



MANUFACTURING EQUIPMENT

RELIABLE ROTARY INDEXING

High quality and low footprint dial press enables component assembly.



LONG LIFE



ROTARY



EASE OF
MAINTENANCE



SPACE SAVING
DESIGN

MESH Automation Inc. is a machine integrator located in Dawsonville, GA. They design and build custom machines and robotic systems, but also offer pre-engineered platforms for “bolt-on” automation solutions. MESH values providing thoughtful process design and the use of quality components to achieve or exceed the project goals.

MESH was tasked with designing and building an assembly process for a range of power train components. The machine designers engineered a system that fed and assembled nine parts per component, with quick, no-tool changeover for the complete range of part sizes. Error-proofing and quality checks were implemented throughout the process.

MESH chose a dual-indexing dial process to handle the press assembly operations, with ABB robots providing much of the material handling.

CHALLENGE

RELIABLE ROTARY INDEXING MOTION WITH OPEN CENTER DESIGN

The rotary guidance system for the dials required not only load support, but a large open center. Each dial plate weighed 341 kg with tooling. Typical “C” press frames were required at six different locations on the dials, applying up to 13.3 kN of pressing force for several assembly operations.

Locating the press frames through the center of the dial would greatly enhance the ease of maintenance, changeover access, and operational visibility of the design. Therefore, it was critical that the rotary system provide a large internal opening to mount the presses.

Because there is a mechanism to assist in locating the fixtures, rotary precision and backlash are not a major challenge. However, the rigidity of the motion system required small indicated runout to keep the dial aligned with each press anvil.



PRT2 guide wheels run on the matching vee surfaces of the ring or track. The guide wheels can be mounted internally or externally to the ring.



PRT2 rings have several options for driving rotary motion. They can be undriven, rack driven, or driven by timing belts.

SOLUTION

PRT2 VEE GUIDE RING

MESH worked with Bishop-Wisecarver's motion system experts to assess the goals and challenges for this project, and provided local technical support tailored to MESH Automation's needs. From an understanding of the application specifics and success with similar designs, BW's experts recommended HepcoMotion PRT2 (Precision Ring and Track) systems for the rotary motion.

BW Application Engineers assisted the design team with sizing and selection. The solution was a PRT2 ring with an internal diameter of approximately 28.5" and an internal gear drive. The PRT2 ring uses vee guide technology, meaning it has angled edges that are supported by matching vee guide wheel bearings. The 4 bearings are located on the outside edge of the ring, providing easy access for maintenance.

CHALLENGE SOLVED

RELIABLE ROTARY TABLE PROVIDES DESIGN FLEXIBILITY AND EASE OF MAINTENANCE

The large open center of PRT2 ring systems provided ample space for mounting machine components. In fact, the PRT2 and Heavy Duty Ring and Track product lines offered by Bishop-Wisecarver include rings with open centers upwards of 56".

Bishop-Wisecarver and HepcoMotion solutions that use vee guide technology make it easy to install and maintain motion systems, whether they are rotary, linear, or using custom-shaped curvilinear track. This PRT2 system includes bearings that can disengage from the track, allowing the ring to be installed and removed easily. Plus, the bearings themselves can be readjusted over time to take out wear (or replaced entirely) in a matter of minutes using simple hand tools.

Where other solutions would have come out over budget, the PRT2 system met the challenge within budget. Additionally, the simplicity, reliability, and ease of maintenance of vee guide technology further lowers the Total Cost of Ownership over the system life.

QUANTIFIABLE RESULTS

BUILT TO EXCEL WELL INTO THE FUTURE

At the time the line was commissioned, all goals for cycle rate, OEE, and changeover had been met or exceeded. Additionally, the customer now has verifiable quality data and a repeatable assembly process. The design philosophy and highly reliable component selection will make it easy for the customer to continuously improve on the machine's performance. Thanks to MESH and Bishop-Wisecarver, the customer ended up with their process of the future that will allow them to be competitive for a long time.