

Appendix I: Senior Design Project Abstract

Part Sorter

Product Description:

Sorting and part presentation cell for an injection Molded Part

Abstract: (less than 350 words)

Mechanical System: We assemble injection molded parts in automated robotic cells. These parts have a specific geometry and need to be presented to a robot in a specific orientation with a positional accuracy to allow automated manufacturing. The parts will be delivered in large quantities and the solution will have to be able to receive the parts poured in from a bucket or with a “scoop”. The device will have to have a way to determine the approximate content of parts in the device for signaling to operators, at a minimum it should be able to draw attention via a dry contact and optical signaling when the parts count is at or below 75, and should not hold more than 3000. The device can not be a rotary vibratory feeder due to abrasion and stability, however a 300mm or less linear vibratory feeder is acceptable.

Automation System: The device shall be operated via ADC Click PLC and shall be interfaceable with the assembly robot and a DCS system. The electrical system shall be 24VDC and all control parts shall be sourced from ADC. The device shall have none contact sensors that can determine that a part is ready for the process to be picked up or not. The position for pickup shall be approx. 36” (tbd) above the floor, and have a footprint of maximal 18” x 24” the unit shall be on wheels and otherwise freestanding, requiring 120VAC and House air as well as a interface connector (TBD) for signaling. A detailed Spec will be provided. MTBF is to be 3600 HRS minimum and MTBS 360 HRS.

Deliverables: The project design groups will be expected to deliver the mechanical system and its automation system that address the above requirements described above and meets the following criteria:

Safety: Design shall not introduce or expose the operator to any hazards in excess of the current process.

Ergonomics: Using the tool shall not induce fatigue in excess of the current process

Form factor: Design solution shall fit within the current production Tredd-TS without impeding other processes.

Durability: Solution must be capable of being operated for a minimum of 360 hours before requiring maintenance or servicing.

Equipment: Using the systems shall not result in damage to the travel system.

Cost: Prototype budget shall not exceed \$3,000 USD.

- The Top view is how the part will be presented, this is also represented in the Tredd-TS ASSY v3 sheet.

- The highlighted dashed areas is an exclusion zone, this is where the gripper will obtain the part and transfer it to the workplace.

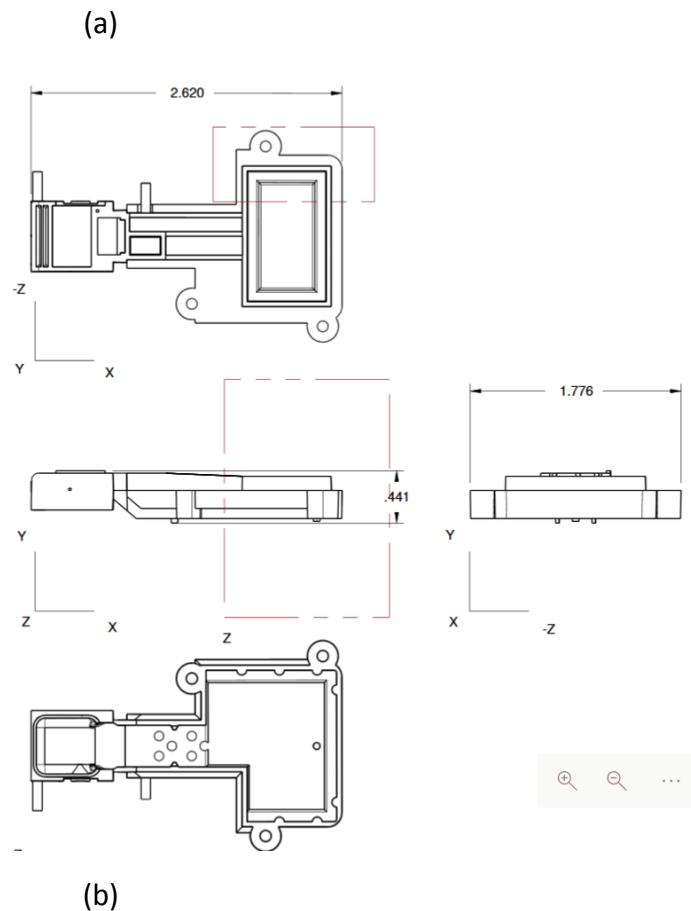


Figure 1: Injection Molded Part (a) Solid Model; (b) 2 D drawings

- 413-0200-02 needs to be presented as shown below (Also referenced on 413-0200-02 sheet).

-The highlighted region is where the gripper will be in position to grab 413-0200-02, just the gripper is shown for simplicity.

- The workpiece will travel 50mm in the positive Y axis and traverse 200mm in the positive X axis.

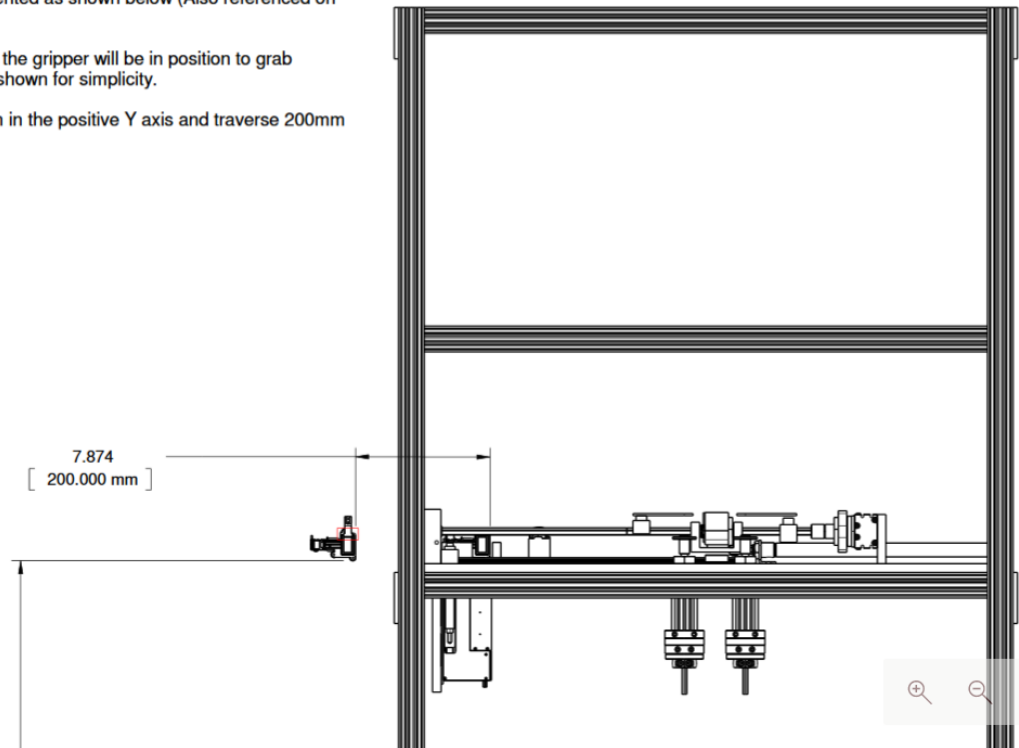


Figure 2: Travel System Assembly

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