swisslog

MOBILIZING INVENTORY AND INCREASING FLEXIBILITY THROUGH CONTAINER-BASED AUTOMATION SOLUTIONS

TABLE OF CONTENTS

BRINGING FULFILLMENT CLOSER TO THE CUSTOMER WITH INCREASED SUPPLY-CHAIN AGILITY

The explosive growth in e-commerce and omni-channel distribution has increased supply chain volatility and customer expectations, straining existing resources and forcing supply chain managers to re-think traditional distribution strategies.

Swisslog offers a range of automated solutions based on the future-ready principles of *data-driven*, *flexible* and *robotic* to help warehouse operators improve inventory management, reduce order cycle and delivery times and increase productivity.

However, simply optimizing operations within the warehouse will no longer be enough to meet the demands of the future. It is becoming increasingly necessary to move storage and fulfillment closer to customers while maintaining the agility to quickly relocate those functions as market demand shifts or supply chain needs change. Typically, this has meant falling back on manually run operations since traditional automation cannot provide this flexibility. But now, new approaches are emerging that make automated and flexible solutions a reality.

It is becoming increasingly necessary to move storage and fulfillment closer to customers while maintaining the agility to quickly relocate those functions as market demand shifts or supply chain needs change.

Specifically, Swisslog is building on the principles of the future-ready warehouse to develop a family of compact, movable material handling modules that can be quickly and easily deployed to almost any location; work together to support a range of functions including storage, item picking, carton handling, customer pickup and last-mile delivery; and can be scaled or even moved to a new location whenever required.

The building block for this solution, called QTainer, is the standard shipping container. These durable and versatile structures have been used for a range of purposes outside shipping, from temporary school buildings to pop-up cafés to permanent homes and offices.

When integrated with powerful Swisslog material handling technology, and controlled by the Swisslog SynQ WMS, these standardized container-based solutions bring greater flexibility to network design, provide the ability to dynamically manage inventory and allow fulfillment services to be positioned in close proximity to customers.

This paper presents an overview of the Swisslog QTainer modular solution and describes how the solution can be deployed to create pop-up urban distribution centers that address the volume growth, inventory placement and delivery-speed challenges associated with meeting demand in urban areas.

THE SWISSLOG QTAINER SOLUTION

Through the development of QTainer, Swisslog will integrate proven automation in a variety of flexible configurations to address many of the challenges the industry is now facing. All QTainer modules will be designed to be interoperable, allowing plug-and-play connectivity, and will be cloud-connected to SynQ software to control material flow across multiple locations. Modules will automatically detect and recognize how they are connected for easy configuration and self-learning software within SynQ will automatically optimize storage and routing between modules.

While a wide range of module configurations is possible, Swisslog is developing the following standard QTainer configurations to support the early adopters of container-based material handling modules.

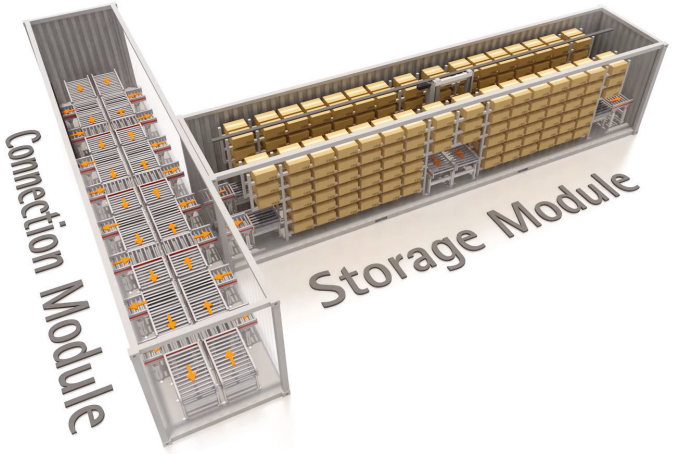
Storage Module

The QTainer inventory storage module integrates a compact version of the proven Swisslog mini-load crane into the module to create an automated and mobile storage system capable of handling a wide range of bins and cartons. It has the capacity to store 300 units and move 200 bins or cartons per hour.

Standardized conveyor interfaces are available at the front and back of the module to allow the storage container to connect with other QTainer modules in almost any configuration. The modules can also be stacked on top of each other to enable multi-story storage.

Connection Module

The connection module is a versatile component of the system that includes standardized conveyor connections at the front, back and sides, as well as the ability to support elevators for vertical connectivity, enabling virtually unlimited system configurations. The connection module supports speeds of up to 1,600 movements per hour.



THE SWISSLOG QTAINER SOLUTION

Item-Picking Module

The QTainer item-picking module leverages recent advances in robotic item picking to create a stand-alone or connected module that supports product picking from bin-to-bin or bin-to-carton, unlocking a host of applications for containerized material handling modules.

Two Swisslog ItemPiQ robot cells can be used within each module. Each ItemPiQ cell can achieve speeds of up to 1,000 picks per hour and feature improved product recognition, multiple gripping modes that adapt to product size and shape, and cloud-based machine-learning that continually improves pick accuracy and gripper performance.

Standardized connections are available at the front and back of the item-picking module to enable connectivity with other QTainer modules.

> Each ItemPiQ cell can achieve speeds of up to 1,000 picks per hour.

Carton-Handling Module

For applications that require carton erecting or closing, the QTainer solution includes an automated carton-handling module to address these functions.

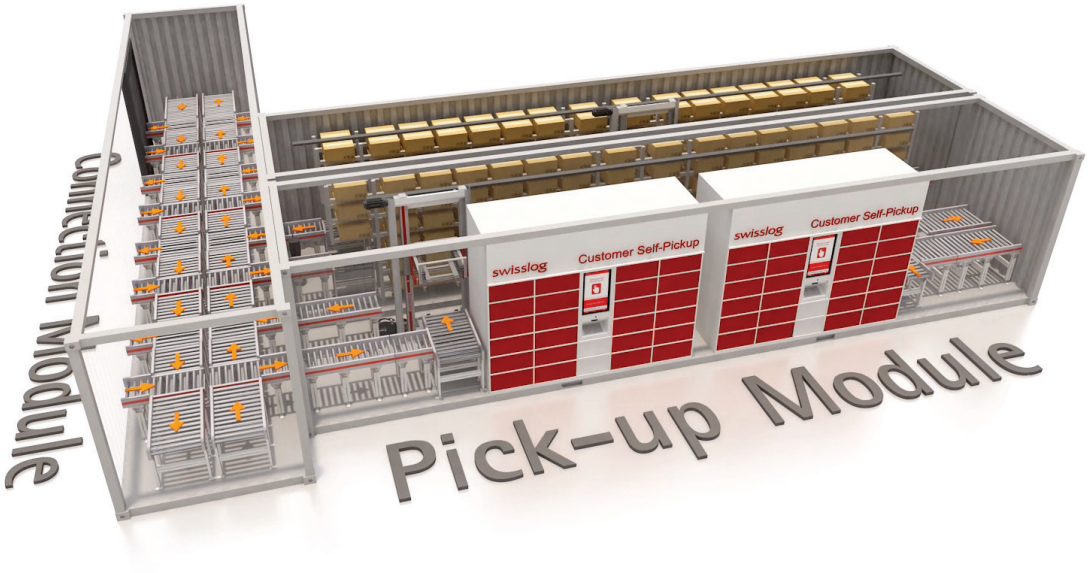
As with the item-picking module, standard conveyor connections are available at the front and back to enable plug-and-play connectivity with other modules in the product family.

Last-Mile Delivery Modules

Last-mile delivery remains one of the key challenges facing material handling operators, particularly in congested urban areas, and containerized solutions provide a cost-effective, flexible solution for enabling customer pickup or establishing local, last-mile delivery hubs.

For consumer parcel pick-up, the outside wall of the module will have multiple pick-up points. Consumers access products by entering a code they receive when ordering. Automatic filling of the pick-up boxes is accomplished through the same mini-load crane used in the storage module and is triggered by IoT technology that tells the system when a consumer is arriving to collect a parcel.

Delivery van modules can be configured to automatically pre-sort parcels into delivery routes and sequence orders using mini-load cranes and flow-racks. The module features loading doors at the side for drivers to collect the parcels for their routes.

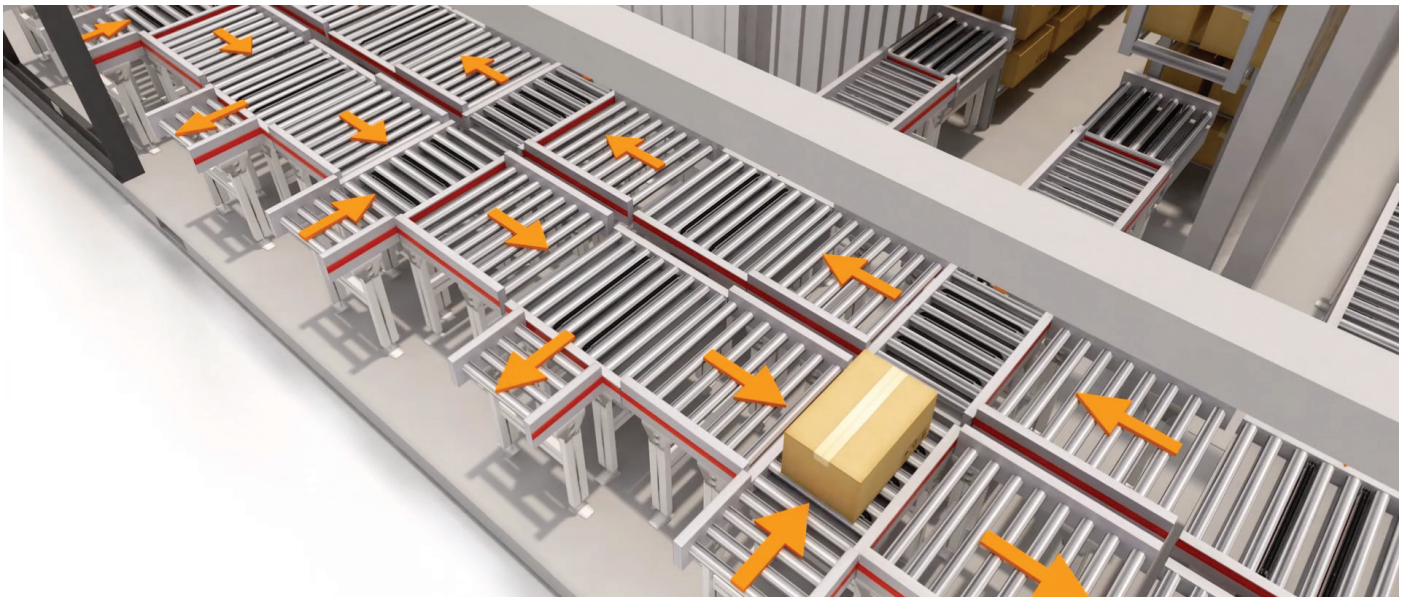


THE POP-UP URBAN DISTRIBUTION CENTER

While the QTainer solution addresses a variety of supply chain challenges, one of the drivers behind the development of this innovative system was the need to expand distribution into urban areas to support faster delivery and enable more efficient omni-channel distribution.

The weather-proof QTainer modules can be deployed on any paved surface, such as a store parking lot, and can help retailers meet peak demands with additional inventory while also alleviating labor challenges by automating services such as item picking and carton handling.

Because of the plug-and-play connectivity of the QTainer modules, they support pop-up distribution centers as simple as a single storage module to supplement in-store inventory and reduce the need for expensive "milk run" replenishments. Or as sophisticated as multiple storage, item-picking and carton-handling modules configured to create a complete pop-up warehouse in an underused parking lot.



WAREHOUSE CAPACITY ON DEMAND

The combination of standardization, modularity and portability allows container-based solutions such as QTainer to enable new business models. These solutions make it practical and cost-effective to lease or rent modules as required to meet short-term peaks or facilitate entry into new markets. This will enable both greater agility in responding to shifts in business strategy or market dynamics while maintaining a high degree of financial flexibility.

THE FUTURE OF CONTAINERIZED MATERIAL HANDLING MODULES

Containers were invented to simplify supply chain processes. Meanwhile, container-based solutions have been applied in a number of different industries to speed deployment and increase standardization. Now, the circle is closing: When configured with the appropriate technology, containers are now ready to help the supply chain industry adapt to the changes being driven by e-commerce and omni-channel distribution.

Swisslog plans to integrate proven material handing technology into containers to bring greater agility and flexibility to inventory management and fulfillment.

The initial solutions in the QTainer family can be configured to support a range of warehouse functions and can be interconnected to provide a practical, cost-effective solution to moving inventory and fulfillment closer to customers in urban areas.

As the technology continues to evolve, modules will be designed to enable them to be moved with goods stored inside, mobilizing inventory in a way that creates a host of new opportunities. Fully stocked modules could be shipped by truck or rail from a central distribution center for store replenishment. Or, several modules could meet each other at any parking space to cross-dock goods from one module to the other with each then continuing to its next destination.

QTainer modules will be also be easily adapted to new last mile delivery methods, such as drone delivery or other forms of autonomous delivery.

Container-based material handling solutions have the potential to bring increased agility and flexibility to the entire supply chain and Swisslog is leading the way in bringing this exciting solution to market.

QTainer is now in the early phases of development and is approaching the prototype phase. To ensure the final solution meets the needs of the market we invite interested customers to participate in the development process. To learn more, contact Swisslog at info@swisslog.com

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