



for a greener tomorrow



## T-ROC Equipment improves made-to-measure box system with Mitsubishi Electric Automation solution

### Case Study

#### Solution

- iQ-F Series PLC
- MR-J4 Servos
- GT27 HMI
- MES Interface

#### T-ROC Machine Benefits

- Improved accuracy
- Precise fit to measure packaging
- Lower shipping costs for customers

#### Mitsubishi Electric Value-added Advantages

- Comprehensive single source solution
- High speed measuring and data transmission
- SQL server interface

#### BACKGROUND

T-ROC Equipment, a Kansas City, KS based box machine manufacturer built the very first state-of-the-art, heavy duty, automated box making machine in 1995. T-ROC is changing the face of the packaging industry by creating high quality machinery designed to help companies improve their bottom line in a multitude of ways. Most importantly, by improving shipping efficiencies and carrier costs for their customers.



*“The Mitsubishi iQ-F PLC was the exact fit for our control needs on the Automated Box Sizer and helped us meet our customer’s needs within their budget.”*

**Ron Cowell, Owner, CEO**  
T-ROC Equipment

#### CHALLENGE

T-ROC serves customers with varied box requirements. With the saturation of e-commerce as a primary commercial distribution model, T-ROC customers are now faced with shipping costs based on package size and weight. Box sizing has never been more important in improving profitability. Identifying the customer’s optimum box size can produce dramatic reductions in shipping costs. As a complete solution for box making, T-ROC needed an easy to use and automatic way of measuring the items to be boxed, sometimes in lot sizes of one, and capable of loading the appropriate dimensions into the board feeder and box maker.

## SOLUTION

On semi-automatic box machines, to make a box or inner packaging, an operator must select an icon that represents a box blank style. The HMI leads the operator step-by-step, through the entire process of choosing dimensions, quantity, and tabs for every style. Long containers for extrusions, folders for books, dividers, pads, or standard boxes, can be selected. The touch screen automatically prompts when to start feeding sheets of material. Excess board, trimmed off during production, can be reused to make additional boxes, and environmentally friendly inner packaging, from such corrugated excess board, can be produced quickly.

With the new automated box sizer, items to be packed are set upon a sizing table and scanned with a mini array scanner which feeds an iQ-F Series PLC capable of high-speed calculations. With engineering expertise, system programming, and application support provided by Power Motion, a value added Diamond Partner, to engineer the machine system, the successful machine is controlled by an FX5 controller and 2 axes of servo communicating via RS-485 to Banner Arrays. High-speed inputs are used for an encoder to measure height, Banner Array outputs wired to high speed interrupt inputs to tell the PLC when no beams were blocked and to record encoder count. The GOT uses the MES option to send the size and weight of the required box to the user SQL database where they are compared to common shipping carrier's rates. This allows the user to custom box items in order to pack efficiently and ship as inexpensively as possible.



## RESULTS

The OEM ultimately chose Mitsubishi Electric because of the supplier's respected reputation in the industry, and customers have been excited with the ease and efficiency of the system. Wireless communication from the sizer to the box machine allows for flexible placement and workflows.

Thanks to Mitsubishi Electric's precision PLC and servo system, boxes can be quickly sized without manual guesswork, resulting in less wasted material. Most importantly, shipping cost analysis based on box size, weight, and delivery time is showing that right-sizing the box can save a significant amount in shipping costs.



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