Batt*Lion*

Lithium Iron Phosphate
48V Telco Battery System
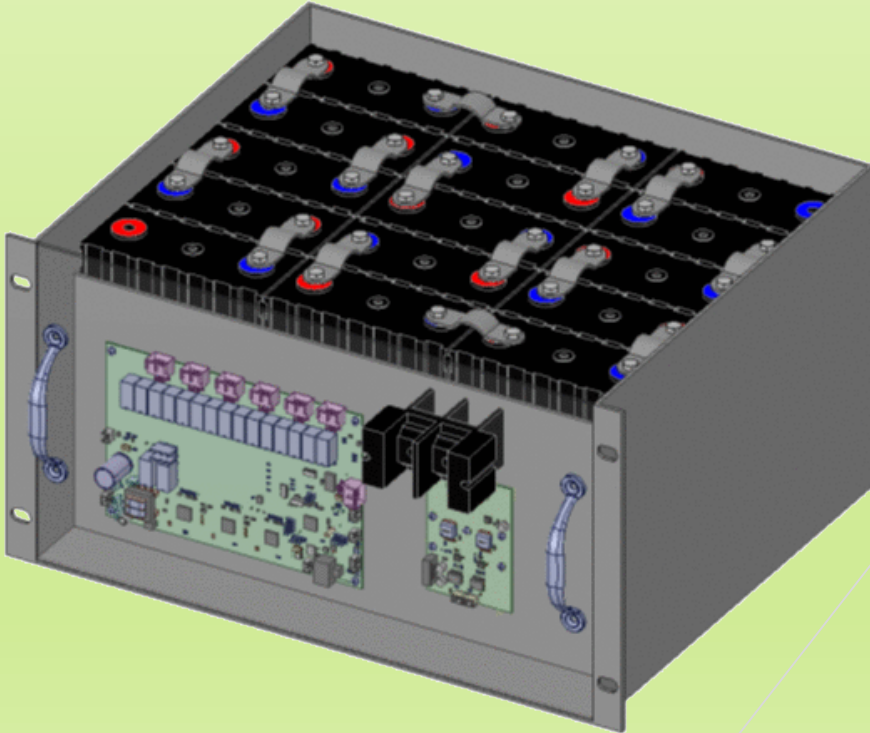
Telco Remote Stations

Most of the present GSM base station applications 4 units of 12V VRLA batteries are serially connected and form a group of battery which are parallel connected into 3 or 4 groups. In this situation 48V 300Ah/400Ah energy storage capacity can be provided as for energy back-up.

In the high power-outage region applications VRLA batteries make many cycles. Due to their limited cycle life the VRLA batteries are aging by losing their "Ah" capacity. GSM Operators need to replace VRLA batteries very frequently, this situation increases OPEX of the operator.

SOLUTION = BATT*LION*

Batt*Lion* system, is 48V Lithium Ferrite Phosphate (LFP) Energy Storage System (ESS)" designed by BATKON. During power outage LFP-ESS is discharged. In case of "frequent but short" (<2 hours) power outages VRLA batteries cannot be charge properly because they need to be charged 12-16 hours. But LFP batteries can be charge with 1C current within 1 hour. Every power recovery, LFP battery can be "ready" for another 1-2 hours backup.
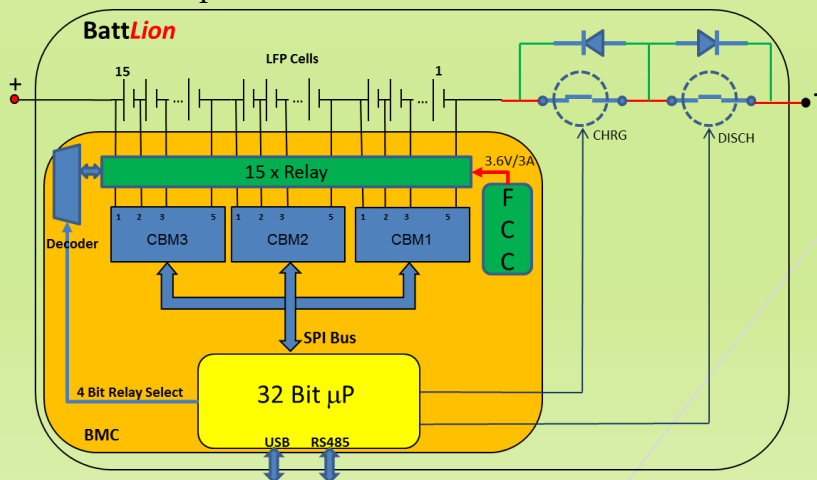
Batt*Lion* System Structure:

Rectifier's battery charge output will directly connected on to the faceplate of the Batt*Lion* system

BMC Card is the main system control card which has 32-Bit micro controller. The current measurement of LFP is done by Hall Effect current sensors.

BMC controls the LFP charge and discharge contactors. BMC reads the voltage and temperature values of the LFP cells.

Batt*Lion* System is made up of Lithium Ferrite Phosphate (LiFePO4-LFP) cells which are made for 48V based Telecom Energy Storage System. "BATKON Battery Control Technologies Co." has designed hardware and software control algorithms are used as for battery management system.
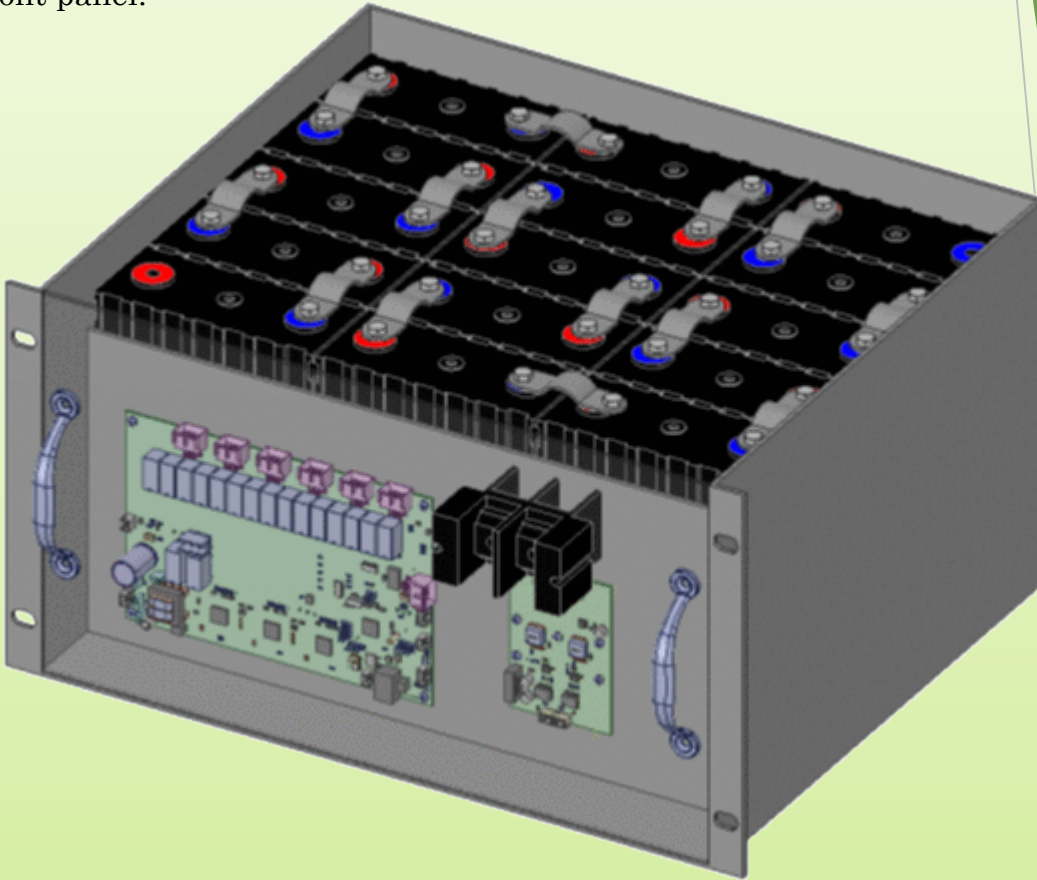
BattLion System Mechanical Structure

BattLion Monoblock structure; 15 cells and BMS electronics placed in one box.

BMC card and CDC cards are placed to front panel.

Metric-8 terminal compatible, barrier type power connectors are suitable for cable connections in the GSM sites. The plastic barriers are prevent the short-circuit during installation.

BattLion Monoblock
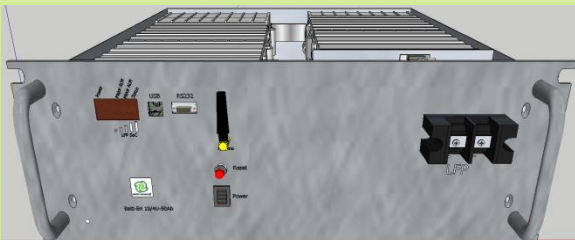
BattLion 19 " Rack Type

In the Batt*Lion* BMC unit there is a GSM/GPRS module.

GSM/GPRS module is connected to BMC card.

Remote Management Server

Remote Manager

GPRS Network

GPRS

Batt*Lion*

BMC sends "keep alive" message to remote monitoring server and basic alarms and voltage data will be sent in this data package

Keep alive message period is set by the server (1 sec to hours)

Remote Monitoring & Control engineer can initiate an online connection to site over the server. In this mode BMC can send more detailed parameters to server in every 1-5 sec.

Remote Monitoring & Control engineer can manage the server. If it is needed battery group currents and charging parameters can be adjusted by the engineer.
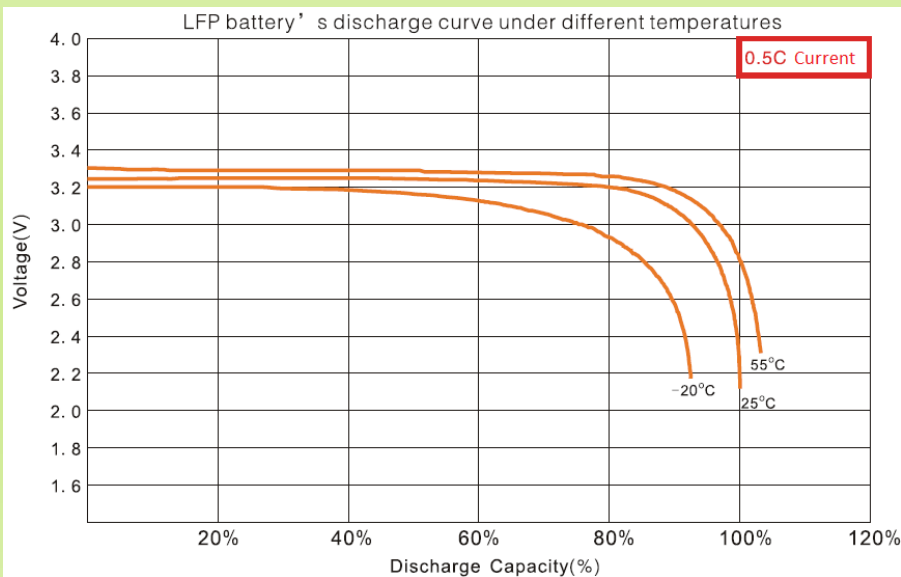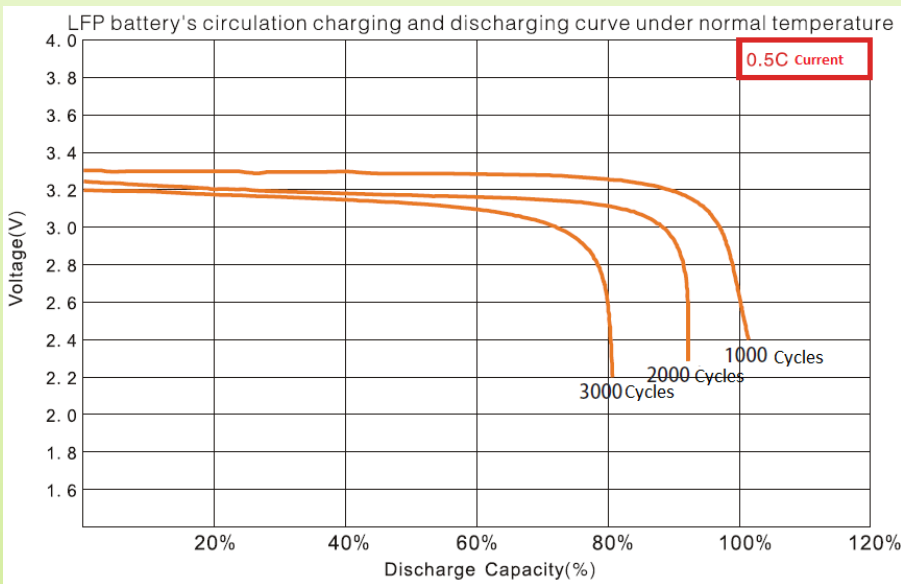
Server could download the version updates to BMC card's flash memory and BMC install the new version firmware onto its memory itself
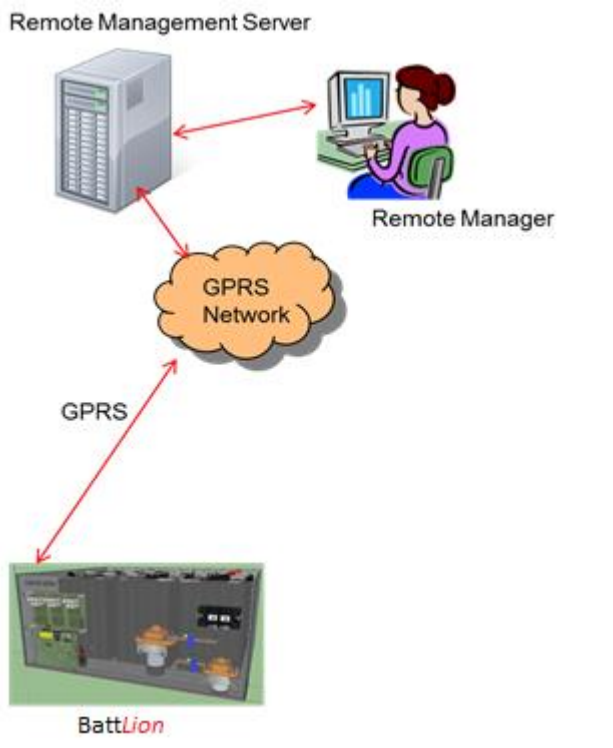
Why Batt*Lion* is needed ?

- Batt*Lion* system can extend the operation life of GSM base station battery backup system

- Batt*Lion* can work 45-50 ^{o}C and decrease acclimatization needs for base station shelter

- System can lower VRLA junk formation.

- By the Remote Monitoring & Control system, the total energy back up unit can be monitored and periodic maintenance can be made.

- With this solution "Total Operation Cost of The GSM Operators" will be decreased

Battery Discharge Specifications:
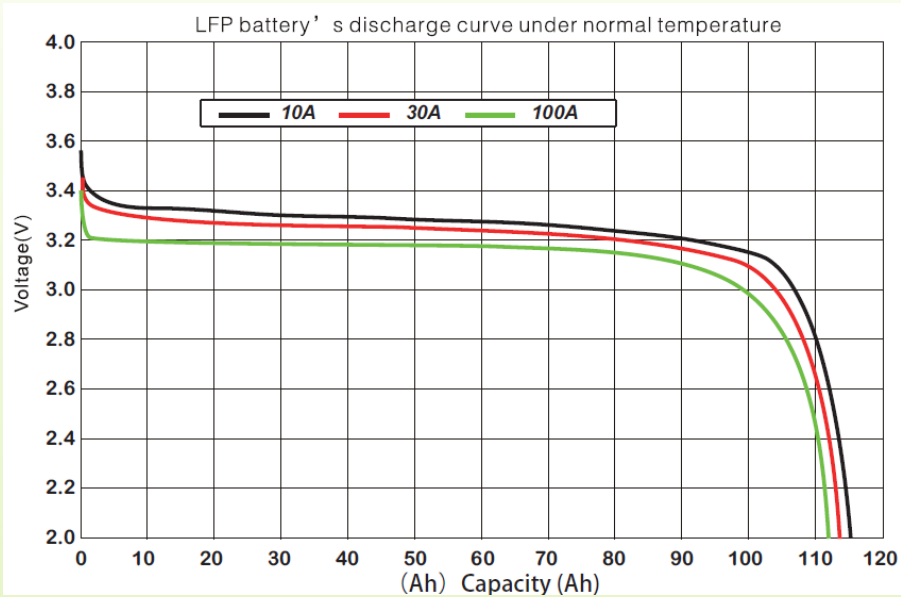
BatKon

LFP battery's discharge curve under normal temperature

Legend: —— 10A —— 30A —— 100A

X-axis: (Ah) Capacity (Ah) — 0 to 120
Y-axis: Voltage(V) — 2.0 to 4.0

LFP battery's circulation charging and discharging curve under normal temperature

0.5C Current

1000 Cycles
2000 Cycles
3000 Cycles

X-axis: Discharge Capacity(%) — 20% to 120%
Y-axis: Voltage(V) — 1.6 to 4.0

LFP battery's discharge curve under different temperatures

0.5C Current

55°C
−20°C
25°C

X-axis: Discharge Capacity(%) — 20% to 120%
Y-axis: Voltage(V) — 1.6 to 4.0

Technical Parameters:

Physical Dimensions:

Monoblock Version
- 25 x 44.2 x 37,5 cm (H x W x D), 70 kg
- Cell Sizes: 142 x 81 x 222 mm , Weight: 3.13 kg
  (Sinopoly SP-LFP100AHA)

Electrical:
- Input Voltage: – 42V.. – 56VDC
- LFP Battery Capacity: 100Ah
- LFP Charge Current: Max 100A (1C)
- LFP Charge Voltage: Max 54V
- >2000 cycle on 80% DoD (20-25 ºC)
- >3000 cycle on 70% DoD (20-25 ºC)

Environmental:
- Operation Temperature: 0 .. 50 ºC
- Relative Humidity: 90% RH

BMS Specifications:
- BMS Microcontroller: ARM M3, Cell monitoring chipset: MAXIM
- Cell Balancing Method: "Active Balancing". Flying Capacitor circuit.
- Cell Protection Feature: Charging stops in case of any cell voltage exceeds 3.85V, discharging stops in case of any cell voltage drops under 2.5V
- RS485 interface for site Management systems
- USB-A interface for maintenance PC and USB Memory connections (firmware upgrade)
- External or Internal GSM/GPRS modem for Remote monitoring & Control system server
- 2 pole Metric-8 barrier type power connector to prevent short circuits during cable installation
- 5 LED LFP State of Charge display (0%, 20% … 100%)
- 3 LED System Alarm and status monitoring display. 1 LED for BMS power status