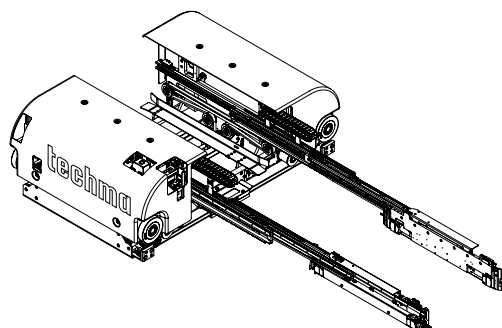
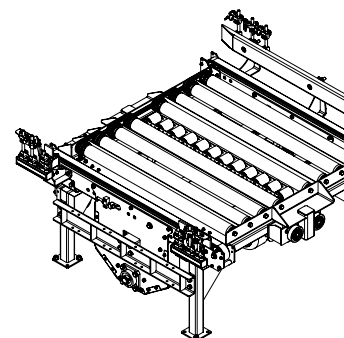
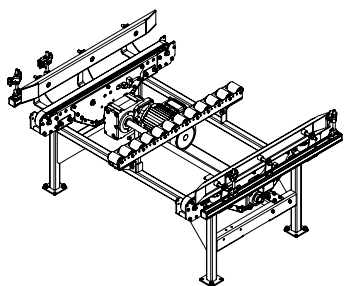
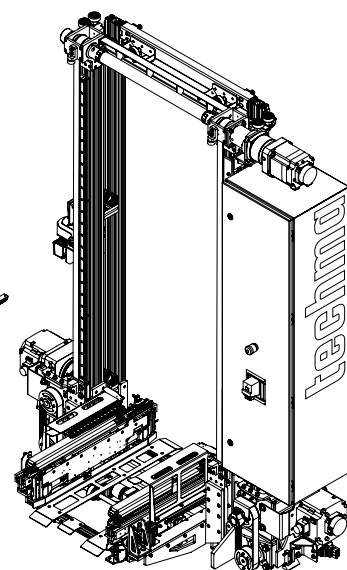
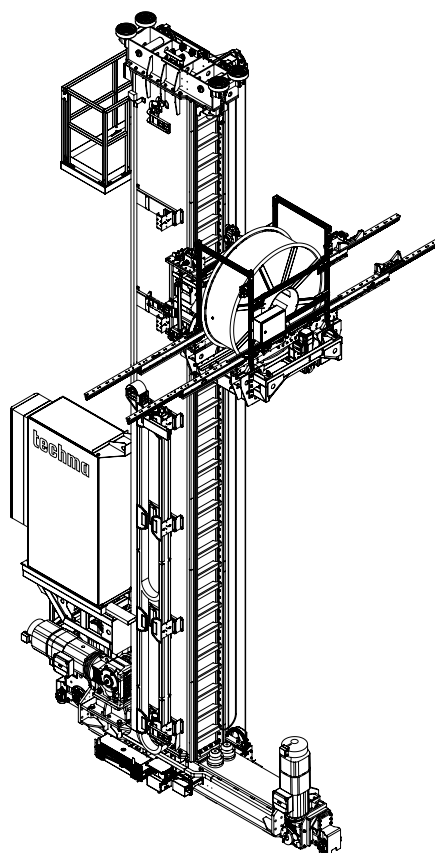
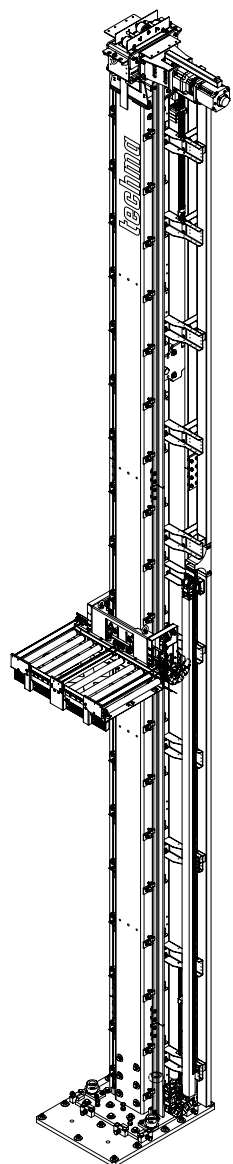
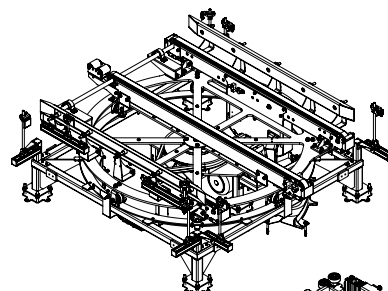
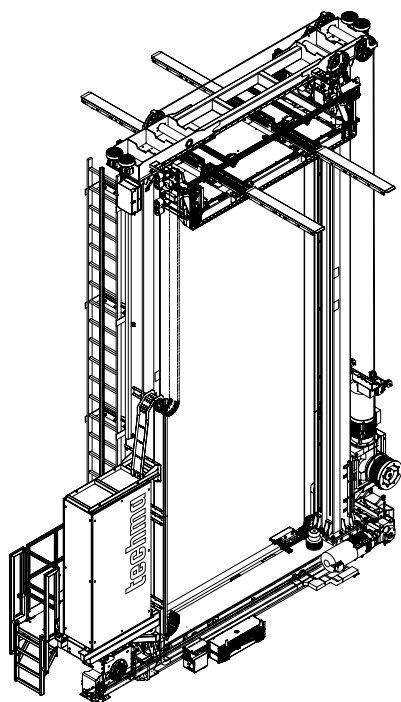
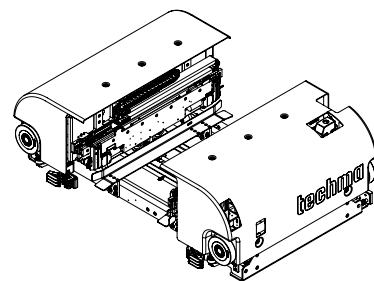
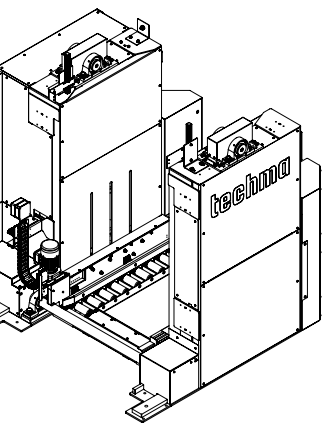


# techma

dedicated  
intralogistics

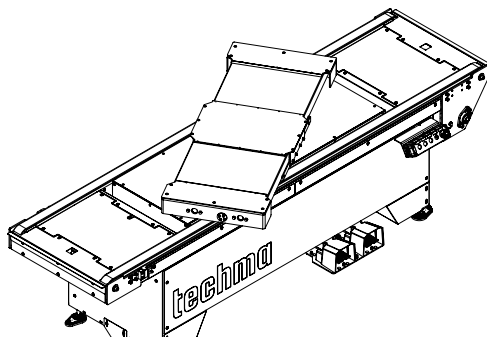


## TECHNICAL SOLUTIONS

2nd edition | September 2023



**Polish producer**  
of intralogistic systems  
Since 2003



[mp|techma.pl](http://mp|techma.pl)

Welcome to the catalog of technical solutions dedicated to Techma intralogistics systems!

**We are a Polish technological company specialized in solving the most complex intralogistics problems for over 20 years.** Our mission is to deliver exceptional solutions that cater to individual customer needs and enable effective logistics management in the 21st century.

Using creative knowledge and rich experience in the fields of mechanics, automation, and electronics, **we design and manufacture unique systems of automated and robotic workstations** dedicated to industrial applications. Our solutions are innovative, modern, and tailored to the dynamic requirements of the contemporary market.

Understanding the specific nature of each client's business is of utmost importance to us. This allows us to identify, define, and effectively solve key design problems. **Flexibility and an individual approach to each project enable us to create dedicated intralogistics systems** that perfectly match the unique needs and requirements of our customers.

In addition to offering warehouses, we also provide comprehensive and dedicated solutions for transport and handling infrastructure, both before and after the warehouse.

**We are ready to take responsibility for the entire investment process, acting as the general contractor.** From analyzing needs and developing







concepts to the design phase, all the way to commissioning and implementation, we provide professional support at every step of the project.

We invite you to explore our dedicated intralogistics systems and a wide range of technical solutions that can fully meet your requirements.

More information can be found on the website [www.mpltechma.pl](http://www.mpltechma.pl).

Join the ranks of satisfied customers and benefit from advanced technologies that will transform and optimize your logistics processes.

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# 1. Scalable single-column stacker crane

Dedicated for use in e-commerce and various manufacturing industries: home appliances, sanitary, automotive, FMCG, and others utilizing EURO pallets or other non-standard pallets for goods storage. **Designed for automatic arrangement of goods on deposit locations within the warehouse.**

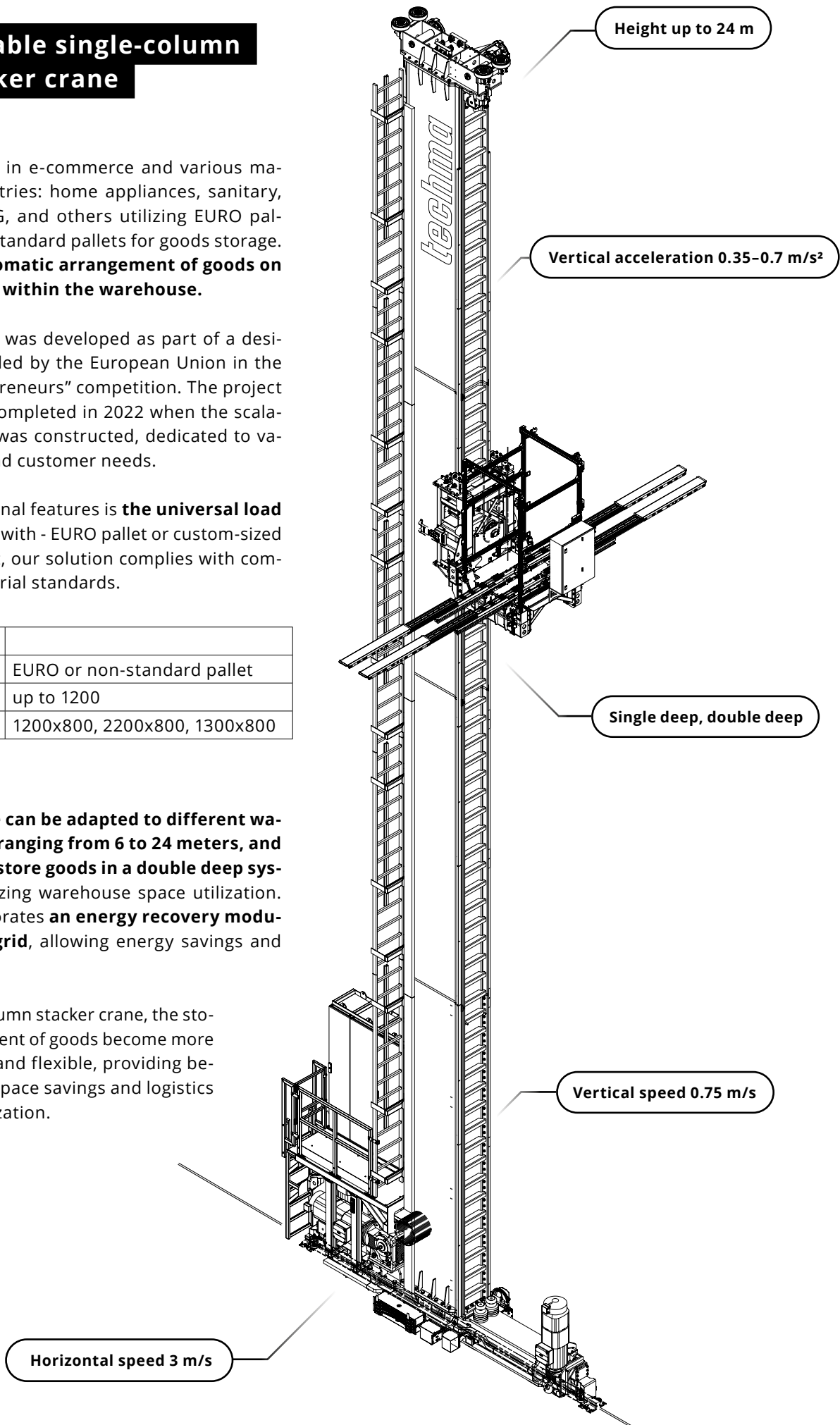
This stacker crane was developed as part of a design project co-funded by the European Union in the „Design for Entrepreneurs” competition. The project was successfully completed in 2022 when the scalable stacker crane was constructed, dedicated to various industries and customer needs.

One of its exceptional features is **the universal load carrier** it operates with - EURO pallet or custom-sized pallets. As a result, our solution complies with commonly used industrial standards.

|                 | load                         |
|-----------------|------------------------------|
| type            | EURO or non-standard pallet  |
| weight (kg)     | up to 1200                   |
| dimensions (mm) | 1200x800, 2200x800, 1300x800 |

**The stacker crane can be adapted to different warehouse heights, ranging from 6 to 24 meters, and has the ability to store goods in a double deep system,** thus maximizing warehouse space utilization. The device incorporates **an energy recovery module to the power grid,** allowing energy savings and cost reduction.

With our single-column stacker crane, the storage and arrangement of goods become more efficient, precise, and flexible, providing benefits in terms of space savings and logistics operations optimization.

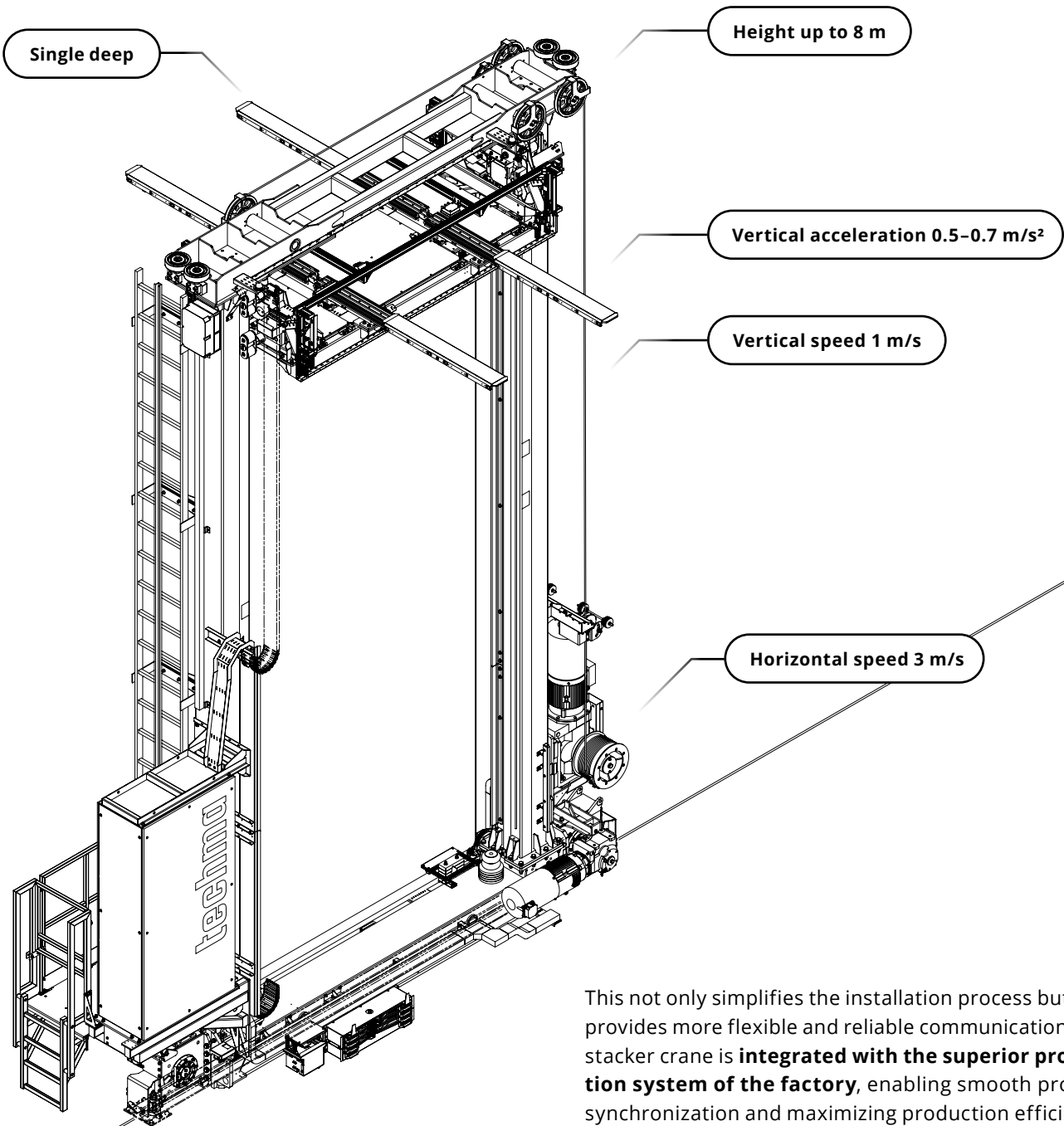




## 2. Two-column plate stacker crane

Dedicated to the sanitary industry. Designed for automatic arrangement of goods on deposit locations within the warehouse. This stacker crane was designed and built in 2023 for a sanitary manufacturer.

It allows for automatic arrangement of goods on 700 deposit locations. Communication is facilitated via WiFi technology, reducing the need for extensive electrical installation wiring.



This not only simplifies the installation process but also provides more flexible and reliable communication. The stacker crane is **integrated with the superior production system of the factory**, enabling smooth process synchronization and maximizing production efficiency.

With our plate stacker crane, the storage process becomes highly efficient and precise, ensuring rapid and accurate placement of goods in the warehouse.

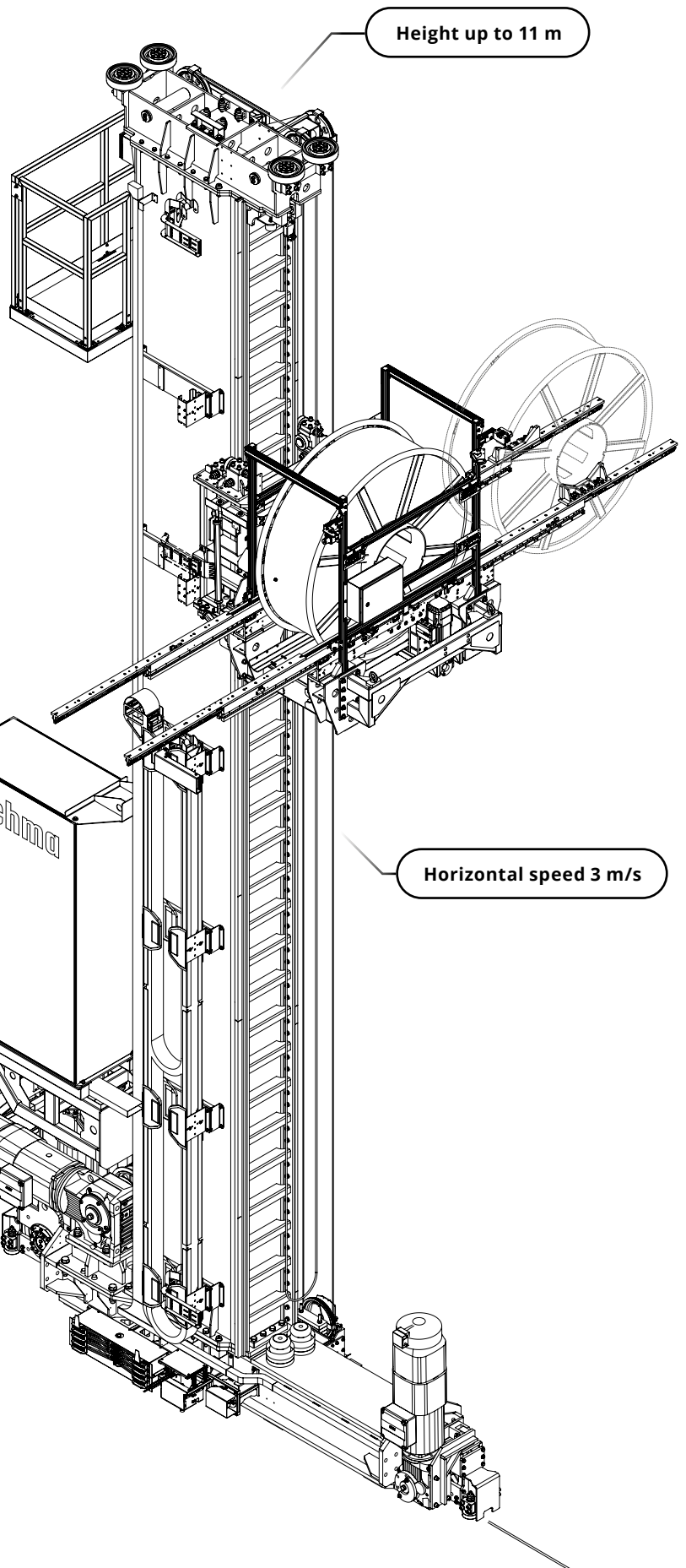
|                 | load          |
|-----------------|---------------|
| type            | plates, trays |
| weight (kg)     | 400           |
| dimensions (mm) | 2400x1400     |

# 3. Single-column spool stacker crane

Designed and implemented in 2019 for the tire industry. Enables automatic arrangement of spools with materials for tire production on deposit locations within the warehouse.

This stacker crane is versatile, **capable of handling various spools with different material winding degrees**. Thanks to advanced sensors, **it can accurately identify and transport spools to the appropriate locations in the warehouse**, optimizing the arrangement process, reducing time, and eliminating human errors.

With the single-column spool stacker crane, storing materials for tire production becomes more efficient, precise, and reliable, resulting in benefits in terms of time savings, optimized warehouse space, and increased production efficiency.



|                 | load        |
|-----------------|-------------|
| type            | steel spool |
| weight (kg)     | 800         |
| dimensions (mm) | D1600 x 700 |

# 4. Two-column tire stacker crane

Designed in 2018, specifically for tire industry projects. Dedicated to the automatic transport of raw tires on a special pallet in an automated warehouse.

Vertical speed 2 m/s

Vertical acceleration 0.5 m/s<sup>2</sup>

Height up to 8 m

With the use of 15 kW motors, the stacker crane achieves an impressive speed of 4 m/s, accelerating the transport process and improving efficiency.

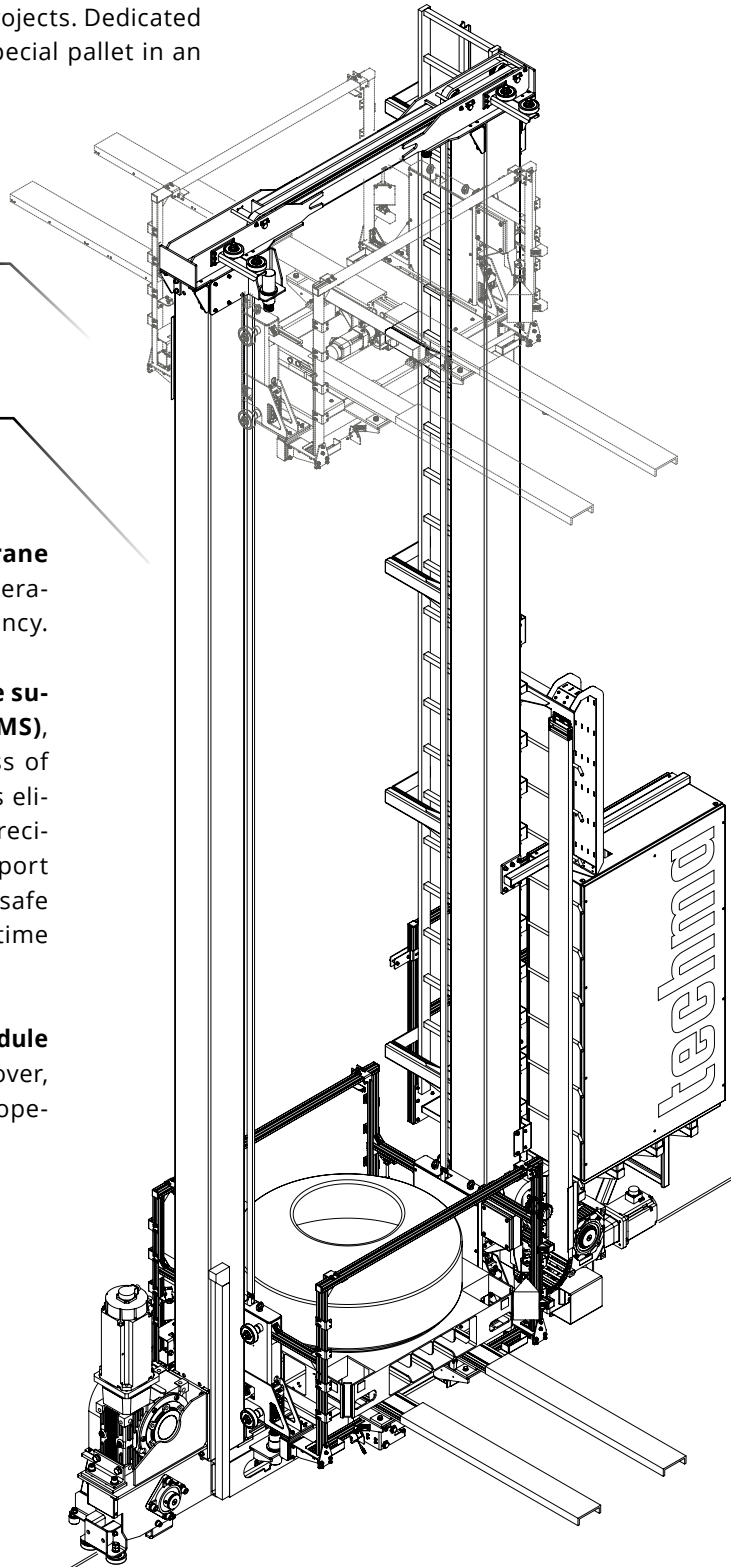
The stacker crane is **tightly integrated with the superior Warehouse Management System (WMS)**, allowing for the full automation of the process of locating the necessary tire for production. This eliminates the possibility of errors and ensures precision and reliability. With our solution, the transport of raw tires becomes not only efficient but also safe and error-free, providing benefits in terms of time savings and production quality improvement.

The device **incorporates an energy recovery module and can be adapted to any load carrier**. Moreover, it is designed to allow several stacker cranes to operate independently in one warehouse.



A Warehouse Management System (WMS) focuses on managing warehouse operations and administrative tasks, while a Warehouse Control System (WCS) is responsible for controlling and directing devices and optimizing the movement of goods within the warehouse.

In practice, WMS and WCS often collaborate together, creating comprehensive warehouse management solutions.



|                 | load      |
|-----------------|-----------|
| type            | raw tire  |
| weight (kg)     | up to 150 |
| dimensions (mm) | 1200x1200 |



# 5. MiniLoad stacker crane

Designed and implemented in 2020 as a dedicated device for the e-commerce industry. Automatically arranges boxes, cartons, or trays on deposit locations within the warehouse. **It allows storage in FIFO, FEFO, LIFO,** and other systems, optimizing processes and increasing logistics operation efficiency.

|                 |             |
|-----------------|-------------|
| load            |             |
| type            | plastic box |
| weight (kg)     | 35-50       |
| dimensions (mm) | 600x400x320 |

With the use of the double deep operating system, the stacker crane can store goods at two depths in the rack, effectively utilizing available space.

To increase device reliability and reduce maintenance costs, the cart is powered from the grid (without the need for installing batteries).

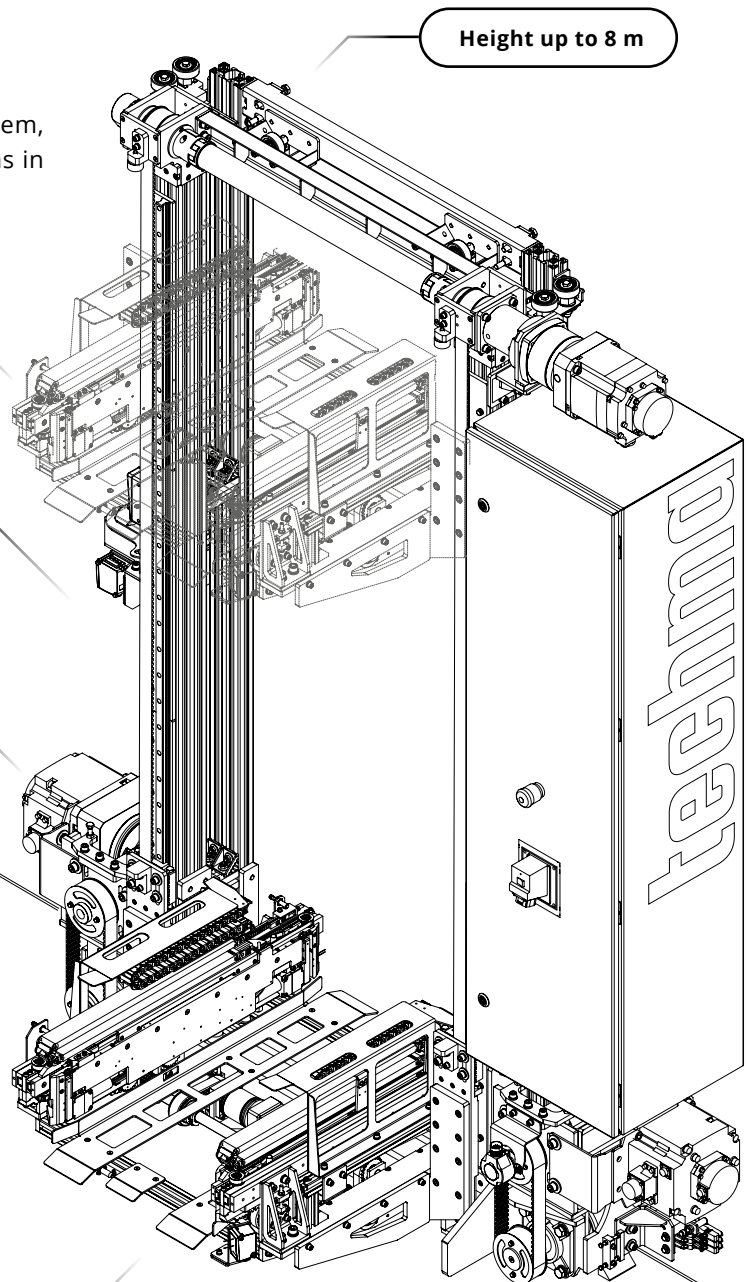
With the MiniLoad stacker crane, the process of warehousing and arranging goods becomes more precise, fast, and efficient, offering benefits in terms of space savings and optimized inventory management.

Vertical speed 0.5 m/s

Horizontal speed 4 m/s

Vertical acceleration 1-1.25 m/s<sup>2</sup>

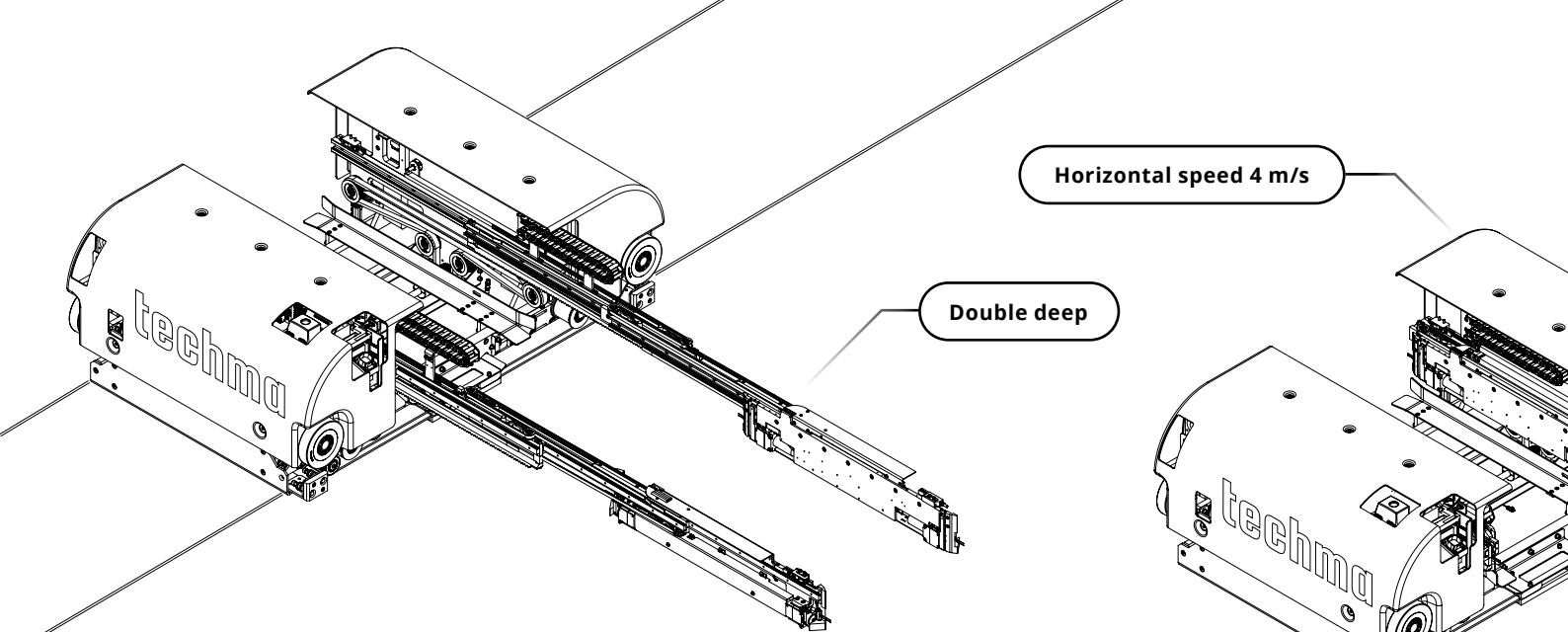
Height up to 8 m



The difference between MiniLoad and a stacker crane lies in the weight of the transported load. It is generally accepted that MiniLoad handles small loads up to 200 kg, while a stacker crane is designed for larger loads exceeding 200 kg.

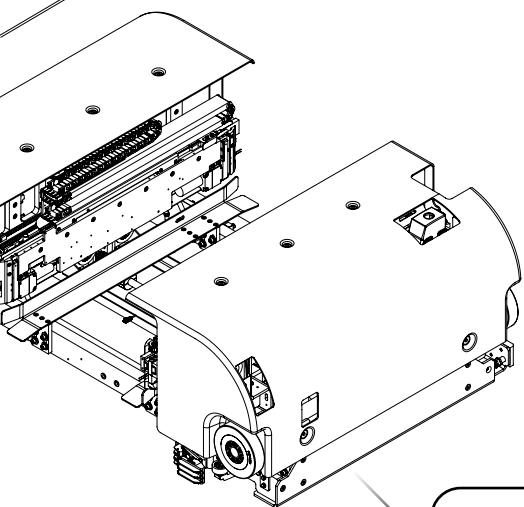
MiniLoad is a scalable device, meaning it can handle both a 5-story warehouse and a 10-story one.

Double deep



Horizontal speed 4 m/s

Double deep

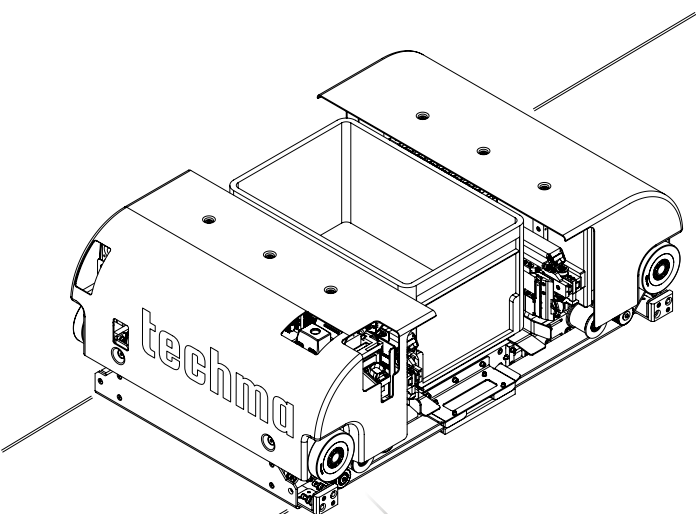


Optical link

## 6. Boxes shuttle

Created in 2020 as a dedicated device for transporting boxes in an automated e-commerce warehouse. It is designed for transporting loads weighing up to 50 kg. Utilizing the double deep system, the cart allows for goods storage in two layers of the warehouse, optimizing warehouse space utilization and maximizing efficiency.

|                       | load        |
|-----------------------|-------------|
| type                  | plastic box |
| weight (kg)           | 35-50       |
| dimensions (mm)       | 600x400x320 |
| cycle rate (cycles/h) | 300         |



Acceleration 1 m/s<sup>2</sup>

It stands out for its **high operating speed and low noise level**, making the work environment in the warehouse more comfortable.

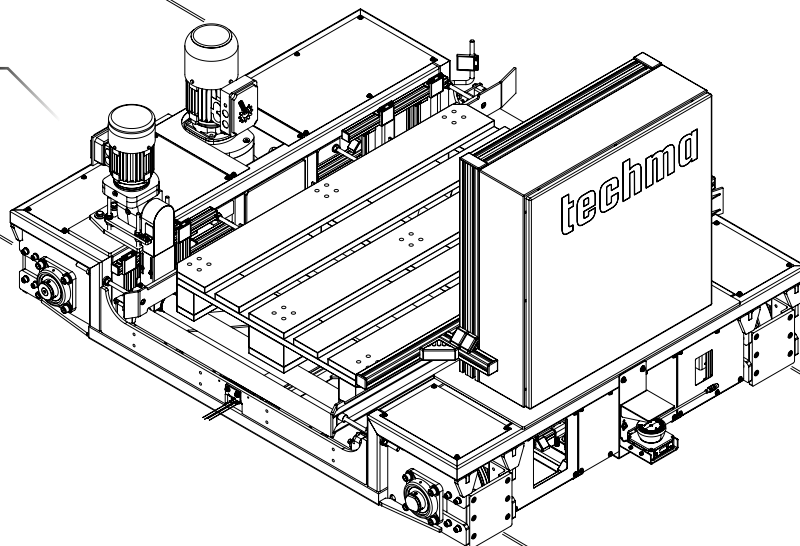
One of the key advantages of the cart is its **direct power supply from the grid** (without the need for installing batteries). This **allows us to avoid downtimes resulting from battery replacements** and reduces disposal costs. Its lightweight aluminum construction facilitates handling. An ideal solution for an automated e-commerce warehouse, providing not only efficiency but also time, energy, and resource savings.



*Boxes shuttle is designed with accessories, including a service cart, which greatly facilitates the maintenance process of the shuttle.*

Acceleration 0.3-0.5 m/s<sup>2</sup>

Horizontal speed 0.5 m/s

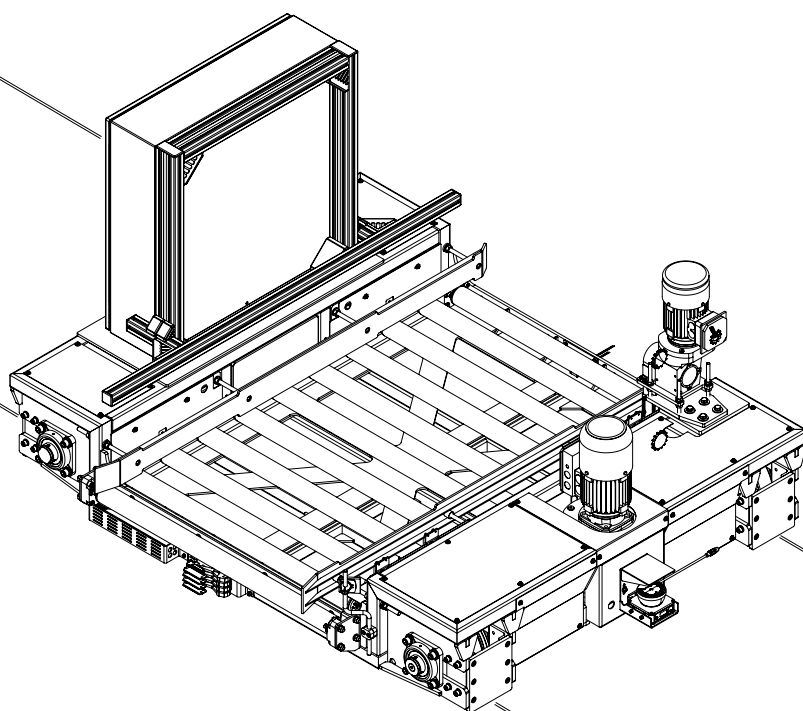


## 7. Pallet shuttle

Designed and built in 2021 specifically for an e-commerce project. Our solution enables convenient and precise distribution of goods at the mezzanine level of the warehouse to selected deposit locations.

The shuttle-type cart is perfectly **adapted to work with EURO pallets**, ensuring their precise positioning relative to the deposit location.

With the shuttle-type cart, the process of delivering goods becomes even more efficient and precise, eliminating the possibility of errors or incorrect placement. The solution contributes to increased efficiency and optimization of operations in the warehouse, ensuring smooth flow of goods and time and resource savings.



Vertical speed 0.3 m/s

|                 | load        |
|-----------------|-------------|
| type            | EURO pallet |
| weight (kg)     | 1200        |
| dimensions (mm) | 1200x800    |

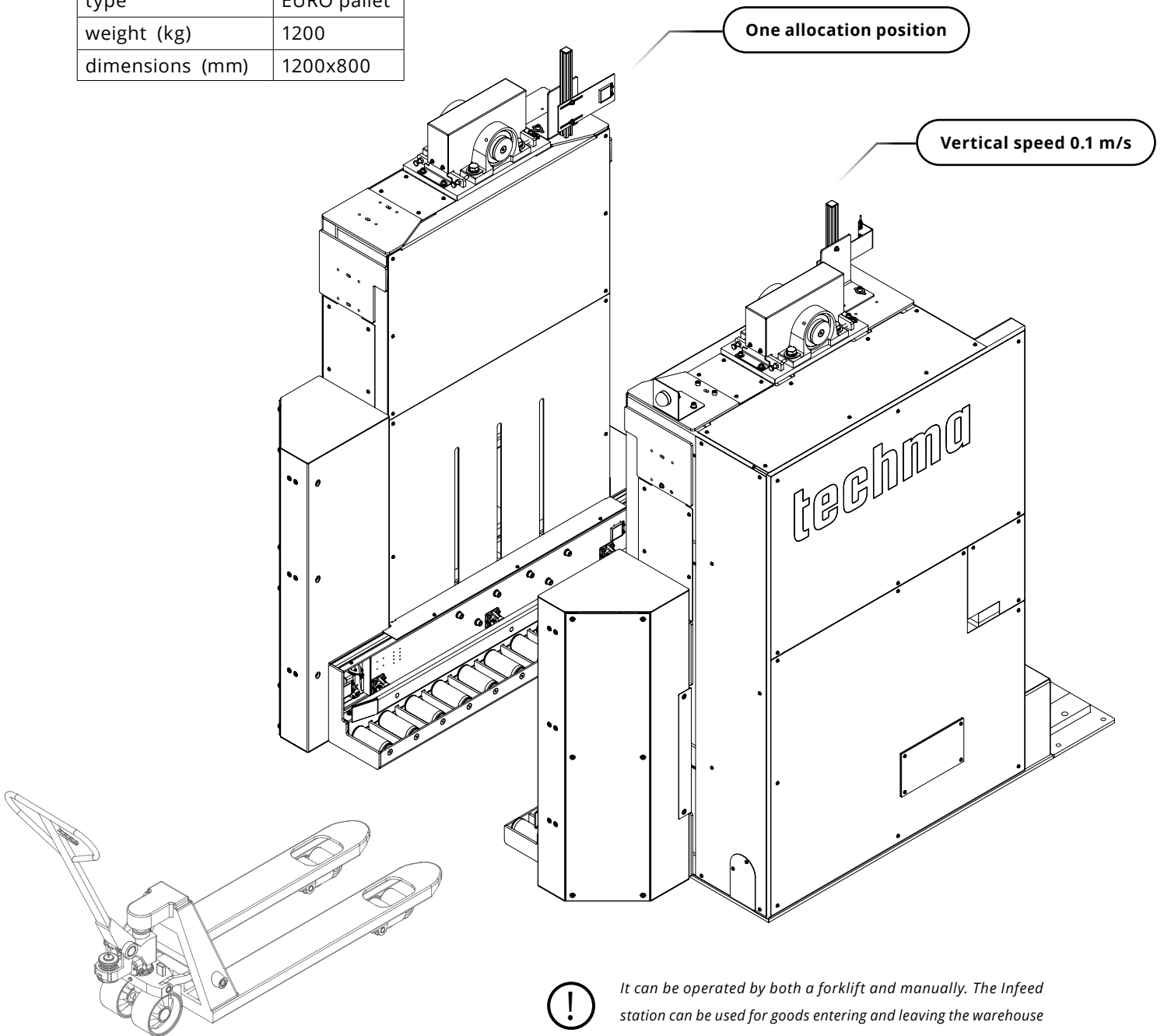


# 8. Loading station - infeed

A device designed in 2021 specifically for e-commerce clients. **The Infeed station is an ideal solution for effectively lifting pallets with loads and smoothly introducing them onto transporting conveyors.**

With the „push and leave” mode, loading becomes extremely simple - the operator only needs to place the pallet on the deposit location, and the device takes care of the rest. This allows the operator to focus on other tasks, increasing work efficiency and saving valuable time.

|                 | load        |
|-----------------|-------------|
| type            | EURO pallet |
| weight (kg)     | 1200        |
| dimensions (mm) | 1200x800    |



*It can be operated by both a forklift and manually. The Infeed station can be used for goods entering and leaving the warehouse (e.g., empty cartons). It is equipped with a control gate that signals oversize pallet loading.*

# 9. Vertical conveyor

Dedicated to the e-commerce industry. **Specially designed for handling boxes in an automated warehouse.** It allows for efficient lifting of loads to a height of up to 11 meters!

By using a high-power motor, it achieves an impressive **vertical speed of 6 m/s.**

Height up to 20m

Vertical speed 6 m/s

Acceleration 4 m/s<sup>2</sup>

Importantly, it can transport two boxes simultaneously, increasing efficiency and accelerating the logistic process.

Our vertical conveyor is not only an efficient technological solution but also ensures fast and safe movement of boxes in the logistic process. It incorporates an energy return module.

|                       | load                    |
|-----------------------|-------------------------|
| type                  | plastic boxes/cardboard |
| weight (kg)           | 50                      |
| dimensions (mm)       | 600x400x320             |
| cycle rate (cycles/h) | 300                     |



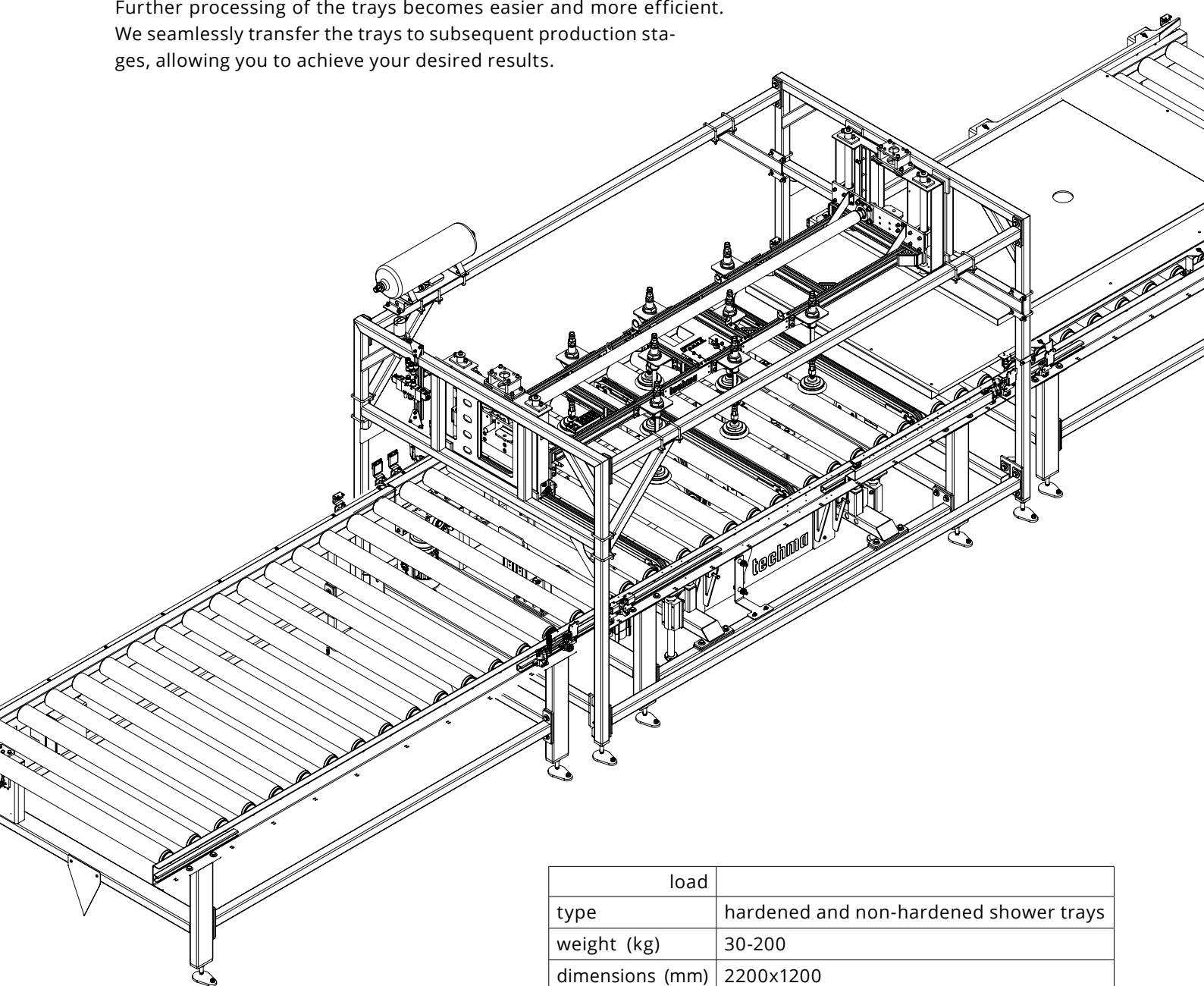
*The vertical conveyor carriage is configurable and can accommodate one to four boxes.*

# 10. Manipulator

An ideal solution for arranging elements on boards or other carriers in the warehousing process. With this device, you can enjoy an efficient and precise handling process. The manipulator is specially designed for arranging shower trays on boards, which are then sent to the seasoning warehouse for hardening. This ensures that the elements are solidly prepared and secured.

After the hardening process, the manipulator can safely and effectively remove the trays from the boards. **By using vacuum grippers, the manipulator can securely hold the trays and precisely move them.** You don't have to worry about damage or incorrect placement of the trays - the manipulator ensures that everything is precisely done.

Further processing of the trays becomes easier and more efficient. We seamlessly transfer the trays to subsequent production stages, allowing you to achieve your desired results.



|                 | load                                   |
|-----------------|--|
| type            | hardened and non-hardened shower trays |
| weight (kg)     | 30-200                                 |
| dimensions (mm) | 2200x1200                              |



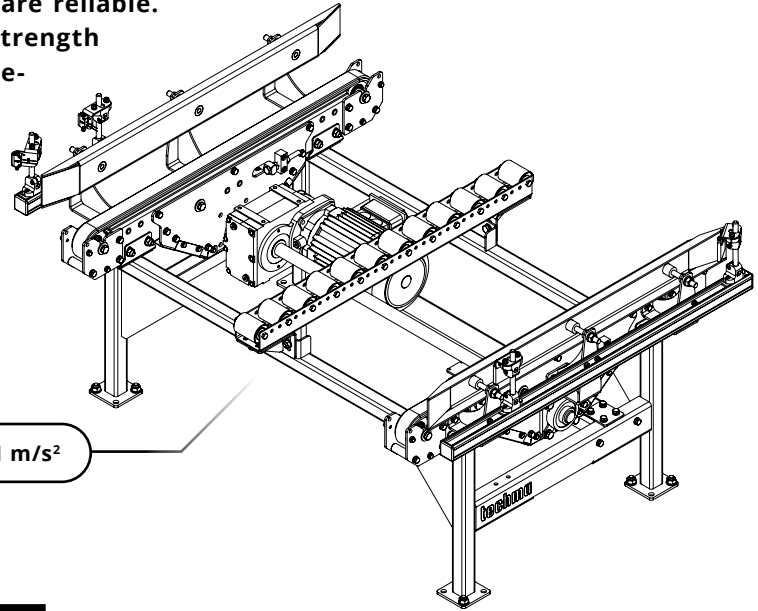
# 11. Chain conveyor

Designed and manufactured in 2021 for the e-commerce industry. It enables the **transportation of heavy loads on EURO pallets**. The transport speed is precisely regulated using a frequency converter. It can be adapted to other types of loads.

|                 |      |             |
|-----------------|------|-------------|
|                 | load |             |
| load            |      | EURO pallet |
| weight (kg)     |      | 1200        |
| dimensions (mm) |      | 1200x800    |

**Thanks to its simple design, chain conveyors are reliable. The steel construction ensures exceptional strength and safety during the transport of even the heaviest loads.**

Chain conveyors minimize the risk of failures and downtime, contributing to smooth, fast, and safe transportation. Using our solution brings benefits in terms of efficiency, time, and resources.



Chain acceleration 0,1 m/s<sup>2</sup>

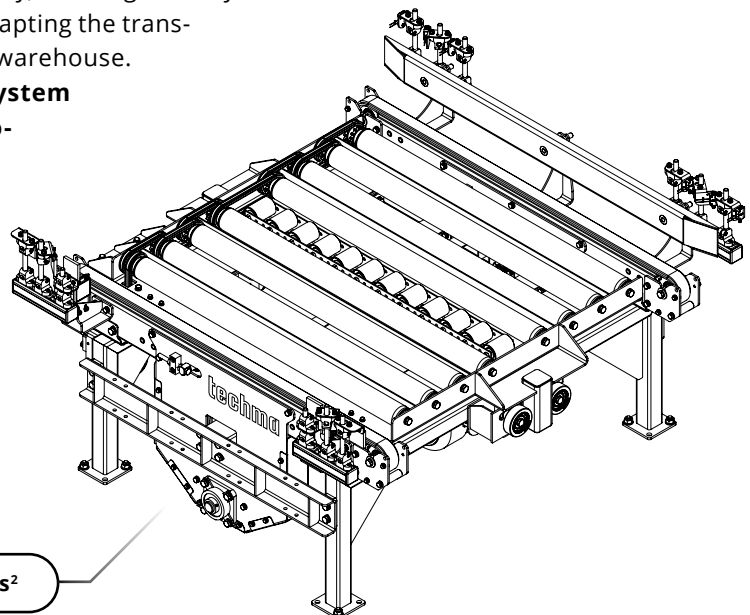
# 12. Roller-chain conveyor

Designed and produced since 2021 for the e-commerce industry. It enables efficient transportation of loads in boxes within the warehouse hall. **Thanks to the use of a gearmotor, the conveyor speed is automatically adjusted to the current movement in the warehouse, ensuring smooth operation without downtime.**

|                 |      |         |
|-----------------|------|---------|
|                 | load |         |
| type            |      | box     |
| weight (kg)     |      | 35      |
| dimensions (mm) |      | 600x400 |

Our roller conveyors are characterized by modularity, allowing for easy connection of additional conveyor sections, and adapting the transport infrastructure to the growing needs of the warehouse. Additionally, the conveyors are equipped with **a system for quick roller/belt replacement, minimizing downtime for maintenance and configuration.**

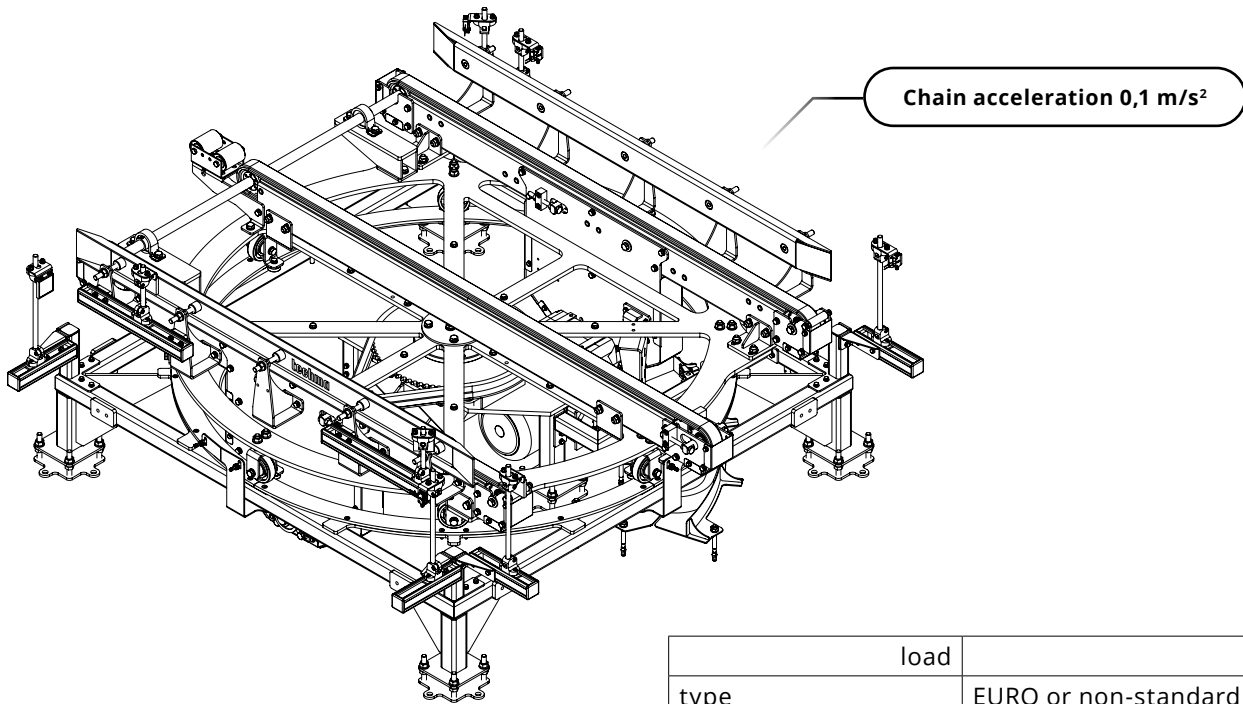
This flexibility and ease of use make roller conveyors an ideal solution for dynamic e-commerce warehouses, providing precise, fast, and efficient load transportation, with optimal resource utilization.



Roller acceleration 3,0 m/s<sup>2</sup>

# 13. Automatic turntable

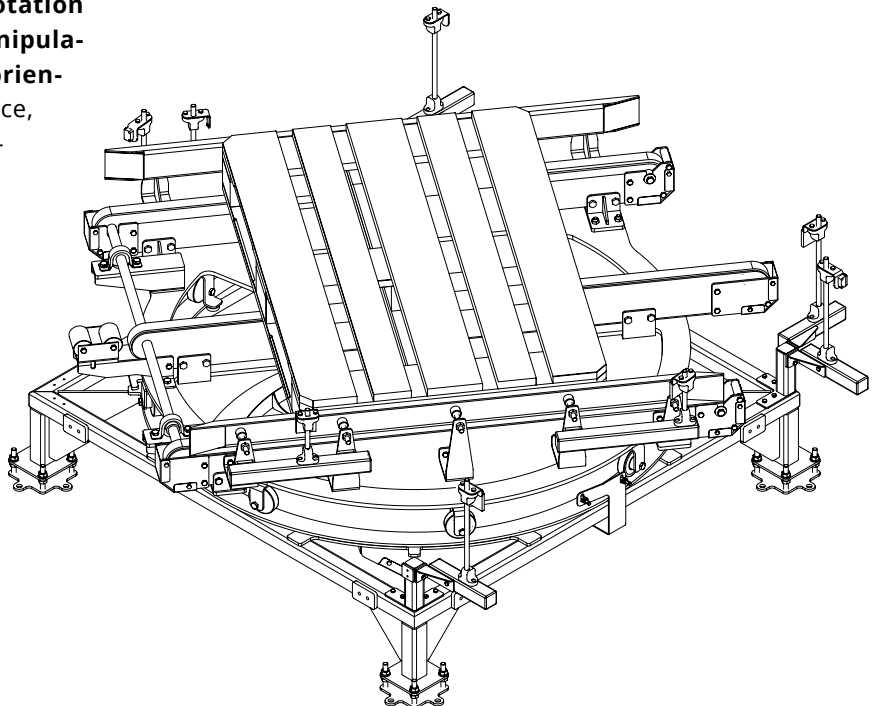
Developed in 2021 for the e-commerce industry. It is ideal for changing the direction of transported goods. **The robust steel construction** guarantees reliability and long-term use, resistance to impacts, and collisions. Additionally, it **can be combined with various products such as roller and chain conveyors, and other devices.**



|                      | load                        |
|----------------------|-----------------------------|
| type                 | EURO or non-standard pallet |
| weight (kg)          | 1200                        |
| dimensions (mm)      | 1200x800                    |
| rotation performance | 90°/8s                      |

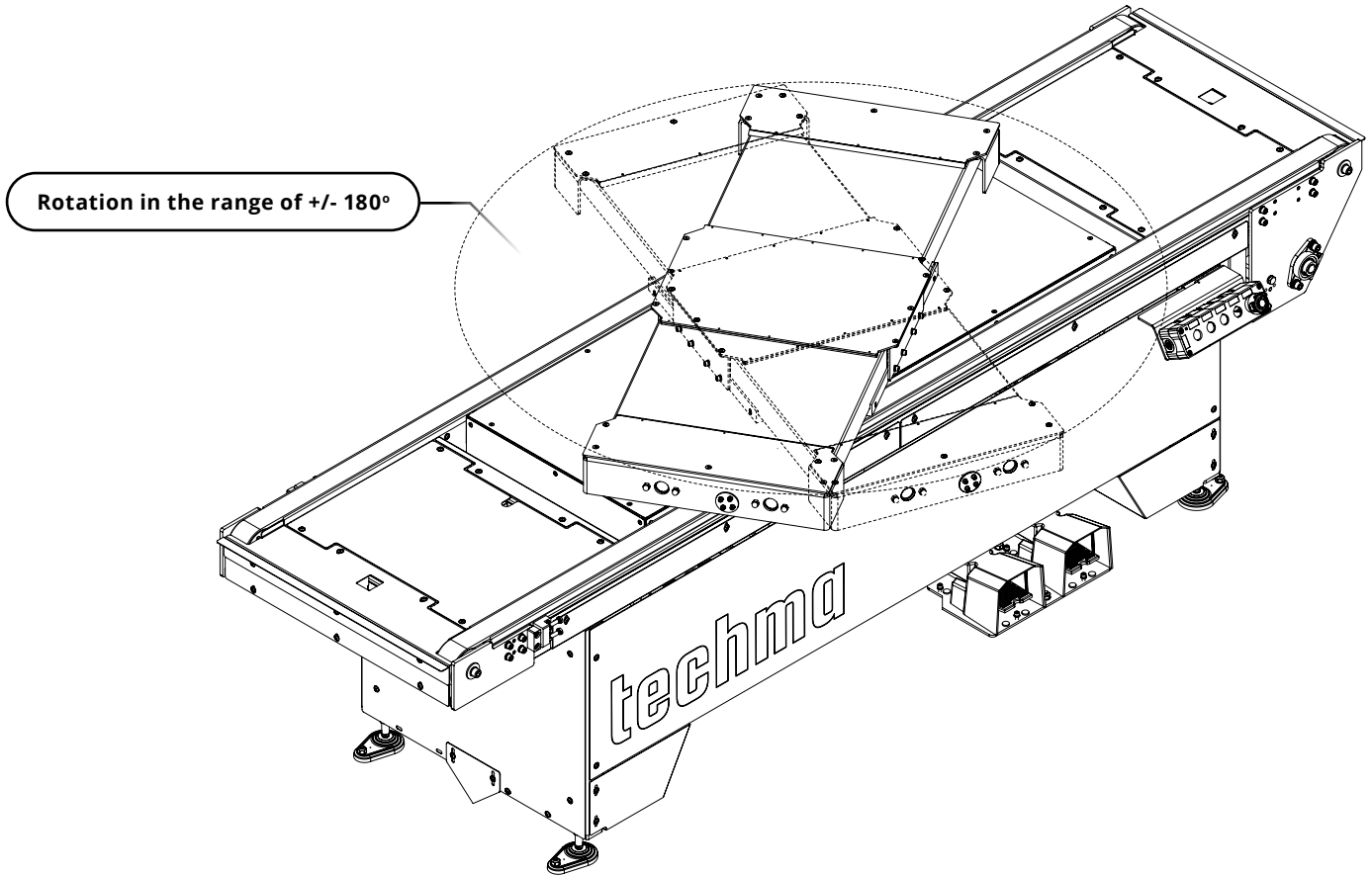
**The control system ensures precise rotation adjustment, enabling 360-degree manipulation and changing the direction and orientation of the goods.** Thanks to the device, the transportation process becomes smoother and more efficient.

The turntable is versatile and functional, meeting various requirements of the e-commerce industry, contributing to flexible and efficient transport.



# 14. Manual turntable

With our manual turntable, the process of manual material handling becomes easier and more efficient. **The solution finds application in various industries where there is a need to rotate heavy loads for final processing and inspection.**



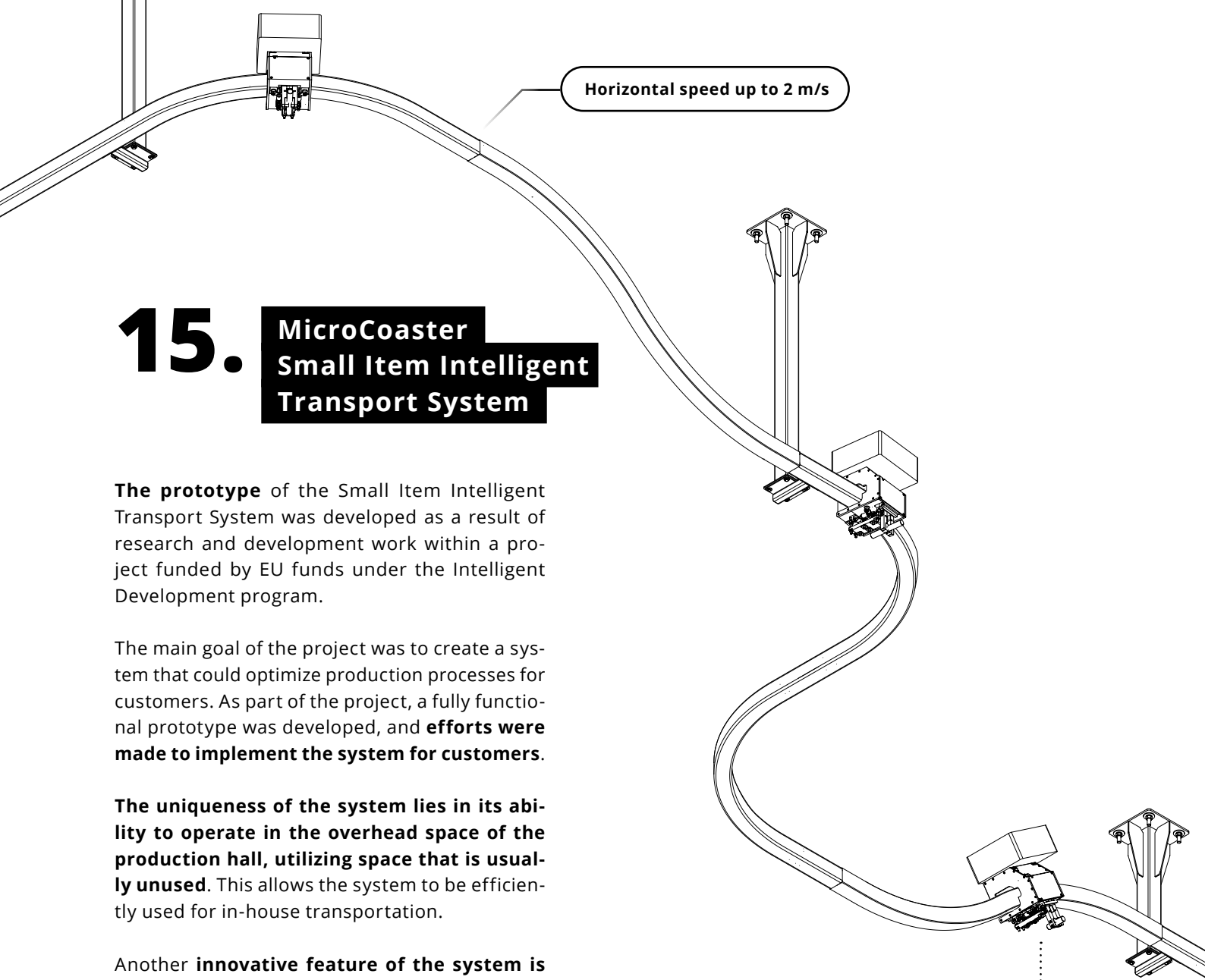
**The manual turntable allows the operator to lift the material above the roller conveyor, eliminating the need for heavy lifting.** This significantly reduces the risk of injuries and body strain while increasing the comfort and safety of work. **The operator can freely perform manual tasks and easily rotate the material without the need for relocation.**

|                      | load |   |
|----------------------|------|---|
| type                 |      | hardened bathroom shower trays for final processing |
| weight (kg)          |      | 30-200  |
| dimensions (mm)      |      | 2200x1200   |
| rotation performance |      | 90°/8s  |

In a sample application, our manual turntable works perfectly in the final processing of hardened shower trays. The operator can precisely manipulate the trays, rotating them in the desired direction, which speeds up and facilitates the processing.

With the manual turntable, you gain greater control over manual material handling, saving time and effort for the operator, while minimizing the risk of material damage during manipulation. The solution ensures not only efficiency but also ergonomic and safe work, resulting in operator satisfaction and increased enterprise productivity.





# 15. **MicroCoaster** **Small Item Intelligent** **Transport System**

**The prototype** of the Small Item Intelligent Transport System was developed as a result of research and development work within a project funded by EU funds under the Intelligent Development program.

The main goal of the project was to create a system that could optimize production processes for customers. As part of the project, a fully functional prototype was developed, and **efforts were made to implement the system for customers.**

**The uniqueness of the system lies in its ability to operate in the overhead space of the production hall, utilizing space that is usually unused.** This allows the system to be efficiently used for in-house transportation.

Another **innovative feature of the system is its software, which enables communication between the trolleys** and optimal transport route planning. **The trolleys can collaborate, avoiding collisions and reducing transport time.** Additionally, the communication between the trolleys is achieved using WiFi technology, minimizing the need for numerous cables in the system.

The system can be tailored to the individual needs of the customer. This means that **transport routes can be designed to accommodate various conditions, such as 90-degree turns, slopes, or inclines.** The system is also scalable - it can be expanded with additional routes and trolleys to handle larger orders and transportation demands within production plants or the e-commerce industry.

In the future, **machine learning will be introduced into the system,** allowing for even better utilization of its capabilities. This will enable the system to continuously improve and adapt to changing conditions and customer needs.

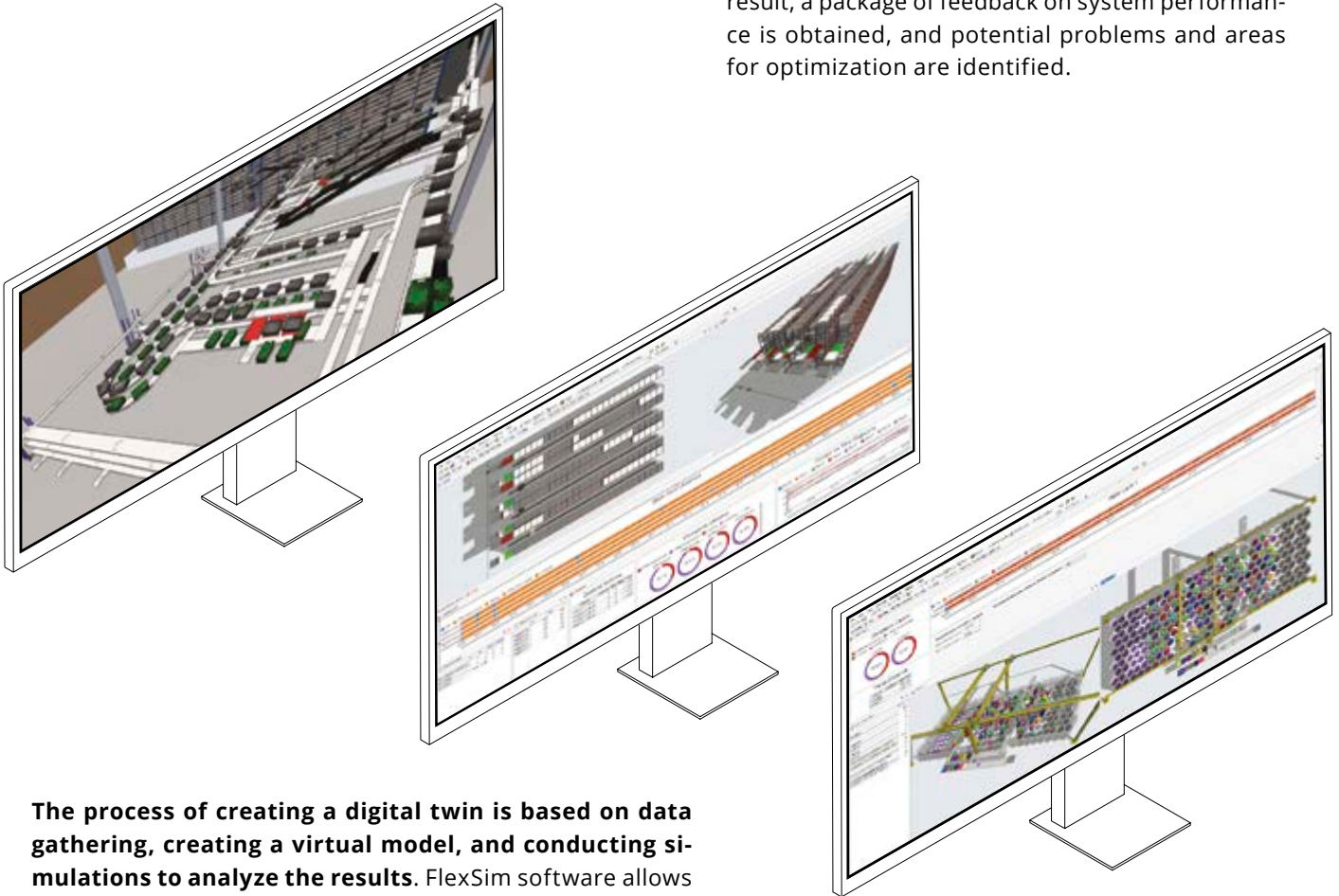
The Small Item Intelligent Transport System also has a wide range of applications. It is designed for transporting goods weighing up to 5 kilograms and can be used in various industries, including manufacturing, warehousing, and e-commerce, providing flexibility and efficient transport process management.

**Load weight up to 5 kg**

# 16. Computational analysis

FlexSim is software used by MPL Techma to create digital twins. Through **simulations developed during the bidding process, customers can see a virtual version of the process and assess its efficiency.** This helps avoid errors, save time and costs related to physical system construction, and ensures that the project is tailored to their requirements.

Interdependencies between elements and the logic of the entire system are also introduced. The next step is to prepare the simulation, in which the digital model is subjected to different scenarios and work conditions. **Simulation allows for analyzing system performance, process optimization, and evaluating different strategies.** As a result, a package of feedback on system performance is obtained, and potential problems and areas for optimization are identified.



**The process of creating a digital twin is based on data gathering, creating a virtual model, and conducting simulations to analyze the results.** FlexSim software allows for exploring different variants and scenarios, contributing to efficient planning, optimization, and management of intralogistics systems.

Creating a digital twin using FlexSim enables the delivery of comprehensive solutions to customers, **considering real conditions and needs, minimizing the risk of errors, optimizing processes, and ensuring high warehouse system performance.**

The process of creating a digital twin begins with acquiring detailed data from the customer. Then, a 2D or 3D layout is created, replicating the actual dimensions and layout of elements in the warehouse. The system components are then assigned physical and dynamic properties (speeds, accelerations, distances, etc.).

In the final phase of the process, **the customer receives a visualization of the capabilities of the optimized system,** allowing for a better understanding of how their warehouse system will operate after implementation.

Throughout the entire process of creating a digital twin using FlexSim, it is essential to consider realistic input data to obtain accurate and reliable results. Regularly providing simulation feedback to the customer is also important to enable further analysis and project adjustment.





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