

trak | systemizer fleet

Cost-optimised charging stations
for motive power 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 forwards 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.



More than the sum of its parts – trak | systemizer fleet - the customisable charging station



The number of electric forklifts in intralogistics is growing consistently. Currently, about one in five forklifts worldwide is running on batteries. In Europe, the share of electric forklifts has increased from 49% to 55.2% in the past five years.

For the efficient and smooth operation of a modern forklift fleet, the use of battery charging and changing stations is indispensable – especially in a 24/7 multi-shift operation.

Apart from economic efficiency and operational safety, easy handling plays an important role. The driver must be able to handle the battery exchange easily, quickly and intuitively.

With the trak | systemizer fleet, HOPPECKE offers a system solution tailored to your requirements. Perfectly matched components guarantee the highest possible level of efficiency. Only in combination can the individual parts reach their full potential.



We analyse your energy requirements and local conditions directly on site

- ▶ Vehicle fleet
- ▶ Energy consumption
- ▶ Logistics routes
- ▶ Shift / break models
- ▶ Measurements
- ▶ Floor conditions
- ▶ Electric installation
- ▶ Ventilation

Our many years of experience guarantee innovative solutions tailored to your requirements.

- ▶ Concept development for central and decentralised charging stations and sites
- ▶ Technical drawings
- ▶ Consulting on safety requirements
- ▶ Support for tenders
- ▶ European market leader in research and development

We plan your system holistically, sustainable and modular using state-of-the-art technology.

- ▶ Extensive competence in energy storage
- ▶ Company-specific solutions in accordance with European standards
- ▶ Optimisation of logistics routes, energy saving and space utilisation
- ▶ Support for the architect and/or the planner

We only use high-quality and perfectly coordinated HOPPECKE components.

- ▶ Modular and flexible
- ▶ Delivery of all system assemblies and accessories
- ▶ All from one source: ventilation systems, electrical installations, floor coatings etc.
- ▶ Flexible energy billing solutions
- ▶ Top quality - Made in Germany

HOPPECKE system solutions are ready to use. No subsequent installation necessary.

- ▶ Project management or support for sub- or complete projects
- ▶ Installation of turnkey charging stations
- ▶ Commissioning and acceptance of charging stations
- ▶ Operation of charging stations
- ▶ Energy Management

Our extensive range of services secures your investment in the long run and ensures optimal availability.

- ▶ On-site installation, maintenance, inspection and training
- ▶ Global collection and waste management system
- ▶ Professional consulting based on the accumulated data
- ▶ Identification of optimisation and savings potentials
- ▶ Individual models for purchase, rental and refurbishment

Applications

Perfect for your electric fleets including:

- ▶ Industrial trucks
- ▶ Pallet trucks
- ▶ Electric commercial vehicles
- ▶ Electric construction and agricultural vehicles
- ▶ Special applications (e.g. airports)
- ▶ Floor cleaning machines
- ▶ Electric leisure vehicles



Industries

- ▶ Logistics
- ▶ Food industry
- ▶ Retail and wholesale
- ▶ Wood industry
- ▶ Automotive industry
- ▶ Pharmaceutical industry
- ▶ and many more





More power to your business

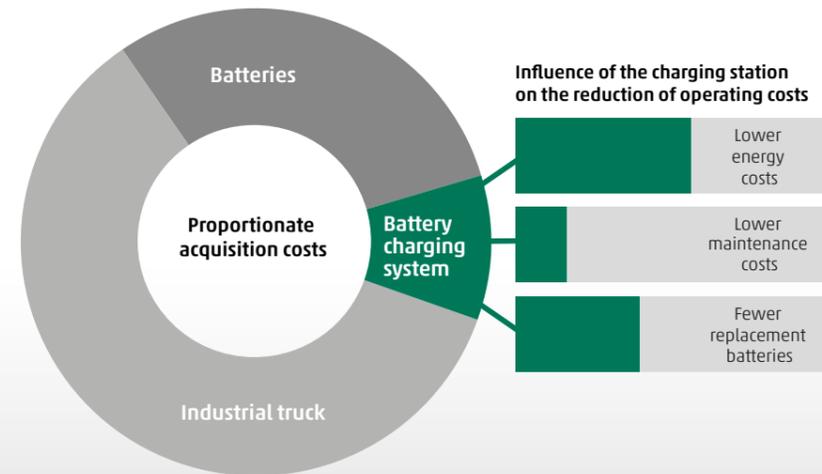
trak | systemizer fleet – an investment that pays off

When acquiring an electric vehicle fleet, oftentimes too little importance is placed on the battery charging station. The positive effect an efficient charging and changing system can have on the running costs is often overlooked.

With trak | systemizer fleet we offer you individual project planning as well as the installation and commissioning of a turnkey charging and changing station for industrial trucks. Together, we develop a solution that is specially tailored to your requirements. Our professionals accompany you every step of the way and focus on all important factors.

Our charging stations guarantee maximum system and energy availability. We provide a cost-efficient solution and make sure that all legal standards and regulations are complied with. Thanks to the modularity and flexibility of our system components, we can help you to reduce your investment, maintenance and energy costs and to optimise your fleet.

Small investment - big effect



More economic efficiency

Maximum efficiency
All components are perfectly coordinated.

Higher energy saving
The high-quality trak | charger HF premium charger reduces energy consumption considerably. Compared to a conventional 50 Hz charger, energy savings of approx. 14% can be achieved during each charging process.

Increased vehicle availability
The quick charge function allows batteries to be charged to 95% of their nominal capacity within 2.5 hours.

Precise and plannable charging times
Thanks to the automatic mains regulation of the high-frequency technology, an optimal charging characteristic is created during the charging process, which allows for precise planning.

Lowered maintenance costs
Excessive or insufficient use of the batteries is avoided. Time and costs for battery maintenance and servicing are reduced.

Extended battery life
Optimal usage of the entire battery pool via systematic placement in the charging station.

Optimal investment protection

Less space required
Dedicated charging rooms with associated chargers for different battery/vehicle types are no longer required.

Fewer chargers – thanks to chaos charging
Batteries with different voltages and capacities can be charged at each charger. This reduces the number of units required.

Integrates into existing building management systems
Easy integration into standard building control systems via standardised interfaces and protocols.

Increased productivity
Thanks to continuous and dynamic optimisation of the customer application, productivity can be increased significantly.

High flexibility
Accessories and optional components can be retrofitted or activated at any time. That way the system grows with your requirements without interrupting operations.

Outdoor use
The trak | systemizer powercube is the optimal solution for safe and professional outdoor charging of your batteries.

trak | systemizer fleet is a safe and sustainable investment in your future.

Use Case | Cost optimisation



The challenge

The company wants to convert its heavy-duty forklift trucks from combustion engines to electric drive, while at the same time reducing its ongoing operating costs.

- ▶ Creating a suitable environment for the charging station
- ▶ Complying with the relevant regulations
- ▶ Reducing ongoing operating costs
- ▶ Lowering energy costs and CO₂ emissions
- ▶ Optimising space for large and heavy traction batteries

HOPPECKE developed a turnkey solution for the electrification of the heavy-duty fleet of a woodworking company

The logistics department of a leading company in the wood industry was about to undergo a complete technology change of its heavy-duty forklifts. In addition to cutting operating costs, the switch to electric drive was also intended to benefit the environment and the health of the employees.

The sophisticated charging station concept and the intelligent management of the changing process were convincing. HOPPECKE handled the entire planning and fitting of the charging station, including electrical installation and floor coating. The twelve diesel-powered heavy-duty forklifts on site were replaced by twelve 8-ton heavy-duty electric forklifts. They now do the same transporting as the diesel vehicles before.

The 24 batteries required are stored space-savingly on a two-story heavy-duty rack system. They can be changed quickly and easily directly in the warehouse. The customer thus saved one hour and thirty minutes per shift in time and production costs.

Customer benefits:

- ▶ 20% time saved on production per shift
- ▶ Operating cost savings of 180,000€ / year
- ▶ 100% less particulate matter thanks to electric drive
- ▶ Reduced noise level and soot particle emission
- ▶ Increased customer satisfaction (no soot on the goods)
- ▶ Increased service life of the motive power batteries



We do not cut corners on safety and comfort

trak | systemizer fleet – your fleet has earned it

trak | systemizer fleet is designed for all types of industrial trucks and fleet sizes. When planning for your optimal charging and changing system, we take into account both the number of batteries required, their size and vehicle type, as well as the surrounding conditions for the best use of available space.

Depending on the selected components, battery changing is done manually or automatically. This means that either no or very little force is required during the procedure. This ensures increased productivity and operational safety.

More safety

Automated alerts

Timely detection of malfunctions with immediate notification to the operator in charge.

Detailed reports on incorrect or failed removals

The screen displays the battery to be removed. Monitoring of shifts and vehicles indicates any potential need for driver training.

“Best-Charged” function

Always take the best available battery from the charging station.

Monitored ventilation system

The development of oxyhydrogen gas is prevented by enclosing of the battery places and dedicated ventilation systems.

Optional gas detection system

Connecting with trak | monitor's fail-safe alarm gives an early warning in case of problems.

More convenience

Easier fleet management

Manage up to 200 chargers and 10 battery pools. Easy integration of third-party chargers into the battery management system is possible.

Intuitive handling

Multilingual and easy-to-use instructions for vehicle operators.

“fire and forget”

Each battery can be connected to all HOPPECKE chargers.

Easy battery change

Change the battery with no or very little effort.

Easy access to reports

Optionally on desktops or smartphones.

The 360° dashboard

The 360° dashboard provides a quick overview of the readiness and availability of your charging station - even from a distance.

Future proof

Predictive maintenance

A HOPPECKE service technician is on the spot before a malfunction becomes critical and causes downtime.

Data security

Close cooperation with leading cloud providers. High emphasis on cyber security and protection against data loss by using redundant and distributed servers.

Cloud Access

Remote access to all data via dashboards. Either via smartphone or desktop. Automated messages for alarms and threshold violations.

trak | optimizer

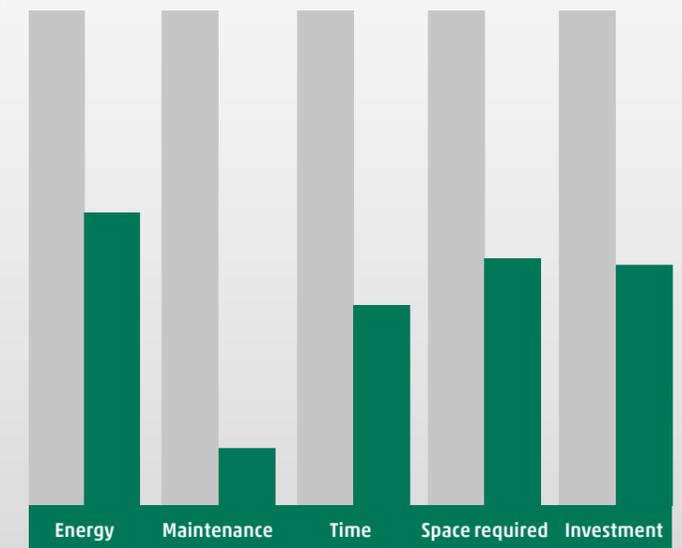
Design, commissioning, support and optimisation of the installation by HOPPECKE - 24/7.

trak | ecomizer

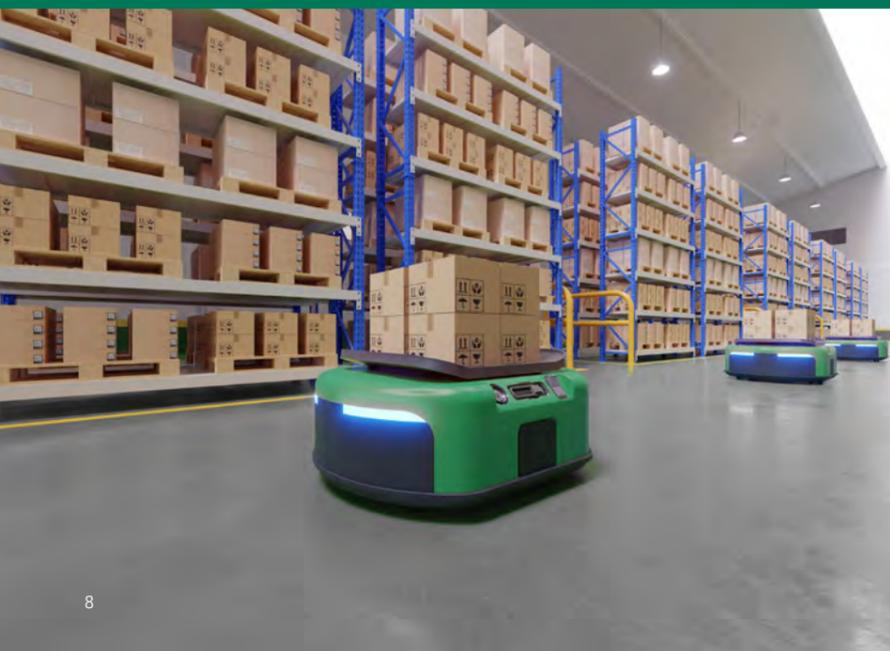
Individual fleet solutions, including provision of assets. HOPPECKE always guarantees optimum battery and energy availability. You only pay for the energy actually consumed.



Conclusion: an optimally planned charging station can help to significantly reduce your operating costs!



Use Case | Fully automated operation



The challenge

The company requires a completely automated operation with automated guided vehicles (AGV) including a fully autonomous battery changing station.

- ▶ Fluctuating utilisation of fleet capacity due to lack of batteries
- ▶ Delayed logistics processes due to downtimes
- ▶ Risk of malfunction during battery change due to incorrect removal
- ▶ Damage to battery trays during battery changing

HOPPECKE developed a tailor-made solution for the fully automated vehicle fleet of a Chinese steel manufacturer

Automated guided vehicle systems perform their work independently, but often still require human assistance to change and recharge the batteries. With the flexible and fully automatic trak | systemizer fleet this is no longer necessary.

In the customer's new changing station, 18 low-maintenance and fast-charging trak | uplift batteries are used in combination with 13 trak | charger HF premium chargers.

The battery management system trak | monitor 4.0 provides the necessary data for controlling the fully autonomous application. A powered changer removes the battery from the charging station and places it in the AGV.

No human assistance is required during the entire process. If a battery requires maintenance, it is automatically moved to a separate service station where the necessary work can be carried out.

Customer benefits:

- ▶ Investment protection
- ▶ Extended battery life
- ▶ Optimal use of the battery pool
- ▶ Fully automated battery change in the charging station
- ▶ Optimised charging processes save energy
- ▶ Reduced downtime
- ▶ Maximum availability of the vehicle pool
- ▶ Reduced maintenance costs



More efficiency thanks to innovative components

trak | systemizer fleet – perfectly coordinated

Modern intralogistics places increasing demands on every single component within the process chain – including the battery changing station.

Accelerated processes ensure the highest possible efficiency in value-adding activities. This is achieved by solutions optimally tailored to your requirements.

100%

turnkey, including all prescribed safety instructions and first aid station

trak | systemizer fleet



35%

Up to 35% less investment by reducing the number of batteries and maximum space saving

trak | Xchange TU

50%

Up to 50% energy savings thanks to optimised charging with

trak | monitor 4.0



50%

Up to 50% time saved with minimum effort battery changing

trak | Xchange PU

50%

Up to 50% more space with customised system racks

trak | Xcharge

25%

Up to 25% fewer charge interruptions

trak | charger HF premium



40%

Up to 40% faster safe battery change (up to 1.8t)

trak | Xchange MU

85%

Up to 85% savings in operating costs due to minimised water consumption and maintenance intervals

trak | uplift iq



HOPPECKE charging stations – flexible and tailored to your requirements.



The charging station for small batteries

With **trak | Xchange TU** battery changing system

The HOPPECKE battery changing trolleys **trak | Xchange TU** are suitable for small batteries from 12 V to 48 V. They have been specially developed for electric pallet trucks and low-lift order pickers with lateral battery change on roller beds.

The **trak | Xchange TU** is equipped with a double roller conveyor, which enables a quick battery change. All of the **trak | Xchange TU** systems run on floor-mounted rails to ensure easy movement of the trolley. At the same time, the safe transport of the battery is ensured by a locking device.

The **trak | Xchange TU-PT** version is equipped with a special lifting mechanism, which allows a height adjustment of 110 mm.

The **trak | Xchange TU-HY** has a hydraulic height adjustment device. Due to the large adjustment range, all vehicle types and changing heights for 12 V to 48 V batteries can be changed by means of **trak | Xchange TU-HY**. The abrasion of the vehicle tyres is compensated in the system by the height adjustment of the roller bed.



trak | Xchange TU

Charging station components

- ▶ **trak | Xcharge**
Space-saving system rack
- ▶ **trak | charger HF premium**
Powerful high frequency charger
- ▶ **trak | Xchange TU**
Battery changing system for small batteries
- ▶ **trak | monitor 4.0**
Battery management system

The charging station for medium to large batteries

With battery changing systems **trak | Xchange MU** or **trak | Xchange PU**

The HOPPECKE battery changing trolleys **trak | Xchange MU** and **trak | Xchange PU** are suitable for all industrial motive power batteries from 24 V to 80 V. They have been specially developed for electric pallet trucks and low-lift order pickers with lateral battery change on roller beds.

The **trak | Xchange MU** is equipped with a roller conveyor. This battery changing unit has a manual gear-assisted device to facilitate the insertion and removal of the battery into the vehicle and to reload it onto the roller beds.

On the **trak | Xchange PU**, the exchange attachments are equipped with a hydraulically driven extension and a corresponding electromagnet.

They have a hydraulic device for easy insertion and removal of the battery into the vehicle and onto the roller beds.

The **trak | Xchange MU** and **PU** systems can be moved freely and allow a quick battery change. At the same time, the safe transport of the battery is ensured by a locking device.



trak | Xchange MU



trak | Xchange PU

Charging station components

- ▶ **trak | Xcharge**
Space-saving system rack
- ▶ **trak | charger HF premium**
Powerful high frequency charger
- ▶ **trak | Xchange PU / MU**
Battery changing system for medium to large batteries
- ▶ **trak | monitor 4.0**
Battery management system

Benefits

- ▶ Instant usability
- ▶ Additional warehouse space
- ▶ Compact design
- ▶ Reduced investment costs
- ▶ Easy to expand
- ▶ Quick battery change
- ▶ Increased operator safety

Applications

- ▶ Industrial trucks
- ▶ Commercial vehicles
- ▶ Agricultural and construction vehicles
- ▶ Special-purpose vehicles
- ▶ Cleaning machines
- ▶ Lifting platforms
- ▶ Cold storage warehouses
- ▶ Factory halls
- ▶ Workshops
- ▶ Storage facilities
- ▶ Charging stations decentralised / centralised
- ▶ and many more

Of course, you can also rent our charging stations.

They are resource-friendly thanks to the HOPPECKE take-back and recycling system.



Made in Germany

Saves more than just space: **trak | systemizer** powercube

The outdoor alternative for your charging station with optimum space efficiency

Due to unexpected order peaks, the number of your traction batteries and chargers is no longer sufficient to supply your industrial trucks with energy? Are you planning to convert your fleet from combustion to electric drive? But an extension of your charging station is not possible due to lack of space, low budget or high safety standards? We understand your challenges.

The trak | systemizer powercube is a comprehensive solution for battery changing of industrial trucks. The charging container is a fully mobile charging station with an integrated ventilation system, a heater and lighting and features a wide range of sophisticated technologies.

Everything that you need in order to use the trak | systemizer powercube is an electrical connection. This means that it can be set up outdoors at the factory site but also at any location within the production site that has a power outlet.

When constructing new buildings, planning and installation of charging and changing stations is no longer necessary. The space in the warehouses can be used for your core business and high insurance costs for fire-sensitive areas can be saved.

This guarantees that your vehicle fleet will always be supplied with power, both on a centralised and decentralised basis.

The trak | systemizer powercube helps you to free up space and offers improved flexibility, for example during peak periods with a high level of utilisation.

Benefits

- ▶ Flexible outdoor solution
- ▶ Easy to expand
- ▶ Reduced investment costs
- ▶ Compliance with legal requirements
- ▶ Additional warehouse space
- ▶ No oxyhydrogen gas emissions
- ▶ Rent / resale option available
- ▶ No construction time / readily available



49%
up to 49% lower
installation costs

Sample calculation: Construction **trak | systemizer** powercube

The costs listed in the calculation example have been provided by an independent engineering and planning office. This is a cost estimate based on decades of experience on the part of the architect. The costs may vary according to the individual customer.

Work package	Construction	Powercube
Planning and approval	6.200 €	250 €
Construction costs	68.000 €	1.900 €
Interior work (infrastructure)	48.000 €	61.700 €
Approval and commissioning	3.850 €	1.000 €
Total	126.050 €	64.850 €

Use Case | Outdoor solution



The challenge

The company wants to extend its charging station but does not have the possibility to expand the premises.

- ▶ An expansion of the building was not possible due to lack of space
- ▶ No overnight charging possible due to individual fire protection concept
- ▶ Complying with the EN 62485-3 safety standard for traction batteries
- ▶ Outdoor charging must be temperature independent

HOPPECKE developed a tailor-made solution to expand the charging facilities of a logistics company

Unexpected bottlenecks in the workload, more space required in the warehouse and pre-existing fire protection and safety regulations presented the logistics company with the challenge of having to relocate the expansion of its charging infrastructure.

The trak | systemizer powercube makes it possible to change and charge batteries outdoors instead of indoors. This solution preserves space and allows flexibility, for example when there is an increase in order volume.

Together with the warehouse operator, a concept for the optimal positioning of the charging containers was developed. HOPPECKE supported the customer in the preparation of the official applications and in the necessary expansion of the existing infrastructure.

After analysing the local facilities, HOPPECKE took on the implementation and installation of the charging container including the chargers and batteries.

Customer benefits:

- ▶ Additional storage space
- ▶ Savings on investment costs
- ▶ Compliance with legal requirements
- ▶ Season-independent charging
- ▶ Compliance with the Water Resources Act
- ▶ Time saved by eliminating the need for building planning
- ▶ High flexibility when charging different batteries

HOPPECKE Batterien GmbH & Co. KG
Bontkirchener Str. 1
59929 Brilon
Fon: +49 (0) 2963 61-475
Fax: +49 (0) 2963 61-270
E-Mail: motivepower@hoppecke.com

