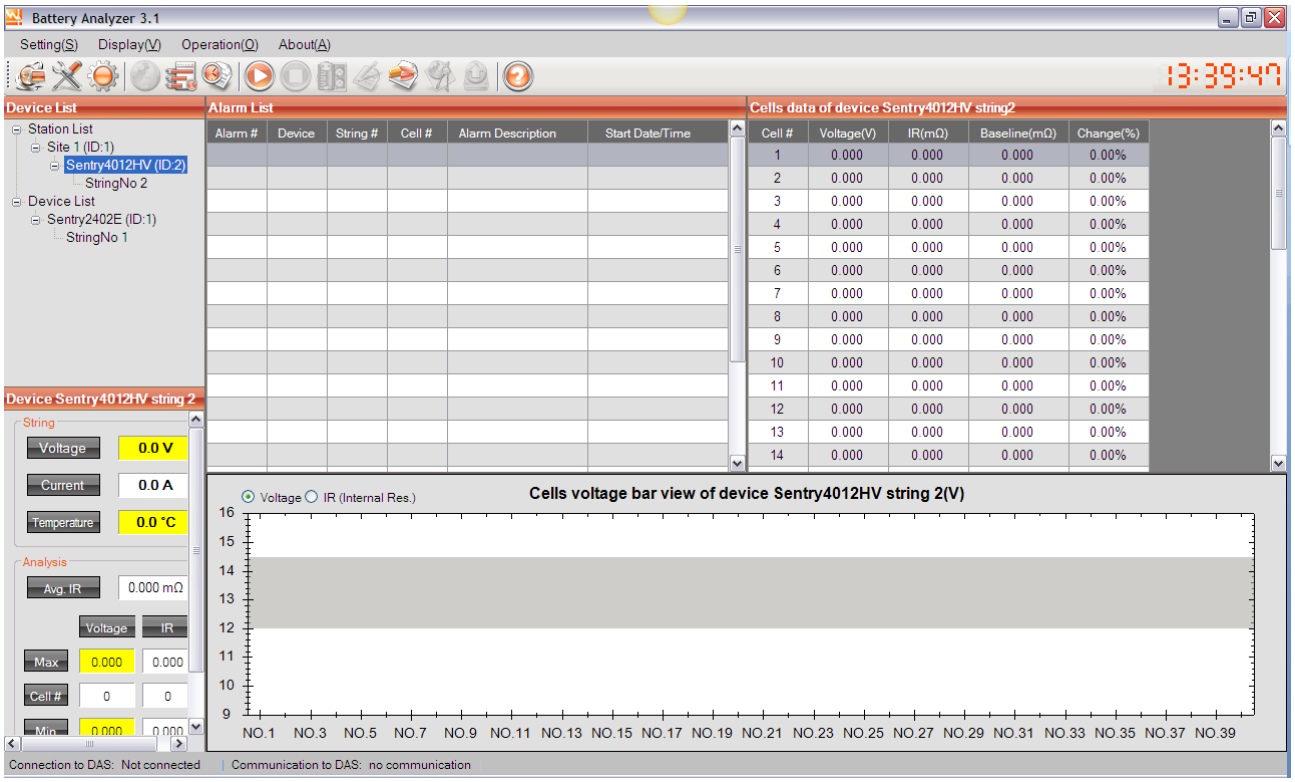
Click “Open Port” for **each serial port**. The DAS will run and the status should be GREEN.

When you close this application by clicking “X” on the upper-right corner, DAS will continue to run in the background.

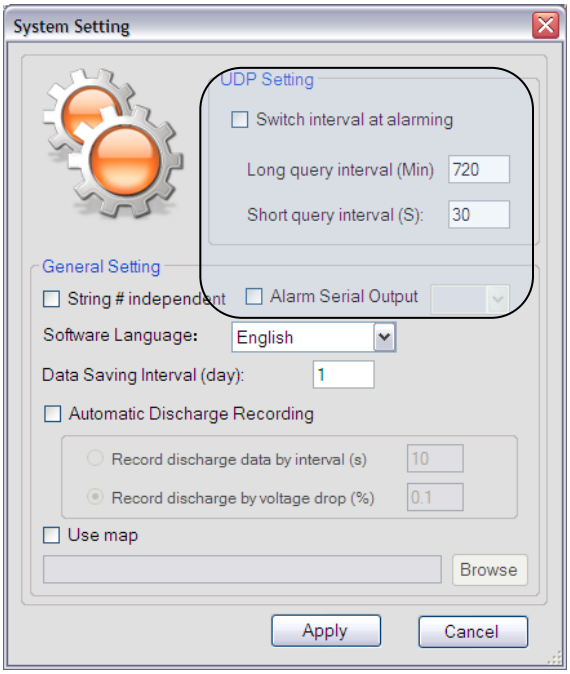


7.2 Battery Analyzer configuration

Run Battery Analyzer in the client computer.



7.2.1 System setting



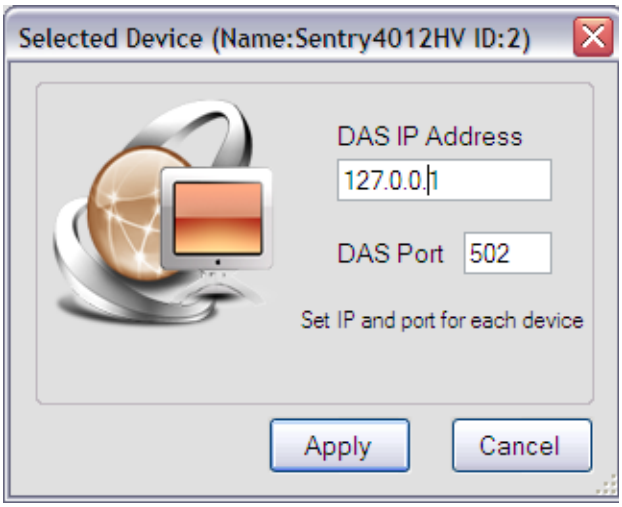
There is no need to set anything for “UDP Setting” and Alarm Serial Output.

For “Automatic Discharge Recording”, “Record discharge by voltage drop(%)” is recommended.

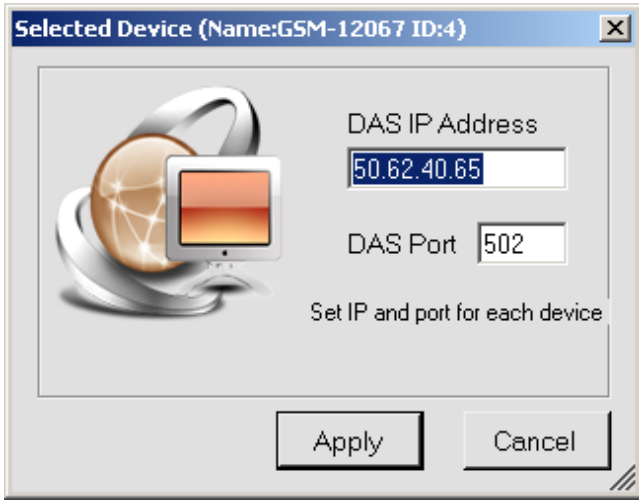
7.2.2 Server setting

If the DAS and Analyzer are running in the same computer, set the IP as above. Otherwise, find out the IP for the DAS computer.

When the DAS is running on the same computer, set IP to local 127.0.0.1



When DAS is running on a remote computer, set IP to the actual address.

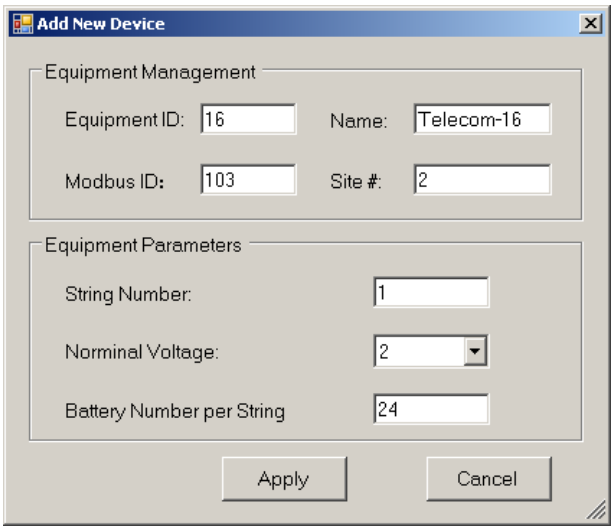


One DAS server can provide battery data to many clients, including Battery Analyzer software or other standard Modbus client using Modbus TCP.

Battery Analyzer software can manage data from multiple DAS sources.

7.2.3 Equipment (Device) Management

In the Device Manage, you can add/delete device or modify the parameters for your batteries. The Device ID can be any number from 1 to 99999.



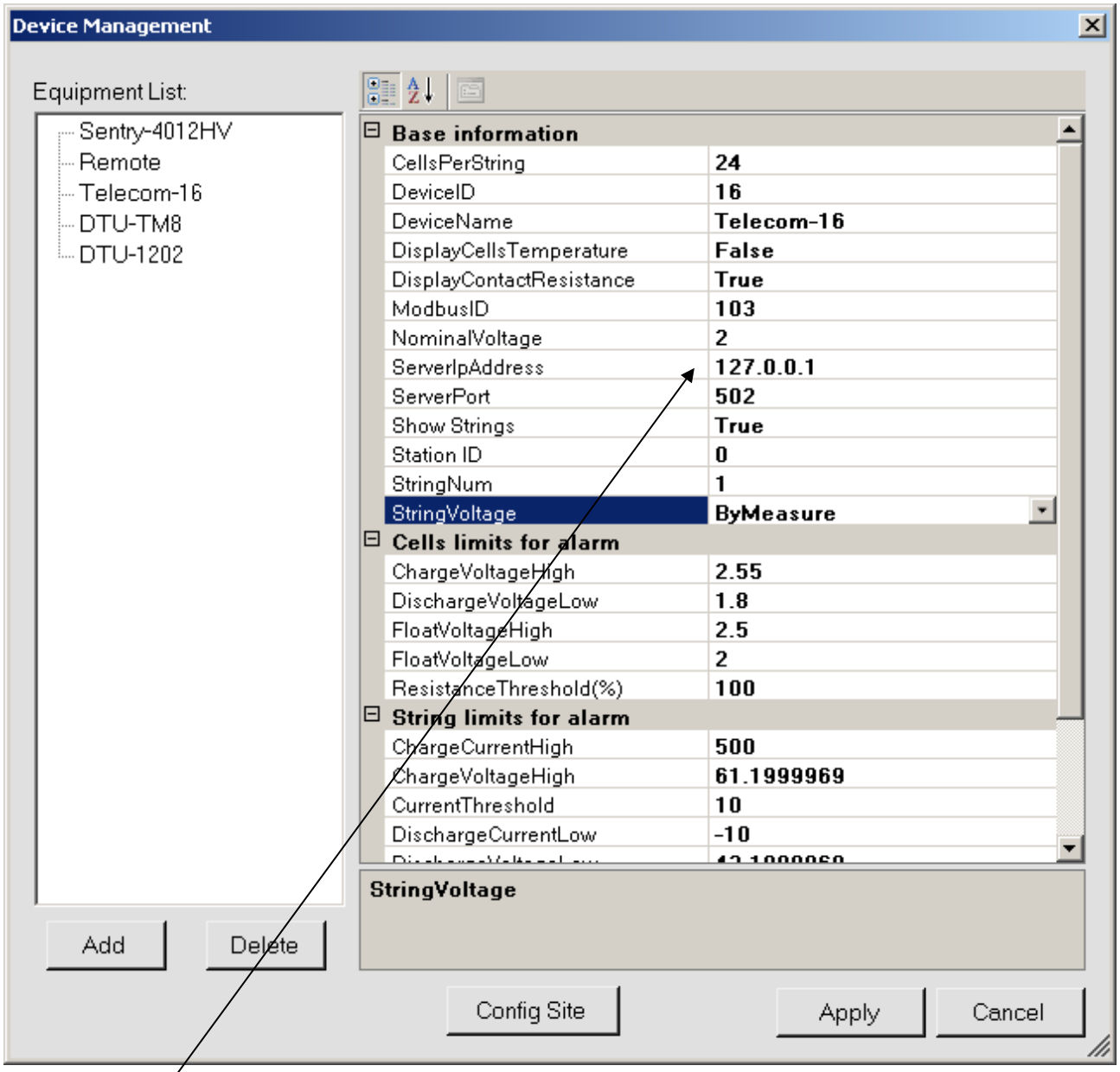
Setting(s) → Disconnect All

Click any device to verify. If all devices are disconnected, Equipment Management menu comes out of gray.

Click “Equipment Management”

Click “Add” on Device Management

Select 2V or 12V to automatically generate default parameters. Later, changes can be made to those numbers/parameters.



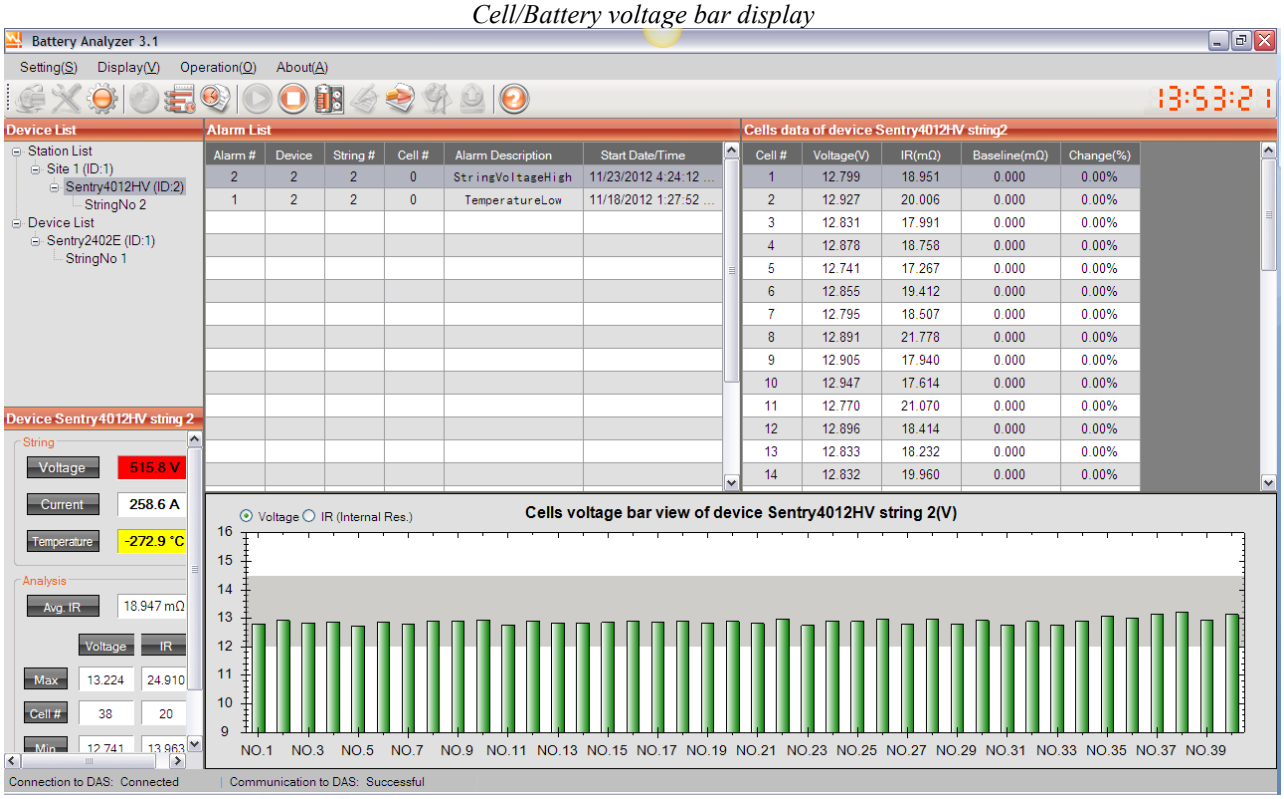
Server address:
Local: 127.0.0.1 when DAS software is running in the same computer
Cloud: 50.62.40.65 when utilizing BatteryDAQ cloud server or your server IP where the DAS server program is running.

Battery alarm parameters will be adjusted for battery type and charger settings.

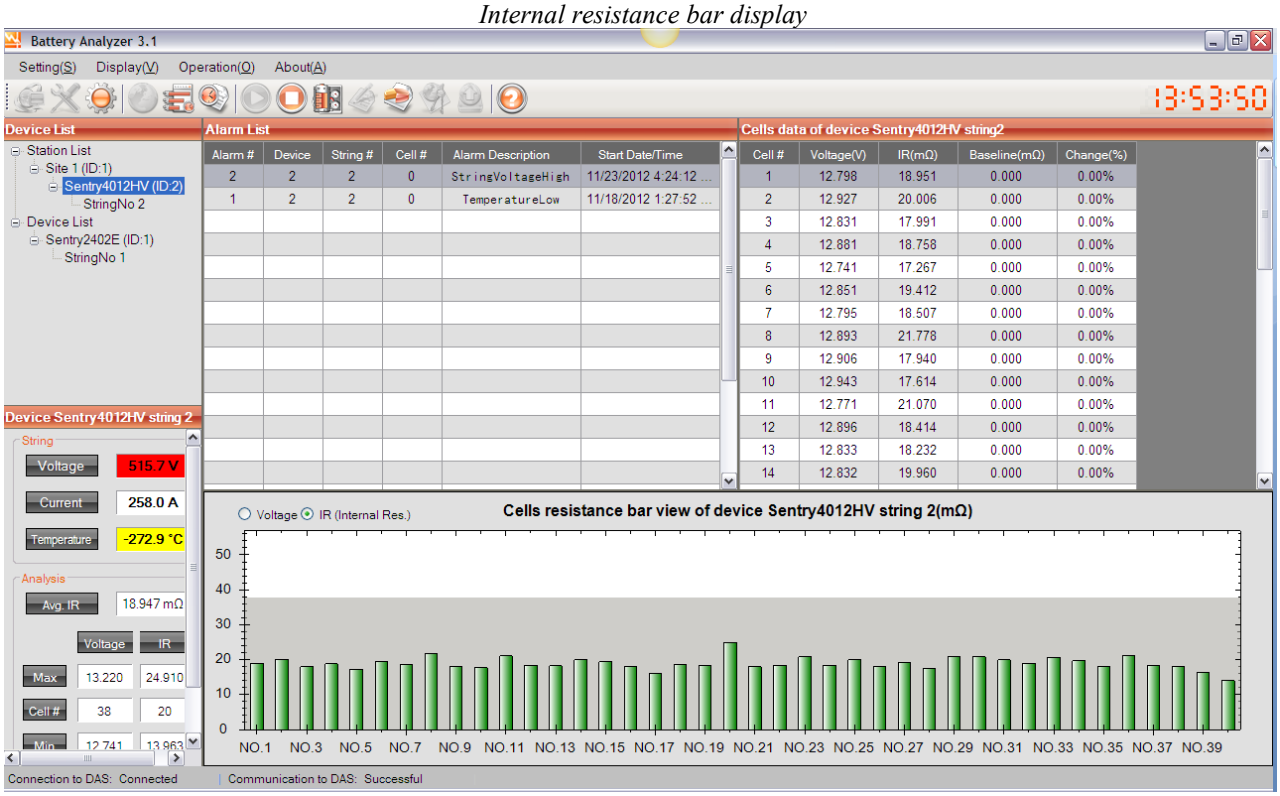
7.2.4 Data viewer

If the settings are correct, select the device and start it. The real-time data should be shown on the screen.

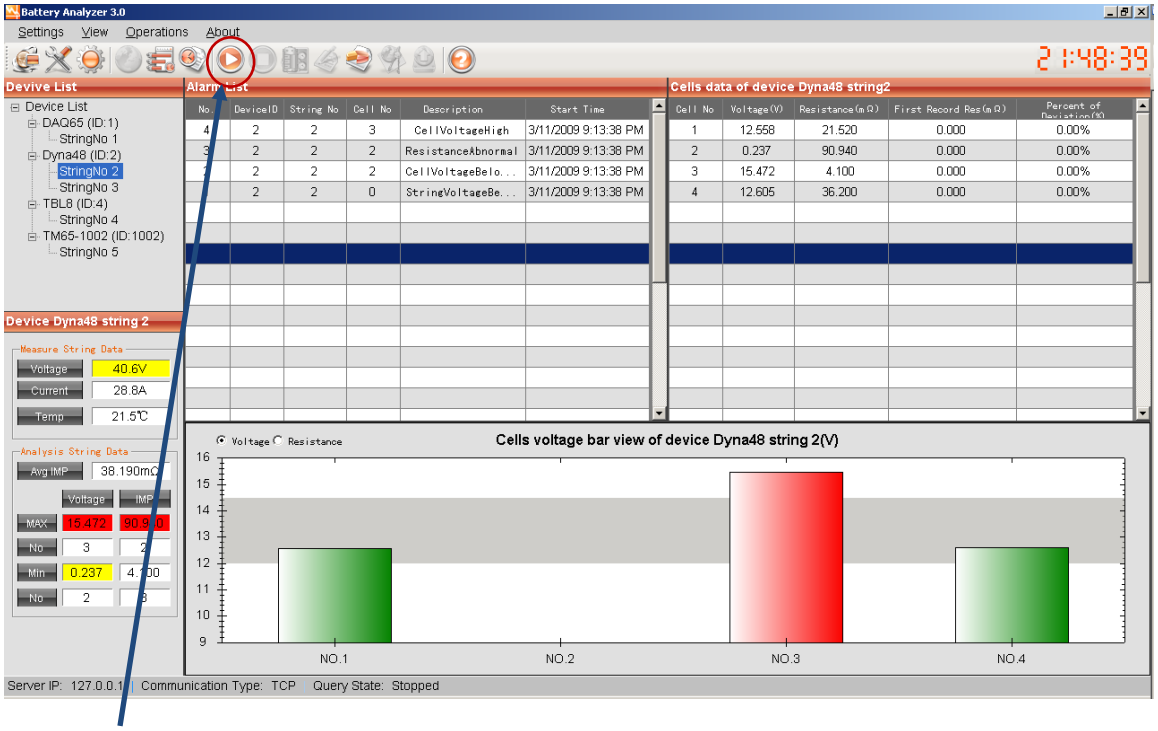
Cell/Battery voltage bar display



Internal resistance bar display



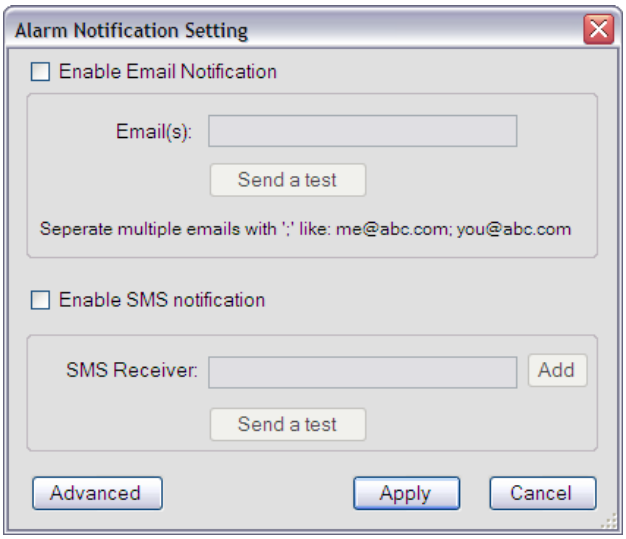
If the link is not correct, or the battery data is out of range, the color will change with a highlighted alarm.

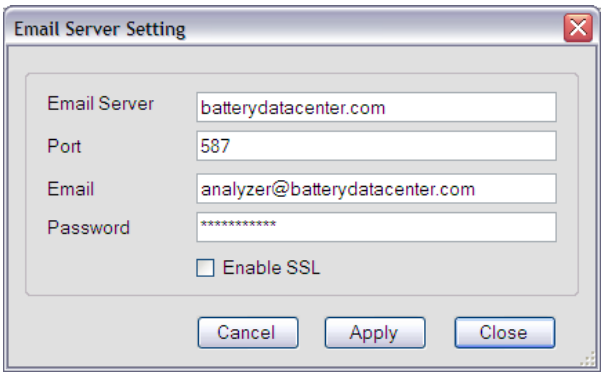


When "Run" is visible, that device is not connected. Click to connect or click "Setting(s)" → "Connect All".

Right click data window to export the data to an Excel sheet. If you are not sure the data is within the correct range, you can send the file to BatteryDAQ technical support.

7.2.5 Alarm Notification

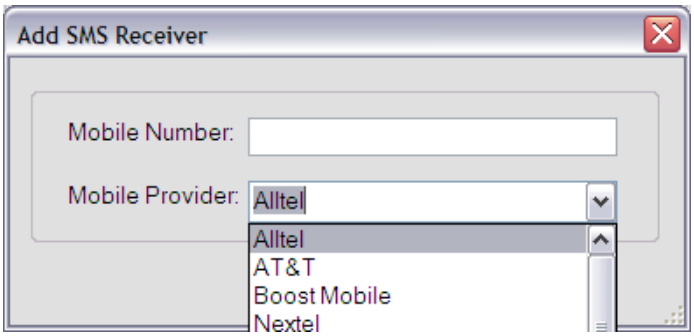




Click "Advanced" to configure mail server. You may continue to use the BatteryDAQ mail server. However, no performance or availability guarantee is made by BatteryDAQ.

SMS (mobile phone message) may only work for certain carriers. After setting, send a test to confirm.

.

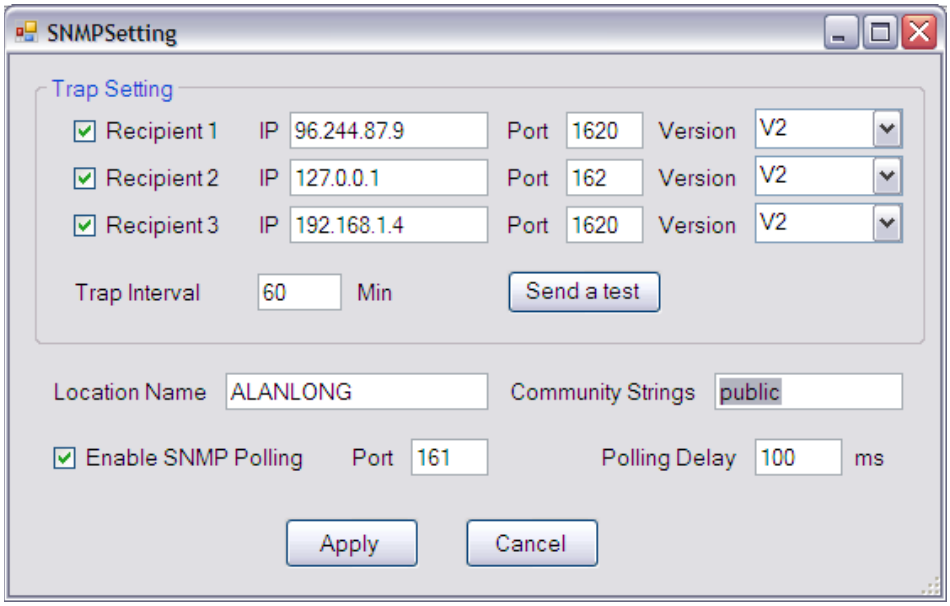


Alltel
AT&T
Boost Mobile
Nextel
Sprint PCS (now Sprint Nextel)
T-Mobile
US Cellular
Verizon
Virgin Mobile

7.2.6 SNMP Setting

You may set up to 3 SNMP recipients.

Please find the MIB file in the software CD or contact us at tech@batterydaq.com



For other functions not mentioned in this manual, please refer to the Battery Analyzer software manual.

8 Installation Record

Measurement

Parameters	Value or Range	Note
Battery Capacity		
Cell Number		
Cell Voltage		
Nominal Bus Voltage		
Floating Charge Voltage:		
Maximum Discharge Current		
Maximum Charge Current		
Ambient Temperature Range		
Pilot Temperature Range		

Data Analysis

Parameters	Low Value	High Value	Note
Cell Voltage Abnormal			
Cell IR Threshold (Absolute Setting to Sentry)			
Cell IR Abnormal (Percentage Setting to PC Software)	N/A		
Bus Voltage Abnormal			
Discharge Current	N/A		
Charge Current	N/A		
Ambient Temperature			
Deep Discharge (Percentage)			
Battery Capacity	N/A		
Designed Runtime	N/A		

Communication/Networking

DTUID	IP Address:
Modbus Address (Default 01)	Host: (www.thisbattery.com)

Other Notes

9 Installation Acceptance Report

Company Name:	Sentry Monitor Serial No:
Engineer:	DTU ID:
Site Name:	Address:
Battery Installation Date:	BMS Installation Date:
Battery Type:	Capacity: Ah
Cell Voltage: V	Battery Number in This String:
Bus Voltage: V	Designed Maximum Current: A

Battery capacity and designed runtime must be set to unit(s) for SOH and SOC calculation.

Current and Temperature Measurement

Sensor model:	**Calibration Offset:**	**Calibration Gain:**

	Current Test 1(open circuit)	Current Test 2	Ambient Temperature	Pilot Temperature
Measured Value				
Readout				
Difference				

Voltage Measurement

Calibration Offset:	**Calibration Gain:**

Sample	1	2	3	4	5	6	7	8	9	10
Cell #										
Reference										
Readout										
Percentage										

Internal Resistance Measurement Comparing to Reference

Instrument Name/Model:	**IR Calibration:**

Sample	1	2	3	4	5	6	7	8	9	10
Cell #										
Reference										
Readout										
Percentage										

Signature	Date

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