

High flexibility and practical use of the latest technologies are key attributes of this highly automated non-synchronous assembly and test system. It was conceived, designed, and built to accommodate multiple steering column model variations . . . with the ability to add virtually any number of product variations. There is no hardware changeover time between models. The system can be programmed to assemble and test any combination of models. The system was designed for the easy addition of automatic stations for future production. This flexibility, coupled with robotic capabilities, provides the customer with significant processing options.



System Highlights

Applied technologies and system features include:

- Three robots, with integral vision systems, pick and place a variety of components from specially designed, vacuum-formed, polyethylene dunnage
- Product identification and reporting system, using bar code labels and assembly data to capture important information on each unit; bar code scanning of incoming dunnage verifies the correct parts for each model being produced
- RF tag system for product tracking
- Manual Repair stations (conveyor spurs) at every station allow off-line repairs and re-entry of partially assembled units; Panel View monitors with color CRTs and keypads at each station assure clear, straightforward operator interface . . . the monitors guide operators through the proper corrective steps for needed repairs
- Force monitoring of all press operations ensure desired results
- Torque and angle monitoring of all fastening processes uses DC tools
- A vision system with six cameras checks quality of assembled units
- The system is controlled with one Allen-Bradley PLC 5 Controller System with remote I/O configuration

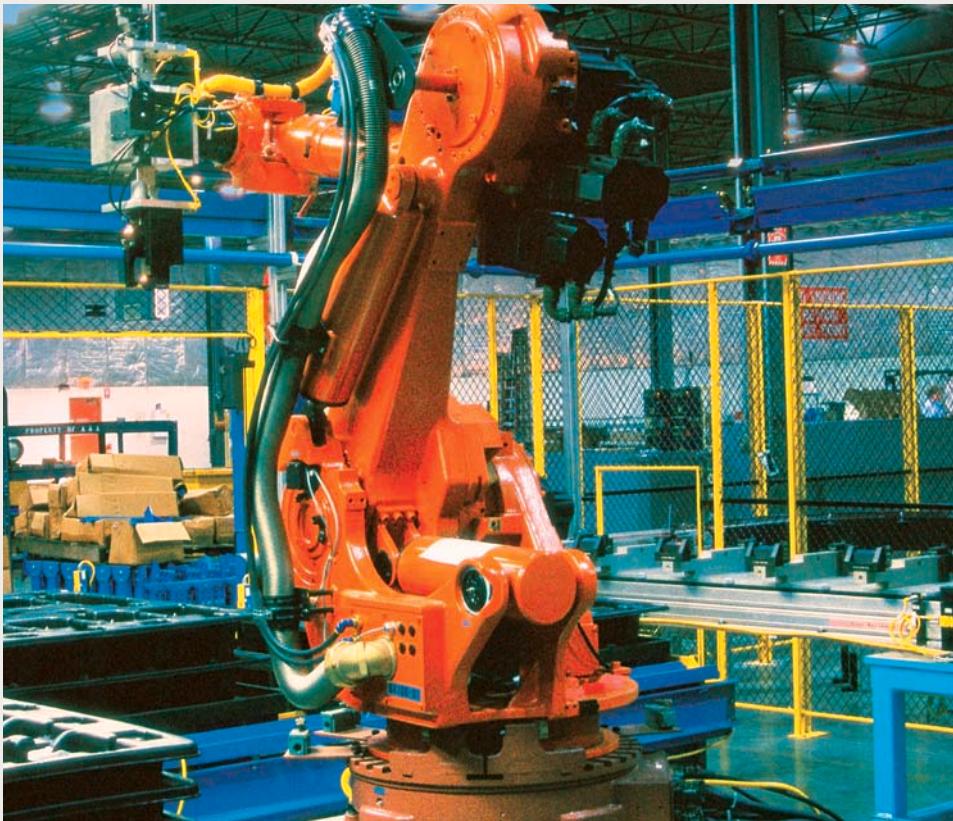
System Values & Benefits

- Lowest labor cost assembly in the entire plant
- Highly cooperative and successful simultaneous engineering project with customer's product design engineering team
- Planned expansion allowed customer to delay capital spending
- Highly adaptable to piece part design changes – many requiring only robot reprogramming and/or gripper tooling changes
- Dunnage stacking errors corrected by vision guidance
- Completely retooled for new product with only 10 days of downtime

Steering Column Assembly System

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▲ *An integral vision system with cameras captures the alignment of dunnage, which is used to adjust robot movements to ensure proper pick and place motions. The system also uses one robot to unload assembled units and pack them for shipping in reusable plastic dunnage.*



◀ *Automation stations interfaced with robots to press, stake, and screw-drive assemblies. Custom feed systems were designed and built as required.*

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System Overview

- Non-synchronous, palletized assembly and test system
- 190' long; 70' wide
- 340' of conveyor; 32 pallets
- 11 main stations, including 4 robot stations
- 11 part feeding systems
- 4 operators: 2 manual station operators and 2 roving repair operators

Take the Next Step.

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