

# Energy solutions.

Full steam ahead.

For greater efficiency and less CO<sub>2</sub>.



 **JUNGHEINRICH**

 **JUNGHEINRICH**

**ENERGY SOLUTIONS**

Holistic energy concepts from a single source.

03

**ENERGY CONSULTING**

Expert advice. From carrying out a requirement assessment to creating a complete turnkey solution.

04–05

**ENERGY SYSTEM**

Networked smart services for holistically improved energy management.

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**LITHIUM-ION BATTERIES**

The high-performance option – fulfilling the highest demands for performance and availability.

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**LEAD-ACID BATTERIES**

Proven technology for reliable performance at an affordable price.

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**BATTERY CHARGERS**

Mobile or integrated – the perfect battery charger to suit your warehouse environment.

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Comprehensive service and maintenance following implementation.

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Interesting facts about the leading provider of intralogistics solutions along with information regarding our products, systems and services.

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# Optimum performance is what drives us.

Holistic energy concepts from a single source.



We provide a comprehensive range of services for energy-efficient set-up or modernisation of your fleet. Thanks to our in-depth knowledge and support that goes far beyond the implementation phase, we ensure a sustainable return on investment and a fleet that is constantly moving forwards.

# Energy consulting.

With a unique range of solutions, we can revolutionise energy usage in your warehouse.

## FULL SERVICE PROVIDER

Professional energy management in the warehouse is becoming increasingly important. We can support you every step of the way. As specialists in comprehensive energy concepts, we offer sustainable intralogistics with smart use of resources. In cooperation our specially trained, experienced energy experts select the right option for your warehouse. They carry out an in-depth assessment of your energy infrastructure, suggest measures for optimisation if necessary and develop a tailor-made ecosystem from perfectly coordinated components. This could include trucks using innovative lithium-ion technology as well as suitable battery chargers. In addition, we integrate energy storage systems that reduce the demands on the power supply and guarantee full charging capacity even in periods of high utilisation. The result is maximum efficiency at all times.

- ▶ Planning, project management, implementation and optimisation from a single source.
- ▶ Customised energy and charging concept as well as process consultancy from trained, experienced experts.
- ▶ A wide range of technology (e.g. battery types, charging concepts, power generation).
- ▶ A high degree of innovation through in-house research and development.
- ▶ Maximum availability, even with large fleets and three-shift operation.
- ▶ Falling energy costs thanks to consumption based models (taking peaks into account).
- ▶ Supporting a sustainable energy supply, e.g. by reducing consumption, reducing CO<sub>2</sub> emissions and using renewable energy sources.
- ▶ Continuous adaptation of the solution according to your needs, even after implementation.

# SMART ENERGY!

## THE JUNGHEINRICH CONSULTING MODEL

### STEP 1

#### NEEDS RECOGNITION

Together we look at the status quo and define your energy solution goals, in due consideration of economic efficiency.

### STEP 2

#### ANALYSIS

We carry out detailed inventory and process mapping (current energy profile).

### STEP 3

#### CONCEPT

We evaluate the data, create a target energy profile, present a detailed cost and action plan and generate the perfect energy concept (covering efficiency and CO<sub>2</sub> footprint).

### STEP 4

#### IMPLEMENTATION

Layout planning and commissioning of the solution or the complete ecosystem (batteries, trucks, battery chargers, process adjustments and storage systems).

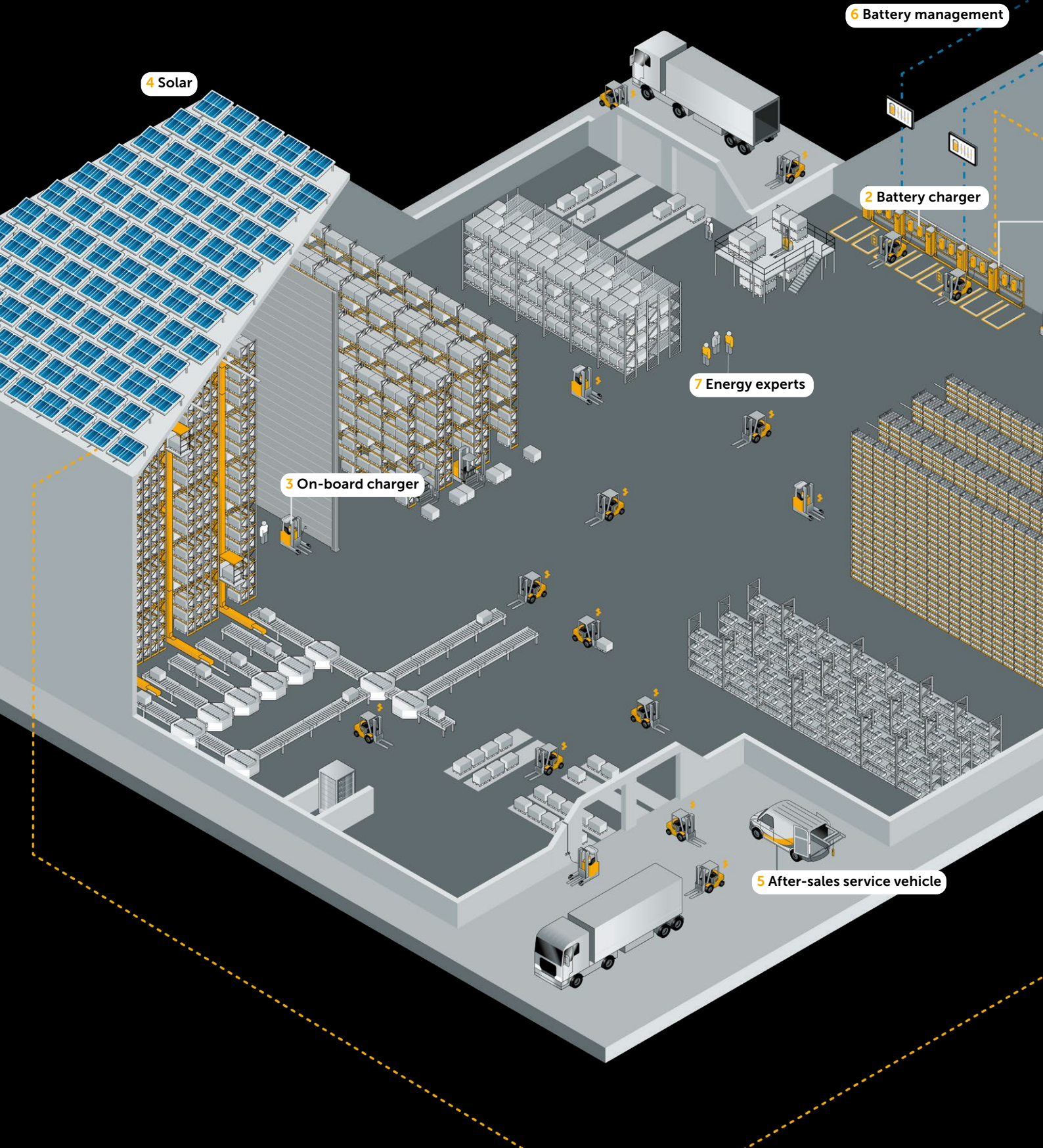
### STEP 5

#### OPTIMISATION

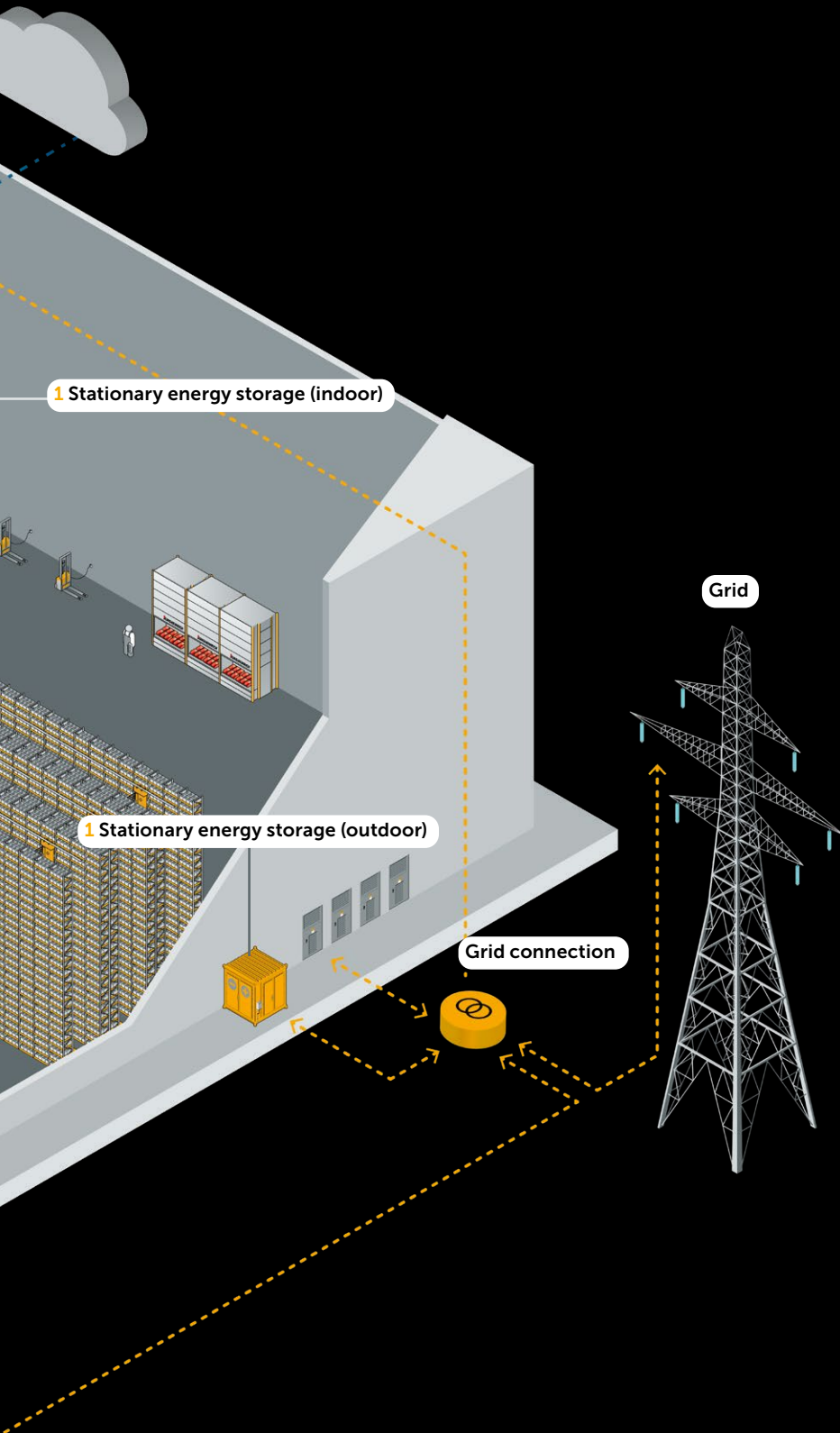
Energy is a key area for innovation. The requirements in your warehouse are also constantly changing. Therefore, we will continue to adapt your system on an ongoing basis.

# The energy system in the warehouse

Keeping everything in motion with networked smart services.



# ehouse.



## 1 Stationary energy storage (indoor/outdoor)

Manage energy resources efficiently with buffer solutions that absorb and temporarily store energy so that it can be made available again at peak times.

## 2 Battery charger

Jungheinrich provides high-frequency charging technology for all voltage classes in line with the highest performance requirements to ensure fast and safe intermediate charging and recharging. Achieve efficiency levels of up to 93%.

## 3 On-board charger

Vehicles with integrated HF charging technology offer great flexibility. They can be quickly recharged at any socket and off they go.

## 4 Solar

Long-term solutions: By integrating renewable energy systems, e.g. using solar power, there are fewer CO<sub>2</sub> emissions.

## 5 After-sales service vehicle

Fast, competent and in use worldwide: Jungheinrich's energy fleet makes it easy to repair lithium-ion battery storage systems on site.

## 6 Battery management

Battery management is a cloud-based information system. It continuously collects data during operation, e.g. data relating to performance or charge status. Among other benefits, this optimises the life of the batteries.

## 7 Energy experts

Highly trained specialists provide personalised advice and support as well as optimisation measures that are always up to date with the latest technology.

# Lithium-ion batteries.

The future is electric. Lithium-ion technology combines consistent performance with virtually maintenance-free operation and minimal charging times.

## INNOVATION FROM THE MARKET LEADER.

No other well-known brand currently has as many industrial trucks with lithium-ion technology in use as Jungheinrich. As a pioneer of innovative electrification, we can offer you a complete system consisting of truck, charging technology and battery that will revolutionise your fleet. By relying on rapid intermediate charging and recharging, your trucks will benefit from optimum availability and require virtually no maintenance work. Thanks to smart energy recovery and lower consumption, you will also save on energy costs and improve your ecological footprint.

- ▶ Ideal for multi-shift operation.
- ▶ High availability thanks to intermediate charging and a lack of time-consuming battery replacements.
- ▶ Eliminates the cost of a second battery.
- ▶ Safe return on investment thanks to high efficiency and long service life.



## We also retrofit third-party fleets!

Even if your fleet is not made by Jungheinrich, you can still benefit from lithium-ion power.



## Non-hazardous

Jungheinrich uses lithium iron phosphate (LiFePO<sub>4</sub>), currently the safest cell chemistry, which is non-toxic and non-hazardous from an ecological perspective.

## LITHIUM-ION PERFORMANCE IN FIGURES:

### 20%

Up to 20% less consumption and CO<sub>2</sub> emissions

### 3x

Battery life is at least 3 times longer than conventional batteries

### 80 min.

Fully charged in just 80 minutes

### 5 years

5-year manufacturer's warranty



# Take the first step. Get lithium-ion power.

**PERFORMANCE-ORIENTED.**

We offer a 5-year guarantee and a 6-month exchange period.

**HIGHLY EFFICIENT.**

Lower energy consumption and longer life compared with lead-acid batteries.

**ALWAYS READY TO GO.**

Zero maintenance.

**DURABLE.**

Can also be used in multi-shift operation.

**ULTRA-FAST.**

Intermediate charging and recharging at maximum speed.



Full li-ion power.  
Full conversion right.

**LI-ION**  
technology

**5** YEARS  
**GUARANTEE**  
ON LI-ION BATTERIES

# Lead-acid batteries.

Our proven battery technology provides powerful performance and maximum reliability at an affordable price. With a single charge, forklifts are able to complete two shifts at a time.

## PROVEN ALL-ROUNDERS.

Robust, scalable and therefore perfectly adapted to the respective tasks in your warehouse – this is what you can expect from Jungheinrich lead-acid batteries. We offer the full range of products from 24 to 80 volts. For light to moderate applications, you have the option of extended maintenance intervals to maximise cost efficiency.

## DO YOU WANT TO IMPROVE YOUR EFFICIENCY?

### WE OFFER THE FOLLOWING ADDITIONAL OPTIONS:

- ▶ "Electrolyte circulation" option.  
For faster charging.
- ▶ "Aquamatik" option.  
Saves time and always ensures the optimal fill level.

## TWO SHIFTS. ONE CHARGE. ONLY ONE PROVIDER.

With 2Shifts1Charge the trucks are able to complete two shifts at a time without having to have their batteries replaced or recharged. This is possible thanks to our newly developed synchronous reluctance motor combined with additional components, which are also guaranteed to provide maximum efficiency. The motor converts around 93 percent of the energy into power, reducing energy loss by half. As a result, you save valuable time and precious energy while simultaneously reducing operating costs.



### Optimised plate alloys

These can complete up to 120 cycles (charging/discharging) without the need for a water refill. In turn, this extends the maintenance cycles.



**MORE  
PUNCH**  
TO LAST MORE  
**ROUNDS.**



**2SHIFTS**  
**1CHARGE**  
GUARANTEED



# Battery chargers.

High quality based on our own research and development:  
We have the right charger to suit every type of battery technology and every peripheral device.

## STATIONARY CHARGERS

At Jungheinrich you receive the battery, truck and battery charger from a single source. All components are 100% compatible to each other. This optimises the performance of your batteries and extends the service life. Thanks to fast charging and intermediate charging, your trucks are ready for operation again in no time at all – whether this is for one, two or three-shift operation or for light, medium or heavy-duty applications.

- ▶ Suitable for all applications from 24 to 80 volts.
- ▶ Automatic compensation charging. Ensures even charging of the cells and thus optimal availability.
- ▶ Automatic trickle charging. Prevents the lead-acid battery from self-discharging if it is not used for a long time.
- ▶ Electrolyte recirculation option. For intensive operations with intermediate charging.

## ON-BOARD CHARGERS

The on-board chargers offer maximum versatility. Simply connect to a conventional socket in the evening or between shifts, and your truck is ready for use again. The high-frequency technology makes the charging process particularly smooth.



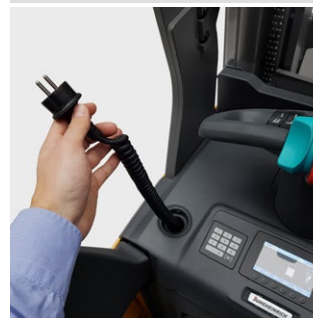
### SLH 300/300i

The all-rounder with high-frequency technology. Flexible and energy-saving, particularly quick charging, suitable for lithium-ion and lead-acid batteries.



### SLT 150

The economical option with transformer technology. Easy to use, safe to handle, low procurement costs.



### On-board charger

Easy-to-operate mains connector for on-board charger.



# Energy and battery service.

Concentrated power whenever you need it: Our services guarantee that your fleet is fully operational.

Powerful performance, a long service life and high availability are key factors for optimal energy efficiency in your warehouse. We support you with a comprehensive service package for batteries and battery chargers. When needed, we will provide you with replacement batteries and care tips or carry out status inspections and maintenance work. We ensure that your intralogistics solution never loses momentum.

- ▶ Investment security for trucks, batteries and battery chargers.
- ▶ Consistently high performance from your batteries.
- ▶ Maximum reliability for operators.
- ▶ Battery charger inspections in accordance with legal guidelines.



#### **Battery charger service**

We check the function and safety of chargers in accordance with all relevant legal regulations and supply an inspection sticker.



#### **Battery service**

Includes status inspections, maintenance, replacement and care tips: As your reliable energy supplier, we ensure consistently high performance.

# Lithium-ion power for DHL.

At the new European spare parts centre (ESPC), the logistics service provider DHL relies on innovative lithium-ion technology for a large proportion of its industrial truck fleet.

## SOLUTION FOR GROWING DEMANDS.



DHL has been managing the logistics operations for the Ricoh Europe supply chain from Bergen op Zoom for several years. Spare parts sales have also recently moved to this location. In order to meet the increased demands for throughput and performance, the fleet was switched to lithium-ion technology. A total of 13 new transport trucks now ensure maximum efficiency in spare parts management for the world's largest logistics service provider. "We have wanted to switch to lithium-ion technology for some time now", says warehouse manager Albert Leenderse. "We had discussions with Jungheinrich and our energy supplier two years ago. At that time, the technology was still considered too untested."

## BACK IN OPERATION IN 15 MINUTES.



DHL has strict rules for charging the new batteries. The transport trucks with lithium-ion batteries are connected to a nearby quick charger during coffee breaks. "The batteries are fully charged again in just 15 minutes, and all transport trucks can then be used during the 13-hour shift. The transport trucks do not have to be charged in the evening, and we can be sure that they will be fully operational again the next day", explains Leenderse.





## SAVING TIME AND INCREASING PRODUCTIVITY.

Ricoh and DHL are very happy with their decision. "Lithium-ion batteries offer many advantages. The technology is more energy-efficient and the batteries are maintenance-free, which means we save a lot of money. In addition, the lithium-ion batteries can easily be recharged locally. Time-consuming and somewhat risky battery replacement is no longer necessary. Since the walking and driving distances are now significantly shorter, we can use the employees more productively", explains Leenderse.

## "RECOUP ADDITIONAL COSTS QUICKLY"



According to the warehouse manager, the advantages of lithium-ion batteries outweigh the higher investments: "I am convinced that we will recoup the additional costs. I wouldn't be surprised if we could ultimately achieve the same performance data with fewer transport trucks." Leenderse does not rule out that DHL's entire materials handling technology in Bergen op Zoom will be replaced by lithium-ion transport trucks in the foreseeable future.

## CUSTOMER PROFILE



**2002**

Year of formation



**52,000 m<sup>2</sup>**

Area



**400**

Employees



**15,000**

pallet places

Throughput



**71**

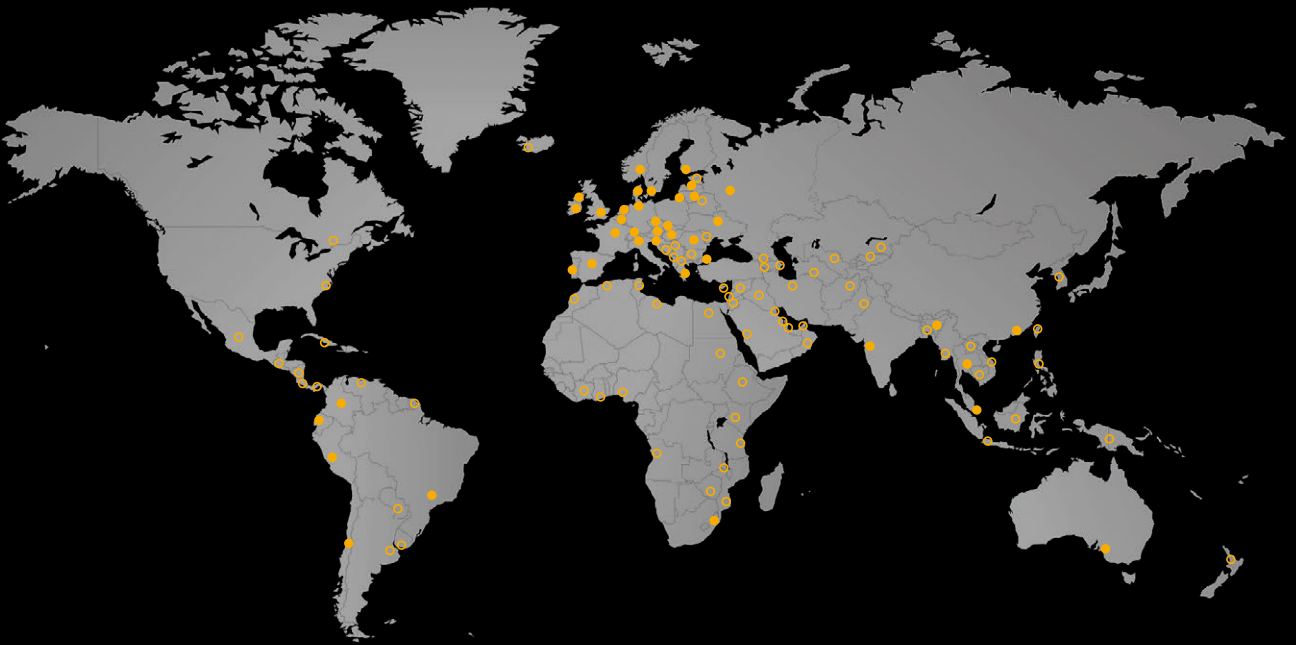
Industrial trucks



**Logistics**

Sector

# A leader in intralogistics. There for you across the globe.



● Our own direct sales companies  
in 40 countries.

○ Partner companies in more than  
70 other countries.

Over 18,000 employees.

More than 5,400 service  
engineers across the globe.

Founded in 1953, Jungheinrich is one of the world's leading providers of intralogistics solutions. With a comprehensive portfolio of industrial trucks, logistics systems and services, we offer tailor-made solutions that allow you to devote your full attention to your core business. With our unique direct sales and service network, you can call upon a reliable partner who is at your side at all times, wherever you may be in the world.



### LOGISTICS SYSTEMS

Based on our comprehensive process knowledge and extensive experience in a wide range of industries, we can provide you with tailor-made logistics systems, ranging from manual to semi-automatic and fully automated solutions. We will thus work together to raise your efficiency and productivity to a whole new level.



### NEW TRUCKS

Lifting, stacking, transporting, order picking – electrically, by combustion engine or by hand? Our product portfolio contains the perfect trucks for your needs.



### RENTAL

Forklift truck rental is not just an ideal solution for addressing short-term or seasonal requirements. Jungheinrich offers "power on demand" for all companies, regardless of their size or industry. We provide rental solutions to suit all requirements, with more than 60,000 trucks available worldwide for immediate use.



### USED TRUCKS

JUNGSTARS are used trucks from Jungheinrich, which are among the best on the market. With high-end reconditioning according to our 5-star principle, every truck is returned to an outstanding technical and visual condition to satisfy the highest safety and sustainability standards.



### DIGITAL SOLUTIONS

With intelligent software and sophisticated hardware components, we ensure complete digital networking within your warehouse. All processes can be monitored centrally and controlled with utmost efficiency. Systems from different manufacturers can also be integrated with ease.



### CONSULTING

Products and services must meet your exact requirements. That is why our consulting combines a high level of technical know-how with process knowledge and in-depth industry expertise. We can thus work together to identify the perfect complete solution.



### FINANCING

Jungheinrich Financial Services is your reliable partner throughout the entire life cycle of your Jungheinrich product. We offer individual solutions for trucks, racking, warehousing and system solutions, while taking your budget and the special requirements of your business into account.



### AFTER SALES

The trouble-free operation of your intralogistics solution is our top priority. That is why we offer reliable, global support for your trucks and systems with more than 5,400 qualified service engineers. This allows us to be on-site within a very short time frame to restore the availability of your trucks and systems.

**ISO 9001** The German production facilities  
**ISO 14001** in Norderstedt, Moosburg  
and Landsberg are certified.

 Jungheinrich trucks  
conform to the European  
Safety Requirements.

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