

MFG AUTOMATION, LLC
Engineered Robotic Systems
Certified ABB Robotic Integrator

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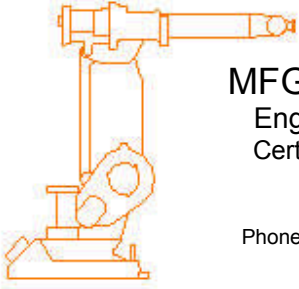
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32 Nott Highway
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An ABB integrators guide to designing turnkey manufacturing cells

This is a summary review of core techniques and processes used by this integrator in the development of turnkey manufacturing cells. Leveraging Robot Studio and the suite of ABB robotic products we highlight the critical steps of development. It's a basic process that minimizes risk, validates performance, and clarifies operational requirements. We will review non-automotive applications however, the techniques are universal.

MFG Integration Approach - notes

1. Define the need
 - a. Increase production
 - b. Improve quality
 - c. Resolve ergonomic issues
 - d. Resolve safety issues
 - e. Lower production cost
 - f. Lower maintenance cost
 - g. New product
2. Frame the solution
 - a. Reach
 - b. Payload
 - c. Speed
 - d. Orientation
 - e. Multiple robots / tracks
3. Know the Expectations
 - a. Single operator
 - b. Performance
 - c. Support
 - d. Cost
 - e. Ownership
4. Document metrics
 - a. Tolerance, accuracy, repeatability (not all the same)
 - b. Confirm in writing
5. Isolate critical operations (key)
 - a. Material processing
 - b. Finishing (grind, polish, paint, plasma sprayed)



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- c. Part Handling
 - d. Welding / Laser, MIG, TIG, etc
6. Determine feasibility
 - a. Suitable for robotics
 - b. Risk factors
7. Cell design
 - a. Initial - optimize to need not cost
 - b. Resolve critical operations first (key)
 - c. Test and validate as necessary
8. Robot Studio station design
 - a. Layout major components
 - b. Confirm paths, reach, and orientations
 - c. Validate critical operations (key)
 - d. Verify material flow and user functions
 - e. Confirm cycle times to metrics
 - f. Safety - design to operational needs
9. Project review
 - a. Features and benefits
 - b. Cost options
 - c. ROI
10. Project build
 - a. Build and stage
 - b. Customized HMI
 - c. Test to metrics
 - d. Train operators and support personnel
 - e. Ship and install