

## **BTMS - Battery Monitoring System**

BTMS is a battery monitoring system for larger UPS systems. Enables:

- · cell status monitoring
- equalization of cell load within the string
- switching off strings where an error is detected on at least one cell

## **Dictionary of terms and abbreviations**

| BTMS    | Batery Monitoring<br>System             | Battery monitoring system for larger UPS systems.  |
|---------|---|--|
| battery | -                                       | Lead-acid rechargeable battery stores electricity to operate the UPS during a power outage.  |
| cell    | -                                       | Basic battery building. A battery usually consists of several cells connected in series.   |
| string  | -                                       | Multiple batteries connected in series.  |
| UPS     | Uninterruptible Power<br>Supply         | A device that provides battery backup when the electrical power fails or drops to an unacceptable voltage level.   |
| BM-AG   | BTMS Aggregator                         | When several BM-GW's are needed at the Datacenter, aggregate all BM-GW and provide site functionality + Cloud connectivity and alarming.'  |
| BM-GW   | BTMS Gateway                            | Visualization (browser) of batteries and installed systems connected to the GW logically grouped into strings and UPS's in real time and their historical data. Alarming, Cloud connectivity |
| SCADA   | 3rd party SCADA                         | Any SCADA that accesses battery, stringig and/or UPS data via Modbus TCP/IP protocol.  |
| PC web  | PC with WEB Browser                     | Viewing the user interface from BM-AG or BM-GW via any web browser.  |
| вм-мс   | BTMS Master Controller                  | It allows the connection of BM-TH sensors and configurable digital inputs for monitoring additional alarm signals and outputs for alarming or switching off strings where an error occurs.   |
| ВМ-НМІ  | BTMS Human-Machine<br>Interface         | Local display of the state of the batteries inside the UPS, string and by battery.   |
| CAD     | BTMS HMI interface                      | Communication interface for connecting BM-HMI to BM-CS   |
| BM-LC   | BTMS IO Module                          | Expansion for MC with additional digital inputs and outputs.   |
| вм-тн   | BTMS Temperature and<br>Humidity sensor | Ambient temperature and relative humidity sensor.  |
| BM-GS   | BTMS Insulation monitoring sensor       | String insulation resistance monitoring  |

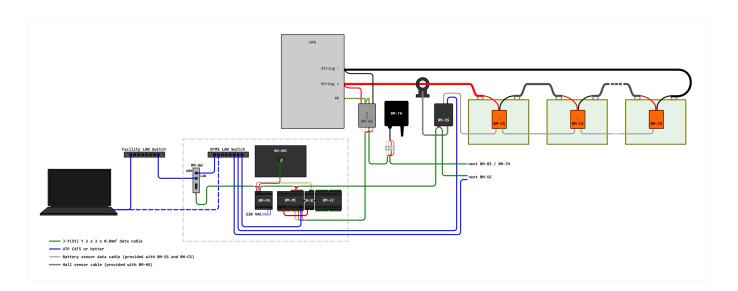
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| BM-SS   | BTMS String Master            | It monitors the string (string current), aggregates battery data (total string voltage, average SOC, Balance) and enables monitoring of data from BM-CSs.  |
|---------|-------------------------------|--|
| BM-HS   | BTMS Hall Sensor              | It measures the string current   |
| BM-CS   | BTMS Cell / Battery<br>Sensor | Control of each individual battery / cell. It allows monitoring the status, voltage, internal resistance, temperature of the cell and calculates SOC and SOH.  |
| SOC     | State Of Charge               | Calculated battery charge; it is calculated from the actual voltage on the battery and by integrating the charge and discharge current.  |
| SOH     | State Of Health               | Informative battery state calculation that takes into account internal resistance, battery temperature, rise/fall of voltage during charge/discharge and other parameters that affect battery performance. |
| Balance | Voltage balance within string | Calculation of voltage inequality on the batteries within the string. Battery sensors can actively equalize the voltage between the batteries within the string during the floating charge phase.          |

## System diagram



## Wiring diagram



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