

## Engineering Excellence

### SUCCESS STORY

## Simplified Electrical Architecture for Packaging Machine Performance

### THE COMPANY

An OEM specializing in packaging machinery designs and builds box filling and sealing systems used across high-volume production environments. These machines require reliable electrical control systems that are easy to support in the field while maintaining safe and consistent operation across multiple voltage requirements.

### OVERVIEW

-Tech was engaged to modernize an existing electrical control system for a box filling and sealing machine. The original design used multiple enclosures and separate schematic sets to manage different power requirements. The goal of the project was to simplify the architecture, reduce documentation complexity, and improve long-term serviceability while maintaining full functional performance across all system voltages.

### CHALLENGE

The original machine design relied on two separate electrical enclosures, one for low voltage (240VAC single-phase) and one for high voltage (480VAC three-phase). Each enclosure had its own full schematic set, creating duplication and increasing complexity for both engineering and service teams. In total, the documentation exceeded 60 pages, making troubleshooting and field support more difficult for OEM technicians and end users. In addition, the system required careful management of multiple voltage levels within a constrained footprint, including 240VAC, 480VAC, 24VDC control power, and analog signal routing. This combination of complexity, documentation overload, and multi-voltage coordination created ongoing challenges in both design maintenance and field support.

# SOLUTION

Tri-Tech redesigned the system into a simplified, unified control architecture focused on clarity, serviceability, and efficient electrical layout. The new design consolidated power distribution, reduced documentation complexity, and improved internal panel organization for long-term maintainability.

## Unified Single-Enclosure Design:

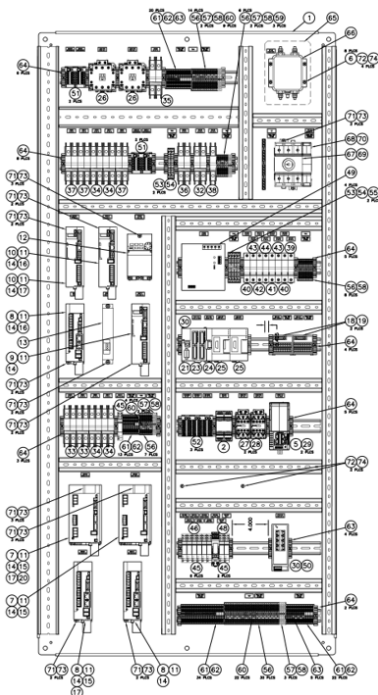
The system was redesigned into one consolidated electrical enclosure powered from a single incoming power source. This eliminated the need for multiple panels and reduced overall system footprint and complexity.

## Streamlined Electrical Documentation:

Separate schematic sets were replaced with one unified electrical drawing package. The revised design reduced documentation from over 60 pages to 26 pages, significantly improving readability and troubleshooting efficiency.

## Optimized Multi-Voltage Cable Routing:

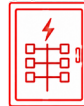
Careful internal layout planning was used to separate and organize 480VAC, 240VAC, 24VDC, and analog signal wiring. This improved electrical clarity, reduced interference risk, and simplified long-term service access.



# RESULTS & OUTCOMES

The redesigned control system significantly improved system clarity, reduced engineering overhead, and simplified long-term maintenance for both OEM teams and end users. By consolidating power distribution and streamlining documentation, the updated design created a more scalable and supportable platform for future machines.

## REDUCED ELECTRICAL COMPLEXITY



A single enclosure design eliminated redundant systems and simplified overall machine architecture.

## IMPROVED DOCUMENTATION EFFICIENCY



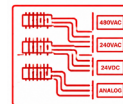
Schematic package reduced from 60+ pages to 26 pages, making troubleshooting and support faster and more intuitive.

## SIMPLIFIED FIELD SERVICEABILITY



Clearer layouts and unified drawings reduce diagnostic time and improve maintenance efficiency.

## ENHANCED SYSTEM ORGANIZATION



Structured routing of multiple voltage types improves safety, clarity, and long-term electrical reliability.