Sunlight Group Energy Storage Systems

Li.ON ESS

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LiONESS

Why Lithium-ion batteries

- Environmentally friendly
  Non-toxic, No Gassing
- Long cycle life
- Maintenance free
- Remote connectivity/serviceability over the GLocal cloud platform
- Modularity/Expandability
- Inverter compatibility
- Cost and time savings
  Remote maintenance,
  Diagnosis and debugging
  TCO reduction

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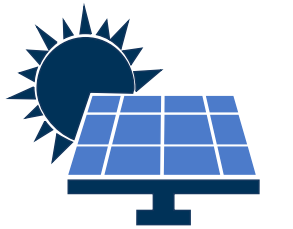
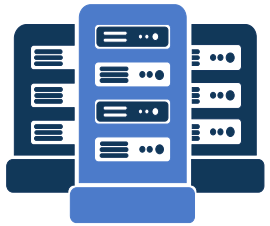
Main applications



PV Solar/Wind Power/
Remote Installations

Remote
Telecommunications
Applications



Data Centers

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LiONESS

Smart Home
Smart Buildings

e-Mobility/
Charging Facilities

Industry/
Smart Business

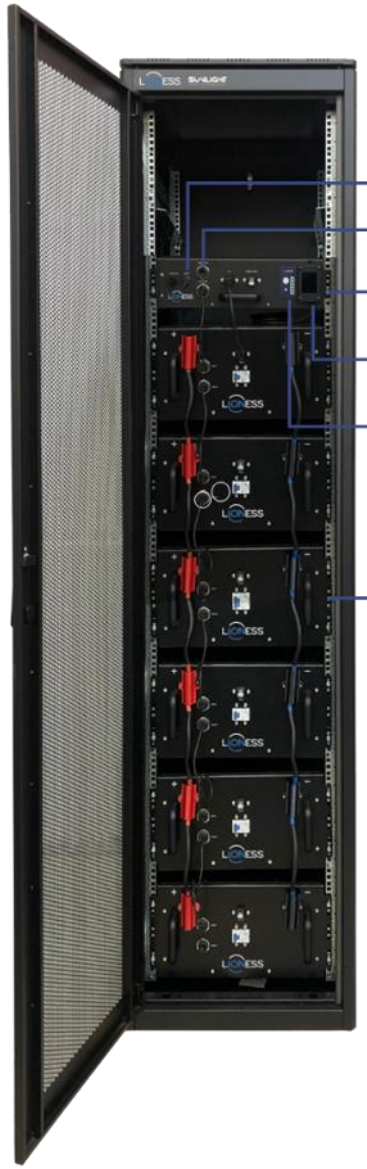
CERTIFICATIONS

Cells: **UL 1642,UL 1973, IEC 62619:2017,MSDS,ROHS, UN 38.3**

Batteries: **UN 38.3, ISO 9001, ISO 14001, BS OHSAS 18001**

CE marked

Cabin expandability



Range: 51.2V, capacity 5kWh – 200kWh

Chemistry: LFP

Standard battery tray: 19" tray

Charging: up to 1C

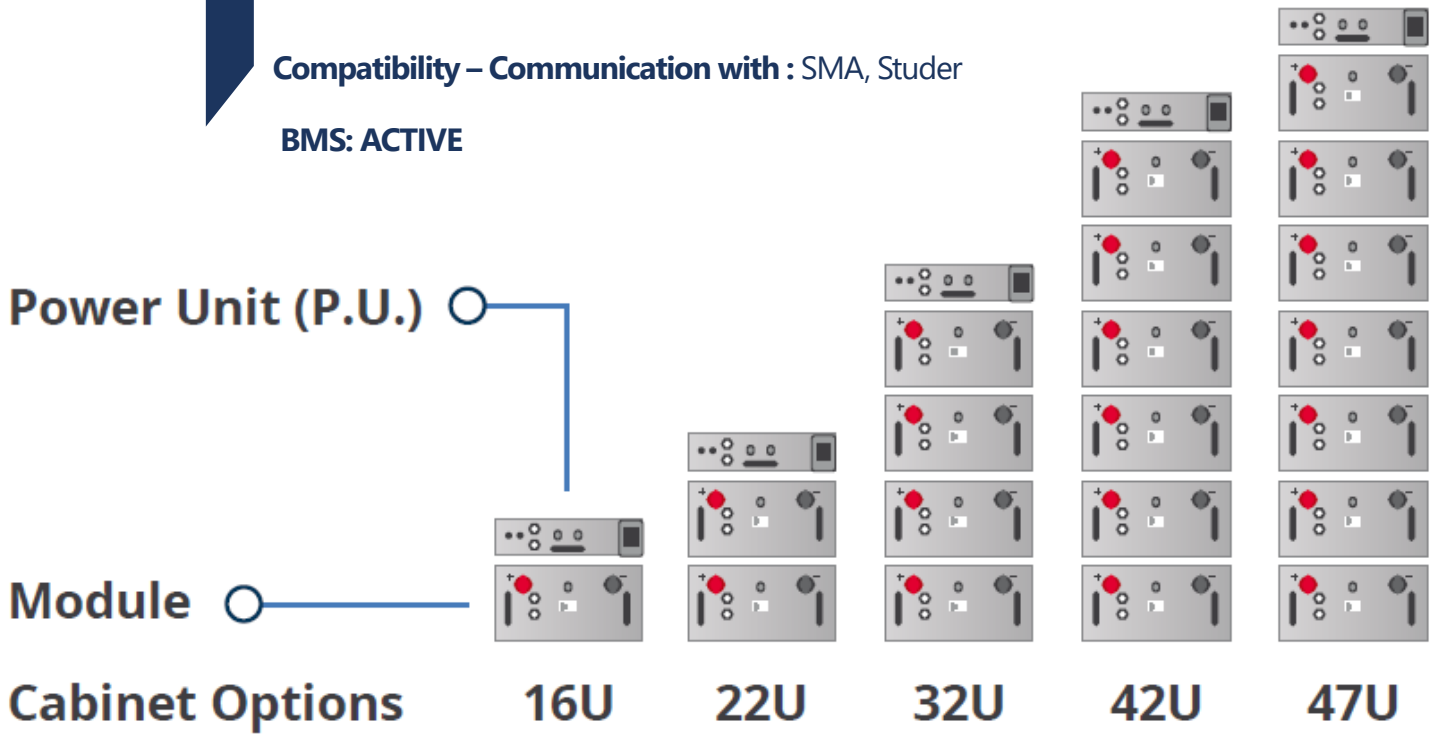
Cycles : Long lifespan

Operating Temperature:

Charging: 0°C up to 55°C | Discharging: -20°C up to 55°C

Compatibility – Communication with : SMA, Studer

BMS: ACTIVE



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High Voltage Li.ON ESS

"Fully-integrated modular and compact plug & play storage building block for safe, cost-effective and high-quality solution for your diverse set of market applications."

Key Features

- Cost effective system with maximum quality control
- Outdoor rated cabinet fully equipped with battery and "smart" BMS
- Integrated liquid cooling system
- Fully equipped with gas and heat detection systems as well as fire protection system
- Factory assembled, pre-populated and transportable system which provides:
  - Minimum scope and complexity of installation
  - Shortest overall deployment time (transport + installation + commissioning)
- Separated compartments to improve O&M capabilities as well as safety (door opening, manual disconnect separated from battery compartment, water splash, etc.)
- Emergency shutdown

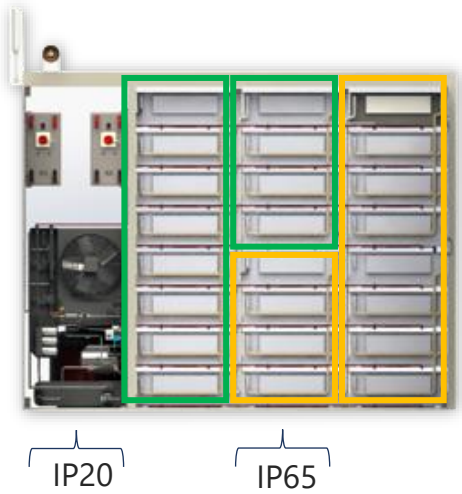
Specifications

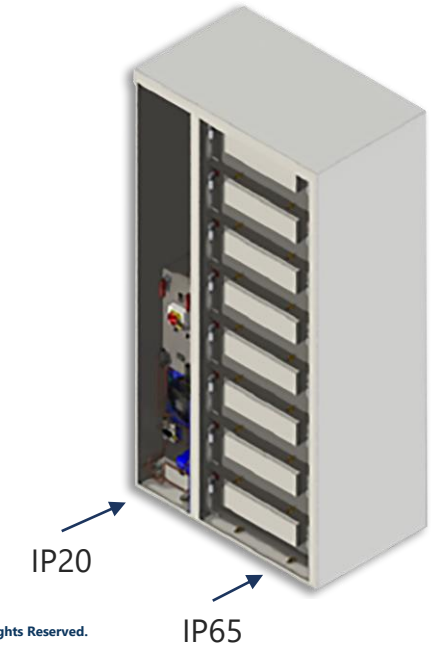
System Grid

Energy	1376.3 kWh | 1500V (1075.2V - 1401.6V) | 1C
# Modules/Str	12
String energy	344.1 kWh
# String	4 B2B
Dimensions	3300 x 1700 x 2200 mm
Weight	13000 kg

System C&I

Energy	229.4 kWh | 1000V (716.8V – 934.4V) | 0.5C & 1C
# Modules/Str	8
String energy	229.4 kWh
# String	Single
Dimensions	1260 x 800 x 2200 mm
Weight	2300 kg





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Sunlight Li.ON ESS BMS – Communication - Cloud

Sunlight Innovation

Why Battery Management System (BMS) by Sunlight?

1. **ACTIVE Balancing per Cell**
   Extending Cell life - No heat dissipation during balancing like other balancing methods

2. **Monitoring & Management of battery's critical parameters** (e.g. Voltage, Temperature, Current, SoC, SoH, Operating Cycles, Ah, Wh)
   41 different error messages to achieve higher safety

3. **Protection of Cells & Battery** against overcharging, over & under temperature, High Currents / Short Circuit – **Safe & Reliable Operation guaranteed**

4. **Communicates** and interfaces with
   - **USER/OWNER/DEALER/SUNLIGHT through CLOUD**
   - USER through Display Telecommunication Box
   - Battery Control Pad

VARIOUS APPLICATIONS

ESS WITH ACTIVE BMS

DISPLAY TELECOMMUNICATION BOX

WiFi/GSM M2M Communication

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GLocal Battery Intelligence

BI-DIRECTIONAL COMMUNICATION via CLOUD

USER / OWNER ← – – ▸ 3 ACCESS LEVELS ← – – ▸ SUNLIGHT

SERVICE /DEALER

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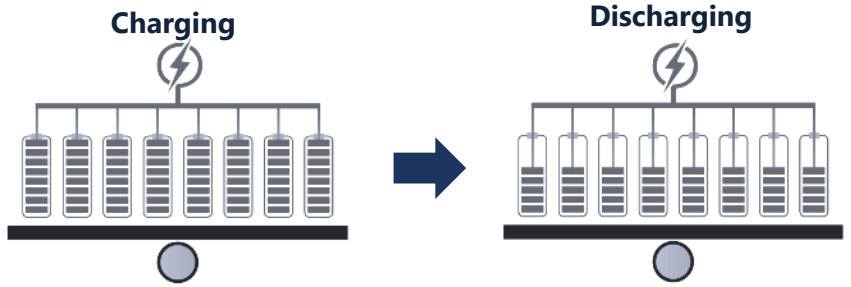
SUNLIGHT Li.ON ESS BMS – Communication-Cloud

ACTIVE METHOD

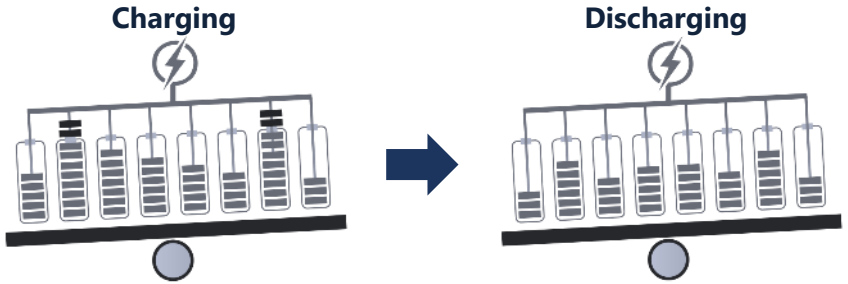
Balanced Operation: Balancing during full operation of the battery



VS

PASSIVE METHOD

Unbalanced Operation: Balancing only at the end of Charging



Why **Innovative** ACTIVE **Balancing** BMS?

Active Method

- All cells are Charged and Discharged at the same time in a uniform way via Energy Transfer
- Minimized Energy Losses
- The full Capacity of each Cell is used

- Up to 30% Battery Cells Life Extension
- Energy Savings by 10%
- Increased Charging Efficiency
- Monitoring / Balancing per CELL not per pool
- Increased system runtime

Passive Method

- **Battery's Capacity is limited from the weakest cell** during Charging & Discharging

Charging:
- End of charging at different time for each Cell
- **Temperature increase – Excessive Energy wasted to heat through resistors**
- **Cell life cycle is affected**
- **Energy Loss**

Discharging: Unused Capacity

Sunlight Li.ON ESS Glocal Cloud Application

USERS

REMOTE ACCESS
from anywhere via PC, mobile, tablet

NOTIFICATIONS, WARNINGS, ALARMS VIA EMAIL sent directly to Clients/Sunlight

Sunlight Innovation

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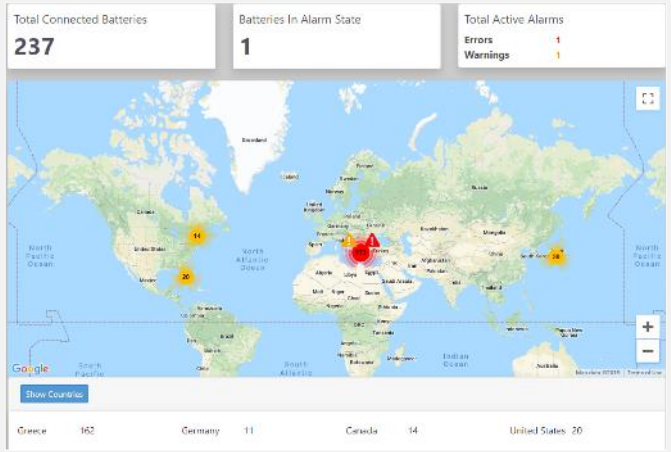
GLocal
Battery Intelligence

USER FRIENDLY APPLICATION



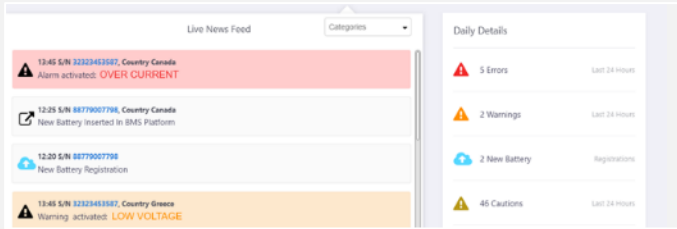
All **PARAMETERS** / Limits are **FULLY ADJUSTABLE** (by Sunlight or dealers)

24/7 BATTERY MONITORING

- **Track of Battery Data & History of Events**
  Valuable outcomes about BATTERY behaviour

SERVICEABILITY

- **FIRST LEVEL MAINTENANCE:**
  Up to 90% of the issues that may occur **can be repaired through GLOCAL!** This eliminates costs spent on visits, labor, fuel etc.
- Maintenance **Diagnosis & Debugging**
- **Safety**
- **PBT Function: Capability of MODULE REMOTE DEACTIVATION in case of failure WITHOUT interrupting the battery operation**

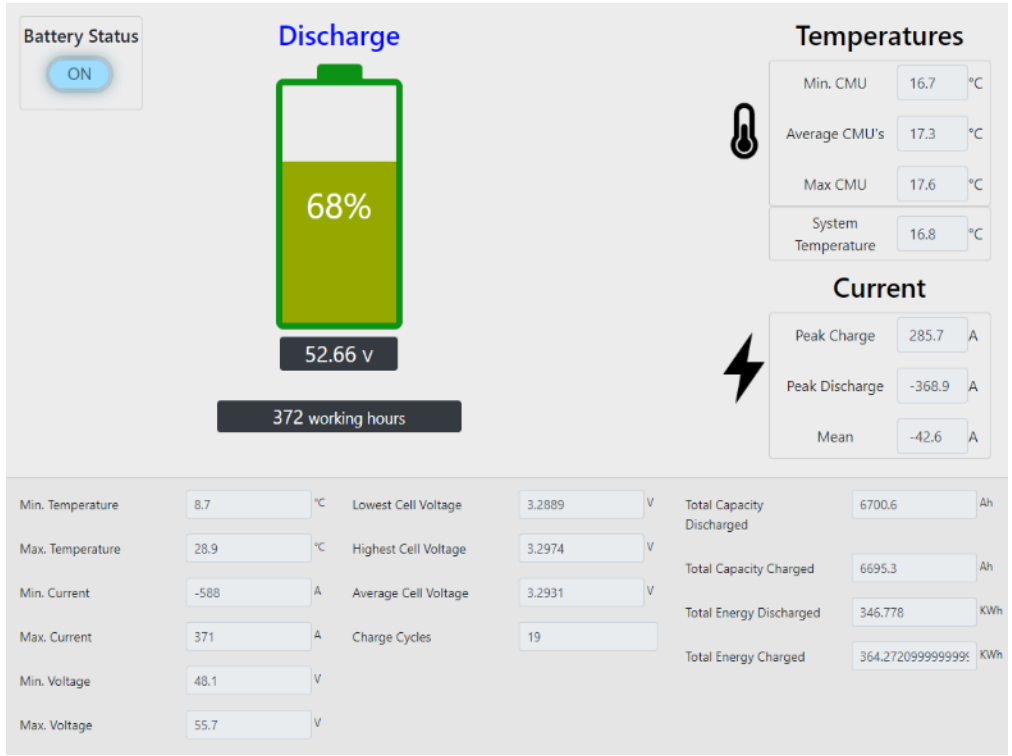


REMOTE TROUBLESHOOTING or FIT on different applications
e.g. Highly demanding working periods, Extension of DOD

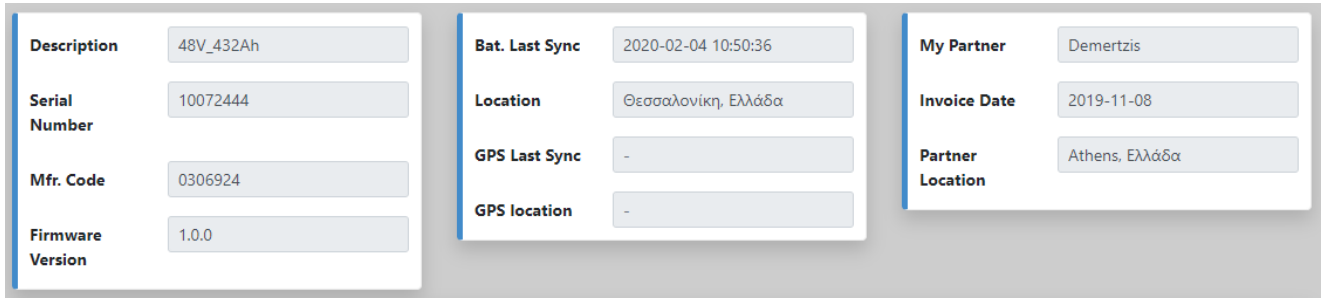
Sunlight Li.ON ESS GLocal Cloud Application

Real time monitoring of Battery Data

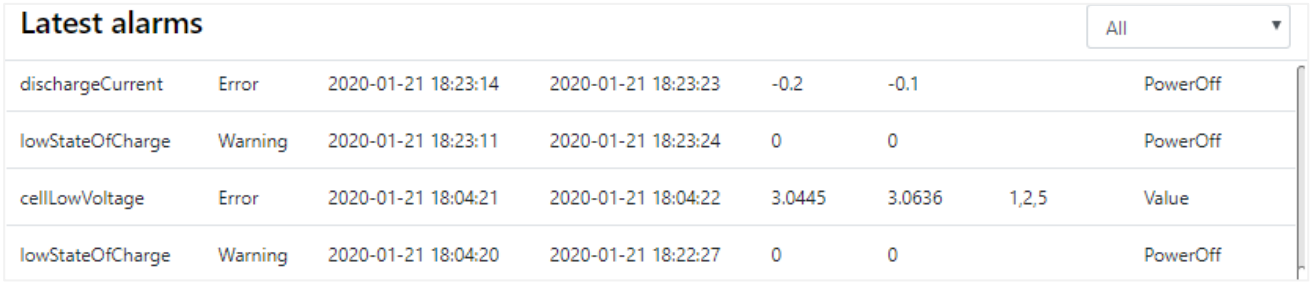
Battery status visualization



Basic info



Alarm history display



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