



grid | AquaGen^{pro}

Recombination system for
stationary batteries



Power is our passion ...

You are looking at the results of 90 years' work. 90 years of passion for innovative solutions for mobile power supplies – 90 years of German engineering skill and the aim of never being satisfied with what we have already achieved.

This is only possible thanks to the employees, who continuously support us along this path. Together with our business partners, we have continued to push the limits forward and ensure that the impossibilities of yesterday have now become a jointly achieved reality.

Only through our partnership with you, we are able to create the perfect symbiosis of economically optimised solutions and state-of-the-art technological products.

With our structure of nearly 2000 employees at more than 20 locations around the world, we are always close to you and keep our finger on the pulse of pioneering innovations.

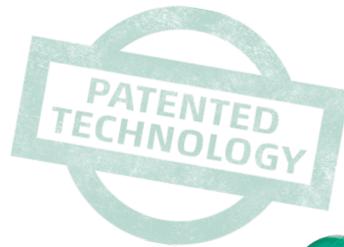
Flexibility in the design of your projects and extremely reliable products are our every day aims. With highly available local service we have ensured a thorough understanding of your special challenges for decades.

If you expect more than just a product but a competent partner who is always at your side, HOPPECKE is the right choice for you.



grid | AquaGen pro

The unique recombination system



grid | AquaGen pro max

grid | AquaGen pro



The new grid | AquaGen pro and grid | AquaGen pro max offer you new, improved components for optimum battery system operation. Users throughout the world have used the grid | AquaGen recombination system for many years. The new, fourth generation of the patented HOPPECKE solution utilises the knowledge and experience from almost 50 years. The motivation for the further development of the proven grid | AquaGen recombination system was its use in new applications for stationary batteries with frequent charging and discharge cycles (peak shaving, load levelling).

Based on experience with battery systems in a wide range of applications and conditions of use, we have equipped the grid | AquaGen pro and grid | AquaGen pro max with pioneering

features, which meet the requirements of these new applications. For use with the familiar applications, the additional functions are an improvement of the proven grid | AquaGen recombination system.

Function

During decomposition of water in the battery, the grid | AquaGen pro absorbs the gases which are produced and recombines them with its integrated precious metal catalyst to form water vapour. This water vapour condenses on the walls of the grid | AquaGen pro to form water droplets, which flow downwards and are then returned to the battery. By the use of a bi-directional valve, the retention time of the gases in the system is increased and therefore the recombination rate is maximised. As a result, the effort for refilling water is drastically reduced, up to complete elimination of maintenance.

Due to the recombination of the gases which are produced, the ventilation requirements according to IEC 62485-2 / EN 50272-2 / DIN 0510 Part 2 can be considerably reduced.

The recombination of hydrogen and oxygen is an exothermic process in which heat is released. In a sealed battery, recombination takes place internally at the negative electrodes. Ultimately, the increased heat, especially on the electrodes, causes effects which reduce the lifetime of the battery. During operation, sealed batteries are subjected to various restrictions, e.g. increased thermal load. This must be taken into account in the design of the components.

With the grid | AquaGen pro, recombination does not take place at the electrodes inside the battery. Because the grid | AquaGen pro is installed as an external component, a temperature increase inside the battery and therefore premature ageing is eliminated. External recombination therefore enables a reduction of maintenance ex-pense in comparison with sealed batteries, without a negative effect on the expected service life and operating conditions. The integrated flame arrestor also provides maximum protection against external sources of ignition.



The recombination system in detail

New 2-chamber design

separates the absorber filling from the catalyst filling and protects against thermal overload of the hydrophobic impregnation.

Catalyst

in the form of a spherical fill to maximise the catalytic surface.

Flame arrestor

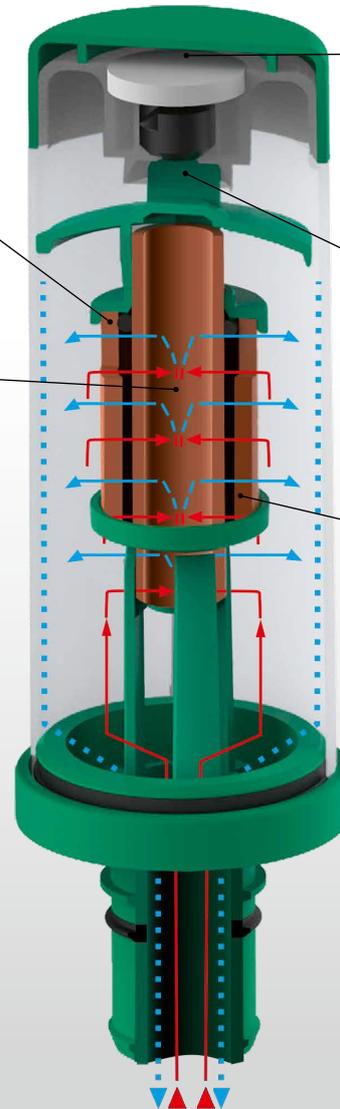
for maximum safety. Prevents ignition of the gases in the interior by an external ignition source.

Bi-directional valve

increases the retention time of hydrogen and oxygen in the recombination system to maximise the recombination rate.

Absorber

as protection against catalyst poisons to ensure long battery lifetime.



grid | AquaGen pro

grid | AquaGen pro is available for capacities up to 500 Ah and for applications with restrictions due to dimensions (such as height with regard to the battery installation and depth with regard to cell dimensions).

grid | AquaGen pro max

grid | AquaGen pro max is specially optimised and is the right choice for capacities of 500 Ah and higher.

- Hydrogen / oxygen mixture
- Water vapour
- • • Water

The advantages at a glance

► Cost reduction

for maintenance and ventilation requirements – integral catalyst for greatly extended water refilling intervals, up to maintenance-free operations.

► Minimal investment

one-time purchase, no replacement necessary during the entire battery life.

► Maximum safety

due to integrated flame arrestor against external ignition.

► Increased robustness

no removal of the grid | aquagen pro necessary for equalization charges.

► Effectiveness

even in partially cyclic applications.



Extremely economical

Example of cost calculation for flooded lead-acid-batteries

Installation of a grid | AquaGen pro system pays for itself:

With a one-off extra cost of approx. 5 % you not only save time and unnecessary frustration for planning regular service intervals, but also approx. 15 % of total costs over the service life of the system.

Battery type grid | power VL
 Number of cells 108
 Capacity 1600 Ah
 Discharge depth 80 %

Ambient temperature 20°C
 Battery lifetime 15 years
 Effort for water replenishment 5,4 hours/year*
 Expenditure for water refilling 15



Average water consumption of these battery approx. 200 liters per year**

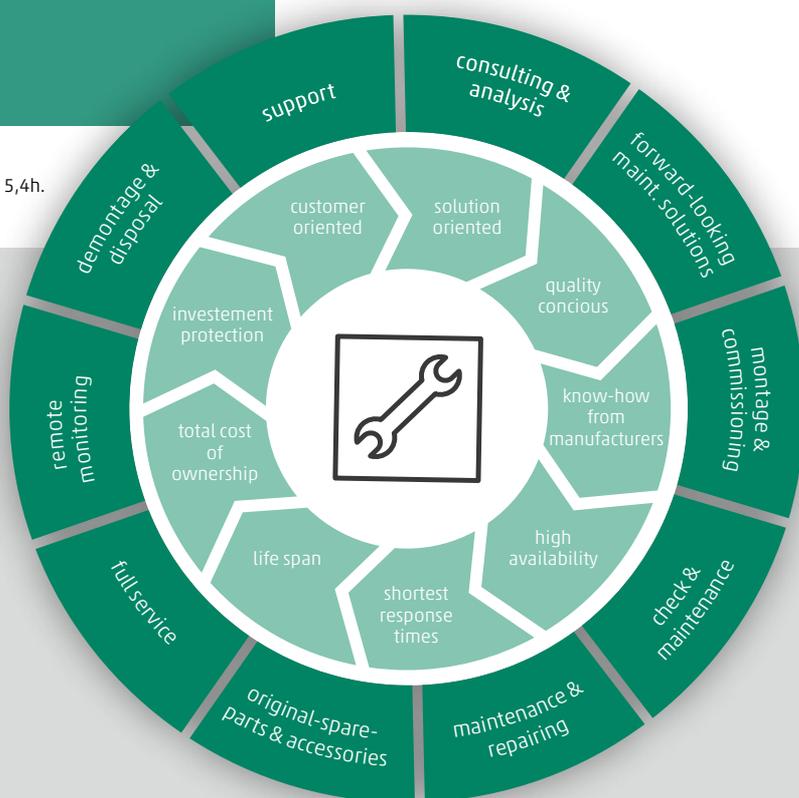
The water consumption increases in practice

- ▶ with longer operating lifetime
- ▶ due to higher ambient temperatures
- ▶ through charging and discharge cycles

* For each maintenance, approx. 2.3 ltr. must be refilled per cell. Which means a time expenditure of approx. 3 min. 108 * 3 min. = 324 min. = 5,4h.
 ** Without a grid | AquaGen recombination system.

Our Service makes the difference

- ▶ **Hotline and technical support**
- ▶ **Analysis and advice**
- ▶ **Monitoring**
- ▶ **Installation and commissioning, disassembly and recycling**
- ▶ **Testing, maintenance and repair**



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