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Chapter 2: Overview

Purpose

The purpose of this chapter is to familiarize the operator with the functional parts and the layout of the Inventek Engineering Automated Artisan Production System, and to provide an overview of the system operation.

The information is provided in the following sections:

- “Functional Overview”
- “General Views”

Functional Overview

The AAPS is designed and intended for the purpose of automatic filling of either the 50 ml or 100 ml (nominal) Artisan Reagent containers. The AAPS consists of a pallet conveyor, which transports an Artisan Reagent Reservoir throughout the production process. The following steps are included in the process: Load/Offload, Fill, Clamp and Assembly, Label, and Label Inspection. Component part loading of the left and right clamps and dispense heads are accomplished from individual feed trays. A Denso six axis Robot is used to pick up each of the three parts from the three feed trays and articulate them into place onto the Artisan Reservoir after the Fill Station. A Universal Labeler is incorporated into the System, and Labels are automatically applied to the Artisan Reservoirs, after which a vision system is used to validate label placement accuracy and that both the Label Bar Code and 2D Matrix Code are readable.
Overhead View of Cell Showing Key Components and Access Points

- **Universal Labeler** (Print and Apply) at **Labeler Station**
- **Denso Six Axis Robot**
- **Clamping Station** and Dispenser Head Insertion
- **Bosch Pallet Conveyor**
- **Filling Station** (Under Fume Hood)
- **Pallet Load and Offload Area**
- **Watson Marlow Pumps** (Under Fume Hood)
- **Tray Station** Access through Hinged Doors

**Universal Labeler Access** through Hinged Doors

**Clamping Station Access** through Hinged Doors
Pallet Shown Entering Fill Station with Two Empty Reservoirs Loaded

Tray Station Shown From Operator Loading Position (Doors Open)
Overhead View of Cell Showing Door and Operator Locations

Interlocked Door for Access to Front of Labeler

Interlocked Side Doors for Access to Robot Cell and Inner Tray Station Areas

Interlocked Front Doors for Access to Tray Station and Loading of Feed Trays

Empty Reservoirs are loaded onto Pallets here and completed Reservoirs are removed from Pallets

Interlocked Door for Access to Denso Robot and Rear of Labeler
Chapter 4: System Operation

Purpose

The purpose of this chapter is to familiarize the operator with the system operation of the Artisan Automation Production System. The following topics are covered in these sections:
1. “System Power-up Procedures”
2. “Starts, Stops, & Emergencies”
3. “Operator Console Touch Screen”

System Power-up Procedures, E-STOP & Interlocks

“Cold” Start Up Procedure

Turn “ON” Main Disconnect and Main Switch on front of Main Control Panel. Note: The [E-STOP RESET] Switch and Lamp will not be illuminated at this point. NOTE: If this is a “cold” start up, it may be necessary to open the Main Control Cabinet and Place all Circuit Breakers in the ON position.
Reset E-STOP

1. Make sure all [E-STOP] buttons are released (Turn CCW).
2. Remove “loose” Left and Right Clamps, Dispensers, etc from inside the work area.
3. Warn employees working in the area of the impending re-start.
4. Make sure all Access Doors are firmly closed.
5. Reset E-STOP circuitry by pressing the green [E-STOP RESET] button.
6. The Green [E-STOP RESET] light will illuminate when the E-STOP has been properly reset.
7. Push all four of the black [MACHINE RESET] buttons.

8. Go to the Main Operator Touch Screen, (refer to the figure below).
9. The interlocks in the system should all be “satisfied”, and the interlock status in the lower left corner will turn green for each area. If any interlock is not properly reset it’s interlock status will be red. Check that all doors are securely closed and push the black [MACHINE RESET] buttons again.

10. Turn on the conveyor by touching the Conveyor On control indicated by green circle above.

11. Access the Labeler Status Screen by touching the control indicated by the blue circle above. The Labeler Status Screen will appear.

12. Push the RESET LABELER control and the MASTER RESET – LABELER Screen will appear. (See figure on next page.)

13. Follow the directions on the Touch Screen within the green circle.

14. When completed, touch the yellow RETURN control twice to return to the main Touch Screen.
15. Reset the Clamp, Fill and Tray Stations following the same procedure. Refer to the figures below.
Chapter 5: System Installation

Purpose

The purpose of this chapter is to provide system installation and setup information. Information is provided in the following section:

- “System Installation”

System Installation

Facilitation Requirements:

Electrical Power:
Main Panel 208 VAC, 60 Hz, 3 phase, 30A

CDA – Compressed Air 110 PSI, 3 to 5 CFM, Filtered

This section describes the process of installing the AAPS.

1 Ship crated machine to customer site.
2 Uncrate and inspect all shipping crates for damage.
3 Inspect machine location. For ease of installation, the AAPS is provided with both heavy duty casters and leveling pads. Move the AAPS into position using the supplied casters. Upon locating the AAPS into location use the leveling pads to position the main frames and conveyor.
4 Assemble the system starting with the reconnecting the framing. Ensure that there is at least 36” front to back clearance and 30” shoulder clearance in front of the electrical enclosure.

AAPS Installation Dimensions with Facility Drop Locations

5 Reconnect all cables, mechanical components, and tubing.
6 Connect main power and other facilities.
7 Power up system and validate interlocks and EMO’s.
8 Confirm operator console is fully operable.
9 Run complete I/O check.
10 Bring system on-line.
11 Confirm that all final alignments and adjustments are complete.
AAPS Overall Footprint with Dimensions
AAPS Footprint Dimensions Relevant to Fume Hood
Chapter 9:  Attachments:

Attachments and Appendices

- Electrical Schematics for AAPS
  1290 Schematic – AAPS.pdf

- Spare Parts List for AAPS
  Spares Parts List - AAPS.pdf

- Detailed Fabrication Drawings for AAPS
  Print Out plus PDF Files

- Assembly Views and Bill of Materials
  ACAD Files plus Indentured Parts List

- OEM Technical Literature and Data Sheets (Binder No. 1)

- Operators and Instruction Manuals for Cognex Insight Micro Vision System and Cognex Checker 3G Vision Sensor

- Operators and Maintenance Manuals for DENSO VM-G SCARA Robots. Includes installation and removal instructions for Robot, and preventative maintenance procedures.
  DENSO Manuals (On a CD)
DENSO Robot – Safety Precautions Manual

- OEM Technical Literature and Data Sheets (Binder No. 2)
- MOXA EtherDevice Switch Installation Guide
- Safety Precautions and Instruction Bulletins for Omron Components

SYSCMAC CJ Series Programmable Controllers

Instruction Sheet NS10 Touch Screen
Instruction Sheet Switching Power Supply
Instruction Sheet Remote I/O Terminal
Instruction Sheet E3T-ST13 Photoelectric Sensor
Instruction Sheet E3X-NA41 Photoelectric Sensor
Instruction Sheet E2K-X8MF1 Proximity Switch
Instruction Sheet Model D4BL Safety Door Switch

- Patlite Signal Tower Installation Guide

- Mounting, Operating and Assembly Instructions for Bosch-Rexroth Conveyor and Components.

Lenze Keypad Global Drive Instructions
Lenze Drive Motor Mounting Instructions
Vario Flow Pallet Assembly Instructions
Lateral Guide Assembly Instructions
Lateral Guide Holder Assembly Instructions
Switch Bracket Assembly Instructions
Stop Gate Assembly Instructions
Vario Flow Conveyor Assembly Instructions, Operation and Maintenance

- SMC Digital Pressure Switch Operation Instructions
- Schmersal Safety Interlock Switch Mounting and Wiring Instructions
  - **AZ 15/16 Safety Interlock Switch**
  - **LAZ 15 / AZ 16 Switch Actuators**
- Zebra Print Head and Universal Labeler (Provided by Others)
  - **Safety Guide Zebra Print Heads**
  - **Software and Documentation for Zebra PAX4 Series (On a CD)**
  - **Label House/Universal APA-II Manual on CD**