



CROSS-DOCKING AT VARIABLE SPEEDS FOR JCPenney

Leading retailer JCPenney operates over 1,000 department stores throughout the US and Puerto Rico, as well as one of the largest apparel and home furnishing sites on the Internet, and the nation's largest general merchandise catalogue business. They are supported by one of the most integrated distribution networks in the US.

JCPenney's Retail Logistics Center (RLC) at Lathrop, California represents state-of-the-art in package conveying.

The RLC, which is essentially a cross-dock facility for imported goods, is equipped with a host of smart conveying systems to transport up to 200,000 cases per day and sort them at 99.9% accuracy.

Smart Dematic technologies include high rate merge, single line high rate carton gapper, sliding shoe sorter with parallel diverting, linear induction motors, modular variable-speed functionality, and single-point system control.

"JCPenney had two criteria for the Lathrop DC," said Dematic's Mike Harding. "One, high throughput, capable of handling at least 150,000 – 200,000 cartons per day over two shifts; and two, automatic speed control to adjust sorter speed to actual volume," he said.

Dematic Integrated Sortation Sub-System®

The DC is JCPenney's first to utilize a sortation technology called Integrated Sortation Sub-System® (ISS), developed by Dematic.

ISS approaches the entire sortation sub-system as a singular unit, fully integrated with a single

point of control, permitting the flexibility for all sections of the system to run at independent, variable speeds to optimize component throughput requirements and maximize operational and energy efficiencies.

From the moment the ASN's (Advanced Shipping Notice) are received and containers or trucks arrive at one of the 17 receiving docks JCPenney knows exactly what is coming in.

The high-tech automation, from receiving to shipping and everywhere in between, means a typical case only spends six minutes in the DC and is only touched twice (unloading at receipt and loading at shipping) in the process, before it is on its way to one of the company's regional Store Support Centers (SSCs). Once received at the SSCs, they cross-dock the merchandise and ship it out to 1000+ JCPenney retail stores.

Important addition to supply chain network

Lathrop's primary function is to receive and sort imported merchandise for routing to JCPenney's SSCs. 90% of merchandise received at the RLC is from overseas in containers. The remaining 10% from local suppliers is merged in with the container merchandise at the RLC's receiving docks.

Prior to Lathrop being built, JCPenney received

JCPenney
CALIFORNIA, USA



The sorter automatically adjusts speed to accommodate actual throughput rates.



all West Coast container shipments at its Buena Park RLC in Southern California, through the Port of Long Beach. Increasingly, more merchandise was being received from overseas and through the Buena Park facility, stretching the limits of the DC.

JCPenney in Lathrop, CA, now allows routing of inbound goods through the Port of Oakland. The added capacity of the DC, and the port diversification, has helped reduce transportation time for direct imports and mitigate potential risks.

Dematic conveyor system operational features


“We have automatic variable speed control on the whole sorting sub-system,” said Tim Wood, Manager of Logistics Facilities Engineering, JCPenney.

“It automatically adjusts sorter speed to accommodate actual rates. Or, we can dial in whatever speed we want. If we know it is a slow day we will run the conveyors at 300 feet per minute. If it is a heavy day we can run them at 550 feet per minute.”

“This helps save electricity and it really helps save on the wear and tear of equipment.”

- **Power loaders** – Power loaders unload containers and trucks, with each carton immediately assigned to a specific store and given a UPC code while it is still on the conveyor.





Dematic's FlexGap induction system closes the gaps between cartons, significantly improving conveyor sorting efficiency.

- **Pre-merge accumulation** – It is possible that hundreds of cartons from a container could be destined for a specific store. A conventional merge handling this volume of cartons to the same store would have caused throughput issues on the sorter. To overcome this, Dematic designed a zipper merge so that cartons for the same store don't enter the sortation subsystem in a continuous line. The zipper merge shuffles the deck, so to speak, so the chance of having a high number of cartons going to the same location in a continuous line is reduced.
- **Precision gapping** – The cartons exiting the main merge are moving at 45 CPM. But after the main merge, everything needs to run at sorter speed, which is 238-plus CPM. The answer is Dematic's FlexGap™ induction system which closes the gaps between cartons. Because the packages are closer together, the sorter can run at a slower speed, yet handle the same volume of packages that another sorter would handle having to run at least 20% faster. Consequently, Lathrop's sorter can process the same number of cartons at 540 feet per minute (FPM) compared to the industry standard of 650 FPM.
- **Parallel Divert Sortation with Linear Induction Motors** – A unique feature of the Dematic FlexSort SL sorter is its use of linear induction motors (LIM). These electro-magnetic drives use a magnetic field to move the aluminum

slats of the sorter without mechanical contact – there is an air gap between the electromagnets and the slats. The LIM drive-units are mounted and centered on cross member supports, are evenly spaced along the sorter track, and propel the sorter slats without any moving parts. The sorter has no belts, drive chains, gears or sprockets, no air lines or compressors requiring maintenance, no filters to clean, and no oiling.

“One of the big features for us is the linear induction motors,” explained Mr Wood.

“The sorter utilizes multiple linear induction drive motors for redundancy. It is engineered such that the sorter will still operate if a motor is off line. With our other sorters, if a motor or gearbox drops, our whole sorter is down until we get it fixed.”

The sortation subsystem is controlled by the Dematic FlexSort PC controller, which handles all inductions, tracking and diverting, with a web-based graphic monitoring system simplifying operational control and management.