

Medical Component Assembly System

Background

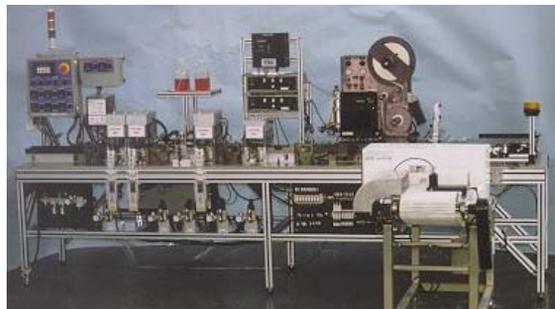
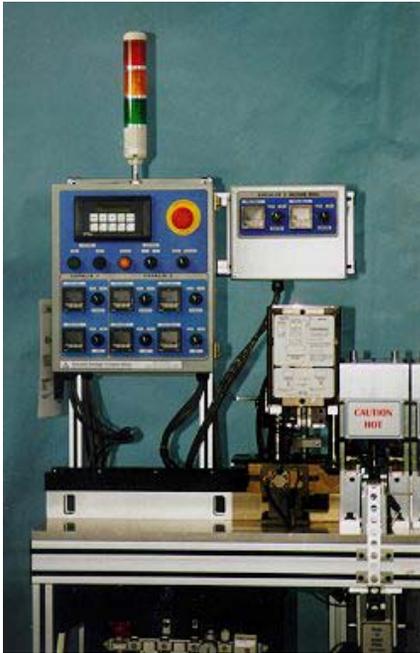
Advent Design's client developed a new medical diagnostic instrument which included a disposable reagent vessel preloaded with buffer solutions and stir bars. Our customer required an automated assembly system to produce the consumable vessel at a rate of 30 pieces per minute.

System Description

Advent designed, built, and installed two manufacturing systems for the consumable component of a new medical diagnostic instrument. The first-generation machine produced a single cavity vessel for the initial instrument release. The second-generation machine was capable of producing both the first generation and second generation vessels, the latter being a four-cavity vessel. The transport mechanism for the vessels was a multi-vessel based pallet with a pneumatic walking mechanism which indexed the pallet vessel to vessel. This allowed an accumulation of 1000+ vessels in a drying oven for an upstream process.

The second-generation system performed the following operations:

- Pallets of 20 vessels were fed into the system.
- A stir bar was cut and deposited into the first cavity. The stir bar station was capable of producing a stir bar as short as .20".
- Two cavities were sealed with a heat activated foil cover.
- Two cavities were filled with a buffer solution. IVEC dispensers were used for liquid handling.
- Foil seals were diecut and thermally sealed over the last two cavities.
- A sequentially bar coded label was applied to the top lip of the vessel.
- Barcode label presence was verified, and barcode sequence validated.
- Individual vessels were ejected from the pallet, onto an exit conveyor. Rejects remained in the pallet for operator removal.
- Vessels passed through a metal detector to detect the presence of the stir bar. Rejects were removed from the belt.
- The stream of good parts were then counted, and directed into a pouching machine.
- A pouching machine was included with the system and packaged 25 vessels to a pouch.



Impact

The challenge with the first generation machine was a very tight implementation schedule. The machine was designed, built, and acceptance tested in 16 weeks. With the lessons learned from the first machine, Advent increased the throughput of the second-generation machine from 30 to 45 vessels per minute.

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