

INNOVATIVE CONVEYING SYSTEM REDUCES COST, IMPROVES FLEXIBILITY IN AUTOMATED ASSEMBLY SYSTEM FOR A MEDICAL DEVICE

SYSTEMATIX Inc. designs and builds automated assembly and test systems for the demanding transportation and health science industries. When a prominent medical device customer engaged us to provide a fully automated system for manufacturing a single-use medical device containing a needle and vial, we turned to one of our technology partners to explore how the MagneMover® LITE (MM LITE™) Intelligent Transport System by Rockwell Automation could help us achieve the customer's requirements for flexibility, accuracy and cost reduction.

A Multi-faceted Manufacturing Challenge

The process consisted of mechanical assembly, adhesive application and cure, and robotic placement into packaging at the end of the line. There was also a concern with inspecting the incoming glass vials for cracks before and after assembly so that rejects could be identified before further processing.

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Rob Veldhuis, Director of Sales

The customer's requirements for the finished system were demanding and had to meet a prescribed return on investment. Specifications included:

- Assembly of a complex product with consistent accuracy
- 100% inspection of incoming parts and in-process assemblies with inline reject processing
- 2.5 second cycle time
- ISO 7 (Class 10,000) clean room compatible
- Multiple product types with minimal changeover
- Single operator to reduce operating costs
- Reduced scheduled maintenance and spares requirements
- Maximized Mean Time Between Failures (MTBF)
- Reduced cost and effort for validation process

Innovation Partnerships for Best Solutions

Through innovative engineering and the integration of the MM LITE flexible conveying platform, SYSTEMATIX achieved the reduction in overall capital expense outlay, and exceeded customer expectations with 100% inspection of incoming parts and assembly processes, flexibility to handle different



assemblies, ability to scale up as needed, operation by one person, and low setup and maintenance costs. Plus, with expert controls integration, validation was achieved ahead of schedule at a lower cost than anticipated.

Sensing and Measuring in Place

SYSTEMATIX integrated sensing, measuring and inspection operations throughout the line, using various technologies to monitor the process, including:

- Mechanical gripping devices that sense part presence
- Load cells and LVDTs to measure force/displacement and ensure processes produce the correct profiles
- Machine vision to detect nonconforming parts for immediate rejection,
- Process monitoring and product integrity verification throughout

PROCESS OPTIMIZATION

SUCCESS STORY

The MM LITE linear synchronous motor intelligent transport system

The MM LITE system consists of individual carriers, a guideway, and the electronics that control the motion. MM LITE operates on the principle of linear synchronous motor technology. A conventional electric motor consists of a cylindrical stationary part on the outside and a moving part inside, which rotates. A linear synchronous motor is similar, but the stationary part of the motor contains electrical windings. The carrier is the moving part and travels in either direction along the motor.

Modular motors and guideway segments fit together like model train tracks, at the same time making the necessary electrical connections. The system's compact size allows for a smaller footprint. The control system manages the speed and direction of each carrier individually and keeps track of its location. The carriers are the only moving parts of the MM LITE system; they operate with a very low coefficient of friction, and do not require lubrication, a definite advantage in the clean-room environment.

In the new assembly automation system, MM LITE carriers are fitted with fixtures

to handle the two product orientations used during assembly. The carriers have a payload capacity of 1 kg (2.2 lb.) and can travel at speeds up to 2 m/s (6.5 ft/s). Since the carriers move independently, they provide maximum flexibility to the conveying system, allowing optimal use of each process station, as well as the ability to buffer product between stations as needed. The use of a diversion module simplifies the removal of rejected parts from the main line.

A Satisfied Customer

The flexible automation system from SYSTEMATIX met or exceeded the customer's original requirements. The use of MM LITE resulted in improvements and 28% savings over a conventional fixed-automation solution including:

- Simpler mechanics
- Only one operator required
- Floor space reduced by 50%
- Validation cost reduced by 46%
- Flexible process for assembling multiple products
- Reduction in costs for scheduled maintenance
- Improved MTBF

"Using MagneMotion's MM LITE system gives us a unique advantage over power-and-free or indexing motion platforms," said Rob Veldhuis, Director of Sales at SYSTEMATIX. "The ability to move both asynchronously and synchronously enables one-up, two-up, or three-up processing. We can balance the line without redundant stations and save significant overall project costs."



FOR MORE INFORMATION:

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