Fluid Dispensing

Collaboration with Altair results in high performance fluid dispensing within a small footprint

INDUSTRY - APPLICATION
Food & Beverage - Fluid Dispensing

APPLICATION DETAILS
Precision linear actuator controlling a fluid handling syringe pump.

CHALLENGE
Altair Engineering, a large design house based in Michigan, was tasked with modernizing outdated pneumatic technology on existing beverage machinery. To achieve this, they needed a precise, rapid, and highly customized linear-motion subassembly while reducing costs and improving throughput. Hygiene remains paramount in the food industry, and with the risk of incidental food contact, a "food friendly" actuator was required. Furthermore, a portion of the design was frozen before final motor selection, and this mandated a powerful actuator that had to fit in a tight footprint. As application testing progressed from dry testing to full fluid, the change in frictional forces from the fluid created unpredictable linear travel since the screw rotated relative to the plunger. Additionally, the application needed integrated feedback sensing, high force, and operated at a high speed.

WHY HAYDON KERK PITTMAN
- Highly customized actuator with aggressive speed/force/footprint specs
- Integrated guide elements/feedback devices designed with assembly/servicing in mind
- "Food friendly" advanced polymers and lubricants

SOLUTION
Facing a myriad of challenges, Altair teamed up with Haydon Kerk Pittman. The first step was to ensure the actuator generated enough force, so a custom Size 34 (87mm) hybrid non-captive actuator was selected. An integrated linear guide system was then created to prevent the screw from rotating while maintaining the target cost and staying within the permitted footprint. "Our Kerk tool engineers designed and molded a sliding bushing for the actuator's lead screw geometry along with an extruded guide tube for the bushing to travel in. With design for manufacturing in mind, we modified the rear end bell of the actuator to accommodate the guide tube. This small tweak gave the customer the ability to attach and detach guide-element components during the assembly process, overcoming the tight footprint constraints while eliminating the need for a costly redesign of the machine's enclosure." said Dan Kish, HKP's Sales Engineer for Altair.

The lead screw was also machined to include features specific to the customer's assembly wrench to further ease the build. To remain "food friendly," food grade grease was used for incidental food contact and a carbon fiber rotor insert was created and molded to meet high-speed and force specs. To simplify the customer's supply chain, the HKP solution included the two required custom pinout wiring harnesses. The feedback device and custom mounting were supplied as a kit to simplify assembly for Altair and keep assembly time to a minimum.

RESULTS
With prototyping complete, Haydon Kerk Pittman helped Altair create a reliable, precise, and lean machine, ideal for their food and beverage application. As said by Brian Brothers, Chief Engineer at Altair, "Our application was unique and required a custom solution. HKP worked with us very closely on ways we could design it."

- FOOD FRIENDLY
- SMALL FOOTPRINT
- HIGH SPEED & FORCE
- INTEGRATED FEEDBACK
- MODULAR GUIDE ELEMENT

"Our application was unique and required a custom solution. HKP worked with us very closely on ways we could design it."

Brian Brothers, Chief Engineer, Altair

To avoid a costly redesign of an existing machine frame, HKP provided a pivoting linear guide system which allowed multiple actuators to be installed in an extremely tight footprint while reducing build time and servicing hours.