

wipro ferretto
GUIDE



Automatic storage systems for sheet metal

The benefits of automation support your business

Key factors, benefits, and logistics solutions for companies handling sheets, rods, and plates

TABLE OF CONTENTS

- 1 The advantages of automation and types of storage systems
- 2 Inside a storage system: trays, stations and control systems
- 3 The Wipro Ferretto solutions for sheet metal

There are goods and materials that are a real challenge to the storage and handling industry. This is the case for metal sheets, panels, and plates which, due to their characteristics - not least of all their size and delicate nature - require special customized solutions able to guarantee space optimization, efficient management and the safety of materials and personnel.

Automated storage systems are one of the logistics solutions that best meet the needs of companies handling these materials.

In this guide we will show why automation can make a difference in these cases and what systems the Wipro Ferretto designs and builds for the logistical management of sheets, plates, or panels.

1 The advantages of automation and types of storage systems



Strategic choice factors

Sheet metal, marble, stone or conglomerate slabs, wood and plywood panels: all these materials have particular characteristics that must be carefully taken into consideration when choosing a storage and handling system.

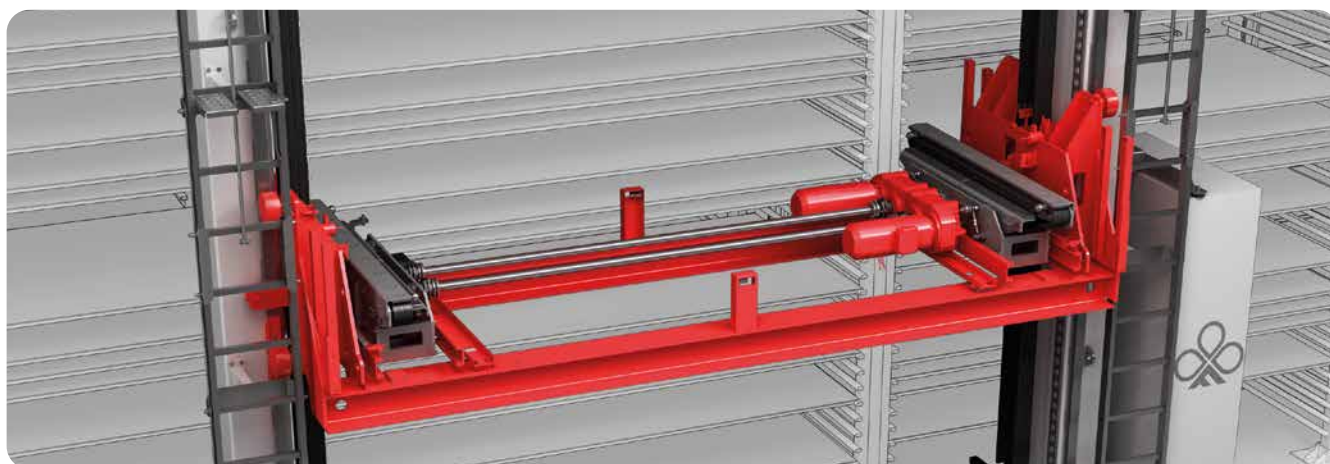
The **size of the product** - up to 4,000 mm by 2,000 mm - requires the use of systems designed to optimize storage space and the adoption of handling systems able to guarantee efficiency in loading/unloading operations.

The different **thickness of bars and plates** - which for sheet metal, for example, can vary from 1 to 30 mm - is another decisive factor when choosing the right storage and picking solution. Other critical factors include the **type of material** (raw, semi-finished or finished) and the need to integrate the storage system with other systems and/or lines used in the production cycle.

The objectives of an efficient warehouse

Designers of automatic storage systems for sheets, bars and plates must therefore consider the specific needs of the customer, which can generally be summed up as follows:

- **optimize storage capacity** by minimizing footprint and maximizing storage density;
- **diversify the type of storage** to manage materials from intermediate processes with flexibility;
- **keep track of inventory and warehouse flows** in real time;
- **guarantee interconnections with external systems**, to meet the requirements for automatic feeding and temporary storage whether for a single machine or for complex multiple lines, so as to make the most of the production capacity.



THE BENEFITS OF AUTOMATED SOLUTIONS

Notwithstanding the differences between the three categories of automatic storage systems described above, they all offer the following tangible advantages:

- Reduction of the footprint
- Elimination of handling and stock management errors
- Efficient inventory management
- Significant risk mitigation
- Enhanced efficiency
- Automatic system for coupling and decoupling trays and plate packs

The main types of sheet metal storage solutions

The automatic solutions for the storage of sheets and plates can be divided into three main categories. They are distinguished on the one hand by their capacity and storage type, and on the other by the number and type of interconnections with external systems:

- **stacker crane storage systems**, characterized by high storage capacity and the ability to manage a virtually infinite number of interconnections with machine tools and external lines;
- **multifunction lift storage systems**, suitable for high density storage of raw and semi-finished materials, able to manage up to a maximum of 3 interconnections with machine tools;
- **compact lift storage systems**, with limited storage capacity and a connection with a single machine tool with a low speed.

2 Inside a storage system: trays, stations, and control systems

A storage system is a complex structure, the individual parts of which must work together to efficiently respond to the specific needs of the user. For this to happen, proper attention must also be paid to each individual component of the assembly.



Trays

Regardless of the type of storage system, sheets are handled using trays on which they are placed individually or stacked on pallets. In general, there are three types of trays:

- The **trays for raw materials** are made of longitudinal tubular sections welded to the sides and designed to rest on the shelves of the racking system. The number of tubular sections varies according to the width of the load. The trays for drag systems are also equipped with devices designed to optimize grip and minimize friction between shelf and tray.
- The **trays for semi-finished materials** are equipped with suitably shaped and perforated surface plates which make it possible to place the material with no risk of part of it falling. Holes can be made to allow the residual particulate from machining to drop.
- **Pallet trays** feature special housings for pallets containing the material to be stored.

Stations

Stations are systems which, managed and controlled directly by the automatic storage system, allow material to be loaded and unloaded in a completely autonomous way, also sending it, if required, directly to the picking points for the sheet metal processing machines downstream of the storage system.

There are different solutions depending on the customer's needs:

- raw material **feeding stations** using shuttles with forkable pins or pin tables placed on shuttles;
- raw / semi-finished / finished material **exchange stations** using shuttles, pin tables on shuttles, or chain conveyors;
- **fast exchange stations** for raw / semi-finished / finished materials equipped with lifts and shuttles.



Stations with shuttles have two operating modes:

- **semi-automatic mode**, which requires the shuttle to be controlled from outside the storage system safety area;
- **automatic mode**, where the shuttle operates completely autonomously.

The stations can also be equipped with a pallet-pack decoupler, a barcode reader, and an auxiliary WMS console.



Interfaces

Interfaces are mechanical and electrical setups of automatic storage systems which enable the **exchange of material with external machines or processing lines**. This exchange can be performed through the picking and repositioning of the tray from/in the storage system or by directly removing the material (typically a single sheet) without extracting the tray.

There are therefore interfaces for handling single sheets and interfaces with systems using external shuttles, shuttles with a lifting table, and chain conveyors. Each interface may have a communication device for the collection of process and safety signals from and to external systems.



The control system

The storage system is operated by a control unit with various functions. In particular, the control unit manages:

- the **operating logic and safety** of the storage system;
- the **interface** with external systems;
- the **exchange of information** with the WMS.

The control system can also be fully accessible remotely via TeamViewer so as to control the operating status of the system as well as its individual components in real time, monitor the workload, carry out an initial analysis and support the operators in the event of a failure or shutdown.

The Warehouse Management Software

Automatic storage systems for sheet metal, bars and plates are also equipped with management software. Among many other things, the WMS also serves to:

- **identify the inbound material**;
- **manage the stock** contained in the storage system;
- **picking materials** based on individual requests or picking lists;
- provide the operator with **information on the status and alarms** of the system.

If required, the software application allows the exchange of information with the company's ERP for the management of production lists.



3 The Wipro Ferretto solutions for bars and plates

Based on the storage capacity and the type of storage required as well as the number and type of interconnections with external systems, the Wipro Ferretto offers three main types of automatic storage systems for sheets, bars and plates. The solutions can be customized according to the needs, a key factor in the decision-making process of leading companies that process these formats in different materials: from natural stone to wood.

The following are the main solutions which, thanks to automation, guarantee space optimization, efficiency, maximum care for the items stored and handled, as well as full integration with production lines when necessary.

Stacker crane storage system

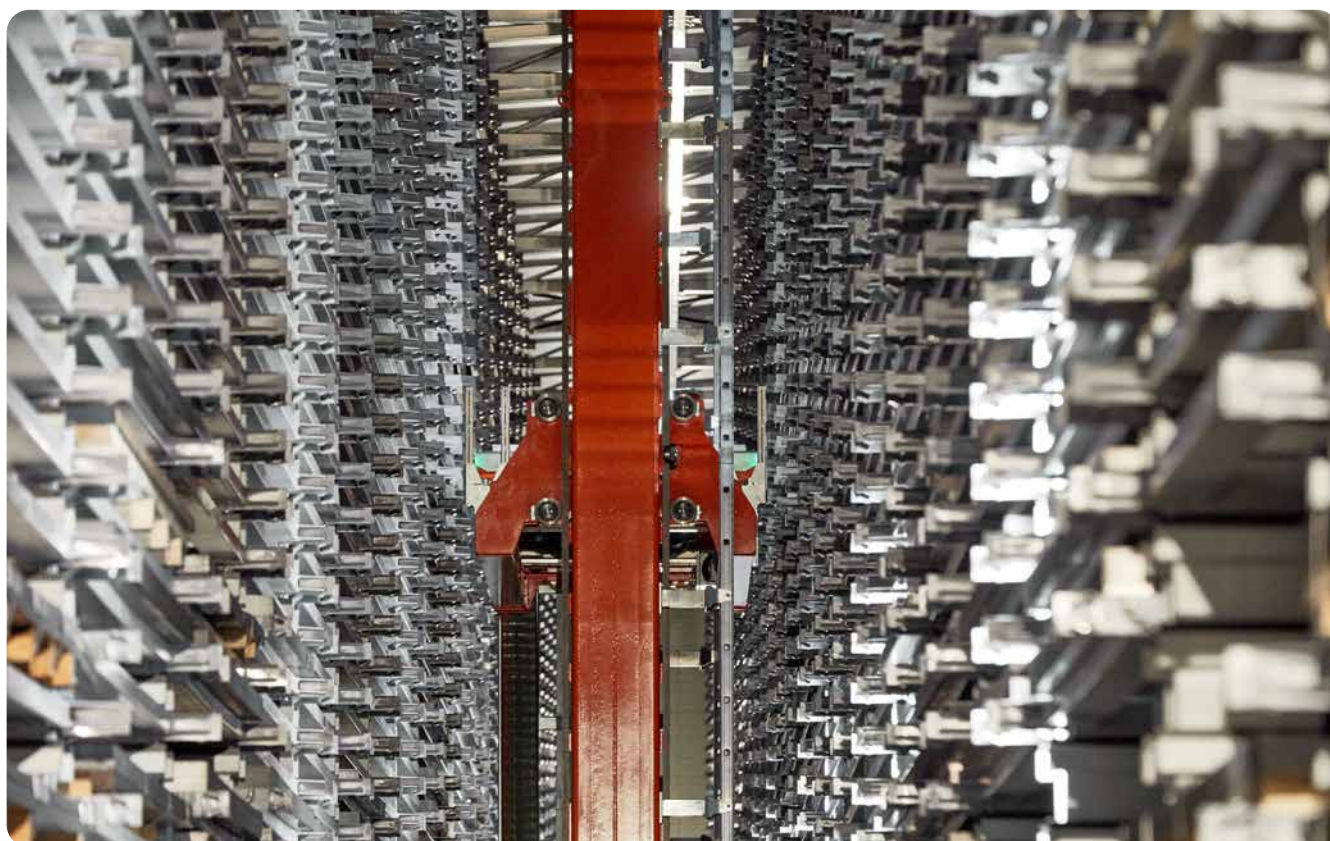
The stacker crane storage system is the solution that ensures the highest performance in terms of storage capacity and flexibility.

The structure is made of **heavy-duty load-bearing structural steelwork** that can also be constructed as a paneled self-supporting structure for outdoor installation. The levels consist of shelves which, for those machines equipped with a dragging system, are constructed with tubular sections while for those with fork-lifting systems are constructed with “L” shaped sections.

Depending on the intended use, the storage system can be made up of simple towers

(intended for the storage of materials), bracing towers (intended for storage but equipped with structural reinforcements), or material input/output towers (intended for storage but also having a lower portion configured to exchange material with external systems).

The trays are handled by a **stacker crane that runs along lower rails** and through a guide located at the top of the racking structure. A chain driven system carries out the lifting movement. The stacker crane can be equipped with **gripping systems with forks** (fixed or with a variable center distance) or with **dragging devices** (variable distance, variable depth).



Multifunction lift storage system

The Wipro Ferretto's multifunction lift storage system provides excellent balance between storage capacity and the number of interconnections with external systems.

This storage system consists of **two towers with a central lift**. The towers are made up of steel beams: each level has slides protected with high-strength polyethylene (polizene) to minimize friction between trays.

The lift moves vertically sliding on fixed vertical guides along the tower and is equipped with precision **sensors for the proper handling** of the trays as well as with an automatic safety system.

The drive is located directly on the lift so as to leave the underlying area free and consequently allow the lower portion of the system to be used for interfacing with external systems.

The system is also equipped with a **material loading/unloading shuttle** having a pantograph table with pins, which brings the empty tray to the loading position and raises the forkable pin table so that the pins protrude above the tray. In addition, reference pegs may be installed, if necessary, so that the sheet metal pack can be accurately aligned on the tray with respect to a vertex or a side thereof. The operator has the task of placing the sheet metal pack on the pins, using a forklift truck, an overhead crane, or a similar handling system.

Compact lift storage system – Steel tower



This is the Wipro Ferretto's simplest and most compact solution for the storage of sheet metal. The system is used to store raw materials and can feed a single external system.

The compact lift system can be supplied in two different configurations:

- **single tower**, with a single storage tower where the lift moves;
- **double tower**, where the lift moves only on the main tower.

The structure is made up of square sections and the towers can have **up to 35 shelving levels each**.

Each level has slides protected with high-strength polyethylene (polizene) to minimize friction between trays.

The **lift moves** the trays by sliding vertically along the tower on a fixed vertical guide. It is driven by a chain system and has precision sensors for the proper handling of the trays as well as an automatic safety system.

The lift drive is located in the lower part of the system and is fixed to the ground.





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