

A close-up, low-angle shot of a white industrial robotic arm with a blue gripper, positioned in a factory environment. The arm is the central focus, with various cables and mechanical components visible. The background is slightly blurred, showing other industrial equipment and overhead lighting. The image is overlaid with semi-transparent geometric shapes (hexagons and polygons) in shades of blue and white, which serve as a design element for the text.

CASE STUDY

Therapeutic Device Assembly – Ventilation Technology

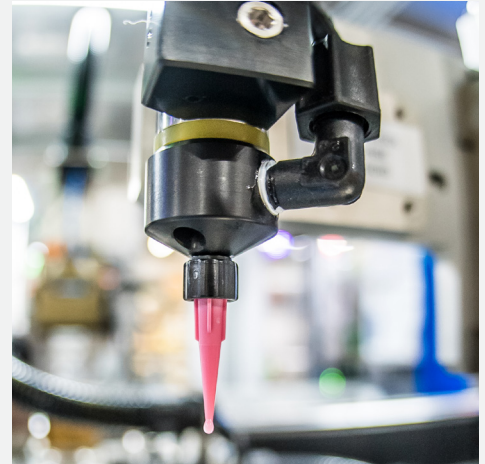
Automation NTH

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Introduction

Hamilton Medical Inc., a global leader in ventilator and respiratory care device manufacturing, partnered with Automation NTH to address rising demand following the exit of two major competitors in the market. The company sought a fully automated solution to meet aggressive production goals for its Flow Sensor Tube assemblies.



Overview

Automation NTH designed and implemented a high-speed, fully automated assembly system to minimize manual labor and improve quality assurance across multiple product skus.. This system leveraged precision robotics, vision systems, and advanced material handling to streamline operations and enhance product consistency.



CHALLENGES

High Performance

The system required a 10 second part to part cycle time with greater than 85% OEE, ensuring 95% performance across quality, availability, and productivity.

Quality Assurance

Defect rates across multiple assembly stations required less than 1% rejects to meet quality standards.

Operator Autonomy

To reduce labor involvement, operators can load 40 minutes worth of material at once, minimizing manual interaction and maximizing OEE.

Product Sensitivity

Flexible tubing presents unique challenges due to its physical memory from coiling, temperature-sensitive behavior, and strict limitations on contact materials.

Safety Requirements

The system needs to be fully guarded to ensure operator safety during all interactions. The guarding also needed to provide easy access for change over and maintenance.



SOLUTIONS

Automation NTH delivered a robust automated cell using its ISO-compliant and cleanroom ready FLEXBASE platform as the foundation. Key components of the system include:

Advanced Material Handling:

- Integrated asynchronous intelligent transport system enables high-speed, precise movement of parts between stations.
- Custom tube de-reelers and shuttle-based winding systems allow operators to pre-load up to 40 minutes of material without interruption.

Intuitive Operator Interface:

- The system features an Ignition HMI with high-quality graphics for intuitive navigation and seamless operation.
- Real-time feedback from robots, servos, mandrel heaters, and vision systems enables intuitive parameter adjustments on the HMI.

Vision-Guided Quality Control:

- AI Vision systems driven conduct dual-stage quality checks:
 - The first camera confirms proper tube insertion.
 - The second camera verifies that each printed label meets exact OCR & OCV and recipe standards.

Robotic Precision and Flexibility:

- Intelligent feeding systems and robots automate tube handling and component loading.
- A 6-axis robot picks parts from hundreds of palletized Flow Sensor positions, applies precise adhesive using micro dispensers, and orients components to prevent glue roll-off prior to final placement.
- Custom end of arm tooling with integrated pneumatics ensures reliable loading, positioning, and winding of tubing on each shuttle.



RESULTS

System Flexibility:

- Configurable for a variety of lengths across multiple part numbers, providing adaptability for evolving product lines.

Compact Footprint:

- Replaces a 10' x 48' legacy system with a compact 14' x 20' footprint.
- Frees up valuable cleanroom space while doubling production.

Quality and Compliance:

- AI-driven vision tools reduce defect rates to meet stringent quality standards.
- Strict compliance requirements are upheld across all material operations.

Operator Workflow Improvements:

- 40-minute walk-away time improves operator autonomy and reduces operator fatigue.
- Sliding drawers and easy-access guard doors streamline material loading and maintenance.

Production Efficiency:

- Achieves 10 second part-to-part cycle times at target OEE, exceeding production demands at scale.
- Asynchronous motion and multi-up stations reduce idle time and maximize throughput.

CONCLUSION

Hamilton Medical's new Flow Sensor Tube Assembly System transformed its production capabilities. The fully automated, high-speed solution delivers superior quality, increases operator autonomy, and fits within a cleanroom compliant, scalable footprint. Automation NTH's ability to engineer reliable and precise solutions for complex, flexible materials underscores its role as a trusted partner for critical medical device manufacturing automation.



About NTH

Founded in 1999, Automation NTH is a trusted partner in automation for manufacturers, with our headquarters located just outside of Nashville, TN and additional offices in San Diego, CA. Our expertise transforms your manufacturing operations from manual processes to semi-automated and fully automated production. Whether scaling up from individual work cells or introducing fully integrated production lines, we deliver solutions that drive cost savings, enhance efficiency, and minimize risks. With a strong focus on robotics and controls, we ensure timely delivery of projects with strict adherence to budget.

Key markets we serve include:



Medical
Diagnostics



Drug Delivery
Systems



Wearable
Devices



Therapeutic
Devices



Vascular
Technologies

Our innovative approaches improve production capacity, product quality, and enable operator autonomy.

Our Solutions:

- Customized Automation: Scalable production solutions for complex products.
- Proof of Principle Creation: Validating manufacturing processes before full automation.
- Scalable Production: From semi-manual cells to full automation.

Services We Provide:



Custom Automation



Automation Consulting



Equipment Optimization

Engineering Your Edge, Together!

Contact Us today at sales@automationnth.com