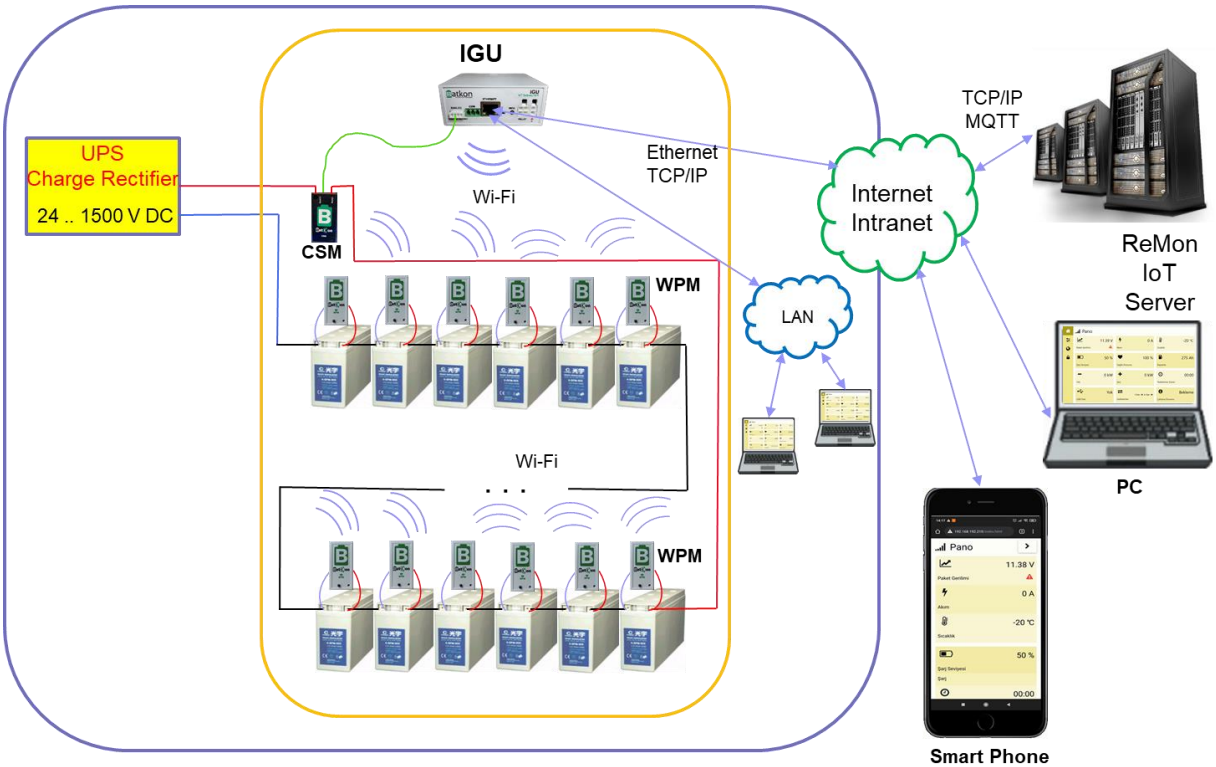
Batkon
Battery Control Technologies

For Smarter Batteries

wBIS

Wireless Battery Inspection System



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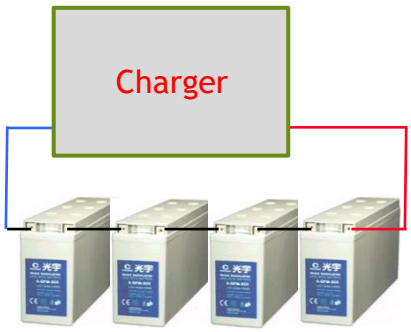
Lead Acid Battery Monitoring

Lead acid batteries are generally used in 2 types, 12V and 2V. In order to reach the voltage required by the application, these batteries are connected in series to obtain battery groups with voltages such as 24V, 36V, 48V, 96V, 108V. Although it is assumed that the batteries are "identical" in series connected battery groups, the capacities of series connected batteries differ over time due to differences in the production process and aging differences. This causes the voltages of the batteries connected in series to differ according to each other, that is to say "unbalance".

Since the systems that charge the battery groups connected in series (UPS, rectifier, etc.) do not measure the battery voltages one by one, they cannot detect these imbalances in the series and do not adjust the charging voltage and current accordingly. Imbalances some batteries, particularly during charging "excessive voltage" as to reach the water level and the electrolysis in the battery so the battery H_2 and O_2 gas to leak out of the battery by turning into «dry out» causes. On the other hand, unbalance causes some batteries to go down to lower voltages than others during discharge and cause "over-discharge". In addition to knowing the voltages of the batteries one by one, it is also important to know the current flowing in the series. "Battery Monitoring Systems" have been designed to provide information to the charging system in order to detect the imbalance between the batteries and accordingly to adjust the current values during the charging process.



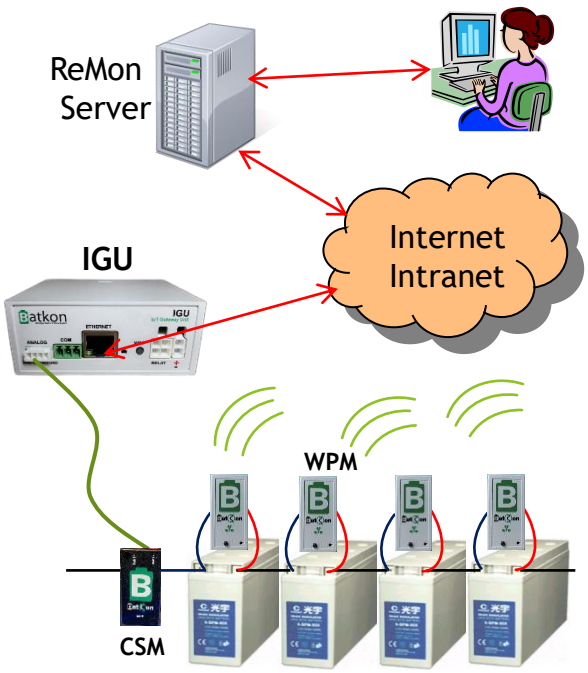
VRLA Batteries

In many battery monitoring systems, modules connected to battery terminals use wired communication interfaces such as RS-485, CAN, Ethernet to communicate with their main unit. Because the wired interfaces are in modules connected to batteries of different voltage levels, wired communication must be provided with electrically «isolated» drivers. This is a factor that increases the hardware cost. In addition, connecting a communication cable for each battery causes cable confusion in the system and makes installation difficult.

wBIS Wireless Battery Inspection

wBIS system consists of 3 types of modules. WPM (Wireless Probe Module), CSM (Current Sense Module) and IGU (IoT Gateway Unit). WPM modules are connected to the battery terminals, measure the voltage and temperature of the battery, and report it to the IGU periodically via wireless communication. In wBIS system, battery terminals mounted measurement modules WPM 's and IGU communicates with « Wi-Fi or Bluetooth » wireless communication interfaces. In this way, there is no need for a communication cable other than the +/- cables connected to the battery terminal for WPM. In order to measure the charge/discharge current flowing from the battery group connected in series, the CSM module is positioned like a busbar between two batteries in the series. By connecting the CSM module to the IGU or WPM , the current flowing in the series is periodically measured. Voltage, temperature and current information collected from WPMs and CSM are analyzed by IGU, calculations and predictions are made about the State of Charge (SoC) and State of Health (SoH) of the batteries.

There are Wi-Fi , Ethernet RJ45 and RS-485 interfaces on the IGU. IGU can store the measurements and calculations on its own MicroSD card as well as transmit it to the cloud IoT server UZDEN via TCP/IP protocols (MQTT , MODBUS -TCP) over Wi-Fi or Ethernet.



Communication with UPS / Rectifier systems can be provided over MODBUS-Serial protocol with RS-485 interface. In this way, in case of any battery reaching an overcharge voltage, it can inform the charging system about the reduction or interruption of the charging current. It can also transmit information to the power system to stop the discharge in case of over-discharge.

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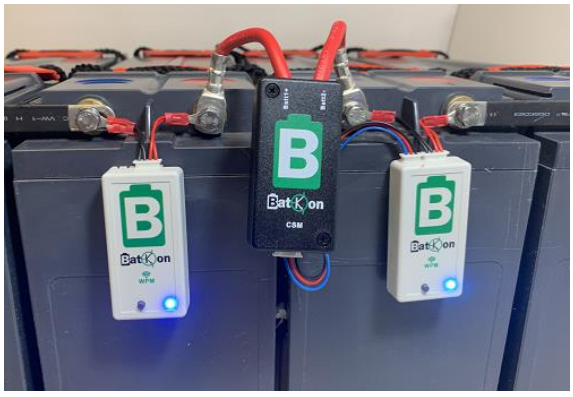
Since wBIS modules communicate “wirelessly”, the number of batteries in the series does not matter in terms of voltage isolation. In practice, from 24V to ~1500V (2 - 128 batteries) can be connected in series and monitored in the same system. Thanks to the "Embedded Web" interface in the Wi-Fi supported processor on the IGU, The web interface can be accessed by connecting to the SSID of the IGU. In addition to introducing WPMs to the system via the web interface, IP / SSID settings can also be made. During the operation, all the data read can be viewed in real time from the Web dashboard page.

Thanks to IGU 's embedded Web interface, there is no need to install special PC software. System management, F/W update and data monitoring can be done via web browser of PC, tablet or smartphone. In some Data-Center applications, more than one battery group can be used in the same environment by connecting them in parallel. In such structures, more than one IGU can run in the same environment. If desired, coordinated monitoring of battery groups can be achieved through communication between IGUs.

There is an Alarm output with a dry contact relay on the IGU. With this contact, the alarm system can be signaled as well as the light and audible alarm systems can be triggered. There are RGB LEDs on the WPMs and the LED color changes according to the status of the connected battery and WPM 's communication with the IGU.

CSM module can measure charge/discharge current up to 100A bi-directionally. Hall Effect current sensors can also be connected to the IGU in higher current applications. In this way, the system can even measure currents of thousands of Amperes.



Technical Data :

Dimensions:

- **IGU** : 86 x 82 x 36 mm **WPM**: 35 x 70 x 15 mm **CSM**: 35 x 70 x 23 mm

Electrical:

Power Input IGU : 8 … 32 VDC

Environmental:

- Working Temperature: -10 ... 50 °C
- Relative Humidity: 90% RH

Module Features:

IGU

- Cell Protection Features: If any cell exceeds the "Over Voltage Protection" (OVP 13.5V) voltage in charging or goes below the "Undervoltage Protection" (UVP 10.8V) voltage in discharge, it informs the power system for current interruption. These limit values can be changed over the embedded web.
- MicroSD memory can be used to save system logs on it or to update firmware and load system parameters at boot.
- RJ45 Ethernet and Wi-Fi interfaces can be used to communicate using TCP/IP protocols with remote IoT server.
- RGB LED indicator informs user regarding system state and alarms.
- Pack current can be read from CSM Hall Effect current sensor.
- RS485 – MODBUS can be used to communicate with power or site management systems.
- ALM : 2 pole dry contact relay (NC or NO) ports can trigger alarm systems

WPM

- Battery balancing: 'Passive balance" (~180 mA)
- Wi-Fi TCP/IP or BlueTooth wireless communication with IGU
- RGB LED indicator informs user regarding system state and alarms.
- NTC type temperature sensor can be connected to measure battery temperature
- Pack current can be read from CSM Hall Effect current sensor.

CSM

- Supply power +5V from IGU or WPM
- Internal Hall effect sensor converts +/- 0…100A current signal to 0-5V voltage signal.