Industrial Case Study

High-Precision Hydraulic Freight Lift for Food Industry

Project Overview

This report analyzes the engineering solution for a high-capacity (3-ton) hydraulic guide rail lift specifically designed for a modern food processing plant. The project emphasizes hygiene, structural integrity, and multi-station synchronization.

Technical Parameter	Specification
Model	SJD3.0-4.5
Rated Load	3,000 kg (3 Tons)
Lifting Height	4,500 mm (2-Speed System)
Cabin Dimensions	3000 x 1800 x 2200 mm (W*L*H)
Pit Depth	-350 mm (Shallow Pit Design)
Material Construction	304 Stainless Steel (Food Grade)
Drive System	Dual Cylinder / 4-Column Guide Rail
Control Logic	PLC Programmed (Delixi Components)

Engineering Highlights

1. Food-Grade Hygiene Standards: All visible surfaces, including cabin walls, flooring, and landing door frames, are constructed from 304 stainless steel to ensure anti-corrosion properties and ease of sterilization.

2. Structural Stability: The 4-column 125H-section steel guide rail system provides superior vertical stability, while the 12# dual wire rope system ensures high-precision leveling and anti-tilt protection.

> *"The integration of a shallow pit (-350mm) significantly reduces civil construction complexity while maintaining full 3-ton lifting capability."*

Visual Documentation

Figure 1: Full Installation with 4-Column Guide

Figure 2: Stainless Steel Cabin and Roll-up Door

Working Principle & Safety Logic

Operational Flow: The 5.5kW pump station initiates the ascent via dual Φ80-60 cylinders. Upon reaching the target floor, PLC-controlled flat-layer pushrods engage at all four corners to ensure a perfectly level interface with the landing floor for heavy pallet unloading.

Safety Protocols: The system features multi-layer interlocking between the cabin, landing doors, and the lifting mechanism. An integrated maintenance password system enforces periodic safety checks at 1.5-month and 1-year intervals.

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