QTRCO – Not Your Average

Early in his career, QTRCO founder, Ed Holtgraver worked at a large valve company where one of his engineering functions included field service, where he saw firsthand how the more robust, and even the more readily repaired products improved the users return on investment through reduced maintenance costs and especially, reduced down-time.

Jump forward 30+ years of valve and actuator experience, Holtgraver founded QTRCO, as an actuator manufacturer, in June of 1998. Aware of the multitudes of available actuators, Holtgraver successfully aimed QTRCO at the ¼ turn, stainless-steel market niche with a new type of reduced friction actuator design. Now celebrating its 21st anniversary, QTRCO has grown to include ¼ turn and linear actuators in both stainless steel and ductile iron materials in sizes up to ½ million pound-inches and 46,000 LbF with numerous unique features and options such as extreme cycle life, lock outs, worry free partial stroke testing and safety margin monitoring. Today QTRCO is known as a leading manufacturer in the valve actuator industry. Valve World Americas spoke to CEO & founder, Ed Holtgraver and VP Sales & Marketing Steve Bursmith to discuss the company's history of innovation.

By Sarah Bradley

Daring to Be Different

The First of its Kind

Twenty-one years after its founding, QTRCO continues to operate according to Holtgraver's original mandate: To supply safe, robust actuators of beneficially unique design, that contribute positively to the buyer's return on investment, whether for common every day or for the most extreme applications, and to back them with a bold, 3-year PERFORMANCE warranty.

In the early days, QTRCO manufactured only stainless steel 'Rack & Pinion' actuators in relatively small sizes. These differed so much from the typical actuator that QTRCO soon rebranded their actuator as Rack & Gear®. Once established, larger and smaller sizes were introduced and in a major move, a ductile iron construction option was added. Because machining gears is too costly for very large actuators, expanding to larger sizes required a scotch yoke type offering. Observing the market, Holtgraver saw that every scotch yoke actuator was nearly the same as the other. Offering another 'me too' was out of the question as it did not fit the QTRCO mandate of exceptionalism. Quite some time passed until, one Friday night, when an inspiration struck. A new, concept was suddenly apparent and by Monday a full 3D model was ready to prototype. Subsequent testing proved the value of the new concept that had fewer major components, fewer seals and bushings, zero side loading of the push rods plus the benefits and capabilities of the Rack & Gear® design but with unlimited torque capacities.

"One night the inspiration came to me. We came up with a new design that we believed outperformed all others on the market. As with our unique Rack & Gear® branding, and considering how greatly our new design differed from the typical scotch yoke actuator, we branded it as the Flat Yoke® design." The flat yoke design employs a scotch yoke mechanism, but it has a balanced dual lever, as opposed to the common single lever. "The major issue you face with the scotch yoke mechanism is that there is a tremendous amount of side load acting on the push rod, which has to be supported. The Flat Yoke® design transfers the side loading directly into the body, with no forces acting on the pushrod. Since we did not need the same type of push rod support structure as with the typical design, we are able to place a piston on both diagonals of the body which results in smaller and lighter actuators," said Bursmith. The design not only performs better, but it has fewer components, is less expensive to manufacture, and much easier to maintain. "Also, as with the Rack & Gear® design, repairing internal debris caused damage can be quickly performed in situ, without disturbing any accessories. There is even an added cost savings in that the cylinders are reversible, which effectively means that there are spare cylinders built into each spring return actuator."

Adhering to the safety mandate, QTRCO has focused on safe use and repair but also on enhancement of the customer process safety. Bursmith described the unique QTRCO tag out – lock out option that the user engages to prevent actuator operation, thereby allowing safe access to downstream piping. And he continued, "perhaps the most significant QTRCO safety related development, is our Xrciser® actuator that enables partial stroke testing with zero spurious trips and zero false diagnostic failures while providing useable diagnostics information. But even this capability has been expanded by co-development with Westlock of a controller, that combined with the Xrciser®, obsoletes the concept of partial stroke testing, replacing it with a much more beneficial test for Safety Margin to provide real knowledge of changes to valve and actuator performance while enabling advance planning of required maintenance. This capability will be displayed at Houston Valve World 2019."

Q Series Rack & Gear®

QTRCO's Q Series Rack & Gear® valve actuators' offset cylinders align the piston axis with the pinion gear pitch circle diameter, eliminating the cantilever forces inherent in rack and pinion type actuators. Low friction rollers maintain correct engagement of the stainless steel gearing for absolutely exceptional cycle life. The reduced friction enables outstanding throttling control as demonstrated in numerous "typical dia-

Actuator Manufacturer

Q SERIES

L SERIES

F SERIES

phragm actuator" applications, where corrosion or high vibration has required a better solution. One of the design features is a hollow shaft that enables passing long control valve shafts through and driving them from the top end, thereby providing a very compact valve and actuator package as compared to ¼ turn diaphragm actuators.

F Series Flat Yoke®

The F Series radically improved upon the ubiquitous scotch yoke actuator design via the first major technological advancement in decades.

The F Series valve actuators' patented slotted body concept absorbs 100% of the yoke mechanism's side loading forces, which leaves the piston rod completely free of bending stresses. This simultaneously allows termination of the rod at the yoke, and the addition of a weight and force balancing second force module diagonally offset from the first. The balanced weight makes lifting and handling of the actuators safer and easier, while reducing valve neck stress caused by unbalanced scotch yoke actuators. Internally, the balanced forces assure less friction and less wear, as there is no net force applied to the shaft bushings. Of interest is that the Flat Yoke® actuators readily passed the most stringent seismic tests required for nuclear applications.

By incorporating the patented flat yoke actuator mechanism, the F series offers higher torques for a given size and weight, ease of assembly, longer life, nearly unlimited cycles, high speed and excellent throttling capability.

Caring for the Customer

Perhaps the most telling thing confirming QTRCO actuator performance and QTRCO's confidence in the capabilities of their actuators, is the 3 year PERFORMANCE warranty. Bursmith points out that there are obviously very few QTRCO actuator failures as evidenced by the fact that we would have been driven out of business if our actuators did not hold up in service.

Holtgraver added that we use our ease of repair as a marketing tool, although few customers ever find it necessary to experience the benefits. We point out that the captured springs make it practical for repairs to be quickly made with the actuator still on the valve and without disturbing the accessories, that our seals are non-proprietary and that spare cylinders are effectively built into the spring return versions. Labor is obviously saved, but savings in down time can be massive.

QTRCO responsiveness is nearing legendary status. Bursmith points out that "in accord with Holtgraver's mandate, we respond the same day to customer requests, whether it be for quotations or any of the myriad reasons a customer may call." The QTRCO team believes they find the best solutions for their users; that is where the company shines. When a quote request comes in by email, it is responded to before the day is finished.

Proven Results

Holtgraver had an interesting experience a few years ago. When asked to visit a large chemical facility to demonstrate the QTRCO design, he saw that they literally had established an assembly line to rebuild the not QTRCO actuators they were using. Then one day a worker pointed out another actuator in their piping that never required repair. It was a QTRCO Q series and they had asked us to explain why this actuator was so dependable. As the world leaders in actuator technology, QTRCO regularly solves challenging performance problems such as:

Oil and Gas

On a drilling rig, a pre-load ballast system requires actuators to be submerged in up to 30 feet of seawater. In an investigation done by QTRCO, the actuators on a rig were allowing water ingress into the body cavity, which resulted in corrosion and premature wear of internal components. The Q Series stainless steel actuators were installed, in order to guarantee sealed internals capable of complete submersion to the specified depths. The body was not pressurized during operation and was vented topside. Actuators were pressure tested and operated while submerged with no signs of water ingress.

Power Generation

A gas turbine engine's inlet guide vane damper modulates position to vary air flow to the compressor. The large OEM prefers a linear pneumatic actuator for precise control, but spring and diaphragm models are large, expensive, and have a long lead-time. QTRCO offered its LDD08SR actuator as a direct bolt in alternative to the previous supplier's design. The compact design also allowed existing positioner and control devices to be used without any special mounting brackets or fasteners.

Chemical and Petrochemical

A plant was experiencing excessive air leakage from its 30 and 36-inch gate valve actuators, which resulted in USD $3,000 per month in power consumption by plant air compressors. Replacement parts were not available for the 70-year-old gate valves and actuators. The valves and actuators needed to be able to withstand high pressures and temperatures, combined with large pipe sizes, therefore making globe valves and ball valves impractical. The industry has adopted parallel slide gate valves for this service, but automation is challenging for these long travel valves. QTRCO suggested a custom-designed L Series linear actuator at 27 inches of travel, and delivered in solution in 10 weeks.

Food and Beverage

In a grape crushing facility, users require long-term reliability. Valves and actuators are cycled frequently during grape harvest, and are then dormant for several months each year. Q Series actuators are designed for high speed and high cycle service, while enabling long periods of dormancy without deterioration. The customer purchased more than 700 actuators for this high-cycle application. As a result, maintenance issues for actuators have become a thing of the past, with no failures in more than 15 years of service.

Pulp and Paper

The 'wet end' of a paper machine is where a slurry of fibers are filtered onto a continuous fabric loop to form a wet web of fiber, which is later pressed and dried to form a solid sheet in the paper-making process. The wet end creates harsh conditions for the materials and equipment used in the forming section of the paper machine. The vacuum system on the wet end is critical to forming the sheet, and providing a quality product. As the conditions are corrosive, conventional actuators do not last long in this service. QTRCO installed a Q Series actuator with a stainless steel design, which is made for longer service life and precise control.

Staying the Same

While QTRCO's business has progressed and grown throughout the past 21 years, Holtgraver expressed his desire to keep the 'small company feel and responsiveness'. "There are significant benefits to being a smaller, or privately-owned company. We are quick to respond to our customers, and we make decisions on the spot, without layers of management approvals. As for our original mandate, it has served us well and it will remain permanently integral to QTRCO.

The views and opinions expressed in this article are those of the profiled company and do not reflect the position of Valve World Americas.