



Learn how scalable automation improves throughput, lowers labor dependency, and helps your team stay ahead of unpredictable returns.

Fixing the Chaos Behind Product Returns:

A Guide to Automating the Returns Workflow

ENGINEERING[™]
i n n o v a t i o n



|| Introduction

Reverse logistics has become a critical function in modern commerce, particularly with the continued growth of eCommerce and evolving consumer behavior. In 2024, the global reverse logistics market was valued at \$823.21 billion and is projected to exceed \$3.18 trillion by 2033. This growth signals a shift: reverse logistics is no longer a backend operation.

Distribution centers (DCs), third-party logistics providers (3PLs), and fulfillment centers (FCs) are facing a surge in returns, coupled with increased complexity, labor constraints, and cost pressures. Managing returns using outdated methods is no longer sustainable.

The Chameleon SLAM solution offers a practical and scalable approach. It automated the scanning, weighing, dimensioning, labeling, and sorting of parcels with minimal human input. Its modular design allows operators to scale capacity up or down in response to fluctuating volumes without disrupting operations.

For logistics professionals seeking to improve efficiency, reduce costs, and maintain agility in a volatile market, scalable automation presents a clear path forward.

|| The Reality of Reverse Logistics

Returns have become a defining element of the supply chain. Today, over 30% of online purchases are returned, compared to less than 10% in brick-and-mortar retail. Apparel leads all product categories in return volume, and more than 80% of product returns occur due to damage or fit issues.

Returns are also significantly more costly to process than outbound shipments, due to the additional handling, inspection, and reconditioning involved. Warehouses face increasing pressure to manage these tasks despite limited labor availability, constrained floor space, and rising expectations for speed and accuracy.

|| Four Core Pain Points Hurting Reverse Logistics Operations

Unpredictable Volume and Surges

Few parts of the supply chain experience as much variability as returns. Seasonal peaks—such as back-to-school, Black Friday, and post-holiday January returns—create dramatic and unpredictable volume surges. These events not only stress operations, but can start to expose structural weaknesses in the existing workflows (or lack thereof).

Returns aren't like outbound shipments. They arrive in mixed conditions, packaging types, and without warning. Providers often rely on temporary labor, overtime shifts, or offsite storage to absorb the impact. These emergency strategies are costly and increasingly unreliable. The labor market remains tight, and expanding capacity physically introduces additional complexity, inefficiency, and of course, extra cost.

In many facilities, the result is congestion at receiving docks, delays in product inspection and relabeling, and extended cycle times. With each delay, shipment service providers experienced a dip in customer satisfaction and lost resale opportunities.

Operators need infrastructure that flexes with volume—without requiring a six-month lead time or a capital-intensive expansion plan. That's where scalable automation becomes not just a nice-to-have, but a competitive necessity.

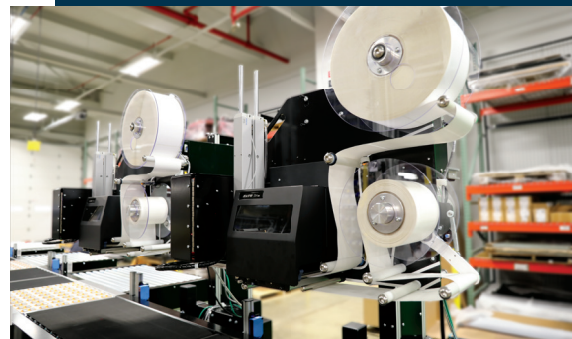
Labor Shortages and Inefficient Workflows

Warehouse labor has become a strategic vulnerability. While warehouse employment has grown steadily over the past decade, roles tied to reverse logistics remain some of the hardest to fill. These positions are often physically demanding, repetitive, and scheduled during off-peak hours. High turnover is common, and training new employees takes time that peak seasons don't afford.

Manual tasks like **scanning, weighing, labeling, and sorting** returned items are still dominant in many facilities. According to the 2025 MHI Annual Industry Report, only 41% of companies currently leverage warehouse automation, leaving most reverse operations highly manual and prone to bottlenecks.

This dependence on labor introduces variability, slows throughput, and increases error rates. It also contributes to employee fatigue and burnout, further exacerbating retention issues.

By automating low-skill, high-volume tasks, facilities can reduce their dependency on temporary labor while freeing up experienced team members to handle exceptions, manage quality, and oversee value-added tasks. The key is deploying systems that enhance, rather than replace, your workforce.



Workflow Fragmentation and Exception Handling

Returns rarely follow a clean, linear path. A single item may pass through multiple steps—receiving, inspection, repackaging, relabeling, restocking—before it re-enters inventory or is routed for liquidation or refurbishment. For multi-client or multi-brand 3PLs, this complexity increases exponentially.

When returns flow through multiple disconnected systems or zones, bottlenecks are inevitable. Items get stuck in queues, data gets lost between touchpoints, and frontline workers spend unnecessary time tracking down product status or resolving errors.



Inconsistent processing workflows also lead to inconsistent customer outcomes. A facility may process one return in under 24 hours while another sits idle for days due to labeling errors or mismatched data.

Exception handling is one of the most time-consuming and labor-intensive aspects of reverse logistics. But many exceptions—like unreadable labels or misrouted items—are avoidable with more intelligent automation. Solutions that combine smart scanning, real-time data capture, and flexible diverting can drastically reduce these disruptions and streamline the flow from return to reintegration.

Lack of Scalable Infrastructure

Most traditional automation systems are designed for stability, not flexibility. They work well at steady-state volumes but become bottlenecks when demand surges, or worse, liabilities when volumes drop.

Many operators, under pressure to automate, have overinvested in rigid systems that are difficult and costly to reconfigure. The results end up being automation that solves a narrow slice of the problem and becomes underutilized during off-peak periods. In some cases, facilities find themselves designing workflows around the limitations of the equipment, rather than the actual needs of the business.

Scalable infrastructure doesn't mean large-scale investment. It means modularity, configurability, and adaptability. Systems should be able to expand or contract without months of planning or layout designs.

We've seen facilities unlock significant gains simply by deploying modular automation targeted at the right pain points—reducing labor requirements, increasing throughput, and maintaining continuity even as demand fluctuates.

Receiving & Reverse Logistics

Capture inbound package data and contents for induction into your WMS. Process returned items back into inventory or spoilage.



Storing Goods

Output SKU location information while routing and tracking inventory to correct warehouse locations. Update your OMS and other relevant databases.

Shipping Orders

Scan parcel to capture accurate delivery information, weight, and dimensions. Generate correct information and print formatted data onto a label that is automatically applied to package.

Delivering Packages

Direct outgoing shipments to independent carriers for delivery to end users. Manifest shipment data to complete the SLAM process and ensure accurate carrier documentation.



Capture

Capture information from the physical package.

- Barcodes
- RFID
- Sender Information
- Recipient Information
- Dimensions
- Weight



Decide

Communicate captured information with your data systems and business rules.

- Order value
- Customer loyalty
- Complimentary products
- Mode of transport
- Speed of transport
- Mode of delivery
- Internal Routing
- Shelf location
- Logistics sorting
- Package dating
- Global commerce rules
- SKU mapping



Act

Execute decisions made in your business logic.

- Pass decision data to downstream systems
- Print & format shipping or routing labels & packing slips
- Identify packages for tracking
- Address, Sort, or Route



The Chameleon SLAM Solution: Built for Flexibility

Not all automation is created equal. Many systems are built for predictable conditions, performing best when volumes are stable and product types are uniform. Returns just don't work that way. They're inconsistent, high-mix, and often arrive in unpredictable waves. The Chameleon parcel processing system was designed to meet these conditions.

Chameleon is a SLAM solution—Scan, Label, Apply, Manifest—and its value lies not just in speed or accuracy, but in its ability to adapt to real-world operational demands.

Scalable by Design

Chameleon's modular architecture allows facilities to expand or contract capacity in response to real-time operational needs. Whether managing standard volumes or peak-season surges, teams can add or remove modules quickly and without operational disruption.

It is particularly effective for:

- Operations with unpredictable volume
- Multi-brand, multi-client returns environments
- Facilities with limited floor space
- Entry-level automation needs with long-term growth plans

Platform-Agnostic Integration with Customer Business Logic

A common pain point with automation is being forced to adopt a specific software platform alongside the equipment. The Chameleon parcel processing system avoids this. Unlike competitors who bundle machines with proprietary systems, the Chameleon is platform-agnostic. Customers are free to integrate Chameleon into their existing tech environment without being locked into a software ecosystem.

Using our API, Chameleon connects to the customer's Business Logic System—a layer created by the customer's development team that interfaces with their WMS, ERP, or other

business systems. This allows the customer to control how Chameleon fits into their overall digital infrastructure, making it highly flexible.

Increased Labor Efficiency

By automating repetitive tasks like scanning, weighing, and label application, it frees up workers to manage exceptions, handle inspections, or oversee more complex decisions.

In environments where finding and retaining qualified labor is a constant challenge, automating low-value tasks helps reduce burnout and turnover. Staff are deployed more strategically, supporting better performance and morale.

Compact and Facility-Friendly

Chameleon is designed for real operations. Unlike traditional conveyor systems that require extensive installation and footprint, Chameleon offers a compact layout and energy-efficient components. It fits into existing spaces without requiring major infrastructure changes.

Whether positioned at the inbound dock, within a sortation zone, or in a standalone returns area, the system integrates smoothly and adapts as facility needs change.

Why Scalable Automation is the Future of Returns

Logistics providers are expected to do more with less. Relying solely on manual labor or rigid systems is not sustainable in a market where unpredictability is the norm.

As eCommerce continues to grow and customer expectations rise, the ability to scale operations quickly and efficiently becomes a competitive advantage. Providers who can process returns accurately and on time, regardless of volume, are better positioned to secure and retain client relationships.

Scalable automation delivers not only cost savings, but also operational resilience. It offers the adaptability that modern reverse logistics operations need to thrive.



Overcome Return Chaos Before it Hurts Your Margins

Returns are more than a strain on operations; they chip away at profitability, customer trust, and operational focus if not well-managed. For logistics leaders already managing tight margins, labor challenges, and client expectations, reverse logistics can feel like the one part of the operation that's always lagging behind.

You don't need to overhaul your entire facility or throw more labor at the problem. **With adaptable solutions and strong partners you can achieve greater control, increased consistency, and less firefighting.**

Engineering Innovation is here for you with common sense automation solutions designed for your problems no matter where you are on the manual to automation spectrum. If you're ready to reduce waste, stabilize your returns process, and free your team from repetitive tasks, we're here to help.

To learn more about how Chameleon can support your returns process, schedule a discovery call with one of our automation experts.



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