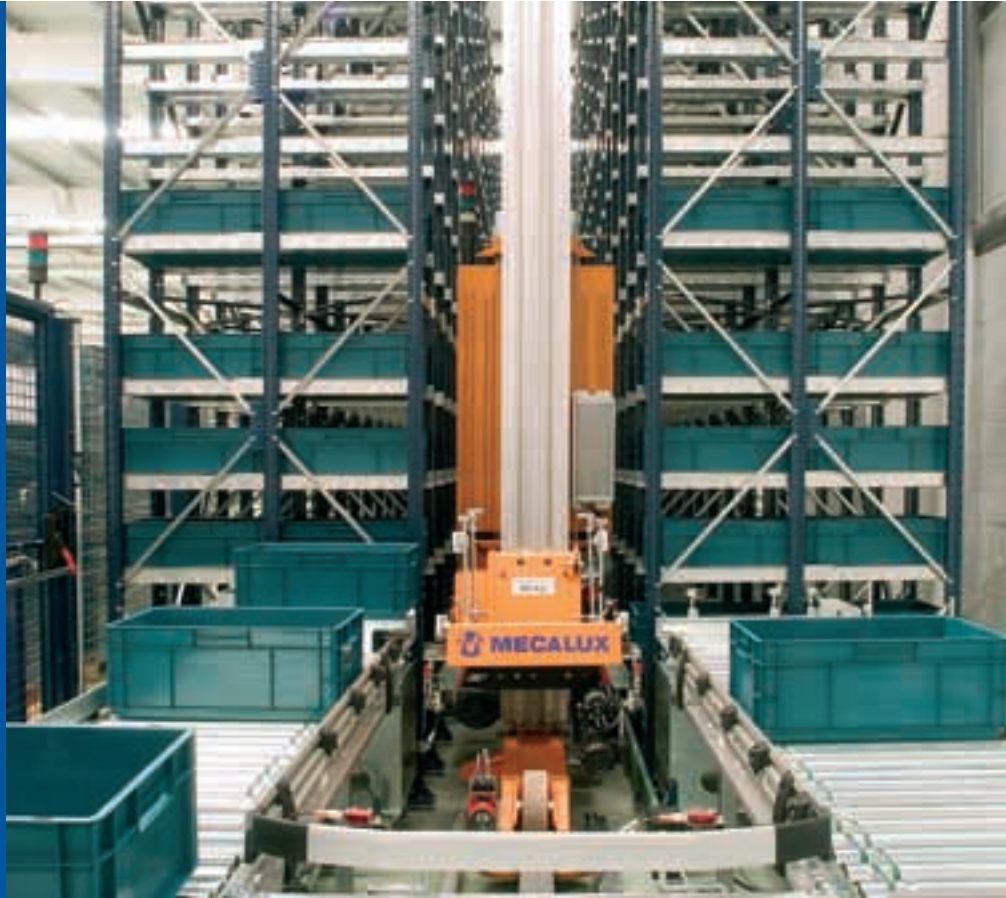


AUTOMATED WAREHOUSES FOR BOXES





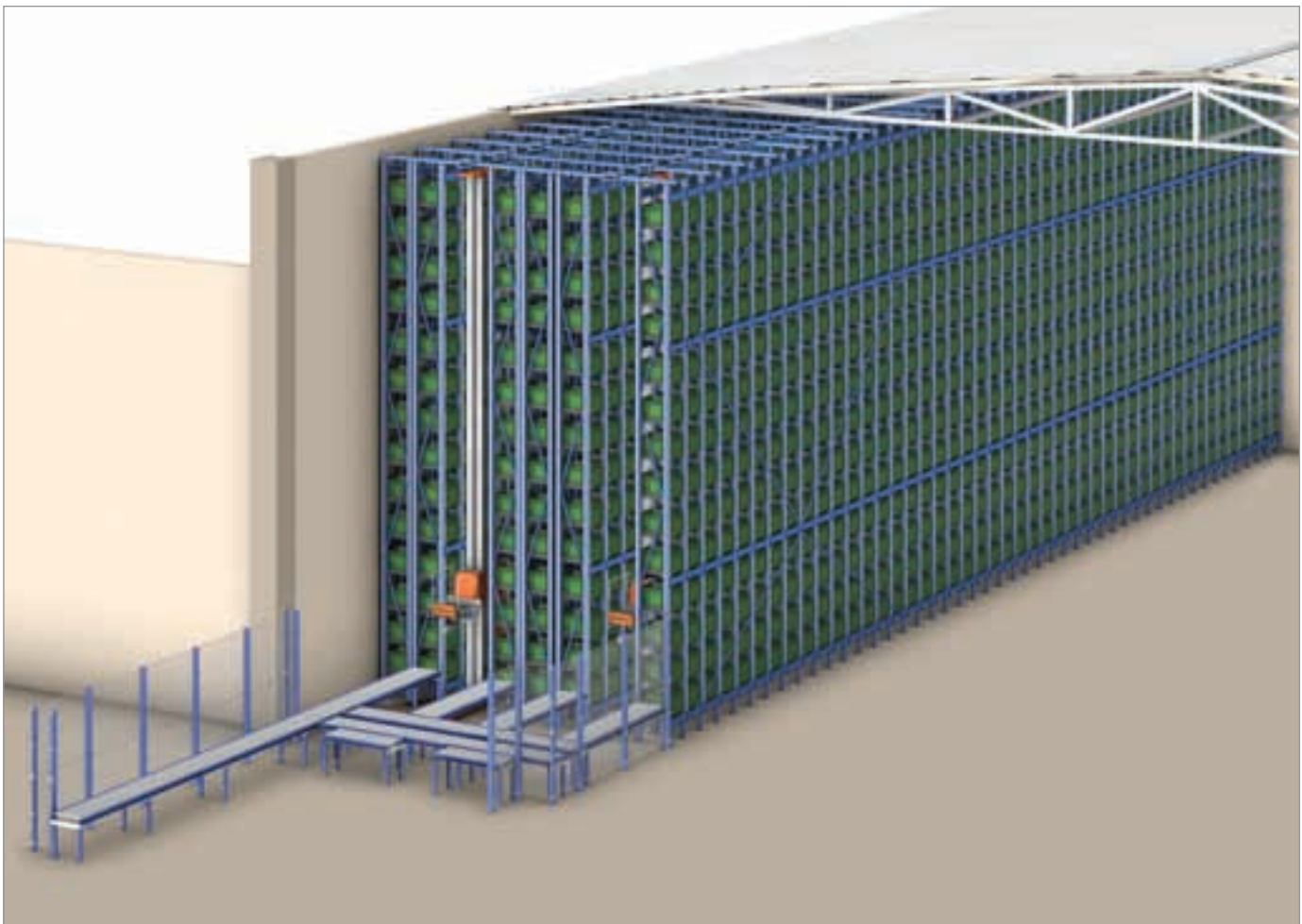
This is the optimum system for handling boxes for picking, following the “product to man” concept.

The Miniload automated warehouse for boxes is made up of a central aisle along which a stacker crane travels and two racks built at both sides used to store boxes or trays. The picking and handling area is made up of conveyors and is positioned at one end or at the side of the racking. Here, the stacker crane deposits the load extracted from the rack. The conveyors then take the box to the operator and once he/she has finished the task at hand, it is returned to the stacker crane which then places it back in the racking. The whole system is controlled by a management software package which registers the location of all the materials in the warehouse and keeps an inventory in real time.

The system’s extraordinary capacity to adapt enables it to be integrated into any production or storage process.

Benefits:

- Automation of the entry and exit operations of your products.
- Saving in storage space.
- Eliminating the errors arising from the manual management of the warehouse.
- Controlling and updating inventory management.
- Operating 365 days a year.
- Multiplying client service capacity.
- Swift payback of investment.



Automated warehouse for boxes

This type of warehouse can be built with one box for each side of the aisle (single depth) or with two boxes for each side (double depth).

Single depth

- A single box per location in the racking.
- Maximum entry and extraction speed of boxes.
- Ideal for companies which give priority to speed and flexibility of the system over total storage capacity.
- All the boxes have direct access, and so it is used mainly when the products stored are all of the same category and level of consumption and there is usually no more than one box per reference.



Double depth

- Two levels of depth in each racking location.
- Maximum box storage capacity.
- Ideal for companies which require a balance between storage capacity and speed of handling.

The front boxes have direct access while the back boxes need the front box to be moved to gain access to them. This may at first sight seem like a disadvantage, but this is not the case in warehouses with a mix of A, B and C products because:

- The second reserve box is placed in the back box with product A.
- Product C can be placed in the second level.
- As a rule, the operator knows what is to be prepared. Relocation is dealt with in down time, placing the boxes to be removed in the first line. It allows adjustment work to be performed during idle times of the stacker crane.
- Capacity per aisle is doubled.



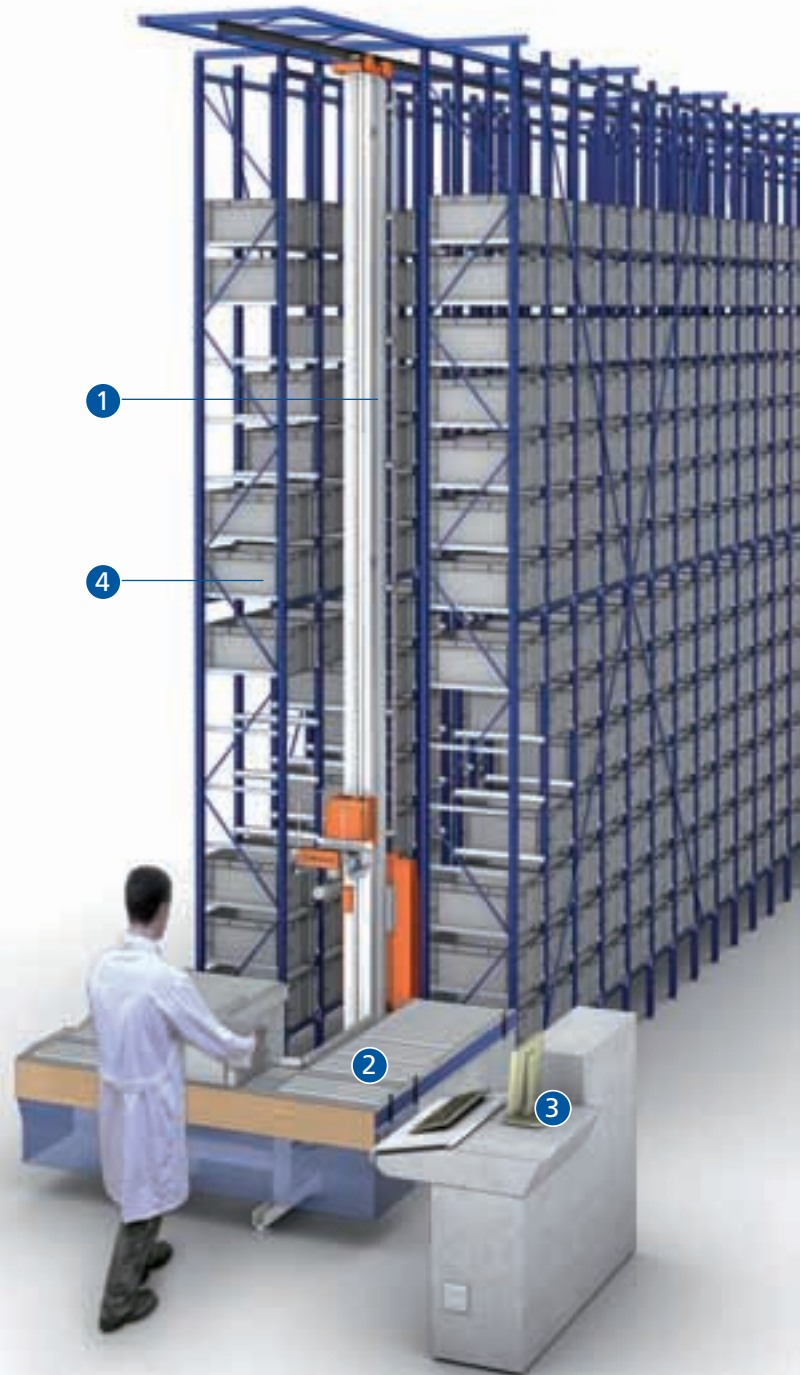
Automated warehouse for boxes

The Miniload automated warehouses are made up of 4 main elements.

Automated stacker crane with racking

The stacker crane is the device in charge of performing the location and extraction operations of the boxes in the racking, along with transporting and depositing them in the P&D station of the warehouse. Stacker cranes move in two ways: longitudinally, up and down the aisle guided on a rail, and vertically, when locating the boxes in the different levels and/or depths of the racking.

The racking is designed to adapt perfectly to the movement of the stacker crane and for the high-bay storage of boxes. Its design enables greater use of space and an increase in the storage capacity, by optimizing the movements of the stacker crane.



Elements of the P&D station. Picking and handling area

The P&D station of the warehouse (picking and handling area) is located at the front or side of the racking and performs the mechanical movements to bring the boxes to the operator, or to the stacker crane so that he/she can collect them and put them back in the warehouse.

It is made up of a series of conveyors which communicate between work positions and the stacker crane, speeding up the system's entry and exit of goods.

Two systems of transport:

- Rollers
- Bands/belts

Management system

The management system controls all the storage actions, optimizing the time and use of space in the warehouse.

Its implementation and level of connectivity make it the perfect tool for the unification of the warehouse with the ERP of the client.

Its software facilitates the management of processes and enables easy access to all the information.

Load unit

Miniload warehouses can be built to store plastic totes or bins for both standard and non standard sizes.

Metal or cardboard boxes can also be used.

The ideal load unit is in function of the product to be stored.



Miniload warehouses enable a range of options to be incorporated:

- Multiple aisles
- Multiple work stations
- P&D station with side or front entry
- Several types of load units
- Various extraction systems
- Heights up to 49 feet
- Loads up to 330 lbs
- Length of installation more than 131feet
- Management system of multiple warehouses
- Adaptation of custom-designed software
- Adaptation of hardware to the client's needs
- Fitting of side picking with "pick to light"
- Different levels of picking
- Combination with elements of classification





Elements which make up an automated warehouse for boxes

- Racking
- Boxes (optional)
- Stacker crane (single or double depth)
- Single-position P&D station (front or side)
- Bottom guide and top guide
- Safety systems
- Electrical and control boxes
- Communication system via infrared
- Programmable robot
- IT server with TFT screen
- Control/Touch screen
- Wireless scanner
- Printer of reports or labels (optional)
- Weighing device
- Vahle electrical system for horizontal/vertical travel
- 6 1/2 feet-high perimeter safety fences
- Warning lights and alarms
- Management system with basic functions:
 - Parameterization of the installation
 - User management
 - Entry management
 - Exit management
 - Inventory
 - Automated relocation
 - Statistics
 - Replenishment
 - Multiple references by load capacity
 - Analysis of the installation
 - Quarantine management
 - Assistance module by remote control
 - Error diagnosis
 - Manual, semi-automated or automated control
 - Communication with the ERP of the client
- Assembly/installation and start-up
- Training

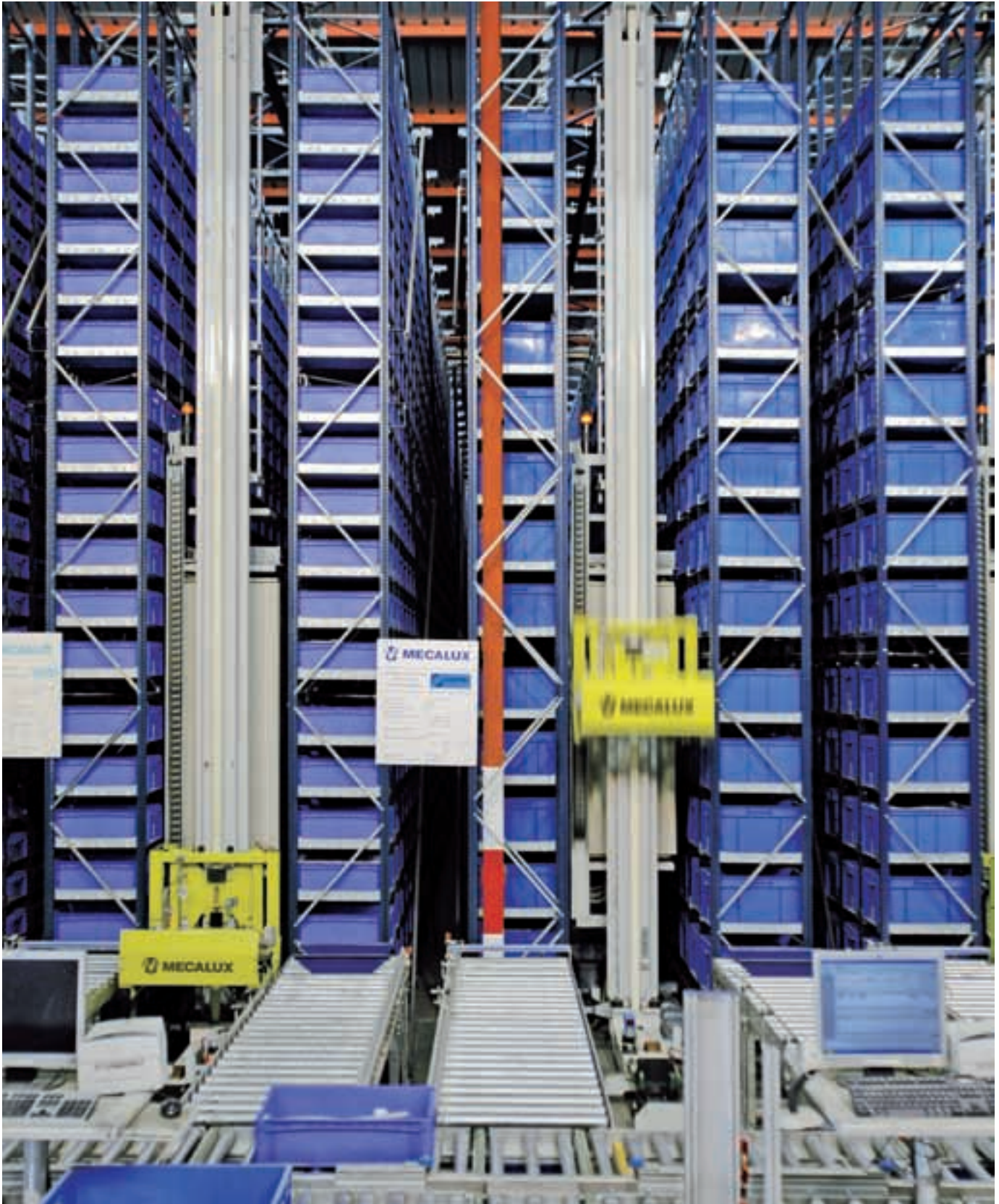
Automated front and side warehouse



Automated front warehouse



Automated side warehouse



Automated warehouse for boxes

This is the simplest and most standard system for the automated storage for boxes. It incorporates the racking, the machine, the P&D station and the warehouse management software in a single product.

Generally, one or two aisles are installed which work independently of each other.

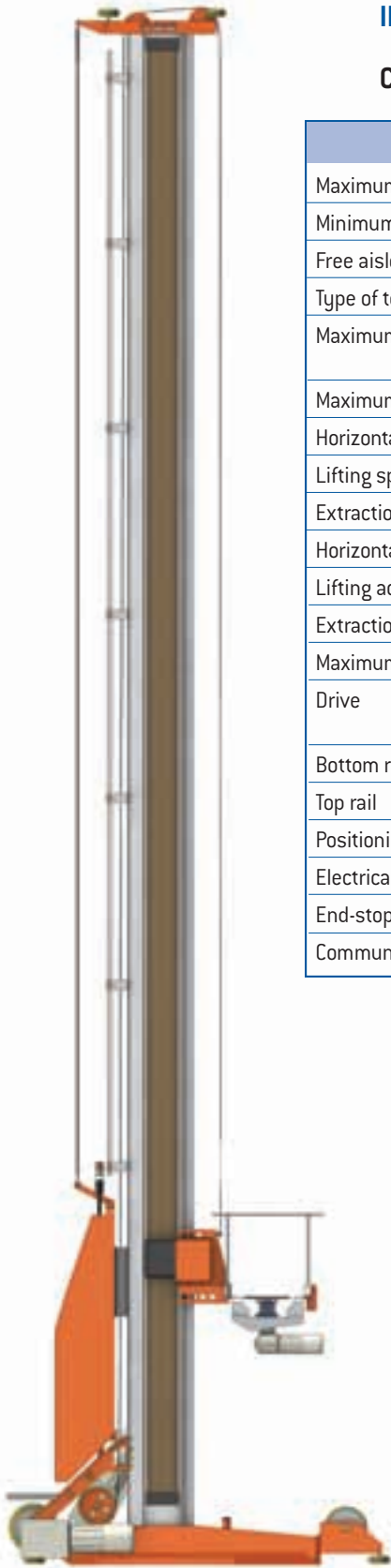
They are designed following the plug and play concept. This is a standardized set, offering the features and functions required in the majority of warehouses of this type.



IN A BOX stacker crane

Characteristics of the IN A BOX stacker crane

	Single depth	Double depth
Maximum height	32 ft	28 ft
Minimum height	10 ft	10 ft
Free aisle width (between loads)	34 1/4"	34 1/4"
Type of telescopic fork	Single depth single mast	Double depth single mast
Maximum load	23 5/8"x31 1/2"x16 13/16" [width x depth x height]	23 5/8"x31 1/2"x16 13/16" [width x depth x height]
Maximum weight of load	110 lbs	110 lbs
Horizontal travel speed	590 ft/min	590 ft/min
Lifting speed	328 ft/min	328 ft/min
Extraction speed	98/196 ft/min	98/196 ft/min
Horizontal travel acceleration	3.28 ft/s ²	3.28 ft/s ²
Lifting acceleration	3.94 ft/s ²	3.94 ft/s ²
Extraction acceleration	1.64/3.28 ft/s ²	1.64/3.28 ft/s ²
Maximum extension path	28 1/2"	28 1/2" / 52 9/16"
Drive	AC gear motors operated by variable speed drive	AC gear motors operated by variable speed drive
Bottom rail	HEA-100	HEA-100
Top rail	LPN-80	LPN-80
Positioning	Horizontal/vertical Telemeter	Horizontal/vertical Telemeter
Electrical power	Electric rail	Electric rail
End-stops	Hydraulic C = 800	Hydraulic C = 800
Communication	By infrared	By infrared



The main functions of the computer management system are:

Management of entries and exits

Introduction of boxes in the warehouse:

- The boxes can be identified automatically or manually. The system has multiple references per box.
- It facilitates the zoning of the warehouse following different logistic considerations (ABC, types of reference, optimization of the size of the box and location, etc.).

Automated extraction of the boxes:

- The orders and lists of orders can be adapted to a wide range of needs: orders from clients, manufacturing orders, etc.
- Management of stock reserves and programmed execution of the orders.
- Selection of the stock following different criteria: FIFO, LIFO, expiration date, control of peaks, etc.

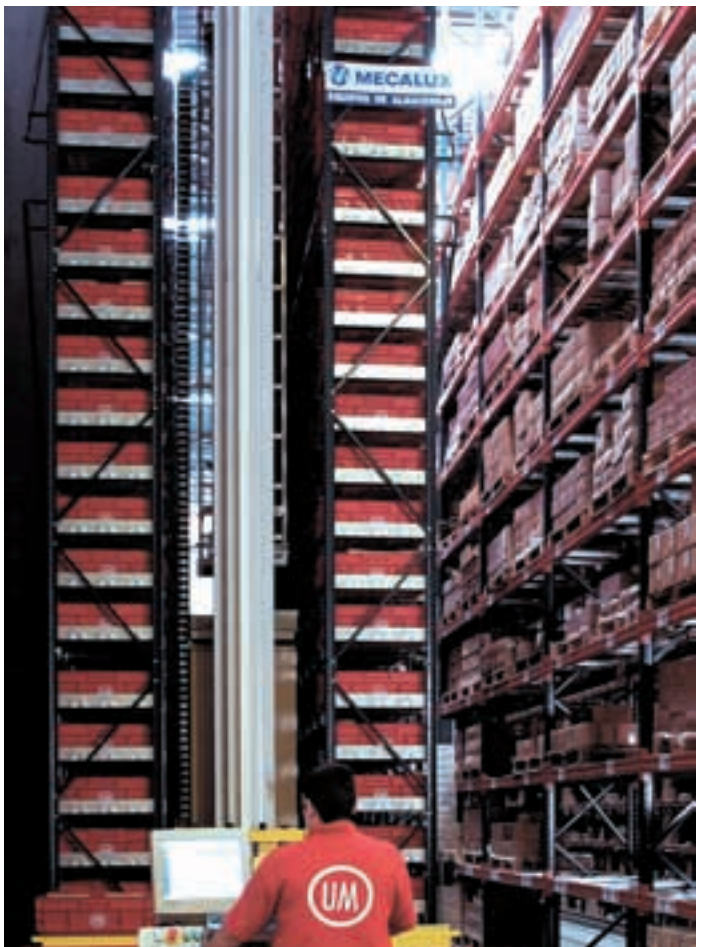
Functions of administration

The management system configures a series of parameters in order to optimize the functioning of the warehouse:

- Control of access through the identification of users and passwords.
- Warehouse configurator. This lays out the different areas of the warehouse, enables or disables storage spaces, changes location and extraction criteria, etc.
- Error diagnosis. The system offers the functions of monitoring and control of the status of the installation and the warehouse.
- Operation mode in automatic, semi-automatic or manual, for jobs involving maintenance or the start-up of the stacker crane.

Statistical functions:

- Percentage of warehouse used.
- Number of movements executed.
- Statistics of availability.
- Number of entries and exits.



Permanent inventory

- Control of stock in real time by storage locations in terms of individual reference, batch, product expiration date, etc.
- Immediate location of any product, either stored in the racking or in movement.

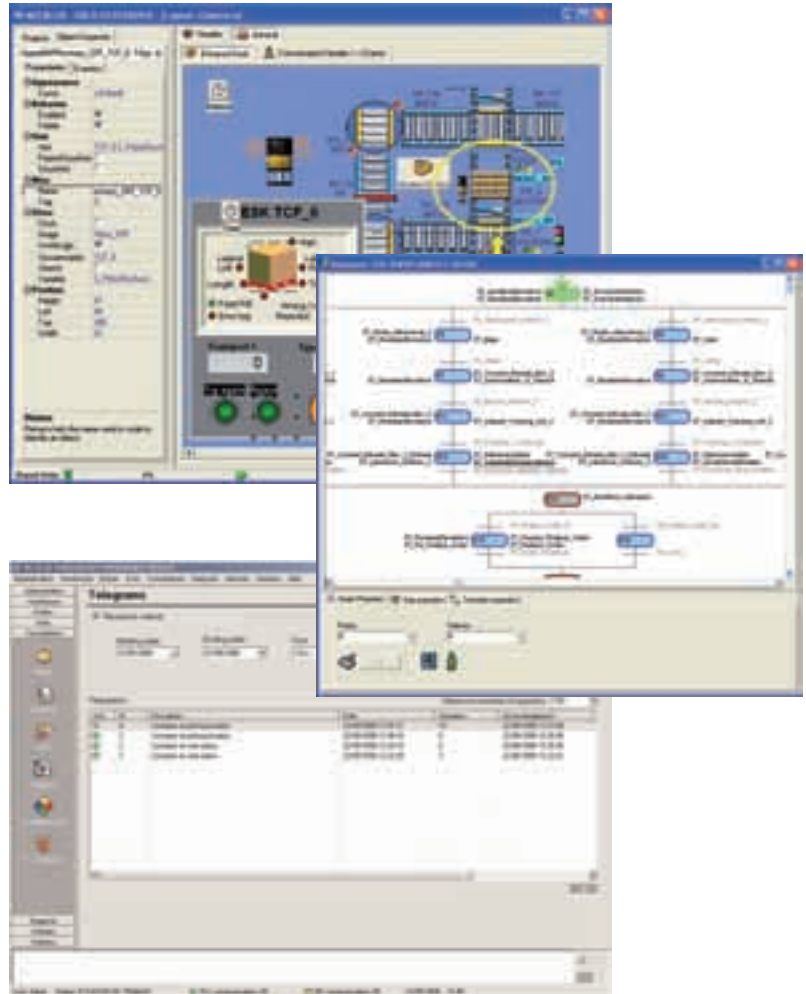
Connection with other systems

- The system can be connected with other information systems of the company (ERP, commercial management, production system, etc.).
- Safe and modern connection technology, adaptable to any current platform.

Powerful viewing system

It deals with the functions related to the diagnosis and monitoring of the installation:

- Information in real time on the status of the installation.
- Manual movements of the conveyor system and the stacker crane.
- Movements in semiautomatic mode of the stacker crane.
- Handling of orders/load movements in the conveyor system.



Automated warehouse for boxes

The main benefits of the management system are:

Maximum accuracy and safety

- The minimum level of computerized handling reduces the risk of accidents or errors.
- Systems of auxiliary checking can be incorporated (loading gauge, barcode readers, weighing devices, etc.) which minimize the possibility of error.

High execution speed

- The technology used enables top speeds to be attained in the management of the warehouse.
- It offers a response in real time to all information requests.

Organizational improvements

- It permits a total standardization of in-house information (references, client orders, inventories, etc.).
- It reduces the costs of training of personnel due to the simplicity of the process.

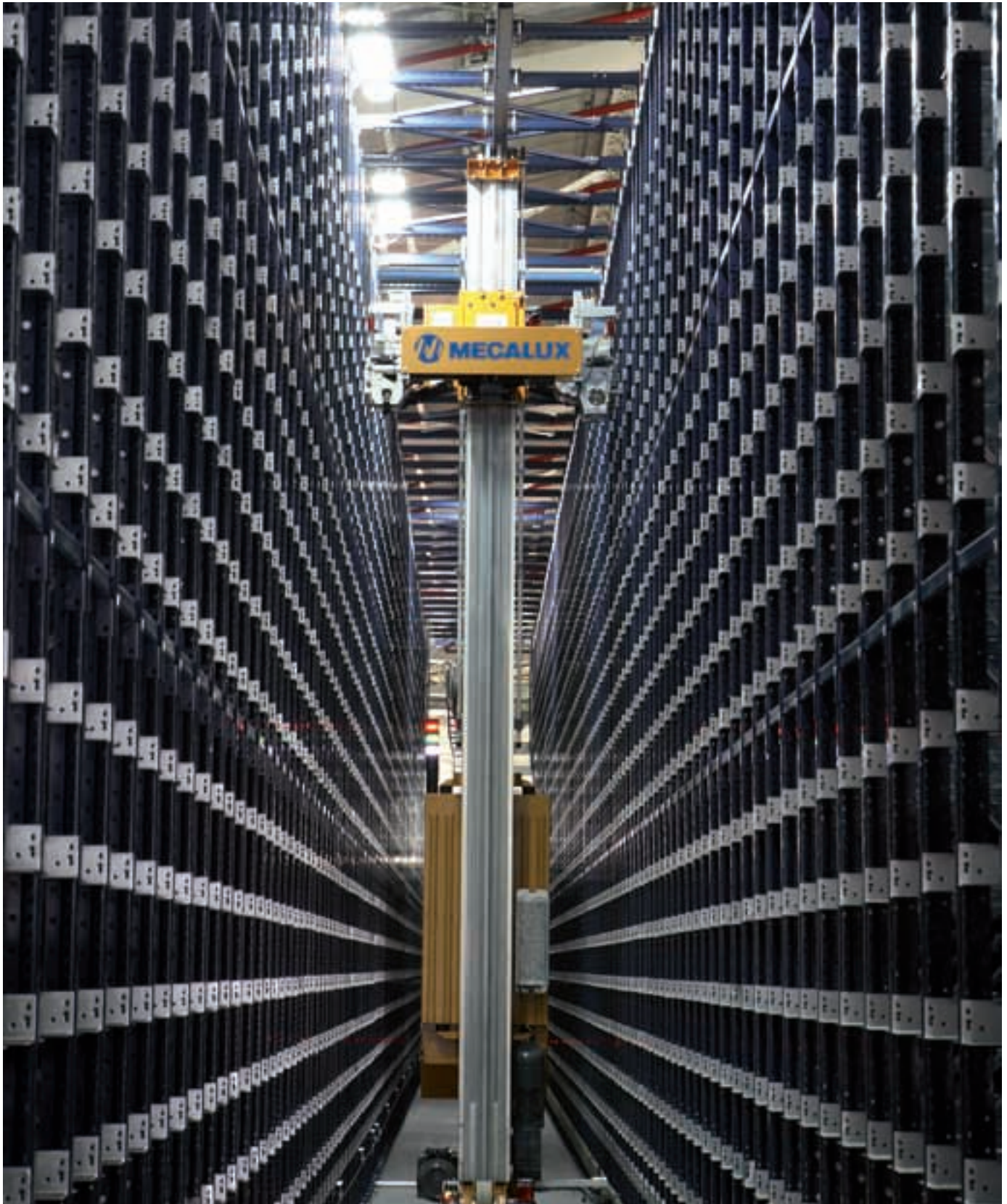
Modern programming architecture

- The SIMEGA computer application (Mecalux Warehouse Management System), the ORACLE® database and the communication modules operate on the Windows 2000® Server or higher.
- Touch-sensitive screen for the manual and semi-automated control of machines and the P&D station. A control of the P&D station can be incorporated through programmable automated routines.

Adaptable to your needs

The management software performs updates in order to adapt to the growing needs of your clients.





Automated warehouse for boxes

In a Miniload warehouse different extraction systems can be fitted in function of the product, the number of units to be handled and the movements required.

The most commonly used are shown below:

Extraction system with forks

This is the simplest and most commonly employed system. The fork is entered underneath and picks up the box.

Models for single depth and double depth are available.

A model is also available to extract two boxes at the same time.



Side extraction system

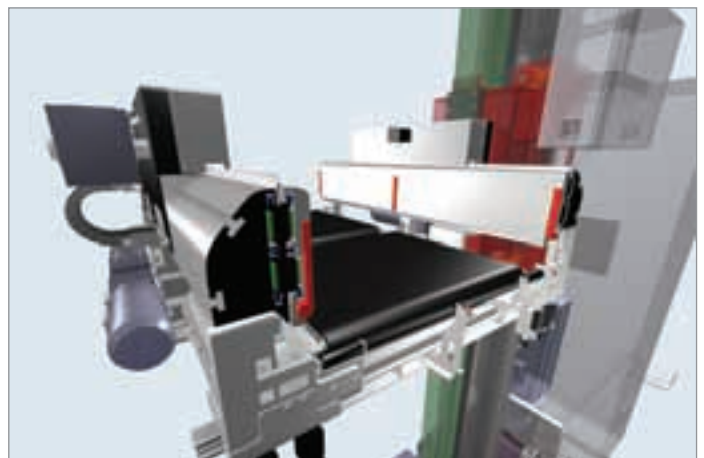
Here, the boxes are picked by their sides and pulled out, without entering the storage space.

This allows a larger number of boxes to be stored in height.



Side extraction system for two boxes

This is capable of picking up two boxes at the same time in double depth racks, thus doubling the number of units handled.



The Miniload automated warehouse can be adapted to other needs or be combined with other management systems which work in parallel or integrated in the warehouse for itself, such as:

- Live picking – “pick to light”
- Preparation station with “put to light”
- Radio frequency



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Tijuana, Baja California: 378,000 sq.ft.



Chicago: 391,000 sq.ft.



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