Flexxbotics





Robotic Machine Tending Project Checklist

In modern manufacturing environments, CNC machine tending with robotics has become essential for improving throughput, efficiency, precision, and safety. This checklist outlines the key components necessary for successful CNC robot machine tending setup projects.

From the primary CNC machines and automated inspection with robots or cobots to supporting or secondary automated systems such as deburring, unique device identification, and other pre/post processing steps each operation plays a critical role in streamlining production.

This checklist outline will help in assessing and establishing a thorough CNC robot machine tending system including in-feed/out-feed mechanisms, end-of-arm tooling, and safety features, as well as other important considerations.

- Business Objectives & Target Outcomes
 - □ Capacity & Throughput Targets
 - □ Yield & Quality Targets
 - □ Labor Savings & Repurposing Objectives
 - □ Safety Objectives
- □ Factory Machine(s) & Equipment
 - □ Machine(s) Targeted for Robot-enablement
 - □ Facility Requirements & Space Limitations
 - □ Layout Footprint, Orientation, Egress and Safety
- □ Workforce Considerations
 - □ Manufacturing Engineering Responsibilities
 - □ Maintenance Technician Responsibilities
 - Operator Responsibilities
 - □ Documentation
 - □ Hand-over Plan
 - □ Training Plan
- □ Robot/Cobot
 - Payload Capacity
 - □ Speed
 - Reach
 - □ Programming

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- □ End-of-Arm-Tooling
 - □ Grippers & Fingers
 - □ Secondary Functions
 - □ Auto-Changeover Requirements

□ Automated Workholding

- □ Vises & Chucks
- □ Workpiece Seating Probes
- □ Chip Management & Removal
- □ Robot Appropriate In-Feed / Out-Feed
 - Part Presentation Pallets
 - □ Pneumatic Trays
 - □ Conveyors
 - Bowl Feed
- □ Robot Mounting & Motion Range
 - □ Stationary Pedestals
 - □ Mobile Carts
 - □ Gantry System
 - □ Rails
- □ Auto-Door Systems
 - □ Reliability & Durability
 - □ Safety

- □ Automated Pre/Post-Processes
 - □ Washdown & Blow-off
 - Deburr
 - □ Vestige Stock Removal
 - □ Polishing
 - □ Laser Marking
- □ Automated Inspection Options
 - □ Coordinate Measurement Machine (CMM)
 - □ Vision Systems
 - □ Laser Systems
 - □ Telecentric Measurement System
 - □ Tactile Sensing Devices for Surfaces
 - □ Probes
- □ Safety & Risk Mitigation
 - □ Safety Regulations and Standards Compliance
 - Physical Guarding and Scanners
 - □ Safety Assessment
 - Risk Assessment

- □ Robotic Production Software
 - □ Cycle Start/End
 - Peripheral Control
 - □ Robot, CNC, Inspection Synchronized Program Loading
 - Operator HMI
 - Digital Work Instructions
 - □ Step-by-Step Online Manuals
 - □ Part Count & Cycle Performance
 - □ Nonconformance Isolation
 - □ Fault Detection
 - □ Failure Reasons
 - □ Utilization & Downtime
 - Downtime Reasons
 - Part Throughput
 - □ Yield & Defect Count
 - OEE
 - Data Collection & Analytics
- □ Automated Part/Job Changeover
 - □ Robot, CNC, Inspection Changeover Program Loading
 - □ Barcode Auto-Changeover
 - □ Line Clear or Non-Line Clear Option

- Problem Alerts & Escalations
 - Email / Text Problem Alerts
 - Conditional Escalation
 - □ Auto-Recovery
- Business Systems Connectivity
 - ERP / MRP
 - □ MES
 - \Box QMS
 - D PLM / PDM
 - 🗆 CAD / CAM
 - DNC
 - SCADA
 - 🗌 IIoT
 - □ Custom Systems
 - □ Other IT Systems
- □ Robot-to-Machine(s) Interfacing
 - □ Robot/Cobot Connectivity Options
 - PLC Protocol Compatibility
 - □ Interoperability Requirements
 - □ Read/Write Functionality
 - □ Macro Parameter Updates
 - Physical Connections Required

About Flexxbotics

Flexxbotics enables robot-driven manufacturing at scale. Flexxbotics solution digitalizes robotic production with autonomous process control for next generation smart factory environments. Flexxbotics breakthrough, the unique FlexxCORE[™] technology, seamlessly connects and coordinates robots with existing automation equipment, IT systems and people. More powerful, flexible and open, Flexxbotics revolutionizes the use of robotics in complex production.

Visit <u>www.flexxbotics.com</u> to learn more and follow us on <u>LinkedIn</u>.