**PRODUCT INFORMATION**

LIPRO 1-3

Battery Management System (BMS) for LiFeYPo4 and LiFePo4 Cells

New version: For high capacity cells

ECS …weil es uns Spaß macht, das Unmögliche zu tun.

The **LiPro1-3** by ECS is used to monitor the charge and discharge of lithium cells so that individual cells in a series-connected battery pack are neither overcharged nor over-discharged.
It includes a built-in balancer to balance unequal charged cells. The Lipro1-3 has two separate safety loops for deep discharge and overcharge protection, so that the load and charge termination can be controlled separately.
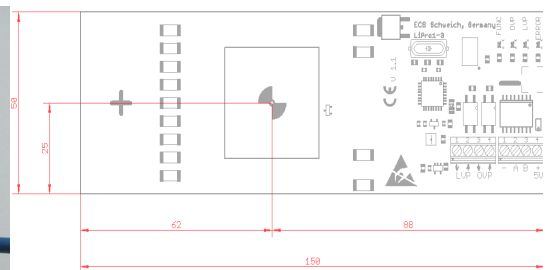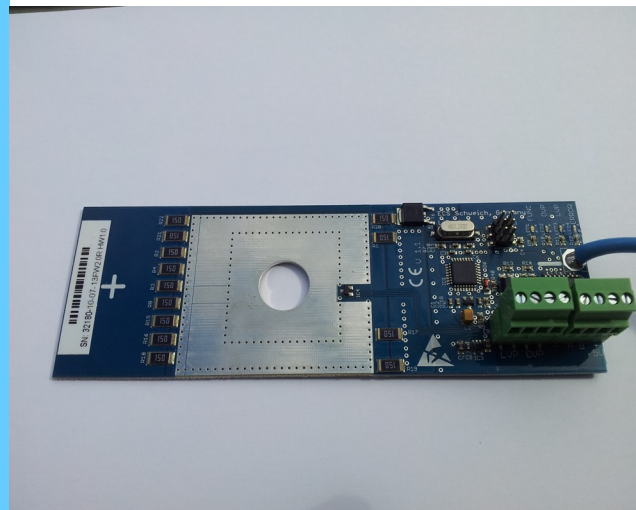
Features:

- 2 separate safety loops against deep discharge or overcharge
- Microprocessor controlled
- Easily expandable, one LiPro1-3 per cell
- Mounting directly on each positive battery terminal
- Balancer current 0 to 3000 mA
- Balancer voltage 3,65 V
- Deep discharge protection (LVP) delayed at 2,8 V (LiFeYPo4)
- Deep discharge protection (LVP) delayed at 2,7 V (LiFePo4)
- Delay to avoid early response at high inrush or cold cells
- Overcharge protection (OVP) at 3,9 V (LiFeYPo4 Version)
  Overcharge protection (OVP) at 3,7 V (LiFePo4 Version)
- 4 LEDs to display: Function, error, ovp, lvp
- Temperature protection 80 °C
- Maximum tolerance of limits better than 0,5%
- Board is lacquered to protect against environmental influences

Also available with electrically isolated RS485 interface:
- RS485 interface with the open Modbus protocol
- Read all data possible
- Thresholds programmable
- Up to 32 devices on bus

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Mechanical data:

♦ Dimension:	150 mm x 50 mm x 25 mm
	Mounting hole M12 / M14
♦ Wight	20 gr.
♦ Cable size	AWG 26 - 16 (0,1 mm² - 1,5 mm²)
♦ Protection class	IP00, Board is lacquered to protect against environmental influences

Electrical data:

♦ Operating voltage range	2,30 V to 6 V
♦ Overcharge protection (OVP disconnect)	3,90 V (LiFeYPo4 Version)
	3,70 V (LiFePo4 Version)
♦ Overcharge protection (OVP reconnect)	3,50 V
♦ Deep discharge protection (LVP disconnect delayed)	2,80 V (LiFeYPo4 Version)
	2,70 V (LiFePo4 Version)
♦ Deep discharge protection (LVP disc. non delayed)	2,60 V (LiFeYPo4 Version)
	2,50 V (LiFePo4 Version)
♦ Deep discharge protection (LVP reconnect)	3,20 V
♦ Balancer voltage	3,65 V
♦ LVP Alarm (red LED)	2,60 V (LiFeYPo4 Version)
	2,50 V (LiFePo4 Version)
♦ OVP Alarm (red LED)	4,00 V (LiFeYPo4 Version)
	3,80 V (LiFePo4 Version)
♦ Maximum tolerance of limits	< 0,5 %
♦ Balancer current	0 mA - 3000 mA
♦ Temperature protection	80 °C (+- 5 °C)

Environmental Data

♦ Ambient temperature	-20 °C to +45 °C
♦ Storage temperature	-20 °C to +85 °C

Outputs

♦ Functions	1 x safety loop LVP
	1 x safety loop OVP
♦ Contact type and design	NC (normally closed), optocoupler with collector, emitter output
♦ Max. switch current	50 mA
♦ Max. switch voltage	80 V
♦ Uce (collector emitter voltage, on state)	about 1 V at 50 mA/0,5 V at 25 mA

RS 485 BUS (optional)

- ♦ Open modbus protocol
- ♦ Up to 32 devices on bus
- ♦ Galvanically isolated
- ♦ Large number of parameters (eg, cell voltage, cell temperature, min and max values, actual balancer current, ...)