Operational manual for

Energy Storage System Power LAB

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I. Product describtion

The energy storage is based on LiFePO4 batteries with a built-in Battery Management System (BMS) and short-circuit protection. Depending on the model, the output power of the storage is 100A, 150A, or 200A respectively, CAN and RS485 communication outputs are used for further management, communication and monitoring with other devices. The exits are on one side of the warehouse. Durable construction, secured with a warranty seal. Warranty 10 years.

Individual modules can be connected in parallel with each other using additional terminals and the RS485 system cable. The maximum amount is 16 units. This increases the storage capacity, but the resulting power output remains the same.

The product is intended primarily for stationary storage, i.e. for storage on the floor of a building.

The Power LAB energy storage is equipped with the Pylontech protocol and is compatible with most inverters available on the market, excluding inverters with a closed ecosystem, such as Solar Edge or Huawei. Power LAB magazines do not work with such inverters. Before purchasing, please make sure that your inverter will work with Power LAB

Package includes

- 1 piece of Power LAB energy storage system
- 1 piece of black power cord for the "minus" connection
- 1 piece of red power cord for connecting "plus"
- 1 pc. Ethernet CAN cable to connect the storage with the inverter
- 1 piece of grounding wire (3 m long, M6 tip)

To communicate with the Victron system, it is necessary to purchase an optional accessory - the Victron VE.CAN cable

II. Power LAB Energy storage applications

- Photovoltaic power plants operating in parallel with the distribution network (single-family houses, small industrial installations…)
- Off-grid photovoltaic installations

• Backup power sources (external batteries for UPS modules…)

• The condition for use is integration with chargers (MPPT, LAN network ...) and devices (usually inverters) supporting the mode for LiFePO4 batteries at 48V volt.

Typical combinations are e.g. Victron Energy, DEYE, Sofar, Growatt, etc

III. Functionality

The energy store can power the load and/or be charged by any power output (outputs are internally connected in parallel). Using the integrated BMS, these outputs are regulated by a semiconductor power element and transmit the information to the inverter as follows

- If the energy store is fully charged, the electrical path for further charging is closed, but discharging is allowed.
- Charging is switched on when the energy storage is discharged (change of current flow at the supply output).
- If the energy storage is fully discharged, the path to further discharging is closed, but charging is enabled.
- Discharging is possible immediately after charging the battery (change of current flow at the supply output).
- The charging status is indicated by the LED indicator. The outputs are protected against short-circuit with a 400A semiconductor fuse for 14.66kWh, 13.44kWh, 11kWh warehouses and 200A for 5kWh warehouses

Via the CAN communication port, the battery can be connected to the VE Cerbo communication module and the following values can be read in the VRM portal:

- Power absorbed or delivered (resulting difference between charging and discharging power)
- Current consumed or supplied (resulting difference in current flow)
- Total energy storage capacity
- Battery SoC
- Energy storage internal temperature

IV. Technical specification

Model name	**11kWh_200A, 13.44kWh_200A, 14.6kWh_200A**
Nominal Voltage (V)	51.2V
Voltage range (V)	41.6V – 57.6V
Max current (A)	210A@30s
Reccomended max current (A)	150A
Max power (W)	10080W@30s
Rekomendowana max moc (W)	7200W
DoD	95%
Communication	**Pylontech** protocol via CAN/RS485 DEYE, Sofar, Growatt, Victron, Foxess, Solis, SMA, LUXPOWER, Sermatec, Renac, TBB POWER, Goodwe, IMEON, etc
Balancing function	YES
Parallel connection	Yes, up to 16 units
Number of Cycles	13.44kWh: 6000 @25° 80%DoD 11kWh, 14.66kWh: 4000 @25° 95%DoD / 6000 @25° 80%DoD
Charging range (°C)	-10°C to +55°C
Zakres temperatury pracy rozładowania	-5°C to +55°C
Weight	130kg dla 14.66kWh, 125kg dla 13.44kWh, 90kg dla 11kWh,
Warranty	10 years

V. Ports describtion

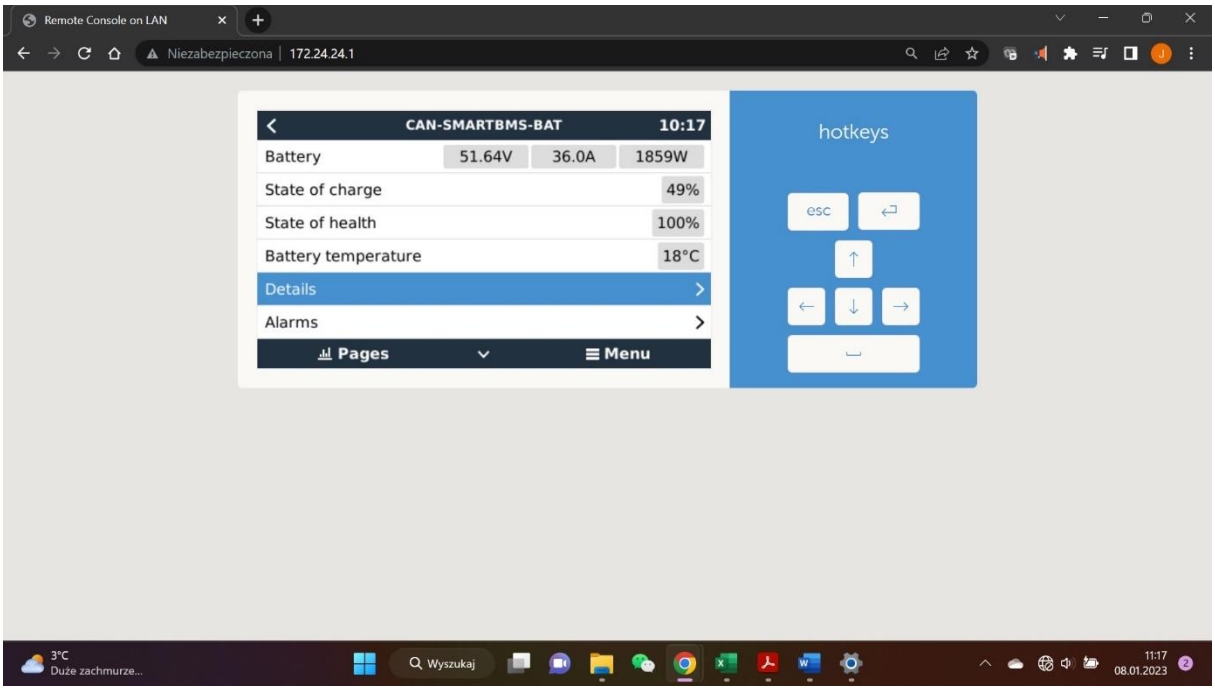
1. The reset port is used to enable/disable the storage
    a. To turn on the magazine, press the button in the housing (the magazine will also turn on automatically when it detects voltage from the inverter)
    b. To turn off the magazine, press and hold the button in the housing
2. RS485 ports are used for:
    a. Communication with other storages connected in parallel
    b. As a service port

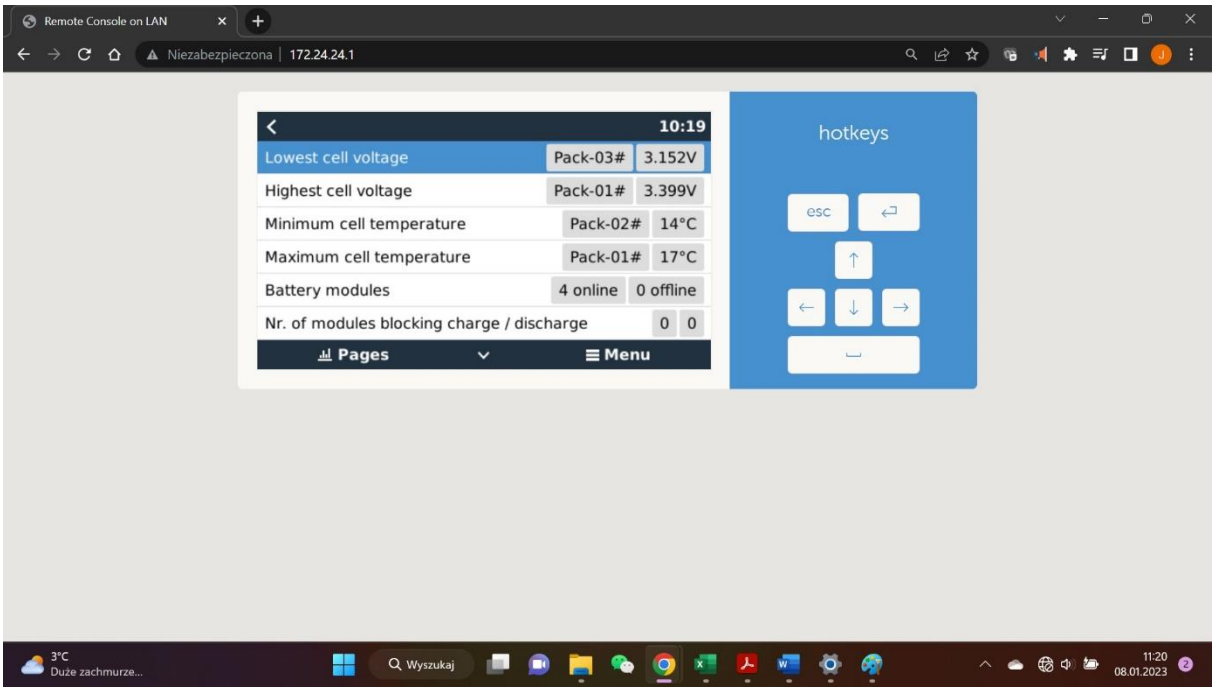
3. LED indicator lights
    a. They are used to read the charge level of the energy storage, and signal the charging and discharging of the storage
4. CAN port
    a. It is used to connect the communication cable between the energy storage and the inwerter

5. The "DIP switch" switches are used to address subsequent magazines (applies to older software versions). In the latest Power LAB energy storages (on sale from November 2022), there is no need to change the DIP Switch settings

For CAN communication with the inverter, DIP switches should be set as shown in the figure:

Example view in Victron CERBO for 4 warehouses connected in parallel:





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A special Victron cable (VE.CAN) must be used to communicate between the Power LAB and the Victron ecosystem. When connecting, be sure to insert the wire ends correctly (BMS

We recommend the original Victron VE.CAN cable, however, you can prepare the Ethernet cable yourself according to the diagram below:

Type A

Function	Victron VE.Can side	Battery side
GND	Pin 3	Pin 6
CAN-L	Pin 8	Pin 5
CAN-H	Pin 7	Pin 4

Type B

Function	Victron VE.Can side	Battery side
GND	Pin 3	Pin 2
CAN-L	Pin 8	Pin 5
CAN-H	Pin 7	Pin 4

VI. First start

Before the first start-up, prepare the energy storage, inverter, cabling, and all necessary tools. The connection is to be made by a qualified person with appropriate qualifications in force in a given country. The installation is to take place within the standards of protection degree IP21

The energy storage should be connected to the inverter through the appropriate fuses MCCB, MCB. No fuse installed between the inverter and the energy storage, in the event of damage to the energy storage, will result in the cancellation of the warranty.

Instalation steps:

1. Preparation of the ecosystem / state of the inverter for connecting the energy storage in accordance with the instructions of the inverter manufacturer.
2. Preparation of the place where the energy storage will be located. We recommend at least 20 cm distance from other objects on the sides, and about 5 cm from the wall
3. Installing the MCB/MCCB fuse
4. Installation of wires between the fuse and the inverter.
5. The fuse, if it has a switch function, should be set to "off" mode
6. Preparation of the appropriate length of wires between the fuse and the energy storage.
7. Connect the wires to the fuse taking precautions and paying attention to the position of the fuse/switch to be "off". Please pay special attention to the correct polarity connection (plus and minus): from the fuse to the inverter, and from the fuse to the storage
8. Unpacking the warehouse (removing the protective film, removing the PE foam)
9. While ESS is on a pallet, assembly of wheels (applies to warehouses on transport wheels)
10. We recommend screwing in the screws by hand and then tightening them with a torque wrench to 10Nm
11. After installing the wheels, carefully put the magazine on the wheels with the help of a second person
12. Slowly transporting the warehouse on wheels to the installation site
13. Connecting the power wires between the magazine and the fuse
14. Connecting the CAN cable between the energy storage and the inwerter
15. Careful, re-checking all the points from the above-mentioned manual in turn
16. Turn MCB/MCCB fuse/breaker on

The energy storage (specifically the BMS) will detect the voltage and turn on.

Provided the inverter has standard settings, it will detect the presence of the energy storage via CAN communication. The energy storage will take over the charge/discharge controls and policy.

The energy storage is ready for operation