# Substation Batteries Monitoring

integrated


PowerView
Testing & Monitoring Equipment

www.powerview-energy.com

Pioneering the future of power testing and monitoring

# Battery monitoring

## Most accurate system

0.02 % of range + 0.05 % of reading

## Compact design

Very compact design, part of FC Stack Control System

## Introduction

The whole safety of the Power grid is closely dependent on substation battery reliability and optimal performance. Cell voltage and individual temperature monitoring is crucial for the battery lifetime and power network security.

## Modular cost-effective system

Reduced preventive maintenance costs and increasing safety. Extended batterie life by knowing the right time when a battery needs to be replaced.
Preventive maintenance or Maintenance of the equipment real condition is proven to be the most economical maintenance - in terms of service costs and investment management, capitalization and extension of the life of the equipment and the smallest losses in production (due to delays).

## Fully configurable and field upgradable

This online monitoring system is fully configurable onsite up-gradable. Users can start as voltage monitoring and continue with advanced individual cells temperature monitoring, ripple current and voltage monitoring and explosive gases monitoring.

## Cell Voltage monitoring

Generally, with the weakening of the capacity of a cell - the whole string of the battery loses its performance and the ability to deliver the necessary power. A bad cell turns from source to a consumer and damages other cells in the battery string (draws more current). POWERVIEW BVM system has highest accuracy on cell voltage measurement on the market , most advanced reporting and communication features. Software also includes most precise cell voltages monitoring and reporting according IEC during battery string deep discharge.

## Why perform battery monitoring?

- Increase the reliability of the system
- Prevent battery system failure /outages
- Prevent transformers and other HV equipment damage for improper protection relay / CB operation
- Increase battery lifetime and reduce waste -faulty cell will be replaced on time before it degrades the whole battery
- Reduce man hours while deep discharge testing - Cell voltage recording during deep discharge is included in the monitoring system and it works with all load unit manufacturers
- Improve safety and prevent explosions in battery rooms


*Fig.1 Cell voltage monitoring unit*

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## Individual cell temp. monitoring

Individual cell temperature measurement eliminates premature cell aging and can regulate the battery charge voltage (within the given limit). If this is not regulated in time, the speed of chemical reactions in the cells increases and they are additionally heated. This is a catalytic process that results in cell sulfation and permanent damage. Part of the system are thermo-sensors that are installed on the negative electrode of all cells.

## Explosive gases monitoring

Cells degradation or failure results in extended Explosive gas generation in battery room. When hydrogen in generated to a higher level (when it is contained in 4% in the battery room air- it becomes explosive so the smallest spark can cause explosion. The BVM EX monitors this gas full to LEL limit and requires no maintenance and re-calibration in the whole lifetime.


## Charger ripple current monitoring

The effects caused by significant ripple are, over time, likely to cause the battery to deteriorate more quickly than if the DC float current is quiescent. The reversal of current much greater than the float current can cause heating, plate corrosion and 'walk-down' in state of health/state of charge, in addition to electrolyte stratification. It is therefore sensible to ensure the ripple current through the battery is as low as possible.

## Software features

Most precise Realtime cell monitoring and reporting
Cells + inter cell connection resistance
Most precise cell voltages monitoring and reporting according IEC during battery string deep discharge
Individual cell temperature and charger regulation
Electrolyte and explosive gases reporting


*Fig.2 Charger ripple current monitoring*

## Key advantages

- 24/7 notifications
- Historical trending
- Most advanced reporting and communication
- IP 69 protection
- Explosive gases detection to full LEL with no recalibration
- Modular system ( up to 400 cells monitored)
- Cost effective
- Greatest accuracy among battery monitoring systems 0.02 % of range + 0.05 % of reading
- Optional charger performance monitor

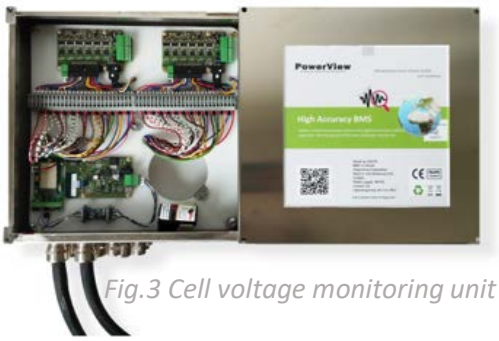


*Fig.3 Cell voltage monitoring unit*

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# Battery monitoring

## Technical Specification

| | |
|---|---|
| **Power supply** | **12- 24V V DC** |
| **Dimensions** | 85 x 58 x 13.5 mm (without connector plugs) |
| **Dimensions** | Modular system 25x25 x 7 cm box |
| **Channel count** | Configurable and field upgradable system -up to 400 cells can be monitored with single monitoring system) |
| **Channel voltage ranges** | -5 … +5 V or -50 to +50V |
| **Insulation** | 2 kV between channels and power supply + communication bus |
| | Additional isolation can be provided by isolating bus segments |
| **Sampling** | Precise 24-bit. All-channel sample rate up to 500 samples per second |
| **Accuracy** | 0.02 % of range + 0.05 % of reading |
| **IP protection** | IP 69 water and dust protection |
| **Ambient operating temperature** | -40 °C to +85 °C |
| | +85 °C to +125 °C module can be powered, measurement |
| | inactive |

| Ordering code | Description |
|---|---|
| 102-1342 | Cell Voltage monitoring 24 cells |
| 102-1623 | Cell Voltage monitoring 48 cells |
| 102-1626 | Cell Voltage monitoring 110 cells |
| 102-1629 | Cell Voltage monitoring 220V |
| 102-1612 | Cell Voltage monitoring 400cells |
| 102-1343 | Individual cell temperature monitoring |
| 102-1421 | Explosive gases monitoring |
| 102-1422 | Charger Ripple current monitoring |
| **Applicable Current** | 2.5mA～5A |
| **Max. Capable Current** | 5A |
| **Nominal CT Ratio** | 4500:1 |
| **CT Inside Diameter** | ϕ22mm |
| **Applicable Frequency** | 10Hz～5kHz |

*) Channels are organized by groups of 4 channels. Channels in one group can measure up to ±20 V if the sum of group channels does not exceed 20V. So, one channel can measure up to ±20 V, if other channels in group are short-circuited. Note that adjacent channels and groups are chained together and are not independent.

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