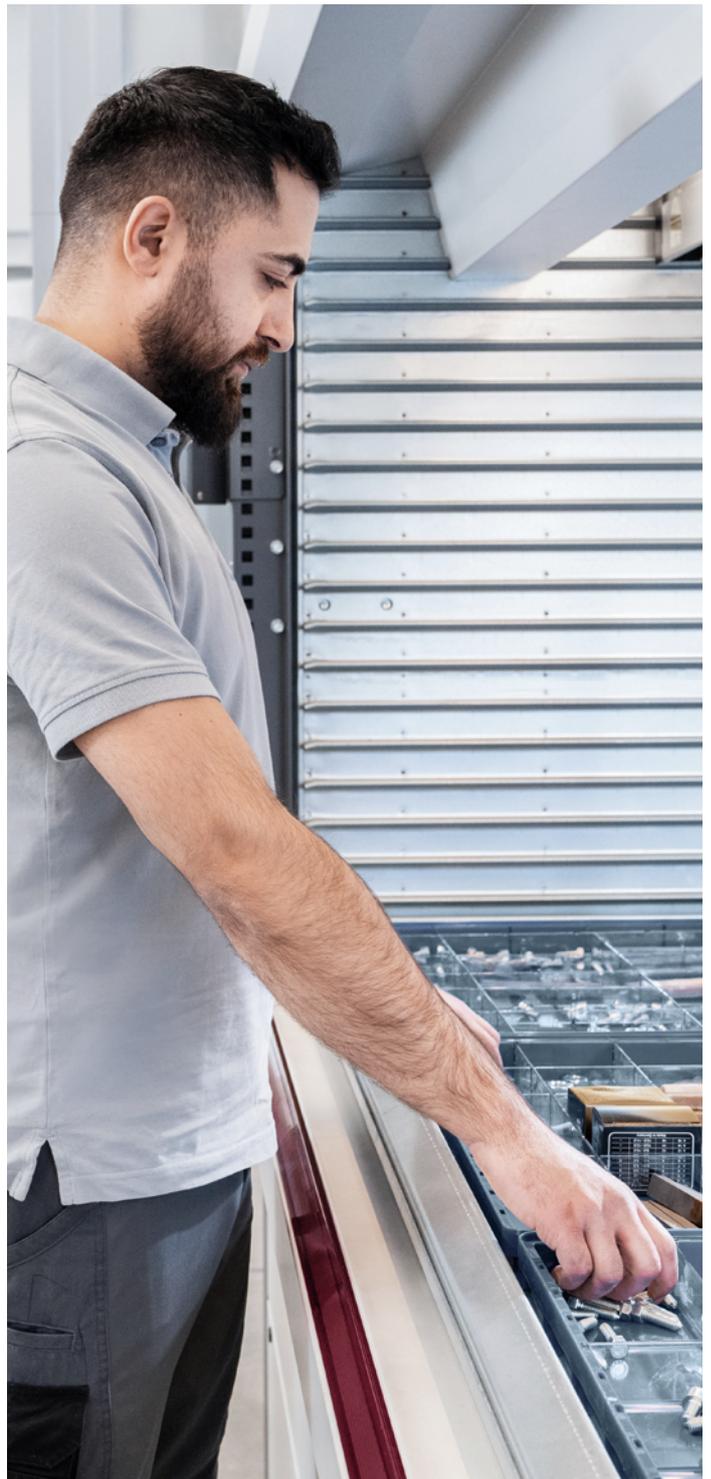


Buyer's Guide

Vertical Carousel vs. Vertical Lift Modules



Which is best for you?

A side by side comparison

Thinking of making the leap into automated storage with either a Vertical Lift Module or Vertical Carousel Module? Good news – your storage situation will definitely be looking up. Only now you have the daunting task of choosing which one of these technologies to invest in, install and use daily. This guide will help you understand the differences between the two technologies as the first part of making your decision.



Vertical Lift Modules



Vertical Carousel Modules

What are the benefits?

High density storage

Ideal for storing slow- to medium-velocity items a 6 m tall machine can provide anywhere from 5,000–7,000 locations.

Automatic delivery

Required items are delivered automatically to a waist-high access window for ergonomic, high-throughput picking.

Restricted access

Full enclosures and restricted access for enhanced security.

Maximize floorspace

Maximizing storage in a compact footprint by leveraging a facility's overhead space.

How do they store items?

Vertical Lift Modules



Vertical Lift Modules (VLM) consist of two columns of trays with a mechanical inserter/extractor positioned in the center. The inserter/extractor travels up and down between the stored trays, automatically locating and retrieving them as needed – similar to an elevator with doors that open on both the front and rear.

Vertical Carousel Modules



Vertical Carousel Modules (VCM) are built with 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.

How do they measure up?

Footprints

Both technologies span roughly the same range of widths, not much of a differentiator. When it comes to depths, VLMs can be about twice as deep as VCMs – giving VCMs an overall narrower footprint.

A standard VLM unit is roughly 1.6 to 4.4 m wide by 2.3 to 3 m deep. Standard trays that store inventory range from 1.3 m to just over 4 m wide by 0.6 to 0.9 m deep, with a maximum product height of just over 0.72 m. (Ergonomics: You don't want the trays to be too deep or the operator won't be able to reach items with minimal effort.)

In comparison, standard VCMs range from 1.9 m to 3.9 m wide by 1.3 to just over 1.5 m deep. Designed for smaller product sizes, the carriers that store the inventory measure from 1.3 to almost 3.3 m wide by 0.43 to 0.63 m deep, with a product height up to 0.56 m.



The VLM maximizes density in the smallest footprint.

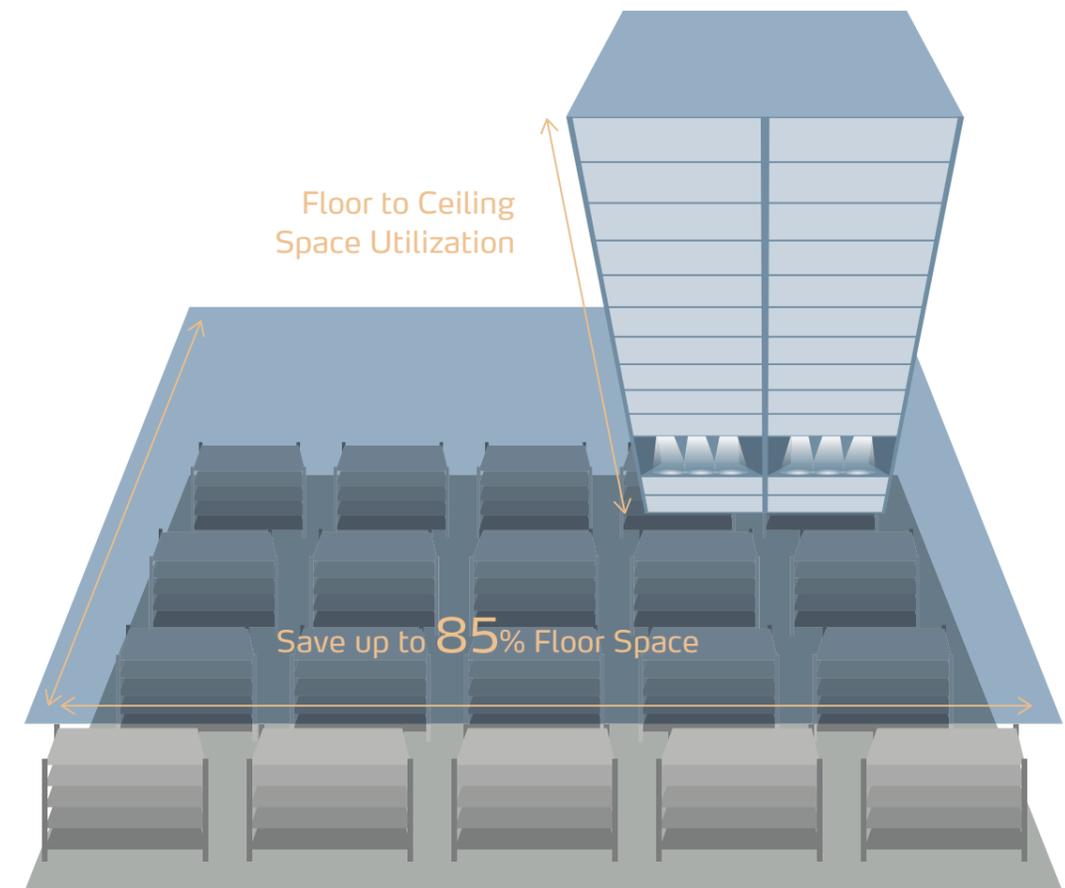
Height

VLMs start at 2.6 m tall and can be installed up to 30 m high. In contrast, VCMs start a little shorter, at just over 2.2 m and can reach up to 10 m tall.

Although both machines can reach straight up to your ceiling, it doesn't mean they always should. Often, the taller the machine, the slower the throughput. It's really up to you to determine the machine height which gives you the perfect mix of space savings and throughput. There are plenty of experts in the material handling field who can help you figure out the throughput rates of different-sized machines.



To determine the perfect height, find the best mix of space savings and throughput.



Load capacities

VCMs can handle up to 650 kg per carrier. VLMs can be outfitted with trays that handle up to 1,000 kg each. For applications with heavier loads, lift-assist equipment can be added to a VLM as well. This is a major difference between the two machines: VCMs are difficult to fit with ergonomic lifts and cranes – so if it's heavy loads you're looking to store, the VLM is probably the choice for you.



VLMs can manage heavier loads by integrating ergonomic lifts and cranes.



How fast are they?

Throughput rates in VLMs and VCMs are application dependent. Depending on an individual machine's configuration (mostly unit height), customer's order profile (single line vs. multi), single order or batch picking, etc. both units can perform at very similar throughput rates. VLMs can deliver throughput up to 350 items per hour while VCMs can reach up to 400 items per hour.

To reach those top throughput speeds, both types of machines need to be outfitted with light-directed picking technologies, such as pick-to-light. Located within the access window, these devices illuminate to show the operator where within the tray or carrier the required item is stored to eliminate search time.

Also, to achieve high throughput rates, regardless of how your VLM or VCM is configured, slotting is critical. Although the slotting process typically doesn't rank high on a warehouse manager's list of favorite things to do, committing to regularly reviewing inventory data – such as seasonality, how often an item is picked and replenished, which items are commonly picked together, and so on – then figuring out the most appropriate place to store each item in the machine goes a long way toward achieving maximum throughput. If it's throughput you're after, you might as well embrace slotting from the start.

A properly slotted machine will keep the most frequently picked (and co-picked) items stored together on the same tray or carrier. The more picks an operator can make on a level before the unit moves to the next level with picks (less travel time), the faster the picking. In a VLM, the items with the highest pick frequency are stored closest to the access window so the inserter/extractor doesn't have far to travel to retrieve them. In a VCM, the carriers with the highest pick frequencies are adjacent (or at least a carrier or two away) so the drive chain only travels a short distance most of the time.

For even more, learn more about cross picking to speed throughput beyond standard batch picking applications.

Which is best for you?

Now that you've learned about the physical differences between Vertical Lift Modules and Vertical Carousel Modules, it's time to figure out which one is right for your operations.

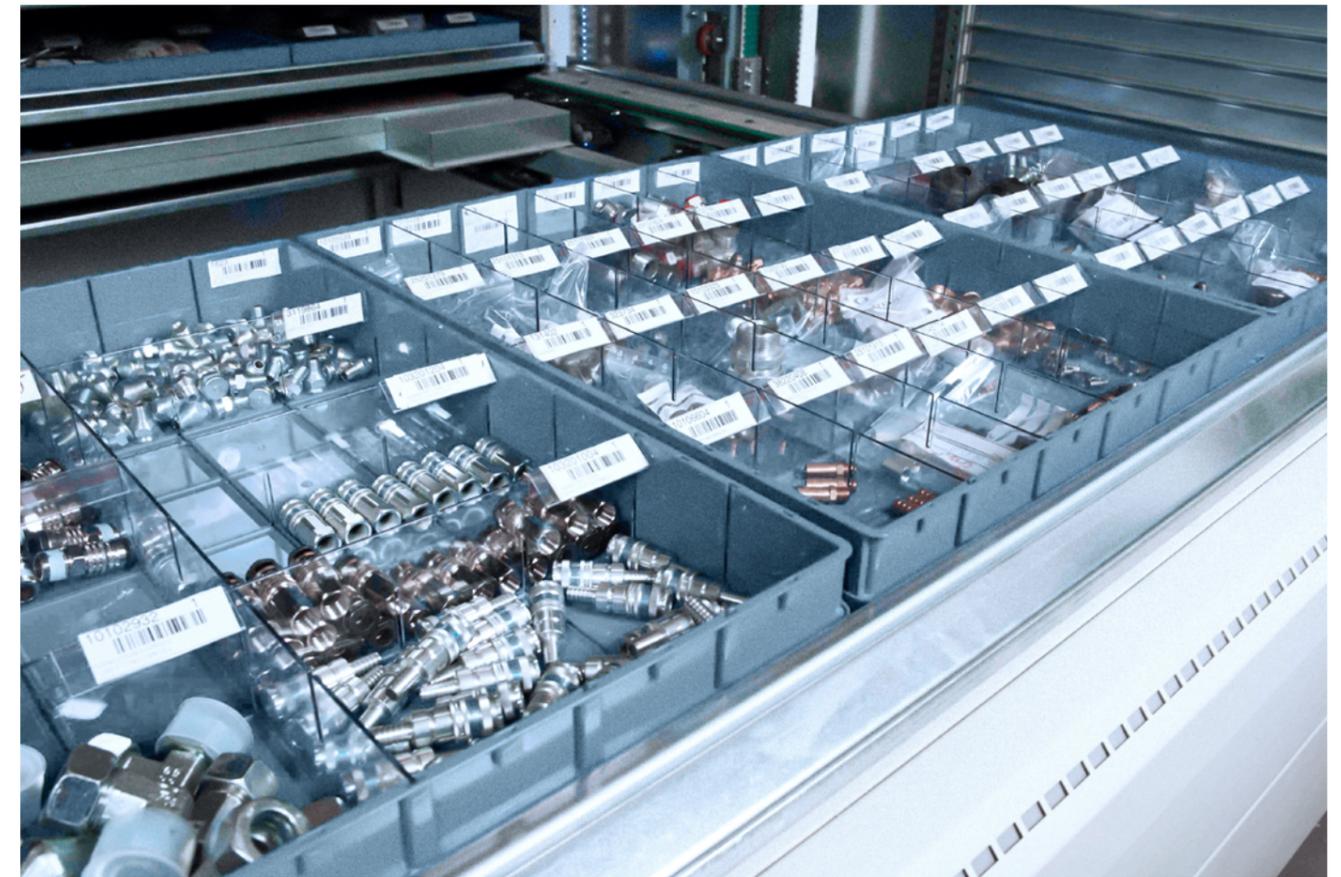
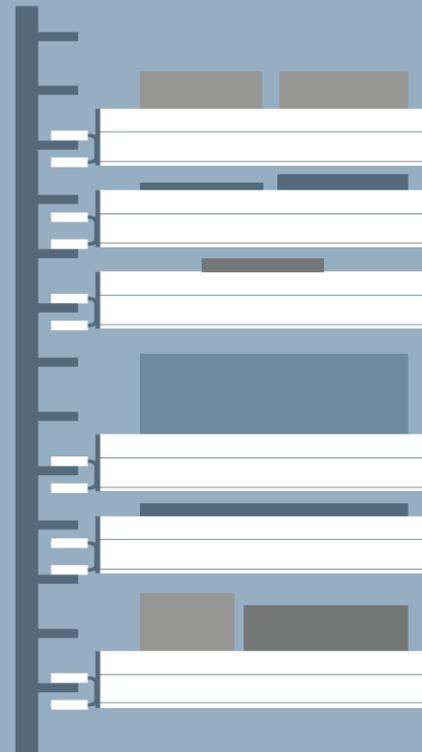
Let's talk about product mix

The size and weight of the items you plan to store in the machine – and how frequently your product mix changes – are the key deciding factors when picking between a VLM and a VCM. This is because each system stores items differently.

More sophisticated than VCMs, VLMs use a height sensor that measures how tall the items placed in each storage tray are every time it's put away. Integrated software crunches those numbers, then directs the VLM to store the trays dynamically – as close as 25 mm apart – to maximize storage density.

VLM tray spacing allows dynamic storage

For example, if the tallest item you place on a tray measures 15 cm tall, the VLM will store it in a 17.5 cm space inside the machine. If that product is picked and the next tallest product remaining in the tray measures 9 cm tall, the VLM will automatically place the tray in a 11.5 cm tall location. The machine prioritizes compressed storage to give you the highest storage density possible.



Vertical Lift Module and VLM Boxes



Vertical Carousel Module



Similar sized product mix

In VCMs, the carriers are spaced evenly in fixed positions. The shelf levels within the carrier can be adjusted up or down to compress the vertical space – but not automatically. Adjustment is manual. Nobody wants to pay to inventory air, so it's critical to know the heights of your stored items when specifying the machine in order to have the shelves as close together as possible.

This makes VCMs an ideal choice to store products that are similar in height (usually under 20 cm, and whose sizes do not often change). Every carrier in a VCM can be subdivided further (both vertically and horizontally) to maximize storage density. In fact, they are frequently divided into two or three shelves to separate items for slotting and organization.

Adjusting those dividers – while possible to do – is a tedious task which requires all the product to be removed first, then the dividers unbolted, moved and re-attached in a new position. If inventory changes frequently enough that a new carrier configuration is required often, a lot of labor hours will be spent maximizing the machine's storage density. That's why VCMs are a great choice if your product mix is pretty consistent in size.



VCMs contain evenly spaced carriers which can be subdivided for maximum storage density.



VCMs are ideal for storing products of similar size.

Which one do you need?

VLMs and VCMs are ideal for different applications because of their construction, operation and product handling differences. When you're deciding which system is right for you, keep the following in mind...



Vertical Lift Modules

work best in situations with:

- ✓ Ceiling heights up to 30 m
- ✓ Highly variable sizes and weights of stored parts
- ✓ Frequently changing inventory mix



Vertical Carousel Modules

work best in situations with:

- ✓ Ceiling heights under 7.5 m
- ✓ Stored parts sharing relatively similar dimensions
- ✓ Items that can be hand-picked without lift assistance



Contact a specialist