

**Do you want to  
optimise your  
transport processes?  
We deliver you  
tow trains with  
expert advice.**

**JUNGHEINRICH**









**Plan your  
next train.  
With us.**





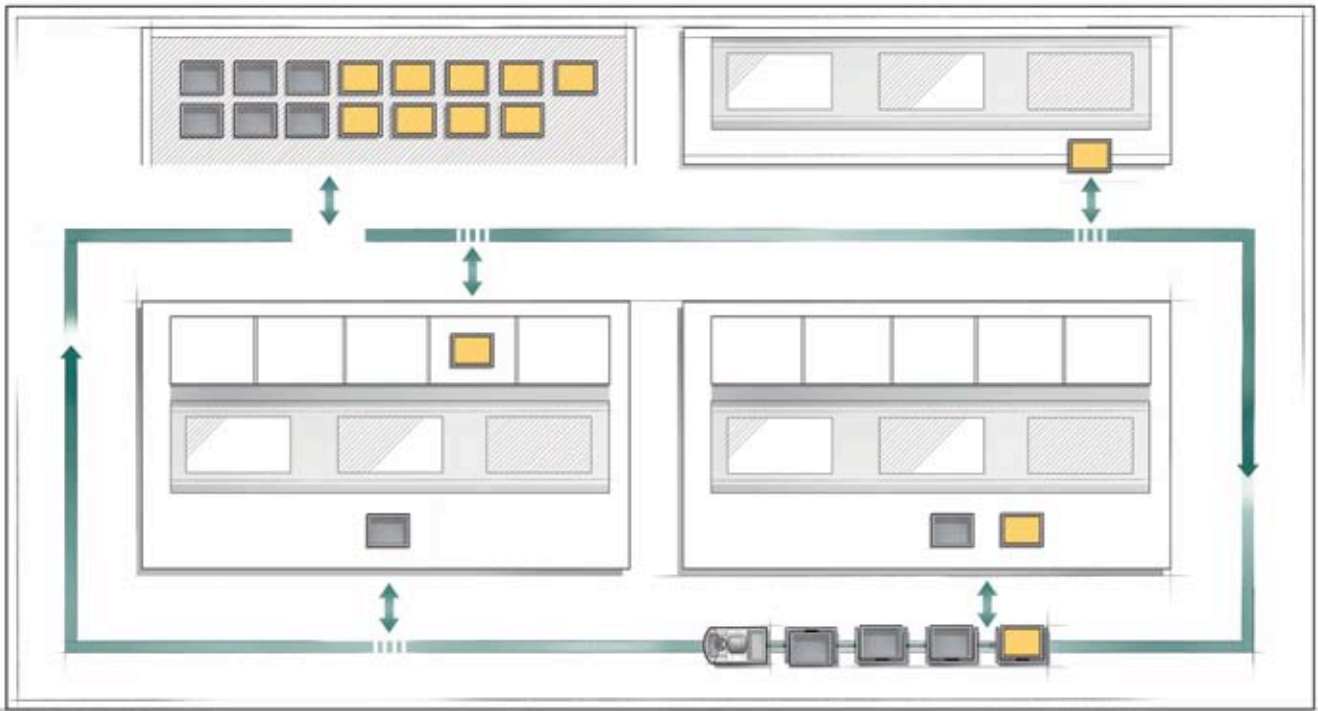
# Our alternative for your material flow: Tow trains.

## When should you change?

Primarily electric fork lifts and pallet trucks are used for transport within warehouses and production areas. If different load carriers and loads are to be transported at the same time, this is where our tow train comes into play. It comprises a tow tractor and at least one, but usually several trailers. These can be loaded and unloaded at different points of use. The design of the technology and planning of the routes are always based on your requirements.

## Less traffic, lower costs

In just-in-time production in particular, the precisely timed supply and disposal of materials to the production machinery is crucial. If conventional fork lift trucks are used, they quickly reach their limits. Often, several trucks must be used simultaneously. This means greater investment and follow-up costs, greater risk of accidents due to a heavy flow of traffic. Our tow train system represents a real alternative because a train is able to serve several pieces of machinery, keeping costs down and calming the traffic situation.

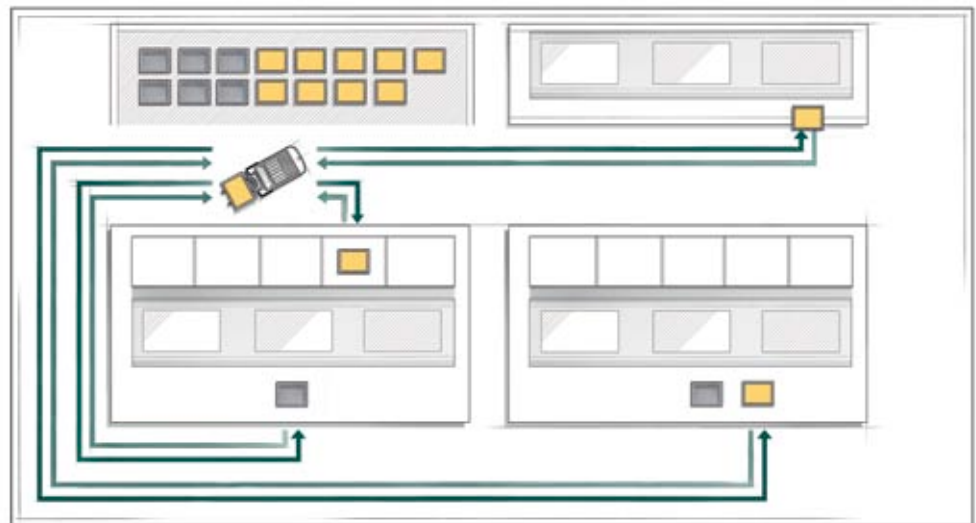


**A comparison:**

Typical factory layout in mechanical engineering with three assembly lines. Comparison of the material flow between tow train (top) and fork lift truck (bottom).

**Summary:**

A fork lift truck requires a route of 4.2 km for supplying with load carriers, whereas a tow train requires a route of 1.8 km.



**From truck technology to comprehensive solution**

Not only do we offer you a graded choice of tow tractors with different drawbar pulls and equipment as well as trailers for a wide range of loads, but also expert consultations on your system. Ranging from the route planning, process integration and optimisation through to connection to control systems and other warehouse technology peripherals. Because we are a one-stop shop. With more than 60 years of experience in the industrial truck, warehousing and materials handling sectors.

**The challenge:** To provide a broad spectrum of parts on different load carriers and in small batches efficiently, frequently and regularly in the production area.

**The solution:** Tow trains. In addition to a broad portfolio of tow tractors and trailers, we also offer you integrated tow train system consulting. We will be happy to help you plan a tow train system.





# Our aim:

## The synchronisation of your production and logistics processes.

### The tow train as “lean factor”

The use of tow trains is characterised by a high degree of flexibility. Simply put, it involves different transport tasks from A to B on various routes. Achieving predefined, cycled processes, for example in the supply and disposal of materials to and from machinery is a challenging task. This is where integration of the control systems and management programs comes in. It is precisely this issue which is addressed by our system consultants. We will demonstrate the possible ways and means available to you for making your production processes leaner and more effective.

### Providing advice requires understanding

Before we focus on the planning of your individual tow train solution, we create an accurate image of your intralogistics processes. Because when, where, how often and how many tow trains must be operated is dependent on several factors: How broad is your parts spectrum? What parameters are to be considered with respect to time and production technology? What area, personnel and transportation capacities are available? We record and coordinate all the resulting data for you.

### Recording the processes

- Identification of optimal transportation routes
- Logical allocation of the trucks to the routes
- Resource-saving route development
- Interaction of provisioning and disposal processes
- Analysis of relevant storage and commissioning processes

### Design of the controls

- Optimisation of material and information flows
- Timing of the tow train
- Definition of the stops
- Process support through visualisation

### Provision of the technology

- Selection of the appropriate tow tractor and trailer technology for your respective supply process
- Deciding on the control system
- Equipping your material sources and material requirement locations with racking, storage and commissioning technology
- Taking into account all process-relevant resources

### Our tow train systems enable you to achieve several goals simultaneously:

- Greater throughput
- Leaner production processes
- Increasing security of supply
- Optimised resource utilisation
- Reduced risk of accidents
- Avoiding unnecessary journeys



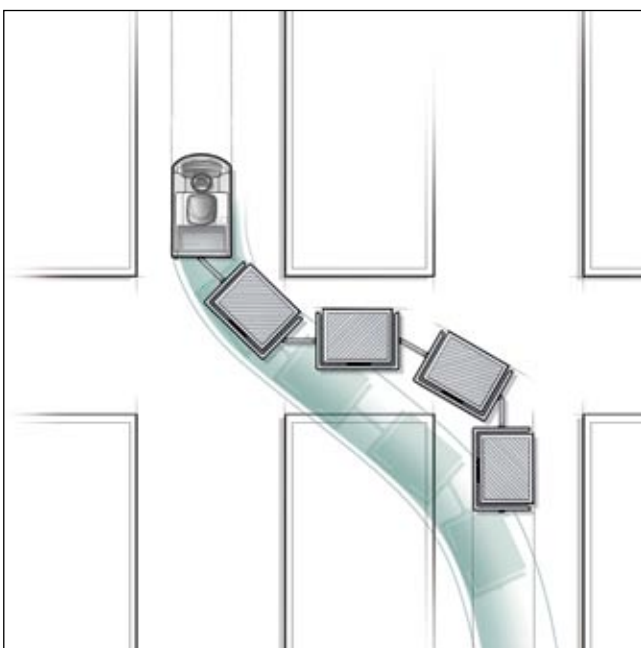
# Keep on track with us.

## Two trailer versions, many applications

You can use our trailers to move the widest variety of loads. Choose between two versions, which can be further tailored to your needs with various options: The E-frame (GTE version) with robust central axis is compact and energy saving, the portal model (GTP version) is robust and ergonomic. Electric trailer connections and direct energy conversion in the trailers ensure clean and efficient operation at the same time.

## Excellent direction stability, easy handling

The advantage of directionally stable trailers is obvious: they follow exactly the path the tow tractor has taken. This allows your operators to drive safely inside and outside the rack aisle and to avoid any obstructions with minimum effort. The coupling and uncoupling can be accomplished in no time at all. The same is true for loading and unloading. Our portal trailers make it particularly easy for you: The load can be removed from both sides.



### Our trailers – advantages:

- Optimum ergonomics for efficient work
- Robust construction for tough operations
- Reduced costs due to energy-efficient operation
- Electrical connection of trailers, eliminating the possibility of hydraulic fluid leaks
- Simple coupling system
- Excellent directional stability
- Comprehensive accessories for individual adaptations to your application case





### Choose our tow tractors

We offer you a graded choice of long-lasting tow tractors inside and outside. For light, medium and heavy loads. For particularly smooth surfaces or with a higher ground clearance to compensate for unevenness. Whether for delivery, regular distribution of goods or transport where necessary – our tow tractors are distinguished by robust and tested design as well as energy-efficient operation.

### Our tow tractors – advantages:

- Up to 25,000 kg drawbar pull
- Robust tow tractors for heavy loads
- More powerful, yet cost-effective 3-phase AC drive
- Comfortable operator workplace promotes efficiency
- Universally applicable from delivery to distribution
- Driver's cabs (optional)





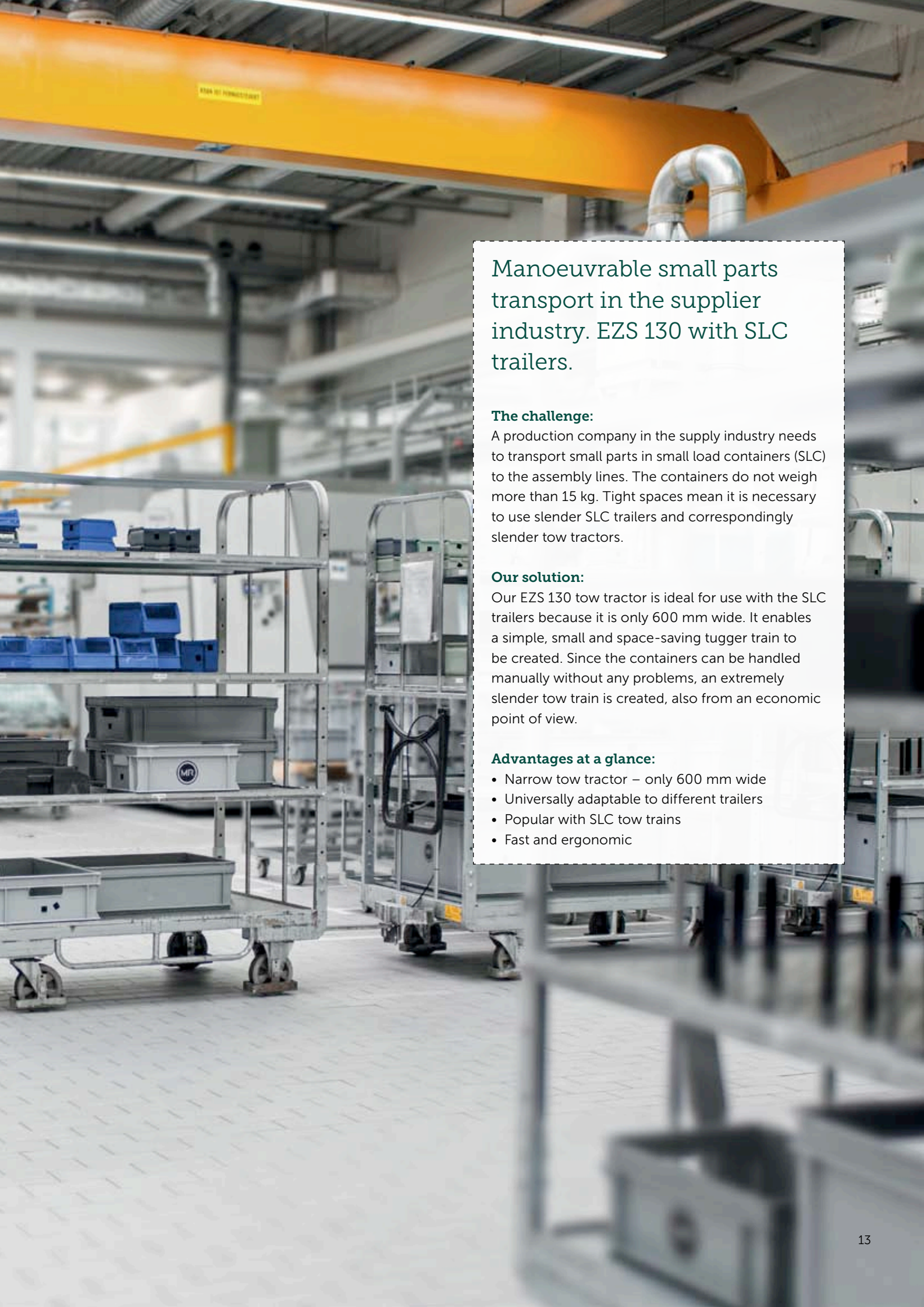


**Take an example.**  
**Our tow trains in practice.**









Manoeuvrable small parts transport in the supplier industry. EZS 130 with SLC trailers.

**The challenge:**

A production company in the supply industry needs to transport small parts in small load containers (SLC) to the assembly lines. The containers do not weigh more than 15 kg. Tight spaces mean it is necessary to use slender SLC trailers and correspondingly slender tow tractors.

**Our solution:**

Our EZS 130 tow tractor is ideal for use with the SLC trailers because it is only 600 mm wide. It enables a simple, small and space-saving tugger train to be created. Since the containers can be handled manually without any problems, an extremely slender tow train is created, also from an economic point of view.

**Advantages at a glance:**

- Narrow tow tractor – only 600 mm wide
- Universally adaptable to different trailers
- Popular with SLC tow trains
- Fast and ergonomic





**JUNGHEINRICH**  
EZS 350





## Lean Production in mechanical and plant engineering. EZS 350 with GTE trailers.

### **The challenge:**

A mechanical engineering company constantly requires different parts from the warehouse and logistics area at the assembly location. Larger and heavier parts need to be moved which are handled on pallets – so-called large load carriers (LLC).

### **Our solution:**

The tow train comprising our GTE trailers with an EZS 350 tow tractor is a harmonious combination. The E-frame trailers are easy to load. They can be used for all shipments on pallets. Operation via trolleys movable by hand facilitates assembly with few or no fork lifts. During operation, transports are reduced to the bare essentials. This saves time and money and avoids risks to employees, loads and equipment.

### **Advantages at a glance:**

- Powerful tow tractor with up to 5000 kg drawbar pull
- Easy to handle and robust GTE trailers for flexible use in material transport
- Excellent directional stability of the GTE trailers ensures safe driving, even in narrow spaces (follow the tow tractor as if on rails)
- Reliable transport of different loads
- Simple loading of the trailers via trolleys









## Reliable supply to production for automotive supplier. EZS C40 with special trailers.

### **The challenge:**

For an automotive supplier, the connection between production and warehouse works in two directions: The required components must be brought to the assembly lines, and completed modules are transported to the warehouse. It should be noted that electrical components require special protection. Therefore only special trailers can be used. In addition, the floors are specially sealed and particularly smoothly to ensure maximum cleanliness.


### **Our solution:**

The tow train comprising special taxi trailers is pulled by an EZS C40 here. This tow tractor is powerful and easy to handle in order to enable the tugger train to also be used with ease in narrow production areas. The CSE tyres ensure safe traction on the particularly smooth floors of the production halls.

### **Advantages at a glance:**

- Powerful tow tractors with up to 4000 kg drawbar pull
- Elastic tyres ensure traction on both smooth and uneven floors and increase comfort
- Universal coupling attachment is designed for different trailers
- Easy entering and exiting of the truck saves time and protects the operator – especially with frequent stops





## Heavy transport tasks in the automotive industry. EZS 590 with GTP portal trailers.

### **The challenge:**

In an automotive plant, large and heavy components must be transported from the warehouse to the assembly lines. In addition to the higher weight, longer distances must also be covered. Occasionally, material must also be transported from hall to hall.

### **Our solution:**

Our powerful combination here is GTP trailers with the EZS 590. The GTP portal trailers can carry loads weighing up to 1600 kg. Since the total tow train weighs more, a particularly powerful tow tractor is required: the EZS 590. This can pull up to 9000 kg. As a sit-on tow tractor, it is also suitable for use over longer distances.

### **Advantages at a glance:**

- Particularly powerful tow tractor with up to 9000 kg drawbar pull
- Easy to handle and robust GTP trailers for flexible use in material transport
- Excellent directional stability of the GTP trailers thanks to optional all-wheel steering for safe driving
- Reliable transport of different loads
- Simple loading of the trailers via trolleys
- Pushing through of the load allows for particularly ergonomic loading and unloading of heavy loads





# Yes or no?

**Investment decisions are simple, but not straightforward.**

**We compile the facts that make it easier for you:**

## **BestInvest**

Our tow tractors will reduce your operating costs by up to 20 % in the long term. With a wide range of technological and ergonomic advantages that reduce all of the expenses making up the Total Cost of Operations (TCO) to minimum levels, from purchase to disposal. We call this promise BestInvest. It helps you transform your costs into profitable investments. So that you can make the best total investment decision.

## **100 % customised vehicles**

Special applications require special trucks. This is especially true for factors to which the standard trucks cannot easily adapt, such as company-specific transport operations, unusual goods or complicated layouts. We offer customised adaptations for specific applications. Quality and cost-effectiveness from series production are combined with your personal requirements. The consistently modular design of our entire product line makes this possible.

## **Explosion protection for hazardous areas**

Many industrial sectors are subject to a high level of explosive hazard due to flammable gases, fumes, powder or dust. To meet these special requirements and to guarantee safe operation, we can supply explosion-proof electric fork lift trucks in accordance with Directive 94/9/EC (also referred to as ATEX 95).

## **The right racking for the right truck**

We can provide you with the complete solution for this: integrated warehouse planning, with the racking and the trucks working "hand in hand" as part of a single system. From project planning through CAD drafting to handover. From modular racking systems through system platforms to high-bay racking. From consultancy through installation to service. A one-stop shop.

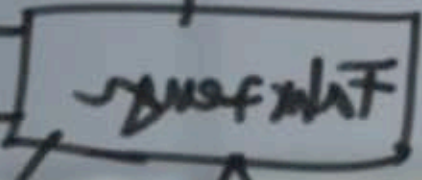




Ext. Verantwortl.?

Finanzl.?

Leistung?



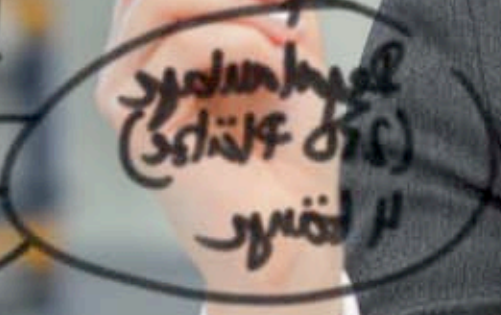
+10%

+20%

Planung

Integriert

Projekt



### Service with the manufacturer's expertise

Benefit from our service. Benefit from the manufacturer's expertise. With our full service offer, our individual maintenance intervals, or, or, or ... You will be convinced by the diversity of our service, which is flexibly adapted to your specific application. In this way our service provides you with long-term investment and planning security. Our comprehensive direct sales network and superbly trained engineers ensure rapid response times, minimum downtimes and low operating costs.

#### Advantages

- Competent and comprehensive consultancy
- Short communication channels and rapid response times
- Short downtimes to save you money
- First-class training of the service engineers
- Efficient spare part logistics with 98.5 % spare parts availability.
- Preserve the value of your trucks with original spare parts
- Increased operational safety and reliability

### The whole is greater than the sum of its parts

Our service department has exclusive access worldwide to original spare parts. Using only original spare parts is the only way to maintain optimum interaction between all components, ensuring maximum reliability and preserving value. Only our original spare parts meet the high performance requirements of the truck and material and secure your complete warranty claim.

### Double digit decrease in CO<sub>2</sub> emissions over ten years

We have drastically reduced CO<sub>2</sub> emissions for our entire truck range over the last ten years. By more than 25 % for electric and diesel/LPG fork lift trucks, and by more than 35 % for medium/high level order pickers and narrow aisle/reach trucks. We have done this with a series of technological innovations which are currently setting standards for CO<sub>2</sub> emissions.

### Significantly reduced CO<sub>2</sub> emissions also mean significantly lower energy costs

Our entire product cycle now features technological innovations for reducing CO<sub>2</sub> emissions, from manufacturing through usage to reconditioning. And our high-tech solutions are really setting standards in the usage phase which is where more than 80 % of all emissions occur. You can easily use this advantage to your benefit, immediately reducing your energy costs considerably while simultaneously achieving maximum throughput rates. [www.jungheinrich.com/oekobilanz](http://www.jungheinrich.com/oekobilanz)

### TÜV certified product life-cycle assessment

TÜV-Nord has systematically analysed the life-cycle assessment and certified it in accordance with DIN EN ISO 14040, giving us the environmental rating "Geprüfte Produkt-Ökobilanz" [Certified Product Life-cycle Assessment].







**JUNGHEINRICH**

With night express delivery, all spare parts can be delivered directly in our service engineers' vans so they reach you by next morning.

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

 Jungheinrich trucks  
conform to the European  
Safety Requirements.

### **Jungheinrich Aktiengesellschaft**

Friedrich-Ebert-Damm 129  
22047 Hamburg  
Germany  
Telephone +49 40 6948-0  
Telefax +49 40 6948-1777

info@jungheinrich.com  
www.jungheinrich.com

 **JUNGHEINRICH**