

## Front Page Instructions

### Section 1 – Complete the Description statement

This quote is for Koops to design, fabricate, build and program (insert your description of the machine here)

### Section 2 – Complete the operation sequence

Complete the sequence with 3 columns (Type [OP, MA, RT], Description, and Cycle Time)

End with total cycle time

### Section 3 – Complete the machine features list

The machine features list has 4 main sections, you should complete them to accommodate your conceptual design and add any more sections if needed. Here are the four templates:

#### Machine Frame Base:

- Base frame will be made of welded steel with fork pockets
- Steel base frame with adjustable height (tube-in-a-tube forklift required to change height)
- Adjustable lift system (quote as line item option)
- Base will be fixed work height
- Painted or Powder Coated to customer specification
- Aluminum base plate
- Leveling pads
- (4) casters, (2) swivels, (2) fixed
- Upright structure for the overhead light and operator cooling fan
- Air prep unit (filter, regulator & shut-off)

- Valve stack

#### Fixture

- The station will have fixture to
- The nest will be machined out of
- Will accommodate the following versions:
  -
- CNC supports and guides for locating and nesting part(s). Tooling adjustments will be done manually (not meant to be done by the operators).

#### Guarding

- All pinch points
- 3-sided guarding (T-slotted aluminum extrusion with polycarb panels) or (Steel Wire Mesh)
- (1) vertical and (1) horizontal set of light curtains
- Drawer style with 4-sided hard guarding (T-slotted aluminum extrusion with polycarb panels)
- Clam shell style with 4-sided hard guarding (T-slotted aluminum extrusion with polycarb panels)

#### Controls

- The controls will be in an enclosure mounted to the base of the machine.
- Allen Bradley Compact Logix 5380 series control system
- Allen Bradley PanelView+??? HMI system
- Sensors for error proofing:
  - Specialized sensing ????????
  - Part presence - (1) panel - photo eye
  - Upper platen - (2) position - cylinder switch
  - Short shot - (2) location - photo eye

- Unless otherwise stated, part presence sensors will only detect presence of the component not proper installation

## Section 4 – choosing and creating assumptions

Assumptions are in place to cover our bases and make sure we don't over promise. We have 8 blocks of standard assumptions, listed below. All you need to tell the user is which of the 8 blocks need to be added. If any other assumptions are needed to cover special circumstances, create a new block for the user in the same style as the other 8. Here they are:

### **Product & Machine Assumptions:**

1. Operator times are estimates and will vary depending on operator skill and dexterity levels.
2. This station will abide by the ergonomic requirements, as long as part design allows.
3. Machine tolerances will be held to a degree that will ensure the components are assembled in a repeatable fashion. If the components themselves are out of tolerance, this station will not have the ability to force into compliance components that are already out of spec., nor be able to solve issues associated with tolerance stack-ups in the assembled components themselves.
4. This quote makes several assumptions on part verification techniques because parts are not currently available for testing. The quoted techniques are based on Koops' past experiences and knowledge, and Koops has a high degree of confidence in the quoted solutions. However, if unforeseen part characteristics require verification techniques other than what has been quoted here, an Engineering Change Order (ECO) may be required.
5. This quote assumes that all items on this quote will be sourced to Koops and will be purchased and built concurrently.
6. If equipment is complete and the receiving plant is not prepared to receive the equipment or if ECOs extend the delivery of equipment, a warehousing fee may be applied.
7. Machines come standard with metric fasteners. English fasteners can be incorporated at additional cost.

8. This quote assumes that the manufacturing environment in which this equipment will operate is within the temperature and humidity guidelines specified by the component manufacturers. Generally these fall within 15°C - 26°C; and 20% - 60% humidity. If manufacturing conditions are not within these limits, it is the customer's responsibility to notify Koops so that provisions can be made. These provisions may incur additional cost.
9. Not included in this quote, the following can be quoted at [Account.AccountName]'s request.
  - barcode scanners
  - installation rigging
  - plant network programming
  - line side racking or WIP racks
  - CMM study
  - Third party safety inspections

**Grease Assumptions:**

1. The quoted grease system will not monitor the amount of grease being dispensed.
2. Grease dispensers will dispense grease by time, not volume. Grease dispense time will be adjustable via the HMI.
3. Due to the nature of grease dispensing systems, grease will tend to take the path of least resistance. A grease port may get clogged and cause a short-shot of grease to be applied to the bushing. Periodic cleaning will be required by the Customer maintenance team.
4. Due to the nature of grease dispensing systems, grease will build up on the fixturing. The buildup of grease will affect the performance of the bushing presence sensors and will also affect the performance of the fixture to accurately position the b-brackets. Periodic cleaning will be required by the Customer maintenance team. This quote does not include grease guarding or grease containment features.

**Pallet Assumptions:**

- Price per pallet
  - Pallets quoted here will be designed to accommodate the following product on each pallet: \_\_\_\_\_

- Koops estimates approximately \_\_\_\_ pallets for this system to maintain cycle time. Please use this quantity when placing initial order.
- Exact pallet quantity will be defined during the design phase, and price delta will be handled via a +/- ECO.

**Plant Network Programming Assumptions:**

1. This quote includes estimates for sending quality-check data only and does not include provisions for machine sequence changes to accommodate incoming plant network data.
2. This quote does not include additional external devices for plant network communication.
3. Additional hardware or programming beyond this scope will quoted upon request.

**Customer Responsibilities:**

1. Define plant network protocol or provide working example
2. Provide detailed network handshaking sequence at beginning of programming phase
3. Provide list of all tags and required information to be transmitted (serial numbers, quality data, etc.)
4. Provide list of all device IP addresses (if applicable).

**Laser Marking Assumptions:**

1. Parts to be marked will have consistent surface finish.
2. Parts will be presented without debris or oil contaminants on the marking surface
3. Parts cannot deviate in material properties or color vs tested
4. Information contained within the marking will not change from information provided during testing. Additional/Alternate information, may be able to be marked to the part, but will need to be investigated as an Engineering Change Order
5. This quote does not include additional provisions for laser fume extraction. This can be quoted upon Customer request.

**AMR Assumptions:**

1. This quote assumes all autonomous vehicle traffic will traverse level floors that are free from debris and have a matte finish.
2. This quote assumes all autonomous vehicles will be travelling in a one-way traffic pattern and in autonomous vehicle-only aisleways unless otherwise specified in quote content.
3. If operating in shared traffic aisles, this quote assumes that the autonomous vehicle will be given the right of way.
4. The number of autonomous vehicles calculated does not include delays due to mixed vehicle traffic or parked materials blocking aisleways or limiting access to load/unload zones.
5. Paths for autonomous vehicles need to be at least 7 feet wide for one-way traffic and 14 feet wide for two-way traffic.
6. This quote assumes end-user plants have a sufficient IT network to support the autonomous vehicle fleet with the speed and density of signals required without dead zones that would adversely affect communication with autonomous vehicles.
7. No additional accessories (for example, forklift safety blue lights, flags, or additional speakers) will be added to the autonomous vehicles unless explicitly outlined in the quote content.
8. This quote assumes that any materials being loaded on top of autonomous vehicles has a smaller footprint than the vehicle itself.
9. All autonomous vehicle loads should be weight balanced.

#### **Part Feeders Assumptions:**

1. Quotes for part feeders and feeder feasibility are subject to change when physical product/parts are received for testing. This may drive pricing and scope changes, which will be handled via an ECO.
2. 2500 production level parts will be required at project kick-off for bowl feeding. If production level parts are not available, project timing will be delayed.
3. The vibratory feeders require parts that are dry, clean, oil free, chip free, and within part tolerance.
4. Bowl feeders will require daily up-keep to maintain expected effectiveness.
5. Bowl feeders may jam and will require attention from the operator.

6. Vibratory feeders are sized for up to (4) hours of run-time.
7. Machine tolerances will be held to a degree that will ensure the components are assembled in a repeatable fashion. If the components themselves are out of tolerance, this bowl feeder will not have the ability to force into compliance components that are already out of spec.

#### **Vision System Assumptions:**

1. To confirm the vision system capabilities, sample parts are needed for testing.
2. The above list of main system components is recommended at this point. If different or additional components are required, an ECO will be required.
3. Koops requires sample production parts of all versions by the end of the design phase to develop vision programs.
4. Vision systems are highly sensitive to their environment, specifically lighting and reflections. Small changes in the environment may affect the performance of the camera.
5. Any additional lighting or shrouding of ambient lighting is customer's responsibility. Skylights or other outdoor lighting in the plant may have to be removed or covered.
6. To keep the environment consistent, daily maintenance of the vision system is required to remove debris from the lighting and lenses.
7. Since the cameras will need to have a clear view of the parts to successfully perform all checks, there must be no obstructions.
8. Vision system will provide pass/fail data to the Programmable Logic Controller (PLC). This system will not perform any measurements on the components, nor will any measurement analysis be displayed to the operator. Only text and a Pass/Fail will be displayed for the operator on the HMI.
9. Checks not mentioned in the error proofing sections are not included in this quote. Any changes to what is stated in the error proofing sections may require an ECO.

These are the four main sections you are needed to complete. Thank you.