



Rollon Gantry Robot Boosts Tire Bead Production

Bartell Machinery Systems is a global manufacturer of highly engineered industrial manufacturing equipment for the tire and rubber, oil and gas and wire and cable industries. With more than 75 years in business and over 8,500 machine builds, the company now offers a variety of automatic transfer and storage systems, bead handling systems and bead measuring equipment. For the pick-and-place component in one of its machines serving the tire and rubber industry, Bartell specified a custom Y-Z gantry robot from Rollon Corp. This particular Bartell machine makes tire beads—steel cables coated in rubber and wound to a particular geometric shape.

With the help of Rollon's gantry robot, the pick-and-place system transports finished tire beads to automated carts at the end of the production line. Bartell needed to automate this part of the process because the machine's cycle time is roughly four cycles per minute, far too fast for a shop floor worker to keep pace with.

Here's a closer look at how Rollon's gantry robot fit the bill:

A Fully-Customizable System

Bartell custom designs its machines to meet very specific application requirements and plant layouts. For the pick-and-place system in the tire beading operation, the robot system needed to be fully customizable. Bartell explored several options before deciding that a multi-axis system from Rollon was the best fit.

Rollon's Y-Z gantry robot moves anywhere from 3 to 6 meters horizontally, and 1.8 to 2.4 meters vertically. For the tire beading application, it is imperative that the actuator is not belt-driven and that it is quiet enough to meet the customer's stringent noise requirements. Belt drive actuators previously used in this application had failed due to high thrust forces. Further, due to the machine's long travel requirements, ball screws were not an option. After ruling out these two drive systems, it was determined that a rack and pinion design could handle the loads, and Rollon's Tecline actuator was specified for the job.

Stable & Precise Motion Guaranteed

Because the Tecline actuator used in this gantry robot features a rack and pinion design, there is no belt slippage or breakage to worry about. Instead, hardened sloping tooth racks guarantee stability and precise motion. In addition, the noise levels are well below Bartell's maximum allowable value of 75 dB. With regard to machine size, the two-meter vertical Z axis length requirement is easily achieved and offers the required level of torsional rigidity. Rollon's standard beam lengths can go up to 12 meters, with longer lengths available as jointed versions. The required acceleration of 2 m/s² and thrust force of 222 ft/lb. are well within Rollon's 10 m/s² and maximum load limit. In addition, a centralized lubrication system ensures that maintenance requirements are kept to a minimum.

About the Actuator

Because Rollon manufactures its custom linear modules to meet a wide range of application requirements, Tecline rack

and pinion actuators are designed to handle payloads from 5 to 2,000 kg. In addition to Bartell's tire bead transport system, Tecline actuators are easily integrated into other applications such as robotics, palletizing equipment, production lines and logistics and manufacturing machines with Cartesian axis movements.

Tecline actuators feature several benefits over competing designs:

- Quick and easy assembly.
- Simplified maintenance
- Wide range of integrated solutions.

- Fully customizable.
- Reliable technical support.

Actuator construction features solid beams made of extruded aluminum profiles, a high-performance aluminum casting alloy plate that is preset for tool assembly and fixed and oscillating roller slides that can be adjusted through an eccentric bushing. Other features include:

- Caged ball roller sliders. Systems are supplied with caged ball roller slides, which reduce friction between

the guide rail and slide, increase service life and minimize lubrication requirements.

- Perfect alignment. All profile anchor supports must be perfectly aligned. When mounting the linear axes in parallel, it is important to verify parallelism between the linear units themselves, as well as the coplanarity of all head surfaces.
- Permanent lubrication. Roller slides and V-shaped rollers come with a permanent lubrication system. When used properly, this feature eliminates the need for maintenance and increases the average service life of handling systems such as pick-and-place transport systems.

Box - Tecline Actuators at a Glance:

- Rack and pinion drive system achieves fast and silent movement.
- Hardened, sloping tooth racks guarantee stability and precise motion control.
- Flexible range of payloads possible - from 5 to 2,000 kg.
- Impressive speed and acceleration - max. speed of 4 m/s and max. acceleration of 10 m/s².
- Multiple beam lengths available to 12 m; longer beams possible as jointed versions.
- High torsional rigidity enables smooth and precise motion.
- Hardened and ground steel guide rails boost system stability and performance.
- Pre-assembled systems easily installed in 2 or 3 axis Cartesian robots.
- Safe, reliable motion guaranteed with sturdy adjustable-position safety stops with dampers.



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