



Pallet Shuttle

Semi-automated and automated high-performance high-density storage system





The development of high-density storage systems: higher capacity, speed and performance

The Pallet Shuttle is a semi-automated or automated high-density storage system in which a shuttle with an electric motor runs along rails within the storage channels in order to load and unload pallets. This achieves higher storage capacity and increases the throughput of incoming and outgoing goods in the warehouse.

Logistics has become a key function in business management, since it allows real competitive advantages to be achieved. In this context, there is a greater focus on the design and implementation of warehouses that can be increasingly flexible and versatile, with the ability to adapt to the three main demands of today's market: **greater product variety, lower cost and faster, higher quality service.**

Mecalux, highly attentive to changes in the market, has opted for the development of high-density systems as a means of helping companies meet these demands with maximum flexibility. In this regard, the Pallet Shuttle high-density storage system incorporates the latest technological innovations to enhance the performance and profitability of the warehouse.

The system offers two possibilities of operation that suit different needs: semi-automated, where an operator controls the shuttles using a tablet with Wi-Fi connection; and automated, which uses automatic handling systems (stacker cranes or transfer cars) to locate the shuttles and the load in the corresponding channel. In both cases, Pallet Shuttle system lowers operating costs and adds value to the logistics activity of the company.





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Ideal solution for companies with a high volume of pallets per SKU and high level of loading and unloading activity.

Key advantages

Technology applied at top operating speeds

Save space

Storage channels can be up to 40 m deep, while the height can reach up to 40 m in automated systems.

1

- The system works with minimal clearances between levels, which allows for **high-density storage**.
- Through the use of pallet sensors, the shuttles **can position loads intelligently**, eliminating empty spaces in the storage channels.

Save time

Loading and unloading times are reduced, since the operator does not need to work inside the storage lanes.

2

- **Rapid execution of orders:** the travelling speed of the shuttle reaches 90 m/min when empty or 45 m/min when loaded.
- Load lifting **cycle of just 2 seconds**.
- By just giving a single command, the shuttle can serially **fill or empty a whole channel**.

Increased productivity

Product-to-person system: it is the load that moves to the operator, optimising their movements.

3

- Great **increase in the number of cycles/hour**, especially on systems with transfer cars.
- **Eliminates errors**.
- **The system is easy to use** and easy to maintain.
- **Inventory function**.





4

Cost savings

Pallet Shuttle is a high-density system that offers increased profitability with a decrease in short-term costs.

- The **optimal use** of space helps reduce the floor area, with the consequent cost savings on land or rental costs.
- **Lower energy consumption**, particularly notable in cold storage because the floor area that needs to be maintained at low temperatures is smaller.
- **Reduction of personnel** required for storage, handling and administration (especially in automated systems).
- The **elimination of the use of forklifts** inside the storage aisles lowers maintenance costs: reducing blows to the structure of the racking, eliminating wear and tear as a result of misuse of the installation, etc.

5

Versatility

SKUs can be grouped by channels, instead of by entire lanes, allowing a greater diversification of the warehouse.

- Any type of forklift or stacker crane **can be used to handle the shuttle** (by installing a specific cradle for the Pallet Shuttle), making it adaptable to most storage requirements.
- The shuttles can work with pallets of **different sizes and widths**.
- Each shuttle holds **up to 1,500 kg per pallet**.
- It is a **scalable system**.
- The system allows **different configurations** of the installation depending on the number of SKUs, the number of pallets and the movements required in each case.

6

Safety

Because of the way the structure is built, and given that forklifts do not need to drive into the lanes, the risk of accidents is practically non-existent, and the metallic structure is not damaged.

The racks, shuttle, stacker cranes and transfer cars all **incorporate specific safety devices** for the proper functioning of the system and the protection of the operators and goods.



Semi-automated storage with Pallet Shuttle

Multiple functionalities at your fingertips

In semi-automated installations with Pallet Shuttle, the forklifts deposit the pallets on the rails at the level entrance and the electric shuttle picks them up and moves them to the first free location in the channel, compacting the load as much as possible.

The movement of the shuttles inside the racks is automated, following orders sent by an operator using a tablet with a Wi-Fi connection.

Therefore, in these types of warehouses, operators are needed to handle the forklifts that carry the pallets and to activate the operation of the motorised shuttle.



The Wi-Fi control tablet has a highly intuitive user interface

Operation

The loading and unloading of pallets is carried out in four easy steps:



1

A forklift places the Pallet Shuttle in the channel where the work is to be done.



2

Next, the forklift is used to position pallets one by one in the channel entrance, resting them on the load profiles. The forklift never enters the rack structure.



3

Using the tablet with a Wi-Fi connection, the operator sends the command to the shuttle to start the loading operation. Once the location of the pallet has been identified, the shuttle lifts the pallet slightly and moves it horizontally until it reaches the first free location, where it deposits the pallet. Different sensors accurately control the movement of the load being stored.



4

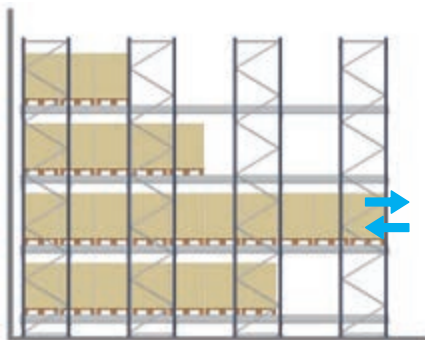
The shuttle returns to the top of the channel in order to repeat the operation with the next pallet, and the next, as many times as necessary until the channel is filled. Before the last position is filled, the shuttle is withdrawn and the sequence is repeated in the next channel where work is required.

In order to unload the pallets, the shuttle carries out the same operation, but in reverse.

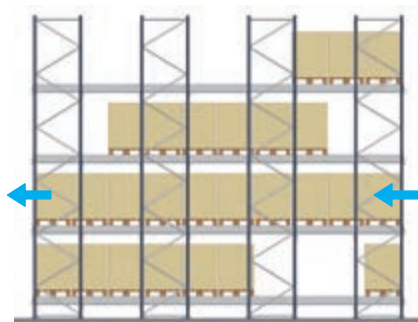


Load management systems

Semi-automated installations with Pallet Shuttle allow two types of operations:



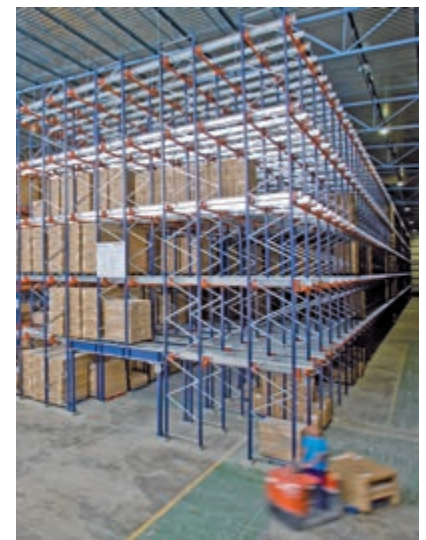
LIFO System



FIFO System

LIFO (Last In, First Out), where the last pallet loaded is the first to be unloaded. Loading and unloading are done from the same side. This is the most common method used with the Pallet Shuttle system.

FIFO (First In, First Out), where the first pallet loaded is the first to be unloaded. Two access aisles are needed: one to load the goods and another to unload them. This FIFO system is relative, or by batches, recommended for the complete loading or unloading of a level. When the channel is not entirely empty, the



shuttle itself relocates the pallets, bringing them closer to the outgoing position and thus allowing the reintroduction of goods.

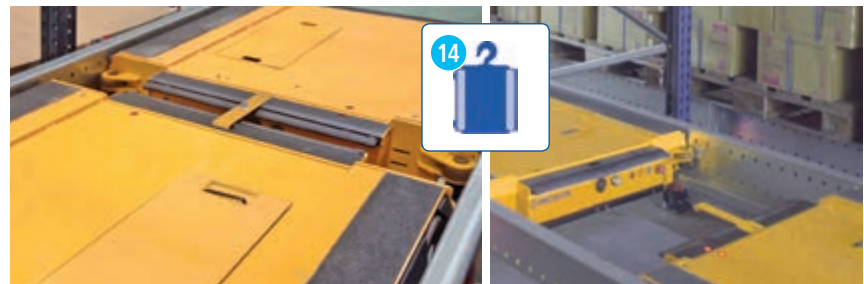
It is the ideal system to function as a buffer between two areas or when the aim is to maintain proper rotation.



Control system

The control system is responsible for communicating orders to the shuttle via the tablet with a Wi-Fi connection. It is very easy-to-use software which does not require special training for proper use. The operator only needs to select the desired function on the screen of the tablet, which has a very user-friendly interface.

The main functions that the Pallet Shuttle semi-automated system can perform are:



Main functions	
1 Pallet selector	Selects the type of pallet to be handled
2 LIFO/FIFO configuration	Selects the load management strategy
3 Change of work aisle	Selects which side of the structure you want to work on (in FIFO mode)
4 Locking system	Activates the additional locking system, which increases the clamping between the Pallet Shuttle and the blades of the forklift. Activation can be manual or automatic.
5 Compacting	Compacts pallets at the beginning (LIFO) or end (FIFO) of the channel
6 Continuous loading/unloading	Loads/unloads a channel without interruption
7 Partial unload	Selects the number of pallets to be extracted
8 Location signal	Activates the audible and light signals to identify the location of the selected shuttle
9 Inventory	Counts the number of pallets stored in the channel
10 Management of users	Manages user permissions for the shuttles for authorised personnel
11 Operating mode selector	Automatic or manual (for maintenance tasks)
12 Shuttle indicator	Shows the number of shuttles in operation and their status
13 Tiltmeter	Detects the incorrect position of the shuttle within the channel
14 Rescue	Recovers the damaged shuttle from within the channel
15 Position camera (optional)	Facilitates the insertion of the Pallet Shuttle on the rails



Distinctive features

The semi-automated Pallet Shuttle system incorporates the latest technological innovations in order to optimise the operation of the installation. Among its distinguishing features are the following:



It is possible to **manage up to 18 shuttles** with a single control tablet.

Inventory function: the shuttle can take stock of the number of pallets stored in the channel.

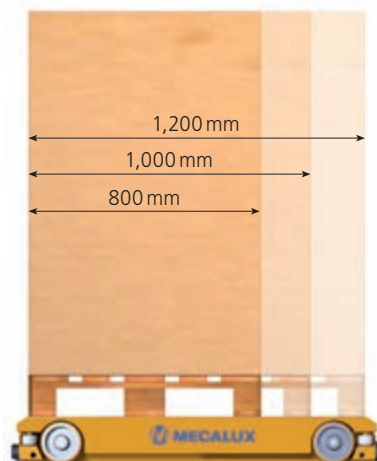
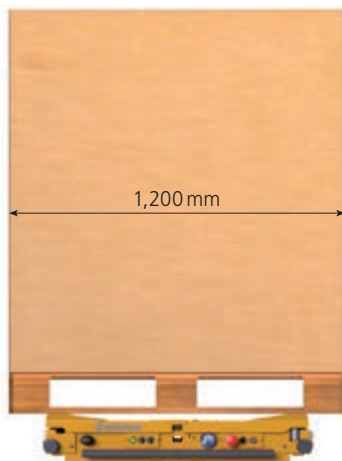
Possibility of installing the **Easy WMS Warehouse Management Software** by Mecalux on the tablet.



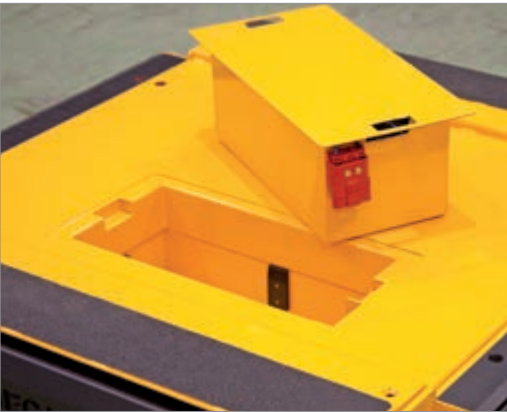
All shuttles can **operate in LIFO or FIFO mode**. The operator uses the tablet to select the desired working mode.

The shuttle is equipped with **sensors to detect and handle pallets** of different widths and sizes.

The shuttle **operates with lithium batteries**, which provide an autonomy of up to 10 hours at full power, depending on the temperature and load conditions.

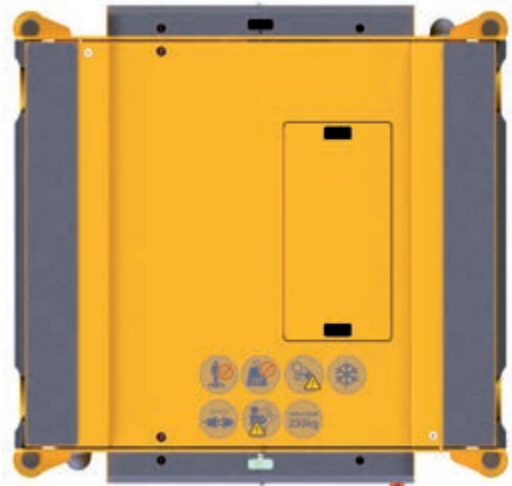


1,500 kg



The **lithium batteries are easily accessible** and have fast connections that eliminate the need for cables, so that they can be changed quickly without interrupting the operation cycle.

The shuttle platform is designed to **carry pallets with a buckling limit of up to 25 mm**.

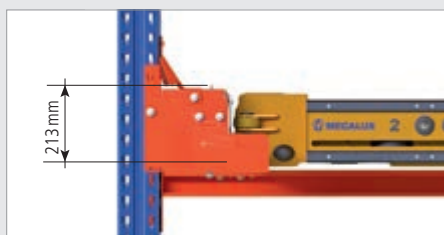


Adaptable to temperatures of between -30 °C and 45 °C

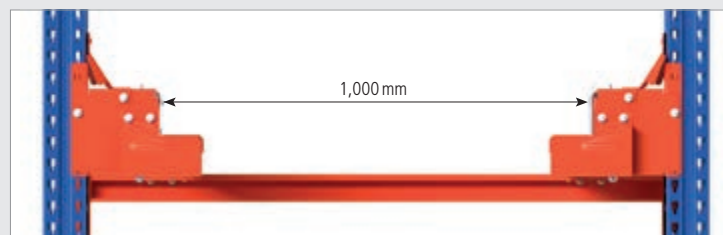
The **system is scalable**. Over time, the number of shuttles can be increased easily as the need to increase productivity arises.

Characteristics of shuttles	
Pallet width	1,200 mm
Pallet depth	800/1,000/1,200 mm
Load capacity	Up to 1,500 kg
Wheels	4
Travelling speed without load	Ambient: 90 m/min Cold: 55 m/min*
Travelling speed with load	45 m/min
Lifting time	2 s
Working temperature	Ambient: 5 °C to 45 °C Cold: -30 °C to 5 °C
Batteries	Lithium

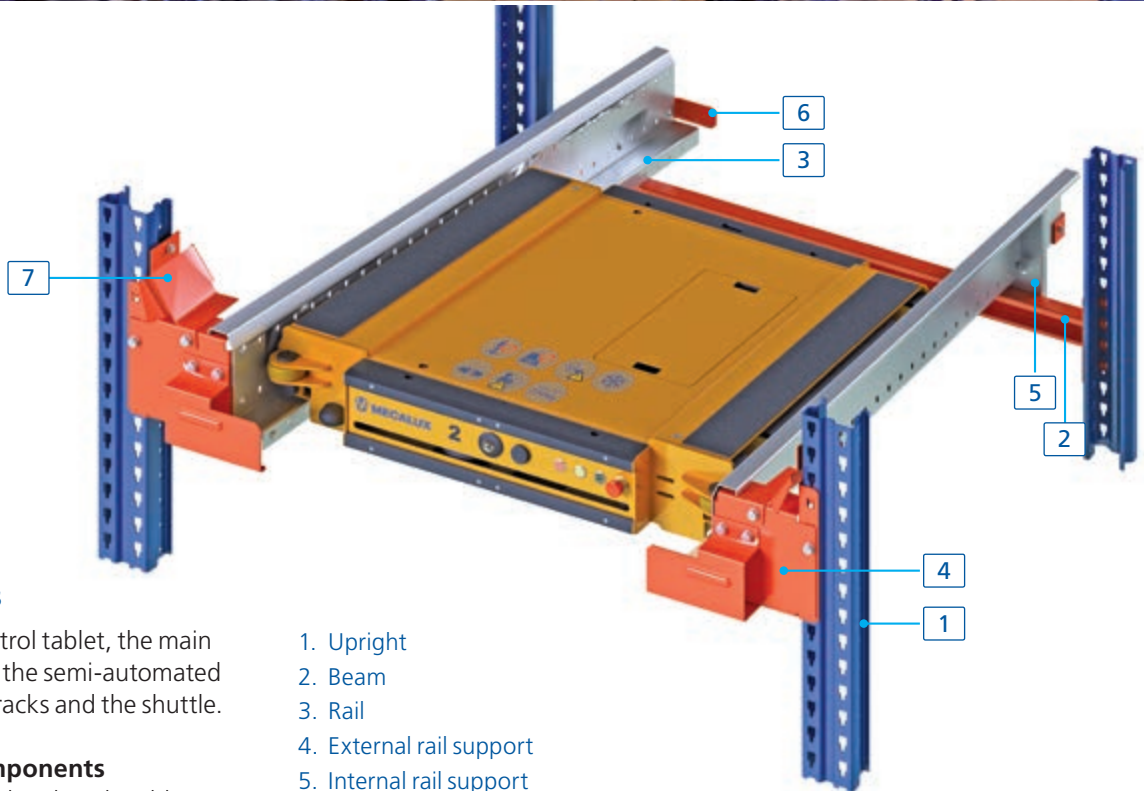
*For loads of up to 1,500 kg



Height of rail



Width between rails



Components

Besides the control tablet, the main components of the semi-automated system are the racks and the shuttle.

Structural components

For the electric shuttle to be able to travel safely within the storage channels, the structure of the racking needs to be adapted. It incorporates the following elements:

1. Upright
2. Beam
3. Rail
4. External rail support
5. Internal rail support
6. Rail-end stop
7. Pallet centraliser



Rail-end stop

Detection element to slow and stop the shuttle in normal working conditions.



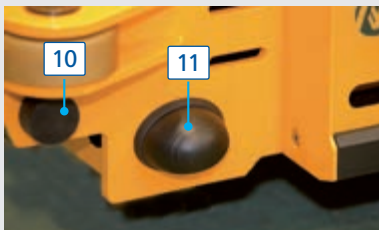
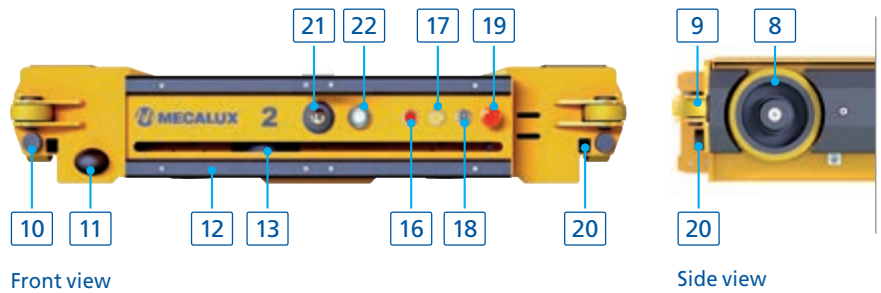
Pallet centraliser

It is fitted to the entry/exit points in the storage channels to aid in the positioning of the unit load in the channel, ensuring it has been centred.

Shuttle components

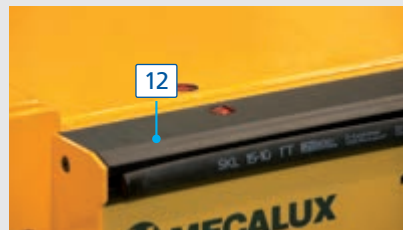
They are designed for maximum speed and security, with various devices to avoid possible incidents caused by improper use.

- 8. Wheel
- 9. Contrast wheel
- 10. Shuttle stops
- 11. Aerial
- 12. Safety bumper
- 13. Safety scanner (optional)
- 14. Lifting platform
- 15. Battery compartment
- 16. Fault indicator
- 17. Battery status indicator
- 18. On/off switch
- 19. Emergency stop button
- 20. End-of-track sensor
- 21. Position camera (optional)
- 22. Pallet detector
- 23. Locking system

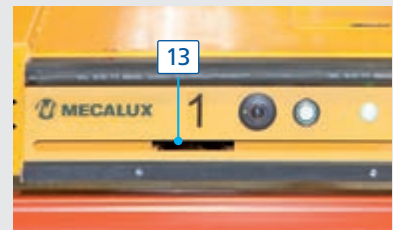


Shuttle stops (10): used to prevent possible collisions or incidents resulting from improper use.

Aerial (11): receives orders transmitted via Wi-Fi from the control tablet.



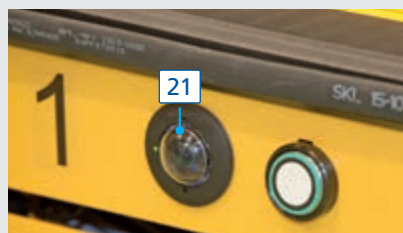
Safety bumper (12): used to prevent potential jams or collisions.



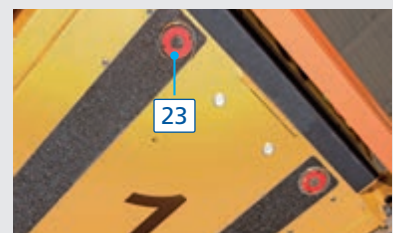
Safety scanner (optional): installed on either side of the Pallet Shuttle to control access to the channels more safely while the shuttle is in operation.



Emergency stop button (19): ensures the Pallet Shuttle stops for any preventive maintenance tasks.



Positioning camera (21): helps the operator to centre the shuttle between the two rails (optional).



Locking system (23): ensures the fastening of the shuttle on the lifting blades of the forklift, preventing it from moving during travel.



Distribution possibilities

In general, the Pallet Shuttle system noticeably increases warehouse productivity when working with incoming and outgoing goods with a large number of pallets per SKU.

Depending on conditions such as the size of the warehouse, the number of SKUs, the storage capacity required, the load management system or goods throughput required, you can opt for different distributions of the warehouse with the semi-automated Pallet Shuttle.

Below we show the four most common distribution options,

although other alternatives are also possible to find the most suitable solution for the logistical needs of each company.

1 Solution with a single front aisle

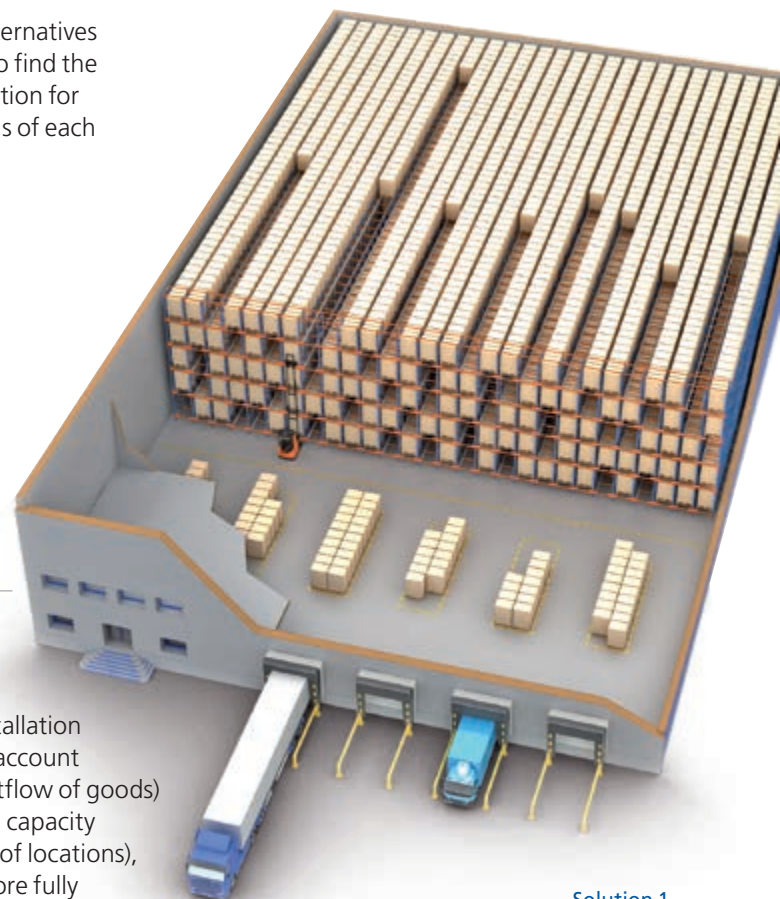
The warehouse consists of a single racking unit with only one access or front aisle, which separates the racking from the reception and/or dispatch areas.

The load management system is LIFO, the pallets enter and leave on the same side.

This is the option that offers greater storage capacity, i.e. a greater number of locations. The more channels are used for a single SKU,

the higher the installation (which takes into account the inflow and outflow of goods) with their physical capacity (the total number of locations), as there will be more fully loaded channels.

Hence, it is particularly recommendable when there are few SKUs, and there are many pallets for each SKU.



Solution 1.
Warehouse with semi-automated Pallet Shuttle system consisting of a single racking structure with only one access.

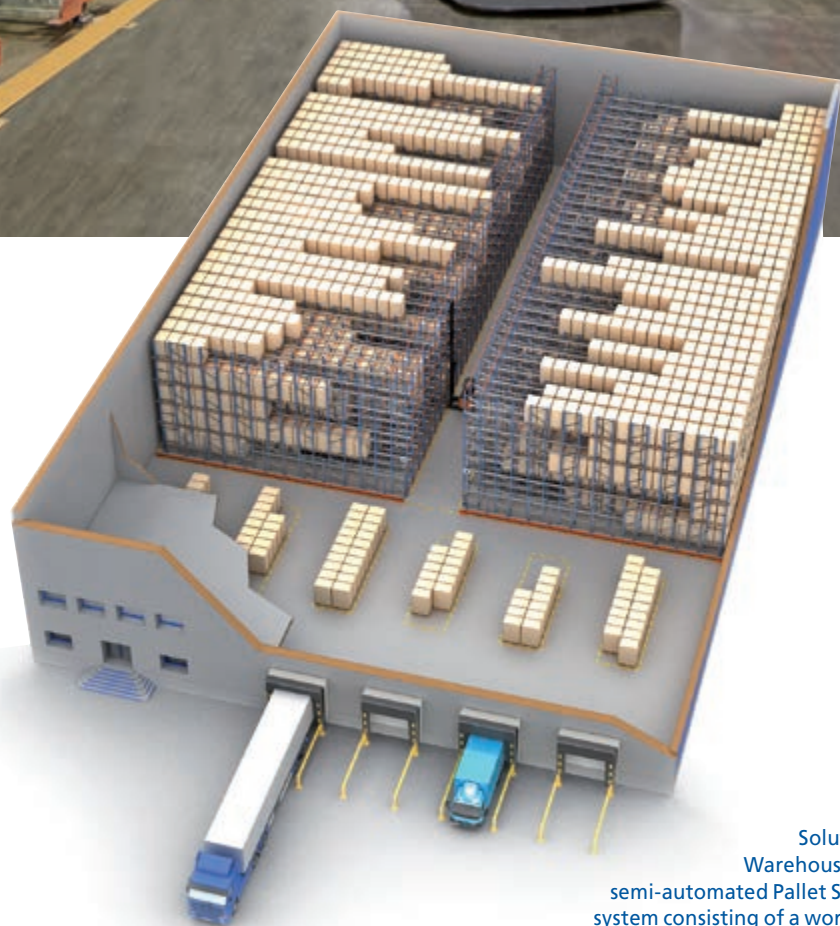


2 Solution with one work aisle and racking on both sides

The warehouse consists of two racking units between which the work aisle is arranged.

It is also used for a LIFO load management operation.

When installing racking on either side of a work aisle, more storage channels are achieved. The channels are shallower, allowing more channels per SKU and increasing the effective capacity of the warehouse.



Solution 2.
Warehouse with semi-automated Pallet Shuttle system consisting of a work aisle and two racking units.



3 Solution with two access aisles

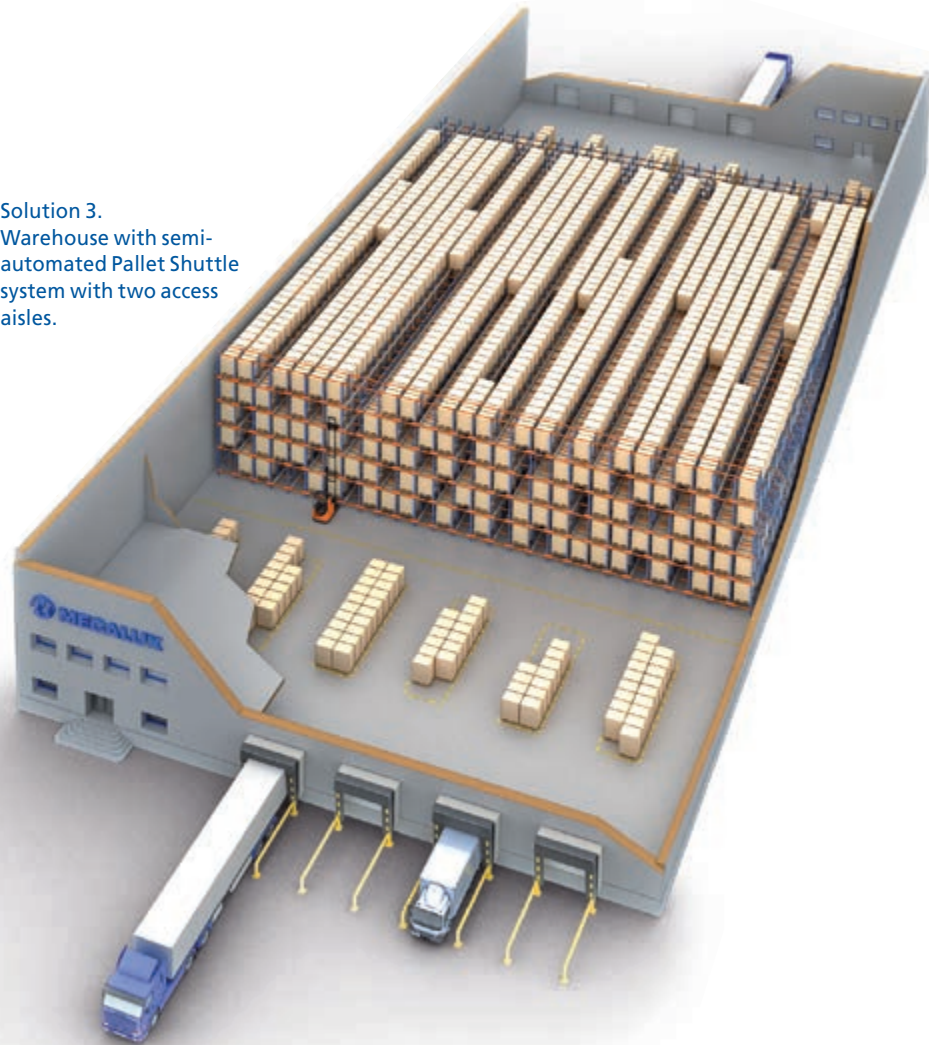
Warehouse consisting of a single racking unit with two access aisles: one for incoming goods and the other for outgoing goods.

Therefore, the load management method will be FIFO, since the pallets enter from one side and leave from the other side. By having two aisles, there is no interference between the forklifts loading the pallets and those unloading them.

With this type of distribution, it is recommendable to load and unload the channels fully in order to minimise the need to relocate the pallets within the channel.

This is the ideal choice when the warehouse acts as a buffer (a temporary warehouse with short stays and full loads).

Solution 3. Warehouse with semi-automated Pallet Shuttle system with two access aisles.



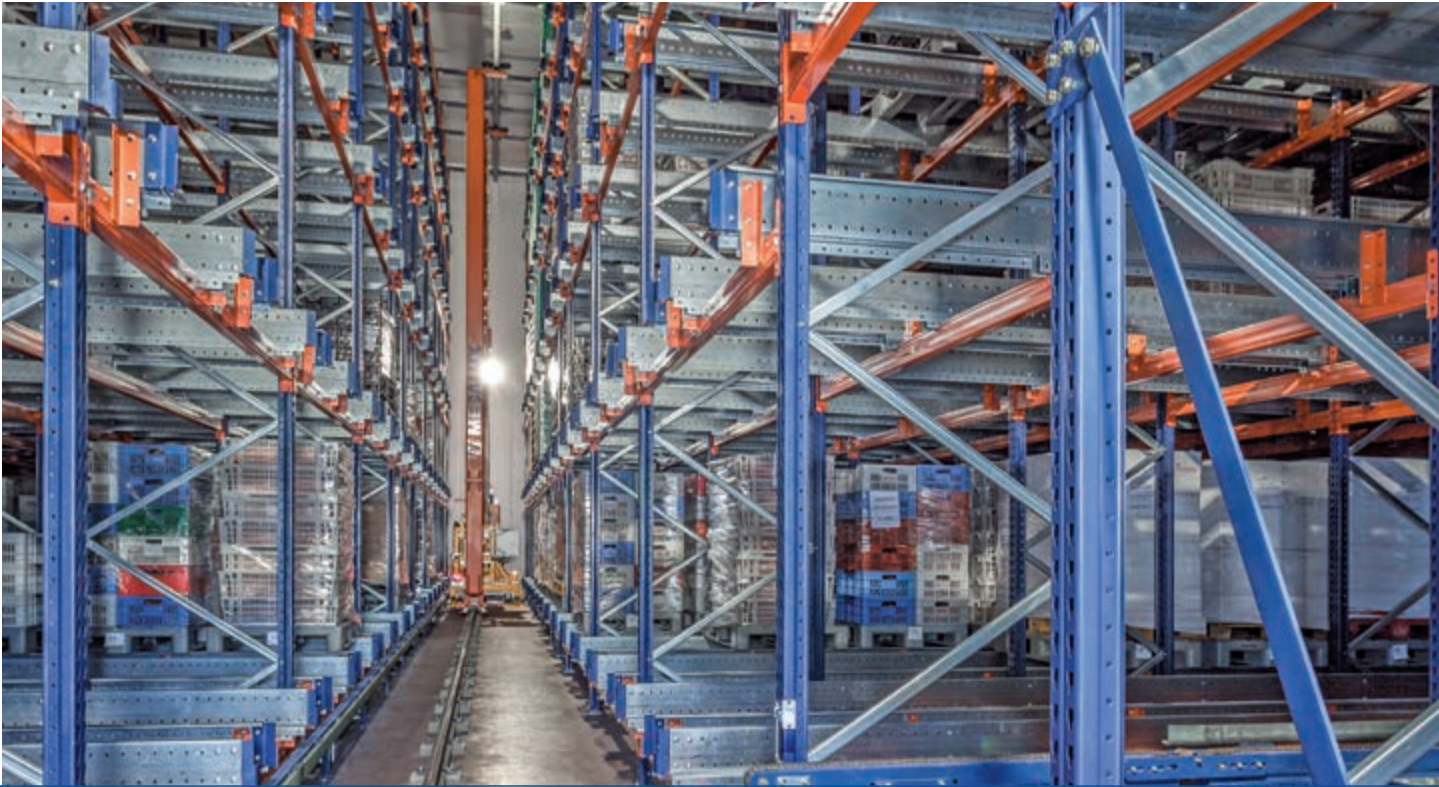
4 Solution with two work aisles and lower levels for picking

Warehouse consisting of two racking modules combined with live levels for picking and two work aisles on both sides of the racking.

With this option, storage capacity is lost to the picking area, due to the enabling of bulk order preparation on pallets. The racking on the highest levels serves as a reserve warehouse to supply the picking levels located at the bottom. These live picking channels can accommodate a depth of up to four pallets.

Solution 4.
Warehouse with semi-automated Pallet Shuttle system consisting of two modules combined with live levels for picking.

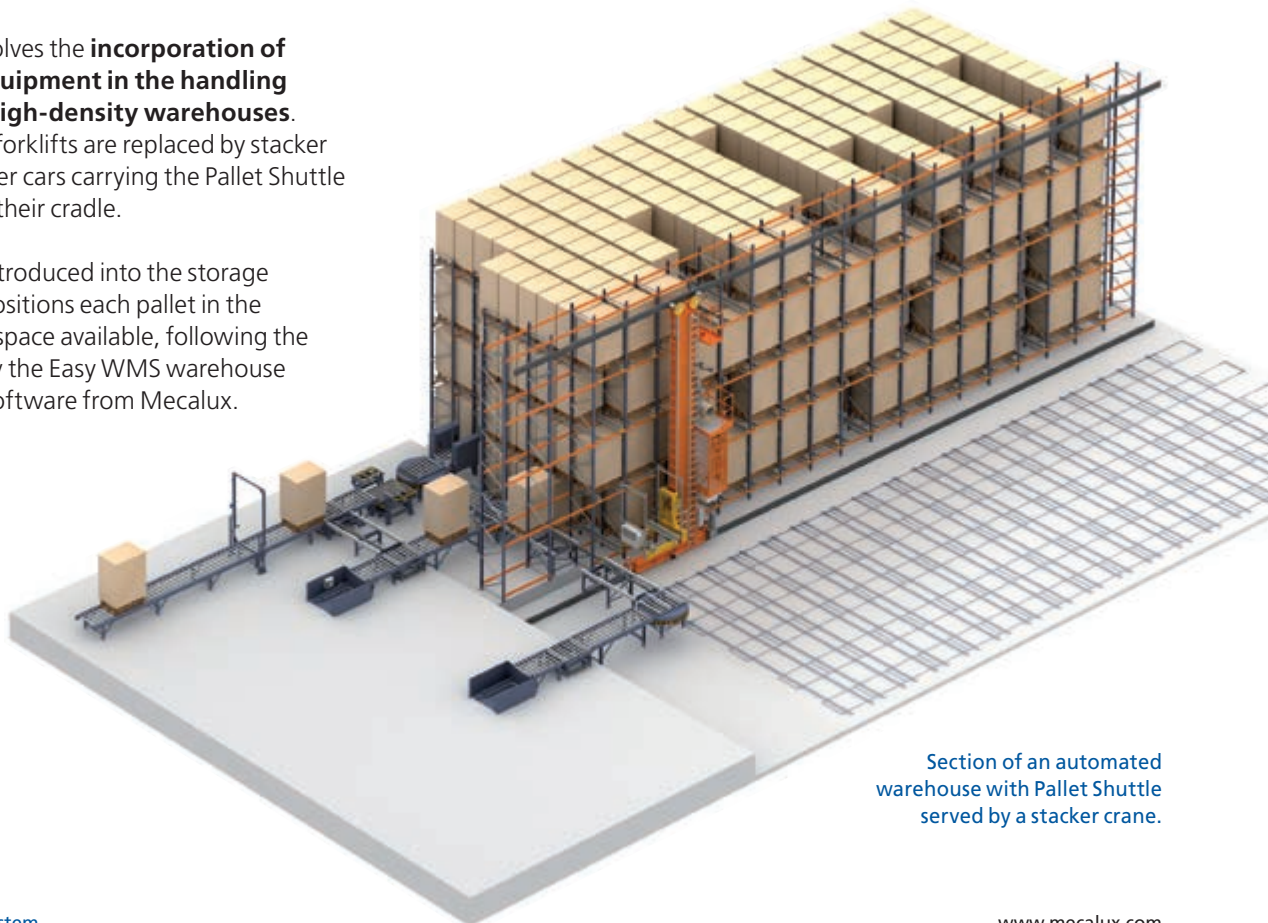




Automated storage with Pallet Shuttle Union means strength

This system involves the **incorporation of automated equipment in the handling processes of high-density warehouses**. As a result, the forklifts are replaced by stacker cranes or transfer cars carrying the Pallet Shuttle and the load in their cradle.

The shuttle is introduced into the storage channels and positions each pallet in the innermost free space available, following the orders issued by the Easy WMS warehouse management software from Mecalux.



Section of an automated warehouse with Pallet Shuttle served by a stacker crane.

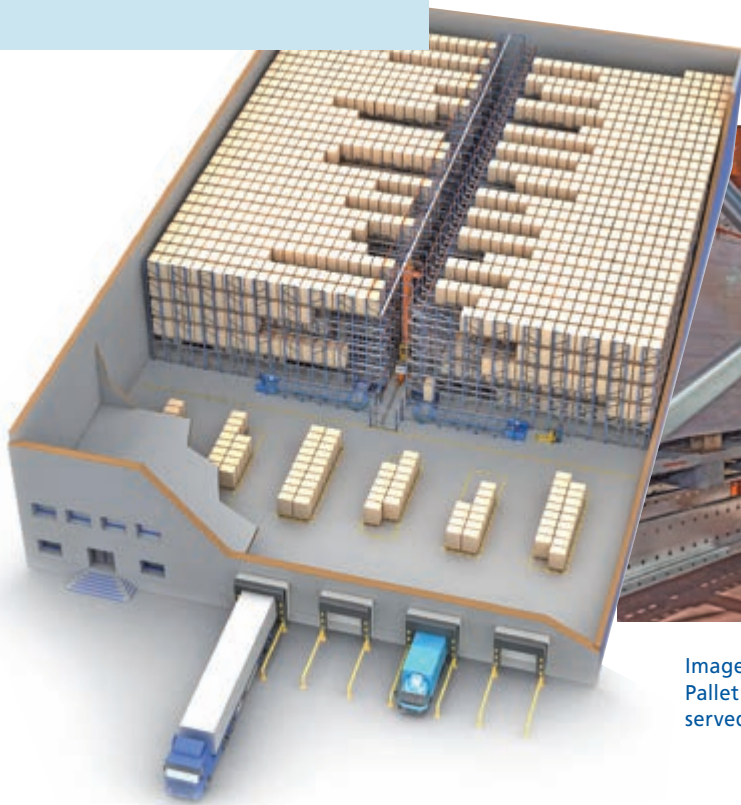


Image of an automated warehouse with Pallet Shuttle consisting of five load levels served by a stacker crane.



When a **stacker crane** is used as the basic handling equipment, it serves all the locations in the storage aisles in its entire height. When the basic handling equipment is the **transfer car**, each level is served by one of them, which accesses all the channels on that level.

The choice of handling equipment will depend on the number of incoming and outgoing movements, the number of SKUs and the number of pallets per SKU or batch. The fundamental difference between

the two systems lies in the potential number of pallets that a solution based on transfer cars is capable of moving compared with a stacker crane solution, given that this quantity is multiplied by the number of levels at the installation.

Thus, the **automated Pallet Shuttle is the result of merging the optimisation of the storage capacity of high-density systems with the reduction in the time spent** on each operation, typical of automated systems.

This combination of benefits results in the creation of added value in the company's business with some immediately visible results: maximum utilisation of the installation's capacity, immediate availability of products, streamlining of movements and greater responsiveness to changes in demand.

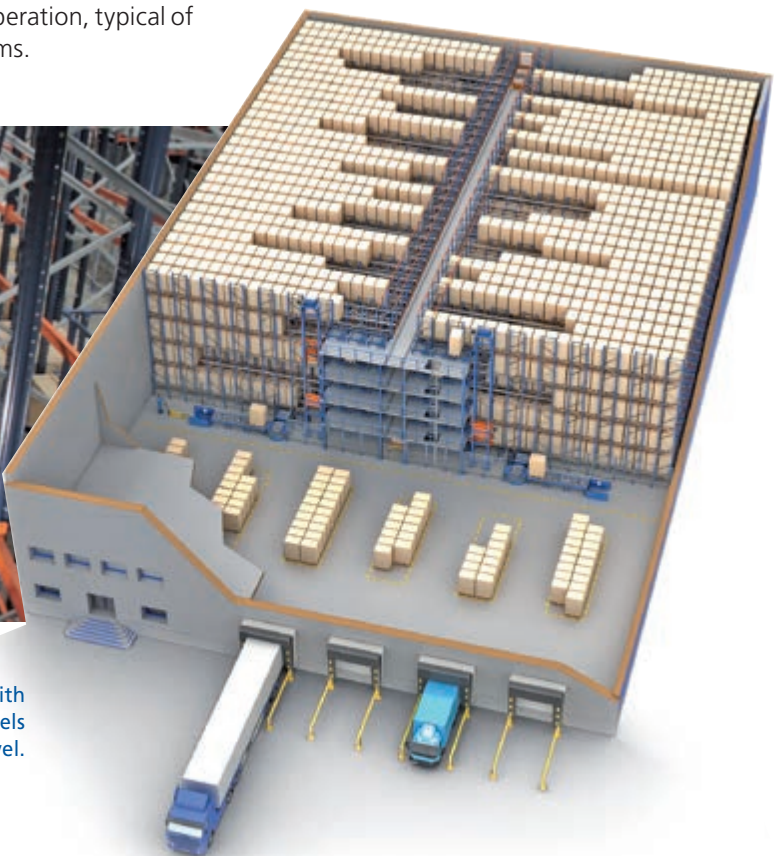
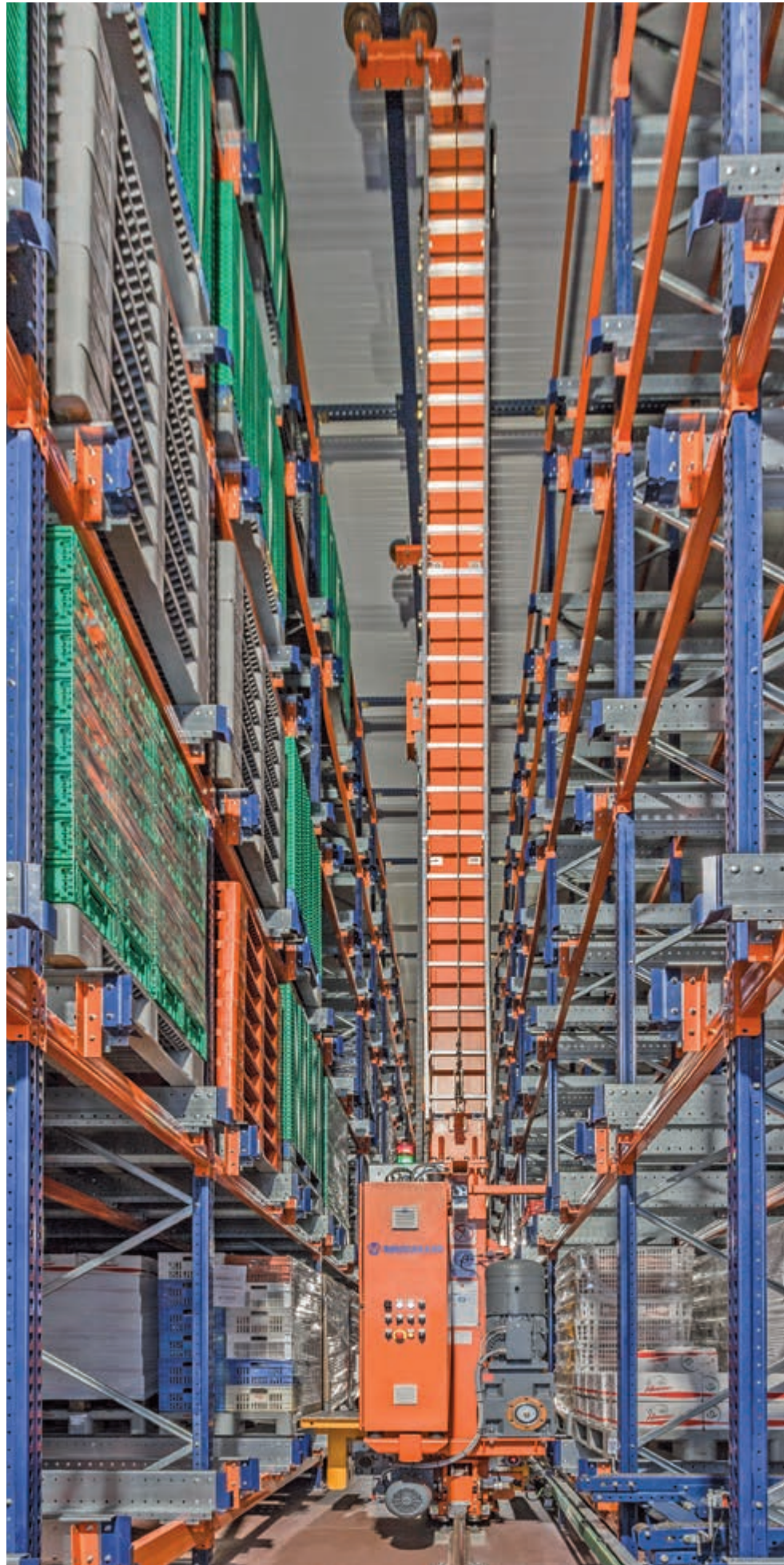


Image of an automated warehouse with Pallet Shuttle consisting of five load levels and one transfer car per level.

Distinctive features

The automated storage system with Pallet Shuttle offers many features that make it one of the most efficient solutions on the market for intensive circulation of products. The most prominent functions are:

- Automation involves **the removal of errors and an increase in the number of cycles of pallets/hour**, improving the efficiency in the service to the end customer.
- The use of stacker cranes or transfer cars requires **less width between aisles** (less than 1,600 mm), meaning more surface area is obtainable .
- The supercapacitors of the Pallet Shuttle **are automatically charged** while they are aboard the cradle of the stacker crane or transfer car, so the shuttle is always ready to run the next command.
- Potential to establish **continuous throughput and increased availability in the movement** of goods without being subject to working hours.
- The automated installation with Pallet Shuttle **can be mounted in phases**, implementing the automation in different stages as the needs of the warehouse change.
- The services offered by high-density automated warehouses with Pallet Shuttle pay back the initial investment with a **reduction in short-term costs and rapid return on the investment**.



Safety features



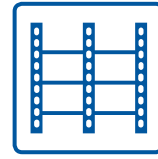
Safety of personnel:

- The installation is designed for **minimal human intervention**. Perimeter protection with safety locks prevents unauthorised access to the racking area.
- The racking, the shuttle, the stacker cranes and transfer cars all **incorporate safety devices** that reduce the likelihood of accidents.



Safety of goods:

- The very design of these types of installations means that the goods are inaccessible. The racks can only be accessed by authorised maintenance personnel.
- **Reduction in unknown product losses.**
- **Reduction in breakage** due to improper handling.
- **Decrease in the number of and the need for checkpoints.**



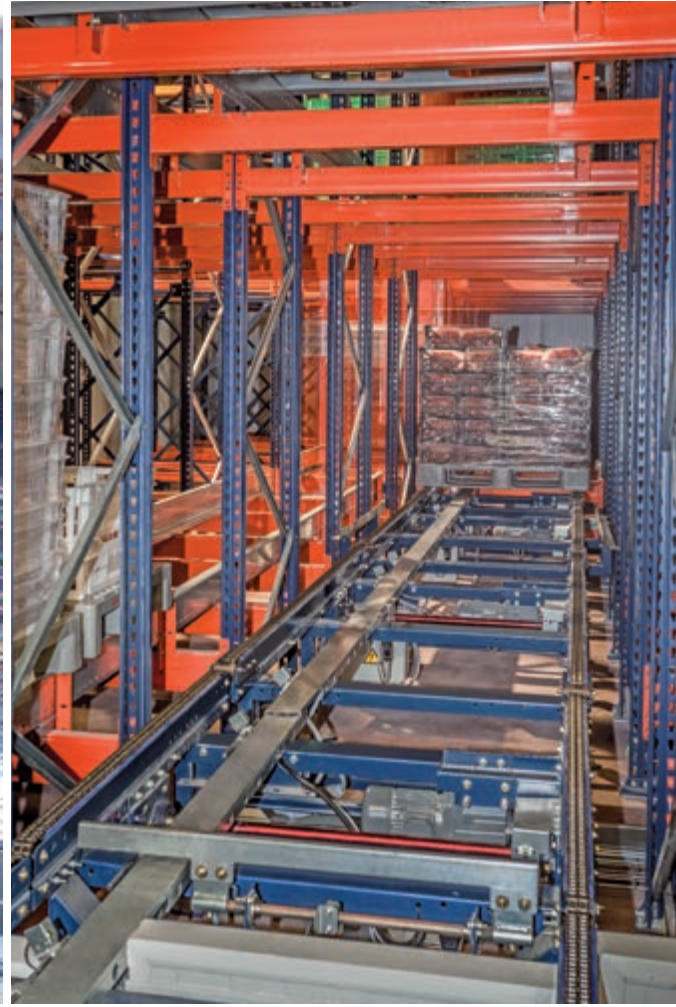
Safety of the installation:

- The electric shuttle **is equipped with pallet position sensors and end of travel sensors** to ensure proper operation.
- The stacker cranes and transfer cars are **equipped with devices** to ensure the long life of the equipment.
- The accuracy of the automated handling equipment in transporting the Pallet Shuttle **prevents damage to the racking and to the shuttle itself.**



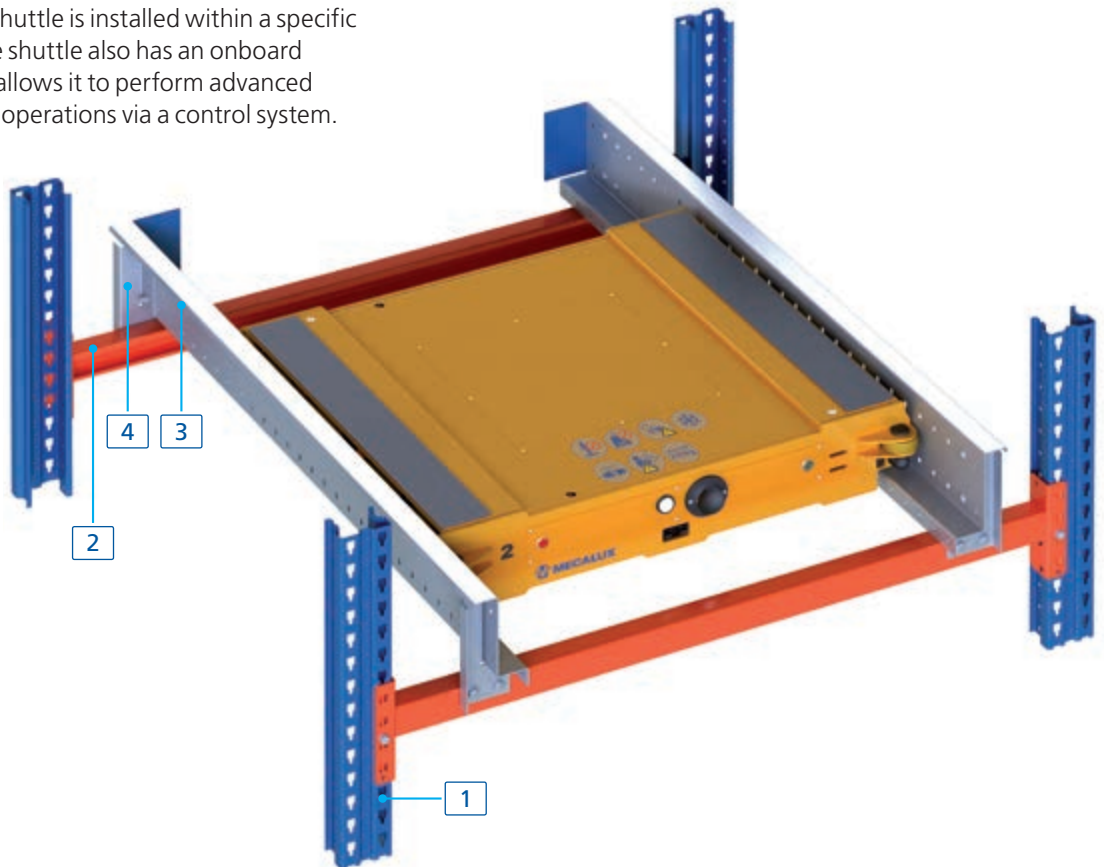
Characteristics of shuttles

Pallet width	1,200 mm
Pallet depth	800/1,000/1,200 mm
Load capacity	Up to 1,500 kg
Wheels	8
Travelling speed without load	Ambient: 110 m/min / Cold: 76 m/min
Travelling speed with load	70 m/min
Lifting time	2 s
Working temperature	Ambient: 5°C to 45°C / Cold: -30°C to 5°C
Batteries	Supercapacitors



Components

The automated Pallet Shuttle is installed within a specific compact structure. The shuttle also has an onboard electronic system that allows it to perform advanced loading and unloading operations via a control system.



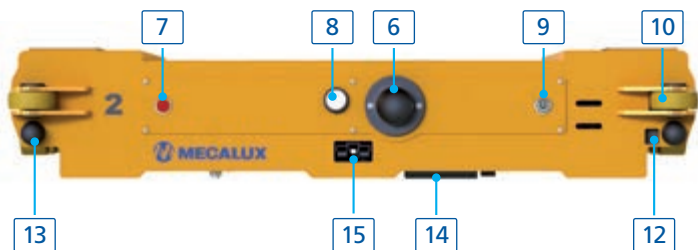
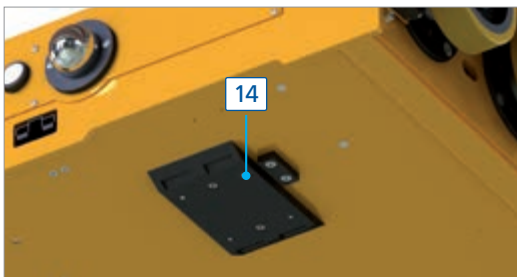
Structure

- 1. Upright
- 2. Beam
- 3. Rail
- 4. Inner rail support



Shuttle

- 5. Lifting platform
- 6. Aerial
- 7. Fault indicator
- 8. Ultrasound sensors
- 9. On/off switch
- 10. Contrast wheel
- 11. Wheel
- 12. End-of-track sensors
- 13. Rubber stop
- 14. Automatic battery connectors for supercapacitors
- 15. Power plug for supercapacitors discharge



Automatic battery connectors

The supercapacitors are charged in the cradle of the stacker crane or transfer car.

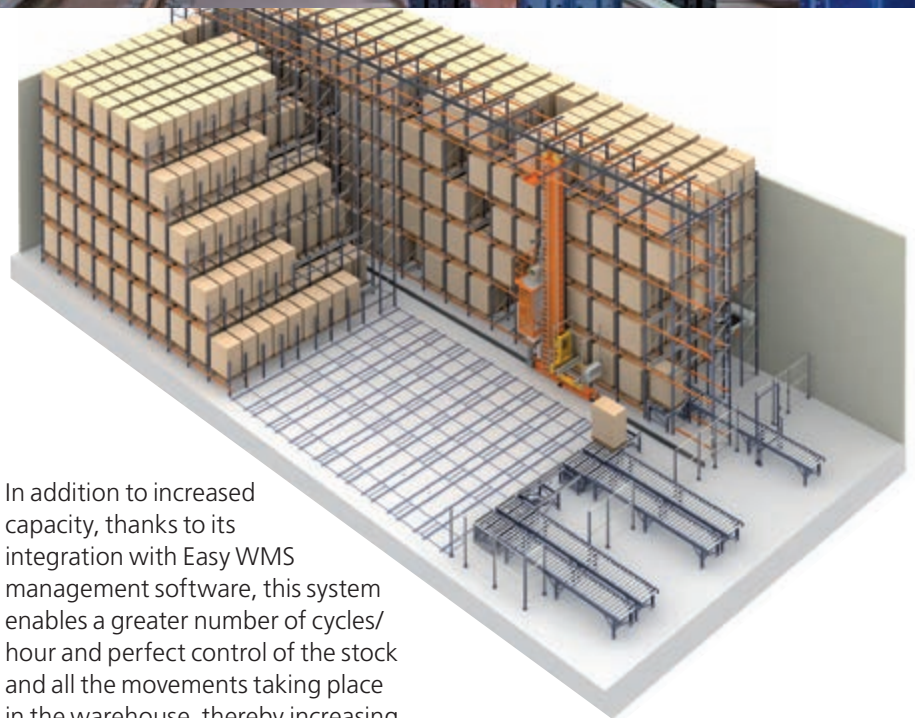
Automated Pallet Shuttle with stacker crane

High-density storage up to 40 m high



With this system, a stacker crane is responsible for carrying out the movements from the entry and exit positions in the warehouse to any storage channel. The Pallet Shuttle is tasked with moving the pallets from the cradle of the stacker crane to their position in the corresponding channel.

Generally, two compact storage racking units are installed, one on each side of the work aisle. This configuration allows a greater capacity because the main aisle is small in size (less than 1,600 mm). Moreover, with the use of stacker cranes, the storage height can exceed 40 m.



In addition to increased capacity, thanks to its integration with Easy WMS management software, this system enables a greater number of cycles/hour and perfect control of the stock and all the movements taking place in the warehouse, thereby increasing productivity.

Operation

The loading or unloading of pallets is performed in four steps:



1

The Pallet Shuttle sits on the cradle of the stacker crane at rest, awaiting the arrival of a pallet from the loading gauge control.



2

When the inbound conveyor gives the signal for the presence of a pallet, the stacker crane picks it up by the chains installed in the cradle and moves it to the assigned channel.



3

The shuttle raises the pallet slightly and inserts it into the storage channel, moving it along the rails until it reaches the innermost free position. It lowers the pallet and rests it on top of the rail.



4

The stacker crane waits for the Pallet Shuttle to finish running the command and be automatically placed in the cradle. Both elements remain in that position until they receive the next order.

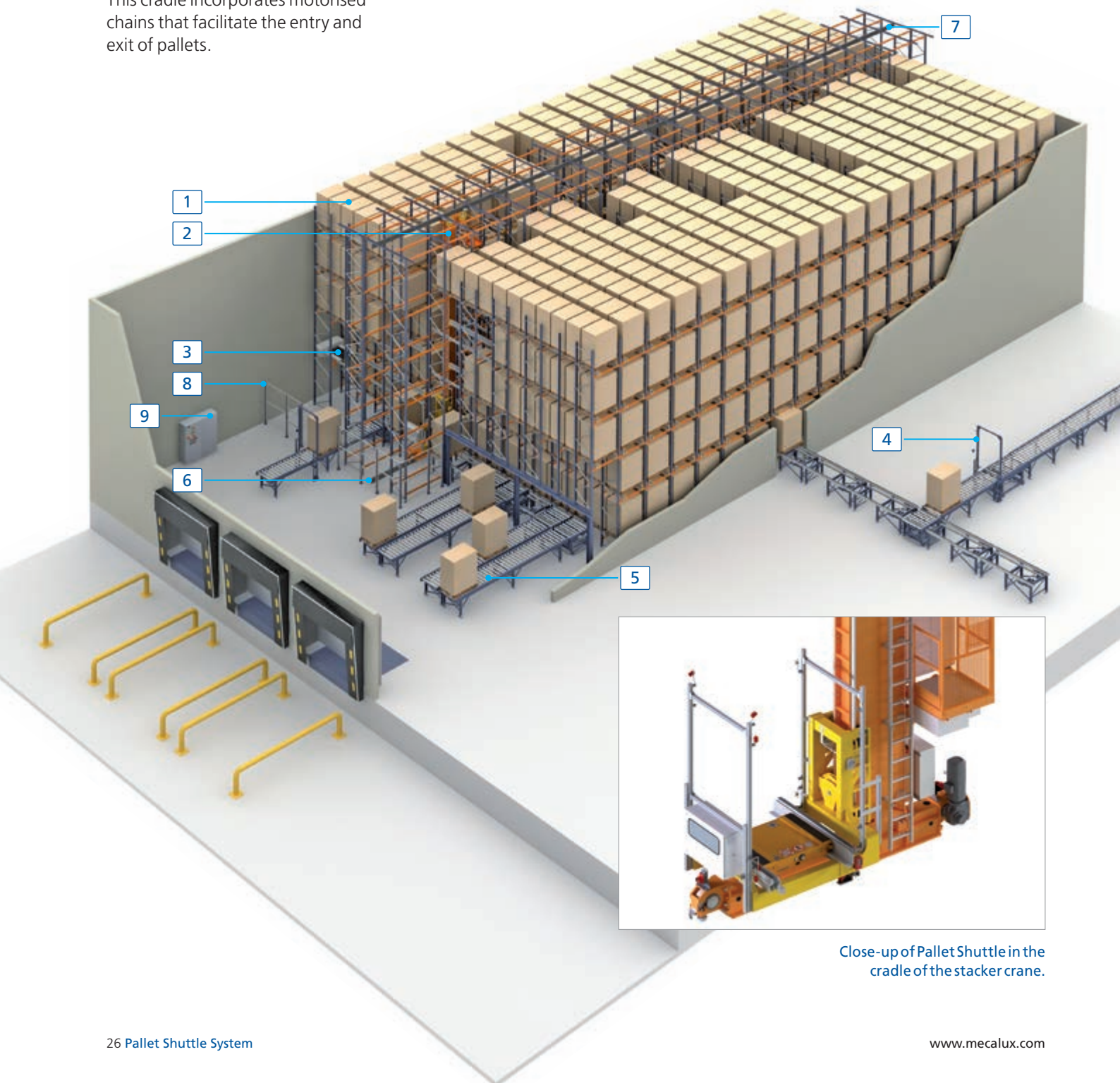
Unloading operations are the same but in reverse order.

Specific components

The points of entry and exit of the warehouse are placed at strategic locations to optimise movements, ensuring they are as close as possible to work areas (collection, production, shipping, etc.). They are usually roller and chain conveyors with the necessary control and loading gauge elements.

Any stacker crane from the single-mast or twin-mast line can carry a specific cradle for the Pallet Shuttle. This cradle incorporates motorised chains that facilitate the entry and exit of pallets.

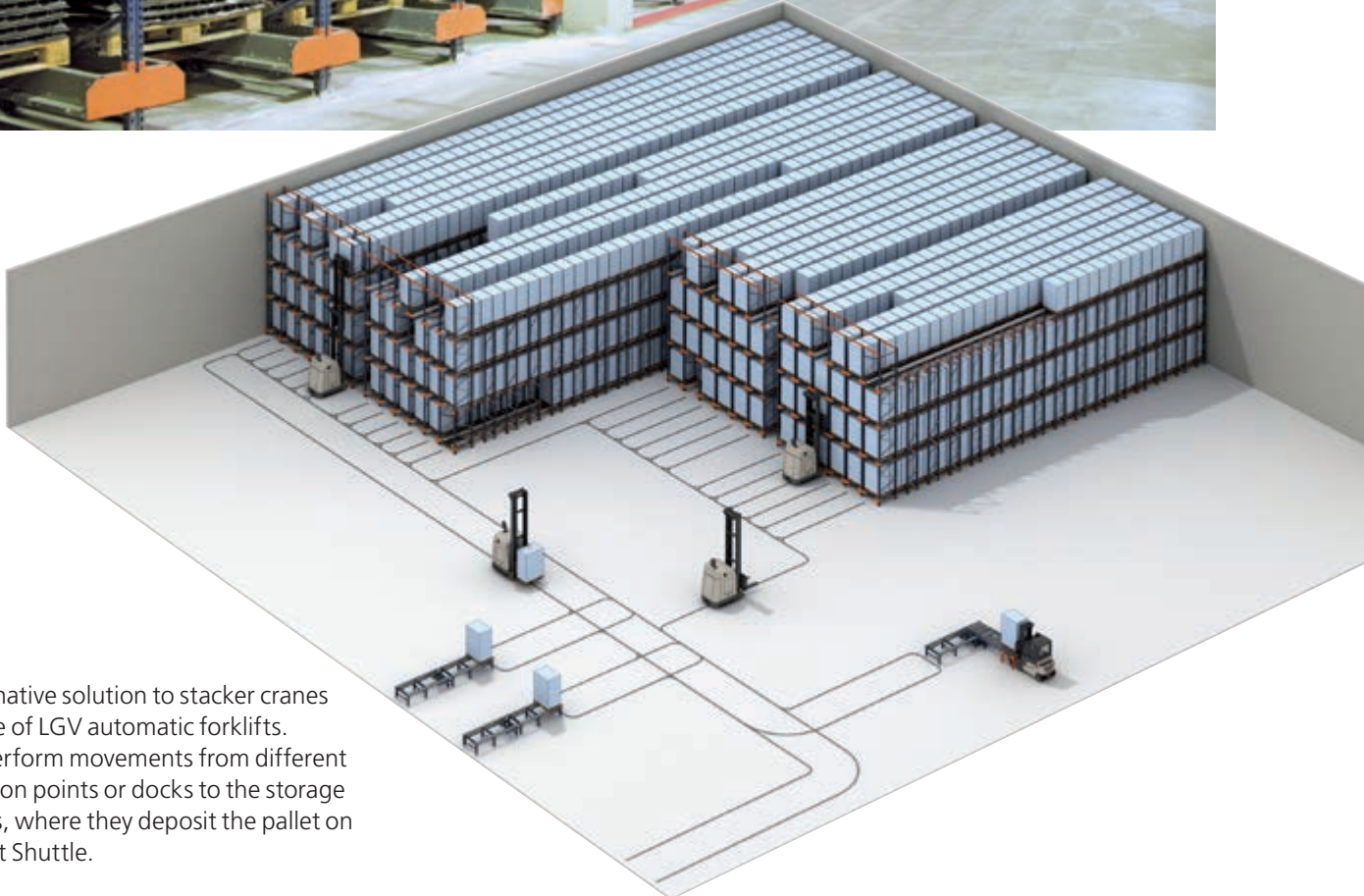
1. Racks
2. Stacker crane
3. Automatic shuttle
4. Inbound conveyor with loading gauge control
5. Outbound conveyor
6. Lower guide for the stacker crane
7. Upper guide for the stacker crane
8. Safety barrier
9. Control and power cabinets and equipment



Close-up of Pallet Shuttle in the cradle of the stacker crane.

Automated Pallet Shuttle with LGV

The alternative to stacker cranes



An alternative solution to stacker cranes is the use of LGV automatic forklifts. These perform movements from different production points or docks to the storage channels, where they deposit the pallet on the Pallet Shuttle.

It is an optimal system wherever there are few movements, heights of less than 8 m and different stations for pallet loading and unloading.

Automated Pallet Shuttle with transfer car

The most efficient system when you need to combine high capacity with a large number of movements

Instead of one stacker crane serving all the storage channels on all levels, a raised walkway structure is installed with guide rails which allow the movement of one transfer car on each level. As with the stacker cranes, generally two compact storage racking units are installed, one on each side of the work aisle.

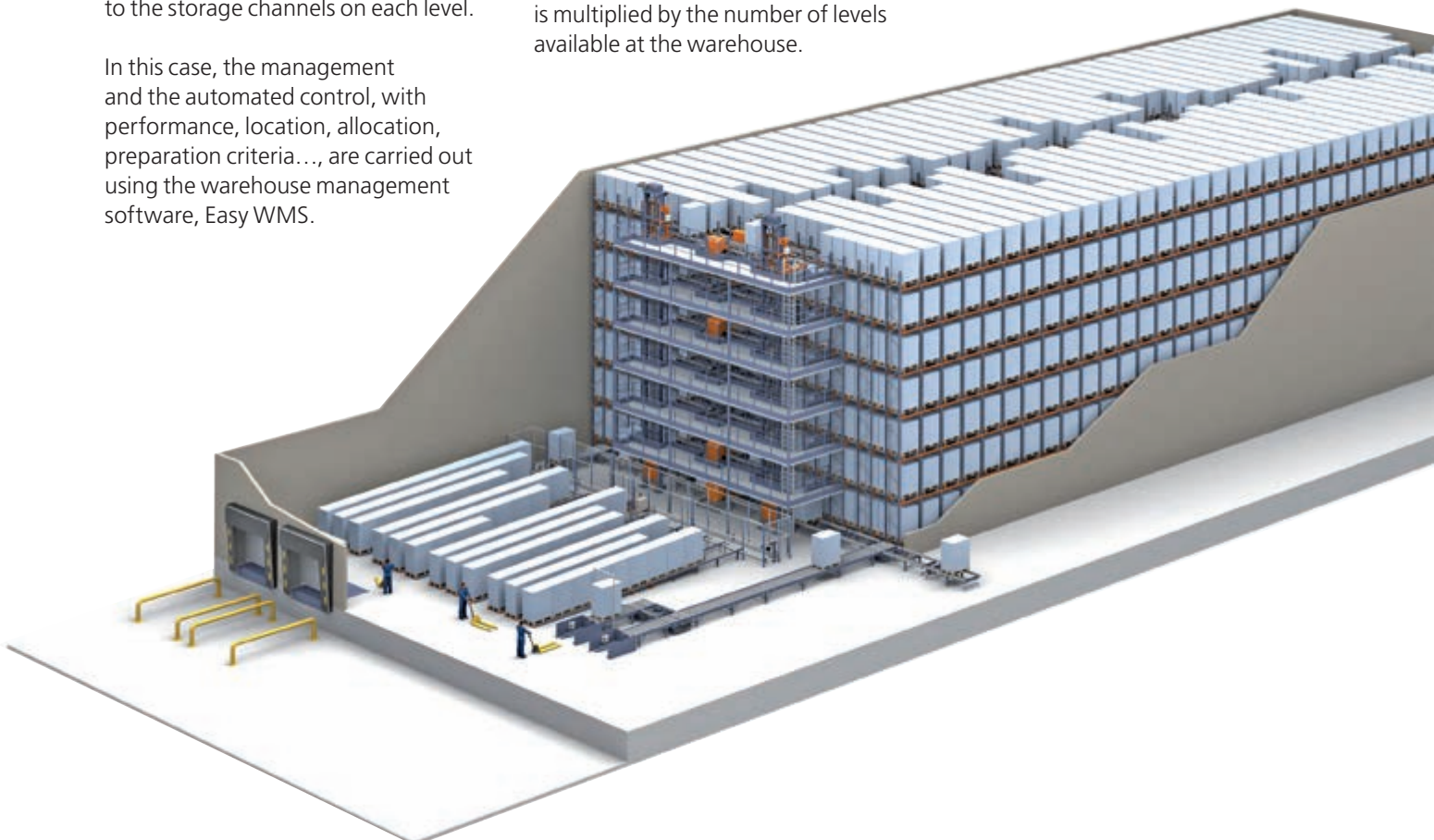
The transfer car is a non-continuous pallet conveyor which circulates on rails in a straight line moving goods from one point of the warehouse to another. In turn, it incorporates another transport element on board where the Pallet Shuttle is located, with drag chains for pallets.

One or two lifting platforms carry out movements at heights, connecting the different levels. Thus, if the installation has five levels, five transfer cars are installed, which are responsible for carrying out the movements from the lifting platforms to the storage channels on each level.

In this case, the management and the automated control, with performance, location, allocation, preparation criteria..., are carried out using the warehouse management software, Easy WMS.



Besides offering all the advantages of the installations with Pallet Shuttle and stacker cranes, in the installations with transfer cars the number of movements or cycles/hour is multiplied by the number of levels available at the warehouse.



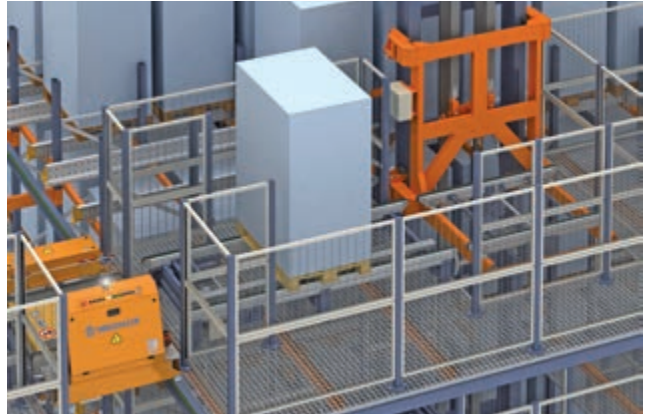
Operation

The process of loading or unloading in the racks is carried out in 5 steps:



1

The pallet enters the automated warehouse after passing through the loading gauge control, where it is verified that it meets the weight, measurement and quality requirements of the pallet.



2

A lifting platform raises the pallet to the level where the assigned channel is located and transfers it to an accumulation conveyor.



3

The transfer car with the Pallet Shuttle onboard takes the pallet and slides it to the entrance of the storage channel.



4

The Pallet Shuttle raises the pallet slightly and inserts it into the channel, where it is moved along the rails to the innermost free position. Next, it deposits the pallet on the rails.



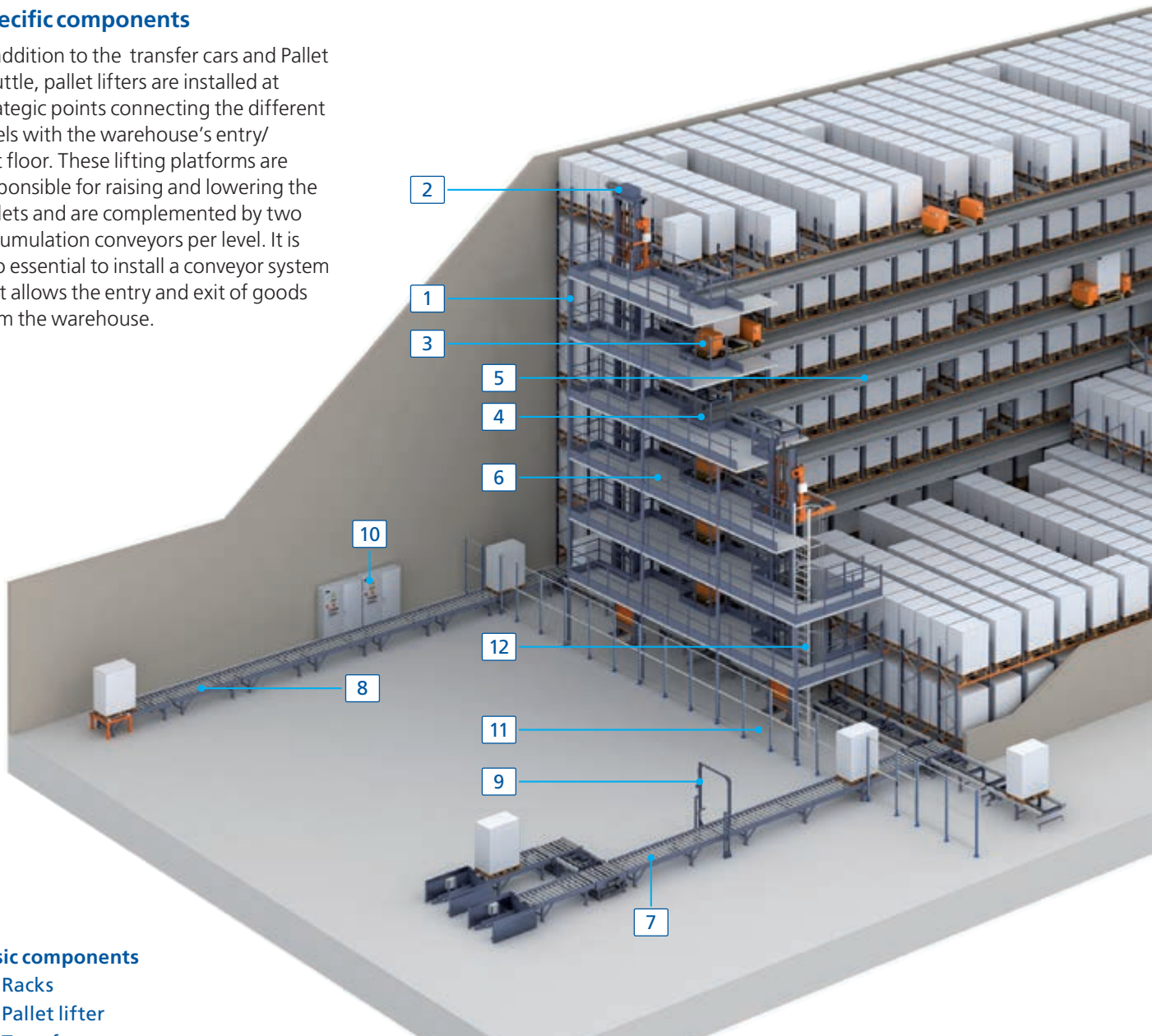
5

When the operations in that storage channel are complete, the Pallet Shuttle enters the cradle on the transfer car and awaits a new order. The supercapacitors are charged while the transfer car is in motion.

To perform an outgoing operation, you follow the same steps but in reverse.

Specific components

In addition to the transfer cars and Pallet Shuttle, pallet lifters are installed at strategic points connecting the different levels with the warehouse's entry/ exit floor. These lifting platforms are responsible for raising and lowering the pallets and are complemented by two accumulation conveyors per level. It is also essential to install a conveyor system that allows the entry and exit of goods from the warehouse.

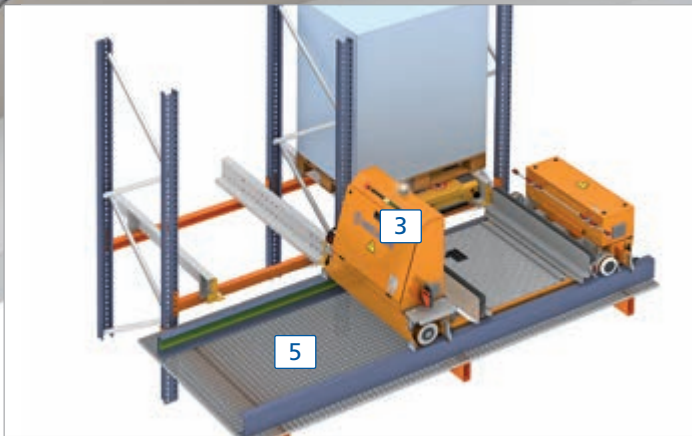
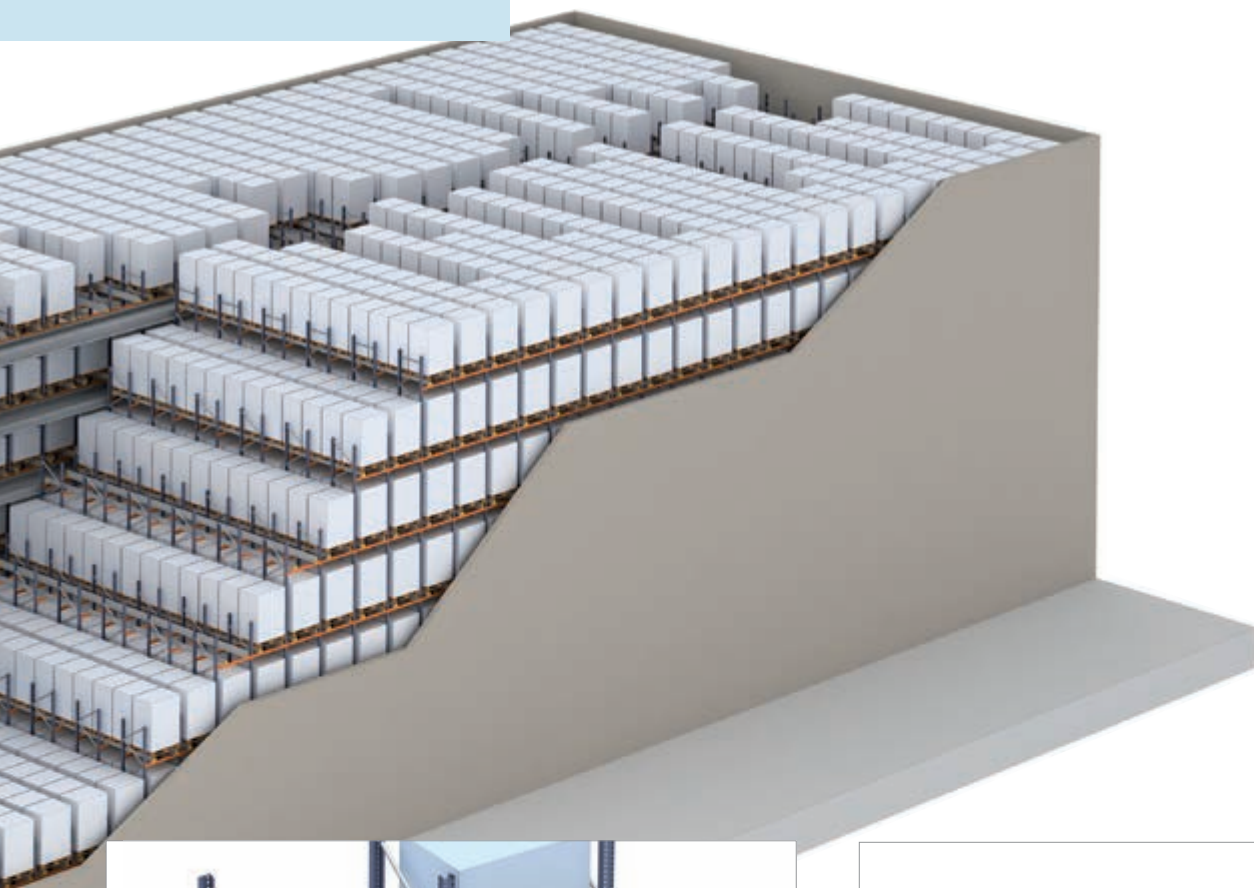


Basic components

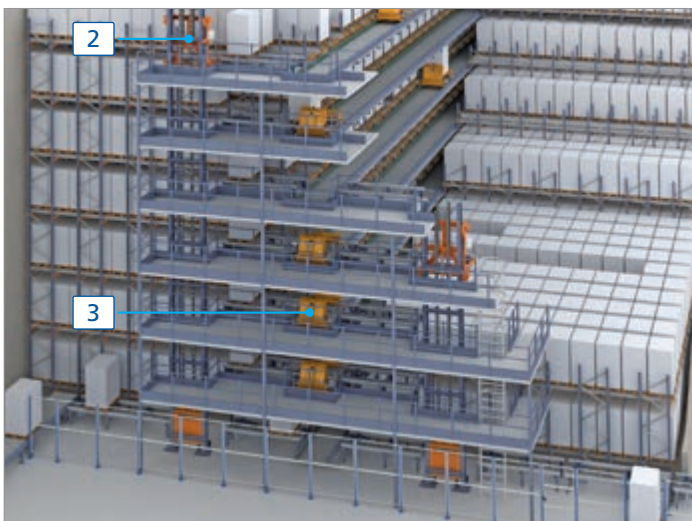
1. Racks
2. Pallet lifter
3. Transfer car
4. Structure and rails
5. Maintenance floor
6. Connecting platform
7. Inbound conveyor
8. Outbound conveyor
9. Loading gauge control
10. Control, power and management equipment
11. Safety barrier
12. Maintenance ladder



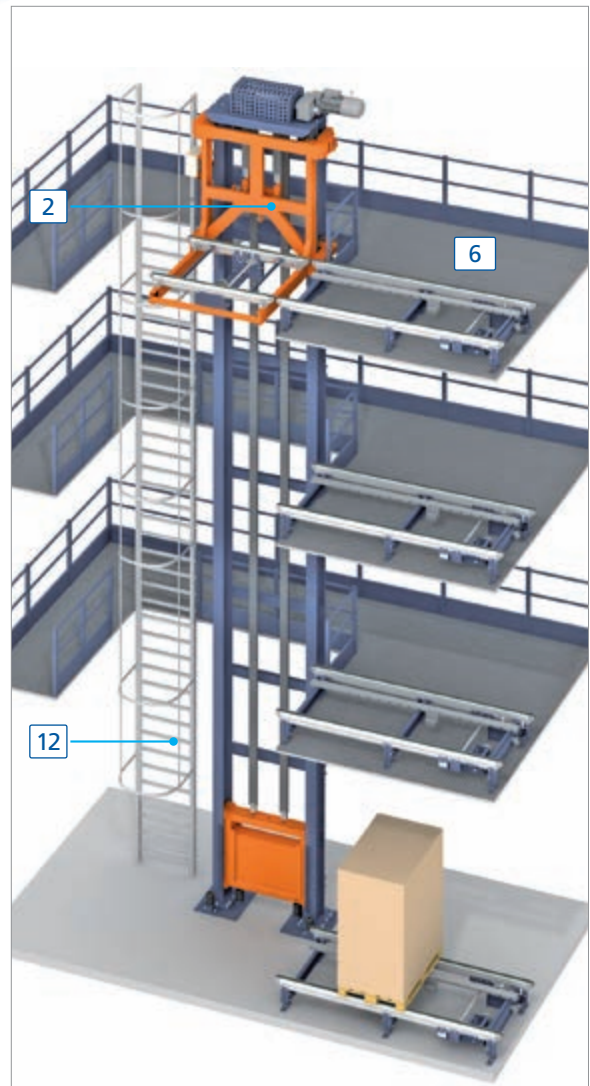
Close-up of the transfer car and the maintenance floor.



Close-up of the structure required for the movement of the transfer car.



The use of transfer cars multiplies the number of cycles/hour.



The installation of pallet lifters enables the vertical movement of the load.



Examples of applications

The ideal system for high-density storage

1 In combination with traditional systems

Depending on the needs and the number of pallets stored, it is common for installations with Pallet Shuttle to be combined with other storage systems.

In the example shown in these pages, different systems have been installed depending on the turnover of products, using reach trucks and pallet trucks as the handling equipment.

Semi-automated Pallet Shuttle system (1)

Three compact storage units with a semi-automated Pallet Shuttle, intended for medium demand, type B products.

Conventional system (2)

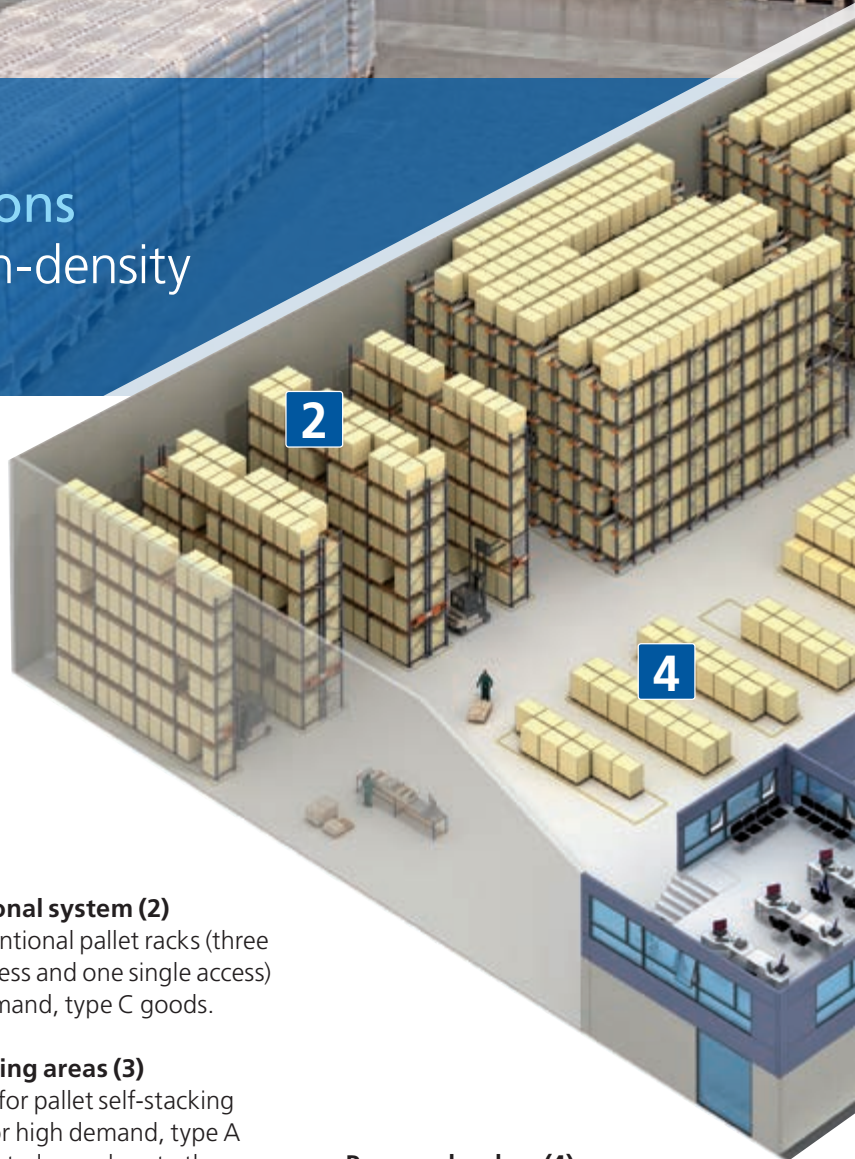
Four conventional pallet racks (three double access and one single access) for low demand, type C goods.

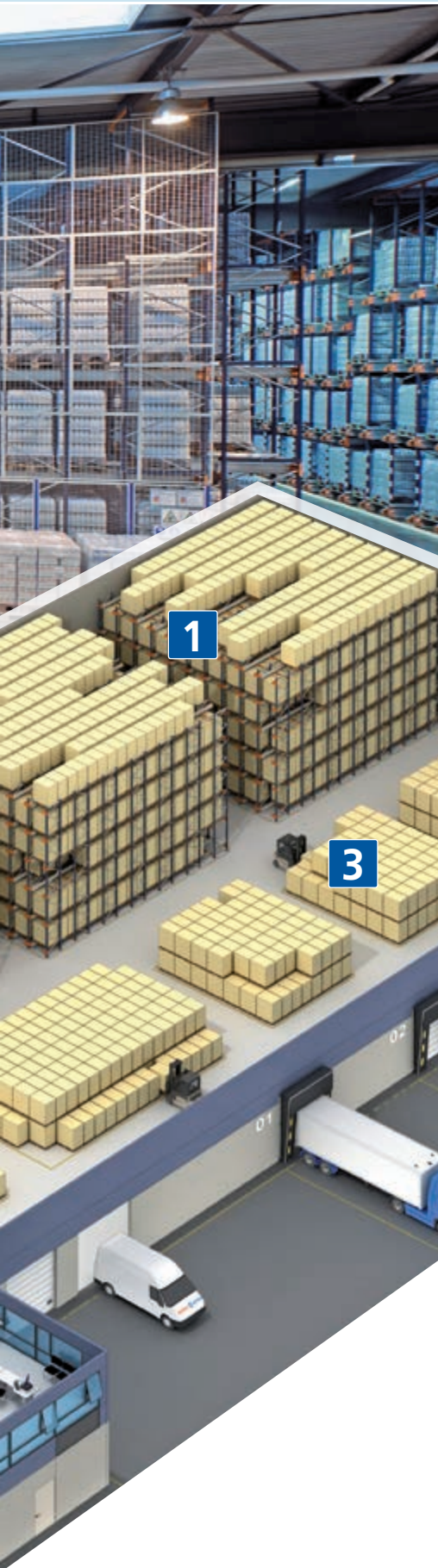
Self-stacking areas (3)

Four areas for pallet self-stacking reserved for high demand, type A goods, located very close to the loading docks.

Prepared orders (4)

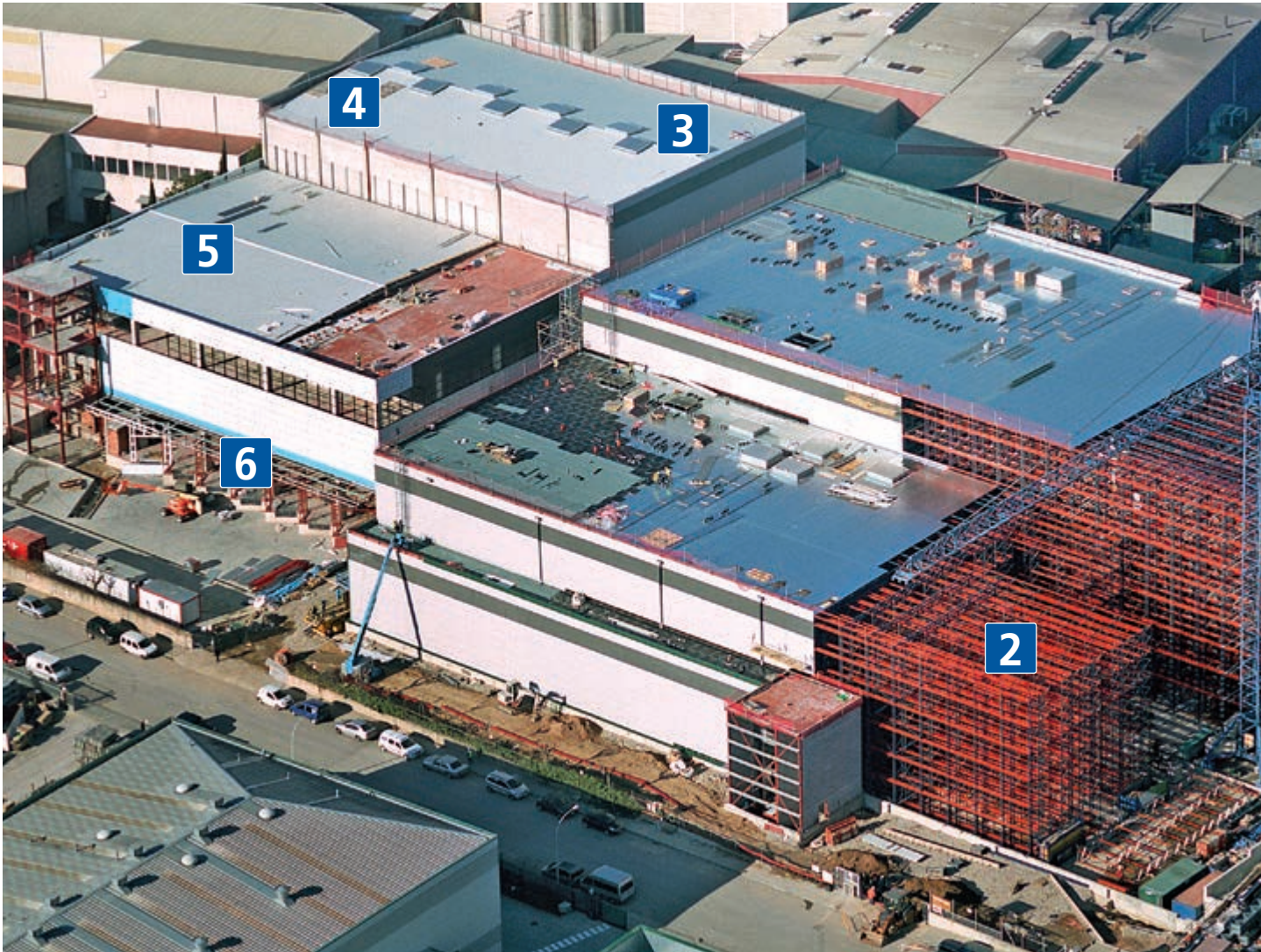
Picking area for type C products.





Systems installed

1. Semi-automated Pallet Shuttle: compact storage system
2. Conventional pallet racking.
3. Self-stacking areas.
4. Picking area.



2 In combination with automated systems

This other example features a fully automated warehouse built with a self-supporting structure. In addition to the stored goods, the racks support the cladding forming a complete building.

This warehouse is divided into the following areas, each with a different function:

Compact automated warehouse with Pallet Shuttle and stacker cranes (1). Used for the storage of high-consumption products (type A).

Automated warehouse with double-depth racking handled by stacker cranes (2). Used for the storage of medium- and low-consumption products (types B and C).

Compact automated warehouse with Pallet Shuttle and stacker cranes (3). Used for the storage of prepared orders.

Automated warehouse with double-depth racking handled by stacker cranes (4). Used for the storage of partially filled pallets from the picking area.

Manual and automatic picking area (5). For order preparation.

Dispatch (6). Area equipped with live channels to classify the pallets by orders or routes.



Automated warehouse with double-depth racking (2).



Close up of interior of the main warehouse (1).



Close up of picking area (5).



Systems installed

1. Compact automated warehouse with Pallet Shuttle and stacker cranes
2. Automated warehouse with double-depth racking handled by stacker cranes.
3. Compact automated warehouse with Pallet Shuttle and stacker cranes
4. Automated warehouse with double-depth racking handled by stacker cranes.
5. Picking area.
6. Dispatch areas.



Automated warehouse with automated Pallet Shuttle (3) for picking and automated warehouse with double-depth racking (4).



Dispatch area (6).



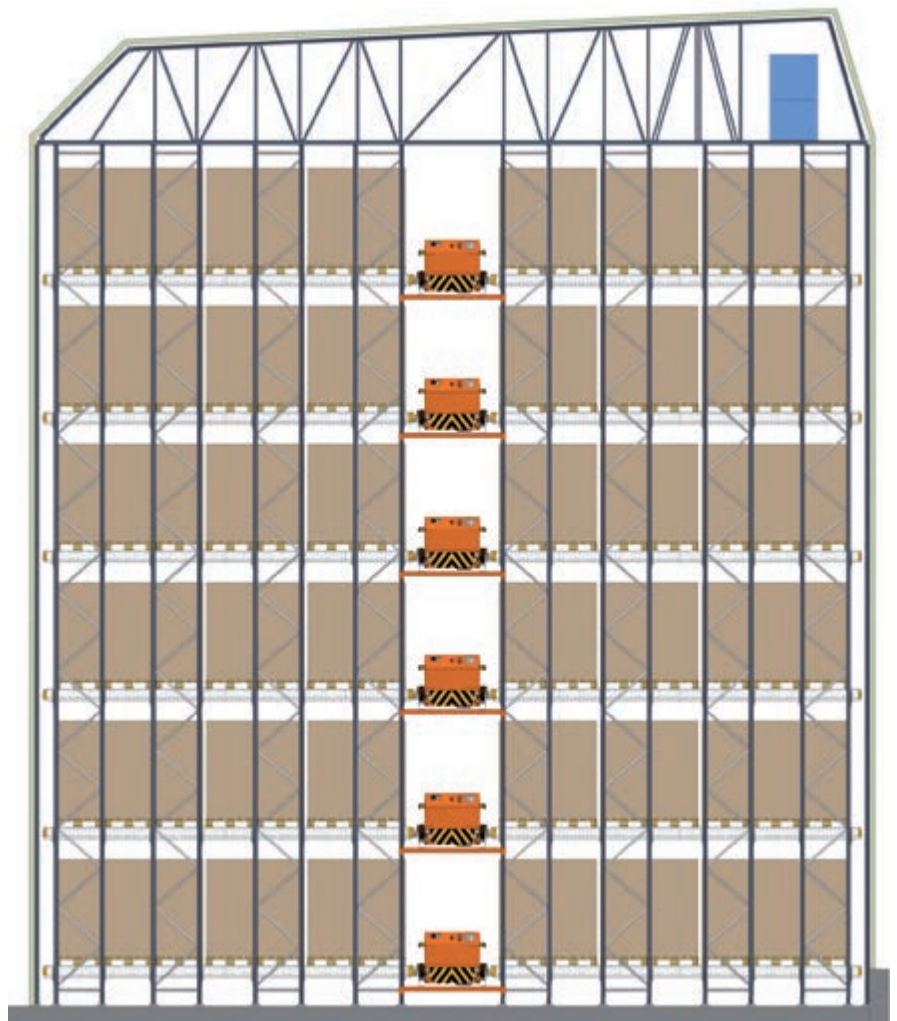
3 Application for cold storage

This example shows an automated warehouse with Pallet Shuttle and transfer cars for cold storage.

The installation is built with a clad-rack system, very common for this type of storage system because it reduces the volume that needs to be cooled, thus saving energy costs.

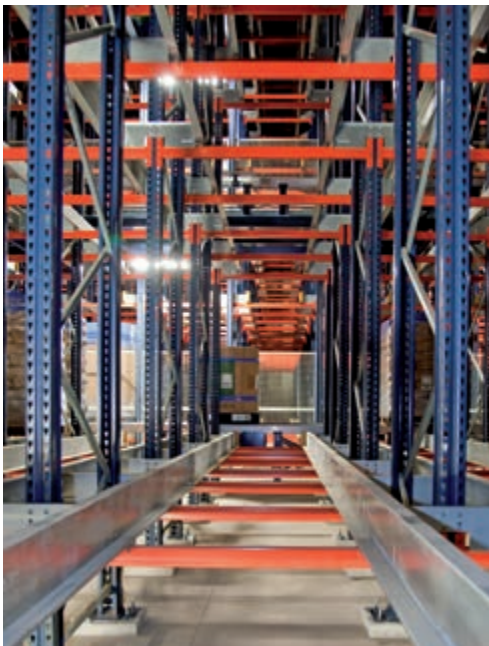
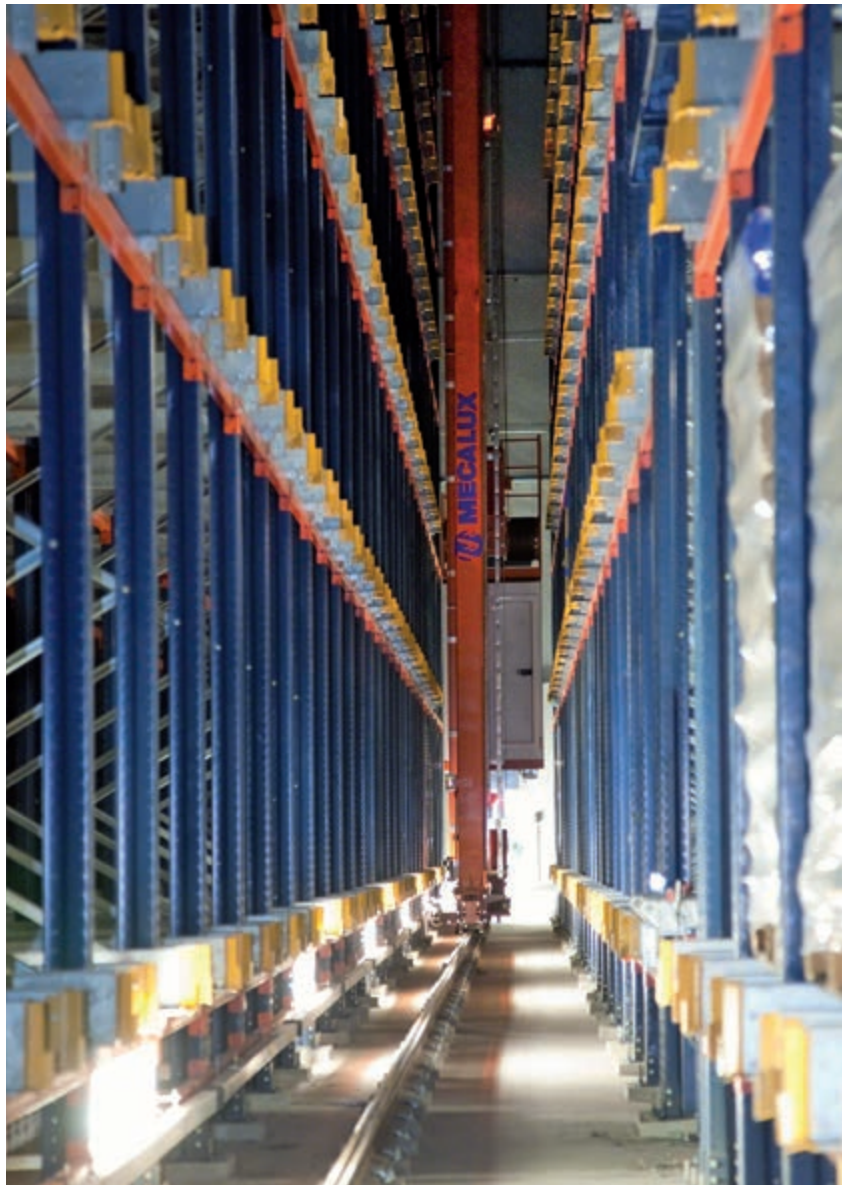
It consists of two racking units placed on either side of a central aisle with six load levels. At each level has a transfer car with a Pallet Shuttle.

The cooling equipment has been installed on one side at the top, using the space for the trusses, to achieve optimum air circulation.



Elevation of the self-supporting structure of six levels and their corresponding automated Pallet Shuttles.

In general, the various Pallet Shuttle systems are an ideal solution for cold storage, with temperatures from $-30\text{ }^{\circ}\text{C}$, and especially when combined with automated handling equipment. In these cases, the entrance of forklift operators or the presence of other operators is unnecessary in this low temperature environment. This can significantly increase the number of movements, working continuously 24 hours a day with total control of the goods.





Easy WMS Warehouse Management Software

The nerve centre of the installation



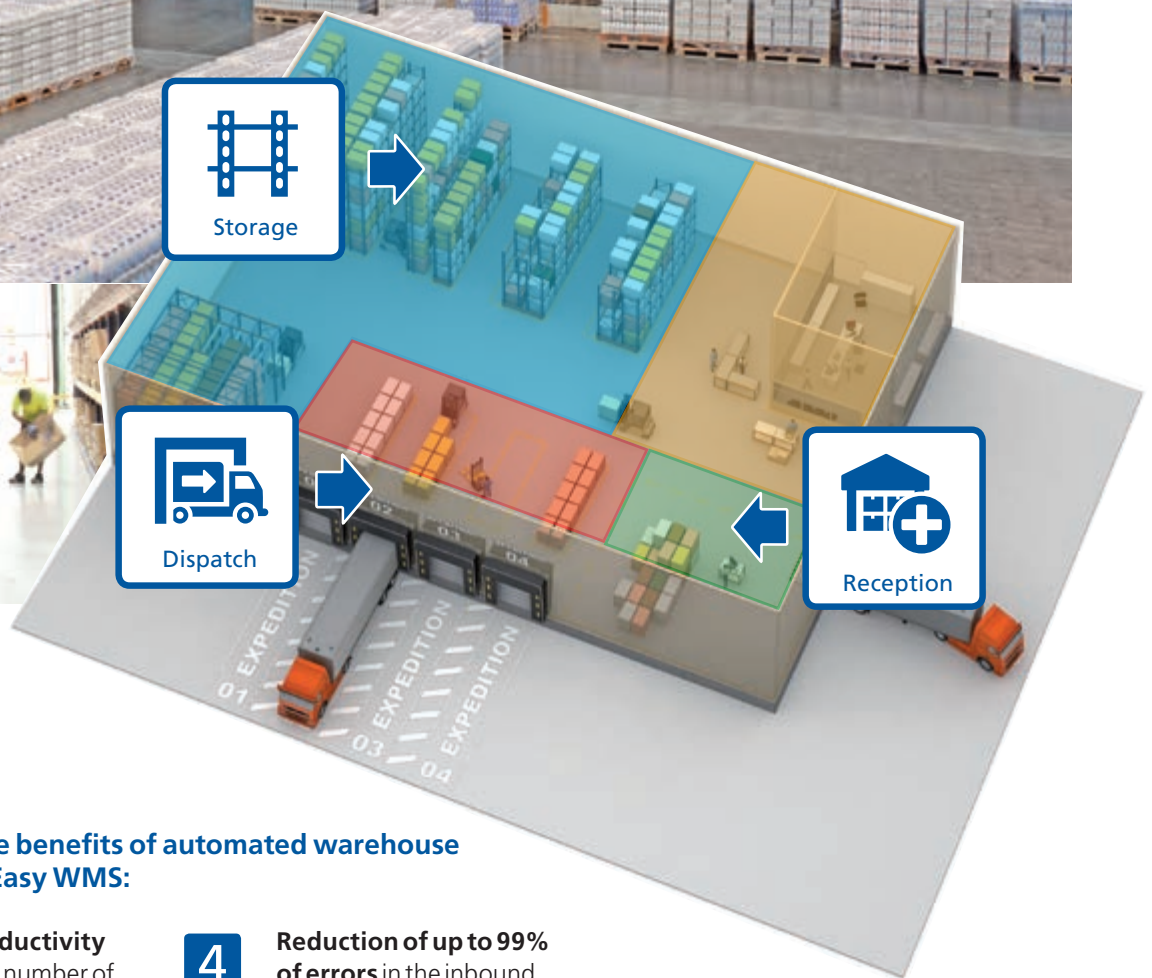
Easy WMS is a warehouse management software (WMS) developed and constantly updated by the Mecalux Software Solutions division, comprising more than 100 full time engineers.

Easy WMS ensures correct operation and control of semi-automated and automated installations with Pallet

Shuttle, coordinating the movement of goods from origin to destination to achieve maximum efficiency. It also handles full warehouse operations to integrate with customer systems, because it has standard communication interfaces with the leading ERPs on the market.

To facilitate integration of the software in warehouses of every kind and size,

Easy WMS has several modules that provide great flexibility and a high degree of customisation. It offers two types of architecture: cloud-based. (SaaS) and on-premises.



Here are some of the benefits of automated warehouse management with Easy WMS:

- 1** **Enhances productivity** and lessens the number of operations.
- 4** **Reduction of up to 99% of errors** in the inbound and outbound processing of material.
- 8** **Multi-proprietor, multi-warehouse and multilingual** functionalities.
- 2** **Storage capacity improved by up to 40%:** maximising the space occupied by goods in the warehouse.
- 5** **Control and optimisation of stock.**
- 9** **Ability to adapt to new market requirements** or trends, such as e-commerce.
- 3** **Increases the speed of order preparation and dispatch.**
- 6** **Real-time inventory and traceability of goods.**
- 10** **Improved document management.**
- 7** **Logistics cost reduction:** optimises human resources and handling costs.

For more information, request the Easy WMS catalogue or contact the sales department to ask for a demonstration or obligation-free advice.



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