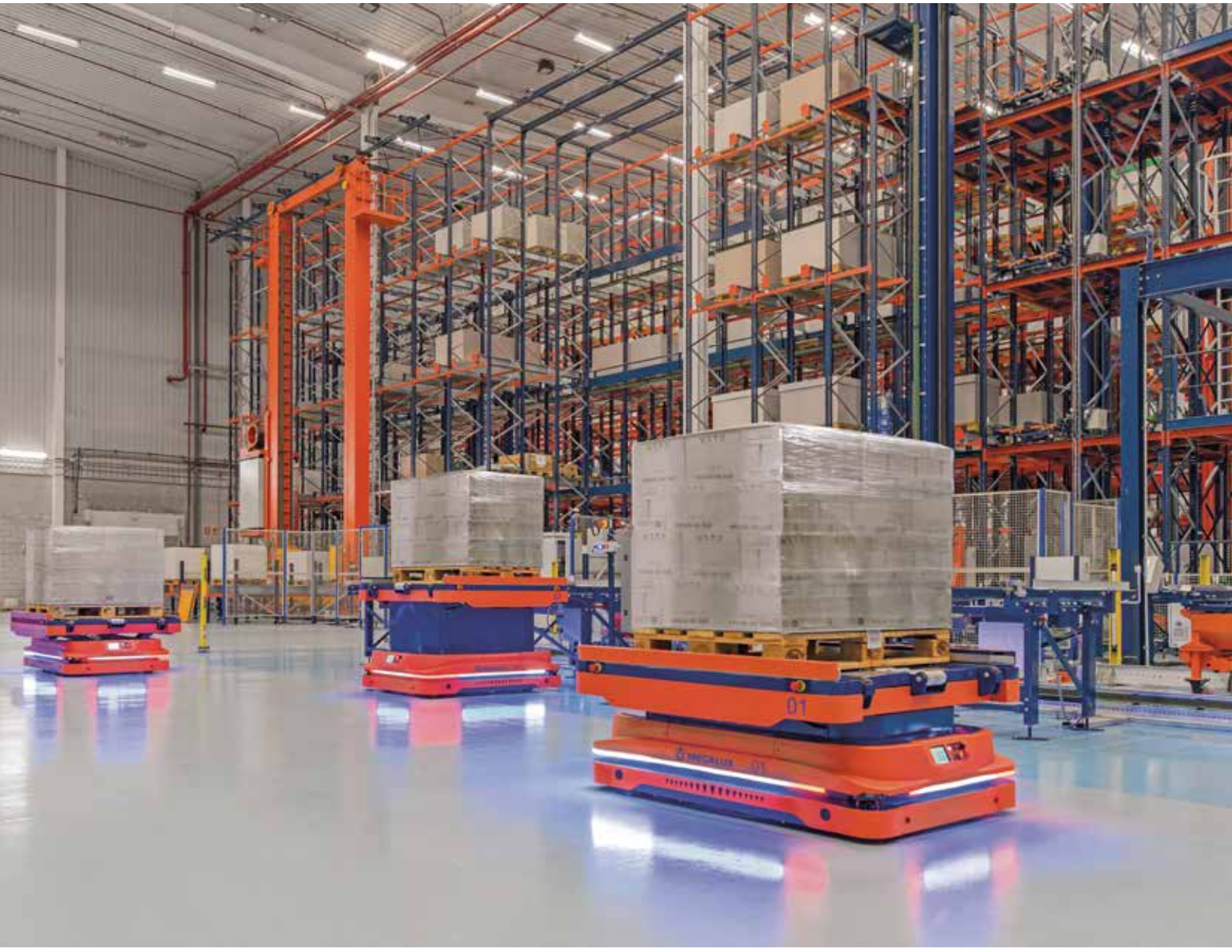
Autonomous Mobile Robots (AMRs)

Intelligent vehicles that navigate the warehouse independently to automate and streamline internal goods transport



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Autonomous mobile robots (AMRs) are vehicles designed to move loads between two points independently. They navigate the warehouse freely based on dynamic routes generated by intelligent software. This software optimises the AMRs' movements, assigning the ideal route for each task. Equipped with state-of-the-art sensors and scanners, AMRs can identify and avoid obstacles. They operate safely in collaborative environments alongside other machines as well as people.

AMRs are highly versatile devices that integrate seamlessly into all types of warehouses and require no modifications to existing infrastructure.

Implementing AMRs expedites and streamlines internal flows of goods in multiple intralogistics operations, boosting warehouse productivity and efficiency.

Advantages

AMRs are the intelligent solution designed to optimise multiple intralogistics operations.

Autonomous
AMRs move freely, orienting themselves by means of virtual maps. They are not confined to predefined paths or closed-loop, delineated navigation circuits.

Intelligent
They follow routes generated by navigation software, which calculates the most efficient path. These robots detect and avoid all kinds of obstacles — fixed or moving — readjusting their route in real time.

Flexible
AMRs adapt perfectly to the warehouse layout, making for a fast, easy implementation.

Scalable
The fleet can be expanded simply by adding new robots to accommodate operational growth or seasonal demand peaks.

Efficient
Fleet management software oversees robot traffic and anticipates routes to assign each job to the ideal AMR.

Accurate
These machines execute their tasks with the highest precision, significantly reducing errors and boosting warehouse performance.

Safe
The units operate safely in highly complex scenarios involving people, goods, storage systems and other machines. A series of highly accurate collision avoidance sensors and scanners makes all AMR movements stable and reliable.

Applications

AMRs streamline material flows in warehouses, distribution centres and production facilities. They automate various logistics processes for companies across numerous industries.

Pallet flows

AMRs are used to transport palletised goods internally. These machines replace or complement traditional solutions such as forklifts, conveyors and electric monorail systems. They enhance flexibility and safety in facilities by limiting the presence of manually operated handling equipment.

Order dispatch

Autonomous mobile robots speed up internal movements of filled orders by connecting pick, consolidation and packaging stations with the shipping area.

Production supply

Mecalux's versatile AMRs include models designed to move both light and heavy loads. These robots are an ideal solution for automating the supply of parts, components and raw materials to workstations and assembly stations on production lines across various industries.

Person-to-goods picking

AMR robots simplify order picking in warehouses that employ the person-to-goods method, acting collaboratively with operators. AMRs guide them through their tasks while optimising routes and reducing physical strain (e.g. eliminating the need for picking carts).

Goods-to-person picking

AMRs adapt to goods-to-person order picking strategies by automating the transport of products from storage areas to pick stations. They cut down significantly on operator travel in the warehouse and raise productivity.

AMR 1500 Conveyor

AMR models

The robots in Mecalux's AMR line adapt to multiple intralogistics transport requirements. Their versatility enables them to handle a broad spectrum of loads, with capacities of up to 1,500 kg.

AMR 1500 Pallet Conveyor

• Designed for safe, controlled in-house pallet movements. This AMR is equipped with an upper conveyor for transferring loads.

Characteristics	
Maximum speed	1.5 m/s
Robot weight	610 kg
Max. load weight	1,500 kg
Battery	Li-ion (LFP) 48 V / 42 Ah (2.88 kWh)
Runtime (90 % to 10 %)	8 h
Charge time (10 % to 90 %)	40 min
Runtime ratio	12:1
Dimensions	Width: 1,235-1,435 mm Length: 1,520 mm
Transport height	570–950 mm
Movements	• Autonomous navigation • Load transfer

AMR 100 Box

AMR 1500 Pallet Lifter

• Transfers pallets using a lifting platform integrated into the robot's upper surface.

AMR 100 Box

• Ideal for transporting boxes, totes, bins, trays and packages. Equipped with a completely configurable upper conveyor for load transfers.

AMR 100 Multi-Box

• Integrates perfectly with collaborative picking scenarios, supplying pick stations and accompanying operators (follow-me mode).

1.5 m/s	1.6 m/s	1.6 m/s
570 kg	130–170 kg (depending on configuration)	110 kg
1,500 kg	100 kg	100 kg
Li-ion (LFP) 48 V / 42 Ah (2.88 kWh)	Li-ion (NMC) 51.8 V / 29 Ah (1.5 kWh)	Li-ion (NMC) 51.8 V / 29 Ah (1.5 kWh)
8 h	9 h	9 h
40 min	< 60 min	< 60 min
12:1	9:1	9:1
Width: 1,000 mm Length: 1,520 mm	Width: 640–815 mm Length: 780–1,150 mm	Width: 647 mm Length: 780 mm
570 mm	550–950 mm	1,663 mm
• Autonomous navigation • Load lifting	• Autonomous navigation • Load transfer	• Autonomous navigation

Components

Mecalux's AMRs adapt easily and quickly to all types of environments. Moreover, they work safely and efficiently in scenarios of varying operational complexity.

Lights
The AMRs are outfitted with clearly visible multicoloured lights. They indicate the robot's status, operating mode and certain manoeuvres, such as changes in direction.

Wheels
Each AMR robot is equipped with two drive wheels in the centre and four freewheels at the corners. This configuration ensures stable movements and smooth changes in direction.

LiDAR scanner
The laser scanner surveys the surroundings with a high degree of accuracy to provide an exact map of the AMR's operational environment. It allows the vehicle to move independently and safely by determining its positioning and detecting obstacles that could obstruct its path.

Depth camera
This detection device identifies objects along the AMR's path. It complements the LiDAR scanner to cover areas outside its scanning plane, reinforcing the robot's collision avoidance system by extending the obstacle detection range.

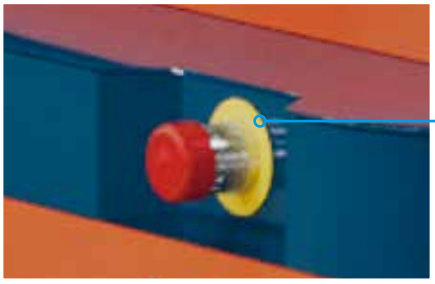
Battery
The AMRs use high-performance lithium batteries with extended autonomy, supporting uninterrupted operation to maximise robot availability.

Charging station
Located in a separate area of the facility, the AMRs automatically connect to this station when positioned on top. The vehicles feature a high-efficiency wireless induction charging system.

Top module with conveyor
The AMR 100 Box and AMR 1500 Conveyor integrate with conveyor systems to transfer loads from the vehicle to other storage solutions. Several conveyor models are available to suit different needs.

Touchscreen
Each vehicle is equipped with a touchscreen featuring a simple and intuitive interface. This enables users to inquire about the robot's status and manage specific maintenance tasks.

Emergency stop buttons
These safety stop buttons are positioned in clearly visible, easy-access locations for use in emergencies. When pressed, the AMR comes to a complete stop.



Lifting platform
The AMR 600 and AMR 1500 Pallet Lifter models incorporate a platform on the vehicle's upper surface that lifts goods slightly for controlled, efficient load transfers.

Mecalux has developed a VDA 5050 interface that enables standardised communication between its AMRs and any VDA 5050-compatible fleet manager. Integration is carried out through the Mecalux AMR Fleet Manager, which acts as an intermediary layer to ensure the safety, robustness and performance of Mecalux AMRs within multi-vendor fleets.

The intelligence behind AMR coordination

Navigation software
Integrated into every robot in the fleet, this tool dynamically calculates the best path for each task, selecting the most efficient route. Likewise, the software responds to obstacle detection by readjusting the vehicle's trajectory in real time to ensure uninterrupted operation.

Fleet management software
This program oversees robot traffic and manages task assignment. It distributes jobs among the AMR units according to variables such as planned routes, distances to cover and availability. The software monitors the AMRs' battery charge levels and organises charging cycles that adapt to the fleet's workload. It can also manage third-party AMRs.

Warehouse management system (WMS)
This software supervises inventory in the facility, ensures product traceability and issues goods-in/goods-out commands to the fleet manager. This manager can communicate with various WMS solutions and is optimised for seamless integration with Easy WMS, Mecalux's warehouse management system.

AMR 1500 PALLET CONVEYOR

High-load capacity vehicle designed for safe, controlled pallet movements within the warehouse. It adapts to various operations, such as supplying automated storage and retrieval systems or shipping areas.

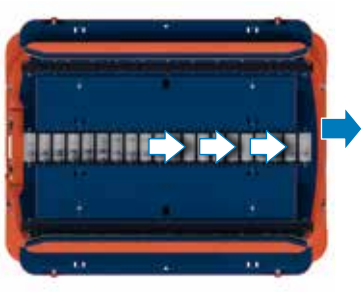
- **Equipped with a top conveyor for load transfer.**
- **Configurable height from 570 to 950 mm.**
- **Handles pallets of different widths and dimensions, including standard formats such as Euro pallets, GMA pallets and block pallets.**

Euro pallet	
Length	800 / 1,000 / 1,200 mm
Width	1,200 mm
Maximum load	1,500 kg

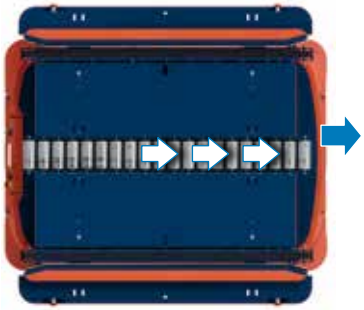
GMA pallet	
Length	1,219 mm
Width	1,016 mm
Maximum load	1,500 kg

Block pallet	
Length	1,000 mm
Width	1,200 mm
Maximum load	1,500 kg

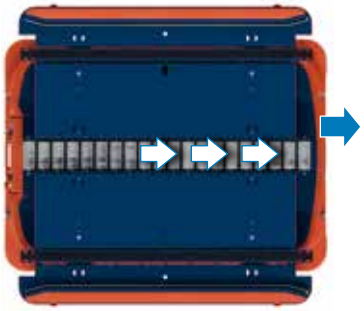
AMR 1500 Conveyor configurations



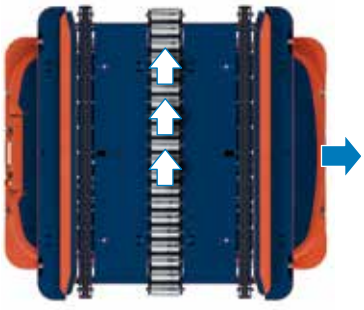
Front load transfer for Euro pallets
800 x 1,200 mm.



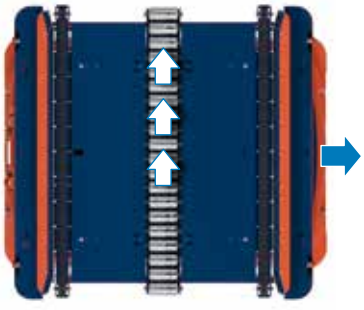
Front load transfer for Euro pallets
1,000 x 1,200 mm.



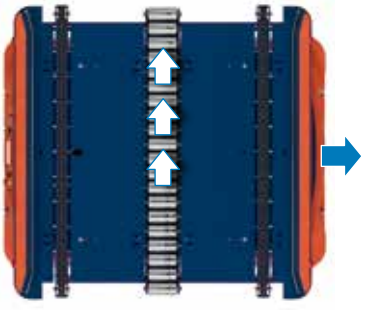
Front load transfer for Euro pallets
1,200 x 800 / 1,000 / 1,200 mm.



Side load transfer for Euro pallets
800 x 1,200 mm.



Side load transfer for Euro pallets
1,000 x 1,200 mm.



Side load transfer for Euro pallets
1,200 x 800 / 1,000 / 1,200 mm.

The AMR's conveyor top module supports multiple configurations to accommodate different pallet types. The various mounting positions of the chains and guiding elements ensure compatibility with a wide range of pallets.

This conveyor top module can transfer loads to both chain and roller conveyors.

General features of the AMR 1500 Conveyor

Dimensions	L 1,520 x W (1,235–1,435) x H 570–950 mm
Weight	610 kg
Ground clearance	35 mm
Max. payload	1,500 kg
Max. speed	1.0 m/s (loaded) / 1.5 m/s (unloaded)
Maximum acceleration	0.7 m/s²
Power type	$LiFePO_4$
Battery capacity	42 Ah
Runtime (10–90%)	8 h
Intelligent braking	Fail-safe brakes
E-Stop	5 E-Stops
Standards compliance	ISO 3691-4, EN 1175, EN 60204-1, EN 12895, UL 3100, ANSI/RIA R15.08, FCC Part 15.B
Display	5" touchscreen
Sensors	2 x SICK NanoScan safety LiDAR (360° field of view), 4 x Intel RealSense cameras, integrated 6-axis IMU, Data Matrix camera, photocells
Ambient temperature	0–40 °C
Max. humidity	70%, non-condensing

AMR 1500 LIFTER

Robust device designed for the autonomous transport of palletised loads in all types of warehouses.
It performs pallet transfer using a lifting platform integrated into the robot's top module.

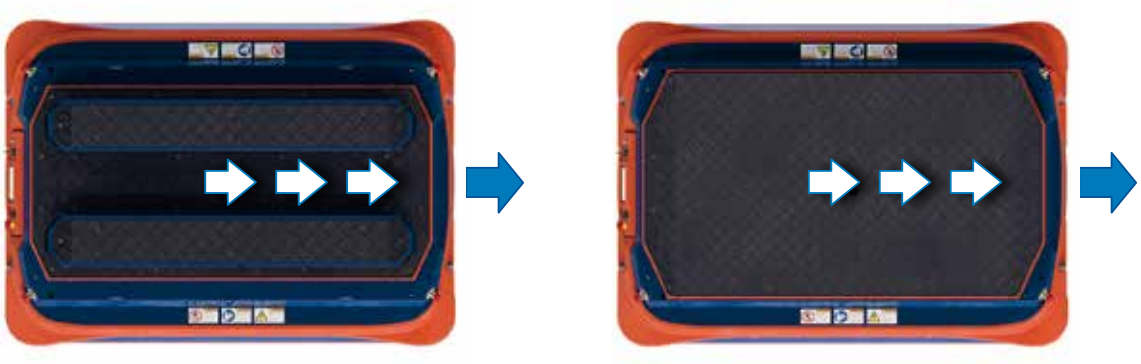
- **The lifting platform enables pallet pick-up and delivery, either to fixed platforms or to conveyors designed for this type of transfer.**
- **Guiding elements can be incorporated depending on the type of load.**
- **The platform width is configurable for different pallet dimensions.**

Euro pallet	
Length	800 / 1,000 / 1,200 mm
Width	1,200 mm
Maximum load	1,500 kg

GMA pallet	
Length	1,219 mm
Width	1,016 mm
Maximum load	1,500 kg

Block pallet	
Length	1,000 mm
Width	1,200 mm
Maximum load	1,500 kg

AMR 1500 Pallet Lifter configurations



Transfer to a conveyor for Euro pallets 800 / 1,000 / 1,200 x 1,200 mm.

Transfer to another platform for Euro pallets 1,200 x 800 / 1,000 / 1,200 mm or perimeter-base block pallet.

General features of the AMR 1500 Pallet Lifter

Dimensions	L 1,520 mm x W 570 mm x H 1,000 mm
Weight	570 kg
Ground clearance	35 mm
Max. payload	1,500 kg
Max. speed	1.0 m/s (loaded) / 1.5 m/s (unloaded)
Maximum acceleration	0.7 m/s²
Power type	$LiFePO_4$
Battery capacity	42 Ah
Runtime (10–90%)	8 h
Intelligent braking	Fail-safe brakes
E-Stop	5 E-Stops
Standards compliance	ISO 3691-4, EN 1175, EN 60204-1, EN 12895, UL 3100, ANSI/RIA R15.08, FCC Part 15.B
Display	5" touchscreen
Sensors	2 x SICK NanoScan safety LiDAR (360° field of view), 4 x Intel RealSense cameras, integrated 6-axis IMU, Data Matrix camera, photocells
Ambient temperature	0–40 °C
Max. humidity	70%, non-condensing

AMR 100 BOX

Compact vehicle designed for agile and efficient transport of boxes, trays and parcels in warehouses, distribution centres and production areas.

- **Equipped with a fully configurable top conveyor that provides great versatility for load transfer.**
- **Compatible with automatic load transfer to conveyors, pick stations and consolidation or shipping areas.**
- **Can transport one or two boxes with a maximum load of up to 100 kg.**

Plastic boxes	
Length (L) x width (W)	400 x 600 mm
Variable height (H)	120 / 170 / 240 / 320 / 420 mm

AMR 100 Box configurations

AMR 100 Box with **front load** conveyor for a 400 mm wide box.

AMR 100 Box with **front load** conveyor for a 600 mm wide box.

AMR 100 Box with **double front load** conveyor with in-line transfer for 600 mm wide boxes.

AMR Box with **side load** conveyor for a 400 mm wide box.

AMR 100 Box with **side load** conveyor for a 600 mm wide box.

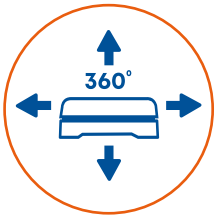
AMR 100 box with **double side load** conveyor with parallel transfer for 400 mm wide boxes.

General features of the AMR 100

Dimensions	L 780–1,150 mm x W 640–815 mm x H 550–950 mm
Weight	130–170 kg
Ground clearance	30 mm
Max. payload	100 kg
Max. speed	1.6 m/s
Max. turning speed	80°/s
Power type	Li-ion NMC
Battery capacity	29 Ah
Runtime (10–90%)	9 h
Intelligent braking	Fail-safe brakes
E-Stop	3 E-Stops
Standards compliance	ISO 3691-4, EN 1175, EN 60204-1, EN 12895, FCC Part 15.B
Display	5" touchscreen
Sensors	1 x SICK NanoScan safety LiDAR (230° field of view), 2 x Intel RealSense cameras, integrated 6-axis IMU, Data Matrix camera, photocells
Ambient temperature	0–40 °C
Max. humidity	70%, non-condensing

Safety

Mecalux AMRs are designed and manufactured in accordance with international industrial safety standards, ensuring reliable, certified operation suited to demanding logistics environments. They comply with the Machinery Directive 2006/42/EC and with key standards such as ISO 3691-4 and UL 3100, among others.



Environment monitoring

The AMR continuously monitors its surroundings using LiDAR scanners.

It automatically reduces its speed when a nearby object is detected and stops in the presence of people or obstacles. It also adjusts the safety distance according to its speed and expands its monitoring area in operational zones. This enables it to anticipate potential risks before a collision can occur.

Speed under control

Each wheel incorporates a dual encoder that continuously monitors speed.

The system automatically adapts safety parameters according to the operating mode and keeps the detection system active when necessary.

Real-time load monitoring

The AMR protects both people and goods.

Depending on the model, it integrates sensors that verify the presence and correct position of the load during transfer and movement. If any deviation outside the permitted range is detected, the system performs a controlled stop to prevent damage to the goods or the facility.

Accessible emergency stop buttons

Emergency stop buttons are located around the perimeter of the unit, on the control panel and on the remote control.

These devices allow the AMR to be stopped immediately from any point in the event of an unexpected situation.

Clear and visible communication

The unit displays its movements through directional indicators and identifies its operating mode using colour codes. It also features additional visual and audible alerts that signal movements, faults, low battery levels, charging and risk situations.

This communication facilitates human– robot interaction and helps reduce incidents.

Safe management of risk zones

The AMR distinguishes between standard zones and risk areas, such as narrow aisles or loading areas. In these zones, it automatically adapts its behaviour by reducing its speed and activating specific signalling to enhance safety.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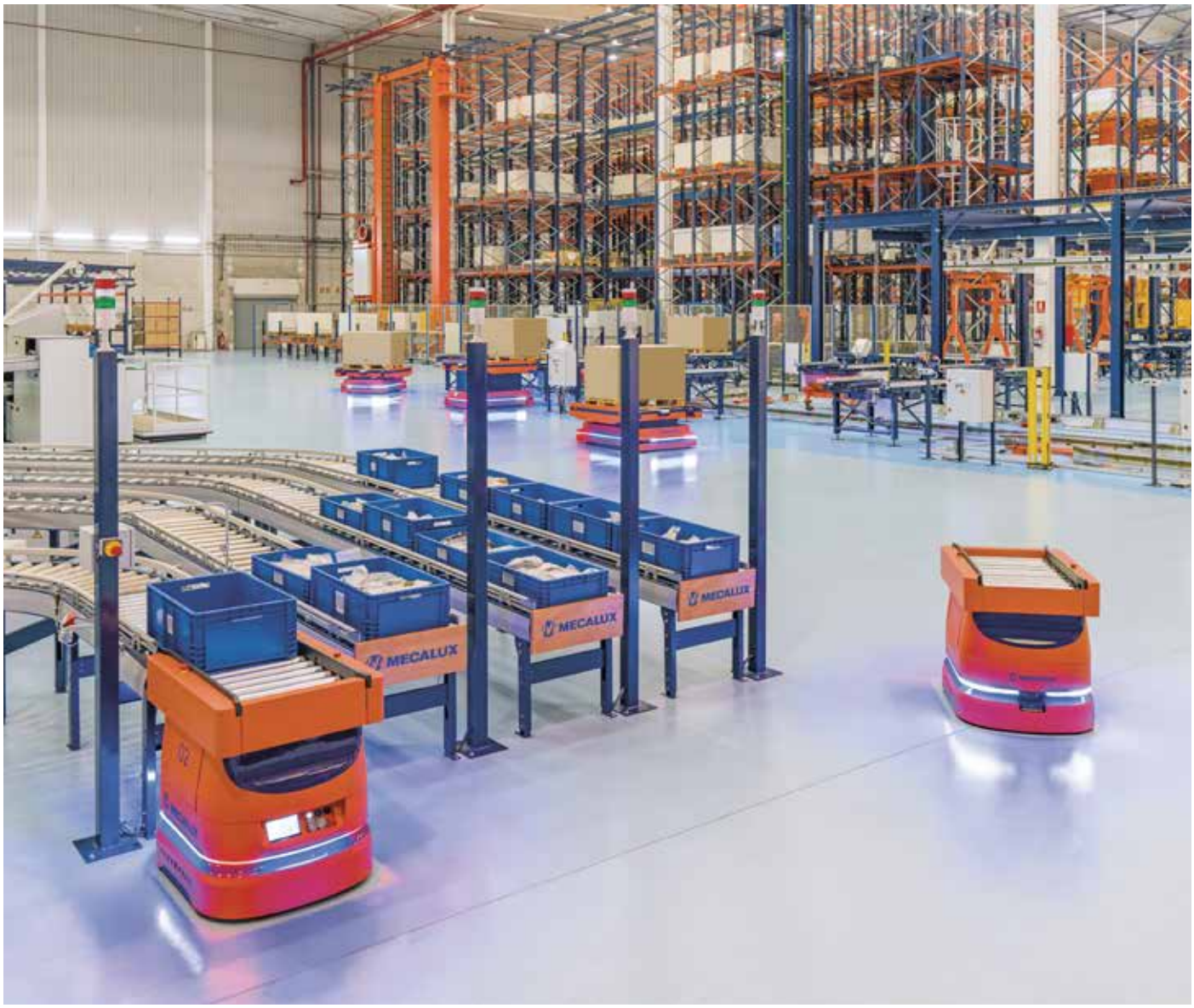

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