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Gardner Denver:

## Twice the work, half the time

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Jack Bockman, supply chain  
manager at Gardner Denver

A man in a striped shirt stands in a warehouse, leaning on a horizontal carousel system. The carousel consists of a large metal frame with many small, empty compartments. In the foreground, there are several large, cylindrical metal pipes. The lighting is warm and industrial.

# Twice the work, half the time

Industrial manufacturer Gardner Denver enjoyed a 100% increase in picking productivity and a 50% reduction in labor hours by combining new and aftermarket business in a horizontal carousel system.

By Bob Trebilcock, Editor at Large

**K**EEPING TRACK OF 13,000 SKUs (STOCK KEEPING UNITS) is no small matter for any manufacturer that aims to keep the production lines running without a hiccup.

Combine that challenge with a full-scale aftermarket fulfillment operation that has an additional 80,000 active SKUs, and you understand the challenge faced by Gardner Denver, a leading worldwide manufacturer of compressors, pumps and blowers for industrial and transportation applications.

In the fall of 2005, Gardner Denver closed an aftermarket parts distribution center in Memphis and integrated most of that activity into the assembly parts warehouse at two of its plants, including a 345,000 square foot facility in Sedalia, Mo. The company pulled off the transition in a tight timeframe and without missing a logistics beat.

The facility works because of an automated picking and storage system featuring five horizontal carousel pods with two carousels each (Remstar International, 800-639-5805, www.remstar.com), and an automation control system integrated with the facility's warehouse management system (WMS). Combined with a conveyor and sortation system, the facility manages picking to meet manufacturing line production requirements while at the same time meeting stringent customer service requirements for the outbound shipments of aftermarket parts.

Simultaneously managing those two processes simply could not have been done without additional automation, says Jack Bockman, supply chain manager at the Sedalia facility. "The carousels allowed us to take a somewhat slow process that was adequate for our manufacturing needs and speed it up considerably to meet new customer service requirements."

**Carousels enable Gardner Denver to feed the production line and fill aftermarket parts orders at the same time, says Jack Bockman, supply chain manager.**

As an additional benefit, the system delivered a 100% increase in picking productivity with a 50% reduction in labor hours.

#### **A history of service**

With headquarters in Quincy, Ill., a nearly 150-year history, and more than \$1.7 billion in revenues, Gardner Denver has a tremendous installed base of equipment in manufacturing plants around the world.

To service those plants, the company had maintained a dedicated parts distribution warehouse in Memphis. Parts manufactured in Gardner Denver's plants, including Sedalia, were shipped to Memphis where they were stored and shipped out to customers.

After assessing its manufacturing and aftermarket parts needs, Gardner Denver realized sizable benefits could result from combining its aftermarket parts fulfillment operations with its production warehousing at two of the manufacturing facilities.

The biggest benefit: Eliminating redundant inventory. For instance, instead of maintaining duplicate sets of 60,000 SKUs in inventory in Sedalia, it could have just one set of SKUs for the plant.

Since the manufacturer was already familiar with automated picking carousels in Memphis, Gardner Denver decided to use that technology to integrate the two processes in Sedalia.

"In Memphis, we were a pure distribution system," explains Bockman. "Here in Sedalia, however, most of the inventory was stored manually. That was adequate for meeting the requirements of the production line, but it would not work in an aftermarket's distribution environment where orders entered today are packed and shipped within 24 hours."

In addition, the transition needed to be com-



The carousel system consists of 10 carousels and manages an inventory of 60,000 SKUs.

pleted quickly with planning, installation and the go-live all taking place within five months.

### Mixed-use picking for 60,000 SKUs

The picking systems needed to serve two purposes: distribution of spare parts to customers, and assembly of pick kits to feed the manufacturing floor.

To build a compressor or blower in the redesigned facility:

- an order goes into the carousel,
- it gets picked and put into a tote, and
- the tote is conveyed to a workstation on the production line where the components are assembled into a product.

For the aftermarket business:

- the parts get picked,
- they get put into a tote, and
- the parts are conveyed on a different line out to shipping.

Essentially, the same process of filling an order takes place for both businesses, except the parts go down separate conveying spurs to different end points.

Coordinating those two separate functions required a highly workable solution incorporating both needs into a common picking system.

The picking infrastructure consists

of 10 carousels supported by a double-tiered mezzanine—five carousels above and five below.

Carousel sizes range from 60 to 80 feet long and can adjust for space requirements. Each carousel is designed to be flexible with two, three or five picking pods, which adjust to accommodate activity levels.

One operator can pick from a pod of two to four carousels with just a few clicks of a button. This functionality allows an operator to actively pick from one carousel while the other carousels are pre-positioning to be picked when the operator is ready. The picking manager balances production requirements with personnel to maximize throughput efficiency.

Sedalia freed-up floor space by removing a large amount of bulk rack. This system's high-density design uses 40 to 60% less floor space and 80% less cubic space than traditional shelving.

### Pick-and-pass zone batch technology

Gardner Denver's solution combined pick-to-light and put-to-light, with pick-and-pass zone technology to maximize picking efficiency.

Together, the technologies assist picking operators with four basic functions:

- 1 picking a specific or active item,
- 2 putting an item in an active order or location,
- 3 communicating a message such as quantity and description, and
- 4 completing the task and moving on to the next.

As orders are picked, batches move from work zone to work zone, bypassing zones with no picking requirements. As batches are completed, they are routed to the next required workstation until complete and sent to shipping, or to the floor for assembly. Pick-and-pass zone batch picking is one of the most effective split-case picking methods.

"The whole system is quite automated and coordinated," Bockman says. "Parts are put in totes, which are sent around the conveyor system to different carousel locations where picking is required to fill an order. When an order has been completed, the system will



Totes are automatically delivered to operators, who are directed by pick- and put-to-light technologies.




In addition to carousels, rack storage is used for bulk storage and over-sized finished goods.

automatically consolidate those totes and then send them down a single lane for order processing.”

Underneath is a sophisticated multi-layered IT structure that integrates the put-to-light and pick-to-light systems with the carousels and conveyors. The system is controlled by the WMS, which receives its ordering information from Gardner Denver’s enterprise resource planning system.

Not only is inventory processing time improved and labor hours reduced, but the company has seen another benefit to its bottom line. With the company’s new distribution model, it no longer maintains a dedicated aftermarket warehouse with its thousands of SKUs of duplicate inventory. That change has sizably streamlined Gardner Denver’s DC operating costs.

“We simply could not have kept up with customer demand without automation,” says Bockman. 

# Faster with carousels

Gardner Denver's seamless consolidation of a manufacturing plant and an aftermarket parts DC combines higher efficiency and better service.

By Bob Trebilcock, Editor at Large

Now that Gardner Denver has consolidated order fulfillment for its aftermarket parts business in the Sedalia, Mo., manufacturing plant, the warehouse area manages deliveries to the manufacturing line and to parts customers.

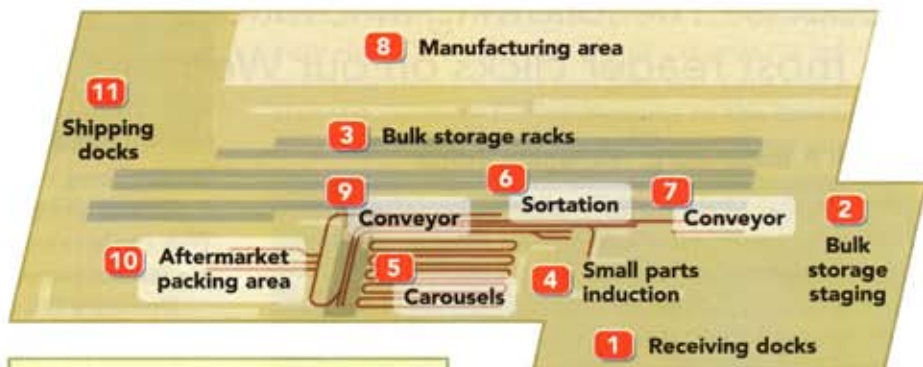
Lift trucks unload palletized deliveries at the receiving docks 1. The received product is manually entered into the inventory management system.

## Putaway

Once the inventory is keyed in, it may go to a bulk staging area 2 for inspection, or it may be putaway directly into storage. Putaway is determined by two different systems: A warehouse management system (WMS) manages the putaway of inventory in bulk storage racks 3 while an automation control system manages the putaway of inventory into the carousel system 5.

Inventory is transported to the bulk storage racks 3 by lift truck. The lift truck operator scans a bar code on the pallet and a location tag to confirm the putaway in the WMS. That inventory is now available in the system.

Inventory for the carousel is delivered to a small parts induction area 4. There, it is repackaged and relabeled for putaway. Once the repackaging is complete, the new label is scanned and the product is put into a tote, which is delivered by conveyor 6 and sorted 7 to a workstation for putaway into the carousels 5. As many as six totes can appear at a workstation at one time.



## Gardner Denver Sedalia, Mo.

**FACILITY SIZE:** 345,000 square feet

**EMPLOYEES:** 230 (3 shifts, 7 days)

**PRODUCTS HANDLED:** Industrial blowers and air compressors


When the operator scans a bar code label, the carousel turns and a put-to-light system tells the operator which bin to put the parts in. When the parts have been put away, the operator enters a "task complete" into the computer.

## Picking

Orders to be picked are downloaded three times a day. Bulk picks are picked from the bulk storage racks 3 and delivered to the manufacturing area 8 or to the aftermarket packing area 10 where the picks are consolidated with other items before shipment 11.

Order picking from the carousels begins with the delivery of a tote to one of the workstations. The automation control system directs picking at that workstation.

Once items from that area have

been scanned and placed into a tote, it travels by conveyor 6 to the next workstation. When an order is complete, the tote is sorted 7 to the aftermarket packing area 10 to be consolidated with other parts before shipping 11, or it travels by a different conveyor 7 to a segregation area, where the items are placed on a pallet and delivered to the manufacturing area 8. 

## System suppliers

**SYSTEM INTEGRATION AND HORIZONTAL CAROUSEL SYSTEM:** Remstar International, 800-639-5805, [www.remstar.com](http://www.remstar.com)

**CONVEYOR AND SORTATION:** Intelligrated, 513-701-7300, [www.intelligrated.com](http://www.intelligrated.com)

**ERP AND WAREHOUSE MANAGEMENT SYSTEM:** SAP, 800-872-1727, [www.sap.com/usa/index.epx](http://www.sap.com/usa/index.epx)

**AUTOMATION CONTROL SYSTEM:** Innovative Automation, 858-452-2004, [www.iasoftware.com](http://www.iasoftware.com)

**MOBILE COMPUTING AND BAR CODE SCANNING:** Motorola, 866-416-8545, [www.symbol.com](http://www.symbol.com)

**LIFT TRUCKS:** Crown, 419-629-2311, [www.crown.com](http://www.crown.com)

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