Fork-Type Vertical Lifter

Model XBT-4.28-0.03

Export to Brazil — Vertical Logistics Automation Case Study
Textile Decoration Industry

Client:	Shanghai Textile Decoration Co., Ltd.
Equipment:	Fork-Type Vertical Lifter XBT-4.28-0.03
Contract No.:	ZD-WXQ20260129 (Zhongding)
Destination:	Brazil (South America)
Cycle:	Feb 3, 2026 – Mar 20, 2026 (45 days)
Contents:	Case Study · On-Site Photos · Principle Diagrams

1. Project Overview

In early 2026, **Shanghai Textile Decoration Co., Ltd.** initiated a project to deploy an automated vertical conveying system at its manufacturing facility in Brazil, aiming to eliminate inefficient cross-floor manual transfer of finished textile cartons. The Zhongding team (Contract ZD-WXQ20260129, Sales Engineer: Wang Xianquan) undertook this project and custom-engineered one **fork-type vertical lifter** (Model XBT-4.28-0.03), flanked by two **roller conveyors**, forming a complete "horizontal infeed → vertical lifting → horizontal outfeed" automated conveying loop.

The equipment operates on Brazil’s three-phase 220 V / 60 Hz power standard and integrates **Profinet industrial Ethernet communication**, enabling direct connection to a Siemens S7-series PLC master control network. The order was confirmed on February 3, 2026, with factory delivery on March 20, 2026 — a manufacturing cycle of just 45 days. The complete system was packed in ocean-freight-ready wooden crates and shipped to Brazil. Below are on-site photos taken during factory assembly and commissioning:

Figure 1: XBT-4.28-0.03 during factory testing — front view, RAL 6002 Leaf Green + Gray

Figure 2: Side view — 2.2 kW Chengbang geared motor and chain drive assembly at top

2. Customer Pain Points & Challenges

Shanghai Textile Decoration Co., Ltd. specializes in decorative fabrics and finished home-textile products. Its Brazilian plant handles uniform cartons (615 × 375 × 210 mm, 30 kg each) across two production floors. Prior to this project, cross-floor transfer relied on manual labor assisted by a freight elevator, creating three critical pain points:

1. Throughput Bottleneck: Manual handling speeds were inconsistent, causing production line congestion during peak periods and failing to meet the 100-carton-per-hour target. A conventional freight elevator's single-trip cycle delivers only 1/3 to 1/5 of a fork-type lifter's continuous-loop throughput.

2. Physical Strain & Safety Risks: Repeatedly lifting 30 kg cartons placed significant physical demands on workers, leading to risks of lumbar strain and crush injuries. With a predominantly female workforce in the textile decoration sector, this ergonomic burden was particularly acute.

3. Data Isolation: The existing manual transfer process had no connection to the factory's Profinet-based control network, leaving management without real-time material flow visibility. The vertical logistics segment became a **data blind spot**, hindering MES deployment and lean manufacturing initiatives.

In summary, the customer urgently needed a **custom-engineered vertical conveying solution** that would comply with Brazilian electrical codes (three-phase 220 V / 60 Hz) while integrating seamlessly with the existing Siemens PLC infrastructure — achieving unmanned, automated cross-floor material transfer.

Figure 3: Integrated commissioning — technicians inspecting drive components from scaffolding, roller conveyor at inlet

3. Technical Specifications

Parameter	Specification	Technical Note
Equipment Model	Fork-Type Vertical Lifter XBT-4.28-0.03	Continuous lift, circulating fork trays
Product Dimensions	615 × 375 × 210 mm	Standard textile finished-goods cartons
Rated Load	30 kg / carton	Well within fork-tray capacity
Design Throughput	100 cartons / hour	~36 sec cycle, mid-speed line
Lifting Stroke	Inlet 880 mm / Outlet 4,280 mm	Net lift: 3.4 m, floor-to-floor
Infeed Orientation	Short-side entry (615 mm edge)	Saves floor space
Stops / Stations	2 stops / 2 stations	One interaction point per floor
Drive Motor	Chengbang 2.2 kW	Domestic premium geared motor
Power Standard	Three-phase 220 V / 60 Hz	Brazil grid — plug-and-play
Communication	Profinet	Siemens PLC industrial Ethernet
Finish	RAL 6002 Leaf Green + Gray	Textile industry standard color
Auxiliary Equipment	Roller conveyors x 2	L1400 × W500 × H880 mm each
Packaging	1 crate (lifter) 1 crate (conveyors)	Moisture-proof, shock-resistant

Table 1: Core Specifications — Fork-Type Vertical Lifter XBT-4.28-0.03

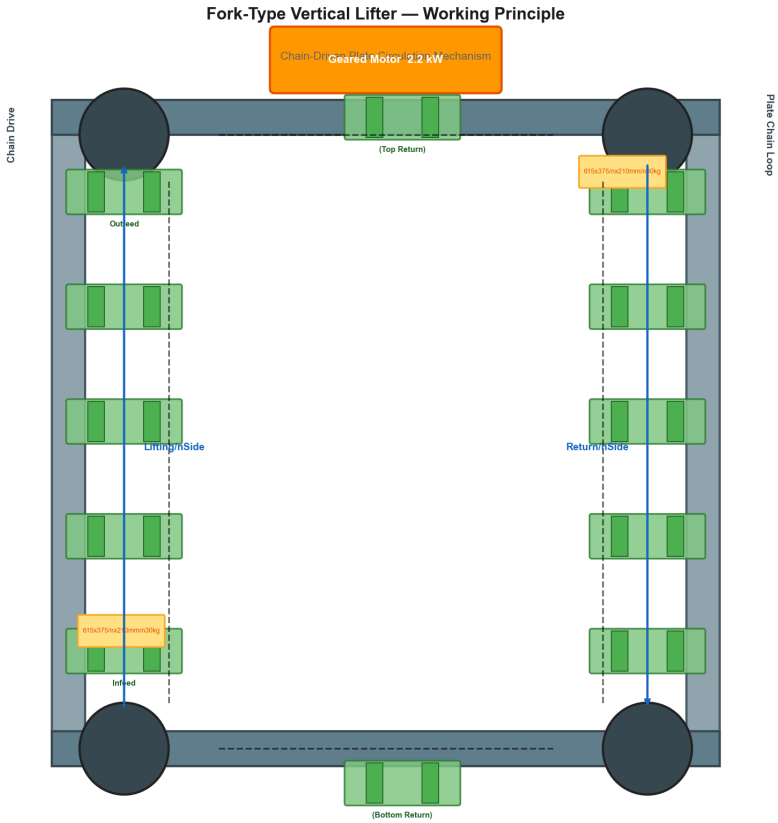

Figure 4: Working principle — chain-driven plate circulation mechanism with fork trays

4. Solution Architecture

Electrical Adaptation Layer: The entire electrical chain — motor windings, VFD, and control transformer — was specified to Brazil's three-phase 220 V / 60 Hz standard. The equipment powers up directly upon arrival with zero on-site electrical modifications — true **plug-and-play** deployment.

Mechanical Conveying Layer: At the ground floor, the inlet roller conveyor (L1400 × W500 × H880 mm) receives finished cartons from the production line and feeds them short-edge-first onto the fork trays. A 2.2 kW Chengbang geared motor drives the **chain transmission** and **plate-chain circulation mechanism**, lifting trays smoothly along vertical guide rails over a 3.4 m stroke to the 4,280 mm outlet elevation, where cartons are automatically discharged onto the upper roller conveyor. The lifter supports **bi-directional operation**, and the 2-stop/2-station layout ensures independent interaction at each floor.

Control & Communication Layer: Full **Profinet protocol** integration connects directly to the client's Siemens S7-series PLC backbone. The central control room monitors real-time operating status, fault alarms, and production counts. The vertical logistics segment is no longer a "data black box" — every lift cycle and tray position is traceable, and a standard interface is reserved for future MES integration.

Export Assurance Layer: Split-crate wooden packaging with internal shock-absorbing foam and moisture-proof treatment. All exposed metal surfaces were coated with anti-rust oil. Each shipment includes a complete technical drawing set, wiring diagrams, and Profinet communication parameter tables, enabling the local Brazilian team to complete installation and commissioning independently. Ex Works delivery terms provide the client with flexible freight arrangements.

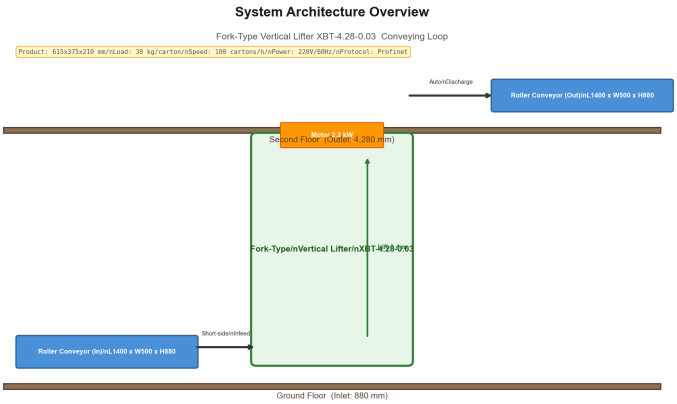

Figure 5: System architecture — roller conveyor (in) → vertical lifter → roller conveyor (out)

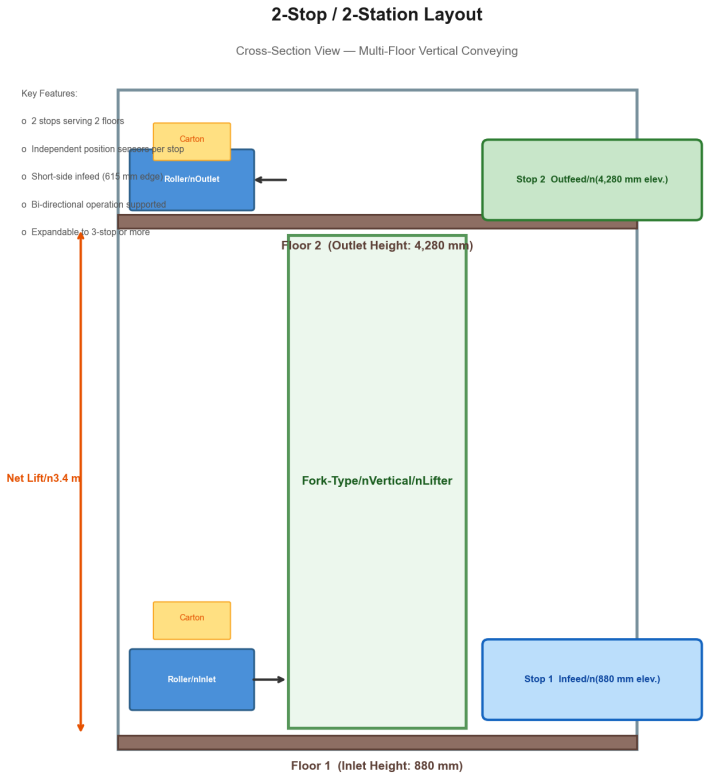

Figure 6: 2-stop/2-station layout — one interaction point per floor, expandable to 3-stop

5. Frequently Asked Questions

Q1: How does a fork-type vertical lifter differ from a conventional freight elevator?

A fork-type vertical lifter uses a **chain-driven plate circulation mechanism** to move multiple fork trays simultaneously in a continuous loop, achieving throughputs exceeding 100 cartons per hour. Unlike a freight elevator's single-trip up-and-down cycle with door operations, the lifter delivers 3–5× higher efficiency without requiring a dedicated operator, making it ideal for **continuous production-line conveying** applications.

Q2: Why does this equipment use 220 V / 60 Hz three-phase power?

Because **Brazil**'s national industrial power standard is three-phase 220 V / 60 Hz — fundamentally different from China's 380 V / 50 Hz. We performed full-chain adaptation across the motor, VFD, and control circuit. The equipment connects directly to the local grid with no transformer or electrical retrofit required on-site.

Q3: What is the practical value of Profinet in a vertical conveying system?

Conventional lifters provide only dry-contact signals for basic start/stop control. With **Profinet** integration, the host PLC reads real-time equipment status, fault diagnostics, and production counters. For plant management, the vertical logistics segment is no longer a "data black box" — it can be incorporated directly into the MES platform and digital factory management system.

Q4: What scenarios suit a 2-stop / 2-station layout? Can it be expanded?

A 2-stop / 2-station configuration serves two floors with one interaction point each. In this case, the ground floor handles infeed (880 mm elevation) and the second floor handles outfeed (4,280 mm elevation) — the two stations operate independently without interference. For customers requiring more floors, the structure supports expansion to **3-stop / 3-station**, 4-stop, or more.

Q5: What special packaging is required for exporting equipment to Brazil?

The Brazil shipping route takes approximately 35–40 days, involving multiple cargo-handling events and a high-humidity maritime environment. We use a **split-crate strategy** (main machine and roller conveyors packed separately), with foam and bubble-wrap layered internally for shock absorption. All exposed metal surfaces receive anti-rust oil treatment. Bilingual shipping marks, packing lists, and a complete technical documentation package accompany each shipment to ensure smooth Brazilian customs clearance.

This document was prepared by the Zhongding technical team. All specifications are based on the work order dated February 11, 2026. On-site photos were taken during factory commissioning. Principle diagrams are provided for illustrative purposes.