



## METICULOUS ASSEMBLY FOR LIFE-SAVING RESULTS



### ABOUT THE CUSTOMER:

*A pioneer in blood gas testing, our customer is a leading developer and manufacturer of solutions for blood sampling, analysis, transcutaneous monitoring and immunoassay testing. Today, they are a prominent provider of innovative instrumentation for hospitals, clinics and laboratories worldwide.*

### CHALLENGE

**In situations where people are not given the luxury of time, blood test results are required quickly. Our customer has developed an analyser that provides results within minutes.**

Such an environment needs to be kept completely clean and defect-free. Blood samples are collected and stored in individual containers and depending on the required specifications, each container may vary by the smallest measurements. A station was requested by the customer to assemble and verify these containers so that each one is built to the exact measurement, completely clear of any imperfections.

**This assembly station needed to ensure the following:**

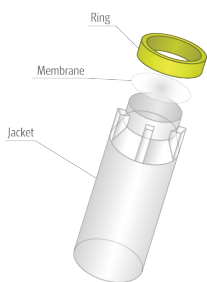
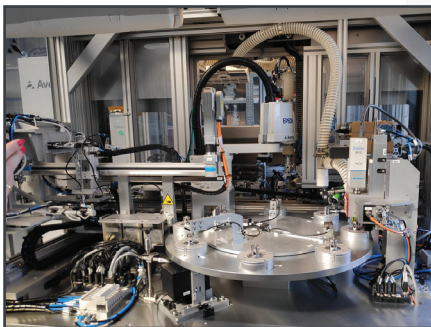
- Each container is assembled properly with each component of the container properly selected and installed.
- The containers and environment remain free of dirt, particles, & scratches which can be invisible to the human eye.
- Fast cycle time to produce results quickly.
- Zero operator intervention with an automated scrapping process.

### RESULTS

THE CLIENT WENT FROM MANAGING ASSEMBLY MANUALLY WHICH SLOWED PRODUCTION DOWN AND INCREASED THE RISK OF CONTAMINATION TO A **FULLY AUTOMATED PROCESS** IN THE SAFETY OF A CLEAN ROOM. BENEFITING FROM AVERNA'S EXTENSIVE EXPERTISE IN **HIGHLY SOPHISTICATED VISION INSPECTION SYSTEMS** THE NEED FOR OPERATOR INTERVENTION WAS ELIMINATED COMPLETELY WHILE INCREASING THE VOLUME AND QUALITY OF PRODUCTION. **MULTIPLE UNITS ARE FLAWLESSLY ASSEMBLED SIMULTANEOUSLY**, COMPENSATING FOR LIMITED PRODUCTION RESOURCES. ALL RESULTS ARE LOGGED IN DATA FILES AND PICTURES THEN AUTOMATICALLY TRANSMITTED FOR ANALYSIS. THE ASSEMBLY AND VERIFICATION STATIONS HAVE INCREASED STABILITY THROUGHOUT THE MANUFACTURING FLOOR AND **DELIVER PREDICTABILITY** IN RELIABLE RESULTS.

## RESULTS DRIVEN BY LIFE ALTERING DATA

*In life sciences, accuracy and speed are essential to the well-being of each subject. Patients waiting for the results of their blood tests do not have the time to risk inaccuracies in the data they are provided. When follow up actions need to be taken, the starting point begins by determining what is being treated. There is never a time for ambivalence based on improper machinery or interferences.*



## THE AVERNA SOLUTION

A fully automated chamber was designed to first assemble the receptacle or “jacket” which consist of 3 parts, the plastic container, a flexible ring that must be placed within a specific depth and a thin piece of membrane allowing for different levels of stretch-ability. The entire jacket measures no more than 3 cms. Once the parameters are entered, the jacket is then assembled, glued and verified using vision inspection to ensure every defect is caught. This includes:

1. **Proper assembly.**
2. **Dirt, particles, & scratches which can be invisible to the human eye.**
3. **Ensuring the proper color ring is selected as they coded by the associated enzymes.**
4. **Controlling the depth of the ring when inserted into the jacket.**
5. **Verification of the membrane when stretched on to the jacket.**

Using an Epson robot, Beckhoff PLC and powered by NI LabVIEW, the vision station first assembles the 3 components of the jacket, verifying the correct pieces are selected and securely fastened without any indication of the glue. The membrane is then verified for defects including scratches, particles or tears. Any scraps are sorted into separate compartments, labelling the reason for the rejection.

With limited production resources, automation was the key to stabilize production and produce quick, consistent results. A cycle is complete within 10 seconds, assembling 8 jackets simultaneously. The assembly station follows the following process:

### First set of sequences executed in parallel:

- The jackets are transported via vibration feeder to be selected for the jacket nest.
- The rings are transported via vibration feeder to be selected for the ring nest.
- The membranes are transported on a fixture above the assembly nest.

### Second set of sequences executed in parallel:

- Visual inspection verifies the position of the jackets within the pick up nest and aligns them for a robotic arm to place each jacket in the proper orientation. The arm then brings the jacket in position above the assembly nest.
- A color sensor validates the ring color according to the product specification and determines if it is useable or if it should be scrapped. If the color is accurate, it is placed in the assembly nest.
- The quality of the membrane is checked by visual inspection and follows the same process as the ring.

Following these sequences, the robotic arm handles each jacket above the assembly nest, the membrane is placed between the jacket and assembly nest, while the ring is inserted in the assembly nest, just below membrane. The arm is then driven down to stretch the membrane across the jacket and firmly secured with the ring.

Lastly, the table rotates for the assembled product to receive final inspection and once complete is sorted based on its assembly status. The passed product continues to the main line while failed jackets are scrapped and sorted to one of three boxes that indicate the reason of the failure.