

VALLEY CRAFT ENGINEERS CUSTOM CABINET MANIPULATOR
WITH A MOTOR CONTROL SYSTEM SUPPLIED BY
LAKELAND ENGINEERING EQUIPMENT COMPANY



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Custom Cabinet Lift Provides New Level of Safety & Efficiency



OVERVIEW

Valley Craft Industries was approached by a large manufacturer to create a completely customized cabinet lift to enhance the safety and efficiency of their manufacturing process. The equipment would require a complete motor control system. Being impressed with the level of knowledge and troubleshooting assistance they had received from Lakeland on previous projects, Valley Craft reached out to Lakeland Engineering Equipment Company.

Lakeland collaborated with the engineers at Valley Craft to select the right electrical components including a new technology to Valley Craft, the variable frequency drive. Valley Craft engineered and designed the cabinet manipulator to fit the exact specifications their customer needed while Lakeland assisted with selecting the electrical components to perform the necessary functionalities of the system.

GOALS

- To create a custom cabinet lift system
- Increase efficiency
- Reduce safety hazards
- Engineer custom grips fit to cabinet dimensions
- Find cost-competitive components for within the machine
- Start, pause and stop at precise contact points
- Accelerate and decelerate at exact speeds
- Delight the customer and deliver excellence in engineering and design

OUTCOME

Valley Craft designed and engineered a custom lift known as the cabinet manipulator – the first of its kind on the market. The safety-optimized material handling custom cabinet lift is complete with the capability to custom grip their cabinets, rotate them to precise contact points, start and stop the lift at exact speeds and withstand specific weight capacities.

THE STORY

Valley Craft Industries began engineering and manufacturing hand trucks approximately 50-years ago. Their dedication to safety first material handling, innovation and solving their customers' problems no matter how big the feat has held true to this day. Over the years, Valley Craft has expanded their capabilities with the majority of their business now consisting of custom engineered projects – unlike any available for purchase within the industry.

One of their focus areas is developing custom lifts for material handling. Valley Craft is different from their competitors because they have a tried and true standard lift. The standard lift design their engineers begin with is then taken to new levels by the vision and talent of their engineering team.

Designing & Engineering the Cabinet Manipulator

[Valley Craft](#) was approached by a large manufacturer to engineer a custom cabinet lift that was specifically built to fit their equipment. "At the time, they were using a hand truck to tip the cabinet on its back and then put components in," said Kurt Mehrkens, Design Engineer at Valley Craft. "This posed safety concerns for their employees and prolonged their manufacturing process."

The customer knew they needed a power drive lift that would perform these functions to enhance the safety of their material handling personnel and the efficiency of their manufacturing processes. "The concept was to have something that would grab onto the cabinet, lift it up, turn it on one side to put parts in, turn it on the other side to put parts in and then set it back down," explained Derek Holper, Engineering Manager at Valley Craft.

"There was nothing else like it on the market that performed the type of movements the customer required," said Derek. **"The cabinet manipulator is completely custom built to the customer's specifications including the dimensions, weight capacities and contact points."**



Selecting an Electrical Controls Distributor

The next step was to find a distributor that had the right components, knowledge, lead times and price to provide the complete motor control system. Kurt had worked with Lakeland at the company he was previously with. Being impressed with Lakeland's product line, knowledge and level of service, Kurt reached out to Lakeland to assist with this project.

"We had other distributors look at this project and Lakeland was the most competitive by far," said Kurt. **"It was the complete package with the motor, VFD, relay, proximity sensor and more."** Valley Craft completed the entire design and engineering of the custom cabinet lift and Lakeland supplied the complete electrical control package.



All of the components for the custom cabinet lift were fabricated in-house which allowed Valley Craft to meet the expectations of Valley Craft's manufacturing customer. "After the engineering design is complete, our lead times vary depending on the complexity of the project, but most custom projects are a 4 to 6-week lead time," Derek explained. "We completed the cabinet manipulator in just above 4-weeks."

"A lot of the electrical components we needed, Lakeland already had in-stock," said Kurt. **"The rest came in within one-week. This made all the difference when it came to meeting our timelines."**



*Pictured from left to right:
Kurt Mehrkens, Design Engineer; Karl
Schultz, Programming Engineer; Derek
Holper, Engineering Manager*

Capabilities of the Custom Cabinet Lift & Overcoming Challenges

The standard lift that Valley Craft used as a base model did not meet the specific speed needs of the customer. “When the cabinet lift is rotated, the standard system starts and stops really fast,” Kurt explained. “The manipulator was a big cabinet with lots of mass outside. When they rotated the cabinet, it was jerky and unsmooth.”

To overcome this concern, Lakeland suggested a variable frequency drive. The VFD is programmable and can slow or decelerate the motor on stop or accelerate the motor on start. “The variable speed allowed the custom cabinet lift to come to a stop at the exact speed the customer needed with the VFD that Lakeland provided,” said Derek. Watch the [cabinet manipulator rotation](#).

“We’re not an expert in VFDs, it’s a rather new technology for Valley Craft,” said Derek. “Lakeland helped us with this – they came to our facility to assist with programming the VFD. This process would have been a roadblock without them.”

Valley Craft used a Lenze i510 drive on the cabinet manipulator because of the small package, Electronic Programming Module (EPM) and user-friendly software that can be downloaded and replicated for use on future devices. The custom lift still required a motor, proximity sensor and circuit breaker.

Designing the Motor Control Package

With the speed of the cabinet lift now meeting the specifications, Valley Craft needed a component that would control the rotation of the cabinet to stop and start at precise locations. “The proximity sensor allowed the customer to start and stop the cabinet manipulator at the specific contact points the customer needed,” said Derek. Lakeland supplied the Pepperl & Fuchs Inductive Proximity Sensor to meet their needs.

In addition to the VFD and proximity sensor used, the system also needed a motor to run the hydraulic supply. Together, they selected a Brook Compton motor. To control the valves and solenoids, the high current rated IDEC ice cube relays met their specifications. With safety being a core component to the Lakeland Engineering and Valley Craft companies, a circuit breaker was also added for short circuit protection on the electrical components.



“Lakeland was easy to work with and knowledgeable,” said Kurt. “The parts were exactly what we needed and came in on-time.”

Enhancing the Cabinet Manipulator Functionality

The second time around was a smoother process for Valley Craft after working with Lakeland. **“Prior to this project we were hesitant to use VFDs – Lakeland made it easy,”** said Derek. **“Working with Lakeland has enhanced the capabilities we can provide for our customers.”**

After the production of the first system, Valley Craft took this opportunity to improve upon the already-impressive design for the second cabinet manipulator their customer needed. “We tweaked the front section to increase its stability (or rigidity),” said Derek. “Valley Craft also sent our customer the electrical components from Lakeland and the components we built in-house to retrofit the first unit. We did this at no cost to our customer.”

“Every custom we do adds another tool to the toolbox,” Derek exclaimed. **“We can draw on this experience for other lift designs. The tools gained from designing and engineering this custom project and working with Lakeland to find the right solutions can now be used for future projects.”**

Watch the cabinet manipulator grip, lift, rotate, start, stop [and more](#).

The Future of Valley Craft

While the majority of the work Valley Craft does is focused on custom design and engineering requests, they also engineer and manufacture a wide-variety of material handling and other equipment. The company was established in 1953 when Carl Weinmann introduced the first hand truck with a brake.



Over the last six decades, Valley Craft has grown to become a world class manufacturer known for its expertise in producing rugged and versatile hand trucks, carts, trailers, portable lifts, hydraulic drum handling devices, and storage equipment. Their warehouse is located in Lake City, Minnesota and is comprised of a heavy equipment material side and a side dedicated to cabinets, flat files and office products.

Valley Craft also recently released two exciting projects – a 12-gauge privately labeled cabinet and the [Collector's Edition Garage](#) line of high-end cabinets for residential storage. Valley Craft serves customers from large OEMs to window manufacturers, architecture firms, ad agencies and more.

The relationship with Lakeland and Valley Craft remains strong with continuous collaboration. To stay up-to-date on future inventions and projects from Valley Craft, or to learn more about this project, [contact Valley Craft Industries](#). For questions regarding this case study or the electrical components provided, [contact Lakeland Engineering Equipment Company](#).



Todd Spinner, Account Manager at Lakeland Engineering with the Valley Craft team