Cellwatch Installer Training Primer

- *Material in this document is designed to complement the Cellwatch Installer Certification training.*
- *Material in this document may appear on the Certification Examination which must be passed to receive the Installer Certification.*
- *Material in this primer may be updated or removed without notice. Always verify that the latest primer is used.*

Installer Certification Expiration

- All Installer Certifications will expire after 3 years
- At least one person on site must be a Certified Installer during installation
- Certified Installers who are unwilling to support the customer may have their badges revoked and may place the reseller/partner relationship in jeopardy

Terms

- **Battery** – a single/multi string configuration that is connected to a DC charger or UPS module
- **String** – a parallel feature of the battery comprised of multiple jars connected in series or a single jar
- **Jar** – the lowest changeable unit of the string. Often 2V, 4V, 6V, 8V, 12V, or 16V modules (can also be called a container or regarding 2V modules, cells)
- **iBMU (I**ntegrated **B**attery **M**onitor **U**nit**)** – a standalone solid state server running Windows Embedded Standard (i.e. Win 7 Embedded) dedicated to running Cellwatch.
- **CU (C**ontrol **U**nit**)** – a data aggregator that sends commands issued by the iBMU over dedicated RS-485 to the optically connected DCM modules.
- **TRC (T**hermal **R**unaway **C**ontroller) – a CU with the expanded ability to send a signal to disconnect switches to isolate a battery if thermal runaway conditions have been continuously present for 12 hours (default).
- **DCM (D**ata **C**ollection **M**odule) – a device that reports back voltage, ohmic value, AC ripple (any DCM 5 version), and cell temperature (DCM 5T only).
- **Generator Extender Kit** – a dedicated Cat5 expansion between a CU/TRC and a Remote module that allows fiber optic communications to DCM modules connected to generator, substation, switchgear or transfer switch batteries.

System Overview
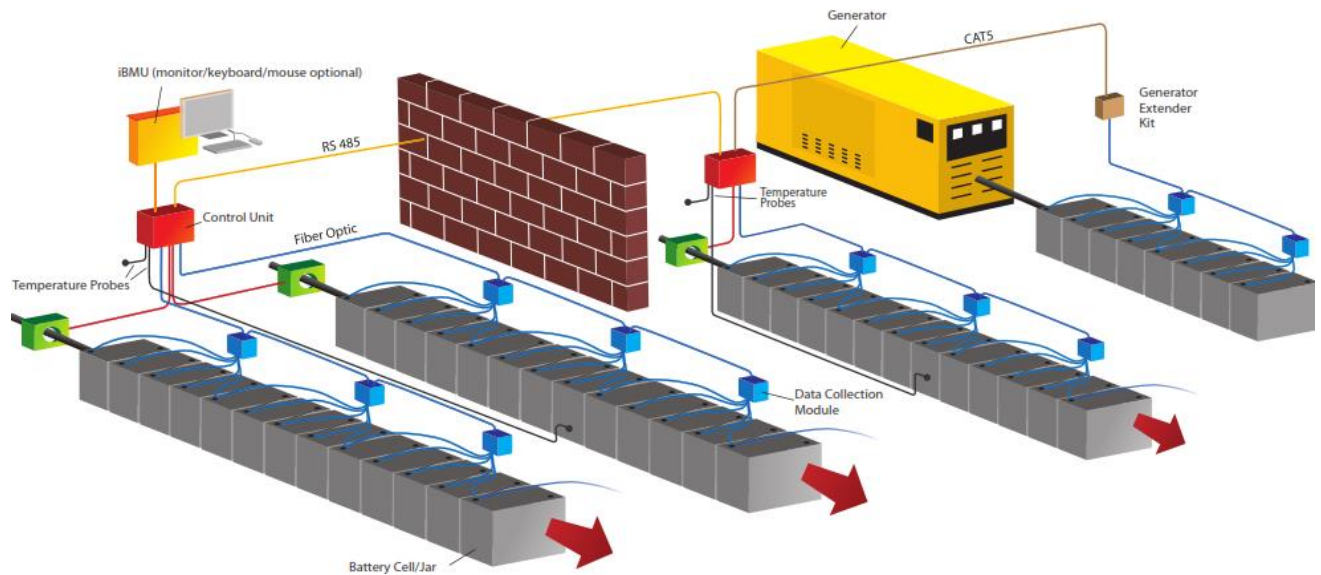
Tabbing a Battery

Some installations contain pre-tabbed cabinets or racks while others must be tabbed. NDSL recommends using the Every Negative Post installation method for connecting DCM modules to the battery.

For Rack based installations, starting from the most positive post, connect 2 tabs. Then continuing on every negative post connect 1 tab. On every fourth jar install 4 tab washers. On the last most negative post only 2 tabs will be connected.

For Tray based installations typically with four jars and quick disconnects between trays, it is recommended to consider each tray as its own sub-string and place 2 tabs on the negative post of the fourth jar (instead of 4 tabs). This removes the high resistance measurement of the quick disconnect from the measurements.

Why Every Negative Post?

The every negative post method is recommended so the temperature of the negative terminal of the jar/cell can be monitored. The negative terminal is most likely to heat during an overcharge situation as the hydrogen evolution occurs at the negative plates. Excess heat will then be conducted to the negative post.

Every Negative Post Method
Post August 2014
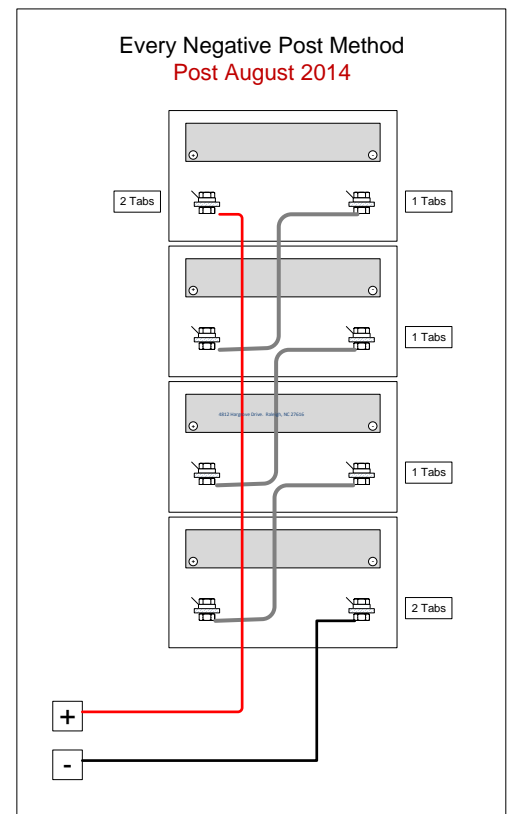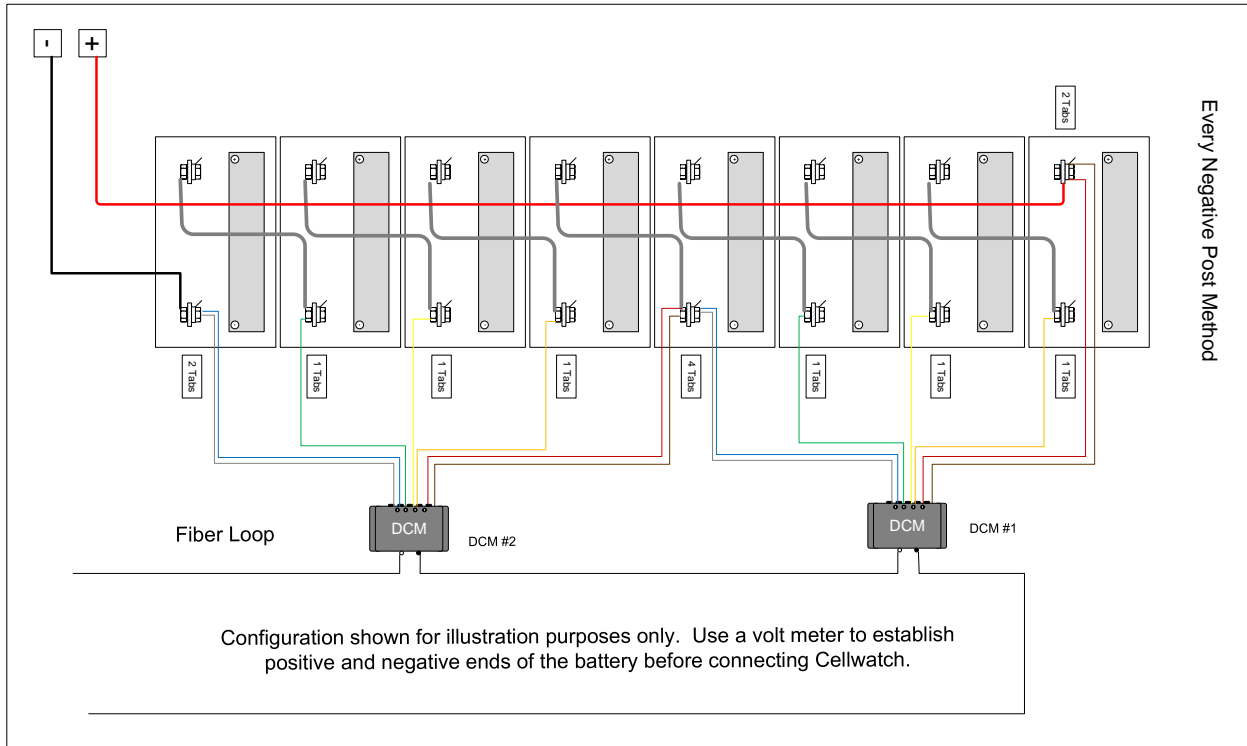
Monitoring at this post helps ensure:

1. The string is not exposed to an improper temperature gradient which can affect charge and open circuit voltages
2. Temperatures of the cells do not reach Thermal Runaway stages

DCM Installation

Each DCM has seven connecting wires. Two Load Wires and five Sense wires. Sense wires return the voltage and ohmic readings from the jars. DCMs may also be equipped with four optional temperature sensors.

DCM Wire	Location	Temperature
Brown (+ Power)	Most Positive	-
Red	Most Positive	-
Orange	Negative of Channel 1	Channel 1
Yellow	Negative of Channel 2	Channel 2
Green	Negative of Channel 3	Channel 3
Blue	Most Negative	Channel 4
White (- Ground)	Most Negative	-

DCM Installation example is shown below. Note most positive begins on the right.

Every Negative Post Method

Fiber Loop   DCM   DCM #2   DCM   DCM #1

Configuration shown for illustration purposes only. Use a volt meter to establish
positive and negative ends of the battery before connecting Cellwatch.

Connections

Cellwatch is installed using hard-wired communications cables between the iBMU and the CU/TRC Units to the Ambient Temperature Sensor, Current Transducer, and Genset Remote Units. These are least likely to fail as they are hard-wired.
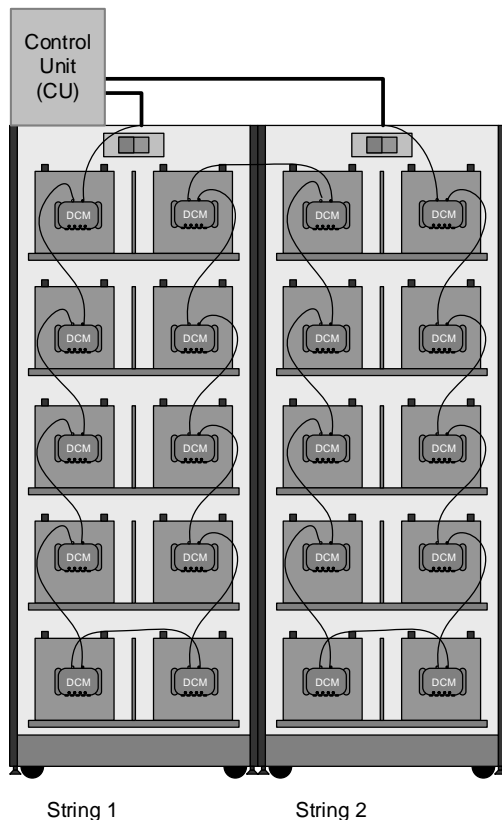
String 1   String 2

DCM modules are serially connected in a fiber optic loop (see left) from the Control Unit to the DCM at the most positive connection on String 1 to the most negative connection on String 1. The last DCM on String 1 is either returned to the CU or connected to the most positive of String 2 where the loop continues for up to four strings total, then returned to the CU.

In the diagram to the left, the fiber loop begins at the most positive of String 1 and continues to the most negative of String 1. It then continues to the most positive of String 2 to the most negative of String 2. The fiber loop is then returned to the CU.

Note: Not all cabinets are configured as the diagram is shown. Always follow the cables of the battery for polarity, tabbing, and DCM installation.

All DCM connections will connect Blue/White connectors (i.e. Transmit) to Black connectors (i.e. Receive).

Alarm Notifications

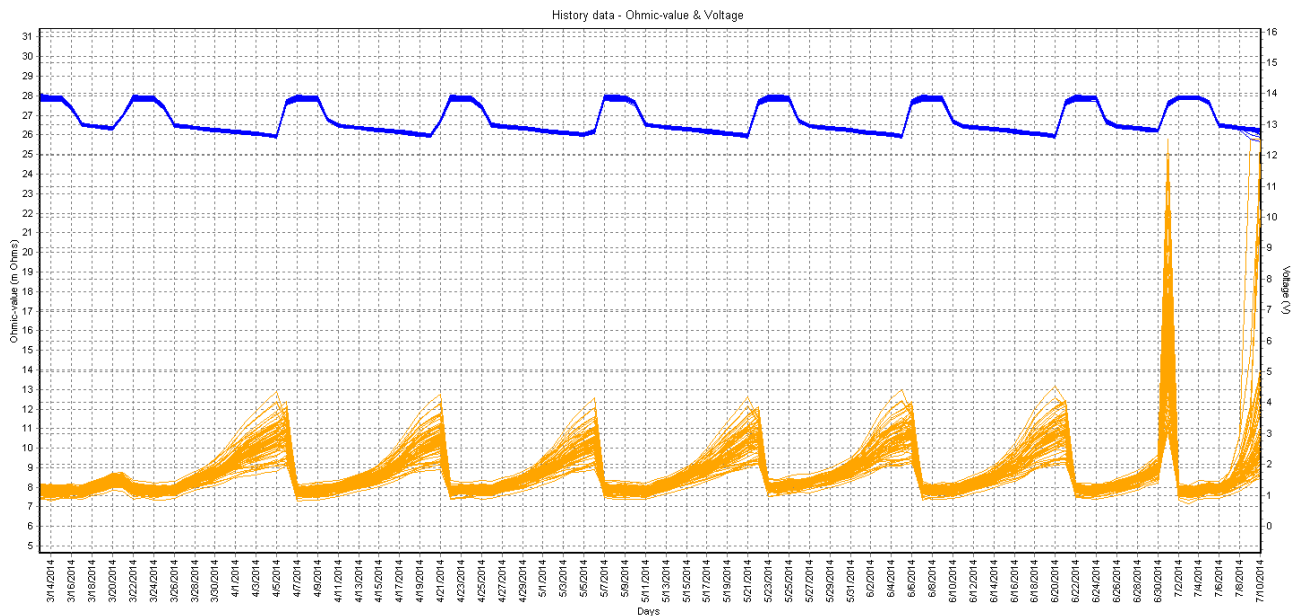Cellwatch provides the following methods to collect data or alarms:

- On-Screen in Cellwatch via Alerts Window or Red battery, string, or jar
- On-Screen in Data Manager via Red lines
- Relay Notifications on CU or TRC
- Webpage interface (optionally disabled)
- Modbus TCP/IP (optionally disabled)
- SNMP (client must be installed)
- Email Notifications via Email Alert or Cellwatch.net (on-line service)

Cellwatch Suite

- Cellwatch – the standalone Cellwatch software that actively monitors and collects battery data
- Configuration Builder – a program that configures the on-screen display to properly display the data from the connected hardware
- Data Manager – a historical and live alarm database maintained on the iBMU
- Email Alert – a free email notification program that sends alarm notifications to users
- Battery Warranty Report Tool – a tool used to allow users to print PDF battery reports for warranty claims

Data Collected

- History file – daily average data for voltage, ohmic, temperature, and current across the current year (ripple included with extended features of DCM5); can be plotted across multiple years to view trending values over life of jar
- Discharge file – voltage, current, and temperature every few seconds during an on-load event
- Recharge file - voltage, current, and temperature every few seconds following the end of a discharge/on-load event
- Logfile – an account of every software interaction and measurement taken in Cellwatch
- Cellwatch.fdb – database containing every logged alarm event

History data file (Graph view)