Buyer's Guide

E-Commerce ASRS Solutions

kardexremstar

E-commerce

Challenges & solutions

E-commerce has been on the rise for the past decade and with the recent impact of a global pandemic, online shopping won't be slowing down anytime soon. Focused on improving order accuracy, speeding up order fulfillment and overcoming labor challenges, e-commerce businesses face many difficulties when trying to meet customers' needs and demands.

In order to be successful, an e-commerce warehouse needs to fulfill more orders faster, maintain or even improve order delivery times all while following social distancing guidelines. It seems like an impossible task in a traditional warehouse. However, by implementing automated storage and retrieval systems (ASRS) integrated with pick-to-light technology and inventory management software, e-commerce companies will see improved efficiencies with a ROI of 18 months or less.

ASRS can manage different work zones all under one roof. From order fulfillment to returns management, ASRS can be a good fit for several applications. In this guide, we will review the types of ASRS available and their impact on warehouse operations.

- Increase throughput
- Reduce labor
- Maximize floor space

Automated storage and retrieval systems

Vertical Lift Module

A Vertical Lift Module (VLM) consists of two columns of trays with an automated 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 which open on both the front and the rear.

Vertical Buffer Module

A Vertical Buffer Module (VBM) contains an aisle in the middle of a multi-segment shelving system, where a moveable mast with a telescopic gripper operates. The unit controller sets the gripper in motion picking up a discrete bin/tote and transporting it to a picking station.

Horizontal Carousel Module

A Horizontal Carousel Module (HCM) 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.

How do they measure up?

Footprints

The picking station, also known as the turntable, on the front of a VBM is 5.8 ft wide whereas the unit reaches a width of 8 ft m as standard. These units only handle two tote/bin sizes, 600 × 400 mm or 640 × 440 mm. The VBM can span up to 34 ft long.

In comparison, a standard VLM unit is roughly 5 to 15 ft wide by 7 to 10 ft deep. Standard trays storing the inventory range from 4 ft to just over 13 ft wide by 2 to 3 ft deep, with a maximum product height of just over 2.3 ft. (Ergonomics: You don't want the trays to be too deep or the operators won't be able to reach the items with minimal effort.)

The HCM ranges from 6 to 7 ft wide by 19 to 159 ft long. Accessed on the width dimension, HCMs are narrow and long.

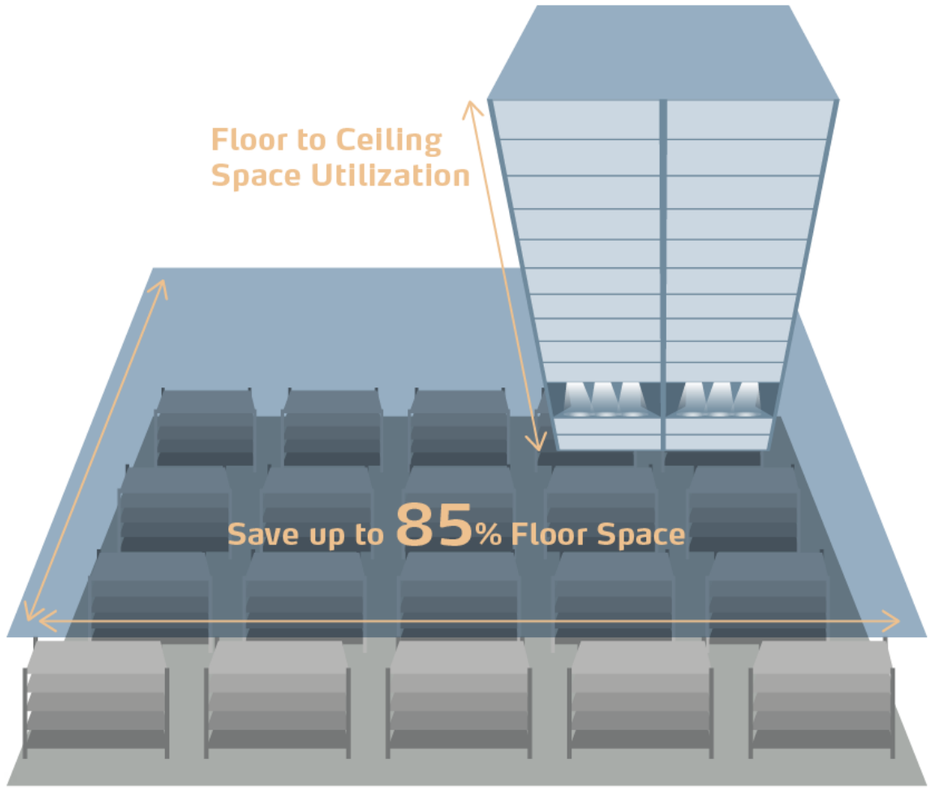
Height

VBMs have a maximum ceiling height of 39 ft, allowing most organizations to take advantage of their full ceiling height. The typical VBM is longer than it is tall, giving it a more rectangular shape.

On the other hand, VLMs are built to take advantage of the vertical height in a facility. They start at 8 ft tall but can reach up to 98 ft. However, the average height of a VLM is between 35 to 45 ft tall. The machine height should be determined by your available ceiling height as well as storage and throughput requirements.

HCMs start at just over 7 ft but have a maximum height of 13.5 ft. While they are indeed a good option for areas with ceiling heights under 15 ft, they can be double (or triple) stacked for higher ceilings.

All three of these ASRS products save space by design, making them a good fit for e-commerce fulfillment operations that are tight on floor space. Exactly how much space can be recovered depends on your existing storage system and the available ceiling height in your facility, but generally these ASRS systems save 60 – 85% floor space with the VLM providing the best storage density per cubic meter.



Load capacities

The VBM can handle 77 lbs per tote. Therefore, if you're looking to store heavy loads, the VLM or a HCM is going to be the better choice for you.

VLMs can be outfitted with trays that handle up to 2,200 lbs each. For applications with heavier loads, lift-assist equipment can be added to a VLM. HCMs can handle up to 2,000 lbs per carrier.

How fast are they?

In e-commerce, speed matters. These technologies deliver items directly to the operator for picking – either from the turntable of the VBM, from a tray presented in the access opening of the VLM or a carrier positioned at an ergonomic access point of the HCM. While the operator picks an item, the next pick is being cued. This eliminates operator dwell time, increasing throughput for fast paced operations.

To maximize picking speeds, each of these technologies can be used in pods or workstations. The center point between each VBM pick station is 8 ft. Using three VBMs in a pod, the pick area is 16 ft. Whereas three VLMs next to one another creates a 30 ft pick area. The access points are a shorter distance in a pod of VBMs, reducing walk time between pick locations.

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 5 or 6 ft.

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.

While VLMs can provide higher storage density, your search time can be greater than the tote-based VBM or the HCM. Even using pick-to-light, searching a VLM tray or HCM carrier will take longer than a single SKU delivered by a VBM. Although a VLM can reach straight up to your ceiling, it sacrifices delivery speed when it does. The taller the VLM, the more time it takes to retrieve a tray for picking.

To reach top throughput speeds, outfit ASRS with light-directed picking technologies, and work in a pod utilizing a batch picking strategy.

Product handling & transportation

Product handling can be managed in a variety of ways. These machines can be operated by a person in a straightforward, semi-automated way where the operator interacts with the storage unit. An operator takes products out of the unit via the access opening or turntable and distributes the items into order totes or onto a conveyor manually.

Automated product handling by integrating robots is also possible. With this automated integration, a robotic arm picks items out of the tray, carrier, shelf or tote and distributes them accordingly.

For more advanced automated product handling, the VBM can be equipped with automatic conveyor connections as standard. This means totes can flow in and out of the unit automatically with no human intervention. VBMs are ideal in both order consolidation and order fulfillment operations. Totes can enter the unit automatically, stay in the VBM as buffer storage until the order is complete and leave automatically on the conveyor to the consolidation area. Totes can also flow out of the VBM from pick station to pick station, completely unmanned, increasing throughput.

Kardex Color Pick System

The Kardex Color Pick System pick-to-light technology can be easily added to an existing system to achieve higher throughput. The Kardex Color Pick System process is based on filling batches of orders – also known as batch picking. Several orders are combined into a batch and simultaneously processed. The unique Kardex Color Pick System concept adds colored lights into the batch picking process allowing multiple operators to pick from dynamic work zones, filling multiple batches of orders at a time to achieve higher throughput.

Each worker is assigned a cart with a fixed color (e.g. red, green, yellow) and follows the assigned color through the work zone to complete the picking process. The color is an easy way to direct the operator to the correct pick location and matching batch cart, reducing the time needed to search for parts and therefore increasing overall throughput.

Product mix

The size and weight of the items you plan to store will often determine the machine which is best for you.

The VBM handles two standard totes, 600 × 400 mm and 640 × 440 mm, and they can't be used interchangeably within the same unit. Unlike the VLM and HCM, which can manage variable product sizes (height, length, width) within a tray or carrier, the VBM can only handle items sized to fit within the standard tote sizes.

VLMs handle various sized products in a compact footprint. A height sensor located at the back of the access opening measures the height of stored items every time the tray is put away. Integrated software crunches those numbers, then directs the VLM to store the trays dynamically –to maximize storage density. As your product mix changes, the VLM automatically adjusts the storage location, always providing the highest storage density possible.

HCMs can easily adjust to a changing product mix. The carrier shelving can be added or moved to accommodate variable sized products. Carriers can be divided using intermediate shelving to create custom storage locations. Totes, containers and boxes can be used to organize stored items.

VBMs accommodate products that fit within totes 600 × 400 mm or 640 × 440 mm.

VLM trays range from 4 ft to just over 13 ft wide by 2 to 3 ft deep and accommodate items up to 28 inches high.

HCM carriers can be approx. 24.5, 32.5 or 37 inches wide by 18, 22 or 24 inches deep. The height ranges from 6 ft to 12 ft.

E-commerce applications

Order fulfillment

With demand for faster order deliveries at an all-time high, e-commerce operations need to focus on improving fulfillment processes to exceed customer expectations without adding labor costs.

Implementing ASRS to support order fulfillment can increase productivity with less labor and occupy less floor space. The VBM, VLM or HCM are great solutions for e-commerce businesses due to their compact footprint and high throughput rates. These systems can save up to 85% floor space and in some cases, achieve up to 600 order lines per hour. Additionally, when integrated with pick-to-light technology, order accuracy can be increased up to 99.9% almost eliminating picking errors.

Learn more about automated order fulfillment.

Order consolidation

If an e-commerce warehouse uses parallel or wave picking strategies, an order consolidation zone is required for combining orders before shipping. Utilizing ASRS as buffer storage at consolidation can improve order processing time.

With a VBM, automatic conveyor can induct totes into the consolidation buffer without any human interaction. Once orders are complete and ready to be consolidated, a worker can request the totes to be delivered either to a turntable or via an automatic conveyor to a remote consolidation station. This allows for the flow of goods to be continuous, queuing up multiple orders to be consolidated at once, without slowing down the process.

Learn more about order consolidation with ASRS.

Returns management

The returns process at an e-commerce operation can put a tremendous strain on available space and labor, but also the associated returns handling costs can be staggering. Using ASRS provides a predictable, repeatable process to handle the complex reverse logistics returns require. A combination of software, put walls and Kardex Horizontal Carousels can be utilized to store items by dispensation category. This allows for faster returns processing and increased customer satisfaction.

Learn more about automating returns management.

Which one do you need?

E-commerce business continues to rise, and consumers will continue to turn to online shopping. Automating an e-commerce warehouse with a combination of VBMs, VLMs or HCMs with pick-to-light technology and inventory management software can improve order fulfillment processes, keeping customers satisfied and coming back for future purchases.

Benefits at a glance

- Recover up to 85% floor space
- Increase accuracy up to 99.9%
- Reduce labor requirements by 2/3
- Improve worker ergonomics

Contact a specialist