[Insert Company Logo]

[Insert Company Name]

[Insert Company Site Address]

Request for Proposal

Robotic Machine Tending

Date

[Insert Primary Contact Name]

[Insert Primary Contact Email]

[Insert Primary Contact Phone]

**1. INTRODUCTION**

[Company Name] requests a proposal for the lights-out automation of [Number of CNC Machines] CNC machine tools [currently in production / newly installed]. The solution must be capable of running conforming parts unattended for up to [Number of Hours] hours. The solution must be integrated into production operations at [Company Name] no later than [Due Date].

**2. PARTS**

The parts that are machined in this process are as follows:

• [Workpiece A], [Number of Variants]

• [Workpiece B], [Number of Variants]

…

• [Workpiece N], [Number of Variants]

Workpieces are machined from [Material] [near net shape forgings] that do not exceed [Weight] in weight.

Specifications, drawings, and samples will be provided for each workpiece.

**3. EQUIPMENT**

The production process to machine all variants of [Product Part] consists of [Number of Operations] operations. The equipment used in this process is as follows:

• OP. [Operation Number] – [Machine Brand and Model] (ca. [Year])

• OP. [Operation Number] – [Machine Brand and Model] (ca. [Year])

…

• OP. [Operation Number] – [Machine Brand and Model] (ca. [Year])

The cycle time of the operations is [Cycle Time] each. Machines are outfitted with [automatic pallet changers]. Each machine is also outfitted with [probing] and [tool-break detection]. Common hydraulic fixturing is deployed in the machining of parts from the same family (i.e., the same fixture is used to machine all variants of [Workpiece]). Fixture changeover is necessary between families and generally occurs every [Frequency of Changeover].

The workholding is [decoupled from fluid power delivery] during machining. As a part of the automation effort, [Company Name / vendor] will be designing new automation-ready workholding(s) to include cycle permissive features and [automated fluid power delivery]. The vendor will be responsible for [designing / integrating] these features with the automation solution. [Company Name / Vendor] will consult with the [Company Name / Vendor] throughout the fixturing design process to ensure that best practices are followed with regards to automated workholding. The weight of each fixture will not exceed [Weight].

**4. SOLUTION & INTEGRATION REQUIREMENTS**

The vendor is responsible for ensuring that delivery of the proposed automation solution satisfies the

following requirements:

* Design, integration, and programming of a robotic machine tending solution that provides for unattended, lights-out production for [Number of Hours].
* [Design / Integration] of workholding solutions.
* Design, integration, and programming of a part inspection solution that provides offset feedback to

CNC equipment to ensure process control. Inspection workholding is responsibility of the vendor.

* Periodic quarantining of parts for detailed inspection by [Company Name] is required.
* Design and integration of automation solution shall include:
  + [Collaborative robot / Industrial robot] with adequate payload capacity for all workpieces and sufficient reach for all equipment in scope.
  + Infeed/outfeed material handling and presentation with quarantine area.
  + Adequate cleanliness of part and fixturing prior to and post machining.
  + Adequate cleanliness of part prior to inspection.
  + Auto-door on machine(s).
  + Fault detection that ensures the protection of the CNC machine tools before, during, and after cycle.
  + All necessary safety systems (e.g., guarding, interlocks, light curtains, etc.).
  + Cycle start and end-cycle detection of all machinery and robot(s).
  + Control and monitoring of all peripheral inputs and outputs necessary for operation including [sensors, conveyors, rail system, auto-door, other auxiliary equipment].
  + Automated job changeover for processing different workpieces [with / without] line clear capabilities.
  + Secure remote equipment monitoring, program distribution, control and support.
  + HMI solution that is central to the operation of the solution and its various subsystems.
  + Problem alerts and stop work notifications by text and/or email
  + Reports and analytics that include utilization, downtime reasons, cycle performance, part count, part throughput, pass/fail, failure reasons, yield, nonconformance count, and OEE.
  + Ability to adjust offsets on the machine in real time based on inspection results.
  + Functionality for autonomous process control to auto-correct processing issues.
  + Capability to integrate to factory IT systems and business intelligence packages.
  + Ability to add other machines in the facility in future.

It is expected that the vendor leads the coordination effort with all subcontractors unless otherwise specified.

**5. SITE PREPARATION, LAYOUT & TIMING**

The vendor is given the freedom to design the layout of the robotic cell and its subsystems as deemed appropriate within the following constraints:

* The solution must not encompass an area larger than [Length] x [Width]. Its height must not exceed [Maximum Height].
* Adequate access to the main panels of the CNC equipment to facilitate tool change and manual offset must be provided.
* Adequate access for the removal of chip hoppers must be provided.
* Adequate forklift access to the main doors of the CNC equipment must be provided.
* Adequate space within the robotic cell must be retained to facilitate fixture changeover. Material handling accommodations must be present to safely facilitate fixture changeover at the [automatic pallet changer] locations.
* Access to equipment maintenance doors, electrical cabinets, and other common areas must not be impeded.
* Adequate space within the cell and appropriate software settings must be provided to run the CNC equipment manually in the event of automation solution downtime.
* Production interruption to integrate the proposed solution must not exceed [Time Period].
* Solution will be fully operational by [Deadline Date].

[Company Name] will assume the responsibility to move existing equipment as required per the solution

design. The vendor shall make [Company Name] aware of any site preparation requirements in advance

of solution delivery

**6. SAFETY**

The proposed solution must adhere to all applicable regulatory safety requirements and standards,

including, but not limited to ANSI/RIA R15.06-2012. A risk assessment must be performed and

documented in accordance with RIA TR R15.306-2016.

**7. TRAINING**

A need for training regarding the various systems and subsystems of the proposed solution is anticipated. The vendor is responsible for providing and/or coordinating relevant training efforts as appropriate throughout the project. Multi-faceted on-site training after solution integration is required (e.g., operation, maintenance, training at subsystem level).

**8. DOCUMENTATION**

At a minimum, system installation shall be accompanied by the following documentation:

* Operating manuals and maintenance & troubleshooting manuals.
* Mechanical and electrical installation diagrams.
* Spare parts lists and vendor contact information.
* Risk assessment per RIA TR15.306-2016.
* USB backup copies of all application-specific software programming, including, but not limited to

PLC programs, robot programs, and inspection programs.

* Neutrally formatted 3D CAD (.step, .igs, etc.) models and 2D part drawings (.pdf and .dxf) of the design of the robotic workstation and any custom ancillary components.

The vendor shall furnish both hard and soft copies of the written information.

**9. ACCEPTANCE**

Periodic involvement and sign-off during the development phase of the project is expected. This includes, but is not limited to:

* Cell layout
* Site preparation requirements
* Network and security design
* High-level system architecture and logic

Solution acceptance testing prior to delivery will include equipment verification and design validation.

Final acceptance at delivery will include a runoff at [Company Name & Address]. The runoff will consist of confirming solution conformance per the functionality described herein, as well as acceptable performance of the part inspection and feedback system(s).

**10. SUBMISSION**

Proposal submission shall be accomplished via email to the following addresses:

* [Customer Email Address 1]
* [Customer Email Address 2]
* [Customer Email Address 3]