

We Optimize Your Supply Chain

DEMATIC



Automated Mixed Case Palletizing

THE HIGH-PERFORMANCE SYSTEM THAT BUILDS MIXED CASE PALLETS

Dematic AMCAP® – Automated Mixed Case Palletizing

THE HIGH-PERFORMANCE SYSTEM THAT BUILDS MIXED CASE PALLETS AND ROLL CONTAINERS

CASES ASSEMBLED ON PALLET IN STRATEGIC POSITION FOR EFFICIENT STORE REPLENISHMENT.

Retailers are challenged with receiving thousands of single SKU pallets from suppliers and then re-assembling the pallets into mixed case orders for their retail stores. Traditional case pick and pallet building methods are labor intensive and often rely on manual lifting of cases, leaving workers vulnerable to injuries. Furthermore, order accuracy issues, product damage, and unstable pallets are too common in many operations.

Dematic has developed a new solution to accommodate mixed case order fulfillment called AMCAP, which stands for Automated Mixed Case Palletizing. AMCAP is a high-performance palletizing system designed to assemble pallets that are ready for easy shelf restocking at the retail store.

It combines scalability with a compact footprint and therefore enables integration into existing brownfield facilities. The scalable design allows flexible throughput variations up to several thousand cases per hour. The Dematic Multishuttle® offers multiple-deep storage, precise sequencing, and accommodates a wide range of SKUs. The Dematic iQ performance optimizing software incorporates business rules and directs the entire palletizing process.

AMCAP, as a fully automated system, enables multiple shift operation. In combination with the small footprint, it achieves the lowest cost per case and therefore a compelling return on investment. It optimizes the entire order assembly process and achieves the best floor space utilization (throughput/m²). Through automated handling and high availability, the number of required operators is reduced to a minimum, order picking accuracy is improved, and human errors are eliminated.

Solution Benefits

- Allows easy shelf restocking at retail store
- Cases on pallet correlate to store planogram
- High order accuracy
- Reduction in warehouse labor & injuries
- Compact footprint in existing space
- Less potential for product damage
- High-density pallets with lower transport costs
- Lower cost per case handled
- Accommodates various pallet sizes
- Automatic loading of roller containers
- Scalability to accommodate change & growth

AMCAP® Process steps

Layer Picking Robot

Layer-depalletizing and orientation of cases on conveyors

Sequencing Buffer

Multishuttle Module

Robotic Palletizing Cell

Mixed case palletizing on pallets and roll containers

The entire system is designed for case handling without using trays to support each case. This omits the need for dedicated equipment for tray merge, de-traying and tray buffering. Direct case handling from depalletizer to palletizer lowers the risk of accidental case damaging and saves additional cost due to footprint minimization.

A substantial reduction of transport costs is achieved by boosting outbound pallet density. Based on the case attributes and business rules, the software generates volume-optimized, stable, and store friendly pallets or roller containers. This lowers freight costs by maximizing the use of truck trailer transport space.



Mixed case pallet built by AMCAP.

Modular Sub-Systems Support Operational Flexibility

COMPACT FOOTPRINT FITS INTO EXISTING FACILITIES

Cases flow directly through each sub-system; trays are not required.

1. Layer Picking Robot

Pallets are transferred from the high-bay warehouse to an automated layer depalletizer.

Each layer is placed on a special conveyor for descrambling and further singulation, and sent directly to the Dematic Multishuttle.

The cases are oriented for optimal storage space. Damaged cases will be recognized and rejected automatically. Trays are not required to accomplish these tasks.



2. Sequencing Buffer

The Dematic Multishuttle case buffer is a high density sequencing engine that occupies a compact footprint.

The Multishuttle module receives and stores the inventory at the case level...up to four deep in the rack.

Since load handling trays are not required in the process, the conveyor network and controls are simplified.



3. Robotic Palletizing Cell

Once the system receives a palletizing order, the software directs the pallet building according to family groups, store planogram, and pallet stability.

Cases are then delivered in precise sequence from the Dematic Multishuttle directly to the RapidPal® cell. RapidPal automatically stacks cases in a roll container or on a pallet.

An integrated ring stretch wrapper stabilizes the pallet directly after palletizing for safe transportation. During the wrapping of one pallet, the next pallet is built through the use of slider plates.



4. Control Software

Dematic iQ, performance optimizing software, directs the AMCAP system processes. From pallet storage and layer picking to sequencing and mixed case palletizing, the software provides real-time control and visibility. When orders are downloaded, the software calculates the arrangement of cases on each pallet and directs the sequenced release of the cases from the Multishuttle buffer.

SettingsWindowsHelp

Palletizing Orders

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Reset Position

Order ID	Client	Status	Destinat	
16	513415	SCACENTRE	Active	SCAC.M
17	513414	SCACENTRE	Active	SCAC.M
18	513413	SCACENTRE	Released	SCAC.M
19	513412	SCACENTRE	Released	SCAC.M
20	513411	SCACENTRE	Active	SCAC.M
21	513410	SCACENTRE	Active	SCAC.M
22	513409	SCACENTRE	Active	SCAC.M
23	513408	SCACENTRE	Active	SCAC.M
24	513407	SCACENTRE	Released	SCAC.M

Pick Container

Load Unit ID	ID/Load Ur	Status	External ID/Dis	
1	333025762856556909	04	Picking	3330257628565
2	333025762856556305	04	Picking	3330257628565
3	333025762856556107	04	Complete	3330257628565
4	333025762856556008	04	Complete	3330257628565





DEPALLETIZING



Layer Picking Robot

DEPALLETIZING AND ORIENTATION OF CASES



Layers of cases are removed from the pallet. Cases are singulated and reoriented.



Cases are transported via conveyor network to Multishuttle sequencing buffer.

FROM PALLETS TO CASE LEVEL

Pallets consisting of one stock keeping unit are conveyed to the depalletizing station. A robot depalletizes by layer onto the conveyor. From here, cases are conveyed to the next module. It supports most packaging formats, sizes and weights. It singulates the cases and can re-orient if needed.



Multishuttle Flex – Compact with high rate capacity

- Load types: Plastic tote box, cardboard carton, trays, bundles, shrink wraps
- Flex version: Telescopic load extractor; expands/contracts, accommodates a range of load sizes
- Storage density: single or multiple-deep

CASE BUFFER

Sequencing Buffer

EFFICIENT CASE BUFFER AND SEQUENCING ENGINE

Flexible, scalable and modular architecture enables the Dematic Multishuttle case buffer to adjust to the ever changing distribution environment: flexible to accommodate various case sizes, scalable to meet various activity profiles, modular to facilitate system expansion.

The Multishuttle case buffer is a high density, high throughput sequencing engine that occupies a compact footprint. It can fit into existing building spaces: above docks, on a mezzanine, thereby effectively using the space available. Each Multishuttle includes a flexible load handling device, rapid acceleration/deceleration, and multi-deep storage capability.

This makes the Dematic Multishuttle® an extremely high-performance, high rate system for accommodating the various case sizes.

Without the use of trays, the Multishuttle Flex can minimize the space between cases and therefore maximize storage density which lowers the cost per storage location. The innovative eight finger load capture design integrated into the load extractor and telescope arms allow products to be stored single, double, or multi-deep. The load capture fingers are plastic cast, carbon fiber reinforced for robust, long term performance.

Many case sizes can be handled in the system without additional re-loading onto trays and additional mechanization and processes. Consequently the design of the Multishuttle configuration minimizes the amount of handling steps throughout the system and reduces the order processing time significantly. This leads to lower investment costs.

Specifications

Load types

Plastic tote box, cardboard carton, trays, bundles, shrink wraps

Load weight within AMCAP® system

Capacity: Up to 25 kg

Multishuttle Flex

Telescopic load extractor; expands/contracts, accommodates a range of load sizes

Load storage density

Standard: Multiple deep

Multishuttle Flex load range within AMCAP system

Cases	mm	inch
Length	150 – 650	5.9 – 25.6
Width	150 – 650	5.9 – 25.6
Height	50 – 450	2.0 – 17.7

Operating temperatures

Temperature range: 2 °C to 40 °C (34 °F to 104 °F)

Relative air humidity: 5% - 90%, no condensation

THE DEMATIC MULTISHUTTLE DESCRIPTION OF OPERATION

The Dematic Multishuttle sub-system as part of the AMCAP, consists of multiple levels of racking, shuttles, lifts, buffer conveyors, controls and software. Each level includes input/output conveyors and a shuttle that travels horizontally to access cases stored in the rack structure. A telescopic load handling device on each shuttle accesses the loads in the rack. Since there is a shuttle captive in each aisle, on each level, ultra high throughput can be achieved. A vertical lift is used to bring the load to the input/output conveyor. Load sequencing occurs as loads are retrieved in the order sequence required for automatic palletizing.

Benefits of the Dematic Multishuttle® system

- Throughput: 3-4 x higher than conventional miniload
- Scalability: Variable for optimal throughput and storage
- Layout: Adaptable to an existing building
- Flow: Precise sequencing
- Back-up: Work platforms allow manual access to inventory
- Storage density: Ultra-high density due to multi-deep storage and handling without trays
- Availability: High redundancy, interchangeable shuttles
- Inter-aisle transfer: Move cases between aisles



The Multishuttle module supports transfer of cases between aisles. This process, called inter-aisle transfer, optimizes system performance.

RapidPall™

- Automated palletizing on pallet or roll containers
- High palletizing rates
- Handles wide range of case sizes
- Stable, accurate pallet building
- Temperature controlled versions available



PALLETIZING

Robotic Palletizing Cell

MIXED CASE PALLET BUILDING

Cases or totes efficiently slide onto the pallets or roll containers. Cases are moved into sequenced position as directed by the system software.

Cases are delivered to the RapidPal® robotic palletizing cell in precise sequence: heavy items first, fragile items last, by family group or in whatever sequence the business rules dictate. Due to the enhanced mechanical design, RapidPal supports palletizing on pallets and roll containers in one cell and supports high palletizing accuracy. With improved load density compared to manually stacked pallets, the retailer can better utilize truck space, and therefore lower transportation costs.

A retractable cell design allows manual finishing of the palletizing process. As soon as all cases are stacked, the pallet is lowered and stretch-wrapped, resulting in a dense, store-friendly pallet that is stable and ready to transport.

Specifications

Mixed case palletizing on multiple pallet sizes	
Mixed case stacking onto roll containers	
Monitoring & verification of palletizing process	
Integrated stretch wrapper	
Pallet attributes	
Max. height of stacked load unit:	2200 mm / 87"
Max. payload of stacked load unit:	1250 kg / 2750 lbs
Case types & dimensions	
Grocery cases, cartons, cardboard/plastic trays	
Size min.:	150 x 150 x 50 mm / 5.9" x 5.9" x 2"
Size max.:	650 x 650 x 450 mm / 25.6" x 25.6" x 17.7"
Weight min.:	0.25 kg / 0.5 lbs
Weight max.:	25.0 kg / 55.1 lbs
Operating environment	
Temperature range: 2 °C to 40 °C (34 °F to 104 °F)	
Humidity: 5% – 90% relative, no condensing	

The integrated Ring Stretch Wrapper allows wrapping of semi complete pallets in order to increase system flexibility and availability. To prevent lost time during pallet exchange, Dematic RapidPal uses the integrated slider plate to continue palletizing. The next layer that is formed is then included with the next pallet load.

The RapidPal cell is designed for sustained productivity. In automatic operation, RapidPal eliminates the need for operators and achieves substantial reduction of ergonomically challenging jobs (health & safety) and therefore labor costs. The simple mechanical design supports the highest throughput while increasing operational efficiency and cost effectiveness.

Benefits of Automatic Palletizing:

- Higher stacked, dense pallets = lower transport costs
- Accommodates wide range of carton & packages
- Pallets built to customer requirements
- Reduced labor costs
- High accuracy and high throughput rates
- Accommodates multiple pallet types



Dematic iQ

- Operational control of palletizing process
- Efficient location management by dynamic slotting
- Visibility & insight dashboards
- Optimized case sequencing strategies
- PackBuilder extensions
- Packaging variation management
- Web-enabled user interface



OPERATIONAL INSIGHT

Control Software

REAL-TIME VISIBILITY AND CONTROL SYSTEM

For the AMCAP system, Dematic iQ software manages and directs the entire process. It tracks the location of each case in the Multishuttle rack; the system put-away logic may be random or may be configured according to specific rules. For example, if SKU velocity rules are deployed, fast moving items are stored at the forward positions in the aisle.

When a store order needs to be palletized for shipping, the software calculates how to arrange the cases on the pallet or roll containers. It directs the Multishuttle sub-system to release the cases in a precise sequence so that the pallet can be assembled efficiently, according to the retail store order requirements.

Typical pallet build rules are based on where the cases are replenished when re-stocking at the retail store. For example, by SKU category, family grouping, weight, size, or direct correlation to the store planogram. Other business rules include security of the product and space-saving placement on the pallet. To calculate the pallet build sequence, essential data like the dimensions of the cases, weight and packaging characteristics are considered. The pallets are assembled to achieve store friendliness, thereby reducing handling time at the retail stores.

Benefits of Dematic iQ Software

- Integrated platform to control all AMCAP processes
- Efficient location management for varying case sizes
- Real time information status monitoring
- Optimized case storage strategies: random, strategic
- Efficient and stable pallet building
- Supports case measuring work station functionality
- Dashboards: Palletizing statistics and KPIs





Depalletizing is accomplished using a delayering robot.



Mixed case pallets are stretch wrapped after palletizing process.