Transformix Engineering blurs the lines between traditional assembly technologies with its CNCAssembly systems.

Transformix Engineering has rapidly built a reputation for bold product development. In 2014, the company introduced the CNCAssembly™ system, which represented a dramatic advancement in high-speed continuous motion assembly. The rotary assembly system offered servo-controlled flexibility, precision and repeatability – with 80 to 90 percent less tooling than typical systems on the market.

Less than 18 months later, the Canadian company built on its success to produce a transformational system that blurs the lines between traditional assembly technologies.

“We pride ourselves on aggressive research and development,” said Larry Allingham, vice president, Transformix Engineering. “In this case, we accelerated our timeline to meet a product orientation challenge that we could not easily address with our existing system. And in doing so, we expanded the power and scope of CNCAssembly far beyond our original expectations.”

Conventional automated assembly systems are highly customized and center on distinct technologies including continuous motion, intermittent motion, palletization and robotics. To achieve the radial part orientation their customer required, Transformix extended CNCAssembly beyond its continuous motion niche.

To solve the product orientation problem, the company developed a robotic workstation that integrates part delivery, orientation and placement on servo-based pallets at very high speeds.
“This initial solution ushered in our whole new approach to automated assembly,” Allingham explained. “Now, we can employ elements of continuous motion and simultaneously use indexing, robotics and palletization.”

Unique in the industry, CNCAssembly patented systems are formed by combining any number of standard work cells called “engines.” These engines can be equipped with application-specific adaptations – and quickly configured to address a wide range of requirements.

“Much like an injection molding press, a CNCAssembly system is a standard asset that can be reconfigured with a relatively small amount of retooling and programming,” said Allingham. “It’s an investment built for long-term efficiency and flexibility.”

Based on the Rockwell Automation Integrated Architecture® system, each CNCAssembly engine features a self-contained control package including an Allen-Bradley® ControlLogix® controller, Kinetix® 6500 servo drives and MP-Series™ servo motors, and LDL-Series™ linear servo motors.

For palletization, Rockwell Automation iTRAK® technology combines linear and rotary motion to enable the independent control of multiple magnetically propelled movers. The system’s iTRAK servo transport engine is completely programmable for deceleration, speed and positioning.

The CNCAssembly system is integrated on an EtherNet/IP™ network and monitored on an Allen-Bradley PanelView™ Plus 6 graphic terminal.

“Since each work cell or engine has its own control package, there is no limit to the number of engines that can be deployed in a given CNCAssembly system,” said Allingham. “And by standardizing on a Rockwell Automation control architecture, we can achieve high-speed, precise motion synchronization throughout.”

In fact, Transformix developed their own robotic technology to best exploit the communication speed of the Rockwell Automation architecture.

“We investigated a number of commercially available spider robots,” Allingham explained. “However, those robots actually provided more range of motion than we needed – and were not able to achieve the speed and positional accuracy required.”

By developing their own technology, Transformix was able to better match robotic performance to application requirements and build a more robust and accurate system.

“And since our robotic engine uses the same Rockwell Automation control architecture as the rest of the system, we were confident we would be able to achieve the required communication speeds for a range of applications,” Allingham said.

The highly flexible system can be deployed to meet an extensive span of rate requirements – from 10 parts per minute to 2000 parts per minute depending on assembly complexity.

During the design phase of their system, Transformix used Motion Analyzer software, a tool developed by Rockwell Automation to analyze, optimize, simulate and select motion control systems. Using Motion Analyzer with SOLIDWORKS® 3D CAD software, Transformix creates visual simulations with actual motion profiles to help ensure systems function correctly. SolidWorks is a Rockwell Automation Encompass™ Product Partner.

Throughout system development, Transformix also tapped the expertise of Rockwell Automation Global OEM Technical Consultants (GOTCs).

“On a technical basis, we were pleased with the access our company had to Rockwell Automation product developers,” Allingham said. “And as we expand our market in Europe, we will rely on Rockwell Automation to help provide the training and support our customers require. That’s one of the advantages of working with a global company.”

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