

Automatic Drum Filling & Pusher Type Palletizing System

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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 successful testing at Cybernetik. 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.
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.



4 Introduction

1.1. About

The Automatic Drum Filling & Pusher Type Palletizing System is a fully integrated, precision-engineered solution designed to streamline the complete lifecycle of drum handling—from initial loading of empty drums to final pallet dispatch. Developed to meet modern industrial demands for accuracy, safety, and uninterrupted processing, this system seamlessly synchronizes mechanical handling, sensor-based validation, automated filling logic, and intelligent palletizing operations. Each stage—from de-capping to precise two-stage filling, sealing, inspection, and final pallet transfer—is orchestrated through a cohesive automation architecture that ensures consistency, reliability, and throughput at every step.

By combining controlled drum movement, high-accuracy weighing, automated bung-alignment, and tamper-proof sealing mechanisms, the system eliminates manual inefficiencies while maintaining stringent quality and traceability standards. Its modular, zone-based layout further allows the process to operate in a continuous flow: drums transition from singling to filling, sealing, buffering, pairing, and pallet loading with minimal operator intervention. Integrated inspection logic and buffering conveyors maintain smooth upstream and downstream coordination, enabling uninterrupted production even during peak operation.

With its robust mechanical design, intelligent process automation, and operator-friendly interfaces, the Automated Drum Feeding, Filling, Sealing, and Palletizing System sets a new benchmark in drum-based material handling and packaging operations. It empowers manufacturers to improve production reliability, minimize human error, enhance safety, and achieve higher throughput—with scalability to support evolving capacity requirements. Built for long-term industrial performance, the system delivers a unified, efficient, and high-precision solution for modern drum processing environments focused on speed, accuracy, and operational excellence.

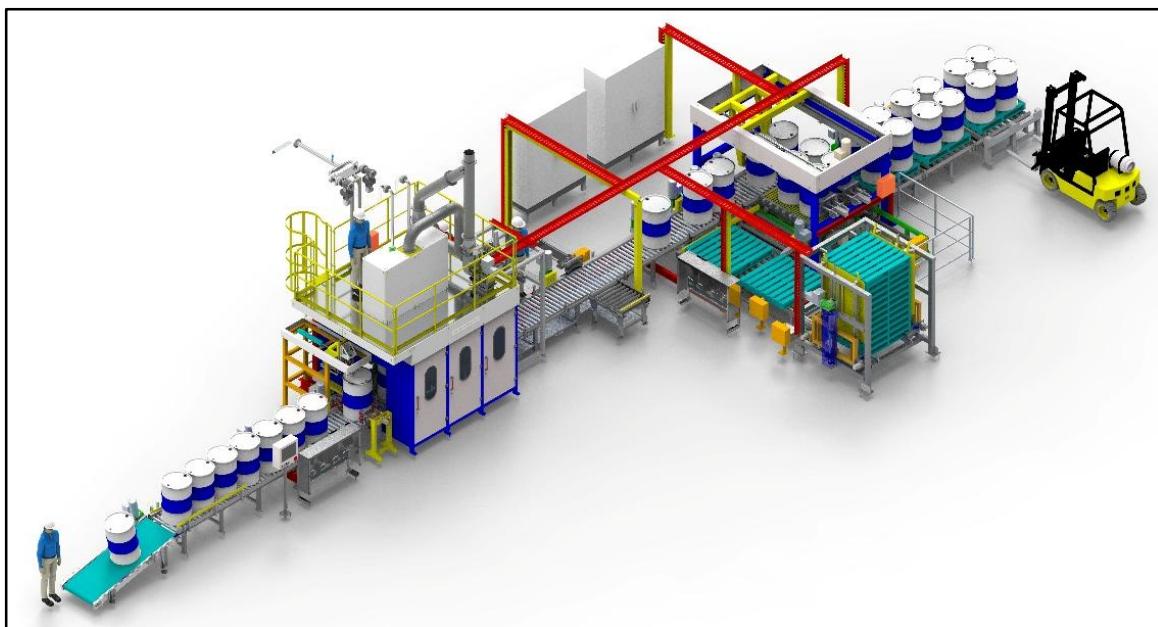


Figure 1: Isometric View

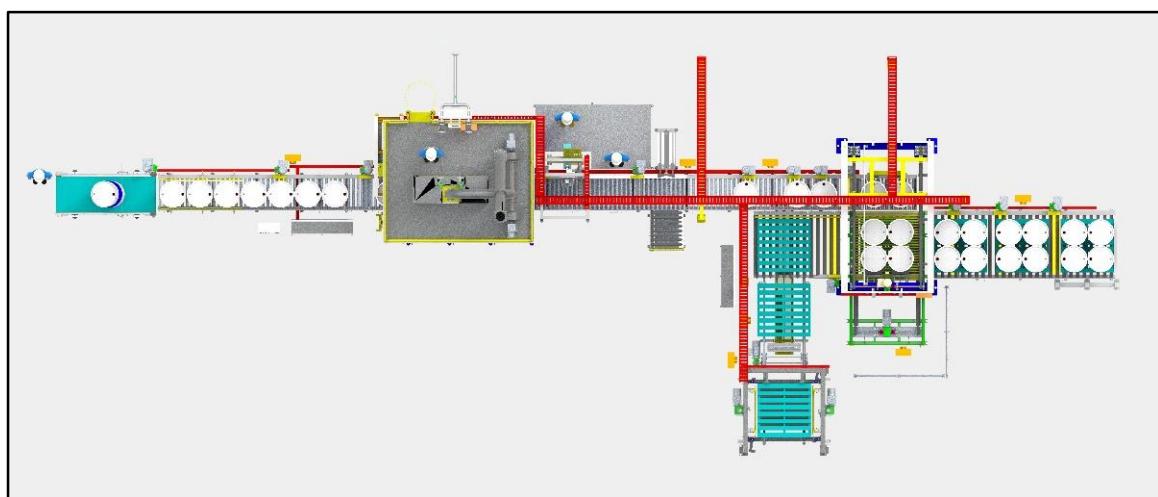


Figure 2: Top View

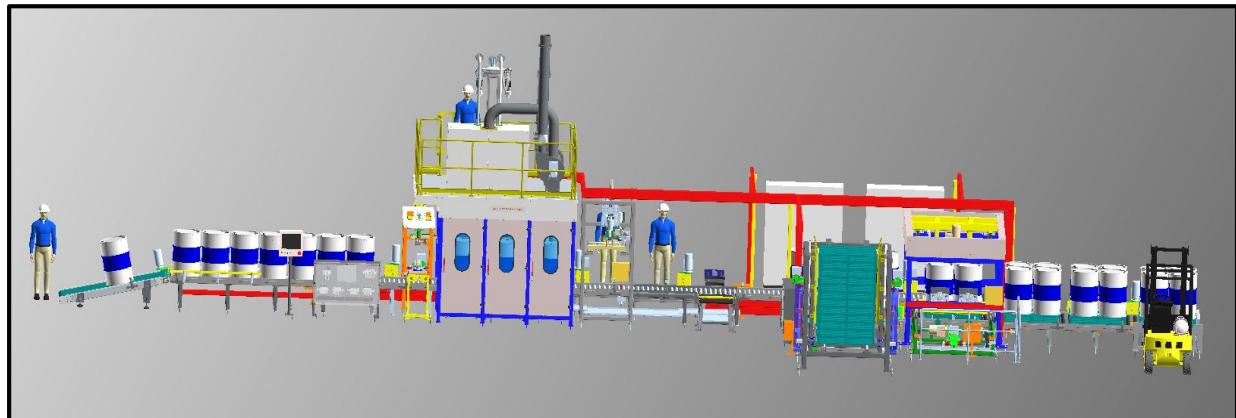


Figure 3: Front View

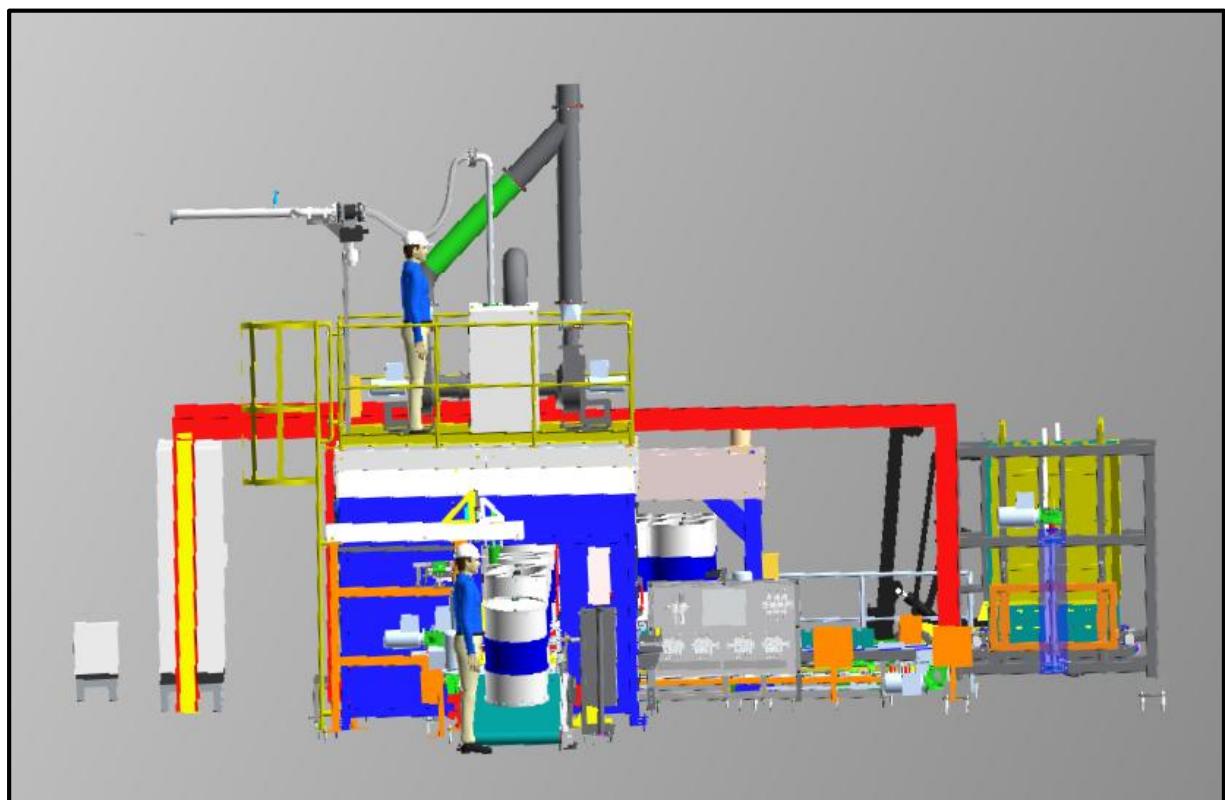


Figure 4: Side View

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	M.O.C
1	Filling Valve (Lance)	SS316
2	Load Cell Platform	SS304
3	Operator Platform	Galvanized
4	Conveyor Roller Structure, Filling Booth, Door	Hot Dip Galvanized
5	All Contact / Wetted Parts	SS316

5.1 Electrical Specifications

Requirements:

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

Following are the electrical specifications of the system.

Table 3: Electrical Details

Control Panel	
Power Supply	415 VAC, 50Hz, 3 PH
Connected Load	35.15 KW, 48 HP, 61.20 A
Design Load (1.25)	45.70 KW, 61 HP, 80 A

Table 4: Start –Up Sequence

Sr. No	System Start Up Sequence
1	Turn On Main Panel Power Switch.
2	Turn On all MCB's & MPCB's.
3	Check PLC and IO module get started.
4	Check HMI get started.
5	Check Prestart Condition on HMI is Healthy.
6	Check Safety Condition is healthy on HMI.
7	Put System In auto mode,
8	Tower Lamp Indicates Green Blinking. (Auto Selected)
9	Press system start button for 3 seconds. (System gets started)
10	Tower Lamp Indicates Solid Green. (Auto Started)
11	System is started.

5.2 Tower Lamp Status



Figure 5: Dome Lamp

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

Table 5: Light Color Status

Lamp Color	Status
Steady Red	System is at Fault and requires RESET
Amber	Manual Operation is done
Green	System is set at 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, inside the panel.

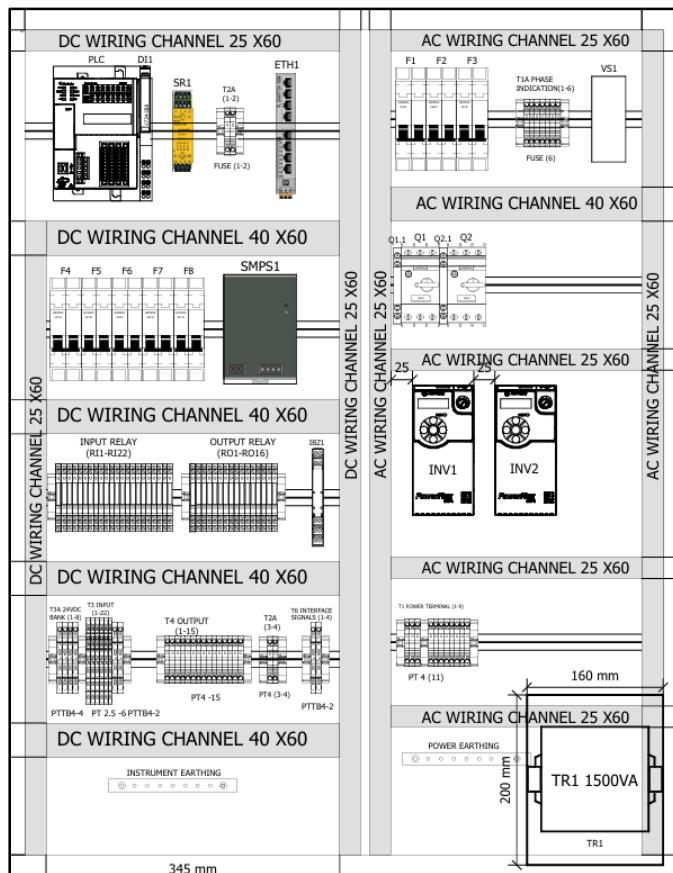
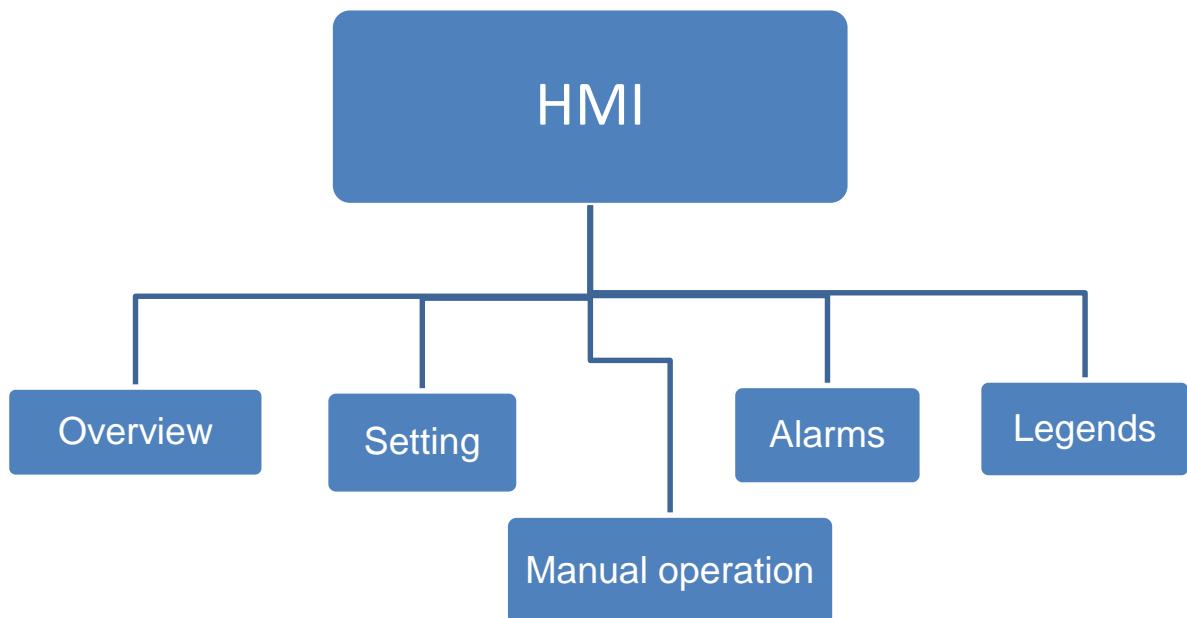


Figure 7: MCBS, MPCBs, RCCBs

3. Check the incoming power supply parameters from the VFD meter.

7 Working with HMI

The below figure shows the overall layout of the HMI



8 Process Flow

1. Empty Drum Feeding

- The operator manually loads empty drums onto **Empty Drum Infeed Roller Conveyor 01 (EDIC-01)**.
- Drums are conveyed forward and aligned into a single file through the **singling mechanism**, ensuring controlled transfer toward the next station.

2. Empty Drum De-Capping Operation

- Drums enter the **Empty Drum De-Capping Conveyor 01 (EDDC-01)**.
- At this station, stoppers hold the drum in place while **Empty Drum Rotary Motor 01** rotates the drum to locate the drum bung.
- Sensors detect the bung position; rotation slows for precise alignment and stops once the bung is accurately positioned.
- **Blower 01** descends and rotates clockwise to uncap the drum.
- The removed cap is transferred automatically to **Empty Cap Transfer Conveyor 01 (ECTC-01)**.
- The aligned, de-capped drum is released to the next stage.

3. Drum Filling – Stage 1 (Partial Fill)

- The de-capped drum moves to **Empty Drum Filling Conveyor 01 (EDFC-01)**.
- The drum is weighed to confirm acceptable empty weight within tolerance.
- Upon validation, the lance inserts into the drum and performs **partial (half) filling**.
- The drum then advances to the second filling stage.

4. Drum Filling – Stage 2 (Final Fill)

- In **Empty Drum Filling Conveyor 02 (EDFC-02)**, the drum is filled to its final required level.
- A second weight check is performed to record the **post-fill weight** and confirm accuracy.

5. Automatic Drum Capping

- The filled drum enters **Filled Drum Capping Conveyor 01 (FDCC-01)**.
- **Blower 02** automatically applies the cap onto the drum.

6. Drum Sealing and Crimping

- The drum is transferred to **Filled Drum Sealing Conveyor 01 (FDSC-01)**.
- The applied cap is sealed and crimped to ensure tamper-proof closure.

7. Seal Inspection

- The operator performs a visual inspection of the sealed drum.
- **If defect is detected:** the drum is immediately rejected.
- **If seal is OK:** the drum proceeds to the palletizing line.

8. Filled Drum Buffer Transfer

- Approved drums move one-by-one through:
 - Filled Drum Buffer Conveyor 01 (FDBC-01)
 - Filled Drum Buffer Conveyor 02 (FDBC-02)
 - Filled Drum Buffer Conveyor 03 (FDBC-03)
 - Filled Drum Buffer Conveyor 04 (FDBC-04)

9. Drum Pairing & Transfer to Pallet

- At **FDBC-04**, drums accumulate in pairs of two.
- Once two drums are aligned, **Filled Drum Transfer Trolley 01** retracts, allowing both drums to drop gently onto the pallet located below.

10. Pallet Loading

- Drums are placed on the pallet in sets of two.
- Each pallet accommodates a maximum of **four drums (two pairs)**.
- The loaded pallet is moved through:
 - Filled Drum Palletizing Conveyor 01 (FDPC-01)
 - Filled Pallet Buffer Conveyor 01 (FPBC-01)
 - Filled Pallet Buffer Conveyor 02 (FPBC-02)
 - Filled Pallet Buffer Conveyor 03 (FPBC-03)

11. Pallet Removal

- At the end of **FPBC-03**, the fully loaded pallet is picked up by the operator using a forklift and transferred to the designated storage or dispatch area.

Rejection Criteria:

1) De-Capping Failure:

- During the De-capping process, the blower is allowed a defined number of de-capping attempts.
- If the cap does not come off within the specified number of trials, the drum is classified as de-capping failure and is automatically diverted to the Rejection Conveyor.

2) Empty Weight Out of Tolerance:

- When an empty drum arrives at Empty Drum Filling Conveyor 01, it is weighed prior to filing.
- If the recorded weight is outside the acceptable tolerance range, the drum is immediately rejected and sent to the rejection line.

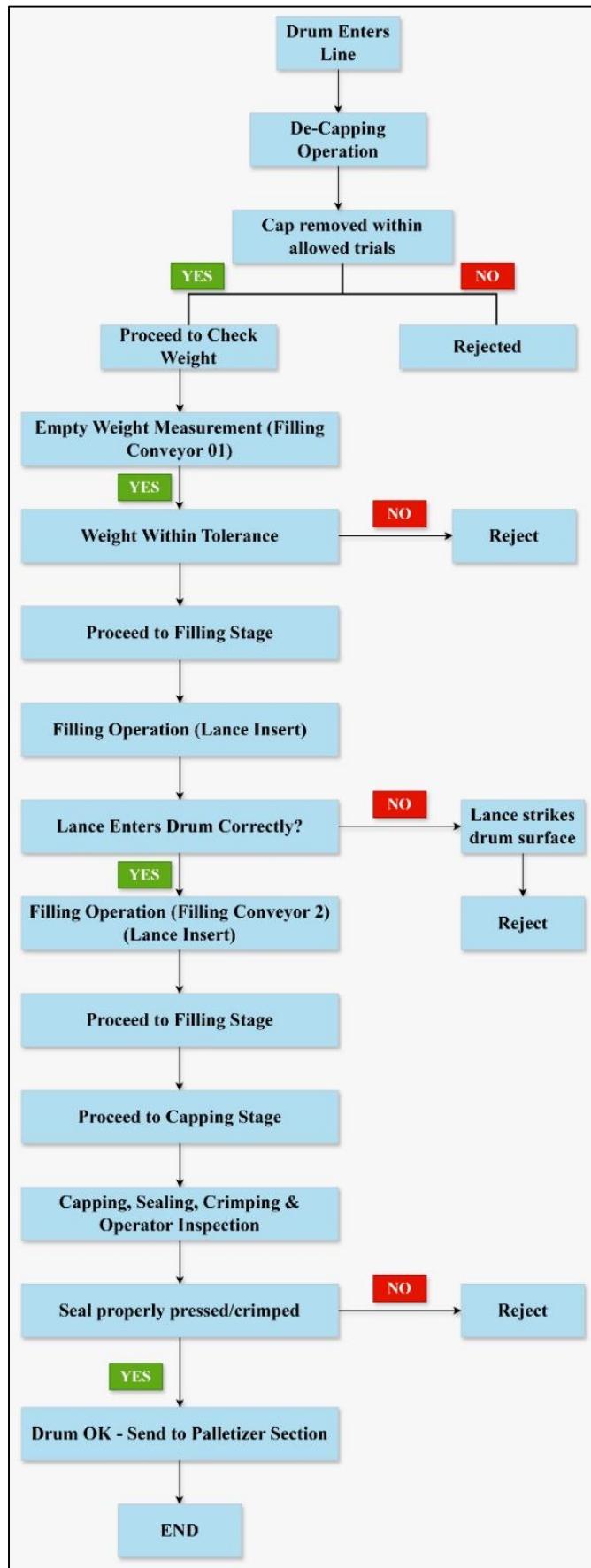
3) Lance-to-Drum Surface Impact:

- If the Lance makes contact with the outer surface of the drum- indicating incorrect rotational alignment or rotation failure- the drum is deemed unsafe for filling.
- Such drums are rejected.

4) Operator Seal Rejection:

- During the sealing inspection, if the operator identifies that the cap is not properly pressed or crimped, the drum is manually rejected and removed from the line.

9 Flowchart



Welcome Screen



Figure 8: welcome screen

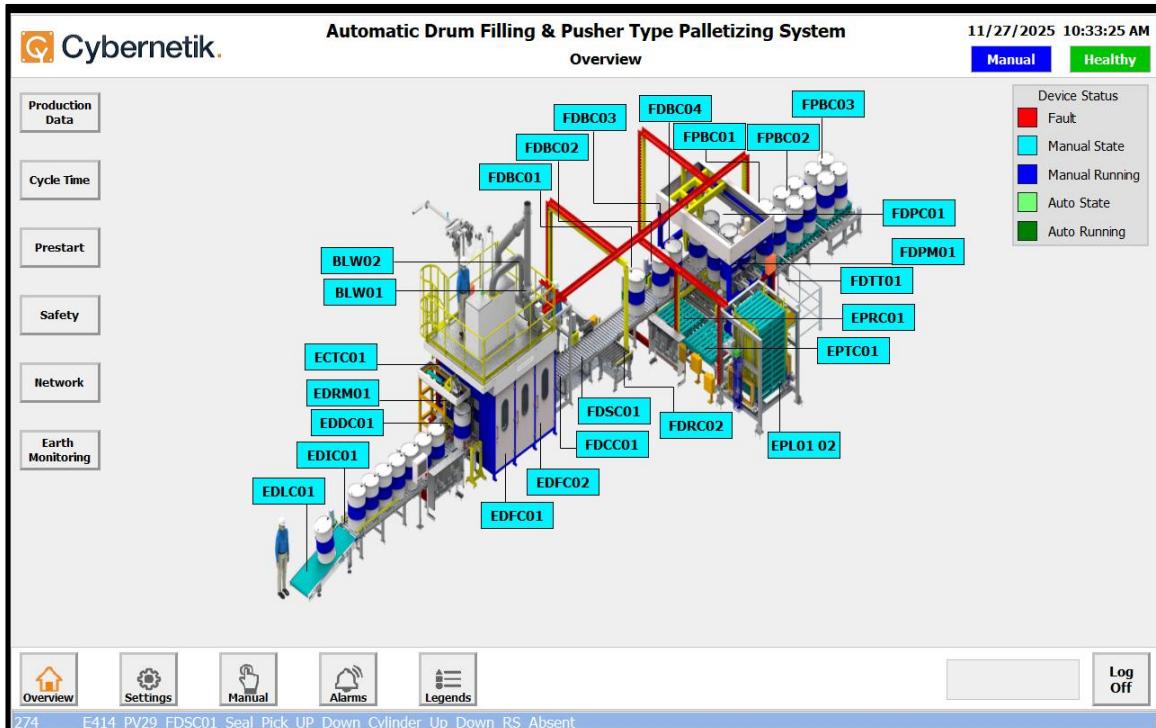


Figure 9: Overview

- This screen provides a complete real-time overview of the entire drum filling and palletizing process. It visually maps every major component, conveyor, and mechanism in the system, allowing operators to quickly identify machine locations, statuses, and alarms.
- Purpose of this Screen is to: Monitor the health and status of all devices and View real-time machine behavior and drum flow.
- The large model in the center displays the **step-by-step material flow**, starting from Empty Drum Infeed to Filled Drum Palletizing.

Device Status:

- **Red** – Fault present
- **Sky Blue** – Manual State
- **Blue** – Manual Running
- **Yellow** – Auto State (ready)
- **Green** – Auto Running

Current Mode:

- **Manual** (top right – blue)
- **Healthy** (green)

Left Navigation Menu:

Operator can access detailed screens:

- ❖ **Production Data** – Line output, production metrics
- ❖ **Cycle Time** – Station-wise cycle tracking
- ❖ **Prestart** – Pre-conditions before starting auto mode
- ❖ **Safety** – Safety inputs, interlocks
- ❖ **Network** – PLC / SCADA network health
- ❖ **Earth Monitoring** – Ground leakage and line safety

10.1.1 Production Data

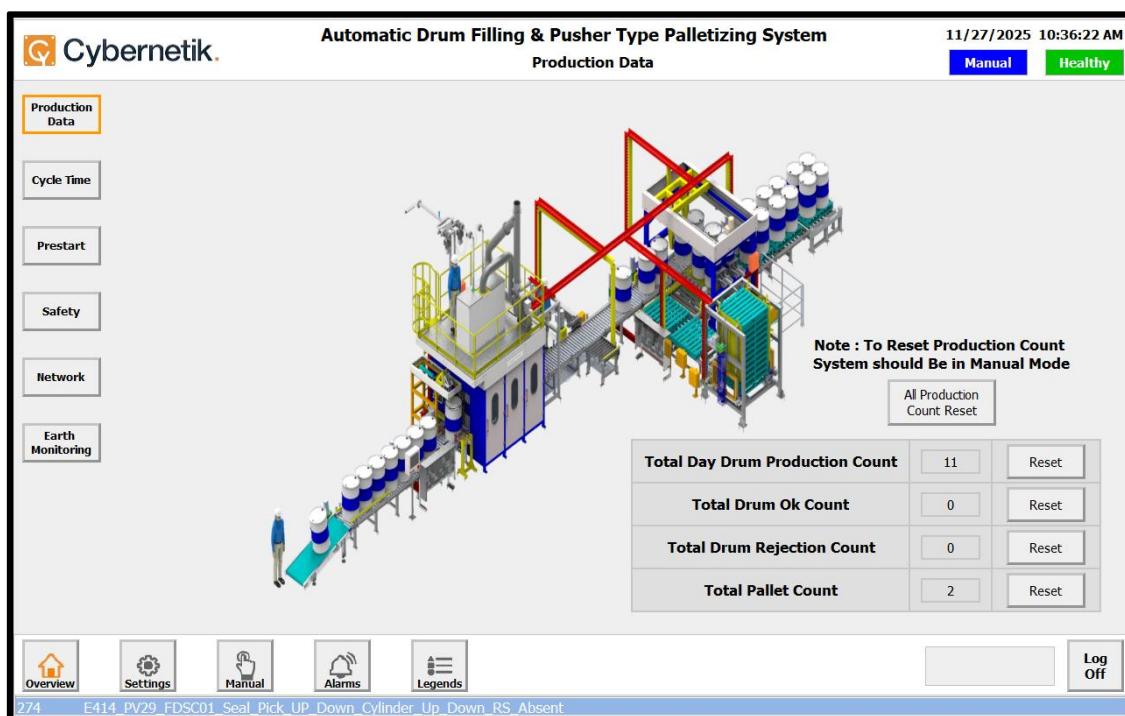


Figure 10: Production Data

- This screen displays the **production performance data** of the Automatic Drum Filling & Pusher-Type Palletizing System. It provides real-time counts and reset options for tracking daily output.
- **Total Day Drum Production Count:** Total number of drums processed today.

- **Total Drum Rejection Count:** Number of drums rejected during the process.
- **Total Pallet Count:** Total pallets completed / stacked.
- Each counter has a **Reset** button.
- **All Production Count Reset:** to clear all counters at once.

10.1.2 Cycle Time

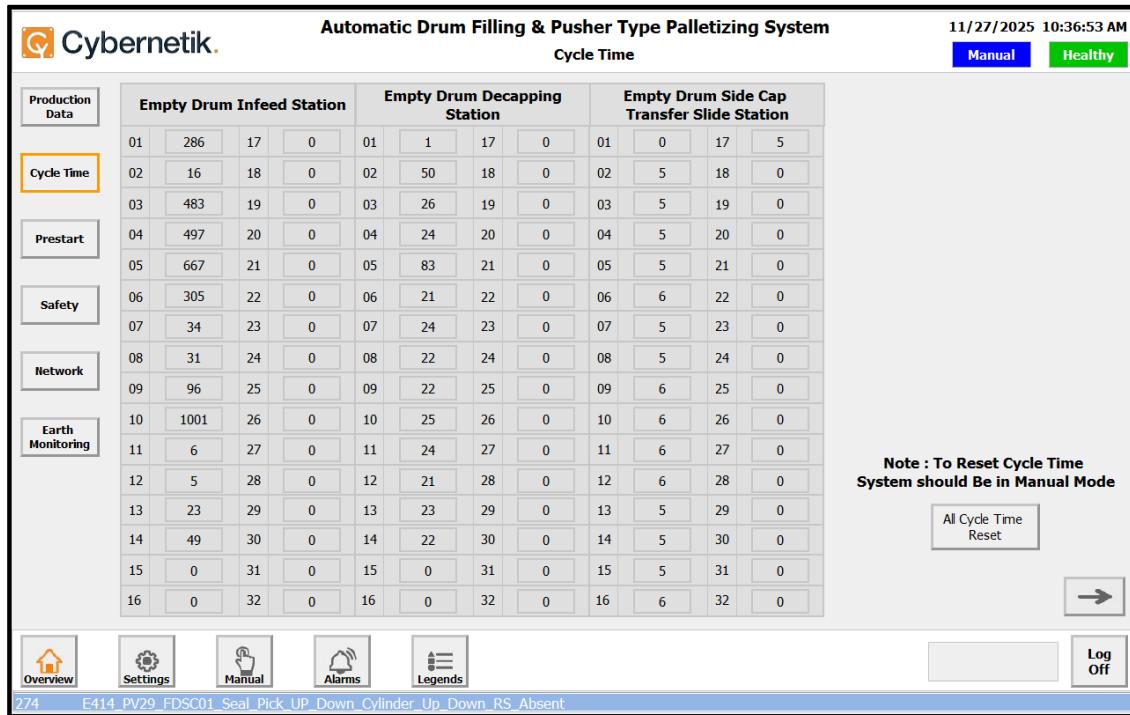


Figure 11: Cycle Time

- The **Cycle Time** screen provides a station-wise breakdown of cycle times for different stages of the Automatic Drum Filling & Pusher Type Palletizing System.
- Its purpose is to monitor performance, identify delays, and maintain process consistency across the complete line.
- **All Cycle Time Reset:** Resets cycle time logs for all stations and all cycles back to zero.
- **Note:** To Reset Cycle Time System should be in Manual Mode.

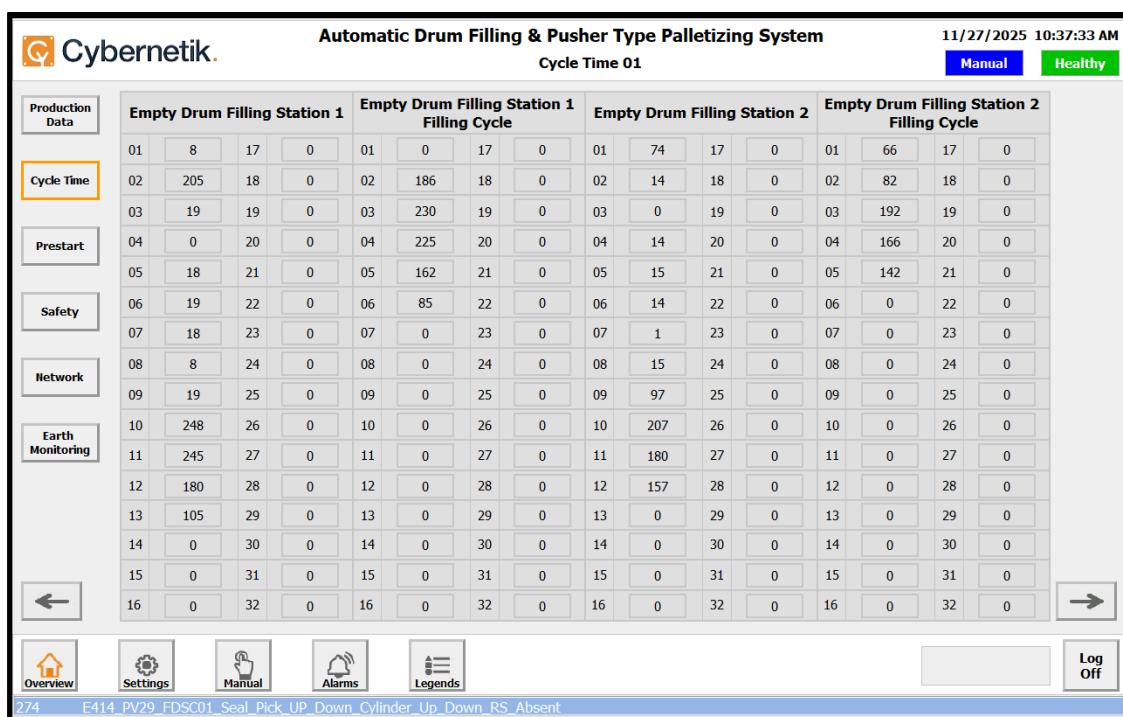


Figure 12: Cycle Time

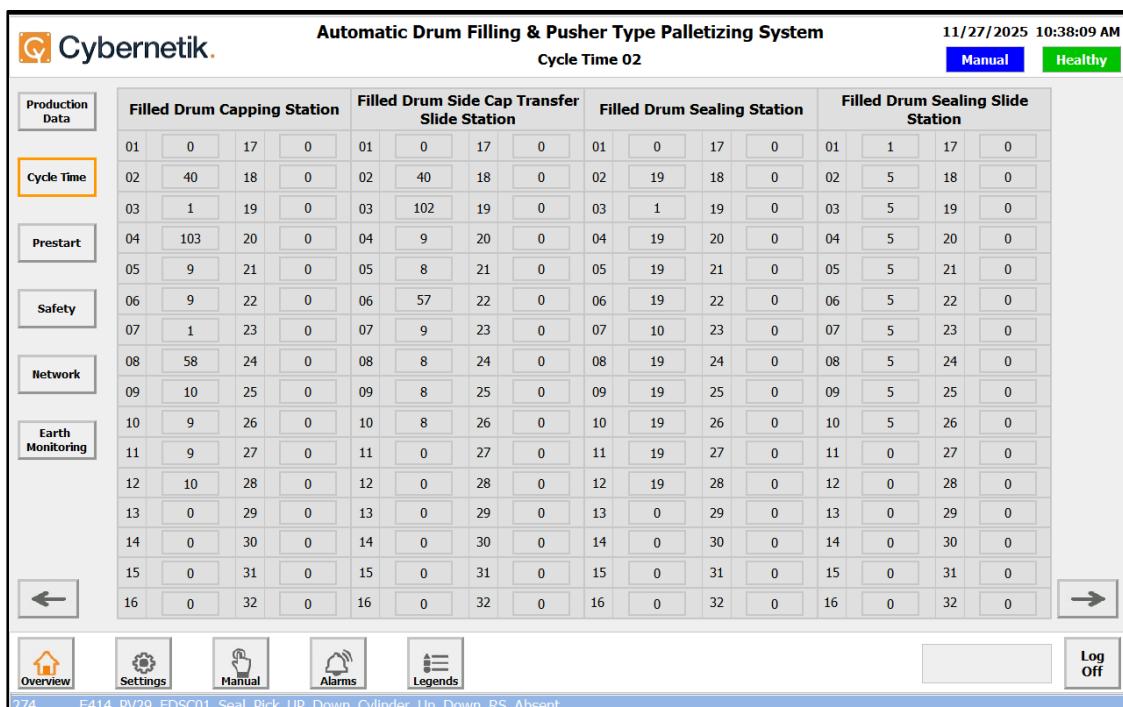


Figure 13: Cycle Time

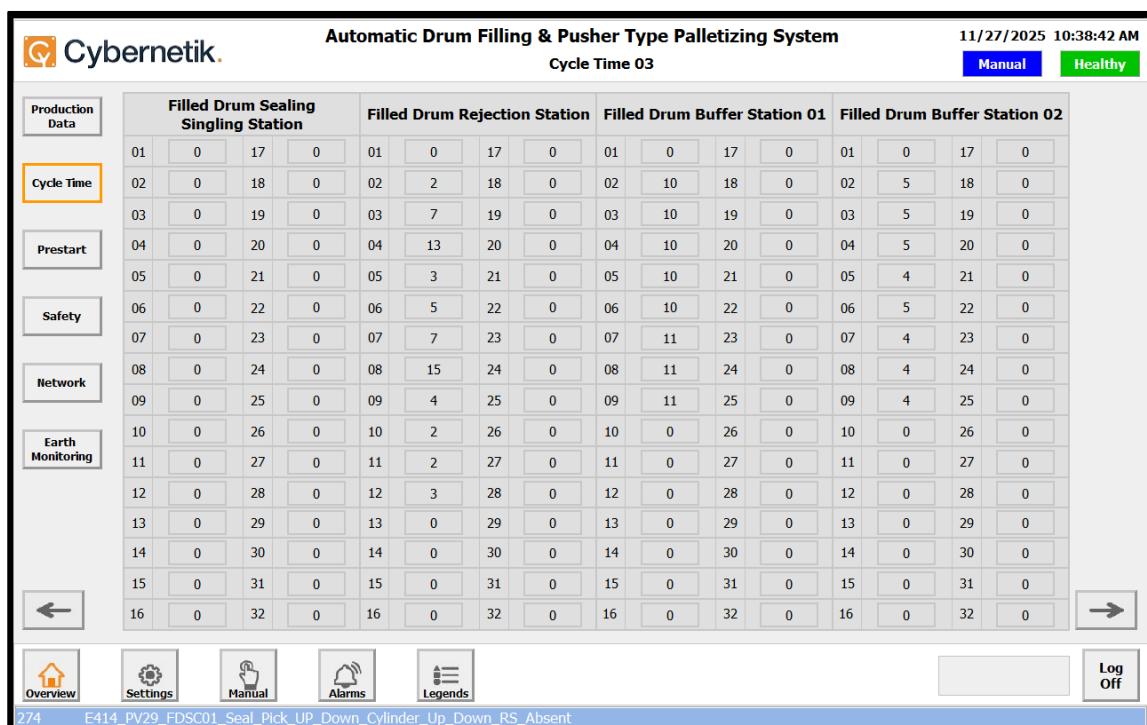


Figure 14: Cycle Time

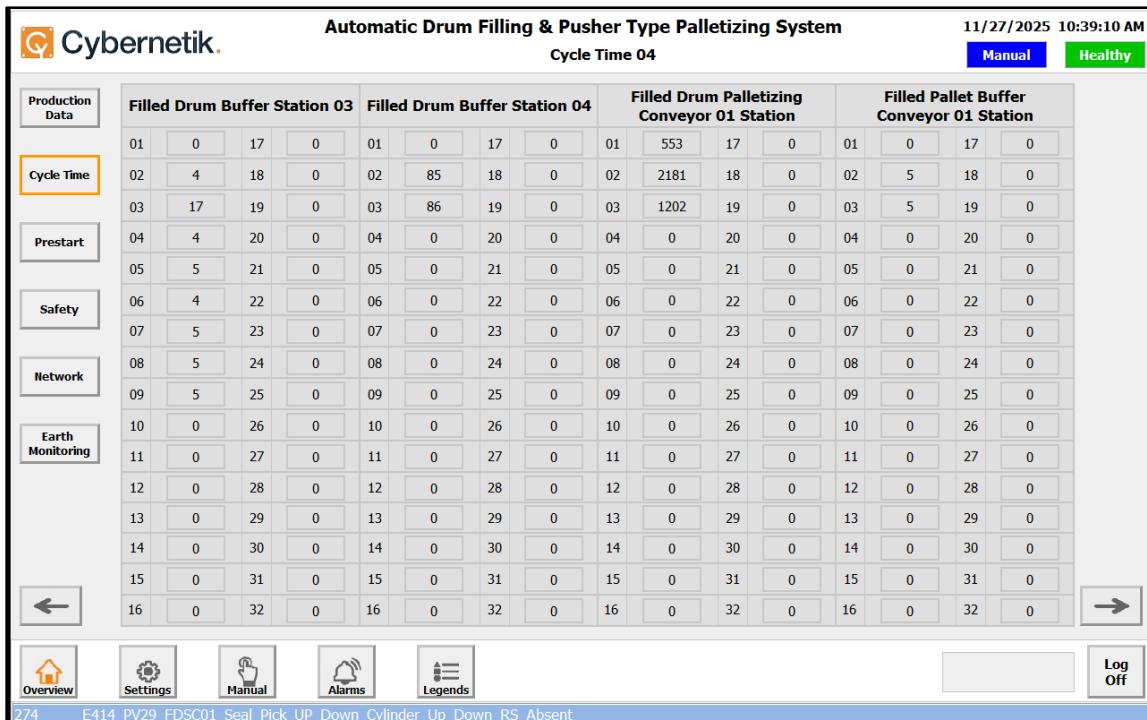


Figure 15: Cycle Time

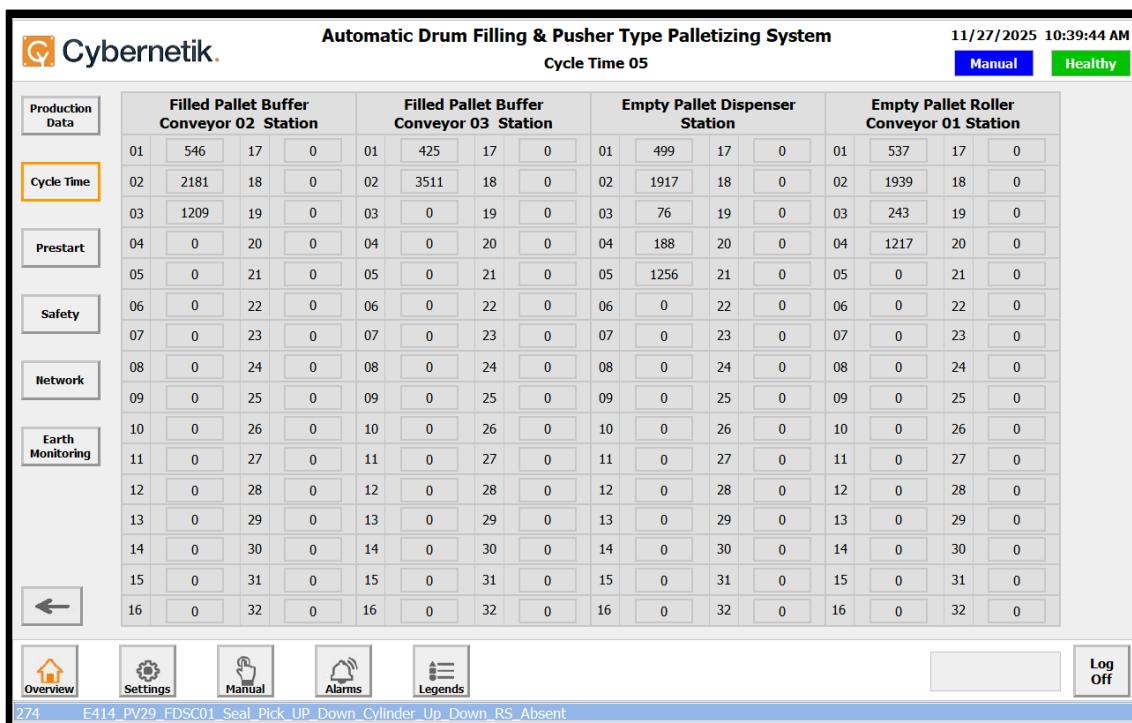


Figure 16: Cycle Time

10.1.3 Prestart

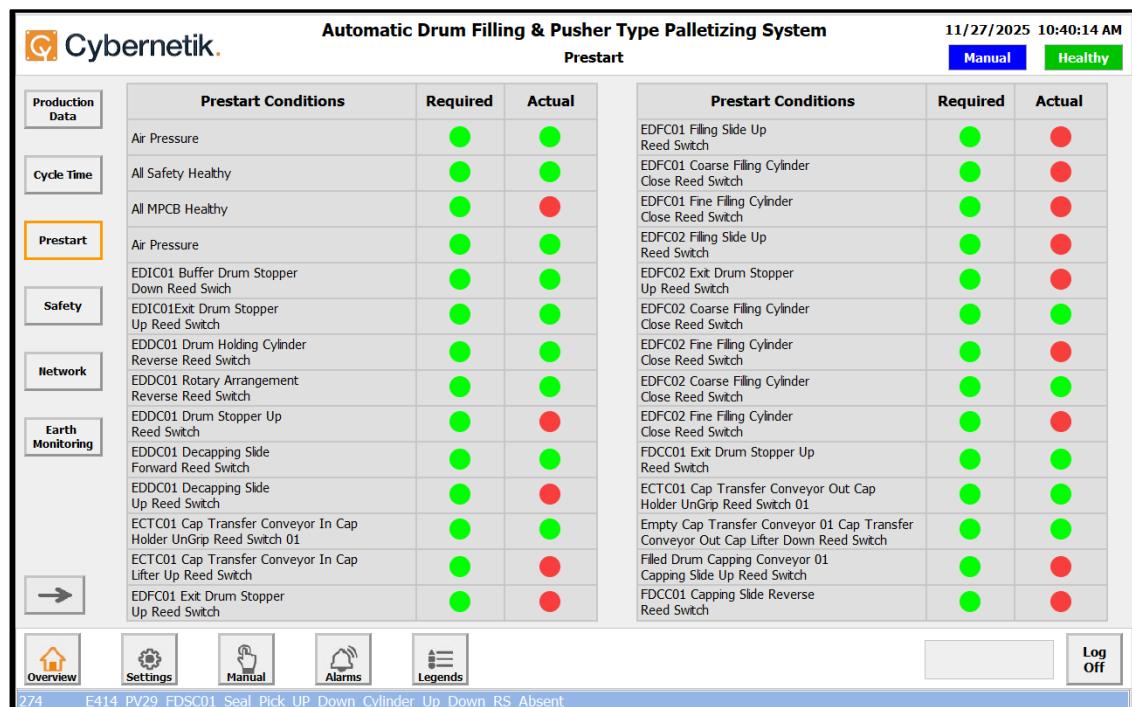


Figure 17: Prestart

- The Prestart screen is a safety and readiness check interface.

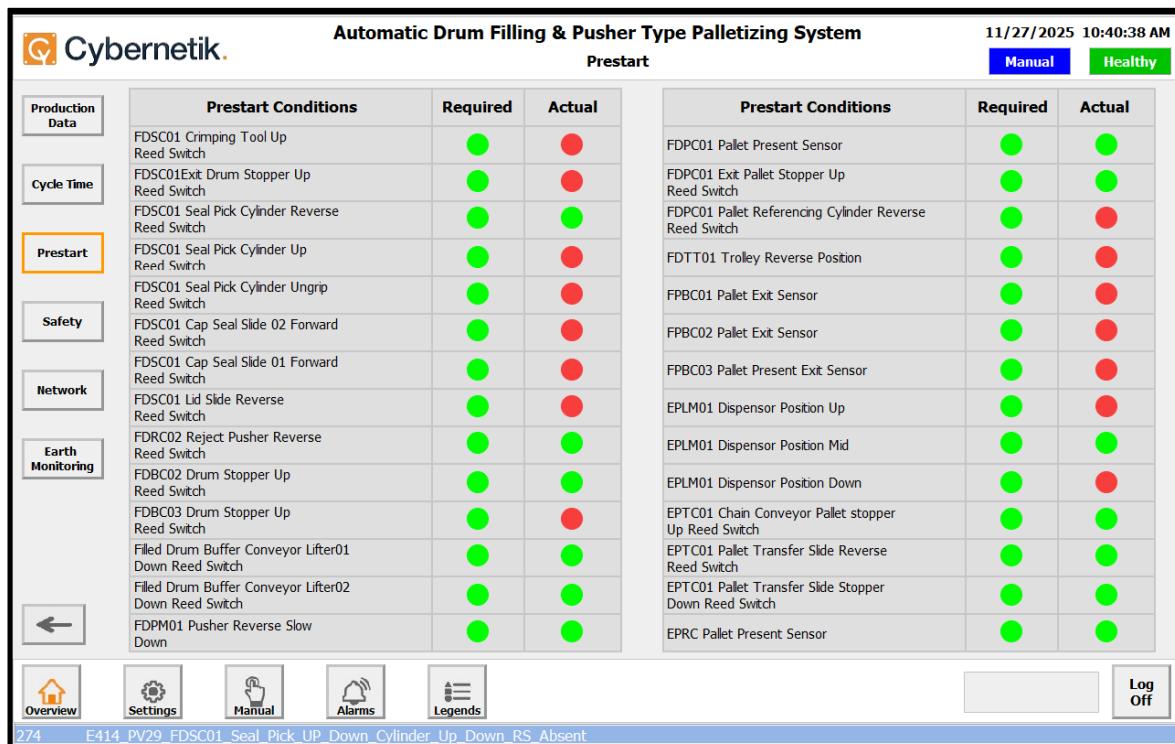


Figure 18: Prestart

- Before the conveyor system can begin operation (in manual or Auto mode), this screen ensures that:
 - All safety circuits are active and healthy.
 - Each conveyor's motor protection device (MPCB) is in a healthy condition (not tripped).
 - The system is safe to start without any electrical or mechanical risk.

Columns	Meaning
Actual	Shows the real-time current condition of each device.
Required	Shows what condition is needed for the system to allow start up.

10.1.4 Safety

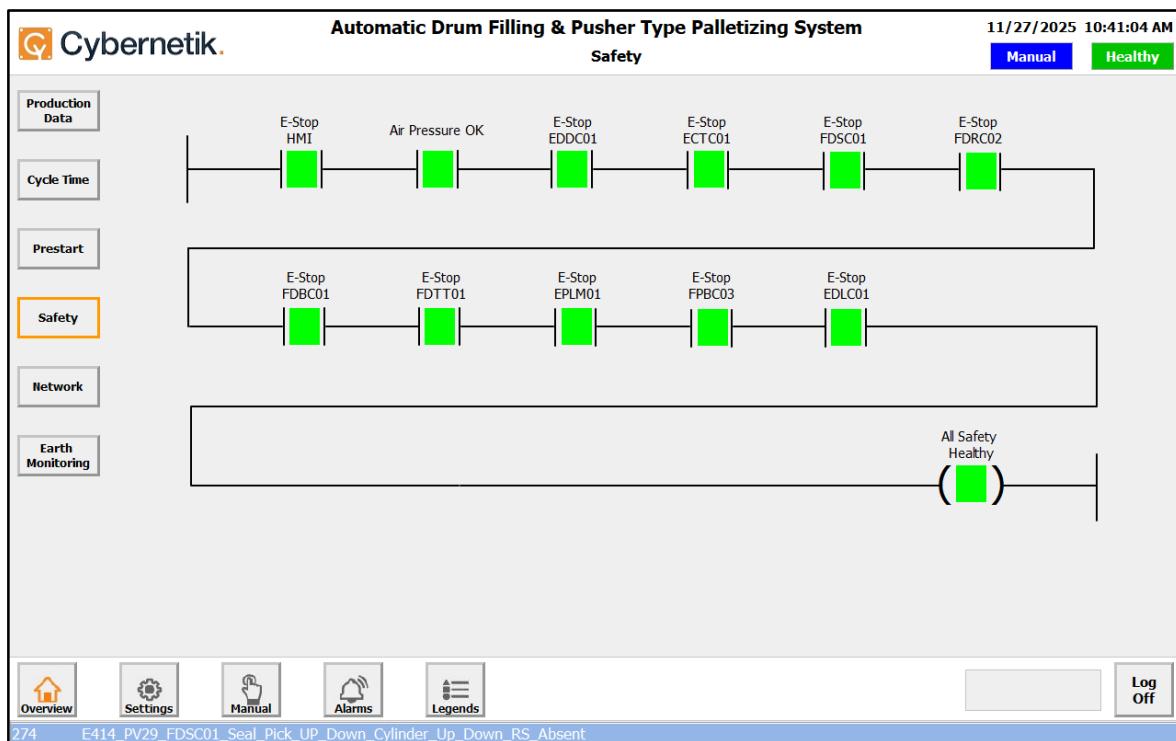


Figure 19: Safety

- The **Safety** screen provides operators with a real-time overview of all safety-related inputs and conditions that must be satisfied for the machine to run. It displays the status of Emergency Stops (E-Stops), pneumatic safety, and the overall system safety health.
- This screen is intended for monitoring only; no safety devices can be reset or overridden from this interface.
- The main area of the screen shows a series of rungs similar to an electrical ladder diagram. Each rung represents a group of safety devices. Every device is shown as a green block when it is **healthy / active**, and would turn **red or grey** if a fault, open circuit, or E-Stop activation occurs.
- **All Safety Healthy:** This is the final safety verdict generated from all safety inputs. When green, the system safety circuit is complete and the machine can run.

10.1.5 Network

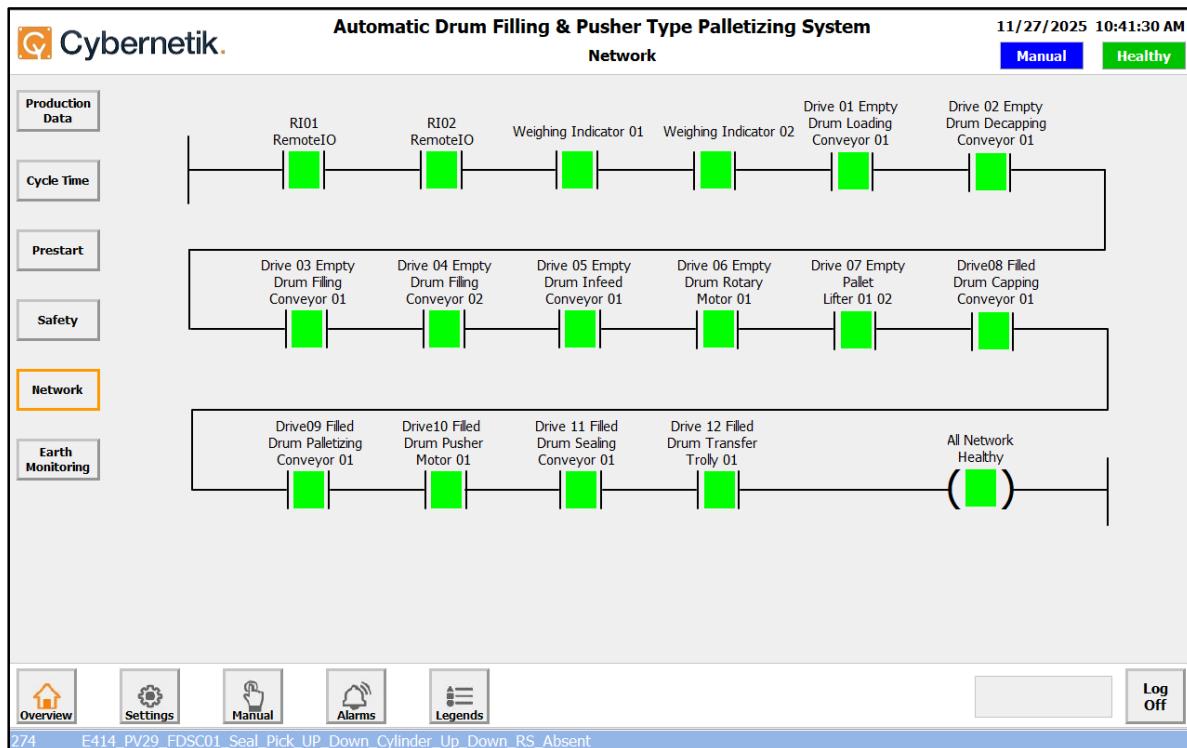


Figure 20: Network

- The **Network** screen provides a real-time status overview of all network-connected field devices communicating with the PLC.
- Each device is displayed using a graphical indicator that turns **green** when communication is healthy.
- If communication fails or the PLC stops receiving data, the indicator would turn **red or grey**, helping operators quickly identify network faults.
- This screen is intended strictly for monitoring network health; it does not allow any control or resetting of devices.
- The main area consists of three horizontal rungs, each containing a group of network-connected devices. All devices are represented by green blocks indicating **normal, healthy communication**.
- **All Network Healthy:** confirms that every device in the system is communicating without errors.

10.1.6 Earth Monitoring

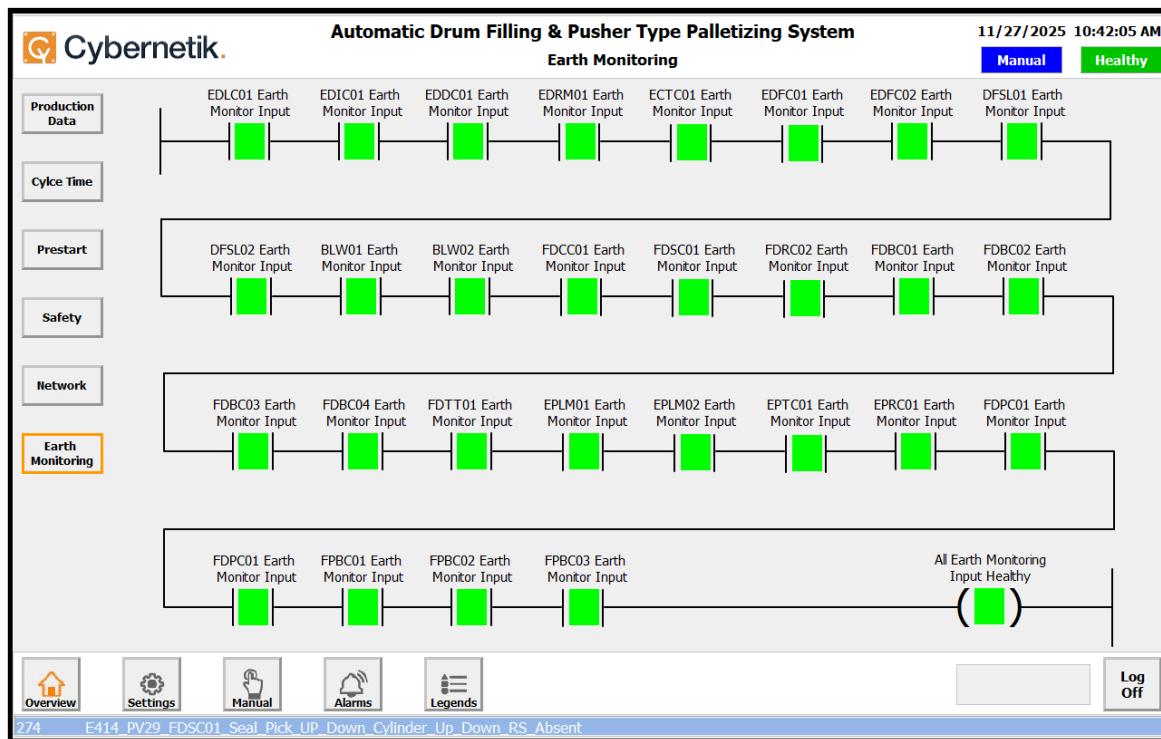


Figure 21: Earth Monitoring

- The **Earth Monitoring** screen provides a complete overview of the grounding (Earthing) status of all field devices connected to the system. Proper Earthing is critical for electrical safety, prevention of shock hazards, and protection of sensitive instruments from electrical noise and faults.
- Each earth monitor input is shown using a color-coded indicator.
 - Green** indicates proper grounding
 - Red/Grey** would indicate a grounding fault or disconnected earth line
- This screen is **monitoring-only**; no control or reset action is available.
- The main area of the screen contains four horizontal rungs representing groups of **Earth Monitor Inputs** distributed across the system. Every indicator visible is **green**, confirming healthy grounding across all monitored equipment.
- All Earth Monitoring Input Healthy:** confirming the complete Earthing circuit across the system is functioning correctly.

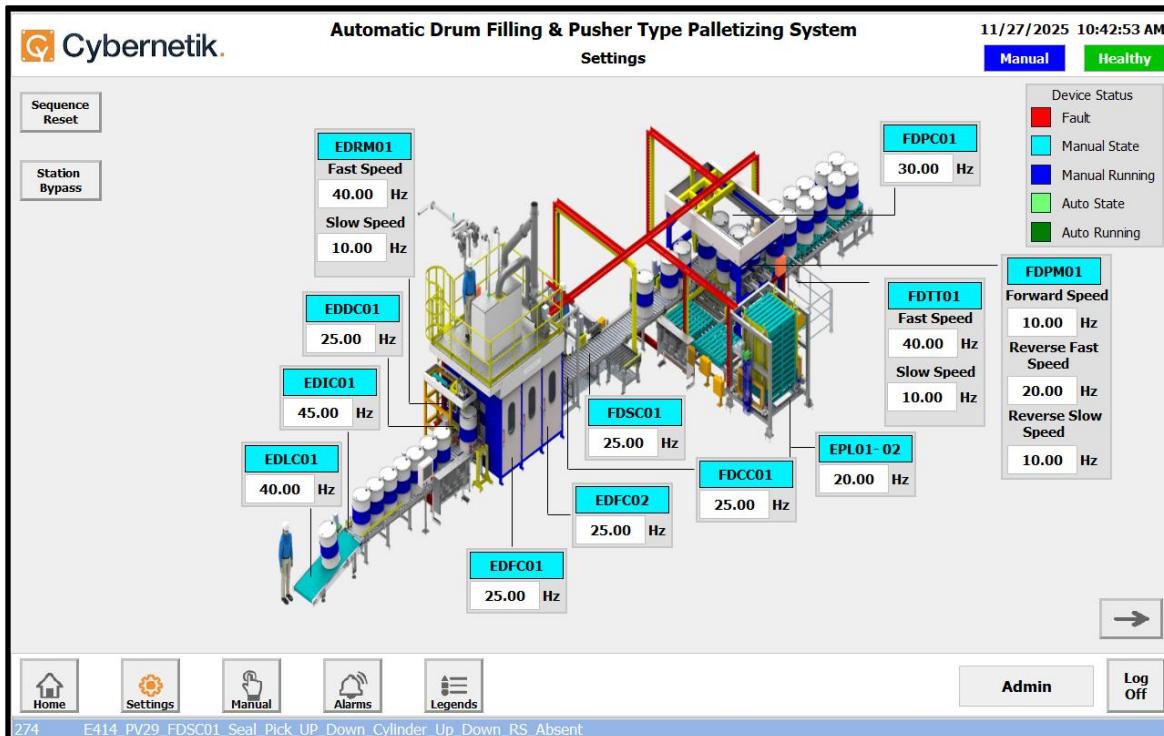


Figure 22: Settings

- The **Settings** screen allows operators and maintenance personnel to view and adjust the speed settings (in Hz) of key motors, conveyors, and actuators throughout the Drum Filling & Pusher Type Palletizing System. It provides a clear, graphical representation of the machine layout, with speed parameters displayed at their respective locations in the process flow.
- Purpose of the screen:** Verify current speed settings of all conveyor and motor drives, Fine-tune frequency settings to optimize throughput.
- This screen is typically accessible only to authorized personnel (Admin).
- On the left side, two important action buttons are provided:
 - Sequence Reset:** Resets the machine's current sequence logic
 - Station Bypass:** Allows authorized personnel to bypass a station for maintenance or troubleshooting
- Each motor or drive has a label indicating its current operating speed in Hz. Some devices also show multi-speed configurations (Fast, Slow, Forward, Reverse).
- All values represent configured frequency drive speeds used during system operation.

11.1.1 Settings-1

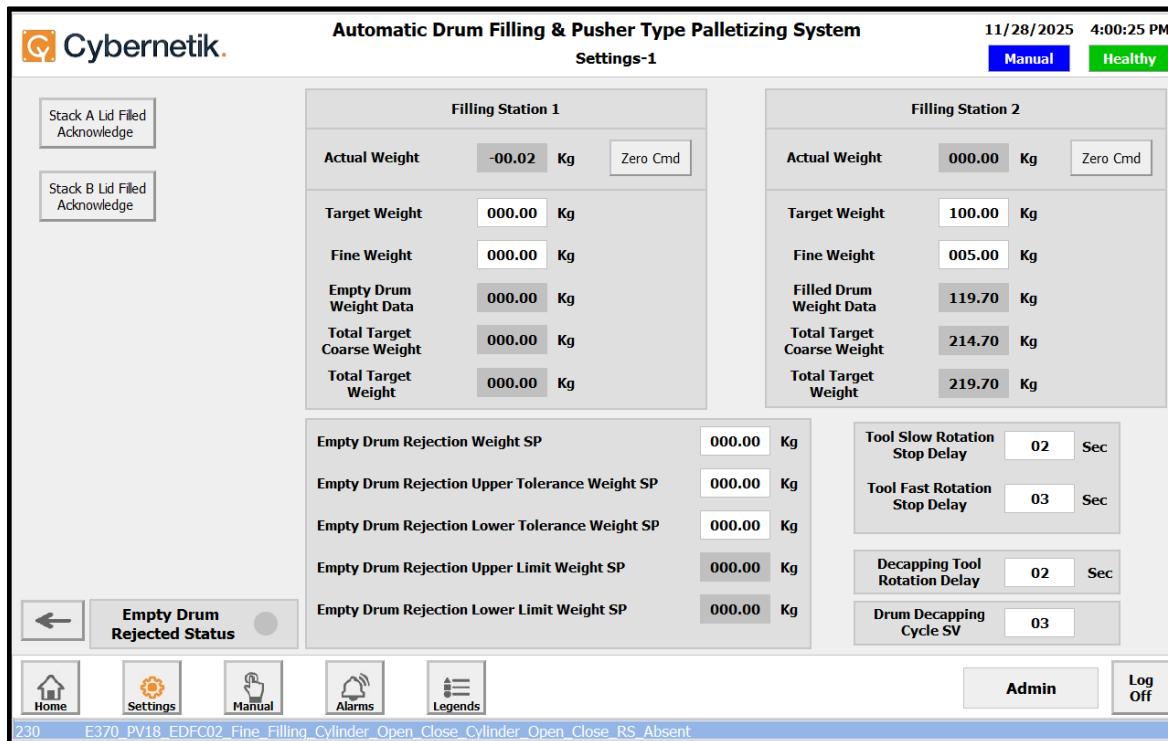


Figure 23: Settings

- The **Settings-1** screen is used to configure and monitor weight-related parameters for the two filling stations, as well as configure de-capping tool timings and drum rejection set points.
- Filling Station 1 and 2:** Displays and allows configuration of process weight parameters.

Parameter	Description
Actual Weight	Real-time weight from the load cell.
Zero Cmd	Manually resets the weight reading to zero (used during calibration or empty drum placement).
Target Weight	The required final fill weight for the drum.
Fine Weight	The weight used for the transition from fast filling to slow filling (fine dosing).
Empty Drum Weight Data	Automatically captured weight of the empty drum.

Parameter	Description
Total Target Coarse Weight	Calculated coarse-fill weight (Target Weight – Fine Weight).
Total Target Weight	Final total target weight including fine filling.

- **Drum Rejection Weight Set points:** These parameters determine whether empty drums are acceptable for filling or should be rejected.

Parameter	Description
Empty Drum Rejection Weight SP	Minimum acceptable empty drum weight to prevent using extremely light / faulty drums.
Upper Tolerance Weight SP	Maximum acceptable empty drum weight tolerance.
Lower Tolerance Weight SP	Minimum acceptable empty drum weight tolerance.
Upper Limit Weight SP	Upper limit beyond which drum is rejected.
Lower Limit Weight SP	Lower limit beyond which drum is rejected.

- **De-capping Tool & Cycle Timing Parameters:** These configurable timers control mechanical de-capping operations:

Parameter	Description
Tool Slow Rotation Stop Delay	Delay before the tool stops after slow rotation (pre-stop buffer).
Tool Fast Rotation Stop Delay	Delay before the tool stops after fast rotation.
De-capping Tool Rotation Delay	Time delay before tool rotation begins after activation.
Drum De-capping Cycle SV	Total de-capping cycle duration set point (in seconds).

11.1.2 Station Sequence Reset

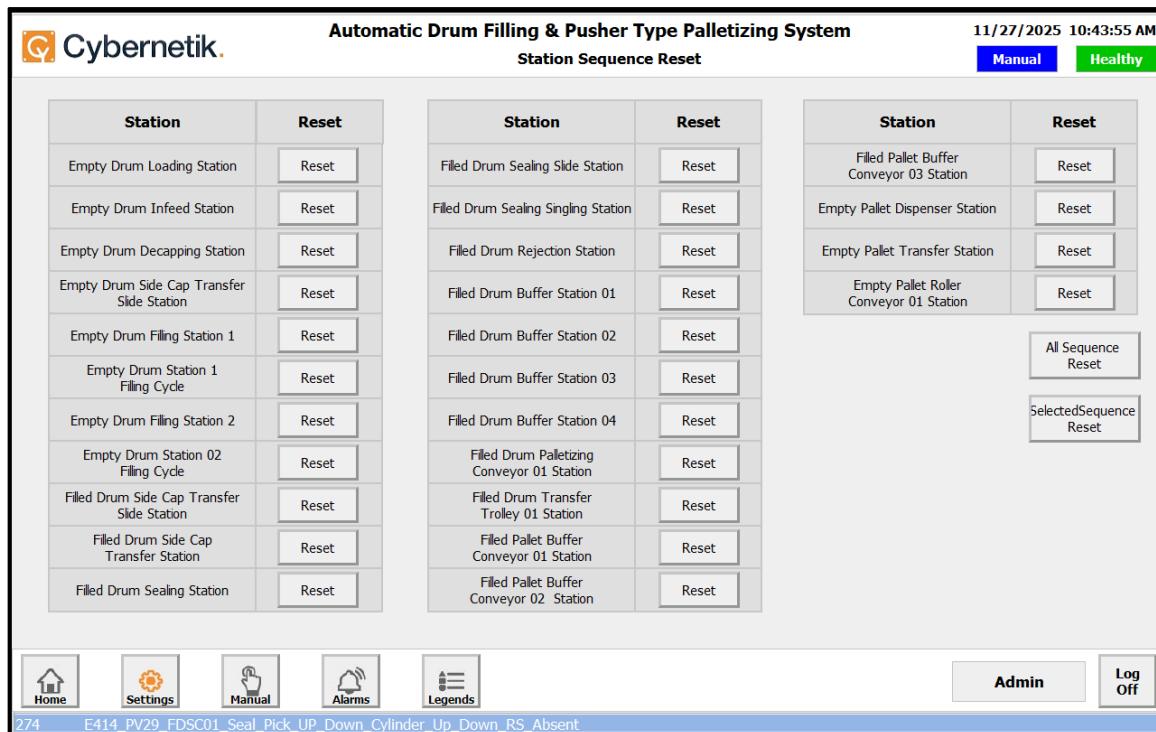


Figure 24: Settings

- The **Station Sequence Reset** screen allows operators or maintenance engineers to reset the sequence logic of individual stations or entire groups of stations within the Automatic Drum Filling & Pusher Type Palletizing System.
- The screen is divided into **three station groups**, each with its own reset buttons.
- All Sequence Reset:** Resets all station sequences at once.
- Selected Sequence Reset:** allows the operator to choose one station or group before resetting.

11.1.3 Station Bypass & Test mode

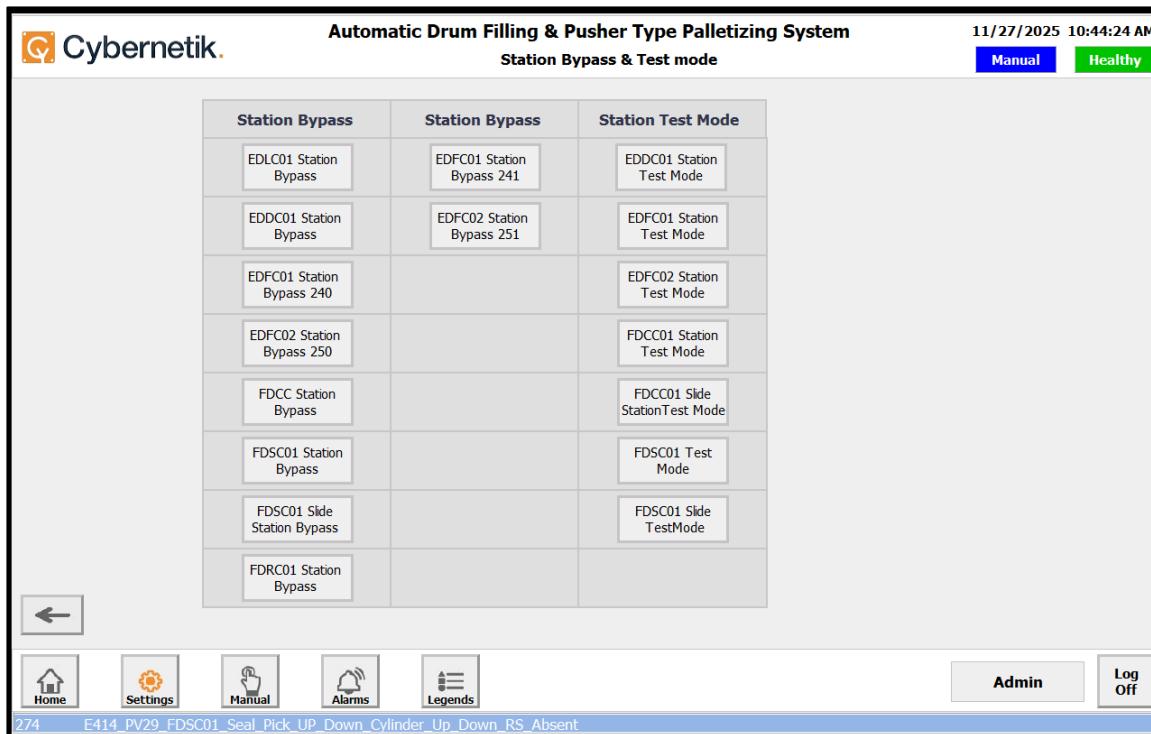


Figure 25: Settings

- This screen allows maintenance engineers or supervisors to override, skip, or manually test specific stations of the Automatic Drum Filling & Pusher Type Palletizing System.
- Test Mode allows manual testing of a station without running full production.
- **Bypass a station** → Skip it when running the machine.

12 Manual Operation

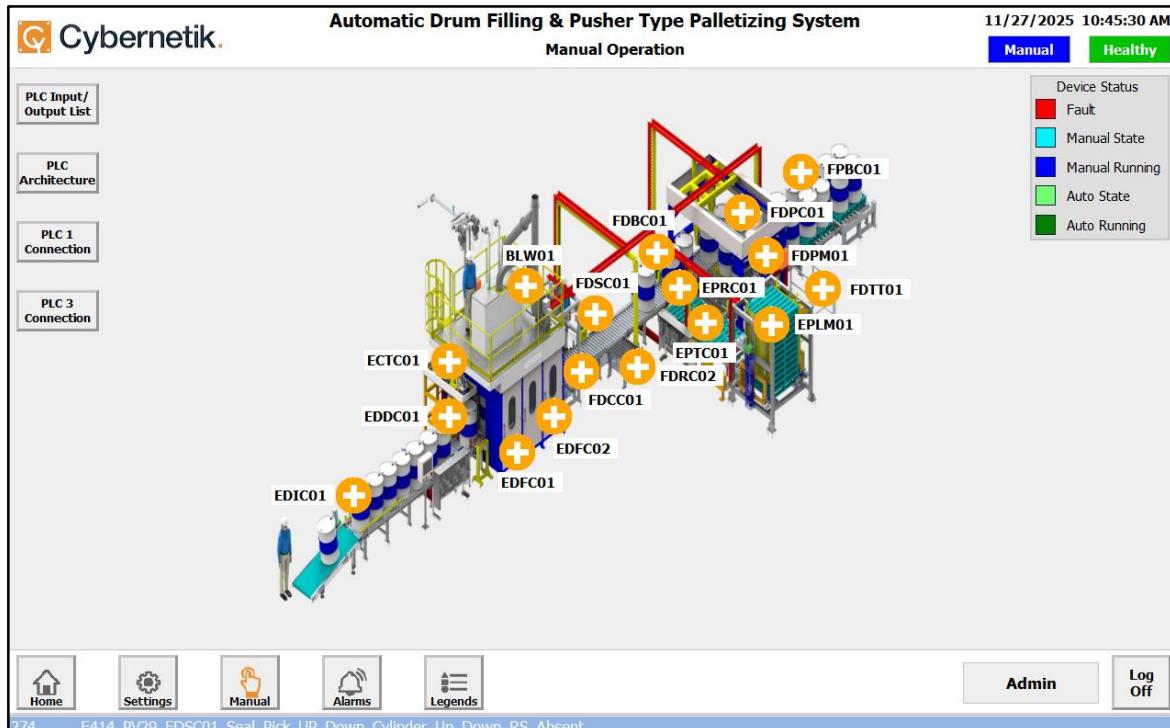


Figure 26: Manual Operation

- This screen is used when the system is operated in **Manual Mode**.
- Each yellow (+) button corresponds to a station or actuator. Clicking on any of them opens the manual control popup for that station.
- Buttons on the left allow you to navigate to PLC-related diagnostic screens:
 - **PLC Input / Output List** → Shows all I/O signals
 - **PLC Architecture** → Shows PLC hardware structure
 - **PLC 1 Connection** → Status of PLC-1
 - **PLC 3 Connection** → Status of PLC-3

12.1.1 Empty Cap Transfer Conveyor 01

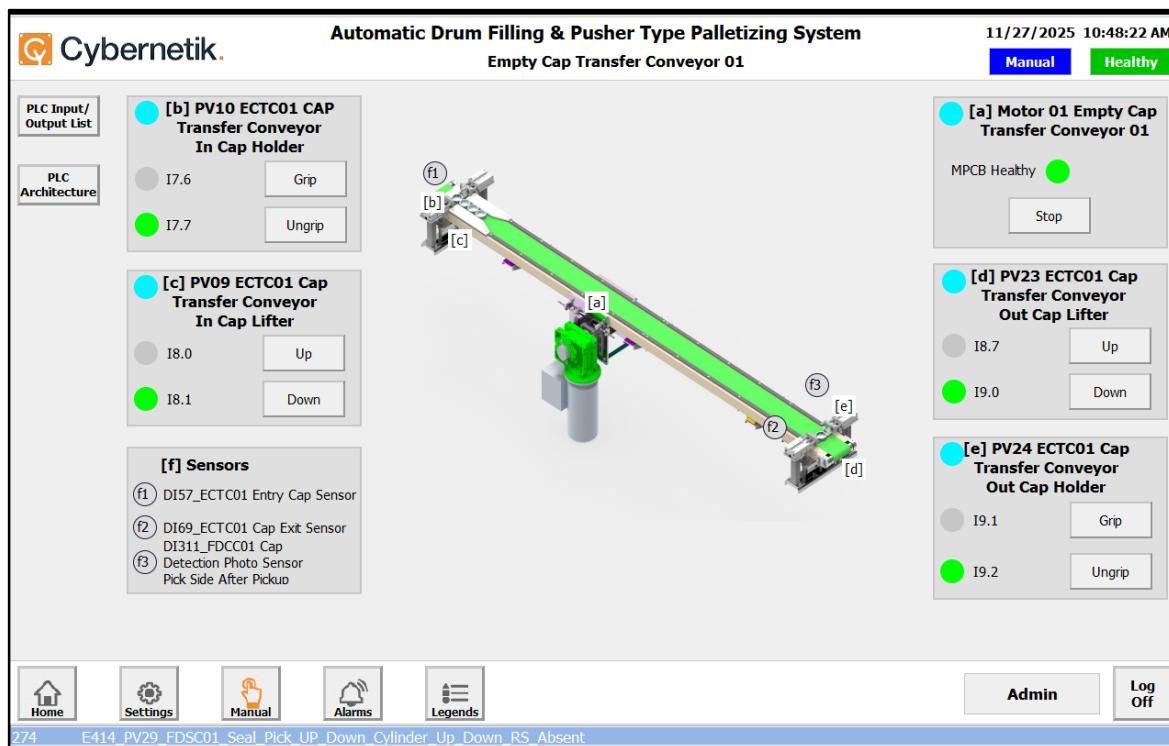


Figure 27: Manual Operation

- This screen displays the operational status, controls, and sensor feedback for **Empty Cap Transfer Conveyor 01**, which forms part of the cap-handling subsystem. The interface presents a visual layout of the conveyor and provides real-time control / monitoring of motors, pneumatic devices, and sensors.
- Buttons on the left allow you to navigate to PLC-related diagnostic screens:
 - PLC Input / Output List** – Opens the list of I/O tags for troubleshooting.
 - PLC Architecture** – Shows controller and module-level system architecture.
- Label references such as **[a]**, **[b]**, **[c]**, **[d]**, **[e]**, **[f]** match the functional components displayed in the side and left control panels, improving clarity during troubleshooting.

a) Motor 01 – Empty Cap Transfer Conveyor 01

Located on the right panel.

- Displays motor status and health.
- MPCB Healthy (green)** confirms the motor protection circuit breaker is not tripped.
- Stop Button** – Allows manual stopping of the conveyor.

b) PV10 – Cap Transfer Conveyor (In Cap Holder)

This is a pneumatic valve used for gripping caps at the holder.

- 17.6 – Grip
- 17.7 – Ungrip

Each indicator shows:

- **Grey** = command not active
- **Green** = command active

c) PV09 – Cap Transfer Conveyor (In Cap Lifter)

This valve lifts or lowers caps onto the conveyor.

- 18.0 – Up
- 18.1 – Down

Green indicates the active position.

d) PV23 – Cap Transfer Conveyor (Out Cap Lifter)

Located on the right panel.

Controls the lifter at the discharge end of the conveyor.

- 18.7 – Up
- 19.0 – Down

e) PV24 – Cap Transfer Conveyor (Out Cap Holder)

Controls the holder mechanism at the conveyor's discharge end.

- 19.1 – Grip
- 19.2 – Ungrip

12.1.2 Filled Drum Capping Conveyor 01

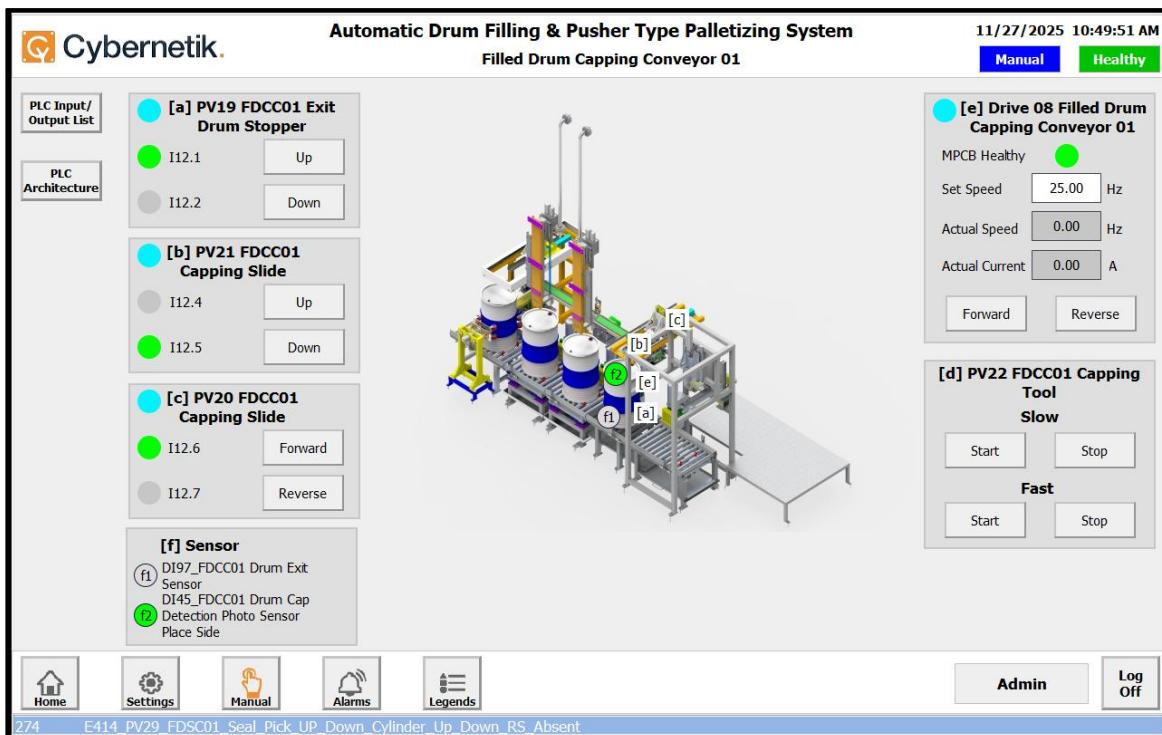


Figure 28: Manual Operation

- This screen provides full operational control and real-time feedback for the **Filled Drum Capping Conveyor 01** subsystem. It includes manual operation controls, pneumatic valve status, motor drive information, and sensor indications used during the drum capping process.

a) PV19 FDCC01 – Exit Drum Stopper

Located in the left panel.

Controls the pneumatic stopper at the exit end of the capping conveyor.

Command	Description
112.1 – Up	Stopper lifts to hold or stop the drum.
112.2 – Down	Stopper lowers to release the drum.

The indicator turns:

- Green** = command active
- Grey** = not active

b) PV21 FDCC01 – Capping Slide (Up / Down)

Controls the vertical slide mechanism for positioning the capping tool.

Command	Description
112.4 – Up	Lifts the capping slide.
112.5 – Down	Lowers the capping slide.

c) PV20 FDCC01 – Capping Slide (Forward/Reverse)

Controls horizontal movement of the capping slide.

Command	Description
112.6 – Forward	Moves the slide toward the drum.
112.7 – Reverse	Moves the slide back to home position.

d) PV22 FDCC01 – Capping Tool (Slow / Fast)

Provides two-speed control for the capping tool operation.

- **Slow Mode:**
 - Start / Stop buttons for controlled low-speed operation.
- **Fast Mode:**
 - Start / Stop buttons for high-speed cap tightening.

Used depending on drum type, torque requirements, or test operation.

e) Drive 08 – Filled Drum Capping Conveyor 01

This is the conveyor drive motor section.

The following parameters are shown:

- **MPCB Healthy (Green):** Motor protection device not tripped.
- **Set Speed:** Displays target frequency (e.g., 25.00 Hz).
- **Actual Speed:** Real-time running frequency (Hz).
- **Actual Current:** Motor current in amps.

Motor Control Buttons:

- **Forward** – Runs the conveyor forward.
- **Reverse** – Runs the conveyor in the reverse direction.

This is primarily used in manual or maintenance modes.

f) Sensors

Located in the lower left section.

These sensors provide detection feedback for drum positioning and cap presence:

Sensor	Description
F1 – D197_FDCC01 Drum Exit Sensor	Detects if a drum has reached the exit point.
F2 – D145_FDCC01 Drum Cap Detection Photo Sensor (Place Side)	Confirms presence of cap at the capping location.

Green = sensor active

Grey = inactive

These signals ensure accurate cap placement and prevent misalignment.

12.1.3 Empty Drum De-capping Conveyor 01

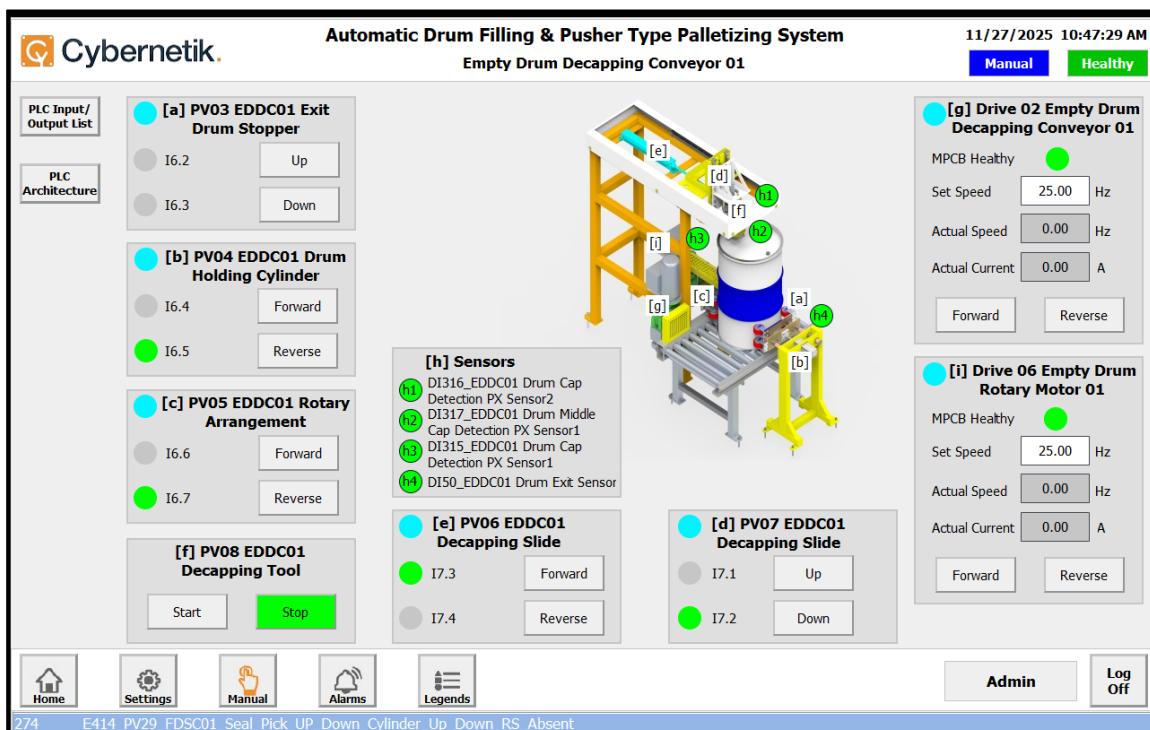


Figure 29: Manual Operation

- This HMI screen provides complete manual control for the Empty Drum De-capping Section of the Automatic Drum Filling & Pusher Type Palletizing System.
- Operators use this screen to control pneumatic actuators, monitor sensors, and operate the conveyor/rotary motors during drum de-capping.

a) PV03 EDDC01 – Exit Drum Stopper

A pneumatic stopper used to hold or release drums at the de-capping station exit.

Command	Function
16.2 Up	Lifts the stopper to hold the drum.
16.3 Down	Lowers the stopper to release the drum.

Indicator Colours:

- Green:** Active command
- Grey:** Inactive

b) PV04 EDDC01 – Drum Holding Cylinder

Holds the empty drum in position for de-capping.

Command	Function
16.4 Forward	Cylinder moves forward to clamp and hold the drum.
16.5 Reverse	Cylinder retracts to release the drum.

c) PV05 EDDC01 – Rotary Arrangement

Controls the rotary mechanism that positions the drum or cap for de-capping.

Command	Function
16.6 Forward	Rotates in forward direction.
16.7 Reverse	Rotates in reverse direction.

Used to align the drum cap with the de-capping tool.

d) PV07 EDDC01 – De-capping Slide (Up / Down)

Controls the vertical movement of the slide that positions the de-capping tool above the drum.

Command	Function
17.1 Up	Raises the de-capping slide.
17.2 Down	Lowers the de-capping slide.

e) PV06 EDDC01 – De-capping Slide (Forward/Reverse)

Controls the horizontal slide to move the de-capping head toward or away from the drum.

Command	Function
17.3 Forward	Moves slide towards drum.

Command	Function
17.4 Reverse	Moves slide away to home position.

f) PV08 EDDC01 – De-capping Tool

Controls the motorized tool used for removing (unscrewing) drum caps.

Button	Function
Start	Starts de-capping tool operation.
Stop	Stops the de-capping tool.

g) Drive 02 – Empty Drum De-capping Conveyor 01

Motor for the conveyor that moves empty drums into the de-capping area.

Control buttons:

- **Forward** – Conveyor moves forward
- **Reverse** – Conveyor direction reversed

h) Sensors: These sensors ensure accurate drum position and cap alignment before de-capping.

Sensor Code	Function
h1 – D1316 EDDC01 Drum Cap Detection PX Sensor	Detects presence of drum cap (top).
h2 – D1377 EDDC01 Drum Middle Cap Detection PX Sensor	Checks mid-level cap presence/position.
h3 – D1315 EDDC01 Drum Cap Detection PX Sensor	Confirms cap alignment for tool engagement.
h4 – D150 EDDC01 Drum Exit Sensor	Confirms drum presence at exit position.

Indicator Colors:

- **Green:** Sensor active
- **Grey:** Sensor idle

i) Drive 06 – Empty Drum Rotary Motor 01

Controls the rotary motion for aligning drums during de-capping.

Control Buttons:

- **Forward** – Rotates drum / tool assembly
- **Reverse** – Reverse rotation

12.1.4 Empty Drum Filling Conveyor 01

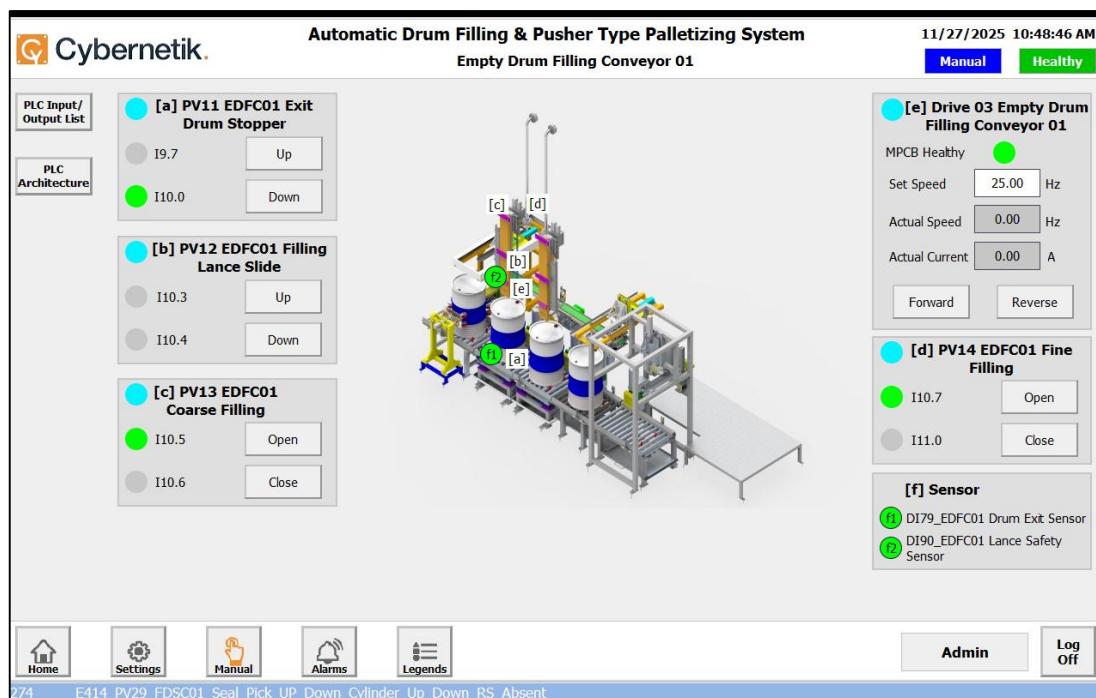


Figure 30: Manual Operation

- This screen is used for manual operation and monitoring of the Empty Drum Filling Section of the **Automatic Drum Filling & Pusher Type Palletizing System**.
- It allows the operator to position drums, control the filling lance, operate coarse and fine filling valves, and monitor sensors and conveyor motor status.

a) PV11 EDFC01 – Exit Drum Stopper

Used to hold or release drums at the exit point of the filling station.

Command	Function
Up (19.7)	Raises the stopper to block drum movement.

Command	Function
Down (110.0)	Lowers the stopper to allow the drum to exit.

Indicators:

- **Green:** Active
- **Grey:** Inactive

b) PV12 EDFC01 – Filling Lance Slide (Up/Down)

Controls the vertical movement of the filling lance.

Command	Function
Up (110.3)	Lifts the lance after filling.
Down (110.4)	Lowers the lance into the drum before filling.

This ensures correct lance position for safe and accurate filling.

c) PV13 EDFC01 – Coarse Filling Valve

Controls the high-flow valve for fast initial filling.

Command	Function
Open (110.5)	Opens coarse filling to start high-flow filling.
Close (110.6)	Closes coarse filling at the cutoff point.

Used for bulk filling until the drum reaches near-set level.

d) PV14 EDFC01 – Fine Filling Valve

Controls the low-flow valve for precision filling.

Command	Function
Open (110.7)	Starts fine filling.
Close (111.0)	Stops fine filling.

This ensures accurate final weight/top-up filling after coarse filling closes.

e) Drive 03 – Empty Drum Filling Conveyor 01

Controls the conveyor that moves empty drums into the filling position.

Conveyor Commands

Command	Function
Forward	Moves drums forward into filling area.
Reverse	Reverses conveyor movement.

f) Sensors

These sensors are essential for safe filling operations.

Sensor Code	Function
f1 – D179 EDFC01 Drum Exit Sensor	Detects drum presence at exit of filling station.
f2 – D190 EDFC01 Lance Safety Sensor	Confirms lance is safely positioned (ensures lance clearance).

Sensor Indicator Colours:

- **Green:** Sensor active
- **Grey:** Sensor inactive

These sensors prevent accidental filling or movement during lance insertion.

12.1.5 Empty Drum Filling Conveyor 02

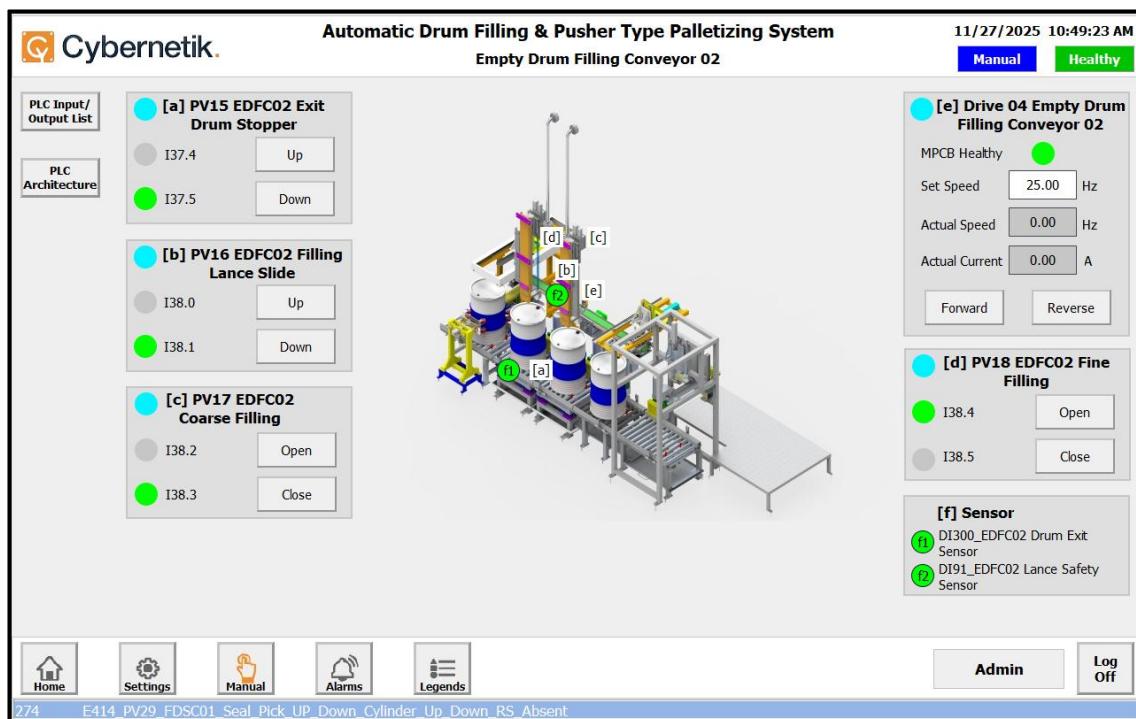


Figure 31: Manual Operation

- This screen displays the manual operation interface for the Empty Drum Filling Conveyor 02 of the Automatic Drum Filling & Pusher Type Palletizing System. It allows the operator to manually actuate valves, cylinders, conveyor drive, and monitor sensor status.
- A 3D representation of the **Empty Drum Filling Station 02** is shown. Labels [a], [b], [c], [d], [e], [f1], [f2] correspond to:
 - Location of valves
 - Lance components
 - Coarse/Fine filling lines
 - Sensors
 - Conveyor drive assembly

This visual helps verify physical component positions during manual operation.

a) PV15 – EDFC02 Exit Drum Stopper

Controls stopper cylinder for drum movement.

- Up Button:** Raises stopper.
- Down Button:** Lowers stopper.
- Indicator shows digital input status (e.g., I37.4, I37.5).

b) PV16 – EDFCO2 Filling Lance Slide

Controls the sliding movement of the filling lance.

- **Up Button:** Moves lance up.
- **Down Button:** Moves lance down.
- Inputs displayed (I38.0, I38.1).

c) PV17 – EDFCO2 Coarse Filling Valve

Controls coarse filling flow.

- **Open Button:** Opens coarse filling valve.
- **Close Button:** Closes valve.
- Inputs shown (I38.2, I38.3).

d) PV18 – EDFCO2 Fine Filling Valve

Controls fine filling flow.

- Open Button
- Close Button
- Input feedback (I38.4, I38.5)

e) Drive 04 – Empty Drum Filling Conveyor O2

Displays drive motor status and allows manual jogging.

- **MPCB Healthy Indicator:** Confirms motor protection circuit breaker is OK.
- **Set Speed:** 25.00 Hz (operator-set frequency).
- **Actual Speed:** Real-time speed feedback.
- **Actual Current:** Motor current draw.
- **Forward / Reverse Buttons:** For conveyor direction control.

f) Sensors

Displays real-time status of critical sensors:

- **f1 – DI300 EDFCO2 Drum Exit Sensor**
detects whether drum has reached exit position.
- **f2 – DI91 EDFCO2 Lance Safety Sensor**
Ensures lance is in safe position before operation.

Green indicates sensor is active/ON.

12.1.6 Empty Pallet Lifter Motor 01

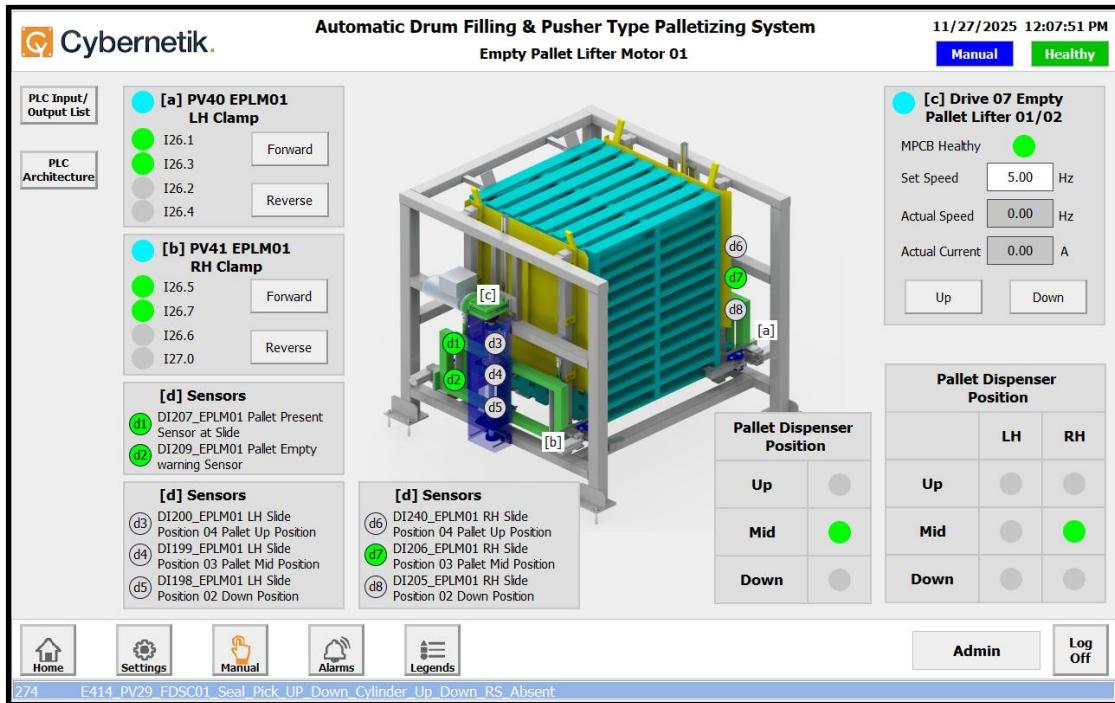


Figure 32: Manual Operation

- This screen provides manual control and status monitoring for the Empty Pallet Lifter 01 of the Automatic Drum Filling & Pusher Type Palletizing System. It enables the operator to actuate clamps, move the pallet lifter, and verify sensor feedback associated with pallet lifting and dispensing.

a) PV40 EPLM01 – Left-Hand (LH) Clamp

Controls clamping on the left side of the empty pallet stack.

- Forward:** Engages LH clamp.
- Reverse:** Releases LH clamp.
- Inputs displayed: I126.1, I126.2, I126.3

b) PV41 EPLM01 – Right-Hand (RH) Clamp

Controls clamping on the right side.

- Forward:** Engages RH clamp.
- Reverse:** Releases RH clamp.
- Inputs displayed: I126.5, I126.6, I127.0

c) Drive 07 Empty Pallet Lifter 01/02

Motor control for lifting and lowering the pallet stack.

- **MPCB Healthy Indicator:** Confirms motor breaker status.
- **Set Speed:** Target speed shown (5.00 Hz).
- **Actual Speed:** Real-time frequency feedback.
- **Actual Current:** Motor current draw.
- **Up / Down Buttons:** Moves pallet lifter vertically in manual mode.

d) Sensors:

- These sensors monitor the position of both sides of the lifter arms (Up / Mid / Down).
- The 3D model labels (d1 → d8) correspond to these sensors for easy identification.

Pallet Dispenser Position Indicators:

Shows the current **vertical position** of the pallet dispenser for LH and RH sides:

- **Up**
- **Mid**
- **Down**

Green LEDs indicate active / true sensor state.

12.1.7 Empty Pallet Roller Conveyor 01

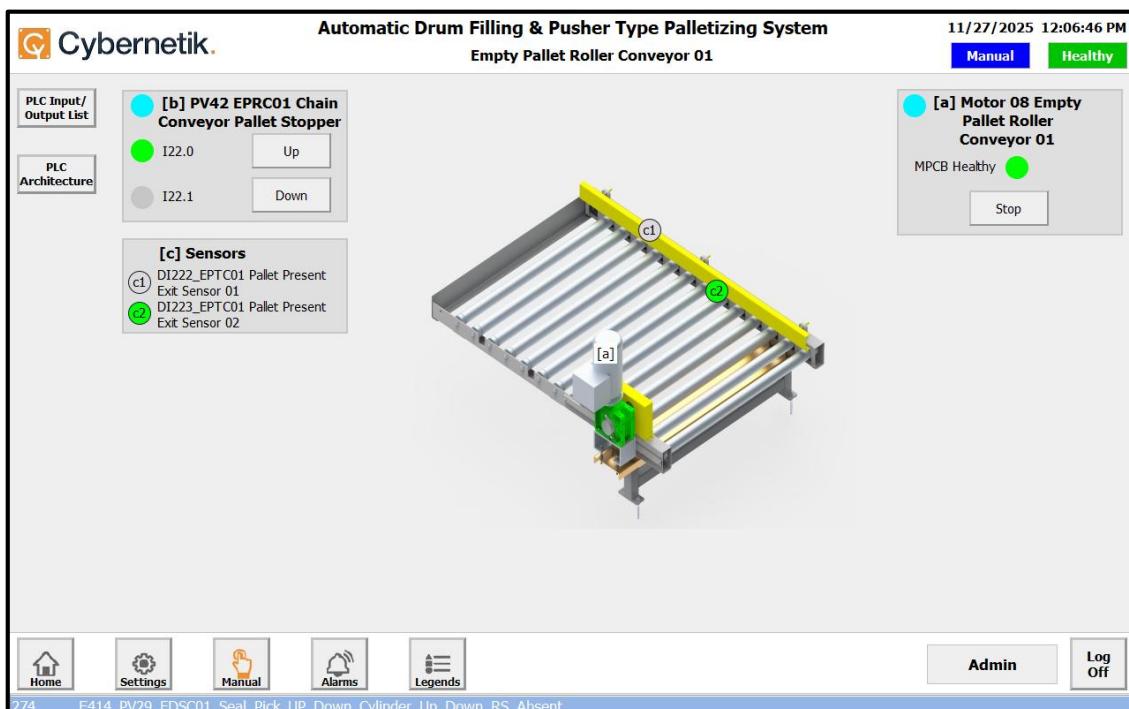


Figure 33: Manual Operation

- This screen provides manual control and status monitoring for the Empty Pallet Roller Conveyor 01, which transfers empty pallets downstream in the palletizing system. It displays conveyor motor status, pallet stopper control, and pallet presence sensors.

a) Motor 08 – Empty Pallet Roller Conveyor 01

Controls the main roller conveyor movement.

- MPCB Healthy Indicator** – Shows motor protection breaker status
- Stop Button** – Stops the roller conveyor motor when in manual mode

b) PV42 EPRC01 – Chain Conveyor Pallet Stopper

This actuator raises or lowers the pallet stopper to control pallet movement onto / from the roller conveyor.

- Up** → Raises stopper to hold the pallet
- Down** → Lowers stopper to release the pallet
- Status Inputs:**
 - I22.0 – Stopper Up Feedback
 - I22.1 – Stopper Down Feedback

These statuses show whether the stopper is physically in the commanded position.

c) Sensors – Pallet Presence Detection

Two sensors detect whether an empty pallet is present at the exit/transfer area of the roller conveyor:

- C1 – DI222_EPRC01 Pallet Present Exit Sensor 01
- C2 – DI223_EPRC01 Pallet Present Exit Sensor 02

Green indicates the sensor is active (pallet detected).

In the displayed screen, Sensor C2 is active, meaning a pallet is at or near the exit.

12.1.8 Empty Pallet Transfer Conveyor 01

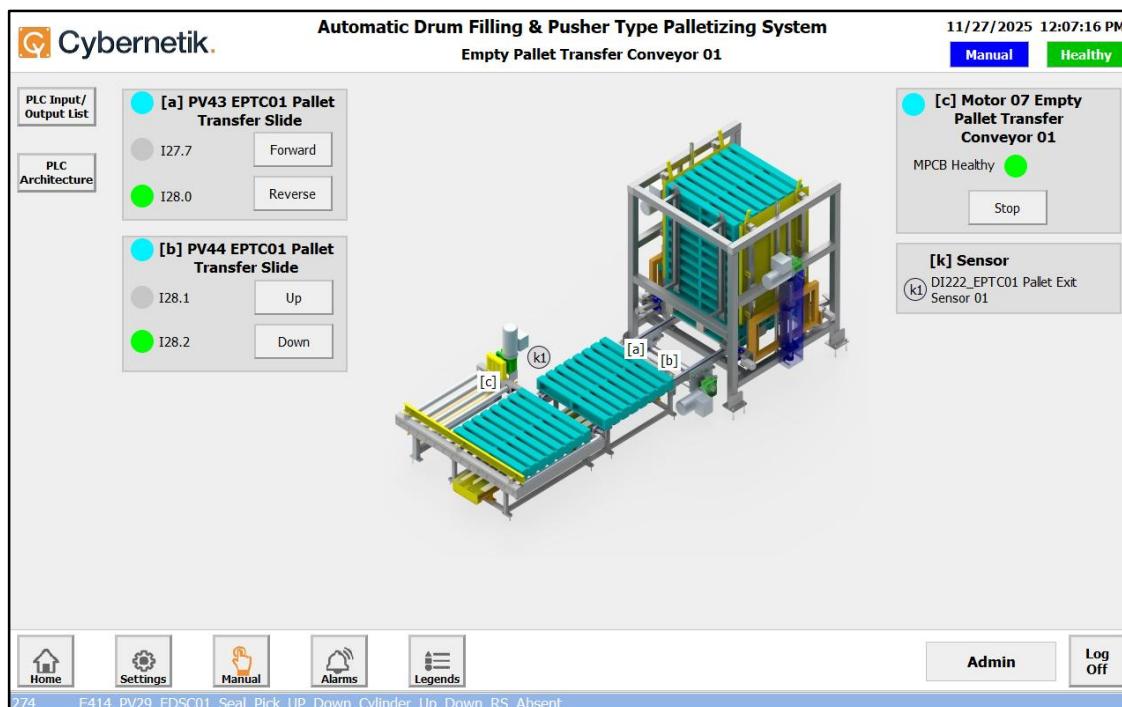


Figure 34: Manual Operation

- This screen provides manual operation and status monitoring for the **Empty Pallet Transfer Conveyor 01**, which transfers empty pallets from the pallet dispenser area to downstream conveyors.

a) PV43 EPTC01 – Pallet Transfer Slide:

This slide transfers the pallet laterally from one conveyor section to another.

- **Forward** → Moves the slide in the forward direction.
- **Reverse** → Moves the slide back to the home position.

Feedback indicators:

- **I27.7** – Forward feedback
- **I28.0** – Reverse feedback

Green indicates the slide is in the corresponding position.

b) PV44 EPTC01 – Pallet Transfer Slide (Vertical Movement)

This slide mechanism raises or lowers the pallet for level matching with adjacent conveyors.

- **Up** → raises the pallet transfer slide.
- **Down** → lowers the slide.

Feedback indicators:

- **I28.1** – Slide Up
- **I28.2** – Slide Down

Green indicates the true (active) condition.

c) Motor 07 – Empty Pallet Transfer Conveyor 01

Controls the primary roller conveyor that moves empty pallets after they are transferred.

- **MPCB Healthy** – Indicates the motor protection circuit breaker is ON and no fault exists.
- **Stop** – Stops the conveyor motor in manual mode.

(Forward / Reverse may be disabled depending on safety logic.)

K) Sensors

Detects pallet presence at the conveyor exit point.

- **Green** – Pallet detected
- **Grey** – No pallet present

This sensor ensures safe transfer before allowing the next pallet to move in.

12.1.9 Filled Drum Buffer Conveyor 01

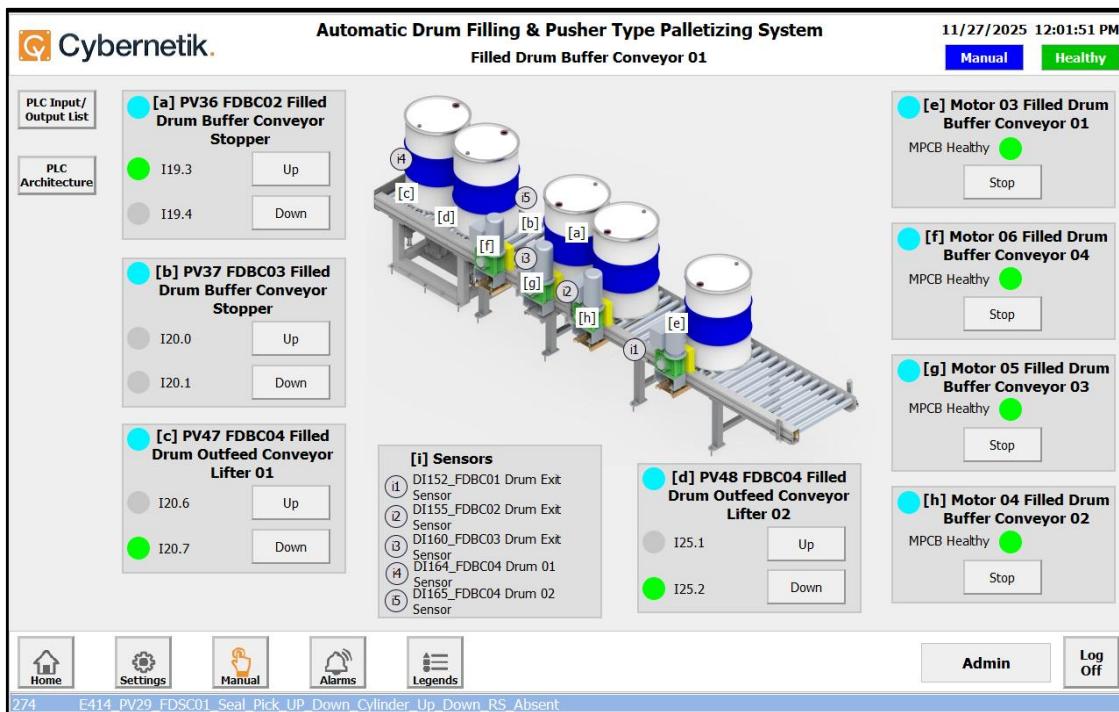


Figure 35: Manual Operation

- This screen is part of the Automatic Drum Filling & Pusher Type Palletizing System. It provides the operator with full control and status monitoring of the Filled Drum Buffer Conveyor 01 section.
- These blocks allow manual control of pneumatic stoppers and lifters.

Each device shows:

- Position Feedback:** Numerical value of the actuator's current position.
- Status Lamp:** Green = device available / active, Grey = inactive.
- Up / Down Pushbuttons:** Allows manual movement of the actuator.

a) PV36 – Filled Drum Buffer Conveyor Stopper

Purpose: Holds or releases drums on Buffer Conveyor 02.

Indicators:

- Green light = Actuator in expected / healthy state.

Controls:

- Up** – Lifts the stopper to stop drum movement.

b) PV37 – Filled Drum Buffer Conveyor Stopper

Purpose: Holds or releases drums on Buffer Conveyor 03.

Indicators:

- Green light = Actuator in expected/healthy state.

Controls:

- **Up** – Lifts the stopper to stop drum movement.

c) PV47 – Drum Outfeed Conveyor Lifter 01

- **Purpose:** Lifts drums onto the Outfeed conveyor section.
- **Controls:** Up / Down

d) PV48 – Drum Outfeed Conveyor Lifter 02

Works in series with Lifter 01.

Feedback Indicators:

- 25.1, 25.2 → Sensor or valve position monitoring.

Controls: Up / Down

12.1.10 Filled Drum Palletizing Conveyor 01

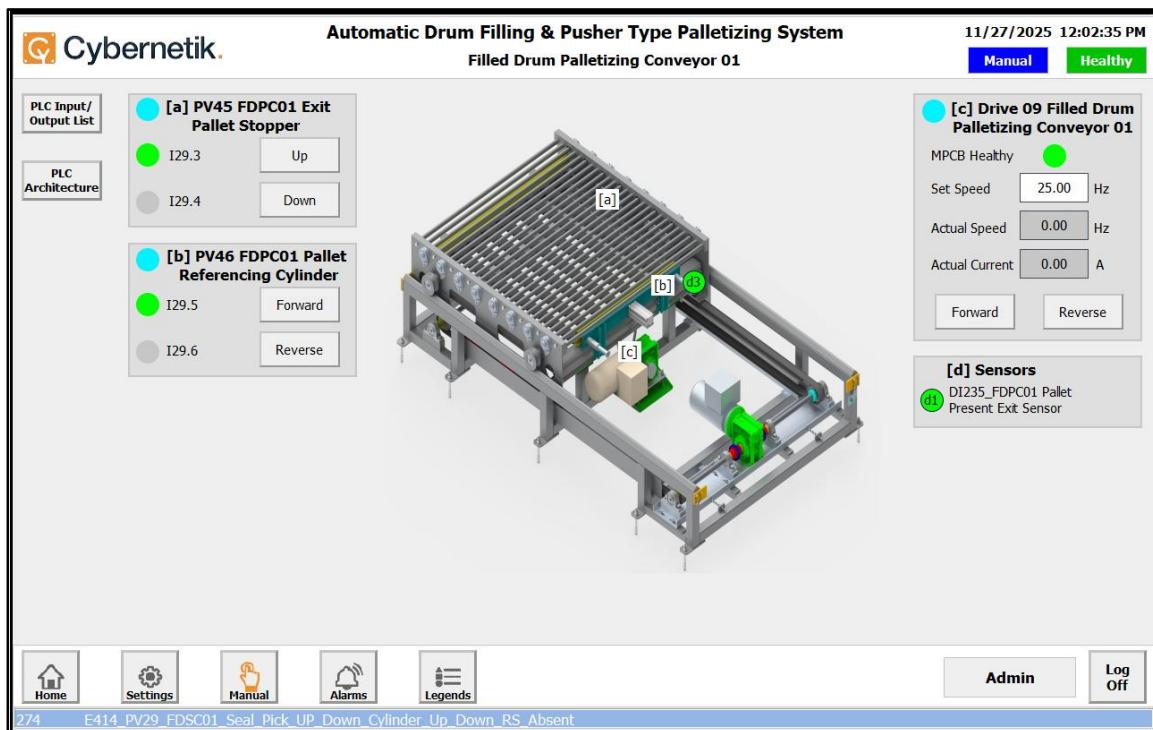


Figure 36: Manual Operation

- This screen is part of the Automatic Drum Filling & Pusher-Type Palletizing System. It provides the operator with real-time status and manual controls for Filled Drum Palletizing Conveyor 01, including actuators, sensors, and drive parameters.

a) PV45 FDPC01 Exit Pallet Stopper

Function:

Prevents pallets from leaving the conveyor until conditions permit.

Indicators:

- 129.3 – Up (Green):** Stopper is in the UP position.
- 129.4 – Down (Grey):** Stopper is not in the DOWN position.

Buttons:

- Up** – Raises the pallet stopper.
- Down** – Lowers the pallet stopper.

b) PV46 FDPC01 Pallet Referencing Cylinder

Function:

Aligns or "references" the pallet to ensure proper positioning for the palletizing operation.

Indicators:

- **129.5 – Forward (Green):** Cylinder extended.
- **129.6 – Reverse (Grey):** Cylinder retracted.

Buttons:

- **Forward** – Extends the cylinder.
- **Reverse** – Retracts the cylinder.

c) Drive 09 – Filled Drum Palletizing Conveyor 01

MPCB Healthy: Indicates that the motor protection circuit breaker is ON and no electrical faults exist.

Parameters:

- **Set Speed:** Desired conveyor frequency.
- **Actual Speed:** Real-time measured motor speed (Hz).
- **Actual Current:** Real-time motor current (A).

Control Buttons:

- **Forward** – Runs the conveyor forward.
- **Reverse** – Runs the conveyor in reverse.

d) Pallet Present Exit Sensor

- **d1: DI235_FDPC01 Pallet Present Exit Sensor**
- Detects whether a pallet is present at the conveyor exit.
- Green indicates pallet detected.

12.1.11 Filled Pallet Buffer Conveyor 01

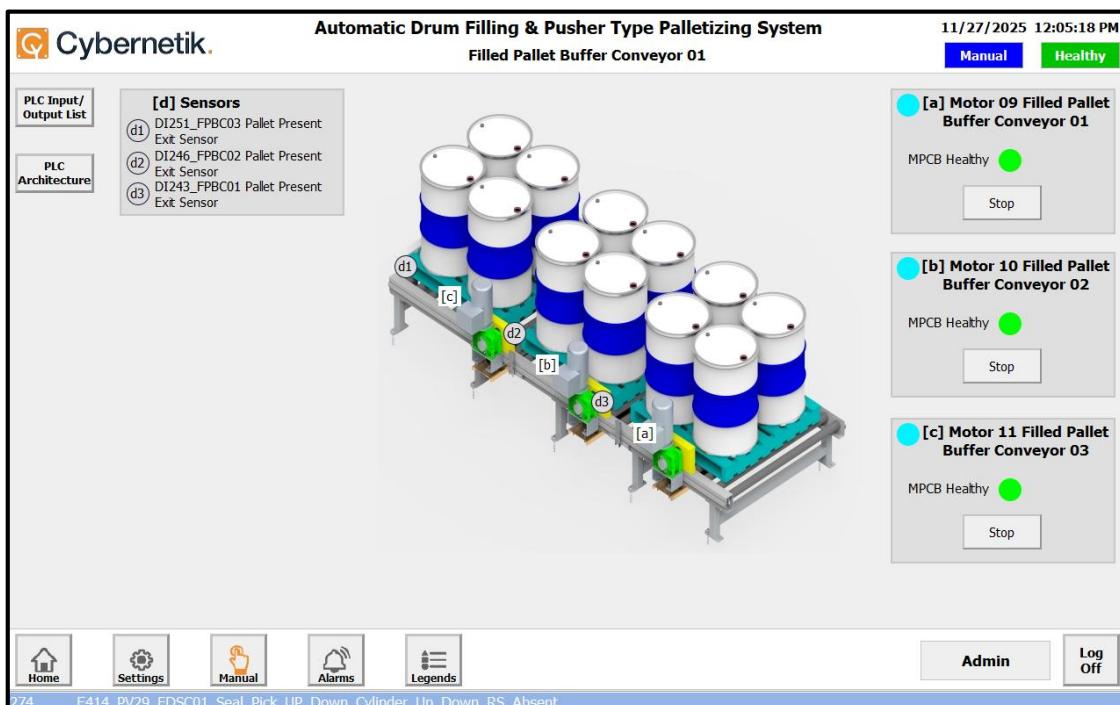


Figure 37: Manual Operation

- This screen belongs to the Automatic Drum Filling & Pusher-Type Palletizing System. It displays the status, controls, and sensor feedback for the Filled Pallet Buffer Conveyor Zone 01, including motors, pallet sensors, and system health.

a) Motor 09 – Filled Pallet Buffer Conveyor 01

Small green markers labeled **d1, d2, d3** correspond to the physical exit sensor

Motor Health Indicator

- A **green circle** labelled **MPCB Healthy**
Means:

- Motor Protection Circuit Breaker is ON
- No overload or fault detected
- Motor ready for operation

If red, troubleshooting would be required.

Motor Control Button

Stop Button:

Since system is in manual mode, operator can command motor stop.

12.1.12 Filled Drum Pusher Motor 01

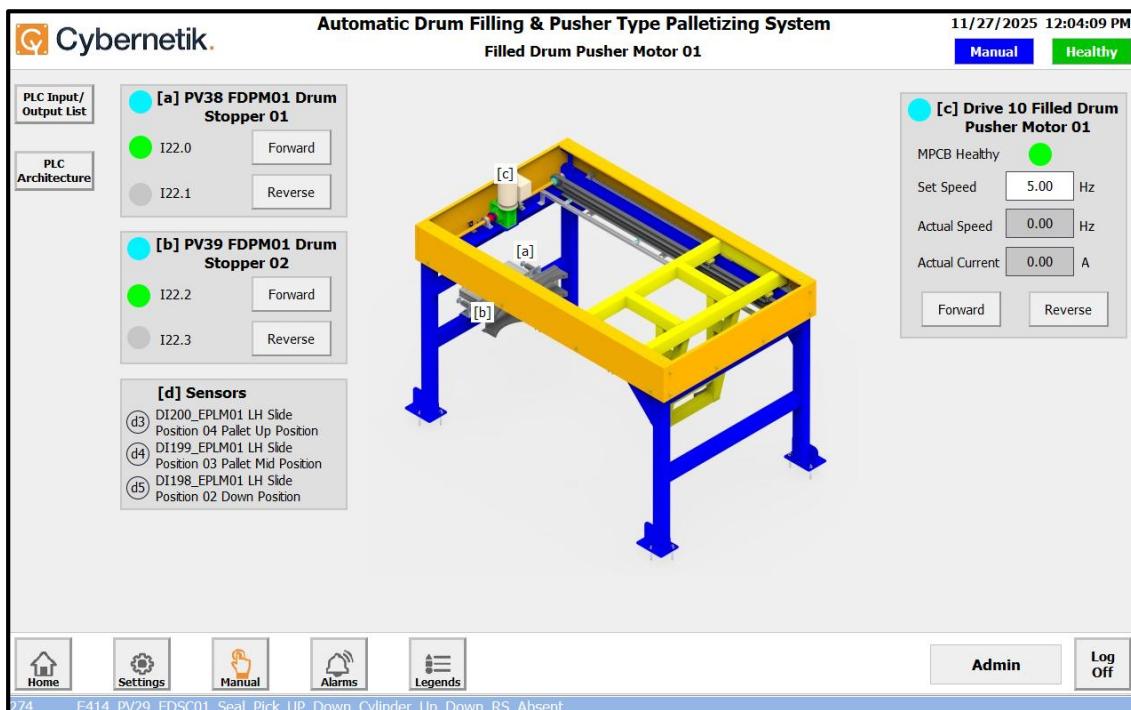


Figure 38: Manual Operation

- This screen displays the manual operating interface, real-time status, and sensor feedback for the Filled Drum Pusher Station, which pushes filled drums onto conveyors or into palletizing zones.

a) PV38 FDPM01 Drum Stopper 01

- 122.0 ON = Green** → Stopper is currently in the **active / engaged** position.
- Forward Button** – Extends the stopper (blocks drum movement).
- Reverse Button** – Retracts the stopper (allows drum movement).

b) PV39 FDPM01 Drum Stopper 02

- 122.2 ON = Green** → Stopper is active.
- Forward Button** – Extends the stopper (blocks drum movement).
- Reverse Button** – Retracts the stopper (allows drum movement).

Purpose of both stoppers:

To control drum flow into the pusher zone—one typically stops incoming drums, the other sequences them correctly.

c) Drive 10 – Filled Drum Pusher Motor 01

MPCB Healthy (Green) indicates:

- Motor protection circuit breaker is ON
- No overloads, faults, or tripped conditions
- Motor ready for operation

Buttons available:

- **Forward** – Moves the pusher in forward direction
- **Reverse** – Moves the pusher in reverse direction

12.1.13 Filled Drum Capping Conveyor 01

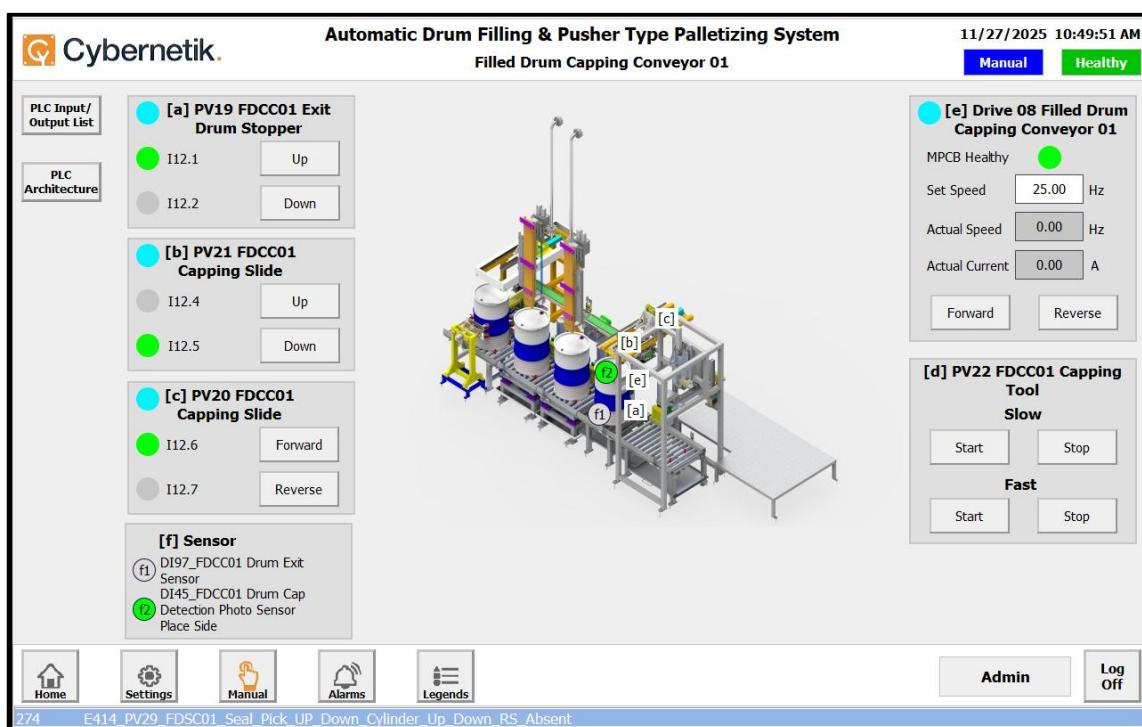


Figure 39: Manual Operation

- This HMI screen provides manual control, status visualization, and sensor feedback for the drum capping station located after the drum-filling area.

a) PV19 FDCC01 Exit Drum Stopper

Controls the stopper that holds or releases drums at the conveyor exit.

- **112.1 (Green)** = Stopper Up (Active position)
- **112.2 (Grey)** = Stopper Down (Inactive position)

Buttons:

- **Up** – Raises the stopper to hold drums.
- **Down** – Lowers the stopper to allow drum movement.

b) PV21 FDCC01 Capping Slide

Controls slide mechanism guiding drums into the capping position.

- **112.4 ON (Green)** – Slide Up
- **112.5 OFF** – Slide Down

Buttons:

- **Up** – Moves slide to upper position.
- **Down** – Moves slide to lower position.

c) PV20 FDCC01 Capping Slide (Forward / Reverse)

Controls horizontal slide motion for positioning drums under the capping unit.

- **112.6 ON (Green)** – Forward position
- **112.7 OFF** – Reverse position

Buttons:

- **Forward** – Moves the slide toward the capping location.
- **Reverse** – Retracts slide away from capping zone.

d) Capping Tool Control - PV22 FDCC01

The capping tool can operate at two speeds:

Slow Mode

- **Start**
- **Stop**

Used for:

- Precise alignment
- Testing
- Tightening operations at controlled speed

Fast Mode

- **Start**
- **Stop**

Used for:

- Standard production capping
- Normal tightening cycle

This allows operators to choose the appropriate speed based on drum type and operational need.

e) Conveyor Motor Control –Drive 08

Motor Status

- **MPCB Healthy (Green)** – Motor protection breaker is ON; no faults present.

Drive Parameters

- **Set Speed:** 25.00 Hz
- **Actual Speed:** 0.00 Hz (motor currently stopped)
- **Actual Current:** 0.00 A (no load)

Shows the commanded vs. real-time performance of the conveyor motor.

Manual Motor Controls

- **Forward** – Runs conveyor forward
- **Reverse** – Runs conveyor backward

Used during maintenance, cleaning, or commissioning.

12.1.14 Filled Drum Sealing Conveyor 01

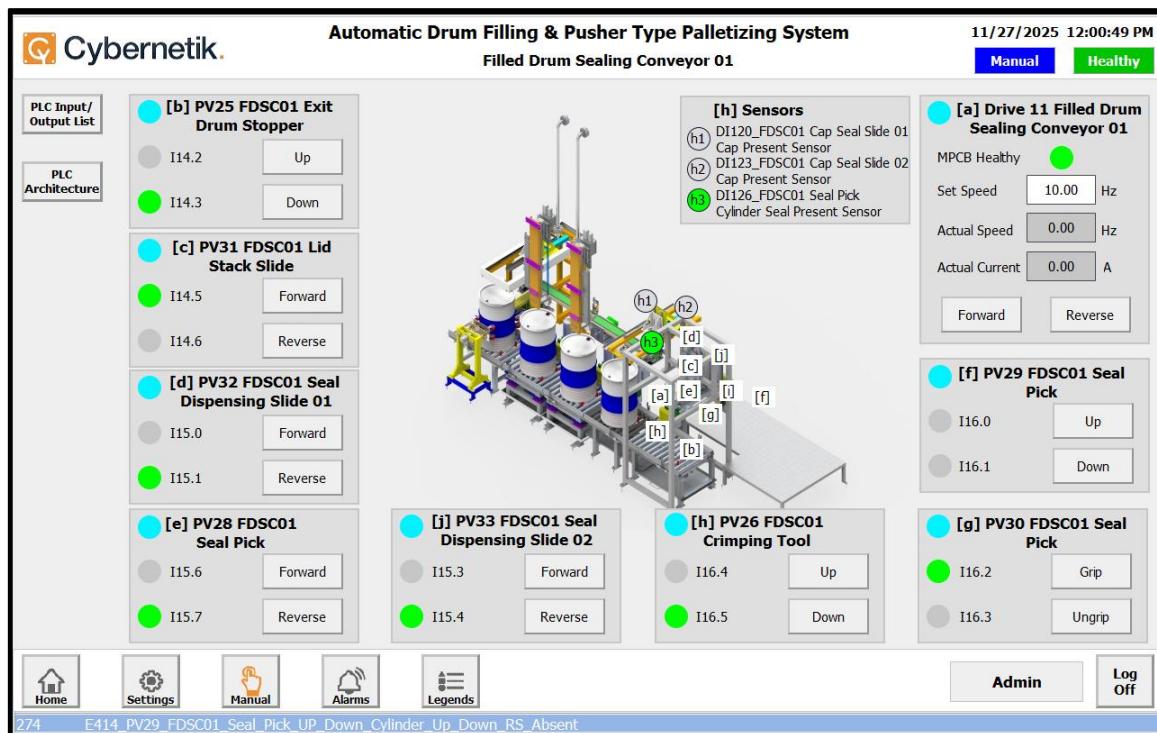


Figure 40: Manual Operation

- This screen represents the Manual Operation Interface for the Filled Drum Sealing Conveyor 01 within the Automatic Drum Filling & Pusher Type Palletizing System. It allows the operator to manually control actuators, monitor sensors, and check the health status of the drive and connected devices.
- This panel provides manual jog controls for actuators associated with the sealing station.

a) Drive 11 – Filled Drum Sealing Conveyor 01

Shows drive status and allows manual jog of the conveyor.

- MPCB Healthy:** Indicates motor protection status.
- Set Speed:** Adjustable frequency (Hz).
- Actual Speed / Current:** Real-time feedback.
- Forward / Reverse:** Jog commands for conveyor movement.

b) PV25 – Exit Drum Stopper

Controls the stopper that holds or releases drums.

- Up :** Stopper lifted (drum allowed to move)
- Down:** Stopper engaged (drum held)

c) PV31 – Lid Stack Slide

Controls movement of the lid-stacking slide.

- **Forward:** Moves the lid stack towards the dispense position
- **Reverse:** Retracts the lid stack

d) PV32 – Seal Dispensing Slide 01

Slides the seal from stack to position.

- **Forward:** Dispenses a seal
- **Reverse:** Returns slide to home

e) PV28 – Seal Pick

Performs vertical movement for seal picking.

- **Forward:** Cylinder up
- **Reverse:** Cylinder down

f) PV29 – Seal Pick (Vertical Movement)

- **Up / Down**

g) PV30 – Seal Pick (Gripper)

Controls the gripper that holds / release seals.

- **Grip:** Clamps on seal
- **Ungrip:** Releases seal

h) PV26 – Crimping Tool

Applies final seal crimping onto filled drums.

- **Up:** Crimping tool raised
- **Down:** Crimping tool lowered for sealing

Sensors (h1, h2, h3, h4)

The panel lists the key process sensors, these help verify correct positioning during manual testing.

i) PV33 – Seal Dispensing Slide 02

Secondary slide for seal dispensing.

- **Forward: / Reverse**

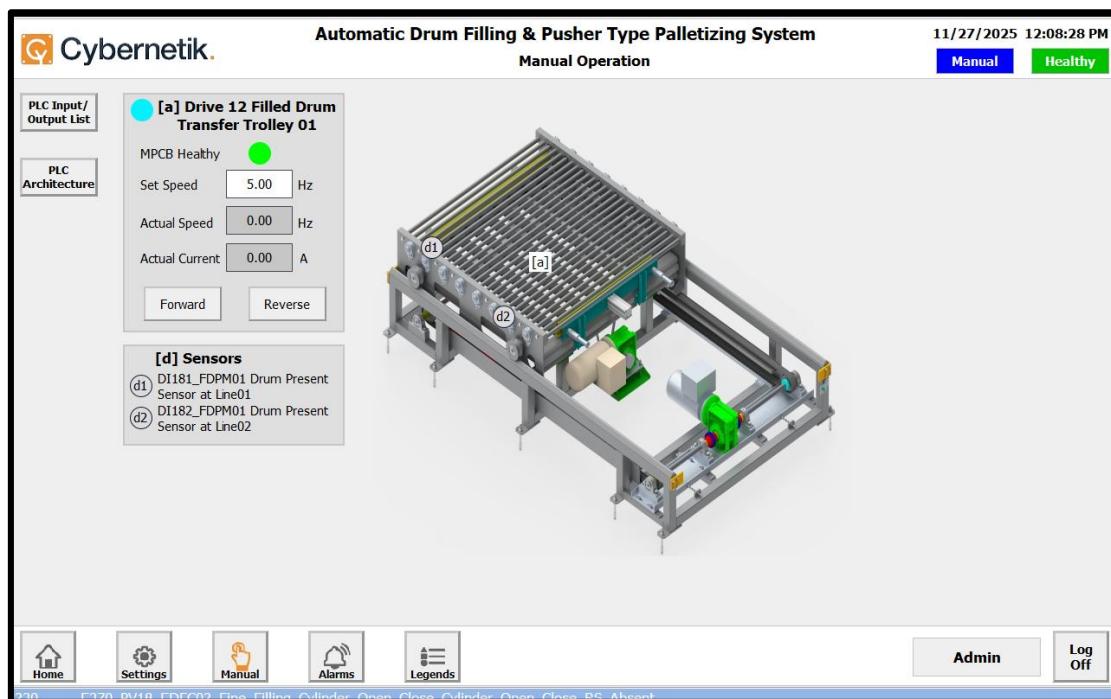


Figure 41: Manual Operation

- This screen is used for **manual operation** of the Filled Drum Transfer Trolley, which moves filled drums from Line 01 or Line 02 to the next conveyor stage. Operators can monitor the conveyor status, control the drive direction, and view sensor feedbacks.

a) Drive 12 Filled Drum Transfer Trolley 01:

This panel provides full manual control of the trolley conveyor.

Status:

MPCB Healthy – Indicates that the Motor Protection Circuit Breaker is ON and the motor is safe to operate.

Speed Settings

- Set Speed (Hz):** User-defined frequency for drive operation.
 - Default shown: **5.00 Hz**
- Actual Speed (Hz):** Real-time conveyor speed.
- Actual Current (A):** Motor current draw.

Drive Direction Controls

- Forward**
 - Moves the transfer trolley conveyor in the forward direction to send drums downstream.

- Reverse
 - Used only for clearing jams or maintenance.

d) Sensors:

This section shows real-time feedback from drum presence sensors.

12.1.15 BLW01 and BLW02

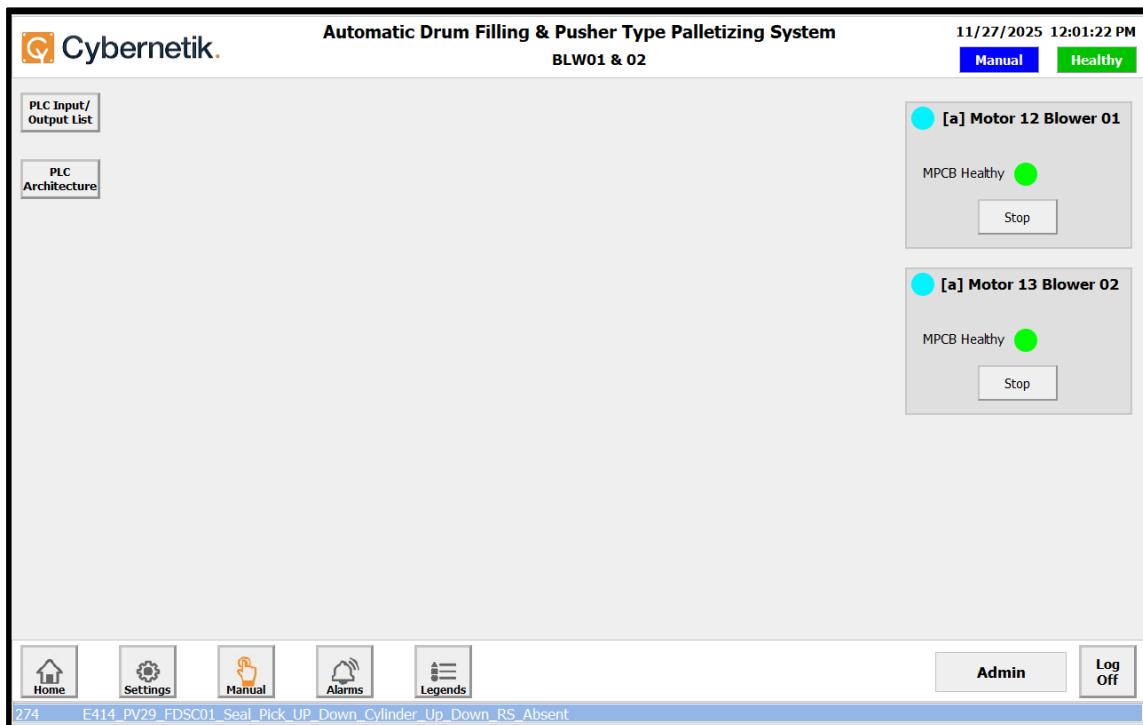


Figure 42: Manual Operation

- This screen provides operators with manual control and health monitoring for Blower Motor 12 Blower Motor 13, which is part of the Automatic Drum Filling & Pusher Type Palletizing System.
- The screen is designed for maintenance staff and operators who need to start / stop the blowers manually during inspection, cleaning, and troubleshooting.

Motor 12 – Blower 01:

This panel represents Blower 01 and provides its operational status.

Indicators

a) MPCB Healthy:

Shows that Motor Protection Circuit Breaker is ON, and the motor is ready for operation.

- Green = OK
- Red = Fault / Trip

b) Control:

- **Stop**

Stops the blower motor immediately.

Motor 13 – Blower 02:

This block functions identically to Blower 01. But controls the second blower.

Indicators:

a) MPCB Healthy:

Confirms that electrical protection for Blower 02 is healthy

b) Control:

- **Stop**

Terminates blower 02 operation.

13 I/O List

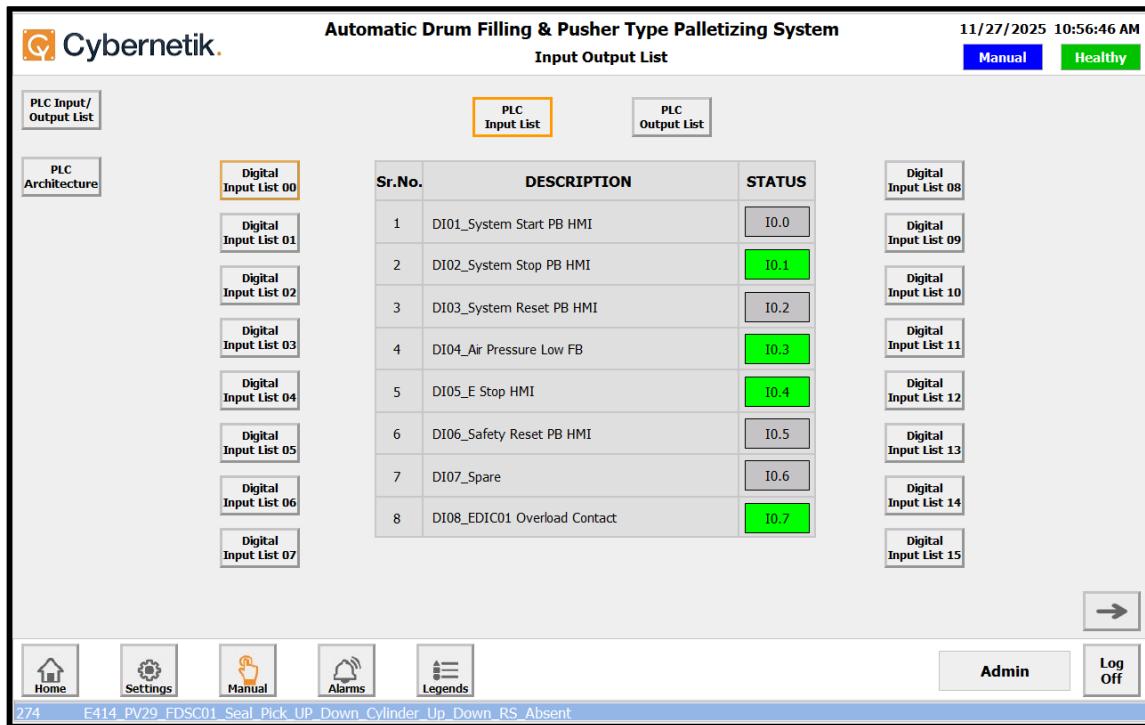


Figure 43: I/O List

- From the I/O screen, one can check the list of PLC input and output. Healthy I/O's are indicated by green color whereas error is highlighted in red color.
- The list of PLC Input and Output (I/O), includes digital I/O.
- To view the I/O list one has to click on the required PLC I/O card.
- The list shows, the input name and its description.

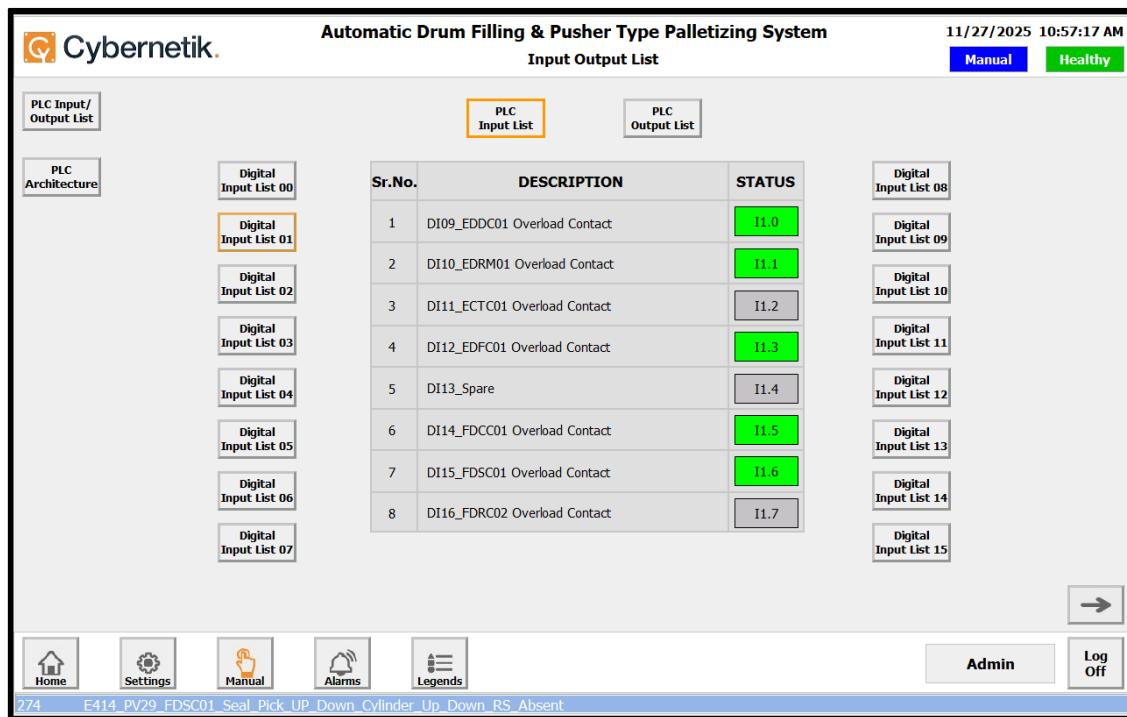


Figure 44: I/O List

- **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.
- **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.

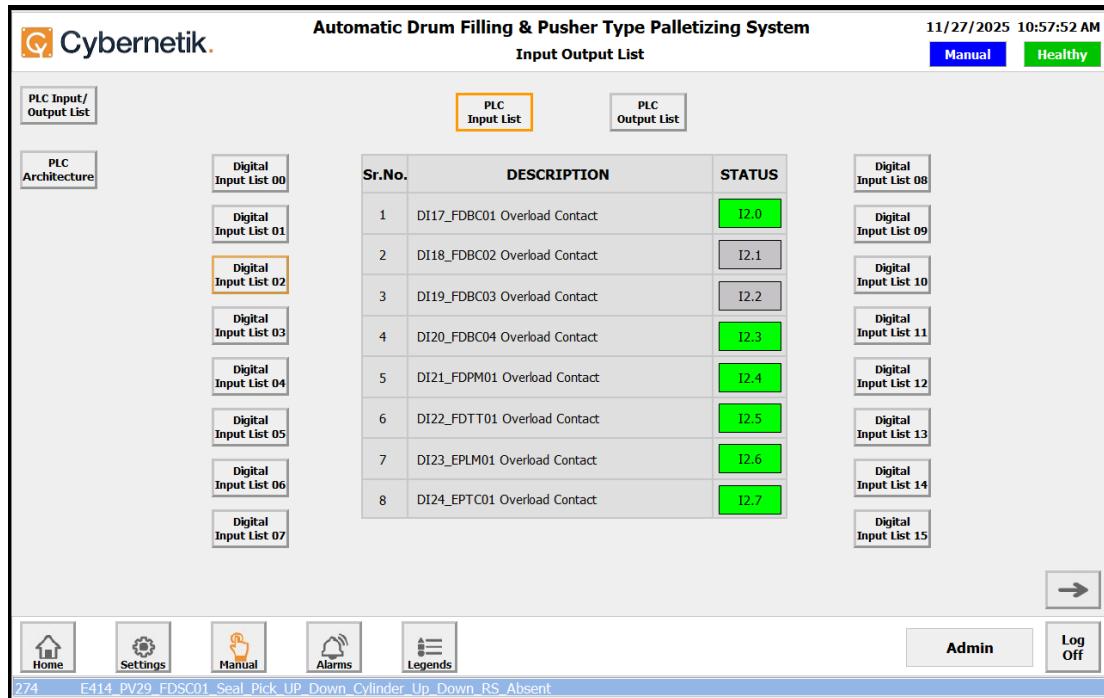


Figure 45: I/O List

- **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.
- **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.

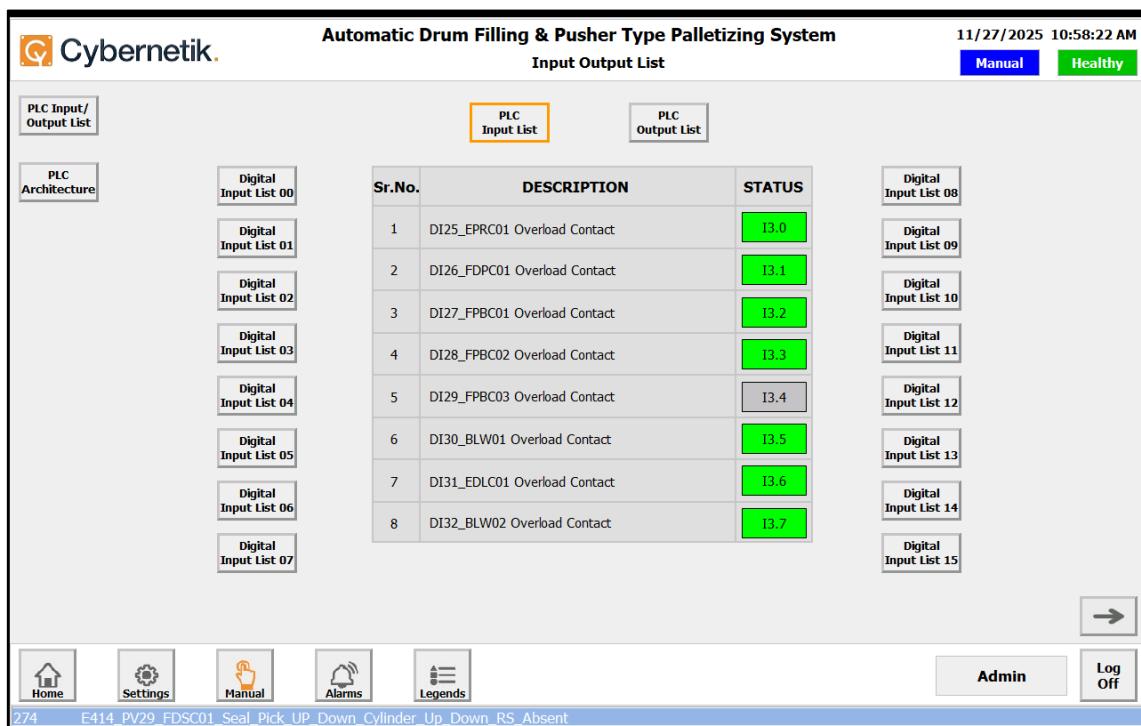


Figure 46: I/O List

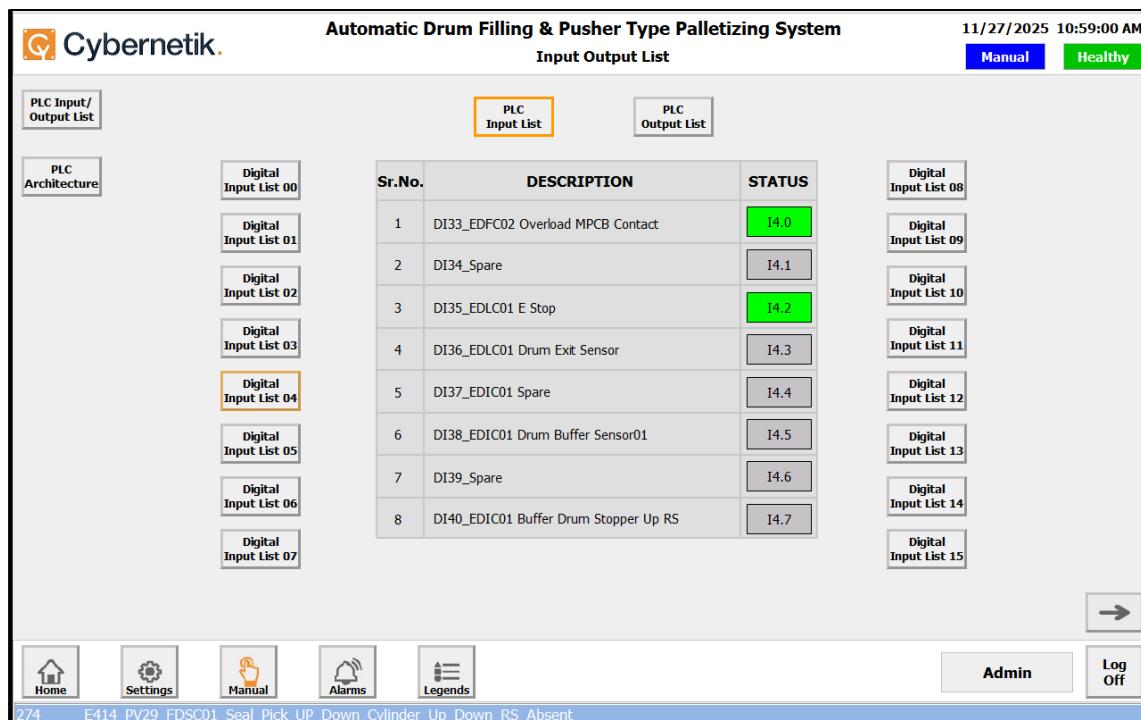


Figure 47: I/O List

14.1 Active Alarms

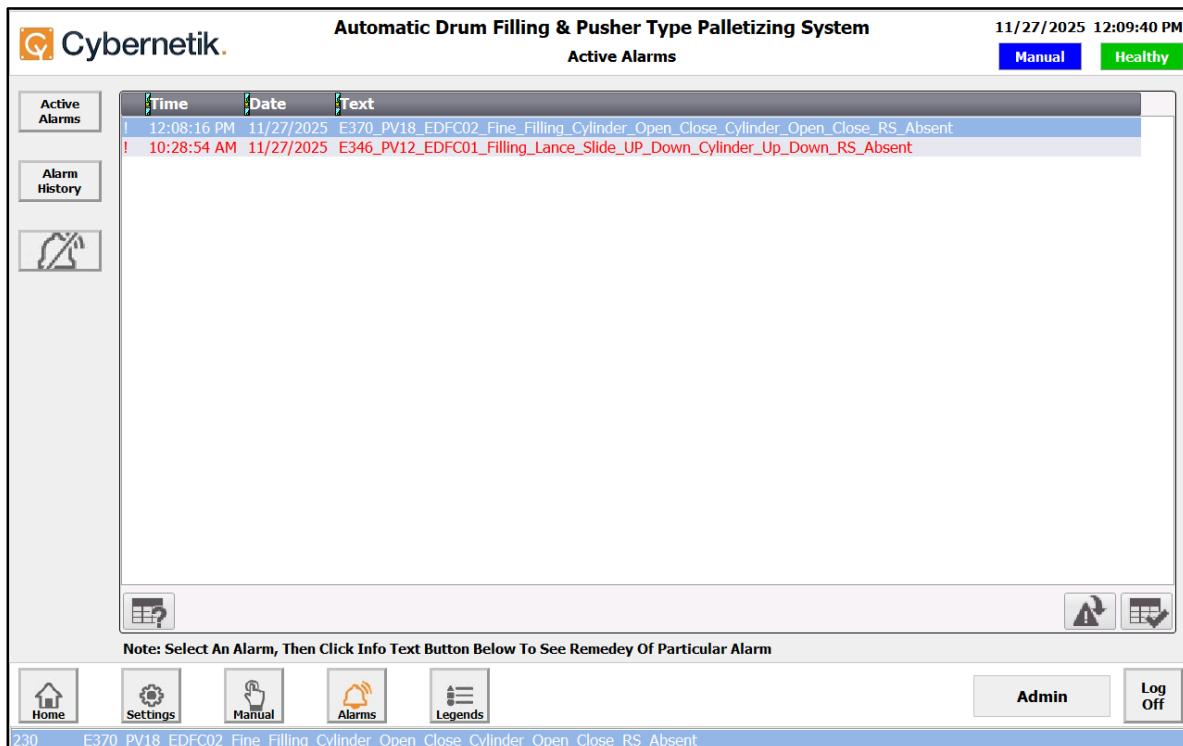


Figure 48: Alarms

- This screen lists all currently active alarms in the system.
- Each alarm includes:
 - **Time stamp**
 - **Error code (Exxx)**
 - **Device & fault description**
- Alarms remain listed until the fault is resolved and acknowledged.

14.2 Alarms History

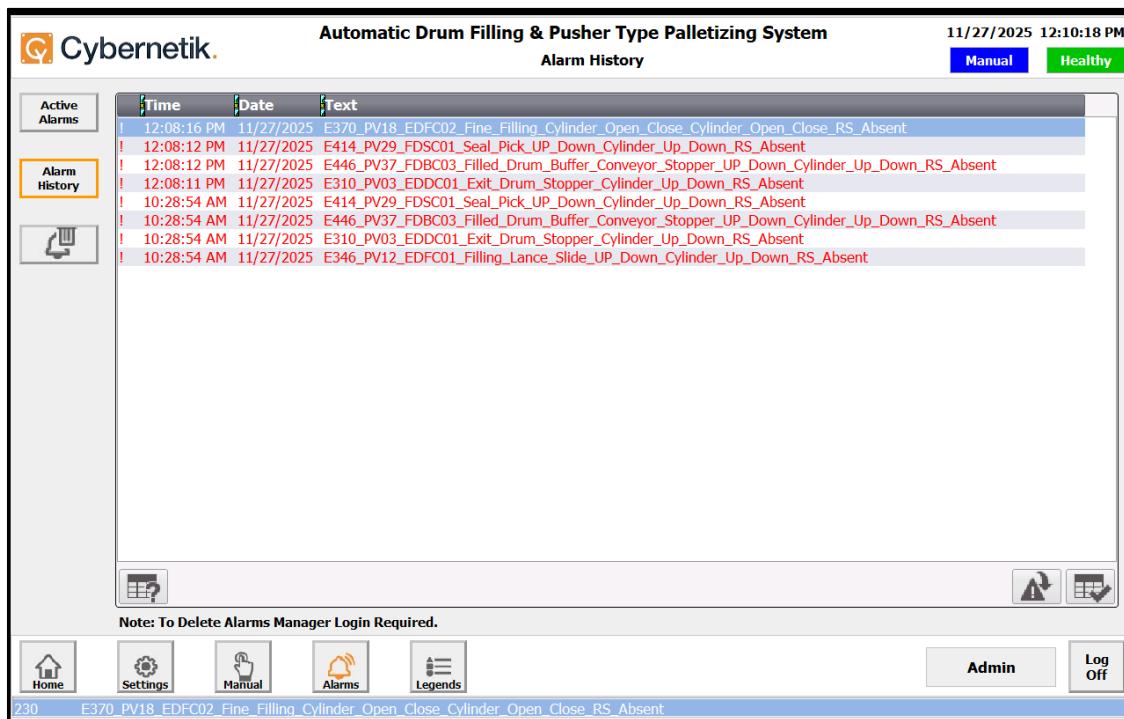


Figure 49: Alarms History

- The Alarm History screen is a logbook of all past alarms that occurred on the system.
- It records when, what, and where an alarm happened.
- Useful for maintenance analysis, troubleshooting, and downtime tracking.

Legends			
Abbreviations	Full Forms	Abbreviations	Full Forms
EDIC01	Empty Drum Infeed Roller Conveyor 01	FDPM01	Filled Drum Pusher Motor 01
EDDC01	Empty Drum Decapping Conveyor 01	FDTT01	Filled Drum Transfer Trolley 01
EDRM01	Empty Drum Rotary Motor 01	EPLM01	Empty Pallet Lifter Motor 01
ECTC01	Empty Cap Transfer Conveyor 01	EPTC01	Empty Pallet Transfer Conveyor 01
EDFC01	Empty Drum Filling Conveyor 01	EPRC01	Empty Pallet Roller Conveyor 01
FDCC01	Filled Drum Capping Conveyor 01	FDPC01	Filled Drum Palletizing Conveyor 01
FDSC01	Filled Drum Sealing Conveyor 01	FPBC01	Filled Pallet Buffer Conveyor 01
FDRC02	Filled Drum Rejection Conveyor 02	FPBC02	Filled Pallet Buffer Conveyor 02
FDBC01	Filled Drum Buffer Conveyor 01	FPBC03	Filled Pallet Buffer Conveyor 03
FDBC02	Filled Drum Buffer Conveyor 02	BLW01	Blower - 1
FDBC03	Filled Drum Buffer Conveyor 03	BLW02	Blower - 2
FDBC04	Filled Drum Buffer Conveyor 04	EDFC02	Empty Drum Filling Conveyor 02

Figure 50: Legends

16 Alarm List

Sr. No	Alarm Code	Alarm Description	Alarm Troubleshooting
1	E001	RIO01 Communication Fault	<ol style="list-style-type: none"> 1. Check network cable connection. 2. Check if any hardware issues. 3. Check if any network configuration errors. 4. Check if any protocol mismatches.
2	E002	Drive BIC01 Drive Communication Fault	<ol style="list-style-type: none"> 1. Check network cable connection. 2. Check if any hardware issues. 3. Check if any network configuration errors. 4. Check if any protocol mismatches.
3	E003	Drive SIC01 Drive Communication Fault	<ol style="list-style-type: none"> 1. Check network cable connection. 2. Check if any hardware issues. 3. Check if any network configuration errors. 4. Check if any protocol mismatches.
4	E004	Drive BDS01 Drive Communication Fault	<ol style="list-style-type: none"> 1. Check network cable connection. 2. Check if any hardware issues. 3. Check if any network configuration errors. 4. Check if any protocol mismatches.
5	E005	Drive IRC01 Communication Fault	<ol style="list-style-type: none"> 1. Check network cable connection. 2. Check if any hardware issues. 3. Check if any network configuration errors. 4. Check if any protocol mismatches.
6	E006	Drive SHRV01 Communication Fault	<ol style="list-style-type: none"> 1. Check network cable connection. 2. Check if any hardware issues. 3. Check if any network configuration errors. 4. Check if any protocol mismatches.
7	E007	Spare	<ol style="list-style-type: none"> 1. Check Network Cable connection. 2. Check If any hardware issues. 3. Check if any network configuration errors. 4. Check if any Protocol Mismatches.
8	E008	PCS_RV01 Communication Fault	<ol style="list-style-type: none"> 1. Check Network Cable connection. 2. Check If any hardware issues. 3. Check if any network configuration errors. 4. Check if any Protocol Mismatches.

Sr. No	Alarm code	Alarm description	Alarm troubleshooting
9	E009	Spare Communication Fault	<ol style="list-style-type: none"> 1. Check Network Cable connection. 2. Check If any hardware issues. 3. Check if any network configuration errors. 4. Check if any Protocol Mismatches.
10	E010	Spare Communication Fault	<ol style="list-style-type: none"> 1. Check Network Cable connection. 2. Check If any hardware issues. 3. Check if any network configuration errors. 4. Check if any Protocol Mismatches.
11	E101	Air Pressure Low	<ol style="list-style-type: none"> 1. Check inlet air supply to air pressure switch. 2. Check if there is any air leakage. 3. Check air pressure switch setting & if input (R1: I: 1.7) is On.
12	E102	E-Stop At HMI Pressed	<ol style="list-style-type: none"> 1. Check whether emergency pressed. 2. Check all the electrical connection at E-Stop. 3. Check input (R1: I: 1.4) is On or Off.
13	E103	E-Stop At Bag Feeding Pressed	<ol style="list-style-type: none"> 1. Check whether emergency pressed. 2. Check all the electrical connection at E-Stop. 3. Check Input (R1: I: 1.5) is On or Off.
14	E104	Line Monitoring FB Pressed	<ol style="list-style-type: none"> 1. Check Network Cable connection. 2. Check If any hardware issues. 3. Check if any network configuration errors. 4. Check if any Protocol Mismatches.
15	E105	PCS Air Pressure Low Alarm	<ol style="list-style-type: none"> 1. Check inlet air supply to air pressure switch. 2. Check if there is any air leakage. 3. Check air pressure switch setting & if input (R1: I: 2.2) is On.
16	E201	Drive BIC01 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1: I: 2.5) is Off. 5. Check if voltage fluctuations.
17	E202	Drive BIC02 Drive Not Ready	<ol style="list-style-type: none"> 1. Check if any loose or Faulty connections. 2. Check if any drive failure. 3. Check if any compatibility issues. 4. Check if any file system errors. 5. Check if any driver issues.

Sr. no	Alarm code	Alarm description	Alarm troubleshooting
18	E203	Drive BIC03 Drive Overload	1 . Reduce the load. 2. Adjust Voltage. 3. Replace Damaged Parts. 4. Check for Mechanical Failures
19	E204	Drive SIC01 MPCB Tripped	1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:2.6) is Off. 5. Check if voltage fluctuations.
20	E205	Drive SIC01 Drive Not Ready	1. Check if any Loose or Faulty connections. 2. Check if any drive failure. 3. Check if any compatibility issues. 4. Check if any file system errors. 5. Check if any driver issues.
21	E206	Drive SIC01 Drive Overload	1. Reduce the load. 2. Adjust Voltage. 3. Replace Damaged Parts. 4. Check for Mechanical Failures
22	E207	Drive BDS01 MPCB Tripped	1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:3.5) is Off. 5. Check if voltage fluctuations.
23	E208	Drive BDS01 Drive Not Ready	1. Check if any loose or Faulty connections. 2. Check if any drive failure. 3. Check if any compatibility issues. 4. Check if any file system errors. 5. Check if any driver issues.
24	E209	Drive BDS01 Drive Overload	1. Reduce the load. 2. Adjust Voltage. 3. Replace Damaged Parts. 4. Check for Mechanical Failures
25	E210	Drive IRC01 MPCB Tripped	1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Check if voltage fluctuations.
26	E211	Drive IRC01 Driver Not Ready	1. Check if any loose or Faulty connections. 2. Check if any drive failure. 3. Check if any compatibility issues. 4. Check if any file system errors. 5. Check if any driver issues.

Sr. no	Alarm code	Alarm description	Alarm troubleshooting
27	E212	Drive IRC01 Drive Overload	<ol style="list-style-type: none"> 1. Reduce the load. 2. Adjust Voltage. 3. Replace Damaged Parts. 4. Check for Mechanical Failures
28	E213	Drive SHRV01 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:3.0) is Off. 5. Check if voltage fluctuations.
29	E214	Drive SHRV02 Drive Not Ready	<ol style="list-style-type: none"> 1. Check if any loose or Faulty connections. 2. Check if any drive failure. 3. Check if any compatibility issues. 4. Check if any file system errors. 5. Check if any driver issues.
30	E215	Drive SHRV03 Drive Overload	<ol style="list-style-type: none"> 1. Reduce the load. 2. Adjust Voltage. 3. Replace Damaged Parts. 4. Check for Mechanical Failures
31	E216	BSC01 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:3.2) is Off. 5. Check if voltage fluctuations.
32	E217	BSC02 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:3.3) is Off. 5. Check if voltage fluctuations.
33	E218	BDRM01 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:3.4) is Off. 5. Check if voltage fluctuations.
34	E219	PTV01 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:3.6) is Off. 5. Check if voltage fluctuations.
35	E220	PTV02 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:3.7) is Off. 5. Check if voltage fluctuations.

Sr. no	Alarm code	Alarm description	Alarm troubleshooting
36	E221	BSAKB01 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:4.0) is Off. 5. Check if voltage fluctuations.
37	E222	BSDCB01 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:4.1) is Off. 5. Check if voltage fluctuations.
38	E223	HVM01 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:4.4) is Off. 5. Check if voltage fluctuations.
39	E224	Spare	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:4.5) is Off. 5. Check if voltage fluctuations.
40	E225	BCAKB01 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:4.2) is Off. 5. Check if voltage fluctuations.
41	E226	BCDCB01 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:4.3) is Off. 5. Check if voltage fluctuations.
42	E227	HVM02 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:5.0) is Off. 5. Check if voltage fluctuations.
43	E228	PCSVP01 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:4.6) is Off. 5. Check if voltage fluctuations.
44	E229	PCSVP02 MPCB Tripped	<ol style="list-style-type: none"> 1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Fault cause input (R1:I:4.7) is Off. 5. Check if voltage fluctuations.

Sr. no	Alarm code	Alarm description	Alarm troubleshooting
45	E230	Hopper 1 Low Level Sensor Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
46	E231	Hopper 1 High Level Sensor Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
47	E232	Hopper 2 Low Level Sensor Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
48	E233	Hopper 2 High Level Sensor Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
49	E234	PCS_RV01 MPCB Tripped	1. Check if motor overload. 2. Check if short circuit is there. 3. Check if earth Fault. 4. Check if voltage fluctuations.
50	E235	PCS_RV01_Drive Not Ready	1. Check if any loose or Faulty connections. 2. Check if any drive failure. 3. Check if any compatibility issues. 4. Check if any file system errors. 5. Check if any driver issues.
51	E236	PCS_RV01_Drive Overload	1. Check if any loose or Faulty connections. 2. Check if any drive failure. 3. Check if any compatibility issues. 4. Check if any file system errors. 5. Check if any driver issues.
52	E237	BDS01 Disconnector Switch Off Alarm	1. Check Physically Disconnector if Off or On. 2. Check Wiring Connection. 3. Check Disconnector is Damage.
53	E238	BCS01_02_Disconnector Switch Off Alarm	1. Check Physically Disconnector if Off or On. 2. Check Wiring Connection. 3. Check Disconnector is Damage.
54	E301	DI57 IRC01 Bag Present Sensor WatchDog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
55	E302	DI38 IRC01 Bag Cleaning Entry Present Sensor WatchDog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
56	E303	DI39 IRC01 Bag Cleaning Exit Present Sensor WatchDog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
57	E304	DI40 BIC01 Entry Present Sensor WatchDog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.

Sr. no	Alarm code	Alarm description	Alarm troubleshooting
58	E305	DI42 SIC01 Entry Present Sensor WatchDog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
59	E306	DI45 Cutter Cyl1 Fwd Sensor Absent WatchDog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
60	E307	DI49 Cutter Cyl2 Fwd Sensor Absent WatchDog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
61	E308	DI46 Cutter Cyl1 Rev Sensor Absent WatchDog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
62	E309	DI50 Cutter Cyl2 Rev Sensor Absent WatchDog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
63	E310	DI51 PCS01 Outlet Valve Open FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
64	E311	DI52 PCS01 Outlet Valve Close FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
65	E312	DI53 PCS01 Inlet Valve Open FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
66	E313	DI54 PCS01 Inlet Valve Close FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
67	E314	DI55 PCS01 Vacuum Valve Open FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
68	E315	DI56 PCS01 Vacuum Valve Close FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
69	E316	DI58 PCS02 Outlet Valve Open FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
70	E317	DI59 PCS02 Outlet Valve Close FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
71	E318	DI60 PCS02 Inlet Valve Open FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
72	E319	DI61 PCS02 Inlet Valve Close FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
73	E320	DI62 PCS02 Vacuum Valve Close FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
74	E321	DI63 PCS02 Vacuum Valve Close FB Absent Watchdog Timer Alarm	1. Physically Check the Sensor. 2. Check Wiring Connection.
75	E322	Bag Stuck at Bag Cleaning Station	Check the Alignment of Bag and check if any mechanical problem.
76	E323	PCS Mode Not Selected	Please Select PCS Mode from HMI.
77	E324	Bag Stuck at BIC01 Exit Sensor	Check the Alignment of Bag and check if any mechanical problem or the sensor alignment.

Sr. no	Alarm code	Alarm description	Alarm troubleshooting
78	E325	Bag Selection Not Selected	Select Bag Selection from HMI.
79	E326	Vacuum Pump Not Selected	Select Vacuum Pump Selection in Settings Screen from HMI.

17 Spare Parts List

17.1 Mechanical Spare List

Item Code	Description	Used Qty
020ABB000047	ABB MOTOR 0.75KW,B5,IP55:3GJA 082 470 - BSDIN	2
020ABB000048	ABB MOTOR 1.5KW,B5,IP55:3GJA 092 540- BSDIN	2
020ABB000046	ABB MOTOR 0.25KW,B5,IP55:3GJA 082 440- BSDIN	1
020ABB000049	ABB MOTOR 1.1KW,B3,IP55:3GJA 081 370- ASDIN	1
030BON000141	BONFIGLIOLI GEAR BOX W75-U80-P80-B5-B3	1
030BON000197	BONFIGLIOLI_GEARBOX_W86-U-46-P80-B5-B3	1
030BON000045	BONFIGLIOLI GEAR BOX W86U-100-P80B5B3	1
030BON001391	BONGIFLIOLI GEAR BOX W86-U46-P90-B5B3	1
030BON000128	BONFIGLIOLI GEAR BOX - W75-U7-P90-B5-B3	1
030BON000235	BONFIGLIOLI GEAR BOX- W86-U30-P90-B5B3	1
030BON001454	BONGIFLIOLI GEAR BOX - W75-U-100-P80-B5-B3	1
100FOR000192	FORBO BELT-E8/2 U0/V20 AR SE BLACK ADV-09B,LG-4760	1
100FOR000193	FORBO BELT-E8/2 U0/U2 LF GREEN ADV-09B,LG-6550MM	1
010FES001293	570080_DSBF-C-63-100-PPVA-N3EX4-R	1
010FES001292	ISO CYLINDER DSBF-C-50-50-PPVA-N3EX4-R,570079	2

Item Code	Description	Used Qty
040000FY30TF	Y BEARING UNIT- FY30TF	1
0400006006ZZ	D.G.B. BEARING 6006-2Z	1
040THK000003	LM BUSH LMF30L-UU- THK	2
040THK000007	LM BUSH LMF30-UU- THK	1
200PIO000116	PU WHEEL_PU-PP-WH-100x40x17-BB_PIONEER	2
040THK000008	LM BEARING - LMF 20 UU, MAKE-THK OR EQUIVALENT	2
040NTNUCF206	NTN FLANGED BEARING UCFH206D1	1
040HIW000071	LM BLOCK SIZE 30 - HGW30-CA-ZOC MAKE HIWIN	2
010FES001280	COMPACT CYLINDER ADN-50-25-A-P-A-EX4 FESTO 536309	1
010FES001283	GUIDED DRIVE DFM-20-50-B-P-A-GF-EX3 FESTO 532316	1
010FES001319	ISO CYLINDER DSBF-C-63-500-PPVA-N3EX4-R 1776054	1
120IGR000023	AIR NUT RUNNER:QA4ASRS046NF41S08W,20-46 NM,MAKE-IR	1
52000000262	MAGNET : OD 19 X ID 9 X 4 THK	2
012IPC000023	PNEUMATIC ACTUATED BALL VALVE 50NB,SS316,MAKE-IPC	1
052DSN000026	DIE CAST HINGE DHFM-60	4
040HIW000001	LM BLOCK SIZE_15HGW15CCZ0C HIWIN	2
010FES001294	ISO CYLINDER DSBF-C-63-25-PPVA-N3EX4-R,570080	1

Item Code	Description	Used Qty
010FES001290	ISO CYLINDER DSBF-C-50-25-PPVA-N3EX4-R,570079	1
052ELG000073	LATCHE - GN-115-SCT-32 ELESA GANTER	1
052MSM000056	MAGNET FLAT SHAPE FOR COUNTERSUNK:C-NHXCC15-3	2
040THK000124	LM BUSH LMF40L-UU- THK	2
010FES001298	ISO CYLINDER DSBG-160-40-PPVA-N3EX4,2036032	1
040HIW000425	HIWIN LM BLOCK SIZE35,HGW35HCZ0C+E2	2
040000UCP207	PILLOW BLOCK UCP207 D1	2
010FES001297	ISO CYLINDER DSBF-C-80-150-PPVA-N3EX4-R,570081	1
040INA003030	PLAIN BUSH EGB3030-E40 - MAKE-INA	3
040NTNUCF206	NTN FLANGED BEARING UCFH206D1	2
40000006306	DEEP GROOVE BALL BEARING- 6306-2RS1 MAKE-SKF	2
040000UCP206	PILLOW BLOCK- UCP 206 D1 NTN	2
040HIW000005	LM BLOCK SIZE 30 HGW30CCZOC MAKE HIWIN	2
010FES001282	COMPACT CYLINDER ADN-63-125-A-P-A-EX4 FESTO 536330	1
011FES032961	FESTO TRUNNION SHAFT LNZG-63/80, 32961	1

Item Code	Description	Used Qty
011FES174414	TRUNNION MOUNTING- ZNCF 63 -FESTO 174414	1
0400006005ZZ	D.G.B. BEARING 6005-2Z	2
040000UCF206	FLANGED BEARING UCF 206 D1 NTN	1
040THK000012	LM BUSH LMF40L-UU- THK	1
UAP009170102	DRIVEN ROLLER	1
UAP009170005	DRIVE ROLLER	1
UAP009540104	G.B.SPROCKET	2
UAP009110303	GUIDE ROD	2
UAP009110302	STOPPER BKT	1
UAP009212002	SPRING	1
UAP009212006	GUIDE ROD-1	1
UAP009213007	DRIVE WHEEL	1
UAP009213006	DRIVE SPROCKET	1
UAP009213002	LM RAIL REWORK-1	1
UAP009214008	REWORK LM RAIL-1	2
UAP009214009	REWORK LM RAIL-2	2
UAP009214022	CAP TIGHTNING TOOL	1

Item Code	Description	Used Qty
UAP009227046	HOSE CONNECTION	1
UAP009224004	LM RAIL 15-HGR15R (040HIW000412)	2
UAP009224023	SEAT-3	1
UAP009224021	SEAT-1	1
UAP009182007	UHMW PAD	1
UAP009182003	GUIDE ROD	1
UAP009310009	GFT PAD	4
UAP009410005	UHMW PAD	1
UAP009410002	REWORK LM RAIL HGR35RC	1
UAP009410201	3-4 INCH DUPLEX SPROCKET 19 T	2
UAP009410104	UHMW PAD	2
UAP009410102	GUIDE ROD	2
UAP009420004	SHAFT - 1	3
UAP009420011	SHAFT - 2	1
UAP009420101	TROLLEY WHEEL	1
UAP009510004	LEAD SCREW	1
UAP009510102	LEAD NUT	1

Item Code	Description	Used Qty
UAP009510103	GUIDE BUSH	1
UAP009510014	RAIL REWORK HGR 30	2
UAP009520105	IDLER SPROCKET	1
UAP009520103	DRIVE SPROCKET	1
UAP009520302	GUIDE ROD	1

17.2 Electrical Spare List

Sr. No	Item Code	Description	Make	Used Qty	R Spare	C Spare
Parent Code UAP009990100 : CONTROLLER ASSEMBLY						
1.	601SIE000117	PLC REDUNDANT 6ES75152RN030AB0 CPU1515R-2PN SIEMEN	Siemens	2	1	0
2.	601SIE000148	PLC 6ES72141AG400XB0 CPU1214C 14DI/10DO 2AI	Siemens	1	1	0
3.	601SIE000197	BUSADAPTER ET 200SP 6ES71936AR000AA0 2XRJ45 SIEMEN	Siemens	2	1	1
4.	601SIE000198	BASEUNIT TYPE AO BU15-P16+A0+2B 6ES71936BP000BA0	Siemens	19	4	2
5.	601SIE000199	BASEUNIT TYPE AO BU15-P16+A0+2D 6ES71936BP000DA0	Siemens	12	3	2
6.	601SIE000244	INTERFACE MODULE 6ES71556MU010CN0 IM155-6PN SIEMEN	Siemens	2	1	1
7.	601SIE000310	MODULE 6ES71326BH010BA0 ET 200SP 16 DO 24VDC ST	Siemens	9	2	1
8.	601SIE000341	ANALOG INPUT MODULE 6ES71346HD010BA1 4AI SIEMENS	Siemens	1	1	1
9.	601SIE000393	SCALANCE XB116 UNMANAGED E-SW 16X-6GK51160BA002AB2	Siemens	2	1	1
10.	601SIE000413	SCALENCE XF204 6GK52040BA002YF2 MANAGED SIEMENS	Siemens	1	1	1
11.	601SIE000419	SCALANCE XC208 MANAGEABLE 6GK52080BA002AC2 SIEMENS	Siemens	2	1	1
12.	602SIE000007	HMI 6AV21240MC010AX0 SIMATIC HMI TP1200 COMFORT	Siemens	1	1	0
Parent Code UAP009990200: PANEL ASSEMBLY : PANEL ASSEMBLY						

Sr. No	Item Code	Description	Make	Used Qty	R Spare	C Spare
13.	601PHX000021	SMPS ESSENTIAL - PS / 1AC / 24DC / 480W / EE 24V 20A 2910588	Phoenix	2	1	1
14.	601PHX000038	TRIO2-DIODE / 12-24DC / 2 X 10 / 1X20 - REDUNDANCY MODULE	Phoenix	2	1	0
15.	601PHX000040	TRIO2-DIODE/12-24DC / 2 X 20 / 1 X 40 - REDUNDANCY MODULE	Phoenix	2	1	0
16.	601PHX000041	SMPS PS-EE-2G / 1AC / 24DC / 240W / SC 24V 10A 1234304	Phoenix	2	1	1
17.	605SIE000013	BOP-2 6SL32550AA004CA1 - SIEMENS	Siemens	12	3	3
18.	605SIE000037	DRIVE SINAMICS G120C 6SL32101KE175UF1 3KW 480VAC	Siemens	1	1	1
19.	605SIE000040	G120C AC DRIVE 0.75KW 1 HP 6SL32101KE123UF2	Siemens	8	1	1
20.	605SIE000041	G120C AC DRIVE 1.5KW 2HP 6SL32101KE143UF2	Siemens	3	1	1
21.	607ARH000007	TRANSFORMER 1000VA PRI:415VAC-SEC: 230VAC CE	Arihant	1	1	1
22.	607SIE000135	MPCB 7-10A 3RV20111JA10 SIZE:S00 -SIEMENS	Siemens	2	1	0
23.	607SIE000136	MPCB 5.5-8A 3RV20111HA10 SIZE:S00 -SIEMENS	Siemens	1	1	0
24.	607SIE000338	MCB 2P 2A 5SL62027RC 7.5KA BREAK CAPACITY-SIEMENS	Siemens	7	1	0
25.	607SIE000340	MCB 2P 4A 5SL62047RC 7.5KA BREAK CAPACITY-SIEMENS	Siemens	3	1	0
26.	607SIE000341	MCB 2P 6A 5SL62067RC 7.5KA BREAK CAPACITY-SIEMENS	Siemens	1	1	0
27.	607SIE000342	MCB 2P 8A 5SL62087RC 7.5KA BREAK CAPACITY-SIEMENS	Siemens	1	1	0
28.	607SIE000343	MCB 2P 10A 5SL62107RC 7.5KA BREAK CAPACITY-SIEMENS	Siemens	3	1	1
29.	607SIE000409	CONTACTOR 7A 230VAC 1NO 3RT20151AP01 -SIEMENS	Siemens	16	2	1

Sr. No	Item Code	Description	Make	Used Qty	R Spare	C Spare
30.	607SIE000412	CONTACTOR 9A 230VAC 3RT20161AP01 1NO -SIEMENS	Siemens	2	1	0
31.	607SIE000420	CONTACTOR 40A 230VAC 3RT20281AL200JA0 1NO+1NC-SIEMENS	Siemens	2	1	1
32.	607SIE000459	MPCB 1.4-2A 3RV20111BA10 SIZE:S00 -SIEMENS	Siemens	7	1	0
33.	607SIE000460	MPCB 1.8-2.5A 3RV20111CA10 SIZE:S00 -SIEMENS	Siemens	8	1	0
34.	607SIE000462	MPCB 3.5-5A 3RV20111FA10 SIZE:S00 -SIEMENS	Siemens	3	1	0
35.	607SIE000704	MPCB 35-45A 3RV20314VA10 SIZE:S2 -SIEMENS	Siemens	1	1	1
36.	607SIE011846	OVERLOAD RELAY 1-4A 3RB3016-1PB0 SIZE S00-SIEMENS	Siemens	12	3	2
37.	607SIE011847	OVERLOAD RELAY 3-12A 3RB3016-1SB0 SIZE S00-SIEMEN	Siemens	2	1	1
38.	607TUQ000001	AUTOMATIC CHANGEOVER SWITCH 110V MAKE-TUQI	TUQI	1	1	0
39.	608PIZ000007	SAFETY RELAY 777301 PNOZ X2.8P 24 VACDC 3N/O 1N/C	Pilz	2	1	1
40.	608PNF000103	BARRIER KCD2-SR-EX2 2DI 24 VDC MAKE: P&F	P&F	116	20	10
41.	608PNF000284	BARRIER KCD2-STC-EX1 24VDC AI MAKE:P&F	P&F	1	1	1
42.	610FUS000001	FUSE 500MA GLASS FUSE	Fuse	144	20	10
43.	610FUS000002	FUSE 1 A GLASS FUSE	Fuse	32	15	10
44.	610PHX000001	SSR PLC-OSC-24DC/24DC/2 ART NO:2966634- PHOENIX	Phoenix	3	1	1
45.	610PHX000130	RELAY SLIM PLC-RSC / 24DC / 21 / UWL / IN 1NO + 1NC 1533207	Phoenix	200	40	20
46.	610PHX000174	SURGE PROTECTION VAL-US- 277/40/3+1FM TYPE1 2910374	Phoenix	1	1	1

Sr. No	Item Code	Description	Make	Used Qty	R Spare	C Spare
47.	610SOC000003	SOCKET CDINS 6A 3-PIN DIN RAIL MOUNT CONNECTWELL	Connect well	1	1	1
48.	610SUD000001	FLP SINGLE TUBE LIGHT 20W 110V AC MAKE:SUDHIR	Sudhir	2	1	1
49.	610XEX000009	LED TUBE LIGHT 10 WATTS XN-1008 90-280VAC XEXAGON	Xexagon	4	1	1
Parent Code UAP009990300 : SENSOR ASSEMBLY						
50.	011FES161760	PRESSURE SWITCH PEV-1/4-SC-OD FESTO 161760	Festo	1	1	1
51.	608ENH000170	PRESSURETRANSMITTER CERABAR PMP21 PMP21-1D46/0 E&H	E&H	1	1	0
52.	608FES579071	REED SWITCH SDBT-MS-20NL-ZN-E-5-LE-EX6 579071 FEST	Festo	163	30	15
53.	608LUZ000045	PHOTODIODE ATEX HRTL46B / 66 200-S12 S- EX LEUZE	Leuze	6	2	1
54.	608LUZ000048	RETRO-REFLECTIVE PHOTO SENSOR 50080723 PRK 92/3 L	Leuze	29	6	3
55.	608LUZ000050	REFLECTORT KS 50X50 MAKE:- LEUZE	Leuze	29	6	3
56.	608PNF000218	PROXI SENSOR NAMUR NCB8-18GM40-N0-V1 P&F	P&F	24	5	3
57.	608PNF000352	USB INTRINSIC SAFETY BARRIER SK-PC-Z1D1-UU1-10-HS	P&F	1	1	1
58.	608PNF000353	USB CONNE.CABLE WITH FERRULE ENDS S-UN2 / USB-18-N0	P&F	1	1	1
59.	608SAP000048	VIBRATORY FORK LEVEL SWITCH VITAL PROBE-68MM	-----	2	1	0
60.	608TEK000005	LIMIT SWITCH NG1HS510L-24VDC ROLLER LEVER-TEKNIC	Teknic	4	1	0

Sr. No	Item Code	Description	Make	Used Qty	R Spare	C Spare
61.	610BAN000006	TOWER LAMP MODEL NO.K50LIGRYP 24VDC PNP BANNER	Banner	1	1	1
62.	614PRG000001	FLAMEPROOF HOOTER 24VDC 80DB MAKE: PRAGATI ELECTRO	Pragati Electro	2	1	1
Parent Code UAP009990400 : CABLE & CABLE TRAY ASSEMBLY						
63.	601SIE000134	PROFINET CABLE TYPE A 6XV18402AH10 -SIEMENS	Siemens	200	20	10
64.	601SIE000135	PROFINET CONNECTOR-50QTY 6GK19011BB102AE0-SIEMENS	Siemens	40	10	5
65.	607SUD000001	FLP ROTARY DISCONNECTOR SWITCH MAKE: SUDHIR	Sudhir	1	1	1
66.	609SUD000003	FLP/WP PUSH BUTTON STATION PBS/2C/2021 MAKE:SUDHIR	Sudhir	15	5	2
67.	613SIE000045	PUSH BUTTON METAL RED 3SU10500AB200AA0 SIEMENS	Siemens	1	1	1
68.	613SIE000050	METAL ILLUMINATED PB GREEN 3SU10510AB400AA0 SIEMEN	Siemens	1	1	1
69.	613SIE000051	ILLUMINATION MODULE GREEN 24VDC 3SU14011BB401AA0	Siemens	1	1	1
70.	613SIE000065	METAL EMERGENCY STOP 3SU10501HB200AA0 SIEMENS	Siemens	26	6	2
71.	613SIE000075	PUSH BUTTON METAL YELLOW 3SU10500AB300AA0 SIEMENS	Siemens	1	1	1
72.	613SIE000077	PUSH BUTTON METAL BLUE 3SU10500AB500AA0 SIEMENS	Siemens	1	1	1
73.	613TEK000018	LEGENDS EMERGENCY STOP ROUND TYPE YELLOW 2LP41	Teknic	26	6	3

18 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	All nuts and bolts should be tight.		✓		
3	Pneumatic cylinders.			✓	
4	Lifting belt Inspection				✓
5	Cleaning of FRL unit			✓	
6	Inflatable bellow		✓		
7	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.		✓		

19 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.