

trak[®] power trak[®] basic 50 Hz trak[®] LiOn charge

Innovative and diverse charging technologies
from HOPPECKE for all motive power applications



Motive Power Systems

Reserve Power Systems
Special Power Systems
Service

Your benefits from HOPPECKE battery chargers

- The most suitable charging technology for your specific applications and requirements – high-frequency and 50 Hz charging systems - **and for all types of battery**
- Protective and optimal charging of the traction batteries of your electric vehicles at all times
- Reliable, efficient and user-friendly charging systems
- Use of innovative technology plus constant developments in engineering and quality

Typical applications of HOPPECKE chargers

- All motive power applications
- All traction battery technologies (PzS, PzV, NiX, Li-Ion, AGM)



Similar to the illustration

All charging technologies from a single source

High-frequency charging technologies

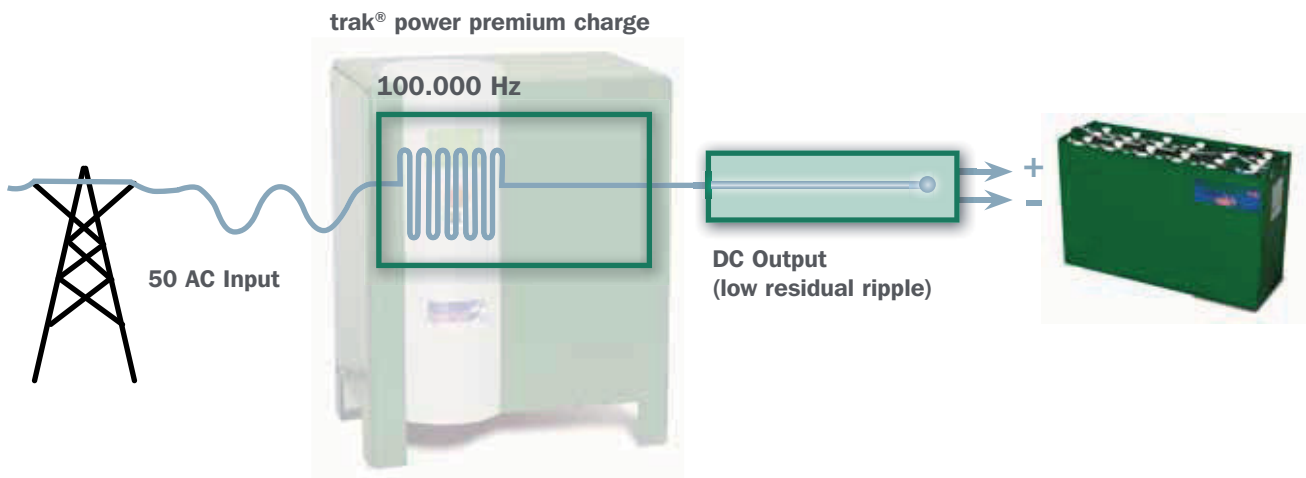
From 50 Hz through to high-frequency charging technology, HOPPECKE develops and produces its own chargers, perfectly attuned to the battery, at its German production centre in Zwickau.

Technical features of high-frequency and 50 Hz charging technology

High-frequency (HF) charging technology (HOPPECKE trak® power and trak® LiOn ranges)

HF chargers are industrial chargers with automatic mains regulation. In this charging system, the electrical alternating current of 50/60 Hz from the mains power systems is converted to direct current by the high-frequency technology. This produces a regulated charging

characteristic, which facilitates precise charging times. On top of that, battery and capacity assignment may be programmed freely. All battery technologies may be charged using the high-frequency technique.



- Rectify
- Generate high alternating frequency (HF)
- Transform
- Rectify
- Smooth

All charging technologies from a single source

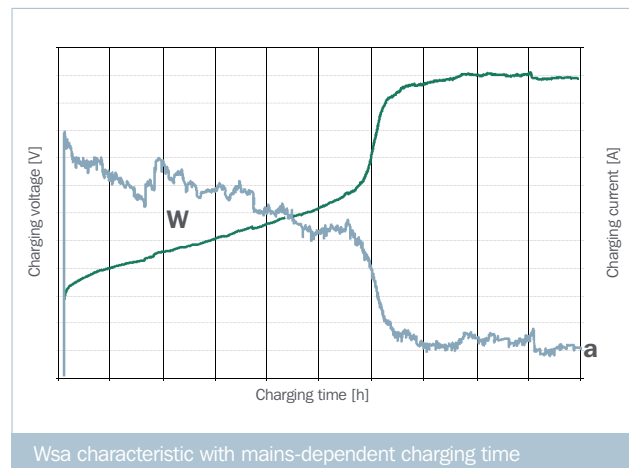
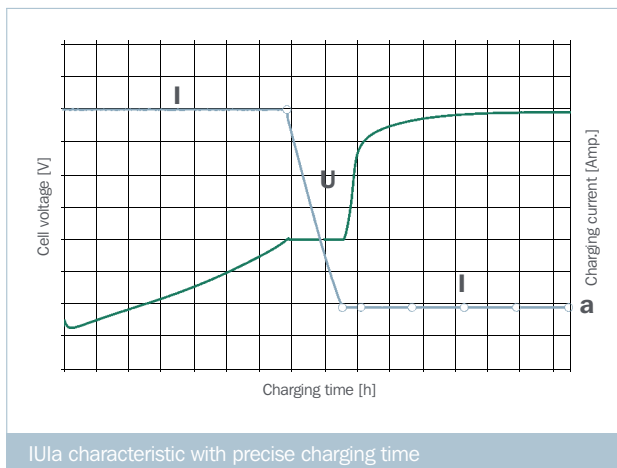
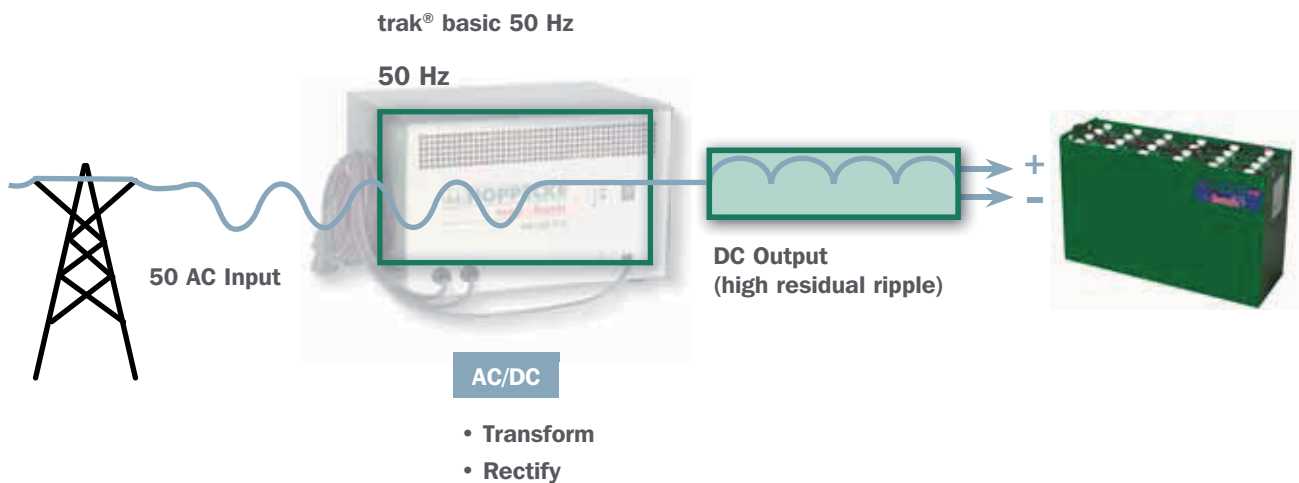
50 Hz charging technology

50 Hz charging technology (HOPPECKE trak[®] basic 50Hz)

50 Hz chargers are unregulated chargers, also known as W chargers (W stands for resistance characteristic). The electrical alternating current of 50 Hz is converted using a conventional transformer and passive rectifier bridges. This produces a charging characteristic with

charging times which are dependent on mains voltage fluctuations.

With this charging technology, battery voltage and capacity are rigidly assigned. Only vented lead-acid batteries may be charged using 50 Hz charging technology.



trak[®] power

HOPPECKE innovative and efficient high-frequency (HF) charging technology

Battery and charger together form the basic system of your mobile energy supply. Alongside the correct battery technology, voltage and capacity, the most suitable charging system plays a critical role in ensuring efficient and economical use of your traction energy system.

trak[®] power chargers come equipped with the intelligent firmware for microprocessor control developed by HOPPECKE. They are especially energy-saving in opera-

tion and take top place on the rating scale for energy consumption, similar to efficiency class 1A.

HOPPECKE trak[®] power chargers are as diverse as their applications. With chargers from the ranges **trak[®] power premium charge**, **trak[®] power multi charge**, **trak[®] power rapid charge** and **trak[®] power mini**, you will always find the optimal charging system for optimum battery performance and long battery life.

Benefits of HOPPECKE trak[®] power HF charging technology

■ Lower operating costs through reduced energy consumption

This HOPPECKE primary-cycled high-frequency charging technology gives an improvement in efficiency to over 92% and energy savings in every charging operation of around 12% as compared with conventional 50 Hz chargers.

■ Excellent flexibility and operating safety due to the modular charger design

Chargers of the trak[®] power range consist of several power modules, which may be retrofitted at any time to increase performance. Through the redundant circuitry of the power modules, trak[®] power chargers offer maximum operating safety in comparison with standard HF and 50 Hz chargers.

■ Lower electrical installation and energy costs (no additional costs for reactive current compensation)

High-quality reactive current compensation is standard in all chargers.

■ Gentle and optimal charging of the battery

The regulated HF charging method with automatic correction of possible mains fluctuations of +/- 10% rules out undercharging or damage (or overloading) due to mains voltage fluctuations.

■ Safer operation without monitoring

Thanks to HOPPECKE charging electronics, automatic adjustment of charging progress to the current state of charge of the battery is made after a power failure.

■ Freedom to decide when purchasing batteries – safe investment for the future

Chargers in the trak[®] power range may be used to charge all types of battery.

■ High standards of safety

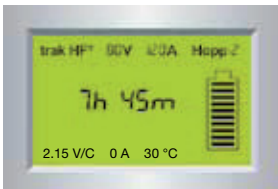
All units in the trak[®] power HF charger range are tested to the latest EMC standard.

trak[®] power premium charge

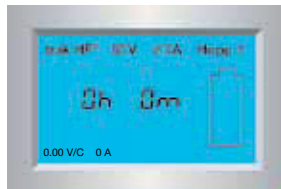
High-frequency (HF) charger for all motive power applications



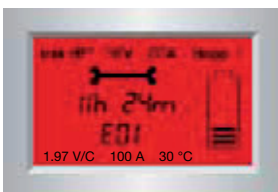
LCD display



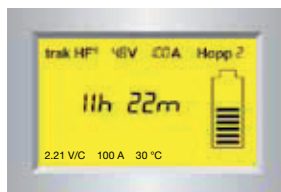
End of charging



Standby



Fault



Charging



LED display



Power LED lamp

HOPPECKE trak[®] power premium charge HF chargers are suitable for all motive power applications and may be specially configured for your requirements. These high-grade chargers have a wide range of both standard and optional equipment features, leaving scarcely any desire unmet.

Areas of application:

- Single and multi-shift operation
- Continuous operation 24/7
- Normal and/or heavy-duty operation
- Opportunity charging (with trak[®] air – electrolyte circulation)
- Extreme conditions (e.g. in close vicinity to cold stores)

Rating:

- Voltage: from 12V to 120V
- Capacity (C₅ 30°C): from 40 Ah to 1550 Ah

Additional features and benefits:

■ Large LCD or LED display, freely selectable

State of charge easy to read, even from a distance. All-round visualisation through optional power LED lamp on the charger

■ Compact, lightweight construction

Suitable for wall and rack mounting. Space-saving installation in the charging station due to straight-line design

■ Charging cycle memory is standard

Stores information from the last 200 charging cycles for analysis

■ Optional networking of chargers via trak[®] monitor

Central memory for all charging and battery data for detailed analysis and optimisation of use of your motive power energy systems

■ Automatic battery temperature monitoring

Interactive charging system for cold store applications or major fluctuations in ambient temperature

■ Programmable start of charging with weekly schedule

Reduces peaks in mains power loading and facilitates use of the more favourable off-peak charging period

■ Ready for trak[®] air (electrolyte circulation system)

Automatic control of trak[®] air. High battery availability through intermediate charging plus reduction in your energy costs of up to 30% with the trak[®] air system.

trak[®] power multi charge

HF chargers for simultaneous charging of several batteries and industrial trucks



HOPPECKE trak[®] power power multi charge HF chargers have been specially developed for simultaneous charging of several small or large traction batteries.

The trak[®] power multi charge charging cubicle contains **up to eight independent HF chargers**. This investment-protecting solution saves a large amount of space in your charging station.

This range of chargers also provides you with a very high level of operating reliability. If any charger module malfunctions, trak[®] power multi charge continues to be operational.

Areas of application:

- Single and multi-shift operation
- Continuous operation 24/7
- Normal and/or heavy-duty operation
- Opportunity charging (with trak[®] air – electrolyte circulation)
- Extreme conditions (e.g. in close vicinity to cold stores)

Rating:

- Voltage: from 12V to 120V
- Capacity (C₅ 30°C): from 40 Ah to 1550 Ah

Additional features and benefits:

- **Up to 8 large LCD displays**
State of charge easy to read, even from a distance. One LCD display per charger module
- **Simultaneous charging of batteries with different voltages**
Up to 8 independent chargers in one housing
- **Charging cycle memory is standard**
Stores information from the last 200 charging cycles for analysis
- **Automatic battery temperature monitoring**
Interactive charging system for cold store applications or major fluctuations in ambient temperature
- **Programmable start of charging with weekly schedule**
Reduces peaks in mains power loading and facilitates use of the more favourable off-peak charging period
- **Ready for trak[®] air (electrolyte circulation system)**
Automatic control of trak[®] air. High battery availability through opportunity charging plus reduction in your energy costs of up to 30% with the trak[®] air system
- **IP protection rating up to 54 possible**
Suitable for use in damp and/or dusty environments

trak[®] power rapid charge

High frequency (HF) quick charge system



HOPPECKE trak[®] power rapid charge HF chargers have been designed especially for rapid charging of traction batteries. Your batteries are charged within **2.5 hours** to 95% of their original state of **charge**. With trak[®] power rapid charge you can make a considerable reduction in your capital costs and achieve a major increase in your productivity. You do not need a central battery charging station (perhaps with changeover batteries and corresponding accessories).

Through the rapid opportunity charging during pauses and shift changeover, the system is fully integrated in your processes, and raises the availability of your industrial trucks.

Areas of application:

- Multi-shift operation
- Continuous operation 24/7
- Heavy-duty operation

Rating:

- Voltage: from 12V to 120V
- Capacity (C₅ 30°C): from 40 Ah to 1550 Ah
- Example: 48V/320A with standardised CEE 32A socket outlet possible

Additional features and benefits:

- **Use of trak[®] air as standard**
Gentle charging of the battery. Lower temperature evolution than with conventional systems
- **Large LCD display**
State of charge easily read even from a considerable distance.
- **Charging cycle memory is standard**
Stores information from the last 200 charging cycles for analysis
- **Automatic monitoring of electrolyte level and battery temperature**
Audible warning in the event of deviations
- **Programmable start of charging with weekly schedule**
Reduces peaks in mains power loading and facilitates use of the more favourable off-peak charging period
- **IP protection rating up to 54 possible**
Suitable for use in damp and/or dusty environments

trak[®] power mini

HF charger for ware house applications



LED display



Areas of application:

- Single and two-shift operation
- Light-duty and normal operation

Rating:

- Voltage: from 12V to 120V
- Capacity (C₅ 30°C): from 20 Ah to 750 Ah

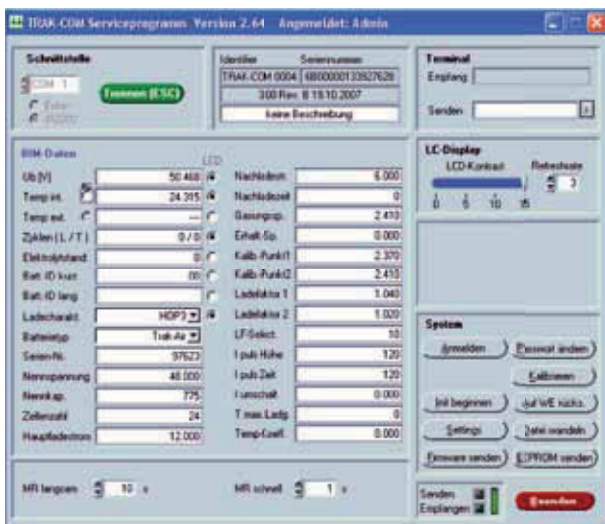
Additional features and benefits:

- **Compact, lightweight construction**
Floor bracket with bolts for rack mounting and holes on rear side for wall mounting provided as standard. Straight-line design facilitates space-saving installation
- **Power LED display**
State of charge easy to read from a distance
- **Automatic start and stop**
Easy to handle
- **Plug-in charging cable on the charger**

The HOPPECKE trak[®] power mini HF range of chargers has been **specially developed for use with smaller industrial trucks, electric lift trucks, order pickers, lifting and access platforms and cleaning machines**. This series is excellent for the charging of different battery technologies such as lead-acid, AGM/lead-gel, lithium-ion and nickel-metal-hydride. This is achieved simply by suitable programming of the chip inserted in the front of the charger

trak[®] com IP

Interactive charging and discharge via battery communication module



The battery identification and inspection module **trak[®] com IP records battery-relevant parameters and transmits the battery data, battery temperature and electrolyte level to the charger for correct charging.** By this means it is possible for one charger to recognise and charge different voltages, capacities and battery technologies (chaos charging). With trak[®] com IP, charging current is disconnected quickly if battery charging is interrupted without the STOP button being actuated.

Parameters recorded:

- Manufacturer and date of manufacture
- Serial number
- Battery type and technology
- Charging parameters
- Rated capacity and voltage
- Battery voltage
- Battery temperature
- Electrolyte level

Additional features and benefits:

- **Lower capital costs**
through "chaos" charging
- **Enhanced operating safety**
through early disconnection of charging current
- **User-friendly system**
Recorded data may be read directly
- **Timely scheduling of maintenance work**
from early warning of low electrolyte level
- **Protection of your battery**
The temperature-controlled interactive charging safeguards battery life
- **Universal system**
May be used with all current makes and can be retrofitted at any time

This avoids accidents in operation. With the integral LC display you can read the recorded data without the use of peripherals. The display changes every three seconds.

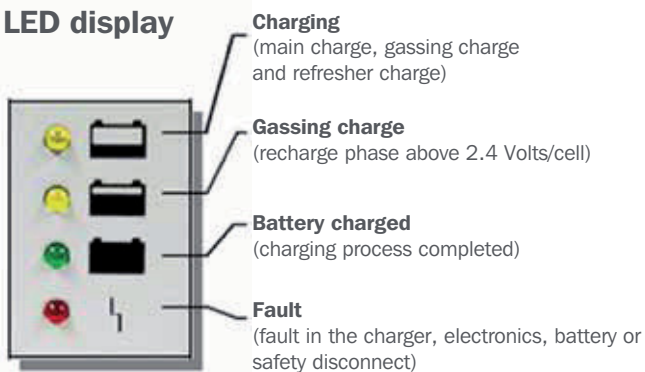
trak[®] basic 50 Hz

50 Hz charging system for light to normal duty in single-shift operation



The HOPPECKE trak[®] basic 50 Hz range of chargers is especially suitable for light to normal duty in single-shift operation. This solid and reliable series offers **top class quality at a competitive price.**

LED display



Areas of application:

- Single-shift operation

Rating:

- Voltage: 24V, 48V, 80V
- Capacity (C₅ 30°C): from 120 Ah to 1550 Ah

Additional features and benefits:

- **Excellent price/performance ratio**
Tested in accordance with the “quality specifications for chargers for HOPPECKE lead-acid traction batteries”
- **May be used for different battery capacities**
- **High standard safety in operation**
ZVEI-compliant in respect of safety disconnect and charging characteristics
- **Gentle charging of the battery**
 - Charging current variations during mains power fluctuations are lower than for Wa chargers
 - Optimal capacitive charging current with minimum assignments up to 12.5 A/100 Ah
- **Guaranteed full charging of the battery**
Charging disconnect criterion is independent of battery age and manufacturer
- **Table units may be wall-mounted**
- **Durable design**
Robust industrial design
- **Very easy to use**

The right charger

for your applications and requirements

	trak® power premium charge	trak® power multi charge	trak® power rapid charge	trak® power mini	trak® basic 50 Hz	trak® LiOn charge
Areas of application						
Single-shift operation	■	■	■	■	■	■
Multi-shift operation	■	■	■	■		■
Continuous operation 24/7			■			■
Battery rated voltage (V)	12-120	12-120	12-120	12-24	24, 48, 80	3-400
Special battery rated voltage (V)	■	■	■	■		■
Battery capacity range (Ah) – C ₅ 30 °C	40-1550	40-1550	40-1550	20-750	120-1550	10-200
Battery technologies						
Lead-acid vented (PzS)	■	■	■	■	■	
Lead-acid sealed (PzV, AGM, gel)	■	■	■	■		
Fibre-Nickel (FNC®)	■	■	■			
Nickel-Metal Hydride	■	■	■			
Lithium-Ion	■	■		■		■
Charging systems						
HF, primary-cycled IUI a characteristic curve	■	■	■	■		■
50Hz, unregulated W characteristic curve					■	
Charging times						
approx. 2.5 hours with trak® air (95% SOC)			■			
0.5 – 1 hour						■
5 – 12 hours	■	■	■			
8 – 12 hours				■	■	

The right charger

for your applications and requirements

	trak® power premium charge	trak® power multi charge	trak® power rapid charge	trak® power mini	trak® basic 50 Hz	trak® LiOn charge
Funktional features						
Integral reactive current compensation	■	■	■	■		■
Ampere-hour balancing	■	■	■	■		■
Automatic refresh charging	■	■	■	■	■	
Manual equalising charging	■	■	■	■		
Opportunity charging possible (where required with trak® air)	o	o	■			■
Desulphation charging	■	■	■	■		
Sulphation barrier	■	■	■			
Automatic recognition of charged batteries	■	■	■			
Integral CAN bus	■	■	■			■
USB interface	■	■	■			■
Connectable to trak® monitor battery management system	■	■	■			■
State of charge display with countdown	■	■	■			■
Charging cycle memory	■	■	■			■
Programmable start of charging	■	■	■			■
Automatic start and stop	■	■	■	■	■	■
Fault diagnosis and safety cutoff	■	■	■	■	■	■
Automatic monitoring and indication of electrolyte level	o	o	o			
Temperature-controlled charging	■	■	■			
Early disconnection (in the event of interruption without actuation of STOP button)	o	o	o			
Interactive charging via trak® com IP battery inspection module	o	o	o			
Equipment features						
Large LCD display	■	■	■			■
Power LED display	o	o	o	■		
External state of charge display	o	o	o			o
trak® air electrolyte circulation	o	o	■			
Wall and rack mounting system	o			o	o	o
Dust filter	o	o	o	o		o
IP 54 protection rating		o	o			
External temperature sensor	o	o	o			
Steel underframe	o			o		o
Programmable, external chip				■		
Included, plug-in power and charging cables				■		
Stop button	■	■	■	■	■	■
Charging plug connector	o	o	o	o	o	o
Equipment cooling (convection)					■	

■ Standard o optional

trak[®] LiOn charge

Charger for use with lithium-ion batteries for motive power applications



Lithium-ion batteries require special charging technology. The intelligent electronics and the battery management and monitoring system control and monitor charging, to ensure gentle full charging and safe operation. The HOPPECKE trak[®] LiOn charge unit provides rapid charging of your lithium-ion battery, **which can be fully charged within an hour.**

Areas of application:

- Multi-shift operation
- Continuous operation 24/7
- Heavy-duty operation

Rating:

- Voltage: from 3V to 400V
- Capacity: from 10 Ah to 200 Ah – Further capacities on request

Additional features and benefits:

■ Power LCD display

State of charge easy to read, even from a distance

■ Compact, lightweight construction

Suitable for wall and rack mounting. Space-saving installation in the charging station due to straight-line design

■ Communications interface to the trak[®] LiOn battery

Optimal charging of the lithium-ion battery



Motive Power Systems



Reserve Power Systems



Special Power Systems



Service



HOPPECKE subsidiaries and factories - European sales and service network

Industrial batteries - Complete energy systems - Full Service

- Low-maintenance and no-maintenance batteries
- Innovative battery chargers based on the latest technology
- Battery accessories
- Battery management systems and software
- Battery changeover systems
- Battery/charger servicing
- Battery recycling
- Applications engineering and technology
- Battery room design
- Technical training and seminars
- Leasing
- Power by the hour

Your partner for sustainable energy solutions!

Further information on www.hoppecke.com

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POWER FROM INNOVATION