HOPPECKE - BASIC INFORMATION GUIDE

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TECHNOLOGY OF THE FUTURE. TODAY.

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This document does not replace operation manual!

BASIC INFORMATION ABOUT LEAD-ACID BATTERIES

Battery

- Is the most widely used energy storage
- Is a galvanic cell with lead-based electrodes
- Sulfuric acid is used as the electrolyte

Advantage

- Well-managed production technology
- Low price in relation to performance
- Almost completely recycable
- No electronic devices needed

Disadvantage

- The battery is necessary to fully charge immediately after discharging
- Higher weight
- More difficult handling

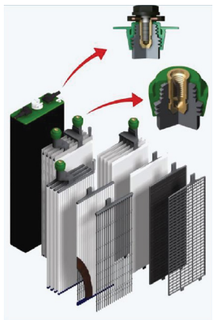
Cell data

Nominal voltage	2V
Fully charged 100%	2,13V*
Fully discharged 80%	1,97V*

*measured 2 hours after operation

Electrolyte density

After charging 100%	1,29kg/lit.
After discharging 80%	1,13kg/lit.
At the temperature	30°C



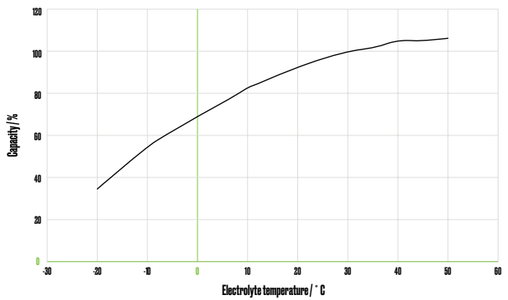
Important notice!

TEMPERATURE AND CAPACITY RELATION

- Its usable capacity decreases with its temperature
- 100% reaches at 30°C - at 0°C it is just 70% C5!
- The temperature limit for start of charging is 45oC
- When the temperature has reached 55°C the battery must be disconnected and cooling period is needed!
- Battery charged at 80% can freeze at -10°C but fully charged battery can freeze at -60°C

C5 capacity - The nominal capacity Cn is a reference value given by the manufacturer, which is measured at a cell/battery temperature of 30°C. a discharge time of 5 h and a final discharge voltage of Uf = 1.70 V per cell.

Capacity = f (Electrolyte temperature)



Important notice!

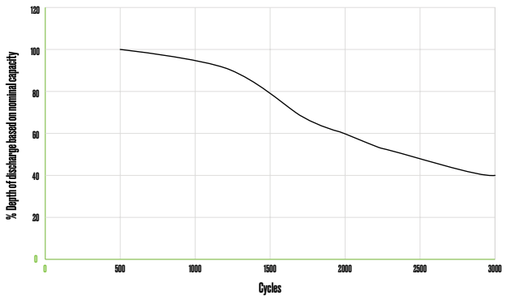
CAPACITY AND CYCLES RELATIVITY

- Capacity of the battery decrease with cycles
  1 CYCLE = 1 CHARGING AND DISCHARGING
- The capacity of the battery is reduced to 80% after 1.500 charging cycles = in use 80% of capacity is achieved lifetime 1.500 charging cycles

Warning - with using 100% of capacity is lifetime reduced to only 500 cycles!

Discharges >80 % are deep discharges with severe negative effects on the service life!

Capacity and cycles relativity



Important notice!

STORAGE CONDITIONS FOR THE BATTERIES

- Battery should be stored in a dry, frost-free room
- Battery should be stored in the fully charged condition

Ambient conditions

Place of use	In dry, well-ventilated areas up to at most 1.000 m above sea level
Ambient storage temperature	-25..+ 60°C
Ambient temperature for activation	0..+ 40 °C
Ambient temperature for operation	-5..+ 40 °C
Relative huminidy	Max. 90% (at 23°C)
Dusty enviroments	Exclusively with a filter (accessory)
Protection against contact, dust	IP 21 and water

Without heating system – not allowed!

- Freezing of water filling system

Available capacity C5 55%
Usable capacity C5 35%
(20% balance)

Heating up to +10 °C

Available capacity C5 85%
Usable capacity C5 65%
(20% balance)

Available capacity C5 100%
Usable capacity C5 80%
(20% balance)

Important notice!

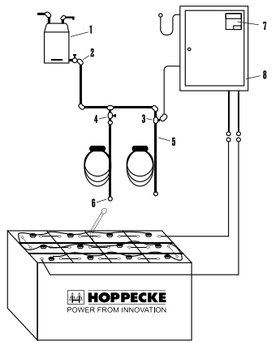
AQUAFILL SYSTEM - water replenishment systems

- Refill directly after the full charge was done!
- Topping up with purified water
- Temperature range is 0-65°C
- Operation in area with a temperature below 0°C may cause freezing of the system.
- The water replenishment facility must be installed such that a water pressure of 0.2 to 0.6 bar is achieved at the upper edge of the battery.
- To avoid any damage, the plug should be removed only by service. The damage of the plug may cause damage of the cell.

Aquafill system

Water-filling troley
(capacity 25L of demi water)

The water tank should be installed at height of 3 to 7 m.



1 Water dispenser
2 Outlet nozzle with all valve
3 Tap with magnetic valve
4 Tap with ball valve
5 Flow control
6 Battery connection coupling
7 Charger

Important notice!

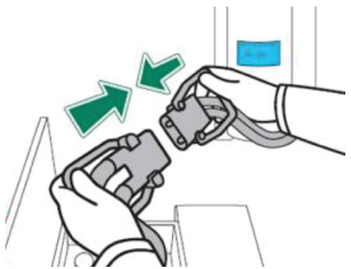
TRAK AIR – SYSTEM OF ELECTROLYTE CIRCULATION

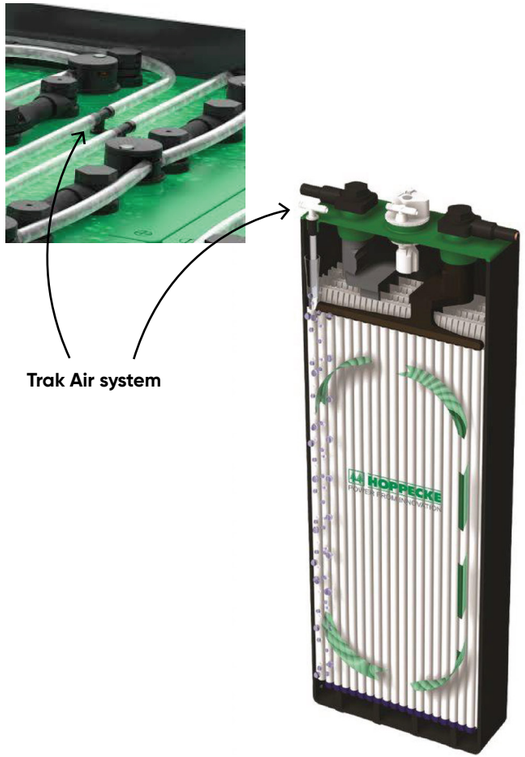
The charger supplies the compressed air needed to circulate the electrolyte in the battery cells via a tube system.

- Charging time reduced up to 2 hours
- Battery temperature level reduced by approx. 10°C within charging
- Enables opportunity charging without damage of the battery

Fully functional system requires the intact hose connection and the plug connection between battery and charger!

Leakness of the system will appear on the LCD display and multiple faults will block the charger (to protect the battery).



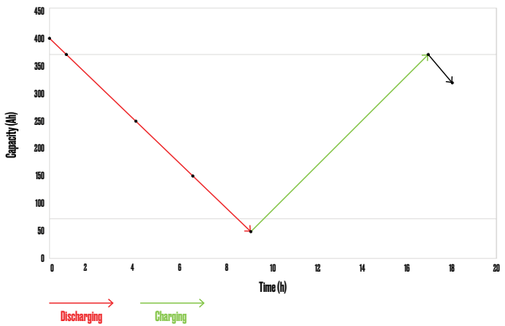


Trak Air system

CAPACITY BEHAVIOR IN 1 CYCLE

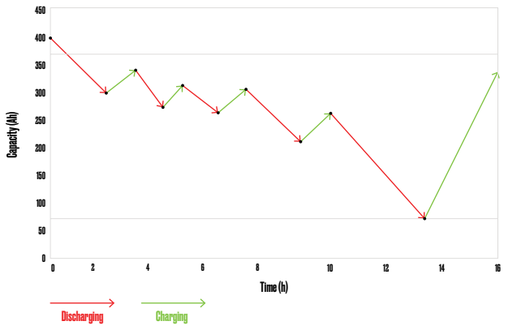
Basic charging (without systemTrakAir)

Capacity behavior in 1 cycle with fully charging
(opportunity charging causes damage of the battery)



Charging with electrolyte circulation (system Trak Air)

Capacity behavior in 1 cycle with opportunity charging
(opportunity charging does not cause any damage of the battery)



Safety first!

Risk of corrosion caused by leaking electrolyte. Electrolyte is strongly corrosive!

No smoking! Do not expose batteries to naked flames, glowing embers or sparks, as it may cause the battery to explode.

Electrical voltages hazardous to health may cause fatal injury. Metal parts of the battery are always under voltage, therefore do not place items or tools on the battery. Failure to observe this hazard notice can lead to severe or fatal injury.

Observe these instructions and keep them located near the battery for future reference. Work on batteries only by trained qualified personnel.

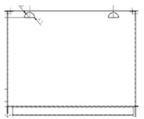
Face shields (impact-resistant visor in accordance with EN 166, class F), safety goggles and protective clothing must be worn when working on batteries. Accident prevention regulations EN 62485-3 and EN 50110-1 must be observed.

Acid splashes in the eyes or on the skin must be washed with water. In case of accident consult a doctor immediately! Clothing contaminated by acid should be washed in water.

AVAILABLE CAPACITIES AND DIMENSIOS

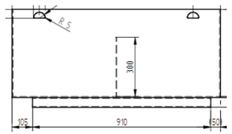
48V – 225 Ah:

- Capacity C5 - 225 Ah
- 24 cells 3HPzB 225
- Hoppecke drawing T54053



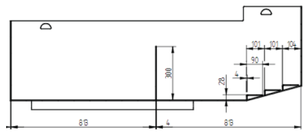
96V – 240 Ah:

- Capacity C5 - 240 Ah
- 48 cells 3HPzS 240
- Hoppecke drawing T54161



96V – 400 Ah:

- Capacity C5 - 400 Ah
- 24 cells 3HPzS 240
- Hoppecke drawing T54097



MINI Z BATTERY OPTIONS

Basic solution

Description:

- Basic battery type with water filling system (lifetime 1.200 – 1.500 cycles by 80% DoD*)
- Charging time 8-10 hours
- Charging without interruption
- 1-phase or 3-phases models
- Lower price

Disadvantage:

- Unregulated charging – 50 Hz
- Depend on unstable net
- Full charging cycle needed
- Lower energy efficiency
- Higher energy costs

*80% DoD – 80% deep of discharge

Hoppecke solution

Description:

- Battery with acid circulation by TraAir system
- Charging time 6 hours
- Charging interruption allowed
- High frequency charger with fully regulated charging
- Unstable network independence
- Safety battery charging with HF charger
- High density of international service network via Hoppecke or service partners
- EN and UL certifications
- High energy efficiency - lower energy costs

Disadvantage:

- Higher price
- 1 phase solution available just till 3/2022

Model TCHF
(24-80V)

ELISE 900 BATTERY OPTIONS

Basic solution

Description:

- Basic battery type with water filling system (lifetime 1.200 – 1.500 cycles by 80% DoD*)
- Charging time 8-10 hours
- Charging without interruption
- 1-phase or 3-phases models
- Lower price

Disadvantage:

- Unregulated charging – 50 Hz
- Depend on unstable net
- Full charging cycle needed
- Lower energy efficiency
- Higher energy costs

*80% DoD – 80% deep of discharge

Hoppecke solution

Description:

- Battery with acid circulation by TraAir system
- Charging time 6 hours
- Charging interruption allowed
- High frequency charger with fully regulated charging
- Unstable network independence
- Safety battery charging with HF charger
- High density of international service network via Hoppecke or service partners
- High energy efficiency - lower energy costs

Disadvantage:

- Higher price
- Available only in 3-phases version

Important notice!

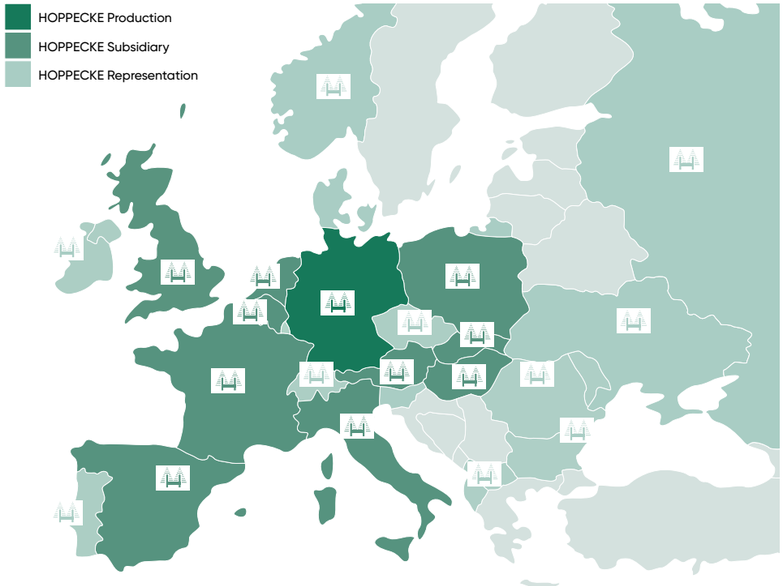
BATTERY SETUP FOR SERVICE ACTION

- It is necessary to pull out the battery from the vehicle!
- **Measurement of the battery and service action cannot be provided if the battery approaches the vehicle area without access!**

INTERNATIONAL SERVICE

HOPPECKE subsidiary	HOPPECKE service experts
HSD	> 95
HAT	> 10
HUK	> 30
HNL	> 30
HBE	> 20
HFR	> 10
HES	> 10
HIT	> 10
HPL	> 40
HSK	> 10
HUN	> 15

Total service experts in Europe	> 275
Service China, USA, SEA	> 40

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