



rail | systemizer

Battery systems
for railway applications

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HOPPECKE – Your partner for sustainable energy solutions

Innovation has been driving us forward since 1927. This is the reason why HOPPECKE's Special Power business unit has been at the forefront of battery technology from the start.

Together with our customers we are developing sustainable energy solutions of the future which feature high levels of operational flexibility and fail-safety, even under conditions of peak demand. We are setting new and higher standards for the energy supply systems of tomorrow and are already world leaders in the integration of battery systems for rail vehicles. Our commitment and cooperation in your development process are something you can take for granted – both today and into the future.

Product performance and reliability combined with skilled attention to customer service lie at the heart of our worldwide operations. Why not try it for yourself? Challenge us and find out just what support we can offer in your quest for faster access to and greater success in your markets.

HOPPECKE – Your global partner

We see ourselves as a partner and a solution finder of the rail industry. We would gladly provide you with our competence and experience in replacing of existing systems and development of new systems. Both in designing, construction and validation of the product as well as in the global supply and maintenance, HOPPECKE is always your reliable partner. The HOPPECKE service network offers you support during commissioning, service and application analyses. This allows you to increase your system availability as well as safety and keep the life cycle costs at a minimum.

Responsibility

We offer a tailor-made recycling solution for all HOPPECKE products. In accordance with our company philosophy we are responsible for the careful handling of the resources entrusted to us – people, capital, time, environment, and raw materials – taking into account social aspects and a support of environmentally friendly processes, techniques, and products.

Certifications

The HOPPECKE products are manufactured in due consideration of the international standards for quality, safety and environment.

Quality/Safety:

- ISO 9001
- IRIS
- OHSAS 18001
- EN 50126
- EN 50155

Performance:

- IEC 60623
- UIC 854
- EN 60254
- EN 60896
- GOST

Mechanics:

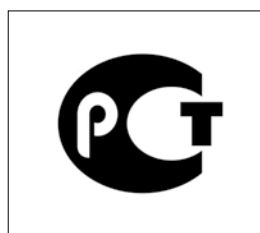
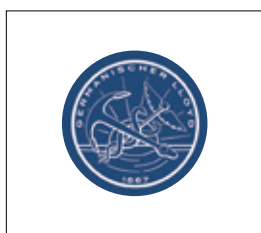
- EN 12663
- IEC 61373
- EN 15085, ASTM

Fire Safety:

- EN 45545
- NFF 16101-16102
- DIN 5510
- NFPA 130
- UNI IEC 11170-3

Environment:

- ISO 14001





**Unique
electrical design**
Define your requirements - We create
your battery!

**Unique
mechanical design**
Designed for maintenance - Designed to
cost!

**HOPPECKE -
Your specialist
and partner
for sustainable
energy solutions!**

Battery expert
Since 1927

rail | power

The HOPPECKE battery technologies

All storage-technologies from a single source

Since 30 years HOPPECKE has been your partner for efficient systems solutions in the railway sector and is best prepared for the requirements of the future.

Quality "Made in Germany"

HOPPECKE products are continuously developed further. The railway competence centre in Germany guarantees, that all of our products are developed and produced in compliance with the applicable laws and standards.

rail | power

Lead-acid technology

- Cost efficient battery for standard rail auxiliary supply
- Advanced HOPPECKE Standard in quality and technology
- Complete systems with vented or valve regulated batteries (VRLA)



rail | power FNC

NiCd technology

- Technologically advanced battery for demanding requirements
- Longer life and higher cyclic endurance for railway applications even under conditions of extreme temperature
- Wide variety of energy-to-power ratios for optimum adaptation to customers' needs



rail | power XNH

NiMH technology

- Most advanced alkaline cell technology for industrial applications
- Longest life and highest cyclic endurance for railway applications
- Meets highest demands concerning battery volume and weight



rail | power LiIon

Li-Ion technology

- Highest energy and power density
- High cycle life for both full and partial cycles
- Extremely low self-discharge







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Installation options

For every application the right battery

HOPPECKE offers a wide range of cells, batteries and complete solutions, which are used in the most varied applications for rail vehicles and in power ranges required in the national and international rail use.

The installation options are varied, whether it is roof assembly, underfloor installation, or installation inside the train – we construct and manufacture your individual energy system.



ROOF ASSEMBLY

Your benefits with HOPPECKE

- Low space requirement (no passengers space lost)
- Optimum protection against dispersed dirt, dust and moisture
- Efficient system integration



INSTALLATION INSIDE THE TRAIN

Your benefits with HOPPECKE

- Easy accessibility
- Optimum protection against heat and cold
- Optimum protection against dust and moisture



UNDERFLOOR INSTALLATION

Your benefits with HOPPECKE

- Easy to maintain
- Optimum weight distribution and low centre of gravity
- Protection against strong sun exposure and heat

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System solutions for rail vehicles

The complete low voltage power supply system from a single source

HOPPECKE is your partner for efficient battery system solutions in the railway battery sector and provides complete power supply systems.

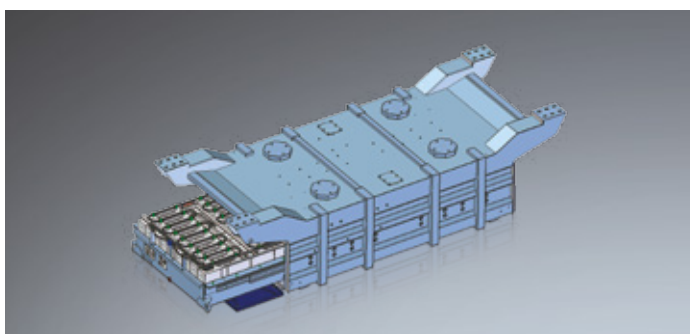
Complete power supply systems consisting of

- Cells in four technologies (see page 4)
- Carrier / Trays, Battery box / Battery container
- Electrical components (fuses, switches, diodes, etc.) in the battery box or in separate e-box
- Chargers that are optionally installed either inside or outside the battery box
- Optional: water refilling systems
- Monitoring of battery status (rail | control)

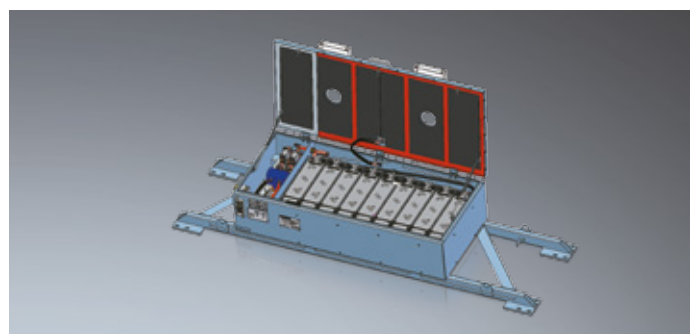
Precisely tailored to your needs, we design customised, turnkey railway battery systems. For this our customers already receive, in the very early stages of the project, 3D models or 2D drawings in the standard exchange formats. To verify the construction design, strength calculations – finite elements analyses – and if necessary also thermal analyses are carried out.

Your advantages with HOPPECKE

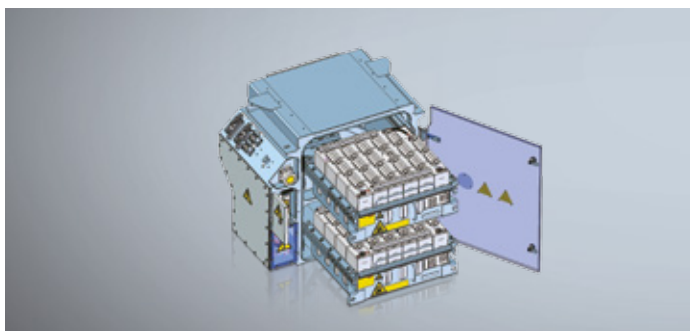
- Reliable energy supply – due to extremely high cycle stability
- Long service life – due to the HOPPECKE quality standard
- Maximum safety – through superior technology
- Temperature resistant – best properties under extreme temperature conditions
- Low follow-up costs – due to long maintenance intervals



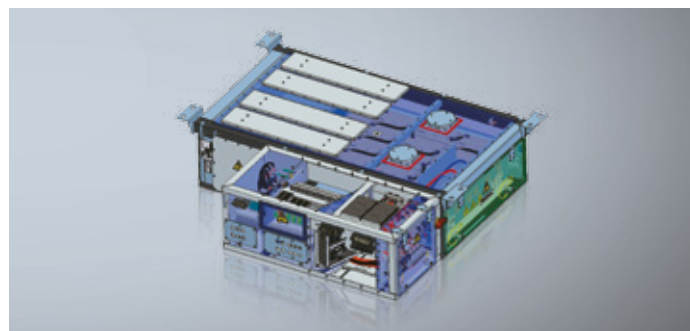
Underfloor container



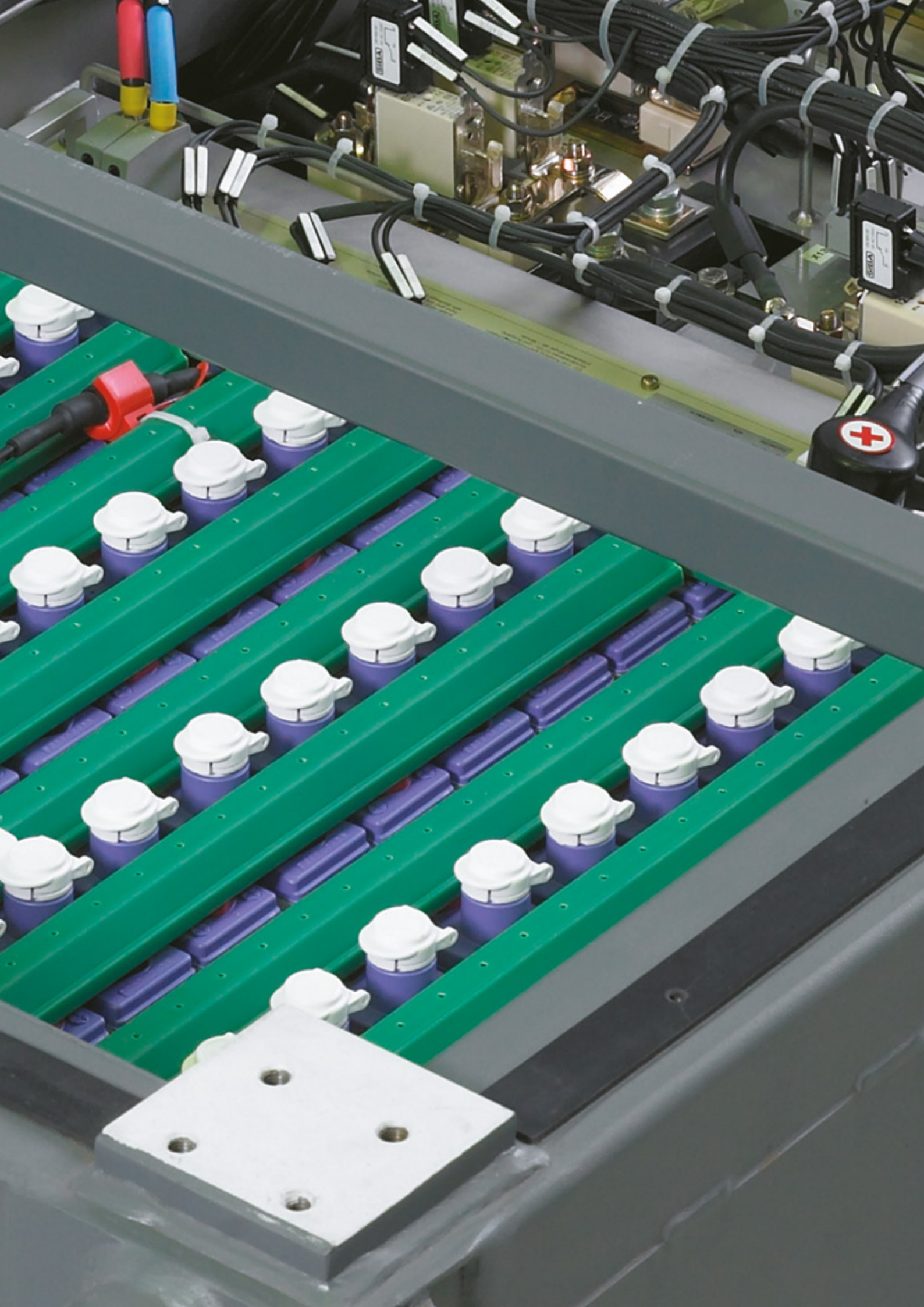
Roof assembly



Inside train assembly



Low voltage power supply system



rail | systemizer + rail | control

Connected energy

Technology-independent data monitoring for reduction of your life cycle cost (LCC)

Optimize your own energy demand and the system availability using HOPPECKE rail | control. The monitoring unit rail | control can be additively installed in every rail | systemizer system solution, regardless of the used battery technology and the size of the energy storage system.

The data determination can be effected via analogue and digital inputs as well as via diverse bus systems. The implemented online analysis of the data provides you with your completely individual and specific system variables.

Your advantages with HOPPECKE:

- Monitoring of the battery state variables (e.g. voltage, current, temperature) in the form of dynamic data gathering
- Data analysis on the basis of the determined online state variables or offline with stored data
- Adaptation of the charging times for reduction of the energy demand
- Performance optimization
- Performance monitoring
- Reduction in Life-Cycle-Cost (LCC)
- Determination of the system availability
- Available for all storage technologies (FNC, NiMH, LiOn)
- Customised control and regulation algorithms can be integrated



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- Online-monitoring
- Failure detection
- Optimization of maintenance measures

Communication via CAN

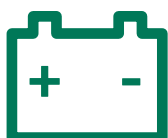


rail | data

- Charging parameter presetting
- Charging monitoring
- Dynamic data collection



Certified according to
EN 50155 - EN50121-3-2



rail | power

- Monitoring of battery status
- Adaptation of your charging times for reduction of the energy demand

Communication via Ethernet



rail | service

- Accounting
- Error detection
- Service personnel



connected energy

POWERED BY HOPPECKE



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