



# Medical Device Assembly – Precision Micro Winding

Automation NTH



## TABLE OF CONTENTS

<b>OVERVIEW.....</b>	<b>3</b>
<b>CHALLENGES.....</b>	<b>4</b>
<b>SOLUTIONS .....</b>	<b>5</b>
<b>RESULTS.....</b>	<b>6</b>
<b>CONCLUSION .....</b>	<b>6</b>
<b>ABOUT NTH .....</b>	<b>7</b>

# OVERVIEW

A leading Medical Device manufacturer approached Automation NTH with the need for a semiautomated Machine that winds various Nitinol wires around a irregular shaped mandrels.



The machine needed to handle multiple different products all with a sub 1 mm pitch on the winds of the nitinol wire. The previous process required extensive manual rework, driving the need for automation



# CHALLENGES

## Compact Footprint

The entire cell had to fit within a 5' x 7' space, ensuring minimal use of valuable cleanroom real estate.

## Efficient Recipe Changeover

Recipe driven product change with minimal changeover time.

## Automatic Rework

Has the ability to detect small errors in wind pitch and correct them with a rewind function.

## International Requirements

Fully UL and CE Compliant machine ready to be deployed to the European market.

## No Margin for Error

Inline vision inspection needed to confirm recipe wind pitch within 100 Micron Tolerance.

## Operator-Friendly Loading

Accept various types of pre-coiled wire to be loaded manually for cycle prep. Accept different sizes of mandrels to be wound.



# SOLUTIONS

To meet these stringent requirements, Automation NTH utilized their FlexBase platform: a reliable, scalable foundation ready to integrate a high-performance vision system, precision servo driven linear positioners, and a large touchscreen HMI powered by Ignition for important process information and control over the machine. This solution offered several key advantages:

## High Precision Linear Actuators With Allen Bradley Servos

- Provided a high level of control over the process resulting in controlled and repeatable winding.
- Fast recipe driven changeover between products. The system positions tooling exactly where required for the new product with the push of a button.

## Automated Operations

- Using Ignition Front End on a Tangent VITA KW 21 Flex-Arm mounted PC, the operator initiates the cycle prep and start with a simple push of a button.
- The system automatically unlocks the safety guard doors at the end of a cycle, and then moves to the recipe start after the operator has removed the previous part.

## Vision-Guided Verification

- Integrated vision system confirms incoming product was loaded correctly before allowing the process to start.
- The vision system inspects continuously during the winding process to confirm that the wire is being wound within spec. This results in over 3000 individual measurements being made on a single part.
- Inspection images from the vision system are integrated into the Ignition HMI allowing the system to display images to the operators allowing them to make an informed decision on product non-conformity.
- Continuous inspection of the process resulted in the customer having a better understanding of the variance of incoming material.

## Thoughtful Machine Design

- Operators were able to run off the machine for acceptance testing with minimal training necessary.
- Machine was installed into the customers cleanroom and finished acceptance testing in less than 3 days.
- Only two quick changeout components required for product changeover taking less than 90 seconds.
- Easy access and removable high wear components





# RESULTS

## Streamlined Workflow

Vision-based verification improved product accuracy and quality control.

## Compact Footprint

The entire system fit within the 4' x 6' footprint, maximizing floor space efficiency.

## Operator-Friendly Design

The intuitive Ignition Front End interface and complete hands off during the main cycle enhanced operator efficiency and reduced fatigue.

## Enhanced Operator Safety

Previous pieces of equipment the customer wanted replaced did not have the required safety systems in place.

The Spindle Winding Assembly Machine prevents operator entry during servo motion with magnetic safety locking guard doors

# CONCLUSION

Automation NTH's Spindle Winding Assembly Machine demonstrates how advanced automation and precision servo driven systems can improve efficiency and quality of complicated product transformations.

The solution offers superior quality, safety, and operator efficiency—all within a compact and thoughtful design.



# 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](mailto:sales@automationnth.com)