Project Overview

**Problem:** Masimo needs to streamline their current process of inserting adhesive sensors into pouches. Presently this process is completed by an operator that prepares an adhesive sensor, manually opens a pouch to insert the sensor, and then places the filled pouch into a bin.

**Solution:** To increase the production volume, speed, and accuracy Team Bondi has designed an automated pouch opener/presenter for Masimo to implement into their facilities that utilizes pneumatics to grab a pouch from a designated hopper and then opens and presents the pouch to an operator for sensor insert.

Team Members

- Zachary Casteel  MI Team Lead
- Hans Mominuddin  Testing/Analysis
- Jessica Giese  Design/Research
- Joshua Arora  Manufacturing/Quality
- Cline Fougarty  Manufacturing/Assembly
- Branden Hooper  ECE Team Lead
- Timmo Trink  Software Integration
- Bryan Lopez-Corona  Electrical Integration
- Ryan Wilson  Power Systems
- Abdalali Alid  Hardware

CAD Models

- System Assembly
- Actuator Subassembly
- Hopper Subassembly

System Process

1. The hopper is filled with pouches.
2. The operator starts APOP system using HMI.
3. The linear actuator extends to suction on to pouch.
4. The linear actuator extends to the stationary suction cups.
5. The linear actuator rotates the linear actuator assembly 90°.
6. The operator places a medical sensor in the opened pouch.
7. As suction is applied to both sides of the pouch the linear actuator retract to open the pouch.
8. The filled pouch is dropped below into a bin.
9. The number of pouches processed successfully.
10. Dimensions of the pouch being processed.
11. On-screen buttons for start and stop.
12. System Status (idle, operational, warning, error).
13. Status messages.

Enclosure Diagram

- Controller
- Panasonic AFP0HC32EP PLC Module
- Zebra FS20 Barcode Scanner
- 2x Magnetic Position Sensors
- 6x 24VDC Relays
- Zebra 3005T Label Printer
- Ethernet Switch
- 120VAC to 24VDC Power Supply
- 3 Port/2 Way Solenoid Valve
- 2x Flow Control Valves
- Safety Light Curtain
- 5x Magnetic Position Sensors
- 2x Flow Control Valves
- External Interface

Meet the Sponsor

Masimo is a global medical device company headquartered in Irvine, CA that creates over a hundred million adhesive sensors each year.

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System Level Diagram

- HMI Touchscreen Display
- Air Compressor
- Pneumatic Rotary Actuator
- 2x Magnetic Position Sensors
- 3 Port/2 Way Solenoid Valve
- Safety Relay
- Vertical Gravity Fed Hopper System
- 6x 24VDC Relays
- 5 Port/3 Way Solenoid Valve
- Air Prep Unit
- Safety Light Curtain
- 2x Flow Control Valves
- Vacuum Generator
- External Interface