



VERTICAL CAROUSEL SYSTEMS

AUTOMATED STORAGE AND RETRIEVAL SOLUTIONS

At White Systems, we're solutions-driven

As a pioneer in the vertical carousel market, White Systems leads the industry in providing high-density automated storage and retrieval systems. Backed by over 60 years of experience, White Systems vertical carousels provide maximum storage for minimum footprint, providing intelligent automated solutions to storage and retrieval challenges in a safe, secure user-friendly package.

We solve item order picking problems in e-commerce fulfillment applications, warehouses and distribution centers, manufacturing stockrooms, hospitals, or anywhere there are critical items that just have to get out the door or into use. These systems provide dramatic increases in throughput, productivity, space utilization and management – and often pay back their investment in less than 12 months.

Here are just a few of the benefits offered by White Vertical Carousel Systems:

Increased Operational Productivity for Fast Payback

Cube Utilization – Customers have been able to *reclaim up to 90% of floor space* versus static shelving when implementing a vertical carousel system. The carousels can be used with or without mezzanines and in multi-story applications, to maximize cube use.

Higher Throughput – *Increase throughput by up to 250%*. Vertical carousels offer pick rates of up to 150 lines per hour (LPH) versus 60 LPH for static shelving. Vertical carousel systems don't just store efficiently, they bring the items to the user, reducing walking time by up to 66 percent.

Reduced Man-Hours – At 150 lines per hour, *a single worker* using a vertical carousel can be as *productive as three workers* picking from static shelving. Software automatically queues orders, batches picks and positions the carousels for picking, dramatically reducing idle time for operators.

Ergonomics

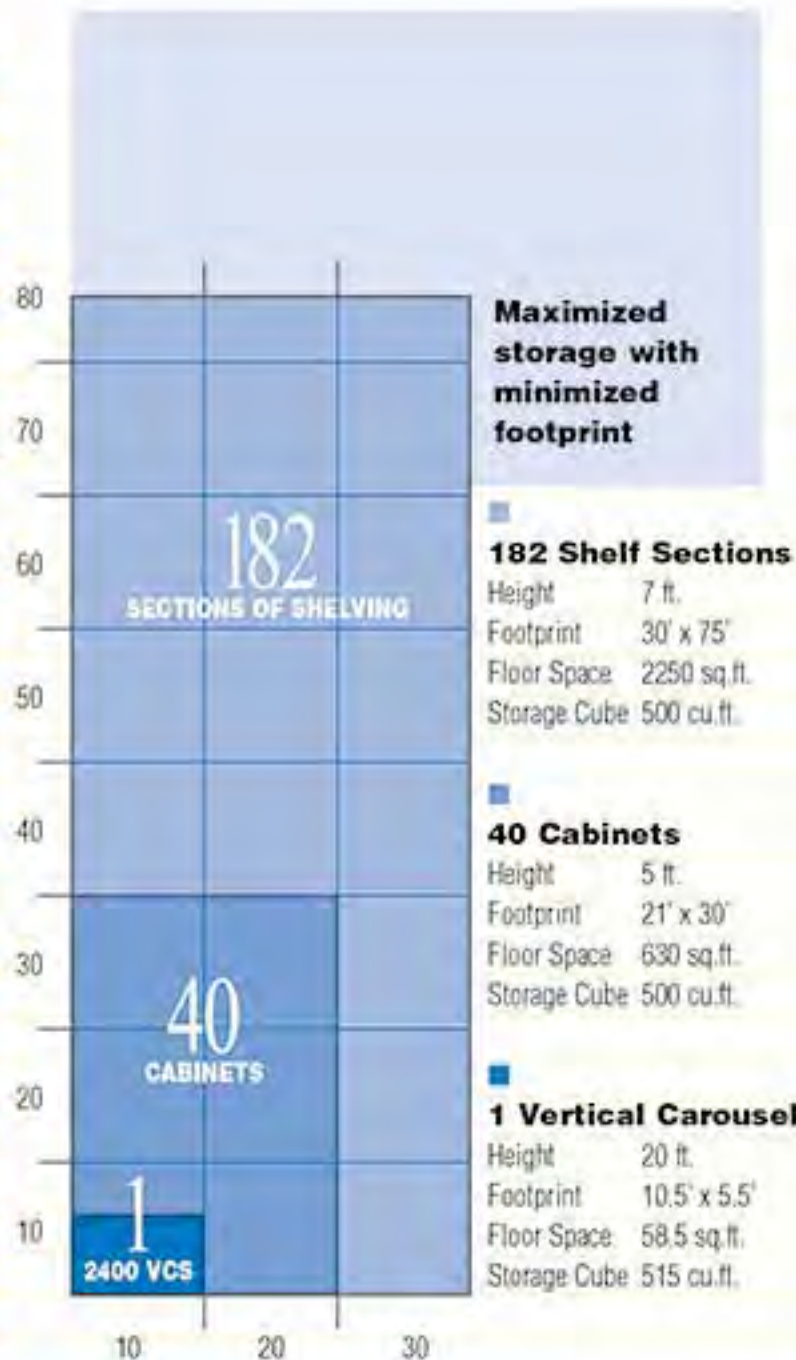
By presenting the items to the operator at a comfortable counter height all climbing, reaching and bending necessary to pick from multiple levels is eliminated, *increasing worker safety, productivity and satisfaction*.

Security

Vertical carousel systems offer a level of security that's simply not possible with other types of storage systems. Unlike aisles of unprotected open bins of parts, *a vertical carousel can be locked down completely*. From simple lockable doors to advanced access systems such as biometrics and RFID systems, there is a security system to meet even the most stringent requirements.

Increased Accuracy

White's paperless picking method virtually eliminates picking errors. *Pick accuracy is improved to 99+%* by eliminating problematic paper pick lists and employing of integrated pick-to-light systems.



For case studies of how companies have benefited from using vertical carousels please visit the performance reports section of our web site at www.whitesystems.com.

Features and Benefits

A vertical carousel is an enclosed, high-density storage unit housing vertically rotating shelves; the shelves are then cycled internally and presented to the operator via an ergonomic opening for easy access.

Vertical carousel systems make use of the vertical space above the working floor to dramatically reduce the footprint required for product storage, and can provide *space savings of up to 90%*. With customizable trays, totes, drawers and pans, these systems further maximize the internal space available for pieces and parts.

Spectrum™ Controls and Software

From the simplest up/down manual controls to fully automated controls with integral Vertical Carousel Interface Terminal (VCIT), control packages are available for any situation. White Systems offers the Spectrum™ family of software products which provides for **easy integration with existing inventory management systems**.

Heavy Duty, Load Bearing Roller Chain

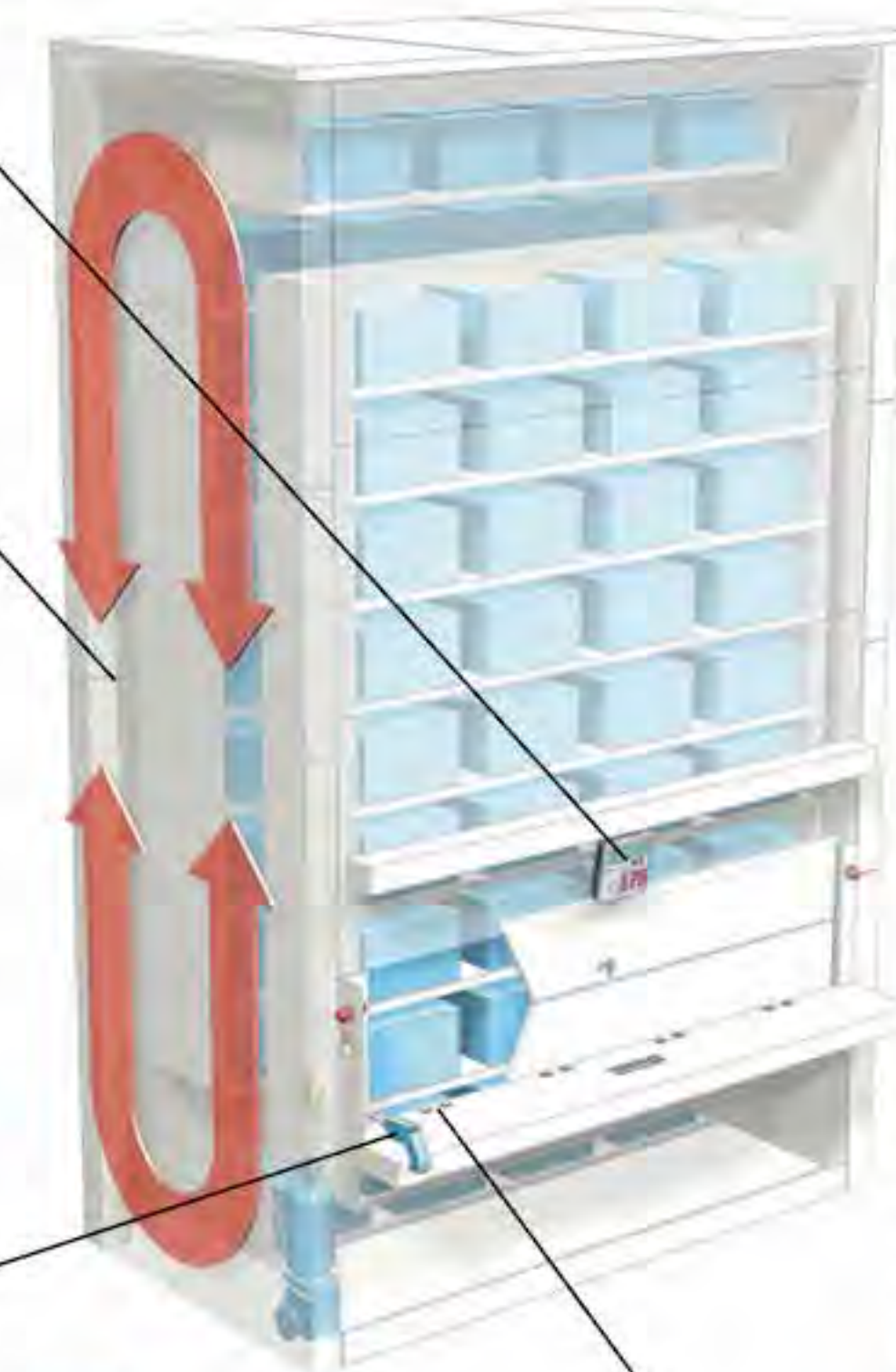
The design utilizes a heavy duty roller chain moving around an inner guide track, in combination with an outer guide arrangement, to ensure **accurate rotation** of the pans while reducing wear and the possibility of overturned shelves.

Operator Safety and Ergonomic Design

White vertical carousels **eliminate the climbing, stretching and bending** common to walk and search picking applications. The carousel delivers the requested items to a conveniently located work counter. Various models are designed for standing, sitting or sit/stand operations.

Reliability and Ease of Maintenance

Built for **years of trouble-free service**, White vertical carousels feature heavy-duty components machined to customer applications. Drives and controls are easily accessible for adjustments and routine maintenance. The manual override function offers extra reliability to your production in the event of a power loss. If the system is down you can rotate the system via crank or cordless drill to access the product you need.



Accuracy

By replacing paper pick lists, and shelving with software, light bars and bar code scanning, accuracy of both orders and inventory can be improved. Our "pick to light" system shines lights on the counter to **show the operator clearly where to pick** from and how many to pick, greatly improving his/her accuracy.

Productivity

White vertical storage modules increase productivity by eliminating walk and search time. **One person** using the vertical carousel **can do the work of three** in a conventional racking environment.

Security

Inventory is kept clean and secure within the vertical storage module. Controls are password protected and doors lockable, preventing unauthorized personnel from accessing contents.

Fast Payback (ROI)

Increased efficiencies often allow companies to **recover their investments in less than 12 months**. White offers a complimentary custom ROI analysis for you to evaluate the benefits to your business process.

Cube-Utilization/Space Savings

White vertical storage modules make full use of available overhead space, **saving up to 90% of valuable floor space**.

Flexibility

Vertical carousels accommodate a wide variety of totes, trays and drawers. Pan pitches and styles can be mixed for various items requirements. The White Vertical Carousel offers the **widest, deepest and highest pan pitch in the industry** - ideal for larger components; and pans are reconfigurable.

Fast Delivery

White Systems Vertical Carousels are manufactured in the United States allowing us to offer the fastest delivery in the industry.



The Customer Service and Support (CSS) Difference

CSS Difference

With the largest and only regionally based, dedicated service engineering team of employees in the material handling industry, we understand the critical role carousel systems play within our customers' business process. To ensure *maximum system uptime and reliability* the Customer Service and Support (CSS) team offers the following services:

- System installation and start-up
- Equipment service and repair
- *Emergency response*
- Preventive maintenance and troubleshooting
- Service and Preventative Maintenance contracts
- Live *24/7 technical support* hotline
- Full service MRO parts supply with \$3+ Million in part inventory
- Equipment and system audits
- Product enhancement and modifications
- *Upgrades and retrofits*
- Equipment relocation
- Customized training programs



Special Applications

Clean Rooms

Since 1994, White has been building *clean room carousels*, from class 1 to class 10,000, for major semiconductor manufacturers. White's clean room carousels conform to SEMI S2 and S8 Guidelines, and are ETL and CE certified. They can be configured to handle just about any storage application. Applications include:

- Semiconductor manufacturers
- Electronics manufacturers
- Aerospace
- Pharmaceuticals
- Biotechnology
- Medical device manufacturers
- Clinical and pharmaceutical research



Fire Suppression

Because of the growing need to comply with NFPA and Factory Mutual requirements, a majority of White Systems vertical carousels are sold with *built-in fire suppression systems*, wet-pipe sprinkler systems, single-interlock pre-action sprinkler systems, or clean agent gaseous suppression systems.

Explosion Proof

White vertical carousels also come with a Complete *Explosion Proof System* with a Manual Purge System, a device used in the hazardous area to manually flush explosive gases from the membrane keypad enclosure, and the Intrinsically Safe Assembly that consists of photo eyes and safety switches connected to intrinsic barriers inside a NEMA-12 control enclosure.

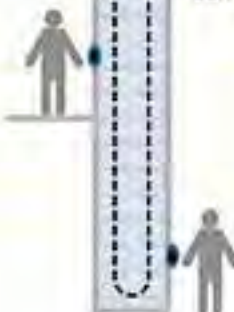
Utilize the full height of your building



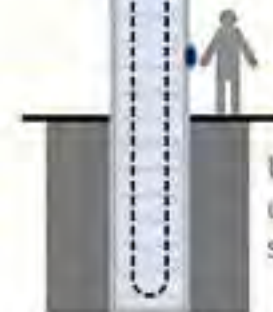
Mezzanine configuration



Multi floor configuration



Utilize underground space



Custom Storage and Retrieval Solutions

Customized to meet your unique needs, White Systems prides itself on creating systems that offer the best solution. Special paint color, automated extraction systems, clean room environments, whatever the application, White Systems has the experience and resources to create the right solution. White Systems offers a wide range of automated storage and retrieval systems to fit the most demanding applications including horizontal carousels and vertical lift modules (VLM) as well as vertical carousels. White will always objectively evaluate your material handling situation and *provide a tailored solution*, backed by a fully staffed in-house systems development team with the capability to design and install the complete solution to meet your needs.



2100

	(in)	(cm)
Overall Unit Footprint*	105.75 x 48	270 x 122
	118.5 x 48	300 x 122
	134.5 x 48	342 x 122

*Operator access counter will add 12 inches to the depth of the machine

Number of Pans	8-30	
Max. Overall Height	18'	5.5m
Max. Pan Capacity	400 lb.	180kg
Pan Pitches – Standard*	11, 12, 14, 16, 18	28, 30, 35, 41, 46
	*Custom pitches are available upon request	
Pan Dimensions	89.25 x 18.5 102 x 18.5 118 x 18.5	227 x 47 260 x 47 300 x 47
Max. Load Imbalance	1,220 lb.	533kg
Machine Capacity	10,200 lb.	4,627kg
Stopping Accuracy (best in the industry)	±1/8"	0.3

2200

	(in)	(cm)
Overall Unit Footprint *	118.5 x 64	300 x 163
	134.5 x 64	342 x 163

*Operator access counter will add 15 inches to the depth of the machine

Number of Pans	8-50	
Max. Overall Height	21'	6.4m
Max. Pan Capacity	400 lb.	180kg
Pan Pitches – Standard*	12, 15, 18, 19	30, 38, 46, 48
	*Custom pitches are available upon request	
Pan Dimensions	102 x 24.5 118 x 24.5	260 x 63 300 x 63
Max. Load Imbalance	1,220 lb.	553kg
Machine Capacity	10,200 lb.	4,627kg
Stopping Accuracy (best in the industry)	±1/8"	0.3

2400

Overall Footprint:	(pan width + 24.5") x 56.25" (pan width + 63cm) x 143cm (pan width + 24.5") x 67.75" (pan width + 63cm) x 174cm
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Pan Widths (in) (m)	60, 72, 95, 100, 106, 112, 130 1.5, 1.8, 2.4, 2.5, 2.7, 2.8, 3.2
Pan Depths* (in) (cm)	15.5, 16.5, 18.5, 24.5, 25.5 40, 42, 47, 62, 65 *available with any pan width
Number of Pans	8-50
Max. Overall Height	36' 11m
Max. Pan Capacity	600-800 lb. 272-363kg
Pan Pitches – (in) Standard (cm)	10.5, 12, 13.5, 15, 16.5, 18, 19.5, 21, 22.5, 24, 25.5 27, 30, 34, 38, 42, 46, 50, 53, 57, 61, 65
Max Load Imbalance	1800 (3hp) 815kg (3hp) 3000 (5hp) 1360kg (5hp)
Machine Capacity	25,000 lb. 11,340kg
Stopping Accuracy	±1/8" (best in the industry) 0.3cm
Control System Configuration	Available in AC and DC

Specifications and Dimensions*

* Additional models and features available, and custom pan sizes are available upon request – consult your local sales representative for details.
All specifications are nominal and subject to change without notice. All machines are ETL approved and can be configured to meet ADA, CE, CSA, Seismic and SEMI standards.

Integrated System Solutions

At White, we understand no single piece of equipment can accommodate all material management needs. That's why we develop integrated system solutions.

Here are the key components:

Horizontal Carousels: White developed and pioneered the carousel concept from its inception. Today we're still the leader. Our horizontal carousels are more advanced, cost-efficient and reliable than ever. The only manufacturer with both bottom-drive and top-drive carousels to handle the full range of applications, White has led the industry in innovation, solving the toughest challenges.

Vertical Carousels: Leading companies use White's vertical carousels to increase storage density, order accuracy and efficiency while reducing inventory and man-hours.

Vertical Lift Modules: Adds flexibility and speed to high-density storage. Leading the industry in volume and weight capacity, White has taken VLM technology to the next step with the Power Column 2 – fewer machines to do the same job.

Software & Controls: White Systems offers a full line of software and controls to meet specific customer demands – from Spectrum/MMS, a state-of-the-art software package with either full inventory management or transaction processing capability to full custom systems integrating carousels, pick-to-light, conveyors and bulk – from induction to packing. Fully supported. Proven. Reliable.

Customer Service: White has the industry's largest factory certified field service group. From a single part to around-the-clock on-call maintenance contracts. Moves, upgrades, major overhauls. Nobody beats White in service.

Complementary Equipment and Accessories



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