



Flexibility in Industrial Automation: A Robotics Systems Integrator

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“We Engineer Solutions that Move the World.”



October 31, 2019

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Systems Integrator



- Design & install robotic systems
- Redeploy & service existing robots
- Implement conveyors, marking systems, vision, & other process equipment
- Work with existing line equipment
- Help train and prepare your operators
- Offer services & support beyond robots

Who We Work With



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Robotic Applications



- Material Handling
- Process (material removal, spraying/coating, sampling)
- Traceability/Quality Control
- Assembly
- Custom/Process Equipment



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Large Robotics

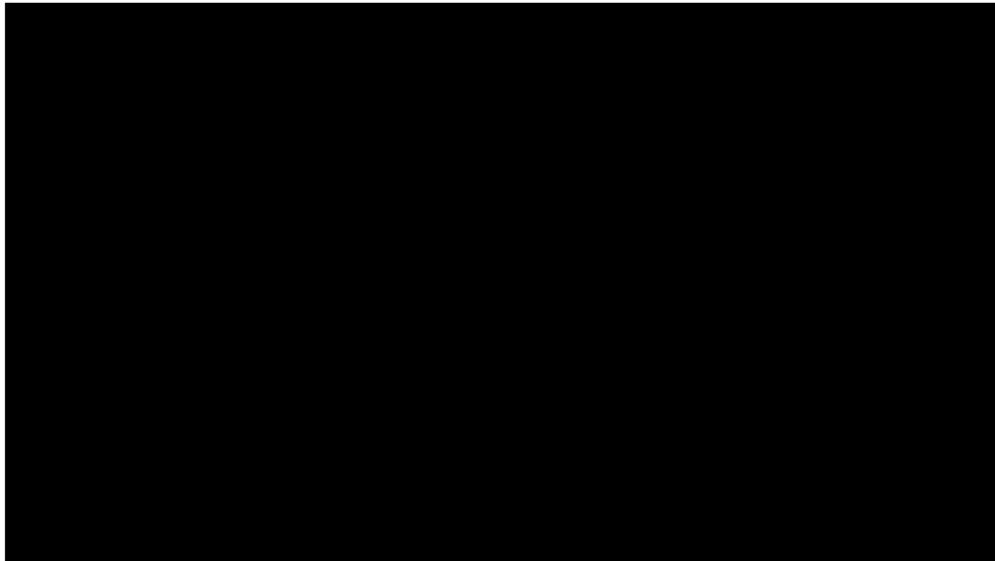


FANUC M2000

- Largest FANUC robot
- Robot loads train wheel into a CNC machine, takes it out, then flips it over
- Then it loads it in a second machine to CNC the other face
- Each wheel weighs 1,200 lbs



Large Robotics



Drum Palletizing System

- The robot picks up a pallet and places it onto an outfeed conveyor
- Filled 55-gallon drums enter the cell one at a time onto an infeed conveyor
- The robot picks them up and places them onto the pallet



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Large Robotics



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Medium-Size Robots

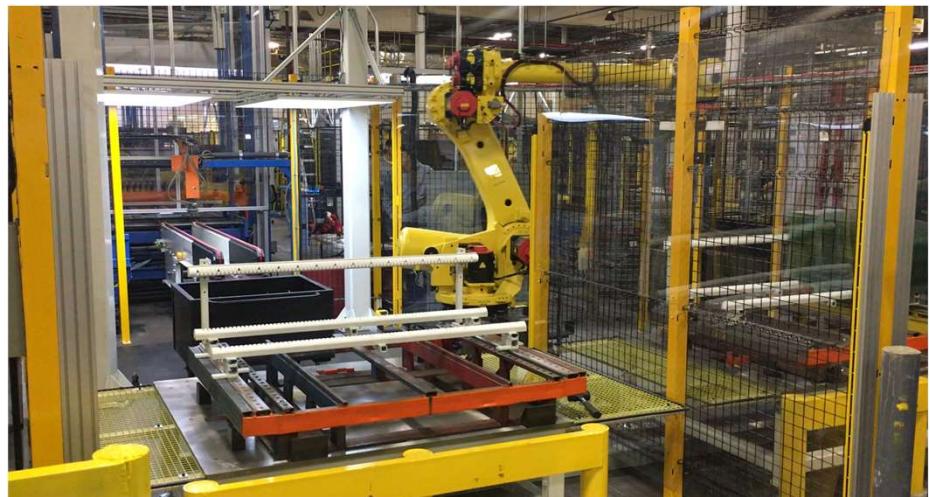


Glass Manufacturer Company

This is a multi-style glass rack. The vertical rail is in a fixed location, but the bottom two rails are moved to fit the features of different styles of glass.

The plastic that is used in the construction of the rails is not machine cut and can shrink, grow and warp over time due to exposure to high temperatures during the processing of the glass.

Medium-Size Robots



- Needed to map out the rails on the rack and ensure in correct location.
- Needed to consider cycle time and to be efficient as possible.
- did not want to use a camera system that could add over \$50,000 to the cost of the job, be hard to align and calibrate, and require a critical spare adding another cost to operating the system.
- The robot above takes time out of loading the current rack when it gets ahead and scans the rack that we need information on.
- The sensors on the end of arm tooling are only simple couple hundred-dollar sensors and do not require calibration saving much setup time.

Medium-Size Robots



- The system accuracy of the slot detection was around 0.5 mm.
- The scanning was processed around 1/8th of a millisecond, or 8,000 times a second to determine edges in the slots.
- Once the three rails were scanned, an algorithm was developed to create compatible groups of slots from the three rails following a set of rules, to calculate a plane that the glass shape will fit into, and finally to create rotation of the glass using the three small wrist axes.
- In the video, the precision of the glass placement can be seen. Notice that the glass does not touch and reduces the defects introduced by human handling.

Medium-Size Robots

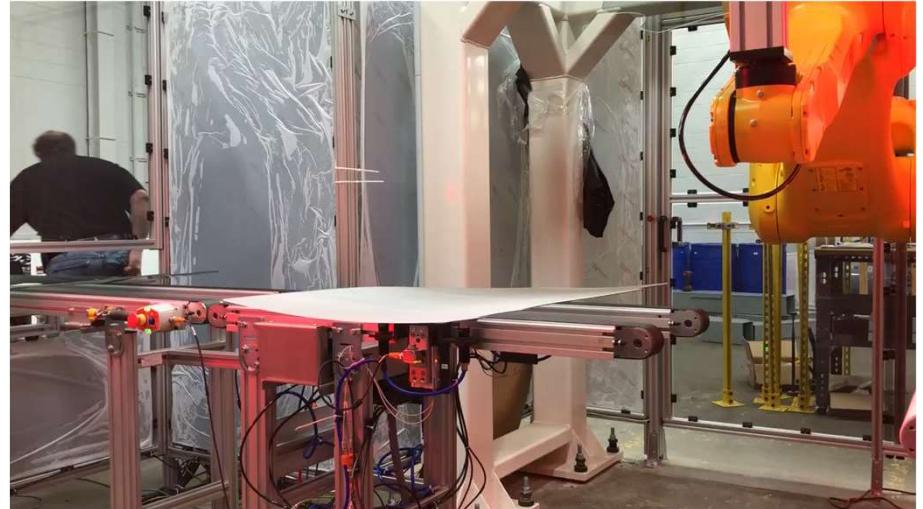
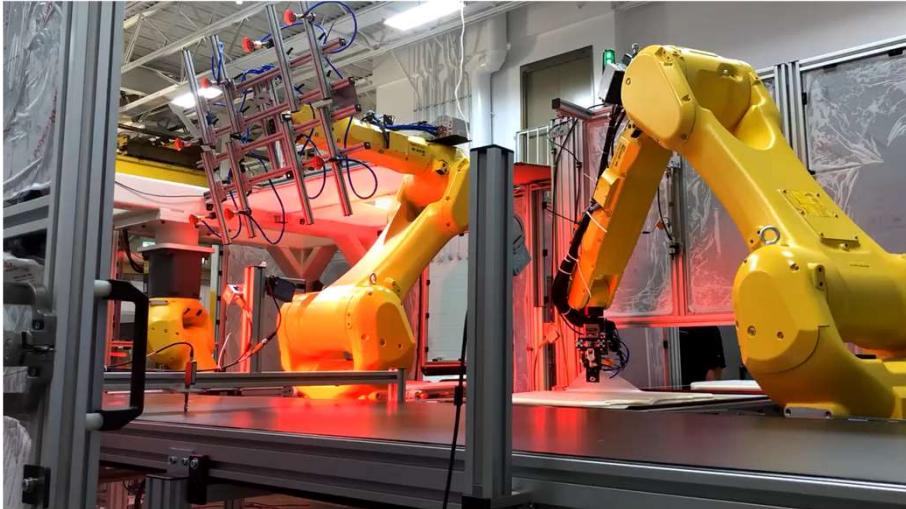


- Project for a large glass manufacturer
- Makes a “sandwich” and assembles two pieces of glass with a piece of vinyl in between
- Eliminates damage to glass and human error

Medium-Size Robots



Time lapse video



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Small Robots



These pick-and-place robots were able to successfully handle a part smaller than a grain of rice.

Collaborative Robots

- Commonly referred to as “cobots”
- Simplifying automation by allowing humans and robots to work side-by-side

Benefits of cobots:

- Increased system safety
- Simplistic user interface
- Flexible redeployment
- Fast setup



Collaborative Robots



- Assembling an engine valve cover
- Works along side operator to dispense adhesive
- Other robot screws the separator plate to ensure everything is torqued to the proper set points
- Vision inspection verifies all components are properly installed

Exercise In Robot Design



The Evolution of the Project

“How would I do this with the lights out and my eyes closed?”

Final Thoughts



- Manufacturing has begun the transition from mass production to mass customization
 - Requires more flexibility and an increase in the use of robots in the integration process
- A robot integrator provides a complete package and guides customers towards systematic industrial automation.
- Premier Automation has worked with a diverse line of advanced robots, anywhere from super-heavy payload models to collaborative models that stand about three feet tall.
- These highly efficient robotic solutions streamline production, increase efficiency, improve safety, and reduce operating costs.



Questions?

www.premierautomation.com



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