



AI RFID tunnel solution

Enabling supply chain visibility with AI-powered RFID

High-speed, high-accuracy item-level validation

Automatically reads and validates all RFID-tagged items inside a carton at 99,9% accuracy, without slowing down or stopping and thereby impacting throughput. The AI-powered RFID tunnel combines RFID, vision and embedded AI to deliver accurate item-level validation in real time even in high-speed, high-volume warehouse environments.

Performance highlights

- Reads up to 300 RFID tags per carton
- Conveyor speeds up to 1.5 m/s
- Box distance \geq 50 cm
- Accurate performance of >99,9%



Why it matters

Traditional RFID tunnels require high effort to deploy and integrate to existing infrastructure, as they are intrusive. The AI-powered RFID tunnel removes these barriers as it can be placed as an add-on to conveyors. From complex to simple:

- Easy installation on existing conveyors
- Easy system configuration for different process conditions
- No impact on throughput of conveyor
- Cross-reads from surrounding cartons are filtered using machine learning
- Easy integration to conveyor or WMS

Typical use cases

- Inbound: item-level validation on received goods
- Picking: validation on picked items before packing
- Outbound: ensure shipments are complete and correct





Key features

The AI-powered RFID tunnel combines speed, accuracy and ease of deployment in one solution.

- **AI-driven accuracy**
AI dynamically filters and assigns RFID reads to the correct carton, eliminating cross-reads without manual tuning (accuracy >99,9%)
- **High-speed processing**
Maintains performance at conveyor speeds up to 1.5 m/s
- **Easy deployment**
Install as add-on to existing conveyors with minimal disruption
- **Scalable across operations**
Suitable for multiple warehouse processes and sites
- **Seamless system integration**
Connects with WMS, ERP and ASN data

Hardware components

The solution is built on industrial-grade hardware designed for reliability and performance.

- **Industry-leading RFID Reader**
High-performance and fast RFID reading
- **Vision barcode scanner (optional)**
Scans barcode label of cartons to validate against expected
- **RFID antenna configuration**
Optimized for conveyor setup and prevent cross-reads
- **Industrial PC / edge device**
Runs the AI-powered RFID tunnel logic

Software

The solution is powered by Mieloo & Alexander's ARC Suite platform, enabling real-time processing and integration.

- **ARC Base RFID Middleware**
Converts RFID data into actionable operational insights
- **Embedded AI machine learning engine**
Ensures tag-to-carton allocation and accurate cross-read filtering

Applications

Designed for high-volume logistics environments where speed and accuracy are critical. Inbound validation, picking validation and outbound verification in automated 3PL warehouse environments and beyond.

>99,9% Item-level
Performance

Up to 300 items
per carton

Easy add-on to
existing conveyors

No complex
integration or
shielding required

Fast to deploy,
easy to scale