

## **Custom Cart with Height Adjustment Helps Videojet Improve First Pass Yield**

### ***Lifting column solution boosts production ergonomics***

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In the past, Videojet used carts consisting of wire boxes on wheels to move inkjet printing and laser marking products from station to station during the assembly process. The major problem with this approach was that the height of the work surface could not be adjusted so tall and short operators had difficulty reaching the printer for assembly operations. In addition, the cart was not able to store subassemblies that traveled with the printer so they had to be carried by hand and sometimes were misplaced. Videojet overcame this problem by building a custom cart using the Thomson LC2000 lifting column to move the work surface up and down for operator comfort and ergonomics. “We selected the LC2000 lifting column because it provides a very low retracted-length-to-stroke length ratio so it can easily accommodate operators from under five feet to well above six feet,” said John Forster, Principal Manufacturing Engineer at Videojet. The custom cart also includes shelves that hold the subassemblies that travel with the printer and incorporates electrostatic discharge (ESD) protection.

### ***Assembly line challenge***

Videojet Technologies Inc. is a leading manufacturer of coding, printing and laser marking products, fluids, and accessories for the product identification industry. Videojet has more than 325,000 continuous ink jet (CIJ), thermal ink jet (TIJ), case coding, thermal transfer overprinting (TTO) and laser marking units installed worldwide. The company builds numerous products at its Wood Dale, Illinois plant.

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Various models of CIJs, TIJs and laser markers are built on a particular Wood Dale line. The printers range in size from a shoebox to a mini refrigerator.

In manufacturing, VideoJet had recently moved from typical stationary workstations to using mobile cart workstations. However, Videojet operators expressed concern over the difficulties of working with the carts, primarily because they had difficulty either reaching up to or bending down to the printers in the carts. Engineers first considered purchasing a cart and looked at a number of off-the-shelf alternatives. Most readily available carts offered only a manual, mechanical height adjustment requiring extra time to adjust. This would also create difficulties for smaller operators when heavier products were on the cart. A few offered an electrical height adjustment but they were expensive and the amount of adjustment did not fully accommodate the differences in height among the operators. None of the carts offered for sale could accommodate the assemblies that travel with the printers.

## ***Designing a custom cart***

Engineers began looking at ways to make their own cart. The main challenge was finding a lifting column that could deliver the full range of motion required to accommodate the height differences between the company's shortest and tallest operators. They found the Thomson LC2000 lifting column, which moves from a compact collapsed position to a fully extended position along a single linear axis while achieving a retraction to extension ratio in excess of 2 to 1. The aesthetic design of the extruded aluminum profiles on the LC2000 allows it to be a visible component, which greatly reduced the effort and cost involved in building the custom carts.

The LC2000 is built around a telescoping lead screw driven by a geared DC motor. This design provides quiet operation and high load capacity with minimum current draw. Engineered polymer bushings are used as the guiding technology between the profiles, creating a high moment load capability in a compact envelope. The lifting column is maintenance free, has built-in end of stroke limit switches, and utilizes dynamic braking for short and consistent stops. With power off, the integrated load holding brake keeps the unit in position. An encoder option is available for

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synchronous operation of multiple columns, but was not needed for this single axis application.

## ***Prototype helps ensure operator buy-in***

“We have 12 operators on the line and making them all happy is not easy,” Forster said. “The quick delivery of the Thomson prototype helped us gain everyone’s buy-in. We made sure that everyone was happy before we built the first cart. The carts only cost us about ½ the amount of off-the-shelf carts, which would have also required considerable additional expense to adapt them to Videojet’s requirements.”

“We ordered 25 carts because that’s the maximum number of units that we have in process at any one time,” Forster said. “With the subassemblies traveling along with the printers, we have fewer mistakes and so our first pass yield has gone up and we are saving a lot of time in the re-work process. In the near future we are also going to mount our test stands on carts. The focal distance of our different models of laser marking systems can vary so today we have to take the laser off the cart and mount it on an adjustable test stand. In the future we will leave the laser on the cart and use the lifting column to achieve the right focal distance. By eliminating the test stands we will be able to double the number of lasers that we are able to test within the space available, doubling our productivity.”

## Image Captions:



The Thomson LC 2000 lifting columns are self-supporting and height adjustable lifting solutions in a compact, pre-aligned package, perfect for applications requiring telescopic motion.

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The LC 2000 provided an easy to install, low-cost ergonomic solution that increased operator comfort and productivity in the Videojet production line.



Operators expressed concern over the difficulties of working with the original carts, primarily because they had difficulty either reaching up to or bending down to the printers in the carts.