



Proposal For  
**TPMS Snap-In Automation**

Proposal # 4902C

## TABLE OF CONTENTS

|      |  |    |
|------|--|----|
| 1.0  | RFQ SUMMARY .....                                | 3  |
| 2.0  | SYSTEM DESCRIPTION .....                         | 4  |
| 3.0  | SYSTEM COMPONENTS .....                          | 6  |
| 4.0  | MACHINE CONCEPT & LAYOUT .....                   | 7  |
| 5.0  | ALLIANCE AUTOMATION STANDARD DOCUMENTATION ..... | 9  |
| 6.0  | ALLIANCE AUTOMATION PROJECT MANAGEMENT .....     | 10 |
| 7.0  | COMMENTS AND EXCEPTIONS .....                    | 11 |
| 8.0  | CUSTOMER REQUIREMENTS .....                      | 12 |
| 9.0  | SHIPPING, INSTALLATION & TRAINING.....           | 13 |
| 10.0 | RUN OFF REQUIREMENTS .....                       | 14 |
| 11.0 | DELIVERY.....                                    | 15 |
| 12.0 | PRICING .....                                    | 15 |
| 13.0 | PAYMENT TERMS .....                              | 15 |
| 14.0 | WARRANTY, TERMS, AND CONDITIONS .....            | 16 |

## 1.0 RFQ SUMMARY

██████████ has requested stand-alone TPMS Snap-In Automation. This system will be identical to the machines delivered under Alliance Job 3192 & 3193. The machine in this proposal will be installed in the ██████████ facility, and will be programmed to run all previous wheels, and (1) additional wheel (size unknown). The machine parameters, design, and function will be identical to the systems previously provided.

### 1.1 Part Sizes

1.1.1 Equipped to handle wheels sized between 17" and 21"

1.1.2 The wheels below have already been programmed on previous machines, and will be on this machine as well

1.1.2.1 20" x 9"

1.1.2.2 19" x 8.5"

1.1.2.3 18" x 8"

1.1.2.4 18" x 7.5"

1.1.2.5 17" x 7"

1.1.3 A Single New Size will be programmed (As yet unknown, but must fit in existing machine parameters)

1.1.4 All wheels must have common hub size, & valve-stem seat angle

### 1.2 Machine Capacity

1.2.1 Part to Part Cycle Time = 10.5 seconds

### 1.3 Other Requirements

1.3.1 Maintain insertion angle of +/- 10°

1.3.2 Horizontal angle must be maintained by +/- 1°

1.3.3 Max force: 600-1100N

1.3.4 No forces may be applied to back side of TPMS Sensor

1.3.5 Max insertion rate 100-500 mm/min

1.3.6 Stem must be lubricated prior to insertion

## 2.0 SYSTEM DESCRIPTION

2.1 Alliance Automation will provide [REDACTED] with a turn-key TPMS Snap-In Automation. The cell components are provided in Section 3.0.

2.2 The cell will insert (1) TPMS Valve Stem every 10.5 seconds.

### 2.3 SEQUENCE OF OPERATION

2.3.1 Wheel enters Station 1

2.3.2 Lift & Rotate Tooling Lifts wheel

2.3.3 Overhead vision system locates valve-stem hole & tooling rotates wheel to approximate install position.

2.3.4 Overhead vision system identifies wheel by spoke pattern & diameter & compares to expected recipe.

2.3.4.1 If fail, system alerts operator

2.3.4.2 If pass, wheel travels to next station

2.3.5 Wheel is transferred to next station

2.3.5.1 Wheel will be elevated from (utilizing the hub hole as the contact point) and spun in the direction to most quickly find valve-stem hole (identified in station 1)

2.3.5.2 A laser system will be used to precisely locate the valve-stem hole. Upon finding the valve-stem hole, the wheel will be locked in place

2.3.5.3 An associate will place a TPMS valve-stem into the tooling (while it is in the retracted/load position)

2.3.5.4 Associate clears the light curtains and initiates a cycle start switch

2.3.5.5 TPMS insert tooling moves forward to specific location (servo driven) and extends to snap in TPMS valve-stem. The system will determine whether the valve-stem insert passed or failed

2.3.6 If a model is running that doesn't require a snap-in valve stem, the system will allow for the wheels to pass through without any interaction, via a "pass-through" mode.

2.4 **Option: Servo Insertion Upgrade** – This option replaces the insertion cylinder with an IAI actuator and the wheel lift with a three-position cylinder. Additionally, wheel outfeed time will be lowered. Cycle time remains under 10.5 seconds.

2.5 **Option: Automatic TPMS Loading** – This option is identical to proposal #4684.03B.

2.5.1 Alliance Automation will provide a robotic station that will be mounted to the floor and to the TPMS installation machine. The station will be guarded using with wire mesh and polycarbonate guarding.

2.5.2 Alliance Automation recommends a Yaskawa Motoman GP7 Robot for this application, to be supplied by [REDACTED]

2.5.3 The TPMS units will be moved in individual plastic trays via a gantry system.

2.5.4 The system will pick, lubricate, and load a TPMS unit every 10.5 seconds.

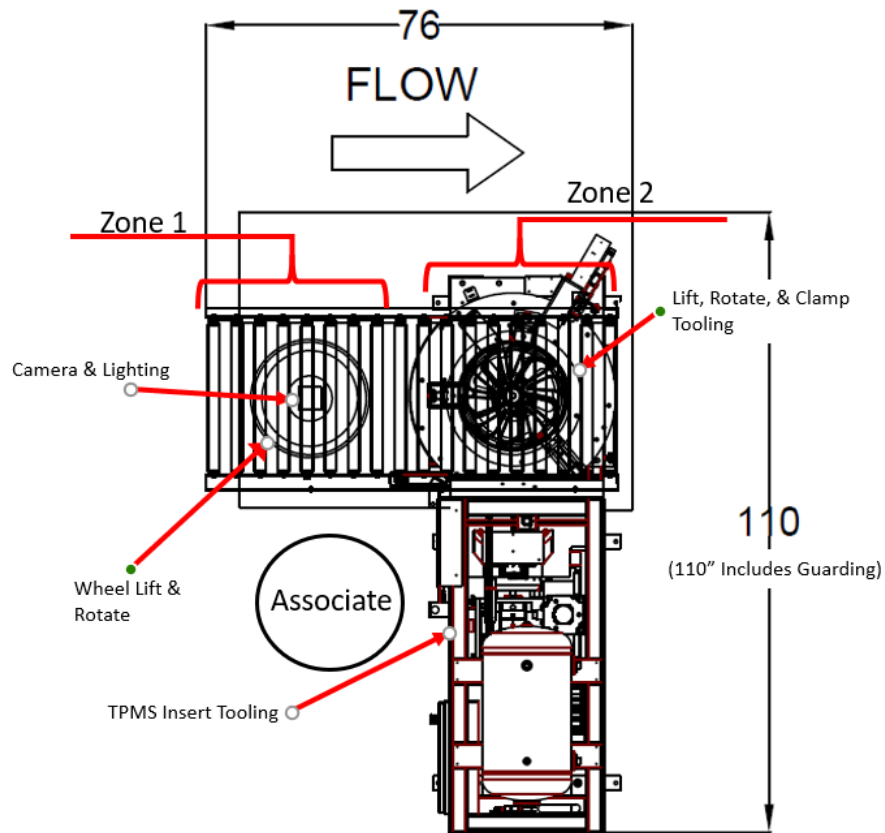
- 2.5.5 The system will utilize lubrication pump on the TPMS Install Machine to fill a new lubrication station.
- 2.5.6 If the machine is in pass-through mode, the robotic load system will be idle.
- 2.5.7 If the machine is in manual load mode, the robotic system will be locked out, and an operator manually load the TPMS units.
- 2.5.8 Assumptions:
  - 2.5.8.1 [REDACTED] to supply Robot
  - 2.5.8.2 [REDACTED] to supply Vision Camera & related components
- 2.5.9 Sequence of Operation
  - 2.5.9.1 Manual TPMS loading will be a function of the machine. The associate will select the “manual load” button on the HMI, and a physical door will open, allowing the operator access to the TPMS tooling. When this happens, the automatic load system will be locked out. Otherwise, in “automatic load” mode, the door will be closed, preventing the associate from accessing the automation.
  - 2.5.9.2 Operator places individual full trays of TPMS units into the machine.
  - 2.5.9.3 Individual trays are picked up by an overhead gantry system and placed in the staging area.
  - 2.5.9.4 The robot picks a TPMS valve-stem, lubricates the stem, and places it into the TPMS insertion tooling.
    - 2.5.9.4.1 Robotic End of Arm Tool holds the TPMS via suction and locating pins
    - 2.5.9.4.2 The system must detect that the valve-stem has been lubricated before the robot will place the valve stem into the tooling
  - 2.5.9.5 Once a tray is empty, it will be removed from the infeed system, and placed into an “empty tray zone”, which will periodically need to be manually unloaded by an associate.
  - 2.5.9.6 A new tray will automatically advance into the loading position via a gantry, and the robot will continue loading TPMS units. There will be 2 “full-tray” zones, allowing the robot to continuously pick from a full tray while an empty tray is being replaced.
  - 2.5.9.7 If the system sits idle with a TPMS unit on the installation tooling for a specific period of time (to be determined [REDACTED] & Alliance), the robot will re-lubricate the stem.
    - 2.5.9.7.1 Optional – A vision system, supplied by [REDACTED], would be used to determine the part location in the packaging.

### 3.0 SYSTEM COMPONENTS

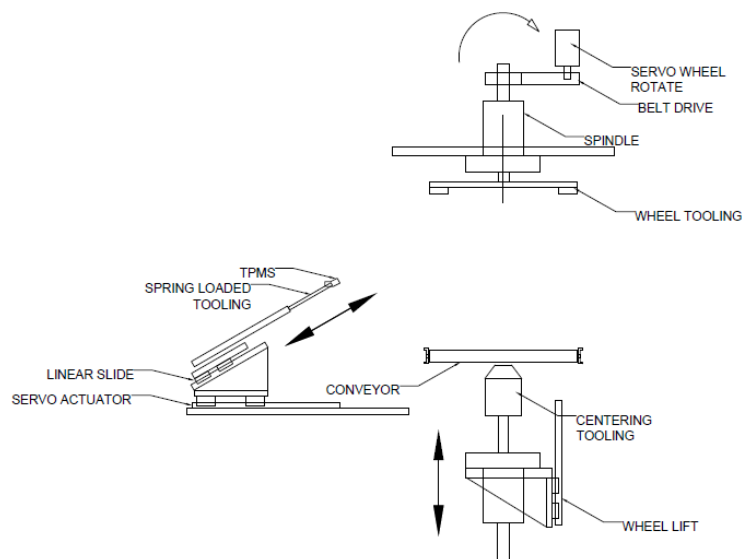
#### 3.1 System Components

- (1) Machine Frame
- (2) 36" MDR Conveyors
- (1) Cone Tooling, Lift, & Rotate Mechanism
  - Wheel lift cone tooling
  - Pneumatic Lift Assembly
  - Hiwin Linear Guide Rails
  - Shocks & Hard-stops
  - Servo Rotation
- (1) Cone Tooling, Lift, Clamp, & Rotate Mechanism
  - Wheel lift cone tooling
  - Pneumatic Lift Assembly
  - Hiwin Linear Guide Rails
  - Shocks & Hard-stops
  - Servo Rotation
- (1) Valve Stem Precision Laser Location System
- (1) Manual Valve-stem Lubrication System
  - Oil Delivery system
  - Felt applicators
  - PVA Sensor
- (1) TPMS Snap-in Tooling
  - Hiwin Guide Rails
  - TPMS guide & placement tooling
  - Insertion cylinders
  - Servo actuator
- (1) Control System
  - Emergency stop buttons
  - Control Buttons
  - Mitsubishi PLC
  - Mitsubishi Servo Controls
  - CC-Link
  - GOT HMI
  - USB, 110V, ethernet, & fold-down table on Control Enclosure
- (1) Guarding
  - Light Curtain
  - Clear Hard Guarding
  - Dog-house Guarding

#### 4.0 MACHINE CONCEPT & LAYOUT

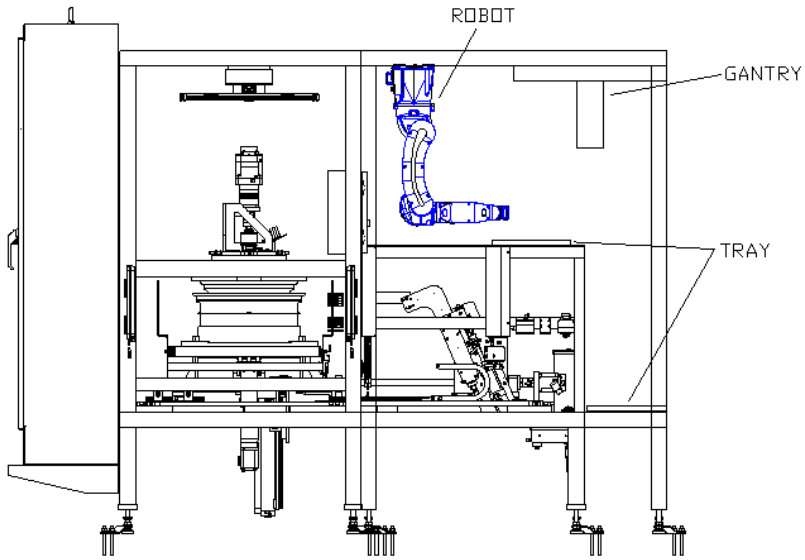


#### FRONT VIEW OF INSERTION CONCEPT

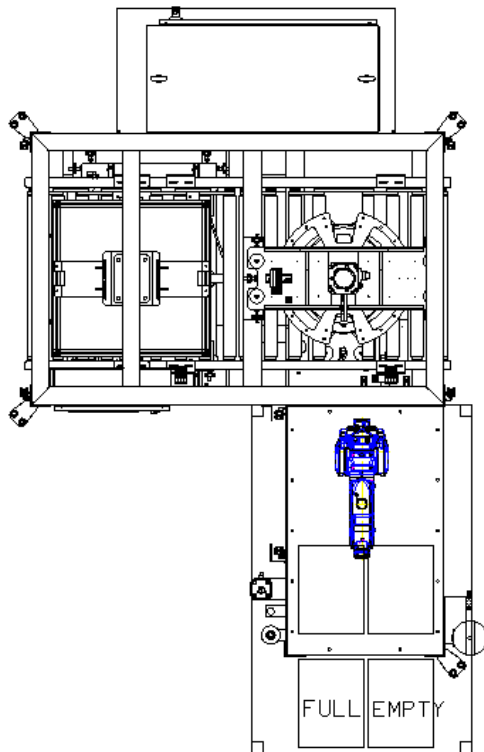


## Robotic TPMS Loading Concept Drawing

### Side View



### Top View





## **5.0 ALLIANCE AUTOMATION STANDARD DOCUMENTATION**

### 5.1 Mechanical Documentation (1 electronic copy)

- 5.1.1 Mechanical CAD drawings
- 5.1.2 Cell Layout
- 5.1.3 Assembly Prints
- 5.1.4 Spare Parts List

### 5.2 Controls Documentation ( 1 electronic copy)

- 5.2.1 Electrical CAD drawings (1 electronic copy)
- 5.2.2 Panel layouts
- 5.2.3 I/O
- 5.2.4 AC/DC power distribution
- 5.2.5 PLC program
- 5.2.6 HMI program

## **6.0 ALLIANCE AUTOMATION PROJECT MANAGEMENT**

- 6.1 Each project at Alliance Automation is assigned a Project Manager, Mechanical Engineer and Controls Engineer.
- 6.2 Upon awarding of the project, a meeting will be scheduled to review the design concept, system operation, customer obligations to Alliance Automation, and customer expectation of Alliance Automation.
- 6.3 Additional design review meetings, as determined by the design team, will be scheduled with times convenient to both the customer and Alliance Automation. All design review meetings must occur prior start of manufacturing.
- 6.4 The customer may direct their communications to any of the Alliance team, however the official contact will be the Project Manager.
- 6.5 The project team will meet upon an agreed basis to review the schedule, review milestones, and identify any problems.
- 6.6 Project Resources
  - 6.6.1 The Project Manager is responsible for acting as the main point of communication with the customer, project schedule, resources, and informing the Mechanical and Controls Engineer of any project changes.
  - 6.6.2 The Mechanical Engineer is responsible for the Mechanical design of the equipment, ensures adherence to the customer's specifications, and enforces ANSI, OSHA and Alliance Automation standards. The Mechanical Engineer is also responsible for monitoring the manufacturing of details and fielding questions from the shop as well as directing the assembly technicians during the assembly and debug of the equipment.
  - 6.6.3 The Controls Engineer is responsible for the Controls design of the equipment, ensures adherence to the customer's specifications, and enforces NEC, OSHA and Alliance Automation standards. The Controls Engineer is also responsible for monitoring panel build and fielding questions from the shop as well as directing the electricians during the assembly and debug of the equipment.

## 7.0 COMMENTS AND EXCEPTIONS

- 7.1 Alliance Automation will provide a machine that will be designed to run a machine cycle time as stated within this proposal. The stated cycle time does not include allowance for machine downtime, rejected parts, operator breaks, operator stoppages, operator load/unload time, scheduled machine maintenance and set-up time.
- 7.2 Any work or hardware requested by the customer that is not detailed, explained, or specified in this proposal will be quoted separately. A purchase order must be received for this additional work before Alliance Automation will implement the requested change.
- 7.3 Alliance Automation will quote additional time and material cost for any modifications required in the event that customer part designs change from the original part prints or production parts are different from what was provided at time of proposal.
- 7.4 This proposal represents Alliance Automation's best effort to address the specified requirements and is based on available information to date. Alliance Automation reserves the right to modify or substitute concepts, methods or components as appropriate based on discovery, new information, material availability or engineering principles. Any changes requiring cost adjustments will only be done on a mutually agreed upon basis.
- 7.5 Unless specified by the customer Alliance Automation reserves the right to specify component manufacturers.
- 7.6 All Vision & Lighting Components to be purchased [REDACTED]. If specified vision & lighting items are not adequate for the application, [REDACTED] is responsible to purchase the additional/changed components, as needed.

## 8.0 CUSTOMER REQUIREMENTS

- 8.1 [REDACTED] is responsible for providing operators able to feed/load the proposed system to allow the machine to run at the required cycle time.
- 8.2 [REDACTED] must supply 480 volts / 3 Ph / 60 Hz input power and clean dry air. Other voltages shall be obtained by transformers and power supplies within the control enclosure. The control voltage will be 24 VDC. The customer facility must be capable of supplying the necessary utilities to run the equipment.
- 8.3 [REDACTED] is encouraged to provide a VPN connection to the control panel for remote access to the system. The VPN connection can provide remote support efficiently and be more cost effective. The customer may incur additional cost for onsite service in the event that a VPN connection is not provided.
- 8.4 [REDACTED] is responsible for all floor preparations (concrete/building modifications where needed) and area preparations. Alliance Automation will provide all modification specifications and will add delivery of such specifications to the project timeline.
- 8.5 [REDACTED] will be responsible for all verification parts, plant layout and machine placement, operator instructions, and all part dunnage.
- 8.6 [REDACTED] is responsible for supplying all production parts needed to perform testing to prove process capability including but not limited to initial process testing, production run testing, equipment sizing & capability testing, and other ECAP requirements.
- 8.7 [REDACTED] is responsible for providing sample parts of each part number on or before the project kick off meeting with Alliance Automation. Project timing and cost could be affected if parts are not available at the kick-off meeting.
- 8.8 Additional parts may be needed for feeding, vision, and special applications testing. The overall project timing and cost could be impacted if parts are not received per requested dates.
- 8.9 [REDACTED] is responsible for supplying all calibration or pass/fail type parts.
- 8.10 [REDACTED] is responsible for all parts required for testing and evaluation in the design phase of the equipment.
- 8.11 [REDACTED] will be responsible for the following:
- 8.11.1 Mechanical Design Review Sign-off
  - 8.11.2 Electrical Design Review Sign-off
  - 8.11.3 Machine Run-off at Alliance Automation Sign-off
  - 8.11.4 Machine Installation, Start-up and Training, Final Machine Sign-off

## 9.0 SHIPPING, INSTALLATION & TRAINING

### 9.1 Shipping

- 9.1.1 Shipping will be F.O.B. Alliance Automation, Van Wert Ohio. Customer will be responsible shipping arrangements.
- 9.1.2 Alliance will be responsible for rigging equipment onto truck at Alliance Automation in Van Wert, Ohio.
- 9.1.3 [REDACTED] will be responsible for rigging equipment and placing the equipment on the floor where it is to be installed. Customer is responsible for providing all required rigging equipment needed during installation. In the event the customer cannot provide this equipment Alliance Automation will provide the equipment at an additional cost to the customer.

### 9.2 Installation

- 9.2.1 [REDACTED] is responsible for all electrical, communication, air and plumbing service drops required for the proposed assembly equipment.
- 9.2.2 [REDACTED] will be responsible for the electrical connection from the facility buss bar to the main panel disconnect lugs.
- 9.2.3 All other internal cell connections and termination will be made by Alliance during Alliance Set-up and Start-up.
- 9.2.4 [REDACTED] will be responsible for the pneumatic connection from the facility air supply (plant air) to the Alliance cell drip leg connection.
- 9.2.5 All other internal cell pneumatic connections are the responsibility of Alliance during Alliance Set-up and Start-up.
- 9.2.6 Installation will be performed during non-holiday weekends.

### 9.3 Training

- 9.3.1 This proposal includes 2 days of training onsite. All personnel being trained must understand English. Bilingual training is not available.
- 9.3.2 Training will be performed during 1st shift working hours, Monday - Friday. Training hours requested outside of this time period will be quoted as an additional cost.
- 9.3.3 Additional training for new operators and maintenance personnel can be scheduled and performed by our technicians, if needed. Additional training will be billed at our normal rates and can be quoted upon request.
- 9.3.4 This proposal also includes an additional Post-Install Support Option. On-site time must be scheduled with adequate notice. Remote support typically requires less notice. This consists of the following:
  - 9.3.4.1 2 non-consecutive days of on-site support in [REDACTED]
  - 9.3.4.2 10 hours of remote phone support

## 10.0 RUN OFF REQUIREMENTS

### 10.1 Run-Off at Alliance Automation

- 10.1.1 The customer and Alliance to agree upon requirements during kick off phase of project. At a minimum the equipment must meet cycle time, safety and functional requirements.

### 10.2 Run-Off at Customer Facility

- 10.2.1 The customer and Alliance to agree upon requirements during kick off phase of project. At a minimum the equipment must meet cycle time, safety and functional requirements.

### 10.3 Run-Off Notes

- 10.3.1 [REDACTED] is responsible for supplying all necessary parts and labor for all runoffs.
- 10.3.2 The system acceptance shall apply only to work provided under this quotation. In the system acceptance testing phase of this project, any downtime due to breakdowns of ancillary equipment, interfacing equipment, or, in general, any equipment not provided by Alliance Automation, and/or by damaged/defective product shall not be included in determination of acceptance testing.
- 10.3.3 The customer is responsible for reimbursing Alliance for any additional labor and or travel expenses incurred in the event the customer does not supply the pre-determined amount of parts necessary to perform any run-off requirements. This includes run-offs performed at Alliance Automation and at customer facility.

## 11.0 DELIVERY

If a PO is placed by February 3, 2020 delivery will be approximately **18 weeks** from project kick off meeting. The project timeline will not start until part prints, part models, and part samples have been received.

## 12.0 PRICING

| ITEM #  | DESCRIPTION   | QTY | UNIT PRICE | TOTAL |
|---|---|-----|------------|-------|
| 1   | Equipment Cost  | 1   |            |       |
| 2   | Installation Cost   | 1   |            |       |
| <b>TOTAL SYSTEM PRICE</b>                     |   |     |            |       |
| <b>PURCHASING OPTIONS – ROBOTIC TPMS LOAD</b> |   |     |            |       |
| 3   | Automatic TPMS Loading                                    | 1   |            |       |
| 4   | Option: Vision System (MEI to supply camera and lighting) | 1   |            |       |
| 5   | Installation  | 1   |            |       |
| <b>TOTAL OPTIONS PRICE</b>                    |   |     |            |       |
| <b>ADDITIONAL PURCHASING OPTIONS</b>          |   |     |            |       |
| 6   | Servo Insertion Upgrade                                   | 1   |            |       |
| 7   | Additional Support After Installation                     | 1   |            |       |

## 13.0 PAYMENT TERMS

- 30% Invoiced upon Receipt of Purchase Order, Due Net 0 Days
- 30% Invoiced upon design approval, Due Net 30 Days
- 30% Invoiced after run-off (at Alliance) or shipment of equipment, whichever occurs first. In the event that multiple shipments are required invoice will be sent upon first shipment. Due Net 30 Days
- 10% Invoiced upon completion of installation & final run-off, not longer than 30 days after delivery, Due Net 30 Days
- Payments must be in U.S. Dollars

## 14.0 WARRANTY, TERMS, and CONDITIONS

**WARRANTY:** Alliance Automation, LLC (hereafter Seller) warrants for **one year** from date of shipment, the mechanical and electrical equipment of its own manufacture against defects in workmanship or material, its obligation being limited solely to repair or replacement of defective parts. The seller warrants for **one year** from date of shipment the engineering design of the equipment and will replace or repair any component not properly designed or applied in the intended process. The seller shall not be liable for any other damages, direct, indirect or consequential. Equipment not manufactured by the Seller shall carry the warranty of the manufacturer thereof. Deterioration caused by misuse, abuse or improper operating procedures does not constitute a defect. This warranty, which is given expressly and in lieu of all other warranties, expressed or implied, of merchantability and fitness for particular purpose, constitutes the only warranty made by the Seller. It is further agreed that there are no understandings, agreements or representations, express or implied, not specified herein respecting this order and this instrument contains the entire agreement between the parties

**DELIVERY:** Except as otherwise specified in this quotation, delivery will be FOB, Alliance Automation, Van Wert, OH. Shipping dates are approximate and are based upon receipt of all information and necessary approvals.

**TERMS:** Except as otherwise specified in this quotation, The terms of payment shall be balance net within 60 days from date of invoice, depending upon standard terms or progressive terms. Amounts past due and older will be charged a finance charge of 1.5% of the outstanding balance per month.

**FORCE MAJEURE:** Seller will not be responsible or liable for any delays in delivery or manufacture due to any cause or condition beyond its control, including, without limitation, strikes or other labor difficulties, or unavailability, flood, earthquake, inability to secure transportation facilities, shortage of materials or supplies, riot or other civil disturbance, war, acts of God or nature, accident, or any acts of any government. Seller will also not be held responsible or liable for scheduled installation completion dates if at any time during the project process the seller's timeline is put on hold by the seller due to lack of information, sample run-off material delays, machine downtime, untimely review process, change in scope and/or customer support. (Installation completion dates will move the same amount of days as project is on hold or adjusted for scope change.)

**ACCEPTANCE:** This quotation shall expire 30 days after its date, unless otherwise stated herein.

**PRICES:** The prices specified herein do not include sales, use, occupation, license, excise or other taxes in respect to manufacture, sale or delivery, all of which shall be paid by the Purchaser, unless a proper exemption certificate is furnished.

**TITLE:** The equipment shall remain personal property, regardless of how affixed to any realty or structure. Title thereto shall remain with the Seller until the purchase price has been fully paid.

**RIGHT TO RESTRICT USE:** In order to provide additional security for both Interim and Final Payments, Alliance may install a software registration key in the equipment furnished under this proposal. In the event of payment default by the customer Alliance may, at its discretion, limit use of the equipment using programmatic methods incorporated in such software. These methods include, without limitation, the restriction of the use of controller software contained in the equipment by the withholding of additional software registration keys necessary to continue to operate the equipment. This restriction may make the equipment incapable of operating for its intended purpose. In the event that Alliance exercises the right to restrict use, and upon satisfaction of all customer payment and nonpayment obligations under this proposal, Alliance will at its sole expense provide customer with a software registration key having no expiration date.

**CANCELLATION AND TERMINATION:** Upon cancellation of all or a portion of an order placed with Alliance Automation, LLC the customer becomes liable for payment of reasonable cancellation charges, which shall take into account, expenses already incurred and commitments made by Alliance Automation, LLC relating to the subject order. In the event that Alliance Automation, LLC experiences any restocking, cancellation, or associated charges from a related vendor contracted to supply material or labor for a specific customer's order, these charges shall become the full responsibility of the customer. No termination by the customer for default shall be effective unless and until Alliance Automation, LLC shall have failed to correct such alleged default within 30 days after receipt of a written notice specifying the default and required corrective measure.