

# Smoke Detector Sensor Base Assembly System

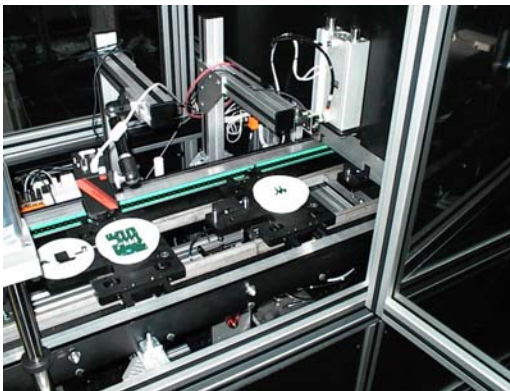
## Background

Advent Design's client manufactures a variety of fire protection devices. The base of their smoke detector product line required a significant amount of labor to assemble and test, and our customer requested an automated assembly and test system for the product.



## System Description

Advent designed, built and installed a system to automatically assemble and package the smoke detector sensor base. The system utilizes a synchronous pallet conveyor transport mechanism. The pallet conveyor system allows for the movement of product from station to station and provides holding clips for products containing wires. The system is designed to handle 5 different product styles.

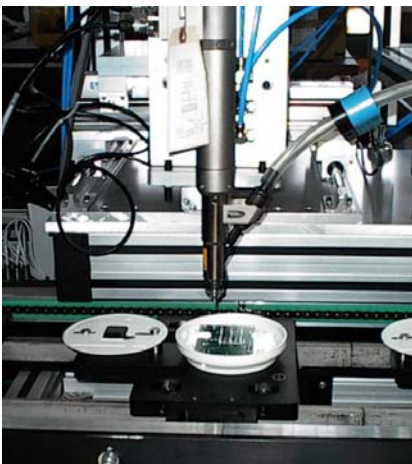


2D Barcode, Cover Place, Laser Mark

The sensor base consists of a number of large components that are not economical to automatically load into the system. To further complicate matters some of the sensor base models include printed circuit boards containing wires. Advent designed the system to minimize component feeding costs and system complexity by utilizing operators to manually feed these components while automating operations which could not be performed manually or were very repetitive and offered a good return on investment.

Following is a brief description of the operations performed by the system:

1. Infeed – Operators manually load the sensor base housing, printed circuit board, and back cover onto a pallet. If the product contains wires the operator secures the end of the wires into a clip on the pallet.
2. Automatically feed and drive two sems screws.
3. Automatically feed and drive four torx screws.
4. Read 2D ID Matrix bar code on PCB. This information is used to setup the Teradyne circuit board tester.
5. Configure Teradyne test system, and test circuit board.
6. Flip back cover onto housing.
7. Laser print 2D ID Matrix bar code and product specifications on cover.
8. Ultrasonically weld cover to housing
9. Automatically feed mounting screws into a pre-formed bag
10. Feed finished sensor base into pre-formed bag
11. Feed instruction sheet into the sensor base bag.
12. Seal bag.
13. Eject finished product.
14. Reject product that failed during any of the automated assembly operations or test.



Automatic Screwdriving

## Impact

The automated sensor base assembly system is capable of producing approximately 1 million units per year, using two operators. The system, now in production, has been running with an uptime of 96 to 98 percent.

**Custom Engineering Solutions**



**Advent Design**  
Corporation