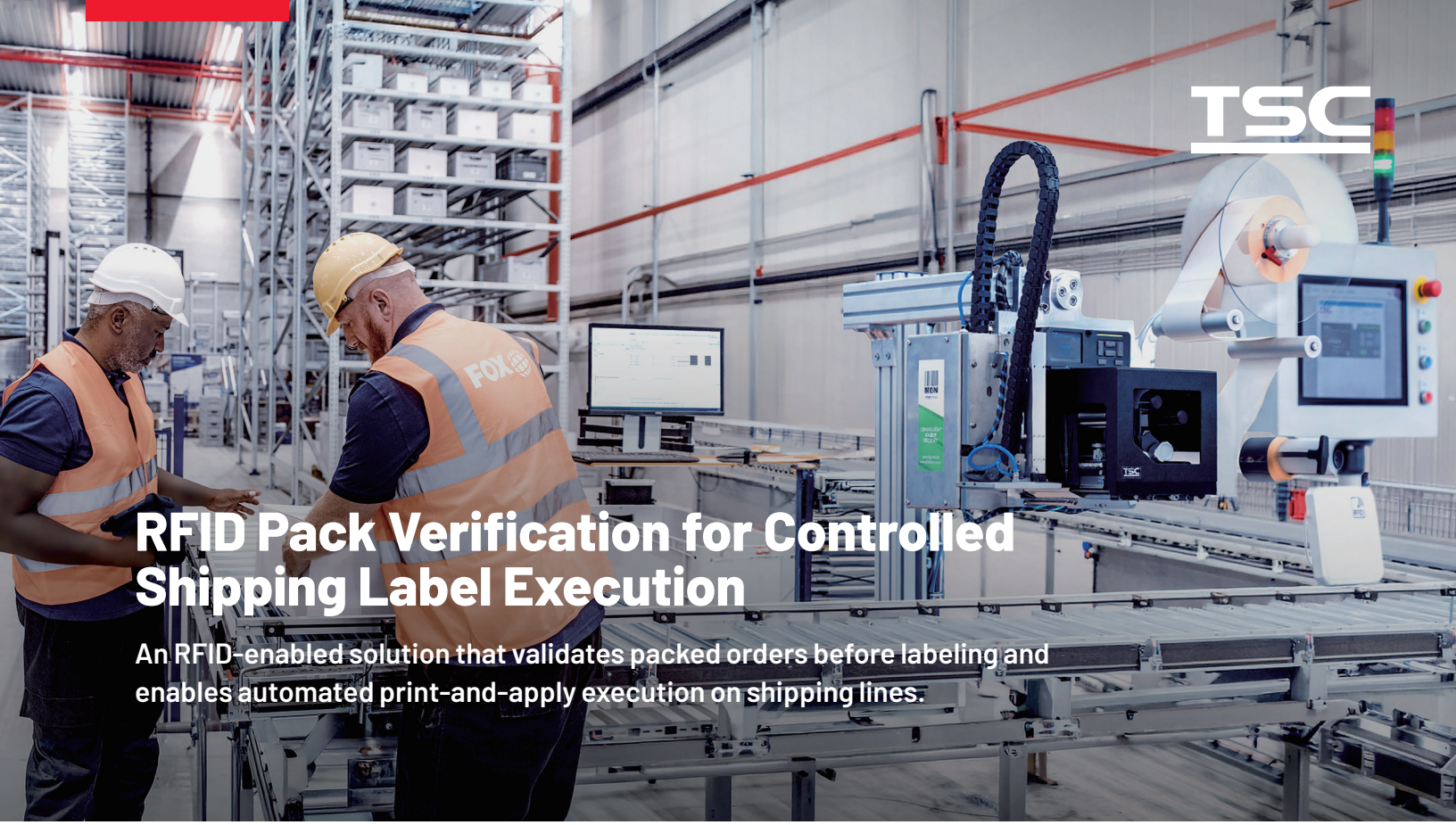


RFID Pack Verification for Controlled Shipping Label Execution

An RFID-enabled solution that validates packed orders before labeling and enables automated print-and-apply execution on shipping lines.

Solution Overview

Packing errors lead to shipping inaccuracies, rework, and operational disruptions in manufacturing outbound environments. This solution utilizes RFID to verify packed orders and controls whether labeling and print-and-apply execution are released. The solution combines:

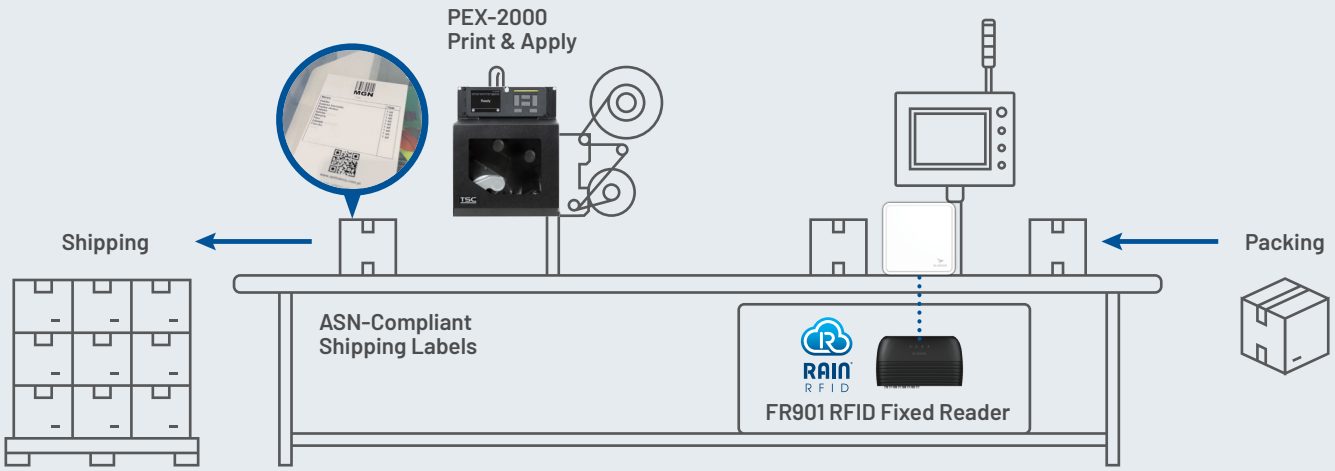
RFID pack verification and execution validation (FR901 + ANS970)

+

RFID-based pass/fail control before labeling

+

Automated label generation with the PEX-2000 print engine



Solution Architecture

A. RFID Pack Verification Layer (Fixed Readers & Antennas)

RFID readers validate packed items at the completion point before labeling is triggered. Key capabilities include:

- Item-level and quantity-level verification
- FR901 enables high-speed RFID reading at the pack completion point
- Real-time detection of missing or incorrect items

B. Execution Control Logic (RFID Middleware)

RFID data is evaluated to determine execution readiness for labeling. Key capabilities include:

- Pass/fail decision against order data
- Automatic conveyor stop upon validation failure
- Controlled release to the labeling stage
- Optional integration with RFID middleware for ERP/WMS synchronization

C. Print-and-Apply Execution (Automated Labeling)

Only validated shipments proceed to automated labeling on the conveyor line. Key capabilities include:

- Trigger-based label generation after validation pass
- High-speed print output with the PEX-2000 print engine
- PLC-synchronized print-and-apply execution
- Accurate inline label application at line speed



Operational Impact

Data-powered RFID improves shipping execution accuracy and control in outbound packing operations:

95–99%	40–80%	30–40%	60–90%
Pack accuracy	Faster verification	Labor reduction	Mislabel reduction

Deployment Characteristics

The solution is deployed in conveyor-based packing and shipping environments.

- **Inline conveyor deployment:** RFID verification and labeling integrated into existing shipping lines
- **PLC-based automation control:** Enables pass/fail gating, conveyor stop, and print-and-apply triggering
- **Line-segment rollout:** Enables phased deployment across packing or shipping line sections

Business & Technical Value

Key operational and technical benefits of this architecture include:

- **Pack-Level Execution Control:** Prevents unverified shipments from entering the labeling stage
- **Closed-Loop Line Control:** Stops execution on mismatches and enforces validation before release
- **Integrated Automation Flow:** Connects RFID sensing, PLC logic, and print-and-apply systems
- **Flexible System Integration:** Supports ERP/WMS connectivity via an optional middleware layer

Target Environments

- Manufacturing outbound shipping lines
- Automated packing and dispatch stations
- High-volume production fulfillment operations

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