

Kinder joy Robotic Pick & Place

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1 Statutory Information

Disclaimer

The information contained in this document is confidential and only for informing intended recipient. This information may not be used, published or redistributed without the prior written consent of Cybernetik Technologies Pvt. Ltd. Legal action will be taken against the violator.

Warranty

The warranty period will be 12 months from the date of Commissioning or 14 Months from the date of dispatch whichever occurs first. The warranty work against any manufacturing defects in the equipment or parts of the equipment designed and manufactured by us. Warranty on bought-out items by Cybernetik is restricted by the warranty period specified by the specific vendors. Any extended warranty for the bought-out items, unless stated otherwise in the above document, will be charged extra. Under all circumstances our liability arising out of any manufacturing defects/workmanship if any, will be restricted to the ex-works price of the offered system and not extended to any consequential damage. Our warranty extends to the system provided by us and is not related to any other machinery or related equipment which may be linked to the system. Warranty above said will not be applicable if usage and maintenance instruction are not properly adhered to as per our guidelines and instructions. The warranty does not apply to normal wear, improper storage and maintenance, failure to observe operating instructions, manhandling and use of system beyond defined use as per agreement. Replacement of defective components, described above, does not include international freight, customs and duties, as applicable. It also doesn't include manpower cost required for reinstallation of the said item.

In the event of replacement of any individual element (subject to conditions mentioned above), the said element needs to be sent back to Cybernetik and the replacement/repair will be done by individual equipment manufacturer and this will be facilitated by Cybernetik.



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2 Purpose of this Manual

This manual contains instructions for:

- Installation Instruction
- Power up and Operation Sequence
- Alarm troubleshooting
- Preventive Maintenance

The manual is organized as below,

Table 1: Outline of the manual

Chapter	Description
Purpose of this Manual	This chapter
General Safety Instruction	Safety instructions to be followed.
Intended Use of the Machine	Information regarding the exclusivity of the system.
System Description	Information on working and product description
Operation	Power up sequence and Operating Procedure.
Alarm Diagnostic and Troubleshooting	How to diagnose and troubleshoot the alarms in the system.
Preventive Maintenance	Information about maintenance schedule.
Spare Parts List	Contains the mechanical/electrical spare list.

3 General Safety

3.1 Identify the Safety



When you see the above symbol on your machine or in this manual, be alert to the potential for personal injury. Follow recommended precautions and safe operating practices.

3.2 Understand Signal Words



DANGER: Danger refers to the state of being exposed to harm, risk, or the potential for adverse consequences that may threaten one's well-being, safety, or life.

WARNING: A warning is a communication or signal that alerts individuals to the presence of a potential danger, threat, or problem, urging them to take precautionary measures or actions to avoid harm or adverse outcomes.

CAUTION: Caution is a state of alertness and careful consideration, typically exercised in response to potential risks or dangers.

3.3 Safety Instruction

- Always keep work area clean.
- Avoid all electrical dangers. Pay attention to the risks of electric shock or arc flash hazards.
- Always bear in mind the risk of drowning, electrical accidents, and burn injuries.
- Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs.
- Additional safety information contained on parts and components sourced from suppliers that is not reproduced in this manual.
- Learn how to operate the system. Do not let anyone operate the system without instruction.

3.4 Safety Equipment

Use the following safety equipment within the work area:

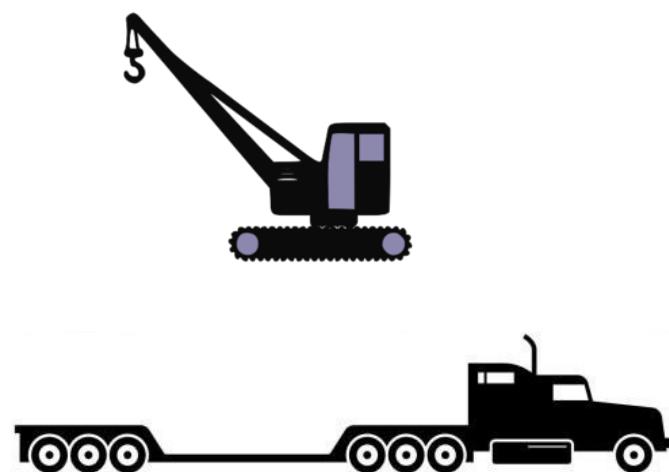
- Safety Helmet, Safety goggles, preferably with side shields, Protective shoes and gloves, First-aid kit, Fire extinguisher



3.5 Transport the System Safely

A disassembled system is best transported on a flatbed carrier. Use crane to lift the system assemblies and load it on a heavy hauler for transportation.

Before transporting the system, make sure that the sub-assemblies are having suitable attachment points. Use chains to secure the system assemblies to the carrier.



3.6 Emergency Stop

The **Emergency Stop (E-Stop) push button** is a manually operated control device used as a safety measure to quickly and safely halt machinery or industrial processes during hazardous or unforeseen situations. It is not a part of a machine's normal operational controls but is specially designed as a protective mechanism, allowing immediate intervention to prevent or reduce the risk of injury, equipment damage, fire, or environmental hazard.

The E-Stop's primary function is to bring a machine or system to a safe and rapid stop in the shortest possible time. It overrides all commands and brings the process to a halt without waiting for cycles to complete or for software routines. This is vital in environments where:

- Human Limbs may get caught in moving parts.
- Equipment may overheat or malfunction.
- Chemical leaks, fires, or electrical faults may occur.
- The product or process is sensitive to timing errors or mechanical failure.



Figure 1: Emergency Stop

4 Introduction

1.1. About

The **Kinderjoy Robotic Pick & Place system** is a custom-built automation solution developed by **Cybernetik Technologies** to meet the specialized requirements of Kinderjoy's high-speed pick and place machine. Engineered with precision, this advanced robotic system automates the task of picking and placing Kinderjoy products with exceptional accuracy and speed. Its design ensures consistent product handling, reducing human error, improving hygiene, and maintaining the quality standards expected in food-grade manufacturing.

Cybernetik Technologies, known for their expertise in industrial automation, has designed and manufactured this equipment using state-of-the-art robotics, integrated control systems, and tailor-made mechanical components. The solution reflects a deep understanding of both the product and the operational workflow, ensuring seamless integration into existing production lines. With its focus on efficiency, reliability, and innovation, the Kinderjoy Robotic Pick & Place system stands as a benchmark in custom automation for the FMCG sector.

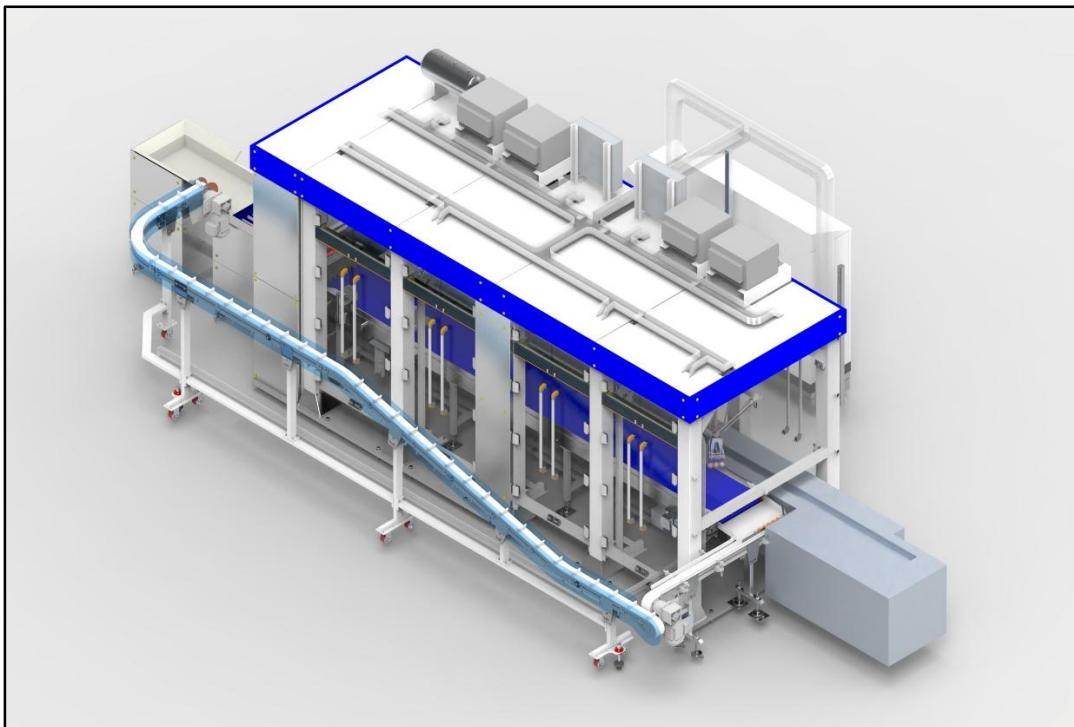


Figure 2: Isometric View



Figure 3: Front View

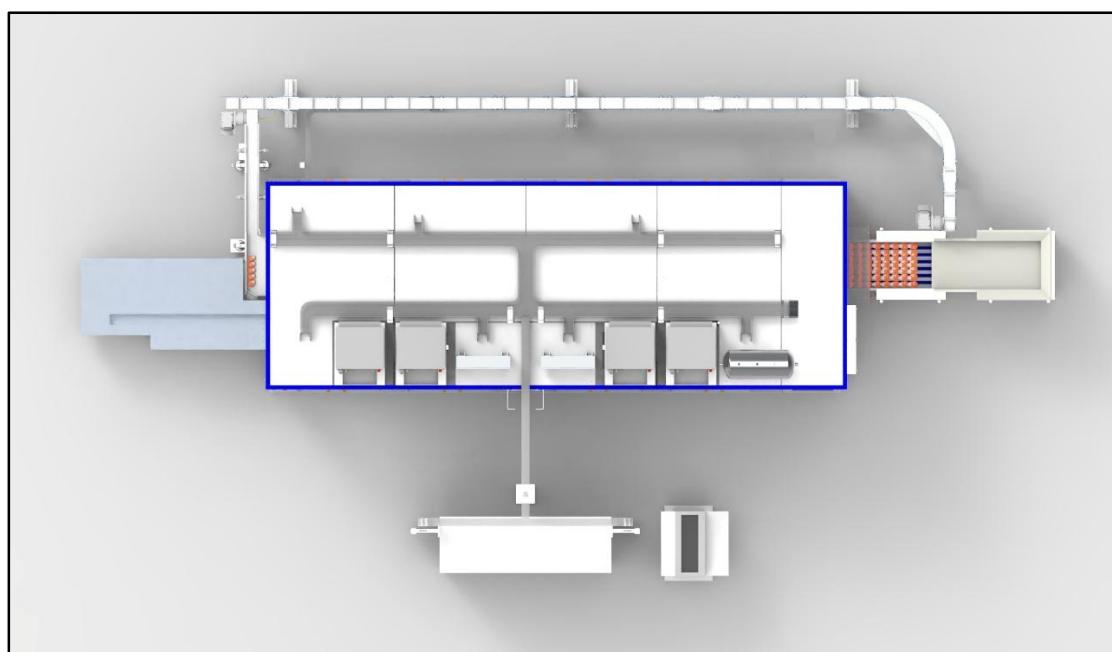


Figure 4: Top View

5 Technical Specifications

This chapter consists of both mechanical and electrical specifications. It has a set of information and requirements for the product in order for it to work as it was meant to.

Table 2: Technical Specification

Sr. No	Part Name	Specifications	Make
1	Flex Picker Robot	8 kg payload, 1.13 meter diameter	ABB
2	Modular Belt Conveyor 1.5m	Conveyor Length - 1500mm, Conveyor Speed - 30 M/min, Conveyor Height - 700mm Food grade belt (POM B)	Flexlink
3	Modular Belt Conveyor 5.1 meter	Conveyor Length - 5100 mm belt Width - 103 mm Conveyor Speed - 30M/min Food grade belt (POM B)	Flexlink
4	Modular Belt Conveyor geared motor	Helical Worm type Gear Motor K Series O/P Speed – 30M/min O/P Power - 0.55kW	Sew
5	Belt Conveyor geared motor	Helical Worn type Gear Motor K series O/P Speed – 8M/Min, O/P Power – 0.75 kW	Sew
6	Vibrator Feeder SVSP100	SV100 with Side Plate Voltage: 230 V, Current Rating: 2.5 A, Frequency: 50 Hz Corrugated Tray Tray Size : 1000 L x 450 W X 200 H mm SS304	Shri Vibracion
7	Product Transfer endless Belt (Food Grade)	Length – 5000 mm , width-500 mm, Food grade belt - fda approved Tt12 matt blue frayless belt material – Thermoplastic polyurethane (TPU)	Habasit
8	Pick & place gripper pneu cylinder	CDM2B20-75Z1-M9PL-X3423	Festo/SMC

9	Vacuum cup	FSG 20 SI-55 G1/8-IG	SCHMALZ
10	Flanged Bearing Unit	UCFQ206-30M-COM	System plast/elesa / ganter/SKF/ NTN

5.1 Electrical Specifications

Requirements:

1. Need separate earth pit for Robot Earthling (RE), Instrumental Earthing (IE) and Power Earthling (PE).
2. Earth resistance should be below 5 Ohm.

Following are the electrical specifications of the system.

Table 3: Electrical Utility Requirements

Control Panel	
Power Supply	415 VAC, 50Hz , 3PH
Connected Load	9 kW, 12 HP, 16 AMP
Design Load	12 kW, 15 HP, 20 AMP

Table 4: Pneumatic Utility Requirements

Air Consumption	35 CFM (as per ISO 8573-1:2010 7:4:4)
Pneumatic Supply	6 Bar Dry Compressed Air

5.2 Tower Lamp Status



Figure 5: Tower Lamp

The following table describes the light color status shown by tower lamp.

Table 5: Light Color Status

Lamp Color	Status
Continuous Red	System is at Fault and requires RESET
Amber	System in Maintenance
Blinking Green	System is set at Auto Mode and Idle
Continuous Green	System is running in Auto Mode

6 Operation

6.1 Startup sequence

Follow below Power up sequence.

1. Switch on the main Isolator switch on the control panel.



Figure 6: Isolator Switch

2. Switch on all the MCBs, MPCBs, and RCCBs inside the panel.



Figure 7: MCBs, MPCBs, RCCBs

3. Check whether the RYB lamps on the panel are glowing or not. If not, then the power cable connections and supply need to be checked.



Figure 8: L1, L2, L3 Lamps

4. Check the incoming power supply parameters from the VFD meter.
5. Click the Start Utility button from the Overview screen of the HMI.

7 Door Switch Sequence for LOTOTO Provision

1) Normal Operation:

- All Doors Closed and Locked.
- Safety door switches are engaged.
- Machine is in RUNNING condition.
- Control system allows operation (PLC Safety circuit completed).

2) Initiating LOTOTO:

- Press the “Emergency Stop” or “System Stop” button on HMI/Control Panel to stop the machine safely.
- From the **Manual Mode screen**, issue a **Door Open Command**.
- Turn **Main Isolator Switch OFF**.
- Apply LOTO Lock and Tag on Main Isolator Switch.
- Try attempt to start the machine via HMI or Control Panel, the Machine should not start.
- Upon opening the door, the indicator light within the door switch will illuminate red, signaling that the door is open.

3) "Maintenance Access:

- Authorized personnel open the safety doors.
- Perform maintenance/service inside the machine area.
- Door remain Open/Unlocked and safe for personnel access.
- System remains under LOTOTO with lock & tag.

4) Re-Engaging Door Interlocks (Post-Maintenance):

- Close all Safety Doors physically.
- From the **Manual Mode Screen**, issue a **Door Close Command**. The indicator light within the door switch will illuminate green, signaling that the door is closed.

- Unless the door receives the close command from the HMI and securely latches, the door switch indicator will illuminate Blinking Green.
- Press the Safety Reset Button on HMI/ Control Panel to reset the safety circuit.
- Remove LOTO Lock and Tag from Main Isolator Switch.
- Turn ON the Main Isolator Switch.

5) System Reset and Try-Out:

- Press Reset on HMI/Control Panel.
- Safety PLC validates:
 - All doors are closed and locked.
 - Safety circuits are Healthy.
 - All LOTO devices are removed.
- If validated, control system permits machine start-up.

6) Machine Restart:

- Operator gives Start Command via HMI OR Control Panel.
- Machine resumes normal operation.

8 Intended Use of the Machine

This machine is designed for the automated handling, orientation, and robotic pick-and-place of packed Kinderjoy products in a high-speed production environment.

Its primary purpose is to efficiently receive manually-fed packed Kinderjoy units, align them properly, and accurately pick and place them onto a downstream conveyor for further operations such as inspection, secondary packaging, or processing.

Key functions of the machine include:

- Gentle product infeed and orientation using a vibratory conveyor to prevent damage to the packaging.
- Automated Transfer and spacing of Kinderjoy units through guided belt conveyors equipped with proximity sensors for optimal robot picking.
- High-speed robotic pick-and-place operation using Delta Robots integrated with a vision system to ensure precise picking of each product without collision or damage.
- Continuous loop handling of unpicked products via a return conveyor system, ensuring all products are recirculated and re-attempted for picking, minimizing product wastage.
- Synchronization of all movements to maintain seamless and uninterrupted production flow.

Limitations of Use:

The machine is designed for specific operational parameters and product types. Use beyond these defined conditions may result in malfunction, product damage, or unsafe operation. The following limitations must be observed.

1) Product Specificity :

- The machine is configured and optimized for handling packed Kinderjoy products only.
- It is not designed for handling loose, unpackaged, or significantly different-sized products without mechanical and software adjustments.

2) Orientation and Feeding:

- Manual feeding into the vibratory infeed hopper must be done carefully to **avoid excessive overlapping or bulk feeding**, which can affect orientation and disrupt the pick-and-place process.
- Feeding of severely deformed, damaged, or oversized products is not recommended.

3) Weight and Size Range:

- The system is calibrated for Kinderjoy with standard dimensions and weight.
- Products exceeding the preset size and weight limits may not be accurately detected, picked, or handled.

4) Material Compatibility:

- The machine is suitable for handling products with rigid plastic packaging (like Kinderjoy).
- Soft, fragile, or non-rigid items may not withstand the pick-and-place vacuum suction process.

5) Vision System Limitations:

- The vision system may fail to detect products if:
 - The product orientation is too extreme.
 - Products are overlapping or stacked.
 - The product surface is heavily reflective, dirty, or damaged.
- The machine cannot correct product orientation beyond the detection range of the vision system.

6) Throughput Capacity:

- The machine is designed for a specific throughput rate, matching conveyor speeds and robot cycle times.
- Exceeding the designed feeding rate may lead to product jams, missed picks, or return loop congestion.

7) Environmental Conditions:

- The system is intended for operations in clean, dry, and controlled industrial environments.
- Excessive dust, humidity, or temperature extremes can impair sensor performance and mechanical operations.

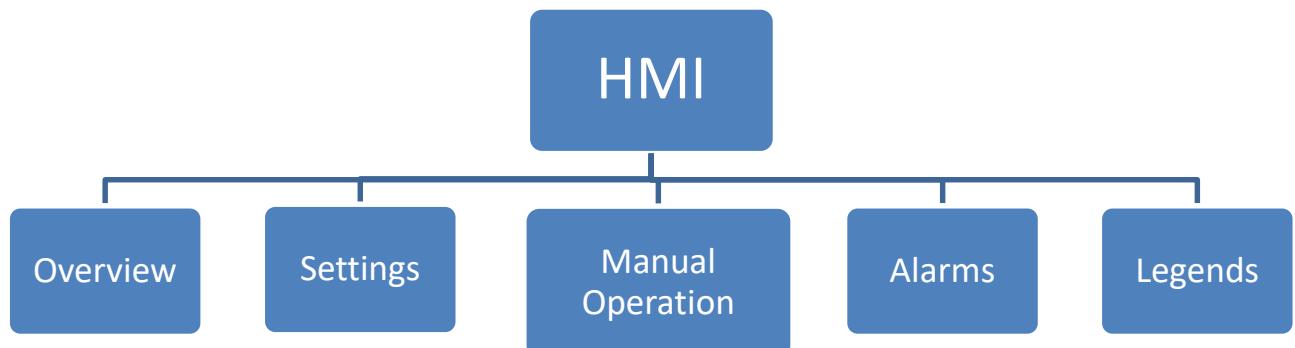
8) Product Rejection Handling:

- Kinderjoy products that repeatedly fail to be detected (due to persistent orientation or defect issues) will continue to circulate in the return loop. Manual intervention may be required if a product fails multiple cycles.

9) No Human Interference During Operation:

- The machine is designed for automated operation without human interference in the robotic pick-and-place zone during normal running conditions.

The below figure shows the overall layout of the HMI



1. Manual Feeding of Packed Kinderjoy:

- Packed Kinderjoy are manually fed into the Hopper of the Vibratory Infeed Conveyor by the operator.
- This conveyor gently vibrates, which helps in spreading and orientating the Kinderjoy evenly without damaging the packaging.

2. Transfer to Belt Conveyor:

- After feeding, the chocolate are automatically transferred onto a Belt Conveyor through Entry guide which aligns and spaces the Kinderjoy for robotic picking.
- **Entry Guide Function:** This guide acts as a funnel or channel to:
 - Prevent pile-ups or product overlaps.
 - Align Kinderjoy properly.
 - Create sufficient spacing between Kinderjoy for optimal robotic detection and picking.
 - Proximity sensors are used to detect the presence of Kinderjoy.

3. Robotic Pick-and-Place Operation:

- The system is equipped with Four Delta Robots, known for high-speed and precise movement in pick-and-place-operations.
- Each Robot can pick three Kinderjoy at a time using a suction-based end effector.
- The robots are integrated with a **vision system** that :
 - Detects the exact **position, orientation, and presence** of Kinderjoy on the Conveyor Belt with high accuracy.
 - Ensures precise picking without collision or damage.
- Once detected, the robots place the Kinderjoy onto a **Langen Conveyor (Customer Scope)**, which may be for inspection, packaging or another process.
- The entire robotic movement is synchronized with the conveyor speed, ensuring continuous, non-stop operation.

4. Chocolate Entry Movement:

- The Kinderjoy continues to move along the Belt conveyor, allowing all available Kinderjoy to be picked by the robots.

5. Handling of Undetected Kinderjoy:**• Missed Kinderjoy:**

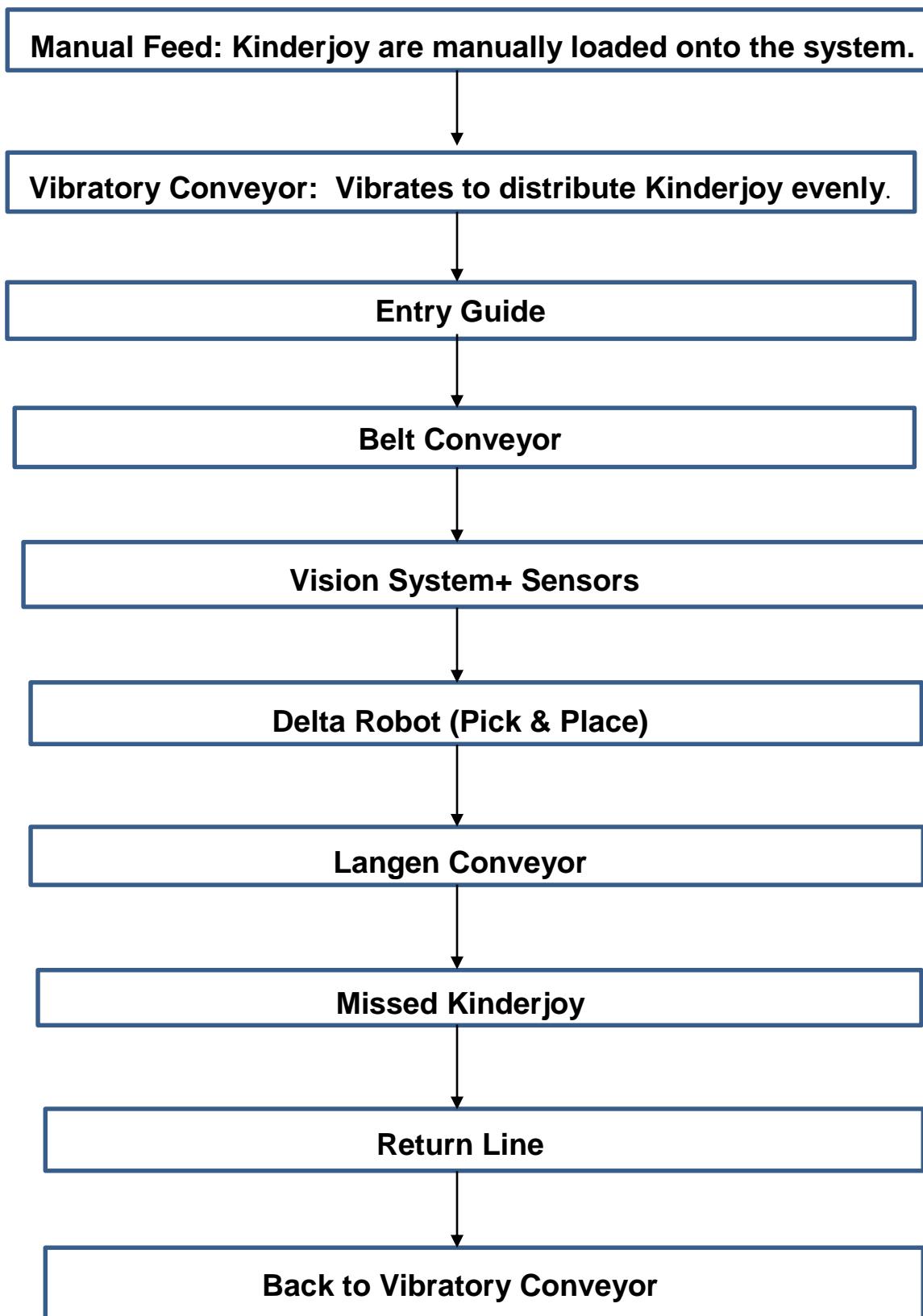
Sometimes, Kinderjoy may not be picked due to:

- Orientation of Kinderjoy must be proper.
- Vision detection failure.
- Overlapping or improper spacing.

• Return line:

- These Kinderjoy are not wasted.
- They are automatically routed back to **the Vibratory Infeed area** via **return conveyor system**.
- These re-enter the cycle and are attempted to be picked again.

10.1 Flow Chart



Welcome Screen



Figure 9: welcome screen

10.2 Overview

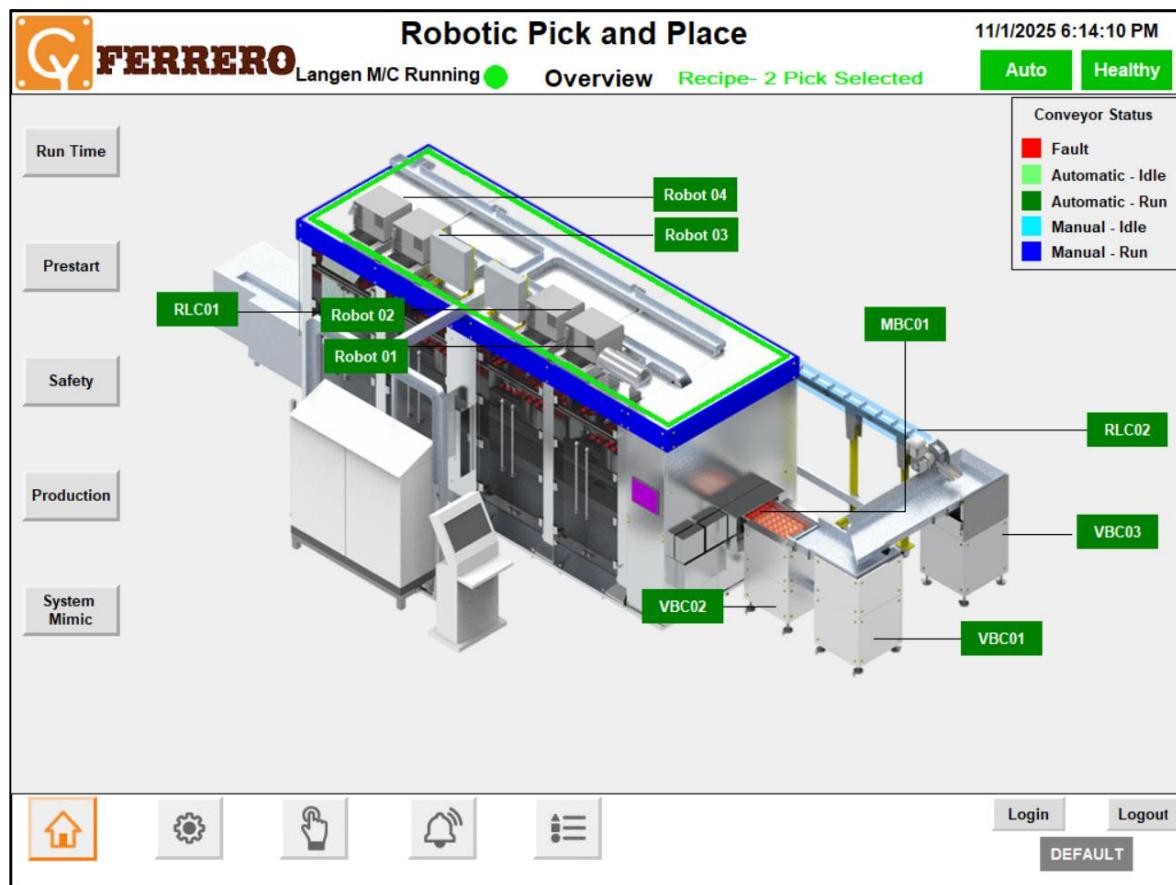


Figure 10: Overview

- This screen is a real-time operational dashboard showing the status of various conveyors and robotic pick-and-place stations in the Kinderjoy line. Below is the detailed explanation of the overview screen.
- Conveyor Status Legend: Color codes used throughout the schematic:
 - Red = Fault
 - Green = Automatic - Idle
 - Dark Green= Manual - Run
 - Cyan = Manual - Idle
 - Dark Blue = Automatic – Run

- **Machine Running Status:** “Langen M/C Running” confirms the Conveyor is operational.
- **Mode Indicator:**
 - **Auto (Green):** System is currently in Auto mode.
 - **Healthy (Green):** System Health status is “healthy”, meaning no general faults in the entire line.
- **“Recipe – 2 Pick Selected”** →The system is running a recipe that uses 2 pick positions (i.e., 2 robots picking simultaneously).
- **Controls on the left side of the screen :**
 - **Run Time:** Displays current operational runtime.
 - **Prestart:** Usually for initialization checks before running.
 - **Safety:** Safety-related controls or diagnostics.
 - **System Mimic:** The System Mimic screen serves as a real-time diagnostic and monitoring tool for operators.

10.2.1 Run Time

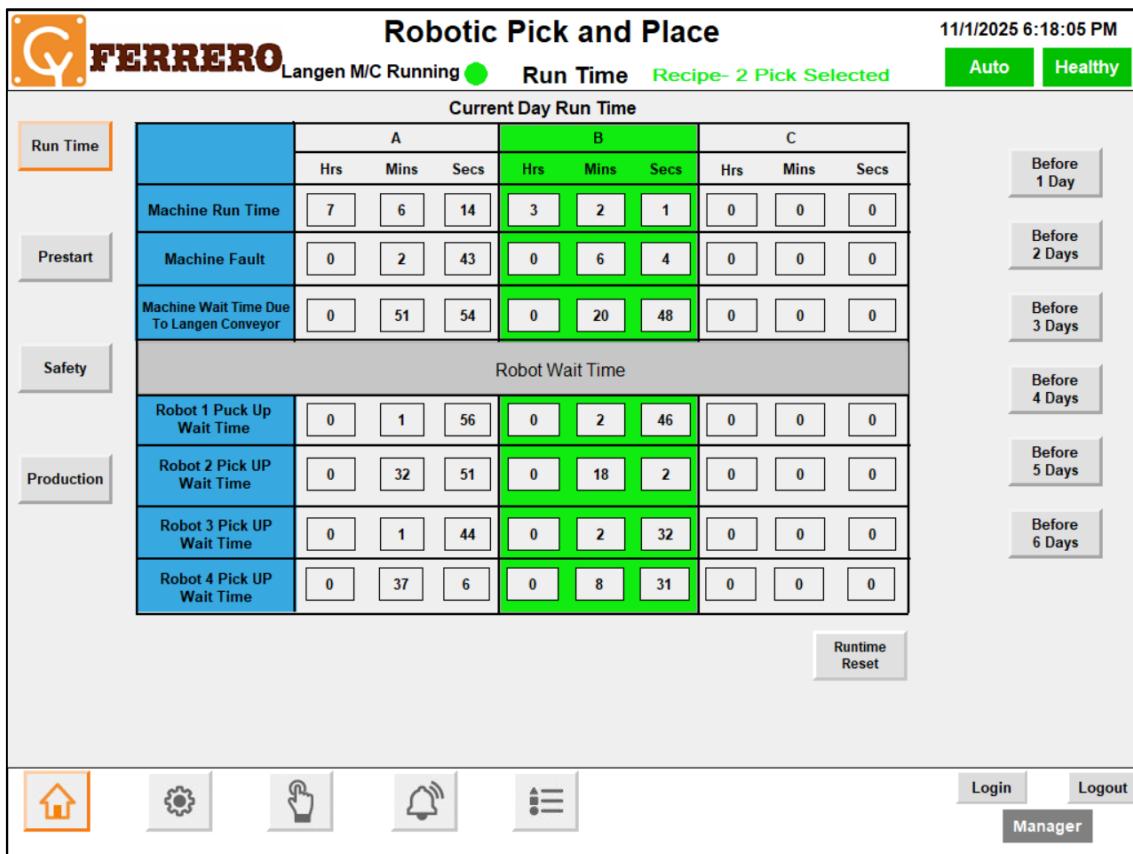


Figure 11: Run Time

- It provides **detailed runtime statistics and wait times** for both the overall machine and each individual robot.
- This **Run Time screen** helps operators and engineers **monitor daily machine performance**, including:
 - ❖ How long the system and each robot has been running, idle, or in fault.
 - ❖ Wait times that may indicate process bottlenecks.
 - ❖ Comparison of run / fault / wait times for different machines or shifts (A, B, C).
- **Machine Run Time:** Shows total active operation time of the robotic cell for the current day:
 - ❖ **Machine Run Time (A):** 7 hours 6 mins 14 secs
 - ❖ **Machine Run Time (B):** 3 hours 2 mins 1 sec
- **Machine Fault:** Indicates how long the machine was **in fault condition** (errors or interlocks).

- **Machine Wait Time Due to Langen Conveyor:** This measures how long the robotic system **waited** for the upstream “Langen Machine” (feeder or carton conveyor).
- **Robot Wait Time Section:** Each robot’s “Pick Up Wait Time” shows how long each robot was **idle**, waiting for a product to arrive at its pick position.
- **Runtime Reset Button:** Used by maintenance or supervisors to **reset all counters** (after recording daily data).

10.2.2 Production

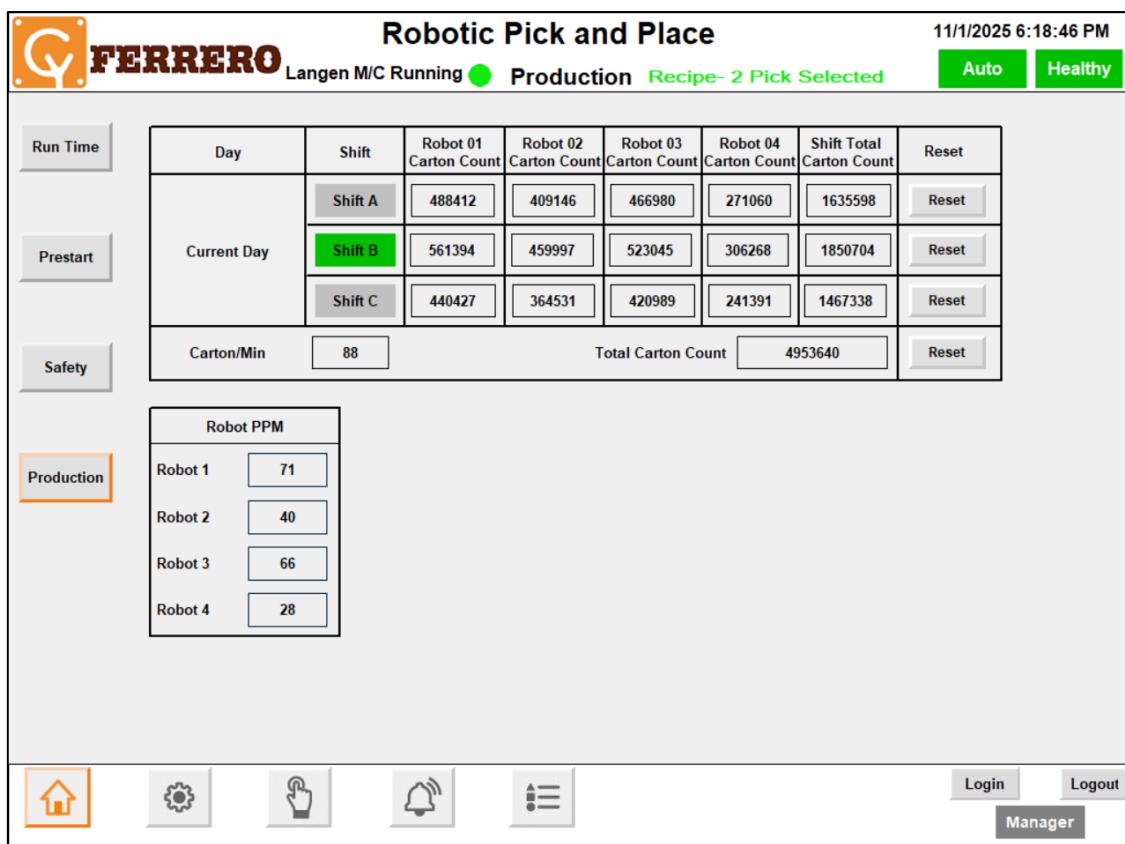


Figure 12: Production

- This screen is the **Production Screen** for the *Robotic Pick and Place* system.
- It is used to monitor:
 - ❖ How many cartons each robot has handled.
 - ❖ Total carton count per shift and per day.
 - ❖ The efficiency of each robot (measured in PPM — Picks Per Minute).
 - ❖ Comparison between different shifts (A, B, C).

- Essentially, it's a **production performance dashboard** for the robotic system.

Current Day Data: Each row corresponds to a shift:

- **Shift A, Shift B, Shift C**
- Current running shift is **highlighted in green (Shift B)**.

Each column shows the **carton count handled by individual robots** and the **total for that shift**.

- **Total Carton Count:** At the bottom, the total production count for all shifts combined is shown
- **Carton per Minute:** This value shows the average speed of the line — i.e., how many cartons the system processes per minute.
- **Robot PPM:** Picks per Minute by the Robot.
- **Reset Buttons:** Each row and the total section has a “**Reset**” button — used by managers to clear production data:
 - ❖ **Individual shift reset** → clears carton counts for that shift.
 - ❖ **Total reset** → clears all shift and daily counts.

10.2.3 System Mimic

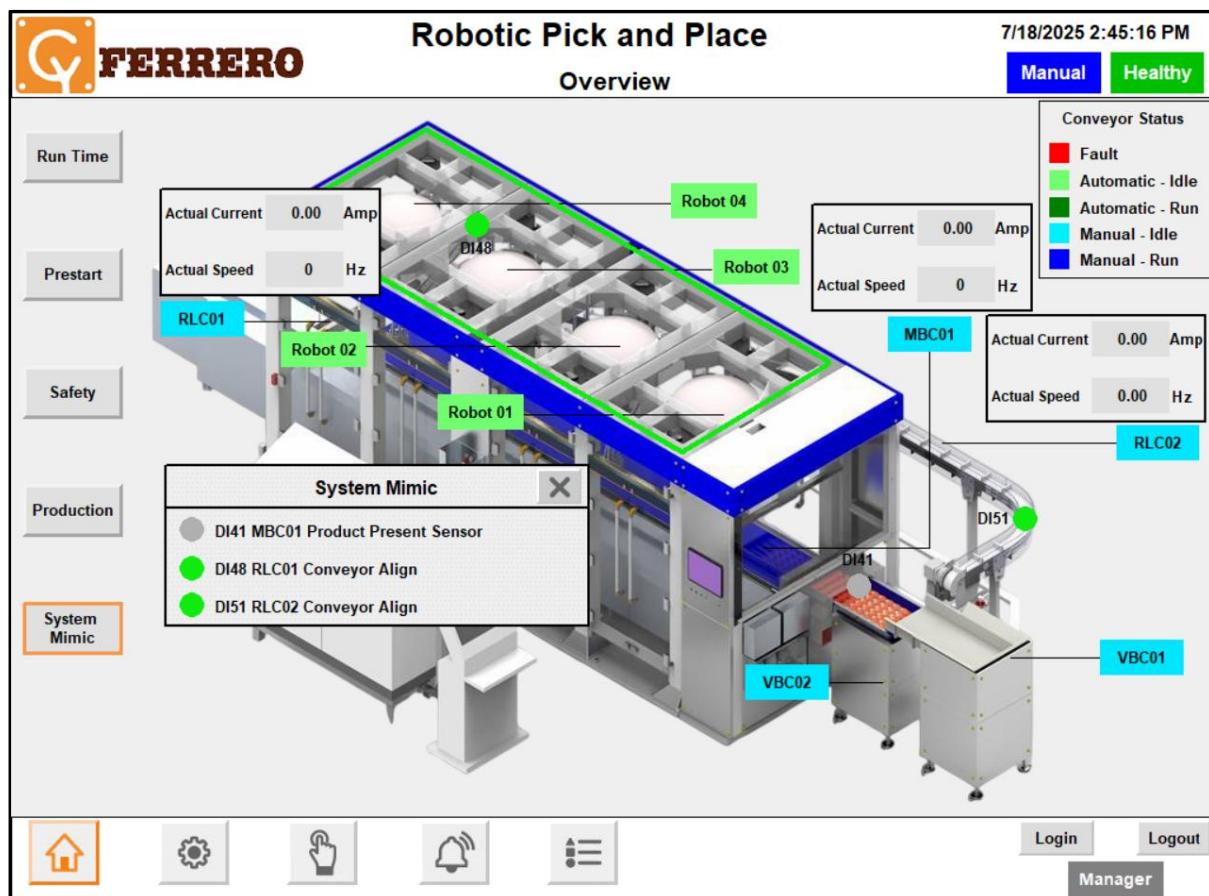
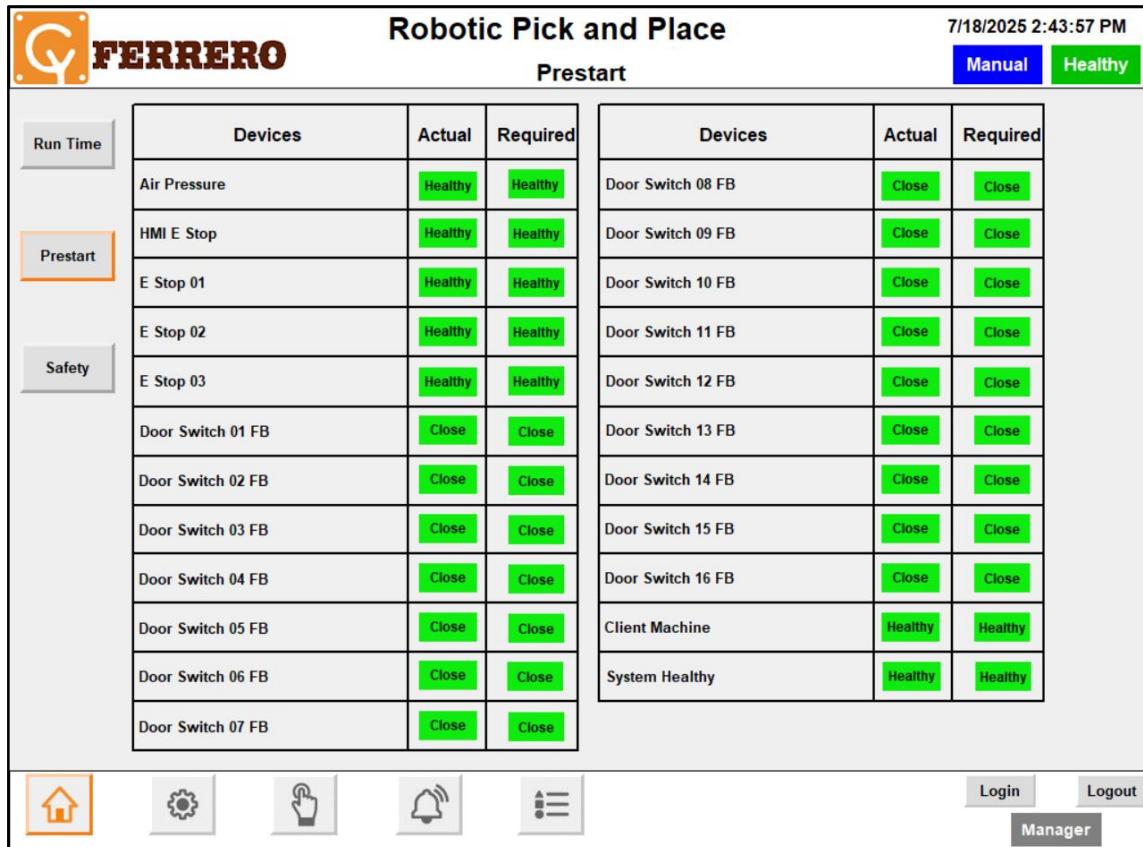


Figure 13: System Mimic

- The mimic screen visually shows the status of each sensor involved in the system.
 - **Green Dot:** Sensor is Active
 - **Gray Dot:** Sensor is Inactive.
- This immediate visual feedback helps operators confirm the current physical state of the system without needing to inspect it manually.

10.2.4 Prestart



Robotic Pick and Place

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Prestart

Run Time	Devices	Actual	Required	Devices	Actual	Required
Prestart	Air Pressure	Healthy	Healthy	Door Switch 08 FB	Close	Close
	HMI E Stop	Healthy	Healthy	Door Switch 09 FB	Close	Close
	E Stop 01	Healthy	Healthy	Door Switch 10 FB	Close	Close
	E Stop 02	Healthy	Healthy	Door Switch 11 FB	Close	Close
	E Stop 03	Healthy	Healthy	Door Switch 12 FB	Close	Close
	Door Switch 01 FB	Close	Close	Door Switch 13 FB	Close	Close
	Door Switch 02 FB	Close	Close	Door Switch 14 FB	Close	Close
	Door Switch 03 FB	Close	Close	Door Switch 15 FB	Close	Close
	Door Switch 04 FB	Close	Close	Door Switch 16 FB	Close	Close
	Door Switch 05 FB	Close	Close	Client Machine	Healthy	Healthy
Door Switch 06 FB	Close	Close	System Healthy	Healthy	Healthy	
Door Switch 07 FB	Close	Close				

Navigation: Home | Settings | Help | Notifications | Lists | Manager

User Options: Login | Logout | Manager

Figure 14: Prestart

- The Prestart screen shows the pre-required conditions of different devices before starting the system.
- If all the prestart conditions are fulfilled then states of the devices will show “green” otherwise it shows “grey”.

10.2.5 Safety

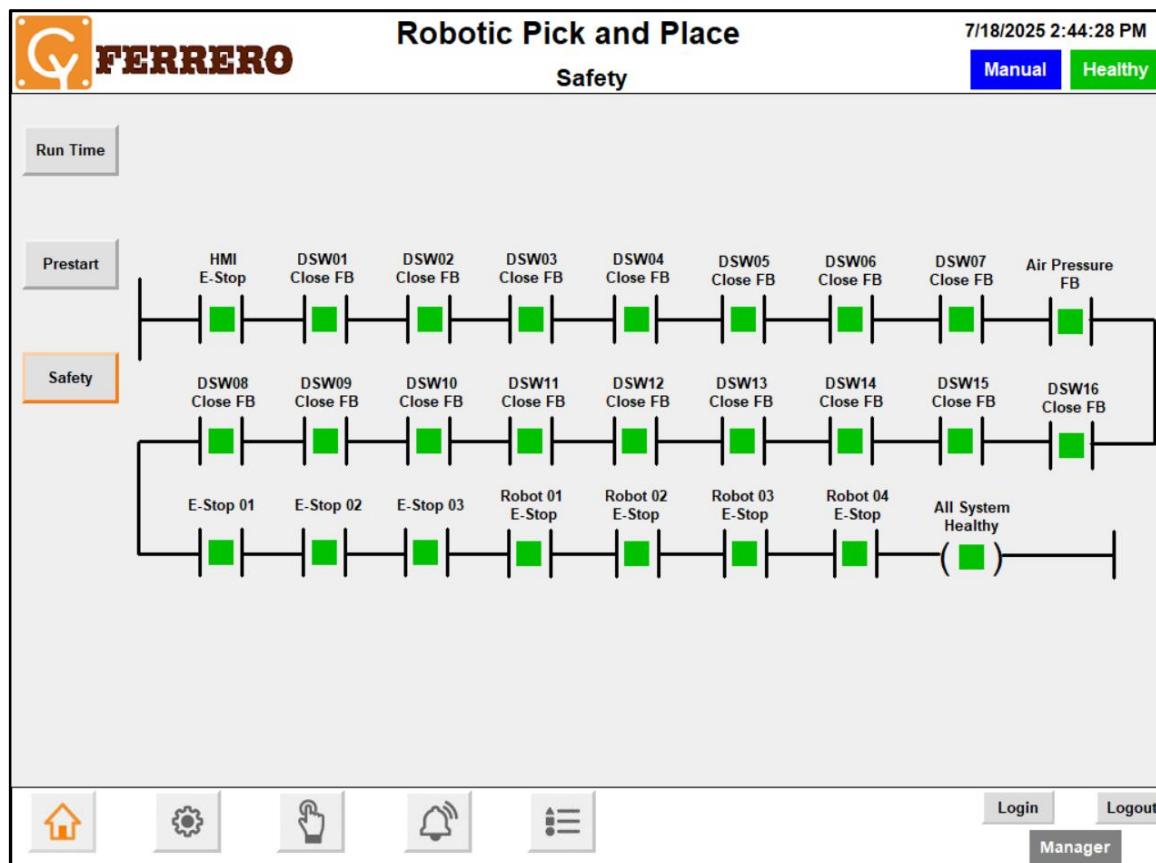


Figure 15: Safety

- The safety screen provides a visual representation of the safety circuit feedback in the Kinderjoy Robotic Pick and Place system. It is used to:
 - Monitor emergency stop devices (E-Stop).
 - Track feedback from door safety switches (DSW).
 - Verify overall system safety status before and during operation.
- Each red  square represents a **safety input** that is currently **not in a safe state**.
- **Red = Unsafe** → The associated door is open, E-stop is pressed, or signal is not received.
- "All System Healthy"  turns green only when all safety inputs are in a safe condition.

10.3 Settings

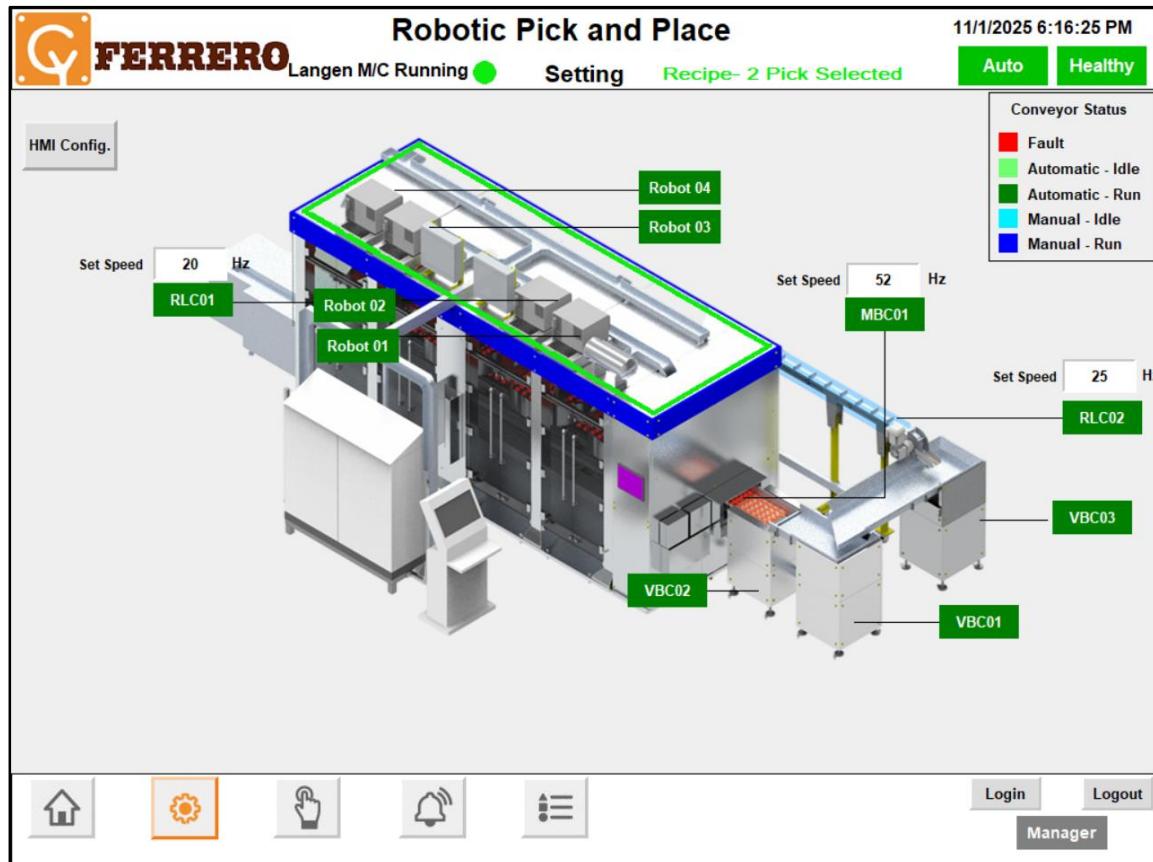


Figure 16: Settings

The setting screen is used by the operator to:

- Adjust conveyor speeds.
- One can set the speed of each conveyor in the system in Hz. The following conveyors are adjustable here:
 - **RLC01** (Return Line Conveyor 01).
 - **MBC01** (Main Belt Conveyor).
 - **RLC02** (Return Line Conveyor 02).

{ **Note:** If the Set Speed is set to 100%, the conveyor runs at its maximum configured speed.
 You can reduce the speed (e.g., to 80%, 60%) depending on process requirements or to
 match robot picking cycle time. }

10.4 Manual Operation

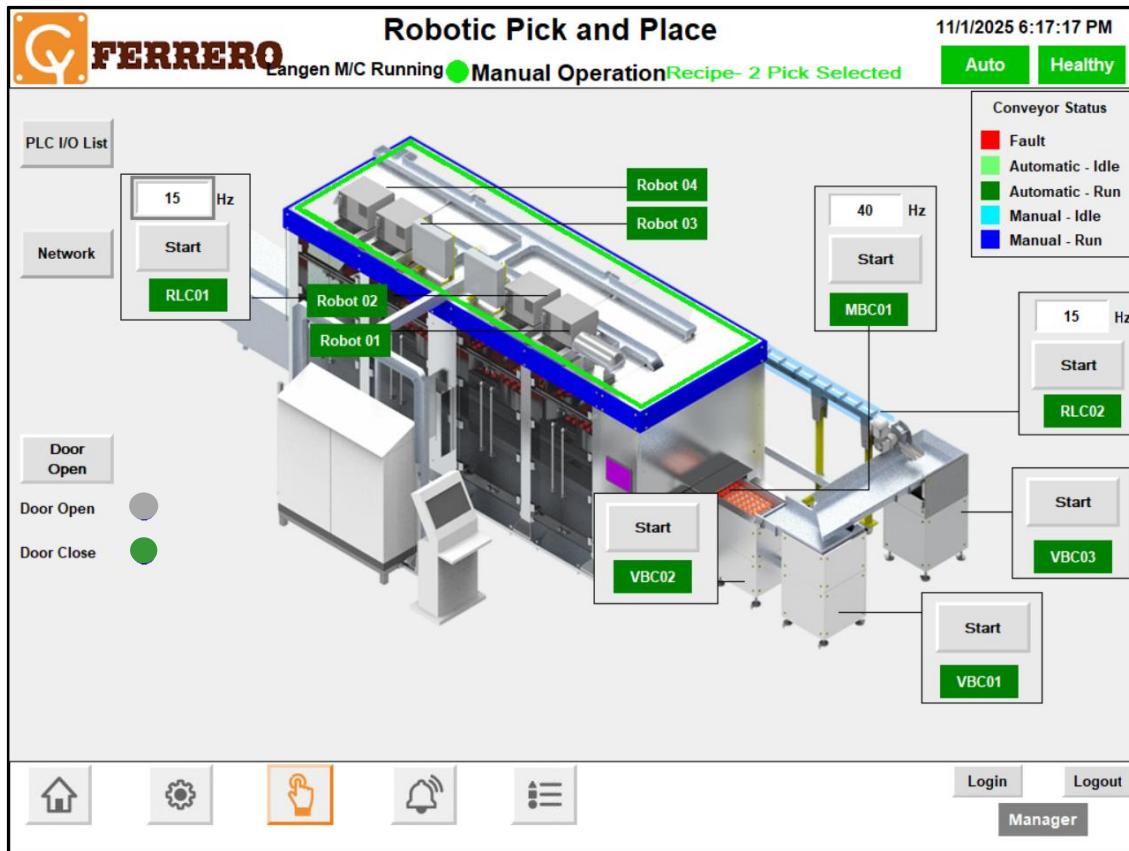


Figure 17: Manual Operation

This interface represents the **manual control panel** of a **Robotic Pick and Place system** used for handling and transferring products within an automated production line. The screen is part of the Human-Machine Interface (HMI) system and enables operators to monitor and manually control robotic cells and conveyor belts.

- The Robot and conveyor section is associated with a drive control module, which displays:
 - **Frequency (Hz):** Operating Frequency (Speed Setting).
 - **Start Button:** Initiates operation of the respective component.

Machine Modules:

- **RLC01** (Return Line Conveyor 01): Feeds product into Robot 1 and 2 area.
- **MBC01** (Main Belt Conveyor 01): Central conveyor for all 4 Robots carries products through.
- **RLC02** (Return Line Conveyor 02): Takes the Kinderjoy back to the infeeder.
- **VBC01 / VBC02 / VBC03:** Vibratory Conveyor.

- Start Buttons are provided for manual engagement.

Left Panel:

- **PLC I/O List:** Opens a window to monitor PLC Input / Output status.
- **Network:** Accesses the network diagnostic screen.
- **Door Status Indicator:**
 - **Green LED:** Door is closed and safe for operation.
 - **Grey LED:** Door is open (machine may halt for safety).

10.4.1 PLC Architecture

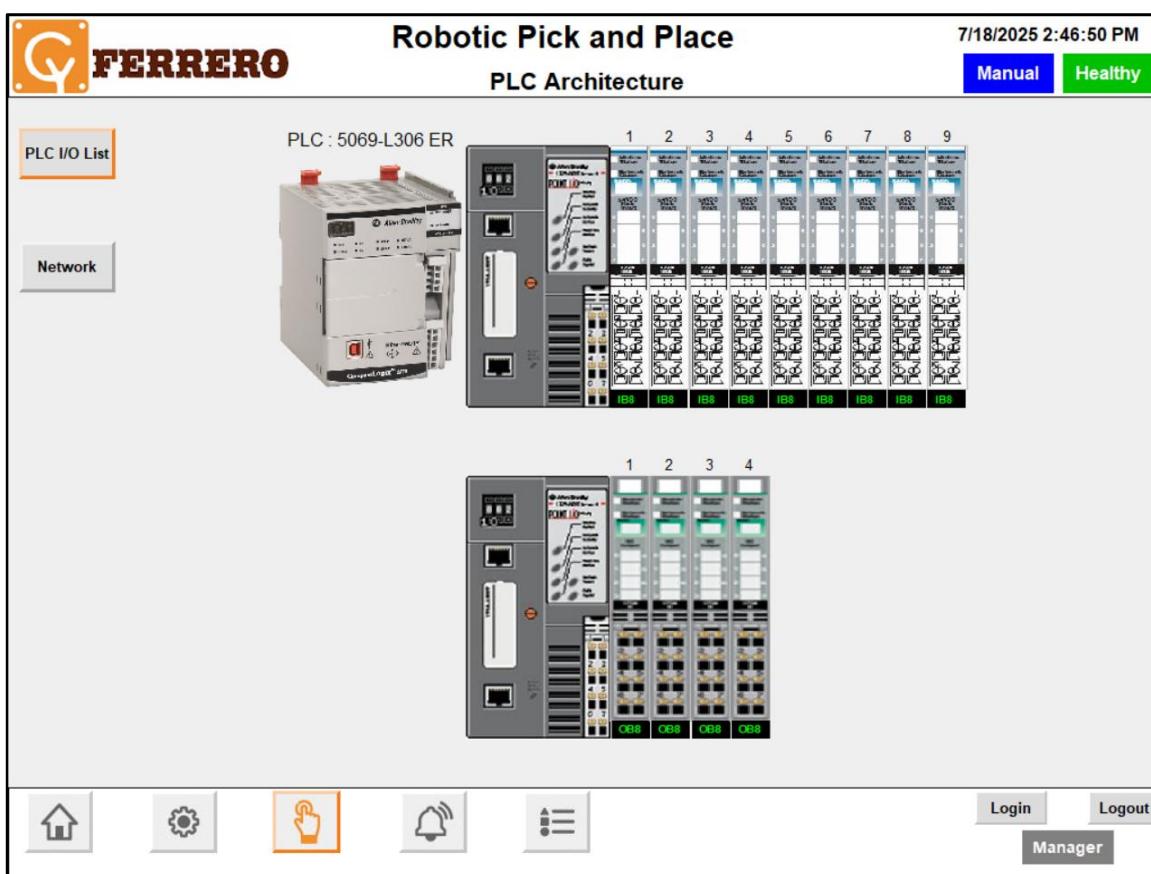


Figure 18: PLC Architecture

- **Input Devices:** This section lists all the devices or sensors that provide input to the SCADA system. These could include things like switches, buttons, sensors (such as temperature, pressure, or proximity sensors), and any other devices that send signals to the SCADA.

Digital Input 1			
SR. NO.	IO NUMBER	DESCRIPTION	STATUS
1	RIO01:I.Data[01].0	DI01_System_Start_PB	OFF
2	RIO01:I.Data[01].1	DI02_System_Stop_PB	ON
3	RIO01:I.Data[01].2	DI03_System_Reset_PB	OFF
4	RIO01:I.Data[01].3	DI04_Safety_Reset_PB	OFF
5	RIO01:I.Data[01].4	DI05_HMI_E_Stop	ON
6	RIO01:I.Data[01].5	DI06_Air_Pressure_Low_FB	ON
7	RIO01:I.Data[01].6	DI07_Spare	OFF
8	RIO01:I.Data[01].7	DI08_Spare	OFF

Figure 19: PLC I/O

- **Output Devices:** This part of the list enumerates all the devices controlled by the SCADA. These could include motors, valves, actuators, alarms, indicators, and any other devices that the SCADA can send signals to in order to operate.
- **Signal Types:** Each input and output point is usually described in terms of the signal type it accepts or generates. This could include analog signals (such as voltage or current), digital signals (binary on/off), or other specialized signal types depending on the specific requirements of the system.

Digital Output 1			
SR. NO.	IO NUMBER	DESCRIPTION	STATUS
1	RIO01:O.Data[01].0	DO01_System_Red_Lamp	OFF
2	RIO01:O.Data[01].1	DO02_System_Amber_Lamp	OFF
3	RIO01:O.Data[01].2	DO03_System_Green_Lamp	OFF
4	RIO01:O.Data[01].3	DO04_Buzzer	OFF
5	RIO01:O.Data[01].4	DO05_System_Start_Lamp	OFF
6	RIO01:O.Data[01].5	DO06_System_Reset_Lamp	OFF
7	RIO01:O.Data[01].6	DO07_All_Door_Open_CMD	OFF
8	RIO01:O.Data[01].7	DO08_Spare	OFF

Figure 20: PLC I/O

- Descriptions and Labels:** Each input and output point is typically accompanied by a description or label that helps identify its function or location within the system. Clear labelling is crucial for proper system understanding and troubleshooting.
- Addressing Information:** In systems where devices are connected via a network or bus, the I/O list may include addressing information that specifies how each device is uniquely identified within the system architecture.
- Control Logic:** In some cases, the I/O list may also include information about the control logic associated with each input and output point. This could include details about how inputs are processed, how outputs are triggered, and any interlocks or safety mechanisms in place.

10.4.2 Network

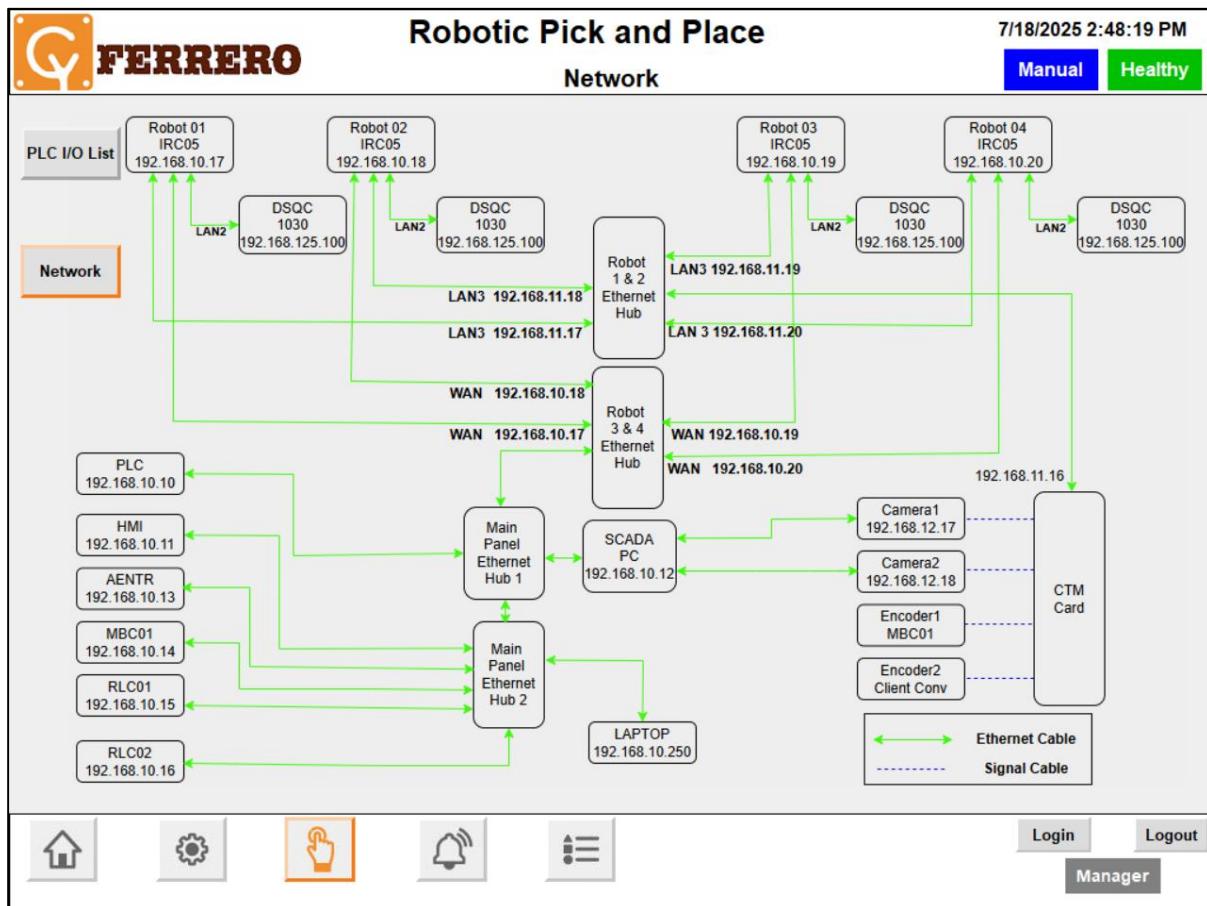


Figure 21: Network

- From the Network Screen, one can check the network architecture for a complete system.
- In this system, network architecture refers to the arrangement and configuration of network components that enable communication between the SCADA device and other devices within a control system or industrial environment. The network architecture plays a crucial role in ensuring efficient and reliable data exchange between the SCADA and various devices, sensors, actuators, and other components.

10.5 Alarms

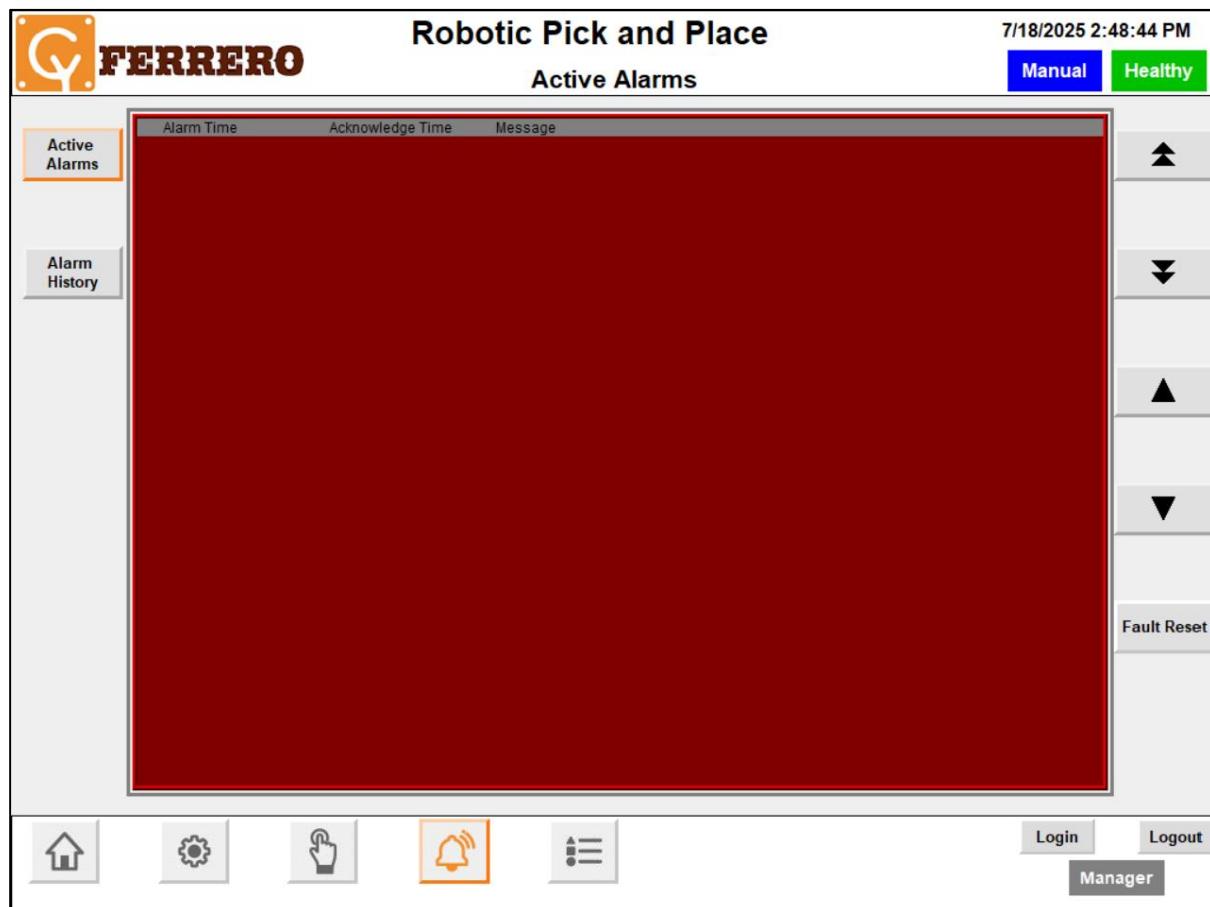


Figure 22: Active Alarms

All the active alarms in the system are checked from the Alarm screen. From this screen, one can;

1. Silent the buzzer on arising any alarm by clicking the **Silent** button.
2. Acknowledge the active alarm present in the system by selecting it and then by clicking **Fault Reset** button.
3. Check the alarm history by clicking on the **Alarm History** button.

10.5.1 Alarms History

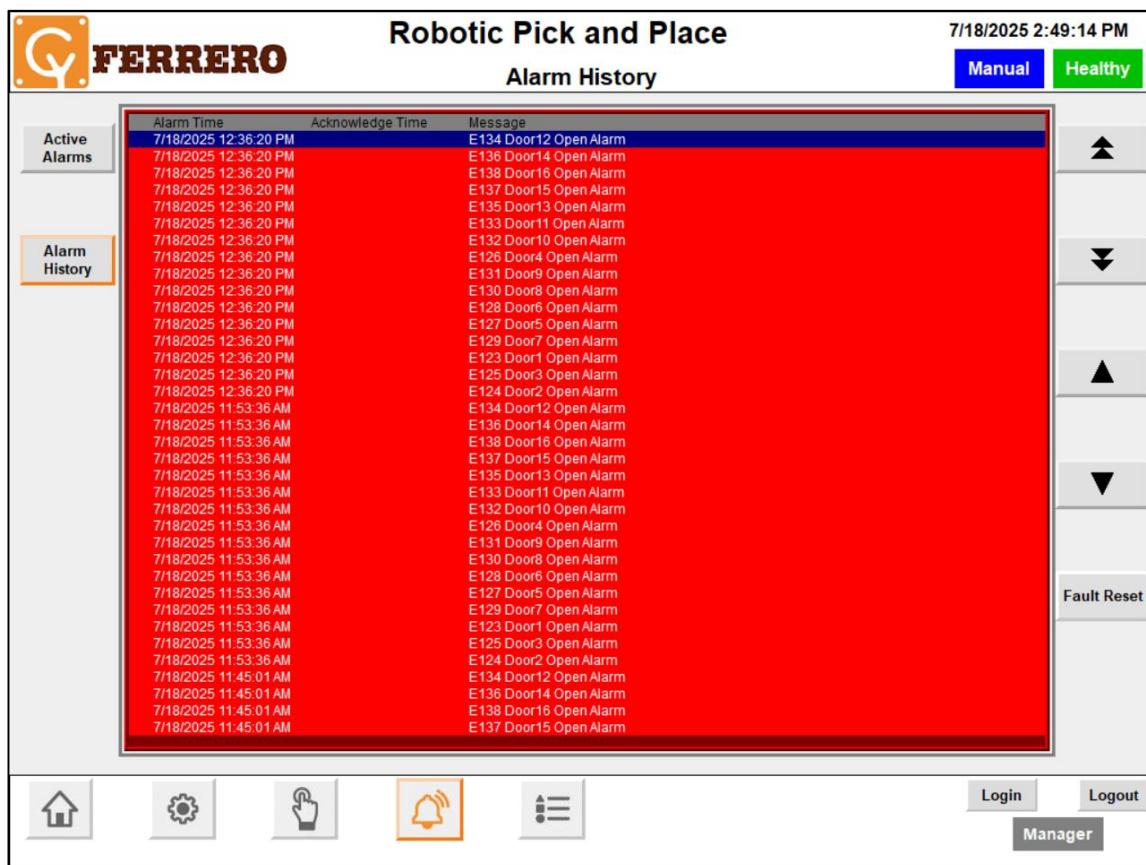


Figure 23: Alarms History

- The Alarm screen shows all Acknowledged (Green) and Unacknowledged alarms (Red) of the system, their Status, Alarm code, and their message.
- This screen shows the alarm history with time.
- And this alarm history will clear only by admin or manager.

10.6 Legends

Abbreviations	Full Forms	X
VBC01	Vibratory Conveyor 01	
VBC02	Vibratory Conveyor 02	
MBC01	Main Belt Conveyor 01	
RLC01	Return Line Conveyor 01	
RLC02	Return Line Conveyor 02	

Figure 24: Legends

11 Alarm List

Sr. No.	Code	Alarm Description	Cause	Solution
1	E001	E001_RIO01_Communication_Fault	Communication Fault occurs due to disconnection between the Ethernet cables from remote IO01 to PLC through Ethernet Hub.	<ul style="list-style-type: none"> 1. Check the Ethernet Cable connection. 2 .Check the Remote IO Module power is ON. 3. Press the Reset button from the HMI panel.
2	E002	E002_DriveMBC01_Drive_Communication_Fault	Communication Fault occurs due to disconnection between the Ethernet cables from Drive MBC01 to PLC through Ethernet HUB.	<ul style="list-style-type: none"> 1. Check the Ethernet Cable connection. 2. Check the drive power is ON. 3. Press the Drive Reset button from HMI or press the Reset button from HMI Panel.
3	E003	E003_DriveRLC01_Drive_Communication_Fault	Communication fault occurs due to disconnection between the Ethernet cables from Drive RLC01 to PLC through Ethernet HUB.	<ul style="list-style-type: none"> 1. Check the Ethernet Cable connection. 2. Check the Drive Power is ON. 3. Press the Drive Reset button from HMI or press the Reset button from HMI Panel.
4	E004	E004_DriveRLC02_Drive_Communication_Fault	Communication fault occurs due to disconnection between the Ethernet cables from Drive RLC01 to PLC through Ethernet HUB.	<ul style="list-style-type: none"> 1. Check the Ethernet cable connection. 2. Check the Drive Power is ON. 3. Press the Drive Reset button from HMI or press the Reset button from HMI Panel.
5	E005	E005_ROBOT01_Communication_Fault	Communication fault occurs due to disconnection between the Ethernet cables from ROBOT01 to PLC through Ethernet HUB.	<ul style="list-style-type: none"> 1. Check the Ethernet cable connection. 2. Check the Robot01 Power is ON. 3. Press the Reset button from HMI Panel.

Sr. No.	Code	Alarm Description	Cause	Solution
6	E006	E006_ROBOT02_Communication_Fault	Communication fault occurs due to disconnection between the Ethernet cables from ROBOT02 to PLC through Ethernet HUB.	1. Check the Ethernet cable connection. 2. Check the Robot02 power is ON. 3. Press the Reset button from HMI Panel.
7	E007	E007_ROBOT03_Communication_Fault	Communication fault occurs due to disconnection between the Ethernet cables from ROBOT03 to PLC through Ethernet HUB.	1. Check the Ethernet Cable Connection. 2. Check the Robot03 power is ON. 3. Press the Reset button from the HMI Panel.
8	E008	E008_ROBOT04_Communication_Fault	Communication fault occurs due to disconnection between the Ethernet cables from ROBOT04 to PLC through Ethernet HUB.	1. Check the Ethernet Cable Connection. 2. Check the Robot04 power is ON. 3. Press the Reset button from the HMI Panel.
9	E101	E101_Air Pressure_Low	Air pressure might be low than the required set point.	Required minimum compressed air pressure must satisfy. If it isn't, the air pressure needs to be checked and pressure value must be brought at the required set point.
10	E102	E102_E-Stop At HMI_Pressed	HMI Emergency stop button might have been pressed making the system unhealthy to start by breaking the safety circuit.	To make system healthy & ready to run, emergency button pressed which is placed on main panel door must be reset by releasing the button.
11	E103	E103_E-Stop1_Pressed@MBC01 End Side	E-Stop1 emergency stop button might have been pressed making the system unhealthy to start by breaking the safety circuit.	To make system healthy & ready to run, emergency button pressed which is placed on MBC01 at end side must be reset by releasing the button.
12	E104	E104_E-Stop2_Pressed @RLC01	E-Stop 2 emergency button might have been pressed making the system unhealthy to start by breaking the safety circuit.	To make system healthy & ready to run, emergency button pressed which is placed on RLC01 must be reset by releasing the button.

Sr. No.	Code	Alarm Description	Cause	Solution
13	E105	E105_E-Stop3_Pressed @RLC02	E-Stop 3 emergency button might have been pressed making the system unhealthy to start by breaking the safety circuit.	To make system healthy & ready to run, emergency button pressed which is placed on RLC02 must be reset by releasing the button.
14	E106	E106_Robot01_E_Stop_Pressed	Robot01 Emergency button might have been pressed making the system unhealthy to start by breaking the safety circuit.	To make system healthy & ready to run, emergency button pressed which is placed on the Robot01 Teach Pendant must be reset by releasing the button.
15	E107	E107_Robot02_E_Stop_Pressed	Robot02 Emergency button might have pressed making the system unhealthy to start by breaking the safety circuit.	To make the system healthy & ready to run, emergency button pressed which is placed on the Robot02 Teach Pendant must be reset by releasing the button.
16	E108	E108_Robot03_E_Stop_Pressed	Robot03 Emergency button might have pressed making the system unhealthy to start by breaking the safety circuit.	To make the system healthy & ready to run, emergency button pressed which is placed on the Robot03 Teach Pendant must be reset by releasing the button.
17	E109	E109_Robot04_E_Stop_Pressed	Robot04 Emergency button might have pressed making the system unhealthy to start by breaking the safety circuit.	To make the system healthy & ready to run, emergency button pressed which is placed on the Robot04 Teach Pendant must be reset by releasing the button.
18	E110	E110_Line Monitoring FB _Alarm	Suppose to any line phase is missing out of 3 phase.	Check the 3 phase supply at line Monitoring relay.
19	E111	E111_No Product Detected_Alarm at MBC01 Conveyor.	1. Empty feeder, misfeed, or product blockage. 2. Dirty, misaligned, damaged, or disconnected sensor. 3. Product has fallen, tilted, or is outside the detection area.	1. Ensure the product is being correctly fed into the detection area. 2. Clean and realign the product detection sensor. 3. Once the cause is corrected, reset the alarm using the HMI or control panel.

Sr. No.	Code	Alarm Description	Cause	Solution
20	E112	E112_RLC01 Conveyor not Align_Alarm	1. The conveyor is physically out of its required position. 2. Feedback sensor does not detect the conveyor in the align position.	1. Inspect the conveyor's mechanical structure. Ensure it is fully and correctly aligned. 2. Clean, test, and realign the alignment sensor. 3. Check the wiring of sensor.
21	E113	E113_RLC02 Conveyor not Align_Alarm	1. Conveyor Misalignment. 2. Faulty or Dirty Alignment Sensors.	1. Physically inspect RLC02 conveyor alignment. 2. Clean and Inspect Sensors.
22	E114	E114_MBC01 Power Disconnector Switch FB_Alarm	1. Power Disconnector Not in Proper State. 2. Feedback sensor fault or Loss of signal	1. Physically inspect the MBC01 disconnector switch and ensure it is in the expected position. 2. Clean and inspect the sensor.
23	E115	E115_RLC01 Power Disconnector Switch FB_Alarm	1. Incorrect switch position. 2. Feedback Sensor/ Limit Switch Fault.	1. Physically inspect the RLC01 disconnector switch and ensure it is in the expected position. 2. Check the wiring of Disconnector Switch.
24	E116	E116_RLC02 Power Disconnector Switch FB_Alarm	1. Power Disconnector Not in Proper State. 2. Check the Wiring of Disconnector Switch.	1. Physically inspect the RLC02 disconnector switch and ensure it is in the expected position. 2. Check the Wiring of Disconnector Switch.
25	E121	E121_VBC01 Power Disconnector Switch FB_Alarm	1. Power Disconnector Not in Proper State. 2. Check the Wiring of Disconnector Switch.	1. Physically inspect the VBC01 disconnector switch and ensure it is in the expected position. 2. Check the Wiring of Disconnector Switch.
26	E122	E122_VBC02 Power Disconnector Switch FB_Alarm	1. Power Disconnector Not in Proper State. 2. Check the Wiring of Disconnector Switch.	1. Physically inspect the VBC02 disconnector switch and ensure it is in the expected position. 2. Check the wiring of Disconnector Switch.

Sr. No.	Code	Alarm Description	Cause	Solution
27	E123	E123_Door1Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch/sensor	1. Check if Door 1 is properly closed and latched. 2. Inspect the door safety switch or sensor for dirt, misalignment, or damage.
28	E124	E124_Door2Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch/sensor	1. Check if Door 2 is properly closed and latched. 2. Inspect the door safety switch or sensor for dirt, misalignment, or damage.
29	E125	E125_Door3Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch/sensor.	1. Check if Door 3 is properly closed and latched. 2. Inspect the door safety switch or sensor for dirt, misalignment, or damage.
30	E126	E126_Door4Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch/sensor.	1. Check if Door4 is properly closed and latched. 2. Inspect the door safety switch.
31	E127	E127_Door5Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch / sensor.	1. Check if Door5 is properly closed and latched. 2. Inspect the door safety switch.
32	E128	E128_Door6Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch/sensor.	1. Check if Door6 is properly closed and latched. 2. Inspect the door safety switch.
33	E129	E129_Door7Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch/sensor.	1. Check if Door 7 is properly closed and latched. 2. Inspect the door safety switch.
34	E130	E130_Door8Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch / sensor.	1. Check if Door 8 is properly closed and latched. 2. Inspect the door safety switch.

Sr. No.	Code	Alarm Description	Cause	Solution
35	E131	E131_Door9Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch / sensor.	1. Check if Door 9 is properly closed and latched. 2. Inspect the door safety switch.
36	E132	E132_Door10Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch/ sensor.	1. Check if Door 10 is properly closed and latched. 2. Inspect the door safety switch.
37	E133	E133_Door11Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch / sensor.	1. Check if Door11 is properly closed and latched. 2. Inspect the door safety switch.
38	E134	E134_Door12Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch / sensor.	1. Check if Door 12 is properly closed and latched. 2. Inspect the door safety switch.
39	E135	E135_Door13Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch / sensor.	1. Check if Door 13 is properly closed and latched. 2. Inspect the door safety switch.
40	E136	E136_Door14Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch/ sensor.	1. Check if Door 14 is properly closed and latched. 2. Inspect the door safety switch.
41	E137	E137_Door15Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch/ sensor.	1. Check if Door 15 is properly closed and latched. 2. Inspect the door safety switch.

Sr. No.	Code	Alarm Description	Cause	Solution
42	E138	E138_Door16Open_Alarm	1. The door has not been closed fully or securely. 2. Faulty door switch / sensor.	1. Check if Door 16 is properly closed and latched. 2. Inspect the door safety switch.
43	E201	E201_DriveMBC01_MPCB_Tripped	1. Overload Condition 2. Short Circuit. 3. Phase Imbalance or Phase Loss.	1. Check if the motor is running under excessive load and reduce it if necessary. 2. Replace any damaged cables or faulty components. 3. Check input voltage across all three phases using a voltmeter.
44	E202	E202_DriveMBC01_Drive_Not_Ready	1. Power supply issues. 2. E-Stop is Active.	1. Check the incoming power supply voltage and ensure all three phases are present. 2. The Emergency Stop button is pressed or a safety relay has tripped.
45	E203	E203_DriveMBC01_Drive_Overload	1. Motor Overload. 2. Phase Imbalance or Voltage Drop.	1. Check if the motor is running under excessive load and reduce it if possible. 2. Measure Voltage across all three phases to ensure balance.
46	E204	E204_DriveRLC01_MPCB_Tripped	1. Overload Condition. 2. Short Circuit. 3. Phase Imbalance or Phase Loss.	1. Check if the motor is running under excessive load and reduce it if necessary. 2. Replace any damaged cables or faulty components. 3. Check input voltage across all three phases using a voltmeter.
47	E205	E205_DriveRLC01_Drive_Not_Ready	1. Power Supply Issues. 2. E-Stop is Active.	1. Check the incoming power supply voltage and ensure all three phases are present. 2. The emergency stop button is pressed or a safety relay has tripped.

Sr. No.	Code	Alarm Description	Cause	Solution
48	E206	E206_DriveRLC01_Drive_Overload	1. Motor Overload. 2. Phase imbalance or Voltage drop.	1. Check if the motor is running under excessive load and reduce it if possible. 2. Measure voltage across all three phases to ensure balance.
49	E207	E207_DriveRLC02_MPCB_Tripped	1. Overload Condition. 2. Short Circuit. 3. Phase Imbalance or Phase loss.	1. Check if the motor is running under excessive load and reduce it if necessary. 2. Replace any damaged cables or faulty components. 3. Check input voltage across all three phases using a voltmeter.
50	E208	E208_DriveRLC02_Drive_Not_Ready	1. Power Supply Issues. 2. E-Stop is Active.	1. Check the incoming power supply voltage and ensure all three phases are present. 2. The emergency stop button is pressed or a safety relay has tripped.
51	E209	E209_DriveRLC02_Drive_Overload	1. Motor Overload. 2. Phase Imbalance or Voltage Drop.	1. Check if the motor is running under excessive load and reduce it if possible. 2. Measure voltage across all three phases to ensure balance.
52	E210	E210_DriveVBC01_MPCB_Tripped	1. Overload Condition. 2. Short Circuit. 3. Phase Imbalance or Phase Loss.	1. Check if the motor is running under excessive load and reduce it if necessary. 2. Replace any damaged cables or faulty components. 3. Check input voltage across all three phases using a voltmeter.

Sr. No.	Code	Alarm Description	Cause	Solution
53	E211	E211_DriveVBC01_Controller_Not_Ready	1. Drive is powered OFF or has lost power. 2. E-Stop or Safety Circuit is Active. 3. Drive Fault is present.	1. Ensure main power supply to the drive is ON and stable. 2. Check and reset the E-Stop circuit and ensure all safety interlocks are cleared. 3. Reset any active drive faults by checking the drive's local display or diagnostic software.
54	E212	E212_DriveVBC01_Controller_Overload	1. Controller is mechanically jammed, overloaded, or obstructed. 2. Motor bearings or gearbox are worn out or have high friction.	1. Inspect conveyor for jams, excessive load, or mechanical restrictions. 2. Check and lubricate or replace motor bearings, gearbox, and rollers if needed.
55	E213	E213_DriveVBC02_MPCB_Tripped	1. Overload Condition. 2. Short Circuit. 3. Phase imbalance or phase loss.	1. Check if the motor is running under excessive load reduce it if necessary. 2. Replace any damaged cables or faulty components. 3. Check input voltage across all three phases using a voltmeter.
56	E214	E214_DriveVBC02_Controller_Not_Ready	1. Drive is powered OFF or has lost power. 2. E-Stop or Safety Circuit is Active. 3. Drive Fault is present.	1. Ensure main power supply to the drive is ON and stable. 2. Check and reset the E-Stop circuit and ensure all safety interlocks are cleared. 3. Reset any active drive faults by checking the driver's local display or diagnostic software.
57	E215	E215_DriveVBC02_Controller_Overload	1. Controller is mechanically jammed, overloaded, or obstructed. 2. Motor bearings or gearbox are worn out or have high friction.	1. Inspect conveyor for jams, excessive load, or mechanical restrictions. 2. Check and lubricate or replace motor bearings, gearbox, and rollers if needed.

12 Spare Parts List

12.1 Mechanical Spare List

Item Code	Description	Make	Used Qty	Recommended Qty	Critical Qty	Image
UAP180100000 ROBOT & STRUCTURE						
UAP180103002	CONNECTOR	Cybernetik	12	6	3	
UAP180103003	MANIFOLD	Cybernetik	4	4	0	
UAP180103004	CYL MTG BKT	Cybernetik	4	2	2	
UAP180103001	TUBING PLATE	Cybernetik	4	2	0	
UAP180101108	DOOR REST PAD	Cybernetik	8	4	0	
UAP180200000 BELT CONVEYOR						
100HBT000029	HABASIT TT12 MATT BLUE FRAYLESS BELT LG=10400MM	HABASIT	1	1	0	-
031SEW000270	GEARED MOTOR:KA47/T DRN80MK4,M1AB,0.55 KW,SEW	SEW	1	1	0	
040000FY35TF	Y BEARING UNIT - FY35TF	SKF	8	4	2	
040000ECY207	END COVERS ECY 207 - SKF	SKF	8	4	0	
052SMP000002	FIXED FOOT LSSC100-01-SM16L240, SYSTEM PLAST-177361	SYSTEM PLAST	8	0	0	
UAP180200013	BELT SUPPORT PLATE - 2	Cybernetik	2	0	0	-
UAP180200012	BELT SUPPORT PLATE - 1	Cybernetik	8	0	0	-
0400006006ZZ	DEEP GROOVE BALL BEARING- 6006ZZ	Cybernetik	2	2	1	-
04000060032Z	D.G.B BEARING 6003-2Z	SKF	8	4	2	

UAP180300000 PRODUCT RETURN CONVEYOR						
084FLX000001	FLEX LINK FLEXIBLE CONVEYOR XHEB SERIES- 1800MM	FLEX LINK	1	0	0	
084FLX000002	FLEX LINK FLEXIBLE CONVEYOR XHEB SERIES- 6500MM	FLEX LINK	1	0	0	
052SMP000002	FIXED FOOT LSSC100-01-SM16L240, SYSTEM PLAST-177361	SYSTEM PLAST	4	0	0	
UAP180302009	BUSH-01	Cybernetik	2	2	0	-
200PIO000117	FIXED CASTOR PU-PP/FX/MD/100X 50/BB - PIONEER	PIONEER	6	2	0	
UAP180302013	BUSH-02	Cybernetik	2	2	0	-
052SMP000002	FIXED FOOT LSSC100-01-SM16L240, SYSTEM PLAST-177361	SYSTEM PLAST	4	2	0	
052DSN000047	DIE CAST HINGES FLAT DHIM-6536-SS304 DARSHANA	DARSHNA	2	2	1	
UAP180500000 PNEUMATICS						
011SCH000047	COMPACT EJECTOR:10.02.02.04116 MAKE-SCHMALZ	SCHMALZ	12	6	3	
011SCH000049	BELLOWS SUCTION CUP:10.01.06.04149 MAKE-SCHMALZ	SCHMALZ	12	12	12	
010SMC000192	AIR CYLINDER:CDM2B20-75Z1-M9PL-X3423, MAKE-SMC	SCHMALZ	12	12	6	
010SMC000194	5/2 SINGLE SOLENOID VALVE:DXT1215T-5W4U-01N, SMC	SCHMALZ	12	6	3	
010SMC000195	FILTER REGULATOR:AW40-04BCG-D, MAKE-SMC	SCHMALZ	1	1	0	
010SMC000196	SPACER:Y400T-D, MAKE-SMC	SCHMALZ	1	1	0	
010SMC000197	MANUAL SHUTOFF VALVE:VHS40-04S-D, MAKE-SMC	SCHMALZ	1	1	0	

010SMC000198	INPUT AND OUTPUT FITTING FOR FR:KQ2H10-U04A, SMC	SCHMALZ	24	12	6	
010SMC000199	WATER SEPERATOR:AF40-04BD-A-X2729, MAKE-SMC	SCHMALZ	1	1	0	
010SMC000200	FITTING, MALE CONNECTOR:KQ2H10-U04A, MAKE-SMC	SCHMALZ	4	2	0	
010SMC000186	SS MALE CONNECTOR:KQ2H06-U01A, SMC	SCHMALZ	24	12	0	
010SMC000121	STRAIGHT CONNECTOR-KQ2H10-U01A, MAKE-SMC	SCHMALZ	12	6	3	
011SMC000108	SILENCER- AN10-01- MAKE SMC	SCHMALZ	24	12	3	
011FES153048	PUSH IN L FITTING QSL-1/8-8 FESTO 153048	FESTO	36	12	12	
011FES153004	PUSH IN FITTING QS-1/8-8 FESTO 153004	FESTO	36	12	12	
OTHERS						
088ELS000065	HANDLE-262157-C2 ETH.28-400-AN--C2 ELESA GANTER	ELESA	16	0	0	
088ELS000045	HINGE GN 138-ZD-60-95-A-SR ELESA GANTER	ELESA	50	5	5	
040000HK0609	NEEDLE ROLLER BEARING - HK 0609 - SKF MAKE	SKF	4	4	2	

12.2 Electrical Spare List

Item Code	Description	Make	Used Qty	Recommended Qty	Critical Qty	Image
6010AB000018	MODULE 1734-AENTR ETHERNET/IP TWISTED IO ADAPTOR	ALLEN BRADLY	1	0	0	
6010AB000019	MODULE 1734-EP24DC 24VDC POWER / BUS EXTENSION - AB	ALLEN BRADLY	1	0	0	
6010AB000021	MODULE 1734-IB8 24VDC 8 CHANNEL SINK I/P MODULE	ALLEN BRADLY	10	0	0	
6010AB000022	MODULE 1734-OB8 24VDC 8 CHANNEL SOURCE O/P MODULE	ALLEN BRADLY	4	0	0	
6010AB000152	ONE PIECE TERMINAL BASE 1734-TOP SCREW TERMINAL	ALLEN BRADLY	14	0	0	
6010AB000207	COMPACT I/O POWER TERM RTB KIT 5069- RTB64-SCREW	ALLEN BRADLY	1	0	0	
6010AB000225	PLC COMPACTLOGIX 5380 5069-L306ER ALLEN BRADLEY	ALLEN BRADLY	1	0	0	
601EMC000009	LINE FILTER TMF3132- 80-2 80A EMI SOLUTION	END MILL CUTTER	1	0	0	
601PHX000025	ETHERNET SW 1008N UNMANAGED 1085256 8 PORT-PHX	PHOENIX	1	0	1	
6020AB000044	HMI PV+7 2711P- T15C21D8S 15" XGA TFT WIN CE STD	ALLEN BRADLY	1	0	0	
6050AB000050	DRIVE PF525 25B- D2P3N104 0.75KW 1 HP 480VAC -AB	ALLEN BRADLY	3	0	1	
606ABB360006	MASTER ROBOT IRB 360-8/1130 WITH CTM CARD HW UNIT	ABB	1	0	0	

Item Code	Description	Make	Used Qty	Recommended Qty	Critical Qty	Image
606ABB360007	SLAVE ROBOT IRB 360-8/1130 WITH CTM SW UNIT	ABB	3	0	0	
607ARH000018	TRANSFORMER 5000VA P:380 / 400 / 415V 3Ø S:230V 1Ø CE	ARIHANT	1	0	0	--
607MIT000002	ENERGY METER ME96SSHB-MB MODBUS RTU COMM MITSUB	MITSUBISHI	1	0	0	
607RIS000002	CURRENT TRANSFORMER 100/5A MAKE - RISHABH	RISHABH	3	0	0	--
607SIE000138	AUX CONTACT BLOCK 1NO+1NC 3RV29011A - SIEMENS	SIEMENS	9	1	1	
607SIE000544	ROTARY DISCONNECT SWITCHES 16A 3LD20640TB530	SIEMENS	7	1	1	
607SIII000763	LINE MONITOR RELAY 7UG07121AA20 3PH W/O DISPLAY	SIEMENS	1	0	0	
607TEL000011	CONTACT BLOCK 1NO ZBE101N MAKE - SCHNEIDER	TELEMECA NIQUE	7	0	0	
607TEL000044	CONTACT BLOCK 1NC ZBE102N MAKE - SCHNEIDER	TELEMECA NIQUE	8	0	0	
608COG000106	EXT CABLE FLYING LEAD TO M12(F) 5M M12-5M-1W	Cognex	4	0	0	
608COG000126	MORITEX WHITE LIGHT CV-BA-389X36W-DF-M COGNEX	Cognex	4	0	0	--

Item Code	Description	Make	Used Qty	Recommended Qty	Critical Qty	Image
608COG000131	LENS MORITEX 5MP 8MM 2/3":ML-M0822UR MAKE-COGNEX	Cognex	2	0	0	
608KUB000006	ENCODER COUPLER AF-25-10-10 L: 32MM KUEBLER	KUBLER	1	0	0	
608KYN000048	SAFETY DOOR SWITCH MOD.NO.GS-53PC PNP M12 KEYENCE	KEYENCE	16	2	2	
608KYN000049	SAFETY DOOR SWITCH CABLE GS-P12C5 M12 5M KEYENCE	KEYENCE	16	2	2	
608KYN000050	SAFETY DOOR SWITCH MOUNTING BRACKET GS-B21 KEYENCE	KEYENCE	16	2	2	
608PFR000013	ENCODER UTD-IPH00-XXXXX-L100-PRQ 10MM 10000PPR	POSITAL FRABA	2	1	1	
608PFR000014	MEASURING WHEELS 500MM-SMOOTH PUR SURFACE 10071957	POSITAL FRABA	1	1	1	
608PFR000015	MOUNTING BRACKET SPRING LOADED F.CLAMPING 10072051	POSITAL FRABA	1	1	1	
608PFR000016	ENCODER CABLE 10036664 M12 8-PIN FEMALE	POSITAL FRABA	2	0	0	
608PIZ000007	SAFETY RELAY 777301 PNOZ X2.8P 24 VACDC 3N/O 1N/C	PILZ	12	2	2	

Item Code	Description	Make	Used Qty	Recommended Qty	Critical Qty	Image
608PIZ000018	PNOZ S SET1SPRING LOADED TERMINALS 45MM 751008	PILZ	1	0	0	
608PIZ000019	PNOZ multi Chipcard 1 piece 8kB 779201	PILZ	1	0	0	
608PIZ000021	CONFIGURABLE CONTROLLER PNOZ M B0 772100 PILZ	PILZ	1	0	0	
608PIZ000022	EXPANSION MODULE PNOZ M EF 16DI 772140 PILZ	PILZ	2	0	0	
608PIZ000023	PNOZ S SET1SPRING LOADED TERMINALS 22.5MM 751004	PILZ	2	0	0	
608SIC000019	FEMALE CONNECTOR M12 5-PIN STRAIGHT: 6009719-SICK	SICK	1	0	0	
608SIC000033	PHOTO SENSOR GTB2S-P1451 PNP RANGE: 2-120MM-SICK	SICK	1	1	1	
608SIC000061	INDUCTIVE PROXIMITY SENSOR IME18-08BPSZC0K 1040965	SICK	2	1	1	
608SIC000062	FEMALE CONNECTOR M124P ANGLED 6007303 DOS-1204-WS	SICK	5	1	1	
608SIC000084	Y-SPLITTER SBO-02D12-SF 6028392 M12 5PIN SICK	SICK	1	1	1	
608SIC000104	PHOTO SENSOR GTB10-P4211 20-950 MM 1064694	SICK	1	1	1	

Item Code	Description	Make	Used Qty	Recommended Qty	Critical Qty	Image
608TMS000001	RING LIGHT LSW-15-100-5-W-24V-M8 WHITE TMS LITE	TMS	1	0	0	
609BNP000001	JUNCTION BOX SLOPED ROOF 150(W) X 150(H) X 80 (D) B.N.P	#N/A	3	0	0	--
609CON000003	CONNECTOR RECTANGULAR 16 PIN (M+F) BOTTOM OPEN IND	INDO	1	0	0	--
609CON000099	MODULAR DISTRIBUTION BLOCK CDB10/4 16 OUTPUTS	INDO	3	0	0	
609ESB000001	PUSH BUTTON BOX ESBEE WITHOUT HOLE 110X80X65MM	ESBEE	4	0	0	--
609PHX000081	RJ45 CONNECTOR CAT6 VS-08- RJ45- 10G/Q-1419001 8POS.	PHOENIX	36	5	5	
610BAN000002	TOWER LAMP MODEL NO. K50LGRYP 24VDC PNP BANNER	BANNER	1	0	0	
610FUS000001	FUSE 500MA GLASS FUSE	RELIANCE	50	5	5	
610FUS000002	FUSE 1 A GLASS FUSE	RELIANCE	10	5	5	
610FUS000004	FUSE 3 A GLASS FUSE	RELIANCE	9	2	2	
610FUS000005	FUSE 5 A GLASS FUSE	RELIANCE	12	2	2	
610LAP000025	METAL DETECTABLE CABLE TIE 61723360 100MM BU LAPP	LAPP	2000	0	0	

Item Code	Description	Make	Used Qty	Recommended Qty	Critical Qty	Image
610LAP000026	METAL DETECTABLE CABLE TIE 61723361 200MM BU LAPP	LAPP	4000	0	0	
610PHX000001	SSR PLC-OSC-24DC/24DC/2 ART NO:2966634- PHOENIX	PHOENIX	87	5	5	
610PHX000004	FUSE TERMINAL UK 5 HESILA 250-I 3004142	PHOENIX	12	0	0	
610PHX000005	FUSE TERMINAL UK 5 HESILED 24-I 5792067	PHOENIX	40	0	0	
610PHX000038	RELAYS PLC-RSC-24DC/21-21 2NO+2NC ART NO: 2967060	PHOENIX	12	2	2	
610PHX000130	RELAY SLIM PLC-RSC/24DC/21/UWL/IN 1NO+1NC 1533207	PHOENIX	50	2	2	
610PHX000174	SURGE PROTECTION VAL-US-277/40/3+1FM TYPE1 2910374	PHOENIX	1	0	0	
610PHX000245	POWER SUPPLY TRIO-UPS-2G/1AC/24DC/20 1105556 PHOEN	PHOENIX	1	0	1	
610PHX000247	BATTERYMODULE TRIO-BAT/PB/24DC/12AH 1394727 PHOENIX	PHOENIX	1	0	1	
610SOC000003	SOCKET CDINS 6A 3-PIN DIN RAIL MOUNT CONNECTWELL	CONNECTWELL	2	0	0	
610TEL000004	TOWER LAMP 3-TIER 24VDC XVGB3S - TELEMECHANIQUE	TELEMECANIQUE	2	0	1	
610XEX000003	LED TUBE LIGHT 10 WATTS XX-LTLC-230-A-10W XEXAGON	Xexagoan	2	0	0	---
6110AB000003	ETHERNET CABLE 1585-C8TB-S600 TEAL PVC SHIELDED-AB	ALLEN BRADLY	100	0	20	--

Item Code	Description	Make	Used Qty	Recommended Qty	Critical Qty	Image
611ETH000001	ETHERNET PATCH CORD CAT 6 LENGTH: 1 METER	ETHERNET	13	0	1	--
611ETH000003	ETHERNET PATCH CORD CAT 6 LENGTH :3 METER	ETHERNET	3	0	1	--
611ETH000004	ETHERNET PATCH CORD CAT 6 LENGTH: 2 METER	ETHERNET	2	0	1	--
612MUR000011	UNIVERSAL SOCKET 4000-68713-8300001 MAKE-MURR	MURR	1	0	0	
613TEL000003	EMERGENCY PB XB5AS542N RED MUSHROOM TYPE - SCHNIEDE	TELEMECA NIQUE	4	1	1	
614TEL000006	INDICATING LAMP 230VAC WHITE XB4-BVM1 - SCHINDER	TELEMECA NIQUE	3	0	0	
615APC000005	UPS 600VA MODEL: BX-600I-IN MAKE: APC SMART	APC SMART	1	0	0	
617ABB000007	PICKMASTER S/W BUILT IN 4 NOS. COLOR VISION ABB	ABB	1	0	0	--
617DEL000277	DELL PRECISION T3680 I7-14700 / 16GB / 1TB / T1000 8GB	DELL	1	0	0	
617HSM000001	ETHERNET SW_SPIDER-SL-20-08T1999999SY9HHHH HIRSCHM	HSM	3	0	1	
617HSM000002	ETHERNET SW _ BN40 -08GTX-ULRE HIRSCHM	HSM	1	0	0	
3HAC046196-001	Robot-Bar	ABB	24	24	12	-
3HAC045215-001	Robot-Bearing	ABB	48	48	24	-

Item Code	Description	Make	Used Qty	Recommended Qty	Critical Qty	Image
3HAC078709-001	Robot- Spring Unit	ABB	24	24	12	-

13 Cleaning and Maintenance Chart

- The spray used for the cleaning purpose must be food grade eligible so that any part of the machine doesn't get defected.
- For stainless steel cleaning: 3M Stainless Steel Cleaner and Polish, which is standardly utilized in the food industry is employed for cleaning stainless steel components.
- For Non-SS Cleaning, food grade eligible IP Solution is used.
- For Brass Cleaning: FDA Approved Brass Cleaners available in the standard market must be used.

Sr. No	CLIT Code	Activity	Machine Part/Location of part	Method	Tool	Frequency	Responsibility
1	C	SS Frame Structure	Outer Cleaning of SS Frame	Look for dirt and clean with dry / wet cloth	Hand, Visual and cotton waste	Clean in a Shift	Operator
2	C	Aluminum parts/ plate	Outer cleaning of Aluminum part / plate	Look for dirt and clean with dry / wet cloth	Hand, Visual and Cotton waste	Clean in a shift	Operator
3	C	Brass part	Outer Cleaning of Brass part	Look for Dirt and clean with dry / wet cloth	Hand, Visual and cotton waste	Clean in a shift	Operator
4	C	All sensors and camera	Camera stand 1& 2	Look for dirt and clean with dry/ wet cloth	Hand, Visual and cotton waste	Clean in a shift	Operator
5	T	Tighten the Nut and Bolt	All pneumatic cylinders and robot gripper bolts	Check the nut and bolt and confirm the alignment before start.	Hand, Visual, Spanner	Weekly/ Bi-Weekly	Operator

Sr. No	CLIT Code	Activity	Machine Part/Location of part	Method	Tool	Frequency	Responsibility
6	I	Pneumatic Cylinder Connector	All pneumatic cylinder to be check for leakage.	Check pneumatic air supply fitting leakage if any. If leakage found, then replace the connector.	Visual, Hand.	Monthly	Operator
7	I	All sensors and their inputs must be checked.	All sensors for flex conveyor end side and belt conveyor.	Do inspection for the sensor input and outputs	Visual, Hand	Monthly	Operator
8	I	All junction box terminals and lugs should be checked.	All Junction Boxes for Vibratory Conveyor and Belt Conveyor.	Do inspection for terminal and lugs inside Junction box.	Visual, Hand	Monthly	Operator
9	I	All doors witches should be checked.	Vibratory Conveyor	Do inspection for the sensor input and output	Visual, Hand	Monthly	Operator

14 Preventive Maintenance

Table given below will cover all the areas in the system where periodic maintenance is very important.

Sr. no.	Activity	Weekly	Monthly	Quarterly	Annually
Mechanical Maintenance					
1	Gear box oil			✓	
2	Lubrication –LM Rail and LM block, Bearing, Roller Chain.			✓	
3	All nuts and bolts should be tight.	✓			
4	Pneumatic cylinders.		✓		
5	Lifting belt Inspection				✓
6	Cleaning of FRL unit			✓	
7	Inflatable bellow		✓		
8	Flexible bellow		✓		
Electrical Maintenance					
1	All sensor brackets should be checked and make sure that they are properly mounted.			✓	
2	All sensor & there inputs should be checked.		✓		
3	All solenoid valve and there check-nuts should be checked.			✓	
4	Air pressure switch should be checked.			✓	
5	All junction box terminals and lugs should be checked.				✓
6	All Magnetic sensors should be checked.			✓	
7	All reed switches should be checked.		✓		

15 Lifecycle of Material

The definition of life cycle is ‘Consecutive and interlinked stages of a product (or service) system, from raw material acquisition or generation from natural resources to final disposal. Life cycle stages include acquisition of raw materials, design, production, transportation/delivery, use, end-of-life treatment and final disposal.’

Table 6: Life cycle of material

Raw Material	Life	Recycle
SS 304 / S.S.316 / S.S.316L	50 Years	Recycle by sorting, Melting and Purification
Mild Steel	20 Years	Recycle by sorting, Melting and Purification
Rubber (Gasket, “O” ring, etc.	5 years	Recycle by sorting and de-vulcanization.
PVC	50 Years	Recycle by Mechanical recycling / Chemical recycling
Aluminum	40 Years	Recycle by aluminum is sorted and cleaned then melted and uses for further process
Polyurethane	5 Years	Recycle by Mechanical recycling / Chemical recycling
Ultra High Molecular Weight Polyethylene	30 Years	Recycle by Shredding and Resizing then Compounding
Silicon	10 Years	Recycle by grinding or tearing shredded silicone granules into a prepared mold
Plastic	No End life	Recycle
Packaging Material (Paper Box, Wooden Box, Carton Box)	No End life	Recycle
Engine Oil	18 Months (Also depends on its Practical use)	stored in factory hazard areas

Note: Disposal to be done as per local rules and regulations.

15.1 Robot and Camera Calibration Manual :