Buyer's Guide

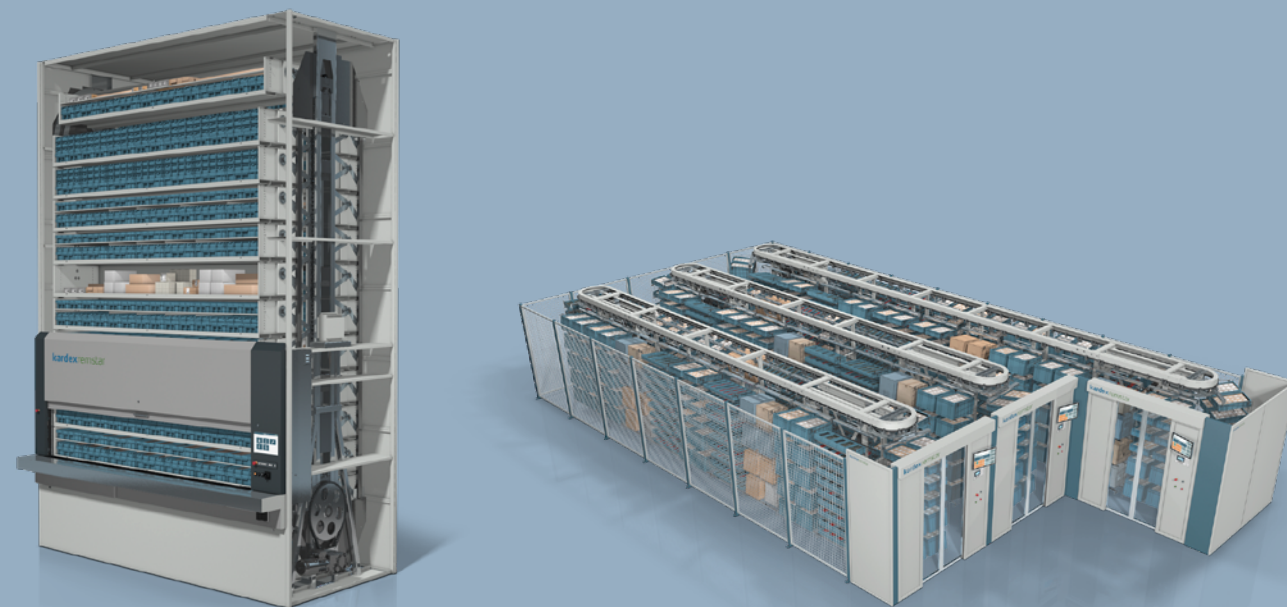# Vertical vs. Horizontal Carousel Modules

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Which one is best for you?

A side by side comparison

Although similar in name, Vertical Carousel Modules (VCM) and Horizontal Carousel Modules (HCM) are dramatically different automated storage and retrieval systems (ASRS) when you take a closer look. The most obvious difference is the way the machines operate. Per their names – Vertical Carousel Modules rotate vertically, and Horizontal Carousel Modules rotate horizontally.

Both automated technologies have been around since the 1950s. Their rich history and experience in material handling makes them steadfast and reliable storage devices.

A variety of design tweaks and improvements over their lifetime have ensured these loyal, dynamic storage units continue to deliver modern, world class manufacturing and distribution facilities improved material handling efficiencies.

Vertical Carousel Modules

Horizontal Carousel Modules

What are the benefits?

High density **storage**

Recover up to 60–75% floor space by densely storing items in a more compact footprint.

Reduce **labor**

Increase throughput by delivering goods directly to an operator allowing you to reduce labor by ⅔.

Improve **pick accuracy**

Integrated with pick-to-light technology, pick accuracy can increase up to 99.9%.

Higher **inventory control**

Access to stored items can be restricted by user with inventory management software.

How do they store items?

Vertical Carousel Modules

Vertical Carousel Modules are a series of carriers attached in fixed locations to a chain drive. Movement is powered by a motor, which sends the carriers in a vertical loop around a track in both forward and reverse directions – similar to a Ferris wheel. Goods are stored or retrieved through an ergonomically positioned access opening with a work counter.

Horizontal Carousel Modules

A Horizontal Carousel Module consists of an oval track supporting rotating bins with shelves. A motor located inside of the oval track powers the carriers around the track horizontally, stopping at a pre-determined access point for storage or retrieval of goods.

General dimensions

Both units are generally rectangular in shape with VCMs ranging from 1.9 to 4.3 m wide by 1.3 to 1.7 m deep. While HCMs range from 1.8 to 2.1 m wide by 5.8 to 46.5 m long. The difference here is both carousels are accessed on the width dimension; making VCMs wide and shallow and HCMs narrow and long.

Another big differentiator is height. VCMs start at just over 2.2 m and can reach up to 10 m tall. HCMs start at just over 2.1 m, but have a maximum height of 4.1 m. While HCMs are indeed a good option for areas with ceiling heights under 4.6 m, they can be double (or triple) stacked for higher ceilings.

Vertical Carousel Modules

2.2–10 m

1.3–1.7 m   1.9–4.3 m

Horizontal Carousel Modules

2.1–4.1 m

5.8–46.5 m   1.8–2.1 m
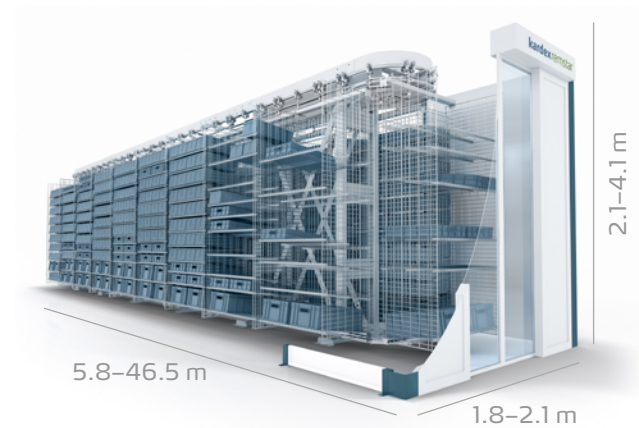
Products stored

The ultimate footprint of the unit always starts with the size and weight of the product you need to store — and then how much of it you have.

Size

VCMs store items on carriers ranging from 1.3 to 3.6 m wide by 0.43 to 0.63 m deep. The carrier width is roughly 0.7 m shorter than the overall unit width allowing some room on either side of the carrier for the track. The height of the carrier can range from 0.21 to 0.49 m. Carriers can be further subdivided with additional shelves for managing smaller items.

HCMs store items in carriers that hang from an overhead track. Carriers can be 0.62 m, 0.83 m or 0.96 m wide by 0.46 m, 0.56 m or 0.61 m deep. The carrier height ranges from 1.9 to 3.7 m and determines the height of the overall unit. Carriers can be divided using intermediate shelving to create custom storage locations.

Totes, containers and boxes can be used to organize parts in both units.

Weight

Product weight can also be variable in your automated storage technology selection. VCMs can handle weights up to 650 kg per carrier. While HCMs can handle up to 900 kg per carrier. In some cases, a few kilograms can make all the difference.

Considerations

#1 Picking speed

What are the system throughput requirements? This will be dependent upon your specific application. How fast you need to get products out of the system might determine the best technology for you.

Throughput rates are highly dependent on the system configuration (layout and process), inventory locations (slotting), order profile (single line vs multi), picking strategy (single order or batch picking), etc. Carousels are generally arranged into workstations, or pods. An operator works within the pod picking stored product from each machine to fill orders usually following light or voice directed picking commands.

One of the main advantages to ASRS is the goods-to-person delivery. All stored items are delivered directly to the operator, significantly reducing walk and search time and therefore increasing order picking throughput rates. VCMs are generally laid out in a straight line, two or three in a row next to each other. Arranging three VCMs next to each VCMs you usually see them arranged two by two; face to face. This allows the operator to work in the middle and access all four units easily; with a 7.3 m walking area, instead of 14.6 m. In high throughput applications, every step counts.

HCMs can also be arranged in workstations or pods. The difference here is the access point is variable and can be adjusted to create the most efficient layout. When using two HCMs side by side, the operator can access each carousel at an angle, creating a small workstation of only 1.5 or 1.8 m.

When multiple HCMs are positioned in a workstation, the center carousels can be pushed back and accessed from the front, while the side units can be directed to stop on a side or angle creating a very close workstation for the operator.

#2 Physical space

The physical space of your warehouse is a main consideration when it comes to deciding between VCMs and HCMs, specifically ceiling height. A lower ceiling height might mandate a HCM over a VCM. Although if space is really tight and you're looking for maximum cubic capacity, a VCM might be a better option. Even at a lower ceiling height, VCMs provide a bit more capacity when compared to HCMs.

Another option is to build a tall attached exterior enclosure to house the VCM and punch an access opening through an existing exterior wall. This is more common than you'd think especially for low ceiling facilities that are out of space.

Balance the physical space you have with the storage density you require.

#3 Product mix

The stability of your product mix is also something to consider. VCMs provide highly dense storage for static product sizes. While intermediate shelves can be changed from storing 50 mm tall products today to 100 mm products tomorrow; there are carrier size limitations. HCMs are easier to adjust to a changing product mix. Carrier shelving can be added or removed, and pick lights can be adjusted as needed.

HCMs are easier to adjust
if your product mix changes often.

#4 Cost

It all comes down to how much does it cost and what is in your budget. Overall, the HCM is the least expensive option per cubic foot stored. While price is always a main consideration, it's never all about price in the end – it's about finding the best system to meet your needs now and in the future.

Your decision should be based on the space you have, the requirements of your application and the cost. Ask a material handling specialist to analyze your application, provide you a comparison for both solutions and help you weigh the pros and cons.

Price shouldn't be the only
factor in your decision.

Contact a specialist

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