

# DATASHEET TECHNICAL SPECIFICATIONS

<https://www.kon-tec.eu/>

## LITHIUM IRON PHOSPHATE $\text{LiFePO}_4$ BATTERY WITH HEATING PADS & WIRELESS COMMUNICATION

12,8V 100Ah

KT-LFP12100MG

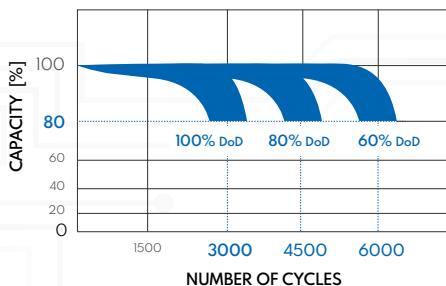


### 1. BATTERY PARAMETRERS

- **Kon-TEC MG batteries can be charged in low temperatures (below 0 degrees Celsius)**
- **Kon-TEC batteries' weight is 50% less (or more) than conventional lead-acid, gel or AGM batteries.** Kon-TEC batteries also provide more power output.
- **Fast charging, with low energy loss.** High energy efficiency is ensured by very high efficiency (approx. 98%).
- **100% of current independent of the state of discharge.** In case of lead-acid batteries no more than 60% of the declared capacity.
- **Very high durability – 3000 cycles at 100% DoD (full charge and discharge), up to 6000 cycles and more at 60% DoD.** In comparison, a lead-acid battery typically lasts only approx. 200–300 cycles.
- **Performance gain.**  $\text{LiFePO}_4$  battery life shows a 2x lower cost of given energy compared to GEL batteries.
- **Wireless communication** integrated with the BMS. It provides communication between the battery and the mobile device and allows real-time monitoring of battery parameters.

Read more at [www.kon-tec.eu](http://www.kon-tec.eu)

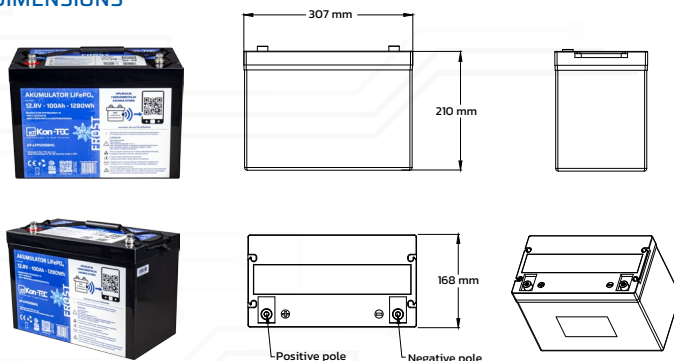
### BATTERY LIFE AT CYCLIC OPERATION



### APPLICATION

- REPLACEMENT FOR SLA BATTERIES (LEAD-ACID AND GEL),
- CARAVANS AND CAMPER VANS
- SPECIALIZED ELECTRIC VEHICLES
- ELECTRIC DRIVES
- YACHTS, CATAMARANS,, HOUSEBOATS
- WHEELCHAIRS AND CARRIAGES FOR DISABLED
- HYBRID PHOTOVOLTAIC SYSTEMS
- WIND TURBINES
- EMERGENCY LIGHTING
- APPLIANCES AND TOYS 12V
- POWER SOURCE FOR INVERTERS 12V~/230V~
- AND MORE

### DIMENSIONS



### VOLTAGE AND CAPACITY

Nominal voltage	12.8V
Average voltage	13.2V±0.1V (C/20)
Nominal capacity	100Ah
Energy	1280Wh

### CHARGE AND DISCHARGE

Recommended charge voltage	14.6±0.2V
Maximum charge current	100A
Recommended charge current	≤ 50A
BMS charge voltage cut-off	15V (3,75V per cell)
Balancing voltage	14,4V (3,6V per cell)
Charge method	CC/CV
Charge time	10A - 10h / 20A - 5h
Maximum continuous discharge current	100A
Pulse discharge current	350A(3s)
BMS discharge current cut-off	L1: 115A(25ms) L2: 300A(3s)
Recommended low voltage disconnect	9.2 ± 11.2V
BMS discharge voltage cut-off	10V
Reconnect voltage	11V
Short circuit protection	400µs

### OPERATING CONDITIONS

Operating temperature	-20°C ± 60°C
Charging temperature	-20°C ± 45°C
Storage temperature	-20°C ± 60°C
BMS High temperature cut-off	65°C
Reconnect temperature	50°C

### OTHER

Lifetime	100% DoD (3000 cycles)
Weight	11,2kg
Dimensions (without terminals)	307x168x210mm
Terminals height	-25mm
Terminal type	M8
Number of cells	4
Cell configuration	4S1P
Efficiency	98%
Self-discharge	<4% per month

### COMMUNICATION

Wireless communication	Yes
Range	10m
Application	Android, iOS

### COMPLIANCE

Certification	CE
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The battery contains built in battery management system BMS.

### PROTECTION TYPE

- Overcharge,
- Overdischarge,
- Short-circuit,
- High temperatures,
- Passive balancing of cells

## 2. PERFORMANCE CHARACTERISTICS

Fig 1. Battery voltage drop, discharge 1C

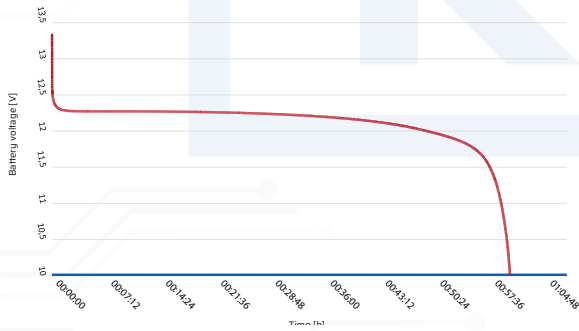


Fig 2. Cyclelife at different temperature 1C

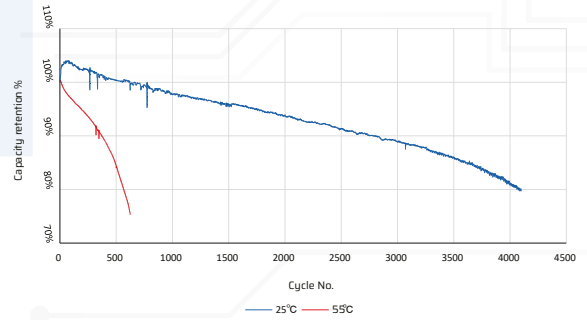


Fig 3. Cycle life at various depth of discharge (DoD).  
Discharge current 0.5C

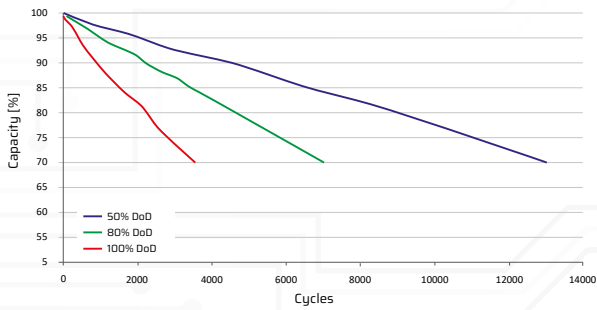


Fig 4. Discharge voltage at different temperatures.  
Discharge current 1C

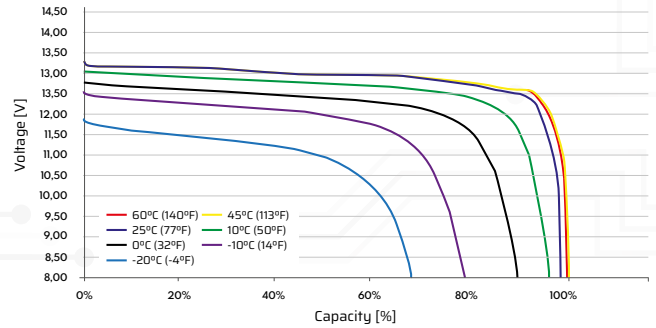


Fig 5. Capacity of Kon-TEC LiFePO<sub>4</sub> and lead acid at different rates of discharge

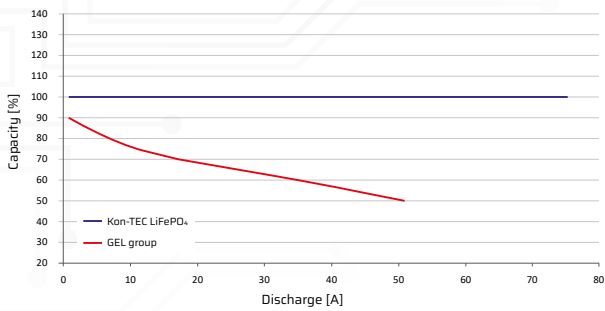


Fig 6. Charge voltage characteristics at various temperatures.  
Charging current 0.2C

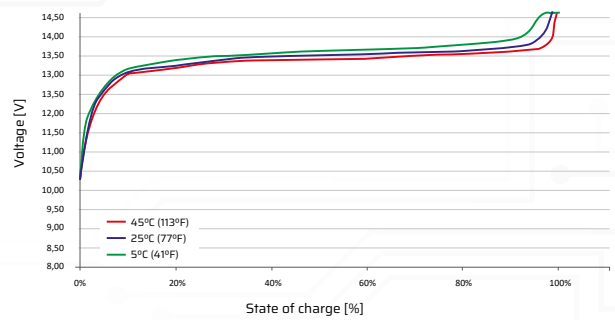


Fig 7. Discharge voltage at state of charge  
Discharge current 0.1C

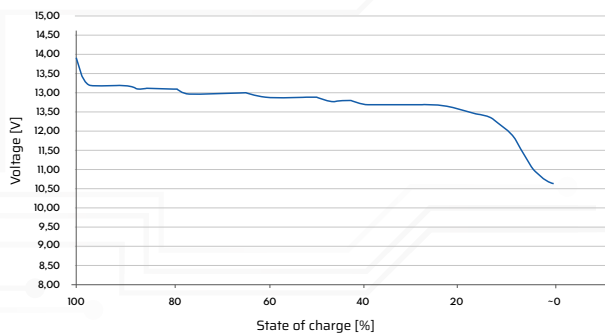
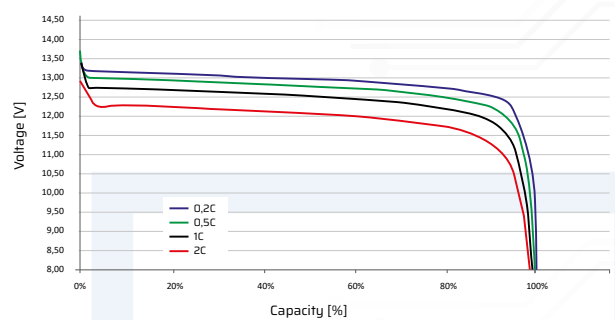


Fig 8. Discharge voltage at different rates.



## SPECIFICATION OF HEATING PADS

LiFePO<sub>4</sub> batteries can be used in sub-zero temperatures (below 0 degrees Celsius), but they should not be charged then. This is due to the chemical reactions taking place inside the cells, where charging such a battery at a sub-zero temperature can shorten its life or damage it.

Typically, LiFePO<sub>4</sub> Kon-TEC batteries have built-in protection in the BMS system, which prevents the battery from charging if it is connected to the charger at a sub-zero temperature (the BMS system will limit the charging current to practically 0 A, which will prevent battery damage).

To meet the requirements of users who need to charge LiFePO<sub>4</sub> batteries at temperatures below 0 degrees Celsius (environmental conditions), we have introduced LiFePO<sub>4</sub> Kon-TEC battery models with a heating pads system, with the MG designation at the end of the battery serial number.

Such a system allows you to charge the LiFePO<sub>4</sub> Kon-TEC MG battery at sub-zero temperatures.

Inside each Kon-TEC MG series battery there are installed special, internal heating pads that are responsible for pre-heating the cells to a positive temperature, which results in enabling the charging process at a negative ambient temperature.

The process starts when the charger is connected to the battery. When the BMS system, built into the battery, detects the temperature of the cells below 0 degrees Celsius, it turns on the heating pads system. The heating pads take energy from the charger and start the process of pre-heating the cells. When the battery cells reach a safe temperature of 0 degrees Celsius or higher, the BMS system starts the process of charging the Kon-TEC LiFePO<sub>4</sub> MG series battery.

## PRECAUTIONS

- do not expose the battery to sunlight,
- do not immerse the battery in water,
- do not place the battery near heat sources,
- charge the battery only under supervision,
- do not short-circuit the + and - terminals with any conductive elements,
- do not connect the battery directly to electrical outlets,
- do not throw the battery into fire,
- do not transport the battery together with other metal objects,
- do not hit, throw or step on the battery,
- do not pierce the battery with any objects,
- do not disassemble/open the battery,
- do not keep the battery unused for a long period of time,
- do not leave the battery in high temperature conditions,
- do not use the battery in the area of strong electrostatic or magnetic field,
- read the charger manual carefully,
- store the battery with secured terminals,
- use only dedicated charger for LiFePO<sub>4</sub> batteries
- keep the battery away from children and pets,
- do not wear metal objects during handling and using the battery,
- charging time should not be longer than described in the charger manual,
- do not solder anything to the battery,
- do not expose the battery to microwaves and high pressure,
- do not use any form of pressure on the battery,
- if the battery emits a strange smell, is noticeably hot, changes colour, deforms or otherwise deviates from the standard at use, immediately disconnect it from the load and put it in a safe place, then contact with the supplier/manufacturer,
- if the battery terminals are dirty, clean them with a dry cloth, otherwise connection with the battery may be defective.

## STORAGE AND LIFETIME

The batteries should be stored under the following conditions:

- In ventilated rooms avoiding direct sunlight.
- For long-term storage, do it in rooms with low air humidity and temperature in the range from -10°C to +45°C.
- Keep the battery fully charged,
- When storing the battery for 6 months or more, at least one full charge cycle is required to avoid damaging the cells by self discharge.

The number of cycles (lifetime), after the battery maintains up to 80% of nominal capacity, depends on depth of discharge (DoD). It is no less than 3,000 with 100% DoD (fully charged and fully discharged battery). After exceeding 3000 cycles the battery is still functional and its capacity is at least 80% of the nominal capacity and begins to decrease with time and/or further use. The lower DoD cycles, the longer the service life. Accordingly for 80% DoD cycles (discharge to the level of 20% of nominal capacity), the battery lifetime is 4,500 cycles. For 60% DoD cycles (discharge to the level of 40% of nominal capacity), the battery lifetime is 6,000.

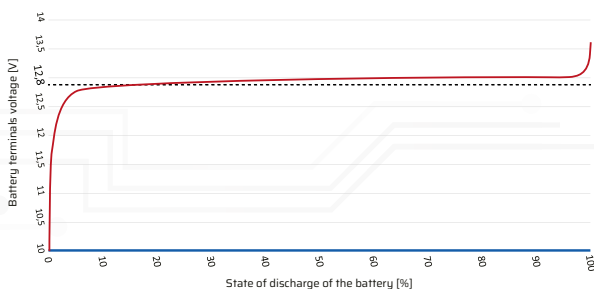
The energy density of the battery reaches over 120Wh/kg, which is desirable and energy efficient. The estimated lifetime of the battery electrolyte is approximately 12 years of use.

## NOTICE

Due to the non-linear nature of the LiFePO<sub>4</sub> battery discharge, its voltage ranges maintain an almost constant value through a wide range of its capacity (Fig 9). The nominal voltage of 12.8V (for our batteries) can mean both a charged battery approx. 90% of the nominal capacity, BUT also discharged battery nearly 0% of the nominal capacity. As can be seen from the characteristic, a battery whose quiescent voltage (open circuit, no load) is 12.8V (or less) can be practically fully discharged.

Therefore, in the case of LiFePO<sub>4</sub> batteries, you must not rely on their voltage to determine their actual state of discharge/charge. Despite this, never let the quiescent voltage on the LiFePO<sub>4</sub> battery to be less than 12.8V.

Fig 9. Battery voltage [V] at the battery state of discharge [%]



## TERMS OF WARRANTY

For the above product, which is a 12.8V LiFePO4 battery, the customer is warranted that this product will be free from material and manufacturing defects for period of 5 years from the date of production, unconditionally 3 years from the date of purchase in Poland. If during the warranty period there are symptoms that may indicate a defect in the product, please contact the technical support department, which will indicate the further course of action.

Under this warranty, a defective product will be restored to working order or replaced if the defect makes it impossible to repair.

The warranty will be considered within no more than 30 business days from the date of receipt of the complaint.

Replacement of the device includes the delivery of a new product free of defects, the same or - in the case when it is withdrawn from production with similar parameters, excluding dimensions that may change. After servicing there may be noticeable indicators of repair (traces, gluing marks, small scratches) on the outer packaging of the battery.

## THIS WARRANTY DOES NOT APPLY

- if the product has been modified, opened or damaged due to improper use,
- in case of non-compliance with the instructions of use of the device,
- if the product is sold at a public auction,
- in the event of damage to the device due to an accident or natural disaster,
- in case of destruction of the terminals,
- in case of incorrect connection, use or charging of the device,
- if the device is damaged by fire, freezing or high temperature,
- in case of flooding/crushing by pressure,
- in the event of user interference with the device,
- in case of damage to the casing.