INTRALOGISTICS DIVISION

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AUTOMATIC MATERIAL HANDLING

INTRALOGISTICS DIVISION

Cassioli Intralogistics Division focuses on developing specific solutions for the storage and handling of raw materials, semi-finished and finished products.
We manufacture specific automated systems for distribution centres, picking systems, various types of conveyors and everything necessary for corporate intralogistics.
In today's global marketplace, companies need to increase the efficiency, flexibility and productivity of their plants and the machinery that serves them.
Cassioli's innovative automated systems allow precise and safe handling and storage of a wide variety of materials, optimising space, guaranteeing speed and precision of operations and reducing the risk of physical damage to the goods.
Our systems contain different types of automated warehouses, stacker cranes, machinery with various gripping devices, AGV-LGV automatic units, conveyors, Rail Guided Vehicles, SLS, EMS - Electrified Monorail Systems and much more machinery to allow fast and safe transport, improving productivity and significantly reducing management costs.

> "INNOVATION BORN FROM A SOLID EXPERIENCE"


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01 AUTOMATED WAREHOUSES

Cassioli designs and manufactures single or double-depth automated warehouses, with a pallet-shuttle system, vertical units, miniload and special warehouses according to the specific needs of the end customer.

The stacker cranes that slide on rails, with single or double-column frames, are equipped with a variety of gripping systems (such as telescopic fork, finger, satellite shuttles, and more) for picking and placing in single, double or multiple-depth shelving, making these automatic solutions adaptable for any product sector.

Our warehouses can also be built with a self-supporting structure, allowing a reduction in total plant costs.

Cassioli offers complete, flexible and customised storage systems.

The consulting and system design service takes into account all technical factors contributing to the cost-effectiveness and functionality of the system: dimensions of the shelving, possibility of excavations to increase the number of vertical compartments with the same planning constraints, integration with warehouse handling systems, and so on.

Based on the required load capacity, handling capacity, and the type of items to be stored, whether finished/semi-finished/raw materials, Cassioli technicians will identify the most suitable warehouse for your needs. Cassioli's automated warehouses guarantee high quality and performance for every requirement, seeking maximum efficiency and productivity in every project, in order to improve corporate intralogistics.

AUTOMATED WAREHOUSE WITH STACKER CRANE

The single/double-depth unitload automated warehouses with stacker cranes are extremely reliable systems.

Cassioli's automated warehouses for pallets and heavy LU are state-of-the-art storage systems that allow handling of load units using stacker cranes sliding on rails and which, if necessary, service multiple aisles using a transfer trolley.

Depending on customer and system requirements, these stacker cranes can be equipped with a single or double-column frame and different gripping systems (single/double, fork, telescopic, finger or bar) for picking and placing inside the shelving.

Cassioli's automatic pallet stacker crane systems can therefore be adapted to any product sector.

Our management software, designed and developed in-house, coordinates all stacker crane movements and allows management of the entire automated warehouse quickly and efficiently.

MAIN FEATURES

Cassioli stacker cranes perfectly adapt to all warehouse requirements (up to 40 metres high), based on the load capacity, dimensions, maximum height and cycle times.
The state-of-the-art mechatronic solutions and the WMS management systems, which are developed in-house) guarantee optimum functionality.

- *Optimisation of space and logistical efficiency*
- *Automation of inbound and outbound pallet operations*
- *Goods to Man concept*
- *Greater operator safety*
- *Less errors and reduced costs*
- *Live inventory and optimum stock management*
- *Continuous monitoring of performance and traceability of materials*
- *Possibility of using self-supporting structure*

UNITLOAD STACKER CRANE

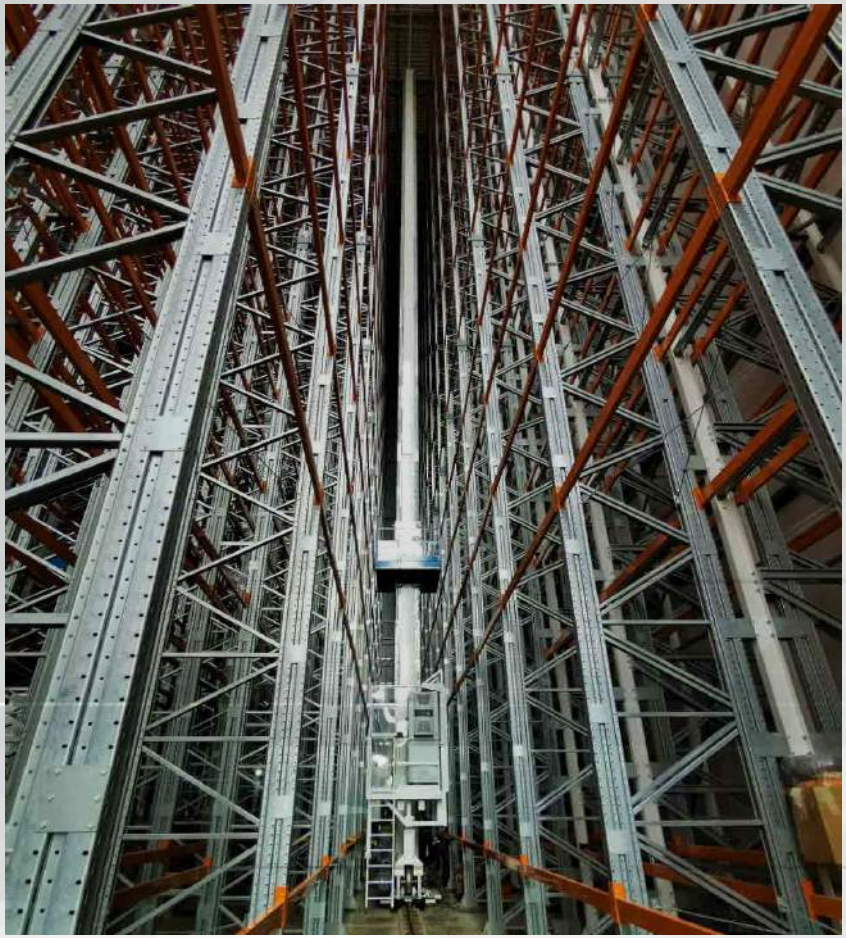
Cassioli's unitload stacker cranes for automated warehouses are machines designed for automatic **pallet** storage, thanks to the management software that coordinates its movements and operations to implement.

They differ from miniload stacker cranes because Cassioli 's ULTRA HIGH stacker cranes can handle a load unit **up to 2,000 kg**, with a **maximum height of 23 metres**. Unitload stacker cranes for unitload warehouses reach high speeds and allow fast and safe goods picking and placement: they are also available in single or double-column mode.

ULTRA HIGH STACKER CRANE

Cassioli's ULTRA HIGH stacker cranes allow automatic storage of heavy loads inside unitload automated warehouses with a medium-high height.

Each stacker crane is managed by specific software, developed in-house by Cassioli, that coordinates the operations and allows live inventory of the goods stored. ULTRA HIGH stacker cranes are capable of transporting **load units higher or equal to 0.8 T** and they are available in **single-column** mode, **up to 40 metres high** and in **double-column mode, up to 32 metres high**.



AUTOMATED WAREHOUSE WITH ISAT PALLET SHUTTLE

In addition to traditional warehouses, Cassioli manufactures multi-depth automated warehouses with high storage density ISAT pallet shuttles that allow optimal use of warehouse space.

The multi-depth automated warehouse uses ISAT pallet shuttles that independently pick and place the various load units on the shelves.

This system allows many pallets to be stored one in front of the other on one level, optimising the available space.

IThe pallet shuttle is equipped with sensors to display the position of the device at any time.

In addition to storage, Cassioli ISAT allows various functions to be performed, such as reordering, counting, manual management and much more.

The multi-depth warehouse with ISAT pallet shuttle has a double working logic,

with a FIFO or LIFO system; ISAT can operate combined with the IMASTER shuttle, the ICRANE stacker crane or ILIFT; AWDS technology (All-Wheel Drive System). Thanks to continuous research and development of innovative solutions, Cassioli can ensure the ISAT pallet shuttles can also work at a negative temperature, **up to -30°**. In refrigerated automated warehouses, used for example in the Food and Pharma sectors, the ISAT pallet shuttles specifically for low temperatures can work in perfect conditions, without

the surrounding environment influencing operation and performance of the machine. Product control and tracking is always guaranteed by specific software designed in-house by Cassioli, allowing live inventory, as well as continuously monitoring the goods stored and stock.

MAIN FEATURES

- Optimisation of space and warehouse efficiency
- Reduced system energy consumption
- Automation of inbound and outbound product operations
- Reduction of operator risks and errors due to manual management
- Easy picking
- Possibility of using self-supporting structure
- Possibility of adaptation to particular working conditions
- Working temperature from –30° to +40°

AUTOMATED WAREHOUSE WITH IMASTER PALLET SHUTTLE

Cassioli's IMASTER is the most efficient system when a combination is necessary of high storage capacity at a high number of movements. IMASTER is the shuttle which, completely automatically, slides on guide rails, transferring the shuttle to the various storage channels.

One or two elevators execute the vertical movements, communicating with the various levels. By doing so, if the system has for example five levels in terms of height, five IMASTER shuttles will be installed capable of executing the movements of the elevators to the storage channels of each level.

Alternatively, if the number of cycles/time permits it, the shuttle can service all the levels of the warehouse being moved vertically by an elevator; in this case, the elevator not only handles the pallet, but the IMASTER itself.

The entire management and control is automatic, with operating, location, allocation, preparation, etc. criteria, taking place via the Cassioli warehouses management software.

In the systems with IMASTER shuttles, the number of movements or cycles/hour multiplies by the number of warehouse levels.

MAIN FEATURES

- Optimisation of space and warehouse efficiency
- Reduced system energy consumption
- Automation of inbound and outbound product operations
- Working temperature from –30° to +40°
- Possibility of adaptation to particular working conditions
- Reduction of operator risks and errors due to manual management
- Easy picking
- Easy use and increased productivity
- Possibility of using self-supporting structure

AUTOMATED WAREHOUSE WITH ICRANE STACKER CRANE

Automated warehouse with ICRANE stacker crane dedicated to storing pallets in multi-depth shelving.

After the load is transferred onto a stacker crane in a specific storage channel, ISAT shuttles pick or place the load according to the information received from the warehouse management system (ASRV system).
Cassioli ISAT are extremely compact devices and use the most modern mechanical functionality, data transfer and battery efficiency technologies.
ISAT satellites interface directly with the control system and can be integrated with other automated movement systems such as AGV, SLS automated trolleys and traditional handling systems.
Data transfer uses Wi-Fi technology, which means the control system can communicate missions, carry out diagnostics, monitor battery status and supervise operations remotely.

MAIN FEATURES

- Optimisation of space and warehouse efficiency
- Reduced system energy consumption
- Automation of inbound and outbound product operations
- Reduction of operator risks and errors due to manual management
- Greater flexibility and easy picking
- Easy use and increased productivity
- Possibility of using self-supporting structure

AUTOMATED WAREHOUSE WITH ILIFT STACKER CRANE

ILIFT is an electrically activated machine, designed and manufactured to move an ISAT shuttle with LU from and to multi-depth metal scaffolding, enabled for intensive storage and specifically constructed. Within the warehouse, ILIFT transfers the ISAT pallet shuttle inside a certain storage channel: ISAT places or recovers the load, based on the information received from warehouse management, thereby reaching various storage depths.

The perfect management and safe control of the machine are guaranteed by integration of the three fundamental sectors of industrial automation: mechanical, electrical and IT-management. ILIFT and ISAT interface directly with the management system and can be integrated with other automatic handling systems such as AGV vehicles, guided vehicles on SLS rails or traditional handling systems. Data communication with Wi-Fi technology allows the control system to communication missions, execute diagnostics, know the status of the batteries and remote monitoring.

ILIFT is the ideal solution for those with a semi-automatic system looking to make it completely automated in just a few, simple steps and with contained costs.

MAIN FEATURES

- Optimisation of space and warehouse efficiency
- Automation of inbound and outbound product operations
- Working temperature from –30° to + 40°
- Maximum height 12 metres
- Easy picking
- Reduction of operator risks and errors due to manual management
- Possibility of using self-supporting structure

SEMI-AUTOMATIC ISAT FOR MULTI-DEPTH INTENSIVE STORAGE

Cassioli's semi-automatic ISAT pallet shuttle was designed for high density pallet storage. The semi-automatic ISAT allows many pallets to be stored, up to a depth of 40 metres from the loading surface.

ISAT, in semi-automatic mode, is moved by a forklift that positions it in the various aisles and is controlled by a remote control managed directly by the operator. LED indicators help the operator to locate the exact position of the shuttle in the warehouse. From the display on the remote control the user can monitor working conditions in real time. The ISAT pallet shuttle is also designed to work in environments with temperatures below zero: it is therefore the ideal solution for use in industrial refrigerators or freezers, without affecting their operation and performance.

MAIN FEATURES

- *Maximum storage capacity in small spaces*
- *Ability to operate in environments with temperatures down to –30°C*
- *Space optimisation and reduction of warehouse management costs*
- *Reduced risk of accidents and physical damage to goods*
- *Adaptability to existing drive-in structures*
- *Possibility to operate in LIFO and FIFO mode*
- *Compatibility with pallets of different sizes*
- *Possibility to store pallets with different loads in the same lane*
- *Fast operation*

TECHNICAL FEATURES

Maximum ISAT speed (no load)	up to 1.22 m/s
Maximum ISAT speed (with load)	up to 0.62 m/s
ISAT weight (without battery)	250 kg
Drive wheels	4
Data communication	Wi-fi
Working temperature	From 0° to 45°C and from -30° to 0°
Maximum load capacity	1500 kg (on request, up to 2000 kg)
Working autonomy	up to 10 hours
Battery recharge time	2 and a half hours
Number of recharge cycles	1200 cycles (FELIPO4 48V 33A)
Recharge voltage and frequency	220V (50/60 HZ) - 110 V (60 HZ)
Battery weight	16,5 kg
Recharge type	Removable battery

MINILOAD WAREHOUSE

AUTOMATED WAREHOUSE FOR LIGHT LOADS - MINILOAD

Cassioli's miniload automated warehouses are primarily designed to meet storage and handling needs for small parts placed inside containers, such as boxes, crates or trays of various materials and dimensions and can be configured according to the needs of each individual project.
The miniload warehouse, which features a light and performance-oriented design, is composed of two shelving units positioned at the sides and a central aisle for a stacker crane to operate.
Cassioli manufactures various types of miniloads suitable for heights up to 16 metres, horizontal speed up to 5 m/s and operation with various types of load units. The automation and handling area is located at one end or on one side of the shelving: the stacker crane places the load taken from the shelving onto the conveyors, so that the operator can pick or place the goods.
The stacker crane is coordinated by management software that tracks the location of all materials in the warehouse and maintains a live inventory. High-speed operation allows stacker cranes to guarantee high performance, with reduced pick and place times.
The specific features of the miniload warehouses make them the ideal solution to optimise picking operations on assembly lines or in shipping departments.

MINILOAD STACKER CRANE

Cassioli's stacker cranes for miniload automated warehouses use innovative technologies to offer maximum performance in terms of productivity, optimum use of space and energy efficiency. This type of stacker cranes can reach a **maximum height of 16 metres** and they are ideal for handling and storage of light loads, such as boxes and trays for load units **up to 50 kg**. Stacker cranes for miniload warehouses are available both in **single-column** and **double-column** mode, according to customer requirements and the goods to handle.

CARTESIO VERTICAL WAREHOUSE

AUTOMATED WAREHOUSE FOR PLASTIC CONTAINERS

The CARTESIO automated warehouse offers high density storage with low surface area. The Cartesio system is primarily aimed at the storage of small objects, subject to significant pick or place activity. The warehouse is made up of shelving organised into columns, which can also be configured two-deep in order to double the capacity of the system. By using multiple storage columns, the CARTESIO system is modular and can be configured for optimal use of available space.

The wide range of containers that can be used, together with the modular architecture of the system, makes CARTESIO an intensive warehouse suitable for any industrial environment, including mechanical, pharma-

MAIN FEATURES

ceutical, electrical, hydraulic, fashion sectors and many more.

The heart of the CARTESIO warehouse is represented by an automatic extractor of containers that moves diagonally across the static elements of the shelving, with minimum transfer times ensured.

The simultaneous vertical and horizontal movements guarantee high speed picking, sufficient to dispatch orders given from various picking points. The CARTESIO warehouse is fully lined and is not therefore accessible to operators: this guarantees a reduction in the risk of accidents and greater safety for personnel, as well as less physical damage to materials and zero risk of goods being stolen.

- *High storage density*
- *Ideal for warehouses with high levels of pick and place activity*
- *Fast and safe picking*
- *Reduced risk of injury and greater safety for personnel*
- *Less physical damage to materials*
- *Increased speed and reduced space requirements*
- *Possibility of using self-supporting structure*

F.A.ST. WAREHOUSE

FURNITURE AUTOMATIC STORAGE

F.A.ST. is CASSIOLI's innovative plant engineering solution capable of increasing the effectiveness and efficiency of the production-distribution processes for companies that plan production according to a demand planning logic.

The F.A.ST. system allows performance that would be impossible with any traditional storage system: features such as the innovative operating logic based on just-in-time sharing of production plans and the original package-gripping device (assembled and disassembled furniture, etc.) make the patented FAST solution a truly unique system. In the absence of an automated solution, the typical situation in furniture manufacturing companies often involves fully manual management of the preparation of orders to be processed. This carries significant critical issues in terms of time and cost.

Usually, the shipping operative receives a packing list with the component codes of an "environment" for a specific customer. Items are identified and stacked on individual trolleys associated with the orders.

Synchronisation of production lines is therefore necessary: a particularly onerous task.

Instead, the revolutionary F.A.ST. system allows optimisation of the storage of finished products, customer order definition and shipment of products. Traditional handling systems encounter extreme difficulty in contexts where goods from various production lines have to be stored whilst everything needed for a given order is prepared. There are not only production problems, but also logistics, storage, handling and management issues.

The patents identifying the FAST (Furniture Automated Storage) System represents an innovation in the automated storage system industry. Specifically, an innovative gripping device and sophisticated operating methodology deliver performance that would be impossible with any traditional system using stacker cranes.

Taking advantage of the ability to keep all storage fronts open, i.e. all the references in which the packages must be grouped (for shipment), companies can move from an ordered production, by work order, to random production, by type (i.e. production with optimised logic independent of the progression required to complete customer orders).

A FAST warehouse allows automation of all activities from the end of the production lines to loading of vehicles.

In fact, the system receives the packages from different production areas, composes the customer order directly on the

shelf, picks the entire quantity of goods assigned to a customer and sends this to a specific vehicle loading bay at the precise moment required.
All fully automated. Tangible benefits include greater accuracy of customer orders and less damage to goods due to the absence of handling performed by operators.

PANEL AND DOOR WAREHOUSES

The automated warehouses for finished or semi-finished doors and panels are customised solutions to optimise space and considerably improve warehouse management, at the same time guaranteeing safety of materials and operators.

The doors and panels are moved through special stacker cranes on rails, which can assume different configurations depending on customer or plant requirements.

The stacker cranes and manipulator place and pick panels via dedicated software, developed in-house by our engineers, that manages the various tasks and allows integration with other automatic handling systems.

such as conveyors and automatic vehicles or with other processing areas adjacent to the storage system.

The experience acquired over the years now allows us to provide automated solutions tested for the main door production sectors.

SPECIAL AUTOMATED WAREHOUSES

Cassioli's special warehouses are automated systems for the storage and handling of bulky load units, such as sheet metal, wood, marble slabs, packages, long elements, reels, stacks of panels and much more.
Cassioli's special warehouses, designed to optimise space and increase efficiency and productivity, can be single, double and multi-depth, depending on the customer's needs and the operations to be carried out. The stacker crane, equipped with gripping tools such as telescopic forks or drag-and-drop systems for pick and place, allows high-density storage handling for all types of materials. Cassioli offers a wide range of special warehouses that vary in operating methodology, type of material handled and handling capacity. On the strength of experience built up over many years in the intensive warehousing sector, Cassioli offers customers the plant engineering solution best suited to their needs, bringing tangible improvements to the production-distribution system, as well as cost optimisation.
The initial investment necessary to purchase the automated system can be amortised in a few years thanks to the significant operational savings on personnel and optimal management of work.

The SPECIAL stacker cranes are machines designed and developed specifically for handling and storage of **particular load units by shape and dimension**. This type of stacker cranes are manufactured according to the specified requirements of the customer and the goods to handle and are ideal for storing particular bulky or large loads, such as wood panels, marble slabs, aluminium, glass or other material with a maximum weight of **6000 kg**.

Thanks to internal know-how and the possibility of counting on customised design, Cassioli is capable of providing the ideal stacker crane to move each type of goods, all coordinated with the specific management software developed by our best planners.

INTEGRATION OF SELF-SUPPORTING STRUCTURES

WAREHOUSE WITH SELF-SUPPORTING STRUCTURE

Cassioli's self-supporting automated warehouses are characterised by the fact the very structure of the warehouse, i.e. the shelving equipped with automatic handling systems, is designed and built to support infill walls and covers that allow the construction of an actual building, optimised according to the customer needs.

In self-supporting warehouses, the shelving supports not only the weight of stored goods and the various elements of the structure, but also the stresses of handling equipment and various external agents, such as wind, snow, rain, etc.

MAIN FEATURES

- Up to 40 metres high
- Perfect integration between external structure and internal shelving
- Tailored construction according to customer requirements
- Possibility of construction in areas adjacent to existing structures
- Maximum use of available space
- Applicable in any type of automated warehouse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02 AUTOMATED VEHICLES

Cassioli designs and manufactures innovative automatic guided vehicles capable of significantly improving the efficiency and flexibility of company intralogistics. Cassioli automated vehicles are hi-tech handling systems, designed for multiple sectors and production phases. Automated guided vehicles can be used to move raw materials, and semi-finished or finished products from one point to another in the plant, guaranteeing maximum safety thanks to specific devices capable of safeguarding people and goods transported.

Cassioli provides customers with the following types of automated vehicles:

- AGV – Automated Guided Vehicle
- AMR - Autonomous Mobile Robot
- RGV – Rail Guided Vehicle
- EMS – Electrified monorail System

AGV - AUTOMATIC GUIDED VEHICLE

The AGV automated guided vehicle is an extremely flexible solution for handling goods and an excellent alternative to conveyors and hand trucks.

The AGV system guarantees full integration between the high-level information system used by the customer (Customer, Host, departmental system, SAP, etc.) and other management systems or management devices, such as forklifts, robotic areas, palletisers, assembly lines and automated warehouses.

Cassioli's control system monitors all information relating to the positioning and status of AGV vehicles, as well as requests sent by the production system. This allows the system to perform real-time processing and determination of the most suitable route for the current situation (planning and routing of vehicles).

Cassioli's automated AGV vehicles differ significantly in terms of weight and load size, single or multiple load, type of load and navigation system: Cassioli will develop the optimal solution, based on customer requirements, whatever the size and type of load to be handled.

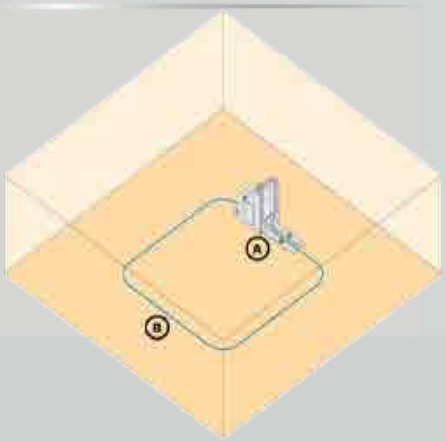
After analysing the dimensions, layout and environmental conditions of the system location, CASSIOLI technical personnel will decide whether a laser or natural navigation system is most appropriate.

MAIN FEATURES

- *Prompt execution of operations and elimination of destination errors*
- *Reduction of risks associated with the handling of loads, such as damage to people, goods, machinery or structures*
- *Possibility to work continuously 24/7 without human intervention*
- *Efficient, fast and flexible transport*
- *Compatible with different pallet sizes*
- *Available with natural or laser navigation*
- *Customisable according to type of weight/load/products to be handled*

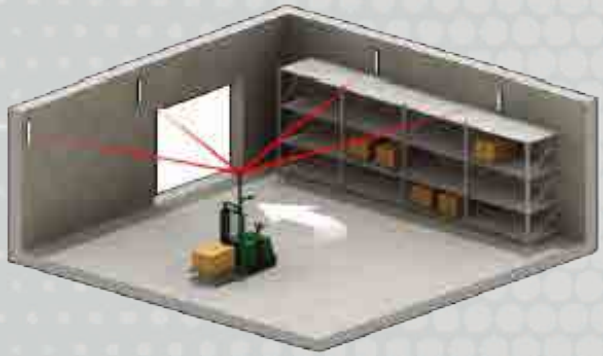
GUIDE SYSTEM OF AUTOMATED VEHICLES

NATURAL NAVIGATION



This type of navigation does not require any infrastructure in particular: natural navigation technology searches the reference points ("feature recognition") in the environment, as for example a specific door or a specific pillar or correlates it to a database that catalogues all these points.
The major limit set by this technology is it cannot allow operations in complex or constantly reconfigured environments.

LASER NAVIGATION



In a laser navigation AGV, the reflectors are strategically positioned in the operating area based on a specific layout. The layout data, including the position and angle of all the reflectors, are recognised by the vehicle controller. An automated guided vehicle with laser navigation uses a scanner to detect the reflectors assembled in the environment, that continuously measures the angles compared to the reflectors.

POWER SUPPLY: BATTERY CHANGE

AGV trucks are powered using a removable battery. According to the customer's requirements, the battery can be replaced using the following systems:

MANUAL CHANGE

The AGV battery is removed by the operator and charged manually, then it is inserted again in the automated truck once charged.

AUTOMATIC CHARGE

Top-up charge: recharging stations are positioned along the route on which each AGV can pause to ensure constant charge.

AUTOMATIC CHANGE

The AGV positions in a dedicated area and the battery is extracted, recharged and repositioned once ready. It is all completely automatic.

PRODUCT TECHNICAL AND USE SPECIFICATIONS

CHARGE TYPE	Pallets, containers, panels, reels, etc...
PRODUCTS TYPE	Finished, semi-finished products, raw materials
LOAD WEIGHT	Motorised chain conveyor with accumulation
LIFTING SYSTEM	Speed up to 1.5 m/s
DATA COMMUNICATION	Wi-Fi
RECHARGE TYPE	Removal battery or top-up charge

TYPES OF AGV

AGV WITH FORKS

Cassioli has different types of AGV units with different forks for positioning of the goods handled. Our technical personnel choose the best configuration according to the physical characteristics of the object to be transported (weight and overall dimensions). The high positioning accuracy prevents damage to the product during handling.

TECHNICAL FEATURES

Capacity	From 250 to 2.000 kg
Lifting stroke	From 0 to 4.000 mm
Speed	Up to 2,0 m/s
Vehicle weight	From 1.000 to 2.000 kg
Battery weight	From 350 to 600 kg
Positioning precision	Up to 1 cm
Recharge type	Standard or with “top-up” station
Max surpassable slope	5% with full load, 10% no load

AGV DECK LOADING

With Cassioli's AGV Deck Loading, the pick-up/unloading device of the load unit consists of roller, belt or chain conveyors, depending on the product to be handled. The on-board handling device allows lifting, lowering, rotation and control of the transported load, depending on specific needs.
It differs from fork AGV because deck loading trucks require less space for manoeuvre. The ability to also carry multiple load units makes this type of vehicle the ideal choice for long routes.

TECHNICAL FEATURES

Capacity	From 250 to 1.500 kg
Lifting stroke	From 0 to 4.000 mm
Speed	Up to 2,0 m/s
Vehicle weight	From 1.000 to 2.000 kg
Battery weight	From 350 to 600 kg
Positioning precision	Up to 1 cm
Recharge type	Standard or with "top-up" station
Max surpassable slope	5% with full load, 10% no load

AGV WITH TELESCOPIC FORKS

Cassioli's AGV with telescopic forks is an automated guided vehicle equipped with single or double-depth telescopic forks. The AGV can be equipped with 2 or more forks, with fixed or mobile wheelbases.

TECHNICAL FEATURES

Capacity	From 250 to 1.500 kg
Lifting stroke	From 0 to 4.000 mm
Speed	Up to 2,0 m/s
Vehicle weight	From 1.000 to 2.000 kg
Battery weight	From 350 to 600 kg
Positioning precision	Up to 1 cm
Recharge type	Standard or with "top-up" station
Max surpassable slope	5% with full load, 10% no load

SPECIFIC AGV FOR STACKS AND PANELS

This type of AGV is designed specifically for the transport of panels in wood or other materials.
The special flatbed configuration of the AGV makes it possible to transport several panels at the same time, allowing faster processes and a smaller footprint.

TECHNICAL FEATURES

Capacity	From 250 to 1.500 kg
Lifting stroke	From 0 to 4.000 mm
Speed	Up to 2,0 m/s
Vehicle weight	From 1.000 to 2.000 kg
Battery weight	From 350 to 600 kg
Positioning precision	Up to 1 cm
Recharge type	Standard or with "top-up" station
Max surpassable slope	5% with full load, 10% no load

AMR- Autonomous Mobile Robot

AMR – Autonomous Mobile Robots are the new generation of AGV systems. They are easily configurable, do not require drastic changes to the production plant and have greater flexibility.

The AMR navigates through maps that its software builds on site or through preloaded drawings of the structure: it represents the ideal solution for end-of-line handling.

The excellent positioning capacity, maximum precision and speed of movements allow it to interact with roller conveyors for loading materials and subsequent safe and fast handling in production environments.

TECHNICAL FEATURES

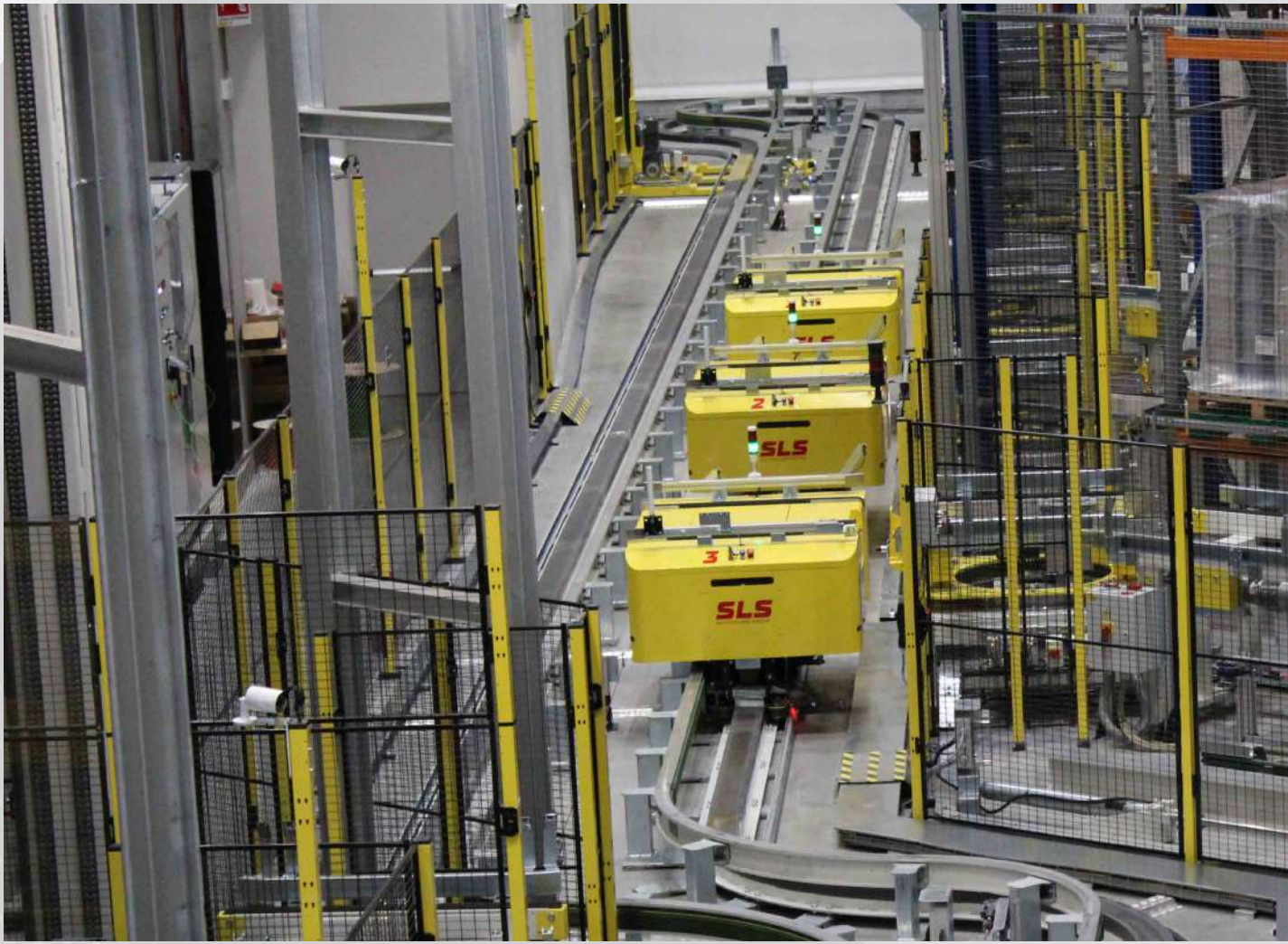
Dimensions (LxWxH)	1400x662x850 mm
Capacity	From 150 to 180 kg
Speed	From 0,1 m/s to 1 m/s
Kinematics and drive	Double trike - Multi-directional
Battery	Life PO4 24V 120 Ah- LeadGel 24V 140 Ah - PureLead 24V 120 Ah
Autonomy	9-4-6 hours
Equipment	Automated roller
Navigation	Natural navigation
Bend radius	The vehicle rotates on its vertical axis
Precision	X,Y: ± 10 mm – Yaw: ± 1°
Safety devices	2 Sick S300 laser scanner - E-stop button - Safety control central unit Sick Flexi

RGV - RAIL GUIDED VEHICLE

SLS (Shuttle Loop System) are Cassioli's RGV systems consisting of several rapid and independent self-propelled, steering, mobile units on a closed circuit consisting of a monorail loop.

Cassioli's RGV system is a fast, flexible and easy to install method of transporting large quantities of heavy goods over long distances, at low cost and with high efficiency.

Cassioli SLS are perfectly adapted to the customer's needs, differing according to weight and size, single or multiple load, and function and type of load.



MAIN FEATURES

- Scalable solution
- Easy maintenance and installation
- Possibility to work continuously 24/7 without human intervention
- Transport speed
- Increased incoming and outgoing flows
- Customisable and adaptable to layout changes
- Dynamic balancing of operating areas involved in the handling system

TYPES OF RGV

SLS - RAIL GUIDED SHUTTLE

SLS are Rail Guided Vehicles systems composed of a self-propelled, steering shuttle that moves on a closed circuit consisting of a monorail loop.
As occurs for all the models in the RVG range, the SLS has the benefit, compared to a traditional conveyors solution, of allowing selective, unplanned management of the load units.
The possibility of executing various paths in real time, according to the specific features of the single load or the status in which an operating station is found, allows the plant to automatically tend towards the best distribution of the material flows.

Various types of materials can be loaded on SLS shuttles, such as pallets, boxes, cartons, trays, racks, skids, finished products, semi-finished products and raw materials.

TECHNICAL FEATURES

Load type	European or international pallet, plastic boxes, metal casings
Load weight	Up to 1.500 kg
Load height	Up to 1,300 mm for loads not close to the limit of 1,500 kg
Rail	1 floor level rail

SLS CABIN - MONORAIL SHUTTLE WITH CABIN

SLS Cabin is Cassioli's shuttle with cabin, ideal for working environments where the unit to transport follows a route positioned above work areas with the operator present.
To guarantee utmost safety, the SLS Cabin system avoids accidental falling due to a possible unstable load, since the entire load is enclosed inside the cabin. The automatic doors of the cabin allow loading/unloading operations at the entrance and exit points of the route. As for Cassioli's other shuttle configurations, the modular structure of the SLS Cabin system allows easy expandability. The flexibility of the solution includes the possibility of adding or easily moving the individual workstations or change the layout of the route.

TECHNICAL FEATURES

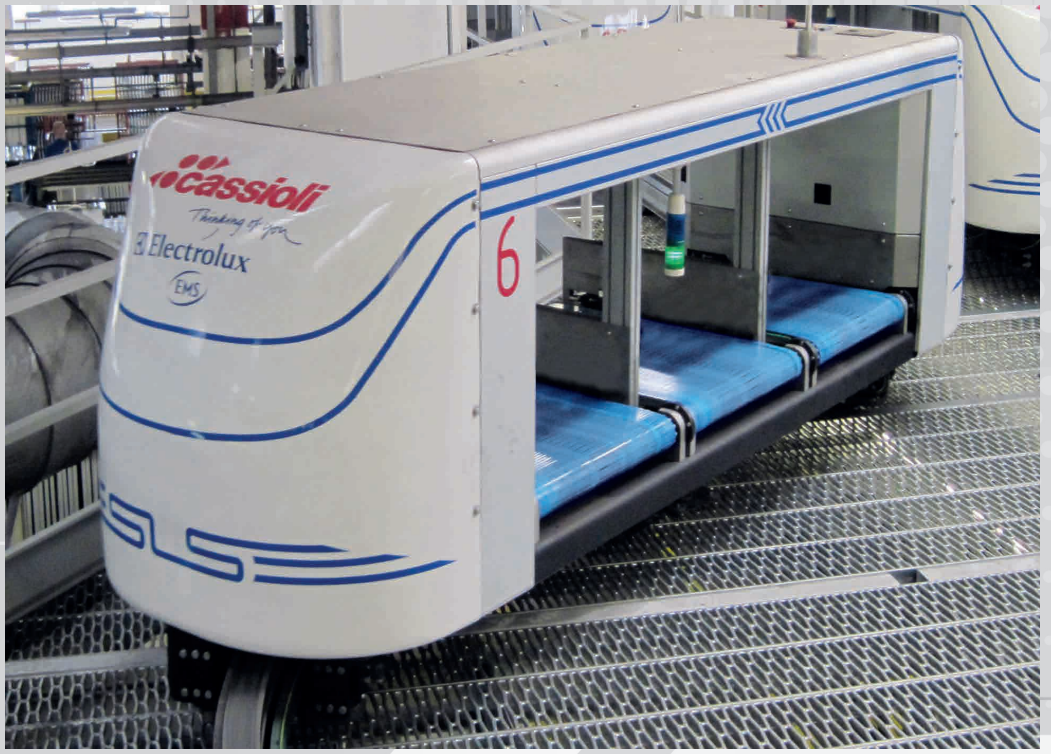
Load type	Roll cage, objects up to 1.5 metres cubed up to 1.5 cubic metres
Load weight	Up to 600 kg
Load height	Up to 1,600 mm for light loads
Rail	1 lower rail, 1 upper rail (at floor or raised level)

SLS MULTI-LOAD - MONORAIL SHUTTLE WITH MULTIPLE LOAD

Cassioli's SLS Multi-load combines the benefits of handling with a RGV system with the Multi-load configuration, so that individual shuttles can simultaneously transport two or more parts to maximise the transport flow.

An optimised movement capacity is obtained, since multiple parts can be transported at the same time, maximising the transport flow.

The individual loads transported by the shuttles can be loaded or unloaded in the same in/out points, or they can have different destinations. The connection with the various workstations can take place in different ways, since the individual shuttles can be equipped with specific handling devices that allow rotation, movement and lifting of the load unit.



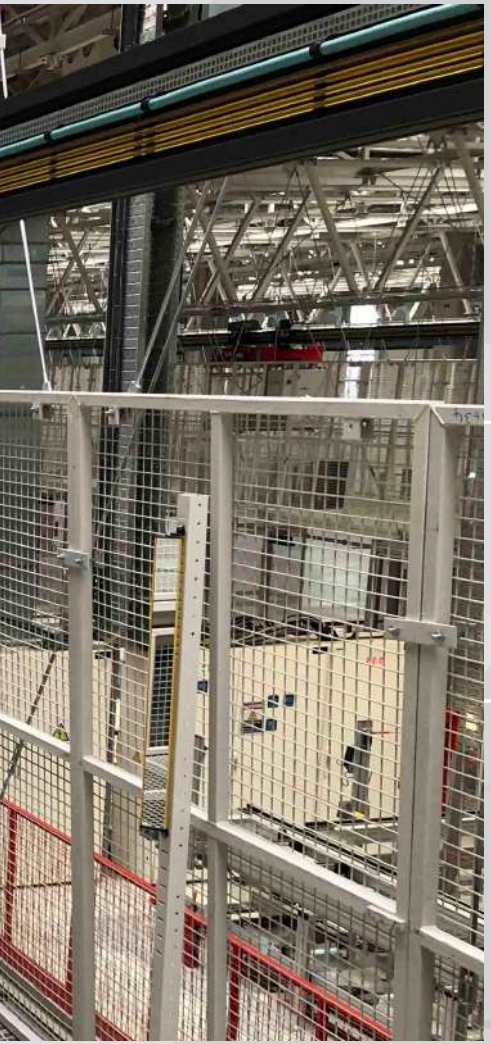
TECHNICAL FEATURES

Load type	Average sized container, objects up to 1 cubic metre
Load weight	Up to 800 kg
Load height	Up to 1.000 mm
Rail	1 floor level rail

EMS - ELECTRIFIED MONORAIL SISTEM

Cassioli's EMS are motorised shuttles capable of travelling any route along an overhead track. An EMS is the ideal solution for plants requiring optimisation of space, making best use of the available area thanks to this suspended system.
The supporting frame consists of an electro-welded structure, while the motorisation and suspension on the track are guaranteed by a steering unit.
A self-braking gearmotor is applied to a wheel assembly to ensure traction and to stop the shuttle in its position. In case of a fault, the gearmotor has a mechanical release system that allows the shuttle to be pulled in neutral towards the maintenance station.

MAIN FEATURES



- Costs containment (no support structure required)
- Easy maintenance
- Faster installation times
- Modular solution: easy variation in the number of shuttles
- Increased incoming and outgoing flows
- Greater operator safety

TECHNICAL FEATURES

Load type	Average sized container, objects up to 1 cubic metre
Load weight	Up to 800 kg
Load height	Up to 1.000 mm
Rail	1 raised rail

03 CONVEYORS

Cassioli produces conveyor systems that allow the mechanical transfer of materials from one part of the plant to another. All of Cassioli's transport or handling devices are applied in any production or distribution system. The high quality of the materials used and the components of the highest order give utmost reliability and operating precision. Conveyor belts allow fast and efficient transport of a wide variety of materials, making them very useful in industries requiring handling and packaging of materials. Cassioli provides customers with different types of conveyor systems used according to the needs of different sectors.

MOTORISED CHAIN CONVEYORS

Motorised chain conveyors are used for transferring products for straight and curved conveying. Sliding of the chains allows transfer of the load (usually a pallet) through the different areas of the plant.
The physical characteristics of the load to be transported affect the quantity of chains used and their dimensions.

ROLLER CONVEYORS

Roller conveyors are industrial systems used for the transfer of goods, pallets and other types of loads inside warehouses, distribution centres or in production and assembly plants.

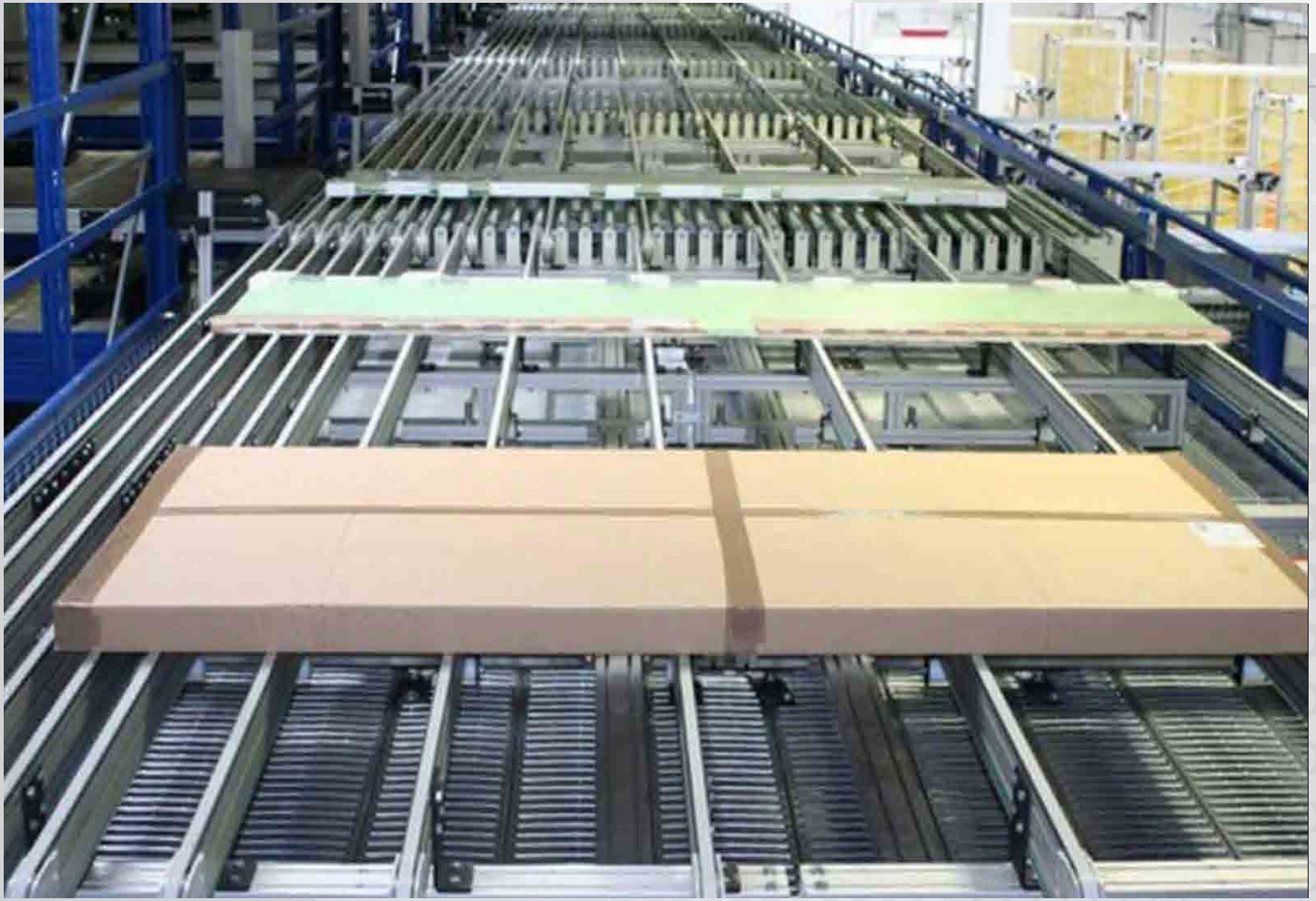
Roller conveyors save significant amounts of time and increase the efficiency of the plant itself, as roller conveyors streamline the transfer of goods along pre-established routes, reducing the operators' physical work.

BELT CONVEYORS

Belt conveyors or conveyor belts are devices used for transferring objects, boxes, pallets and other materials destined for dispatch and/or processing on an industrial scale, such as production on assembly lines.

LIGHT BELT CONVEYORS

Light belt conveyors are ideal handling systems for transferring light objects with specific dimensions.
The physical characteristics of the load to be transported also affect the quantity of belts used, the dimensions and sections of the latter.



04 DISTRIBUTION CENTRES, PICKING AND SORTING SYSTEMS

Correct order preparation methods not only influence the company's efficiency, but also the level of service offered to customers.
This is why picking systems have become an important tool in competition, especially in a modern context where it is necessary to focus on a range of performance factors, such as order accuracy, availability, speed and delivery precision. Composition of the order involves grouping certain articles, materials and components prior to shipment in logistics centres or a specific processing phase in a production cycle. For these operations, it is essential to be able to rely on an automated warehouse equipped with an efficient picking system.
Picking refers to all operations involving handling of goods, whether picking or loading: these goods can be picked from shelving as a single unit or as a pallet, systematically monitoring all incoming and outgoing flows from the warehouse thanks to perfect integration of logistics and IT systems. This allows important inventory management, providing a general overview of the warehouse, which is constantly updated.
Cassioli offers several distribution centres and picking solutions created with different technologies, each of which is compatible with particular needs and different production scenarios. The distribution centres and picking systems differ from one another in terms of performance and operating methodology. For each distribution centre, a prior logical understanding of the design process is always necessary in relation to data defining the distribution context, such as the main information on the item (Stock Keeping Unit), dimensions, type of load unit, weight, item per box, box per layer, layer per pallet, etc..., but also statistics on orders, order lines, seasonality of orders.
Together with picking, another particularly important operation for order preparation is sorting, which allows selection of the goods picked towards different exits. CASSIOLI offers a range of picking and sorting systems, each compatible with a specific scenario. In some cases, the solution may involve joint adoption of different solutions.

PICKING SYSTEMS

PICK TO LIGHT

The Pick to Light system is a "man-to-goods" picking solution that guarantees high productivity (up to 500 – 600 picks per hour). The system consists of spots connected to the warehouse management system via a network that allows real-time two-way communication. A series of warning lights are placed on the shelving, indicating where to pick the goods and the exact quantity. The operator moves along the shelving (dynamic and with multiple-depth storage) and picks the quantity of materials required for a whole batch of orders following signals appearing on light displays. Basically, the picker immediately divides the materials into several cartons, each of which is associated with a picking list that is being completed. At the end of the task, the operator can confirm the result through a button that causes the display to switch off and immediate exchange of information with the warehouse management system. The system can move empty cartons towards the operators and transfer the boxes to other operator areas or to end-of-line as they are filled.

Pick-to-light is used where picking speed and a very small margin of permitted error are crucial aspects.

Among automated picking systems, pick-to-light has a greater degree of flexibility to cope with the high performance variations required by high variability of orders to be processed: this results in more agile processes, a lower margin of error and significant cost savings. Matching a progressive number to each box guarantees the traceability required by activities downline (weighing, packing list, label printing, etc.).

PICK TO BELT

Cassioli's Pick to Belt solution is usually adopted to pick large articles or entire cartons or merchandise (sets of products in secondary packaging).

The system comprises a main conveyor on which the picker positions the cartons picked from a set of pallets. The operator is equipped with an RF terminal and a printer to apply a serial number or shipping label. The handling line conveys the packages to the vehicle-loading area.

In some cases, the Pick to Belt system may directly serve as a sorter for order sorting. In this case, the set of pallets where pick-up was made (with return or residual quantities) may be automatically replaced by a new group of pallets corresponding to a mass pick-up from the automated warehouse.

PICKING BAYS

Cassioli's picking bays are specific bays for picking goods, which can be carried out using machinery (automatic AGV, RGV or EMS vehicles, conveyors or other automatic or semi-automatic devices) or by the operators.

Cassioli's picking bays serviced by automatic vehicles represent the ideal picking solution for the "goods-to-man" approach.

Each picking island can be associated with one or more orders being completed.

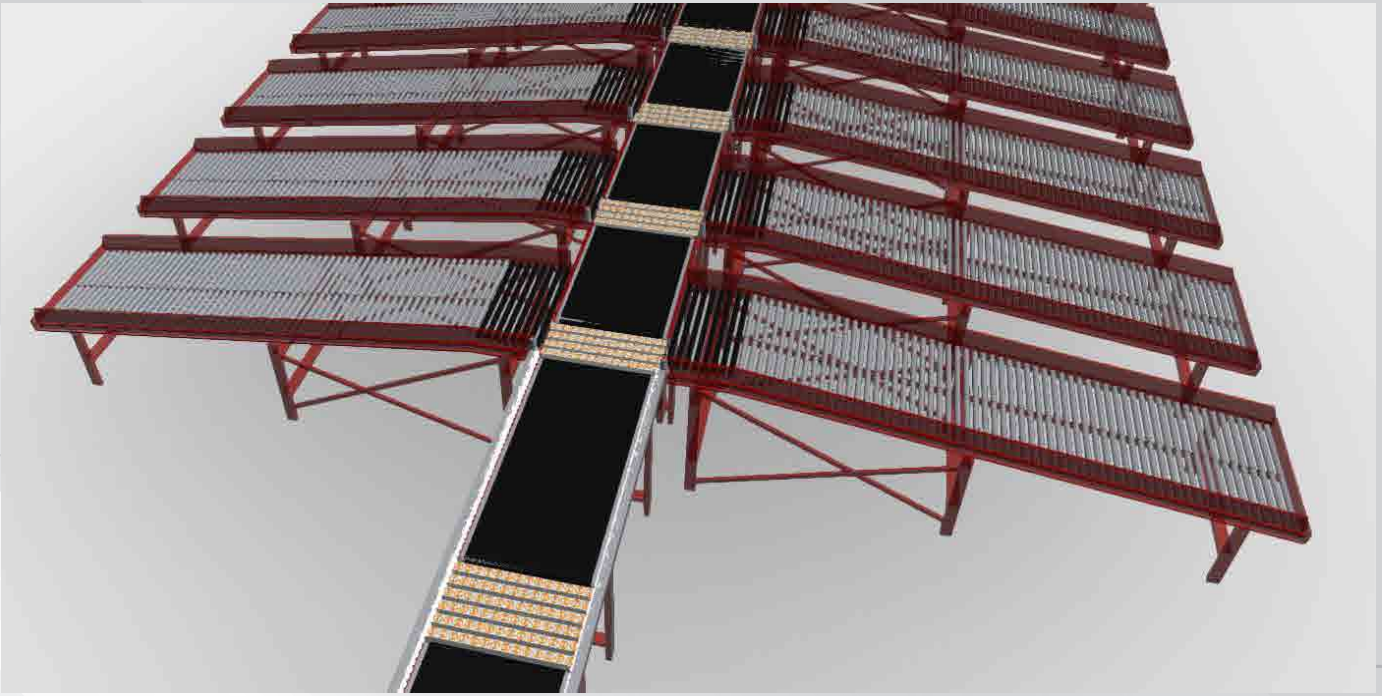
SORTING SYSTEMS

POP UP ROLLER SORTER

The POP-UP Roller sorting solution enables sorting of packages using specific rollers that move sideways to quickly and precisely direct goods towards various exits.
This system is ideal for high speed packaging lines that require constant orientation of the product.
The divert wheels, activated by a clutch, prolong the duration of the system and reduce jamming to a minimum.
The pulleys coated in urethane and rounded improve tracking of the product through the sorter.

SWIVEL SORTER

The SWIVEL sorter is a modular sorting system that can be configured in different ways, based on customer requirements.
This type of modular sorter is mainly used in the postal sector to sort parcels and letters.
The sorter, composed of modules with 4 small wheels, rotates to the right or left based on the exit towards which the transported goods are destined.
If multiple sorting points are necessary, simply connect them and configure them as you wish, to direct the products quickly and precisely toward the exits.

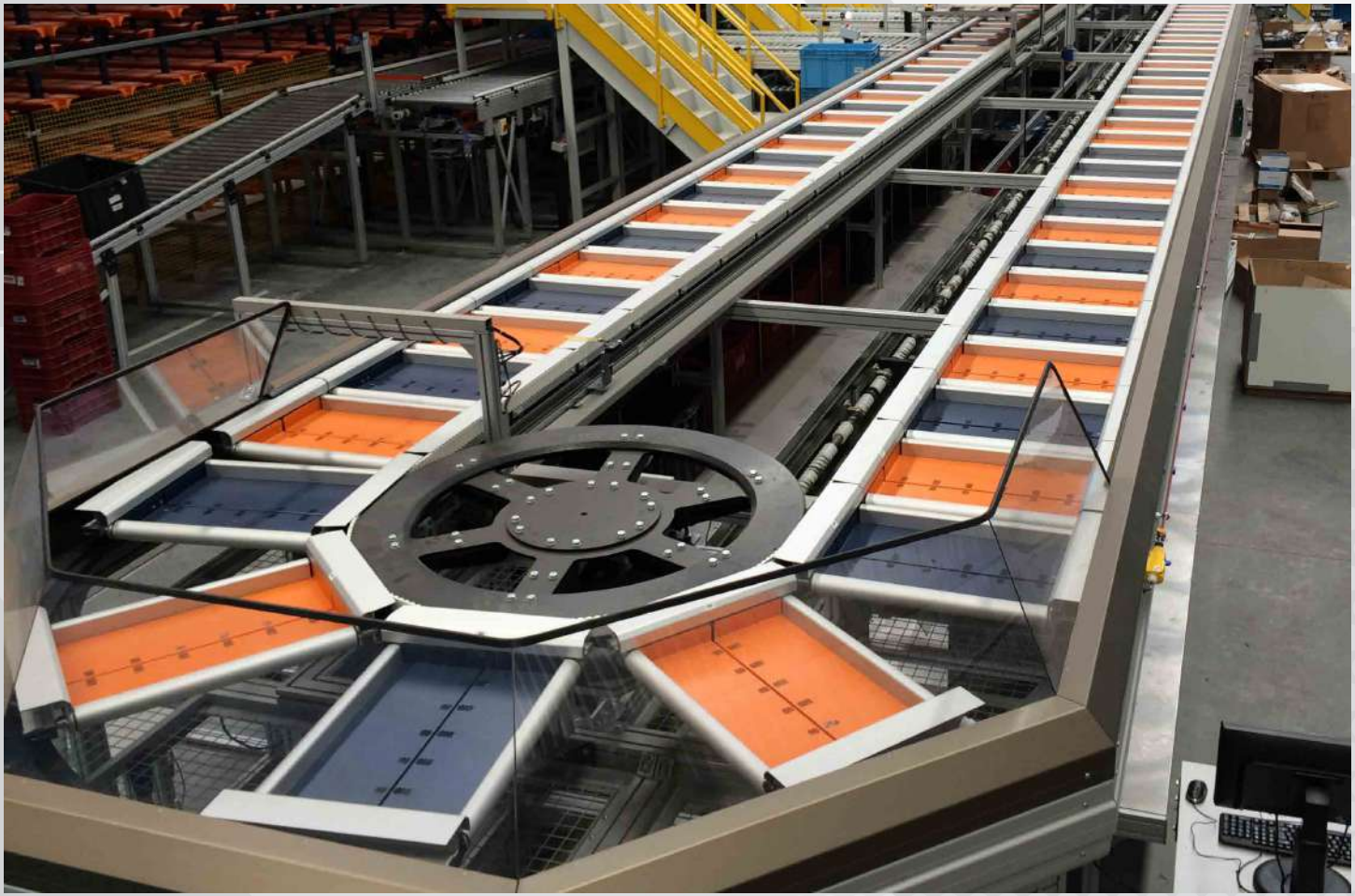


BOMB BAY SORTER

The BOMB BAY sorter, also called the "Flat Sorter", is mainly used for automatic sorting at high speed of light items, such as bags, pharmaceutical products, jewellery, post, books and small packages.

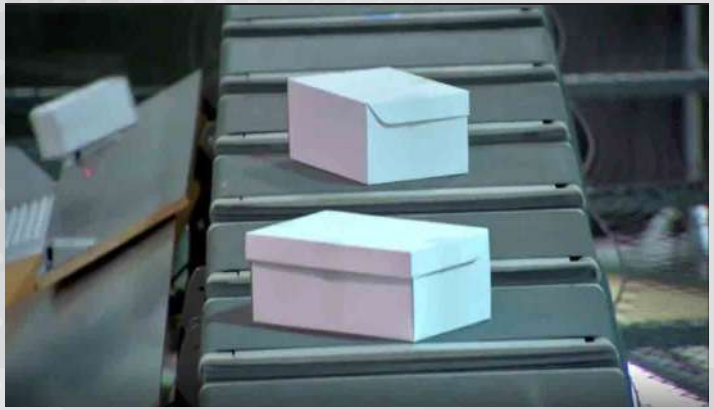
This type of sorter uses a metal tray to transport the product towards a crate or a slide, which is found under the sorter: when it is in position, the doors of the tray open like a trap-door and allow the product to fall down into the desired exit.

The destination slides or crates are found under the sorter.



CROSS BELT SORTER

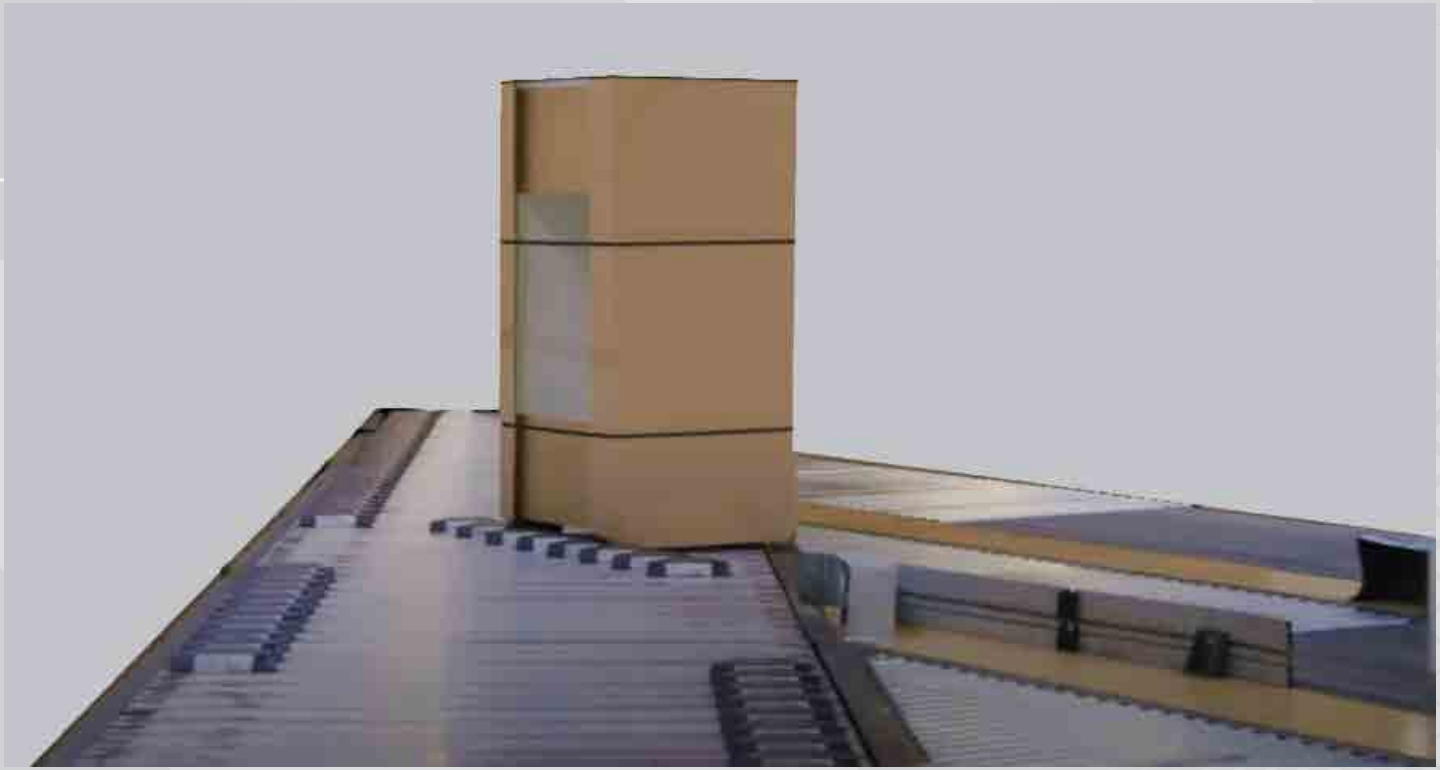
The CROSS BELT sorting solution is ideal for management of particularly fragile and high friction items, such as large volumes of clothing, packages, letters, books and crates.
This type of sorter allows sorting of goods through a transversal belt sorter, with utmost accuracy and reduction to a minimum of manual handling.
Thanks to the modular design, the CROSS BELT sorting system offers a highly flexible solution, capable of perfectly integrating with the existing structures and adapting to the potential changes to layout.



SHOE SORTER

The SHOE SORTER solution is a sorting system particularly indicated for boxes and large boxes in cardboard; its functionality is based on a sort of "sliding guides" that move on the conveyor belt or roller, moving the goods outwards. This type of sorter allows delicate movement of the product together with a high production speed.

The "sliding guides" are almost invisible and have an essential design in aluminium which eliminates possible crushing points of the goods; the technology of the electronic switch that controls movement guarantees precision even at high production speeds.




AI
BLOCK CHAIN

05 CASSIOLI SOFTWARE

FOR INTRALOGISTICS AND AUTOMATION

Cassioli deals with the complete automation of the plants, from warehouses to production areas, up to test lines. Cassioli offers the best compromise between software and hardware from the beginning of design to monitoring and final testing. Our software packages are scalable systems capable of managing every single process within the plant, from the warehouse to maintenance of machinery, through to control of test areas and generation of analytical reports. All software is designed in-house by our programming technicians who, based on customer requirements and the specific characteristics of the plant, develop the most suitable program for the project, ensuring simple and intuitive use. Optimal software running is always tested initially within our plants: only later, Cassioli's technicians deal with installation and start-up of the software service at the customer's site, integrating the new system with existing machines and plants. During the start-up phase, Cassioli will train operators to ensure their autonomy and independence: to further facilitate the work, we have supplied all our software with a **user-friendly human-machine interface**, with a simple and immediate design.

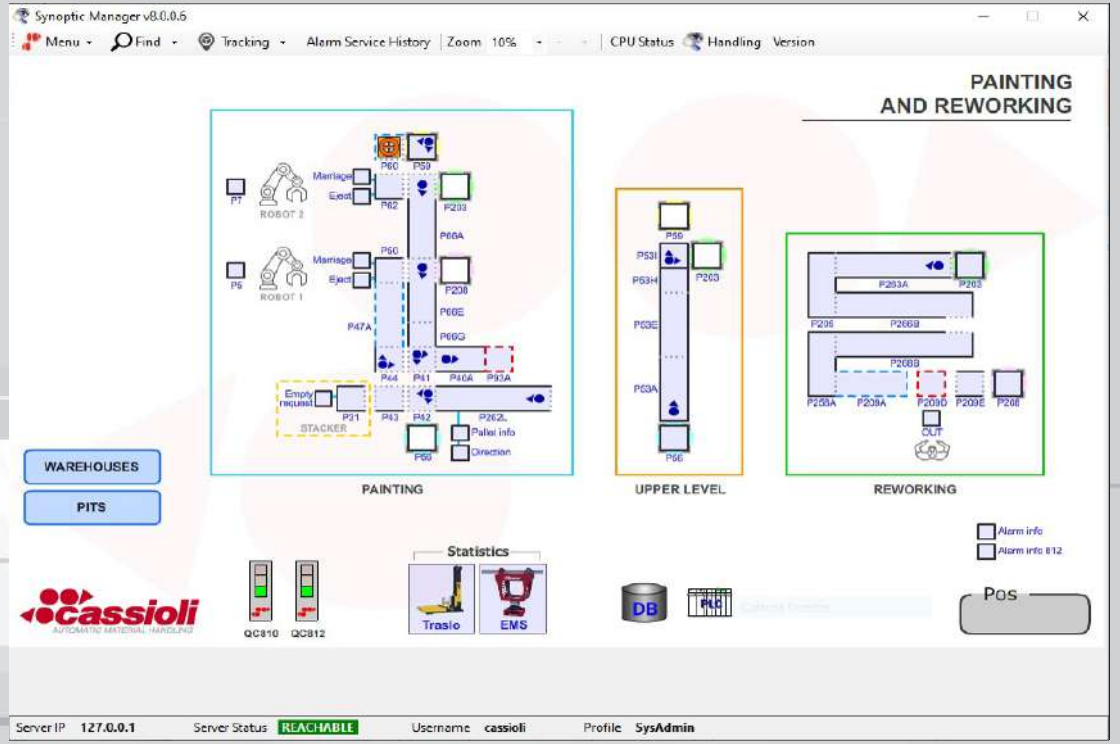
Cassioli's software can be easily configured for different contexts, both as the main system and as a specific solution to manage the individual, automated process, for example an automated warehouse, a manual warehouse or a production line with movement systems that incorporate various degrees of automation. Our software can theoretically manage an unlimited number of stacker cranes and all the equipment involved in handling, track each LU (Load Unit), interact with graphical interfaces such as PC, mobile terminals and tablets, monitor BCR (barcode readers) and Rfid readers, connect with the customer's ERP (Enterprise Resource Planning), interface with databases, and display or retrieve information through Web Services.

The modular structure of the software makes it adaptable to any customer requirements or to the existing information system: each module integrates perfectly with the others, ensuring simple and effective composition of the entire management system. The plant is constantly controlled, to perform all the maintenance operations necessary to restart the machinery as quickly as possible in the event of a fault.

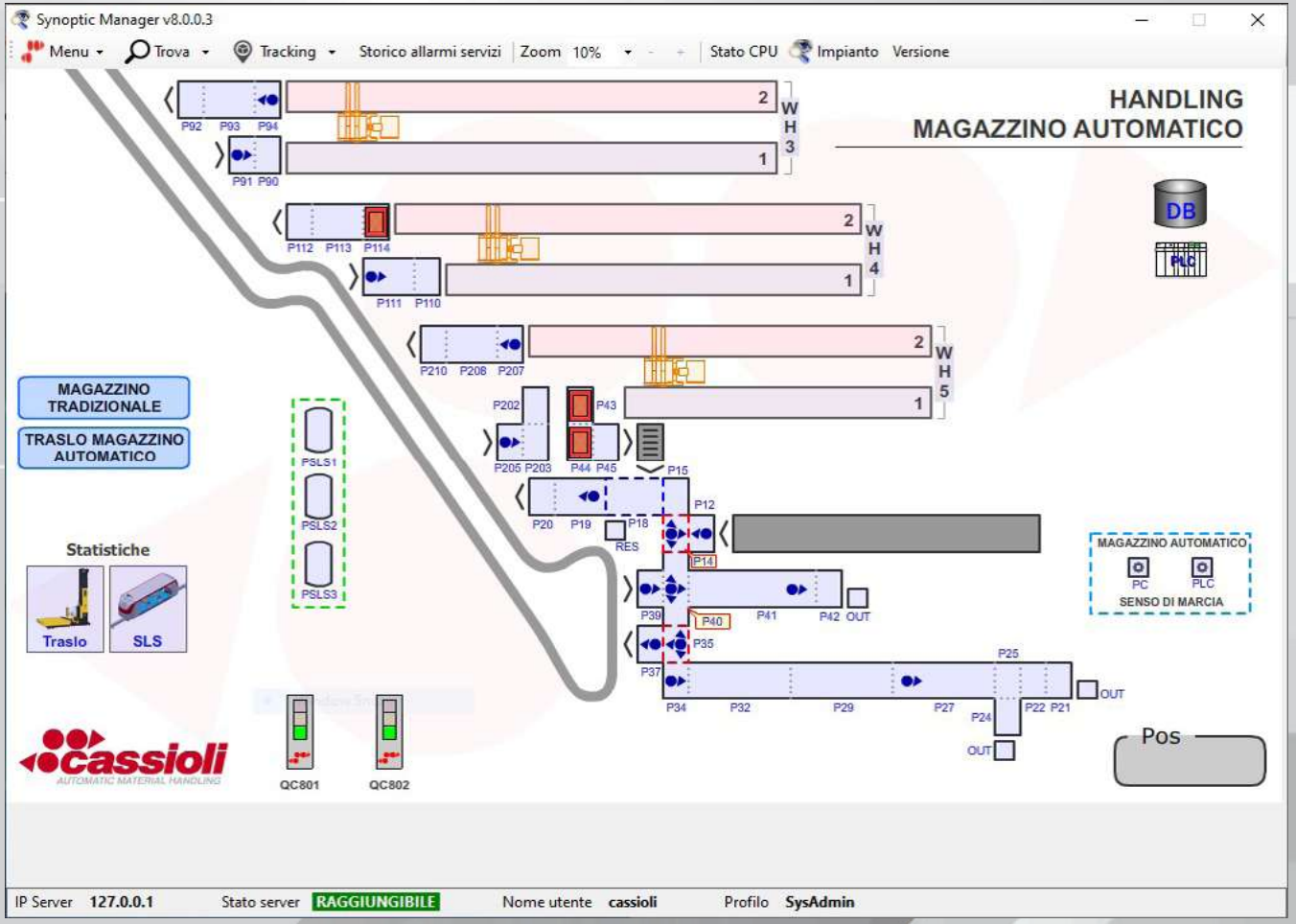
MANAGEMENT OF LOGISTIC PROCESSES

1. RECEIVING
2. HANDLING
3. STORING
4. PICKING

1. **Goods inbound:** control of inbound gates, goods received, details, quality of the products and packaging by the suppliers;
2. **Handling and production flows management;**
3. **Automated warehouses:** control and automation of the entire goods flow; complete management of the processes, including PLC control, guaranteeing optimal use of the storage capacity and calculating the various factors of the warehouse capacity;
4. **Optimisation of the picking phase**, ensuring maximum productivity of the entire system: batch picking with sorting and multi-order truck, goods to man, man to goods, e-commerce collection, etc...



Cassioli software can manage various warehouses and can be configured in multiple languages: thanks to the modular structure, it meets customer needs and adapts to the existing IT system. The flexible architecture of Cassioli's IT solutions allow efficient communication between high level systems (ERP, SAP, etc.) and slave systems (up to simple control of transport equipment). The software package can be integrated with many existing WMS systems or with enterprise resources planning (ERP) systems. This means that each function required by an automated process can be easily integrated by Cassioli with the existing customer management system, thanks to the software and mechatronic solutions.



Intelligent programming of the standard modules allows management of any industrial requirement, from simple, seasonal variations of the internal warehouses or production cycles. Customisation of the functions makes the system suitable for mono-commissioning (distribution or manufacturing industries) and multi-commissioning (3PL).

Modular software for every need

WMS

For warehouse management

Storage in a warehouse means guaranteeing the availability of the product or the material to ensure uninterrupted provision and production. WMS by Cassioli is modular software (multilingual) with a standardised base. It was designed to provide considerable customisation and parameterisation, to meet customer needs (LU specifications, plant surfaces and volume conditions, storage and movement logic, etc.).

FOCUS ON:

- Distribution warehouses
- Inter-operational warehouses for assembly
- Small picking / kitting of components warehouses
- Picking based on customised logics
- Optimisation of the work with the routing techniques
- Solid picking and sorting plans
- Pick to light, put to light, voice picking and pick & pack
- Synoptic layout

WCS

For flow and process control

WCS (Warehouse Control System) coordinates, controls and adjusts all the processes relating to the automated material flows. Equipped with a modular and open system, the WCS system allows dynamic management of storage allocation, thereby reducing to a minimum the loading and unloading routes. WCS is perfectly integrated with the warehouse management system and with the production control software. The movement processes managed by WCS allow horizontal or vertical transfer of the material or the product from one place to another. Cassioli produces advanced transfer systems, from simple conveyors (belt, chain, slatted conveyor, roller, etc.) to more complex automated solutions, such as AGV and RGV.

FOCUS ON:

- Synoptic layout: simplified display of the electromechanical devices that provides important information regarding the operating conditions (alarms, photocell conditions, physical conditions, of a given segment) of the conveyors, stacker cranes, AGV, shuttles, SLS, robotic areas, etc.

CLIENT APPLICATIONS

Control panel

The Cassioli software control panel is managed by a series of clients with reporting and was designed with the user in mind, thanks to the intuitive interface that makes it easy to use, offering simple browsing of the system. Using the Control Panel, you access the realistic display of the entire structure, viewing various levels of detail.
The central information platform not only displays the system, but also the material flow. It also provides key performance indicators and a vast range of monitoring options, merging the technical and logistical prospect with the operating data in a single platform.

FOCUS ON:

- User-orientated design with intuitive interface
- Diagrams and control panels configurable for various roles
- Scalable web application independent of the platform
- Supports the technicians and service staff with detailed and structured technical displays of the system
- Supports the warehouse managers and operating personnel with detailed and structured displays of the logistical aspects of the system, including the performance data, the material flows and order dispatches

GLOBALLY PRESENT
LOCALLY INVOLVED

Cassioli is an active group at international level in the provision of plant design solutions for industrial handling and automation. With 3 different production plants, offices and business partners around the world, Cassioli is divided into 5 divisions: Intralogistics Division; Manufacturing Division; Airport Division; Tire Division; Service Division. Each time you need to transport or handle a finished product, semi-finished product, components kit or raw material more or less automatically, Cassioli can offer the most suitable transport and storage system based on operating capacity, cost, safety and ergonomics. Automated warehouses, assembly and service lines, inspection systems, automated laser guided or inductive vehicles (AGV - LGV), RGV self-propelled trucks, picking systems and robotic islands with viewing systems, but also handling systems equipped with roller, chain, shutter and belt conveyors. Being able to rely on your own widespread, yet at the same time specialist production, allows Cassioli to offer the customer the most efficient solution according to specific needs.

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